



Aluminum Electrolytic Capacitor

KUAN KUN ELECTRONIC CORPORATION



2017 - 2018

<http://www.su-scon.com.tw>

Halogen
Free  Environmental-Benefit Products
RoHS COMPLIANT



Su'scon

本公司創於西元1978年，參拾多年來，一直秉持著追求一流品質，不斷創新的精神，追求永續經營，不斷的成長以達成客戶的期望。

品質政策

品質、誠信、實效、進步

環境方針

遵守環保法規，減少六廢排放
預防環境污染，節約資源能源
生產環保產品，致力環境改善

Our Company was founded in 1978, for more than 30 years, we have been in pursuit for best quality with spirit of continuous innovation; in pursuit of continuous management with continuous growth to meet our customers expectations.

POLICY OF QUALITY

Quality, Reliability, Efficiency, Progression

ENVIRONMENT PROTECTION POLICIES

Abide environment protection policies,
reduce or decrease six emission of wastes.
Prevent environment pollution,
save resources and energies.
Produce environmental friendly products,
aim for better.



Table of Contents

| Page | Production Guide | 產品指南 |
|---------|---|----------------------|
| 2~4 | Series Index | 系列索引 |
| 5 | Explanation of parts numbers | 料號說明 |
| | Conductive Polymer Aluminum Electrolytic Capacitors | 導電性高分子鋁電解電容產品 |
| 6~12 | Precautions in using | 使用注意事項 |
| 12 | Environmental consideration | 環境對策 |
| 13 | Conductive Polymer Hybrid Series Chart of capacitor | 導電性高分子混合型系列關係圖 |
| 14 | Product Process Flow Chart | 導電性高分子混合型生產流程圖 |
| | Product specification of capacitor | 導電性高分子混合型產品規格 |
| 15~18 | Radial Type | 引線型 |
| 19~22 | Surface Mount Type | 表面黏貼型 |
| 23 | Series Chart of solid electrolytic capacitor | 導電性高分子固態電容系列關係圖 |
| 24 | Product Process Flow Chart | 導電性高分子固態電容生產流程圖 |
| | Product specification of solid electrolytic capacitor | 導電性高分子固態電容產品規格 |
| 25~39 | Radial Type | 引線型 |
| 40~52 | Surface Mount Type | 表面黏貼型 |
| 53~54 | Conductive Polymer Aluminum Electrolytic Capacitors Package Specification | 導電性高分子鋁電解電容包裝規範 |
| | Aluminum Electrolytic Capacitors | 液態鋁電解電容產品 |
| 55~56 | Series Chart of solid electrolytic capacitor | 液態鋁電解電容系列關係圖 |
| 57~63 | Precautions in using | 液態鋁電解電容使用需知 |
| 60 | Environmental consideration | 液態鋁電解電容環境對策 |
| 64 | Analysis of failure mode | 液態鋁電解電容失效模式 |
| 65 | Product Process Flow Chart | 液態鋁電解電容生產流程圖 |
| | Product specification of electrolytic capacitor | 液態鋁電解電容產品規格 |
| 66~79 | Surface Mount Type | 表面黏貼型 |
| 80~163 | Radial Type | 引線型 |
| 164~178 | Anhydrous Type | 低含水量型 |
| 179~195 | Snap-In Type | 基板自立型 |
| 196~199 | LUG Terminal Type | LUG接腳型 |
| 200~211 | Screw Terminal Type | 螺絲型 |

Conductive Polymer Type

Polymer Hybrid Capacitors

Polymer Solid Capacitors

Surface Mount Type

Standard & Miniature

High Reliability

Radial Lead Type

Low Impedance

Non-Polarized & special

Anhydrous

Large Can Type



Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

| Series | | Applications | Rated Voltage(V) | Capacitance Range(uF) | Temperature Range(°C) | Load Life (hrs) | Page |
|-------------|-----|---------------------------|------------------|-----------------------|-----------------------|-----------------|------|
| Radial Type | SPA | Low ESR | 16~125 | 10~560 | -55 to +105 | 5,000~10,000 | 15 |
| | SPB | High temperature, Low ESR | 16~50 | 15~560 | -55 to +125 | 2,000~4,000 | 17 |
| SMD Type | SVA | Low ESR | 16~125 | 10~560 | -55 to +105 | 5,000~10,000 | 19 |
| | SVB | High temperature, Low ESR | 16~125 | 10~560 | -55 to +125 | 2,000~4,000 | 21 |



Conductive Polymer Aluminum Solid Capacitors

| Series | | Applications | Rated Voltage(V) | Capacitance Range(uF) | Temperature Range(°C) | Load Life (hrs) | Page |
|-------------|----|--|------------------|-----------------------|-----------------------|-----------------|------|
| Radial Type | EA | Standard | 2.5~25 | 6.8~2,700 | -55 to +105 | 2,000 | 25 |
| | EC | Ultra impedance, high ripple current | 2.5~16 | 82~2,700 | -55 to +105 | 2,000 | 28 |
| | EL | Long life | 2.5~50 | 10~2,200 | -55 to +105 | 5,000 | 31 |
| | EH | High voltage standard, high ripple current | 35~100 | 12~470 | -55 to +105 | 2,000 | 34 |
| | ET | High temperature, Low ESR | 4~50 | 10~2,500 | -55 to +125 | 1,000 | 36 |
| | EP | High temperature, Long Life | 6.3~35 | 56~1800 | -55 to +125 | 2,000 | 38 |
| SMD Type | VA | Standard | 2.5~25 | 22~2,700 | -55 to +105 | 2,000 | 40 |
| | VC | Low impedance, high ripple current | 2.5~16 | 68~2,700 | -55 to +105 | 2,000 | 43 |
| | VL | Long life, Low ESR, high ripple current | 4~50 | 10~2,200 | -55 to +105 | 5,000 | 46 |
| | VH | Low ESR, high voltage, High ripple current | 35~100 | 12~220 | -55 to +105 | 2,000 | 48 |
| | VT | High temperature, Low ESR | 4~50 | 10~2,200 | -55 to +125 | 1,000 | 50 |

Aluminum Electrolytic Capacitor Surface Mount Type



| Series | | Applications | Rated Voltage(V) | Capacitance Range(uF) | Temperature Range(°C) | Load Life (hrs) | Page |
|---------------|----|-------------------|------------------|-----------------------|----------------------------|-----------------|------|
| Surface Mount | CS | Standard, 85°C | 4~100 | 0.1~1,500 | -55 to +85 | 2,000 | 66 |
| | CH | Standard, 105°C | 4~50 | 0.1~1,500 | -55 to +105 | 1,000 | 68 |
| | CK | Long life 105°C | 6.8~50 | 0.1~1,000 | -55 to +105 | 2,000 | 70 |
| | CN | Bi-Polarized | 6.3~50 | 0.1~100 | -55 to +85 | 1,000 | 72 |
| | CD | Low impedance | 6.3~100 | 1~1,500 | -55 to +105 | 2,000~3,000 | 74 |
| | CG | Long life 125°C | 10~63 80~160 | 2.2~470 | -55 to +125 -40 to +125 | 2,000~3,000 | 76 |
| | CL | High voltage 400V | 400 | 2.2~6.8 | -40 to +105 | 2,000 | 78 |

Aluminum Electrolytic Capacitor Radial Type



| Series | | Applications | Rated Voltage(V) | Capacitance Range(uF) | Temperature Range(°C) | Load Life (hrs) | Page |
|-----------|-----|-----------------------------------|--------------------|-----------------------|----------------------------|-----------------|------|
| Miniature | H5 | 5mm height, 105°C | 4~50 | 0.1~220 | -40 to +105 | 1,000 | 80 |
| | M5 | 5mm height, Low impedance | 6.3~35 | 1~100 | -40 to +105 | 1,000 | 82 |
| | SM | 7mm height, 105°C | 6.3~50 | 0.1~330 | -40 to +105 | 1,000 | 84 |
| | MD | 7mm height, Low impedance | 6.3~35 | 6.8~220 | -40 to +105 | 1,000 | 86 |
| | ST | 7mm height, Long life | 6.3~50 | 0.1~220 | -40 to +105 | 5,000 | 88 |
| standard | SL | Standard, 85°C | 6.3~250 350~500 | 0.1~33,000 | -40 to +85 -25 to +85 | 2,000 | 90 |
| | LF | Long life, 85°C | 400 450~500 | 10~150 | -40 to +85 -25 to +85 | 8,000 | 93 |
| | SK | Standard, 105°C | 6.3~250 350~500 | 0.1~22,000 | -40 to +105 -25 to +105 | 2,000 | 95 |
| | SKA | High voltage, High ripple current | 400 450~500 | 10~150 | -40 to +105 -25 to +105 | 2,000 | 98 |
| | SKR | High ripple current | 160~400 450 | 22~470 | -40 to +105 -25 to +105 | 2,000 | 100 |

| Series | Applications | Rated Voltage(V) | Capacitance Range(uF) | Temperature Range(°C) | Load Life (hrs) | Page | |
|------------------|--------------|--|-----------------------|-----------------------|----------------------------|---------------|-----|
| High Reliability | UK | High ripple current, 3000hrs | 6.3~250 350~450 | 0.1~22,000 | -40 to +105 -25 to +105 | 3,000 | 102 |
| | SE | Long life, 5000hrs | 6.3~250 350~450 | 0.47~22,000 | -40 to +105 -25 to +105 | 3,000~5,000 | 104 |
| | SEA | High voltage, High ripple current | 400 450~500 | 10~150 | -40 to +105 -25 to +105 | 5,000 | 107 |
| | SER | Long life, High ripple current, 5000hrs | 160~400 450 | 22~470 | -40 to +105 -25 to +105 | 5,000 | 109 |
| | HE | Long life, 10000hrs | 160~400 450 | 6.8~220 | -40 to +105 -25 to +105 | 10,000 | 111 |
| | HU | Miniaturized and Long life | 10~100 | 0.47~330 | -25 to +105 | 10,000 | 114 |
| | HH | Long life, 12000hrs | 160~400 450 | 6.8~680 | -40 to +105 -25 to +105 | 10,000~12,000 | 116 |
| | SH | High reliability, 125°C | 10~450 | 0.47~1,000 | -40 to +125 | 2,000 | 118 |
| | UH | High reliability, 130°C | 10~450 | 1.8~4,700 | -40 to +130 | 2,000~3,000 | 120 |
| | HW | Long life, 20000hrs (ask engineering bulletin detail) | 400~450 | 6.8~120 | -25 to +105 | 15,000~20,000 | - |
| For ballast | HA | For ballast, 3000hrs | 160~400 450 | 1~220 | -40 to +105 -25 to +105 | 3,000 | 122 |
| | HB | For ballast, 5000hrs | 160~400 450 | 1~220 | -40 to +105 -25 to +105 | 5,000 | 124 |
| | HD | For ballast, 10000hrs | 160~450 | 1~220 | -25 to +105 | 10,000 | 126 |
| Low Impedance | SD | Low impedance | 6.3~400 450 | 0.47~15,000 | -40 to +105 -25 to +105 | 2,000 | 128 |
| | SDA | High voltage, High ripple current | 400 450~500 | 10~150 | -40 to +105 -25 to +105 | 2,000 | 130 |
| | MC | Low impedance, high ripple current | 6.3~400 450 | 1~15,000 | -40 to +105 -25 to +105 | 2,000~3,000 | 132 |
| | MF | Low impedance, high ripple current, than MC series | 6.3~400 450 | 1~15,000 | -40 to +105 -25 to +105 | 2,000~5,000 | 135 |
| | HF | Lower impedance | 6.3~100 | 5.6~18,000 | -40 to +105 | 4,000~8,000 | 138 |
| | SG | Lower impedance, high ripple current | 6.3~50 | 22~6,800 | -40 to +105 | 2,000~5,000 | 141 |
| | SX | Lower impedance, high ripple current | 10~50 | 100~2,700 | -40 to +105 | 4,000~5,000 | 143 |
| | MG | Lower impedance, high ripple current, than SG series | 6.3~35 | 47~8,200 | -40 to +105 | 5,000~6,000 | 145 |
| | HG | Low impedance, high ripple current, long life 10000hrs | 6.3~100 | 6.8~18,000 | -40 to +105 | 4,000~10,000 | 147 |
| | HX | Higher ripple current, long life 10000hrs | 6.3~100 | 5.6~18,000 | -40 to +105 | 6,000~10,000 | 152 |
| Non-Polarized | SN | Standard, 85°C | 6.3~100 | 0.1~6,800 | -40 to +85 | 2,000 | 155 |
| | HN | Standard, 105°C | 6.3~160 | 0.1~1,000 | -40 to +105 | 2,000 | 157 |
| | HR | Horizontal deflection current correction use | 25, 35, 50, 100 | 2.2~10 | -40 to +105 | 1,000 | 159 |
| Special | SA | Low Leakage current, 85°C | 6.3~100 | 0.1~4,700 | -40 to +85 | 2,000 | 160 |
| | SB | Low Leakage current, 105°C | 6.3~100 | 0.1~4,700 | -40 to +105 | 1,000 | 160 |
| | AK | For permissible abnormal voltage | 200, 400 | 22~470 | -25 to +105 | 2,000 | 162 |

Aluminum Electrolytic Capacitor Anhydrous Type



| Series | Applications | Rated Voltage(V) | Capacitance Range(uF) | Temperature Range(°C) | Load Life (hrs) | Page | |
|-----------|--------------|--|-----------------------|-----------------------|----------------------------|--------------|-----|
| Anhydrous | SDN | Low impedance standard | 6.3~100 160~400 | 0.47~15,000 | -55 to +105 -40 to +105 | 2,000 | 164 |
| | HFN | Lower impedance | 6.3~50 63~100 | 5.6~18,000 | -55 to +105 -40 to +105 | 4,000~8,000 | 167 |
| | SGN | Lower impedance, high ripple current | 6.3~50 | 22~6,800 | -55 to +105 | 2,000~5,000 | 170 |
| | HGN | Low impedance, high ripple current, long life 10000hrs | 6.3~50 63~100 | 6.8~18,000 | -55 to +105 -40 to +105 | 4,000~10,000 | 172 |
| | SEN | High voltage, long life, 5000hrs | 160~400 | 2.2~120 | -25 to +105 | 3,000~5,000 | 177 |

Remark: Water content of Anhydrous Type
 Low voltage: <1%
 High voltage: <5%
 Water content of electrolyte

Aluminum Electrolytic Capacitor Snap-in Type



| Series | Applications | Rated Voltage(V) | Capacitance Range(uF) | Temperature Range(°C) | Load Life (hrs) | Page | |
|--------------|--------------|--------------------------------------|-----------------------|-----------------------|----------------------------|-------|-----|
| Snap-in Type | LX | Standard, 85°C | 10~100 160~500 | 47~68,000 | -40 to +85 -25 to +85 | 2,000 | 179 |
| | LZ | Standard, 105°C | 10~250 350~500 | 68~68,000 | -40 to +105 -25 to +105 | 2,000 | 182 |
| | HZ | Long life 3000hrs | 16~250 350~450 | 47~47,000 | -40 to +105 -25 to +105 | 3,000 | 186 |
| | MZ | Long life 5000hrs | 10~100 160~450 | 82~47,000 | -40 to +105 -25 to +105 | 5,000 | 189 |
| | AZ | For over voltage vent operation test | 200, 400, 420 | 33~1,200 | -25 to +105 | 2,000 | 194 |

Aluminum Electrolytic Capacitor LUG Terminal Type



| Series | Applications | Rated Voltage(V) | Capacitance Range(uF) | Temperature Range(°C) | Load Life (hrs) | Page | |
|--------------|--------------|------------------|-----------------------|-----------------------|----------------------------|-------|-----|
| LUG Terminal | LM | Standard, 85°C | 16~250 315~450 | 68~150,000 | -40 to +85 -25 to +85 | 2,000 | 196 |
| | LG | Standard, 105°C | 16~250 315~450 | 22~10,000 | -40 to +105 -25 to +105 | 2,000 | 198 |

Aluminum Electrolytic Capacitor Screw Terminal Type



| Series | Applications | Rated Voltage(V) | Capacitance Range(uF) | Temperature Range(°C) | Load Life (hrs) | Page | |
|----------------|--------------|--------------------------|-----------------------|-----------------------|----------------------------|-------------|-----|
| Screw Terminal | LP | Standard, 85°C | 16~250 350~500 | 470~500,000 | -40 to +85 -25 to +85 | 3,000 | 200 |
| | LS | 85°C High ripple current | 350~500 | 1,000~150,000 | -25 to +85 | 5,000 | 203 |
| | LV | 85°C High voltage | 500~650 | 470~500,000 | -25 to +85 | 5,000 | 205 |
| | LW | 85°C Long life 10,000hrs | 350~450 | 1,000~15,000 | -25 to +85 | 10,000 | 207 |
| | HP | Long life, 105°C | 10~100 160~450 | 220~1,000,000 | -40 to +105 -25 to +105 | 2,000~5,000 | 209 |

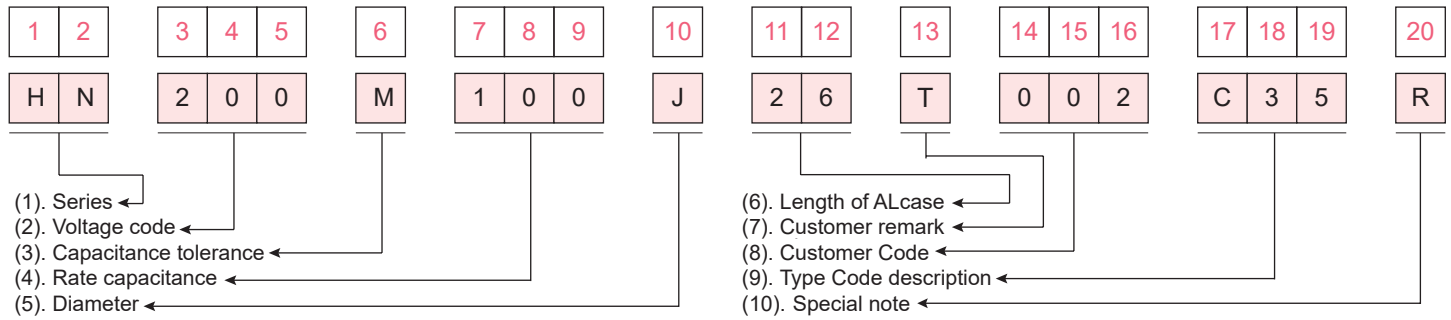
The following series are discontinued. Please use the replacements in the table.

| Series | Discontinued Series | Applications | Replacements | Page |
|-------------|---------------------|---------------------------------|--------------|------|
| Radial Type | S5 | 5mm height, 85°C | H5 | 80 |
| | SS | 7mm height, 85°C | SM | 84 |
| | MA | 7mm height, Low leakage current | ※ | |

Remark:

- 1.Surface Mount Type, Polymer Hybrid Type, Anhydrous Type 符合 AEC-Q200 標準，適用於車載產品。
2. 規格料號，在末端加註 "A" 碼字樣，已表示車載專用料號。

Explanation of Parts Numbers



(1). Series Code:

For details, Please view Page 2, 3, 4 "Series index" table

(2). Voltage Code:

| | | | | | | | | | | | |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Voltage(V) | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160 |
| Code | 004 | 006 | 010 | 016 | 025 | 035 | 050 | 063 | 080 | 100 | 160 |
| Voltage(V) | 180 | 200 | 250 | 315 | 330 | 350 | 400 | 420 | 450 | 500 | |
| Code | 180 | 200 | 250 | 315 | 330 | 350 | 400 | 420 | 450 | 500 | |

(3). Capacitance Tolerance

| | | | | | | | |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Tolerance(%) | -5 ~ +15 | ± 10 | ± 20 | -0 ~ +20 | -0 ~ +40 | -0 ~ +50 | -5 ~ +20 |
| Code | C | K | M | A | S | R | D |
| Tolerance(%) | -10 ~ +20 | -10 ~ +30 | -10 ~ +50 | -15 ~ +20 | -30 ~ +20 | +10 ~ +30 | +10 ~ +25 |
| Code | V | Q | T | E | I | B | N |

(4). Capacitance Code

| | | | | | | | | |
|-------------|-----|-----|-----|-----|------|-------|--------|-------|
| Capacitance | 0.1 | 1 | 10 | 100 | 1000 | 10000 | 100000 | 22000 |
| Code | 0R1 | 1R0 | 100 | 101 | 102 | 103 | 104 | 223 |

(5). Diameter

| | | | | | | | | | | | | |
|----------|----|----|----|-----|----|----|----|------|----|------|-----|----|
| Diameter | 3 | 4 | 5 | 6.3 | 8 | 10 | 12 | 12.5 | 13 | 14.5 | 16 | 18 |
| Code | B | C | D | E | F | G | H | X | I | Y | J | K |
| Diameter | 20 | 22 | 25 | 30 | 35 | 40 | 51 | 64 | 76 | 90 | 100 | |
| Code | L | M | N | O | P | Q | R | S | T | U | V | |

(6). Length rule for Aluminum case

| | | | | | | | | | | | | | |
|--------|----|-----|----|----|------|----|-----|-----|-----|-----|-----|-----|-----|
| Length | 5 | 5.4 | 7 | 12 | 13.5 | 25 | 105 | 125 | 136 | 155 | 185 | 195 | 200 |
| Code | 05 | 5A | 07 | 12 | DB | 25 | A5 | C5 | D6 | F5 | I5 | J5 | K0 |

(7). Customer remark

This code to distinction when customers have special requirements.

(8). Customer Code

(9). Type Code Description

A. Radial and V-chip code:

Code 17 for processing method, code 18, 19: Refer to Page. "Lead Cutting and Forming".

| | | | | | | |
|-------------|--------------------------|--------------------------|--------------------|--------------------------|-------------------|---------|
| Description | Long lead | Lead cut | Lead cut and Crimp | Lead cut, Crimp and Form | Lead cut and Form | Forming |
| Code | S | C | D | H | F | B |
| Description | Lead cut and bending (+) | Lead cut and bending (-) | Taping (Ammo pack) | Tape and Reel | V-chip type(SMD) | |
| Code | Z | L | P | R | V | |

B. Terminal Diagram Code for Snap-in, LUG and Screw Terminal

| | | | | | |
|-------------|-------------------------------|------------------------------------|--------------------------------|-------------------------|------------------------------------|
| Description | Snap-in long terminal | Snap-in short terminal | LG Type terminal | Straight type terminal | PC board pin-out straight terminal |
| Code | YL | YS | G | ST | PCS |
| Description | PC board pin-out Lug terminal | PC board pin-out U-insert terminal | PC board pin-out bend terminal | 5 pin straight terminal | screw terminal |
| Code | PCY | PCU | PCB | U | W |

(10). Special note:

R:Generally component and RoHS compliance code
A:Automotive component and RoHS compliance code

■ 導電性高分子鋁電解電容使用注意事項 (Solid & Hybrid)



一、回路設計上的注意事項

1. 極性
導電性高分子鋁電解電容是有正極和負極。使用時，切勿錯置極性。若極性錯置，使用時將會增加漏電流或減少使用壽命。
2. 禁止使用的回路
導電性高分子鋁電解電容的漏電流在以下條件有可能會增大。
 - (a) 鍍焊錫時
 - (b) 經過無外加電壓的高溫無負荷、高溫高濕無負荷、冷熱衝擊試驗等，漏電流也有增大的可能。

以下回路有可能出現故障，請禁止使用

 - (a) 高阻抗回路
 - (b) 藕合回路
 - (c) 時間恆定回路
 - (d) 有關漏電流變而影響回路工作的情况

▲為提高耐壓性而將兩個以上的導電性高分子鋁電解電容串聯連接使用時，請與我們聯絡。
3. 電路設計
請在確認以下內容的基礎上進行電路設計。
 - (a) 隨著溫度及頻率的變化，電容器的電氣特性會隨之變化。請在確認這些變化之後進行電路的設計。
 - (b) 當並聯2 個以上的電容器時，請在設計電路時考慮電流的平衡
 - (c) 當串聯2 個以上的電容器時，因載入電壓存在差異，有可能加載過電壓，請使用的時候另行諮詢我們。
4. 確認使用環境溫度、電壓和紋波電流
 - (a) 使用溫度應控制在出廠規格書規定的使用溫度範圍內
 - (b) 超過額定電壓的過電壓將會發生短路，因此，即使是瞬間也不得外加過電壓
 - (c) 不得接通過額定的紋波電流若接通過大的紋波電流，將會增高內部發熱，減少使用壽命

■ Precautions In Using(Solid & Hybrid)



一、Precautions for circuit designing

1. Polarity
Conductive Polymer Aluminum Electrolytic Capacitors have the positive and negative electrodes. Using reversed polarity may cause leakage current increased or life span decreased.
2. Prohibited circuits
Conductive Polymer Aluminum Electrolytic Capacitors leakage current may become larger as the following conditions.
 - (a) Soldering
 - (b) High temperature no-load test, high temperature and high humidity no-load test, rapidly changing temperature test, etc.

Avoid the use of Conductive Polymer Aluminum Electrolytic Capacitors in the following type of circuits because leakage current may increase.

 - (a) High-impedance circuits
 - (b) Coupling circuits
 - (c) Time constant circuits
 - (d) Other circuits that are significantly affected by leakage current

▲ If you plan to use 2 or more Conductive Polymer Aluminum Electrolytic Capacitors in a series connection, please contact us before use.
3. Circuit Design
Verify the following before designing the circuit:
 - (a) The electrical characteristics of the capacitor will vary depending on differences in temperature and frequency. Only design your after verifying the scope of these factors.
 - (b) When connecting two or more capacitors in parallel ensure that the design takes current balancing into account.
 - (c) When two or more capacitors are connected in series, variability in applied voltage may cause over-voltage conditions. Contact Su'scon before using capacitors connected in series.
4. Operating temperature、voltages and ripple current
 - (a) Operating temperature must be under the category temperature range of specification.
 - (b) Do not apply voltages exceeding the full rated voltage.
 - (c) Do not apply currents that excess the rated ripple current. When excessive ripple current is applied, the Conductive Polymer Aluminum Electrolytic Capacitors may result in shorter life due to the internal heat increase.

1. 快速充放電的限制

急速充放電所導致過大的衝擊電流將會造成短路或增加漏電流。以下條件時，應使用保護回路。

(a) 衝擊電流超過10A

(b) 超過所用導電性高分子鋁電解電容額定紋波電流值10倍

▲測試漏電流時，務必插入1kΩ的保護電阻，進行充電和放電。

2. 故障

最高使用溫度範圍、外加電壓範圍時，基於JIS C 5003標準(可信度水準60%) 0.5%/1000小時。以下為導電性高分子鋁電解電容的主要故障模式。

6-1. 偶發故障

1. 產品溫度上升引起的靜電電容減少及ESR的上升引起的開放模式磨損是主要的故障模式。有時候也會偶發因過大電壓和超大電流導致的短路模式

2. 通過降低周圍溫度、紋波電流、加載電壓可以減少故障率。

3. 由於加載超過額定電壓的電壓引起短路和通電電流過大的時候、會因內壓的上升而使得膠蓋膨脹或剝落，發出臭氣。

4. 構成產品的材質中含有可燃物質，短路部位有可能因為電火花等而起火。產品的安裝方法、位置、圖形設計等請考慮以下設計方面的注意點，以確認絕對的安全

- A. 設置保護電路、保護裝置，確保絕對的安全
- B. 設置冗長電路等，以便設備不會因為單個的故障而不穩定。

6-2. 使用中的電氣特性變動及磨耗故障(使用壽命)

導電性高分子鋁電解電容即使在出廠規格書記載的額定，電性能和機械性能的範圍內使用，也會在各自性能規定的範圍內發生靜電容量減少，等效串聯電阻增大等電氣特性的變動，設計時應予以注意。至於磨耗故障，主要是超過信賴性和高溫高濕保障時間後，這類電氣特性的變動進而增大，最終形成電解質的絕緣化(劣化)，成為開放模式。

1. Sudden charge and discharge

An excessive surge current by sudden charge or discharge may result in a short circuit or a large leakage current. Protection circuits are recommended to retain high reliability in case of the following conditions.

(a) The surge current value exceeds 10A

(b) The value exceeds 10 times of the rated ripple current

▲ When you measure leakage current, a protection resistor of approximately 1k Ω must be inserted to the circuit before charge and discharge.

2. Failure

The failure rate is 0.5% / 1000h (with a 60% reliability standard) based on JIS C 5003.

The mainly failure modes are as follows.

6-1. Contingency failure

1. The product of electrostatic capacitance decrease caused by temperature rise and the rise of the ESR open mode caused by the wear .that is the main failure mode. Sometimes accidental short-circuit caused by excessive voltage and large current mode

2. Decrease the failure rate we can reduce ambient temperature, ripple current and use voltage.

3. When the load voltage exceeds the rated voltage will cause a short circuit or ripple current is too large, internal pressure increased and the rubber expansion or peeling, smelliness

4. The installation method of products, Position, Graphic design please consider the following points to ensure the safety

- A. Set the protection circuit and Protector to ensure the safety.
- B. Setting a redundant circuit, so that the equipment will not be unstable because of a single fault.

6-2. Wear-out failure (life-span)

When life span exceeded the specified guarantee time of Endurance and Damp heat, electrolyte might insulate and cause electric characteristic changed. This is called an open circuit. The electric characteristics of capacitance and ESR may possibly change within the specified range in specifications when it is used under the condition of the rated voltage, electric and mechanical performance. Please note it when design.

二、安裝的注意事項

1. 漏電流

漏電流因焊接的熱應力及輸送等機械性應力的影響而有增大的可能在這種情況下，若在導電性高分子鋁電解電容的最高使用溫度範圍以下外加電壓，則漏電流將會逐漸變小。在接近最高使用溫度範圍的狀態下，越是外加額定電壓以下的高電壓，越會加快漏電流的修復速度。

漏電流回升的原因

- a. 焊接
- b. 高溫無負荷、高溫高濕、溫度急劇變化等試驗。

2. 電容器的絕緣

- (a) 外殼和負極端子之間有不穩定的電阻，未經絕緣處理，應予以注意
- (b) 外殼，負極電極端子，正極電極端子及線路結構之間的電路應完全隔離

3. 使用環境的限制

不得在以下環境下使用

- (a) 直接濺水，濺鹽水，濺油或結露狀態下的環境
- (b) 充滿有害氣體(硫化氫，亞硫酸，亞硝酸，氯，氨等)的環境
- (c) 受臭氧，紫外線，放射線照射的環境

4. 印刷電路板的設計

- (a) 避免在導電性高分子鋁電解電容周圍及印刷電路板背面安裝發熱元件
- (b) 貼裝型應按照技術手冊或出廠規格書記載的建議條件，設計印刷電路板接合區結構的電路
- (c) 插裝型應按照技術手冊或出廠規格書記載的產品尺寸公差，設計安裝的基板孔及孔徑

5. 並聯連接

導電性高分子鋁電解電容與其他電容器並聯連接使用時，流入導電性高分子鋁電解電容的紋波電流將會增多，選購時應予以注意。

6. 其他

確認以下內容後，再設計電路

- (a) 電氣特性隨著溫度和頻率的變動而變化。設計前，應先掌握這一變化部份
- (b) 在雙面基板上安裝導電性高分子鋁電解電容時，多餘的基板孔和基板正反面連接用通孔不要位於導電性高分子鋁電解電容的下方

二、Caution For Assembling Capacitors

1. Leakage Current

Mechanical stress may cause Conductive Polymer Aluminum Electrolytic Capacitors leakage current increased. In such a case, leakage current will gradually decrease by applying voltage within the category voltage and the upper category temperature. Then, self-healing speed of leakage current is faster when it is near to the upper category temperature and the category voltage.

The cause of Leakage current rise again

- a. soldering
- b. High Temp shelf、High Temp High Humidity and Temp rapid change etc.

2. Capacitor insulation

- (a) The space between the case and the negative electrode terminal is insulated and has some resistance.
- (b) Be sure to completely separate the case, negative lead terminal, positive lead terminal and PC board patternst.

3. Operating environmental restrictions

Do not use the Conductive Polymer Aluminum Electrolytic Capacitors in the following environments.

- (a) Places where water, salt water or oil can directly fall on it, and places where condensation may form.
- (b) Places filled with noxious gas (hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.)
- (c) Places susceptible to ozone, ultraviolet rays and radiation.

4. PCB design

- (a) Avoid locating heat-generating components around the Conductive Polymer Aluminum Electrolytic Capacitors and on the underside of the PC board.
- (b) For the surface mount capacitor, design the copper pads on the PC board in according with the recommended land pattern or dimensions in the series specifications.
- (c) For radial capacitor, design the terminal pitch and hole size after conforming the dimensional tolerance in the series specifications.

5. Parallel connection

A large amount of ripple current may be applied to the Conductive Polymer Aluminum Electrolytic Capacitors when it is used in parallel with another capacitor. Carefully select the type of capacitor.

6. Others

Design circuits after checking the following items.

- (a) Electric characteristics are affected by temperature or frequency fluctuations. Design circuits after checking the changes.
- (b) When mounting an Conductive Polymer Aluminum Electrolytic Capacitors on a double-sided PC board, extra PC board holes or the through holes for connecting the front and back of the PCB must not exist underneath the Conductive Polymer Aluminum Electrolytic Capacitors .

三、實際安裝時的注意事項

1. 焊接時的注意事項

焊接條件應控制在出廠規格書規定的範圍內。若採用規定以外的嚴格焊接條件，因電氣特性的劣化或在最壞的情況下，可導致外觀不良，漏電流增加及容量減少。

2. 安裝前的預備知識

(a) 導電性高分子鋁電解電容安裝在設備上開通電後，不得重新使用。除了定期檢修時為測試電氣性能而卸下的導電性高分子鋁電解電容以外，不得重新使用。

(b) 長期保存的導電性高分子鋁電解電容有時會增加漏電流。遇這種情況，應通過約1kΩ的電阻進行施加電壓處理。此時的電壓處理，推薦在約60~70°C下外加1小時額定電壓。

3. 安裝-1

(a) 先確認額定靜電容量和額定電壓後，再進行安裝。

(b) 小心操作，不要摔落。摔落的導電性高分子鋁電解電容不得使用。

(c) 安裝時不要使其變形。

(d) 安裝時不要破壞鋁殼表面皮膜。

4. 安裝-2

(a) 避免在導電性高分子鋁電解電容周圍及印刷電路板背面安裝發熱元件。

(b) 貼裝型應按照技術手冊或出廠規格書記載的建議條件，設計印刷電路板接合區結構的電路。

(c) 插裝型應用及技術手冊或出廠規格書記載的產品尺寸公差，設計安裝的基板孔及孔徑。

5. 使用電烙鐵時的焊接條件

(a) 請在以下焊接條件(溫度、時間)範圍內使用。

| 條 件 | 電烙鐵溫度 | 時間 |
|------|----------|------------|
| 焊接條件 | 400±10°C | within 5s. |

(b) 焊接插裝型時，若電極端子間距和印刷電路板孔間距不符而需要修整電極端子(引線端子)時，應在焊接前避免對導電性高分子鋁電解電容體施加應力的情況下修整。

(c) 使用電烙鐵焊接時，注意不要對導電性高分子鋁電解電容主體施加過度應力。

(d) 焊接後需要卸下導電性高分子鋁電解電容，用電烙鐵修正焊接狀態時，應先充分熔化焊料，防止對導電性高分子鋁電解電容的電極端子施加應力。

(e) 電烙鐵頭不得接觸導電性高分子鋁電解電容主體。

三、Precautions for mounting on-board

1. Considerations when soldering

The soldering conditions as soldering iron, flow soldering, reflow soldering should be under the range prescribed in specifications. If the specifications are not followed, there is a possibility of the cosmetic deflection, the intensive increase of leakage current or the capacitance reduction.

2. Capacitor insulation

(a) Do not reuse Conductive Polymer Aluminum Electrolytic Capacitors that have been assembled in a set and energized. Excluding Conductive Polymer Aluminum Electrolytic Capacitors that have been removed for measuring electrical characteristics during a periodic inspection, Conductive Polymer Aluminum Electrolytic Capacitors cannot be reused.

(b) Leakage current may increase when Conductive Polymer Aluminum Electrolytic Capacitors are stored for long term. In this case, we recommend that you apply the rated voltage for 1 hour at 60°C~70°C with a resistor load of 1kΩ.

3. Mounting-1

(a) Mount after checking the capacitance and the rated voltage.

(b) Do not drop Conductive Polymer Aluminum Electrolytic Capacitors on the floor and do not use it that is dropped.

(c) Do not mount Conductive Polymer Aluminum Electrolytic Capacitors that is deformed.

(d) Do not break aluminum case surface coating in mounting

4. Mounting-2

(a) Avoid locating heat-generating components around the Conductive Polymer Aluminum Electrolytic Capacitors and on the underside of the PC board.

(b) For the surface mount capacitor, design the copper pads on the PC board in according with the recommended land pattern or dimensions in the series specifications.

(c) For radial capacitor, design the terminal pitch and hole size after conforming the dimensional tolerance in the series specifications.

5. Soldering with a soldering iron

(a) Soldering condition should be under the following ranges.

| Conditions | Soldering iron temperature | Time |
|---------------------|----------------------------|------------|
| Soldering condition | 400±10°C | within 5s. |

(b) When the lead terminal for radial lead type must be processed because the lead pitch and the PCB holes in spacing do not match, process it without any stresses to Conductive Polymer Aluminum Electrolytic Capacitors.

(c) Solder without any excessive stresses to Conductive Polymer Aluminum Electrolytic Capacitors itself.

(d) When an Conductive Polymer Aluminum Electrolytic Capacitors has been soldered once and needs to be removed, remove it after the solder has been completely melted.

(e) Do not let the tip of the soldering iron touch the Conductive Polymer Aluminum Electrolytic Capacitors itself.

1. 正流焊接條件

(a) 請在以下焊接條件(溫度、時間)範圍內使用。
正流焊推薦條件

| 條件 | 溫度 | 時間 | 次數 |
|------|-------------|-----------|---------|
| 預熱 | 120°C以下(環境) | 120秒以下 | 1次 |
| 焊接條件 | 260±5°C以下 | 10 + 1秒以下 | 2次以下 ※1 |

※1. 進行2次時，焊料的浸漬時間合計為10+1秒以下。

(b) 貼裝型導電性高分子鋁電解電容不適用於波峰焊。

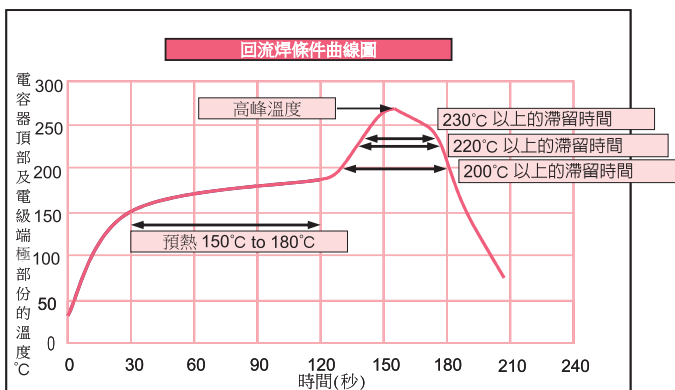
(c) 不要將導電性高分子鋁電解電容主體浸漬在溶解焊料中。焊接部位只限於印刷電路板上與導電性高分子鋁電解電容相反的一側。

(d) 松脂不要貼附在電極端子以外的部位。

(e) 焊接時，注意不要碰倒其他元件，以免碰觸導電性高分子鋁電解電容。

2. 回流焊接條件

(a) 請在以下焊接條件(溫度、時間)範圍內使用。
回流焊推薦條件



※峰值溫度:電容器頂部及電極端子部的溫度。

(b) 導電性高分子混合型鋁電解電容

| 電壓範圍(V) | 16~63 | 80~125 |
|-------------|-------------|-------------|
| 峰值溫度 | 260°C, 5秒以下 | 250°C, 5秒以下 |
| 預熱溫度 | 120秒以內 | 120秒以內 |
| 200°C以上滯留時間 | 100秒以內 | 100秒以內 |
| 220°C以上滯留時間 | 80秒以內 | 80秒以內 |
| 230°C以上滯留時間 | 40秒以內 | 40秒以內 |
| 回流次數 | 2次以下 | 2次以下 |

(c) 導電性高分子固態鋁電解電容

| 項目 | Polymer系列 | |
|-------------|-------------------|---------|
| 峰值溫度 | 250°C以下 | 260°C以下 |
| 預熱溫度 | 150°C~180°C 90±3秒 | |
| 200°C以上滯留時間 | 60秒以內 | 60秒以內 |
| 220°C以上滯留時間 | 50秒以內 | 50秒以內 |
| 230°C以上滯留時間 | 40秒以內 | 40秒以內 |
| 回流次數 | 2次以下 | 1次 |

※以上如需兩次回流焊，需在第一次回流焊後放置1小時以上讓部品恢復常溫(5~35°C)才可進行。

1. Flow soldering

(a) Soldering condition should be under the following ranges.
Recommended flow soldering condition

| Conditions | Temperature | Time | Flow number |
|----------------------|------------------------------------|---------------------|--------------------|
| Preheating | 120°C or less(ambient temperature) | 120 sec. or less | 1 time |
| Soldering conditions | 260 + 5°C or less | 10 + 1 sec. or less | 2 times or less ※1 |

※1. When soldering 2 times, immersion time should be 10 + 1 sec. or less.

(b) Do not apply flow soldering to SMD type.

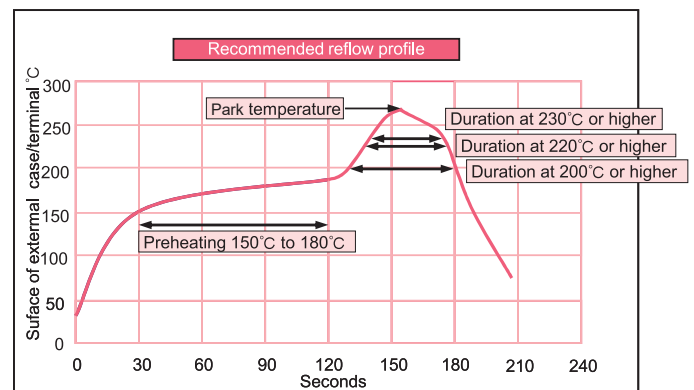
(c) Do not solder Conductive Polymer Aluminum Electrolytic Capacitors itself by submerging it in melted solder. Solder the opposite side that the Conductive Polymer Aluminum Electrolytic Capacitors is mounted on.

(d) Note that flux does not adhere to anywhere expect the lead terminal.

(e) Note that other components do not fall over and touch the Conductive Polymer Aluminum Electrolytic Capacitors when soldering.

2. Reflow soldering

(a) Soldering condition should be under the following ranges.
Recommended reflow soldering condition



※All temperatures are measured on the topside of the Al-can and terminal surface.

(b) Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

| Voltage Range(V) | 16~63 | 80~125 |
|-----------------------------|-------------------|-------------------|
| Peak Temperature | 260°C, 5sec. max. | 250°C, 5sec. max. |
| Preheat Temperature | 120 sec. max. | 120 sec. max. |
| Duration at 200°C or higher | 100 sec. max. | 100 sec. max. |
| Duration at 220°C or higher | 80 sec. max. | 80 sec. max. |
| Duration at 230°C or higher | 40 sec. max. | 40 sec. max. |
| Reflow number | twice or less | twice or less |

(c) Conductive Polymer Aluminum Solid Capacitors

| Item | Polymer系列 | |
|-----------------------------|----------------------|---------------|
| Peak Temperature | 250°C or less | 260°C or less |
| Preheat Temperature | 150°C~180°C 90±3sec. | |
| Duration at 200°C or higher | 60 sec. max. | 60 sec. max. |
| Duration at 220°C or higher | 50 sec. max. | 50 sec. max. |
| Duration at 230°C or higher | 40 sec. max. | 40 sec. max. |
| Reflow number | twice or less | only 1 time |

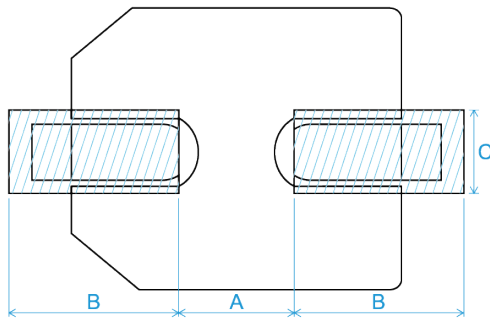
※Reflow should be performed twice or less. Please ensure that the capacitor became cold enough to the room temperature (5 to 35°C) before the second reflow.

(d) 插裝(DIP)型導電性高分子鋁電解電容不適用於回流焊

(e) 建議焊點尺寸

(d) Do not apply reflow soldering to Radial Lead type.

(e) RECOMMENDED LAND PATTEND DIMENSION OF PCB



| ϕD | a | b | c |
|------------|-----|-----|-----|
| $\phi 5$ | 1.4 | 3.0 | 1.6 |
| $\phi 6.3$ | 1.9 | 3.5 | 1.6 |
| $\phi 8$ | 3.1 | 4.2 | 2.2 |
| $\phi 10$ | 4.5 | 4.4 | 2.2 |

3. 焊接後注意事項

- (a) 焊接在線路板上後，不得傾斜，扳倒，扭曲導電性高分子鋁電解電容。
- (b) 焊接在線路板上後，不得用導電性高分子鋁電解電容代替把手移動基板。
- (c) 焊接在線路板上後，注意不要碰撞導電性高分子鋁電解電容。堆放基板時，注意不要使導電性高分子鋁電解電容接觸基板或其他元件。
- (d) 焊接在線路板上後，不得對導電性高分子鋁電解電容施加過度應力。

4. 清洗基板

可使用Pine- α ST-00S、Clean thru750H、750L、710M、750K、Techno CareFRW14~17等高級乙醇類清洗劑或AK-225ES等氟利昂代替品，IPA等清洗劑清洗，清洗時，應確認以下內容。

- (a) 採用浸漬，超聲波等清洗方式時，清洗時間合計應控制在2分以內。
- (b) 清洗液溫度請控制在60°C以下。
- (c) 要進行清洗液的防污染管理(導電度、Ph值、比重、含水量等)。
- (d) 清洗後，不要在清洗液環境中或密封容器中保管。
- (e) 用熱風(請在使用溫度範圍以下進行)烘乾基板和導電性高分子鋁電解電容時，些許的清洗劑其液附在電容器表面上，若擦拭可抹去電容器上的標記，應予以注意。
- (f) 關於清洗劑和清洗方法等詳細情況以及使用其他種類的清洗劑時，請事先與本公司洽詢。

3. Handling after soldering

- (a) Do not tilt, bend or twist Conductive Polymer Aluminum Electrolytic Capacitors.
- (b) Do not move the PCB with catching Conductive Polymer Aluminum Electrolytic Capacitors itself.
- (c) When stacking PCBs, make sure that the Conductive Polymer Aluminum Electrolytic Capacitors does not touch other PCBs or components.
- (d) Do not dump the Conductive Polymer Aluminum Electrolytic Capacitors with objects.

4. Cleaning PCB

Check the following items before washing PC board with these detergents: high quality alcohol-based cleaning fluid such as Pine- α ST-100S, clean thru 750H, 750L, 710M, 750K or Techno Care FRW 14 through 17 or detergents including substitute Freon as AK-225AES or IPA.

- (a) Use immersion or ultrasonic waves to clean within 2 minutes on polymer conductive type.
- (b) The temperature of the cleaning fluid should be less than 60°C.
- (c) Watch the contamination of the detergent as conductivity, ph, specific gravity, water content, etc.
- (d) Do not store the Conductive Polymer Aluminum Electrolytic Capacitors in a location subject to gases from the cleaning fluid or in an airtight container after cleaning.
- (e) Dry the PCB or Conductive Polymer Aluminum Electrolytic Capacitors with hot air that should be less than the maximum operating temperature. Please note that Indication may disappear when rubbing print side after washing as a cleaner.
- (f) Please contact us for details about detergents, cleaning methods and about detergents other than those listed above.

10. 固定劑和塗層劑

- (a) 選擇適合於導電性高分子鋁電解電容外裝材質和封裝材質的材料。特別是固定劑和塗層劑或稀釋劑中不得含有丙酮。
- (b) 使用固定劑和塗層劑前，清除基板和導電性高分子鋁電解電容封裝部之間的焊裝劑殘渣和污垢。
- (c) 使用固定劑和塗層劑前，烘乾清洗劑等。
- (d) 請洽詢固定劑和塗層劑的熱固化條件。

10. Fixatives and coating materials

- (a) Select the appropriate covering and sealant materials for onductive Conductive Polymer Aluminum Electrolytic Capacitors. In particular, make sure the fixative, coating and thinner do not contain acetone.
- (b) Before applying a fixative or coating, completely remove any flux residue and foreign matter form the area where the board and Conductive Polymer Aluminum Electrolytic Capacitors will be jointed together.
- (c) Allow any detergent to dry before applying the fixative or coating.
- (d) Please contact us for fixative and coating heat curing conditions.

■ 環境物質對應 對應 RoHS 法規

| 環境管理物質名 | 化學物質記號 | 環境對應 (ppm) |
|---------|--------|------------|
| 鎘以及鎘化合物 | Cd | 100 |
| 鉛以及鉛化合物 | Pb | 1000 |
| 汞以及汞化合物 | Hg | 1000 |
| 六價鉻化合物 | Cr6+ | 1000 |
| 聚溴聯苯 | PBBs | 1000 |
| 聚溴二苯醚 | PBDEs | 1000 |

■ Environmental Consideration Compliance with RoHS Directive

| Substance | Symbol | Maximum Limit (ppm) |
|--------------------------------|--------|---------------------|
| Cadmiun and Cadmium Compounds | Cd | 100 |
| Lead and Lead Compounds | Pb | 1000 |
| Mercury and Mercury Compounds | Hg | 1000 |
| Hexavalent Chromium Compounds | Cr6+ | 1000 |
| Polybrominated Biphenyls | PBBs | 1000 |
| Polybrominated Diphenyl Ethers | PBDEs | 1000 |

Series Chart

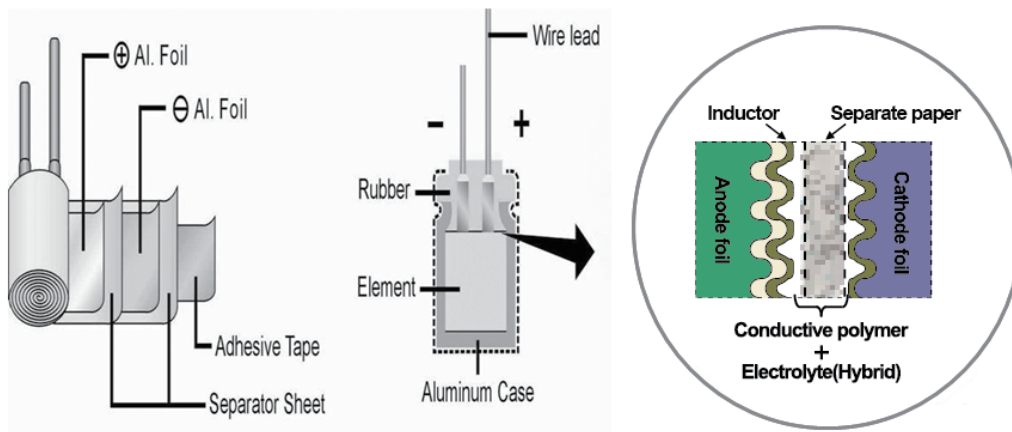
Radial Type



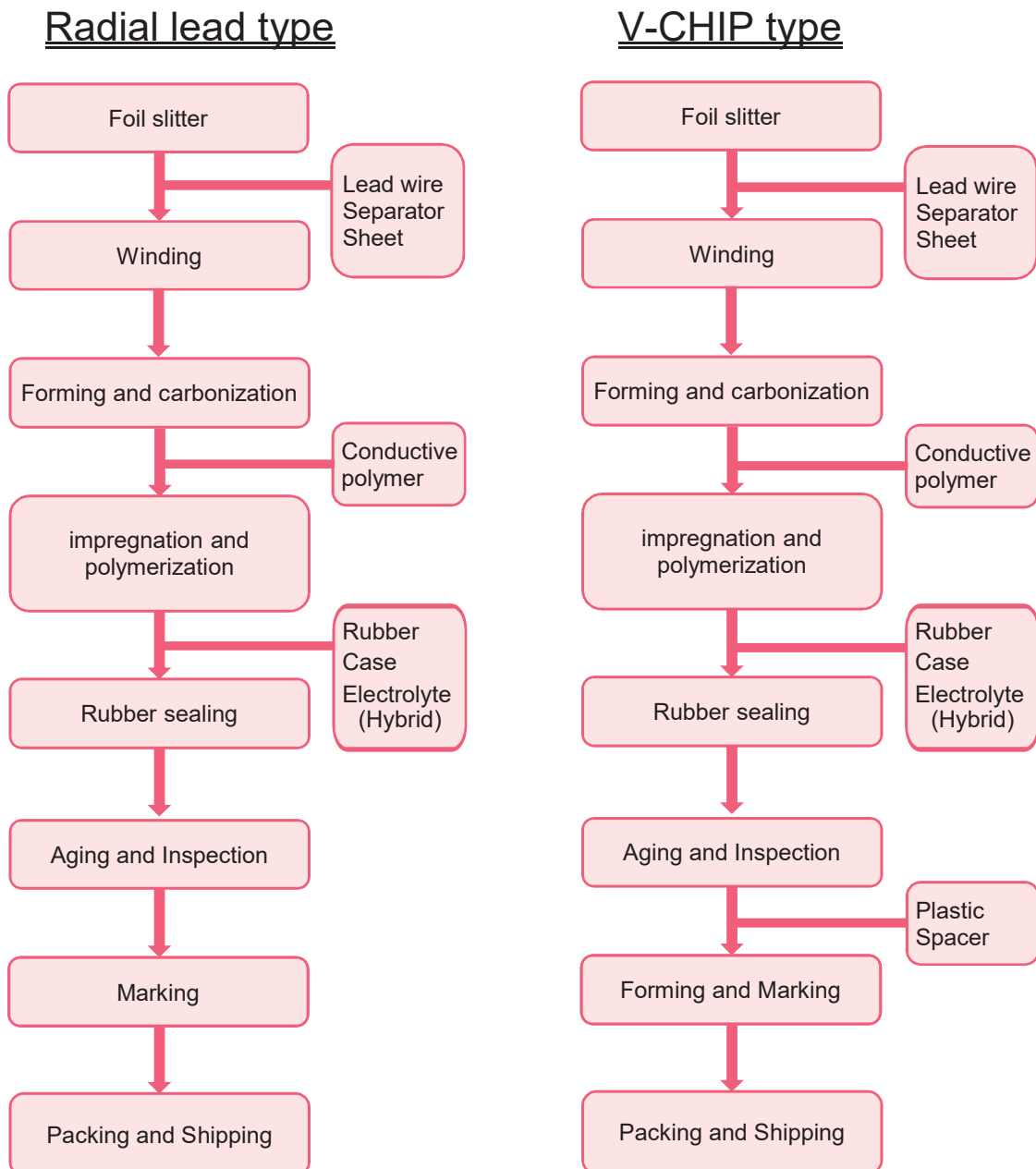
SMD Type



■ Basic structure



■ Manufacturing Method



SPA series

- Low ESR.
- High Voltage, Long Life.
- 105°C, 5,000~10,000hrs.
- RoHS compliant
- For high reliability applications.(Automotive equipment, Base station equipment,etc.)



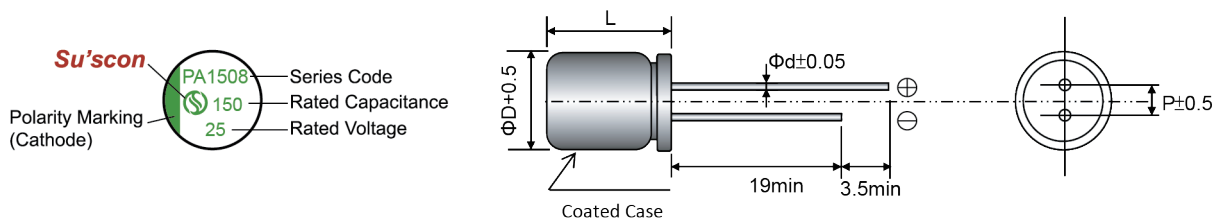
SPA

SPECIFICATIONS

| Items | Conditions | Characteristics | |
|-----------------------------|--|--|--|
| Category Temperature Range | — | -55 to +105°C | |
| Rated Voltage Range | — | 16 ~ 125V | |
| Capacitance Tolerance | at 20°C, 120Hz | ±20%(M) | |
| Surge Voltage | at 15 ~ 35°C | Rated voltage × 1.25V | |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.01CV$ or $3(\mu A)$ Whichever is greater measured,after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list | |
| Dissipation Factor (tan δ) | at 20°C, 120Hz | Please see the attached characteristics list | |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 5,000 to 10,000 hours at 105°C. Φ6.3=5,000hrs,D≥Φ8=10,000hrs. | Appearance | NO significant damage. |
| | | Capacitance change | ≤ ±30% of the initial value. |
| | | DF (tan δ) | ≤ 200% of the initial specified value. |
| | | ESR | ≤ 200% of the initial specified value. |
| | | Leakage current | ≤ The initial specified value. |
| Damp Heag (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance | NO significant damage. |
| | | Capacitance change | ≤ ±30% of the initial value. |
| | | DF (tan δ) | ≤ 200% of the initial specified value. |
| | | ESR | ≤ 200% of the initial specified value. |
| | | Leakage current | ≤ The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 15~35°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds. | Appearance | NO significant damage. |
| | | Capacitance change | ≤ ±30% of the initial value. |
| | | DF (tan δ) | ≤ 200% of the initial specified value. |
| | | ESR | ≤ 200% of the initial specified value. |
| | | Leakage current | ≤ The initial specified value. |

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatmen : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

MARKING AND DIMENSIONS



(Unit:mm)

| Size Code | 6.3x7.2 | 8x9.5 | 10x9.5 | 10x11.5 |
|-----------|----------|----------|----------|----------|
| φ D | 6.3 | 8 | 10 | 10 |
| L | L+1.5max | L+1.5max | L+1.5max | L+1.5max |
| φ d | 0.5 | 0.6 | 0.6 | 0.6 |
| P | 2.5 | 3.5 | 5.0 | 5.0 |

SPA

SPA SERIES STANRD CHARACTERISITICS LIST

| Rated voltage (S.V.) | Cap (μF) | Size Code DxL | Leakage current (μA) max. | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|---------------|---------------------------|-------------------------------------|--|-------------------------------|
| 16 (20) | 120 | 6.3x7.2 | 19 | 40 | 1,500 | 0.16 |
| | 270 | 8x9.5 | 43 | 26 | 2,000 | 0.16 |
| | 470 | 10x9.5 | 75 | 21 | 2,600 | 0.16 |
| | 560 | 10x11.5 | 90 | 15 | 3,000 | 0.16 |
| 25 (32) | 68 | 6.3x7.2 | 17 | 45 | 1,400 | 0.16 |
| | 150 | 8x9.5 | 38 | 27 | 1,900 | 0.16 |
| | 270 | 10x9.5 | 68 | 22 | 2,500 | 0.16 |
| | 330 | 10x11.5 | 83 | 16 | 2,900 | 0.16 |
| 35 (44) | 47 | 6.3x7.2 | 16 | 60 | 1,300 | 0.16 |
| | 100 | 8x9.5 | 35 | 30 | 1,800 | 0.16 |
| | 150 | 10x9.5 | 53 | 23 | 2,400 | 0.16 |
| | 220 | 10x11.5 | 77 | 17 | 2,800 | 0.16 |
| 40 (50) | 27 | 6.3x7.2 | 11 | 70 | 1,200 | 0.16 |
| | 56 | 8x9.5 | 22 | 32 | 1,700 | 0.16 |
| | 100 | 10x9.5 | 40 | 24 | 2,400 | 0.16 |
| | 120 | 10x11.5 | 48 | 18 | 2,700 | 0.16 |
| 50 (63) | 15 | 6.3x7.2 | 8 | 80 | 1,200 | 0.16 |
| | 33 | 8x9.5 | 17 | 35 | 1,600 | 0.16 |
| | 56 | 10x9.5 | 28 | 25 | 2,300 | 0.16 |
| | 82 | 10x11.5 | 41 | 19 | 2,600 | 0.16 |
| 63 (79) | 10 | 6.3x7.2 | 6 | 100 | 1,000 | 0.16 |
| | 22 | 8x9.5 | 14 | 40 | 1,500 | 0.16 |
| | 33 | 8x9.5 | 21 | 40 | 1,500 | 0.16 |
| | | 10x9.5 | 21 | 30 | 2,100 | 0.16 |
| | 47 | 10x9.5 | 30 | 30 | 2,100 | 0.16 |
| | 56 | 10x11.5 | 35 | 22 | 2,400 | 0.16 |
| 80 (100) | 12 | 10x9.5 | 10 | 70 | 1,600 | 0.16 |
| | 15 | 10x9.5 | 12 | 70 | 1,600 | 0.16 |
| | 18 | 10x11.5 | 14 | 50 | 1,800 | 0.16 |
| 100 (125) | 10 | 10x9.5 | 10 | 80 | 1,400 | 0.16 |
| | 12 | 10x9.5 | 12 | 80 | 1,400 | 0.16 |
| | 15 | 10x11.5 | 15 | 60 | 1,600 | 0.16 |
| 125 (157) | 10 | 10x9.5 | 13 | 90 | 1,200 | 0.16 |

Frequency Coefficient of Permissible Ripple Current

| Capacitance (μF) | Frequency (Hz) | | | |
|-------------------|-------------------|-------------------|---------------------|---------------|
| | $100 \leq F < 1K$ | $1K \leq F < 10K$ | $10K \leq F < 100K$ | $100K \leq F$ |
| $4.7 < C \leq 33$ | 0.05 | 0.32 | 0.67 | 1.00 |
| $33 < C$ | 0.10 | 0.35 | 0.70 | 1.00 |

SPB series

SPB

- Low ESR.
- High Voltage, Long Life.
- 125°C, 2,000~4,000hrs.
- RoHS compliant
- For automotive mouldles and other high temperature applications

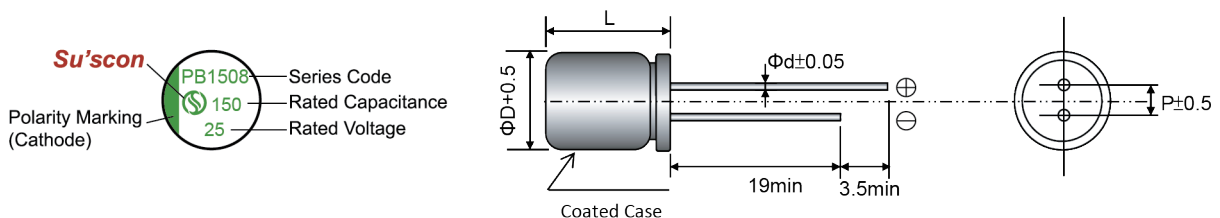


SPECIFICATIONS

| Items | Conditions | Characteristics | |
|--------------------------------------|--|---|--|
| Category Temperature Range | — | -55 to +125°C | |
| Rated Voltage Range | — | 16 ~ 50V | |
| Capacitance Tolerance | at 20°C, 120Hz | ±20%(M) | |
| Surge Voltage | at 15 ~ 35°C | Rated voltage × 1.25V | |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.01CV$ or $3(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list | |
| Dissipation Factor ($\tan \delta$) | at 20°C, 120Hz | Please see the attached characteristics list | |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 to 4,000 hours at 125°C. $\Phi 6.3=2,000hrs, D \geq \Phi 8=4,000hrs.$ | Appearance | NO significant damage. |
| | | Capacitance change | $\leq \pm 30\%$ of the initial value. |
| | | DF ($\tan \delta$) | $\leq 200\%$ of the initial specified value. |
| | | ESR | $\leq 200\%$ of the initial specified value. |
| | | Leakage current | \leq The initial specified value. |
| Damp Heag (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance | NO significant damage. |
| | | Capacitance change | $\leq \pm 30\%$ of the initial value. |
| | | DF ($\tan \delta$) | $\leq 200\%$ of the initial specified value. |
| | | ESR | $\leq 200\%$ of the initial specified value. |
| | | Leakage current | \leq The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 15~35°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds. | Appearance | NO significant damage. |
| | | Capacitance change | $\leq \pm 30\%$ of the initial value. |
| | | DF ($\tan \delta$) | $\leq 200\%$ of the initial specified value. |
| | | ESR | $\leq 200\%$ of the initial specified value. |
| | | Leakage current | \leq The initial specified value. |

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatmen : DC rated voltage are applied to the capacitors for 120 minutes at 125°C.

MARKING AND DIMENSIONS



(Unit:mm)

| Size Code | 6.3x7.2 | 8x9.5 | 10x9.5 | 10x11.5 |
|-----------|----------|----------|----------|----------|
| ϕD | 6.3 | 8.0 | 10.0 | 10.0 |
| L | L+1.5max | L+1.5max | L+1.5max | L+1.5max |
| ϕd | 0.5 | 0.6 | 0.6 | 0.6 |
| P | 2.5 | 3.5 | 5.0 | 5.0 |

SPB

SPB SERIES STANRD CHARACTERISITICS LIST

| Rated voltage (S.V.) | Cap (μF) | Size Code DxL | Leakage current (μA) max. | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 125°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|---------------|---------------------------|-------------------------------------|--|-------------------------------|
| 16 (20) | 120 | 6.3x7.2 | 19 | 40 | 1,100 | 0.16 |
| | 270 | 8x9.5 | 43 | 26 | 1,500 | 0.16 |
| | 470 | 10x9.5 | 75 | 21 | 2,000 | 0.16 |
| | 560 | 10x11.5 | 90 | 15 | 2,300 | 0.16 |
| 25 (32) | 68 | 6.3x7.2 | 17 | 45 | 1,000 | 0.16 |
| | 150 | 8x9.5 | 38 | 27 | 1,300 | 0.16 |
| | 270 | 10x9.5 | 68 | 22 | 1,500 | 0.16 |
| | 330 | 10x11.5 | 83 | 16 | 1,700 | 0.16 |
| 35 (44) | 47 | 6.3x7.2 | 16 | 60 | 900 | 0.16 |
| | 100 | 8x9.5 | 35 | 30 | 1,200 | 0.16 |
| | 150 | 10x9.5 | 53 | 23 | 1,400 | 0.16 |
| | 220 | 10x11.5 | 77 | 17 | 1,600 | 0.16 |
| 40 (50) | 27 | 6.3x7.2 | 11 | 70 | 900 | 0.16 |
| | 56 | 8x9.5 | 22 | 32 | 1,200 | 0.16 |
| | 100 | 10x9.5 | 40 | 24 | 1,400 | 0.16 |
| | 120 | 10x11.5 | 48 | 18 | 1,600 | 0.16 |
| 50 (63) | 15 | 6.3x7.2 | 8 | 80 | 800 | 0.16 |
| | 33 | 8x9.5 | 17 | 35 | 1,100 | 0.16 |
| | 56 | 10x9.5 | 28 | 25 | 1,300 | 0.16 |
| | 82 | 10x11.5 | 41 | 19 | 1,500 | 0.16 |

Frequency Coefficient of Permissible Ripple Current

| Capacitance (μF) | Frequency (Hz) | | | |
|-------------------|-------------------|-------------------|---------------------|---------------|
| | $100 \leq F < 1K$ | $1K \leq F < 10K$ | $10K \leq F < 100K$ | $100K \leq F$ |
| $4.7 < C \leq 33$ | 0.05 | 0.32 | 0.67 | 1.00 |
| $33 < C$ | 0.10 | 0.35 | 0.70 | 1.00 |

SVA series

- Low ESR.
- High Voltage, Long Life.
- 105°C, 5,000 to 10,000hrs.
- RoHS compliant
- For high reliability applications.(Automotive equipment, Base station equipment,etc.)



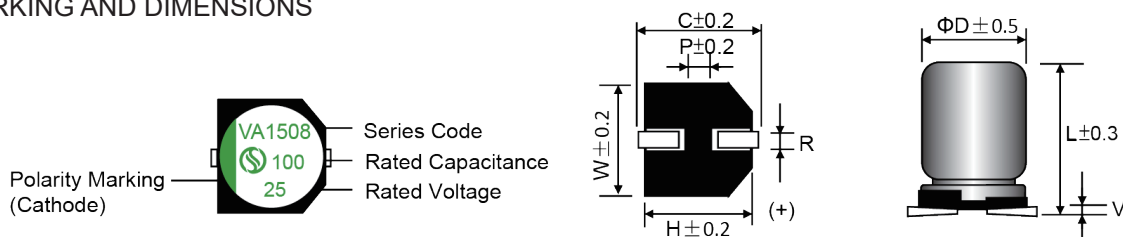
SVA

SPECIFICATIONS

| Items | Conditions | Characteristics |
|--------------------------------------|--|--|
| Category Temperature Range | — | -55 to +105°C |
| Rated Voltage Range | — | 16 ~ 125V |
| Capacitance Tolerance | at 20°C, 120Hz | ±20%(M) |
| Surge Voltage | at 15 ~ 35°C | Rated voltage × 1.25V |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.01CV$ or $3(\mu A)$ Whichever is greater measured,after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list |
| Dissipation Factor ($\tan \delta$) | at 20°C, 120Hz | Please see the attached characteristics list |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 5,000 to 10,000 hours at 105°C. $\Phi 6.3=5,000\text{hrs}, D \geq \Phi 8=10,000\text{hrs}.$ | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 30\%$ of the initial value. |
| | | DF ($\tan \delta$) $\leq 200\%$ of the initial specified value. |
| | | ESR $\leq 200\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Damp Heag (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 30\%$ of the initial value. |
| | | DF ($\tan \delta$) $\leq 200\%$ of the initial specified value. |
| | | ESR $\leq 200\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 15~35°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 30\%$ of the initial value. |
| | | DF ($\tan \delta$) $\leq 200\%$ of the initial specified value. |
| | | ESR $\leq 200\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatmen : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

MARKING AND DIMENSIONS



(Unit:mm)

| Size | ϕD | L | W | H | C | R | P | V max |
|---------|----------|------|------|------|------|---------|-----|-------|
| 6.3×7.7 | 6.3 | 7.7 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 | 0.3 |
| 8×10 | 8.0 | 10.5 | 8.3 | 8.3 | 9.0 | 0.7~1.1 | 3.2 | 0.3 |
| 10×10 | 10.0 | 10.5 | 10.3 | 10.3 | 11.0 | 0.7~1.3 | 4.5 | 0.3 |
| 10×12 | 10.0 | 12.5 | 10.3 | 10.3 | 11.0 | 0.7~1.3 | 4.5 | 0.3 |

SVA

SVA SERIES STANRD CHARACTERISITICS LIST

| Rated voltage (S.V.) | Cap (μF) | Size Code DxL | Leakage current (μA) max. | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|---------------|---------------------------|-------------------------------------|--|-------------------------------|
| 16 (20) | 120 | 6.3x7.7 | 19 | 40 | 1,500 | 0.16 |
| | 270 | 8x10 | 43 | 26 | 2,000 | 0.16 |
| | 470 | 10x10 | 75 | 21 | 2,600 | 0.16 |
| | 560 | 10x12 | 90 | 15 | 3,000 | 0.16 |
| 25 (32) | 68 | 6.3x7.7 | 17 | 45 | 1,400 | 0.16 |
| | 150 | 8x10 | 38 | 27 | 1,900 | 0.16 |
| | 270 | 10x10 | 68 | 22 | 2,500 | 0.16 |
| | 330 | 10x12 | 83 | 16 | 2,900 | 0.16 |
| 35 (44) | 47 | 6.3x7.7 | 16 | 60 | 1,300 | 0.16 |
| | 100 | 8x10 | 35 | 30 | 1,800 | 0.16 |
| | 150 | 10x10 | 53 | 23 | 2,400 | 0.16 |
| | 220 | 10x12 | 77 | 17 | 2,800 | 0.16 |
| 40 (50) | 27 | 6.3x7.7 | 11 | 70 | 1,200 | 0.16 |
| | 56 | 8x10 | 22 | 32 | 1,700 | 0.16 |
| | 100 | 10x10 | 40 | 24 | 2,400 | 0.16 |
| | 120 | 10x12 | 48 | 18 | 2,700 | 0.16 |
| 50 (63) | 15 | 6.3x7.7 | 8 | 80 | 1,200 | 0.16 |
| | 33 | 8x10 | 17 | 35 | 1,600 | 0.16 |
| | 56 | 10x10 | 28 | 25 | 2,300 | 0.16 |
| | 82 | 10x12 | 41 | 19 | 2,600 | 0.16 |
| 63 (79) | 10 | 6.3x7.7 | 6 | 100 | 1,000 | 0.16 |
| | 22 | 8x10 | 14 | 40 | 1,500 | 0.16 |
| | 33 | 8x10 | 21 | 40 | 1,500 | 0.16 |
| | | 10x10 | 21 | 30 | 2,100 | 0.16 |
| | 47 | 10x10 | 30 | 30 | 2,100 | 0.16 |
| 80 (100) | 56 | 10x12 | 35 | 22 | 2,400 | 0.16 |
| | 12 | 10x10 | 10 | 70 | 1,600 | 0.16 |
| | 15 | 10x10 | 12 | 70 | 1,600 | 0.16 |
| 100 (125) | 18 | 10x12 | 14 | 50 | 1,800 | 0.16 |
| | 10 | 10x10 | 10 | 80 | 1,400 | 0.16 |
| | 12 | 10x10 | 12 | 80 | 1,400 | 0.16 |
| 125 (157) | 15 | 10x12 | 15 | 60 | 1,600 | 0.16 |
| | 10 | 10x10 | 13 | 90 | 1,200 | 0.16 |

Frequency Coefficient of Permissible Ripple Current

| Capacitance (μF) | Frequency (Hz) | | | |
|-------------------|-------------------|-------------------|---------------------|---------------|
| | $100 \leq F < 1K$ | $1K \leq F < 10K$ | $10K \leq F < 100K$ | $100K \leq F$ |
| $4.7 < C \leq 33$ | 0.05 | 0.32 | 0.67 | 1.00 |
| $33 < C$ | 0.10 | 0.35 | 0.70 | 1.00 |

SVB series

- Low ESR.
- High Voltage, Long Life.
- 125°C, 2,000 to 4,000hrs.
- RoHS compliant
- For automotive mouldes and other high temperature applications



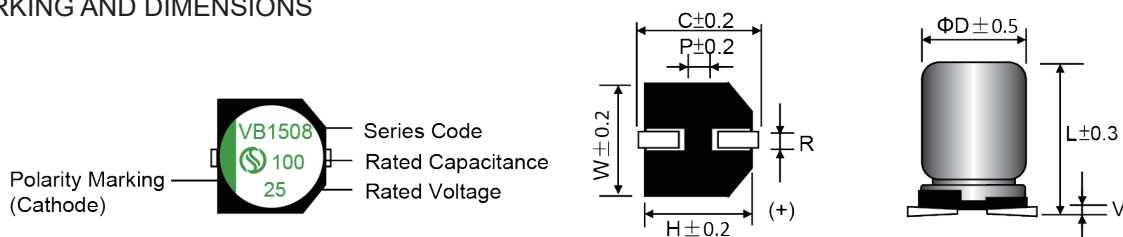
SVB

SPECIFICATIONS

| Items | Conditions | Characteristics | |
|--------------------------------------|---|---|--|
| Category Temperature Range | — | -55 to +125°C | |
| Rated Voltage Range | — | 16 ~ 125V | |
| Capacitance Tolerance | at 20°C, 120Hz | ±20%(M) | |
| Surge Voltage | at 15 ~ 35°C | Rated voltage × 1.25V | |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.01CV$ or $3(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list | |
| Dissipation Factor ($\tan \delta$) | at 20°C, 120Hz | Please see the attached characteristics list | |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 to 4,000 hours at 125°C. $\Phi 6.3=2,000hrs, D \geq \Phi 8=4,000hrs.$ | Appearance | NO significant damage. |
| | | Capacitance change | $\leq \pm 30\%$ of the initial value. |
| | | DF ($\tan \delta$) | $\leq 200\%$ of the initial specified value. |
| | | ESR | $\leq 200\%$ of the initial specified value. |
| | | Leakage current | \leq The initial specified value. |
| Damp Heag (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance | NO significant damage. |
| | | Capacitance change | $\leq \pm 30\%$ of the initial value. |
| | | DF ($\tan \delta$) | $\leq 200\%$ of the initial specified value. |
| | | ESR | $\leq 200\%$ of the initial specified value. |
| | | Leakage current | \leq The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 15~35°C for 30 seconds through a protective resistor ($R = 1 k\Omega$) and discharge for 5 minutes 30 seconds. | Appearance | NO significant damage. |
| | | Capacitance change | $\leq \pm 30\%$ of the initial value. |
| | | DF ($\tan \delta$) | $\leq 200\%$ of the initial specified value. |
| | | ESR | $\leq 200\%$ of the initial specified value. |
| | | Leakage current | \leq The initial specified value. |

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatmen : DC rated voltage are applied to the capacitors for 120 minutes at 125°C.

MARKING AND DIMENSIONS



(Unit:mm)

| Size | ϕD | L | W | H | C | R | P | V max |
|---------|----------|------|------|------|------|---------|-----|-------|
| 6.3×7.7 | 6.3 | 7.7 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 | 0.3 |
| 8×10 | 8.0 | 10.5 | 8.3 | 8.3 | 9.0 | 0.7~1.1 | 3.2 | 0.3 |
| 10×10 | 10.0 | 10.5 | 10.3 | 10.3 | 11.0 | 0.7~1.3 | 4.5 | 0.3 |
| 10×12 | 10.0 | 12.5 | 10.3 | 10.3 | 11.0 | 0.7~1.3 | 4.5 | 0.3 |

SVB

SVB SERIES STANRD CHARACTERISITICS LIST

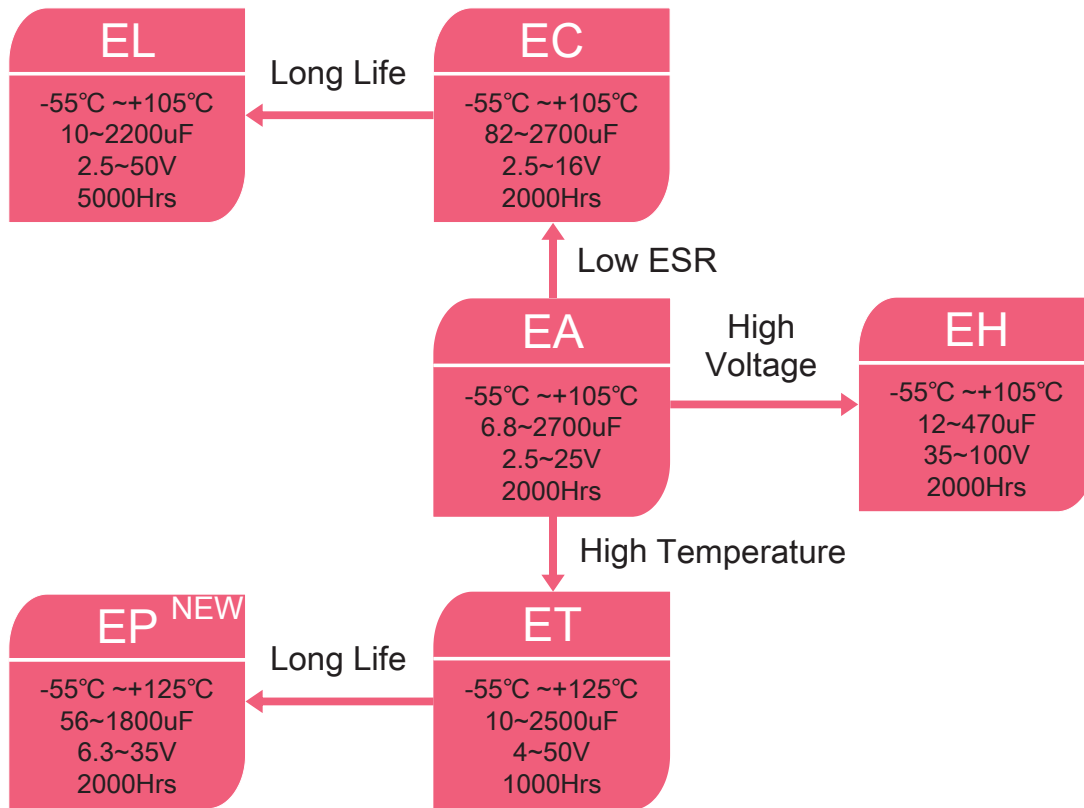
| Rated voltage (S.V.) | Cap (μF) | Size Code DxL | Leakage current (μA) max. | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 125°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|---------------|---------------------------|-------------------------------------|--|-------------------------------|
| 16 (20) | 120 | 6.3x7.7 | 19 | 40 | 1,100 | 0.16 |
| | 270 | 8x10 | 43 | 26 | 1,500 | 0.16 |
| | 470 | 10x10 | 75 | 21 | 2,000 | 0.16 |
| | 560 | 10x12 | 90 | 15 | 2,300 | 0.16 |
| 25 (32) | 68 | 6.3x7.7 | 17 | 45 | 1,000 | 0.16 |
| | 150 | 8x10 | 38 | 27 | 1,300 | 0.16 |
| | 270 | 10x10 | 68 | 22 | 1,500 | 0.16 |
| | 330 | 10x12 | 83 | 16 | 1,700 | 0.16 |
| 35 (44) | 47 | 6.3x7.7 | 16 | 60 | 900 | 0.16 |
| | 100 | 8x10 | 35 | 30 | 1,200 | 0.16 |
| | 150 | 10x10 | 53 | 23 | 1,400 | 0.16 |
| | 220 | 10x12 | 77 | 17 | 1,700 | 0.16 |
| 40 (50) | 27 | 6.3x7.7 | 11 | 70 | 900 | 0.16 |
| | 56 | 8x10 | 22 | 32 | 1,200 | 0.16 |
| | 100 | 10x10 | 40 | 24 | 1,400 | 0.16 |
| | 120 | 10x12 | 48 | 18 | 1,600 | 0.16 |
| 50 (63) | 15 | 6.3x7.7 | 8 | 80 | 800 | 0.16 |
| | 33 | 8x10 | 17 | 35 | 1,100 | 0.16 |
| | 56 | 10x10 | 28 | 25 | 1,300 | 0.16 |
| | 82 | 10x12 | 41 | 19 | 1,500 | 0.16 |
| 63 (79) | 10 | 6.3x7.7 | 6 | 100 | 700 | 0.16 |
| | 22 | 8x10 | 14 | 40 | 1,000 | 0.16 |
| | 33 | 8x10 | 21 | 40 | 1,000 | 0.16 |
| | | 10x10 | 21 | 30 | 1,200 | 0.16 |
| | 47 | 10x10 | 30 | 30 | 1,200 | 0.16 |
| 80 (100) | 56 | 10x12 | 35 | 22 | 1,400 | 0.16 |
| | 12 | 8x10 | 10 | 70 | 900 | 0.16 |
| | 15 | 10x10 | 12 | 70 | 900 | 0.16 |
| 100 (125) | 18 | 10x12 | 14 | 50 | 1,100 | 0.16 |
| | 10 | 8x10 | 10 | 80 | 800 | 0.16 |
| | 12 | 10x10 | 12 | 80 | 800 | 0.16 |
| 125 (157) | 15 | 10x12 | 15 | 60 | 1,000 | 0.16 |
| | 10 | 10x10 | 13 | 90 | 700 | 0.16 |

Frequency Coefficient of Permissible Ripple Current

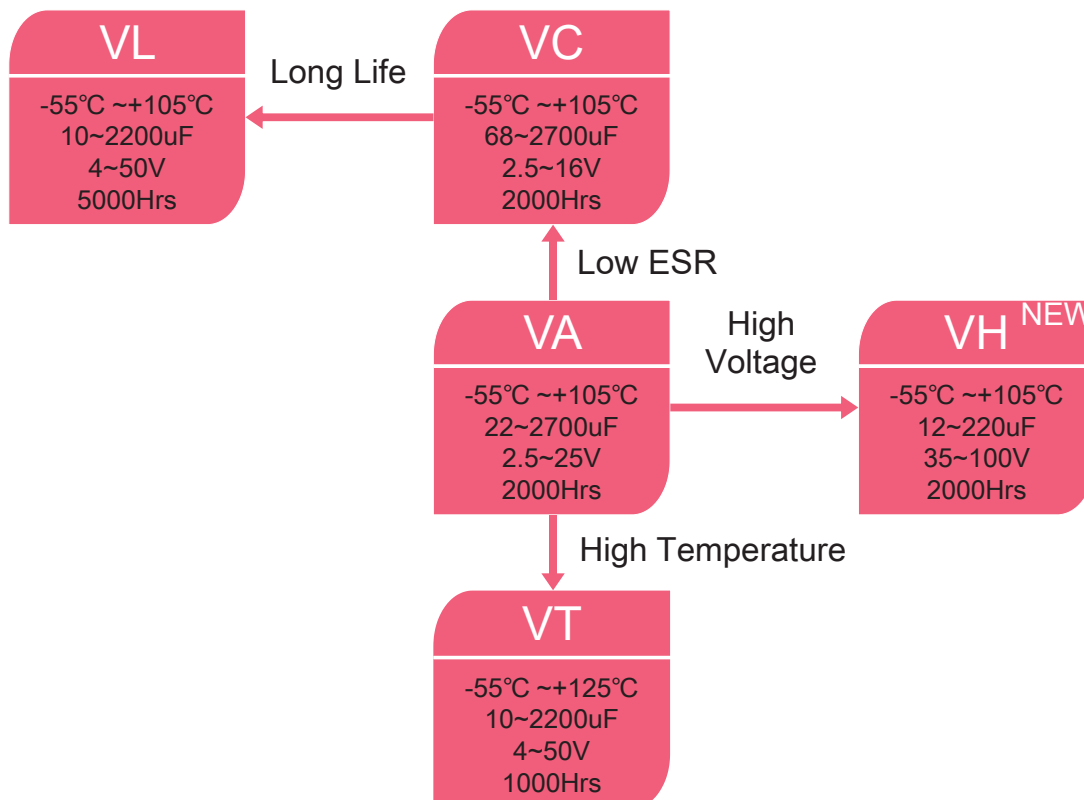
| Capacitance (μF) | Frequency (Hz) | | | |
|------------------|----------------|--------------|----------------|----------|
| | 100 ≤ F < 1K | 1K ≤ F < 10K | 10K ≤ F < 100K | 100K ≤ F |
| 4.7 < C ≤ 33 | 0.05 | 0.32 | 0.67 | 1.00 |
| 33 < C | 0.10 | 0.35 | 0.70 | 1.00 |

Series Chart

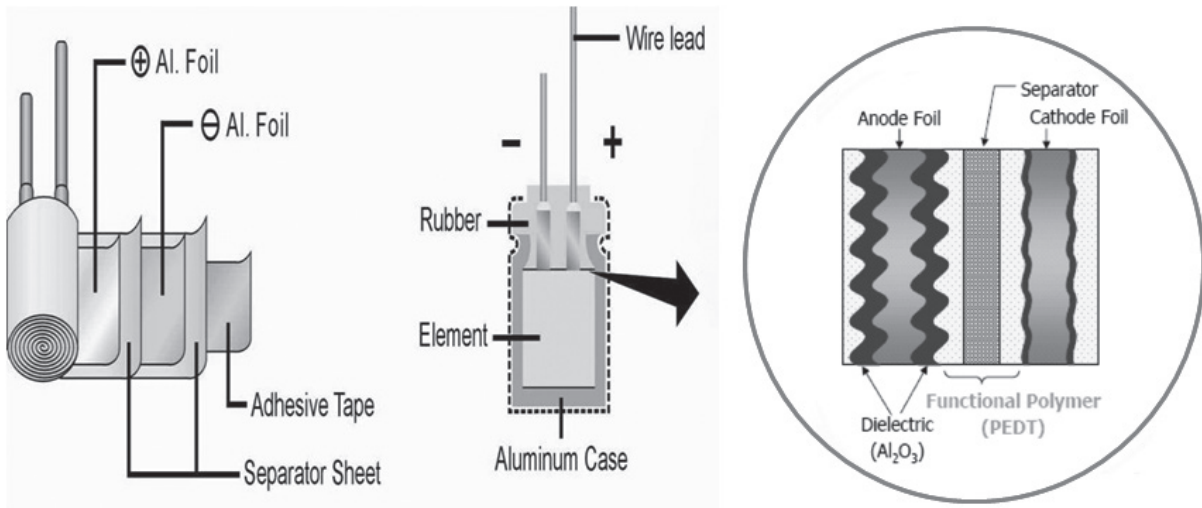
Radial Type



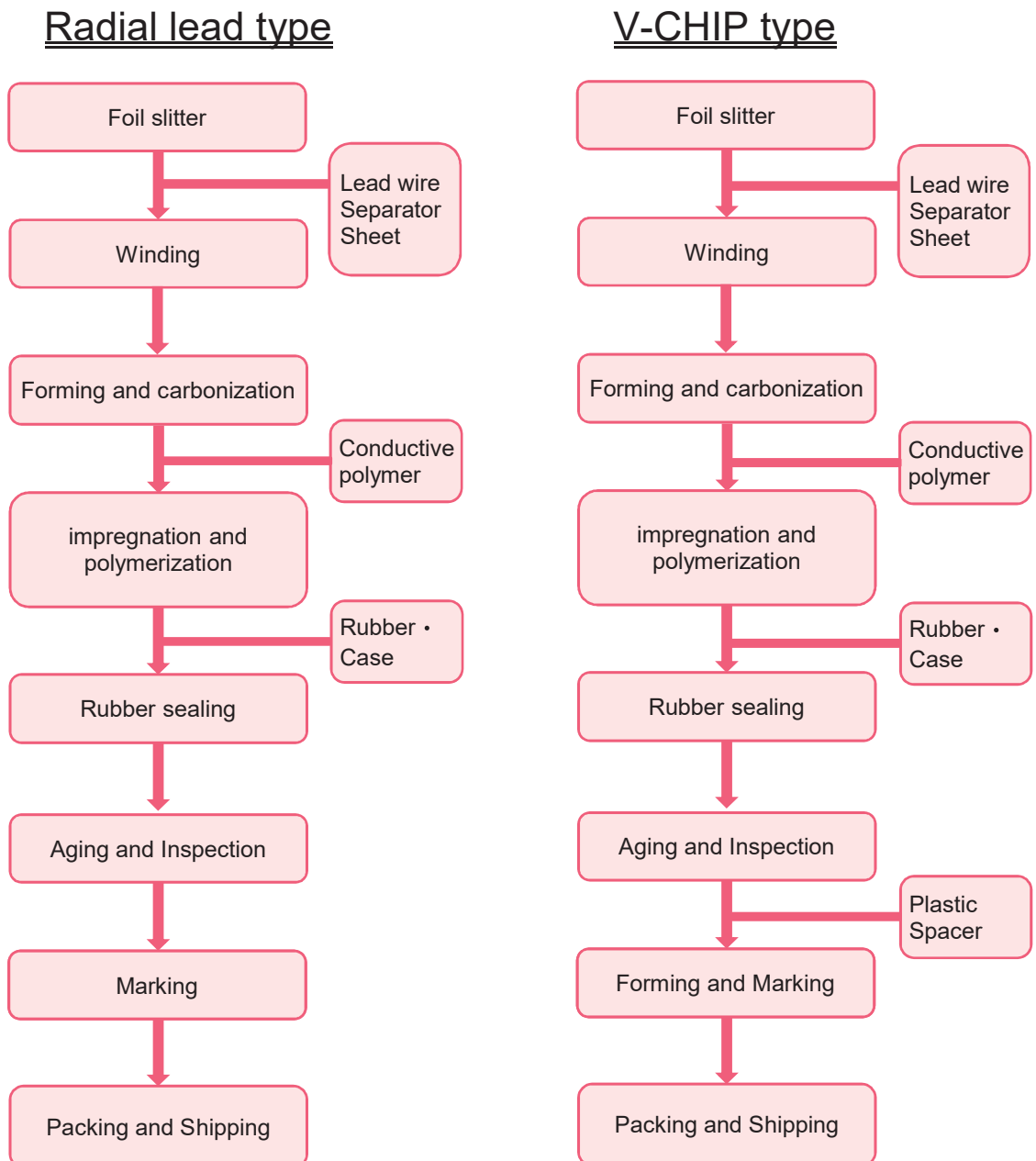
SMD Type



Basic structure



Manufacturing Method



EA series

- Standard radial lead type.
- Rated voltage : 2.5~25V.
- Endurance : 2,000hours at 105°C
- Applications : motherboards, servers,VGA ,etc.
- RoHS Compliance.
- Halogen Free compliant

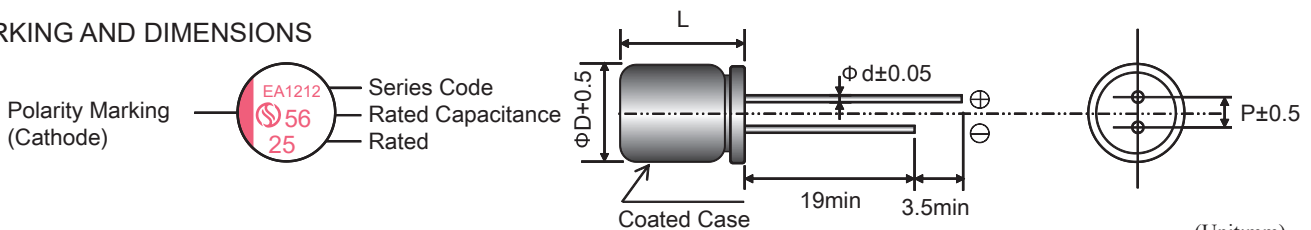


SPECIFICATIONS

| Items | Conditions | Characteristics |
|---|---|--|
| Category Temperature Range | — | -55 to +105°C |
| Rated Voltage Range | — | 2.5 ~ 25V |
| Capacitance Tolerance | at 20°C, 120 Hz | ±20% (M) |
| Surge Voltage | at 105°C | Rated voltage ×1.15V |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured,after 2minutes application of rated working voltage at +20°C. Please see the attached characteristics list |
| Dissipation Factor (tan δ) | at 20°C, 120 Hz | Please see the attached characteristics list |
| Characteristics of Impedance at low, high temperature | at -55°C,100kHz | $Z(-55^\circ C) / Z(+20^\circ C) \leq 1.25$ |
| | at -25°C,100kHz | $Z(-25^\circ C) / Z(+20^\circ C) \leq 1.15$ |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Damp Heag (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through aprotective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

MARKING AND DIMENSIONS



(Unit:mm)

| Size | 5x6 | 5x8 | 6.3×6 | 6.3x8 | 6.3x11 | 8x8 | 8×12 | 10x12、14 |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| φD | 5 | 5 | 6.3 | 6.3 | 6.3 | 8 | 8 | 10 |
| L | L+1.0 max | L+1.0 max | L+1.0 max | L+1.5 max | L+1.0 max | L+1.0 max | L+1.0 max | L+1.0 max |
| φd | 0.45 | 0.5 | 0.45 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 |
| P | 2 | 2 | 2.5 | 2.5 | 2.5 | 3.5 | 3.5 | 5.0 |

EA

EA SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|--|-------------------------------|
| 2.5 (2.9) | 390 | 6.3×6 | 300 | 35 | 2,100 | 0.12 |
| | 560 | 6.3×8 | 300 | 12 | 3,500 | 0.12 |
| | 560 | 8×8 | 300 | 12 | 4,320 | 0.12 |
| | 820 | 6.3×8 | 410 | 12 | 5,200 | 0.12 |
| | 1,200 | 8×8 | 600 | 12 | 5,200 | 0.12 |
| | 1,500 | 8×12 | 750 | 10 | 5,200 | 0.12 |
| | 2,700 | 10×12 | 1,350 | 10 | 5,230 | 0.12 |
| 4 (4.6) | 270 | 6.3×6 | 300 | 35 | 2,000 | 0.12 |
| | 560 | 6.3×8 | 448 | 15 | 3,500 | 0.12 |
| | 680 | 6.3×8 | 544 | 15 | 3,500 | 0.12 |
| | 820 | 8×8 | 656 | 13 | 5,100 | 0.12 |
| | 1,000 | 8×12 | 800 | 12 | 5,100 | 0.12 |
| | 2,200 | 10×12 | 1,760 | 12 | 5,560 | 0.12 |
| 6.3 (7.2) | 82 | 5×6 | 300 | 40 | 1,700 | 0.12 |
| | 100 | 6.3×6 | 300 | 35 | 1,900 | 0.12 |
| | 220 | 6.3×6 | 300 | 35 | 1,900 | 0.12 |
| | 470 | 6.3×8 | 592 | 15 | 3,630 | 0.12 |
| | 560 | 6.3×8 | 706 | 15 | 3,630 | 0.12 |
| | 560 | 8×8 | 706 | 15 | 4,210 | 0.12 |
| | 680 | 8×8 | 857 | 15 | 4,710 | 0.12 |
| | 1,000 | 8×12 | 1,260 | 14 | 5,100 | 0.12 |
| | 1,500 | 10×10 | 1,890 | 15 | 5,400 | 0.12 |
| | 2,200 | 10×12 | 2,772 | 15 | 5,400 | 0.12 |
| 10 (11.5) | 47 | 5×8 | 300 | 25 | 2,200 | 0.12 |
| | 220 | 5×8 | 440 | 25 | 2,200 | 0.12 |
| | 330 | 6.3×8 | 660 | 25 | 3,560 | 0.12 |
| | 680 | 8×8 | 1,360 | 25 | 3,700 | 0.12 |
| | 820 | 8×12 | 1,640 | 12 | 4,500 | 0.12 |
| | 1,500 | 10×12 | 3,000 | 12 | 5,440 | 0.12 |
| 16 (18.4) | 47 | 6.3×6 | 300 | 25 | 1,620 | 0.12 |
| | 82 | 6.3×6 | 300 | 25 | 1,890 | 0.12 |
| | 100 | 6.3×6 | 320 | 25 | 1,890 | 0.12 |
| | 270 | 6.3×8 | 864 | 15 | 2,680 | 0.12 |
| | 470 | 8×8 | 1,504 | 15 | 2,820 | 0.12 |
| | 560 | 8×12 | 1,792 | 20 | 3,640 | 0.12 |
| | 680 | 10×12 | 2,176 | 16 | 4,270 | 0.12 |
| | 820 | 10×12 | 2,624 | 16 | 4,270 | 0.12 |
| | 1,000 | 10×12 | 3,200 | 16 | 4,270 | 0.12 |

※ 1. Capacitance tolerance : ±20% (M)
 ※ 2. After 2 minutes

EA SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|--|-------------------------------|
| 20 (23.0) | 22 | 6.3×6 | 300 | 60 | 1,450 | 0.12 |
| | 82 | 6.3x6 | 328 | 60 | 1,450 | 0.12 |
| | 220 | 6.3x8 | 880 | 40 | 1,620 | 0.12 |
| | 330 | 8x8 | 1,320 | 40 | 2,400 | 0.12 |
| | 470 | 8x12 | 1,880 | 24 | 3,320 | 0.12 |
| | 820 | 10x12 | 3,280 | 20 | 3,800 | 0.12 |
| 25 (28.7) | 6.8 | 6.3×6 | 300 | 80 | 1,200 | 0.12 |
| | 47 | 6.3x6 | 300 | 40 | 2,000 | 0.12 |
| | 100 | 6.3x8 | 500 | 30 | 2,150 | 0.12 |
| | 180 | 8x8 | 900 | 30 | 2,580 | 0.12 |
| | 220 | 8x12 | 1,100 | 25 | 3,200 | 0.12 |
| | 330 | 10x10 | 1,650 | 28 | 3,800 | 0.12 |
| | 470 | 10x12 | 2,350 | 25 | 4,100 | 0.12 |
| | 560 | 10x14 | 2,800 | 16 | 4,500 | 0.12 |
| | 680 | 8x16 | 3,400 | 16 | 4,600 | 0.12 |
| | 820 | 10x14 | 4,100 | 16 | 5,000 | 0.12 |

※ 1. Capacitance tolerance : ±20% (M)

※ 2. After 2 minutes

FREQUENCY COEFFICIENT FOR RIPPLE CURRENT

| Frequency | 120Hz ≤ f < 1kHz | 1KHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f < 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

EA

EC series

- Low ESR at high frequency range.
- Rated voltage : 2.5~16V
- Endurance : 2,000 hours at 105°C
- Applications : LCD Monitor ,LCD-TV ,D/A Inverter ,SPS ,D/D Converter. etc.
- RoHS Compliance.
- Halogen Free compliant



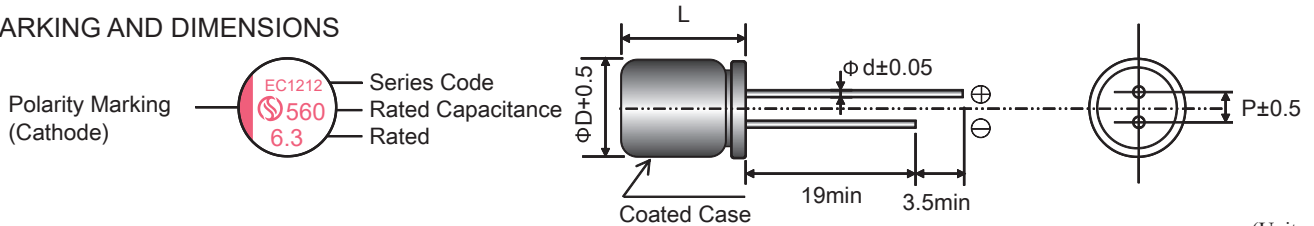
EC

SPECIFICATIONS

| Items | Conditions | Characteristics |
|---|---|--|
| Category Temperature Range | — | -55 to +105°C |
| Rated Voltage Range | — | 2.5 ~ 16V |
| Capacitance Tolerance | at 20°C, 120 Hz | ±20% (M) |
| Surge Voltage | at 105°C | Rated voltage x 1.15v |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured,after 2minutes application of rated working voltage at +20°C. Please see the attached characteristics list |
| Dissipation Factor (tan δ) | at 20°C, 120 Hz | Please see the attached characteristics list |
| Characteristics of Impedance at low, high temperature | at -55°C,100kHz | $Z(-55^{\circ}C) / Z(+20^{\circ}C) \leq 1.25$ |
| | at -25°C,100kHz | $Z(-25^{\circ}C) / Z(+20^{\circ}C) \leq 1.15$ |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| Damp Heag (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1kΩ) and discharge for 5 minutes 30 seconds. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

MARKING AND DIMENSIONS



(Unit:mm)

| Size | 5x6、8 | 6.3x6 | 6.3x8 | 6.3x11 | 8x8 | 8x12 | 8x16 | 8x20 | 10x12 | 10x16、20 |
|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| ϕD | 5 | 6.3 | 6.3 | 6.3 | 8 | 8 | 8 | 8 | 10 | 10 |
| L | L+1.0 max | L+1.0 max | L+1.5 max | L+1.0 max | L+1.5 max | L+1.0 max | L+1.0 max | L+1.5 max | L+1.0 max | L+1.5 max |
| ϕd | 0.45 | 0.45 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| P | 2 | 2.5 | 2.5 | 2.5 | 3.5 | 3.5 | 3.5 | 3.5 | 5.0 | 5.0 |

EC SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|--|-------------------------------|
| 2.5 (2.9) | 560 | 6.3×8 | 300 | 8 | 5,080 | 0.12 |
| | 560 | 8×8 | 300 | 7 | 5,820 | 0.12 |
| | 820 | 6.3×8 | 410 | 8 | 5,080 | 0.12 |
| | 1,200 | 8×8 | 600 | 7 | 5,580 | 0.12 |
| | 1,500 | 8×12 | 750 | 7 | 5,820 | 0.12 |
| | 2,700 | 10×12 | 1,350 | 7 | 6,100 | 0.12 |
| 4 (4.6) | 560 | 6.3×8 | 448 | 8 | 5,080 | 0.12 |
| | 560 | 8×8 | 448 | 7 | 5,580 | 0.12 |
| | 680 | 8×8 | 544 | 7 | 5,580 | 0.12 |
| | 820 | 8×12 | 656 | 7 | 5,820 | 0.12 |
| | 2200 | 10×12 | 1,760 | 7 | 6,100 | 0.12 |
| 6.3 (7.2) | 100 | 5×6 | 300 | 13 | 1,500 | 0.12 |
| | 270 | 5×8 | 340 | 12 | 2,400 | 0.12 |
| | 470 | 6.3×8 | 592 | 10 | 4,500 | 0.12 |
| | 560 | 6.3×8 | 706 | 10 | 5,080 | 0.12 |
| | 560 | 8×8 | 706 | 10 | 5,580 | 0.12 |
| | 1,000 | 8×12 | 1,260 | 7 | 5,820 | 0.12 |
| | 1,000 | 10×12 | 1,260 | 7 | 6,200 | 0.12 |
| | 2,200 | 10×12 | 2,772 | 7 | 6,200 | 0.12 |
| 10 (11.5) | 220 | 6.3×8 | 440 | 10 | 2,820 | 0.12 |
| | 270 | 6.3×8 | 540 | 10 | 3,580 | 0.12 |
| | 560 | 8×8 | 1,120 | 8 | 5,580 | 0.12 |
| | 680 | 8×8 | 1,360 | 9 | 5,580 | 0.12 |
| | 820 | 8×12 | 1,640 | 9 | 5,820 | 0.12 |
| | 1,000 | 10×12 | 2,000 | 9 | 6,100 | 0.12 |
| | 1,500 | 10×12 | 3,000 | 9 | 6,100 | 0.12 |

※ 1. Capacitance tolerance : ±20% (M)
 ※ 2. After 2 minutes



EC SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|--|-------------------------------|
| 16 (18.4) | 82 | 6.3×6 | 300 | 30 | 2,200 | 0.12 |
| | 100 | 6.3×6 | 320 | 30 | 2,200 | 0.12 |
| | 220 | 6.3×8 | 704 | 15 | 3,500 | 0.12 |
| | 270 | 6.3×8 | 864 | 15 | 3,500 | 0.12 |
| | 330 | 6.3×11 | 1,056 | 15 | 3,500 | 0.12 |
| | 470 | 8×8 | 1,504 | 13 | 4,500 | 0.12 |
| | 470 | 8×12 | 1,504 | 13 | 5,400 | 0.12 |
| | 470 | 10×12 | 1,504 | 13 | 6,100 | 0.12 |
| | 560 | 8×12 | 1,792 | 16 | 5,400 | 0.12 |
| | 680 | 10×12 | 2,176 | 16 | 6,100 | 0.12 |
| | 820 | 10×12 | 2,624 | 10 | 6,100 | 0.12 |
| | 1000 | 8×16 | 3,200 | 10 | 6,100 | 0.10 |
| | 1000 | 10×12 | 3,200 | 10 | 6,100 | 0.10 |
| | 1500 | 8x20 | 4,800 | 8 | 6,100 | 0.10 |
| | 1500 | 10x16 | 4,800 | 8 | 6,500 | 0.10 |
| | 1800 | 10x20 | 5,760 | 8 | 6,800 | 0.10 |
| 2200 | 10×20 | 7,040 | 8 | 6,800 | 0.10 | |

※ 1. Capacitance tolerance : ±20% (M)
 ※ 2. After 2 minutes

FREQUENCY COEFFICIENT FOR RIPPLE CURRENT

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f < 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

EC

EL series

- Super low ESR, High ripple current capability
- Rated voltage : 2.5~50V
- Endurance : 5,000 hours at 105°C
- Applications : Servers, LCD-TV power, Inverter etc.
- RoHS Compliance.
- Halogen Free compliant

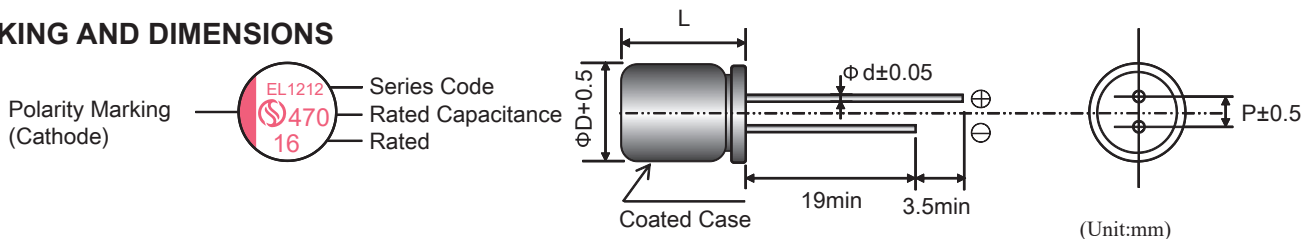


SPECIFICATIONS

| Items | Conditions | Characteristics |
|---|--|--|
| Category Temperature Range | — | -55 to +105°C |
| Rated Voltage Range | — | 2.5 ~ 50V |
| Capacitance Tolerance | at 20°C, 120 Hz | ±20% (M) |
| Surge Voltage | at 105°C | Rated voltage x 1.15v |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list |
| Dissipation Factor (tan δ) | at 20°C, 120 Hz | Please see the attached characteristics list |
| Characteristics of Impedance at low, high temperature | at -55°C, 100kHz | $Z(-55^\circ C) / Z(+20^\circ C) \leq 1.25$ |
| | at -25°C, 100kHz | $Z(-25^\circ C) / Z(+20^\circ C) \leq 1.15$ |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 5,000 hours at 105°C. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Damp Heag (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

MARKING AND DIMENSIONS



| Size | 6.3×6 | 6.3×8 | 8×8 | 8×12 | 10×10 | 10×12 |
|------|-----------|-----------|-----------|-----------|-----------|-----------|
| φ D | 6.3 | 6.3 | 8 | 8 | 10 | 10 |
| L | L+1.0 max | L+1.5 max | L+1.0 max | L+1.0 max | L+1.0 max | L+1.0 max |
| φ d | 0.45 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 |
| P | 2.5 | 2.5 | 3.5 | 3.5 | 5.0 | 5.0 |

EL SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|--|-------------------------------|
| 2.5 (2.9) | 220 | 6.3x6 | 300 | 24 | 2,400 | 0.12 |
| | 560 | 6.3x8 | 300 | 15 | 3,200 | 0.12 |
| | 1,000 | 8x8 | 500 | 15 | 3,640 | 0.12 |
| | 1,200 | 8x12 | 600 | 10 | 5,200 | 0.12 |
| | 1,800 | 10x12 | 900 | 10 | 5,200 | 0.12 |
| | 2,200 | 10x12 | 1,100 | 10 | 5,500 | 0.12 |
| 6.3 (7.2) | 100 | 6.3x6 | 300 | 24 | 2,400 | 0.12 |
| | 180 | 6.3x6 | 300 | 24 | 2,400 | 0.12 |
| | 470 | 6.3x8 | 592 | 15 | 3,500 | 0.12 |
| | 560 | 6.3x8 | 706 | 15 | 3,500 | 0.12 |
| | 560 | 8x8 | 706 | 15 | 4,100 | 0.12 |
| | 680 | 8x8 | 856 | 15 | 4,300 | 0.12 |
| | 1,000 | 8x12 | 1,260 | 12 | 5,000 | 0.12 |
| | 1,200 | 10x10 | 1,512 | 15 | 5,200 | 0.12 |
| 10 (11.5) | 120 | 6.3x6 | 300 | 24 | 2,400 | 0.12 |
| | 330 | 6.3x8 | 660 | 15 | 3,500 | 0.12 |
| | 560 | 8x8 | 1,120 | 15 | 4,000 | 0.12 |
| | 680 | 8x12 | 1,360 | 15 | 4,800 | 0.12 |
| | 1,000 | 10x10 | 2,000 | 15 | 4,800 | 0.12 |
| | 1,200 | 10x12 | 2,400 | 12 | 5,500 | 0.12 |
| 16 (18.4) | 82 | 6.3x6 | 300 | 24 | 2,400 | 0.12 |
| | 100 | 6.3x8 | 320 | 15 | 3,500 | 0.12 |
| | 220 | 6.3x8 | 704 | 15 | 3,500 | 0.12 |
| | 330 | 8x8 | 1,056 | 15 | 4,200 | 0.12 |
| | 470 | 8x12 | 1,504 | 12 | 4,500 | 0.12 |
| | 470 | 10x12 | 1,504 | 10 | 5,100 | 0.12 |
| | 680 | 10x10 | 2,176 | 15 | 5,100 | 0.12 |
| | 820 | 10x12 | 2,624 | 15 | 5,400 | 0.12 |
| | 1,000 | 10x12 | 3,200 | 15 | 5,400 | 0.12 |
| 25 (28.7) | 47 | 6.3x6 | 300 | 40 | 1,500 | 0.12 |
| | 100 | 6.3x9 | 500 | 30 | 2,500 | 0.12 |
| | 180 | 8x8 | 900 | 30 | 3,260 | 0.12 |
| | 220 | 8x12 | 1,100 | 30 | 3,520 | 0.12 |
| | 330 | 10x10 | 1,650 | 20 | 3,850 | 0.12 |
| | 470 | 10x12 | 2,350 | 25 | 4,020 | 0.12 |
| 35 (40.2) | 22 | 6.3x6 | 300 | 70 | 1,450 | 0.12 |
| | 68 | 6.3x8 | 476 | 60 | 1,520 | 0.12 |
| | 120 | 8x8 | 840 | 30 | 2,100 | 0.12 |
| | 150 | 8x12 | 1,050 | 26 | 2,800 | 0.12 |
| | 220 | 10x10 | 1,540 | 30 | 3,050 | 0.12 |
| | 270 | 10x12 | 1,890 | 26 | 3,650 | 0.12 |

EL

EL SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|--|-------------------------------|
| 50 (57.5) | 10 | 6.3x6 | 300 | 90 | 900 | 0.12 |
| | 33 | 6.3x8 | 330 | 60 | 1,500 | 0.12 |
| | 47 | 8x8 | 470 | 32 | 2,000 | 0.12 |
| | 68 | 8x12 | 680 | 28 | 2,200 | 0.12 |
| | 100 | 10x10 | 1,000 | 32 | 2,350 | 0.12 |
| | 100 | 10x12 | 1,000 | 28 | 2,550 | 0.12 |

※ 1. Capacitance tolerance : ±20% (M)
 ※ 2. After 2 minutes

FREQUENCY COEFFICIENT FOR RIPPLE CURRENT

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f < 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |



EH series

- Low ESR, High Voltage, High ripple current capability
- Rated voltage :35~100V
- Endurance:2,000hours at 105°C
- Applications: LED Driver, LED Power Supply etc.
- RoHS compliant
- Halogen Free compliant



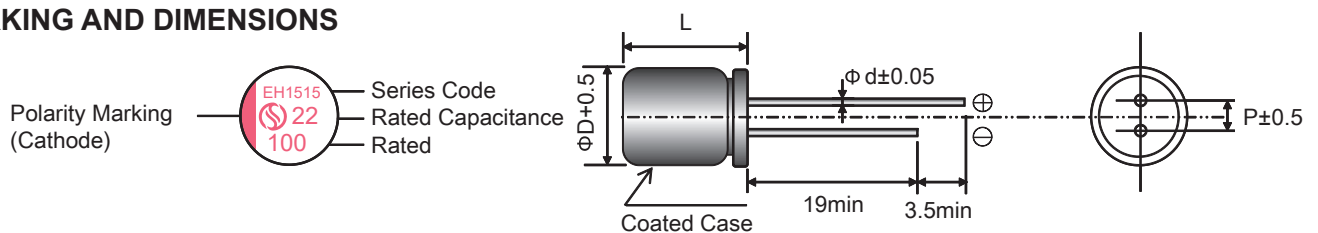
EH

SPECIFICATIONS

| Items | Conditions | Characteristics |
|---|--|--|
| Category Temperature Range | — | -55 to +105°C |
| Rated Voltage Range | — | 35 ~ 100V |
| Capacitance Tolerance | at 20°C, 120Hz | ±20%(M) |
| Surge Voltage | at 105°C | Rated voltage × 1.15V |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list |
| Dissipation Factor (tan δ) | at 20°C, 120Hz | Please see the attached characteristics list |
| Characteristics of Impedance at low, high temperature | at -55°C, 100kHz | $Z(-55^\circ C)/Z(+20^\circ C) \leq 1.25$ |
| | at -25°C, 100kHz | $Z(-25^\circ C)/Z(+20^\circ C) \leq 1.15$ |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF(tanδ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Damp Heat (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF(tanδ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF(tanδ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

MARKING AND DIMENSIONS



| Size | 6.3x6 | 6.3x8 | 8x7 | 8x8 | 8x12 | 10x10 | 10x12 | 10x16 |
|------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| φD | 6.3 | 6.3 | 8 | 8 | 8 | 10 | 10 | 10 |
| L | L+1 max | L+1.5 max | L+1.0 max | L+1.0 max | L+1.0 max | L+1.0 max | L+1.0 max | L+1.0 max |
| φd | 0.45 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| P | 2.5 | 2.5 | 3.5 | 3.5 | 3.5 | 5.0 | 5.0 | 5.0 |

EH SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|--|-------------------------------|
| 35 (40.3) | 22 | 6.3x6 | 300 | 70 | 1,450 | 0.12 |
| | 68 | 6.3x8 | 476 | 40 | 1,500 | 0.12 |
| | 82 | 8x7 | 574 | 60 | 1,800 | 0.12 |
| | 100 | 8x8 | 700 | 30 | 2,100 | 0.12 |
| | 100 | 8x12 | 700 | 26 | 2,300 | 0.12 |
| | 100 | 10x12 | 700 | 24 | 3,000 | 0.12 |
| | 150 | 8x8 | 1,050 | 30 | 2,500 | 0.12 |
| | 180 | 8x12 | 1,260 | 26 | 2,800 | 0.12 |
| | 220 | 10x10 | 1,540 | 26 | 3,000 | 0.12 |
| | 220 | 10x12 | 1,540 | 24 | 3,200 | 0.12 |
| | 330 | 10x12 | 2,310 | 24 | 3,600 | 0.12 |
| | 470 | 10x16 | 3,290 | 20 | 5,000 | 0.12 |
| 50 (57.5) | 12 | 6.3x8 | 300 | 60 | 1,500 | 0.12 |
| | 33 | 6.3x8 | 330 | 60 | 1,500 | 0.12 |
| | 33 | 8x7 | 330 | 60 | 1,500 | 0.12 |
| | 47 | 8x8 | 470 | 32 | 1,850 | 0.12 |
| | 68 | 8x12 | 680 | 30 | 2,250 | 0.12 |
| | 47 | 8x12 | 470 | 30 | 2,250 | 0.12 |
| | 100 | 10x12 | 1,000 | 28 | 2,560 | 0.12 |
| | 150 | 10x12 | 1,500 | 28 | 2,620 | 0.12 |
| 63 (72.5) | 22 | 6.3x8 | 300 | 60 | 1,500 | 0.12 |
| | 33 | 8x8 | 415 | 32 | 2,050 | 0.12 |
| | 33 | 10x10 | 415 | 32 | 2,200 | 0.12 |
| | 47 | 8x12 | 592 | 26 | 2,200 | 0.12 |
| | 56 | 10x10 | 705 | 30 | 2,300 | 0.12 |
| | 82 | 10x12 | 1,033 | 26 | 2,350 | 0.12 |
| | 100 | 10x12 | 1,260 | 25 | 2,550 | 0.12 |
| 80 (92.0) | 22 | 8x8 | 352 | 35 | 1,850 | 0.12 |
| | 33 | 8x12 | 528 | 32 | 1,950 | 0.12 |
| | 47 | 10x10 | 752 | 33 | 2,200 | 0.12 |
| | 68 | 10x12 | 1,088 | 28 | 2,350 | 0.12 |
| 100 (115.0) | 15 | 8x12 | 300 | 40 | 1,850 | 0.12 |
| | 22 | 10x12 | 440 | 38 | 2,250 | 0.12 |
| | 27 | 10x12 | 540 | 38 | 2,250 | 0.12 |

※ 1. Capacitance tolerance : ±20% (M)
 ※ 2. After 2 minutes

FREQUENCY COEFFICIENT FOR RIPPLE CURRENT

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f < 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

ET series

- High temperature, low ESR, High ripple current capability
- Rated voltage :4~50V
- Endurance:1,000hours at 125°C
- Applications: DC-DC Converters, Voltage Regulators, Decoupling Applications for Computer Motherboards, etc.
- RoHS compliant
- Halogen Free compliant



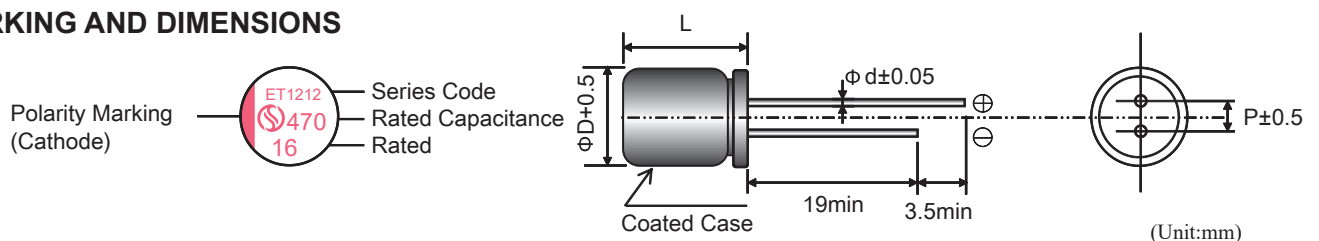
ET

SPECIFICATIONS

| Items | Conditions | Characteristics |
|---|--|--|
| Category Temperature Range | — | -55 to +125°C |
| Rated Voltage Range | — | 4 ~ 50V |
| Capacitance Tolerance | at 20°C, 120Hz | ±20%(M) |
| Surge Voltage | at 125°C | Rated voltage × 1.15V |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list |
| Dissipation Factor ($\tan \delta$) | at 20°C, 120Hz | Please see the attached characteristics list |
| Characteristics of Impedance at low, high temperature | at -55°C, 100kHz | $Z(-55^\circ C)/Z(+20^\circ C) \leq 1.25$ |
| | at -25°C, 100kHz | $Z(-25^\circ C)/Z(+20^\circ C) \leq 1.15$ |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1,000 hours at 125°C. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF($\tan \delta$) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Damp Heat (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF($\tan \delta$) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor ($R=1k\Omega$) and discharge for 5 minutes 30 seconds. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF($\tan \delta$) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |

※ Note: If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment :DC rated voltage are applied to the capacitors for 120 minutes at 125°C.

MARKING AND DIMENSIONS



| Size | 6.3x6 | 6.3x8 | 8x7 | 8x8 | 8x12 | 10x10 | 10x12 |
|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| ϕD | 6.3 | 6.3 | 8 | 8 | 8 | 10 | 10 |
| L | L+1.0 max | L+1.5 max | L+1.0 max | L+1.5 max | L+1.0 max | L+1.0 max | L+1.0 max |
| ϕd | 0.45 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 |
| P | 2.5 | 2.5 | 3.5 | 3.5 | 3.5 | 5.0 | 5.0 |

ET

ET SERIES STANRD CHARACTERISITICS LIST

| Rated voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (uA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) | | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|-------------------------------|--------------|-------------------------------|
| | | | | | 105°C 100kHz | 125°C 100kHz | |
| 4 (4.6) | 100 | 6.3×6 | 300 | 40 | 2390 | 797 | 0.12 |
| | 330 | 6.3x8 | 300 | 20 | 3200 | 1067 | 0.12 |
| | 560 | 6.3x8 | 448 | 20 | 3200 | 1067 | 0.12 |
| | 1,000 | 8x8 | 800 | 20 | 3800 | 1267 | 0.12 |
| | 1,200 | 8x12 | 960 | 16 | 4200 | 1400 | 0.12 |
| | 2,500 | 10x12 | 2,000 | 16 | 5460 | 1820 | 0.12 |
| 6.3 (7.2) | 100 | 6.3x6 | 300 | 40 | 2100 | 700 | 0.12 |
| | 470 | 6.3x8 | 592 | 20 | 3100 | 1033 | 0.12 |
| | 560 | 8x8 | 705 | 20 | 4300 | 1433 | 0.12 |
| | 1,000 | 8x12 | 1,260 | 16 | 5100 | 1700 | 0.12 |
| | 1,200 | 8x12 | 1,512 | 16 | 5100 | 1700 | 0.12 |
| | 1,500 | 10x10 | 1,890 | 20 | 5200 | 1733 | 0.12 |
| | 1,800 | 10x12 | 2,268 | 16 | 5440 | 1813 | 0.12 |
| 10 (11.5) | 100 | 6.3x6 | 300 | 40 | 1800 | 600 | 0.12 |
| | 330 | 6.3x8 | 660 | 20 | 2360 | 787 | 0.12 |
| | 330 | 8x7 | 660 | 40 | 2560 | 853 | 0.12 |
| | 560 | 8x8 | 1,120 | 20 | 3200 | 1067 | 0.12 |
| | 820 | 8x12 | 1,640 | 16 | 4200 | 1400 | 0.12 |
| | 1,000 | 10x10 | 2,000 | 20 | 5120 | 1707 | 0.12 |
| | 1,200 | 10x12 | 2,400 | 16 | 5600 | 1867 | 0.12 |
| 16 (18.4) | 47 | 6.3x6 | 300 | 30 | 1620 | 540 | 0.12 |
| | 82 | 6.3x6 | 300 | 30 | 1620 | 540 | 0.12 |
| | 100 | 6.3x8 | 320 | 20 | 2120 | 707 | 0.12 |
| | 330 | 8x8 | 1,056 | 20 | 4300 | 1433 | 0.12 |
| | 470 | 8x12 | 1,504 | 16 | 4500 | 1500 | 0.12 |
| | 560 | 10x12 | 1,792 | 16 | 4700 | 1567 | 0.12 |
| | 820 | 10x12 | 2,624 | 16 | 4700 | 1567 | 0.12 |
| 25 (28.8) | 47 | 6.3x6 | 300 | 50 | 2000 | 667 | 0.12 |
| | 100 | 6.3x8 | 500 | 30 | 2000 | 667 | 0.12 |
| | 180 | 8x8 | 900 | 28 | 3100 | 1033 | 0.12 |
| | 220 | 8x12 | 1,100 | 24 | 3600 | 1200 | 0.12 |
| | 330 | 10x12 | 1,650 | 24 | 4250 | 1417 | 0.12 |
| | 470 | 10x12 | 2,350 | 24 | 4200 | 1400 | 0.12 |
| 35 (40.3) | 22 | 6.3x6 | 300 | 70 | 1450 | 483 | 0.12 |
| | 68 | 6.3x8 | 476 | 60 | 1500 | 500 | 0.12 |
| | 120 | 8x8 | 840 | 30 | 2200 | 733 | 0.12 |
| | 150 | 8x12 | 1,050 | 28 | 2600 | 867 | 0.12 |
| | 220 | 10x10 | 1,540 | 28 | 2950 | 983 | 0.12 |
| | 270 | 10x12 | 1,890 | 28 | 3200 | 1067 | 0.12 |
| 50 (57.5) | 10 | 6.3x6 | 300 | 60 | 1400 | 467 | 0.12 |
| | 33 | 6.3x8 | 330 | 60 | 1500 | 500 | 0.12 |
| | 47 | 8x8 | 470 | 30 | 2000 | 667 | 0.12 |
| | 68 | 8x12 | 680 | 28 | 2200 | 733 | 0.12 |
| | 100 | 10x10 | 1,000 | 28 | 2300 | 767 | 0.12 |
| | 100 | 10x12 | 1,000 | 28 | 2500 | 833 | 0.12 |

※ 1. Capacitance tolerance : ±20%(M)
 ※ 2. After 2 minutes

FREQUENCY COEFFICIENT FOR RIPPLE CURRENT

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f < 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

EP series

- High temperature, low ESR, High ripple current capability
- Rated voltage :6.3~35V
- Endurance:2,000hours at 125°C
- Applications: Lamps Power, LED Power, Service Equipment.
- RoHS compliant
- Halogen Free compliant



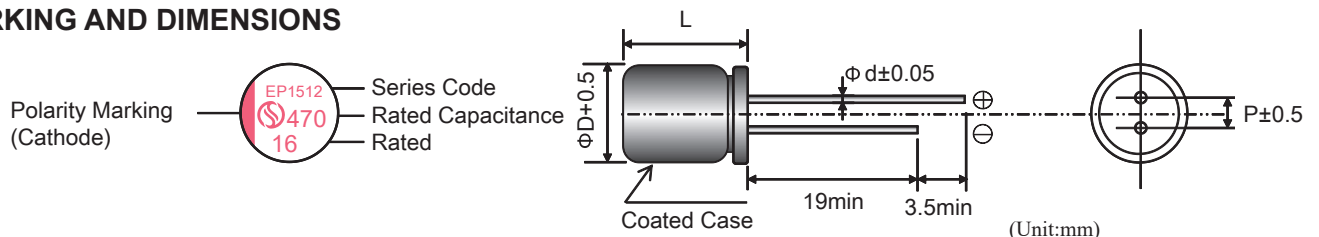
EP

SPECIFICATIONS

| Items | Conditions | Characteristics |
|---|--|--|
| Category Temperature Range | — | -55 to +125°C |
| Rated Voltage Range | — | 6.3 ~ 35V |
| Capacitance Tolerance | at 20°C, 120Hz | ±20%(M) |
| Surge Voltage | at 125°C | Rated voltage × 1.15V |
| Leakage Current | at 20°C after 2 minutes | I ≤ 0.2CV or 300(μA) Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list |
| Dissipation Factor (tan δ) | at 20°C, 120Hz | Please see the attached characteristics list |
| Characteristics of Impedance at low, high temperature | at -55°C, 100kHz | Z(-55°C)/Z(+20°C) ≤ 1.25 |
| | at +105°C, 100kHz | Z(+105°C)/Z(+20°C) ≤ 1.15 |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 125°C. | Appearance NO significant damage. |
| | | Capacitance change ≤ ±20% of the initial value. |
| | | DF(tanδ) ≤ 150% of the initial specified value. |
| | | ESR ≤ 150% of the initial specified value. |
| | | Leakage current ≤ The initial specified value. |
| Damp Heat (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance NO significant damage. |
| | | Capacitance change ≤ ±20% of the initial value. |
| | | DF(tanδ) ≤ 150% of the initial specified value. |
| | | ESR ≤ 150% of the initial specified value. |
| | | Leakage current ≤ The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R=1kΩ) and discharge for 5 minutes 30 seconds | Appearance NO significant damage. |
| | | Capacitance change ≤ ±20% of the initial value. |
| | | DF(tanδ) ≤ 150% of the initial specified value. |
| | | ESR ≤ 150% of the initial specified value. |
| | | Leakage current ≤ The initial specified value. |

※ Note: If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment :DC rated voltage are applied to the capacitors for 120 minutes at 125°C.

MARKING AND DIMENSIONS



| Size | 6.3x8 | 8x8 | 8x12 | 10x10 | 10x12 |
|----------|-----------|-----------|-----------|-----------|-----------|
| ϕD | 6.3 | 8.0 | 8.0 | 10.0 | 10.0 |
| L | L+1.5 max | L+1.5 max | L+1.0 max | L+1.0 max | L+1.0 max |
| ϕd | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 |
| P | 2.5 | 3.5 | 3.5 | 5.0 | 5.0 |

EP SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms/100kHz) | | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|--------------------------------------|----------------------|-------------------------------|
| | | | | | -55°C ≤ 环境温度 ≤ 105°C | 105°C ≤ 环境温度 ≤ 125°C | |
| 6.3 (7.3) | 470 | 6.3x8 | 592 | 25 | 3,800 | 1,267 | 0.12 |
| | 680 | 8x8 | 857 | 25 | 4,000 | 1,333 | 0.12 |
| | 1,000 | 8x12 | 1,260 | 20 | 4,200 | 1,400 | 0.12 |
| | 1,200 | 10x10 | 1,512 | 25 | 5,500 | 1,833 | 0.12 |
| | 1,800 | 10x12 | 2,268 | 20 | 6,100 | 2,033 | 0.12 |
| 10 (11.5) | 330 | 6.3x8 | 660 | 25 | 3,700 | 1,233 | 0.12 |
| | 560 | 8x8 | 1,120 | 25 | 4,000 | 1,333 | 0.12 |
| | 680 | 8x12 | 1,360 | 20 | 4,500 | 1,500 | 0.12 |
| | 820 | 10x10 | 1,640 | 25 | 4,200 | 1,400 | 0.12 |
| | 1,000 | 10x10 | 2,000 | 25 | 4,500 | 1,500 | 0.12 |
| | 1,200 | 10x12 | 2,400 | 20 | 5,600 | 1,867 | 0.12 |
| 16 (18.6) | 220 | 6.3x8 | 704 | 25 | 2,850 | 950 | 0.12 |
| | 330 | 8x8 | 1,056 | 25 | 4,000 | 1,333 | 0.12 |
| | 470 | 8x12 | 1,504 | 20 | 4,500 | 1,500 | 0.12 |
| | 680 | 10x10 | 2,176 | 25 | 5,100 | 1,700 | 0.12 |
| | 820 | 10x12 | 2,624 | 20 | 5,600 | 1,867 | 0.12 |
| 20 (23.0) | 120 | 6.3x8 | 480 | 25 | 2,510 | 837 | 0.12 |
| | 220 | 8x8 | 880 | 25 | 2,750 | 917 | 0.12 |
| | 270 | 8x12 | 1,080 | 20 | 2,950 | 983 | 0.12 |
| | 330 | 10x10 | 1,320 | 25 | 4,700 | 1,567 | 0.12 |
| | 470 | 10x12 | 1,880 | 20 | 4,950 | 1,650 | 0.12 |
| 25 (28.7) | 100 | 6.3x8 | 500 | 40 | 2,380 | 793 | 0.12 |
| | 180 | 8x8 | 900 | 30 | 2,900 | 967 | 0.12 |
| | 220 | 8x8 | 1,100 | 28 | 3,500 | 1,167 | 0.12 |
| | 330 | 10x10 | 1,650 | 30 | 4,250 | 1,417 | 0.12 |
| | 470 | 10x12 | 2,350 | 28 | 4,500 | 1,500 | 0.12 |
| 35 (40.2) | 56 | 6.3x8 | 392 | 60 | 2,300 | 767 | 0.12 |
| | 100 | 8x8 | 700 | 50 | 2,500 | 833 | 0.12 |
| | 120 | 8x12 | 840 | 30 | 2,950 | 983 | 0.12 |
| | 150 | 10x10 | 1,050 | 30 | 2,950 | 983 | 0.12 |
| | 220 | 10x12 | 1,540 | 28 | 3,400 | 1,133 | 0.12 |

※ 1. Capacitance tolerance : ±20% (M)
 ※ 2. After 2 minutes

FREQUENCY COEFFICIENT FOR RIPPLE CURRENT

| | | | | |
|-------------|------------------|------------------|--------------------|---------------------|
| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f < 500kHz |
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

EP

VA series

- Standard SMD type
- Rated voltage : 2.5~25V
- Endurance : 2,000 hours at 105°C
- Applications : motherboards, serves, VGA. etc.
- RoHS Compliance.
- Halogen Free compliant



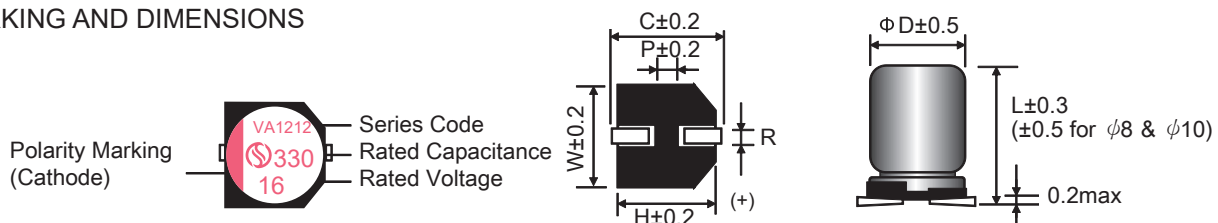
VA

SPECIFICATIONS

| Items | Conditions | Characteristics |
|---|---|--|
| Category Temperature Range | — | -55 to +105°C |
| Rated Voltage Range | — | 2.5 ~ 25V |
| Capacitance Tolerance | at 20°C, 120Hz | ±20%(M) |
| Surge Voltage | at 105°C | Rated voltage ×1.15V |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list |
| Dissipation Factor (tan δ) | at 20°C, 120Hz | Please see the attached characteristics list |
| Characteristics of Impedance at low, high temperature | at -55°C, 100kHz | $Z(-55^\circ C)/Z(+20^\circ C) \leq 1.25$ |
| | at -25°C, 100kHz | $Z(-25^\circ C)/Z(+20^\circ C) \leq 1.15$ |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Damp Heat (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R=1kΩ) and discharge for 5 minutes 30 seconds. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |

※ Note: If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

MARKING AND DIMENSIONS



(Unit:mm)

| φ D×L | φ D | L | W | H | C | R | P |
|---------|------|------|------|------|------|---------|-----|
| 5×6 | 5.0 | 6.0 | 5.3 | 5.3 | 6.0 | 0.5~0.8 | 1.4 |
| 6.3×6 | 6.3 | 6.0 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 |
| 6.3×7 | 6.3 | 7.0 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 |
| 6.3×9.5 | 6.3 | 9.5 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 |
| 8×7 | 8.0 | 7.0 | 8.3 | 8.3 | 9.3 | 0.5~0.8 | 3.2 |
| 8×9.5 | 8.0 | 10.0 | 8.3 | 8.3 | 9.3 | 0.8~1.1 | 3.2 |
| 8×12 | 8.0 | 12.0 | 8.3 | 8.3 | 9.0 | 0.8~1.1 | 3.2 |
| 10×10 | 10.0 | 10.0 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |
| 10×12.5 | 10.0 | 12.5 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |

VA SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|--|-------------------------------|
| 2.5 (2.9) | 220 | 6.3x6 | 300 | 25 | 2,390 | 0.12 |
| | 330 | 6.3x6 | 300 | 25 | 2,390 | 0.12 |
| | 560 | 6.3x7 | 300 | 25 | 2,390 | 0.12 |
| | 820 | 6.3x9.5 | 410 | 20 | 3,000 | 0.12 |
| | 1,200 | 8x9.5 | 600 | 20 | 4,520 | 0.12 |
| | 1,500 | 8x9.5 | 750 | 20 | 4,520 | 0.12 |
| | 1,800 | 8x12 | 900 | 13 | 4,520 | 0.12 |
| | 2,200 | 10x10 | 1,100 | 18 | 4,520 | 0.12 |
| | 2,700 | 10x12.5 | 1,350 | 15 | 5,200 | 0.12 |
| 4 (6.3) | 220 | 6.3x6 | 300 | 25 | 2,000 | 0.12 |
| | 560 | 6.3x9.5 | 448 | 20 | 4,500 | 0.12 |
| | 820 | 8x9.5 | 656 | 20 | 4,500 | 0.12 |
| | 1,000 | 8x9.5 | 800 | 20 | 4,500 | 0.12 |
| | 1,200 | 8x12 | 960 | 15 | 4,820 | 0.12 |
| | 1,500 | 10x10 | 1,200 | 15 | 4,820 | 0.12 |
| | 2,200 | 10x12.5 | 1,760 | 15 | 5,200 | 0.12 |
| 6.3 (7.2) | 100 | 6.3x6 | 300 | 25 | 2,400 | 0.12 |
| | 220 | 6.3x6 | 300 | 25 | 2,400 | 0.12 |
| | 220 | 8x7 | 300 | 25 | 3,020 | 0.12 |
| | 560 | 6.3x9.5 | 705 | 20 | 3,020 | 0.12 |
| | 820 | 8x9.5 | 1,033 | 20 | 4,500 | 0.12 |
| | 1,000 | 8x9.5 | 1,260 | 20 | 4,500 | 0.12 |
| | 1,200 | 8x12 | 1,512 | 15 | 4,800 | 0.12 |
| | 1,500 | 10x10 | 1,890 | 15 | 4,950 | 0.12 |
| | 2,200 | 10x12 | 2,772 | 15 | 5,200 | 0.12 |
| 10 (11.5) | 33 | 5x6 | 300 | 45 | 1,100 | 0.12 |
| | 100 | 6.3x6 | 300 | 30 | 1,700 | 0.12 |
| | 150 | 6.3x6 | 300 | 45 | 1,700 | 0.12 |
| | 330 | 6.3x9.5 | 660 | 45 | 2,050 | 0.12 |
| | 560 | 8x9.5 | 1,120 | 35 | 2,560 | 0.12 |
| | 680 | 8x9.5 | 1,360 | 35 | 2,560 | 0.12 |
| | 820 | 8x12 | 1,640 | 17 | 3,950 | 0.12 |
| | 1,000 | 10x10 | 2,000 | 15 | 3,950 | 0.12 |
| | 1,500 | 10x12 | 3,000 | 13 | 5,230 | 0.12 |
| 16 (18.4) | 22 | 5x6 | 300 | 40 | 1,000 | 0.12 |
| | 100 | 6.3x6 | 320 | 35 | 1,620 | 0.12 |
| | 270 | 6.3x9.5 | 864 | 20 | 2,500 | 0.12 |
| | 270 | 8x9.5 | 864 | 20 | 3,200 | 0.12 |
| | 330 | 8x9.5 | 1,056 | 20 | 3,690 | 0.12 |
| | 470 | 8x9.5 | 1,504 | 20 | 3,890 | 0.12 |
| | 560 | 8x12 | 1,792 | 20 | 3,940 | 0.12 |
| | 680 | 10x10 | 2,176 | 20 | 4,220 | 0.12 |
| | 820 | 10x12.5 | 2,624 | 16 | 4,720 | 0.12 |
| 1,000 | 10x12.5 | 3,200 | 16 | 5,200 | 0.12 | |

※ 1. Capacitance tolerance : ±20% (M)
 ※ 2. After 2 minutes

VA

VA SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|--|-------------------------------|
| 20 (23.1) | 68 | 6.3×6 | 300 | 38 | 1,450 | 0.12 |
| | 180 | 6.3×9.5 | 720 | 30 | 2,450 | 0.12 |
| | 330 | 8×9.5 | 1,320 | 30 | 3,000 | 0.12 |
| | 470 | 8×12 | 1,880 | 28 | 3,320 | 0.12 |
| | 560 | 10×10 | 2,240 | 28 | 3,320 | 0.12 |
| | 680 | 10×12 | 2,720 | 28 | 4,220 | 0.12 |
| 25 (28.7) | 47 | 6.3×6 | 300 | 40 | 1,200 | 0.12 |
| | 100 | 6.3×9.5 | 500 | 30 | 2,000 | 0.12 |
| | 100 | 8×7 | 500 | 40 | 2,000 | 0.12 |
| | 150 | 8×9.5 | 750 | 35 | 3,000 | 0.12 |
| | 220 | 8×12 | 1,100 | 28 | 3,500 | 0.12 |
| | 330 | 10×10 | 1,650 | 30 | 3,800 | 0.12 |
| | 470 | 10×12 | 2,350 | 28 | 4,000 | 0.12 |

※ 1. Capacitance tolerance : ±20% (M)

※ 2. After 2 minutes

FREQUENCY COEFFICIENT FOR RIPPLE CURRENT

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f < 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1.0 |

VC series

- Super low ESR, High ripple current capability
- Rated voltage :2.5~16V.
- Endurance:2,000hours at 105°C
- Applications:motherboards, servers,VGA ,etc.
- RoHS compliant
- Halogen Free compliant

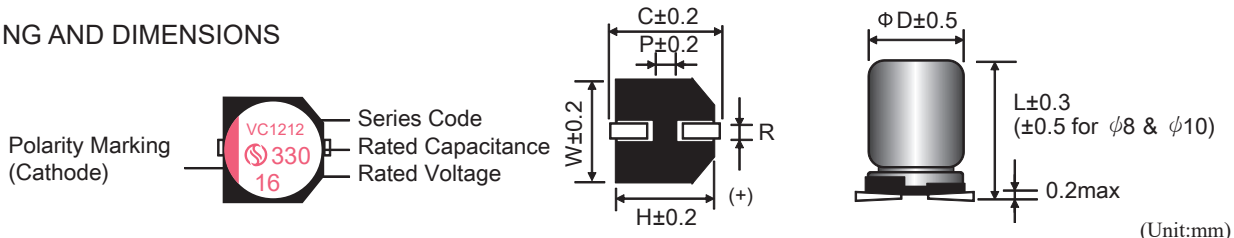


SPECIFICATIONS

| Items | Conditions | Characteristics |
|---|---|--|
| Category Temperature Range | — | -55 to +105°C |
| Rated Voltage Range | — | 2.5 ~ 16V |
| Capacitance Tolerance | at 20°C, 120 Hz | ±20% (M) |
| Surge Voltage | at 105°C | Rated voltage x1.15V |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured,after 2minutes application of rated working voltage at +20°C. Please see the attached characteristics list |
| Dissipation Factor (tan δ) | at 20°C, 120 Hz | Please see the attached characteristics list |
| Characteristics of Impedance at low, high temperature | at -55°C,100kHz | $Z(-55^\circ C) / Z(+20^\circ C) \leq 1.25$ |
| | at -25°C,100kHz | $Z(-25^\circ C) / Z(+20^\circ C) \leq 1.15$ |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Damp Heag (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through aprotective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatmen : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

MARKING AND DIMENSIONS



| φ DxL | φ D | L | W | H | C | R | P |
|---------|------|------|------|------|------|---------|-----|
| 5x6 | 5.0 | 6.0 | 5.3 | 5.3 | 6.0 | 0.5~0.8 | 1.4 |
| 6.3x6 | 6.3 | 6.0 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 |
| 6.3x9.5 | 6.3 | 9.5 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 |
| 8x7 | 8.0 | 7.0 | 8.3 | 8.3 | 9.3 | 0.5~0.8 | 3.2 |
| 8x9.5 | 8.0 | 10.0 | 8.3 | 8.3 | 9.0 | 0.8~1.1 | 3.2 |
| 8x12 | 8.0 | 12.0 | 8.3 | 8.3 | 9.0 | 0.8~1.1 | 3.2 |
| 10x10 | 10.0 | 10.0 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |
| 10x12.5 | 10.0 | 12.5 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |

VC SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|--|-------------------------------|
| 2.5 (2.9) | 220 | 5×6 | 300 | 40 | 1,620 | 0.12 |
| | 330 | 6.3x6 | 300 | 20 | 2,690 | 0.12 |
| | 820 | 6.3x9.5 | 410 | 18 | 3,200 | 0.12 |
| | 820 | 8x9.5 | 410 | 18 | 4,520 | 0.12 |
| | 1,500 | 8x9.5 | 750 | 18 | 4,520 | 0.12 |
| | 1,800 | 8x12 | 900 | 12 | 5,200 | 0.12 |
| | 2,700 | 10x12.5 | 1,350 | 12 | 5,500 | 0.12 |
| 4 (4.6) | 68 | 5x6 | 300 | 40 | 1,500 | 0.12 |
| | 150 | 6.3x6 | 300 | 24 | 2,200 | 0.12 |
| | 680 | 6.3x9.5 | 544 | 16 | 3,200 | 0.12 |
| | 680 | 8x7 | 544 | 20 | 3,400 | 0.12 |
| | 1,000 | 8x9.5 | 800 | 16 | 4,500 | 0.12 |
| | 1,500 | 8x12 | 1,200 | 14 | 5,100 | 0.12 |
| | 1,800 | 10x12.5 | 1,440 | 12 | 5,500 | 0.12 |
| 2,200 | 10x12.5 | 2,000 | 12 | 5,500 | 0.12 | |
| 6.3 (7.2) | 100 | 5x6 | 300 | 40 | 1,500 | 0.12 |
| | 220 | 5x7 | 300 | 20 | 1,600 | 0.12 |
| | 220 | 6.3x6 | 300 | 20 | 2,400 | 0.12 |
| | 560 | 6.3x9.5 | 705 | 20 | 3,200 | 0.12 |
| | 560 | 8x7 | 705 | 20 | 3,300 | 0.12 |
| | 820 | 8x9.5 | 1,033 | 15 | 4,450 | 0.12 |
| | 1,000 | 8x9.5 | 1,260 | 15 | 4,520 | 0.12 |
| | 1,200 | 8x12 | 1,512 | 12 | 5,020 | 0.12 |
| | 1,500 | 10x10 | 1,890 | 15 | 5,020 | 0.12 |
| | 1,800 | 10x12.5 | 2,268 | 12 | 5,400 | 0.12 |
| 2,200 | 10x12.5 | 2,772 | 12 | 5,500 | 0.12 | |
| 10 (11.5) | 68 | 5x6 | 300 | 40 | 1,500 | 0.12 |
| | 120 | 6.3x6 | 300 | 25 | 2,420 | 0.12 |
| | 150 | 8x7 | 300 | 22 | 2,450 | 0.12 |
| | 330 | 6.3x9.5 | 660 | 20 | 3,200 | 0.12 |
| | 560 | 8x9.5 | 1,120 | 16 | 4,450 | 0.12 |
| | 680 | 8x9.5 | 1,360 | 16 | 4,450 | 0.12 |
| | 820 | 8x12 | 1,640 | 14 | 4,850 | 0.12 |
| | 1,000 | 10x10 | 2,000 | 15 | 5,020 | 0.12 |
| | 1,200 | 10x10 | 2,400 | 15 | 5,200 | 0.12 |
| | 1,500 | 10x12.5 | 3,000 | 14 | 5,400 | 0.12 |
| 16 (18.4) | 100 | 6.3x6 | 320 | 24 | 2,400 | 0.12 |
| | 180 | 6.3x9.5 | 576 | 20 | 3,200 | 0.12 |
| | 220 | 6.3x9.5 | 704 | 20 | 3,200 | 0.12 |
| | 270 | 6.3x9.5 | 864 | 20 | 3,200 | 0.12 |
| | 270 | 8x7 | 864 | 20 | 3,400 | 0.12 |
| | 270 | 8x9.5 | 864 | 20 | 4,400 | 0.12 |
| | 470 | 8x9.5 | 1,504 | 20 | 4,400 | 0.12 |
| | 560 | 8x12 | 1,792 | 16 | 4,820 | 0.12 |
| | 680 | 10x10 | 2,176 | 18 | 5,200 | 0.12 |
| | 1,000 | 10x12.5 | 3,200 | 16 | 5,400 | 0.12 |

※ 1. Capacitance tolerance : ±20% (M)

※ 2. After 2 minutes

FREQUENCY COEFFICIENT FOR RIPPLE CURRENT

| | | | | |
|-------------|-------------------------------------|-------------------------------------|---------------------------------------|--|
| Frequency | $120\text{Hz} \leq f < 1\text{kHz}$ | $1\text{kHz} \leq f < 10\text{kHz}$ | $10\text{kHz} \leq f < 100\text{kHz}$ | $100\text{kHz} \leq f < 500\text{kHz}$ |
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

VL series

- Super low ESR, Long Life capability
- Rated voltage :4~50V.
- Endurance:5,000hours at 105°C
- Applications:DC/DC Converter, Voltage Regulators, Decoupling Applications for Computer Motherboards, etc.
- RoHS compliant
- Halogen Free compliant



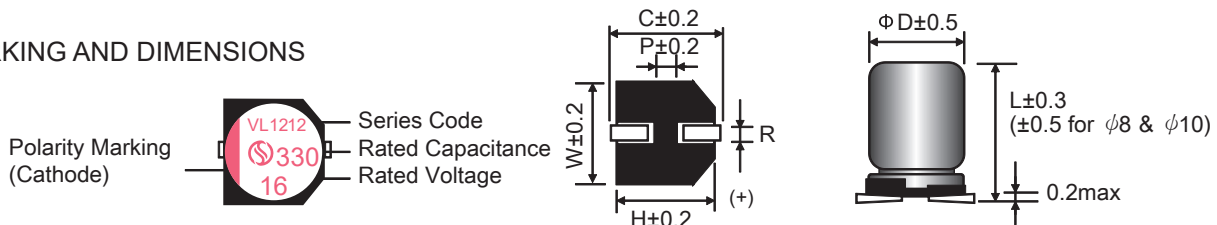
VL

SPECIFICATIONS

| Items | Conditions | Characteristics |
|---|--|--|
| Category Temperature Range | — | -55 to +105°C |
| Rated Voltage Range | — | 4 ~ 50V |
| Capacitance Tolerance | at 20°C, 120Hz | ±20%(M) |
| Surge Voltage | at 105°C | Rated voltage ×1.15V |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list |
| Dissipation Factor (tan δ) | at 20°C, 120Hz | Please see the attached characteristics list |
| Characteristics of Impedance at low, high temperature | at -55°C, 100kHz | $Z(-55^\circ C)/Z(+20^\circ C) \leq 1.25$ |
| | at -25°C, 100kHz | $Z(-25^\circ C)/Z(+20^\circ C) \leq 1.15$ |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 5,000 hours at 105°C. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Damp Heag (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

MARKING AND DIMENSIONS



(Unit:mm)

| φ D×L | φ D | L | W | H | C | R | P |
|---------|------|------|------|------|------|---------|-----|
| 6.3×6 | 6.3 | 6.0 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 |
| 6.3×7 | 6.3 | 7.0 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 |
| 6.3×9.5 | 6.3 | 9.5 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 |
| 8×7 | 8.0 | 7.0 | 8.3 | 8.3 | 9.3 | 0.5~0.8 | 3.2 |
| 8×9.5 | 8.0 | 9.5 | 8.3 | 8.3 | 9.3 | 0.8~1.1 | 3.2 |
| 8×12 | 8.0 | 12.0 | 8.3 | 8.3 | 9.0 | 0.8~1.1 | 3.2 |
| 10×10 | 10.0 | 10.0 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |
| 10×12.5 | 10.0 | 12.5 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |

VL SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|--|-------------------------------|
| 4 (4.6) | 220 | 6.3X6 | 300 | 20 | 2,800 | 0.12 |
| | 560 | 6.3x9.5 | 448 | 20 | 3,500 | 0.12 |
| | 560 | 8x7 | 448 | 18 | 3,700 | 0.12 |
| | 820 | 8x9.5 | 656 | 15 | 4,000 | 0.12 |
| | 1,200 | 8x12 | 960 | 15 | 4,450 | 0.12 |
| | 1,500 | 10x10 | 1,200 | 13 | 4,500 | 0.12 |
| | 2,200 | 10x12.5 | 1,760 | 13 | 5,400 | 0.12 |
| 6.3 (7.3) | 100 | 6.3x6 | 300 | 22 | 2,400 | 0.12 |
| | 220 | 6.3x6 | 300 | 22 | 2,600 | 0.12 |
| | 470 | 6.3x9.5 | 592 | 22 | 3,200 | 0.12 |
| | 560 | 6.3x9.5 | 705 | 22 | 3,200 | 0.12 |
| | 820 | 8x9.5 | 1,033 | 20 | 3,850 | 0.12 |
| | 1,000 | 8x12 | 1,260 | 20 | 4,250 | 0.12 |
| | 1,200 | 10x10 | 1,512 | 18 | 4,350 | 0.12 |
| | 1,800 | 10x12.5 | 2,268 | 18 | 5,200 | 0.12 |
| 10 (11.5) | 68 | 6.3x6 | 300 | 30 | 2,400 | 0.12 |
| | 100 | 6.3x6 | 300 | 30 | 2,400 | 0.12 |
| | 220 | 6.3x7 | 440 | 30 | 2,500 | 0.12 |
| | 330 | 6.3x9.5 | 660 | 30 | 3,150 | 0.12 |
| | 560 | 8x9.5 | 1,120 | 25 | 3,850 | 0.12 |
| | 680 | 8x12 | 1,360 | 25 | 4,150 | 0.12 |
| | 820 | 10x10 | 1,640 | 20 | 4,250 | 0.12 |
| | 1,000 | 10x10 | 2,000 | 20 | 4,250 | 0.12 |
| 1,200 | 10x12.5 | 2,400 | 20 | 5,100 | 0.12 | |
| 16 (18.4) | 100 | 6.3x6 | 320 | 30 | 2,200 | 0.12 |
| | 220 | 6.3x9.5 | 704 | 30 | 3,050 | 0.12 |
| | 330 | 8x9.5 | 1,056 | 20 | 3,450 | 0.12 |
| | 470 | 8x12 | 1,504 | 20 | 4,050 | 0.12 |
| | 680 | 10x10 | 2,176 | 20 | 4,150 | 0.12 |
| | 820 | 10x12.5 | 2,624 | 20 | 5,100 | 0.12 |
| 25 (28.8) | 47 | 6.3x6 | 300 | 40 | 1,500 | 0.12 |
| | 100 | 6.3x9.5 | 500 | 35 | 2,800 | 0.12 |
| | 180 | 8x9.5 | 900 | 30 | 3,250 | 0.12 |
| | 220 | 8x12 | 1,100 | 30 | 3,900 | 0.12 |
| | 330 | 10x10 | 1,650 | 20 | 4,100 | 0.12 |
| | 470 | 10x12.5 | 2,350 | 25 | 4,500 | 0.12 |
| 35 (40.3) | 22 | 6.3x6 | 300 | 70 | 1,450 | 0.12 |
| | 68 | 6.3x9.5 | 476 | 60 | 1,500 | 0.12 |
| | 120 | 8x9.5 | 840 | 50 | 1,800 | 0.12 |
| | 150 | 8x12 | 1,050 | 50 | 2,850 | 0.12 |
| | 220 | 10x10 | 1,540 | 40 | 2,950 | 0.12 |
| | 270 | 10x12.5 | 1,890 | 40 | 3,200 | 0.12 |
| 50 (57.5) | 10 | 6.3x6 | 300 | 60 | 1,400 | 0.12 |
| | 33 | 6.3x9.5 | 330 | 30 | 1,700 | 0.12 |
| | 47 | 8x9.5 | 470 | 30 | 2,000 | 0.12 |
| | 68 | 8x12 | 680 | 28 | 2,200 | 0.12 |
| | 100 | 10x10 | 1,000 | 30 | 2,300 | 0.12 |
| | 100 | 10x12.5 | 1,000 | 26 | 2,650 | 0.12 |

※ 1. Capacitance tolerance : ±20% (M)
 ※ 2. After 2 minutes

FREQUENCY COEFFICIENT FOR RIPPLE CURRENT

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f < 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |



VH series

- Low ESR, High Voltage, High ripple current capability
- Rated voltage : 35~100V.
- Endurance: 2,000 hours at 105°C
- Applications: LED Driver, LED Power Supply etc.
- RoHS compliant
- Halogen Free compliant



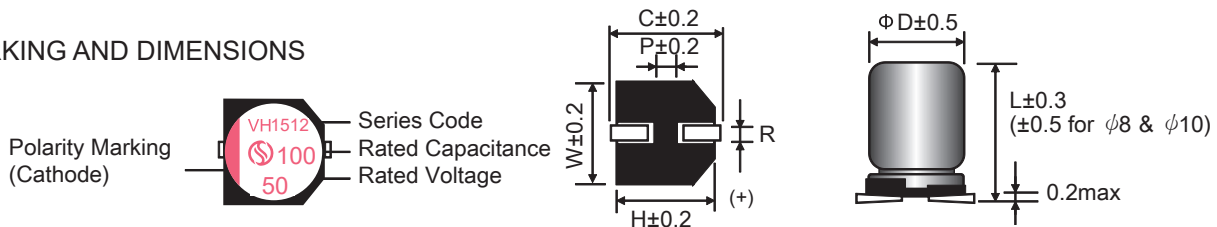
VH

SPECIFICATIONS

| Items | Conditions | Characteristics |
|---|--|--|
| Category Temperature Range | — | -55 to +105°C |
| Rated Voltage Range | — | 35 ~ 100V |
| Capacitance Tolerance | at 20°C, 120Hz | ±20%(M) |
| Surge Voltage | at 105°C | Rated voltage × 1.15V |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list |
| Dissipation Factor (tan δ) | at 20°C, 120Hz | Please see the attached characteristics list |
| Characteristics of Impedance at low, high temperature | at -55°C, 100kHz | $Z(-55^\circ C)/Z(+20^\circ C) \leq 1.25$ |
| | at -25°C, 100kHz | $Z(-25^\circ C)/Z(+20^\circ C) \leq 1.15$ |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Damp Heat (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

MARKING AND DIMENSIONS



(Unit:mm)

| φ D×L | φ D | L | W | H | C | R | P |
|---------|------|------|------|------|------|---------|-----|
| 6.3×6 | 6.3 | 6.0 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 |
| 6.3×9.5 | 6.3 | 9.5 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 |
| 8×7 | 8.0 | 7.0 | 8.3 | 8.3 | 9.3 | 0.5~0.8 | 3.2 |
| 8×9.5 | 8.0 | 9.5 | 8.3 | 8.3 | 9.3 | 0.5~0.8 | 3.2 |
| 8×12 | 8.0 | 12.0 | 8.3 | 8.3 | 9.0 | 0.8~1.1 | 3.2 |
| 10×10 | 10.0 | 10.0 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |
| 10×12.5 | 10.0 | 12.5 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |

VH SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) 100kHz / 105°C | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|--|-------------------------------|
| 35 (40.3) | 22 | 6.3x6 | 300 | 80 | 1,450 | 0.12 |
| | 56 | 6.3x9.5 | 392 | 50 | 2,300 | 0.12 |
| | 68 | 6.3x9.5 | 476 | 50 | 2,300 | 0.12 |
| | 68 | 8x7 | 476 | 60 | 2,500 | 0.12 |
| | 100 | 8x12 | 700 | 28 | 2,750 | 0.12 |
| | 220 | 10x12.5 | 1,540 | 28 | 3,200 | 0.12 |
| 50 (57.5) | 12 | 6.3x6 | 300 | 100 | 1,450 | 0.12 |
| | 33 | 6.3x9.5 | 330 | 50 | 1,800 | 0.12 |
| | 47 | 8x9.5 | 470 | 45 | 2,100 | 0.12 |
| | 100 | 10x12.5 | 1,000 | 28 | 2,560 | 0.12 |
| | 180 | 10x12.5 | 1,800 | 28 | 2,750 | 0.12 |
| 63 (72.0) | 22 | 6.3x9.5 | 300 | 50 | 1,800 | 0.12 |
| | 33 | 6.3x9.5 | 416 | 50 | 1,800 | 0.12 |
| | 47 | 8x12 | 592 | 36 | 2,200 | 0.12 |
| | 56 | 10x10 | 705 | 32 | 2,350 | 0.12 |
| | 100 | 10x12.5 | 1,260 | 28 | 2,550 | 0.12 |
| | 150 | 10x12.5 | 1,890 | 28 | 2,550 | 0.12 |
| 80 (92.0) | 22 | 8x9.5 | 352 | 45 | 2,100 | 0.12 |
| | 33 | 8x12 | 528 | 45 | 2,100 | 0.12 |
| | 47 | 10x10 | 752 | 45 | 2,250 | 0.12 |
| | 68 | 10x12.5 | 1,088 | 38 | 2,550 | 0.12 |
| 100 (115.0) | 15 | 8x12 | 300 | 40 | 2,050 | 0.12 |
| | 22 | 10x12.5 | 440 | 38 | 2,250 | 0.12 |
| | 27 | 10x12.5 | 540 | 38 | 2,250 | 0.12 |

※ 1. Capacitance tolerance : ±20% (M)
 ※ 2. After 2 minutes

FREQUENCY COEFFICIENT FOR RIPPLE CURRENT

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f < 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

VH

VT series

- Super low ESR, High ripple current capability
- Rated voltage :4~50V.
- Endurance:1,000hours at 125°C
- Applications:Motherboard,DC/DC Converter,Adapter,SPS,VCR, Camcorder,DSC,PDA,HD Drive,MO Drive,etc.
- RoHS compliant
- Halogen Free compliant



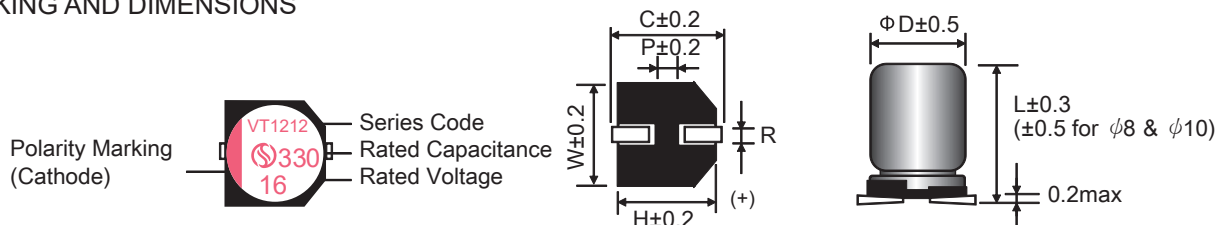
VT

SPECIFICATIONS

| Items | Conditions | Characteristics |
|---|--|--|
| Category Temperature Range | — | -55 to +125°C |
| Rated Voltage Range | — | 4 ~ 50V |
| Capacitance Tolerance | at 20°C, 120Hz | ±20%(M) |
| Surge Voltage | at 105°C | Rated voltage ×1.15V |
| Leakage Current | at 20°C after 2 minutes | $I \leq 0.2CV$ or $300(\mu A)$ Whichever is greater measured, after 2 minutes application of rated working voltage at +20°C. Please see the attached characteristics list |
| Dissipation Factor (tan δ) | at 20°C, 120Hz | Please see the attached characteristics list |
| Characteristics of Impedance at low, high temperature | at -55°C, 100kHz | $Z(-55^\circ C)/Z(+20^\circ C) \leq 1.25$ |
| | at -25°C, 100kHz | $Z(-25^\circ C)/Z(+20^\circ C) \leq 1.15$ |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1,000 hours at 125°C. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Damp Heat (Steady State) | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store 60°C, 90 to 95% RH for 1,000 hours, without DC applied. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |
| Surge Voltage | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltages specified at 105°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds. | Appearance NO significant damage. |
| | | Capacitance change $\leq \pm 20\%$ of the initial value. |
| | | DF (tan δ) $\leq 150\%$ of the initial specified value. |
| | | ESR $\leq 150\%$ of the initial specified value. |
| | | Leakage current \leq The initial specified value. |

※ Note : If any doubt arises, measure the leakage current after following voltage treatment.
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 125°C.

MARKING AND DIMENSIONS



(Unit:mm)

| φ D×L | φ D | L | W | H | C | R | P |
|---------|------|------|------|------|------|---------|-----|
| 6.3×6 | 6.3 | 6.0 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 |
| 6.3×7 | 6.3 | 7.0 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 |
| 6.3×9.5 | 6.3 | 9.5 | 6.6 | 6.6 | 7.3 | 0.5~0.8 | 2.1 |
| 8×7 | 8.0 | 7.0 | 8.3 | 8.3 | 9.3 | 0.5~0.8 | 3.2 |
| 8×9.5 | 8.0 | 9.5 | 8.3 | 8.3 | 9.3 | 0.8~1.1 | 3.2 |
| 8×12 | 8.0 | 12.0 | 8.3 | 8.3 | 9.0 | 0.8~1.1 | 3.2 |
| 10×10 | 10.0 | 10.0 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |
| 10×12.5 | 10.0 | 12.5 | 10.3 | 10.3 | 11.0 | 0.8~1.1 | 4.6 |

VT SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) | | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|-------------------------------|--------------|-------------------------------|
| | | | | | 105°C 100kHz | 125°C 100kHz | |
| 4 (4.6) | 150 | 6.3x6 | 300 | 35 | 2,450 | 700 | 0.12 |
| | 220 | 6.3x6 | 300 | 20 | 2,800 | 800 | 0.12 |
| | 560 | 6.3x9.5 | 448 | 20 | 3,000 | 857 | 0.12 |
| | 560 | 8x7 | 448 | 20 | 3,000 | 857 | 0.12 |
| | 820 | 8x9.5 | 656 | 15 | 3,500 | 1,000 | 0.12 |
| | 1,200 | 8x12 | 960 | 15 | 3,800 | 1,086 | 0.12 |
| | 1,500 | 10x10 | 1,200 | 12 | 4,500 | 1,286 | 0.12 |
| | 2,200 | 10x12.5 | 1,760 | 12 | 5,500 | 1,571 | 0.12 |
| 6.3 (7.3) | 100 | 6.3x6 | 300 | 40 | 2,400 | 686 | 0.12 |
| | 150 | 6.3x6 | 300 | 40 | 2,400 | 686 | 0.12 |
| | 330 | 6.3x7 | 415 | 30 | 2,800 | 800 | 0.12 |
| | 470 | 6.3x9.5 | 592 | 25 | 2,800 | 800 | 0.12 |
| | 680 | 8x9.5 | 856 | 25 | 2,800 | 800 | 0.12 |
| | 820 | 8x12 | 1,033 | 20 | 3,000 | 857 | 0.12 |
| | 1,000 | 8x12 | 1,260 | 20 | 3,000 | 857 | 0.12 |
| | 1,200 | 10x10 | 1,512 | 20 | 3,000 | 857 | 0.12 |
| | 1,800 | 10x12.5 | 2,268 | 18 | 3,000 | 857 | 0.12 |
| 10 (11.5) | 100 | 6.3x6 | 300 | 35 | 2,800 | 800 | 0.12 |
| | 330 | 6.3x9.5 | 660 | 25 | 2,800 | 800 | 0.12 |
| | 470 | 8x9.5 | 940 | 25 | 3,000 | 857 | 0.12 |
| | 560 | 8x9.5 | 1,120 | 25 | 3,000 | 857 | 0.12 |
| | 680 | 8x12 | 1,360 | 20 | 3,500 | 1,000 | 0.12 |
| | 820 | 10x10 | 1,640 | 20 | 3,500 | 1,000 | 0.12 |
| | 1,000 | 10x10 | 2,000 | 20 | 3,500 | 1,000 | 0.12 |
| | 1,200 | 10x12.5 | 2,400 | 12 | 5,200 | 1,486 | 0.12 |
| 16 (18.4) | 100 | 6.3x6 | 320 | 35 | 2,050 | 586 | 0.12 |
| | 220 | 6.3x9.5 | 704 | 25 | 2,050 | 586 | 0.12 |
| | 330 | 8x9.5 | 1,056 | 25 | 2,700 | 771 | 0.12 |
| | 470 | 8x12 | 1,504 | 20 | 3,930 | 1,123 | 0.12 |
| | 680 | 10x10 | 2,176 | 18 | 4,520 | 1,291 | 0.12 |
| | 820 | 10x12.5 | 2,624 | 18 | 4,900 | 1,400 | 0.12 |
| 25 (28.8) | 47 | 6.3x6 | 300 | 60 | 1,650 | 471 | 0.12 |
| | 100 | 6.3x9.5 | 500 | 30 | 1,650 | 471 | 0.12 |
| | 220 | 8x12 | 1,100 | 28 | 3,310 | 946 | 0.12 |
| | 330 | 10x10 | 1,650 | 30 | 4,320 | 1,234 | 0.12 |
| | 470 | 10x12.5 | 2,350 | 28 | 4,500 | 1,286 | 0.12 |
| 35 (40.3) | 22 | 6.3x6 | 300 | 70 | 1,450 | 414 | 0.12 |
| | 68 | 6.3x9.5 | 476 | 40 | 1,450 | 414 | 0.12 |
| | 120 | 8x9.5 | 840 | 40 | 1,800 | 514 | 0.12 |
| | 150 | 8x12 | 1,050 | 30 | 2,000 | 571 | 0.12 |
| | 220 | 10x10 | 1,540 | 30 | 2,200 | 629 | 0.12 |
| | 270 | 10x12.5 | 1,890 | 30 | 2,500 | 714 | 0.12 |

VT

VT SERIES STANRD CHARACTERISITICS LIST

| Rated Voltage (S.V.) | Cap (μF) | Size DxL | Leakage current (μA) max. ※2 | ESR (mΩ) max. 100k to 300kHz / 20°C | Rated Ripple Current (mA rms) | | D.F. (tanδ) max. 120Hz / 20°C |
|----------------------|----------|----------|------------------------------|-------------------------------------|-------------------------------|--------------|-------------------------------|
| | | | | | 105°C 100kHz | 125°C 100kHz | |
| 50 (57.5) | 10 | 6.3x6 | 300 | 60 | 1,400 | 400 | 0.12 |
| | 33 | 6.3x9.5 | 330 | 40 | 1,500 | 429 | 0.12 |
| | 47 | 8x9.5 | 470 | 40 | 2,000 | 571 | 0.12 |
| | 68 | 8x12 | 680 | 35 | 2,300 | 657 | 0.12 |
| | 100 | 10x10 | 1,000 | 35 | 2,200 | 629 | 0.12 |
| | 100 | 10x12.5 | 1,000 | 35 | 2,500 | 714 | 0.12 |

- ※ 1. Capacitance tolerance : ±20% (M)
- ※ 2. After 2 minutes

FREQUENCY COEFFICIENT FOR RIPPLE CURRENT

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f < 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

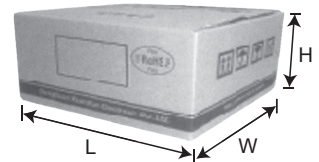
VT

Packing specifications(Lead type)

| ϕ DxL | Bags / Inner Box | Layer Quantity | Quantity (pcs/bag) | Total Quantity (pcs/carton) | Size of Inner Box | Size of Out Box (L)x(W)x(H) |
|-----------------|------------------|----------------|--------------------|-----------------------------|-----------------------------|-----------------------------|
| 5x6 | 15 | 2 | 1000 | 30,000 | 267 X 260 X 135 | 546 X 279 X 160 |
| 6.3x6 | 10 | 2 | 1000 | 20,000 | | |
| 6.3x (7 ~ 12) | 9 | 2 | 1000 | 18,000 | | |
| 8x (7 ~ 12) | 10 | 2 | 500 | 10,000 | | |
| 10x (8 ~ 12) | 11 | 2 | 200 | 4,400 | | |
| 10x (16 ~ 20) | 9 | 2 | 200 | 3,600 | | |

PACKAGE BOX

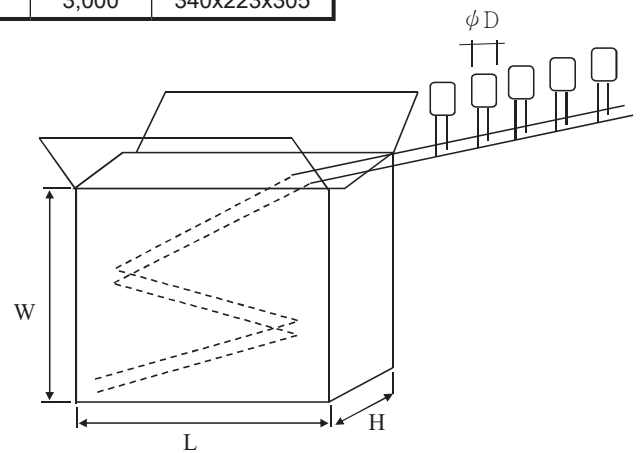
INNER BOX



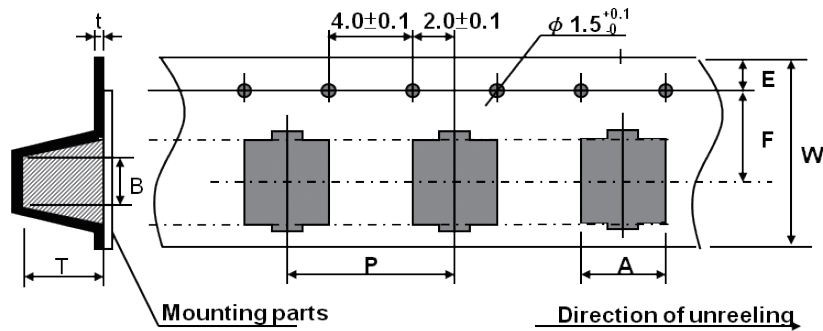
Inner Box Size:
(L) X (W) X (H)

TAPING PACKAGE

| Item | Taping packing | | | | | | Size of Out Box (L)x(W)x(H) |
|------------------|----------------|----------------|----------------|------------|-----------------|-------------|-----------------------------|
| ϕ D (mm) | W \pm 5 (mm) | L \pm 5 (mm) | H \pm 5 (mm) | Qty. (pcs) | Inner Box (pcs) | Total (pcs) | |
| 5x6 | 235 | 320 | 54 | 2000 | 10 | 20,000 | 490x330x293 |
| 6.3x (6 ~ 9.5) | 235 | 320 | 54 | 1500 | | 15,000 | 490x330x293 |
| 8x (7 ~ 12) | 235 | 320 | 51 | 1000 | | 10,000 | 490x330x285 |
| 8x (16 ~ 20) | 255 | 320 | 63 | 1000 | 8 | 8,000 | 490x330x275 |
| 10x (8 ~ 20) | 218 | 325 | 57 | 600 | 5 | 3,000 | 340x223x305 |



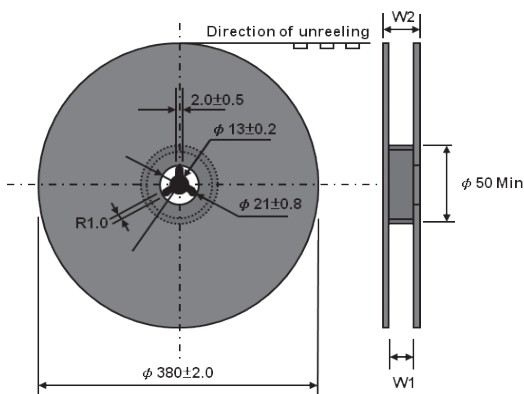
■ Carrier Tape



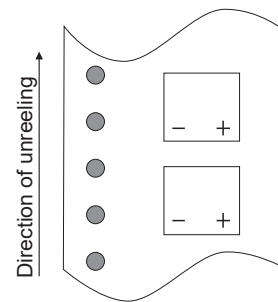
(Unit:mm)

| $\Phi D \times L$ | A | B | W | F | E | P | t | T |
|-------------------|----------|----------|----------|----------|----------|----------|---------|---------------|
| 5×6 | 5.7±0.2 | 5.7±0.2 | 12.0±0.3 | 6.5±0.1 | 1.75±0.1 | 12.0±0.1 | 0.4±0.1 | 7.5±0.2 |
| 6.3×6 | 7.0±0.2 | 7.0±0.2 | 16.0±0.3 | 7.5±0.1 | 1.75±0.1 | 12.0±0.1 | 0.4±0.1 | 8.0±0.2 |
| 6.3×(7~8) | 7.0±0.2 | 7.0±0.2 | 16.0±0.3 | 7.5±0.1 | 1.75±0.1 | 12.0±0.1 | 0.4±0.1 | 8.0±0.2 |
| 6.3×9.5 | 7.0±0.2 | 7.0±0.2 | 16.0±0.3 | 7.5±0.1 | 1.75±0.1 | 12.0±0.1 | 0.4±0.1 | 10.0±0.2 |
| 8×7 | 8.7±0.2 | 8.7±0.2 | 24.0±0.3 | 11.5±0.1 | 1.75±0.1 | 16.0±0.1 | 0.4±0.1 | 8.8±0.2 |
| 8×(9.5~10) | 8.7±0.2 | 8.7±0.2 | 24.0±0.3 | 11.5±0.1 | 1.75±0.1 | 16.0±0.1 | 0.4±0.1 | 11.0±0.2 |
| 8×12 | 8.7±0.2 | 8.7±0.2 | 24.0±0.3 | 11.5±0.1 | 1.75±0.1 | 16.0±0.1 | 0.4±0.1 | 13.0±0.2 |
| 10×8 | 10.7±0.2 | 10.7±0.2 | 24.0±0.3 | 11.5±0.1 | 1.75±0.1 | 16.0±0.1 | 0.4±0.1 | 8.5±0.2 |
| 10×10 | 10.7±0.2 | 10.7±0.2 | 24.0±0.3 | 11.5±0.1 | 1.75±0.1 | 16.0±0.1 | 0.4±0.1 | 11.0±0.2 |
| 10×(12~12.5) | 10.7±0.2 | 10.7±0.2 | 24.0±0.3 | 11.5±0.1 | 1.75±0.1 | 16.0±0.1 | 0.4±0.1 | (13~13.5)±0.2 |

■ Reel



■ Polarity

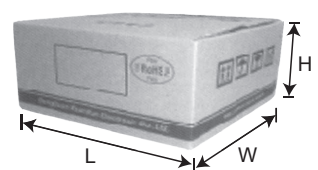


PACKAGE BOX

(Unit:mm)

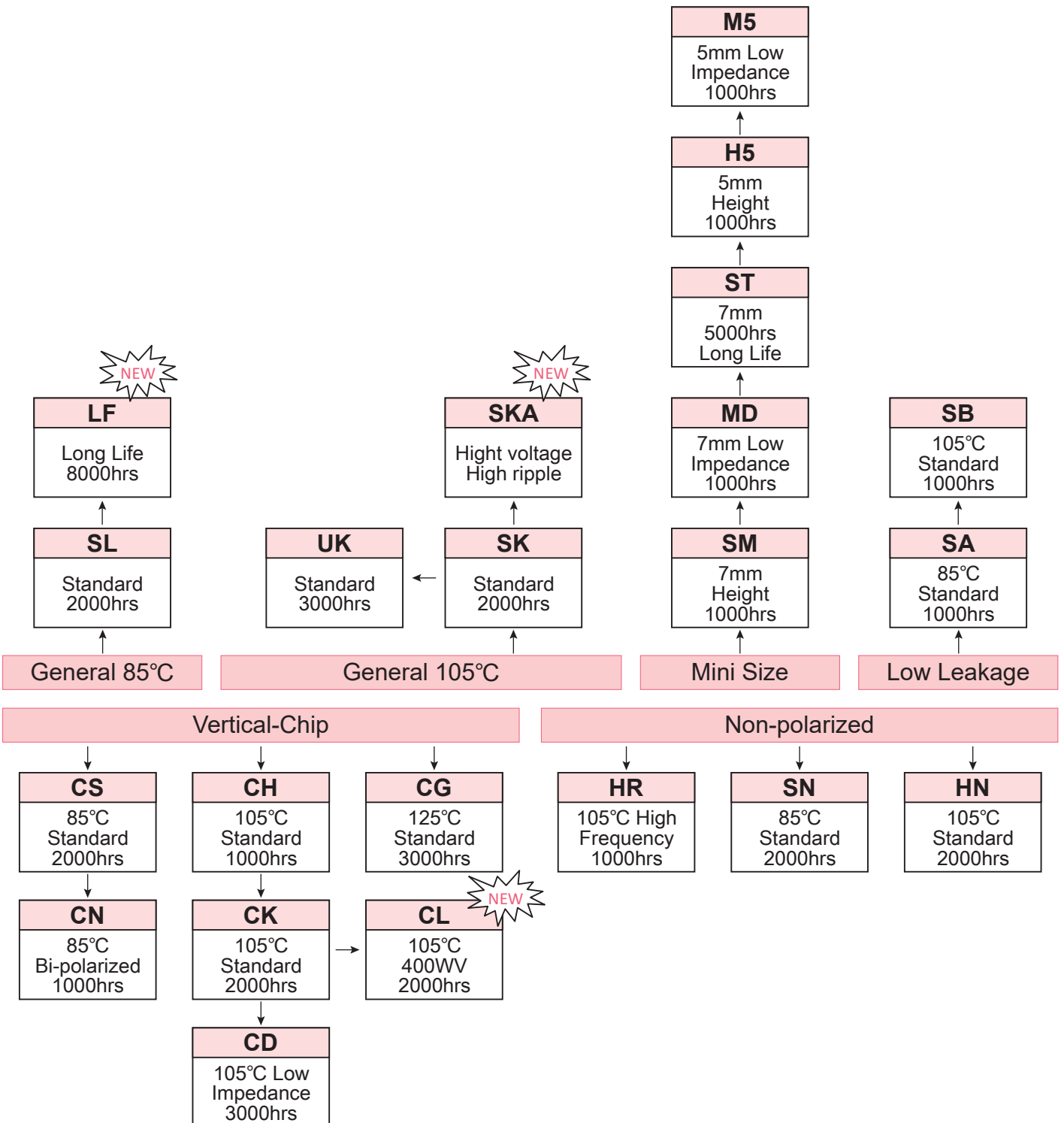
| Size Code $\Phi D \times L$ | W1 | W2 | Q'ty / Reel | Size of Inner Box (L)×(W)×(H) | Size of Out Box (L)×(W)×(H) |
|--------------------------------|----------|----------|-------------|----------------------------------|--------------------------------|
| 5×6 | 14.0±1.0 | 18.0±1.0 | 1000 pcs. | 385×385×106 | 412×403×255 |
| 6.3×(6~8) | 18.0±1.0 | 22.0±1.0 | 1000 pcs. | 385×385×125 | 412×403×255 |
| 6.3×9.5 | 18.0±1.0 | 22.0±1.0 | 800 pcs. | 385×385×125 | 412×403×255 |
| 8×(7~10) | 26.0±1.0 | 30.0±1.0 | 500 pcs. | 385×385×106 | 412×403×255 |
| 10×(8~10) | 26.0±1.0 | 30.0±1.0 | 500 pcs. | 385×385×106 | 412×403×255 |
| (8~10)×12 | 26.0±1.0 | 30.0±1.0 | 400 pcs. | 385×385×106 | 412×403×255 |

INNER BOX

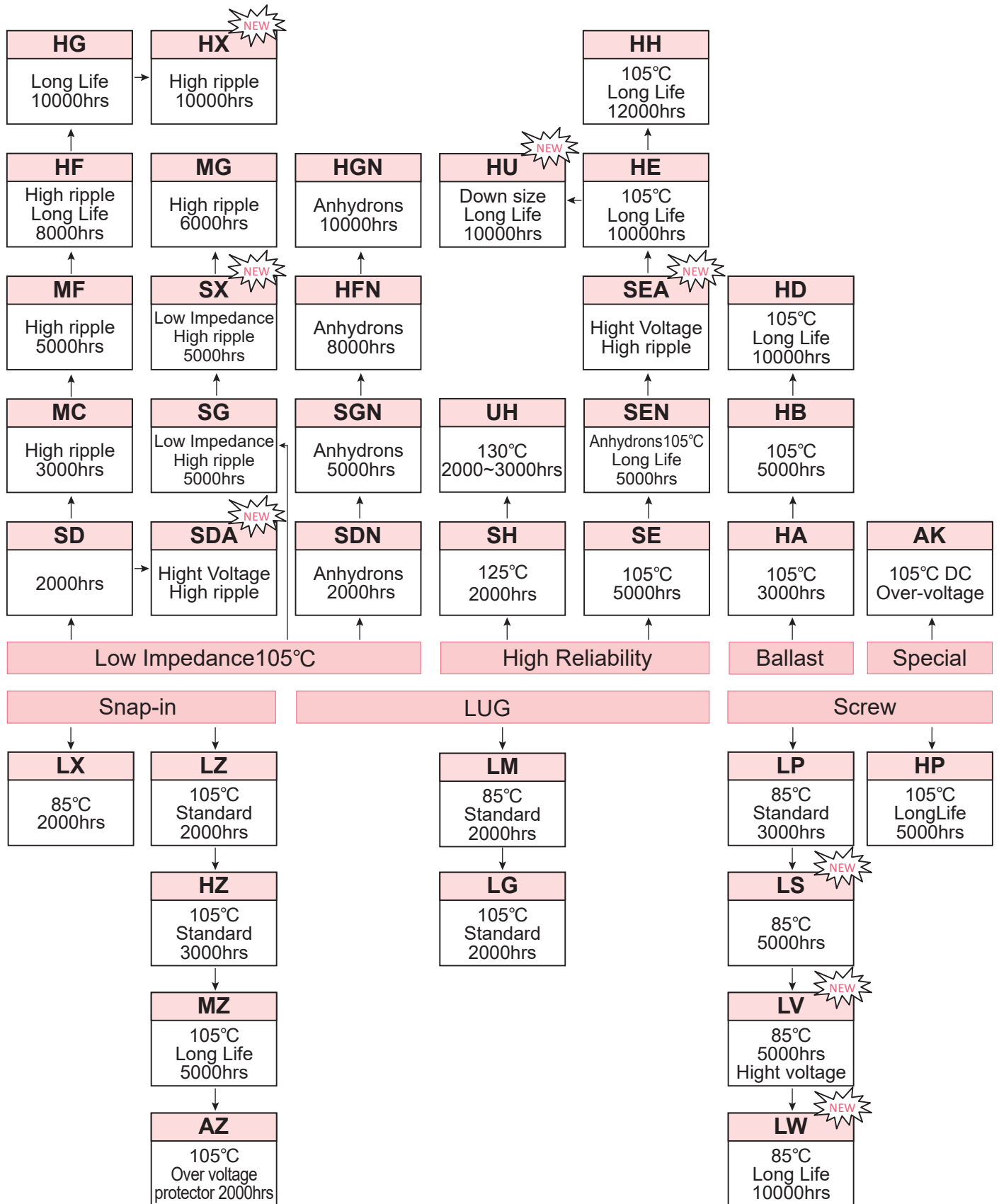


Inner Box Size:
(L) X (W) X (H)

Series Chart



Series Chart



Application Guidelines For Aluminum Electrolytic Capacitors

鋁電解電容器使用需知

一、電路設計的注意事項

1. 在確認使用環境及安裝環境的基礎上，在電容器的產品目錄及規格書上所規定的性能範圍內進行設計。
2. 在設計上，應該避免在下述情況下使用：
 - (1) 不可超過電容器的最高使用溫度。
 - (2) 不可有超過額定紋波電流的電流通過。
 - (3) 不可有超過額定電壓的電壓通過電容器。
 - a. 要注意紋波電壓(交流部分)重疊到直流電壓上時的峰值不可超過額定電壓。
 - b. 當兩個電容器串聯時，通過各個電容器的電壓不可超過額定電壓。此時，要在各個電容器上並聯用於防止漏損電流的分壓電阻器。
 - (4) 電容器為極性電容器。要確認有無連接反向電壓或交流電壓。在極性反轉電路中請用雙極性電容器，但是雙極性電容器也不可以用於交流電路。
3. 進行電路設計時，請選用與機器壽命相符的電容器。
4. 在需要重複進行急速充放電的電路中請選用與條件相符的電容器。
5. 電容器的外殼、輔助引出端子與正、負極以及電路板間必須完全隔離。
6. 當電容器套管的絕緣不能保證時，在有絕緣性能特定要求的地方請不要使用。需要外套具有絕緣功能時請諮詢我們。
7. 電容器如果在以下環境中使用，可能會發生故障。
 - (1) 直接與水、油類、鹽水相接觸的環境或高溫高濕或結露的環境。
 - (2) 充滿有毒氣體(硫化物、亞硫酸、亞硝酸、氯氣、氨水等)的環境。
 - (3) 不能置於日照、O₃、紫外線及有放射性物質環境下使用。
 - (4) 有酸性及鹼性溶劑濺落的環境。
 - (5) 振動或衝擊條件超過交貨仕様書規定範圍的惡劣環境。

一、Caution During Circuit Design

1. Please make sure the application and mounting conditions to which the capacitor will be exposed are within the conditions specified in the catalog or alternate product specification (Referred as to specification here after).
2. Design Aluminum Electrolytic Capacitors, please pay attention to the points listed below:
 - (1) The capacitor shall not be used in an ambient temperature which exceeds the operating temperature specified in the specification.
 - (2) Do not apply excessive current which exceeds the allowable ripple current.
 - (3) Make sure that no excess voltage (that is higher than the rated voltage) is applied to the capacitor.
 - a. Please pay attention that the peak voltage, which is DC voltage overlapped by ripple current, should not exceed the rated voltage.
 - b. In the case where more than 2 aluminum electrolytic capacitors are used in series, please make sure that applied voltage will be lower than rated voltage and the voltage be will applied to each capacitor equally using a balancing resistor in parallel with the capacitors.
 - (4) Aluminum electrolytic capacitors are polarized. Make sure that no reverse voltage or AC voltage is applied to the capacitors. Please apply bi-polarized capacitor to reverse polarity circuit but bi-polarized capacitors can not be applied to AC circuit.
3. Appropriate capacitors which comply with the life requirement of the products should be selected when designing the circuit.
4. For a circuit that repeats rapid charging/discharging of electricity, an appropriate capacitor that is capable of enduring such a condition must be used.
5. Aluminum case, cathode lead wire, anode lead wire and circuit pattern must be isolated .
6. The sleeve of capacitors is not recognized as an insulator, and therefore, the standard capacitor should not be used in a place where insulation function is needed. If you require a higher grade of insulating sleeve, please consult us.
7. Capacitors may fail if they are used under the following conditions:
 - (1) Damp conditions such as water, saltwater spray, or oil spray or fumes. High humidity or humidity condensation situations.
 - (2) In an atmosphere filled with toxic gasses (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.)
 - (3) Being exposed to direct sunlight, ozone, ultraviolet ray, or radiation.
 - (4) Being exposed to acidic or alkaline solutions.
 - (5) Under severe conditions where vibration and / or mechanical shock exceed the applicable ranges of the specification.

Application Guidelines For Aluminum Electrolytic Capacitors

鋁電解電容器使用需知

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| <p>8. 在設計電容器的安裝時，必須確認下述內容：</p> <p>(1) 电路板的孔距必須與電容器兩端子的間距相吻合。</p> <p>(2) 在電容器防爆閥的上方盡量不要安裝配線及其它元件，應在防爆閥的上方保留一定的空間。</p> <p style="margin-left: 20px;"> $\phi 8(6.3) \sim \phi 16$: 2mm以上 $\phi 18 \sim \phi 35$: 3mm以上 $\geq \phi 40$: 5mm以上 </p> <p>(3) 請勿在電容器的四周及电路板的背面(電容器下面)配置發熱元件。</p> <p>(4) 請勿在電容器的封口部下方進行电路配線。如果在電容器附近配線，請確保線路間隔在2mm以上。</p> <p>(5) 螺栓型電容器在主體安裝螺絲時，鎖緊的扭力不要超過產品目錄或規格說明書規定的範圍。此外，橫放時，防爆閥的位置不可居於下方。</p> <p>9. 電容器的電氣特性根據溫度及頻率的變動而變化，請在確認該變化量的基礎上進行电路設計。</p> <p>10. 在雙面印刷板上安裝電容器時，電容器的安裝位置避免多餘的基板孔和過孔。</p> <p>11. 並聯兩個以上的電容器時，要充分考慮電流平衡。</p> <p>12. 串聯兩個以上的電容器時，要充分考慮電壓平衡和插入並聯用分壓相抗。</p> | <p>8. In designing a circuit, the following matters should be ensured in advance to the capacitor assembly on the P.C. board.</p> <p>(1) Design the appropriate hole spacing to match the lead pitch of capacitors.</p> <p>(2) Do not locate any wiring and circuit patterns directly above the capacitor vent. Ensure enough free space above the capacitor vent.</p> <p style="margin-left: 20px;"> $\phi 8(6.3) \sim \phi 16$: 2mm以上 $\phi 18 \sim \phi 35$: 3mm以上 $\geq \phi 40$: 5mm以上 </p> <p>(3) Do not design a circuit board so that heat generating components are placed near an aluminum electrolytic capacitor or reverse side of P.C. board (under the capacitor).</p> <p>(4) Do not print any copper trace under the seal (terminal) side of a capacitor. Copper traces should be 2mm spaced apart from the side of the capacitor body.</p> <p>(5) For a screw terminal type capacitor. Tightening the terminal screws and the mounting clamp should be within the maximum torque specified in the catalogs or product specifications. Do not mount a screw terminal type capacitor with the terminal facing downward. Also, if the body of a capacitor is installed horizontally such as being laid on its side. Do not position the pressure relief vent downward.</p> <p>9. Electrical characteristics may vary depending on changes in temperature and frequency. Please consider this variation when you design circuits.</p> <p>10. When you mount capacitors on the double-sided P.C. boards, avoid excess substrate holes and vias to capacitor location.</p> <p>11. When you install more than 2 capacitors in parallel, consider the balance of current flowing through the capacitors.</p> <p>12. If more than 2 aluminum electrolytic capacitors are used in series, make sure the applied voltage will be lower than the rated voltage and that voltage will be applied to each capacitor equally using a balancing resistor in parallel with each capacitor.</p> |
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二、安裝的注意事項

1. 除了定期點檢時為檢測電氣性能而拆卸的電容器外，對組裝到設備上已經通電的電容器，拆除後均不能再使用。
2. 當電容器產生再生電壓時，請通過約1K Ω 的電阻器進行放電。
3. 長期保存的電容器，需通過約1K Ω 的電阻加壓處理。
4. 請確認電容器的規格(靜電容量及額定電壓)及極性後，才可進行安裝。
5. 掉落在地上的電容器及本體已經變形的電容器，請勿再使用。

二、Caution For Assembling Capacitors

1. Once a capacitor has been assembled in the set and power applied, even if a capacitor is discharged, an electric potential (restricting voltage) may exist between the terminals.
2. Electric potential between positive and negative terminal may exist as a result of returned electromotive force, so please discharge the capacitor using a 1K Ω resistor.
3. Leakage current of aluminum electrolytic capacitors may be increased during long storage time. In this case, the capacitors should be subjected to voltage treatment a 1K Ω resistor before using.
4. Please confirm ratings (voltage and capacitance) and polarity before in stalling capacitors on the P.C. board.
5. Do not drop capacitors on the floors and damage, nor use a capacitors that was dropped.

Application Guidelines For Aluminum Electrolytic Capacitors

鋁電解電容器使用需知

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| <p>6. 安裝時請確認電路板的孔距是否與電容器兩端子的間距吻合。</p> <p>7. 自動插入機扭結固定電容器引線的強度不可過大。</p> <p>8. 焊接時請注意以下內容：</p> <p>(1) 焊接條件(溫度、時間)不可超出承認書中所規定的範圍。</p> <p>(2) 請勿讓烙鐵的烙鐵頭接觸到電容器的本體及不要將電容器本體浸入焊錫溶液中。</p> <p>(3) 在進行焊接時，避免其它物件倒下碰到電容器。</p> <p>(4) 在進行焊接時，除端子外電容器其它部位不可附著有焊劑。</p> <p>9. 電容器焊接在電路板後，請注意以下內容：</p> <p>(1) 不可將電容器本體傾斜、扭轉等。</p> <p>(2) 不可讓其它物體碰到電容器。</p> <p>10. 電解電容器不得以鹵化化學藥品類似溶劑，作為電容器洗滌用。</p> <p>11. 在使用固定劑與塗層劑時，電路板與電容器的封口部之間須乾淨，不可留有焊劑殘渣及污垢。</p> | <p>6. Please confirm that lead spacing of the capacitor matches the hole spacing of the P.C. board prior to installation.</p> <p>7. Please pay attention that the clinch force is not too strong when capacitors are placed and fixed by an automatic insertion machine.</p> <p>8. Soldering</p> <p>(1) Soldering condition (temperature and times) must be confirmed to be within Su'scon specification.</p> <p>(2) Soldering iron should never touch the capacitors body and do not dip capacitors body into melted solder.</p> <p>(3) Please avoid contact between other components and the aluminum capacitor.</p> <p>(4) Please avoid having flux adhere to any portion except the terminal.</p> <p>9. After Soldering</p> <p>(1) Do not bend or twist the capacitors body after soldering on P.C. board.</p> <p>(2) Do not hit the capacitors and isolate capacitors from the P.C. board or other device when stacking P.C. boards in store.</p> <p>10. Standard Aluminum Electrolytic Capacitors should be free from halogenated solvents during P.C. board cleaning after soldering.</p> <p>11. Do not use halogenated adhesives and coating materials to fix aluminum electrolytic capacitors.</p> |
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三、組裝使用注意事項

1. 不可直接觸摸電容器的端子，有導致觸電的危險。
2. 不可有導電體靠近電容器的兩端子，避免電容器端子之間短路。
3. 裝配了電容器的設備請不要在以下環境中使用：
 - (1) 直接與水、油類、鹽水相接觸的環境或高溫高濕或結露的環境。
 - (2) 充滿有毒氣體(硫化物、亞硫酸、亞硝酸、氯氣、氨水等)的環境。
 - (3) 不能置於日照、O₃、紫外線及有放射性物質環境下使用。
 - (4) 有酸性及鹼性溶劑濺落的環境。
 - (5) 振動或衝擊條件超過交貨仕様書規定範圍的惡劣環境。

四、電容器的保養與檢修

電容器在工業機器中使用時要進行定期檢修，檢修時請注意電容器的外觀及電氣性能是否符合產品的標準。

五、安全注意事項

1. 在設備使用過程中，電容器的防爆閥開裂，並冒出氣體時，應切斷設備的主電源或從設備上拔下電線插頭。

三、Caution For Assembling Capacitors

1. Do not directly touch terminal by hand.
2. Keep electric conductor off terminals to avoid short circuit.
3. Do not use following conditions for assembling capacitors.
 - (1) Damp conditions such as water, saltwater spray, or oil spray or fumes. High humidity or humidity condensation situations.
 - (2) In an atmosphere filled with toxic gasses (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.)
 - (3) Being exposed to direct sunlight, ozone, ultraviolet ray, or radiation.
 - (4) Being exposed to acidic or alkaline solutions.
 - (5) Under severe conditions where vibration and / or mechanical shock exceed the applicable ranges of the specification.

四、Maintenance Inspection

Please periodically inspect the capacitors that are installed in industrial equipment. Remarkable abnormality such as vent operating, leaking electrolyte, etc. Capacitance, dielectric loss tangent, leakage current, and items specified in the specification.

五、Safe Precautions

1. If you see smoke due to operation of safety vent, turn off the main switch or pull out the plug from the outlet.

Application Guidelines For Aluminum Electrolytic Capacitors

鋁電解電容器使用需知

2. 電容器的防爆閥開裂時，因為超過100°C高溫氣體噴出，臉不要接近。噴出的氣體進入眼睛時，立即用清水清洗眼睛。如果噴出的電解液濺到皮膚上，請立即使用肥皂進行沖洗。

2. Do not bring your face near the capacitor when the pressure relief vent operates, because the gases emitted from that are over 100°C. If the gas gets into your eyes, please flush your eyes immediately with pure water. If electrolyte exposed on your skin, please wash it with soap and water.

六、儲存條件

1. 電容器建議在環境溫度5 ~ 35°C、相對濕度低於75%的條件下存放。
2. 請勿儲存於下列所述的環境中。
 - (1) 直接與水、油類、鹽水相接觸的環境或高溫高濕或結露的環境。
 - (2) 充滿有毒氣體(硫化物、亞硫酸、亞硝酸、氯氣、氨水等)的環境。
 - (3) 不能置於日照、O₃、紫外線及有放射性物質環境下使用。
 - (4) 有酸性及鹼性溶劑濺落的環境。
 - (5) 振動或衝擊條件超過交貨仕様書規定範圍的惡劣環境。

六、Storage

1. It is recommended to keep capacitors between the ambient temperatures of 5°C to 35°C and a relative humidity of 75% or below.
2. Confirm that the environment does not have any of the following conditions:
 - (1) Damp conditions such as water, saltwater spray, or oil spray or fumes. High humidity or humidity condensation situations.
 - (2) In an atmosphere filled with toxic gasses (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.)
 - (3) Being exposed to direct sunlight, ozone, ultraviolet ray, or radiation.
 - (4) Being exposed to acidic or alkaline solutions.
 - (5) Under severe conditions where vibration and / or mechanical shock exceed the applicable ranges of the specification.

| 分類 | 規格 | 儲存壽命 |
|-------|-----------|---------------------------------|
| 中高壓產品 | 160V(含)以上 | 2年;一年以上,需要做特性檢驗,如果特性異常,需要再次充電老化 |
| 低壓產品 | 120V(含)以下 | 2年 |

註：再次老化的條件視規定而定

| Category | Description | Storage life |
|------------------|----------------|---|
| Mid-High Voltage | 160V and above | 2yrs; after 1yr, needs to check characteristics; if NG, needs to do aging |
| Low Voltage | 120V and below | 2yrs |

Remark: Re-aging condition depends on its own spec.

七、廢棄處理

1. 在電容器上開孔或壓碎後焚燒。
2. 電容器不焚燒時，請交給專業的工業廢棄物處理廠處理。

七、Disposal

1. Make a hole the in the capacitor body or crush capacitors and incinerate them.
2. If incineration is not applicable, hand them over to a waste disposal agent and have them buried in a landfill.

八、特別注意事項

在選用電容器時，如果在產品目錄及規格書中沒有找到符合要求的系列或規格時，請直接與我司的業務部或研發部聯繫，我司可根據客戶的要求開發特殊性能產品。上述鋁電解電容器的使用注意事項依據EIAJRCR-2367B 2002年3月發行的《電子機器用固定鋁電解電容器使用注意事項指南》製作而成，詳情請參照該指南。

八、Special Notice

When choosing capacitors, if clients couldn't find the series or specification in catalogue and data sheet, please contact with our Sales or RD department, we are able to base on clients' needs to develop product with special functions. For further details, please refer to EAIJ RCR-2367B-Guideline of notabilia for fix for use in electronic equipment [Technical Standardization Committee on Passive Components (established in March 1995, revised in March 2002)]

Environment Protection Policy

We are reducing environmentally harmful substances to do our capacitors in global environmental protection activities. Products compatible with Pb-free and products with non-PVC encasing and ROHS Compliance materials are available.

● ROHS Compliance

Our capacitors do not use any of the materials specifically identified and restricted hazardous material under ROHS Prohibited

Pb : Lead, **Cr6+**: Hexavalent chromium, **Hg**:Mercury, **Cd**:Cadmium, **PBB**:Polybrominated biphenyls, **PBDE** : Polybrominated diphenylethers, **PVC**:Polyvinyl chloride

Application Guidelines For Aluminum Electrolytic Capacitors

鋁電解電容器使用需知

● PVC free Capacitors

We use PET (Polyethylene Terephthalate) sleeve to instead of PVC (Polyvinyl Chloride) sleeve since 2005 January. As there is a size limitation for this counter measure, Please consult our sales representative their availability in big size capacitors.

● Pb-Free Capacitors

Our Capacitors lead wire and terminal doesn't contain lead.

We follow up those conditions as rule and standards to use right materials to production capacitors for maintain earth environment everlasting for human.

Effects of ambient temperature to life (for reference)

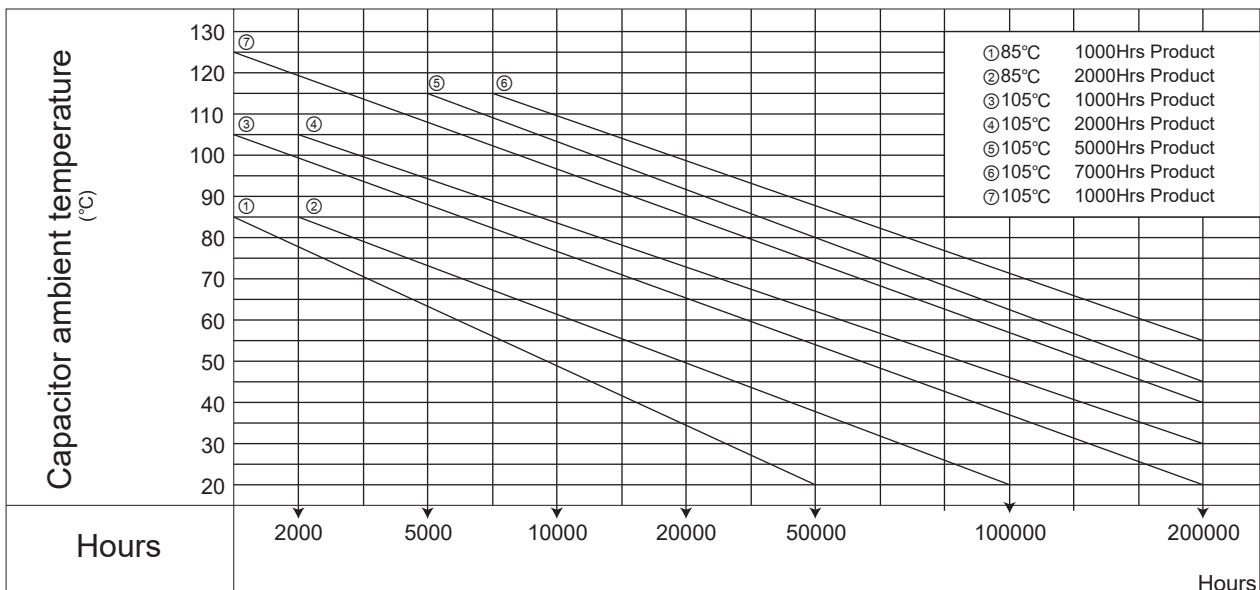
Because an aluminum electrolytic capacitor is essentially an electrochemical component, increase temperatures accelerate the chemical reaction producing gas within the capacitor, diffuse the gas to outside through the end seal, and consequently accelerate a gradual decrease in capacitance and a gradual increase in tenδ and ESR, the following equation has been experimentally found to express the relationship between the temperature acceleration factor and the deterioration of the capacitor.

Where : $Lx = Lo.Ktemp = Lo.B^{(To-Tx)/10}$
 $Ktemp = B(To-Tx)/10$
 Lx = Life time (hour) of capacitor to be estimated
 Lo = Base life time (hour) of capacitor
 To = Maximum rated operating temperature (°C) of capacitor shown in catalog
 Tx = Actual ambient temperature (°C) of capacitor
 B = Temperature acceleration factor (=2)

This equations is similar to Arrhenius equation that express a relationship between chemical reaction rates and temperature and called Arrhenius rule of aluminum electrolytic capacitors.

The temperature acceleration factor (B) is approximately 2 over an ambient temperature range (Tx) from 40°C to the maximum rated operating temperature of the capacitor, and it means that the lifetime is approximately halved with every 10°C rise in ambient temperature and can be extended by using the capacitors at low temperatures.

For an ambient temperature range (Tx) of 20°C to 40°C, the factor B will be close to 2, and the lifetime will be actually extended. However, the environment where the devices are placed and their operating conditions influence ambient temperature, and in particular the ambient temperature in this range will be very inconstant. Therefore, a minimum lifetime should be estimated form the above formula by using the 40°C as Tx.



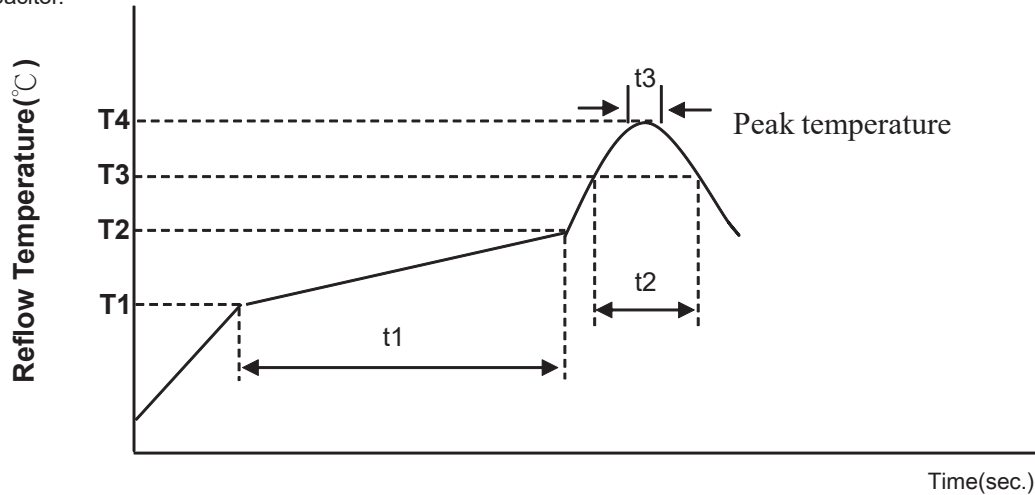
※ 1. A guide limit of the calculated like Aimo is 15 years max
 2. Tx ≥ 40°C

Application Guidelines For Aluminum Electrolytic Capacitors

鋁電解電容器使用需知

RECOMMENDED PB-FREE REFLOW SOLDERING CONDITIONS

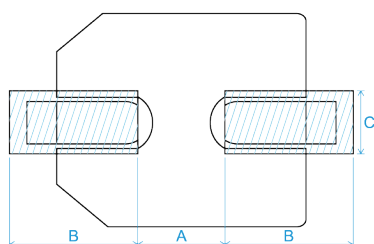
The following conditions are recommended for air or infrared reflow soldering of the surface mount capacitors onto a glass epoxy circuit board of 95 x 50 x 0.8mm (with resist) by cream solder (eutectic solder). The temperatures shown are the surface temperature values of the top of the capacitor.



TEMPERATURE PROFILE

| Profile Feature | Pb Free Assembly | |
|---------------------------------------|------------------|-----------------|
| | 4~6.3Ø | 8~10Ø |
| Average Ramp-up Rate | 3°C/second max. | 3°C/second max. |
| Preheat | | |
| Temperature Min(T1 min) | 150°C | 150°C |
| Temperature Max(T2 max) | 180°C | 180°C |
| Time (t1 Max) | 120sec. | 120sec. |
| Ramp-up Rate (T2 ~T3) | 3°C/second max. | 3°C/second max. |
| Time maintained above Temperature(T3) | 217°C | 217°C |
| Time(t2 Max) | 90sec. | 40sec. |
| Peak Temperature(T4) | 260°C | 245°C |
| Time(t3 Max) | 5sec. | 5sec. |
| Reflow cycles | 1 | 2 or less |

RECOMMENDED LAND PATTEND DIMENSION OF PCB



| DxL | a | b | c |
|---------|-----|-----|-----|
| 4x5.4 | 1.0 | 2.6 | 1.6 |
| 5x5.4 | 1.4 | 3.0 | 1.6 |
| 6.3x5.4 | 1.9 | 3.5 | 1.6 |
| 6.3x7.7 | 1.9 | 3.5 | 1.6 |
| 8x10 | 3.0 | 3.5 | 2.5 |
| 10x10 | 4.0 | 4.0 | 2.5 |

Application Guidelines For Aluminum Electrolytic Capacitors

鋁電解電容器使用需知

PRECAUTIONS FOR USERS**Soldering method**

The capacitors of Alchip-series have no capability to withstand such dip or wave soldering as totally immerses components into a solder bath.

Reflow soldering

Reflow the capacitors within recommended reflow soldering conditions. Verify no temperature stress to the capacitors because the following differences might degrade capacitors electrically and mechanically. Please consult us if other reflow conditions are employed.

1. Location of components : Temperature increases at the edge of PC board more than the center.
2. Population of PC board : The less the component population is the more temperature rises.
3. Material of PC board : A ceramic made board needs more heat than a glass epoxy made board. The heat increase may cause damage of the capacitors.
4. Thickness of PC board : A thicker board needs more heat than a thinner board. The heat increase may damage the capacitors.
5. Size of PC board : A larger board needs more heat than a smaller board. The heat increase may damage the capacitors.
6. Location of infrared ray lamps : IR reflow as well as hot plate reflow applies heat only on the reverse side of the PC board to lessen heat stress to the capacitors.
7. Vapor heat transfer systems (VPS) are not recommended.

Rework of soldering

Avoid reflow soldering more than once. Use a soldering iron for rework. Do not exceed an iron tip temperature of $380 \pm 10^{\circ}\text{C}$ and an exposure time of 3 ± 0.5 seconds.

Mechanical stress

Do not use the capacitors for lifting the PC board and give stress to the capacitor. Avoid bending the PC board. These may damage the capacitors.

Cleaning assembly board

Immediately after solvent cleaning, remove residual solvent for at least 10 minutes with an air knife. The solvent is so insufficiently dry for a long period of time that the capacitors may be cored.

Coating on assembly board

1. Before curing coating material remove the cleaning solvents from the assembly board.
2. Before conformal coating, a chloride free pre-coat material is recommended to use for lessening stress to the capacitors.

Molding with resin

Internal chemical reaction gradually produces gas in the capacitor; then, internal pressure is increasing. If the end seal of the capacitor is completely molded with a resin. The gas stays inside the capacitor. It will face dangerous situation. The chlorine contained resin will penetrate into the end seal, reach the inside element, and cause damage of the capacitor.

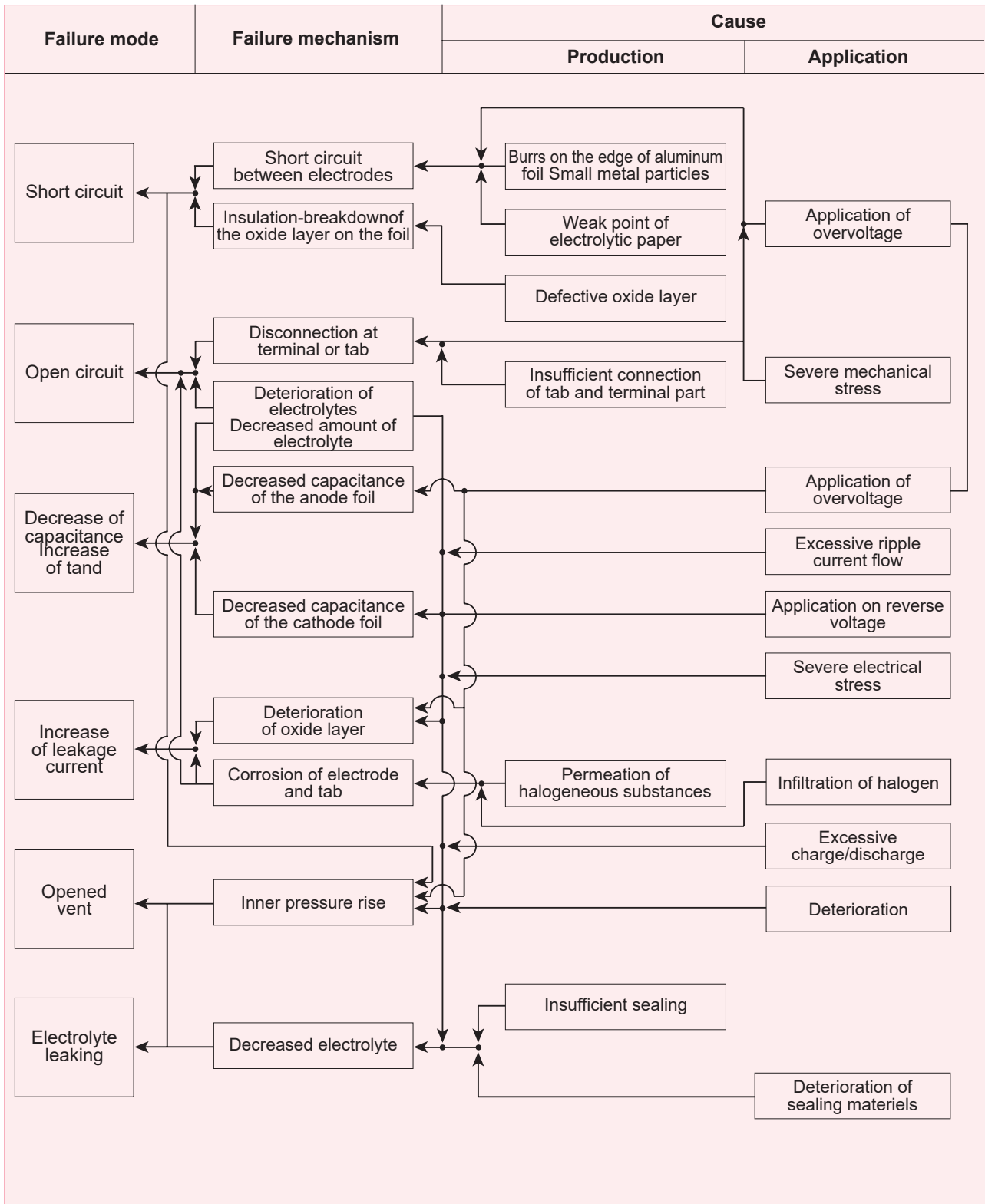
Others

Precautions and Guidelines for Aluminum Electrolytic Capacitors shall be referred.

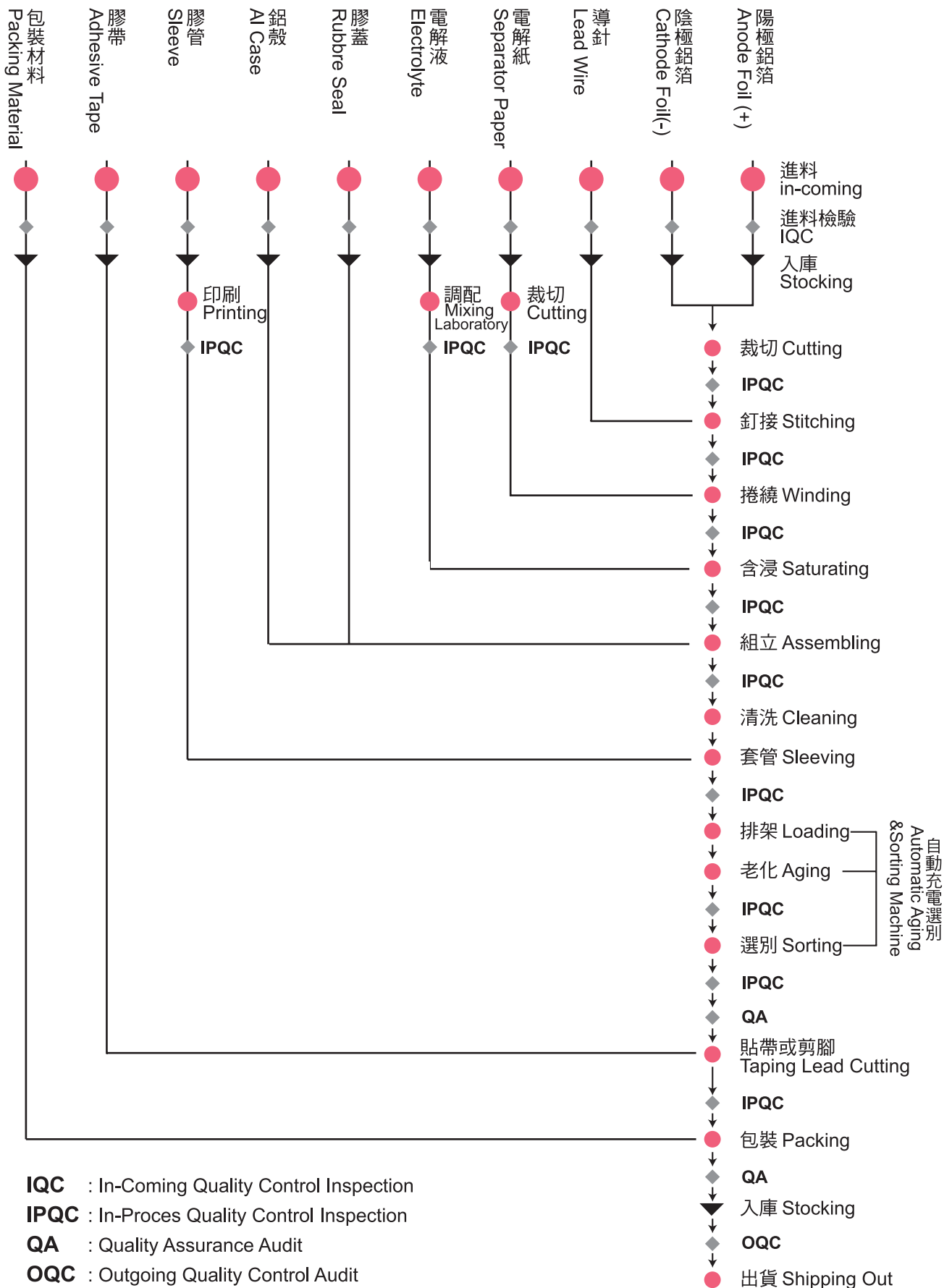
Application Guidelines For Aluminum Electrolytic Capacitors

鋁電解電容器使用需知

Analysis of Failure Mode



Application Guidelines For Aluminum Electrolytic Capacitors



CS series

- Standard type of V-chip, -55 ~ +85°C.
- Applicable to SMT process.
- RoHS Compliance.
- -55 ~ +85°C V-Chip型標準品。
- 適用於SMT製程。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | |
|--|--|---|------|------|--------------------|---------------------------------|------|------|--------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -55 ~ +85°C | | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 4 ~ 100VDC | | | | | | | | |
| Capacitance Range 靜電容量範圍 | 0.1 ~ 1500μF | | | | | | | | |
| Leakage Current 洩漏電流 | $I \leq 0.01CV$ or $3(\mu A)$, which is greater. (After 2 minutes application of DC rated voltage, at 20°C) | | | | | | | | |
| Dissipation Factor 散逸因素($\tan \delta$) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | |
| | Rated Voltage(V) | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | 63~100 |
| | $\tan \delta$ (Max) | 0.42 | 0.30 | 0.26 | 0.22 | 0.16 | 0.14 | 0.14 | 0.10 |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | |
| | Rated Voltage(V) | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | 63~100 |
| | Z(-25°C)/Z(20°C) | 7 | 4 | 3 | 2 | 2 | 2 | 2 | 2 |
| | Z(-55°C) / Z(20°C) | 15 | 8 | 8 | 4 | 4 | 3 | 3 | 3 |
| Load Life 負荷壽命 | 2000hours,with application of rated voltage at 85°C | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value (Within±25% for 4V) | | | | | | | |
| | $\tan \delta$ | 200% or less of Initial Specified Value | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | |
| | $\tan \delta$ | 200% or less of Initial Specified Value | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | |
| Resistance to Soldering Heat 焊錫耐熱性 | The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right. | | | | Capacitance Change | Within ± 10% of Initial Value | | | |
| | | | | | $\tan \delta$ | Initial Specified Value | | | |
| | | | | | Leakage Current | Initial Specified Value or less | | | |
| Marking 標識 | Black print on the case top | | | | | | | | |

Frequency Coefficient of Permissible Ripple Current

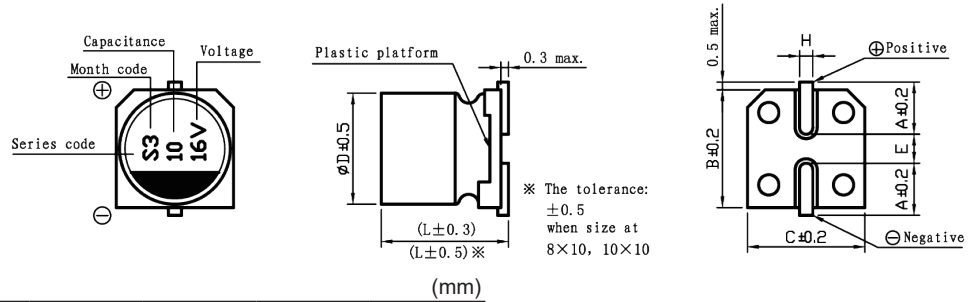
| Frequency (Hz) | 50 | 120 | 300 | 1K | ≥10K |
|----------------|------|------|------|------|------|
| Coefficient | 0.70 | 1.00 | 1.17 | 1.36 | 1.50 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

CS series

DIMENSIONS(mm)

Chip Type



※ The tolerance: ± 0.5 when size at $8 \times 10, 10 \times 10$

| ϕ D x L | 4x5.4 | 5x5.4 | 6.3x5.4 | 6.3x7.7 | 8x10 | 10x10 |
|--------------|---------|---------|---------|---------|---------|---------|
| A | 1.8 | 2.1 | 2.4 | 2.4 | 2.9 | 3.2 |
| B | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 10.3 |
| C | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 10.3 |
| E | 1.0 | 1.3 | 2.2 | 2.2 | 3.1 | 4.5 |
| L | 5.4 | 5.4 | 5.4 | 7.7 | 10 | 10 |
| H | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.8~1.1 | 0.8~1.1 |

STANDARD RATINGS

D x L (mm) ; R.C. (mA rms) at 85°C 120Hz.

| Cap (μF) | V | 4 | | 6.3 | | 10 | | 16 | | 25 | |
|----------|------|---------|------|---------|------|---------|------|---------|------|---------|------|
| | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 4.7 | | | | | | | | | | 4x5.4 | 16 |
| 10 | | | | | | 4x5.4 | 28 | 4x5.4 | 23 | 4x5.4 | 23 |
| 22 | | 4x5.4 | 28 | 4x5.4 | 28 | 5x5.4 | 33 | 5x5.4 | 37 | 5x5.4 | 34 |
| 33 | | 4x5.4 | 28 | 4x5.4 | 28 | 5x5.4 | 41 | 5x5.4 | 49 | 6.3x5.4 | 47 |
| 47 | | 4x5.4 | 33 | 5x5.4 | 45 | 5x5.4 | 52 | 6.3x5.4 | 58 | 6.3x5.4 | 57 |
| 56 | | 5x5.4 | 42 | 6.3x5.4 | 52 | 6.3x5.4 | 57 | 6.3x5.4 | 63 | 6.3x5.4 | 62 |
| 100 | | 5x5.4 | 56 | 6.3x5.4 | 65 | 6.3x5.4 | 76 | 6.3x5.4 | 86 | 6.3x7.7 | 130 |
| 150 | | 6.3x5.4 | 79 | 6.3x5.4 | 71 | 6.3x7.7 | 130 | 6.3x7.7 | 130 | | |
| 220 | | 6.3x5.4 | 96 | 6.3x5.4 | 105 | 6.3x7.7 | 130 | 6.3x7.7 | 130 | 8x10 | 250 |
| | | 6.3x7.7 | 130 | 6.3x7.7 | 130 | | | 8x10 | 250 | | |
| 330 | | 6.3x7.7 | 130 | 6.3x7.7 | 130 | 8x10 | 250 | 8x10 | 250 | 10x10 | 310 |
| 470 | | 6.3x7.7 | 130 | 8x10 | 280 | 8x10 | 280 | 10x10 | 280 | | |
| | | 8x10 | 250 | | | | | | | | |
| 680 | | 8x10 | 300 | 8x10 | 300 | 10x10 | 350 | 10x10 | 350 | | |
| 1000 | | 10x10 | 430 | 10x10 | 430 | 10x10 | 430 | | | | |
| 1500 | | 10x10 | 480 | 10x10 | 480 | | | | | | |

| Cap (μF) | V | 35 | | 50 | | 63 | | 100 | |
|----------|------|---------|------|---------|------|---------|------|-------|------|
| | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 0.1 | | | | 4x5.4 | 3.0 | 4x5.4 | 2.0 | | |
| 0.22 | | | | 4x5.4 | 5.0 | 4x5.4 | 3.0 | | |
| 0.33 | | | | 4x5.4 | 6.0 | 4x5.4 | 4.0 | | |
| 0.47 | | | | 4x5.4 | 7.0 | 4x5.4 | 5.0 | | |
| 1 | | | | 4x5.4 | 10 | 4x5.4 | 8.0 | 4x5.4 | 6.0 |
| 2.2 | | 4x5.4 | 12 | 4x5.4 | 14 | 5x5.4 | 12 | 5x5.4 | 10 |
| 3.3 | | 4x5.4 | 16 | 4x5.4 | 19 | 5x5.4 | 17 | | |
| 4.7 | | 4x5.4 | 18 | 4x5.4 | 26 | 5x5.4 | 23 | | |
| 10 | | 5x5.4 | 29 | 5x5.4 | 31 | 6.3x5.4 | 42 | | |
| 22 | | 6.3x5.4 | 46 | 6.3x5.4 | 59 | 6.3x7.7 | 60 | 10x10 | 90 |
| 33 | | 6.3x5.4 | 51 | 6.3x7.7 | 75 | 8x10 | 110 | 10x10 | 90 |
| 47 | | 6.3x5.4 | 63 | 6.3x7.7 | 75 | 8x10 | 130 | | |
| 56 | | 6.3x7.7 | 70 | 8x10 | 175 | 10x10 | 160 | | |
| 100 | | 6.3x7.7 | 70 | 8x10 | 175 | 10x10 | 170 | | |
| | | 8x10 | 175 | | | | | | |
| 220 | | 10x10 | 320 | 10x10 | 320 | | | | |
| 330 | | 10x10 | 360 | | | | | | |

CS

CH series

- Standard type of V-chip, -55 ~ +105°C.
- Applicable to SMT process.
- RoHS Compliance.
- -55 ~ +105°C V-Chip型標準品。
- 適用於SMT製程。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | |
|---------------------------------------|---|---|------|------|--------------------|---------------------------------|------|------|---|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -55 ~ +105°C | | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 4 ~ 50VDC | | | | | | | | |
| Capacitance Range 靜電容量範圍 | 0.1 ~ 1500µF | | | | | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3(µA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C) | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | |
| | Rated Voltage(V) | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | |
| | tan δ(Max) | 0.42 | 0.30 | 0.26 | 0.22 | 0.16 | 0.14 | 0.14 | |
| Low Temperature Stability 低溫特性 | Measurement Frequency: 120Hz. | | | | | | | | |
| | Rated Voltage(V) | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | |
| | Impedance Ratio(Max) 阻抗比率(最大值) | Z(-25°C)/Z(20°C) | 7 | 4 | 3 | 2 | 2 | 2 | 2 |
| | Z(-55°C)/Z(20°C) | 15 | 8 | 8 | 4 | 4 | 3 | 3 | |
| Load Life 負荷壽命 | 1000hours,with application of rated voltage at 105°C | | | | | | | | |
| | Capacitance Change | Within ± 25% of Initial Value | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | |
| Resistance to Soldering Heat 焊錫耐熱性 | The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. | | | | Capacitance Change | Within ± 10% of Initial Value | | | |
| | After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right. | | | | tan δ | Initial Specified Value | | | |
| | | | | | Leakage Current | Initial Specified Value or less | | | |
| Marking 標識 | Black print on the case top | | | | | | | | |

Frequency Coefficient of Permissible Ripple Current

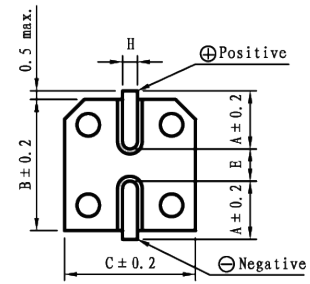
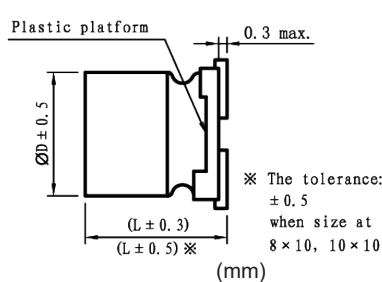
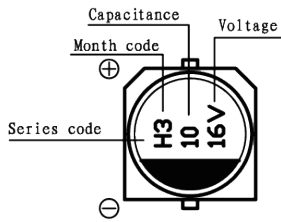
| Frequency (Hz) | 50 | 120 | 300 | 1K | ≧10K |
|----------------|------|------|------|------|------|
| Coefficient | 0.70 | 1.00 | 1.17 | 1.36 | 1.50 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise.
When long life performance is required in actual use , the rms ripple current has to be reduced.

CH series

DIMENSIONS(mm)

Chip Type



| ϕ D x L | 4x5.4 | 5x5.4 | 6.3x5.4 | 6.3x7.7 | 8x10 | 10x10 |
|--------------|---------|---------|---------|---------|---------|---------|
| A | 1.8 | 2.1 | 2.4 | 2.4 | 2.9 | 3.2 |
| B | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 10.3 |
| C | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 10.3 |
| E | 1.0 | 1.3 | 2.2 | 2.2 | 3.1 | 4.5 |
| L | 5.4 | 5.4 | 5.4 | 7.7 | 10 | 10 |
| H | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.8~1.1 | 0.8~1.1 |

STANDARD RATINGS

D x L (mm) ; R.C. (mA rms) at 105°C 120Hz.

| Cap (μF) | V | 4 | | 6.3 | | 10 | | 16 | |
|----------|------|---------|------|---------|------|---------|------|---------|------|
| | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 10 | | | | | | | | 4x5.4 | 18 |
| 22 | | 4x5.4 | 22 | 4x5.4 | 24 | 5x5.4 | 27 | 5x5.4 | 30 |
| 33 | | 5x5.4 | 30 | 5x5.4 | 33 | 5x5.4 | 35 | 6.3x5.4 | 40 |
| 47 | | 5x5.4 | 36 | 5x5.4 | 40 | 5x5.4 | 40 | 6.3x5.4 | 50 |
| 100 | | 6.3x5.4 | 60 | 6.3x5.4 | 66 | 6.3x5.4 | 79 | 6.3x5.4 | 90 |
| | | | | | | 6.3x7.7 | 121 | | |
| 150 | | 6.3x5.4 | 65 | 6.3x5.4 | 75 | 6.3x7.7 | 121 | 8x10 | 210 |
| 220 | | 6.3x5.4 | 79 | 6.3x5.4 | 79 | 6.3x7.7 | 121 | 8x10 | 210 |
| | | | | | | 8x10 | 210 | | |
| 330 | | 6.3x7.7 | 121 | 6.3x7.7 | 121 | 8x10 | 210 | 8x10 | 210 |
| 470 | | 8x10 | 210 | 8x10 | 210 | 8x10 | 210 | 10x10 | 250 |
| 680 | | 8x10 | 210 | 8x10 | 210 | 10x10 | 310 | 10x10 | 310 |
| 1000 | | 8x10 | 230 | 10x10 | 350 | 10x10 | 410 | | |
| 1500 | | 10x10 | 410 | 10x10 | 410 | | | | |

| Cap (μF) | V | 25 | | 35 | | 50 | |
|----------|------|---------|------|---------|------|---------|------|
| | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 0.1 | | | | | | 4x5.4 | 1.0 |
| 0.22 | | | | | | 4x5.4 | 2.6 |
| 0.33 | | | | | | 4x5.4 | 3.2 |
| 0.47 | | | | | | 4x5.4 | 3.8 |
| 1 | | | | | | 4x5.4 | 6.3 |
| 2.2 | | | | | | 4x5.4 | 11 |
| 3.3 | | | | | | 4x5.4 | 14 |
| 4.7 | | 4x5.4 | 13 | 4x5.4 | 15 | 4x5.4 | 18 |
| 10 | | 4x5.4 | 22 | 5x5.4 | 25 | 6.3x5.4 | 30 |
| 22 | | 6.3x5.4 | 32 | 6.3x5.4 | 42 | 6.3x5.4 | 39 |
| 33 | | 6.3x5.4 | 48 | 6.3x5.4 | 47 | 6.3x7.7 | 60 |
| | 8x10 | | | | | 70 | |
| 47 | | 6.3x5.4 | 58 | 6.3x5.4 | 56 | 6.3x7.7 | 60 |
| | | | | | | 8x10 | 110 |
| 100 | | 6.3x7.7 | 84 | 6.3x7.7 | 84 | 8x10 | 140 |
| | | | | 8x10 | 131 | | |
| 150 | | 8x10 | 140 | 8x10 | 155 | 10x10 | 180 |
| 220 | | 8x10 | 155 | 8x10 | 190 | 10x10 | 220 |
| 330 | | 8x10 | 190 | 10x10 | 300 | | |
| 470 | | 10x10 | 300 | | | | |

CK series

- Standard type of V-chip, 2000 hours, 105°C.
- Applicable to SMT process.
- RoHS Compliance.
- 105°C 2000hours V-Chip型標準品。
- 適用於SMT製程。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | |
|--|---|---|------|------|--------------------|---------------------------------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -55 ~ +105°C | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 50VDC | | | | | | |
| Capacitance Range 靜電容量範圍 | 0.1 ~ 1000µF | | | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3 (µA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C) | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 |
| | tan δ(Max) | 0.32 | 0.28 | 0.24 | 0.18 | 0.15 | 0.14 |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 |
| | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 |
| | Z(-55°C)/Z(20°C) | 8 | 8 | 4 | 4 | 3 | 3 |
| Load Life 負荷壽命 | 2000hours,with application of rated voltage at 105°C | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Resistance to Soldering Heat 焊錫耐熱性 | The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right. | | | | Capacitance Change | Within ± 10% of Initial Value | |
| | | | | | tan δ | Initial Specified Value | |
| | | | | | Leakage Current | Initial Specified Value or less | |
| Marking 標識 | Black print on the case top | | | | | | |

Frequency Coefficient of Permissible Ripple Current

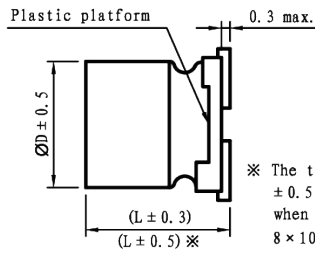
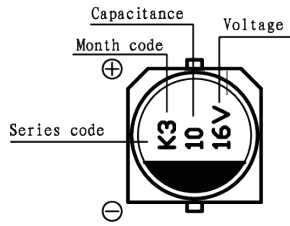
| Frequency (Hz) | 50 | 120 | 300 | 1K | ≧10K |
|----------------|------|------|------|------|------|
| Coefficient | 0.70 | 1.00 | 1.17 | 1.36 | 1.50 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

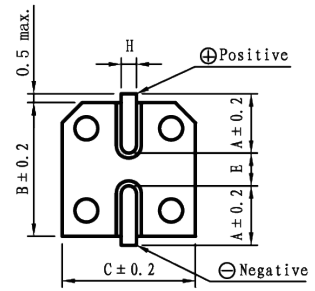
CK series

DIMENSIONS(mm)

Chip Type



※ The tolerance: ± 0.5 when size at 8 × 10, 10 × 10



(mm)

| φ D×L | 4x5.4 | 5x5.4 | 6.3x5.4 | 6.3x7.7 | 8x10 | 10x10 |
|-------|---------|---------|---------|---------|---------|---------|
| A | 1.8 | 2.1 | 2.4 | 2.4 | 2.9 | 3.2 |
| B | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 10.3 |
| C | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 10.3 |
| E | 1.0 | 1.3 | 2.2 | 2.2 | 3.1 | 4.5 |
| L | 5.4 | 5.4 | 5.4 | 7.7 | 10 | 10 |
| H | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.8~1.1 | 0.8~1.1 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

| Cap (μF) | V | 6.3 | | 10 | | 16 | | 25 | | 35 | | 50 | |
|----------|---|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 0.1 | | | | | | | | | | | | 4x5.4 | 1.0 |
| 0.22 | | | | | | | | | | | | 4x5.4 | 2.6 |
| 0.33 | | | | | | | | | | | | 4x5.4 | 3.2 |
| 0.47 | | | | | | | | | | | | 4x5.4 | 3.8 |
| 1 | | | | | | | | | | | | 4x5.4 | 8 |
| 2.2 | | | | | | | | 4x5.4 | 6.6 | 4x5.4 | 8 | 4x5.4 | 11 |
| 3.3 | | | | | | 4x5.4 | 7 | 4x5.4 | 12 | 4x5.4 | 13 | 4x5.4 | 16 |
| 4.7 | | | | 4x5.4 | 7 | 4x5.4 | 9 | 4x5.4 | 13 | 4x5.4 | 15 | 5x5.4 | 19 |
| 10 | | 4x5.4 | 10 | 4x5.4 | 13 | 4x5.4 | 28 | 5x5.4 | 28 | 5x5.4 | 28 | 6.3x5.4 | 35 |
| 22 | | 4x5.4 | 26 | 5x5.4 | 35 | 5x5.4 | 39 | 6.3x5.4 | 45 | 6.3x5.4 | 70 | 6.3x7.7 | 65 |
| 33 | | 4x5.4 | 29 | 6.3x5.4 | 43 | 6.3x5.4 | 51 | 6.3x5.4 | 65 | 6.3x5.4 | 70 | 8x10 | 140 |
| 47 | | 5x5.4 | 45 | 6.3x5.4 | 62 | 6.3x5.4 | 70 | 6.3x5.4 | 70 | 6.3x7.7 | 80 | 8x10 | 170 |
| 100 | | 6.3x5.4 | 71 | 6.3x5.4 | 90 | 6.3x7.7 | 100 | 6.3x7.7 | 100 | 8x10 | 305 | 8x10 | 315 |
| 220 | | 6.3x7.7 | 100 | 6.3x7.7 | 120 | 6.3x7.7 | 125 | 8x10 | 355 | 10x10 | 450 | 10x10 | 450 |
| 330 | | | | 8x10 | 215 | 10x10 | 440 | 10x10 | 450 | | | | |
| 470 | | 10x10 | 310 | 10x10 | 440 | 10x10 | 460 | 10x10 | 490 | | | | |
| 1000 | | 10x10 | 495 | | | | | | | | | | |

CK

CN series

- Non-polarity V-chip.
- Applicable to SMT process.
- RoHS Compliance.
- V-Chip 無極性產品。
- 適用於SMT製程。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | |
|---------------------------------------|--|---|------|------|--------------------|---------------------------------|------|---|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -55 ~ +85°C | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 50VDC | | | | | | | |
| Capacitance Range 靜電容量範圍 | 0.1 ~ 100μF | | | | | | | |
| Leakage Current 洩漏電流 | $I \leq 0.03CV$ or 5 (μA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C) | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | |
| | tan δ(Max) | 0.30 | 0.25 | 0.20 | 0.17 | 0.15 | 0.15 | |
| Low Temperature Stability 低溫特性 | Measurement Frequency: 120Hz. | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | |
| | Impedance Ratio(Max) 阻抗比率(最大值) | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 |
| | Z(-55°C)/Z(20°C) | 8 | 6 | 4 | 4 | 3 | 3 | |
| Load Life 負荷壽命 | 1000hours,with application of rated voltage at 85°C | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | |
| Resistance to Soldering Heat 焊錫耐熱性 | The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right. | | | | Capacitance Change | Within ± 10% of Initial Value | | |
| | | | | | tan δ | Initial Specified Value | | |
| | | | | | Leakage Current | Initial Specified Value or less | | |
| Marking 標識 | Black print on the case top | | | | | | | |

Frequency Coefficient of Permissible Ripple Current

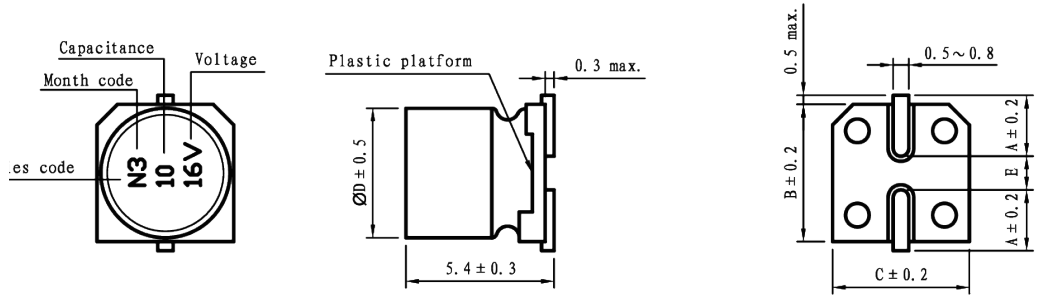
| Frequency (Hz) | 50 | 120 | 300 | 1K | ≧ 10K |
|----------------|------|------|------|------|-------|
| Coefficient | 0.70 | 1.00 | 1.17 | 1.36 | 1.50 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

CN series

DIMENSIONS(mm)

■ Chip Type



| | ϕ D x L | 4x5.4 | 5x5.4 | 6.3x5.4 |
|---|--------------|-------|-------|---------|
| A | | 1.8 | 2.1 | 2.4 |
| B | | 4.3 | 5.3 | 6.6 |
| C | | 4.3 | 5.3 | 6.6 |
| E | | 1.0 | 1.3 | 2.2 |

(mm)

STANDARD RATINGS

D x L (mm) ; R.C. (mA rms) at 85°C 120Hz.

| Cap (μ F) | V Item | 6.3 | | 10 | | 16 | | 25 | | 35 | | 50 | |
|-------------------|-----------|---------|------|---------|------|---------|------|---------|------|---------|------|---------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 0.1 | | | | | | | | | | | | 4x5.4 | 1.0 |
| 0.22 | | | | | | | | | | | | 4x5.4 | 2.0 |
| 0.33 | | | | | | | | | | | | 4x5.4 | 2.8 |
| 0.47 | | | | | | | | | | | | 4x5.4 | 4.0 |
| 1 | | | | | | | | | | | | 4x5.4 | 8.4 |
| 2.2 | | | | | | | | | | 4x5.4 | 8.4 | 5x5.4 | 13 |
| 3.3 | | | | | | | | 5x5.4 | 12 | 5x5.4 | 16 | 5x5.4 | 17 |
| 4.7 | | | | | | 4x5.4 | 12 | 5x5.4 | 16 | 5x5.4 | 18 | 6.3x5.4 | 20 |
| 10 | | | | 4x5.4 | 17 | 5x5.4 | 23 | 6.3x5.4 | 27 | 6.3x5.4 | 29 | 6.3x5.4 | 40 |
| 22 | | 4x5.4 | 28 | 4x5.4 | 33 | 5x5.4 | 37 | 6.3x5.4 | 50 | | | | |
| 33 | | 6.3x5.4 | 37 | 6.3x5.4 | 41 | 6.3x5.4 | 49 | | | | | | |
| 47 | | 6.3x5.4 | 45 | 6.3x5.4 | 54 | | | | | | | | |
| 100 | | 6.3x5.4 | 65 | | | | | | | | | | |

CN

CD series

- Low impedance, 105°C V-chip.
- Applicable to SMT process.
- RoHS Compliance.
- 105°C低阻抗、V-Chip型產品。
- 適用於SMT製程。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | |
|---------------------------------------|---|---|------|------|------|--------------------|---------------------------------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -55 ~ +105°C | | | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 100VDC | | | | | | | | | |
| Capacitance Range 靜電容量範圍 | 1 ~ 1500μF | | | | | | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3(μA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C) | | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 |
| | tan δ(Max) | 0.30 | 0.26 | 0.22 | 0.16 | 0.13 | 0.10 | 0.08 | 0.08 | 0.07 |
| Low Temperature Stability 低溫特性 | Measurement Frequency: 120Hz. | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 |
| | Impedance Ratio(Max) 阻抗比率(最大值) | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 |
| | Z(-55°C)/Z(20°C) | 8 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | |
| Load Life 負荷壽命 | 3000hours,with application of rated voltage at 105°C(ØD=4~6.3mm : 2000hrs) | | | | | | | | | |
| | Capacitance Change | Within ± 30% of Initial Value | | | | | | | | |
| | tan δ | 300% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | |
| | Capacitance Change | Within ± 30% of Initial Value | | | | | | | | |
| | tan δ | 300% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| Resistance to Soldering Heat 焊錫耐熱性 | The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right. | | | | | Capacitance Change | Within ± 10% of Initial Value | | | |
| | | | | | | tan δ | Initial Specified Value | | | |
| | | | | | | Leakage Current | Initial Specified Value or less | | | |
| Marking 標識 | Black print on the case top | | | | | | | | | |

Frequency Coefficient of Permissible Ripple Current

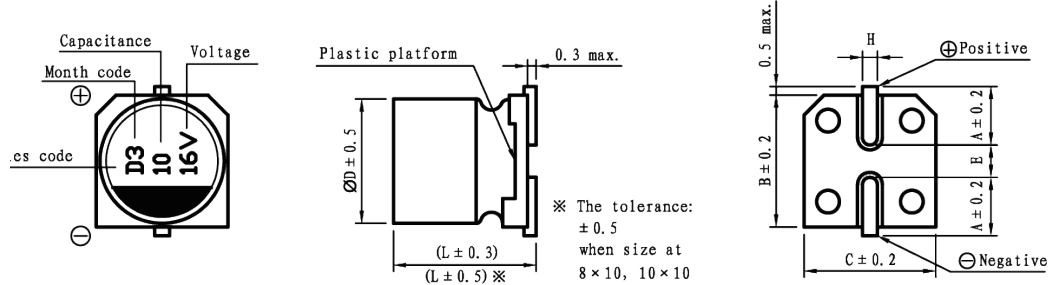
| Frequency (Hz) | 120 ≤ F < 1K | 1K ≤ F < 10K | 10K ≤ F < 100K | 100K ≤ F |
|----------------|--------------|--------------|----------------|----------|
| ≤ 33 | 0.35 | 0.70 | 0.90 | 1.00 |
| 33 ~ 150 | 0.40 | 0.85 | 0.92 | 1.00 |
| > 150 | 0.60 | 0.85 | 0.95 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

CD series

DIMENSIONS(mm)

Chip Type



(mm)

| ϕ D x L | 4x5.4 | 5x5.4 | 6.3x5.4 | 6.3x7.7 | 8x10 | 10x10 |
|--------------|---------|---------|---------|---------|---------|---------|
| A | 1.8 | 2.1 | 2.4 | 2.4 | 2.9 | 3.2 |
| B | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 10.3 |
| C | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 10.3 |
| E | 1.0 | 1.3 | 2.2 | 2.2 | 3.1 | 4.5 |
| L | 5.4 | 5.4 | 5.4 | 7.7 | 10 | 10 |
| H | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.8~1.1 | 0.8~1.1 |

STANDARD RATINGS

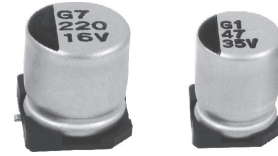
D x L (mm) ; R.C. (mA rms) at 105°C 100KHz, IMP (Ω max) at 20°C 100KHz.

| Cap (μF) | V | 6.3 | | | 10 | | | 16 | | | 25 | | | 35 | | |
|----------|---|---------|-------|------|---------|-------|------|---------|-------|------|---------|-------|------|---------|-------|------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 4.7 | | | | | | | | | | | | | | 4x5.4 | 80 | 2.0 |
| 10 | | | | | | | | 4x5.4 | 80 | 2.0 | 4x5.4 | 80 | 2.0 | 5x5.4 | 150 | 1.20 |
| 22 | | 4x5.4 | 80 | 2.0 | 4x5.4 | 80 | 2.0 | 5x5.4 | 150 | 1.20 | 5x5.4 | 150 | 1.20 | 6.3x5.4 | 230 | 0.80 |
| 33 | | 4x5.4 | 80 | 2.0 | 5x5.4 | 150 | 1.20 | 5x5.4 | 150 | 1.20 | 6.3x5.4 | 230 | 0.80 | 6.3x5.4 | 230 | 0.80 |
| 47 | | 5x5.4 | 150 | 1.20 | 5x5.4 | 150 | 1.20 | 5x5.4 | 150 | 1.20 | 6.3x5.4 | 230 | 0.80 | 6.3x5.4 | 230 | 0.80 |
| 100 | | 6.3x5.4 | 230 | 0.80 | 6.3x5.4 | 230 | 0.80 | 6.3x5.4 | 230 | 0.80 | 6.3x7.7 | 280 | 0.58 | 8x10 | 450 | 0.22 |
| 150 | | 6.3x5.4 | 230 | 0.80 | 6.3x5.4 | 230 | 0.80 | 6.3x7.7 | 280 | 0.58 | 8x10 | 450 | 0.22 | 8x10 | 450 | 0.22 |
| 220 | | 6.3x5.4 | 230 | 0.80 | 6.3x7.7 | 280 | 0.58 | 6.3x7.7 | 280 | 0.58 | 8x10 | 450 | 0.22 | 10x10 | 670 | 0.15 |
| 330 | | 8x10 | 450 | 0.22 | 8x10 | 450 | 0.22 | 8x10 | 450 | 0.22 | 8x10 | 450 | 0.22 | | | |
| 470 | | 8x10 | 450 | 0.22 | 8x10 | 450 | 0.22 | 8x10 | 450 | 0.22 | 10x10 | 670 | 0.15 | | | |
| | | | | | | | | 10x10 | 670 | 0.15 | | | | | | |
| 680 | | 8x10 | 450 | 0.22 | 10x10 | 670 | 0.15 | 10x10 | 670 | 0.15 | | | | | | |
| 1000 | | 8x10 | 450 | 0.22 | 10x10 | 670 | 0.15 | | | | | | | | | |
| 1500 | | 10x10 | 670 | 0.15 | | | | | | | | | | | | |

| Cap (μF) | V | 50 | | | 63 | | | 80 | | | 100 | | |
|----------|---|---------|-------|------|---------|-------|------|---------|-------|------|-------|-------|------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 1 | | 4x5.4 | 60 | 9.0 | | | | | | | | | |
| 2.2 | | 4x5.4 | 60 | 9.0 | | | | | | | | | |
| 3.3 | | 4x5.4 | 60 | 9.0 | 5x5.4 | 85 | 5.0 | 5x5.4 | 50 | 5.3 | | | |
| 4.7 | | 5x5.4 | 85 | 5.0 | 5x5.4 | 85 | 5.0 | 6.3x5.4 | 60 | 4.8 | | | |
| 10 | | 6.3x5.4 | 165 | 2.2 | 6.3x5.4 | 165 | 2.2 | | | | 8x10 | 130 | 1.88 |
| 22 | | 6.3x5.4 | 165 | 2.2 | 6.3x7.7 | 185 | 1.4 | 8x10 | 130 | 1.88 | 10x10 | 200 | 0.90 |
| 33 | | 6.3x7.7 | 185 | 1.4 | 8x10 | 369 | 0.85 | 10x10 | 200 | 0.90 | 10x10 | 200 | 0.90 |
| 47 | | 6.3x7.7 | 185 | 1.4 | 8x10 | 369 | 0.85 | 10x10 | 200 | 0.90 | 10x10 | 200 | 0.90 |
| 68 | | 8x10 | 369 | 0.68 | 10x10 | 450 | 0.48 | 10x10 | 200 | 0.90 | | | |
| 100 | | 8x10 | 369 | 0.68 | 10x10 | 553 | 0.48 | | | | | | |
| | | 10x10 | 553 | 0.48 | | | | | | | | | |
| 150 | | 10x10 | 553 | 0.48 | | | | | | | | | |

CG series

- Wide range of -55~+125°C, long life product.
- Applicable to SMT process.
- RoHS Compliance.
- -55 ~ +125°C廣溫度、長壽命產品。
- 適用於SMT製程。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | |
|--|---|---|------|------|------|--------------------|---------------------------------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -55 ~ +125°C | | | | | -40 ~ +125°C | | | | |
| Rated Voltage Range 額定電壓範圍 | 10 ~ 63VDC | | | | | 80 ~ 160VDC | | | | |
| Capacitance Range 靜電容量範圍 | 10 ~ 470µF | | | | | 2.2 ~ 4.7µF | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3(µA) , which is greater. (After 2 minutes application of DC rated voltage, at 20°C) | | | | | | | | | |
| Dissipation Factor 散逸因素 (tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160 |
| | tan δ(Max) | 0.32 | 0.24 | 0.21 | 0.18 | 0.18 | 0.15 | 0.15 | 0.12 | 0.20 |
| Low Temperature Stability 低温特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160 |
| | Z(-25°C)/Z(20°C) | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | - |
| | Z(-40°C)/Z(20°C) | - | - | - | - | - | - | 3 | 3 | - |
| | Z(-55°C)/Z(20°C) | 6 | 4 | 4 | 3 | 3 | 3 | - | - | - |
| Load Life 負荷壽命 | 3000hours,with application of rated voltage at 125°C (ØD=4~6.3x5.4mm : 1000hrs;6.3x7.7mm : 2000hrs) | | | | | | | | | |
| | Capacitance Change | Within ± 30% of Initial Value | | | | | | | | |
| | tan δ | 300% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | |
| | Capacitance Change | Within ± 30% of Initial Value | | | | | | | | |
| | tan δ | 300% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | 500% or less of Initial Specified Value | | | | | | | | |
| Resistance to Soldering Heat 焊錫耐熱性 | The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. | | | | | Capacitance Change | Within ± 10% of Initial Value | | | |
| | After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right. | | | | | tan δ | Initial Specified Value | | | |
| | | | | | | Leakage Current | Initial Specified Value or less | | | |
| Marking 標識 | Black print on the case top | | | | | | | | | |

Frequency Coefficient of Permissible Ripple Current

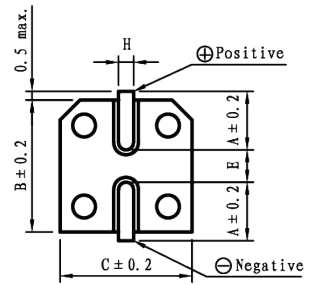
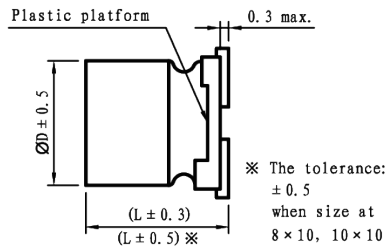
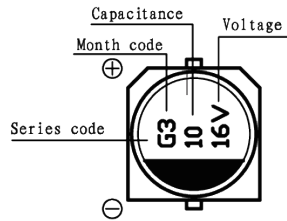
| Frequency (Hz) | 50 | 60 | 120 | 1K | ≥10K |
|----------------|------|------|------|------|------|
| Coefficient | 0.64 | 0.64 | 1.00 | 1.36 | 1.50 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

CG series

DIMENSIONS(mm)

■ Chip Type



(mm)

| φ D×L | 6.3x5.4 | 6.3x7.7 | 8x10 | 10x10 |
|-------|---------|---------|---------|---------|
| A | 2.4 | 2.4 | 2.9 | 3.2 |
| B | 6.6 | 6.6 | 8.3 | 10.3 |
| C | 6.6 | 6.6 | 8.3 | 10.3 |
| E | 2.2 | 2.2 | 3.1 | 4.5 |
| L | 5.4 | 7.7 | 10 | 10 |
| H | 0.5~0.8 | 0.5~0.8 | 0.8~1.1 | 0.8~1.1 |

CG

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 125°C 120Hz.

| Cap (μF) | V | 10 | | 16 | | 25 | | 35 | | 50 | | |
|----------|---------|-------|---------|---------|---------|---------|-------|---------|-------|---------|-------|-----|
| | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | |
| 10 | | | | | | | | 6.3x5.4 | 46 | 6.3x7.7 | 34 | |
| 22 | | | | | | | | 6.3x5.4 | 46 | 6.3x7.7 | 55 | |
| 33 | | | | | | 6.3x5.4 | 46 | 6.3x7.7 | 73 | 8x10 | 106 | |
| 47 | | | | 6.3x5.4 | 40 | 6.3x7.7 | 73 | 6.3x7.7 | 73 | 8x10 | 106 | |
| | | | | | | | | | | 10x10 | 164 | |
| 100 | 6.3x7.7 | 58 | 6.3x7.7 | 73 | 6.3x7.7 | 73 | 8x10 | 131 | 8x10 | 131 | 10x10 | 164 |
| | | | | | | | | 10x10 | 164 | 10x10 | 164 | |
| 220 | 6.3x7.7 | 58 | 8x10 | 131 | 8x10 | 131 | 8x10 | 131 | 10x10 | 164 | | |
| | | | 10x10 | 164 | 10x10 | 164 | 10x10 | 164 | | | | |
| 330 | 8x10 | 90 | 10x10 | 164 | 10x10 | 164 | | | | | | |
| | 10x10 | 112 | | | | | | | | | | |
| 470 | 10x10 | 130 | | | | | | | | | | |

| Cap (μF) | V | 63 | | 80 | | 100 | | 160 | |
|----------|---------|-------|-------|-------|-------|-------|------|-------|------|
| | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 2.2 | | | | | | | | 8x10 | 22 |
| 3.3 | | | | | | | | 8x10 | 22 |
| 4.7 | | | | | | | | 10x10 | 70 |
| 10 | 6.3x7.7 | 40 | 8x10 | 46 | 8x10 | 46 | | | |
| 22 | 8x10 | 66 | 8x10 | 46 | 8x10 | 46 | | | |
| | | | 10x10 | 76 | 10x10 | 76 | | | |
| 33 | 8x10 | 66 | 8x10 | 46 | 10x10 | 76 | | | |
| | 10x10 | 113 | 10x10 | 76 | | | | | |
| 47 | 8x10 | 66 | | | | | | | |
| | 10x10 | 113 | | | | | | | |

CL series

- 105°C 2000hours Life.
- Suitable for lighting and power charger.
- RoHS Compliance.
- 105°C 2000hours產品。
- 適用於照明設備及電源充電器。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | |
|--|---|---|--------------------|---------------------------------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | |
| Rated Voltage Range 額定電壓範圍 | 400VDC | | | |
| Capacitance Range 靜電容量範圍 | 2.2 ~ 6.8μF | | | |
| Leakage Current 洩漏電流 | $I \leq 0.04CV + 100(\mu A)$, which is greater. (After 2 minutes application of DC rated voltage, at 20°C) | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | |
| | Rated Voltage(V) | 400 | | |
| | tan δ(Max) | 0.25 | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | |
| | Rated Voltage(V) | 400 | | |
| | Z(-25°C)/Z(20°C) | 6 | | |
| | Z(-40°C)/Z(20°C) | 10 | | |
| Load Life 負荷壽命 | 2000hours,with application of rated voltage at 105°C | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | |
| | tan δ | 200% or less of Initial Specified Value | | |
| | Leakage Current | Initial Specified Value or less | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | |
| | tan δ | 200% or less of Initial Specified Value | | |
| | Leakage Current | Initial Specified Value or less | | |
| Resistance to Soldering Heat 焊錫耐熱性 | The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removing from the hot plate and restored at room temperature they meet the characteristics requirements listed at right. | | Capacitance Change | Within ± 10% of Initial Value |
| | | | tan δ | Initial Specified Value |
| | | | Leakage Current | Initial Specified Value or less |
| Marking 標識 | JIS C 5101-4-1 (IEC 60384) | | | |

Frequency Coefficient of Permissible Ripple Current

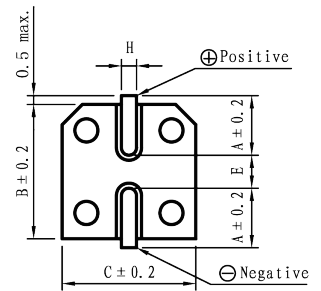
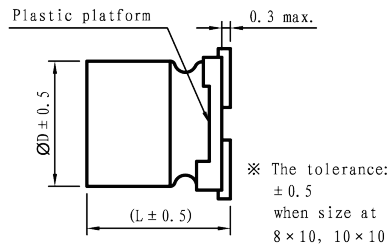
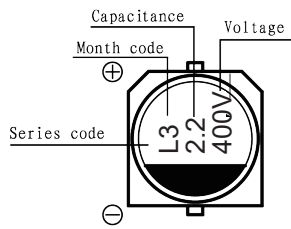
| Frequency (Hz) | 50 | 120 | 300 | 1K | ≥10K |
|------------------|------|------|------|------|------|
| Capacitance (μF) | | | | | |
| 2.2 ~ 6.8 | 0.70 | 1.00 | 1.17 | 1.36 | 1.50 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

CL series

DIMENSIONS(mm)

Chip Type



(mm)

| φ D×L | 8x10 | 10x10 |
|-------|---------|---------|
| A | 2.9 | 3.2 |
| B | 8.3 | 10.3 |
| C | 8.3 | 10.3 |
| E | 3.1 | 4.5 |
| L | 10 | 10 |
| H | 0.8~1.1 | 0.8~1.1 |

STANDARD RATINGS

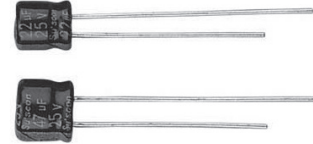
D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

| Cap (μF) | V | 400 | |
|----------|------|-------|------|
| | Item | D x L | R.C. |
| 2.2 | | 8x10 | 26 |
| 3.3 | | 8x10 | 37 |
| 3.9 | | 8x10 | 38 |
| 4.7 | | 8x10 | 39 |
| 6.8 | | 10x10 | 60 |

CL

H5 series

- Subminiature product, 105°C.
- Applicable to small electronic devices.
- Height: 5mm.
- RoHS Compliance
- 105°C超小型產品。
- 適用於小型電子設備。
- 高度：5mm系列。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | |
|---------------------------------------|---|---|------|------|------|------|------|------|---|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 4 ~ 50VDC | | | | | | | | |
| Leakage Current 洩漏電流 | $I \leq 0.01CV$ or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | |
| | Rated Voltage(V) | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | |
| | tan δ(Max) | 0.35 | 0.24 | 0.20 | 0.16 | 0.15 | 0.14 | 0.13 | |
| Low Temperature Stability 低溫特性 | Measurement Frequency: 120Hz. | | | | | | | | |
| | Rated Voltage(V) | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | |
| | Impedance Ratio(Max) 阻抗比率(最大值) | Z(-25°C)/Z(20°C) | 6 | 3 | 3 | 2 | 2 | 2 | 2 |
| | Z(-40°C)/Z(20°C) | 12 | 8 | 5 | 4 | 3 | 3 | 3 | |
| Load Life 負荷壽命 | 1000hours,with application of rated voltage at 105°C | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | |

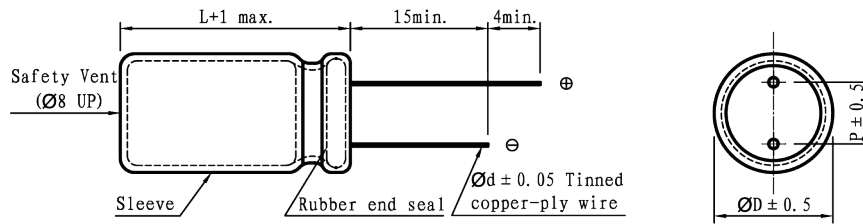
Frequency Coefficient of Permissible Ripple Current

| Capacitance (μF) | Frequency (Hz) | | | |
|------------------|----------------|------|------|------|
| | 50 | 120 | 1K | ≥10K |
| < 100 | 0.80 | 1.00 | 1.30 | 1.50 |
| ≥ 100 | 0.80 | 1.00 | 1.15 | 1.20 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

H5 series

DIMENSIONS(mm)



| | | | | |
|----------|------|------|------|------|
| ϕD | 4 | 5 | 6.3 | 8 |
| P | 1.5 | 2.0 | 2.5 | 2.5 |
| ϕd | 0.45 | 0.45 | 0.45 | 0.45 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

| Cap (µF) | V | 4 | | 6.3 | | 10 | | 16 | |
|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 10 | | | | | | 4x5 | 16 | 4x5 | 18 |
| 22 | | 4x5 | 20 | 4x5 | 21 | 4x5 | 25 | 4x5 | 33 |
| 33 | | 5x5 | 28 | 5x5 | 29 | 5x5 | 34 | 5x5 | 44 |
| 47 | | 5x5 | 33 | 5x5 | 34 | 6.3x5 | 46 | 6.3x5 | 52 |
| 100 | | 6.3x5 | 60 | 6.3x5 | 66 | 6.3x5 | 77 | 8x5 | 93 |
| 150 | | 6.3x5 | 67 | 6.3x5 | 75 | 8x5 | 100 | 8x5 | 115 |
| 220 | | 8x5 | 95 | 8x5 | 115 | 8x5 | 125 | | |

| Cap (µF) | V | 25 | | 35 | | 50 | |
|----------|---|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L |
| 0.1 | | | | | | 4x5 | 1.0 |
| 0.22 | | | | | | 4x5 | 2.0 |
| 0.33 | | | | | | 4x5 | 3.0 |
| 0.47 | | | | | | 4x5 | 3.7 |
| 1 | | | | | | 4x5 | 6.2 |
| 2.2 | | | | | | 4x5 | 10 |
| 3.3 | | | | | 4x5 | 11 | 14 |
| 4.7 | | 4x5 | 13 | 4x5 | 16 | 5x5 | 18 |
| 10 | | 4x5 | 22 | 5x5 | 25 | 6.3x5 | 28 |
| 22 | | 6.3x5 | 38 | 6.3x5 | 46 | 6.3x5 | 59 |
| 33 | | 6.3x5 | 48 | 6.3x5 | 50 | 8x5 | 65 |
| 47 | | 6.3x5 | 58 | 8x5 | 69 | 8x5 | 78 |

H5

M5 series

- Subminiature product, Low impedance, 105°C.
- Applicable to small electronic devices.
- Height: 5mm.
- RoHS Compliance
- 105°C低阻抗、超小型產品。
- 適用於小型電子設備。
- 高度：5mm系列。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | |
|---------------------------------------|---|---|------|------|------|------|---|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 35VDC | | | | | | |
| Leakage Current 洩漏電流 | $I \leq 0.01CV$ or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | |
| | tan δ(Max) | 0.22 | 0.20 | 0.18 | 0.14 | 0.12 | |
| Low Temperature Stability 低溫特性 | Measurement Frequency: 120Hz. | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | |
| | Impedance Ratio(Max) 阻抗比率(最大值) | Z(-25°C)/Z(20°C) | 2 | 2 | 2 | 2 | 2 |
| | Z(-40°C)/Z(20°C) | 4 | 4 | 3 | 3 | 3 | |
| Load Life 負荷壽命 | 1000hours,with application of rated voltage at 105°C | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | |

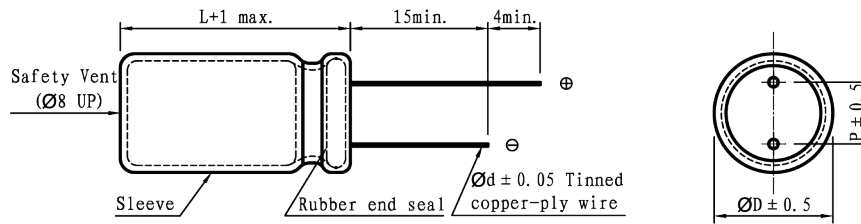
Frequency Coefficient of Permissible Ripple Current

| Frequency (Hz) | 50 | 120 | 300 | 1K | 10K ~ 100K |
|----------------|------|------|------|------|------------|
| Coefficient | 0.50 | 0.65 | 0.70 | 0.90 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

M5 series

DIMENSIONS(mm)



| | | | |
|----------|------|------|------|
| ϕD | 4 | 5 | 6.3 |
| P | 1.5 | 2.0 | 2.5 |
| ϕd | 0.45 | 0.45 | 0.45 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz, IMP (Ω max) at 20°C 100KHz.

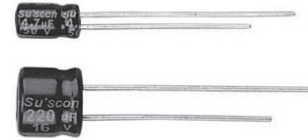
| Cap (μF) | V Item | 6.3 | | | 10 | | | 16 | | |
|--------------------|-----------|-------|------|-----|-------|------|-----|-------|------|-----|
| | | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP |
| 10 | | | | | | | | 4x5 | 55 | 5.0 |
| 15 | | | | | | | | 5x5 | 80 | 2.6 |
| 22 | | 4x5 | 52 | 5.0 | 5x5 | 80 | 2.6 | 5x5 | 82 | 2.5 |
| 33 | | 5x5 | 82 | 2.5 | 5x5 | 82 | 2.5 | 6.3x5 | 113 | 1.3 |
| 47 | | 5x5 | 85 | 2.5 | 6.3x5 | 115 | 1.2 | 6.3x5 | 115 | 1.2 |
| 68 | | 6.3x5 | 118 | 1.3 | | | | | | |
| 100 | | 6.3x5 | 120 | 1.2 | | | | | | |

| Cap (μF) | V Item | 25 | | | 35 | | |
|--------------------|-----------|-------|------|-----|-------|------|-----|
| | | D x L | R.C. | IMP | D x L | R.C. | IMP |
| 1 | | | | | 4x5 | 48 | 5.0 |
| 1.5 | | | | | 4x5 | 49 | 4.9 |
| 2.2 | | | | | 4x5 | 50 | 4.9 |
| 3.3 | | | | | 4x5 | 52 | 4.8 |
| 4.7 | | 4x5 | 49 | 5.0 | 4x5 | 55 | 4.8 |
| 6.8 | | 4x5 | 52 | 4.8 | 5x5 | 80 | 2.6 |
| 10 | | 5x5 | 82 | 2.5 | 5x5 | 85 | 2.5 |
| 15 | | 6.3x5 | 116 | 1.3 | 6.3x5 | 116 | 1.3 |
| 22 | | 6.3x5 | 118 | 1.2 | 6.3x5 | 118 | 1.2 |
| 33 | | 6.3x5 | 120 | 1.1 | | | |

M5

SM series

- Miniature product, 105°C.
- Applicable to small electronic devices.
- Height: 7 mm.
- RoHS Compliance
- 105°C小型化產品。
- 適用於小型電子設備。
- 高度：7mm系列。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | |
|---------------------------------------|---|---|------|------|------|------|------|---|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 50VDC | | | | | | | |
| Leakage Current 洩漏電流 | $I \leq 0.01CV$ or 3 (μA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | |
| | tan δ(Max) | 0.24 | 0.20 | 0.16 | 0.15 | 0.12 | 0.10 | |
| Low Temperature Stability 低溫特性 | Measurement Frequency: 120Hz. | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | |
| | Impedance Ratio(Max) 阻抗比率(最大值) | Z(-25°C)/Z(20°C) | 3 | 2 | 2 | 2 | 2 | 2 |
| | Z(-40°C)/Z(20°C) | 6 | 5 | 4 | 3 | 3 | 3 | |
| Load Life 負荷壽命 | 1000hours,with application of rated voltage at 105°C | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | |

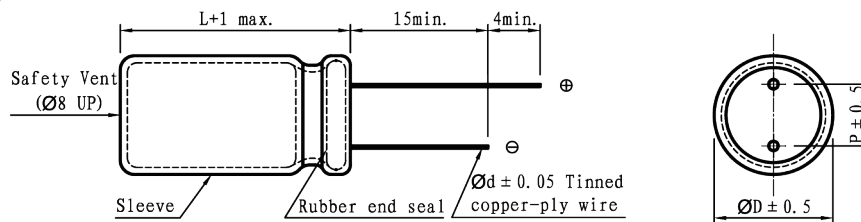
Frequency Coefficient of Permissible Ripple Current

| Capacitance (μF) | Frequency (Hz) | | | |
|------------------|----------------|------|------|------|
| | 50 | 120 | 1K | ≥10K |
| < 100 | 0.80 | 1.00 | 1.30 | 1.50 |
| ≥ 100 | 0.80 | 1.00 | 1.15 | 1.20 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

SM series

DIMENSIONS(mm)



| | | | | |
|----------|------|-----|-----|-----|
| ϕD | 4 | 5 | 6.3 | 8 |
| P | 1.5 | 2.0 | 2.5 | 3.5 |
| ϕd | 0.45 | 0.5 | 0.5 | 0.5 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

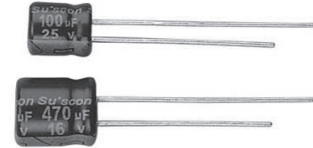
| Cap (µF) | V | 6.3 | | 10 | | 16 | |
|----------|---|-------|-------|------|-------|------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L |
| 10 | | | | | | 4x7 | 28 |
| 22 | | 4x7 | | 34 | 4x7 | 37 | 44 |
| 33 | | 4x7 | | 42 | 4x7 | 45 | 52 |
| 47 | | 4x7 | | 50 | 5x7 | 60 | 69 |
| 100 | | 5x7 | | 75 | 6.3x7 | 86 | 95 |
| 220 | | 6.3x7 | | 95 | 8x7 | 145 | 150 |
| 330 | | 8x7 | | 160 | | | |

| Cap (µF) | V | 25 | | 35 | | 50 | |
|----------|---|-------|-------|------|-------|------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L |
| 0.1 | | | | | | 4x7 | 1.0 |
| 0.22 | | | | | | 4x7 | 2.3 |
| 0.33 | | | | | | 4x7 | 3.5 |
| 0.47 | | | | | | 4x7 | 5.0 |
| 1 | | | | | | 4x7 | 10 |
| 2.2 | | | | | | 4x7 | 18 |
| 3.3 | | | | | 4x7 | 18 | 24 |
| 4.7 | | 4x7 | | 22 | 4x7 | 22 | 28 |
| 10 | | 4x7 | | 29 | 5x7 | 33 | 42 |
| 22 | | 5x7 | | 35 | 6.3x7 | 55 | 60 |
| 33 | | 6.3x7 | | 62 | 6.3x7 | 65 | 68 |
| 47 | | 8x7 | | 75 | 8x7 | 80 | 95 |
| 100 | | 8x7 | | 95 | | | |
| 150 | | 8x7 | | 105 | | | |
| 180 | | 8x7 | | 120 | | | |

SM

MD series

- Miniature, Low impedance, 105°C product.
- Applicable to small electronic devices.
- Height: 7 mm.
- RoHS Compliance
- 105°C 低阻抗、小型化產品。
- 適用於小型電子設備。
- 高度：7mm系列。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | |
|---------------------------------------|---|---|------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 35VDC | | | | | |
| Leakage Current 洩漏電流 | $I \leq 0.01CV$ or 3 (µA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 |
| | tan δ(Max) | 0.18 | 0.16 | 0.14 | 0.12 | 0.12 |
| Low Temperature Stability 低溫特性 | Measurement Frequency: 120Hz. | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 |
| | Impedance Ratio(Max) 阻抗比率(最大值) | $Z(-25°C)/Z(20°C)$ | | | | |
| | | 2 | 2 | 2 | 2 | 2 |
| Load Life 負荷壽命 | 1000hours,with application of rated voltage at 105°C | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | |
| | Leakage Current | Initial Specified Value or less | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | |
| | Leakage Current | Initial Specified Value or less | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | |

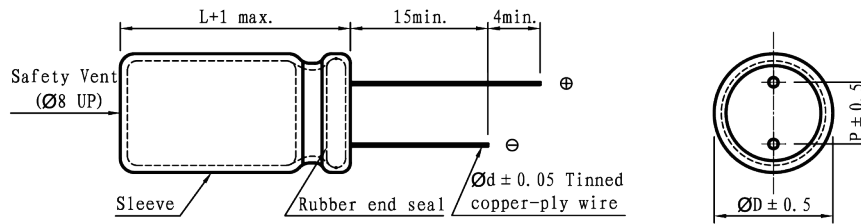
Frequency Coefficient of Permissible Ripple Current

| Frequency (Hz) | 50 | 120 | 300 | 1K | 10K ~ 100K |
|----------------|------|------|------|------|------------|
| Coefficient | 0.35 | 0.50 | 0.64 | 0.83 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

MD series

DIMENSIONS(mm)



| | | | | |
|----------|------|-----|-----|-----|
| ϕD | 4 | 5 | 6.3 | 8 |
| P | 1.5 | 2.0 | 2.5 | 3.5 |
| ϕd | 0.45 | 0.5 | 0.5 | 0.5 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz, IMP (Ω max) at 20°C 100KHz.

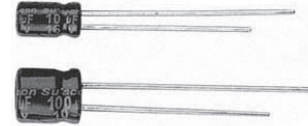
| Cap (μF) | V Item | 6.3 | | | 10 | | | 16 | | |
|--------------------|-----------|-------|------|-----|-------|------|-----|-------|------|-----|
| | | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP |
| 15 | | | | | | | | 4x7 | 70 | 3.3 |
| 22 | | | | | 4x7 | 70 | 3.3 | 5x7 | 110 | 1.7 |
| 33 | | 5x7 | 110 | 1.7 | 5x7 | 115 | 1.7 | 6.3x7 | 160 | 0.8 |
| 47 | | 5x7 | 110 | 1.7 | 5x7 | 143 | 1.3 | 6.3x7 | 165 | 0.8 |
| 68 | | 6.3x7 | 160 | 0.8 | 6.3x7 | 165 | 0.8 | 8x7 | 200 | 0.5 |
| 100 | | 6.3x7 | 160 | 0.8 | 8x7 | 200 | 0.5 | 8x7 | 210 | 0.5 |
| 150 | | 8x7 | 200 | 0.5 | 8x7 | 205 | 0.5 | | | |
| 220 | | 8x7 | 200 | 0.5 | | | | | | |

| Cap (μF) | V Item | 25 | | | 35 | | |
|--------------------|-----------|-------|------|-----|-------|------|-----|
| | | D x L | R.C. | IMP | D x L | R.C. | IMP |
| 6.8 | | | | | 4x7 | 70 | 3.3 |
| 10 | | 4x7 | 70 | 3.3 | 5x7 | 110 | 1.7 |
| 15 | | 5x7 | 110 | 1.7 | 6.3x7 | 132 | 1.7 |
| 22 | | 5x7 | 110 | 1.7 | 6.3x7 | 160 | 0.8 |
| 33 | | 6.3x7 | 160 | 0.8 | 8x7 | 200 | 0.5 |
| 47 | | 8x7 | 200 | 0.5 | 8x7 | 230 | 0.5 |
| 68 | | 8x7 | 200 | 0.5 | | | |
| 100 | | 8x7 | 300 | 0.4 | | | |

MD

ST series

- Miniture, long life 5000 hours, 105°C product.
- Applicable to small electronic devices.
- Height: 7 mm.
- RoHS Compliance
- 105°C 5000小時、小型化長壽命產品。
- 適用於小型電子設備。
- 高度：7mm系列。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | |
|---------------------------------------|---|---|------|------|------|------|------|---|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 50VDC | | | | | | | |
| Leakage Current 洩漏電流 | $I \leq 0.01CV$ or 3 (μA) which is greater.(After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | |
| | tan δ(Max) | 0.24 | 0.20 | 0.17 | 0.15 | 0.13 | 0.12 | |
| Low Temperature Stability 低溫特性 | Measurement Frequency: 120Hz. | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | |
| | Impedance Ratio(Max) 阻抗比率(最大值) | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 |
| | Z(-40°C)/Z(20°C) | 8 | 6 | 4 | 3 | 3 | 3 | |
| Load Life 負荷壽命 | 5000hours,with application of rated voltage at 105°C | | | | | | | |
| | Capacitance Change | Within ± 30% of Initial Value | | | | | | |
| | tan δ | 300% or less of Initial Specified Value | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | |
| | Capacitance Change | Within ± 30% of Initial Value | | | | | | |
| | tan δ | 300% or less of Initial Specified Value | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | |

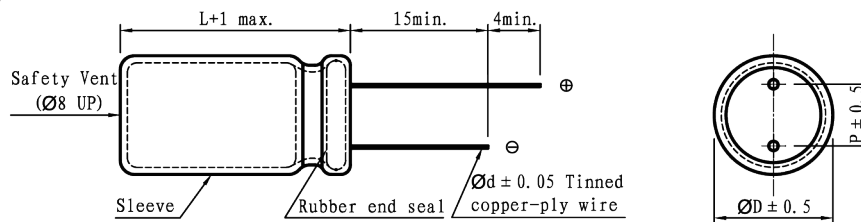
Frequency Coefficient of Permissible Ripple Current

| Frequency (Hz) | 50 | 120 | 1K | ≥ 10K |
|----------------|------|------|------|-------|
| Coefficient | 0.65 | 1.00 | 1.37 | 1.50 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

ST series

DIMENSIONS(mm)



| | | | | |
|----------|------|-----|-----|-----|
| ϕD | 4 | 5 | 6.3 | 8 |
| P | 1.5 | 2.0 | 2.5 | 3.5 |
| ϕd | 0.45 | 0.5 | 0.5 | 0.5 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

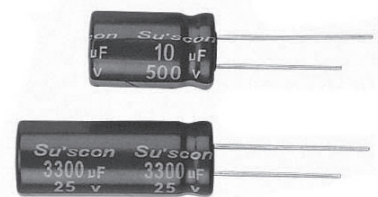
| Cap (μF) | V Item | 6.3 | | 10 | | 16 | |
|----------|--------|-------|------|-------|------|-------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 10 | | | | | | 4x7 | 29 |
| 22 | | 4x7 | 35 | 5x7 | 42 | 5x7 | 46 |
| 33 | | 5x7 | 43 | 5x7 | 50 | 6.3x7 | 58 |
| 47 | | 5x7 | 50 | 6.3x7 | 60 | 6.3x7 | 70 |
| 100 | | 6.3x7 | 76 | 8x7 | 96 | 8x7 | 110 |
| 220 | | 8x7 | 131 | | | | |

| Cap (μF) | V Item | 25 | | 35 | | 50 | |
|----------|--------|-------|------|-------|------|-------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 0.1 | | | | | | 4x7 | 1.5 |
| 0.22 | | | | | | 4x7 | 2.5 |
| 0.33 | | | | | | 4x7 | 3.5 |
| 0.47 | | | | | | 4x7 | 5 |
| 1 | | | | | | 4x7 | 12 |
| 2.2 | | | | | | 4x7 | 21 |
| 3.3 | | | | | | 4x7 | 26 |
| 4.7 | | | | 4x7 | 26 | 5x7 | 31 |
| 10 | | 5x7 | 36 | 5x7 | 36 | 6.3x7 | 46 |
| 22 | | 6.3x7 | 52 | 6.3x7 | 60 | 8x7 | 67 |
| 33 | | 6.3x7 | 65 | 8x7 | 75 | | |
| 47 | | 8x7 | 80 | | | | |

ST

SL series

- 85°C 2000 hours, standard product.
- RoHS Compliance
- 85°C 2000小時標準品



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | | |
|---|--|---|------|------|------|--------------|--|---------|--------------|---------|---------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +85°C | | | | | -40 ~ +85°C | | | -25 ~ +85°C | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 100VDC | | | | | 160 ~ 250VDC | | | 350 ~ 500VDC | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3 (µA) which is greater.(After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | I ≤ 0.03CV +20 (µA) (After 3 minutes application of DC rated voltage, at 20 °C) | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160~250 | 350~500 |
| | tan δ(Max) | 0.24 | 0.20 | 0.16 | 0.15 | 0.12 | 0.10 | 0.09 | 0.08 | 0.20 | 0.25 |
| When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF. | | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50~100 | 160~250 | 350~400 | 450~500 | |
| | Z(-25°C)/Z(20°C) | 5 | 4 | 3 | 2 | 2 | 2 | 3 | 6 | 8 | |
| Z(-40°C)/Z(20°C) | 12 | 10 | 8 | 6 | 4 | 3 | 4 | - | - | | |
| Load Life 負荷壽命 | 2000hours,with application of rated voltage at 85°C | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | | |

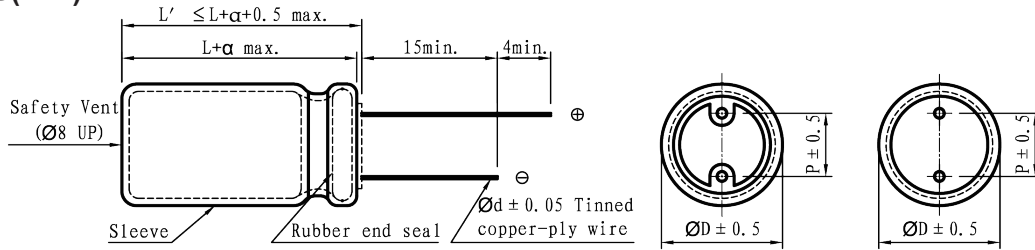
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance (µF) | Frequency (Hz) | | | |
|-------------------|------------------|----------------|------|------|------|
| | | 50 | 120 | 1K | ≤20K |
| ≤ 100 | < 100 | 0.75 | 1.00 | 1.57 | 2.00 |
| | 100 ~ 470 | 0.80 | 1.00 | 1.34 | 1.50 |
| | > 470 | 0.85 | 1.00 | 1.10 | 1.15 |
| ≥ 160 | 0.1 ~ 220 | 0.80 | 1.00 | 1.40 | 1.60 |
| | 330 ~ 1000 | 0.90 | 1.00 | 1.13 | 1.15 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

SL series

DIMENSIONS(mm)



| | | | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 | 22 | 25 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 | 10 | 12.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 1.0 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 85°C 120Hz.

| Cap (µF) | V | 6.3 | | 10 | | 16 | | 25 | | 35 | | 50 | | 63 | | 100 | | |
|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 22 | | | | | | | | | | | | | | | | | 8x12 | 151 |
| 33 | | | | | | | | | | | | | | | | | 8x9 | 180 |
| | | | | | | | | | | | | | | | | | 10x13 | 204 |
| 47 | | | | | | | | | | | | | | 8x9 | 193 | 10x16 | 266 | |
| | | | | | | | | | | | | | | 8x12 | 218 | | | |
| 68 | | | | | | | | | | 8x12 | 206 | 8x12 | 249 | 8x12 | 278 | 10x20 | 315 | |
| 100 | | | | | | | | | | 8x12 | 278 | 8x9 | 275 | 8x14 | 363 | 10x20 | 459 | |
| | | | | | | | | | | | | 8x12 | 303 | | | | | |
| 220 | | | | | | | | 8x12 | 387 | 8x9 | 362 | 10x16 | 532 | 10x16 | 593 | 13x25 | 726 | |
| | | | | | | | | | | | 10x13 | | | | | | | 448 |
| 330 | | | | | | 8x12 | 436 | 8x9 | 442 | 10x16 | 593 | 10x20 | 702 | 10x20 | 823 | 16x26 | 907 | |
| | | | | | | | 8x14 | 508 | | | | | | | | | | |
| 470 | | 8x12 | 460 | 8x12 | 484 | 8x9 | 508 | 10x16 | 653 | 10x16 | 774 | 13x13 | 808 | 13x21 | 1065 | 16x32 | 1113 | |
| | | | | | | | 8x12 | | | | | 569 | 13x21 | | | | | 920 |
| 1000 | | 8x9 | 617 | 10x13 | 762 | 10x16 | 956 | 10x20 | 1150 | 13x21 | 1331 | 13x25 | 1634 | 16x26 | 1755 | 18x40 | 1573 | |
| | | 10x13 | 702 | | | | | | | | | | | | | | | |
| 1500 | | 10x16 | 788 | 10x20 | 823 | 10x20 | 1101 | 13x21 | 1367 | 13x25 | 1597 | 16x32 | 1925 | 18x32 | 2310 | 22x40 | 2145 | |
| 2200 | | 10x16 | 1150 | 10x20 | 1331 | 13x21 | 1634 | 13x25 | 1876 | 16x26 | 2178 | 16x36 | 2541 | 18x35 | 2783 | 25x50 | 2432 | |
| 3300 | | 10x20 | 1513 | 13x21 | 1694 | 13x25 | 2057 | 16x26 | 2118 | 16x32 | 2686 | 18x35 | 3037 | 22x40 | 3267 | | | |
| | | 13x13 | 1392 | | | | | | | | | | | | | | | |
| 4700 | | 13x21 | 1815 | 13x25 | 2178 | 16x26 | 2420 | 16x32 | 2614 | 18x35 | 3110 | 22x40 | 3630 | 22x50 | 4114 | | | |
| 6800 | | 13x25 | 2299 | 16x26 | 2481 | 16x32 | 2783 | 18x35 | 3207 | 22x40 | 3884 | 22x50 | 4235 | 25x50 | 4719 | | | |
| 10000 | | 16x26 | 2481 | 16x36 | 3025 | 18x35 | 3485 | 22x40 | 4380 | 22x50 | 4719 | 25x50 | 4840 | | | | | |
| 15000 | | 16x36 | 3243 | 18x35 | 3775 | 22x40 | 4659 | 22x50 | 5082 | 25x50 | 5203 | | | | | | | |
| 22000 | | 18x40 | 3896 | 22x40 | 4489 | 22x50 | 5336 | 25x50 | 5445 | | | | | | | | | |
| 33000 | | 22x50 | 4719 | 22x50 | 5445 | 25x50 | 5808 | | | | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SL

SL series

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms)at 85°C 120Hz.

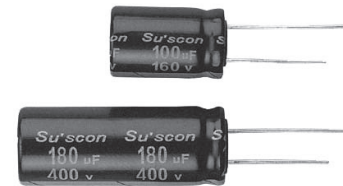
| Cap (μ F) | V | 160 | | 200 | | 250 | | 350 | |
|-------------------|------|-------|------|-------|------|-------|------|-------|------|
| | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 1.0 | | | | | | | | 8x12 | 28 |
| 2.2 | | | | | | 8x12 | 36 | 8x12 | 37 |
| 3.3 | | 8x12 | 42 | 8x12 | 50 | 8x12 | 55 | 10x13 | 56 |
| 4.7 | | 8x12 | 56 | 8x12 | 62 | 10x13 | 67 | 10x16 | 70 |
| 10 | | 10x13 | 97 | 10x16 | 105 | 10x16 | 110 | 10x20 | 120 |
| 22 | | 10x16 | 157 | 10x20 | 165 | 13x13 | 169 | 13x13 | 169 |
| | | | | | | 13x21 | 195 | 13x21 | 210 |
| 33 | | 10x20 | 230 | 13x13 | 212 | 13x21 | 245 | 16x26 | 280 |
| | | | | 13x21 | 238 | | | | |
| 47 | | 13x13 | 254 | 13x21 | 310 | 13x21 | 320 | 16x36 | 380 |
| | | 13x21 | 290 | | | | | | |
| 100 | | 16x26 | 520 | 16x26 | 550 | 16x32 | 570 | 18x40 | 600 |
| 220 | | 16x36 | 860 | 22x30 | 980 | 22x30 | 1070 | 22x50 | 1210 |
| 330 | | 18x40 | 1210 | 22x35 | 1280 | 22x35 | 1320 | | |
| 470 | | 22x40 | 1320 | 22x50 | 1360 | 25x50 | 1500 | | |
| 1000 | | 22x50 | 1720 | | | | | | |

| Cap (μ F) | V | 400 | | 450 | | 500 | |
|-------------------|------|-------|------|-------|------|-------|------|
| | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 1.0 | | 8x12 | 23 | 8x12 | 25 | | |
| 2.2 | | 10x13 | 35 | 10x13 | 36 | 10x13 | 32 |
| 3.3 | | 10x13 | 45 | 10x16 | 50 | 10x16 | 45 |
| 4.7 | | 10x16 | 55 | 10x20 | 62 | 10x20 | 55 |
| 10 | | 13x21 | 85 | 13x21 | 93 | 13x21 | 65 |
| 22 | | 16x26 | 160 | 16x26 | 172 | 16x26 | 135 |
| 33 | | 16x32 | 195 | 16x36 | 210 | 16x36 | 155 |
| 47 | | 16x36 | 275 | 18x40 | 285 | 18x40 | 235 |
| 100 | | 22x35 | 500 | 22x40 | 520 | 22x40 | 450 |
| 220 | | 25x50 | 970 | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

LF series

- Long life of SL series.
- Suitable for LCD TV Power ,SMPS.
- RoHS Compliance.
- SL系列壽命提升品。
- 適用於液晶顯示電源及開關電源等。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | |
|--|--|---|--------------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +85°C | | -25 ~ +85°C | | |
| Rated Voltage Range 額定電壓範圍 | 400 ~ 420VDC | | 450 ~ 500VDC | | |
| Leakage Current 洩漏電流 | $I \leq 0.03CV + 20 (\mu A)$ (After 3 minutes application of DC rated voltage, at 20 °C) | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | |
| | Rated Voltage(V) | 400~420 | 450 | 460 | 500 |
| | tan δ(Max) | 0.15 | 0.20 | 0.20 | 0.20 |
| | When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF . | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | |
| | Rated Voltage(V) | 400~420 | 450 | 460 | 500 |
| | Z(-25°C)/Z(20°C) | 3 | 3 | 6 | 6 |
| | Z(-40°C)/Z(20°C) | 6 | - | - | - |
| Load Life 負荷壽命 | 8000hours,with application of rated voltage at 85°C | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement. The capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Standards 參照標準 | JIS C 5101-4-1 (IEC 60384) | | | | |

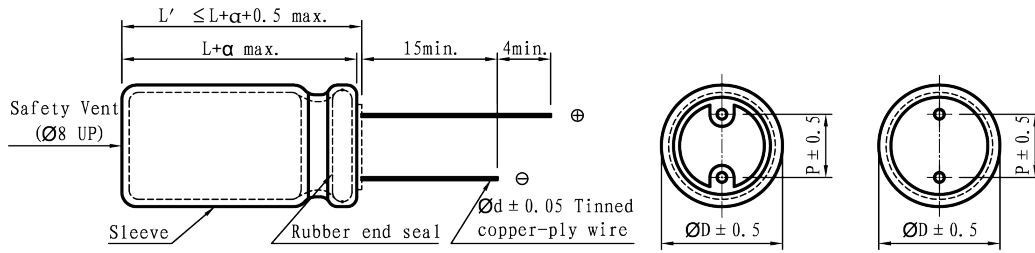
Frequency Coefficient of Permissible Ripple Current

| Capacitance (µF) | Frequency (Hz) | | | | |
|------------------|----------------|------|------|------|------|
| | 120 | 10K | 30K | 50K | 100K |
| 10 ~ 150 | 1.00 | 1.50 | 1.60 | 1.75 | 2.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use . The rms ripple current has to be reduced.

LF series

DIMENSIONS(mm)



| | | | | | |
|----------|-----|-----|-----|-----|-----|
| ϕD | 10 | 13 | 16 | 18 | 20 |
| P | 5.0 | 5.0 | 7.5 | 7.5 | 10 |
| ϕd | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 |

| | |
|----------|-----------------------------------|
| α | (L < 16) 1.0 (L \geq 16) 2.0 |
|----------|-----------------------------------|

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 85°C 120Hz.

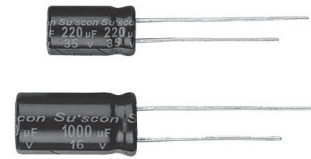
| Cap (μF) | V | 400 | | | | 420 | | | | 450 | | | |
|--------------------|---|-------|-------|-------|--------|-------|-------|--------|-------|-------|--------|--|--|
| | | Item | D x L | R.C. | | D x L | R.C. | | D x L | R.C. | | | |
| | | | | 120Hz | 100KHz | | 120Hz | 100KHz | | 120Hz | 100KHz | | |
| 10 | | 10x16 | 150 | 300 | 10x20 | 180 | 360 | 10x20 | 150 | 300 | | | |
| 22 | | 13x21 | 300 | 600 | 13x25 | 330 | 660 | 13x25 | 330 | 660 | | | |
| 47 | | 13x25 | 350 | 700 | 16x22 | 400 | 800 | 16x26 | 380 | 760 | | | |
| 56 | | 16x25 | 480 | 960 | 16x25 | 500 | 1000 | 16x32 | 450 | 900 | | | |
| 68 | | 16x32 | 563 | 1126 | 16x32 | 550 | 1100 | 16x36 | 530 | 1060 | | | |
| 82 | | 16x35 | 650 | 1300 | 16x36 | 630 | 1260 | 16x40 | 600 | 1200 | | | |
| 100 | | 16x40 | 780 | 1560 | 16x40 | 750 | 1500 | 16x45 | 720 | 1440 | | | |
| 120 | | 16x45 | 889 | 1778 | 16x45 | 840 | 1680 | 16x50 | 840 | 1680 | | | |
| 150 | | 16x50 | 980 | 1960 | 16x50 | 920 | 1840 | | | | | | |

| Cap (μF) | V | 460 | | | | 500 | | | |
|--------------------|---|-------|-------|-------|--------|-------|-------|--------|--|
| | | Item | D x L | R.C. | | D x L | R.C. | | |
| | | | | 120Hz | 100KHz | | 120Hz | 100KHz | |
| 10 | | 13x16 | 120 | 240 | 13x16 | 115 | 230 | | |
| 22 | | 16x25 | 250 | 500 | 16x25 | 230 | 460 | | |
| 47 | | 16x36 | 450 | 900 | 16x36 | 435 | 870 | | |
| 56 | | 16x40 | 500 | 1000 | 16x40 | 491 | 982 | | |
| 68 | | 16x45 | 580 | 1160 | 16x45 | 563 | 1126 | | |
| 82 | | 16x50 | 650 | 1300 | 16x50 | 630 | 1260 | | |
| 100 | | 18x45 | 730 | 1460 | 18x45 | 700 | 1400 | | |
| 120 | | 20x45 | 800 | 1600 | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SK series

- 105°C 2000hours, standard product.
- RoHS Compliance
- 105°C 2000小時標準品



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | | | |
|--|---|---|------|------|--------------|------|--|---------|--------------|---------|---------|---------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | -40 ~ +105°C | | | | -25 ~ +105°C | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 100VDC | | | | 160 ~ 250VDC | | | | 350 ~ 500VDC | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3 (µA) which is greater.(After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | I ≤ 0.03CV +20 (µA) (After 3 minutes application of DC rated voltage, at 20 °C) | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160~250 | 350~500 |
| | tan δ(Max) | 0.24 | 0.20 | 0.16 | 0.15 | 0.12 | 0.10 | 0.09 | 0.08 | 0.08 | 0.20 | 0.25 |
| When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF . | | | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50~100 | 160~250 | 350~400 | 450~500 | | |
| | Z(-25°C)/Z(20°C) | 5 | 4 | 3 | 2 | 2 | 2 | 3 | 6 | 15 | | |
| Z(-40°C)/Z(20°C) | 10 | 8 | 6 | 4 | 3 | 3 | 4 | - | - | | | |
| Load Life 負荷壽命 | 2000hours,with application of rated voltage at 105°C | | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | | | |



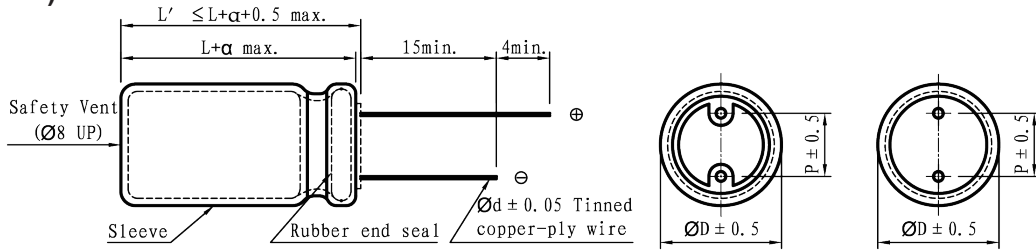
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance (µF) | Frequency (Hz) | | | |
|-------------------|------------------|----------------|------|------|------|
| | | 50 | 120 | 1K | ≥20K |
| ≤ 100 | < 100 | 0.75 | 1.00 | 1.40 | 1.50 |
| | 100 ~ 470 | 0.75 | 1.00 | 1.20 | 1.30 |
| | > 470 | 0.85 | 1.00 | 1.10 | 1.15 |
| ≥ 160 | 0.47 ~ 470 | 0.75 | 1.00 | 1.10 | 1.20 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

SK series

DIMENSIONS(mm)



| | | | | | | | | | | |
|----|-----|-----|-----|-----|-----|------|-----|-----|-----|------|
| φD | 5 | 6.3 | 8 | 10 | 13 | 14.5 | 16 | 18 | 22 | 25 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 | 7.5 | 10 | 12.5 |
| φd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 | 1.0 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

| Cap (μF) | V | 6.3 | | 10 | | 16 | | 25 | | 35 | | 50 | | 63 | | 100 | |
|----------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|-------|--------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 0.1~0.47 | | | | | | | | | | | | 5x11 | 11 | 5x11 | 12 | 5x11 | 17 |
| 1 | | | | | | | | | | | | 5x11 | 15 | 5x11 | 17 | 5x11 | 20 |
| 2.2 | | | | | | | | | | | | 5x11 | 24 | 5x11 | 25 | 5x11 | 30 |
| 3.3 | | | | | | | | | | | | 5x11 | 30 | 5x11 | 31 | 5x11 | 36 |
| 4.7 | | | | | | | | 5x11 | 30 | 5x11 | 31 | 5x11 | 36 | 5x11 | 37 | 5x11 | 44 |
| 6.8 | | | | | | | | 5x11 | 35 | 5x11 | 37 | 5x11 | 46 | 5x11 | 51 | 5x11 | 45 |
| 10 | | | | | | 5x11 | 42 | 5x11 | 43 | 5x11 | 47 | 5x11 | 54 | 5x11 | 58 | 6.3x11 | 75 |
| 22 | 5x11 | 54 | 5x11 | 59 | 5x11 | 63 | 5x11 | 65 | 5x11 | 75 | 5x11 | 83 | 6.3x11 | 109 | 8x12 | 112 | |
| 33 | 5x11 | 66 | 5x11 | 77 | 5x11 | 79 | 5x11 | 83 | 5x11 | 91 | 6.3x11 | 107 | 8x12 | 121 | 8x12 | 133 | |
| 47 | 5x11 | 78 | 5x11 | 87 | 5x11 | 94 | 5x11 | 97 | 6.3x11 | 116 | 6.3x11 | 145 | 8x12 | 163 | 10x13 | 170 | |
| 56 | 5x11 | 90 | 5x11 | 100 | 5x11 | 105 | 5x11 | 109 | 6.3x11 | 127 | 6.3x11 | 151 | 8x12 | 172 | 10x16 | 187 | |
| 68 | 5x11 | 102 | 5x11 | 119 | 5x11 | 145 | 5x11 | 151 | 6.3x11 | 169 | 6.3x11 | 196 | 8x12 | 206 | 10x16 | 238 | |
| 100 | 5x11 | 111 | 5x11 | 139 | 6.3x11 | 151 | 6.3x11 | 163 | 8x12 | 194 | 8x14 | 242 | 10x13 | 254 | 10x20 | 315 | |
| 220 | 5x11 | 175 | 6.3x11 | 212 | 8x12 | 237 | 8x12 | 290 | 10x13 | 332 | 10x16 | 363 | 10x20 | 436 | 13x25 | 581 | |
| 330 | 6.3x11 | 233 | 6.3x11 | 272 | 8x12 | 321 | 10x13 | 369 | 10x16 | 484 | 10x20 | 514 | 13x21 | 666 | 16x26 | 714 | |
| 470 | 6.3x11 | 266 | 8x12 | 299 | 8x14 | 381 | 8x16 | 436 | 10x20 | 581 | 13x21 | 762 | 13x25 | 847 | 16x32 | 968 | |
| 560 | 8x12 | 272 | 8x12 | 306 | 8x14 | 387 | 10x16 | 448 | 10x20 | 629 | 13x21 | 774 | 13x25 | 871 | 16x36 | 1012 | |
| 680 | 8x12 | 278 | 8x12 | 319 | 8x16 | 424 | 10x20 | 581 | 13x21 | 702 | 13x25 | 799 | 16x26 | 1004 | 18x32 | 1210 | |
| 1000 | 8x14 | 484 | 10x13 | 586 | 10x16 | 617 | 10x20 | 750 | 13x21 | 908 | 13x25 | 1089 | 16x32 | 1210 | 18x35 | 1573 | |
| 1500 | 8x20 | 545 | 10x20 | 592 | 10x20 | 641 | 13x21 | 787 | 13x25 | 1041 | 16x32 | 1452 | 18x32 | 1718 | | | |
| 2200 | 10x20 | 774 | 10x20 | 918 | 13x21 | 1004 | 13x25 | 1132 | 16x26 | 1343 | 16x36 | 1609 | 18x35 | 1997 | | | |
| 3300 | 10x20 | 908 | 13x21 | 1091 | 13x25 | 1222 | 16x26 | 1428 | 16x36 | 1730 | 18x35 | 1997 | 22x40 | 2347 | | | |
| 4700 | 13x21 | 1162 | 13x25 | 1306 | 16x26 | 1464 | 16x32 | 1718 | 18x35 | 2057 | 22x40 | 2541 | 22x50 | 2965 | | | |
| 6800 | 13x25 | 1385 | 16x26 | 1770 | 16x36 | 1863 | 18x35 | 2202 | 22x40 | 2602 | 22x50 | 3025 | | | | | |
| 10000 | 16x26 | 1730 | 16x36 | 2236 | 18x35 | 2335 | 22x40 | 2589 | 22x50 | 3207 | | | | | | | |
| 15000 | 16x36 | 2214 | 18x35 | 2808 | 22x40 | 2928 | 22x50 | 3328 | | | | | | | | | |
| 22000 | 18x40 | 2771 | 22x40 | 3514 | 22x50 | 3630 | | | | | | | | | | | |

| Cap (μF) | V | 160 | | 200 | | 250 | | 350 | | 400 | | 450 | | 500 | | | |
|----------|--------|------|--------|------|-------|------|-------|------|-------|------|-------|------|-------|------|--|--|--|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | | | |
| 2.2 | 6.3x11 | 26 | 6.3x11 | 28 | 8x12 | 34 | 8x12 | 30 | 10x13 | 36 | 10x16 | 39 | | | | | |
| 3.3 | 8x12 | 36 | 8x12 | 42 | 8x12 | 48 | 10x13 | 39 | 10x13 | 46 | 10x16 | 51 | 10x20 | 35 | | | |
| 4.7 | 8x12 | 48 | 8x12 | 51 | 10x13 | 61 | 10x13 | 46 | 10x16 | 61 | 10x20 | 65 | 10x20 | 48 | | | |
| 6.8 | 8x12 | 51 | 8x12 | 61 | 10x13 | 70 | 10x13 | 76 | 10x16 | 83 | 13x21 | 87 | 13x21 | 65 | | | |
| 10 | 10x13 | 61 | 10x16 | 73 | 10x16 | 85 | 10x20 | 97 | 10x20 | 97 | 13x21 | 95 | 13x21 | 80 | | | |
| 22 | 10x16 | 121 | 10x20 | 163 | 13x21 | 157 | 13x25 | 151 | 13x25 | 175 | 16x26 | 182 | 16x26 | 105 | | | |
| 33 | 10x20 | 145 | 13x21 | 175 | 13x21 | 182 | 13x25 | 176 | 16x26 | 211 | 16x26 | 211 | 16x32 | 145 | | | |
| 47 | 13x21 | 194 | 13x25 | 242 | 13x25 | 248 | 16x26 | 254 | 16x26 | 278 | 16x32 | 339 | 18x35 | 165 | | | |
| 68 | 13x21 | 224 | 13x25 | 253 | 16x26 | 272 | 16x32 | 260 | 16x32 | 317 | 18x32 | 508 | 18x45 | 180 | | | |
| 82 | 13x25 | 266 | 13x25 | 278 | 16x26 | 300 | 16x32 | 284 | 18x26 | 424 | 18x35 | 569 | | | | | |
| 100 | 16x26 | 363 | 16x26 | 320 | 16x32 | 393 | 18x32 | 328 | 18x32 | 484 | 18x40 | 605 | | | | | |
| 120 | 16x26 | 363 | 16x26 | 363 | 16x32 | 460 | 18x35 | 347 | 18x35 | 545 | 18x40 | 666 | | | | | |
| 150 | 16x26 | 399 | 16x32 | 444 | 18x32 | 545 | 18x40 | 387 | 18x40 | 605 | 22x45 | 750 | | | | | |
| 220 | 16x36 | 520 | 18x32 | 641 | 22x35 | 847 | | | | | | | | | | | |
| 330 | 18x35 | 726 | 22x35 | 750 | | | | | | | | | | | | | |
| 470 | 18x40 | 877 | 22x40 | 925 | | | | | | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SK series

SLIM TYPE

- 105°C high-temperature and high voltage 400~500V, life 2000hrs.
- Specially Size, 8~16mm diameter.
- For LCD-TV and LCD-Monitor power.
- RoHS Compliance.
- 105°C 耐高溫標準品，高壓400~500V，壽命2000小時。
- 特殊專用尺寸，直徑8~16mm。
- 使用於LCD TV與LCD Monitor電源應用。



SPECIFICATIONS

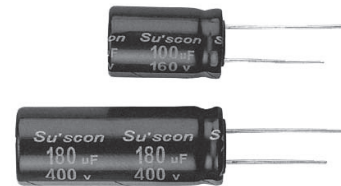
D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

| Cap (µF) | V Item | 400 | | 450 | | 500 | |
|-------------|-----------|---------|------|---------|------|---------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 22 | | 8x50 | 158 | 8x50 | 168 | 13x40 | 158 |
| | | 10x30 | 150 | 10x35 | 153 | | |
| 33 | | 8x61 | 210 | 8x61 | 218 | 13x45 | 162 |
| | | 10x40 | 192 | 10x45 | 198 | | |
| 39 | | 8x61 | 258 | 8x61 | 287 | 14.5x45 | 160 |
| | | 10x45 | 235 | 10x50 | 250 | | |
| | | 13x35 | 250 | 13x40 | 265 | | |
| 47 | | 10x50 | 285 | 10x50 | 335 | 14.5x45 | 163 |
| | | 13x40 | 282 | 13x45 | 305 | 16x50 | 175 |
| | | 14.5x30 | 278 | 14.5x30 | 290 | | |
| 53 | | 10x50 | 305 | 10x50 | 400 | 16x50 | 178 |
| 68 | | 13x45 | 340 | 14.5x40 | 460 | | |
| | | 14.5x30 | 330 | 16x35 | 490 | | |
| 82 | | 13x50 | 365 | 14.5x50 | 460 | | |
| | | 14.5x40 | 385 | 16x40 | 490 | | |
| 100 | | 14.5x45 | 468 | 14.5x50 | 620 | | |
| | | | | 16x50 | 640 | | |
| 120 | | 14.5x50 | 550 | 16x50 | 650 | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SKA series

- On the basis of SK series ripple promotion product.
- Suitable for LCD TV Power ,SMPS.
- RoHS Compliance.
- SK系列紋波提升品。
- 適用於液晶顯示電源及開關電源等。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | |
|--|---|---|--------------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | -25 ~ +105°C | | |
| Rated Voltage Range 額定電壓範圍 | 400VDC | | 450 ~ 500VDC | | |
| Leakage Current 洩漏電流 | $I \leq 0.03CV + 20 (\mu A)$ (After 3 minutes application of DC rated voltage, at 20 °C) | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | |
| | Rated Voltage(V) | 400 | 450 | 460 | 500 |
| | tan δ(Max) | 0.15 | 0.20 | 0.20 | 0.20 |
| | When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF . | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | |
| | Rated Voltage(V) | 400 | 450 | 460 | 500 |
| | Z(-25°C)/Z(20°C) | 3 | 3 | 6 | 6 |
| | Z(-40°C)/Z(20°C) | 6 | - | - | - |
| Load Life 負荷壽命 | 2000hours,with application of rated voltage at 105°C | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement. The capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Standards 參照標準 | JIS C 5101-4-1 (IEC 60384) | | | | |

Frequency Coefficient of Permissible Ripple Current

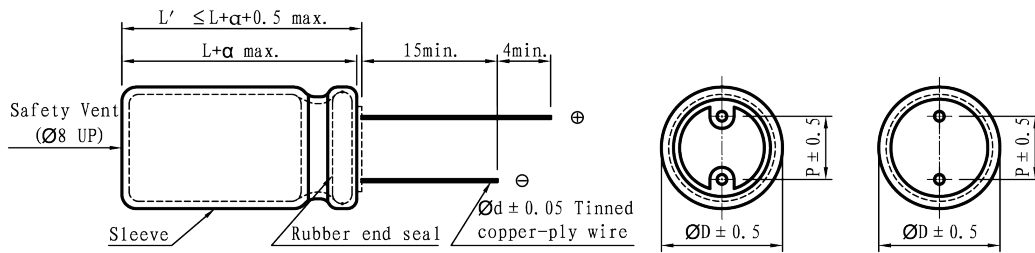
| Capacitance (µF) | Frequency (Hz) | | | | |
|------------------|----------------|------|------|------|------|
| | 120 | 10K | 30K | 50K | 100K |
| 10 ~ 150 | 1.00 | 1.50 | 1.60 | 1.75 | 2.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use . The rms ripple current has to be reduced.

SKA

SKA series

DIMENSIONS(mm)



| | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|
| ϕD | 10 | 13 | 16 | 18 | 20 | 22 |
| P | 5.0 | 5.0 | 7.5 | 7.5 | 10 | 10 |
| ϕd | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 |

| | |
|----------|------------------------------|
| α | (L < 16) 1.0 (L ≥ 16) 2.0 |
|----------|------------------------------|

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

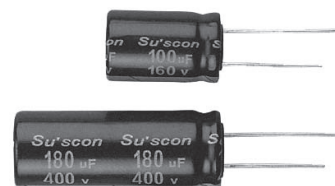
| Cap (μF) | V | 400 | | | | 450 | | | | 460 | | | | 500 | | | |
|--------------------|---|-------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|--|--|--|
| | | Item | D x L | R.C. | | D x L | R.C. | | D x L | R.C. | | D x L | R.C. | | | | |
| | | | | 120Hz | 100KHz | | 120Hz | 100KHz | | 120Hz | 100KHz | | 120Hz | 100KHz | | | |
| 10 | | 10x16 | 100 | 200 | 10x20 | 130 | 260 | 10x20 | 120 | 240 | 13x21 | 78 | 156 | | | | |
| 15 | | 10x20 | 200 | 400 | 13x21 | 200 | 400 | 13x21 | 150 | 300 | 13x21 | 100 | 200 | | | | |
| 22 | | 13x21 | 280 | 560 | 13x21 | 300 | 600 | 13x25 | 300 | 600 | 13x25 | 190 | 380 | | | | |
| 33 | | 13x21 | 330 | 660 | 13x25 | 400 | 800 | 16x25 | 400 | 800 | 16x25 | 270 | 540 | | | | |
| 47 | | 13x25 | 380 | 760 | 16x25 | 500 | 1000 | 18x26 | 500 | 1000 | 18x26 | 300 | 600 | | | | |
| 56 | | 16x25 | 500 | 1000 | 18x26 | 600 | 1200 | 18x26 | 550 | 1100 | 18x32 | 330 | 660 | | | | |
| 68 | | 16x25 | 650 | 1300 | 18x32 | 690 | 1380 | 18x32 | 600 | 1200 | 18x35 | 450 | 900 | | | | |
| 82 | | 18x26 | 750 | 1500 | 18x32 | 750 | 1500 | 18x32 | 650 | 1300 | 18x40 | 560 | 1120 | | | | |
| 100 | | 18x32 | 800 | 1600 | 18x35 | 780 | 1560 | 18x35 | 750 | 1500 | 18x45 | 650 | 1300 | | | | |
| 120 | | 18x35 | 850 | 1700 | 18x40 | 850 | 1700 | 18x40 | 800 | 1600 | 20x45 | 700 | 1400 | | | | |
| 150 | | 18x40 | 900 | 1800 | 18x45 | 900 | 1800 | 20x45 | 827 | 1654 | 22x45 | 750 | 1500 | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SKA

SKR series

- 105°C high-temperature resistance, high ripple current.
- RoHS Compliance.
- 105°C耐高温、高紋波。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | |
|--|---|---|--------------|-----|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | -25 ~ +105°C | |
| Rated Voltage Range 額定電壓範圍 | 160 ~ 400VDC | | 450VDC | |
| Leakage Current 洩漏電流 | $I \leq 0.03CV + 20 (\mu A)$ (After 3 minutes application of DC rated voltage) | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | |
| | Rated Voltage(V) | 160~250 | 400~450 | |
| | tan δ (Max) | 0.15 | 0.20 | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | |
| | Rated Voltage(V) | 160~250 | 400 | 450 |
| | Z(-25°C)/Z(20°C) | 3 | 5 | 6 |
| | Z(-40°C)/Z(20°C) | 6 | 6 | - |
| Load Life 負荷壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105°C | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | |
| | tan δ | 200% or less of Initial Specified Value | | |
| | Leakage Current | Initial Specified Value or less | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | |
| | tan δ | 200% or less of Initial Specified Value | | |
| | Leakage Current | Initial Specified Value or less | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | |

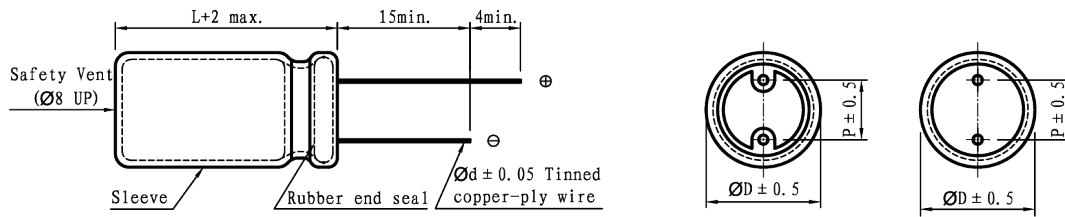
Frequency Coefficient of Permissible Ripple Current

| Capacitance (μF) | Frequency (Hz) | | | |
|-------------------------|----------------|------|------|------|
| | 120 | 1K | 10K | 100K |
| 22~82 | 1.00 | 1.25 | 1.50 | 1.75 |
| 100~470 | 1.00 | 1.15 | 1.30 | 1.40 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

SKR series

DIMENSIONS(mm)



| | | | | | | |
|----------|-----|-----|------|-----|-----|------|
| ϕ D | 10 | 13 | 14.5 | 16 | 18 | 20 |
| P | 5.0 | 5.0 | 7.5 | 7.5 | 7.5 | 10.0 |
| ϕ d | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 |

STANDARD RATINGS

DxL(mm) ; R.C.(mA rms) at 105°C 120Hz.

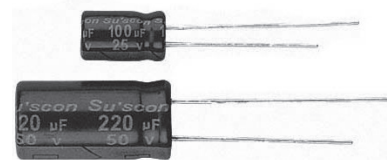
| Cap (μ F) | V Item | 160 | | 200 | | 250 | | 400 | | 450 | |
|-------------------|-----------|-------|---------|-------|-------|-------|---------|---------|-------|---------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 22 | | | | | | | | 10x30 | 260 | 10x35 | 280 |
| 33 | | | | | | | | 10x40 | 360 | 13x30 | 375 |
| 39 | | | | | | | | 10x45 | 405 | 13x35 | 415 |
| 47 | | | | | | | | 13x35 | 443 | 13x40 | 465 |
| 56 | | | | | | | | 13x40 | 510 | 14.5x30 | 465 |
| | | | | | | | | | | 14.5x35 | 520 |
| 68 | 10x25 | 375 | 10x30 | 485 | 13x25 | 530 | | 13x45 | 580 | 14.5x40 | 600 |
| | | | | | | | | 14.5x30 | 580 | 16x35 | 600 |
| 82 | 10x30 | 485 | 10x35 | 528 | 13x30 | 595 | 14.5x40 | 635 | 16x40 | 650 | |
| 100 | 10x35 | 528 | 10x40 | 615 | 16x25 | 650 | | 14.5x45 | 690 | 18x36 | 700 |
| | | | | | | | | 18x32 | 690 | | |
| 120 | 10x40 | 615 | 10x45 | 710 | 16x32 | 715 | | 16x40 | 810 | 18x40 | 820 |
| | | | | | | | | 18x36 | 810 | | |
| 150 | 10x45 | 710 | 13x35 | 780 | 16x35 | 860 | 18x40 | 940 | | 18x45 | 990 |
| | | | | | | | | | | 20x40 | 1000 |
| 220 | 13x40 | 880 | 13x45 | 995 | 18x36 | 1120 | | | | | |
| | | | 14.5x35 | 995 | | | | | | | |
| 270 | 13x45 | 995 | 16x35 | 1150 | 18x40 | 1200 | | | | | |
| 330 | 16x35 | 1150 | 16x40 | 1320 | | | | | | | |
| | | | 18x32 | 1320 | | | | | | | |
| 470 | 18x40 | 1270 | 18x45 | 1660 | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SKR

UK series

- High-temperature resistance, high ripple current.
- 105°C for general purposes, 3000 hours standard product.
- RoHS Compliance
- 耐高温、高紋波。
- 105°C 3000hours 標準品



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | | | |
|--|---|---|------|------|--------------|------|--|---------|--------------|------|---------|---------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz, 20°C) | | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | -40 ~ +105°C | | | | -25 ~ +105°C | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 100VDC | | | | 160 ~ 250VDC | | | | 350 ~ 450VDC | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3 (µA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | I ≤ 0.03CV +20 (µA) (After 3 minutes application of DC rated voltage, at 20 °C) | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160~250 | 350~450 |
| | tan δ(Max) | 0.24 | 0.20 | 0.16 | 0.15 | 0.12 | 0.10 | 0.09 | 0.08 | 0.08 | 0.20 | 0.25 |
| When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF . | | | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50~100 | 160~250 | 350~400 | 450 | | |
| | Z(-25°C)/Z(20°C) | 5 | 4 | 3 | 2 | 2 | 2 | 3 | 6 | 15 | | |
| | Z(-40°C)/Z(20°C) | 10 | 8 | 6 | 4 | 3 | 3 | 4 | - | - | | |
| Load Life 負荷壽命 | 3000hours, with application of rated voltage at 105°C | | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | | | |

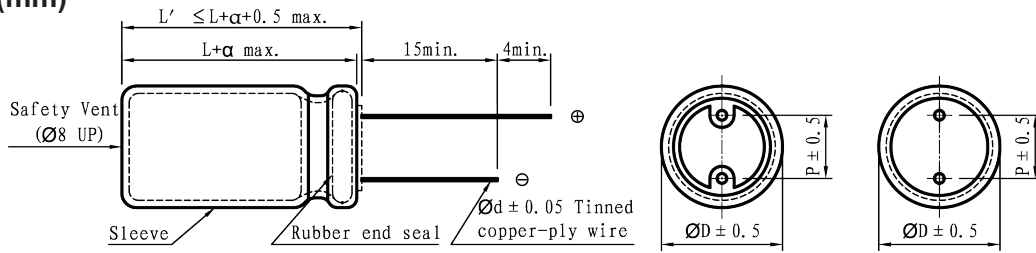
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance (µF) | Frequency (Hz) | | | |
|-------------------|------------------|----------------|------|------|------|
| | | 50 | 120 | 1K | ≤20K |
| ≤ 100 | < 100 | 0.75 | 1.00 | 1.57 | 2.00 |
| | 100 ~ 470 | 0.80 | 1.00 | 1.34 | 1.50 |
| | > 470 | 0.85 | 1.00 | 1.10 | 1.15 |
| ≥ 160 | 0.47 ~ 1000 | 0.85 | 1.00 | 1.40 | 1.50 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

UK series

DIMENSIONS(mm)



| | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| φ D | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 | 20 | 22 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 | 10 | 10 |
| φ d | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

| Cap (μF) | V | 6.3 | | 10 | | 16 | | 25 | | 35 | | 50 | | 63 | |
|----------|---|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 0.1~0.47 | | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | 5x11 | 12 | | |
| 2.2 | | | | | | | | | | | | 5x11 | 16 | | |
| 3.3 | | | | | | | | | | | | 5x11 | 25 | | |
| 4.7 | | | | | | | | | | | | 5x11 | 35 | | |
| 6.8 | | | | | | | | 5x11 | 32 | 5x11 | 33 | 5x11 | 38 | | |
| 10 | | | | | | | | 5x11 | 37 | 5x11 | 39 | 5x11 | 50 | 5x11 | 52 |
| 22 | | | | | | 5x11 | 44 | 5x11 | 45 | 5x11 | 49 | 5x11 | 56 | 5x11 | 68 |
| 33 | | 5x11 | 56 | 5x11 | 61 | 5x11 | 65 | 5x11 | 67 | 5x11 | 76 | 5x11 | 89 | 6.3x11 | 112 |
| 47 | | 5x11 | 68 | 5x11 | 79 | 5x11 | 81 | 5x11 | 85 | 5x11 | 93 | 6.3x11 | 130 | 8x12 | 145 |
| 56 | | 5x11 | 80 | 5x11 | 89 | 5x11 | 97 | 5x11 | 100 | 6.3x11 | 133 | 6.3x11 | 152 | 8x12 | 174 |
| 68 | | 5x11 | 92 | 5x11 | 103 | 5x11 | 107 | 5x11 | 121 | 6.3x11 | 136 | 6.3x11 | 171 | 8x12 | 187 |
| 82 | | 5x11 | 105 | 5x11 | 121 | 5x11 | 150 | 5x11 | 158 | 6.3x11 | 173 | 6.3x11 | 208 | 8x12 | 234 |
| 100 | | 5x11 | 113 | 5x11 | 145 | 6.3x11 | 157 | 6.3x11 | 179 | 8x12 | 197 | 8x14 | 270 | 10x13 | 292 |
| 220 | | 5x11 | 176 | 6.3x11 | 223 | 8x12 | 248 | 8x12 | 318 | 10x13 | 347 | 10x16 | 583 | 10x20 | 693 |
| 330 | | 6.3x11 | 240 | 6.3x11 | 275 | 8x12 | 361 | 10x13 | 391 | 10x16 | 490 | 10x20 | 737 | 13x21 | 770 |
| 470 | | 6.3x11 | 292 | 8x12 | 339 | 8x14 | 427 | 8x16 | 523 | 10x20 | 627 | 13x21 | 902 | 13x25 | 1012 |
| 560 | | 8x12 | 350 | 8x12 | 443 | 8x14 | 475 | 10x16 | 594 | 10x20 | 644 | 13x21 | 963 | 13x25 | 1177 |
| 680 | | 8x12 | 413 | 8x12 | 538 | 8x16 | 548 | 10x20 | 704 | 13x21 | 770 | 13x25 | 1040 | 16x26 | 1337 |
| 1000 | | 8x14 | 502 | 10x13 | 645 | 10x16 | 768 | 10x20 | 919 | 13x21 | 1194 | 13x25 | 1485 | 16x32 | 1848 |
| 1500 | | 10x16 | 669 | 10x20 | 798 | 10x20 | 993 | 13x21 | 1155 | 13x25 | 1370 | 16x32 | 1810 | 18x32 | 1975 |
| 2200 | | 10x20 | 912 | 10x20 | 988 | 13x21 | 1231 | 13x25 | 1447 | 16x26 | 1678 | 16x36 | 2200 | 18x35 | 2288 |
| 3300 | | 10x20 | 1154 | 13x21 | 1395 | 13x25 | 1560 | 16x26 | 1847 | 16x36 | 2145 | 18x35 | 2541 | 22x40 | 2695 |
| 4700 | | 13x21 | 1447 | 13x25 | 1671 | 16x26 | 1958 | 16x32 | 2310 | 18x35 | 2640 | 22x40 | 2915 | 22x50 | 3069 |
| 6800 | | 13x25 | 1795 | 16x26 | 2056 | 16x36 | 2374 | 18x35 | 2767 | 22x40 | 2761 | 22x50 | 3080 | | |
| 10000 | | 16x26 | 2112 | 16x36 | 2265 | 18x35 | 2903 | 22x40 | 2860 | 22x50 | 3210 | | | | |
| 15000 | | 16x36 | 2629 | 18x35 | 2820 | 22x40 | 2991 | 22x50 | 3350 | | | | | | |
| 22000 | | 18x40 | 2805 | 22x40 | 3620 | 22x50 | 3650 | | | | | | | | |

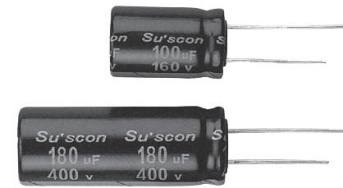
| Cap (μF) | V | 100 | | 160 | | 200 | | 250 | | 350 | | 400 | | 450 | |
|----------|---|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 0.1 | | 5x11 | 1.7 | | | | | | | | | | | | |
| 0.22 | | 5x11 | 3.7 | | | | | | | | | | | | |
| 0.33 | | 5x11 | 5.5 | | | | | | | | | | | | |
| 0.47 | | 5x11 | 12 | 6.3x11 | 11 | 6.3x11 | 11 | 6.3x11 | 13 | 6.3x11 | 12 | 8x12 | 13 | 8x12 | 13 |
| 1 | | 5x11 | 18 | 6.3x11 | 15 | 6.3x11 | 18 | 6.3x11 | 18 | 8x12 | 22 | 8x12 | 23 | 10x16 | 20 |
| 2.2 | | 5x11 | 28 | 6.3x11 | 24 | 6.3x11 | 25 | 8x12 | 31 | 8x12 | 31 | 8x12 | 35 | 10x16 | 39 |
| 3.3 | | 5x11 | 40 | 8x12 | 33 | 8x12 | 39 | 8x12 | 46 | 10x13 | 50 | 10x13 | 50 | 10x20 | 53 |
| 4.7 | | 5x11 | 46 | 8x12 | 46 | 8x12 | 46 | 10x13 | 57 | 10x13 | 62 | 10x16 | 66 | 10x20 | 77 |
| 6.8 | | 5x11 | 54 | 8x12 | 54 | 8x12 | 55 | 10x13 | 68 | 10x13 | 76 | 10x16 | 84 | 13x21 | 88 |
| 10 | | 6.3x11 | 69 | 10x13 | 69 | 10x16 | 80 | 10x16 | 86 | 10x20 | 97 | 10x20 | 101 | 13x21 | 107 |
| 22 | | 8x12 | 127 | 10x16 | 130 | 10x20 | 152 | 13x21 | 165 | 13x25 | 178 | 13x25 | 189 | 16x26 | 193 |
| 33 | | 8x12 | 167 | 10x20 | 185 | 13x21 | 187 | 13x21 | 215 | 16x26 | 237 | 16x26 | 250 | 16x32 | 303 |
| 47 | | 10x16 | 231 | 13x21 | 233 | 13x25 | 264 | 13x25 | 274 | 16x26 | 308 | 16x26 | 319 | 18x32 | 352 |
| 68 | | 10x16 | 271 | 13x21 | 303 | 13x25 | 308 | 16x26 | 319 | 16x32 | 336 | 16x32 | 435 | 18x35 | 462 |
| 82 | | 10x16 | 299 | 13x25 | 365 | 13x25 | 385 | 16x26 | 413 | 16x32 | 435 | 18x32 | 462 | 18x35 | 539 |
| 100 | | 10x20 | 402 | 16x26 | 424 | 16x26 | 446 | 16x32 | 479 | 18x32 | 528 | 18x35 | 529 | 18x40 | 572 |
| 120 | | 10x25 | 457 | 16x26 | 440 | 16x26 | 475 | 16x32 | 495 | 18x35 | 561 | 18x40 | 605 | 18x45 | 677 |
| 150 | | 13x21 | 579 | 16x26 | 462 | 16x32 | 567 | 18x32 | 583 | 18x40 | 605 | 22x40 | 770 | | |
| 220 | | 13x25 | 762 | 16x26 | 660 | 18x35 | 693 | 18x40 | 715 | | | | | | |
| 330 | | 16x26 | 952 | 18x35 | 957 | 22x35 | 1100 | | | | | | | | |
| 470 | | 16x32 | 1238 | 18x40 | 1100 | 22x40 | 1238 | | | | | | | | |
| 1000 | | 18x35 | 2321 | 22x50 | 1760 | | | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

UK

SE series

- 105°C high-temperature, high reliability and long life.
- Suitable for office communicative or industrial equipments.
- RoHS Compliance.
- 105°C耐高温、高性頼性、長壽命產品。
- 適用於辦公室通訊設備、工業設備。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | | | |
|---------------------------------------|---|---|------|------|------|------|--|------|------|--------------|---------|-----|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | - 40 ~ +105°C | | | | | | - 40 ~ +105°C | | | -25 ~ +105°C | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 100VDC | | | | | | 160 ~ 250VDC | | | 350 ~ 450VDC | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3 (µA) which is greater.(After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | I ≤ 0.03CV +20 (µA) (After 3 minutes application of DC rated voltage, at 20 °C) | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160~250 | 350~450 | |
| | tan δ(Max) | 0.24 | 0.20 | 0.17 | 0.15 | 0.12 | 0.10 | 0.09 | 0.08 | 0.15 | 0.20 | |
| | When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF . | | | | | | | | | | | |
| Low Temperature Stability 低溫特性 | Measurement Frequency: 120Hz. | | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160~250 | 350~400 | 450 |
| | Impedance Ratio(Max) 阻抗比率(最大值) | Z(-25°C)/Z(20°C) | 4 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 4 | 8 |
| | Z(-40°C)/Z(20°C) | 8 | 6 | 6 | 4 | 4 | 4 | 4 | 4 | 6 | - | - |
| Load Life 負荷壽命 | 5000hours,with application of rated voltage at 105°C (φ D ≤ 8 : 3,000 hrs ; φ D = 10 : 4,000 hrs) | | | | | | | | | | | |
| | Capacitance Change | Within ± 25% of Initial Value | | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | | | |

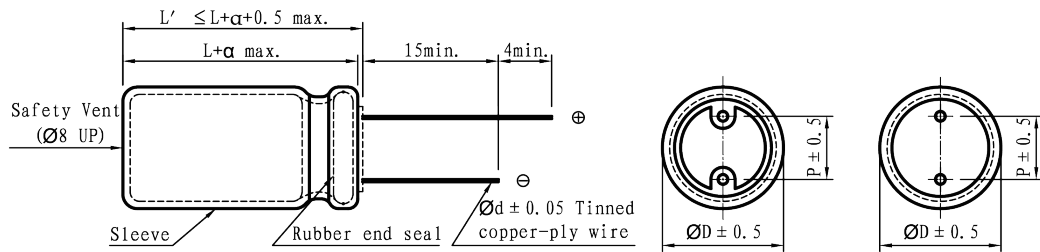
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance (µF) | Frequency (Hz) | | | |
|-------------------|------------------|----------------|------|------|-------|
| | | 50 | 120 | 1K | ≥ 10K |
| ≤ 100 | < 100 | 0.70 | 1.00 | 1.40 | 1.60 |
| | 100 ~ 4700 | 0.75 | 1.00 | 1.30 | 1.40 |
| | > 4700 | 0.80 | 1.00 | 1.15 | 1.20 |
| ≥ 160 | 2.2 ~ 820 | 0.80 | 1.00 | 1.30 | 1.40 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

SE series

DIMENSIONS(mm)



| | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|------|
| φ D | 5 | 6.3 | 8 | 10 | 13 | 14.5 | 16 | 18 | 22 | 25 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 | 7.5 | 10 | 12.5 |
| φ d | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 | 1.0 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

| Cap (μF) | V | 6.3 | | 10 | | 16 | | 25 | | 35 | | 50 | | 63 | |
|----------|---|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 0.47 | | | | | | | | | | | | 5x11 | 8 | | |
| 1 | | | | | | | | | | | | 5x11 | 17 | | |
| 2.2 | | | | | | | | | | | | 5x11 | 23 | | |
| 3.3 | | | | | | | | | | | | 5x11 | 31 | | |
| 4.7 | | | | | | | | | | | | 5x11 | 35 | | |
| 10 | | | | | | | | 5x11 | 45 | 5x11 | 48 | 5x11 | 51 | 5x11 | 56 |
| 22 | | | | | | | | 5x11 | 60 | 6.3x11 | 78 | 6.3x11 | 85 | 6.3x11 | 95 |
| 33 | | | | | | | | 6.3x11 | 90 | 6.3x11 | 100 | 8x12 | 102 | 8x12 | 122 |
| 47 | | | | | | 5x11 | 85 | 6.3x11 | 105 | 8x12 | 130 | 8x12 | 141 | 10x13 | 152 |
| 100 | | 5x11 | 120 | 5x11 | 130 | 6.3x11 | 140 | 8x12 | 185 | 8x12 | 190 | 10x13 | 231 | 10x16 | 250 |
| 220 | | 6.3x11 | 170 | 6.3x11 | 190 | 8x12 | 240 | 10x13 | 290 | 10x13 | 320 | 10x16 | 368 | 10x20 | 415 |
| 330 | | 8x12 | 250 | 8x12 | 280 | 8x12 | 310 | 10x13 | 350 | 10x16 | 420 | 10x20 | 490 | 13x21 | 550 |
| 470 | | 8x12 | 290 | 8x12 | 330 | 10x13 | 380 | 10x20 | 465 | 13x21 | 580 | 13x21 | 665 | 16x26 | 725 |
| 1000 | | 10x13 | 490 | 10x16 | 580 | 10x20 | 670 | 13x21 | 830 | 13x25 | 1000 | 16x26 | 1080 | 16x32 | 1135 |
| 2200 | | 10x20 | 830 | 13x21 | 970 | 13x25 | 1130 | 16x26 | 1210 | 16x32 | 1450 | 18x35 | 1695 | | |
| 3300 | | 13x21 | 1060 | 13x25 | 1250 | 16x26 | 1350 | 16x32 | 1540 | 18x35 | 1830 | 18x40 | 2070 | | |
| 4700 | | 13x25 | 1310 | 16x26 | 1400 | 16x32 | 1570 | 18x35 | 1870 | 18x40 | 2150 | | | | |
| 6800 | | 16x26 | 1430 | 16x32 | 1690 | 18x35 | 1930 | 18x40 | 2120 | | | | | | |
| 10000 | | 16x32 | 1790 | 18x35 | 2010 | 18x40 | 2190 | | | | | | | | |
| 15000 | | 18x35 | 1980 | 18x40 | 2260 | | | | | | | | | | |
| 22000 | | 18x40 | 2290 | | | | | | | | | | | | |

| Cap (μF) | V | 100 | | 160 | | 200 | | 250 | | 350 | | 400 | | 450 | |
|----------|---|--------|-------|--------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 2.2 | | 5x11 | 28 | 6.3x11 | 28 | 6.3x11 | 28 | 8x12 | 35 | 8x12 | 35 | 8x12 | 35 | 10x13 | 36 |
| 3.3 | | 5x11 | 34 | 8x12 | 34 | 8x12 | 35 | 8x12 | 50 | 8x12 | 44 | 8x12 | 50 | 10x13 | 48 |
| 4.7 | | 5x11 | 40 | 8x12 | 43 | 10x13 | 50 | 8x12 | 55 | 10x13 | 55 | 10x13 | 60 | 10x16 | 60 |
| 10 | | 6.3x11 | 66 | 10x13 | 75 | 10x16 | 80 | 10x16 | 100 | 10x20 | 92 | 10x20 | 100 | 13x21 | 110 |
| 22 | | 8x12 | 112 | 10x16 | 130 | 10x20 | 140 | 13x21 | 170 | 13x21 | 162 | 13x25 | 190 | 16x22 | 210 |
| 33 | | 10x13 | 155 | 10x20 | 170 | 13x21 | 200 | 13x21 | 225 | 13x25 | 205 | 16x22 | 240 | 16x26 | 280 |
| 39 | | 10x13 | 160 | 10x20 | 190 | 13x21 | 220 | 13x25 | 250 | 16x22 | 220 | 16x26 | 300 | 16x32 | 330 |
| 47 | | 10x16 | 190 | 13x21 | 230 | 13x21 | 250 | 13x25 | 280 | 16x26 | 320 | 16x32 | 330 | 18x25 | 360 |
| 68 | | 10x20 | 210 | 13x25 | 260 | 13x25 | 280 | 16x22 | 310 | 16x26 | 350 | 18x25 | 350 | 18x32 | 500 |
| 82 | | 13x21 | 240 | 16x22 | 320 | 16x26 | 350 | 16x32 | 390 | 18x25 | 420 | 18x32 | 580 | 18x35 | 600 |
| 100 | | 13x21 | 310 | 16x26 | 350 | 16x32 | 480 | 16x36 | 500 | 18x32 | 550 | 18x35 | 660 | 18x40 | 720 |
| 120 | | | | | | | | | | 18x35 | 650 | 18x40 | 770 | | |
| 220 | | 16x26 | 540 | 18x35 | 640 | 18x40 | 810 | | | | | | | | |
| 330 | | 16x26 | 660 | | | | | | | | | | | | |
| 470 | | 16x32 | 880 | | | | | | | | | | | | |
| 560 | | | | 22x40 | 1300 | 22x50 | 1400 | | | | | | | | |
| 680 | | | | 22x50 | 1420 | 25x50 | 1550 | | | | | | | | |
| 820 | | | | | | 25x50 | 1700 | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SE

SE series

SLIM TYPE

- 105°C high-temperature and high voltage 350~450V, life 3000~5000hrs.
- Specially Size, 8~16mm diameter.
- For LCD-TV and LCD-Monitor power.
- RoHS Compliance.
- 105°C 耐高溫標準品，高壓350~450V，壽命3000~5000小時。
- 特殊專用尺寸，直徑8~16mm。
- 使用於LCD TV與LCD Monitor電源應用。



STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

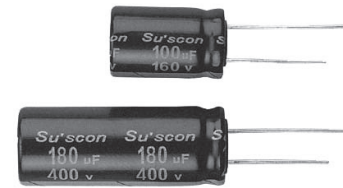
| Cap (µF) | V | 350 | | 400 | | 450 | |
|----------|---|---------|-------|---------|-------|---------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L |
| 22 | | | | 8x50 | 135 | 10x40 | 280 |
| 33 | | | | 8x61 | 280 | 10x50 | 350 |
| | | 10x40 | 210 | 10x40 | 260 | 13x35 | 300 |
| 39 | | 10x40 | 210 | 8x61 | 280 | 8x61 | 350 |
| | | 13x30 | 270 | 10x45 | 300 | 10x50 | 350 |
| | | | | 13x35 | 310 | 13x40 | 360 |
| 47 | | 10x40 | 300 | 10x50 | 330 | 10x60 | 410 |
| | | 13x35 | 320 | 13x40 | 350 | 13x50 | 370 |
| | | 14.5x30 | 320 | 14.5x40 | 370 | 14.5x40 | 390 |
| 53 | | 13x35 | 320 | 13x50 | 385 | 10x60 | 440 |
| 68 | | 10x60 | 400 | 13x50 | 385 | 13x60 | 450 |
| | | 13x40 | 420 | 14.5x45 | 400 | 14.5x50 | 400 |
| | | 16x35 | 430 | 16x35 | 420 | 16x40 | 440 |
| 82 | | 13x50 | 450 | 14.5x45 | 530 | 14.5x50 | 600 |
| | | 16x35 | 500 | 16x40 | 550 | 16x45 | 620 |
| 100 | | 16x40 | 530 | 14.5x50 | 700 | 16x50 | 760 |
| | | | | 16x45 | 720 | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SE

SEA series

- On the basis of SE series ripple promotion product.
- Suitable for LCD TV Power ,SMPS.
- RoHS Compliance.
- SE系列紋波提升品。
- 適用於液晶顯示電源及開關電源等。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | |
|--|---|---|--------------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | -25 ~ +105°C | | |
| Rated Voltage Range 額定電壓範圍 | 400VDC | | 450 ~ 500VDC | | |
| Leakage Current 洩漏電流 | $I \leq 0.03CV + 20 (\mu A)$ (After 3 minutes application of DC rated voltage, at 20 °C) | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | |
| | Rated Voltage(V) | 400 | 450 | 460 | 500 |
| | tan δ(Max) | 0.15 | 0.20 | 0.20 | 0.20 |
| | When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF . | | | | |
| Low Temperature Stability 低温特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | |
| | Rated Voltage(V) | 400 | 450 | 460 | 500 |
| | Z(-25°C)/Z(20°C) | 3 | 3 | 6 | 6 |
| | Z(-40°C)/Z(20°C) | 6 | - | - | - |
| Load Life 負荷壽命 | 5000hours,with application of rated voltage at 105°C | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement. The capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Standards 參照標準 | JIS C 5101-4-1 (IEC 60384) | | | | |

SEA

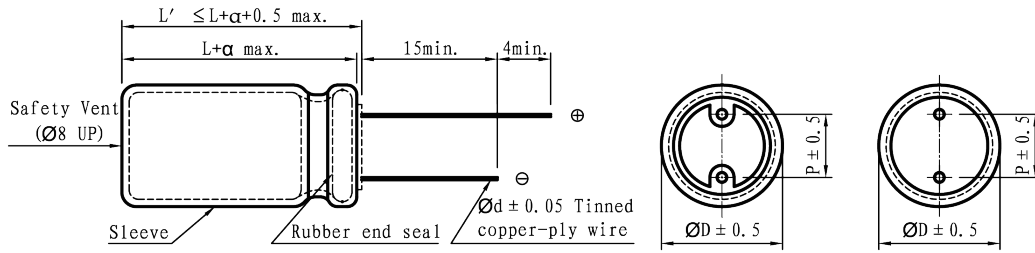
Frequency Coefficient of Permissible Ripple Current

| Capacitance (µF) | Frequency (Hz) | | | | |
|------------------|----------------|------|------|------|------|
| | 120 | 1K | 10K | 50K | 100K |
| 10 ~ 82 | 1.00 | 1.75 | 2.25 | 2.35 | 2.50 |
| 100 ~ 150 | 1.00 | 1.67 | 2.05 | 2.15 | 2.25 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use . The rms ripple current has to be reduced.

SEA series

DIMENSIONS(mm)



| | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|
| ϕD | 10 | 13 | 16 | 18 | 20 | 22 |
| P | 5.0 | 5.0 | 7.5 | 7.5 | 10 | 10 |
| ϕd | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 |

| | |
|----------|-------------------|
| α | (L < 16) 1.0 |
| | (L \geq 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

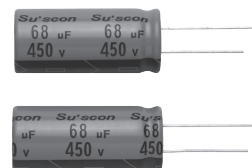
| Cap (μF) | V | 400 | | | | 450 | | | | 460 | | | | 500 | | | |
|--------------------|---|-------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|--|--|--|
| | | Item | D x L | R.C. | | D x L | R.C. | | D x L | R.C. | | D x L | R.C. | | | | |
| | | | | 120Hz | 100KHz | | 120Hz | 100KHz | | 120Hz | 100KHz | | 120Hz | 100KHz | | | |
| 10 | | 10x16 | 150 | 375 | 10x20 | 105 | 263 | 10x20 | 80 | 200 | 13x21 | 75 | 187.5 | | | | |
| 15 | | 10x20 | 170 | 425 | 13x21 | 130 | 325 | 13x21 | 110 | 275 | 13x21 | 90 | 225 | | | | |
| 22 | | 13x21 | 250 | 625 | 13x25 | 210 | 525 | 13x25 | 180 | 450 | 13x25 | 170 | 425 | | | | |
| 33 | | 13x25 | 350 | 875 | 16x22 | 270 | 675 | 16x25 | 330 | 825 | 16x25 | 260 | 650 | | | | |
| 47 | | 13x25 | 480 | 1200 | 18x26 | 450 | 1125 | 18x26 | 400 | 1000 | 18x32 | 350 | 875 | | | | |
| 56 | | 16x25 | 500 | 1250 | 18x26 | 550 | 1375 | 18x26 | 500 | 1250 | 18x35 | 520 | 1300 | | | | |
| 68 | | 18x26 | 650 | 1625 | 18x32 | 600 | 1500 | 18x32 | 600 | 1500 | 18x35 | 550 | 1375 | | | | |
| 82 | | 18x26 | 750 | 1875 | 18x32 | 650 | 1625 | 18x32 | 650 | 1625 | 18x40 | 650 | 1625 | | | | |
| 100 | | 18x32 | 800 | 1800 | 18x35 | 750 | 1688 | 18x35 | 750 | 1688 | 18x45 | 700 | 1575 | | | | |
| 120 | | 18x35 | 850 | 1913 | 18x40 | 800 | 1800 | 18x40 | 800 | 1800 | 22x45 | 800 | 1800 | | | | |
| 150 | | 18x40 | 900 | 2025 | 20x45 | 900 | 2025 | 20x45 | 900 | 2025 | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SEA

SER series

- 105°C high-temperature resistance, high reliability and long life.
high ripple current.
- Suitable for office communicative or industrial equipments.
- RoHS Compliance.
- 105°C耐高温、高信頼性、長壽命。
- 適用於辦公室通訊設備、工業設備。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | |
|--|---|---|--------------|-----|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | -25 ~ +105°C | |
| Rated Voltage Range 額定電壓範圍 | 160 ~ 400VDC | | 450VDC | |
| Leakage Current 洩漏電流 | $I \leq 0.03CV + 20 (\mu A)$ (After 3 minutes application of DC rated voltage) | | | |
| Dissipation Factor 散逸因素 (tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | |
| | Rated Voltage(V) | 160 ~ 250 | 400 ~ 450 | |
| | tan δ (Max) | 0.15 | 0.20 | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | |
| | Rated Voltage(V) | 160 ~ 250 | 400 | 450 |
| | Z(-25°C)/Z(20°C) | 3 | 5 | 6 |
| | Z(-40°C)/Z(20°C) | 6 | 6 | - |
| Load Life 負荷壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied for 5,000 hours at 105°C. | | | |
| | Capacitance Change | Within ± 25% of Initial Value | | |
| | tan δ | 200% of less of Initial Specified Value | | |
| | Leakage Current | Initial Specified Value or less | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | |
| | tan δ | 200% of less of Initial Specified Value | | |
| | Leakage Current | Initial Specified Value or less | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | |

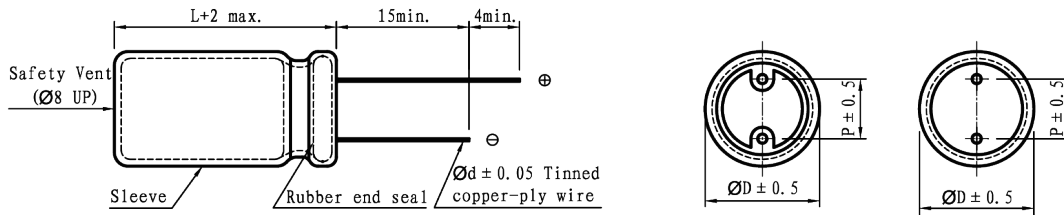
Frequency Coefficient of Permissible Ripple Current

| Capacitance (μF) | Frequency (Hz) | | | |
|-------------------------|----------------|------|------|------|
| | 120 | 1K | 10K | 100K |
| 22 ~ 82 | 1.00 | 1.25 | 1.50 | 1.75 |
| 100 ~ 470 | 1.00 | 1.15 | 1.30 | 1.40 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

SER series

DIMENSIONS(mm)



| | | | | | | |
|----------|-----|-----|------|-----|-----|------|
| ϕD | 10 | 13 | 14.5 | 16 | 18 | 20 |
| P | 5.0 | 5.0 | 7.5 | 7.5 | 7.5 | 10.0 |
| ϕd | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

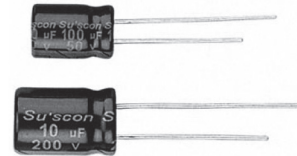
| Cap (µF) | V | 160 | | 200 | | 250 | | 400 | | 450 | | |
|----------|---|------|-------|------|---------|------|-------|-------|---------|---------|---------|------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 22 | | | 10x16 | 130 | | | | | 10x30 | 205 | 10x40 | 280 |
| 33 | | | 10x20 | 210 | | | | | 10x40 | 260 | 13x35 | 290 |
| 39 | | | 10x20 | 210 | | | | | 10x45 | 320 | 13x40 | 345 |
| 47 | | | 10x25 | 305 | | | | 13x35 | 385 | 10x50 | 350 | |
| | | | | | | | | | | 14.5x40 | 420 | |
| 56 | | | 10x25 | 305 | | | | 13x40 | 420 | 14.5x40 | 420 | |
| | | | | | | | | | | 16x30 | 477 | |
| 68 | | | 10x25 | 345 | 10x30 | 445 | 13x25 | 490 | 13x45 | 500 | 14.5x45 | 550 |
| | | | | | | | | | 14.5x30 | 500 | 18x32 | 550 |
| 82 | | | 10x30 | 445 | 10x35 | 485 | 13x30 | 550 | 14.5x40 | 545 | 16x40 | 650 |
| | | | | | | | | | | | 18x32 | 650 |
| 100 | | | 10x35 | 485 | 10x40 | 560 | 16x25 | 620 | 14.5x45 | 600 | 18x36 | 720 |
| | | | | | | | | | 18x32 | 600 | | |
| 120 | | | 10x40 | 560 | 10x45 | 680 | 16x32 | 685 | 16x40 | 710 | 18x40 | 800 |
| | | | | | | | | | 18x36 | 710 | | |
| 150 | | | 10x45 | 680 | 13x35 | 720 | 16x35 | 815 | 18x40 | 835 | 18x45 | 960 |
| | | | | | | | | | | | 20x40 | 1000 |
| 220 | | | 13x40 | 850 | 13x45 | 890 | 18x36 | 1020 | | | | |
| | | | | | 14.5x35 | 890 | | | | | | |
| 270 | | | 13x45 | 945 | 16x35 | 1030 | 18x40 | 1090 | | | | |
| 330 | | | 16x35 | 1100 | 16x40 | 1200 | | | | | | |
| | | | | | 18x32 | 1200 | | | | | | |
| 470 | | | 18x40 | 1220 | 18x45 | 1305 | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SER

HE series

- High ripple current.
- 8000~10000 hours long life product.
- RoHS Compliance
- 高紋波電流。
- 8000~10000小時長壽命品。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | |
|---|---|---|------|--------------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | -25 ~ +105°C | | | |
| Rated Voltage Range 額定電壓範圍 | 160 ~ 400VDC | | | 450VDC | | | |
| Leakage Current 洩漏電流 | $I \leq 0.04CV + 100 (\mu A)$ (After 1 minutes application of DC rated voltage, at 20 °C) | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | |
| | Rated Voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 |
| | tan δ(Max) | 0.15 | 0.15 | 0.15 | 0.20 | 0.20 | 0.20 |
| When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF. | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | |
| | Rated Voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 |
| | Z(-25°C)/Z(20°C) | 3 | 3 | 3 | 6 | 6 | 6 |
| Z(-40°C)/Z(20°C) | | | | | | | |
| 6 6 6 6 6 6 - | | | | | | | |
| Load Life 負荷壽命 | 10000hours,with application of rated voltage at 105°C (ØD≤10 : 8000hrs) | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | |

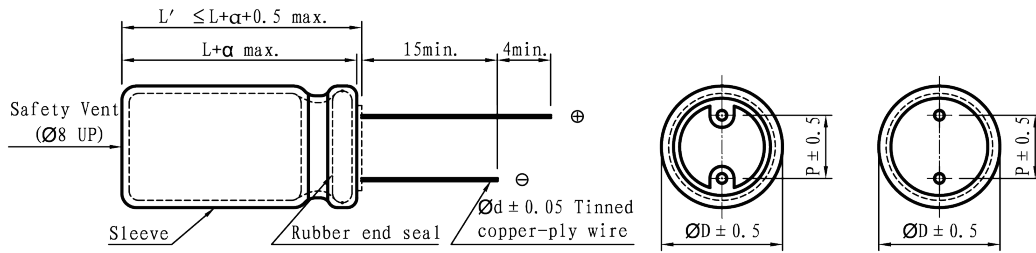
Frequency Coefficient of Permissible Ripple Current

| Capacitance (µF) | Frequency (Hz) | | | | |
|------------------|----------------|------|------|------|------|
| | 50 | 120 | 1K | 10K | 100K |
| 6.8 ~ 82 | 0.70 | 1.00 | 1.75 | 2.25 | 2.50 |
| 100 ~ 330 | 0.75 | 1.00 | 1.67 | 2.05 | 2.25 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

HE series

DIMENSIONS(mm)



| | | | | | | |
|----------|-----|-----|-----|------|-----|-----|
| ϕD | 8 | 10 | 13 | 14.5 | 16 | 18 |
| P | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 | 7.5 |
| ϕd | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 |

| | |
|----------|-------------------|
| α | (L < 16) 1.0 |
| | (L \geq 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

| Cap (μF) | V | 160 | | | | 200 | | | | 250 | | | |
|----------|---|-------|-------|-------|--------|-------|-------|--------|-------|-------|--------|--|--|
| | | Item | D x L | R.C. | | D x L | R.C. | | D x L | R.C. | | | |
| | | | | 120Hz | 100KHZ | | 120Hz | 100KHZ | | 120Hz | 100KHZ | | |
| 10 | | 10x16 | 125 | 313 | 10x16 | 125 | 313 | 10x20 | 140 | 350 | | | |
| 22 | | 10x20 | 200 | 500 | 10x20 | 200 | 500 | 10x20 | 200 | 500 | | | |
| 33 | | 10x20 | 250 | 625 | 10x20 | 260 | 650 | 13x21 | 320 | 800 | | | |
| 47 | | 10x20 | 300 | 750 | 13x21 | 390 | 975 | 13x21 | 390 | 975 | | | |
| 68 | | 13x21 | 470 | 1175 | 13x21 | 470 | 1175 | 16x22 | 520 | 1300 | | | |
| 82 | | 13x21 | 510 | 1275 | 16x22 | 550 | 1375 | 16x22 | 550 | 1375 | | | |
| 100 | | 13x25 | 620 | 1395 | 16x22 | 630 | 1418 | 16x26 | 680 | 1530 | | | |
| | | 16x22 | 630 | 1418 | | | | | | | | | |
| 150 | | 16x22 | 770 | 1733 | 16x26 | 840 | 1890 | 18x25 | 860 | 1935 | | | |
| 220 | | 18x25 | 1020 | 2295 | 18x26 | 1050 | 2363 | 18x32 | 1130 | 2543 | | | |
| 330 | | 18x32 | 1390 | 3128 | 18x36 | 1430 | 3218 | | | | | | |

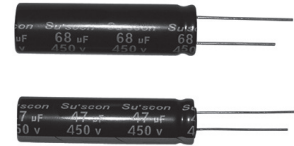
| Cap (μF) | V | 350 | | | | 400 | | | | 450 | | | |
|----------|---|-------|-------|-------|--------|-------|-------|--------|-------|-------|--------|--|--|
| | | Item | D x L | R.C. | | D x L | R.C. | | D x L | R.C. | | | |
| | | | | 120Hz | 100KHZ | | 120Hz | 100KHZ | | 120Hz | 100KHZ | | |
| 6.8 | | 10x16 | 110 | 275 | 10x16 | 110 | 275 | 10x20 | 110 | 275 | | | |
| 10 | | 10x20 | 140 | 350 | 10x20 | 140 | 350 | 13x21 | 180 | 450 | | | |
| 22 | | 13x21 | 260 | 650 | 13x21 | 260 | 650 | 16x22 | 290 | 725 | | | |
| 33 | | 16x22 | 360 | 900 | 16x22 | 360 | 900 | 16x26 | 390 | 975 | | | |
| | | | | | | | | 18x22 | 380 | 950 | | | |
| 47 | | 16x22 | 430 | 1075 | 16x25 | 470 | 1175 | 18x25 | 480 | 1200 | | | |
| | | | | | 18x22 | 450 | 1125 | | | | | | |
| 68 | | 16x26 | 560 | 1400 | 18x25 | 585 | 1463 | 18x32 | 630 | 1575 | | | |
| | | 18x22 | 550 | 1375 | | | | | | | | | |
| 82 | | 18x25 | 610 | 1525 | 18x25 | 610 | 1525 | 18x35 | 715 | 1788 | | | |
| 100 | | 18x25 | 700 | 1575 | 18x32 | 765 | 1721 | 18x40 | 800 | 1800 | | | |
| 120 | | 18x32 | 830 | 1868 | 18x35 | 865 | 1946 | | | | | | |
| 150 | | 18x35 | 960 | 2160 | 18x40 | 985 | 2216 | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HE series

SLIM TYPE

- 105°C high-temperature and high voltage 350~450V, life 8000~10000hrs.
- Specially Size, 8~16mm diameter.
- For LCD-TV and LCD-Monitor power.
- RoHS Compliance.
- 105°C 耐高温，高壓350~450V，壽命8000~10000小時。
- 特殊專用尺寸，直徑8~16mm。
- 使用於LCD TV與LCD Monitor電源應用。



STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

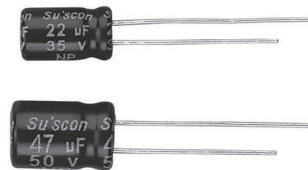
| Cap (μF) | V | 350 | | | 400 | | | 450 | | | |
|----------|---|---------|-------|-------|---------|-------|-------|---------|-------|-------|--------|
| | | Item | D x L | R.C. | | D x L | R.C. | | D x L | R.C. | |
| | | | | 120Hz | 100KHZ | | 120Hz | 100KHZ | | 120Hz | 100KHZ |
| 22 | | 10x30 | 212 | 530 | 8x50 | 236 | 590 | 8x50 | 254 | 635 | |
| | | | | | 10x35 | 260 | 650 | 10x40 | 280 | 700 | |
| 33 | | 8x50 | 240 | 600 | 8x61 | 280 | 700 | 8x61 | 280 | 700 | |
| | | 10x35 | 260 | 650 | 10x40 | 312 | 780 | 10x45 | 332 | 830 | |
| 39 | | 10x40 | 280 | 700 | 10x50 | 380 | 950 | 10x50 | 420 | 1050 | |
| | | | | | 13x35 | 368 | 920 | 13x45 | 408 | 1020 | |
| 47 | | 10x50 | 380 | 950 | 10x60 | 480 | 1200 | 10x60 | 520 | 1300 | |
| | | 13x35 | 400 | 1000 | 13x40 | 460 | 1150 | 13x50 | 560 | 1400 | |
| | | 14.5x30 | 400 | 1000 | 14.5x35 | 440 | 1100 | 14.5x45 | 512 | 1280 | |
| 53 | | 10x50 | 440 | 1100 | 10x60 | 480 | 1200 | 13x50 | 600 | 1500 | |
| | | 13x40 | 480 | 1200 | 13x45 | 500 | 1250 | 14.5x45 | 512 | 1280 | |
| | | 14.5x30 | 400 | 1000 | 14.5x35 | 440 | 1100 | 16x35 | 560 | 1400 | |
| 68 | | 10x60 | 520 | 1300 | 13x50 | 540 | 1350 | 13x60 | 660 | 1650 | |
| | | 13x45 | 480 | 1200 | 14.5x45 | 600 | 1500 | 14.5x50 | 680 | 1700 | |
| | | 14.5x35 | 440 | 1100 | | | | 16x40 | 628 | 1570 | |
| 82 | | 13x50 | 540 | 1350 | 13x60 | 600 | 1500 | 13x60 | 700 | 1750 | |
| | | 14.5x40 | 588 | 1470 | 14.5x50 | 648 | 1620 | 14.5x50 | 720 | 1800 | |
| | | | | | 16x40 | 648 | 1620 | 16x45 | 792 | 1980 | |
| 100 | | 13x60 | 660 | 1485 | 14.5x50 | 770 | 1733 | 14.5x60 | 855 | 1924 | |
| | | 14.5x45 | 682 | 1534 | 16x50 | 902 | 2030 | 16x50 | 990 | 2228 | |

※ 13mm may be replaced by 12.5mm upon customer's request.



HU series

- 105°C 10000 hours , miniaturized and long life.
- RoHS Compliance
- 105°C 10000小時小型化長壽命品。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | |
|--|--|---|------|-----|------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz, 20°C) | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | - 25 ~ +105°C | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 10 ~ 100VDC | | | | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3(μA) which is greater.(After 2 minutes application of DC rated voltage, at 20°C) | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency:120Hz. Temperature: 20°C | | | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 | 63 | 100 |
| | tanδ(MAX) | 0.45 | 0.35 | 0.3 | 0.22 | 0.19 | 0.17 | 0.15 |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency:120Hz | | | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 | 63 | 100 |
| | Z(-25°C) / Z(20°C) | 8 | 6 | 4 | 4 | 3 | 3 | 3 |
| Load Life 負荷壽命 | 10000 hours, with application of rated voltage at 105°C. | | | | | | | |
| | Capacitance Change | within ±25% of Initial Value | | | | | | |
| | tan δ | 300% or less of Initial Specified Value | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000hours 105°C without voltage applied. Before the measurement. The Capacitance shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | |
| | Capacitance Change | within ±25% of Initial Value | | | | | | |
| | tan δ | 300% or less of Initial Specified Value | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | |
| Standards 參照標準 | JIS C 5101-4-1 (IEC 60384) | | | | | | | |

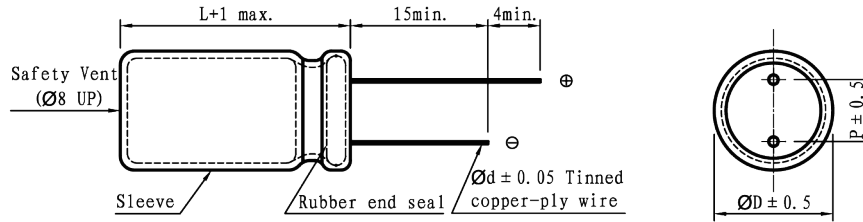
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance (μF) | Frequency (Hz) | | | |
|-------------------|------------------|----------------|------|------|------|
| | | 120 | 1K | 10K | 100K |
| 10~100 | 0.47~10 | 0.42 | 0.60 | 0.80 | 1.00 |
| | 22~33 | 0.55 | 0.75 | 0.90 | 1.00 |
| | 47~330 | 0.70 | 0.85 | 0.95 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise.when long life performance is required in actual use. The rms ripple current has to be reduced.

HU series

DIMENSIONS(mm)



| | | | |
|----------|-----|-----|-----|
| ϕD | 5 | 6.3 | 8 |
| P | 2.0 | 2.5 | 3.5 |
| ϕd | 0.5 | 0.5 | 0.5 |

STANDARD RATINGS

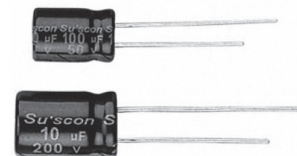
D×L(mm) ; R.C.(mA rms) at 105°C 100KHz.

| Cap (μF) | V Item | 10 | | 16 | | 25 | | 35 | | 50 | | 63 | | 100 | |
|--------------------|-----------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 0.47 | | | | | | | | | | 5x12 | 12 | | | 5x12 | 20 |
| 1 | | | | | | | | | | 5x12 | 25 | | | 5x12 | 40 |
| 2.2 | | | | | | | | | | 5x12 | 35 | | | 5x12 | 50 |
| 3.3 | | | | | | | | | | 5x12 | 70 | | | 5x12 | 60 |
| 4.7 | | | | | | | | | | 5x12 | 80 | | | 5x12 | 70 |
| 10 | | | | | | | | | | 5x12 | 90 | 5x12 | 80 | 6.3x12 | 150 |
| 22 | | | | | | | | | | 5x12 | 120 | 6.3x12 | 170 | 8x12 | 230 |
| 33 | | | | | | 5x12 | 124 | 5x12 | 130 | 6.3x12 | 190 | 6.3x12 | 170 | | |
| 47 | | | | 5x12 | 130 | 5x12 | 157 | 6.3x12 | 210 | 6.3x12 | 190 | 8x12 | 240 | | |
| 100 | | 5x12 | 130 | 6.3x12 | 210 | 6.3x12 | 210 | 8x12 | 330 | 8x12 | 270 | | | | |
| 220 | | 6.3x12 | 210 | 8x12 | 330 | | | | | | | | | | |
| 330 | | 8x12 | 330 | | | | | | | | | | | | |

HU

HH series

- Miniature HE series, long-life products.
- Load life:10000~12000hours.
- Suitable for electronic ballast for lighting equipment.
- long-life power input with smooth function.
- RoHS Compliance
- HE系列的小型化長壽命品。
- 保證壽命10000~12000hours.
- 適用於照明設備電子整流器，長壽命電源輸入平滑用等。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | |
|--|--|---|------|---------------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz, 20°C) | | | | | | |
| Operating Temperature Range 適用溫度範圍 | - 40 ~ +105°C | | | - 25 ~ +105°C | | | |
| Rated Voltage Range 額定電壓範圍 | 160 ~ 400VDC | | | 450VDC | | | |
| Leakage Current 洩漏電流 | $I \leq 0.04CV + 100\mu A$. (After 1minutes application of DC rated voltage, at 20 °C) | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency:120Hz. Temperature: 20°C | | | | | | |
| | Rated Voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 |
| | tanδ(MAX) | 0.20 | 0.20 | 0.20 | 0.24 | 0.24 | 0.24 |
| When nominal capacitance over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF | | | | | | | |
| Low Temperature Stability 低溫特性 | Measurement Frequency:120Hz | | | | | | |
| | Rated Voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 |
| | Impedance Ratio(Max) 阻抗比率(最大值) | Z(-25°C) / Z(20°C) | 3 | 3 | 3 | 5 | 5 |
| Load Life 負荷壽命 | 12,000 hours, with application of rated voltage at 105°C.(L≤20mm,10,000hrs) | | | | | | |
| | Capacitance Change | within ±20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000hours 105°C without voltage applied. Before the measurement. The Capacitance shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | |
| | Capacitance Change | within ±20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | |

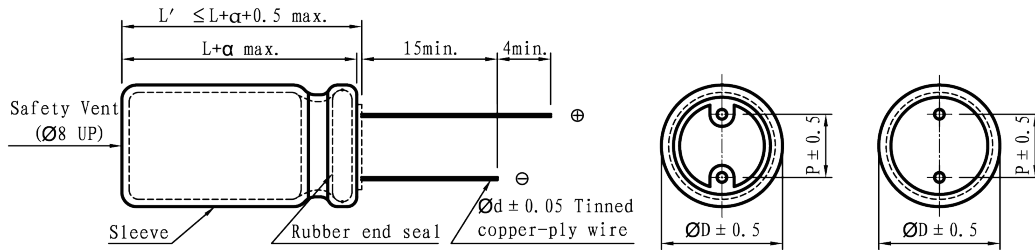
Frequency Coefficient of Permissible Ripple Current

| Capacitance (μF) | Frequency (Hz) | | | |
|------------------|----------------|------|------|------|
| | 120 | 1K | 10K | 100K |
| 6.8~82 | 1.00 | 1.75 | 2.25 | 2.50 |
| 100~680 | 1.00 | 1.67 | 2.05 | 2.25 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise.when long life performance is required in actual use. The rms ripple current has to be reduced.

HH series

DIMENSIONS(mm)



| | | | | |
|----------|-----|-----|-----|-----|
| ϕD | 10 | 13 | 16 | 18 |
| P | 5.0 | 5.0 | 7.5 | 7.5 |
| ϕd | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L > 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

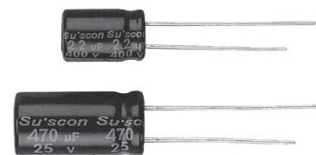
| Cap (μF) | V | 160 | | 200 | | 250 | | 350 | | 400 | | 450 | |
|--------------------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 6.8 | | | | | | | | | | 10x16 | 130 | 10x16 | 100 |
| 10 | | | | | | | | | | 10x16 | 140 | 10x20 | 130 |
| 12 | | | | | | | | 10x16 | 150 | 10x20 | 165 | 10x20 | 145 |
| 15 | | | | | | | | 10x20 | 170 | 10x20 | 180 | 10x25 | 175 |
| 22 | | | | 10x16 | 210 | 10x16 | 210 | 10x20 | 215 | 10x30 | 260 | 13x25 | 285 |
| 33 | 10x16 | 230 | 10x20 | 290 | 10x20 | 290 | 13x21 | 330 | 13x25 | 365 | 16x22 | 365 | |
| 47 | 10x20 | 285 | 10x20 | 340 | 13x21 | 465 | 13x25 | 485 | 16x22 | 495 | 16x26 | 475 | |
| 56 | 10x20 | 300 | 10x25 | 395 | 13x21 | 490 | 16x22 | 530 | 16x26 | 555 | 18x26 | 530 | |
| 68 | 13x21 | 500 | 13x21 | 520 | 13x25 | 550 | 16x26 | 630 | 16x26 | 600 | 16x36 | 625 | |
| 82 | 13x21 | 580 | 13x25 | 610 | 16x22 | 655 | 18x26 | 720 | 18x26 | 720 | 18x32 | 695 | |
| 100 | 13x21 | 610 | 16x22 | 655 | 16x22 | 680 | 18x26 | 750 | 18x32 | 830 | 18x35 | 790 | |
| 120 | 16x22 | 720 | 16x22 | 760 | 16x26 | 800 | 18x32 | 890 | 18x35 | 890 | 18x40 | 885 | |
| 150 | 16x22 | 780 | 18x22 | 865 | 18x26 | 920 | 18x35 | 1020 | 18x40 | 980 | | | |
| 180 | 16x25 | 950 | 18x22 | 950 | 18x30 | 990 | 18x40 | 1140 | 18x45 | 1050 | | | |
| 220 | 18x25 | 1050 | 18x26 | 1125 | 18x32 | 1100 | 18x45 | 1235 | | | | | |
| 270 | 18x30 | 1170 | 18x32 | 1340 | 18x40 | 1380 | | | | | | | |
| 330 | 18x35 | 1370 | 18x32 | 1480 | 18x45 | 1450 | | | | | | | |
| 390 | 18x36 | 1500 | 18x35 | 1590 | | | | | | | | | |
| 470 | 18x40 | 1825 | 18x40 | 1760 | | | | | | | | | |
| 560 | 18x45 | 2025 | | | | | | | | | | | |
| 680 | 18x50 | 2185 | | | | | | | | | | | |

※13mm may be replaced by 12.5mm upon customer's request.



SH series

- High temperature resistance, high reliability.
- 125°C , 2000 hours long life product.
- RoHS Compliance
- 耐高温、高信頼性。
- 125°C 2000小時長壽命品。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | | | | |
|---------------------------------------|---|---|------|------|--------------|------|------|---|--------------|------|------|---------|---|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +125°C | | | | -40 ~ +125°C | | | | -25 ~ +125°C | | | | |
| Rated Voltage Range 額定電壓範圍 | 10 ~ 100VDC | | | | 160 ~ 250VDC | | | | 350 ~ 450VDC | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 2 (µA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | | I ≤ 0.03CV +20 (µA) (After 3 minutes application of DC rated voltage, at 20 °C) | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 200 | 250 | 350~450 | |
| | tan δ(Max) | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.10 | 0.10 | 0.15 | 0.20 | 0.20 | 0.24 | |
| | When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF. | | | | | | | | | | | | |
| Low Temperature Stability 低溫特性 | Measurement Frequency: 120Hz. | | | | | | | | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 200 | 250 | 350~450 | |
| | Impedance Ratio(Max) 阻抗比率(最大值) | Z(-25°C)/Z(20°C) | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 6 |
| | Z(-40°C)/Z(20°C) | 8 | 6 | 4 | 4 | 4 | 4 | 4 | 6 | 6 | 6 | - | |
| Load Life 負荷壽命 | 2000hours,with application of rated voltage at 125°C | | | | | | | | | | | | |
| | Capacitance Change | Within ± 25% of Initial Value | | | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | | | |
| | Capacitance Change | Within ± 25% of Initial Value | | | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | | | | |

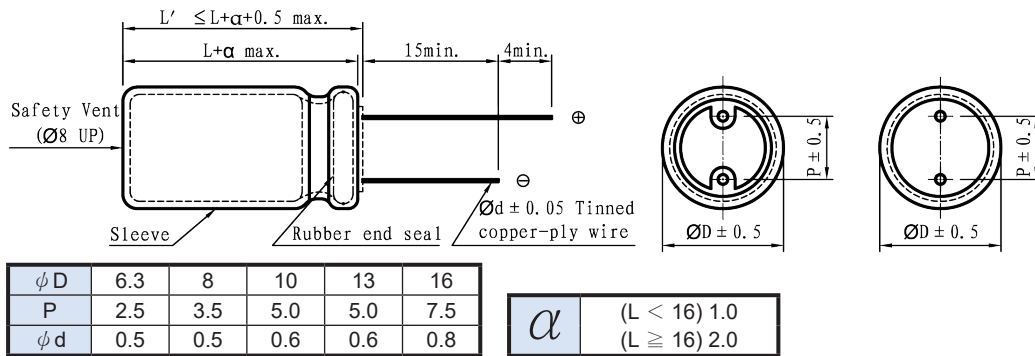
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance (µF) | Frequency (Hz) | | | |
|-------------------|------------------|----------------|------|------|-------|
| | | 50 | 120 | 1K | ≥ 10K |
| ≤ 100 | < 100 | 0.75 | 1.00 | 1.57 | 2.00 |
| | 100 ~ 470 | 0.80 | 1.00 | 1.34 | 1.50 |
| | > 470 | 0.85 | 1.00 | 1.10 | 1.15 |
| ≥ 160 | 1 ~ 100 | 0.85 | 1.00 | 1.40 | 1.50 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

SH series

DIMENSIONS(mm)



STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 125°C 120Hz.

| Cap (μF) | V | 10 | | 16 | | 25 | | 35 | | 50 | | 63 | |
|----------|--------|------|--------|--------|-------|--------|-------|--------|-------|------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 3.3 | | | | | | | | | | | | 8x12 | 28 |
| 4.7 | | | | | | | | | | | | 8x12 | 35 |
| 10 | | | | | | | | 6.3x11 | 40 | 8x12 | 45 | 8x12 | 54 |
| 22 | | | | | | 6.3x11 | 70 | 8x12 | 78 | 8x12 | 80 | 10x13 | 92 |
| 33 | | | | 6.3x11 | 70 | 8x12 | 90 | 8x12 | 105 | 8x12 | 112 | 10x16 | 130 |
| 47 | 6.3x11 | 80 | 6.3x11 | 82 | 8x12 | 110 | 8x12 | 148 | 10x13 | 154 | 10x20 | 170 | |
| 100 | 6.3x11 | 105 | 8x12 | 146 | 8x12 | 220 | 10x13 | 252 | 10x16 | 267 | 13x21 | 285 | |
| 220 | 8x12 | 230 | 10x13 | 300 | 10x13 | 450 | 10x16 | 530 | 13x21 | 568 | 13x25 | 585 | |
| 330 | 10x13 | 310 | 10x13 | 385 | 10x16 | 620 | 10x20 | 710 | 13x25 | 880 | 16x26 | 950 | |
| 470 | 10x13 | 420 | 10x16 | 520 | 10x20 | 800 | 13x21 | 890 | 16x26 | 900 | | | |
| 1000 | 10x20 | 760 | 13x21 | 800 | 13x25 | 900 | 16x26 | 1100 | | | | | |

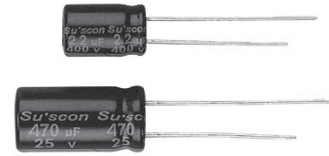
| Cap (μF) | V | 100 | | 160 | | 200 | | 250 | | 350 | | 400 | | 450 | |
|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 0.47 | | 8x12 | 15 | | | | | | | | | | | | |
| 1 | | 8x12 | 22 | 8x12 | 28 | 8x12 | 28 | 8x12 | 40 | 8x12 | 40 | 8x12 | 42 | 8x12 | 45 |
| 2.2 | | 8x12 | 30 | 8x12 | 35 | 8x12 | 35 | 10x13 | 48 | 10x13 | 48 | 10x13 | 48 | 10x16 | 52 |
| 3.3 | | 8x12 | 35 | 10x13 | 40 | 10x16 | 45 | 10x16 | 50 | 10x16 | 50 | 10x16 | 53 | 10x20 | 58 |
| 4.7 | | 10x13 | 42 | 10x13 | 50 | 10x16 | 60 | 10x20 | 65 | 10x20 | 53 | 10x20 | 62 | 10x25 | 65 |
| 10 | | 10x16 | 68 | 10x16 | 80 | 10x20 | 78 | 10x20 | 78 | 10x25 | 85 | 10x25 | 86 | 13x21 | 90 |
| 22 | | 10x20 | 95 | 10x20 | 115 | 10x25 | 126 | 13x21 | 128 | 13x25 | 139 | 13x30 | 142 | 16x26 | 154 |
| 33 | | 13x21 | 150 | 10x25 | 154 | 13x21 | 157 | 13x25 | 171 | 16x26 | 189 | 16x26 | 189 | 16x32 | 203 |
| 47 | | 13x25 | 180 | 13x25 | 200 | 13x25 | 204 | 16x26 | 292 | 16x32 | 243 | 16x32 | 243 | | |
| 68 | | 13x25 | 210 | 16x26 | 245 | 16x26 | 250 | 16x32 | 292 | | | | | | |
| 100 | | 16x26 | 290 | 16x32 | 360 | 16x36 | 329 | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SH

UH series

- High temperature, high ripple current at high frequency.
- Specially designed for electronic ballast and energy saving lamp.
- Load Life: 2,000~3,000 hours.
- RoHS Compliance
- 耐高温、高紋波及高頻率。
- 專為電子整流器和節能燈。
- 2,000~3,000小時長壽命品。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | | | | |
|--|--|---|------|------|------|------|---------------|--|------|---------------|------|-----------|--|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | - 40 ~ +130°C | | | | | | - 40 ~ +130°C | | | - 25 ~ +130°C | | | |
| Rated Voltage Range 額定電壓範圍 | 10 ~ 100VDC | | | | | | 160 ~ 250VDC | | | 350 ~ 450VDC | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 2 (µA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | | I ≤ 0.03CV +20 (µA) (After 3 minutes application of DC rated voltage, at 20 °C) | | | | | |
| Leakage Current 散逸因素(tan δ) | Measurement Frequency:120Hz. Temperature: 20°C | | | | | | | | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 200 | 250 | 350 ~ 450 | |
| | tanδ (Max) | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.10 | 0.10 | 0.15 | 0.20 | 0.20 | 0.24 | |
| When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF . | | | | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency:120Hz | | | | | | | | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 200 | 250 | 350 ~ 450 | |
| | Z(-25°C) / Z(20°C) | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 6 | |
| | Z(-40°C) / Z(20°C) | 8 | 6 | 4 | 4 | 4 | 4 | 4 | 6 | 6 | 6 | - | |
| Load Life 負荷壽命 | 3,000 hours, with application of rated voltage at 130°C.(∅D≤8mm,2,000hrs) | | | | | | | | | | | | |
| | Capacitance Change | within ±25% of Initial Value | | | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000hours 130°C without voltage applied. Before the measurement. The Capacitance shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | | | |
| | Capacitance Change | within ±25% of Initial Value | | | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | | | | |

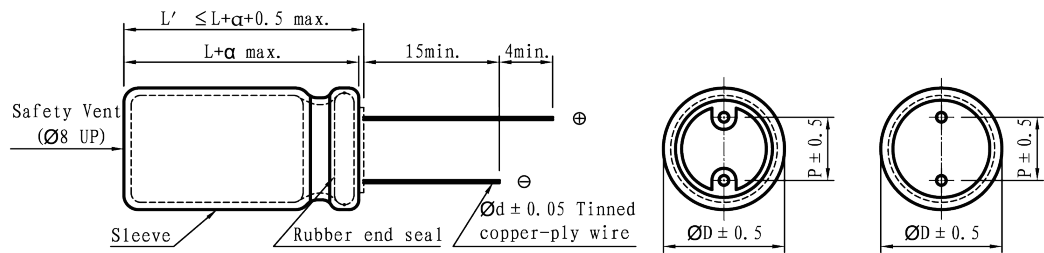
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance (µF) | Frequency (Hz) | | | |
|-------------------|------------------|----------------|------|------|------|
| | | 50 | 120 | 1K | ≥10K |
| ≤ 100 | < 100 | 0.50 | 0.70 | 0.85 | 1.00 |
| | 100 ~ 1500 | 0.65 | 0.75 | 0.90 | 1.00 |
| | > 1500 | 0.75 | 0.80 | 0.95 | 1.00 |
| ≥ 160 | 1.8~5.6 | 0.20 | 0.40 | 0.80 | 1.00 |
| | 6.8~100 | 0.40 | 0.75 | 0.90 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise.when long life performance is required in actual use. The rms ripple current has to be reduced.

UH series

DIMENSIONS(mm)



| | | | | |
|----------|-----|-----|-----|-----|
| ϕD | 8 | 10 | 13 | 16 |
| P | 3.5 | 5.0 | 5.0 | 7.5 |
| ϕd | 0.5 | 0.6 | 0.6 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L > 16) 2.0 |

STANDARD RATINGS

D×L (mm); R.C.: (mA rms) at 130°C, 100KHz.

| Cap (μF) | V | 10 | | 16 | | 25 | | 35 | | 50 | | 63 | |
|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 3.3 | | | | | | | | | | 8x12 | 70 | | |
| 4.7 | | | | | | | | | | 8x12 | 100 | | |
| 10 | | | | | | | | | | 8x12 | 200 | 8x12 | 200 |
| 22 | | | | | | | | | | 8x12 | 260 | 8x12 | 250 |
| 33 | | | | | | | | | | 8x12 | 300 | 10x13 | 400 |
| 47 | | | | | | | | | | 8x12 | 300 | 10x16 | 450 |
| 100 | | 8x12 | 340 | 8x12 | 340 | 8x12 | 340 | 10x13 | 620 | 10x13 | 520 | 13x21 | 820 |
| 220 | | 8x12 | 340 | 10x13 | 620 | 10x13 | 620 | 10x16 | 800 | 10x20 | 890 | 13x25 | 1000 |
| 330 | | 10x13 | 580 | 10x13 | 620 | 10x16 | 800 | 10x20 | 960 | 13x21 | 1000 | 16x26 | 1500 |
| 470 | | 10x13 | 620 | 10x16 | 800 | 10x20 | 960 | 13x21 | 1430 | 13x25 | 1200 | 16x32 | 1850 |
| 1000 | | 10x20 | 960 | 13x21 | 1430 | 13x25 | 1430 | 16x26 | 1900 | 16x32 | 2180 | | |
| 2200 | | 13x25 | 1430 | 16x26 | 1900 | 16x32 | 2300 | 16x36 | 2550 | | | | |
| 3300 | | 16x26 | 1900 | 16x32 | 2300 | 16x36 | 2550 | | | | | | |
| 4700 | | 16x32 | 2300 | 16x36 | 2550 | | | | | | | | |

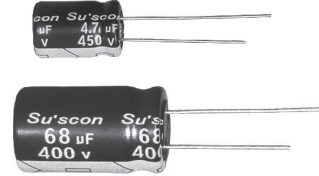
| Cap (μF) | V | 100 | | 160 | | 200 | | 250 | | 350 | | 400 | | 450 | |
|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 1.8 | | | | | | | | | | 10x16 | 62 | 10x16 | 60 | 10x16 | 58 |
| 2.2 | | | | | | | | | | 10x16 | 70 | 10x16 | 68 | 10x16 | 66 |
| 3.3 | | | | | | | | | | 10x16 | 84 | 10x16 | 82 | 10x16 | 80 |
| 4.7 | | 8x12 | 80 | 8x12 | 80 | 8x12 | 80 | 10x16 | 70 | 10x20 | 105 | 10x20 | 100 | 10x20 | 90 |
| 5.6 | | 8x12 | 118 | 8x12 | 100 | 8x16 | 118 | 10x16 | 130 | 10x20 | 150 | 13x21 | 160 | 13x21 | 150 |
| 6.8 | | 8x12 | 145 | 8x14 | 130 | 8x16 | 145 | 10x16 | 150 | 13x21 | 186 | 13x21 | 186 | 13x21 | 176 |
| 10 | | 8x12 | 200 | 10x16 | 200 | 10x16 | 200 | 10x20 | 224 | 13x21 | 278 | 13x21 | 278 | 16x26 | 510 |
| 22 | | 8x12 | 220 | 10x20 | 300 | 13x21 | 400 | 13x21 | 400 | 13x25 | 430 | 13x25 | 430 | 16x32 | 630 |
| 33 | | 10x13 | 260 | 13x21 | 400 | 13x21 | 480 | 13x25 | 510 | 16x26 | 600 | 16x26 | 600 | | |
| 47 | | 10x16 | 330 | 13x25 | 528 | 13x25 | 528 | 16x26 | 620 | 16x32 | 650 | 16x32 | 650 | | |
| 100 | | 13x21 | 670 | 16x26 | 716 | | | | | | | | | | |
| 220 | | 16x26 | 1100 | | | | | | | | | | | | |
| 330 | | 16x32 | 1300 | | | | | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

UH

HA series

- 105°C high-temperature resistance, standard product.
- 3000 hours Load Life.
- Suitable for LED and electronic rectifier.
- RoHS Compliance
- 105°C耐高溫標準品。
- 壽命3000小時。
- 適用於節能燈與電子整流器。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | |
|--|---|---|------|--|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | -25 ~ +105°C | | | |
| Rated Voltage Range 額定電壓範圍 | 160 ~ 400VDC | | | 450VDC | | | |
| Leakage Current 洩漏電流 | I ≤ 0.02CV +10 (µA) which is greater.(After 2 minutes application of DC rated voltage, at 20 °C) | | | I ≤ 0.03CV +10 (µA) (After 2 minutes application of DC rated voltage, at 20 °C) | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | |
| | Rated Voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 |
| | tan δ(Max) | 0.15 | 0.15 | 0.15 | 0.15 | 0.20 | 0.20 |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | |
| | Rated Voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 |
| | Z(-25°C)/Z(20°C) | 3 | 3 | 3 | 5 | 5 | 6 |
| | Z(-40°C)/Z(20°C) | 6 | 6 | 6 | 6 | 6 | - |
| Load Life 負荷壽命 | 3000hours,with application of rated voltage at 105°C | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | 500% or less of Initial Specified Value | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | |

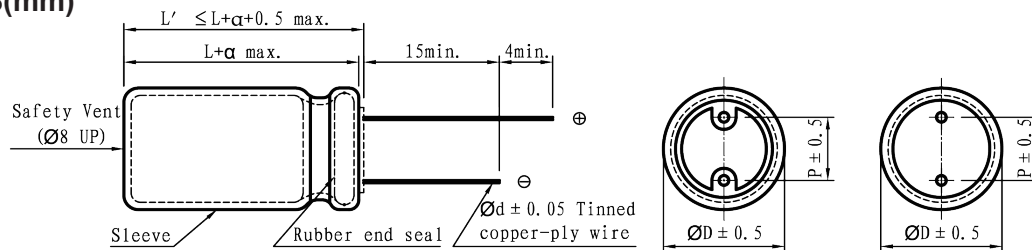
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Frequency (Hz) | | | |
|-------------------|----------------|------|-----------|------------|
| | 120 | 1K | 10K ~ 20K | 30K ~ 100K |
| 160 ~ 250 | 0.55 | 0.85 | 0.90 | 1.00 |
| 350 ~ 450 | 0.50 | 0.80 | 0.90 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

HA series

DIMENSIONS(mm)



| | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|
| ϕD | 6.3 | 8 | 10 | 13 | 16 | 18 |
| P | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz.

| Cap (μF) | V | 160 | | 200 | | 250 | |
|----------|---|--------|------|--------|------|-------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 2.2 | | 6.3x11 | 36 | 6.3x11 | 38 | 8x12 | 47 |
| 3.3 | | 8x12 | 50 | 8x12 | 59 | 8x12 | 69 |
| 4.7 | | 8x12 | 55 | 8x12 | 65 | 8x12 | 70 |
| 5.6 | | 8x12 | 65 | 8x12 | 75 | 8x16 | 85 |
| 6.8 | | 8x12 | 70 | 8x14 | 80 | 10x13 | 95 |
| 8.2 | | 8x12 | 80 | 8x16 | 85 | 10x16 | 105 |
| 10 | | 8x12 | 85 | 10x13 | 120 | 10x16 | 150 |
| 15 | | 8x16 | 120 | 10x13 | 150 | 10x16 | 180 |
| 22 | | 10x16 | 195 | 10x16 | 210 | 10x20 | 250 |
| 33 | | 10x20 | 230 | 13x21 | 280 | 13x21 | 320 |
| 47 | | 13x21 | 310 | 13x21 | 395 | 13x25 | 410 |
| 68 | | 13x21 | 380 | 13x25 | 460 | 16x26 | 480 |
| 82 | | 13x25 | 430 | 13x25 | 570 | 16x26 | 590 |
| 100 | | 16x26 | 640 | 16x26 | 670 | 16x32 | 720 |
| 150 | | 16x26 | 700 | 16x32 | 790 | 18x32 | 875 |
| 220 | | 16x36 | 990 | 18x35 | 1040 | 18x40 | 1100 |

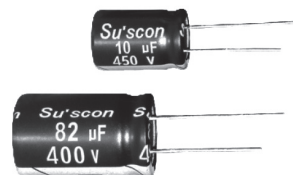
| Cap (μF) | V | 350 | | 400 | | 450 | |
|----------|---|-------|------|-------|------|-------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 1 | | 8x12 | 33 | 8x12 | 35 | 8x16 | 30 |
| 1.5 | | 8x12 | 42 | 8x12 | 45 | 10x16 | 50 |
| 2.2 | | 8x12 | 47 | 8x12 | 55 | 10x16 | 60 |
| 3.3 | | 8x16 | 60 | 10x13 | 75 | 10x16 | 90 |
| 4.7 | | 10x13 | 95 | 10x16 | 100 | 10x20 | 115 |
| 6.8 | | 10x13 | 100 | 10x16 | 125 | 13x21 | 130 |
| 8.2 | | 10x16 | 130 | 10x20 | 145 | 13x21 | 155 |
| 10 | | 10x20 | 145 | 10x20 | 150 | 13x21 | 160 |
| 15 | | 13x21 | 205 | 13x21 | 210 | 13x21 | 255 |
| 22 | | 13x25 | 270 | 13x25 | 285 | 16x26 | 280 |
| 33 | | 16x26 | 355 | 16x26 | 400 | 16x32 | 455 |
| 47 | | 16x26 | 430 | 16x26 | 480 | 18x32 | 550 |
| 68 | | 16x32 | 505 | 16x32 | 585 | 18x35 | 690 |
| 82 | | 16x36 | 655 | 18x32 | 695 | 18x35 | 805 |
| 100 | | 18x32 | 750 | 18x35 | 795 | 18x40 | 860 |

※ 13mm may be replaced by 12.5mm upon customer's request.

HA

HB series

- 105°C high-temperature resistance, high ripple current and long life.
- 5000hours load life.
- Suitable for LED and electronic rectifier.
- RoHS Compliance.
- 105°C耐高温、高紋波、長壽命。
- 壽命為5000小時。
- 適用於節能燈與電子整流器。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | |
|--|---|---|------|---|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | -25 ~ +105°C | | | |
| Rated Voltage Range 額定電壓範圍 | 160 ~ 400VDC | | | 450VDC | | | |
| Leakage Current 洩漏電流 | I ≤ 0.02CV + 10 (µA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | I ≤ 0.03CV + 10 (µA) (After 2 minutes application of DC rated voltage, at 20 °C) | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | |
| | Rated Voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 |
| | tan δ(Max) | 0.15 | 0.15 | 0.15 | 0.15 | 0.20 | 0.20 |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | |
| | Rated Voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 |
| | Z(-25°C)/Z(20°C) | 3 | 3 | 3 | 5 | 5 | 6 |
| | Z(-40°C)/Z(20°C) | 6 | 6 | 6 | 6 | 6 | - |
| Load Life 負荷壽命 | 5000hours,with application of rated voltage at 105°C | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | 500% or less of Initial Specified Value | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | |

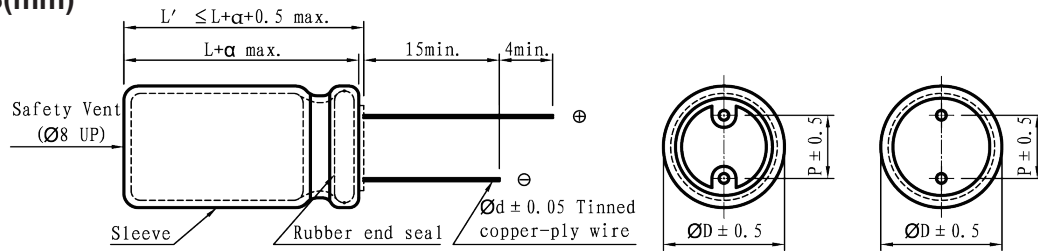
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Frequency (Hz) | | | |
|-------------------|----------------|------|-----------|------------|
| | 120 | 1K | 10K ~ 20K | 30K ~ 100K |
| 160 ~ 250 | 0.55 | 0.85 | 0.90 | 1.00 |
| 350 ~ 450 | 0.50 | 0.80 | 0.90 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

HB series

DIMENSIONS(mm)



| | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|----------|
| ϕD | 6.3 | 8 | 10 | 13 | 16 | 18 | α |
| P | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 | |
| ϕd | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 | |

| | |
|----------|-----|
| (L < 16) | 1.0 |
| (L ≥ 16) | 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz.

| Cap (μF) | V | 160 | | 200 | | 250 | | |
|----------|---|------|--------|------|-------|------|-------|------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 2.2 | | | 6.3x11 | 60 | 8x12 | 68 | 8x12 | 70 |
| 3.3 | | | 8x12 | 72 | 8x12 | 75 | 8x12 | 80 |
| 4.7 | | | 8x12 | 75 | 8x12 | 80 | 10x13 | 85 |
| 5.6 | | | 8x12 | 80 | 8x16 | 85 | 10x13 | 90 |
| 6.8 | | | 8x12 | 90 | 8x16 | 95 | 10x13 | 100 |
| 8.2 | | | 8x12 | 95 | 8x16 | 110 | 10x16 | 130 |
| 10 | | | 8x12 | 100 | 10x16 | 180 | 10x20 | 200 |
| 15 | | | 10x16 | 210 | 10x16 | 230 | 10x20 | 260 |
| 22 | | | 10x20 | 300 | 10x20 | 330 | 10x20 | 380 |
| 33 | | | 10x20 | 330 | 13x21 | 400 | 13x25 | 450 |
| 47 | | | 13x21 | 400 | 13x21 | 450 | 13x25 | 520 |
| 68 | | | 13x25 | 490 | 16x26 | 560 | 16x32 | 630 |
| 82 | | | 13x25 | 550 | 16x26 | 640 | 16x32 | 700 |
| 100 | | | 16x26 | 680 | 16x26 | 720 | 18x32 | 830 |
| 150 | | | 16x32 | 930 | 16x36 | 1030 | 18x35 | 1230 |
| 220 | | | 18x32 | 1050 | 18x35 | 1250 | 18x40 | 1340 |

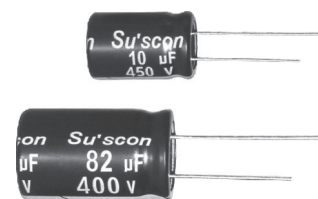
| Cap (μF) | V | 350 | | 400 | | 450 | | |
|----------|---|------|-------|------|-------|------|-------|------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 1 | | | 8x12 | 43 | 8x16 | 50 | 8x16 | 60 |
| 1.5 | | | 8x12 | 45 | 10x13 | 53 | 10x16 | 63 |
| 2.2 | | | 8x12 | 53 | 10x13 | 63 | 10x16 | 70 |
| 3.3 | | | 10x13 | 80 | 10x16 | 90 | 10x16 | 95 |
| 4.7 | | | 10x16 | 90 | 10x16 | 100 | 10x20 | 105 |
| 5.6 | | | 10x16 | 100 | 10x16 | 108 | 10x20 | 110 |
| 6.8 | | | 10x20 | 130 | 10x20 | 155 | 13x21 | 160 |
| 8.2 | | | 13x21 | 160 | 13x21 | 190 | 13x21 | 220 |
| 10 | | | 13x21 | 190 | 13x21 | 230 | 13x21 | 250 |
| 15 | | | 13x25 | 230 | 13x25 | 250 | 13x25 | 300 |
| 22 | | | 16x26 | 300 | 16x26 | 380 | 16x32 | 430 |
| 33 | | | 16x26 | 350 | 16x32 | 430 | 16x36 | 560 |
| 47 | | | 16x36 | 480 | 18x26 | 580 | 18x32 | 630 |
| 68 | | | 18x26 | 560 | 18x32 | 650 | 18x35 | 780 |
| 82 | | | 18x32 | 730 | 18x35 | 800 | 18x40 | 950 |
| 100 | | | 18x35 | 840 | 18x40 | 930 | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HB

HD series

- 105°C high-temperature resistance, high ripple current and long life.
- 10000hours load life.
- Suitable for LED and electronic rectifier.
- RoHS Compliance
- 105°C耐高温、高紋波、長壽命。
- 壽命10000小時。
- 適用於節能燈與電子整流器。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | |
|--|---|---|------|--|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | -25 ~ +105°C | | | |
| Rated Voltage Range 額定電壓範圍 | 160 ~ 400VDC | | | 450VDC | | | |
| Leakage Current 洩漏電流 | I ≤ 0.02CV + 10 (µA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | I ≤ 0.03CV + 10 (µA) (After 2 minutes application of DC rated voltage, at 20 °C) | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | |
| | Rated Voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 |
| | tan δ(Max) | 0.15 | 0.15 | 0.15 | 0.15 | 0.20 | 0.20 |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | |
| | Rated Voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 |
| | Z(-25°C)/Z(20°C) | 3 | 3 | 3 | 5 | 5 | 6 |
| | Z(-40°C)/Z(20°C) | 6 | 6 | 6 | 6 | 6 | - |
| Load Life 負荷壽命 | 10000hours, with application of rated voltage at 105°C(8φ ~ 10φ : 8000 hours) | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | 500% or less of Initial Specified Value | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | |

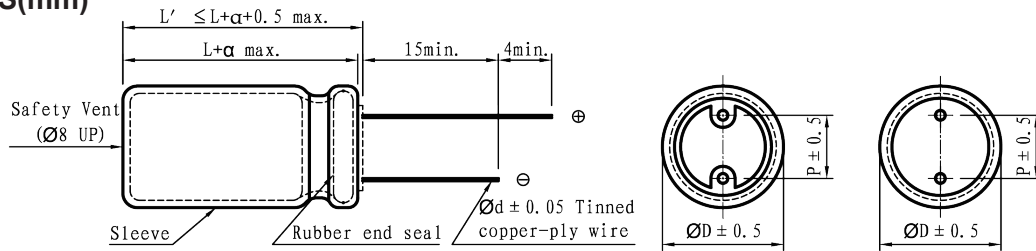
Frequency Coefficient of Permissible Ripple Current

| Frequency (Hz) | 50 | 120 | 1K | 10K | 100K |
|----------------|------|------|------|------|------|
| Coefficient | 0.45 | 0.55 | 0.75 | 0.90 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

HD series

DIMENSIONS(mm)



| | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|
| ϕD | 8 | 10 | 13 | 16 | 18 | 22 |
| P | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 | 10 |
| ϕd | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 |

| | |
|----------|------------------------------|
| α | (L < 16) 1.0 (L ≥ 16) 2.0 |
|----------|------------------------------|

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz.

| Cap (μF) | V | 160 | | 200 | | 250 | | |
|----------|---|------|-------|------|-------|------|-------|------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 2.2 | | | 8x12 | 80 | 8x12 | 90 | 8x12 | 90 |
| 3.3 | | | 8x12 | 90 | 8x12 | 102 | 10x13 | 110 |
| 4.7 | | | 8x12 | 98 | 8x16 | 110 | 10x16 | 120 |
| 5.6 | | | 8x16 | 104 | 8x16 | 118 | 10x16 | 125 |
| 6.8 | | | 8x16 | 115 | 10x13 | 128 | 10x16 | 130 |
| 8.2 | | | 10x16 | 125 | 10x16 | 220 | 10x16 | 240 |
| 10 | | | 10x16 | 255 | 10x16 | 260 | 10x20 | 290 |
| 15 | | | 10x16 | 430 | 10x20 | 430 | 13x21 | 460 |
| 22 | | | 10x20 | 510 | 13x21 | 510 | 13x21 | 610 |
| 33 | | | 13x21 | 580 | 13x21 | 610 | 13x25 | 650 |
| 47 | | | 13x25 | 670 | 13x25 | 670 | 16x26 | 730 |
| 68 | | | 16x26 | 770 | 16x26 | 770 | 16x32 | 930 |
| 100 | | | 16x26 | 900 | 16x26 | 1030 | 18x32 | 1210 |
| 150 | | | 18x32 | 1270 | 18x35 | 1330 | 22x35 | 1530 |
| 220 | | | 18x35 | 1410 | 22x35 | 1710 | | |

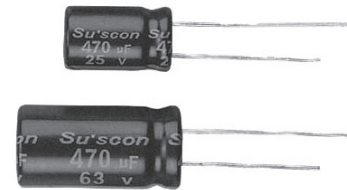
| Cap (μF) | V | 350 | | 400 | | 450 | | |
|----------|---|------|-------|------|-------|------|-------|------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 1 | | | 8x12 | 74 | 8x16 | 85 | 10x13 | 90 |
| 1.5 | | | 10x13 | 80 | 10x13 | 95 | 10x16 | 100 |
| 2.2 | | | 10x16 | 98 | 10x16 | 105 | 10x16 | 110 |
| 3.3 | | | 10x16 | 110 | 10x16 | 115 | 10x16 | 120 |
| 4.7 | | | 10x20 | 145 | 10x20 | 148 | 10x20 | 150 |
| 5.6 | | | 13x21 | 165 | 13x21 | 180 | 13x21 | 200 |
| 6.8 | | | 13x21 | 200 | 13x21 | 230 | 13x21 | 260 |
| 8.2 | | | 13x21 | 250 | 13x21 | 270 | 13x21 | 290 |
| 10 | | | 13x21 | 290 | 13x21 | 300 | 13x21 | 330 |
| 15 | | | 13x25 | 350 | 13x25 | 390 | 13x25 | 430 |
| 22 | | | 16x26 | 450 | 16x26 | 500 | 16x32 | 600 |
| 33 | | | 16x32 | 510 | 16x32 | 650 | 16x36 | 710 |
| 47 | | | 16x36 | 670 | 18x26 | 850 | 18x32 | 900 |
| 68 | | | 18x32 | 860 | 18x32 | 960 | 18x35 | 1150 |
| 82 | | | 18x32 | 1150 | 18x35 | 1300 | 18x40 | 1400 |
| 100 | | | 18x35 | 1250 | 18x40 | 1400 | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HD

SD series

- High frequency and low impedance, high ripple current resistance.
- Suitable for return-circuit of switching power source.
- RoHS Compliance.
- 高頻低阻抗、耐高紋波。
- 適用於開關電源迴路。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | | | |
|--|---|---|------|------|------|------|--------------|------|------|---------|---------|-----|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | | -25 ~ +105°C | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 400VDC | | | | | | 450VDC | | | | | |
| Leakage Current 洩漏電流 | $V \leq 100V$ $I \leq 0.01CV$ or 3 (μA) (After 2 minutes application of DC rated voltage, at 20°C) $V > 100V$ $I \leq 0.03CV + 20$ (μA) (After 5 minutes application of DC rated voltage, at 20°C) | | | | | | | | | | | |
| Dissipation Factor 散逸因素($\tan \delta$) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160~250 | 400~450 | |
| | $\tan \delta$ (Max) | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | 0.07 | 0.20 | 0.24 | |
| When nominal capacitance over 1000 μF , $\tan \delta$ shall be added 0.02 to the listed value with increase of every 1000 μF . | | | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160~250 | 400 | 450 |
| | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 5 | 6 |
| | Z(-40°C)/Z(20°C) | 8 | 6 | 4 | 3 | 3 | 3 | 3 | 3 | 6 | 10 | 12 |
| Load Life 負荷壽命 | 2000hours,with application of rated voltage at 105°C | | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | | |
| | $\tan \delta$ | 200% or less of Initial Specified Value | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | | |
| | $\tan \delta$ | 200% or less of Initial Specified Value | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | | | |

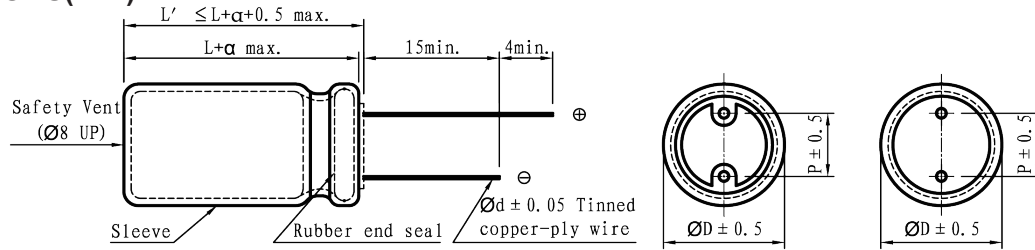
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance (μF) | Frequency (Hz) | | | | |
|-------------------|-------------------------|----------------|------|------|------|------|
| | | 50 | 120 | 1K | 10K | 100K |
| 6.3 ~ 100 | 0.47 ~ 100 | 0.45 | 0.55 | 0.75 | 0.90 | 1.00 |
| | 220 ~ 1000 | 0.60 | 0.70 | 0.85 | 0.95 | 1.00 |
| | 1500 ~ 15000 | 0.70 | 0.80 | 0.95 | 0.98 | 1.00 |
| 160 ~ 450 | 2.2 ~ 330 | 0.55 | 0.65 | 0.80 | 0.90 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

SD series

DIMENSIONS(mm)



| | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|
| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|-------------------|
| α | (L < 16) 1.0 |
| | (L \geq 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C 100KHz.

| Cap (μ F) | V Item | 6.3 | | | 10 | | | 16 | | | 25 | | |
|-------------------|-----------|--------|------|-------|--------|------|-------|--------|------|-------|--------|------|-------|
| | | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP |
| 4.7 | | | | | | | | | | | 5x11 | 50 | 1.500 |
| 10 | | | | | | | | | | | 5x11 | 80 | 1.500 |
| 22 | | | | | | | | | | | 5x11 | 110 | 0.800 |
| 47 | | | | | 5x11 | 140 | 0.650 | 5x11 | 170 | 0.650 | 5x11 | 170 | 0.650 |
| 68 | | | | | 5x11 | 160 | 0.650 | 5x11 | 210 | 0.550 | 6.3x11 | 210 | 0.550 |
| 100 | | | | | 5x11 | 180 | 0.650 | 6.3x11 | 270 | 0.300 | 6.3x11 | 270 | 0.300 |
| 220 | | 6.3x11 | 270 | 0.300 | 6.3x11 | 270 | 0.300 | 8x12 | 440 | 0.200 | 8x12 | 440 | 0.200 |
| 330 | | 6.3x11 | 320 | 0.300 | 8x12 | 440 | 0.200 | 8x12 | 440 | 0.200 | 10x13 | 650 | 0.100 |
| 470 | | 8x12 | 440 | 0.200 | 8x12 | 440 | 0.200 | 10x13 | 650 | 0.100 | 10x16 | 800 | 0.075 |
| 680 | | 8x12 | 440 | 0.200 | 10x13 | 650 | 0.100 | 10x16 | 800 | 0.075 | 10x20 | 1050 | 0.058 |
| 1000 | | 10x13 | 650 | 0.100 | 10x16 | 800 | 0.075 | 10x20 | 1050 | 0.058 | 13x21 | 1350 | 0.055 |
| 1500 | | 10x16 | 800 | 0.075 | 10x20 | 1050 | 0.058 | 13x21 | 1350 | 0.055 | 13x25 | 1650 | 0.040 |
| 2200 | | 10x25 | 1350 | 0.055 | 13x21 | 1350 | 0.055 | 13x25 | 1650 | 0.043 | 16x26 | 2050 | 0.030 |
| 3300 | | 13x21 | 1480 | 0.055 | 13x25 | 1650 | 0.043 | 16x26 | 2050 | 0.030 | 16x32 | 2550 | 0.027 |
| 4700 | | 13x25 | 1820 | 0.035 | 16x26 | 2050 | 0.030 | 16x32 | 2550 | 0.027 | 18x35 | 2950 | 0.025 |
| 6800 | | 16x26 | 2050 | 0.030 | 16x32 | 2550 | 0.027 | 18x35 | 2950 | 0.025 | 18x40 | 3300 | 0.023 |
| 10000 | | 16x32 | 2550 | 0.027 | 18x35 | 2950 | 0.025 | 18x40 | 3300 | 0.023 | | | |
| 15000 | | 16x35 | 2950 | 0.025 | 18x40 | 3300 | 0.023 | | | | | | |

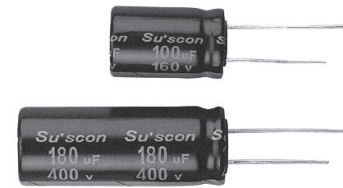
| Cap (μ F) | V Item | 35 | | | 50 | | | 63 | | | 100 | | |
|-------------------|-----------|--------|------|-------|--------|------|-------|--------|------|-------|--------|------|-------|
| | | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP |
| 0.47 | | | | | 5x11 | 25 | 7.500 | | | | 5x11 | 20 | 15.00 |
| 1 | | | | | 5x11 | 40 | 5.300 | | | | 5x11 | 30 | 15.00 |
| 2.2 | | | | | 5x11 | 55 | 4.500 | | | | 5x11 | 44 | 9.800 |
| 3.3 | | | | | 5x11 | 65 | 3.900 | | | | 5x11 | 58 | 6.600 |
| 4.7 | | 5x11 | 85 | 2.000 | 5x11 | 90 | 2.300 | 5x11 | 65 | 4.494 | 5x11 | 74 | 4.600 |
| 10 | | 5x11 | 100 | 1.200 | 5x11 | 110 | 1.400 | 5x11 | 110 | 2.252 | 6.3x11 | 130 | 1.805 |
| 22 | | 5x11 | 120 | 1.000 | 5x11 | 140 | 1.200 | 6.3x11 | 200 | 1.000 | 8x12 | 230 | 1.360 |
| 33 | | 5x11 | 210 | 0.430 | 6.3x11 | 240 | 0.480 | 6.3x11 | 250 | 0.900 | 10x13 | 320 | 0.460 |
| 47 | | 6.3x11 | 270 | 0.300 | 6.3x11 | 240 | 0.480 | 8x12 | 320 | 0.800 | 10x16 | 400 | 0.390 |
| 68 | | 8x12 | 360 | 0.300 | 8x12 | 300 | 0.300 | 10x13 | 380 | 0.760 | 10x20 | 420 | 0.288 |
| 100 | | 8x12 | 440 | 0.200 | 8x12 | 400 | 0.250 | 10x13 | 450 | 0.580 | 13x21 | 580 | 0.208 |
| 220 | | 10x13 | 650 | 0.100 | 10x16 | 600 | 0.170 | 10x20 | 780 | 0.170 | 16x26 | 880 | 0.104 |
| 330 | | 10x16 | 800 | 0.075 | 10x20 | 800 | 0.150 | 13x21 | 950 | 0.142 | 16x32 | 930 | 0.088 |
| 470 | | 10x20 | 1050 | 0.058 | 13x21 | 1050 | 0.090 | 13x25 | 1430 | 0.070 | 16x36 | 1230 | 0.072 |
| 680 | | 13x21 | 1350 | 0.055 | 13x25 | 1150 | 0.070 | 16x26 | 1780 | 0.055 | 18x35 | 1410 | 0.064 |
| 1000 | | 13x25 | 1650 | 0.043 | 16x26 | 1550 | 0.048 | 16x32 | 1900 | 0.043 | 18x40 | 1520 | 0.047 |
| 1500 | | 16x26 | 2050 | 0.030 | 16x32 | 1950 | 0.043 | 18x35 | 2150 | 0.033 | | | |
| 2200 | | 16x32 | 2550 | 0.027 | 18x35 | 2250 | 0.040 | 18x40 | 2350 | 0.032 | | | |
| 3300 | | 18x35 | 2950 | 0.025 | | | | | | | | | |
| 4700 | | 18x40 | 3300 | 0.023 | | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SD

SDA series

- On the basis of SD series ripple promotion product.
- Suitable for LCD TV Power ,SMPS.
- RoHS Compliance.
- SD系列紋波提升品。
- 適用於液晶顯示電源及開關電源等。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | |
|--|---|---|------|--------------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | -25 ~ +105°C | |
| Rated Voltage Range 額定電壓範圍 | 400VDC | | | 450 ~ 500VDC | |
| Leakage Current 洩漏電流 | $I \leq 0.03CV + 20 (\mu A)$ (After 1 minutes application of DC rated voltage, at 20 °C) | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | |
| | Rated Voltage(V) | 400 | 450 | 460 | 500 |
| | tan δ(Max) | 0.15 | 0.20 | 0.20 | 0.20 |
| When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF . | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | |
| | Rated Voltage(V) | 400 | 450 | 460 | 500 |
| | Z(-25°C)/Z(20°C) | 3 | 3 | 6 | 6 |
| | Z(-40°C)/Z(20°C) | 6 | - | - | - |
| Load Life 負荷壽命 | 2000hours,with application of rated voltage at 105°C | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement. The capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Standards 參照標準 | JIS C 5101-4-1 (IEC 60384) | | | | |

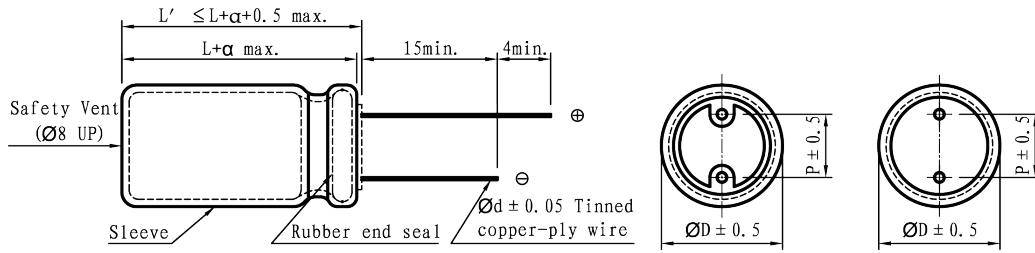
Frequency Coefficient of Permissible Ripple Current

| Capacitance (µF) | Frequency (Hz) | | | | |
|------------------|----------------|------|------|------|------|
| | 120 | 10K | 30K | 50K | 100K |
| 10 ~ 150 | 1.00 | 1.50 | 1.60 | 1.75 | 2.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use . The rms ripple current has to be reduced.

SDA series

DIMENSIONS(mm)



| | | | | | | |
|-----------------|-----|-----|-----|-----|-----|-----|
| $\varnothing D$ | 10 | 13 | 16 | 18 | 20 | 22 |
| P | 5.0 | 5.0 | 7.5 | 7.5 | 10 | 10 |
| $\varnothing d$ | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 |

| | |
|----------|-----------------------------------|
| α | (L < 16) 1.0 (L \geq 16) 2.0 |
|----------|-----------------------------------|

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 120Hz.

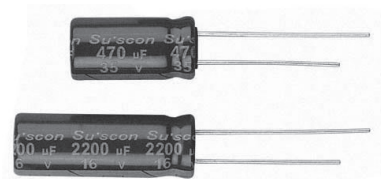
| Cap (μF) | V | 400 | | | | 450 | | | | 460 | | | | 500 | | | |
|--------------------|---|-------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|--|--|--|
| | | Item | D x L | R.C. | | D x L | R.C. | | D x L | R.C. | | D x L | R.C. | | | | |
| | | | | 120Hz | 100KHz | | 120Hz | 100KHz | | 120Hz | 100KHz | | 120Hz | 100KHz | | | |
| 10 | | 10x16 | 120 | 240 | 10x20 | 170 | 340 | 10x20 | 150 | 300 | 13x21 | 83 | 166 | | | | |
| 15 | | 10x20 | 230 | 460 | 13x21 | 230 | 460 | 13x21 | 200 | 400 | 13x21 | 110 | 220 | | | | |
| 22 | | 13x21 | 300 | 600 | 13x21 | 350 | 700 | 13x25 | 350 | 700 | 13x25 | 200 | 400 | | | | |
| 33 | | 13x21 | 380 | 760 | 13x25 | 400 | 800 | 16x25 | 480 | 960 | 16x25 | 300 | 600 | | | | |
| 47 | | 13x25 | 400 | 800 | 16x25 | 530 | 1060 | 18x26 | 530 | 1060 | 18x26 | 330 | 660 | | | | |
| 56 | | 16x25 | 550 | 1100 | 18x26 | 630 | 1260 | 18x26 | 600 | 1200 | 18x32 | 350 | 700 | | | | |
| 68 | | 16x25 | 700 | 1400 | 18x32 | 690 | 1380 | 18x32 | 690 | 1380 | 18x35 | 480 | 960 | | | | |
| 82 | | 18x26 | 780 | 1560 | 18x32 | 750 | 1500 | 18x32 | 750 | 1500 | 18x40 | 590 | 1180 | | | | |
| 100 | | 18x32 | 830 | 1660 | 18x35 | 800 | 1600 | 18x35 | 800 | 1600 | 18x45 | 680 | 1360 | | | | |
| 120 | | 18x35 | 900 | 1800 | 18x40 | 950 | 1900 | 18x40 | 950 | 1900 | 20x45 | 730 | 1460 | | | | |
| 150 | | 18x40 | 1000 | 2000 | 18x45 | 1050 | 2100 | 20x45 | 1300 | 2600 | 22x45 | 780 | 1560 | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SDA

MC series

- Low Impedance, high ripple current resistance, 2000~3000 hours load life.
- Suitable for output return circuit of switching power supply for IT products.
- RoHS Compliance.
- 低阻抗、耐高紋波，2000~3000小時壽命。
- 適於電腦之開關電源供應器的輸出迴路。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | |
|--|---|---|------|------|------|--------------|------|--------|---------|---------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz, 20°C) | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | -25 ~ +105°C | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 400VDC | | | | | 450VDC | | | | |
| Leakage Current 洩漏電流 | $V \leq 100V$ $I \leq 0.01CV$ or $3 (\mu A)$ (After 2 minutes application of DC rated voltage, at 20°C) $V > 100V$ $I \leq 0.03CV + 20 (\mu A)$ (After 5 minutes application of DC rated voltage, at 20°C) | | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63~100 | 160~350 | 400~450 |
| | tan δ (Max) | 0.15 | 0.12 | 0.10 | 0.09 | 0.08 | 0.07 | 0.06 | 0.20 | 0.25 |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63~100 | 160~350 | 400~450 |
| | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 6 |
| | Z(-40°C)/Z(20°C) | 8 | 6 | 4 | 3 | 3 | 3 | 3 | 6 | 12 |
| Load Life 負荷壽命 | 3000hours, with application of rated voltage at 105°C(ØD≤8mm , 2000hrs) | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | |

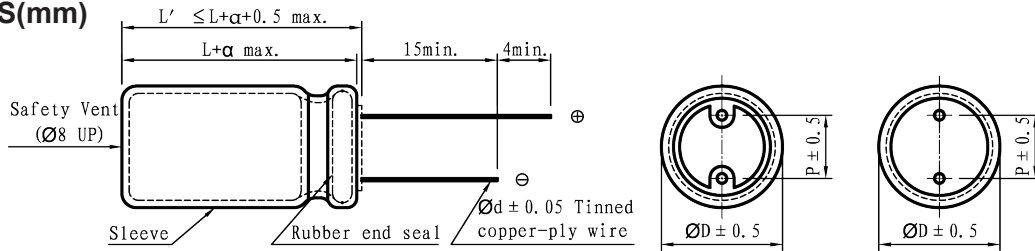
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance (µF) | Frequency (Hz) | | | | |
|-------------------|------------------|----------------|------|------|------|------|
| | | 50 | 120 | 1K | 10K | 100K |
| 6.3 ~ 100 | 0.47 ~ 100 | 0.45 | 0.55 | 0.75 | 0.90 | 1.00 |
| | 220 ~ 1000 | 0.60 | 0.70 | 0.85 | 0.95 | 1.00 |
| | 1500 ~ 15000 | 0.70 | 0.80 | 0.95 | 0.98 | 1.00 |
| 160 ~ 450 | 2.2 ~ 330 | 0.55 | 0.65 | 0.80 | 0.90 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

MC series

DIMENSIONS(mm)



| | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|
| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C 100KHz.

| Cap (μF) | V | 6.3 | | | 10 | | | 16 | | | 25 | | |
|----------|---|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 33 | | | | | | | | | | | 5x11 | 155 | 0.800 |
| 39 | | | | | | | | | | | 5x11 | 175 | 0.650 |
| 47 | | | | | | | | 5x11 | 155 | 0.800 | 6.3x11 | 210 | 0.550 |
| 56 | | | | | | | | 5x11 | 175 | 0.650 | 6.3x11 | 235 | 0.440 |
| 68 | | | | | 5x11 | 155 | 0.800 | 6.3x11 | 220 | 0.500 | 6.3x11 | 260 | 0.336 |
| 82 | | | | | 5x11 | 175 | 0.650 | 6.3x11 | 240 | 0.420 | 6.3x11 | 285 | 0.330 |
| 100 | | 5x11 | 200 | 0.620 | 6.3x11 | 200 | 0.420 | 6.3x11 | 255 | 0.370 | 8x12 | 360 | 0.220 |
| 220 | | 6.3x11 | 275 | 0.320 | 8x12 | 360 | 0.220 | 8x12 | 550 | 0.140 | 8x14 | 600 | 0.100 |
| 270 | | 6.3x11 | 320 | 0.250 | 8x12 | 420 | 0.185 | 8x16 | 650 | 0.140 | 8x20 | 750 | 0.095 |
| 330 | | 8x12 | 420 | 0.180 | 8x12 | 550 | 0.140 | 10x13 | 750 | 0.100 | 10x16 | 800 | 0.069 |
| 470 | | 10x13 | 580 | 0.140 | 10x13 | 750 | 0.100 | 10x16 | 800 | 0.085 | 10x20 | 1050 | 0.064 |
| 680 | | 10x16 | 700 | 0.100 | 10x16 | 800 | 0.085 | 10x20 | 1050 | 0.064 | 13x21 | 1370 | 0.049 |
| 1000 | | 10x16 | 950 | 0.069 | 10x20 | 1080 | 0.065 | 13x21 | 1360 | 0.039 | 13x25 | 1600 | 0.038 |
| 2200 | | 10x25 | 1450 | 0.043 | 13x25 | 1650 | 0.038 | 13x30 | 2050 | 0.028 | 13x40 | 2300 | 0.024 |
| 3300 | | 13x25 | 1750 | 0.035 | 13x35 | 2100 | 0.028 | 13x40 | 2360 | 0.024 | 16x36 | 2600 | 0.019 |
| 3900 | | 13x30 | 1910 | 0.034 | 13x40 | 2360 | 0.024 | 16x32 | 2470 | 0.022 | 16x40 | 2820 | 0.019 |
| 4700 | | 13x35 | 2050 | 0.028 | 16x32 | 2370 | 0.024 | 16x36 | 2600 | 0.019 | 18x40 | 2900 | 0.019 |
| 6800 | | 16x32 | 2300 | 0.024 | 16x36 | 2600 | 0.019 | 18x35 | 2850 | 0.019 | | | |
| 8200 | | 16x36 | 2420 | 0.021 | 18x35 | 2800 | 0.019 | 18x40 | 3040 | 0.017 | | | |
| 10000 | | 18x32 | 2550 | 0.019 | 18x40 | 3000 | 0.018 | | | | | | |
| 15000 | | 18x40 | 2900 | 0.019 | | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

MC series

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C 100KHz.

| Cap (μF) | V | 35 | | | 50 | | | 63 | | | 100 | | |
|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 47 | | | | | 8x12 | 320 | 0.350 | 8x12 | 450 | 0.300 | 10x25 | 550 | 0.350 |
| 68 | | 8x12 | 360 | 0.220 | 8x12 | 450 | 0.250 | 8x16 | 550 | 0.220 | 13x21 | 650 | 0.240 |
| 100 | | 8x12 | 450 | 0.140 | 10x16 | 550 | 0.200 | 10x20 | 700 | 0.170 | 13x25 | 800 | 0.180 |
| 220 | | 10x16 | 810 | 0.069 | 10x20 | 1100 | 0.100 | 13x21 | 1300 | 0.150 | 16x32 | 1400 | 0.071 |
| 330 | | 10x20 | 1100 | 0.044 | 13x21 | 1300 | 0.095 | 13x25 | 1400 | 0.070 | 18x40 | 1650 | 0.049 |
| 470 | | 13x21 | 1370 | 0.039 | 13x25 | 1450 | 0.070 | 13x35 | 1650 | 0.047 | | | |
| 680 | | 13x25 | 1600 | 0.038 | 13x35 | 1800 | 0.040 | 16x32 | 2000 | 0.037 | | | |
| 1000 | | 13x30 | 1930 | 0.029 | 16x32 | 2100 | 0.034 | 18x35 | 2200 | 0.034 | | | |
| 2200 | | 16x36 | 2500 | 0.019 | 18x40 | 2600 | 0.025 | | | | | | |
| 3300 | | 18x40 | 3000 | 0.019 | | | | | | | | | |

| Cap (μF) | V | 160 | | | 200 | | | 250 | | |
|----------|---|-------|-------|------|-------|-------|------|-------|-------|------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 2.2 | | | | | | | | 8x12 | 85 | 13.0 |
| 3.3 | | 8x12 | 85 | 11.0 | 8x12 | 90 | 11.0 | 8x12 | 97 | 11.0 |
| 4.7 | | 8x12 | 90 | 6.50 | 8x12 | 100 | 6.10 | 10x13 | 112 | 4.30 |
| 10 | | 10x13 | 144 | 4.30 | 10x13 | 168 | 3.80 | 10x16 | 240 | 3.50 |
| 22 | | 10x16 | 200 | 3.00 | 10x20 | 372 | 2.70 | 13x21 | 388 | 2.80 |
| 33 | | 10x20 | 450 | 2.50 | 10x25 | 480 | 2.30 | 13x21 | 495 | 2.20 |
| 47 | | 13x21 | 580 | 2.00 | 13x21 | 584 | 2.00 | 13x25 | 650 | 1.80 |
| 68 | | 13x21 | 680 | 1.05 | 13x25 | 788 | 0.98 | 16x26 | 810 | 0.90 |
| 100 | | 16x26 | 1028 | 0.90 | 16x26 | 1030 | 0.90 | 16x32 | 1124 | 0.85 |
| 220 | | 16x36 | 1160 | 0.80 | 18x32 | 1208 | 0.75 | 18x40 | 1200 | 0.70 |
| 330 | | 18x35 | 1480 | 0.70 | | | | | | |

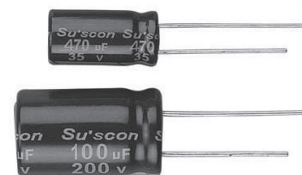
| Cap (μF) | V | 400 | | | 450 | | |
|----------|---|-------|-------|------|-------|-------|------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. |
| 2.2 | | 8x12 | 65 | 7.60 | 10x13 | 75 | 9.50 |
| 3.3 | | 10x13 | 88 | 5.20 | 10x16 | 100 | 7.90 |
| 4.7 | | 10x16 | 128 | 3.85 | 10x20 | 115 | 6.20 |
| 10 | | 10x20 | 156 | 3.10 | 13x21 | 224 | 3.70 |
| 22 | | 13x25 | 280 | 2.10 | 16x26 | 460 | 1.00 |
| 33 | | 13x25 | 460 | 1.78 | 16x26 | 488 | 0.95 |
| 47 | | 16x26 | 580 | 1.36 | 16x32 | 680 | 0.85 |
| 68 | | 16x32 | 960 | 0.96 | 18x32 | 750 | 0.71 |
| 100 | | 18x35 | 1000 | 0.78 | 18x40 | 880 | 0.43 |

※ 13mm may be replaced by 12.5mm upon customer's request.

MC

MF series

- Low impedance, high reliability, 2000~5000 hours load life.
- Suitable for switching regulator of computer, etc.
- RoHS Compliance
- 低阻抗、高信賴性、2000~5000小時壽命。
- 適用於電腦類開關調節器。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | | | |
|--|---|---|------|------|------|------|--------------|--------|---------|---------|------|---------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | | -25 ~ +105°C | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 400VDC | | | | | | 450VDC | | | | | |
| Leakage Current 洩漏電流 | $V \leq 100V I \leq 0.01CV$ or $3 (\mu A)$ (After 2 minutes application of DC rated voltage, at 20°C) $V > 100V I \leq 0.03CV + 20 (\mu A)$ (After 5 minutes application of DC rated voltage, at 20°C) | | | | | | | | | | | |
| Dissipation Factor 散逸因素($\tan \delta$) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160~250 | 350 | 400~450 |
| | $\tan \delta$ (Max) | 0.20 | 0.17 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | 0.08 | 0.15 | 0.20 | 0.25 |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63~100 | 160~250 | 350~400 | 450 | |
| | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 6 | 15 | |
| | Z(-40°C)/Z(20°C) | 8 | 6 | 4 | 3 | 3 | 3 | 3 | 4 | 10 | - | |
| Load Life 負荷壽命 | 5000hours,with application of rated voltage at 105°C ($\phi D \leq 6.3mm, 2,000 \text{ hrs}$; $\phi D = 8mm, 3,000 \text{ hrs}$) | | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | | |
| | $\tan \delta$ | 200% or less of Initial Specified Value | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | | |
| | $\tan \delta$ | 150% or less of Initial Specified Value | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | | | |

MF

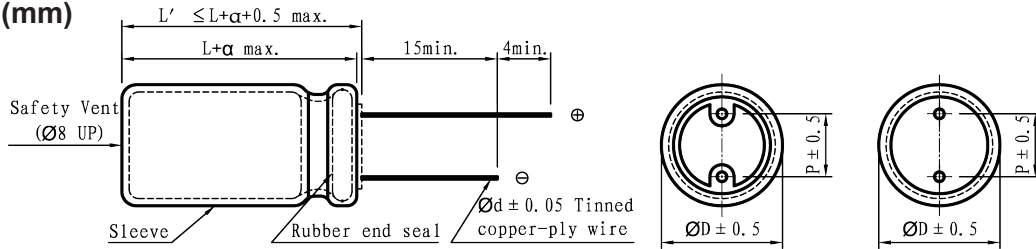
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance (µF) | Frequency (Hz) | | | | |
|-------------------|------------------|----------------|------|------|------|------|
| | | 50 | 120 | 1K | 10K | 100K |
| 6.3 ~ 100 | 10 ~ 150 | 0.60 | 0.70 | 0.85 | 0.95 | 1.00 |
| | 220 ~ 1800 | 0.65 | 0.75 | 0.90 | 0.98 | 1.00 |
| | 2200 ~ 15000 | 0.75 | 0.80 | 1.00 | 1.00 | 1.00 |
| 160 ~ 450 | 1 ~ 330 | 0.55 | 0.65 | 0.80 | 0.90 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

MF series

DIMENSIONS(mm)



| | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|
| φ D | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 |
| φ d | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C 100KHz.

| Cap (μF) | V | 6.3 | | | 10 | | | 16 | | | 25 | | |
|----------|---|--------|-------|-------|--------|-------|-------|-------|-------|-------|--------|-------|-------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 33 | | | | | | | | | | | 5x11 | 145 | 0.920 |
| 47 | | | | | | | | 5x11 | 180 | 0.650 | 6.3x11 | 210 | 0.600 |
| 100 | | 5x11 | 140 | 0.920 | 5x11 | 180 | 0.650 | 5x11 | 230 | 0.550 | 6.3x11 | 370 | 0.350 |
| 220 | | 6.3x11 | 275 | 0.300 | 6.3x11 | 340 | 0.300 | 8x12 | 580 | 0.280 | 8x12 | 640 | 0.230 |
| 330 | | 6.3x11 | 320 | 0.300 | 8x12 | 580 | 0.280 | 8x12 | 640 | 0.230 | 10x13 | 865 | 0.080 |
| 470 | | 8x12 | 580 | 0.280 | 8x12 | 640 | 0.230 | 8x16 | 840 | 0.150 | 10x16 | 1210 | 0.060 |
| 560 | | 8x12 | 640 | 0.230 | 10x13 | 780 | 0.160 | 10x13 | 880 | 0.100 | 10x16 | 1320 | 0.055 |
| 680 | | 8x12 | 720 | 0.140 | 10x13 | 820 | 0.110 | 10x16 | 1000 | 0.085 | 10x20 | 1380 | 0.052 |
| 820 | | 8x16 | 840 | 0.087 | 8x16 | 865 | 0.080 | 10x16 | 1040 | 0.076 | 10x20 | 1400 | 0.046 |
| 1000 | | 10x13 | 865 | 0.080 | 10x16 | 1040 | 0.076 | 10x20 | 1210 | 0.060 | 13x21 | 1900 | 0.035 |
| 1200 | | 10x16 | 960 | 0.064 | 10x16 | 1210 | 0.060 | 10x25 | 1580 | 0.042 | 13x25 | 2058 | 0.032 |
| 1500 | | 10x16 | 1210 | 0.060 | 10x20 | 1400 | 0.058 | 13x21 | 1870 | 0.035 | 13x25 | 2124 | 0.030 |
| 1800 | | 10x20 | 1400 | 0.058 | 13x21 | 1580 | 0.042 | 13x21 | 1900 | 0.032 | 13x30 | 2340 | 0.028 |
| 2200 | | 10x25 | 1450 | 0.046 | 13x21 | 1900 | 0.032 | 13x25 | 2124 | 0.030 | 13x35 | 2450 | 0.026 |
| 2700 | | 13x21 | 1580 | 0.042 | 13x25 | 2124 | 0.030 | 13x30 | 2340 | 0.028 | 13x35 | 2743 | 0.024 |
| 3300 | | 13x21 | 1870 | 0.035 | 13x30 | 2340 | 0.028 | 13x35 | 2450 | 0.026 | 16x32 | 3029 | 0.022 |
| 3900 | | 13x21 | 1900 | 0.032 | 13x35 | 2450 | 0.026 | 16x26 | 2500 | 0.028 | 16x36 | 3124 | 0.020 |
| 4700 | | 13x25 | 2124 | 0.030 | 16x26 | 2500 | 0.028 | 16x32 | 3029 | 0.022 | 18x35 | 3638 | 0.019 |
| 5600 | | 13x30 | 2524 | 0.026 | 16x26 | 2552 | 0.026 | 16x36 | 3124 | 0.020 | 18x40 | 3781 | 0.016 |
| 6800 | | 16x26 | 2760 | 0.028 | 16x32 | 3029 | 0.022 | 16x40 | 3586 | 0.019 | | | |
| 8200 | | 16x32 | 3029 | 0.022 | 16x32 | 3600 | 0.020 | 18x35 | 3750 | 0.018 | | | |
| 10000 | | 16x36 | 3124 | 0.020 | 18x35 | 3638 | 0.019 | | | | | | |
| 12000 | | 18x32 | 3600 | 0.020 | | | | | | | | | |
| 15000 | | 18x35 | 3781 | 0.018 | | | | | | | | | |

| Cap (μF) | V | 35 | | | 50 | | | 63 | | | 100 | | |
|----------|---|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 10 | | | | | 5x11 | 120 | 1.400 | 5x11 | 125 | 1.650 | 6.3x11 | 130 | 1.250 |
| 22 | | 5x11 | 150 | 0.920 | 5x11 | 160 | 1.200 | 6.3x11 | 240 | 0.780 | 8x12 | 230 | 0.850 |
| 33 | | 5x11 | 220 | 0.430 | 6.3x11 | 230 | 0.300 | 8x12 | 270 | 0.650 | 10x13 | 330 | 0.690 |
| 47 | | 6.3x11 | 280 | 0.300 | 6.3x11 | 295 | 0.300 | 8x12 | 300 | 0.504 | 10x13 | 370 | 0.450 |
| 100 | | 8x12 | 450 | 0.200 | 10x13 | 760 | 0.120 | 10x16 | 610 | 0.160 | 10x25 | 560 | 0.300 |
| 220 | | 10x13 | 760 | 0.100 | 10x16 | 1150 | 0.078 | 10x20 | 1100 | 0.120 | 13x25 | 880 | 0.280 |
| 330 | | 10x16 | 1210 | 0.060 | 13x21 | 1660 | 0.055 | 13x21 | 1280 | 0.100 | 16x26 | 1440 | 0.130 |
| 470 | | 10x20 | 1400 | 0.058 | 13x25 | 1950 | 0.046 | 13x25 | 1710 | 0.082 | 18x32 | 1690 | 0.110 |
| 560 | | 13x21 | 1660 | 0.055 | 13x25 | 2124 | 0.034 | 16x26 | 1820 | 0.058 | 18x35 | 2020 | 0.043 |
| 680 | | 13x21 | 1900 | 0.035 | 13x30 | 2310 | 0.030 | 16x26 | 1850 | 0.055 | 18x35 | 2100 | 0.043 |
| 820 | | 13x25 | 2124 | 0.030 | 13x35 | 2510 | 0.025 | 16x32 | 2250 | 0.043 | | | |
| 1000 | | 13x25 | 2340 | 0.028 | 13x35 | 2920 | 0.022 | 16x36 | 2450 | 0.036 | | | |
| 1200 | | 13x30 | 2524 | 0.026 | 16x32 | 3010 | 0.022 | 18x32 | 2580 | 0.031 | | | |
| 1500 | | 16x26 | 2600 | 0.026 | 16x36 | 3150 | 0.020 | | | | | | |
| 1800 | | 16x26 | 2850 | 0.025 | 18x32 | 3635 | 0.020 | | | | | | |
| 2200 | | 16x32 | 3029 | 0.022 | 18x35 | 3680 | 0.017 | | | | | | |
| 2700 | | 18x32 | 3600 | 0.020 | | | | | | | | | |
| 3300 | | 18x40 | 3781 | 0.015 | | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

MF series

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP(Ω max)at 20°C 100KHz

| Cap (μF) | V | 160 | | 200 | | 250 | |
|----------|---|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L |
| 4.7 | | | | | | 8x12 | 150 |
| 10 | | 10x16 | 330 | 10x16 | 330 | 10x16 | 330 |
| 22 | | 10x20 | 510 | 10x20 | 510 | 10x20 | 510 |
| 33 | | 10x20 | 650 | 10x20 | 650 | 13x21 | 800 |
| 47 | | 10x20 | 750 | 13x21 | 980 | 13x21 | 980 |
| 100 | | 13x25 | 1420 | 16x25 | 1580 | 16x32 | 1750 |
| 150 | | 16x25 | 1900 | 16x25 | 1900 | 18x32 | 2050 |
| 330 | | 18x25 | 2100 | 18x32 | 2300 | | |

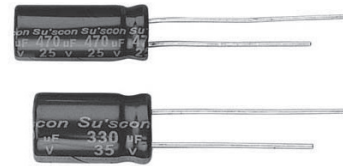
| Cap (μF) | V | 350 | | 400 | | 450 | |
|----------|---|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L |
| 2.2 | | | | 10x13 | 150 | | |
| 3.3 | | | | 10x13 | 160 | | |
| 4.7 | | 10x13 | 140 | 10x16 | 230 | 10x20 | 210 |
| 10 | | 10x20 | 350 | 10x20 | 350 | 13x21 | 450 |
| 22 | | 13x21 | 640 | 13x21 | 640 | 16x22 | 750 |
| 33 | | 16x22 | 850 | 16x22 | 850 | 16x25 | 950 |
| 47 | | 16x25 | 1030 | 16x25 | 1030 | 18x25 | 1050 |
| 100 | | 16x32 | 1180 | 18x32 | 1180 | 18x35 | 1230 |

※ 13mm may be replaced by 12.5mm upon customer's request.



HF series

- Ultra Low impedance at High frequency range.
- High ripple current, 105°C 4000~8000hours long life.
- RoHS Compliance
- 高頻低阻抗。
- 高紋波電流、105°C 4000~8000小時長壽命產品。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | |
|---|---|---|------|------|------|------|------|------|------|--|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 100VDC | | | | | | | | | |
| Leakage Current 洩漏電流 | $I \leq 0.01CV$ or 3 (µA) which is greater.(After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency:120Hz. Temperature: 20°C | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | |
| | tan δ(Max) | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 | |
| When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF. | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | |
| | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | |
| | Z(-40°C)/Z(20°C) | 8 | 6 | 4 | 3 | 3 | 3 | 3 | 3 | |
| Load Life 負荷壽命 | Time | ϕ | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 | |
| | | hours | 4000 | 4000 | 5000 | 6000 | 7000 | 8000 | 8000 | |
| | Capacitance Change | within ±20% of Initial Value | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | |
| | Capacitance Change | within ±20% of Initial Value | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | |

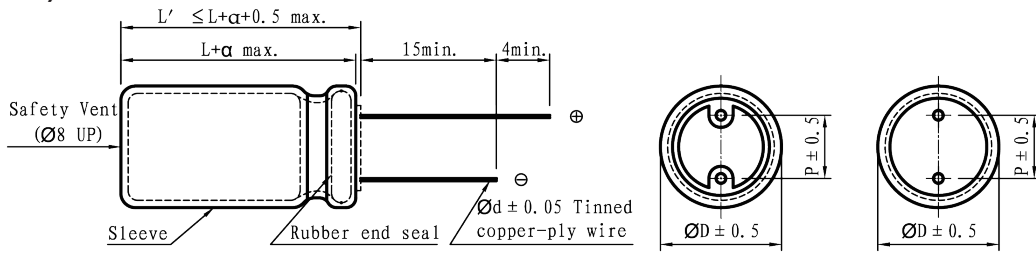
Frequency Coefficient of Permissible Ripple Current

| Capacitance (µF) | Frequency (Hz) | | | |
|------------------|----------------|------|------|------|
| | 120 | 1K | 10K | 100K |
| 5.6 ~ 180 | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 ~ 560 | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 ~ 1800 | 0.60 | 0.87 | 0.95 | 1.00 |
| 2200 ~ 3900 | 0.75 | 0.90 | 0.95 | 1.00 |
| 4700 ~ 18000 | 0.85 | 0.95 | 0.98 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

HF series

DIMENSIONS(mm)



| | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|
| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C, -10°C 100KHz.

| Cap (μ F) | V | 6.3 | | | | 10 | | | | 16 | | | | 25 | | | | |
|-------------------|---|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|------|
| | | Item | D x L | IMP | | R.C. | D x L | IMP | | R.C. | D x L | IMP | | R.C. | D x L | IMP | | R.C. |
| | | | | 20°C | -10°C | | | 20°C | -10°C | | | 20°C | -10°C | | | 20°C | -10°C | |
| 47 | | | | | | | | | | 5x11 | 0.500 | 1.000 | 170 | 5x11 | 0.490 | 1.000 | 175 | |
| 100 | | | | | | 5x11 | 0.500 | 1.000 | 170 | 6.3x11 | 0.250 | 0.500 | 295 | 6.3x11 | 0.250 | 0.500 | 295 | |
| 150 | | 5x11 | 0.500 | 1.000 | 170 | | | | | 6.3x15 | 0.170 | 0.360 | 410 | 6.3x15 | 0.180 | 0.350 | 420 | |
| 220 | | | | | | 6.3x11 | 0.240 | 0.500 | 295 | 6.3x15 | 0.120 | 0.230 | 660 | 8x12 | 0.120 | 0.240 | 650 | |
| 330 | | 6.3x11 | 0.240 | 0.500 | 295 | 6.3x15 | 0.180 | 0.350 | 400 | 8x12 | 0.120 | 0.230 | 660 | 8x16 | 0.090 | 0.180 | 750 | |
| 390 | | | | | | | | | | | | | | 10x13 | 0.090 | 0.180 | 770 | |
| 470 | | 6.3x15 | 0.180 | 0.360 | 400 | 8x12 | 0.120 | 0.230 | 650 | 8x20 | 0.080 | 0.160 | 830 | 8x20 | 0.079 | 0.150 | 820 | |
| 560 | | | | | | | | | | 8x16 | 0.089 | 0.180 | 740 | 10x16 | 0.067 | 0.136 | 1060 | |
| 680 | | 8x12 | 0.120 | 0.240 | 655 | 10x13 | 0.090 | 0.180 | 770 | 10x16 | 0.067 | 0.136 | 1070 | 10x16 | 0.067 | 0.136 | 1060 | |
| 820 | | 10x13 | 0.091 | 0.180 | 860 | 8x12 | 0.120 | 0.230 | 650 | 8x16 | 0.089 | 0.180 | 740 | 10x16 | 0.067 | 0.136 | 1060 | |
| 1000 | | 8x16 | 0.091 | 0.190 | 830 | 10x13 | 0.090 | 0.180 | 770 | 10x16 | 0.067 | 0.136 | 1070 | 10x20 | 0.052 | 0.103 | 1270 | |
| 1200 | | 8x20 | 0.082 | 0.170 | 1060 | 10x16 | 0.067 | 0.136 | 1250 | 10x20 | 0.052 | 0.103 | 1270 | 10x20 | 0.052 | 0.103 | 1270 | |
| 1500 | | 10x16 | 0.067 | 0.136 | 1250 | 10x20 | 0.052 | 0.103 | 1420 | 10x25 | 0.045 | 0.090 | 1450 | 10x25 | 0.045 | 0.090 | 1450 | |
| 1800 | | 10x20 | 0.051 | 0.103 | 1420 | 10x25 | 0.044 | 0.090 | 1640 | 10x30 | 0.036 | 0.074 | 1700 | 13x25 | 0.030 | 0.060 | 1960 | |
| 2200 | | 10x25 | 0.044 | 0.090 | 1640 | 13x21 | 0.038 | 0.077 | 1650 | 13x21 | 0.038 | 0.077 | 1650 | 13x21 | 0.038 | 0.077 | 1650 | |
| 2700 | | 10x30 | 0.038 | 0.075 | 1930 | 13x25 | 0.030 | 0.060 | 1960 | 13x30 | 0.024 | 0.050 | 2330 | 13x30 | 0.024 | 0.050 | 2330 | |
| 3300 | | 13x21 | 0.037 | 0.075 | 1650 | 13x25 | 0.030 | 0.060 | 1960 | 16x22 | 0.028 | 0.058 | 2220 | 16x22 | 0.028 | 0.058 | 2220 | |
| 3900 | | 13x25 | 0.030 | 0.060 | 1960 | 13x30 | 0.024 | 0.050 | 2320 | 13x35 | 0.022 | 0.043 | 2520 | 13x35 | 0.022 | 0.043 | 2520 | |
| 4700 | | 13x30 | 0.024 | 0.050 | 2320 | 16x22 | 0.028 | 0.058 | 2230 | 16x26 | 0.022 | 0.043 | 2570 | 16x26 | 0.022 | 0.043 | 2570 | |
| 5600 | | 13x35 | 0.021 | 0.043 | 2520 | 18x20 | 0.027 | 0.056 | 2490 | 18x20 | 0.028 | 0.055 | 2490 | 18x20 | 0.028 | 0.055 | 2490 | |
| 6300 | | 16x22 | 0.028 | 0.057 | 2230 | 16x32 | 0.018 | 0.038 | 3020 | 16x32 | 0.018 | 0.038 | 3020 | 16x32 | 0.018 | 0.038 | 3020 | |
| 6800 | | 13x40 | 0.017 | 0.034 | 2880 | 16x36 | 0.017 | 0.034 | 3160 | 16x36 | 0.017 | 0.034 | 3160 | 16x36 | 0.017 | 0.034 | 3160 | |
| 8200 | | 16x26 | 0.022 | 0.043 | 2570 | 18x20 | 0.027 | 0.056 | 2490 | 18x20 | 0.028 | 0.055 | 2490 | 18x20 | 0.028 | 0.055 | 2490 | |
| 10000 | | 18x20 | 0.027 | 0.055 | 2490 | 18x25 | 0.020 | 0.040 | 2750 | 18x25 | 0.020 | 0.040 | 2750 | 18x25 | 0.020 | 0.040 | 2750 | |
| 12000 | | 16x32 | 0.019 | 0.038 | 3020 | 16x36 | 0.017 | 0.034 | 3150 | 16x36 | 0.017 | 0.034 | 3150 | 16x36 | 0.017 | 0.034 | 3150 | |
| 15000 | | 18x32 | 0.017 | 0.035 | 3350 | 18x32 | 0.017 | 0.035 | 3350 | 18x32 | 0.017 | 0.035 | 3350 | 18x32 | 0.017 | 0.035 | 3350 | |
| 18000 | | 16x40 | 0.015 | 0.030 | 3720 | 18x35 | 0.016 | 0.031 | 3670 | 18x35 | 0.016 | 0.031 | 3670 | 18x35 | 0.016 | 0.031 | 3670 | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HF

HF series

STANDARD RATINGS

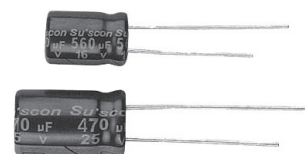
D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C,-10°C 100KHz.

| Cap (μF) | V | 35 | | | 50 | | | 63 | | | 100 | | | | | | |
|----------|--------|-------|-------|------|--------|-------|-------|-------|--------|--------|-------|-------|--------|-------|-------|-------|-----|
| | | Item | D x L | IMP | | R.C. | D x L | IMP | | R.C. | D x L | IMP | | R.C. | | | |
| | | | | 20°C | -10°C | | | 20°C | -10°C | | | 20°C | -10°C | | 20°C | -10°C | |
| 5.6 | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | 5x11 | 1.800 | 4.000 | 145 | 6.3x11 | 2.000 | 5.200 | 90 | |
| 18 | | | | | | | | | | | | | 6.3x15 | 0.620 | 1.800 | 200 | |
| 22 | | | | | | 5x11 | 0.900 | 1.800 | 165 | 6.3x11 | 1.000 | 2.000 | 250 | 8x12 | 0.540 | 1.600 | 250 |
| 27 | | | | | | | | | | | | | | 10x13 | 0.480 | 1.400 | 350 |
| 33 | 5x11 | 0.490 | 1.000 | 185 | | | | | | | | | | 8x16 | 0.74 | 2.000 | 320 |
| | | | | | | | | | | | | | | 10x16 | 0.62 | 1.650 | 460 |
| 39 | | | | | | | | | 6.3x15 | 0.600 | 1.400 | 340 | 8x20 | 0.280 | 0.750 | 450 | |
| 47 | | | | | 6.3x11 | 0.440 | 0.900 | 270 | | | | | | | | | |
| 56 | 6.3x11 | 0.250 | 0.500 | 300 | | | | | | | | | 10x20 | 0.270 | 0.710 | 580 | |
| 68 | | | | | 6.3x15 | 0.310 | 0.620 | 370 | 8x12 | 0.340 | 0.740 | 410 | 10x25 | 0.200 | 0.530 | 760 | |
| 100 | 6.3x15 | 0.170 | 0.360 | 410 | 8x12 | 0.210 | 0.430 | 490 | 8x16 | 0.260 | 0.650 | 540 | 10x30 | 0.160 | 0.430 | 910 | |
| | | | | | | | | | 10x13 | 0.254 | 0.510 | 550 | 13x21 | 0.160 | 0.430 | 840 | |
| 120 | | | | | 8x16 | 0.160 | 0.320 | 640 | | | | | | | | | |
| | | | | | 10x13 | 0.150 | 0.320 | 630 | 10x16 | 0.190 | 0.380 | 620 | 13x25 | 0.120 | 0.320 | 1010 | |
| 150 | 8x12 | 0.120 | 0.230 | 625 | | | | | 8x20 | 0.210 | 0.510 | 690 | 13x21 | 0.250 | 0.650 | 950 | |
| 180 | | | | | 8x20 | 0.120 | 0.240 | 740 | | | | | 13x30 | 0.130 | 0.360 | 1220 | |
| | | | | | 10x16 | 0.130 | 0.250 | 860 | 10x20 | 0.144 | 0.290 | 890 | 16x22 | 0.120 | 0.320 | 1200 | |
| 220 | 8x16 | 0.090 | 0.180 | 740 | | | | | | | | | 13x35 | 0.088 | 0.250 | 1420 | |
| | 10x13 | 0.090 | 0.170 | 770 | 10x20 | 0.087 | 0.180 | 1060 | 10x25 | 0.130 | 0.260 | 1060 | 16x26 | 0.082 | 0.230 | 1400 | |
| 270 | 8x20 | 0.079 | 0.160 | 820 | | | | | | | | | 13x40 | 0.060 | 0.180 | 1600 | |
| | | | | | | | | | | | | | 18x20 | 0.085 | 0.240 | 1400 | |
| 330 | 10x16 | 0.067 | 0.136 | 1060 | 10x25 | 0.073 | 0.150 | 1260 | 10x30 | 0.090 | 0.180 | 1310 | 16x32 | 0.059 | 0.180 | 1740 | |
| | | | | | | | | | 13x21 | 0.084 | 0.170 | 1290 | 18x25 | 0.070 | 0.200 | 1610 | |
| 390 | | | | | 10x30 | 0.054 | 0.110 | 1520 | | | | | 16x36 | 0.053 | 0.150 | 1950 | |
| | | | | | 13x21 | 0.058 | 0.120 | 1490 | 13x25 | 0.070 | 0.140 | 1730 | 18x32 | 0.059 | 0.170 | 1820 | |
| 470 | 10x20 | 0.052 | 0.103 | 1230 | | | | | 13x30 | 0.054 | 0.110 | 2100 | | | | | |
| | | | | | | | | | 16x22 | 0.058 | 0.120 | 1780 | 16x40 | 0.056 | 0.160 | 2100 | |
| 560 | 10x25 | 0.044 | 0.090 | 1450 | 13x25 | 0.044 | 0.087 | 1850 | | | | | 18x35 | 0.053 | 0.150 | 2150 | |
| 680 | 10x30 | 0.037 | 0.073 | 1700 | 13x30 | 0.038 | 0.078 | 2230 | 13x35 | 0.046 | 0.093 | 2280 | | | | | |
| | | | | | | | | | 16x26 | 0.050 | 0.100 | 2170 | 18x40 | 0.042 | 0.120 | 2300 | |
| | 13x21 | 0.038 | 0.076 | 1670 | 16x22 | 0.047 | 0.095 | 1850 | 18x20 | 0.054 | 0.110 | 2300 | | | | | |
| 820 | | | | | 13x35 | 0.033 | 0.065 | 2300 | 13x40 | 0.042 | 0.084 | 2570 | | | | | |
| | | | | | 18x20 | 0.042 | 0.083 | 1990 | 16x32 | 0.042 | 0.085 | 2680 | | | | | |
| | | | | | | | | | 18x25 | 0.042 | 0.085 | 2690 | | | | | |
| 1000 | 13x25 | 0.030 | 0.060 | 1960 | 13x40 | 0.029 | 0.058 | 2510 | 16x36 | 0.035 | 0.071 | 2780 | | | | | |
| | | | | | 16x26 | 0.034 | 0.068 | 2250 | | | | | | | | | |
| 1200 | 13x30 | 0.024 | 0.050 | 2320 | 16x32 | 0.027 | 0.055 | 2710 | 16x36 | 0.030 | 0.060 | 2860 | | | | | |
| | 16x22 | 0.028 | 0.057 | 2220 | 18x25 | 0.028 | 0.057 | 2610 | 18x32 | 0.032 | 0.064 | 2960 | | | | | |
| 1500 | 13x35 | 0.022 | 0.043 | 2520 | 16x36 | 0.025 | 0.050 | 2810 | 18x35 | 0.030 | 0.060 | 3120 | | | | | |
| 1800 | 13x40 | 0.016 | 0.034 | 2880 | 16x40 | 0.020 | 0.042 | 3210 | | | | | | | | | |
| | 16x26 | 0.022 | 0.044 | 2570 | | | | | 18x40 | 0.025 | 0.050 | 3220 | | | | | |
| | 18x20 | 0.027 | 0.055 | 2510 | 18x32 | 0.025 | 0.050 | 3010 | | | | | | | | | |
| 2200 | 16x32 | 0.018 | 0.038 | 3020 | | | | | | | | | | | | | |
| | 18x25 | 0.020 | 0.040 | 2750 | 18x35 | 0.022 | 0.045 | 3110 | | | | | | | | | |
| 2700 | 16x36 | 0.017 | 0.033 | 3160 | | | | | | | | | | | | | |
| | 18x32 | 0.018 | 0.036 | 3340 | 18x40 | 0.020 | 0.040 | 3410 | | | | | | | | | |
| 3300 | 16x40 | 0.015 | 0.030 | 3720 | | | | | | | | | | | | | |
| | 18x35 | 0.016 | 0.031 | 3690 | | | | | | | | | | | | | |
| 3900 | 18x40 | 0.015 | 0.030 | 3810 | | | | | | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SG series

- High ripple current, ultra low impedance at high frequency range.
- Long life.
- RoHS Compliance
- 高紋波電流、高頻超低阻抗。
- 長壽命產品。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | |
|--|---|---|------|------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 50VDC | | | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3 (µA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 |
| | tan δ(Max) | 0.15 | 0.12 | 0.10 | 0.09 | 0.08 | 0.07 |
| | When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF. | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 |
| | Z(-25°C)/Z(20°C) | 2 | 2 | 2 | 2 | 2 | 2 |
| | Z(-40°C)/Z(20°C) | 3 | 3 | 3 | 3 | 3 | 3 |
| Load Life 負荷壽命 | 5000hours,with application of rated voltage at 105°C (φ D ≤ 6.3mm, 2,000 hrs ; φ D = 8mm, 3,000 hrs ; φ D = 10mm, 4,000 hrs) | | | | | | |
| | Capacitance Change | Within ± 25% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | |

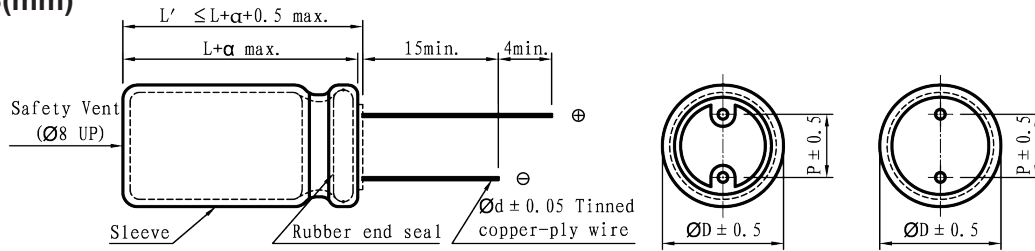
Frequency Coefficient of Permissible Ripple Current

| Capacitance (µF) | Frequency (Hz) | | | | |
|------------------|----------------|------|------|------|------|
| | 50 | 120 | 1K | 10K | 100K |
| ≤ 33 | 0.45 | 0.55 | 0.75 | 0.90 | 1.00 |
| 47 ~ 330 | 0.60 | 0.70 | 0.85 | 0.95 | 1.00 |
| 470 ~ 1000 | 0.65 | 0.75 | 0.90 | 0.98 | 1.00 |
| 1200 ~ 6800 | 0.75 | 0.80 | 0.95 | 1.00 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

SG series

DIMENSIONS(mm)



| | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|
| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C 100KHz.

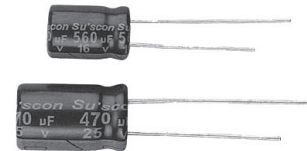
| Cap (μF) | V | 6.3 | | | 10 | | | 16 | | |
|----------|---|--------|-------|-------|--------|-------|-------|--------|-------|-------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 56 | | | | | | | | 5x11 | 250 | 0.300 |
| 100 | | | | | 5x11 | 250 | 0.300 | | | |
| 120 | | | | | | | | 6.3x11 | 405 | 0.130 |
| 150 | | 5x11 | 250 | 0.300 | | | | | | |
| 220 | | | | | 6.3x11 | 405 | 0.130 | | | |
| 330 | | 6.3x11 | 405 | 0.130 | 8x12 | 600 | 0.085 | 8x12 | 760 | 0.072 |
| 470 | | | | | 8x12 | 760 | 0.072 | 8x16 | 995 | 0.056 |
| 560 | | 8x12 | 760 | 0.072 | | | | 10x13 | 1030 | 0.053 |
| 680 | | | | | 8x16 | 995 | 0.056 | 8x20 | 1250 | 0.041 |
| 820 | | 8x16 | 995 | 0.056 | 10x13 | 1030 | 0.053 | 10x16 | 1430 | 0.038 |
| 1000 | | 10x13 | 1030 | 0.053 | 8x20 | 1250 | 0.041 | | | |
| 1200 | | 10x16 | 1430 | 0.038 | 10x16 | 1430 | 0.038 | 10x20 | 1820 | 0.023 |
| 1500 | | 8x20 | 1250 | 0.041 | 10x20 | 1820 | 0.023 | 10x25 | 2150 | 0.022 |
| 2200 | | 10x20 | 1820 | 0.023 | 10x25 | 2150 | 0.022 | 13x21 | 2360 | 0.021 |
| 2700 | | 10x25 | 2150 | 0.022 | 13x21 | 2360 | 0.021 | 13x25 | 2770 | 0.018 |
| 3300 | | | | | | | | 13x30 | 3140 | 0.016 |
| 3900 | | 13x21 | 2360 | 0.021 | 13x25 | 2770 | 0.018 | 16x22 | 3290 | 0.018 |
| 4700 | | 13x25 | 2770 | 0.018 | 13x30 | 3290 | 0.016 | 13x35 | 3400 | 0.015 |
| 5600 | | 13x30 | 3290 | 0.016 | 16x22 | 3140 | 0.018 | | | |
| 6800 | | 13x35 | 3350 | 0.015 | 16x26 | 3460 | 0.016 | | | |
| | | 16x22 | 3400 | 0.018 | | | | | | |
| | | 16x26 | 3460 | 0.016 | | | | | | |

| Cap (μF) | V | 25 | | | 35 | | | 50 | | |
|----------|---|--------|-------|-------|--------|-------|-------|--------|-------|-------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 22 | | | | | | | | 5x11 | 238 | 0.340 |
| 33 | | | | | 5x11 | 250 | 0.300 | | | |
| 47 | | 5x11 | 250 | 0.300 | | | | | | |
| 56 | | | | | 6.3x11 | 405 | 0.130 | 6.3x11 | 385 | 0.140 |
| 68 | | | | | | | | | | |
| 100 | | 6.3x11 | 405 | 0.130 | | | | 8x12 | 724 | 0.074 |
| 120 | | | | | | | | 8x16 | 950 | 0.061 |
| 150 | | | | | 8x12 | 760 | 0.072 | 10x13 | 979 | 0.061 |
| 180 | | | | | | | | 8x20 | 1190 | 0.046 |
| 220 | | 8x12 | 760 | 0.072 | 8x16 | 995 | 0.056 | 10x16 | 1370 | 0.042 |
| 270 | | | | | 10x13 | 1030 | 0.053 | 10x20 | 1580 | 0.030 |
| 330 | | 8x16 | 995 | 0.056 | 8x20 | 1250 | 0.041 | 10x25 | 1870 | 0.028 |
| 470 | | 10x13 | 1030 | 0.053 | 10x16 | 1430 | 0.038 | | | |
| 560 | | 8x20 | 1250 | 0.041 | 10x20 | 1820 | 0.023 | 13x21 | 2050 | 0.027 |
| 680 | | 10x16 | 1430 | 0.038 | 10x25 | 2150 | 0.022 | 13x25 | 2410 | 0.023 |
| 820 | | | | | 10x20 | 1820 | 0.023 | 13x30 | 2860 | 0.021 |
| 1000 | | 10x25 | 2150 | 0.022 | 13x21 | 2360 | 0.021 | 13x35 | 2960 | 0.019 |
| 1200 | | 13x21 | 2360 | 0.021 | 13x25 | 2770 | 0.018 | 16x22 | 2730 | 0.023 |
| 1500 | | 13x25 | 2770 | 0.018 | 13x30 | 3140 | 0.016 | 16x26 | 3010 | 0.021 |
| 1800 | | 13x30 | 3140 | 0.016 | 16x22 | 3290 | 0.018 | | | |
| 2200 | | 16x22 | 3290 | 0.018 | 13x35 | 3400 | 0.015 | | | |
| 2700 | | 13x35 | 3400 | 0.015 | 16x26 | 3460 | 0.016 | | | |
| | | 16x26 | 3460 | 0.016 | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SX series

- 105°C High ripple and Low impedance, long life: 4,000~5,000 hours.
- Suited for LCD TV BLU Inverter, SMPS, IP-Board, Adaptor etc..
- 105°C高紋波低阻抗品，壽命：4,000~5,000 hours。
- 適用背光模組轉換器、開關電源、適配器等。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | |
|---|---|---|------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz, 20°C) | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | |
| Rated Voltage Range 額定電壓範圍 | 10 ~ 50VDC | | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3 (µA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 |
| | tan δ(Max) | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 |
| When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF. | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 |
| | Z(-25°C)/Z(20°C) | 2 | 2 | 2 | 2 | 2 |
| | Z(-40°C)/Z(20°C) | 3 | 3 | 3 | 3 | 3 |
| Load Life 負荷壽命 | 5000hours, with application of working voltage at 105°C (φ D ≤ 8mm & Size: 10x13; load life: 4,000 hours) | | | | | |
| | Capacitance Change | Within ± 30% of Initial Value | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | |
| | Leakage Current | Initial Specified Value or less | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | |
| | Capacitance Change | Within ± 25% of Initial Value | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | |
| | Leakage Current | Initial Specified Value or less | | | | |
| Standards 參照標準 | JIS C 5101-4-1 (IEC 60384) | | | | | |

SX

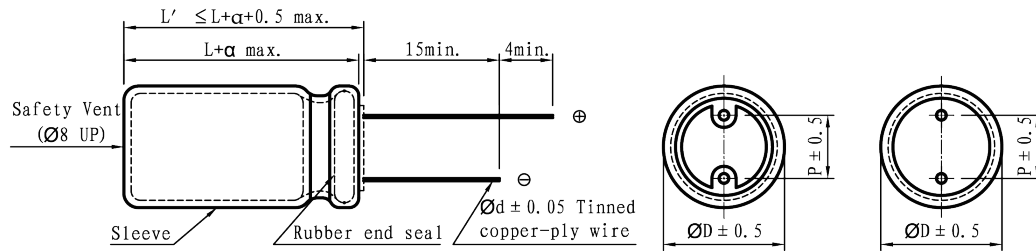
Frequency Coefficient of Permissible Ripple Current

| Capacitance (µF) | Frequency (Hz) | | | |
|------------------|----------------|------|------|------|
| | 120 | 1K | 10K | 100K |
| 100 ~ 270 | 0.40 | 0.75 | 0.90 | 1.00 |
| 330 ~ 680 | 0.50 | 0.85 | 0.94 | 1.00 |
| 820 ~ 1800 | 0.60 | 0.87 | 0.95 | 1.00 |
| 2200 ~ 2700 | 0.75 | 0.90 | 0.95 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

SX series

DIMENSIONS(mm)



| | | |
|----------|-----|-----|
| ϕD | 8 | 10 |
| P | 3.5 | 5 |
| ϕd | 0.5 | 0.6 |

| | |
|----------|------------------------------|
| α | (L < 16) 1.0 (L ≥ 16) 2.0 |
|----------|------------------------------|

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C 100KHz.

| Cap (μF) | V | 10 | | | 16 | | | 25 | | |
|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 330 | | | | | | | | 8x12 | 1420 | 0.072 |
| 390 | | | | | | | | 8x16 | 2045 | 0.056 |
| 470 | | | | | 8x12 | 1420 | 0.072 | 10x13 | 2180 | 0.052 |
| 560 | | | | | | | | 8x20 | 2385 | 0.040 |
| 680 | | 8x12 | 1420 | 0.072 | 8x12 | 2045 | 0.056 | 10x16 | 2540 | 0.037 |
| | | | | | 10x13 | 2180 | 0.052 | | | |
| 820 | | | | | | | | 10x20 | 2870 | 0.027 |
| 1000 | | 8x16 | 2045 | 0.056 | 8x20 | 2385 | 0.040 | 10x25 | 3165 | 0.023 |
| | | 10x13 | 2180 | 0.052 | 10x16 | 2540 | 0.037 | | | |
| 1200 | | | | | | | | 10x35 | 3580 | 0.020 |
| 1500 | | 8x20 | 2385 | 0.040 | 10x20 | 2870 | 0.027 | | | |
| | | 10x16 | 2540 | 0.037 | | | | | | |
| 1800 | | 10x20 | 2870 | 0.027 | 10x25 | 3165 | 0.023 | | | |
| 2200 | | 10x25 | 3165 | 0.023 | 10x35 | 3580 | 0.020 | | | |
| 2700 | | 10x35 | 3580 | 0.020 | | | | | | |

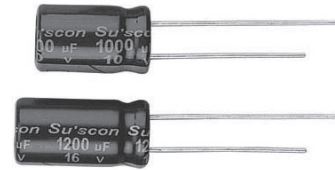
| Cap (μF) | V | 35 | | | 50 | | |
|----------|---|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. |
| 100 | | | | | 8x12 | 1090 | 0.095 |
| 120 | | | | | 8x16 | 1560 | 0.078 |
| 150 | | | | | 10x13 | 1620 | 0.087 |
| 180 | | | | | 8x20 | 1900 | 0.064 |
| 220 | | 8x12 | 1420 | 0.072 | 10x16 | 1990 | 0.056 |
| 270 | | 8x16 | 2045 | 0.056 | 10x20 | 2330 | 0.041 |
| 330 | | 10x13 | 2180 | 0.052 | 10x25 | 2630 | 0.036 |
| 390 | | 8x20 | 2385 | 0.040 | | | |
| 470 | | 10x16 | 2540 | 0.037 | 10x35 | 2960 | 0.032 |
| 560 | | 10x20 | 2870 | 0.027 | | | |
| 680 | | 10x25 | 3165 | 0.023 | | | |
| 820 | | | | | | | |
| 1000 | | 10x35 | 3580 | 0.020 | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

XS

MG series

- Low impedance at high frequency range.
- Smaller case size and high ripple current.
- RoHS Compliance.
- 高頻超低阻抗。
- 小尺寸高紋波電流。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | |
|--|---|---|------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 35VDC | | | | | |
| Leakage Current 洩漏電流 | $I \leq 0.01CV$ or $3(\mu A)$ which is greater.(After 2 minutes application of DC rated voltage, at 20°C) | | | | | |
| Dissipation Factor 散逸因素($\tan \delta$) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 |
| | $\tan \delta$ (Max) | 0.21 | 0.18 | 0.15 | 0.13 | 0.11 |
| When nominal capacitance over 1000 μF , $\tan \delta$ shall be added 0.02 to the listed value with increase of every 1000 μF . | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 |
| | Z(-25°C)/Z(20°C) | 2 | 2 | 2 | 2 | 2 |
| | Z(-40°C)/Z(20°C) | 3 | 3 | 3 | 3 | 3 |
| Load Life 負荷壽命 | 6000hours,with application of rated voltage at 105°C(ØD≤6.3 , 5000hrs) | | | | | |
| | Capacitance Change | Within ± 25% of Initial Value | | | | |
| | $\tan \delta$ | 200% or less of Initial Specified Value | | | | |
| | Leakage Current | Initial Specified Value or less | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | |
| | $\tan \delta$ | 200% or less of Initial Specified Value | | | | |
| | Leakage Current | Initial Specified Value or less | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | |

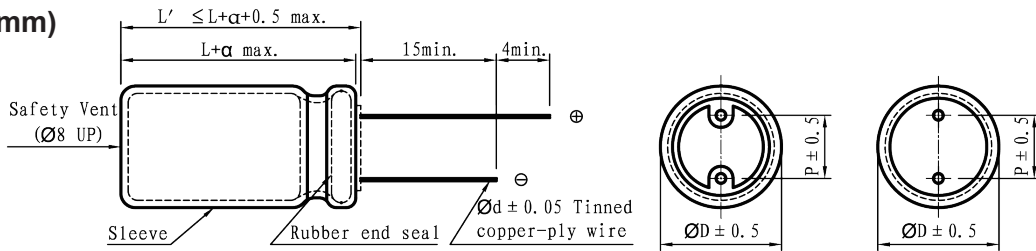
Frequency Coefficient of Permissible Ripple Current

| Capacitance (μF) | Frequency (Hz) | | | |
|-------------------------|----------------|------|------|------|
| | 120 | 1K | 10K | 100K |
| 47 ~ 150 | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 ~ 560 | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 ~ 1800 | 0.60 | 0.87 | 0.95 | 1.00 |
| 2200 ~ 3900 | 0.75 | 0.90 | 0.95 | 1.00 |
| 4700 ~ 8200 | 0.85 | 0.95 | 0.98 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

MG series

DIMENSIONS(mm)



| | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|
| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C,-10°C 100KHz.

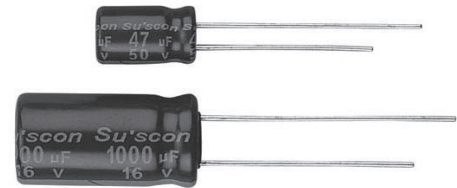
| Cap (μF) | V | 6.3 | | | | 10 | | | | 16 | | | | |
|----------|---|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|------|
| | | Item | D x L | IMP | | R.C. | D x L | IMP | | R.C. | D x L | IMP | | R.C. |
| | | | | 20°C | -10°C | | | 20°C | -10°C | | | 20°C | -10°C | |
| 100 | | | | | | | | | | 5x11 | 0.230 | 0.760 | 360 | |
| 150 | | | | | | 5x11 | 0.230 | 0.760 | 360 | 6.3x11 | 0.100 | 0.330 | 450 | |
| 220 | | 5x11 | 0.230 | 0.760 | 360 | 6.3x11 | 0.100 | 0.330 | 450 | 6.3x11 | 0.100 | 0.330 | 550 | |
| 330 | | 6.3x11 | 0.100 | 0.330 | 460 | 6.3x11 | 0.100 | 0.330 | 550 | 8x12 | 0.059 | 0.181 | 830 | |
| 470 | | 6.3x11 | 0.100 | 0.330 | 550 | 8x12 | 0.059 | 0.181 | 820 | 8x12 | 0.059 | 0.181 | 990 | |
| 680 | | 8x12 | 0.059 | 0.181 | 900 | 8x12 | 0.059 | 0.181 | 990 | 8x16 | 0.046 | 0.143 | 1330 | |
| 820 | | 8x12 | 0.059 | 0.181 | 990 | 10x13 | 0.043 | 0.133 | 1250 | 10x16 | 0.030 | 0.095 | 1650 | |
| 1000 | | 10x13 | 0.043 | 0.133 | 1250 | 8x16 | 0.046 | 0.143 | 1330 | 8x20 | 0.031 | 0.105 | 1550 | |
| 1200 | | 10x13 | 0.043 | 0.133 | 1360 | 10x13 | 0.043 | 0.133 | 1360 | 10x16 | 0.030 | 0.095 | 1650 | |
| 1500 | | 8x20 | 0.031 | 0.105 | 1550 | 10x16 | 0.030 | 0.095 | 1650 | 10x20 | 0.019 | 0.057 | 1930 | |
| 1800 | | 10x16 | 0.030 | 0.095 | 1815 | 8x20 | 0.031 | 0.105 | 1550 | 10x20 | 0.019 | 0.057 | 2160 | |
| 2200 | | 10x20 | 0.019 | 0.057 | 2160 | 10x16 | 0.030 | 0.095 | 1815 | 10x25 | 0.017 | 0.051 | 2475 | |
| 2700 | | 10x25 | 0.017 | 0.051 | 2475 | 10x20 | 0.019 | 0.057 | 2160 | 10x25 | 0.017 | 0.051 | 2450 | |
| 3300 | | 13x21 | 0.016 | 0.041 | 2500 | 10x25 | 0.017 | 0.051 | 2450 | 13x21 | 0.016 | 0.041 | 2725 | |
| 3900 | | 13x21 | 0.016 | 0.041 | 2725 | 13x21 | 0.016 | 0.041 | 2725 | 13x25 | 0.015 | 0.038 | 3190 | |
| 4700 | | 13x25 | 0.014 | 0.036 | 3190 | 13x21 | 0.016 | 0.041 | 2725 | 13x25 | 0.015 | 0.038 | 3190 | |
| 5600 | | 13x30 | 0.012 | 0.031 | 3795 | 13x25 | 0.014 | 0.036 | 3190 | 13x30 | 0.012 | 0.031 | 3795 | |
| 6800 | | 16x22 | 0.014 | 0.036 | 3575 | 16x22 | 0.014 | 0.036 | 3575 | 16x22 | 0.014 | 0.036 | 3575 | |
| 8200 | | 16x26 | 0.012 | 0.033 | 3990 | 16x22 | 0.014 | 0.036 | 3575 | 16x26 | 0.012 | 0.033 | 3990 | |

| Cap (μF) | V | 25 | | | | 35 | | | | |
|----------|---|--------|-------|-------|-------|--------|-------|-------|-------|------|
| | | Item | D x L | IMP | | R.C. | D x L | IMP | | R.C. |
| | | | | 20°C | -10°C | | | 20°C | -10°C | |
| 47 | | | | | | 5x11 | 0.230 | 0.760 | 360 | |
| 68 | | 5x11 | 0.230 | 0.760 | 360 | 6.3x11 | 0.100 | 0.330 | 450 | |
| 100 | | 6.3x11 | 0.100 | 0.330 | 450 | 6.3x11 | 0.100 | 0.330 | 550 | |
| 150 | | 8x12 | 0.085 | 0.260 | 620 | 8x12 | 0.059 | 0.181 | 820 | |
| 220 | | 8x12 | 0.059 | 0.181 | 810 | 8x12 | 0.059 | 0.181 | 990 | |
| 270 | | 8x12 | 0.059 | 0.181 | 900 | 8x16 | 0.046 | 0.143 | 1330 | |
| 330 | | 8x12 | 0.059 | 0.181 | 990 | 10x13 | 0.043 | 0.133 | 1360 | |
| 390 | | 8x16 | 0.046 | 0.143 | 1330 | 8x20 | 0.031 | 0.105 | 1550 | |
| 470 | | 10x13 | 0.043 | 0.133 | 1360 | 10x16 | 0.030 | 0.095 | 1650 | |
| 560 | | 8x20 | 0.032 | 0.110 | 1550 | 10x20 | 0.030 | 0.095 | 2160 | |
| 680 | | 10x16 | 0.031 | 0.100 | 1815 | 10x25 | 0.027 | 0.080 | 2475 | |
| 820 | | 10x20 | 0.020 | 0.062 | 2160 | 13x21 | 0.022 | 0.065 | 2725 | |
| 1000 | | 10x25 | 0.018 | 0.055 | 2475 | 13x21 | 0.019 | 0.053 | 2920 | |
| 1200 | | 13x21 | 0.017 | 0.049 | 2650 | 13x25 | 0.015 | 0.043 | 3190 | |
| 1500 | | 13x21 | 0.023 | 0.059 | 2725 | 13x30 | 0.013 | 0.040 | 3795 | |
| 1800 | | 13x25 | 0.020 | 0.051 | 3190 | 16x22 | 0.014 | 0.036 | 3575 | |
| 2200 | | 13x30 | 0.018 | 0.046 | 3795 | 13x35 | 0.011 | 0.029 | 3925 | |
| 2700 | | 16x22 | 0.014 | 0.036 | 3575 | 16x26 | 0.012 | 0.033 | 3990 | |
| 3300 | | 13x35 | 0.011 | 0.029 | 3925 | | | | | |
| | | 16x26 | 0.012 | 0.033 | 3990 | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HG series

- High ripple current, low impedance at high frequency range.
- 105°C 10000 hours long life .
- RoHS Compliance
- 高紋波電流、高頻低阻抗。
- 105°C 10000小時長壽命產品。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | |
|---|---|---|------|------------|-------------|------------|----------|-------------|------|--|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 100VDC | | | | | | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3 (μA) which is greater.(After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | |
| | tan δ (Max) | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 | |
| When nominal capacitance over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF. | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | |
| | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | |
| Z(-40°C)/Z(20°C) | | | | | | | | | | |
| Load Life 負荷壽命 | Case Size | φ D ≤ 6.3 | | | φ D = 8, 10 | | φ D ≥ 13 | | | |
| | Rated Voltage(V) | 6.3~10 V | | 4,000hours | | 6,000hours | | 8,000hours | | |
| | | 16~100 V | | 5,000hours | | 7,000hours | | 10,000hours | | |
| | Capacitance Change | Within ± 25% of Initial Value | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | |
| Leakage Current | Initial Specified Value or less | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | |

HG

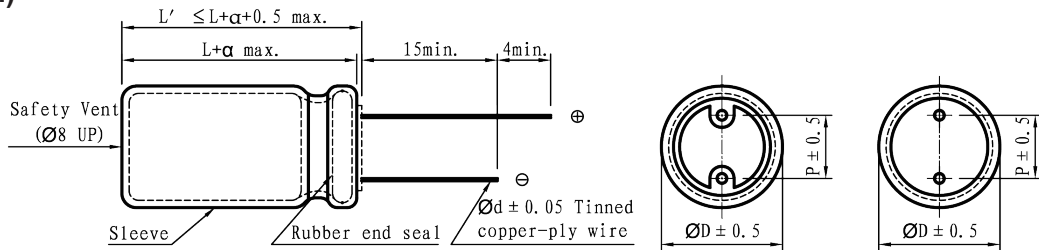
Frequency Coefficient of Permissible Ripple Current

| Capacitance (μF) | Frequency (Hz) | | | | |
|------------------|----------------|------|------|------|------|
| | 50 | 120 | 300 | 1K | 100K |
| ≤ 33 | 0.50 | 0.55 | 0.70 | 0.90 | 1.00 |
| 47 ~ 330 | 0.60 | 0.70 | 0.85 | 0.95 | 1.00 |
| 470 ~ 1000 | 0.65 | 0.75 | 0.90 | 0.98 | 1.00 |
| 1200 ~ 18000 | 0.70 | 0.80 | 0.95 | 1.00 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

HG series

DIMENSIONS(mm)



| | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|
| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C,-10°C 100KHz.

| Cap (μF) | V | Item | 6.3 | | | 10 | | | | |
|----------|---|--------|-------|-------|-------|--------|-------|-------|-------|------|
| | | | D x L | IMP | | R.C. | D x L | IMP | | R.C. |
| | | | | 20°C | -10°C | | | 20°C | -10°C | |
| 100 | | | | | | 5x11 | 0.580 | 2.300 | 215 | |
| 150 | | 5x11 | 0.570 | 2.300 | 210 | 5x11 | 0.580 | 2.300 | 230 | |
| 220 | | 6.3x11 | 0.250 | 0.900 | 320 | 6.3x11 | 0.220 | 0.870 | 340 | |
| 330 | | 6.3x11 | 0.210 | 0.870 | 340 | 6.3x11 | 0.220 | 0.870 | 380 | |
| 470 | | 8x12 | 0.150 | 0.580 | 520 | 8x12 | 0.130 | 0.520 | 640 | |
| 680 | | 8x12 | 0.130 | 0.520 | 645 | 8x16 | 0.086 | 0.350 | 845 | |
| | | | | | | 10x13 | 0.080 | 0.310 | 865 | |
| 820 | | 10x13 | 0.080 | 0.320 | 865 | 10x16 | 0.070 | 0.280 | 1015 | |
| 1000 | | 8x16 | 0.085 | 0.350 | 870 | 8x20 | 0.068 | 0.270 | 1050 | |
| | | | | | | 10x16 | 0.060 | 0.240 | 1215 | |
| 1200 | | 8x20 | 0.071 | 0.260 | 1050 | 10x20 | 0.045 | 0.180 | 1410 | |
| | | 10x16 | 0.062 | 0.240 | 1215 | | | | | |
| 1500 | | 10x20 | 0.045 | 0.180 | 1410 | 10x25 | 0.041 | 0.170 | 1610 | |
| | | | | | | 13x16 | 0.049 | 0.160 | 1450 | |
| 1800 | | 13x16 | 0.048 | 0.160 | 1460 | 13x21 | 0.039 | 0.150 | 1710 | |
| 2200 | | 10x25 | 0.042 | 0.170 | 1650 | 10x30 | 0.030 | 0.120 | 1920 | |
| | | | | | | 13x21 | 0.035 | 0.120 | 1910 | |
| | | | | | | 16x15 | 0.042 | 0.120 | 1900 | |
| 2700 | | 10x30 | 0.030 | 0.120 | 1900 | 18x15 | 0.042 | 0.110 | 2220 | |
| | | 16x15 | 0.041 | 0.120 | 1945 | | | | | |
| 3300 | | 13x21 | 0.034 | 0.120 | 1900 | 13x25 | 0.026 | 0.089 | 2230 | |
| 3900 | | 13x25 | 0.026 | 0.088 | 2240 | 13x30 | 0.023 | 0.078 | 2660 | |
| | | 18x15 | 0.042 | 0.110 | 2210 | 16x22 | 0.026 | 0.078 | 2540 | |
| 4700 | | 13x30 | 0.023 | 0.078 | 2650 | 13x35 | 0.020 | 0.065 | 2890 | |
| 5600 | | 13x35 | 0.020 | 0.065 | 2890 | 13x40 | 0.016 | 0.055 | 3360 | |
| | | | | | | 16x26 | 0.020 | 0.060 | 2940 | |
| | | | | | | 18x20 | 0.025 | 0.066 | 2870 | |
| 6800 | | 13x40 | 0.016 | 0.055 | 3350 | 16x32 | 0.016 | 0.050 | 3460 | |
| | | 16x26 | 0.020 | 0.060 | 2940 | | | | | |
| | | 18x20 | 0.025 | 0.066 | 2870 | | | | | |
| 8200 | | 16x32 | 0.016 | 0.050 | 3450 | 16x36 | 0.015 | 0.044 | 3610 | |
| | | | | | | 18x32 | 0.015 | 0.040 | 4180 | |
| 10000 | | 16x36 | 0.014 | 0.044 | 3620 | 16x40 | 0.013 | 0.038 | 4090 | |
| | | 18x25 | 0.018 | 0.049 | 3150 | 18x35 | 0.012 | 0.038 | 4230 | |
| 12000 | | 16x40 | 0.012 | 0.038 | 4090 | 18x40 | 0.011 | 0.032 | 4290 | |
| | | 18x32 | 0.014 | 0.040 | 4180 | | | | | |
| 15000 | | 18x35 | 0.013 | 0.038 | 4230 | | | | | |
| 18000 | | 18x40 | 0.012 | 0.032 | 4290 | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HG series

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C,-10°C 100KHz.

| Cap (μF) | V Item | 16 | | | 25 | | | | |
|-------------|-----------|--------|-------|-------|------|--------|-------|-------|------|
| | | D x L | IMP | | R.C. | D x L | IMP | | |
| | | | 20°C | -10°C | | | 20°C | -10°C | |
| 47 | | | | | 5x11 | 0.570 | 2.300 | 200 | |
| 56 | | 5x11 | 0.570 | 2.300 | 220 | 5x11 | 0.570 | 2.300 | 240 |
| 100 | | 6.3x11 | 0.210 | 0.820 | 310 | 6.3x11 | 0.210 | 0.870 | 340 |
| 120 | | 6.3x11 | 0.210 | 0.870 | 340 | | | | |
| 220 | | 8x12 | 0.190 | 0.850 | 510 | 8x12 | 0.120 | 0.520 | 650 |
| 330 | | 8x12 | 0.120 | 0.520 | 650 | 8x16 | 0.087 | 0.350 | 850 |
| | | | | | | 10x13 | 0.081 | 0.320 | 870 |
| 470 | | 8x16 | 0.086 | 0.350 | 840 | 8x20 | 0.070 | 0.270 | 1050 |
| | | 10x13 | 0.080 | 0.320 | 865 | 10x16 | 0.060 | 0.240 | 1210 |
| 680 | | 8x20 | 0.069 | 0.270 | 1060 | 10x20 | 0.045 | 0.180 | 1410 |
| | | 10x16 | 0.060 | 0.240 | 1210 | 13x16 | 0.049 | 0.160 | 1460 |
| 820 | | 10x20 | 0.052 | 0.220 | 1310 | 10x25 | 0.041 | 0.170 | 1660 |
| 1000 | | 10x20 | 0.045 | 0.180 | 1410 | 10x30 | 0.030 | 0.120 | 1920 |
| | | 13x16 | 0.050 | 0.160 | 1450 | 13x21 | 0.034 | 0.120 | 1910 |
| | | | | | | 16x15 | 0.042 | 0.120 | 1940 |
| 1200 | | 10x25 | 0.043 | 0.170 | 1650 | 18x15 | 0.043 | 0.110 | 2220 |
| 1500 | | 10x30 | 0.030 | 0.120 | 1920 | 13x25 | 0.026 | 0.089 | 2240 |
| | | 13x21 | 0.035 | 0.120 | 1910 | | | | |
| | | 16x15 | 0.042 | 0.120 | 1940 | | | | |
| 1800 | | 13x25 | 0.028 | 0.095 | 2140 | 13x30 | 0.024 | 0.078 | 2660 |
| | | | | | | 16x22 | 0.026 | 0.078 | 2540 |
| 2200 | | 13x25 | 0.026 | 0.089 | 2240 | 13x35 | 0.020 | 0.065 | 2890 |
| | | 18x15 | 0.042 | 0.110 | 2220 | 18x20 | 0.025 | 0.066 | 2870 |
| 2700 | | 13x30 | 0.023 | 0.077 | 2650 | 13x40 | 0.016 | 0.056 | 3360 |
| | | 16x22 | 0.026 | 0.078 | 2540 | 16x26 | 0.021 | 0.060 | 2940 |
| 3300 | | 13x35 | 0.020 | 0.066 | 2890 | 16x32 | 0.016 | 0.050 | 3460 |
| | | | | | | 18x25 | 0.018 | 0.048 | 3150 |
| 3900 | | 13x40 | 0.016 | 0.056 | 3350 | 16x36 | 0.014 | 0.043 | 3620 |
| | | 16x26 | 0.021 | 0.060 | 2930 | | | | |
| | | 16x22 | 0.025 | 0.067 | 2860 | | | | |
| 4700 | | 16x32 | 0.016 | 0.050 | 3450 | 16x40 | 0.014 | 0.044 | 4080 |
| | | 18x25 | 0.018 | 0.049 | 3150 | 18x35 | 0.013 | 0.040 | 4230 |
| 5600 | | 16x36 | 0.015 | 0.044 | 3620 | 18x40 | 0.011 | 0.032 | 4290 |
| | | 18x32 | 0.015 | 0.040 | 4180 | | | | |
| 6800 | | 16x40 | 0.012 | 0.038 | 4080 | | | | |
| 8200 | | 18x35 | 0.014 | 0.038 | 4230 | | | | |
| 10000 | | 18x40 | 0.011 | 0.032 | 4290 | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HG series

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C,-10°C 100KHz.

| Cap (μF) | V | 35 | | | | 50 | | | | |
|----------|---|--------|-------|-------|-------|--------|-------|-------|-------|------|
| | | Item | D x L | IMP | | R.C. | D x L | IMP | | R.C. |
| | | | | 20°C | -10°C | | | 20°C | -10°C | |
| 22 | | | | | | 5x11 | 0.700 | 2.800 | 180 | |
| 33 | | 5x11 | 0.560 | 2.300 | 220 | | | | | |
| 47 | | 6.3x11 | 0.350 | 1.400 | 280 | 6.3x11 | 0.380 | 1.500 | 220 | |
| 56 | | 6.3x11 | 0.210 | 0.860 | 340 | 6.3x11 | 0.300 | 1.200 | 300 | |
| 100 | | 8x12 | 0.150 | 0.560 | 510 | 8x12 | 0.160 | 0.670 | 560 | |
| 120 | | | | | | 8x16 | 0.120 | 0.480 | 740 | |
| 150 | | 8x12 | 0.130 | 0.520 | 650 | 10x13 | 0.120 | 0.480 | 770 | |
| 180 | | 8x16 | 0.086 | 0.350 | 800 | 8x20 | 0.090 | 0.360 | 920 | |
| 220 | | 8x16 | 0.086 | 0.350 | 850 | 10x16 | 0.083 | 0.340 | 1050 | |
| | | 10x13 | 0.080 | 0.320 | 865 | | | | | |
| 270 | | 8x20 | 0.070 | 0.260 | 1060 | 10x20 | 0.060 | 0.240 | 1230 | |
| | | | | | | 13x16 | 0.062 | 0.200 | 1250 | |
| 330 | | 10x16 | 0.060 | 0.240 | 1210 | 10x25 | 0.053 | 0.220 | 1450 | |
| 470 | | 10x20 | 0.045 | 0.180 | 1410 | 10x30 | 0.043 | 0.170 | 1695 | |
| | | 13x16 | 0.048 | 0.150 | 1460 | 13x21 | 0.044 | 0.150 | 1670 | |
| | | | | | | 16x15 | 0.054 | 0.170 | 1695 | |
| 560 | | 10x25 | 0.041 | 0.160 | 1650 | 13x25 | 0.033 | 0.110 | 1950 | |
| | | | | | | 18x15 | 0.053 | 0.150 | 1940 | |
| | | | | | | 10x30 | 0.030 | 0.120 | 1920 | |
| 680 | | 13x21 | 0.033 | 0.132 | 1910 | 13x30 | 0.030 | 0.100 | 2320 | |
| | | 16x15 | 0.041 | 0.143 | 1950 | | | | | |
| | | 10x30 | 0.030 | 0.120 | 1920 | | | | | |
| 820 | | 13x25 | 0.028 | 0.088 | 2100 | 13x35 | 0.023 | 0.081 | 2520 | |
| | | | | | | 16x22 | 0.033 | 0.100 | 2220 | |
| | | | | | | 13x40 | 0.020 | 0.069 | 2930 | |
| 1000 | | 13x25 | 0.028 | 0.088 | 2230 | 16x26 | 0.025 | 0.075 | 2555 | |
| | | | | | | 18x20 | 0.036 | 0.097 | 2490 | |
| | | | | | | 13x30 | 0.023 | 0.078 | 2660 | |
| 1200 | | 16x22 | 0.026 | 0.078 | 2530 | 16x32 | 0.021 | 0.066 | 3020 | |
| | | 18x25 | 0.025 | 0.070 | 2750 | | | | | |
| 1500 | | 13x35 | 0.020 | 0.065 | 2880 | 16x36 | 0.018 | 0.056 | 3150 | |
| 1800 | | 13x40 | 0.016 | 0.056 | 3350 | 16x40 | 0.016 | 0.048 | 3720 | |
| | | 16x26 | 0.020 | 0.060 | 2940 | | | | | |
| | | 18x20 | 0.025 | 0.066 | 2870 | | | | | |
| 2200 | | 18x32 | 0.021 | 0.057 | 3640 | 18x35 | 0.017 | 0.046 | 3690 | |
| | | 16x32 | 0.016 | 0.050 | 3500 | | | | | |
| 2700 | | 18x25 | 0.019 | 0.049 | 3140 | 18x40 | 0.014 | 0.038 | 3810 | |
| | | 16x36 | 0.015 | 0.044 | 3620 | | | | | |
| | | 18x32 | 0.014 | 0.040 | 4180 | | | | | |
| 3300 | | 16x40 | 0.013 | 0.038 | 4090 | | | | | |
| | | 18x35 | 0.014 | 0.040 | 4230 | | | | | |
| 3900 | | 18x40 | 0.012 | 0.033 | 4290 | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HG

HG series

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C,-10°C 100KHz.

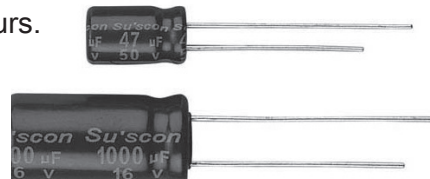
| Cap (μF) | V Item | 63 | | | 100 | | | | |
|-------------|-----------|--------|-------|-------|------|--------|-------|-------|------|
| | | D x L | IMP | | R.C. | D x L | IMP | | |
| | | | 20°C | -10°C | | | 20°C | -10°C | |
| 6.8 | | | | | 5x11 | 2.200 | 9.200 | 56 | |
| 15 | | 5x11 | 2.200 | 9.200 | 56 | 6.3x11 | 1.200 | 5.000 | 120 |
| 27 | | | | | | 8x12 | 0.72 | 3.000 | 235 |
| 33 | | 6.3x11 | 1.200 | 5.000 | 120 | | | | |
| 39 | | | | | | 8x16 | 0.62 | 2.540 | 280 |
| 47 | | 8x12 | 0.680 | 3.100 | 190 | 10x13 | 0.430 | 1.800 | 290 |
| 56 | | 8x12 | 0.620 | 2.800 | 235 | 8x20 | 0.320 | 1.600 | 340 |
| 68 | | | | | | 10x16 | 0.300 | 1.500 | 358 |
| 82 | | 8x16 | 0.450 | 2.100 | 310 | 10x20 | 0.210 | 0.940 | 470 |
| | | 10x13 | 0.430 | 1.800 | 300 | 13x16 | 0.230 | 1.100 | 468 |
| 100 | | 10x16 | 0.350 | 1.800 | 320 | 10x25 | 0.200 | 0.840 | 536 |
| 120 | | 8x20 | 0.330 | 1.600 | 362 | 10x30 | 0.150 | 0.710 | 666 |
| | | 10x16 | 0.300 | 1.500 | 357 | 13x21 | 0.160 | 0.640 | 690 |
| 150 | | | | | | 16x15 | 0.140 | 0.660 | 795 |
| 180 | | 10x20 | 0.200 | 0.940 | 470 | 13x25 | 0.120 | 0.450 | 790 |
| | | 13x16 | 0.230 | 1.100 | 465 | 18x15 | 0.120 | 0.500 | 930 |
| 220 | | 10x25 | 0.200 | 0.840 | 531 | 13x30 | 0.110 | 0.450 | 905 |
| | | | | | | 16x22 | 0.090 | 0.370 | 1050 |
| 270 | | 10x30 | 0.150 | 0.700 | 663 | 13x35 | 0.082 | 0.350 | 1060 |
| | | 13x21 | 0.160 | 0.640 | 690 | 16x26 | 0.072 | 0.270 | 1250 |
| | | 16x15 | 0.130 | 0.650 | 795 | | | | |
| 330 | | 13x25 | 0.120 | 0.450 | 790 | 13x40 | 0.070 | 0.300 | 1190 |
| | | | | | | 18x20 | 0.080 | 0.300 | 1250 |
| 390 | | 18x15 | 0.120 | 0.500 | 920 | 16x32 | 0.053 | 0.200 | 1570 |
| | | | | | | 18x25 | 0.056 | 0.210 | 1490 |
| 470 | | 13x30 | 0.100 | 0.420 | 910 | 16x36 | 0.045 | 0.170 | 1790 |
| | | 16x22 | 0.090 | 0.380 | 1040 | 18x32 | 0.047 | 0.170 | 1640 |
| 560 | | 13x35 | 0.082 | 0.350 | 1050 | 16x40 | 0.040 | 0.150 | 2030 |
| | | 16x26 | 0.073 | 0.270 | 1250 | | | | |
| 680 | | 13x40 | 0.070 | 0.300 | 1190 | 18x35 | 0.040 | 0.150 | 1790 |
| | | 18x20 | 0.080 | 0.300 | 1240 | | | | |
| 820 | | 16x32 | 0.053 | 0.200 | 1580 | 18x40 | 0.036 | 0.130 | 2340 |
| | | 18x25 | 0.057 | 0.210 | 1490 | | | | |
| 1000 | | 16x36 | 0.045 | 0.170 | 1790 | | | | |
| | | 18x32 | 0.047 | 0.170 | 1640 | | | | |
| 1200 | | 16x40 | 0.039 | 0.150 | 2020 | | | | |
| | | 18x35 | 0.040 | 0.150 | 1790 | | | | |
| 1500 | | 18x40 | 0.035 | 0.130 | 2340 | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HG

HX series

- 105°C High ripple and Low impedance, long life: 6,000~10,000 hours.
- Suited for LCD TV BLU Inverter, SMPS, IP-Board, Adaptor etc..
- 105°C高紋波, 低阻抗品, 壽命: 6,000~10,000 hours。
- 適用背光模組轉換器、開關電源、適配器等。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | | |
|---|---|---|---|-------------|-------------|------|-----|-------------------------------|------|------|--|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz, 20°C) | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 100VDC | | | | | | | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3 (µA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | | | | | |
| Dissipation Factor 散逸因素 (tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | |
| | tan δ (Max) | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.1 | 0.09 | 0.08 | 0.08 | |
| When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF. | | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | |
| | Z(-25°C)/Z(20°C) | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | |
| | Z(-40°C)/Z(20°C) | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| Load Life 負荷壽命 | Case Size (φ D) | | | Life time | | | | | | | |
| | | | | 6.3V | 10 ~ 50V | | | 63 ~ 100V | | | |
| | φ 5 ~ φ 6.3 | | | 6,000hours | 7,000hours | | | 6,000hours | | | |
| | φ 8 x12L | | | 8,000hours | 9,000hours | | | 8,000hours | | | |
| | φ 8x16L ~ 20L | | | 9,000hours | 10,000hours | | | 9,000hours | | | |
| | φ 10x13L | | | 9,000hours | | | | | | | |
| | φ 10x16L ~ 25L | | | 10,000hours | | | | | | | |
| | > φ 10 | | | | | | | | | | |
| | Rated Voltage(V) | | 6.3~10 V | | | | | 16~100 V | | | |
| | Capacitance Change | | Within ± 30% of Initial Value | | | | | Within ± 25% of Initial Value | | | |
| tan δ | | 200% or less of Initial Specified Value | | | | | | | | | |
| Leakage Current | | Initial Specified Value or less | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | |
| | Capacitance Change | | Within ± 20% of Initial Value | | | | | | | | |
| | tan δ | | 200% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | | Initial Specified Value or less | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4-1 (IEC 60384) | | | | | | | | | | |

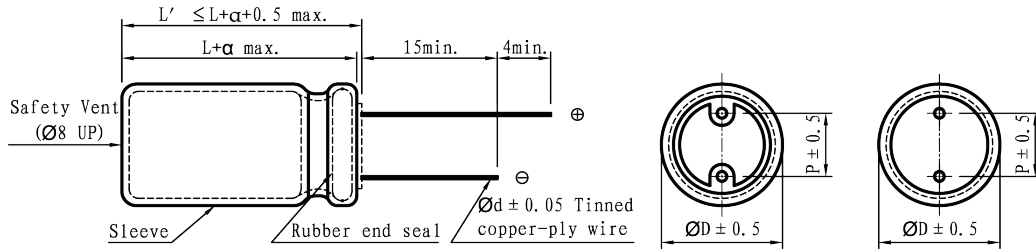
Frequency Coefficient of Permissible Ripple Current

| Capacitance (µF) | Frequency (Hz) | | | |
|------------------|----------------|------|------|------|
| | 120 | 1K | 10K | 100K |
| 5.6 ~ 180 | 0.40 | 0.70 | 0.90 | 1.00 |
| 220 ~ 560 | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 ~ 1800 | 0.60 | 0.87 | 0.95 | 1.00 |
| 2200 ~ 3900 | 0.75 | 0.90 | 0.95 | 1.00 |
| 4700 ~ 18000 | 0.85 | 0.95 | 0.98 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

HX series

DIMENSIONS(mm)



| | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|
| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 |
| P | 2 | 2.5 | 3.5 | 5 | 5 | 7.5 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C 100KHz.

| Cap (μF) | V | 6.3 | | | 10 | | | 16 | | | 25 | | |
|----------|---|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 68 | | | | | | | | | | | 5x12 | 460 | 0.390 |
| 120 | | | | | | | | 5x12 | 460 | 0.390 | | | |
| 150 | | | | | 5x12 | 460 | 0.390 | | | | 6.3x12 | 690 | 0.160 |
| 220 | | 5x12 | 350 | 0.390 | | | | | | | | | |
| 270 | | | | | | | | 6.3x12 | 690 | 0.160 | | | |
| 330 | | | | | 6.3x12 | 690 | 0.160 | | | | 8x12 | 1210 | 0.074 |
| 390 | | | | | | | | | | | 8x16 | 1610 | 0.058 |
| 470 | | 6.3x12 | 530 | 0.180 | | | | 8x12 | 1210 | 0.074 | 10x13 | 1690 | 0.052 |
| 560 | | | | | 8x12 | 1210 | 0.074 | 8x16 | 1610 | 0.058 | 8x20 | 1970 | 0.040 |
| 680 | | | | | 8x16 | 1610 | 0.058 | 10x13 | 1690 | 0.052 | 10x16 | 1990 | 0.037 |
| 820 | | 8x12 | 940 | 0.074 | 10x13 | 1690 | 0.052 | 8x20 | 1970 | 0.040 | | | |
| 1000 | | 8x16 | 1245 | 0.060 | 8x20 | 1970 | 0.040 | 10x16 | 1990 | 0.037 | 10x20 | 2520 | 0.027 |
| 1200 | | 10x13 | 1510 | 0.052 | 10x16 | 1990 | 0.037 | | | | 10x25 | 2910 | 0.023 |
| 1500 | | 8x20 | 1510 | 0.042 | | | | 10x20 | 2520 | 0.027 | 13x21 | 2610 | 0.024 |
| 1800 | | 10x16 | 1765 | 0.037 | 10x20 | 2520 | 0.027 | 10x25 | 2910 | 0.023 | 13x25 | 3060 | 0.018 |
| 2200 | | | | | 10x25 | 2910 | 0.023 | 13x21 | 2610 | 0.024 | 13x30 | 3490 | 0.017 |
| 2700 | | | | | | | | | | | 16x22 | 3250 | 0.021 |
| 2700 | | 10x20 | 1965 | 0.027 | 13x21 | 2610 | 0.024 | 13x25 | 3060 | 0.018 | 13x35 | 3650 | 0.016 |
| 3300 | | 10x25 | 2260 | 0.023 | 13x25 | 3060 | 0.018 | 13x30 | 3490 | 0.017 | 16x25 | 3650 | 0.017 |
| 3900 | | | | | | | | 16x22 | 3250 | 0.021 | | | |
| 3900 | | 13x21 | 2485 | 0.024 | | | | 13x35 | 3650 | 0.016 | | | |
| 4700 | | 13x25 | 2910 | 0.019 | 13x30 | 3490 | 0.017 | | | | | | |
| 4700 | | | | | 16x22 | 3250 | 0.021 | 16x25 | 3650 | 0.017 | | | |
| 5600 | | 13x30 | 3455 | 0.017 | 13x35 | 3620 | 0.016 | | | | | | |
| 5600 | | | | | 16x25 | 3650 | 0.017 | | | | | | |
| 6800 | | 13x35 | 3565 | 0.015 | | | | | | | | | |
| 6800 | | 16x22 | 3245 | 0.021 | | | | | | | | | |
| 8200 | | 16x26 | 3640 | 0.017 | | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HX series

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP (Ω max)at 20°C 100KHz.

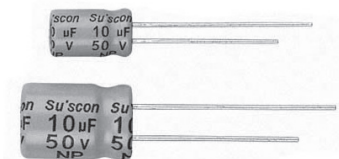
| Cap (μF) | V | 35 | | | 50 | | | 63 | | |
|----------|---|--------|-------|-------|--------|-------|-------|--------|-------|-------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 18 | | | | | | | | | | |
| 27 | | | | | 5x12 | 300 | 0.48 | 5x12 | 250 | 0.700 |
| 33 | | | | | | | | | | |
| 47 | | 5x12 | 460 | 0.39 | | | | 6.3x12 | 430 | 0.500 |
| 56 | | | | | 6.3x12 | 490 | 0.23 | 8x12 | 500 | 0.350 |
| 68 | | | | | | | | | | |
| 82 | | | | | | | | 8x12 | 720 | 0.350 |
| 100 | | 6.3x12 | 690 | 0.16 | 8x12 | 940 | 0.13 | 8x16 | 990 | 0.300 |
| 120 | | | | | 8x16 | 1240 | 0.081 | 10x13 | 990 | 0.280 |
| 150 | | | | | 8x20 | 1600 | 0.057 | 8x20 | 1200 | 0.200 |
| | | | | | 10x13 | 1270 | 0.072 | | | |
| 180 | | 8x12 | 1210 | 0.074 | | | | 10x16 | 1200 | 0.100 |
| 220 | | 8x16 | 1610 | 0.058 | 10x16 | 1645 | 0.052 | | | |
| 270 | | 10x13 | 1690 | 0.052 | | | | 10x20 | 1580 | 0.080 |
| 330 | | 8x20 | 1970 | 0.04 | 10x20 | 2065 | 0.037 | 10x25 | 1990 | 0.075 |
| 390 | | 10x16 | 1990 | 0.037 | 10x25 | 2250 | 0.031 | 13x21 | 1990 | 0.065 |
| 470 | | | | | 13x21 | 2210 | 0.032 | 13x25 | 2450 | 0.055 |
| 560 | | 10x20 | 2520 | 0.027 | | | | 13x30 | 2750 | 0.05 |
| | | | | | | | | 16x22 | 2150 | 0.052 |
| 680 | | 10x25 | 2910 | 0.023 | 13x25 | 2510 | 0.026 | 13x35 | 3050 | 0.045 |
| 820 | | 13x21 | 2610 | 0.024 | 13x30 | 3100 | 0.023 | 16x26 | 2560 | 0.048 |
| | | | | | 16x22 | 2750 | 0.026 | | | |
| 1000 | | | | | 13x35 | 3250 | 0.021 | | | |
| | | | | | 16x25 | 3000 | 0.022 | | | |
| 1200 | | 13x25 | 3060 | 0.017 | | | | | | |
| 1500 | | 13x30 | 3490 | 0.017 | | | | | | |
| | | 16x22 | 3250 | 0.021 | | | | | | |
| 1800 | | 13x35 | 3620 | 0.016 | | | | | | |
| | | 16x25 | 3650 | 0.017 | | | | | | |

| Cap (μF) | V | 80 | | | 100 | | |
|----------|---|--------|-------|------|--------|-------|-------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. |
| 8.2 | | | | | 5x12 | 230 | 1.200 |
| 12 | | 5x12 | | 230 | | | 0.800 |
| 18 | | | | | 6.3x12 | 360 | 0.580 |
| 27 | | 6.3x12 | | 380 | 8x12 | 450 | 0.430 |
| 33 | | | | | 8x12 | 630 | 0.430 |
| 47 | | 8x12 | | 630 | 8x16 | 780 | 0.400 |
| 56 | | 8x16 | | 780 | 10x13 | 780 | 0.330 |
| 68 | | 10x13 | | 780 | 8x20 | 1050 | 0.250 |
| | | | | | 10x16 | 1050 | 0.130 |
| 82 | | 8x20 | | 1050 | | | 0.230 |
| 100 | | 10x16 | | 1050 | 10x20 | 1400 | 0.091 |
| | | | | | 13x16 | 1400 | 0.130 |
| 120 | | | | | 10x25 | 1650 | 0.085 |
| 150 | | 10x20 | | 1400 | 13x21 | 1750 | 0.065 |
| | | 13x16 | | 1400 | | | 0.110 |
| 180 | | 10x25 | | 1650 | | | 0.080 |
| 220 | | 13x21 | | 1750 | 13x25 | 2200 | 0.063 |
| 270 | | 13x25 | | 2200 | 13x30 | 2400 | 0.055 |
| | | | | | 16x22 | 1950 | 0.058 |
| 330 | | 13x30 | | 2400 | 13x35 | 2600 | 0.050 |
| | | 16x22 | | 1950 | | | 0.055 |
| 390 | | 13x35 | | 2600 | 13x40 | 2860 | 0.045 |
| | | | | | 16x25 | 2450 | 0.043 |
| 470 | | 13x40 | | 2860 | 16x32 | 2650 | 0.038 |
| | | 16x25 | | 2450 | 18x22 | 2270 | 0.048 |
| 560 | | | | | 18x25 | 2500 | 0.042 |
| | | 16x32 | | 2650 | 16x36 | 2860 | 0.036 |
| | | | | | 18x32 | 2860 | 0.036 |
| 680 | | 16x36 | | 2860 | 16x40 | 3500 | 0.033 |
| | | 18x25 | | 2500 | 18x36 | 3500 | 0.033 |
| 820 | | 16x40 | | 3500 | | | 0.030 |
| | | 18x32 | | 2860 | 18x40 | 3860 | 0.030 |
| 1000 | | 18x35 | | 3500 | | | 0.030 |

※ 13mm may be replaced by 12.5mm upon customer's request.

SN series

- Non-polarity standard product , 85°C 2000hours.
- Suitable for DC two-way return circuit.
- RoHS Compliance
- 無極性 85°C 2000小時標準品。
- 適用於直流雙向迴路。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | |
|---|--|---|------|------|------|------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +85°C | | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 100VDC | | | | | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.03CV or 3 (µA) which is greater.(After 5 minutes application of DC rated voltage, at 20 °C) | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 |
| | tan δ(Max) | 0.26 | 0.24 | 0.22 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 |
| When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF. | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 |
| | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 |
| Z(-40°C)/Z(20°C) | | | | | | | | | |
| 10 8 6 5 4 4 3 3 | | | | | | | | | |
| Load Life 負荷壽命 | 2000hours with the polarity inverted every 250 hours at 85°C | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | |

Frequency Coefficient of Permissible Ripple Current

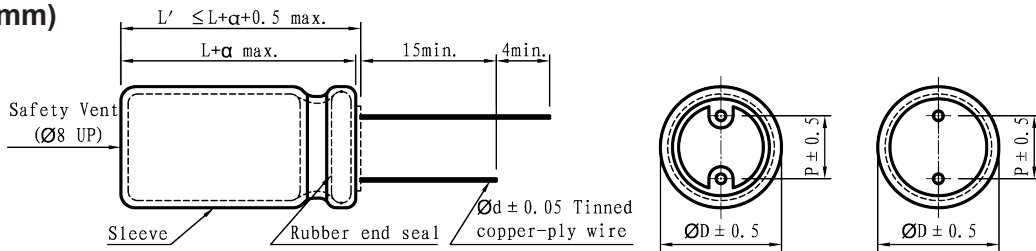
| Capacitance (µF) | Frequency (Hz) | | | |
|------------------|----------------|------|------|-------|
| | 50 | 120 | 1K | ≥ 10K |
| < 100 | 0.80 | 1.00 | 1.30 | 1.50 |
| ≥ 100 | 0.80 | 1.00 | 1.15 | 1.20 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

SN

SN series

DIMENSIONS(mm)



| | | | | | | | | |
|----------|------|-----|-----|-----|-----|-----|-----|-----|
| ϕD | 4 | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 |
| P | 1.5 | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 |
| ϕd | 0.45 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 85°C 120Hz

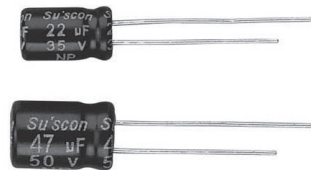
| Cap (μF) | V | 6.3 | | 10 | | 16 | | 25 | |
|----------|---|--------|------|--------|------|--------|------|--------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 4.7 | | | | | | 4x7 | 19 | 5x7 | 22 |
| 10 | | | | 4x7 | 24 | 5x7 | 30 | 5x11 | 45 |
| | | | | 5x7 | 41 | 5x11 | 42 | 6.3x7 | 35 |
| 22 | | | | 5x11 | 57 | 6.3x7 | 51 | 6.3x11 | 66 |
| | | 5x7 | 43 | 5x11 | 67 | 6.3x7 | 64 | 6.3x11 | 88 |
| 33 | | 5x11 | 63 | 6.3x7 | 56 | 6.3x11 | 80 | 8x7 | 74 |
| | | 6.3x7 | 58 | 6.3x7 | 67 | 6.3x7 | 75 | 8x7 | 87 |
| 47 | | 5x11 | 76 | 6.3x11 | 83 | 6.3x11 | 95 | 8x12 | 100 |
| | | 6.3x11 | 125 | 6.3x11 | 128 | 8x7 | 125 | | |
| 100 | | 8x7 | 96 | 8x7 | 110 | 8x12 | 160 | 8x14 | 160 |
| | | 8x7 | 140 | | | | | | |
| 220 | | 8x12 | 210 | 8x14 | 215 | 10x16 | 300 | 10x16 | 385 |
| 330 | | 8x14 | 270 | 10x16 | 350 | 10x16 | 375 | 13x21 | 460 |
| 470 | | 10x16 | 370 | 10x20 | 410 | 10x20 | 480 | 13x21 | 540 |
| 1000 | | 10x20 | 650 | 13x21 | 720 | 13x25 | 855 | 16x26 | 950 |
| 2200 | | 13x25 | 1160 | 16x26 | 1280 | 16x32 | 1510 | 18x35 | 1620 |
| 3300 | | 16x26 | 1570 | 16x32 | 1690 | 18x35 | 1980 | | |
| 4700 | | 16x32 | 2020 | 18x35 | 2160 | | | | |
| 6800 | | 18x35 | 2600 | | | | | | |

| Cap (μF) | V | 35 | | 50 | | 63 | | 100 | |
|----------|---|--------|------|--------|------|--------|------|--------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 0.10 | | | | 4x7 | 4 | | | | |
| 0.22 | | | | 4x7 | 6 | | | | |
| 0.33 | | | | 4x7 | 7.3 | | | | |
| 0.47 | | | | 4x7 | 8.9 | | | | |
| 0.1~0.47 | | | | 5x11 | 11 | 5x11 | 11 | 5x11 | 14 |
| 1.0 | | | | 4x7 | 12 | 5x11 | 17 | 5x11 | 21 |
| | | | | 5x11 | 17 | | | | |
| 2.2 | | | | 4x7 | 19 | 5x11 | 25 | 6.3x11 | 33 |
| | | | | 5x11 | 25 | | | | |
| 3.3 | | | | 5x7 | 25 | 5x11 | 37 | 6.3x11 | 39 |
| | | 4x7 | 20 | 5x11 | 28 | | | | |
| 4.7 | | 5x7 | 30 | 5x11 | 34 | 6.3x11 | 47 | 8x12 | 57 |
| | | 5x11 | 34 | 6.3x7 | 38 | | | | |
| 10 | | 5x11 | 45 | 6.3x11 | 52 | 8x12 | 68 | 8x14 | 80 |
| | | 6.3x7 | 48 | 8x7 | 54 | | | | |
| 22 | | 6.3x11 | 74 | 8x7 | 66 | 8x14 | 95 | 10x16 | 135 |
| | | 8x7 | 62 | 8x12 | 88 | | | | |
| 33 | | 8x7 | 76 | 8x14 | 105 | 10x16 | 135 | 13x21 | 220 |
| | | 8x12 | 105 | | | | | | |
| 47 | | 8x14 | 125 | 10x16 | 150 | 10x20 | 180 | 13x21 | 240 |
| 100 | | 10x16 | 230 | 10x20 | 265 | 13x21 | 320 | 16x26 | 430 |
| 220 | | 13x21 | 420 | 13x25 | 480 | 16x26 | 570 | 18x35 | 720 |
| 330 | | 13x21 | 510 | 16x26 | 650 | 16x32 | 660 | | |
| 470 | | 13x25 | 660 | 16x32 | 840 | 18x35 | 965 | | |
| 1000 | | 16x32 | 1140 | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HN series

- Non-polarity standard product, 105°C 2000hours.
- Suitable for DC two-way return circuit.
- RoHS Compliance
- 無極性105°C 2000小時標準品。
- 適用於直流雙向迴路。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | |
|--|---|---|------|------|------|------|------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 160VDC | | | | | | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.03CV or 3 (μA) which is greater.(After 5 minutes application of DC rated voltage, at 20 °C) | | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 |
| | tan δ(Max) | 0.26 | 0.24 | 0.22 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.15 |
| When nominal capacitance over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF . | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 |
| | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 |
| | Z(-40°C)/Z(20°C) | 10 | 8 | 6 | 5 | 4 | 4 | 3 | 3 | 4 |
| Load Life 負荷壽命 | 2000hours with the polarity inverted every 250 hours at 105°C | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | |

Frequency Coefficient of Permissible Ripple Current

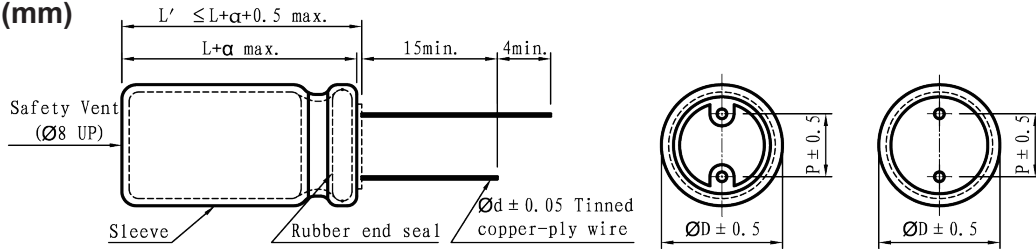
| Capacitance (μF) | Frequency (Hz) | | | |
|------------------|----------------|------|------|-------|
| | 50 | 120 | 1K | ≥ 10K |
| < 100 | 0.80 | 1.00 | 1.30 | 1.50 |
| ≥ 100 | 0.80 | 1.00 | 1.15 | 1.20 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

HN

HN series

DIMENSIONS(mm)



| | | | | | | | |
|-----|------|-----|-----|-----|-----|-----|-----|
| φ D | 4 | 5 | 6.3 | 8 | 10 | 13 | 16 |
| P | 1.5 | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 |
| φ d | 0.45 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≧ 16) 2.0 |

STANDARD RATINGS

D×L (mm) ; R.C.(mA rms) at 105°C 120Hz

| Cap (μF) | V | 6.3 | | 10 | | 16 | | 25 | |
|----------|---|--------|-------|--------|-------|--------|-------|--------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 3.3 | | | | | | | | 4x7 | 15 |
| 4.7 | | | | | | 4x7 | 18 | 5x7 | 18 |
| 10 | | | | 4x7 | 23 | 5x7 | 27 | 5x11 | 36 |
| | | | | | | 5x11 | 30 | 6.3x7 | 28 |
| 22 | | 5x7 | 33 | 5x7 | 36 | 6.3x7 | 41 | 6.3x11 | 55 |
| | | | | 5x11 | 42 | 6.3x11 | 52 | 8x7 | 42 |
| 33 | | 5x7 | 40 | 6.3x7 | 45 | 6.3x11 | 66 | 8x12 | 75 |
| | | 5x11 | 48 | 6.3x11 | 58 | 8x7 | 52 | | |
| 47 | | 6.3x7 | 49 | 6.3x11 | 70 | 8x12 | 90 | 10x13 | 96 |
| | | 6.3x11 | 65 | 8x7 | 55 | | | | |
| 100 | | 8x12 | 105 | 10x13 | 125 | 10x13 | 140 | 10x16 | 158 |
| 220 | | 10x13 | 168 | 10x16 | 205 | 10x20 | 285 | 13x21 | 306 |
| 330 | | 10x16 | 230 | 10x20 | 278 | 13x21 | 346 | 13x25 | 415 |
| 470 | | 10x20 | 330 | 13x21 | 370 | 13x25 | 460 | 16x26 | 545 |
| 1000 | | 13x25 | 550 | 16x26 | 665 | 16x26 | 750 | 16x32 | 870 |

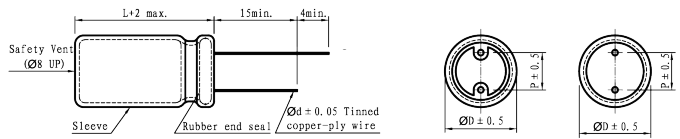
| Cap (μF) | V | 35 | | 50 | | 63 | | 100 | | 160 | |
|----------|---|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 0.1 | | | | 4x7 | 2.1 | 4x7 | 2.6 | | | | |
| 0.22 | | | | 4x7 | 4.5 | 4x7 | 5.0 | | | | |
| 0.33 | | | | 4x7 | 5.6 | 4x7 | 6.1 | | | | |
| 0.47 | | | | 4x7 | 6.6 | 4x7 | 7.3 | | | | |
| 0.1~0.47 | | | | 5x11 | 8 | 5x11 | 5 | 5x11 | 10 | 6.3x11 | 10 |
| | | | | 4x7 | 9.7 | 4x7 | 10 | 5x11 | 15 | 8x12 | 17 |
| | | | | 5x11 | 12 | 5x11 | 15 | | | | |
| 2.2 | | 4x7 | 13 | 5x7 | 14 | 5x7 | 16 | 6.3x11 | 24 | 8x12 | 20 |
| | | | | 5x11 | 18 | 5x11 | 22 | | | | |
| 3.3 | | 5x7 | 16 | 5x7 | 18 | 6.3x7 | 20 | 8x12 | 32 | 8x12 | 25 |
| | | | | 5x11 | 22 | 6.3x11 | 26 | | | | |
| 4.7 | | 5x7 | 20 | 6.3x7 | 22 | 6.3x11 | 32 | 8x12 | 40 | 8x12 | 30 |
| | | 5x11 | 25 | 6.3x11 | 30 | 8x7 | 24 | | | | |
| 5.6 | | 5x11 | 28 | 6.3x11 | 35 | 6.3x11 | 40 | 8x12 | 48 | 8x14 | 35 |
| 6.8 | | 5x11 | 33 | 6.3x11 | 40 | 8x12 | 45 | 8x14 | 52 | 8x16 | 41 |
| 10 | | 6.3x11 | 40 | 8x12 | 50 | 8x12 | 55 | 10x13 | 65 | 10x16 | 55 |
| | | 8x7 | 30 | | | | | | | | |
| 22 | | 8x12 | 68 | 10x13 | 82 | 10x16 | 90 | 10x20 | 120 | 13x21 | 106 |
| 33 | | 10x13 | 90 | 10x16 | 100 | 10x20 | 128 | 13x21 | 168 | 13x21 | 130 |
| 47 | | 10x13 | 110 | 10x20 | 146 | 10x20 | 156 | 13x21 | 200 | 13x25 | 167 |
| 56 | | 10x16 | 140 | 13x21 | 195 | 13x21 | 218 | 13x21 | 250 | 16x26 | 206 |
| 100 | | 10x20 | 196 | 13x25 | 260 | 13x25 | 275 | 13x25 | 295 | 16x32 | 300 |
| 220 | | 13x25 | 365 | 16x26 | 445 | 16x32 | 486 | | | | |
| 330 | | 16x26 | 492 | 16x32 | 595 | | | | | | |
| 470 | | 16x32 | 595 | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HN

HR series

- Non-polarity, low E.S.R., ripple current high frequency and high-temperature resistance.
- Suitable for propositive amplifier of high-grade audio and horizontal compensatory return circuit of TV set.
- RoHS Compliance.
- 無極性、低阻抗、耐高紋波、高頻率、耐高溫產品。
- 適用於高級音響的前置放大器及電視機的水平補償迴路。



| | | | |
|----------|-----|-----|-----|
| ϕ D | 10 | 13 | 16 |
| P | 5.0 | 5.0 | 7.5 |
| ϕ d | 0.6 | 0.6 | 0.8 |

SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | |
|--|---|---|----|----|-----|
| Capacitance Tolerance 靜電容量誤差 | $\pm 20\%$ (120Hz, 20°C) | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | |
| Rated Voltage Range 額定電壓範圍 | 25、35、50、100VDC | | | | |
| Leakage Current 洩漏電流 | After 5 minutes application of DC rated voltage, leakage current is 100 μ A or less. | | | | |
| Dissipation Factor 散逸因素(tan δ) | 0.05 Max. measured at 120Hz, 20°C | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | |
| | Rated Voltage(V) | 25 | 35 | 50 | 100 |
| | Z(-25°C)/Z(20°C) | 3 | 3 | 3 | 3 |
| | Z(-40°C)/Z(20°C) | 4 | 4 | 4 | 4 |
| Load Life 負荷壽命 | 1000hours, with application of rated voltage at 105°C | | | | |
| | Capacitance Change | Within $\pm 15\%$ of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | |
| | Capacitance Change | Within $\pm 15\%$ of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | |

STANDARD RATINGS

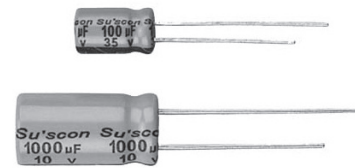
D x L (mm), R.C. A(p-p)15.75KHz at 105°C, E.S.R. (Ω) at 20°C 120Hz.

| Cap (μ F) | V Item | 25 | | | 35 50 100 | | |
|-------------------|-----------|-------|------|-------|-----------|------|-------|
| | | D x L | R.C. | E.S.R | D x L | R.C. | E.S.R |
| 2.2 | | 10x20 | 2.8 | 30.20 | 13x25 | 3.0 | 30.20 |
| 2.7 | | 13x21 | 3.5 | 24.23 | 13x25 | 4.5 | 24.23 |
| 3.3 | | 13x21 | 4.0 | 20.12 | 16x26 | 5.0 | 20.12 |
| 4.7 | | 13x21 | 5.0 | 14.30 | 16x26 | 6.5 | 14.30 |
| 5.6 | | 13x25 | 6.0 | 9.80 | 16x32 | 6.5 | 9.80 |
| 6.8 | | 16x26 | 7.0 | 8.10 | 16x36 | 7.5 | 8.10 |
| 8.2 | | 16x26 | 7.5 | 7.05 | 16x36 | 8.0 | 7.05 |
| 10 | | 16x32 | 9.0 | 5.60 | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SA/SB series

- Low leakage current product.
- Suitable for prepositive amplifier of high-grade audio and oscillating return of TV set.
- RoHS Compliance.
- 低洩漏電流產品。
- 適用於高級音響的前置放大器及電視機的振盪迴路等。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | |
|---|--|---|------|------|------|------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | SA : -40 ~ +85°C SB : -40 ~ +105°C | | | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 100VDC | | | | | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.002CV or 0.4 (μA) , which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 |
| | tan δ(Max) | 0.24 | 0.20 | 0.16 | 0.15 | 0.12 | 0.10 | 0.09 | 0.08 |
| When nominal capacitance over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF. | | | | | | | | | |
| Low Temperature Stability 低溫特性 | Measurement Frequency: 120Hz. | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 |
| | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 |
| Impedance Ratio(Max) 阻抗比率(最大值) | Z(-40°C)/Z(20°C) | 8 | 6 | 6 | 4 | 4 | 3 | 3 | 3 |
| | 2000hours ,with application of rated voltage at 85°C(1000hours at 105°C) | | | | | | | | |
| Load Life 負荷壽命 | Capacitance Change | Within ± 25% of Initial Value | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C and 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | |
| | Capacitance Change | Within ± 25% of Initial Value | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | |

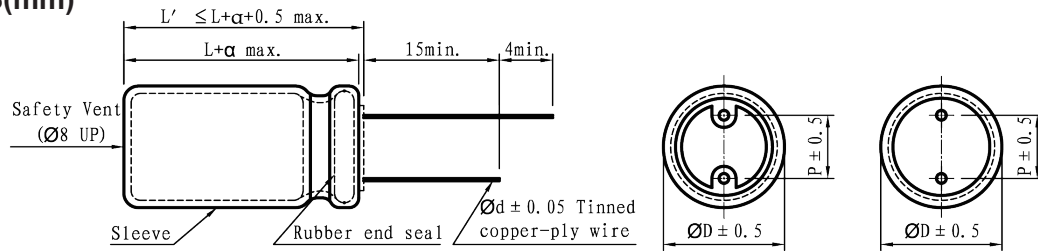
Frequency Coefficient of Permissible Ripple Current

| Capacitance (μF) | Frequency (Hz) | | | |
|------------------|----------------|------|------|------|
| | 50 | 120 | 1K | 10K |
| < 100 | 0.80 | 1.00 | 1.30 | 1.50 |
| 100 ~ 1000 | 0.80 | 1.00 | 1.15 | 1.20 |
| > 1000 | 0.80 | 1.00 | 1.10 | 1.15 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

SA/SB series

DIMENSIONS(mm)



| | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|
| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|------------------------------|
| α | (L < 16) 1.0 (L ≥ 16) 2.0 |
|----------|------------------------------|

STANDARD RATINGS

D×L (mm) ; R.C.(mA rms) at 85°C/105°C 120Hz

| Cap (μF) | V | 6.3 | | 10 | | 16 | | 25 | |
|----------|-------|-------|-------|--------|-------|--------|-------|--------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 4.7 | | | | | | | | 5x11 | 45 |
| 6.8 | | | | | | | | 5x11 | 55 |
| 10 | | | | | | 5x11 | 55 | 5x11 | 70 |
| 15 | | | | | | 5x11 | 70 | 5x11 | 85 |
| 22 | | | | | | 5x11 | 85 | 5x11 | 100 |
| 33 | | | | | | 5x11 | 100 | 6.3x11 | 140 |
| 47 | | | | 5x11 | 100 | 6.3x11 | 140 | 6.3x11 | 170 |
| 68 | | | | 6.3x11 | 150 | 6.3x11 | 160 | 8x12 | 230 |
| 100 | | | | 6.3x11 | 180 | 8x12 | 230 | 8x12 | 280 |
| 150 | | | | 8x12 | 250 | 8x12 | 280 | 10x13 | 370 |
| 220 | | | | 8x12 | 310 | 10x13 | 370 | 10x16 | 400 |
| 330 | | | | 10x13 | 400 | 10x16 | 420 | 10x20 | 490 |
| 470 | 10x13 | 385 | 10x16 | 530 | 10x16 | 550 | 10x20 | 650 | |
| 680 | 10x13 | 480 | 10x16 | 600 | 10x20 | 720 | 13x21 | 800 | |
| 1000 | 10x16 | 640 | 10x20 | 780 | 13x21 | 900 | 13x25 | 1000 | |
| 1500 | 10x20 | 900 | 13x25 | 1020 | 16x26 | 1150 | 16x32 | 1270 | |
| 2200 | 13x21 | 1050 | 13x25 | 1200 | 16x26 | 1300 | 16x36 | 1440 | |
| 3300 | 16x26 | 1300 | 16x32 | 1420 | 16x36 | 1550 | 18x40 | 1720 | |
| 4700 | 16x32 | 1500 | 16x36 | 1650 | 18x35 | 1820 | | | |

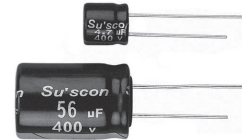
| Cap (μF) | V | 35 | | 50 | | 63 | | 100 | |
|----------|--------|-------|--------|-------|--------|-------|--------|-------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 0.1 | | | | 5x11 | 1.1 | | | 5x11 | 2.1 |
| 0.15 | | | | 5x11 | 1.6 | | | 5x11 | 3.2 |
| 0.22 | | | | 5x11 | 2.3 | | | 5x11 | 4.7 |
| 0.33 | | | | 5x11 | 3.5 | | | 5x11 | 7.0 |
| 0.47 | | | | 5x11 | 5.0 | | | 5x11 | 10.1 |
| 0.68 | | | | 5x11 | 7.3 | | | 5x11 | 14.5 |
| 1 | | | | 5x11 | 10.7 | | | 5x11 | 19 |
| 1.5 | | | | 5x11 | 16 | | | 5x11 | 23 |
| 2.2 | | | | 5x11 | 23 | | | 5x11 | 28 |
| 3.3 | | | | 5x11 | 40 | | | 5x11 | 45 |
| 4.7 | 5x11 | 45 | 5x11 | 45 | | | | 5x11 | 50 |
| 6.8 | 5x11 | 55 | 5x11 | 55 | 5x11 | 59 | 6.3x11 | 65 | |
| 10 | 5x11 | 70 | 5x11 | 70 | 6.3x11 | 75 | 8x12 | 90 | |
| 15 | 5x11 | 85 | 6.3x11 | 95 | 6.3x11 | 100 | 8x12 | 110 | |
| 22 | 6.3x11 | 110 | 6.3x11 | 110 | 8x12 | 115 | 10x13 | 136 | |
| 33 | 6.3x11 | 140 | 8x12 | 165 | 8x12 | 170 | 10x16 | 180 | |
| 47 | 8x12 | 190 | 8x12 | 190 | 10x13 | 200 | 10x20 | 220 | |
| 68 | 8x12 | 230 | 10x13 | 250 | 10x16 | 270 | 10x20 | 290 | |
| 100 | 10x13 | 300 | 10x16 | 320 | 10x20 | 330 | 13x21 | 370 | |
| 150 | 10x16 | 400 | 10x20 | 420 | 13x21 | 450 | 13x25 | 470 | |
| 220 | 10x20 | 440 | 13x21 | 490 | 13x21 | 550 | 16x26 | 580 | |
| 330 | 13x21 | 550 | 13x21 | 600 | 13x25 | 710 | 16x32 | 730 | |
| 470 | 13x25 | 680 | 13x25 | 750 | 16x26 | 850 | 18x35 | 910 | |
| 680 | 13x25 | 800 | 16x26 | 910 | 16x32 | 1050 | | | |
| 1000 | 16x26 | 1110 | 16x32 | 1140 | 18x35 | 1330 | | | |
| 1500 | 16x32 | 1390 | 18x40 | 1480 | | | | | |
| 2200 | 18x35 | 1580 | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SA/SB

AK series

- Protective countermeasure against DC over-voltage, 105°C 2000hours.
- RoHS Compliance.
- DC過電壓安全對策 105°C 2000小時。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | |
|--|---|---|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | |
| Operating Temperature Range 適用溫度範圍 | -25 ~ +105°C | | |
| Rated Voltage Range 額定電壓範圍 | 200VDC、400VDC | | |
| Leakage Current 洩漏電流 | $I \leq 0.04CV + 100 (\mu A)$ (After 1 minutes application of DC rated voltage, at 20 °C) | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | |
| | Rated Voltage(V) | 200 | 400 |
| | tan δ(Max) | 0.15 | 0.15 |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | |
| | Rated Voltage(V) | 200 | 400 |
| | Z(-25°C)/Z(20°C) | 4 | 6 |
| Load Life 負荷壽命 | 2000hours ,with application of rated voltage at 105°C | | |
| | Capacitance Change | Within ± 20% of Initial Value | |
| | tan δ | 200% or less of the Initial Specified Value | |
| | Leakage Current | Initial Specified Value or less | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | |
| | Capacitance Change | Within ± 20% of Initial Value | |
| | tan δ | 200% or less of Initial Specified Value | |
| | Leakage Current | Initial Specified Value or less | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | |

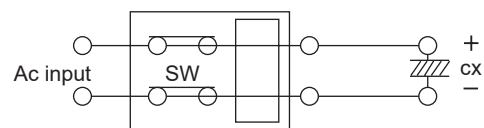
◆ DC over voltage test conditions

The vent will be operated and the capacitor shall become an open circuit without burning materials when the following excess DC voltage is applied.

TEST DC VOLTAGE

| Rated Voltage | Current Limit | Test DC Voltage |
|---------------|---------------|-----------------|
| 200 Vdc | 4A | 300 / 375 Vdc |
| 400 Vdc | 2A | 500 / 600 Vdc |

TEST CIRCUIT



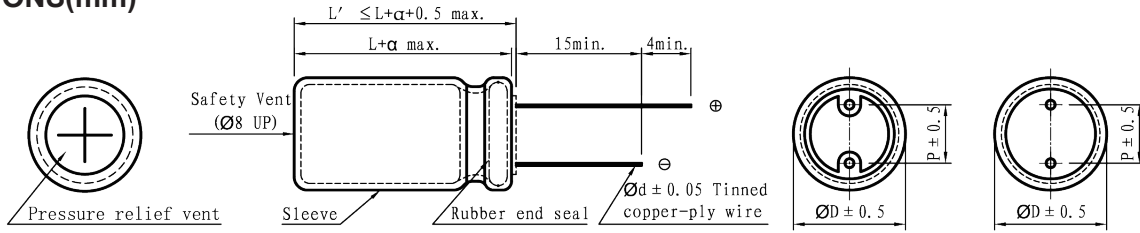
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance (µF) | Frequency (Hz) | | | | |
|-------------------|------------------|----------------|------|------|------|------|
| | | 60(50) | 120 | 150 | 1K | ≥10K |
| 200 | 22 ~ 470 | 0.85 | 1.00 | 1.30 | 1.50 | 1.85 |
| | 4.7 ~ 68 | 0.85 | 1.00 | 1.20 | 1.30 | 1.50 |
| 400 | 82 ~ 220 | 0.85 | 1.00 | 1.10 | 1.15 | 1.20 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

AK series

DIMENSIONS(mm)



| | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|
| ϕD | 10 | 13 | 16 | 18 | 20 | 22 |
| P | 5.0 | 5.0 | 7.5 | 7.5 | 10 | 10 |
| ϕd | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L (mm) ; R.C.(mA rms) at 105°C 120Hz

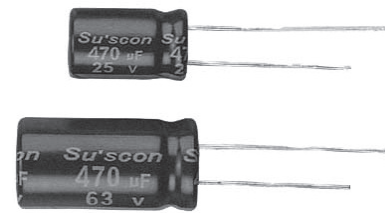
| V | Cap (μF) | D x L | R.C. |
|-------|----------|-------|------|
| 200 | 22 | 10x20 | 120 |
| | 33 | 10x25 | 160 |
| | | 13x21 | 160 |
| | 47 | 10x30 | 195 |
| | | 13x21 | 195 |
| | 56 | 13x25 | 210 |
| | 68 | 13x25 | 250 |
| | | 16x22 | 250 |
| | 82 | 13x32 | 285 |
| | | 16x22 | 285 |
| | | 16x26 | 305 |
| | 100 | 13x35 | 335 |
| | | 16x26 | 335 |
| | | 16x36 | 350 |
| | | 18x21 | 335 |
| | 120 | 16x26 | 450 |
| | | 16x32 | 500 |
| | | 18x25 | 500 |
| | 150 | 16x32 | 560 |
| | | 16x36 | 585 |
| | | 18x21 | 560 |
| | | 18x25 | 585 |
| | 180 | 16x36 | 600 |
| | | 16x40 | 645 |
| | 220 | 18x32 | 645 |
| | | 18x32 | 680 |
| | 330 | 18x35 | 700 |
| | | 18x40 | 735 |
| 18x35 | | 775 | |
| 390 | 18x40 | 810 | |
| | 18x45 | 920 | |
| 470 | 18x40 | 850 | |
| | 22x40 | 920 | |
| | | 18x45 | 1120 |
| | | 22x40 | 1270 |

| V | Cap (μF) | D x L | R.C. | |
|-------|----------|-------|-------|-----|
| 400 | 4.7 | 10x10 | 60 | |
| | 10 | 10x13 | 63 | |
| | | 10x16 | 87 | |
| | | 10x20 | 105 | |
| | 18 | 10x25 | 115 | |
| | | 22 | 13x25 | 135 |
| | | | 13x30 | 145 |
| | | | 16x22 | 145 |
| | 33 | 16x26 | 180 | |
| | | 13x25 | 175 | |
| | | 16x26 | 195 | |
| | | 18x21 | 225 | |
| | 47 | 18x25 | 255 | |
| | | 13x32 | 370 | |
| | | 16x26 | 268 | |
| | | 16x32 | 275 | |
| | | 16x36 | 290 | |
| | | 18x21 | 275 | |
| | | 18x25 | 290 | |
| | 56 | 18x32 | 310 | |
| | | 16x32 | 326 | |
| | | 16x36 | 338 | |
| | | 16x40 | 350 | |
| | | 18x32 | 320 | |
| | 68 | 16x36 | 320 | |
| | | 16x40 | 360 | |
| | | 18x25 | 350 | |
| | | 18x32 | 360 | |
| | 82 | 18x35 | 380 | |
| | | 16x32 | 395 | |
| | | 18x25 | 395 | |
| | | 18x32 | 400 | |
| | 100 | 18x40 | 420 | |
| | | 18x28 | 450 | |
| | | 18x32 | 470 | |
| | | 18x35 | 490 | |
| | 120 | 18x40 | 510 | |
| | | 18x32 | 515 | |
| | | 18x35 | 530 | |
| | 150 | 18x40 | 550 | |
| 18x35 | | 770 | | |
| 18x40 | | 790 | | |
| 180 | 22x35 | 800 | | |
| | 22x40 | 1000 | | |

AK

SDN series

- Anhydrous product.
- Low impedance at High frequency range, high ripple current resistance.
- Suitable for return-circuit of switching power source.
- RoHS Compliance
- 無水系產品。
- 高頻低阻抗、耐高紋波。
- 適用於開關電源迴路。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | | |
|---|---|---|------|------|------|--------------|------|------|------|---------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -55 ~ +105°C | | | | | -40 ~ +105°C | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 100VDC | | | | | 160 ~ 400VDC | | | | | |
| Leakage Current 洩漏電流 | $V \leq 100V I \leq 0.01CV$ or $3 (\mu A)$ (After 2 minutes application of DC rated voltage, at 20 °C) $V > 100V I \leq 0.03CV + 20 (\mu A)$ (After 5 minutes application of DC rated voltage, at 20 °C) | | | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160~250 | 400 |
| | tan δ(Max) | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | 0.07 | 0.20 | 0.24 |
| When nominal capacitance over 1000μF, tanδ shall be added 0.02 to the listed value with increase of every 1000μF. | | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160~250 | 400 |
| | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 6 |
| | Z(-40°C)/Z(20°C) | - | - | - | - | - | - | 3 | 3 | 6 | 12 |
| Z(-55°C)/Z(20°C) | 8 | 6 | 4 | 3 | 3 | 3 | - | - | - | - | |
| Load Life 負荷壽命 | 2000hours,with application of Rated voltage at 105°C | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | | |

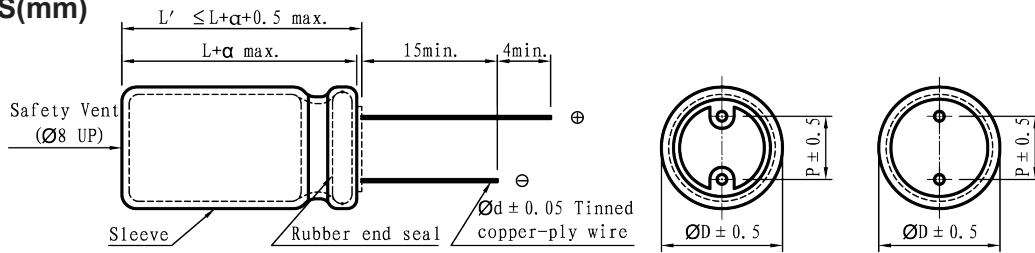
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance (μF) | Frequency (Hz) | | | | |
|-------------------|------------------|----------------|------|------|------|------|
| | | 50 | 120 | 1K | 10K | 100K |
| 6.3 ~ 100 | 47 ~ 100 | 0.45 | 0.55 | 0.75 | 0.90 | 1.00 |
| | 220 ~ 1000 | 0.60 | 0.70 | 0.85 | 0.95 | 1.00 |
| | 1500 ~ 15000 | 0.70 | 0.80 | 0.95 | 0.98 | 1.00 |
| 160 ~ 400 | 2.2 ~ 330 | 0.55 | 0.65 | 0.80 | 0.90 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

SDN series

DIMENSIONS(mm)



| | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|
| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|------------------------------|
| α | (L < 16) 1.0 (L ≥ 16) 2.0 |
|----------|------------------------------|

STANDARD RATINGS

D×L (mm) ; R.C.(mA rms) at 105°C 100KHz ; IMP(Ω max) at 20°C 100KHz

| Cap (μ F) | V Item | 6.3 | | | 10 | | | 16 | | | 25 | | |
|-------------------|-----------|--------|------|-------|--------|------|-------|--------|------|-------|--------|------|-------|
| | | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP |
| 4.7 | | | | | | | | | | | 5x11 | 50 | 1.820 |
| 10 | | | | | | | | | | | 5x11 | 80 | 1.820 |
| 22 | | | | | | | | | | | 5x11 | 110 | 0.970 |
| 47 | | | | | 5x11 | 140 | 0.860 | 5x11 | 170 | 0.790 | 5x11 | 170 | 0.790 |
| 68 | | | | | 5x11 | 160 | 0.860 | 5x11 | 210 | 0.670 | 6.3x11 | 210 | 0.670 |
| 100 | | | | | 5x11 | 180 | 0.860 | 6.3x11 | 270 | 0.360 | 6.3x11 | 270 | 0.360 |
| 220 | | 6.3x11 | 270 | 0.430 | 6.3x11 | 270 | 0.400 | 8x12 | 440 | 0.240 | 8x12 | 440 | 0.240 |
| 330 | | 6.3x11 | 320 | 0.410 | 8x12 | 440 | 0.260 | 8x12 | 440 | 0.240 | 10x13 | 650 | 0.120 |
| 470 | | 8x12 | 440 | 0.290 | 8x12 | 440 | 0.260 | 10x13 | 650 | 0.120 | 10x16 | 800 | 0.091 |
| 680 | | 8x12 | 440 | 0.290 | 10x13 | 650 | 0.130 | 10x16 | 800 | 0.091 | 10x20 | 1050 | 0.070 |
| 1000 | | 10x13 | 650 | 0.140 | 10x16 | 800 | 0.098 | 10x20 | 1050 | 0.070 | 13x21 | 1350 | 0.067 |
| 1500 | | 10x16 | 800 | 0.100 | 10x20 | 1050 | 0.077 | 13x21 | 1350 | 0.067 | 13x25 | 1650 | 0.048 |
| 2200 | | 10x25 | 1350 | 0.079 | 13x21 | 1350 | 0.073 | 13x25 | 1650 | 0.052 | 16x26 | 2050 | 0.036 |
| 3300 | | 13x21 | 1350 | 0.079 | 13x25 | 1650 | 0.065 | 16x26 | 2050 | 0.036 | 16x32 | 2550 | 0.033 |
| 4700 | | 13x25 | 1650 | 0.051 | 13x35 | 2050 | 0.040 | 16x32 | 2550 | 0.033 | 18x35 | 2950 | 0.031 |
| 6800 | | 16x26 | 2050 | 0.043 | 16x32 | 2550 | 0.036 | 18x35 | 2950 | 0.031 | 18x40 | 3300 | 0.028 |
| 10000 | | 16x32 | 2550 | 0.039 | 18x35 | 2950 | 0.034 | 18x40 | 3300 | 0.028 | | | |
| 15000 | | 16x35 | 2950 | 0.036 | 18x40 | 3300 | 0.030 | | | | | | |

| Cap (μ F) | V Item | 35 | | | 50 | | | 63 | | | 100 | | |
|-------------------|-----------|--------|------|-------|--------|------|-------|--------|------|-------|--------|------|-------|
| | | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. | IMP |
| 0.47 | | | | | 5x11 | 25 | 10.73 | | | | 5x11 | 20 | 30.30 |
| 1 | | | | | 5x11 | 40 | 7.580 | | | | 5x11 | 30 | 28.60 |
| 2.2 | | | | | 5x11 | 55 | 6.440 | | | | 5x11 | 44 | 14.00 |
| 3.3 | | | | | 5x11 | 65 | 5.580 | | | | 5x11 | 58 | 9.400 |
| 4.7 | | 5x11 | 85 | 2.640 | 5x11 | 90 | 3.290 | 5x11 | 65 | 9.880 | 5x11 | 74 | 6.600 |
| 10 | | 5x11 | 100 | 1.580 | 5x11 | 110 | 2.000 | 5x11 | 110 | 5.450 | 6.3x11 | 130 | 2.600 |
| 22 | | 5x11 | 120 | 1.320 | 5x11 | 140 | 1.720 | 6.3x11 | 200 | 1.890 | 8x12 | 230 | 2.000 |
| 33 | | 5x11 | 210 | 0.568 | 6.3x11 | 240 | 0.690 | 6.3x11 | 250 | 1.770 | 10x13 | 320 | 0.700 |
| 47 | | 6.3x11 | 270 | 0.550 | 6.3x11 | 240 | 0.690 | 8x12 | 320 | 0.800 | 10x16 | 390 | 0.500 |
| 68 | | 8x12 | 360 | 0.396 | 8x12 | 300 | 0.430 | 10x13 | 380 | 0.760 | 10x20 | 420 | 0.400 |
| 100 | | 8x12 | 440 | 0.246 | 8x12 | 400 | 0.360 | 10x13 | 450 | 0.670 | 13x21 | 580 | 0.300 |
| 220 | | 10x13 | 650 | 0.132 | 10x16 | 600 | 0.240 | 10x20 | 780 | 0.340 | 16x26 | 880 | 0.100 |
| 330 | | 10x16 | 800 | 0.100 | 10x20 | 800 | 0.220 | 13x21 | 950 | 0.210 | 16x32 | 930 | 0.100 |
| 470 | | 10x20 | 1050 | 0.077 | 13x21 | 1050 | 0.130 | 13x25 | 1430 | 0.170 | 16x36 | 1230 | 0.100 |
| 680 | | 13x21 | 1350 | 0.073 | 13x25 | 1150 | 0.100 | 16x26 | 1780 | 0.130 | 18x35 | 1410 | 0.091 |
| 1000 | | 13x25 | 1650 | 0.056 | 16x26 | 1550 | 0.069 | 16x32 | 1900 | 0.100 | 18x40 | 1520 | 0.065 |
| 1500 | | 16x26 | 2050 | 0.040 | 16x32 | 1950 | 0.061 | 18x35 | 2150 | 0.079 | | | |
| 2200 | | 16x32 | 2550 | 0.036 | 18x35 | 2250 | 0.057 | 18x40 | 2350 | 0.077 | | | |
| 3300 | | 18x35 | 2950 | 0.034 | | | | | | | | | |
| 4700 | | 18x40 | 3300 | 0.030 | | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SDN series

STANDARD RATINGS

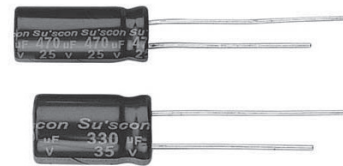
D×L(mm) ; R.C.(mA rms) at 105°C 100KHz

| Cap (μ F) | V Item | 160 | | 200 | | 250 | | 400 | |
|-------------------|-----------|-------|------|-------|------|-------|------|-------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 2.2 | | | | | | 8x12 | 105 | 8x12 | 80 |
| 3.3 | | 8x12 | 104 | 8x12 | 113 | 8x12 | 122 | 10x13 | 110 |
| 4.7 | | 8x12 | 112 | 8x12 | 126 | 10x13 | 140 | 10x16 | 160 |
| 10 | | 10x13 | 180 | 10x13 | 210 | 10x16 | 300 | 10x20 | 195 |
| 22 | | 10x16 | 250 | 10x20 | 465 | 13x21 | 485 | 13x25 | 350 |
| 33 | | 10x20 | 570 | 10x25 | 600 | 13x21 | 620 | 13x25 | 580 |
| 47 | | 13x21 | 730 | 13x21 | 730 | 13x25 | 810 | 16x26 | 720 |
| 68 | | 13x25 | 850 | 13x25 | 985 | 16x26 | 1010 | 16x32 | 820 |
| 100 | | 16x26 | 1285 | 16x26 | 1285 | 16x32 | 1405 | 18x35 | 950 |
| 150 | | 16x32 | 1310 | 16x32 | 1310 | 18x32 | 1455 | | |
| 220 | | 16x36 | 1450 | 18x32 | 1510 | 18x40 | 1490 | | |
| 330 | | 18x35 | 1850 | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HFN series

- Anhydrous product.
- Low impedance at High frequency range.
- High ripple current resistance, 105°C 4000~8000 hours long life.
- RoHS Compliance
- 無水系產品。
- 高頻低阻抗。
- 耐高紋波電流、105°C 4000~8000小時長壽命產品。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | |
|--|---|---|-------|-------|-------|--------------|-------|-------|-------|--|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -55 ~ +105°C | | | | | -40 ~ +105°C | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 50VDC | | | | | 63 ~ 100VDC | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3 (µA) which is greater.(After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | |
| | tan δ(Max) | 0.24 | 0.20 | 0.16 | 0.15 | 0.12 | 0.10 | 0.09 | 0.08 | |
| | When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF. | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | |
| | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | |
| | Z(-40°C)/Z(20°C) | - | - | - | - | - | - | 3 | 3 | |
| | Z(-55°C)/Z(20°C) | 8 | 6 | 4 | 3 | 3 | 3 | - | - | |
| Load Life 負荷壽命 | Time | φ | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 | |
| | | hours | 4,000 | 4,000 | 5,000 | 6,000 | 7,000 | 8,000 | 8,000 | |
| | Capacitance Change | within ±25% of Initial Value | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | |
| | Capacitance Change | within ±25% of Initial Value | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| | Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | |

HFN

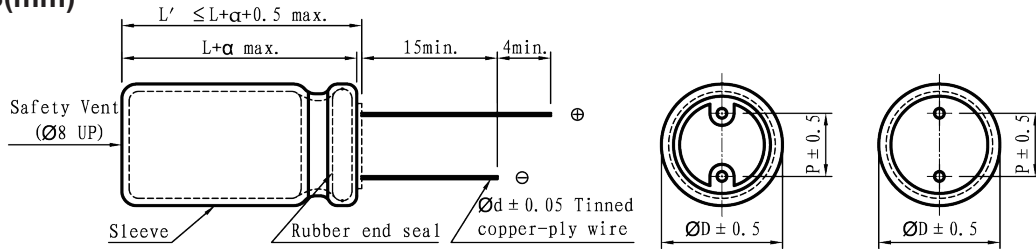
Frequency Coefficient of Permissible Ripple Current

| Capacitance (µF) | Frequency (Hz) | | | |
|------------------|----------------|------|------|------|
| | 120 | 1K | 10K | 100K |
| 5.6 ~ 180 | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 ~ 560 | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 ~ 1800 | 0.60 | 0.87 | 0.95 | 1.00 |
| 2200 ~ 3900 | 0.75 | 0.90 | 0.95 | 1.00 |
| 4700 ~ 18000 | 0.85 | 0.95 | 0.98 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

HFN series

DIMENSIONS(mm)



| | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|
| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm),R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C,-10°C 100KHz.

| Cap (μF) | V | Item | 6.3 | | | 10 | | | 16 | | | 25 | | | | | |
|----------|---|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|------|
| | | | D x L | IMP | | R.C. | D x L | IMP | | R.C. | D x L | IMP | | R.C. | | | |
| | | | | 20°C | -10°C | | | 20°C | -10°C | | | 20°C | -10°C | | 20°C | -10°C | |
| 47 | | | | | | | | | | | | | | | | | |
| 100 | | | | | | 5x11 | 0.550 | 1.100 | 170 | 5x11 | 0.550 | 1.100 | 170 | 5x11 | 0.600 | 1.210 | 175 |
| 150 | | 5x11 | 0.550 | 1.100 | 170 | | | | | 6.3x11 | 0.290 | 0.550 | 295 | 6.3x11 | 0.310 | 0.610 | 295 |
| 220 | | | | | | 6.3x11 | 0.270 | 0.550 | 295 | 6.3x15 | 0.190 | 0.400 | 410 | 6.3x15 | 0.220 | 0.430 | 420 |
| 330 | | 6.3x11 | 0.270 | 0.550 | 295 | 6.3x15 | 0.200 | 0.390 | 400 | 8x12 | 0.140 | 0.260 | 660 | 8x12 | 0.150 | 0.290 | 650 |
| 390 | | | | | | | | | | | | | | 8x16 | 0.110 | 0.220 | 750 |
| 470 | | 6.3x15 | 0.200 | 0.400 | 400 | 8x12 | 0.140 | 0.260 | 650 | 8x20 | 0.091 | 0.180 | 830 | 10x13 | 0.110 | 0.220 | 770 |
| 560 | | | | | | | | | | 8x20 | 0.100 | 0.200 | 740 | 8x20 | 0.096 | 0.180 | 820 |
| 680 | | 8x12 | 0.140 | 0.280 | 655 | 8x16 | 0.100 | 0.200 | 830 | 10x16 | 0.077 | 0.150 | 1070 | 10x16 | 0.085 | 0.170 | 1060 |
| 820 | | 10x13 | 0.100 | 0.200 | 860 | 10x13 | 0.100 | 0.200 | 860 | | | | | 10x16 | 0.085 | 0.170 | 1060 |
| 1000 | | 8x16 | 0.100 | 0.210 | 830 | 8x20 | 0.091 | 0.170 | 1010 | 10x20 | 0.061 | 0.120 | 1270 | 10x20 | 0.085 | 0.170 | 1060 |
| 1200 | | 10x16 | 0.077 | 0.150 | 1250 | 10x16 | 0.077 | 0.150 | 1250 | 10x20 | 0.061 | 0.120 | 1270 | 10x20 | 0.085 | 0.170 | 1060 |
| 1500 | | 10x20 | 0.059 | 0.120 | 1420 | 10x20 | 0.061 | 0.120 | 1420 | 10x25 | 0.053 | 0.100 | 1450 | 10x25 | 0.053 | 0.100 | 1450 |
| 1800 | | | | | | 10x30 | 0.043 | 0.085 | 1930 | 10x30 | 0.043 | 0.085 | 1930 | 10x30 | 0.043 | 0.085 | 1930 |
| 2200 | | 10x25 | 0.052 | 0.100 | 1640 | 10x30 | 0.043 | 0.085 | 1930 | 13x21 | 0.045 | 0.088 | 1650 | 13x21 | 0.045 | 0.088 | 1650 |
| 2700 | | 10x30 | 0.045 | 0.086 | 1930 | 13x21 | 0.045 | 0.088 | 1650 | 13x25 | 0.036 | 0.069 | 1970 | 13x25 | 0.036 | 0.069 | 1970 |
| 3300 | | 13x21 | 0.044 | 0.086 | 1650 | 13x25 | 0.036 | 0.069 | 1960 | 13x30 | 0.030 | 0.058 | 2330 | 13x30 | 0.030 | 0.058 | 2330 |
| 3900 | | 13x25 | 0.036 | 0.069 | 1960 | 13x25 | 0.036 | 0.069 | 1960 | 13x35 | 0.028 | 0.051 | 2520 | 13x35 | 0.028 | 0.051 | 2520 |
| 4700 | | 13x30 | 0.030 | 0.058 | 2320 | 13x30 | 0.030 | 0.058 | 2320 | 13x40 | 0.022 | 0.041 | 2880 | 13x40 | 0.022 | 0.041 | 2880 |
| 5600 | | 13x35 | 0.026 | 0.051 | 2520 | 13x35 | 0.026 | 0.051 | 2520 | 16x26 | 0.028 | 0.051 | 2570 | 16x26 | 0.028 | 0.051 | 2570 |
| 6300 | | | | | | | | | | 16x40 | 0.019 | 0.036 | 3720 | 16x40 | 0.019 | 0.036 | 3720 |
| 6800 | | 13x40 | 0.022 | 0.041 | 2880 | 13x40 | 0.022 | 0.041 | 2880 | 16x40 | 0.022 | 0.041 | 3160 | 16x40 | 0.022 | 0.041 | 3160 |
| 8200 | | 16x32 | 0.024 | 0.045 | 3020 | 16x32 | 0.024 | 0.045 | 3020 | 18x25 | 0.025 | 0.047 | 2750 | 18x25 | 0.025 | 0.047 | 2750 |
| 10000 | | 16x36 | 0.021 | 0.040 | 3150 | 16x36 | 0.021 | 0.040 | 3150 | 18x32 | 0.023 | 0.045 | 3020 | 18x32 | 0.023 | 0.045 | 3020 |
| 12000 | | 18x25 | 0.025 | 0.047 | 2750 | 18x25 | 0.025 | 0.047 | 2750 | 18x35 | 0.021 | 0.039 | 3670 | 18x35 | 0.021 | 0.039 | 3670 |
| 15000 | | 16x40 | 0.020 | 0.036 | 3720 | 16x40 | 0.020 | 0.036 | 3720 | 18x40 | 0.020 | 0.035 | 3810 | 18x40 | 0.020 | 0.035 | 3810 |
| 18000 | | 18x35 | 0.021 | 0.037 | 3670 | 18x35 | 0.021 | 0.037 | 3670 | | | | | | | | |
| | | 18x40 | 0.020 | 0.036 | 3810 | 18x40 | 0.020 | 0.036 | 3810 | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HFN

HFN series

STANDARD RATINGS

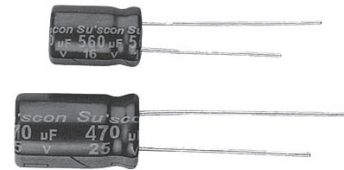
D×L(mm) ; R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C,-10°C 100KHz.

| Cap (μF) | V | 35 | | | | 50 | | | | 63 | | | | 100 | | | | |
|-------------|--------|-------|-------|------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|------|
| | | Item | D x L | IMP | | R.C. | D x L | IMP | | R.C. | D x L | IMP | | R.C. | D x L | IMP | | R.C. |
| | | | | 20°C | -10°C | | | 20°C | -10°C | | | 20°C | -10°C | | | 20°C | -10°C | |
| 5.6 | | | | | | | | | | | | | | 5x11 | 2.640 | 6.860 | 90 | |
| 12 | | | | | | | | | | 5x11 | 2.970 | 6.600 | 145 | 6.3x11 | 1.580 | 4.090 | 120 | |
| 18 | | | | | | | | | | | | | | 6.3x15 | 0.820 | 2.380 | 200 | |
| 22 | | | | | | 5x11 | 1.490 | 2.970 | 165 | 6.3x11 | 1.650 | 3.300 | 250 | 8x12 | 0.720 | 2.110 | 250 | |
| 27 | | | | | | | | | | | | | | 10x13 | 0.640 | 1.850 | 350 | |
| 33 | 5x11 | 0.850 | 1.740 | 185 | | | | | | | | | | 8x16 | 0.480 | 1.300 | 320 | |
| | | | | | | | | | | | | | | 10x16 | 0.450 | 1.200 | 460 | |
| 39 | | | | | | | | | | 6.3x15 | 0.990 | 2.310 | 340 | 8x20 | 0.370 | 0.990 | 450 | |
| 47 | | | | | | 6.3x11 | 0.720 | 1.490 | 270 | | | | | | | | | |
| 56 | 6.3x11 | 0.300 | 0.820 | 300 | | | | | | | | | | 10x20 | 0.360 | 0.940 | 580 | |
| 68 | | | | | | 6.3x15 | 0.520 | 1.060 | 370 | 8x12 | 0.570 | 1.230 | 410 | 10x25 | 0.270 | 0.700 | 760 | |
| 100 | 6.3x15 | 0.280 | 0.720 | 410 | | 8x12 | 0.350 | 0.710 | 490 | 8x16 | 0.430 | 1.080 | 540 | 10x30 | 0.210 | 0.570 | 910 | |
| | | | | | | | | | | 10x13 | 0.420 | 0.850 | 550 | 13x21 | 0.210 | 0.570 | 840 | |
| 120 | | | | | | 8x16 | 0.270 | 0.530 | 640 | | | | | | | | | |
| | | | | | | 10x13 | 0.250 | 0.530 | 630 | 10x16 | 0.320 | 0.630 | 620 | 13x25 | 0.160 | 0.430 | 1010 | |
| 150 | 8x12 | 0.150 | 0.280 | 625 | | | | | | 8x20 | 0.350 | 0.850 | 690 | | | | | |
| 180 | | | | | | 8x20 | 0.200 | 0.400 | 740 | | | | | | | | | |
| | | | | | | 10x16 | 0.220 | 0.420 | 860 | 10x20 | 0.240 | 0.480 | 890 | 13x30 | 0.130 | 0.360 | 1220 | |
| 220 | 8x16 | 0.110 | 0.220 | 740 | | | | | | | | | | 13x35 | 0.120 | 0.330 | 1420 | |
| | 10x13 | 0.110 | 0.210 | 770 | 10x20 | 0.150 | 0.300 | 1060 | 10x25 | 0.220 | 0.430 | 1060 | 16x26 | 0.110 | 0.310 | 1400 | | |
| 270 | 8x20 | 0.099 | 0.200 | 820 | | | | | | | | | | 13x40 | 0.083 | 0.240 | 1600 | |
| 330 | 10x16 | 0.085 | 0.170 | 1060 | | 10x25 | 0.130 | 0.250 | 1260 | 10x30 | 0.150 | 0.300 | 1310 | 16x32 | 0.079 | 0.240 | 1740 | |
| | | | | | | | | | | 13x21 | 0.140 | 0.290 | 1290 | 18x25 | 0.096 | 0.270 | 1610 | |
| 390 | | | | | | 10x30 | 0.095 | 0.190 | 1520 | | | | | 16x36 | 0.074 | 0.200 | 1950 | |
| | | | | | | 13x21 | 0.100 | 0.200 | 1490 | 13x25 | 0.120 | 0.240 | 1730 | 18x32 | 0.082 | 0.230 | 1820 | |
| 470 | 10x20 | 0.067 | 0.130 | 1230 | | | | | | 13x30 | 0.095 | 0.190 | 2100 | 16x40 | 0.060 | 0.160 | 2100 | |
| 560 | 10x25 | 0.057 | 0.110 | 1450 | | 13x25 | 0.078 | 0.150 | 1850 | | | | | 18x35 | 0.074 | 0.200 | 2150 | |
| 680 | 10x30 | 0.048 | 0.092 | 1700 | | | | | | | | | | | | | | |
| | 13x21 | 0.050 | 0.096 | 1670 | | 13x30 | 0.068 | 0.130 | 2230 | 13x35 | 0.081 | 0.160 | 2280 | 18x40 | 0.060 | 0.160 | 2250 | |
| | | | | | | | | | | 16x26 | 0.087 | 0.170 | 2170 | | | | | |
| 820 | | | | | | 13x35 | 0.060 | 0.110 | 2300 | 13x40 | 0.075 | 0.140 | 2570 | | | | | |
| | | | | | | | | | | 16x32 | 0.075 | 0.146 | 2680 | | | | | |
| | | | | | | | | | | 18x25 | 0.075 | 0.150 | 2690 | | | | | |
| 1000 | 13x25 | 0.040 | 0.076 | 1960 | | 13x40 | 0.053 | 0.100 | 2510 | | | | | | | | | |
| | | | | | | 16x26 | 0.062 | 0.120 | 2250 | 16x36 | 0.063 | 0.120 | 2780 | | | | | |
| 1200 | 13x30 | 0.033 | 0.064 | 2320 | | 16x32 | 0.050 | 0.096 | 2710 | 16x36 | 0.054 | 0.100 | 2860 | | | | | |
| | | | | | | 18x25 | 0.051 | 0.099 | 2610 | 18x32 | 0.059 | 0.110 | 2960 | | | | | |
| 1500 | 13x35 | 0.031 | 0.056 | 2520 | | 16x36 | 0.047 | 0.087 | 2810 | 18x35 | 0.054 | 0.100 | 3120 | | | | | |
| 1800 | 13x40 | 0.023 | 0.045 | 2880 | | 16x40 | 0.038 | 0.075 | 3210 | | | | | | | | | |
| | 16x26 | 0.031 | 0.057 | 2570 | | 18x32 | 0.047 | 0.087 | 3010 | 18x40 | 0.047 | 0.087 | 3220 | | | | | |
| 2200 | 16x32 | 0.025 | 0.050 | 3020 | | | | | | | | | | | | | | |
| | 18x25 | 0.028 | 0.052 | 2750 | | 18x35 | 0.042 | 0.080 | 3110 | | | | | | | | | |
| 2700 | 16x36 | 0.024 | 0.044 | 3160 | | | | | | | | | | | | | | |
| | 18x32 | 0.025 | 0.047 | 3340 | | 18x40 | 0.038 | 0.071 | 3410 | | | | | | | | | |
| 3300 | 16x40 | 0.022 | 0.040 | 3720 | | | | | | | | | | | | | | |
| | 18x35 | 0.023 | 0.041 | 3690 | | | | | | | | | | | | | | |
| 3900 | 18x40 | 0.022 | 0.040 | 3810 | | | | | | | | | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SGN series

- Anhydrous product.
- High ripple current, ultra low impedance at high frequency range.
- Long life.
- RoHS Compliance
- 無水系產品。
- 高紋波電流、高頻超低阻抗。
- 長壽命產品。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | |
|---|---|---|------|------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -55 ~ +105°C | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 50VDC | | | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3 (µA) which is greater. (After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 |
| | tan δ(Max) | 0.24 | 0.20 | 0.16 | 0.15 | 0.12 | 0.10 |
| When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF. | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 |
| | Z(-25°C)/Z(20°C) | 2 | 2 | 2 | 2 | 2 | 2 |
| Z(-55°C)/Z(20°C) | | | | | | | |
| Load Life 負荷壽命 | 5000hours,with application of rated voltage at 105°C (φ D ≤ 6.3mm, 2,000 hours ; φ D = 8mm, 3,000 hours ; φ D = 10mm, 4,000 hours) | | | | | | |
| | Capacitance Change | Within ± 25% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | |

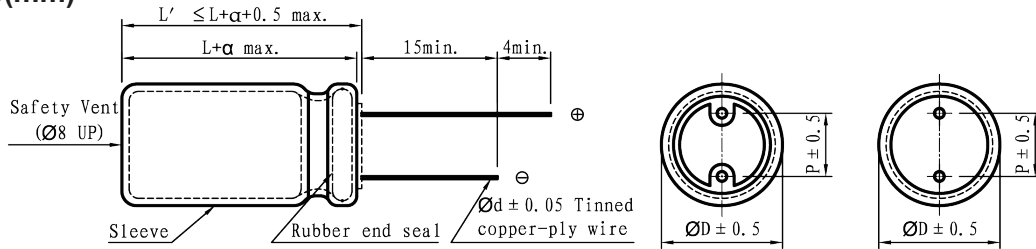
Frequency Coefficient of Permissible Ripple Current

| Capacitance (µF) | Frequency (Hz) | | | | |
|------------------|----------------|------|------|------|------|
| | 50 | 120 | 1K | 10K | 100K |
| ≤ 33 | 0.45 | 0.55 | 0.75 | 0.90 | 1.00 |
| 47 ~ 330 | 0.60 | 0.70 | 0.85 | 0.95 | 1.00 |
| 470 ~ 1000 | 0.65 | 0.75 | 0.90 | 0.98 | 1.00 |
| 1200 ~ 6800 | 0.75 | 0.80 | 0.95 | 1.00 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

SGN series

DIMENSIONS(mm)



| | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|
| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C 100KHz.

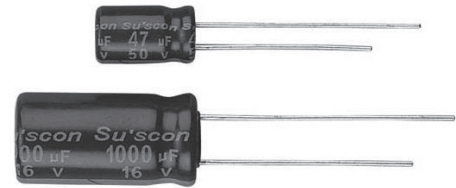
| Cap (μF) | V | 6.3 | | | 10 | | | 16 | | |
|----------|---|--------|-------|-------|--------|-------|-------|--------|-------|-------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 56 | | | | | | | | 5x11 | 250 | 0.500 |
| 100 | | | | | 5x11 | 250 | 0.500 | | | |
| 120 | | | | | | | | 6.3x11 | 405 | 0.210 |
| 150 | | 5x11 | 250 | 0.845 | | | | | | |
| 220 | | | | | 6.3x11 | 405 | 0.380 | 8x12 | 700 | 0.210 |
| 330 | | 6.3x11 | 405 | 0.230 | | | | 8x12 | 760 | 0.120 |
| 470 | | | | | 8x12 | 760 | 0.210 | 8x16 | 995 | 0.093 |
| 560 | | 8x12 | 760 | 0.130 | | | | 10x13 | 1030 | 0.087 |
| 680 | | | | | 8x16 | 995 | 0.093 | 8x20 | 1250 | 0.068 |
| 820 | | 8x16 | 995 | 0.099 | 10x13 | 1030 | 0.087 | 10x16 | 1430 | 0.062 |
| 1000 | | 10x13 | 1030 | 0.093 | 8x20 | 1250 | 0.068 | | | |
| 1200 | | | | | 10x16 | 1430 | 0.062 | 10x20 | 1820 | 0.038 |
| 1500 | | 8x20 | 1250 | 0.072 | 10x20 | 1820 | 0.038 | 10x25 | 2150 | 0.036 |
| 2200 | | 10x16 | 1430 | 0.066 | | | | | | |
| 2700 | | 10x20 | 1820 | 0.040 | 10x25 | 2150 | 0.036 | 13x21 | 2360 | 0.035 |
| 3300 | | 10x25 | 2150 | 0.038 | 13x21 | 2360 | 0.035 | 13x25 | 2770 | 0.030 |
| 3900 | | | | | | | | 13x30 | 3140 | 0.027 |
| 4700 | | 13x21 | 2360 | 0.037 | 13x25 | 2770 | 0.030 | 13x35 | 3400 | 0.024 |
| 5600 | | 13x25 | 2770 | 0.032 | 13x30 | 3290 | 0.027 | 16x26 | 3460 | 0.026 |
| 6800 | | 13x30 | 3290 | 0.027 | 13x35 | 3400 | 0.024 | | | |
| 5600 | | 13x35 | 3140 | 0.026 | 16x26 | 3460 | 0.026 | | | |
| 6800 | | 16x26 | 3460 | 0.027 | | | | | | |

| Cap (μF) | V | 25 | | | 35 | | | 50 | | |
|----------|---|--------|-------|-------|--------|-------|-------|--------|-------|-------|
| | | Item | D x L | R.C. | IMP | D x L | R.C. | IMP | D x L | R.C. |
| 22 | | | | | | | | 5x11 | 238 | 1.310 |
| 33 | | | | | 5x11 | 250 | 0.330 | | | |
| 47 | | 5x11 | 250 | 0.500 | | | | 6.3x11 | 385 | 1.140 |
| 56 | | | | | 6.3x11 | 405 | 0.230 | 6.3x11 | 385 | 0.540 |
| 68 | | | | | | | | | | |
| 100 | | 6.3x11 | 405 | 0.380 | | | | 8x12 | 724 | 0.340 |
| 120 | | | | | | | | 8x16 | 950 | 0.230 |
| 150 | | | | | 8x12 | 760 | 0.130 | 10x13 | 979 | 0.230 |
| 180 | | | | | | | | 8x20 | 1190 | 0.180 |
| 220 | | 8x12 | 760 | 0.150 | 8x16 | 995 | 0.099 | | | |
| 270 | | | | | 10x13 | 1030 | 0.093 | 10x16 | 1370 | 0.160 |
| 330 | | | | | 8x20 | 1250 | 0.100 | 10x20 | 1580 | 0.120 |
| 470 | | 8x16 | 995 | 0.093 | 10x16 | 1430 | 0.100 | 10x25 | 1870 | 0.110 |
| 560 | | 10x13 | 1030 | 0.087 | | | | | | |
| 680 | | 8x20 | 1250 | 0.068 | 10x20 | 1820 | 0.085 | 13x21 | 2050 | 0.110 |
| 820 | | 10x16 | 1430 | 0.062 | | | | | | |
| 1000 | | 10x25 | 2150 | 0.053 | 10x25 | 2150 | 0.053 | 13x25 | 2410 | 0.088 |
| 1200 | | 10x20 | 1820 | 0.058 | 13x21 | 2360 | 0.051 | 13x30 | 2860 | 0.081 |
| 1500 | | 10x25 | 2150 | 0.036 | 13x21 | 2450 | 0.048 | 13x35 | 2960 | 0.074 |
| 1800 | | 13x21 | 2360 | 0.035 | 13x25 | 2770 | 0.044 | 16x26 | 3010 | 0.081 |
| 2200 | | | | | 13x30 | 3140 | 0.037 | | | |
| 2700 | | 13x25 | 2770 | 0.030 | 13x35 | 3400 | 0.035 | | | |
| 3300 | | 13x30 | 3140 | 0.026 | 16x26 | 3460 | 0.037 | | | |
| 3900 | | 13x35 | 3400 | 0.024 | | | | | | |
| 4700 | | 16x26 | 3460 | 0.026 | | | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HGN series

- Anhydrous product.
- High ripple current, Low impedance at high frequency range.
- 105°C, long life 10000hours.
- RoHS Compliance
- 無水系產品。
- 高紋波電流、高頻低阻抗。
- 105°C 10000小時長壽命產品。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | |
|---|--|---------------------------------|---|-------------|--------------|-------------|------|--------------|------|--|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -55 ~ +105°C | | | | -40 ~ +105°C | | | | | |
| Rated Voltage Range 額定電壓範圍 | 6.3 ~ 50VDC | | | | 63 ~ 100VDC | | | | | |
| Leakage Current 洩漏電流 | I ≤ 0.01CV or 3 (µA) which is greater.(After 2 minutes application of DC rated voltage, at 20 °C) | | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | |
| | tan δ(Max) | 0.24 | 0.20 | 0.16 | 0.15 | 0.12 | 0.10 | 0.09 | 0.08 | |
| When nominal capacitance over 1000µF, tanδ shall be added 0.02 to the listed value with increase of every 1000µF. | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | |
| | Rated Voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | |
| | Z(-25°C)/Z(20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | |
| | Z(-40°C)/Z(20°C) | - | - | - | - | - | - | 3 | 3 | |
| Load Life 負荷壽命 | Case size | | | φ D ≤ 6.3 | | φ D = 8,10 | | φ D ≥ 13 | | |
| | Voltage | 6.3 ~ 10 V | | 4,000 hours | | 6,000 hours | | 8,000 hours | | |
| | | 16 ~ 100 V | | 5,000 hours | | 7,000 hours | | 10,000 hours | | |
| | Capacitance Change | | Within ± 25% of Initial Value | | | | | | | |
| | tan δ | | 200% or less of Initial Specified Value | | | | | | | |
| Leakage Current | | Initial Specified Value or less | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing t14be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | |
| | Capacitance Change | | Within ± 25% of Initial Value | | | | | | | |
| | tan δ | | 200% or less of Initial Specified Value | | | | | | | |
| Leakage Current | | Initial Specified Value or less | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | |

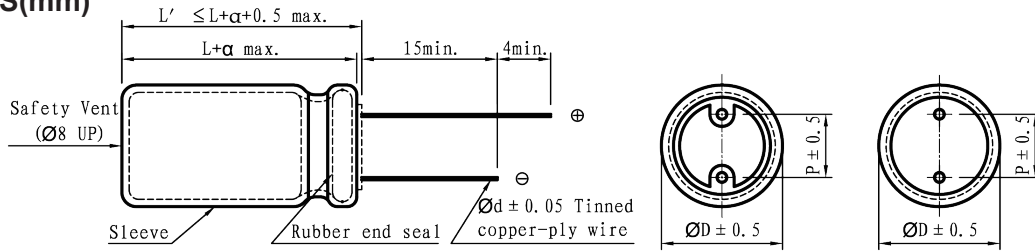
Frequency Coefficient of Permissible Ripple Current

| Capacitance (µF) | Frequency (Hz) | | | | |
|------------------|----------------|------|------|------|------|
| | 50 | 120 | 300 | 1K | 100K |
| ≤ 33 | 0.50 | 0.55 | 0.70 | 0.90 | 1.00 |
| 47 ~ 330 | 0.60 | 0.70 | 0.85 | 0.95 | 1.00 |
| 470 ~ 1000 | 0.65 | 0.75 | 0.90 | 0.98 | 1.00 |
| 1200 ~ 18000 | 0.70 | 0.80 | 0.95 | 1.00 | 1.00 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

HGN series

DIMENSIONS(mm)



| | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|
| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|------------------------------|
| α | (L < 16) 1.0 (L ≥ 16) 2.0 |
|----------|------------------------------|

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C,-10°C 100KHz

| Cap (μ F) | V Item | 6.3 | | | | 10 | | | |
|-------------------|-----------|--------|-------|-------|------|--------|-------|-------|------|
| | | D x L | IMP | | R.C. | D x L | IMP | | R.C. |
| | | | 20°C | -10°C | | | 20°C | -10°C | |
| 100 | | | | | 5x11 | 0.640 | 2.530 | 215 | |
| 150 | | 5x11 | 0.630 | 2.530 | 210 | 5x11 | 0.640 | 2.530 | 230 |
| 220 | | 6.3x11 | 0.280 | 0.990 | 320 | 6.3x11 | 0.250 | 0.960 | 340 |
| 330 | | 6.3x11 | 0.230 | 0.960 | 340 | 6.3x11 | 0.250 | 0.960 | 380 |
| 470 | | 8x12 | 0.170 | 0.640 | 345 | 8x12 | 0.150 | 0.580 | 640 |
| 680 | | 8x12 | 0.150 | 0.580 | 645 | 8x16 | 0.098 | 0.390 | 845 |
| | | | | | | 10x13 | 0.091 | 0.340 | 865 |
| 820 | | 10x13 | 0.091 | 0.360 | 865 | 10x16 | 0.080 | 0.310 | 1015 |
| 1000 | | 8x16 | 0.097 | 0.390 | 870 | 8x20 | 0.078 | 0.300 | 1050 |
| | | | | | | 10x16 | 0.069 | 0.270 | 1215 |
| 1200 | | 8x20 | 0.081 | 0.290 | 1050 | 10x20 | 0.053 | 0.200 | 1410 |
| | | 10x16 | 0.072 | 0.270 | 1215 | | | | |
| 1500 | | 10x20 | 0.053 | 0.210 | 1410 | 10x25 | 0.048 | 0.190 | 1610 |
| 1800 | | | | | | 13x21 | 0.046 | 0.170 | 1710 |
| 2200 | | 10x25 | 0.050 | 0.190 | 1650 | 10x30 | 0.036 | 0.140 | 1920 |
| | | | | | | 13x21 | 0.042 | 0.140 | 1910 |
| 2700 | | 10x30 | 0.036 | 0.140 | 1900 | | | | |
| 3300 | | 13x21 | 0.041 | 0.140 | 1900 | 13x25 | 0.032 | 0.100 | 2230 |
| 3900 | | 13x25 | 0.032 | 0.100 | 2240 | 13x30 | 0.029 | 0.089 | 2660 |
| 4700 | | 13x30 | 0.029 | 0.089 | 2650 | 13x35 | 0.025 | 0.075 | 2890 |
| 5600 | | 13x35 | 0.025 | 0.075 | 2890 | 13x40 | 0.021 | 0.064 | 3360 |
| | | | | | | 16x26 | 0.025 | 0.069 | 2940 |
| 6800 | | 13x40 | 0.021 | 0.064 | 3350 | 16x32 | 0.021 | 0.058 | 3460 |
| | | 16x26 | 0.025 | 0.069 | 2940 | 18x25 | 0.025 | 0.057 | 3150 |
| 8200 | | 16x32 | 0.021 | 0.058 | 3450 | 16x36 | 0.020 | 0.052 | 3610 |
| | | | | | | 18x32 | 0.020 | 0.047 | 4180 |
| 10000 | | 16x36 | 0.019 | 0.052 | 3620 | 16x40 | 0.018 | 0.045 | 4090 |
| | | 18x25 | 0.023 | 0.057 | 3150 | 18x35 | 0.017 | 0.045 | 4150 |
| 12000 | | 16x40 | 0.017 | 0.045 | 4090 | 18x40 | 0.015 | 0.039 | 4290 |
| | | 18x32 | 0.019 | 0.047 | 4180 | | | | |
| 15000 | | 18x35 | 0.018 | 0.045 | 4230 | | | | |
| 18000 | | 18x40 | 0.016 | 0.035 | 4290 | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HGN series

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C,-10°C 100KHz

| Cap (μF) | V Item | 16 | | | | 25 | | | |
|-------------|-----------|--------|-------|-------|------|--------|-------|-------|------|
| | | D x L | IMP | | R.C. | D x L | IMP | | R.C. |
| | | | 20°C | -10°C | | | 20°C | -10°C | |
| 47 | | | | | | 5x11 | 0.760 | 3.040 | 200 |
| 56 | | 5x11 | 0.760 | 3.040 | 220 | 5x11 | 0.760 | 3.040 | 240 |
| 100 | | 6.3x11 | 0.280 | 1.150 | 310 | 6.3x11 | 0.280 | 1.150 | 340 |
| 120 | | 6.3x11 | 0.280 | 1.150 | 340 | | | | |
| 220 | | 8x12 | 0.250 | 1.130 | 510 | 8x12 | 0.160 | 0.690 | 650 |
| 330 | | 8x12 | 0.160 | 0.690 | 650 | 8x16 | 0.120 | 0.470 | 850 |
| | 10x13 | | | | | 0.110 | 0.430 | 870 | |
| 470 | | 8x16 | 0.120 | 0.470 | 840 | 8x20 | 0.096 | 0.360 | 1050 |
| | | 10x13 | 0.110 | 0.430 | 865 | 10x16 | 0.083 | 0.320 | 1210 |
| 680 | | 8x20 | 0.095 | 0.360 | 1060 | 10x20 | 0.064 | 0.240 | 1410 |
| | | 10x16 | 0.083 | 0.320 | 1210 | | | | |
| 820 | | 10x20 | 0.073 | 0.290 | 1310 | 10x25 | 0.058 | 0.230 | 1660 |
| 1000 | | 10x20 | 0.064 | 0.240 | 1410 | 10x30 | 0.043 | 0.160 | 1920 |
| | 13x21 | | | | | 0.049 | 0.160 | 1910 | |
| 1200 | | 10x25 | 0.061 | 0.230 | 1650 | | | | |
| 1500 | | 10x30 | 0.043 | 0.160 | 1920 | 13x25 | 0.038 | 0.120 | 2240 |
| | | 13x21 | 0.050 | 0.160 | 1910 | | | | |
| 1800 | | 13x25 | 0.041 | 0.130 | 2140 | 13x30 | 0.036 | 0.110 | 2660 |
| 2200 | | 13x25 | 0.038 | 0.120 | 2240 | 13x35 | 0.030 | 0.090 | 2890 |
| 2700 | | 13x30 | 0.035 | 0.110 | 2650 | 13x40 | 0.025 | 0.078 | 3360 |
| | 16x26 | | | | | 0.031 | 0.083 | 2940 | |
| 3300 | | 13x35 | 0.030 | 0.091 | 2890 | 16x32 | 0.025 | 0.070 | 3460 |
| | 18x25 | | | | | 0.028 | 0.067 | 3150 | |
| 3900 | | 13x40 | 0.031 | 0.078 | 3350 | 18x25 | 0.023 | 0.061 | 3620 |
| | | 16x26 | 0.028 | 0.083 | 2930 | 18x32 | 0.024 | 0.056 | 4180 |
| 4700 | | 16x32 | 0.025 | 0.070 | 3450 | 16x40 | 0.020 | 0.054 | 4090 |
| | | 18x25 | 0.028 | 0.068 | 3150 | 18x35 | 0.022 | 0.054 | 4230 |
| 5600 | | 16x36 | 0.024 | 0.062 | 3620 | 18x40 | 0.018 | 0.047 | 4290 |
| | | 18x32 | 0.024 | 0.056 | 4180 | | | | |
| 6800 | | 16x40 | 0.020 | 0.054 | 4080 | | | | |
| 8200 | | 18x35 | 0.023 | 0.054 | 4230 | | | | |
| 10000 | | 18x40 | 0.018 | 0.047 | 4290 | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HGN series

STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C,-10°C 100KHz

| Cap (μF) | V Item | 35 | | | | 50 | | | |
|-------------|-----------|--------|-------|-------|------|--------|-------|-------|------|
| | | D x L | IMP | | R.C. | D x L | IMP | | R.C. |
| | | | 20°C | -10°C | | | 20°C | -10°C | |
| 22 | | | | | | 5x11 | 1.540 | 6.16 | 180 |
| 33 | | 5x11 | 0.690 | 2.780 | 220 | | | | |
| 47 | | 6.3x11 | 0.430 | 1.700 | 280 | 6.3x11 | 0.780 | 3.300 | 220 |
| 56 | | 6.3x11 | 0.400 | 1.580 | 340 | 6.3x11 | 0.660 | 2.640 | 300 |
| 100 | | 8x12 | 0.320 | 1.180 | 510 | 8x12 | 0.360 | 1.470 | 560 |
| 120 | | | | | | 8x16 | 0.270 | 1.060 | 740 |
| 150 | | 8x12 | 0.160 | 0.630 | 650 | 10x13 | 0.270 | 1.060 | 770 |
| 180 | | | | | | 8x20 | 0.200 | 0.800 | 920 |
| 220 | | 8x16 | 0.110 | 0.430 | 850 | 10x16 | 0.190 | 0.750 | 1050 |
| | | 10x13 | 0.100 | 0.390 | 865 | | | | |
| 270 | | 8x20 | 0.088 | 0.320 | 1060 | 10x20 | 0.140 | 0.530 | 1230 |
| 330 | | 10x16 | 0.076 | 0.290 | 1210 | 10x25 | 0.120 | 0.490 | 1450 |
| 470 | | 10x20 | 0.058 | 0.220 | 1410 | 10x30 | 0.100 | 0.380 | 1695 |
| | 13x21 | | | | | 0.100 | 0.340 | 1670 | |
| 560 | | 10x25 | 0.053 | 0.200 | 1650 | 13x25 | 0.080 | 0.250 | 1950 |
| 680 | | 10x30 | 0.040 | 0.150 | 1920 | 13x30 | 0.072 | 0.230 | 2320 |
| | | 13x21 | 0.044 | 0.160 | 1910 | | | | |
| 820 | | | | | | 13x35 | 0.058 | 0.180 | 2520 |
| 1000 | | 13x25 | 0.037 | 0.110 | 2230 | 13x40 | 0.050 | 0.160 | 2930 |
| | | | | | | 16x26 | 0.062 | 0.170 | 2555 |
| 1200 | | 13x30 | 0.032 | 0.098 | 2660 | 16x32 | 0.052 | 0.150 | 3020 |
| | | | | | | 18x25 | 0.062 | 0.160 | 2750 |
| 1500 | | 13x35 | 0.028 | 0.083 | 2880 | 16x36 | 0.046 | 0.130 | 3150 |
| 1800 | | 13x40 | 0.023 | 0.072 | 3350 | 16x40 | 0.042 | 0.110 | 3720 |
| | | 16x26 | 0.028 | 0.076 | 2940 | 18x32 | 0.052 | 0.130 | 3640 |
| 2200 | | 16x32 | 0.023 | 0.064 | 3500 | 18x35 | 0.044 | 0.100 | 3690 |
| | | 18x25 | 0.026 | 0.063 | 3140 | | | | |
| 2700 | | 16x36 | 0.022 | 0.057 | 3620 | 18x40 | 0.038 | 0.090 | 3810 |
| | | 18x32 | 0.021 | 0.052 | 4180 | | | | |
| 3300 | | 16x40 | 0.020 | 0.050 | 4090 | | | | |
| | | 18x35 | 0.021 | 0.050 | 4230 | | | | |
| 3900 | | 18x40 | 0.019 | 0.044 | 4290 | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

HGN series

STANDARD RATINGS

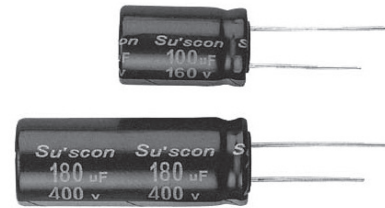
D×L(mm) ; R.C.(mA rms) at 105°C 100KHz; IMP (Ω max)at 20°C,-10°C 100KHz

| Cap (μF) | V Item | 63 | | | 100 | | | | |
|-------------|-----------|--------|-------|-------|------|--------|--------|-------|------|
| | | D x L | IMP | | R.C. | D x L | IMP | | |
| | | | 20°C | -10°C | | | 20°C | -10°C | |
| 6.8 | | | | | 5x11 | 2.780 | 11.640 | 56 | |
| 15 | | 5x11 | 2.20 | 9.20 | 56 | 6.3x11 | 1.520 | 6.330 | 120 |
| 27 | | | | | | 8x12 | 0.980 | 4.390 | 235 |
| 33 | | 6.3x11 | 1.20 | 5.00 | 120 | | | | |
| 39 | | | | | | 8x16 | 0.570 | 2.660 | 280 |
| 47 | | 8x12 | 0.68 | 3.10 | 190 | 10x13 | 0.550 | 2.280 | 290 |
| 56 | | 8x12 | 0.62 | 2.80 | 235 | 8x20 | 0.410 | 2.020 | 330 |
| 68 | | | | | | 10x16 | 0.380 | 1.900 | 358 |
| 82 | | 8x16 | 0.45 | 2.10 | 310 | 10x20 | 0.270 | 1.190 | 470 |
| | | 10x13 | 0.43 | 1.80 | 300 | | | | |
| 100 | | 10x16 | 0.35 | 1.80 | 320 | 10x25 | 0.260 | 1.070 | 536 |
| 120 | | 8x20 | 0.33 | 1.60 | 362 | 10x30 | 0.190 | 0.900 | 666 |
| | | 10x16 | 0.30 | 1.50 | 357 | 13x21 | 0.210 | 0.810 | 690 |
| 180 | | 10x20 | 0.20 | 0.94 | 470 | 13x25 | 0.160 | 0.570 | 790 |
| 220 | | 10x25 | 0.20 | 0.84 | 531 | 13x30 | 0.130 | 0.530 | 905 |
| | 16x22 | | | | | 0.120 | 0.470 | 1050 | |
| 270 | | 10x30 | 0.15 | 0.70 | 663 | 13x35 | 0.110 | 0.450 | 1060 |
| | | 13x21 | 0.13 | 0.65 | 690 | 16x26 | 0.095 | 0.340 | 1250 |
| 330 | | 13x25 | 0.12 | 0.45 | 790 | 13x40 | 0.092 | 0.380 | 1190 |
| 390 | | | | | | 16x32 | 0.071 | 0.260 | 1570 |
| | | | | | | 18x25 | 0.075 | 0.270 | 1490 |
| 470 | | 13x30 | 0.100 | 0.42 | 910 | 16x36 | 0.061 | 0.220 | 1790 |
| | 18x32 | | | | | 0.063 | 0.220 | 1640 | |
| 560 | | 13x35 | 0.082 | 0.35 | 1050 | 16x40 | 0.054 | 0.190 | 2030 |
| | | 16x26 | 0.073 | 0.27 | 1250 | | | | |
| 680 | | 13x40 | 0.070 | 0.30 | 1190 | 18x35 | 0.054 | 0.190 | 1790 |
| 820 | | 16x32 | 0.053 | 0.20 | 1580 | 18x40 | 0.049 | 0.170 | 2340 |
| | | 18x25 | 0.057 | 0.21 | 1490 | | | | |
| 1000 | | 16x36 | 0.045 | 0.17 | 1790 | | | | |
| | | 18x32 | 0.047 | 0.17 | 1640 | | | | |
| 1200 | | 16x40 | 0.039 | 0.15 | 2020 | | | | |
| | | 18x35 | 0.040 | 0.15 | 1790 | | | | |
| 1500 | | 18x40 | 0.035 | 0.13 | 2340 | | | | |

※ 13mm may be replaced by 12.5mm upon customer's request.

SEN series

- Anhydrous product.
- 105°C high-temperature, high reliability and long life.
- Suitable for office communicative and industrial equipments.
- RoHS Compliance
- 無水系產品。
- 105°C 耐高溫、高信賴性長壽命製品。
- 適用於辦公室通訊設備、工業設備。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | |
|---|---|---|------|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | |
| Operating Temperature Range 適用溫度範圍 | -25 ~ +105°C | | | | | |
| Rated Voltage Range 額定電壓範圍 | 160 ~ 400VDC | | | | | |
| Leakage Current 洩漏電流 | $I \leq 0.03CV + 20 (\mu A)$ (After 3 minutes application of DC rated voltage, at 20 °C) | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | |
| | Rated Voltage(V) | 160 | 200 | 250 | 350 | 400 |
| | tan δ (Max) | 0.20 | 0.20 | 0.20 | 0.25 | 0.25 |
| When nominal capacitance over 1000 μ F, tan δ shall be added 0.02 to the listed value with increase of every 1000 μ F. | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | |
| | Rated Voltage(V) | 160 | 200 | 250 | 350 | 400 |
| | Z(-25°C)/Z(20°C) | 3 | 3 | 3 | 6 | 15 |
| Load Life 負荷壽命 | 5000hours,with application of rated voltage at 105°C ($\phi D \leq 8$:3000hrs ; $\phi D = 10$:4000hrs) | | | | | |
| | Capacitance Change | Within ± 25% of Initial Value | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | |
| | Leakage Current | Initial Specified Value or less | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | |
| | Leakage Current | Initial Specified Value or less | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | |

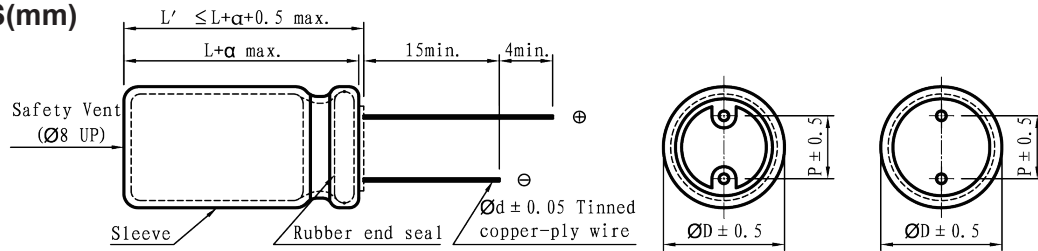
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Capacitance (μ F) | Frequency (Hz) | | | |
|-------------------|------------------------|----------------|------|------|------------|
| | | 50 | 120 | 1K | $\geq 10K$ |
| ≥ 160 | 2.2 ~ 220 | 0.80 | 1.00 | 1.30 | 1.40 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

SEN series

DIMENSIONS(mm)



| | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|
| ϕD | 6.3 | 8 | 10 | 13 | 16 | 18 |
| P | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 |
| ϕd | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |

| | |
|----------|--------------|
| α | (L < 16) 1.0 |
| | (L ≥ 16) 2.0 |

STANDARD RATINGS

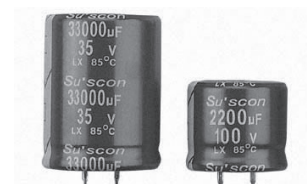
D×L(mm) ; R.C.(mA rms) at 105°C 120Hz

| Cap (μF) | V | 160 | | 200 | | 250 | | 400 | | 450 | | |
|----------|---|------|--------|------|--------|------|-------|------|-------|------|-------|------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 2.2 | | | 6.3x11 | 29 | 6.3x11 | 29 | 8x12 | 36 | 8x12 | 36 | 8x12 | 36 |
| 3.3 | | | 8x12 | 35 | 8x12 | 36 | 8x12 | 52 | 8x12 | 45 | 8x12 | 52 |
| 4.7 | | | 8x12 | 44 | 8x12 | 52 | 8x12 | 57 | 10x13 | 57 | 10x13 | 62 |
| 10 | | | 10x13 | 78 | 10x16 | 83 | 10x16 | 104 | 10x20 | 95 | 10x20 | 104 |
| 22 | | | 10x16 | 135 | 10x20 | 145 | 13x21 | 176 | 13x21 | 168 | 13x25 | 197 |
| 33 | | | 10x20 | 176 | 13x21 | 208 | 13x21 | 234 | 13x25 | 213 | 16x22 | 249 |
| 39 | | | 10x20 | 197 | 13x21 | 228 | 13x25 | 260 | 16x22 | 213 | 16x26 | 312 |
| 47 | | | 13x21 | 239 | 13x21 | 260 | 13x25 | 291 | 16x26 | 332 | 16x32 | 343 |
| 68 | | | 13x25 | 270 | 13x25 | 291 | 16x22 | 322 | 16x26 | 364 | 18x25 | 364 |
| 82 | | | 16x22 | 332 | 16x26 | 364 | 16x32 | 405 | 18x25 | 436 | 18x32 | 603 |
| 100 | | | 16x26 | 364 | 16x32 | 499 | 16x36 | 520 | 18x32 | 572 | 18x35 | 686 |
| 120 | | | | | | | | | 18x40 | 676 | 18x40 | 800 |

※ 13mm may be replaced by 12.5mm upon customer's request.

LX series

- Snap-in type, 85°C 2000 hours standard product.
- Suitable for filter circuit of home appliance, e.g. TV set, audio etc.
- RoHS Compliance
- 基板自立 85°C 2000小時標準品。
- 適用於家電產品輸入/輸出電源的濾波迴路，如電視機、音響等。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | |
|---|--|---|------|---------|--------------|---------|---------|---------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +85°C | | | | -25 ~ +85°C | | | |
| Rated Voltage Range 額定電壓範圍 | 10 ~ 100VDC | | | | 160 ~ 500VDC | | | |
| Leakage Current 洩漏電流 | $I \leq 3\sqrt{CV}$ (µA) (After 5 minutes application of DC rated voltage, at 20 °C) | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50~80 | 100~250 | 350~500 |
| | tan δ(Max) | 0.50 | 0.40 | 0.35 | 0.30 | 0.25 | 0.20 | 0.25 |
| When nominal capacitance over 1000µF, tanδ shall be added 0.01 to the listed value with increase of every 1000µF. | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | |
| | Rated Voltage(V) | 10~100 | | 160~250 | | 350~500 | | |
| | Z(-25°C)/Z(20°C) | 4 | | 4 | | 8 | | |
| | Z(-40°C)/Z(20°C) | 12 | | 15 | | - | | |
| Load Life 負荷壽命 | 2000hours,with application of rated voltage at 85°C | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | |
| | tan δ | 150% or less of Initial Specified Value | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | |

Frequency Coefficient of Permissible Ripple Current

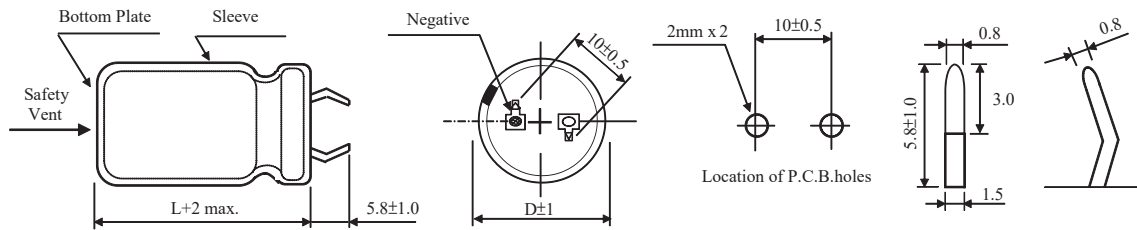
| Rated Voltage (V) | Frequency (Hz) | | | |
|-------------------|----------------|------|------|------|
| | 50 | 120 | 1K | ≥10K |
| 10 ~ 100 | 0.88 | 1.00 | 1.15 | 1.15 |
| 160 ~ 250 | 0.85 | 1.00 | 1.15 | 1.20 |
| 350 ~ 500 | 0.88 | 1.00 | 1.10 | 1.15 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.



LX series

DIMENSIONS(mm)



STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 85°C 120Hz

| Cap (μF) | V | 10 | | 16 | | 25 | | 35 | | 50 | | 63 | | 80 | | |
|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 820 | | | | | | | | | | | | | | | 22x25 | 1.34 |
| 1000 | | | | | | | | | | | | 22x25 | 1.52 | 22x25 | 1.64 | |
| 1500 | | | | | | | | | | | | 22x25 | 1.68 | 22x30 | 1.80 | |
| 2200 | | | | | | | | | | 22x25 | 2.08 | 22x30 | 2.58 | 22x35 | 2.65 | |
| 2700 | | | | | | | | | | 22x30 | 2.32 | 22x35 | 2.80 | 22x40 | 2.82 | |
| 3300 | | | | | | | | | | 22x30 | 2.65 | 22x40 | 2.88 | 22x45 | 3.30 | |
| 3900 | | | | | | | | 22x25 | 2.44 | 22x35 | 2.72 | 22x45 | 3.15 | 25x45 | 3.40 | |
| 4700 | | | | | | 22x25 | 2.49 | 22x30 | 2.64 | 22x40 | 3.09 | 22x50 | 3.39 | 25x50 | 3.62 | |
| 6800 | | | | 22x25 | 2.40 | 22x30 | 2.57 | 22x40 | 2.81 | 22x50 | 3.86 | 25x50 | 4.34 | 30x50 | 4.68 | |
| 8200 | | | | 22x25 | 2.90 | 22x35 | 2.96 | 22x45 | 3.12 | 25x50 | 4.42 | 30x45 | 4.84 | 35x45 | 4.96 | |
| 10000 | | 22x25 | 2.08 | 22x30 | 3.08 | 22x40 | 3.40 | 22x50 | 3.55 | 25x50 | 4.98 | 35x40 | 5.51 | 35x50 | 6.08 | |
| 12000 | | 22x25 | 2.40 | 22x30 | 3.50 | 22x45 | 3.61 | 25x45 | 4.02 | 30x50 | 5.16 | 35x50 | 6.22 | | | |
| 15000 | | 22x30 | 2.76 | 22x35 | 3.95 | 25x45 | 4.10 | 30x40 | 5.01 | 35x45 | 6.45 | | | | | |
| 18000 | | 22x35 | 3.14 | 22x40 | 4.40 | 25x45 | 4.47 | 30x45 | 5.55 | 35x50 | 6.72 | | | | | |
| 22000 | | 22x40 | 3.53 | 22x50 | 4.71 | 25x50 | 5.22 | 35x45 | 6.02 | | | | | | | |
| 27000 | | 22x45 | 4.18 | 25x45 | 5.51 | 30x50 | 6.02 | 35x50 | 6.85 | | | | | | | |
| 33000 | | 22x50 | 5.21 | 25x50 | 5.82 | 35x45 | 6.78 | 35x45 | 6.95 | | | | | | | |
| 39000 | | 25x45 | 5.30 | 30x45 | 6.36 | 35x45 | 7.60 | 35x50 | 7.16 | | | | | | | |
| 47000 | | 30x40 | 5.98 | 30x50 | 6.99 | 35x50 | 7.88 | | | | | | | | | |
| 56000 | | 30x45 | 6.60 | 35x45 | 7.17 | | | | | | | | | | | |
| 68000 | | 35x40 | 7.28 | 35x50 | 10.10 | | | | | | | | | | | |

LX series

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 85°C 120Hz

| Cap (μF) | V Item | 100 | | 160 | | 200 | | 250 | | 350 | | 400 | | 450 | | 500 | |
|-------------|-----------|----------------|------|----------------|------|----------------|------|----------------|------|----------------|------|----------------|------|----------------|------|----------------|--------------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 47 | | | | | | | | | | | | 22x25 | 0.42 | 22x25 | 0.46 | 22x35 | 0.47 |
| 100 | | | | | | | | | | 22x25 | 0.77 | 22x30 25x25 | 1.05 | 22x35 25x25 | 1.10 | 25x40 | 1.13 |
| 120 | | | | | | | | | | 22x30 25x25 | 0.93 | 22x35 25x25 | 1.15 | 22x40 25x30 | 1.21 | 25x45 | 1.25 |
| 150 | | | | | | | | 22x25 | 1.10 | 22x35 25x30 | 1.16 | 22x40 25x30 | 1.25 | 22x45 25x35 | 1.44 | 25x50 30x35 | 1.50 1.48 |
| 220 | | | | 22x20 | 1.12 | 22x25 25x20 | 1.37 | 22x30 25x25 | 1.44 | 22x45 25x35 | 1.47 | 22x50 25x40 | 1.76 | 25x45 30x40 | 1.77 | 30x45 | 1.78 |
| 330 | | | | 22x25 25x20 | 1.45 | 22x30 25x25 | 1.88 | 22x35 25x30 | 1.93 | 25x50 30x40 | 1.99 | 30x40 35x30 | 2.30 | 30x45 35x40 | 2.79 | 35x45 | 2.81 |
| 470 | | | | 22x30 25x25 | 1.83 | 22x40 25x30 | 2.25 | 22x45 25x35 | 2.39 | 30x50 35x40 | 2.44 | 35x45 | 2.82 | 35x50 | 2.92 | 35x60 | 3.00 |
| 560 | | | | 22x35 25x30 | 2.03 | 22x40 25x30 | 2.57 | 25x40 30x35 | 2.81 | 35x45 | 3.29 | 35x50 | 3.36 | 35x55 | 3.15 | 35x60 | 3.03 |
| 680 | | 22x25 | 1.54 | 22x35 25x30 | 2.37 | 22x50 25x40 | 2.84 | 25x50 30x40 | 3.22 | 35x50 | 3.44 | 35x50 | 3.50 | 35x60 | 3.36 | 35x70 | 3.27 |
| 820 | | 22x25 25x20 | 1.88 | 22x40 25x35 | 2.75 | 25x45 30x35 | 3.35 | 30x45 35x40 | 3.51 | 35x50 | 3.58 | 35x60 | 3.83 | 35x65 | 3.59 | 40x70 | 3.76 |
| 1000 | | 22x30 25x25 | 1.94 | 25x40 30x35 | 3.22 | 25x50 30x40 | 3.79 | 30x50 35x45 | 3.94 | 35x55 | 3.89 | 35x65 | 4.20 | 35x70 | 3.81 | 45x80 | 4.21 |
| 1200 | | 22x30 25x25 | 2.11 | 25x40 30x35 | 3.41 | 25x50 30x40 | 4.08 | 30x50 35x45 | 4.45 | 35x60 | 4.17 | 35x70 | 4.41 | 40x70 | 4.01 | 45x90 | 4.50 |
| 1500 | | 22x35 25x30 | 2.47 | 30x45 35x35 | 3.96 | 30x50 35x40 | 5.02 | 35x50 | 5.36 | 35x65 | 4.56 | 40x70 | 4.52 | 45x70 | 4.13 | 45x100 | 4.80 |
| 2200 | | 22x45 25x40 | 3.15 | 35x45 | 4.68 | 35x50 | 6.09 | 40x60 | 6.13 | 47x75 | 5.75 | 45x85 | 5.64 | 45x100 | 5.22 | | |
| 2700 | | 25x45 30x35 | 3.72 | 35x50 | 5.35 | | | | | | | | | | | | |
| 3300 | | 25x50 30x40 | 4.06 | | | | | | | | | | | | | | |
| 3900 | | 30x45 35x35 | 4.55 | | | | | | | | | | | | | | |
| 4700 | | 30x50 35x40 | 5.12 | | | | | | | | | | | | | | |
| 6800 | | 35x50 | 5.85 | | | | | | | | | | | | | | |

LZ series

- Snap-in type, 105°C 2000 hours standard product.
- High temperature and high ripple current resistance.
- Suitable for computer equipment, inverter air conditioner etc.
- RoHS Compliance
- 基板自立 105°C 2000小時標準品。
- 耐高溫、高紋波。
- 適用於電腦設備、變頻空調等。



SPECIFICATIONS

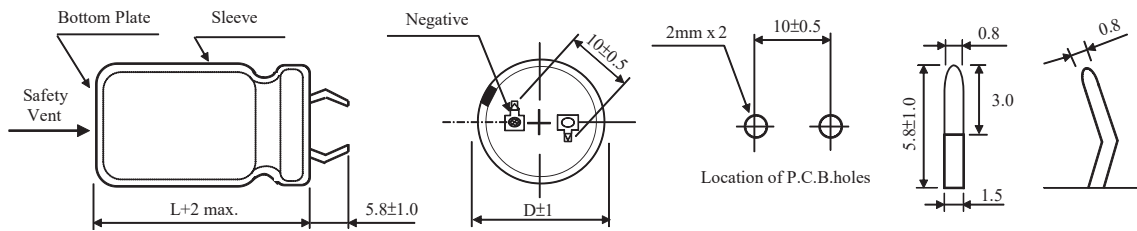
| Items 項目 | Characteristics 特性 | | | | | | | | | | | |
|---|---|---|------|------|------|------|--------------|---------|---------|---------|---------|--|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | | -25 ~ +105°C | | | | | |
| Rated Voltage Range 額定電壓範圍 | 10 ~ 250VDC | | | | | | 350 ~ 500VDC | | | | | |
| Leakage Current 洩漏電流 | $I \leq 3\sqrt{CV}$ (µA) (After 5 minutes application of DC rated voltage, at 20 °C) | | | | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160~250 | 350~500 | |
| | tan δ(Max) | 0.45 | 0.40 | 0.35 | 0.30 | 0.25 | 0.25 | 0.20 | 0.20 | 0.15 | 0.20 | |
| When nominal capacitance over 1000µF, tanδ shall be added 0.01 to the listed value with increase of every 1000µF. | | | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 | 63~100 | 160~250 | 350~500 | | | |
| | Z(-25°C)/Z(20°C) | 6 | 6 | 4 | 4 | 4 | 4 | 4 | 8 | | | |
| | Z(-40°C)/Z(20°C) | 16 | 15 | 10 | 10 | 8 | 6 | 15 | - | | | |
| Load Life 負荷壽命 | 2000hours,with application of rated voltage at 105°C | | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | | |
| | Capacitance Change | Within ± 15% of Initial Value | | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | | | |

Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Frequency (Hz) | | | | |
|-------------------|----------------|------|------|------|------|
| | 50 | 120 | 1K | 10K | 100K |
| 10 ~ 100 | 0.88 | 1.00 | 1.15 | 1.15 | 1.20 |
| 160 ~ 250 | 0.85 | 1.00 | 1.15 | 1.20 | 1.20 |
| 350 ~ 500 | 0.88 | 1.00 | 1.10 | 1.15 | 1.20 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

LZ series



STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

| Cap (μF) | V Item | 10 | | 16 | | 25 | | 35 | | 50 | |
|--------------------------|-----------|----------------|------|----------------|------|----------------|------|----------------|------|----------------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 1500 | | | | | | | | | | 22x25 | 1.20 |
| 1800 | | | | | | | | | | 22x30 | 1.40 |
| 2200 | | | | | | | | | | 22x30 25x25 | 1.60 |
| 2700 | | | | | | | | 22x25 | 1.21 | 22x35 25x30 | 1.73 |
| 3300 | | | | | | | | 22x30 | 1.36 | 22x40 25x30 | 1.97 |
| 3900 | | | | | | 22x25 | 1.35 | 22x30 | 1.57 | 22x45 25x35 | 2.23 |
| 4700 | | | | | | 22x30 | 1.58 | 22x35 25x25 | 1.77 | 22x50 25x40 | 2.45 |
| 5600 | | | | | | 22x30 25x25 | 1.75 | 22x40 25x30 | 1.99 | 25x45 30x35 | 2.74 |
| 6800 | | | | 22x25 | 1.80 | 22x35 25x30 | 2.02 | 22x45 25x35 | 2.29 | 30x40 35x30 | 3.31 |
| 8200 | | | | 22x30 25x25 | 2.08 | 22x40 25x35 | 2.18 | 22x50 25x40 | 2.58 | 30x45 35x35 | 3.60 |
| 10000 | | 22x25 | 1.88 | 22x35 25x30 | 2.15 | 22x45 25x40 | 2.48 | 25x45 30x35 | 2.90 | 35x40 | 4.02 |
| 12000 | | 22x30 25x25 | 2.18 | 22x40 25x30 | 2.31 | 22x50 25x45 | 2.86 | 25x50 30x40 | 3.24 | 35x50 | 4.52 |
| 15000 | | 22x35 25x30 | 2.27 | 22x45 25x35 | 2.69 | 25x50 30x40 | 3.15 | 30x45 35x35 | 3.65 | | |
| 18000 | | 22x40 25x30 | 2.41 | 22x50 25x40 | 3.20 | 30x45 35x35 | 3.55 | 35x40 | 4.13 | | |
| 22000 | | 22x45 25x35 | 2.68 | 25x45 30x35 | 3.40 | 30x50 35x40 | 4.00 | 35x50 | 4.78 | | |
| 27000 | | 25x40 30x35 | 3.17 | 30x40 35x35 | 3.85 | 35x45 | 4.55 | | | | |
| 33000 | | 25x45 30x35 | 3.39 | 30x50 35x40 | 4.32 | 35x50 | 5.56 | | | | |
| 39000 | | 25x50 30x40 | 3.72 | 35x40 | 4.85 | | | | | | |
| 47000 | | 30x45 35x35 | 4.22 | 35x50 | 5.56 | | | | | | |
| 56000 | | 35x40 | 5.00 | | | | | | | | |
| 68000 | | 35x50 | 5.21 | | | | | | | | |

LZ series

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

| Cap (μF) | V Item | 63 | | 80 | | 100 | | 160 | | 200 | |
|-------------|-----------|----------------|------|----------------|------|----------------|------|----------------|------|----------------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 220 | | | | | | | | | | 22x25 | 0.82 |
| 270 | | | | | | | | 22x25 | 1.04 | 22x30 | 1.07 |
| 330 | | | | | | | | 22x30 | 1.26 | 22x30 25x25 | 1.28 |
| 390 | | | | | | | | 22x30 25x25 | 1.29 | 22x35 25x30 | 1.31 |
| 470 | | | | | | | | 22x35 25x30 | 1.56 | 22x40 25x30 | 1.58 |
| 560 | | | | | | 22x25 | 1.02 | 22x40 25x30 | 1.69 | 22x45 25x35 | 1.72 |
| 680 | | | | | | 22x30 | 1.12 | 22x45 25x35 | 1.72 | 25x40 30x30 | 1.75 |
| 820 | | | | 22x25 | 1.04 | 22x30 25x25 | 1.32 | 22x50 25x40 | 1.99 | 25x50 30x35 | 2.04 |
| 1000 | | | | 22x30 | 1.21 | 22x35 25x30 | 1.45 | 25x45 30x35 | 2.20 | 30x45 35x35 | 2.30 |
| 1200 | | 25x25 | 1.21 | 22x35 25x25 | 1.29 | 22x40 25x35 | 1.68 | 30x40 35x35 | 2.45 | 30x50 35x40 | 2.65 |
| 1500 | | 22x30 25x25 | 1.45 | 22x40 25x30 | 1.57 | 22x45 25x40 | 1.98 | 30x50 35x40 | 3.06 | 35x45 | 3.07 |
| 1800 | | 22x35 25x30 | 1.59 | 22x45 25x35 | 1.72 | 25x45 30x35 | 2.23 | 35x45 | 3.14 | | |
| 2200 | | 22x40 25x30 | 1.84 | 25x40 30x30 | 2.01 | 25x50 30x40 | 2.53 | 35x50 | 3.50 | | |
| 2700 | | 22x45 25x35 | 2.12 | 25x45 30x35 | 2.32 | 30x45 35x35 | 2.82 | | | | |
| 3300 | | 25x40 30x30 | 2.30 | 30x40 35x30 | 2.62 | 30x50 35x40 | 3.32 | | | | |
| 3900 | | 25x45 30x35 | 2.42 | 30x45 35x35 | 2.84 | 35x45 | 3.62 | | | | |
| 4700 | | 25x50 30x40 | 2.91 | 30x50 | 3.29 | 35x50 | 3.80 | | | | |
| 5600 | | 30x45 35x35 | 3.18 | 35x45 | 3.82 | | | | | | |
| 6800 | | 30x50 35x40 | 3.54 | 35x50 | 3.92 | | | | | | |
| 8200 | | 35x45 | 3.82 | 35x50 | 4.05 | | | | | | |
| 10000 | | 35x50 | 4.50 | 35x55 | 4.85 | | | | | | |

LZ series

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

| Cap (μF) | V Item | 250 | | 350 | | 400 | | 450 | | 500 | |
|-------------|-----------|----------------|------|----------------|------|----------------|------|----------------|------|----------------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 68 | | | | | | 22x25 | 0.52 | 22x35 25x30 | 0.55 | 22x40 | 0.56 |
| 82 | | | | 22x25 | 0.60 | 22x30 | 0.66 | 22x35 25x30 | 0.65 | 25x35 | 0.68 |
| 100 | | | | 22x30 | 0.69 | 22x35 25x25 | 0.72 | 22x40 25x30 | 0.75 | 25x35 | 0.78 |
| 120 | | 20x20 | 0.65 | 22x35 25x30 | 0.76 | 22x40 25x30 | 0.75 | 22x45 25x40 | 0.83 | 25x45 | 0.85 |
| 150 | | 22x25 | 0.76 | 22x40 25x30 | 0.79 | 22x45 25x35 | 0.89 | 22x50 25x40 | 0.95 | 25x50 30x40 | 1.01 |
| 180 | | 22x30 | 0.98 | 22x45 25x35 | 0.88 | 22x50 25x40 | 0.98 | 25x45 30x40 | 1.15 | 30x45 35x35 | 1.21 |
| 220 | | 22x30 25x25 | 1.09 | 22x50 25x40 | 0.98 | 25x45 30x35 | 1.12 | 30x45 35x40 | 1.24 | 30x45 35x40 | 1.35 |
| 270 | | 22x35 25x30 | 1.19 | 25x45 30x35 | 1.10 | 25x50 30x40 | 1.29 | 30x50 35x45 | 1.46 | 35x45 | 1.53 |
| 330 | | 22x40 25x35 | 1.35 | 30x40 35x35 | 1.22 | 30x45 35x35 | 1.45 | 35x50 | 1.65 | 35x50 | 1.75 |
| 390 | | 22x45 25x35 | 1.52 | 30x45 35x40 | 1.42 | 30x50 35x40 | 1.59 | 35x55 | 1.78 | | |
| 470 | | 22x50 25x40 | 1.63 | 35x45 | 1.62 | 35x45 | 1.75 | | | | |
| 560 | | 25x45 30x35 | 1.84 | 35x50 | 1.89 | 35x50 | 2.12 | | | | |
| 680 | | 25x50 30x40 | 2.05 | 35x50 | 2.10 | 35x50 | 2.20 | | | | |
| 820 | | 30x45 35x35 | 2.29 | 35x65 | 2.35 | 35x65 | 2.50 | | | | |
| 1000 | | 35x40 | 2.49 | | | | | | | | |
| 1200 | | 35x45 | 2.84 | | | | | | | | |

HZ series

- Down size, load life extend to 3000 hours.
- 105°C, high temperature, high ripple current resistance and high reliability.
- RoHS Compliance
- Done size、壽命3000小時。
- 105°C 耐高溫、高紋波、高信賴性。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | | |
|--|---|---|------|------|------|--------------|------|------|---------|---------|---------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | -25 ~ +105°C | | | | | |
| Rated Voltage Range 額定電壓範圍 | 16 ~ 250VDC | | | | | 350 ~ 450VDC | | | | | |
| Leakage Current 洩漏電流 | $I \leq 3\sqrt{CV}$ (µA) (After 5 minutes application of DC rated voltage, at 20 °C) | | | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | |
| | Rated Voltage(V) | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160 | 200~250 | 350~450 |
| | tan δ(Max) | 0.50 | 0.45 | 0.40 | 0.35 | 0.30 | 0.25 | 0.20 | 0.15 | 0.15 | 0.20 |
| | When nominal capacitance over 1000µF, tanδ shall be added 0.01 to the listed value with increase of every 1000µF . | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | | |
| | Rated Voltage(V) | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160~250 | 350~450 | |
| | Z(-25°C)/Z(20°C) | 6 | 6 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 8 |
| | Z(-40°C)/Z(20°C) | 16 | 15 | 10 | 10 | 8 | 6 | 6 | 6 | 15 | - |
| Load Life 負荷壽命 | 3000hours,with application of rated voltage at 105°C | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | |
| | Capacitance Change | Within ± 15% of Initial Value | | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | | |

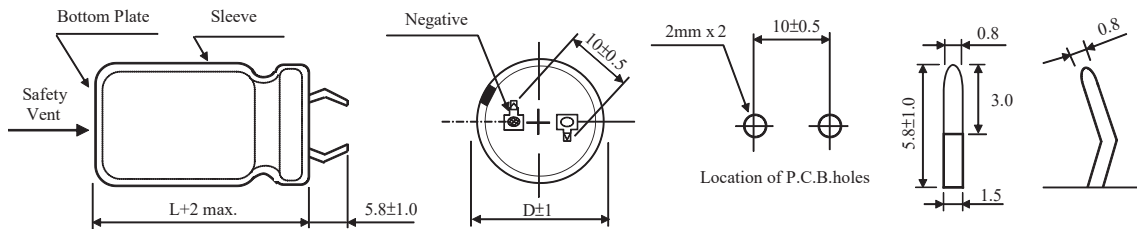
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Frequency (Hz) | | | | |
|-------------------|----------------|------|------|------|------|
| | 50 | 120 | 1K | 10K | 100K |
| 16 ~ 100 | 0.88 | 1.00 | 1.05 | 1.10 | 1.15 |
| 160 ~ 250 | 0.85 | 1.00 | 1.20 | 1.30 | 1.50 |
| 350 ~ 450 | 0.88 | 1.00 | 1.20 | 1.25 | 1.40 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

HZ series

DIMENSIONS(mm)



STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

| Cap (μF) | V | 16 | | 25 | | 35 | | 50 | | 63 | | 80 | | 100 | |
|----------|---|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|----------------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 560 | | | | | | | | | | | | | | 20x25 | 0.95 |
| 680 | | | | | | | | | | | | | | 20x30 | 1.15 |
| 820 | | | | | | | | | | | | 20x25 | 1.04 | 20x35 | 1.32 |
| 1000 | | | | | | | | | | 20x25 | 1.35 | 20x30 22x25 | 1.24 | 20x35 22x30 | 1.47 |
| 1500 | | | | | | | | 20x25 | 1.02 | 20x30 22x25 | 1.47 | 20x35 22x30 | 1.59 | 22x40 25x35 | 1.98 |
| 2200 | | | | | | | | 20x30 22x25 | 1.60 | 20x40 22x35 | 1.82 | 22x40 25x30 | 2.03 | 25x45 30x35 | 2.55 |
| 2700 | | | | | | 20x25 | 1.29 | 20x35 22x30 | 1.73 | 22x35 25x30 | 2.11 | 22x45 25x35 | 2.39 | 25x50 30x40 | 2.89 |
| 3300 | | | | | | 20x30 | 1.57 | 20x40 22x35 | 1.97 | 22x45 25x35 | 2.33 | 25x40 30x35 | 2.64 | 30x45 35x35 | 3.30 |
| 3900 | | | | 20x25 | 1.65 | 22x25 | 1.78 | 22x40 25x30 | 2.22 | 22x50 25x40 | 2.55 | 25x50 30x35 | 2.97 | 30x50 35x40 | 3.67 |
| 4700 | | | | 20x25 | 1.75 | 20x35 22x30 | 2.02 | 22x45 25x35 | 2.43 | 25x45 30x35 | 2.97 | 30x40 35x35 | 3.38 | 35x45 | 3.80 |
| 6800 | | 20x25 | 1.50 | 20x35 22x30 | 2.11 | 22x40 25x30 | 2.41 | 25x45 30x35 | 3.30 | 30x40 35x35 | 3.65 | 35x45 | 4.10 | 35x50 | 4.05 |
| 8200 | | 20x30 | 1.70 | 20x40 22x30 | 2.34 | 22x45 25x35 | 2.85 | 25x50 30x40 | 3.60 | 30x50 35x40 | 4.04 | 35x50 | 4.30 | | |
| 10000 | | 20x35 22x30 | 1.85 | 22x35 25x30 | 2.65 | 22x50 25x40 | 3.05 | 30x45 35x35 | 4.05 | 35x45 | 4.48 | | | | |
| 12000 | | 20x40 22x30 | 2.01 | 22x40 25x30 | 2.81 | 25x45 30x35 | 3.37 | 30x50 35x40 | 4.56 | 35x50 | 4.75 | | | | |
| 15000 | | 22x35 25x30 | 2.39 | 22x45 25x35 | 3.13 | 25x50 30x40 | 3.72 | 35x50 | 4.77 | | | | | | |
| 18000 | | 22x40 25x30 | 2.90 | 25x40 30x30 | 3.56 | 30x45 35x35 | 4.37 | | | | | | | | |
| 22000 | | 22x45 25x35 | 3.10 | 25x50 30x35 | 4.04 | 30x50 35x40 | 4.92 | | | | | | | | |
| 27000 | | 22x50 25x40 | 3.55 | 30x45 35x35 | 4.74 | 35x50 | 5.30 | | | | | | | | |
| 33000 | | 25x45 30x35 | 4.05 | 30x50 35x40 | 5.50 | | | | | | | | | | |
| 39000 | | 25x50 30x40 | 4.55 | 35x45 | 5.80 | | | | | | | | | | |
| 47000 | | 30x45 35x40 | 5.36 | 35x50 | 6.30 | | | | | | | | | | |
| 56000 | | 30x50 35x45 | 5.60 | | | | | | | | | | | | |

HZ

HZ series

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

| Cap (μF) | V Item | 160 | | 200 | | 250 | | 350 | | 400 | | 450 | |
|-------------|-----------|----------------|------|----------------|------|----------------|------|----------------|------|----------------|------|----------------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 47 | | | | | | | | | | 22x25 | 0.45 | 22x25 | 0.43 |
| 68 | | | | | | | | | | 22x25 | 0.50 | 22x30 | 0.50 |
| 82 | | | | | | | | 22x30 | 0.55 | 22x25 | 0.65 | 22x30 25x25 | 0.60 |
| 100 | | | | | | | | 22x30 22x25 | 0.60 | 22x30 25x25 | 0.68 | 22x35 25x30 | 0.70 |
| 120 | | | | | | | | 22x30 25x25 | 0.70 | 22x35 25x25 | 0.75 | 22x40 25x30 | 0.78 |
| 150 | | | | | | 22x25 | 0.65 | 22x35 25x30 | 0.83 | 22x40 25x30 | 0.85 | 22x45 25x35 | 0.89 |
| 220 | | 20x25 | 1.10 | 20x25 | 1.00 | 20x30 22x25 | 1.00 | 22x45 25x35 | 1.05 | 22x50 25x40 | 1.05 | 25x45 30x35 | 1.15 |
| 330 | | 20x30 22x25 | 1.21 | 20x30 | 1.25 | 20x40 22x35 | 1.20 | 25x45 30x35 | 1.35 | 30x40 35x30 | 1.35 | 30x50 35x40 | 1.45 |
| 390 | | 20x30 22x25 | 1.30 | 22x30 25x25 | 1.31 | 22x40 25x30 | 1.35 | 25x50 30x40 | 1.52 | 30x45 35x35 | 1.75 | 35x40 | 1.65 |
| 470 | | 20x35 22x30 | 1.41 | 22x35 25x30 | 1.45 | 22x45 25x35 | 1.57 | 30x45 35x35 | 1.65 | 35x40 | 1.85 | 35x50 | 1.85 |
| 560 | | 20x40 22x35 | 1.54 | 22x40 25x30 | 1.60 | 22x50 25x40 | 1.80 | 30x50 35x40 | 1.90 | 35x45 | 2.05 | | |
| 680 | | 20x45 22x40 | 1.74 | 22x45 25x35 | 1.78 | 25x45 30x35 | 2.00 | 35x45 | 2.00 | 35x50 | 2.45 | | |
| 820 | | 20x45 25x35 | 2.00 | 22x50 25x40 | 1.95 | 25x50 30x40 | 2.18 | 35x55 | 2.30 | | | | |
| 1000 | | 22x50 25x40 | 2.25 | 25x45 30x35 | 2.30 | 30x45 35x35 | 2.35 | | | | | | |
| 1200 | | 25x45 30x35 | 2.49 | 30x40 35x35 | 2.65 | 35x40 | 2.50 | | | | | | |
| 1500 | | 30x40 35x30 | 2.84 | 30x50 35x40 | 3.08 | 35x50 | 3.00 | | | | | | |
| 2200 | | 35x45 | 3.50 | 35x50 | 3.55 | | | | | | | | |
| 2700 | | 35x50 | 4.00 | | | | | | | | | | |

MZ series

- 105°C 5000hours, long life.
- High temperature, high ripple current resistance and high reliability.
- RoHS Compliance
- 105°C 5000小時長壽命。
- 耐高溫、高紋波、高信賴性。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | |
|---|---|---|------|------|------|--------------|------|--------|---------|---------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | | | | -25 ~ +105°C | | | | |
| Rated Voltage Range 額定電壓範圍 | 10 ~ 100VDC | | | | | 160 ~ 450VDC | | | | |
| Leakage Current 洩漏電流 | $I \leq 3\sqrt{CV}$ (μA) (After 5 minutes application of DC rated voltage, at 20 °C) | | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 | 63 | 80~100 | 160~400 | 420~450 |
| | tan δ (Max) | 0.60 | 0.45 | 0.30 | 0.25 | 0.20 | 0.15 | 0.15 | 0.15 | 0.20 |
| When nominal capacitance over 1000 μF , tan δ shall be added 0.01 to the listed value with increase of every 1000 μF . | | | | | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | | | | | |
| | Rated Voltage(V) | 10 | 16 | 25 | 35 | 50 | 63 | 80~100 | 160~400 | 420~450 |
| | Z(-25°C)/Z(20°C) | 4 | 4 | 3 | 3 | 2 | 2 | 2 | 4 | 8 |
| Z(-40°C)/Z(20°C) | | | | | | | | | | |
| Load Life 負荷壽命 | 5000hours,with application of rated voltage at 105°C | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | |
| | Capacitance Change | Within ± 15% of Initial Value | | | | | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | |

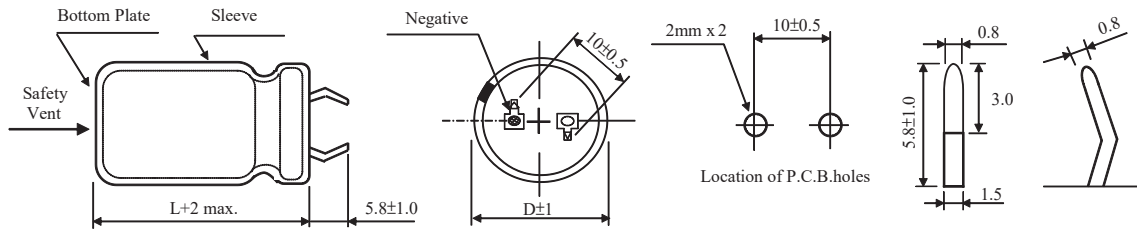
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Frequency (Hz) | | | | |
|-------------------|----------------|------|------|------|------|
| | 50 | 120 | 1K | 10K | 50K |
| 10 ~ 100 | 0.90 | 1.00 | 1.05 | 1.10 | 1.15 |
| 160 ~ 250 | 0.80 | 1.00 | 1.15 | 1.45 | 1.50 |
| 315 ~ 450 | 0.76 | 1.00 | 1.14 | 1.40 | 1.42 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

MZ series

DIMENSIONS(mm)



STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

| Cap (µF) | V | 10 | | 16 | | 25 | | 35 | | 50 | |
|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 1500 | | | | | | | | | | 22x25 | 1.02 |
| 1800 | | | | | | | | | | 22x30 | 1.18 |
| | | | | | | | | | | 25x25 | 1.17 |
| 2200 | | | | | | | | 22x25 | 1.11 | 22x35 | 1.32 |
| 2700 | | | | | | | | | | 22x40 | 1.51 |
| | | | | | | | | | | 25x30 | 1.48 |
| | | | | | | | | | | 30x25 | 1.51 |
| 3300 | | | | | | | | 22x30 | 1.42 | 25x35 | 1.71 |
| | | | | | | | | 25x25 | 1.41 | 30x30 | 1.72 |
| | | | | | | | | | | 35x25 | 1.74 |
| 3900 | | | | | | 22x25 | 1.32 | 22x35 | 1.58 | 22x50 | 1.91 |
| | | | | | | | | 25x30 | 1.59 | 25x40 | 1.89 |
| 4700 | | | | | | 22x30 | 1.51 | 22x40 | 1.78 | 30x35 | 2.12 |
| | | | | | | 25x25 | 1.52 | 30x25 | 1.78 | 35x30 | 2.16 |
| 5600 | | | | 22x25 | 1.45 | 22x35 | 1.71 | 25x35 | 1.98 | 25x50 | 2.39 |
| | | | | | | | | 30x30 | 1.99 | 30x40 | 2.39 |
| | | | | | | | | 35x25 | 2.03 | 35x35 | 2.41 |
| 6800 | | 22x25 | 1.31 | 22x30 | 1.67 | 22x40 | 1.92 | 22x50 | 2.26 | 30x50 | 2.79 |
| | | | | 25x25 | 1.66 | 25x30 | 1.88 | | | | |
| | | | | | | 30x25 | 1.90 | 25x40 | 2.25 | 35x40 | 2.79 |
| 8200 | | | | 22x35 | 1.88 | 25x35 | 2.15 | 25x50 | 2.57 | | |
| | | | | | | 30x30 | 2.16 | 30x35 | 2.51 | | |
| | | | | | | 35x25 | 2.19 | 35x30 | 2.56 | | |
| 10000 | | 22x30 | 1.65 | 22x40 | 2.12 | 22x50 | 2.45 | 30x40 | 2.87 | 35x50 | 3.56 |
| | | 25x25 | 1.63 | 25x30 | 2.08 | | | | | | |
| | | | | 30x25 | 2.12 | 25x40 | 2.44 | 35x35 | 2.88 | | |
| 12000 | | 22x35 | 1.84 | 25x35 | 2.38 | 25x50 | 2.78 | 30x50 | 3.32 | | |
| | | 25x30 | 1.85 | 30x30 | 2.37 | 30x35 | 2.71 | | | | |
| | | 30x25 | 1.88 | 35x25 | 2.41 | 35x30 | 2.76 | 35x40 | 3.31 | | |
| 15000 | | 22x40 | 2.11 | 22x50 | 2.74 | 30x40 | 3.14 | | | | |
| | | 25x35 | 2.15 | 25x40 | 2.72 | 35x35 | 3.16 | | | | |
| 18000 | | 22x50 | 2.45 | 25x50 | 3.12 | 30x50 | 3.63 | 35x50 | 4.28 | | |
| | | 25x40 | 2.42 | | | | | | | | |
| | | 30x30 | 2.38 | 30x35 | 3.03 | | | | | | |
| | | 35x25 | 2.41 | 35x30 | 3.09 | 35x40 | 3.62 | | | | |
| 22000 | | 30x35 | 2.72 | 30x40 | 3.47 | | | | | | |
| | | 35x30 | 2.78 | 35x35 | 3.49 | | | | | | |
| 27000 | | 25x50 | 3.12 | 30x50 | 4.07 | 35x50 | 4.72 | | | | |
| | | 30x40 | 3.14 | 35x40 | 4.05 | | | | | | |
| 33000 | | 35x35 | 3.48 | | | | | | | | |
| 39000 | | 30x50 | 3.98 | 35x50 | 5.15 | | | | | | |
| | | 35x40 | 3.95 | | | | | | | | |
| 47000 | | 35x50 | 4.62 | | | | | | | | |

MZ series

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

| Cap (μF) | V Item | 63 | | 80 | | 100 | | 160 | | 180 | | | | | | | | | | | |
|-------------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|------|-------|------|-------|------|-------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | | | | | | | | | | |
| 330 | | | | | | | | | | 22x25 | 1.22 | | | | | | | | | | |
| 390 | | | | | | 22x25 | 0.78 | 22x25 | 1.32 | | | | | | | | | | | | |
| 470 | | | | | | | | | | 22x30 | 1.53 | | | | | | | | | | |
| | | | | | | | | | | 25x25 | 1.52 | | | | | | | | | | |
| 560 | | | | | | 22x30 | 0.99 | 22x30 | 1.66 | 22x35 | 1.70 | | | | | | | | | | |
| | | | | | | 25x25 | 0.98 | 25x25 | 1.67 | 30x25 | 1.78 | | | | | | | | | | |
| 680 | | | | 22x25 | 0.97 | 22x35 | 1.12 | 22x35 | 1.87 | 22x40 | 1.91 | | | | | | | | | | |
| | | | | | | | | 25x30 | 1.89 | | | | | | | | | | | | |
| | | | | | | | | 30x25 | 1.95 | 25x30 | 1.89 | | | | | | | | | | |
| 820 | | | | 22x30 | 1.12 | 22x40 | 1.26 | 22x40 | 2.09 | 22x45 | 1.99 | | | | | | | | | | |
| | | | | | | 25x30 | 1.24 | | | 25x35 | 2.16 | | | | | | | | | | |
| | | | | | | 30x25 | 1.25 | | | 30x30 | 2.17 | | | | | | | | | | |
| 1000 | 22x25 | 1.00 | 22x35 | 1.26 | 25x35 | 1.41 | 25x40 | 2.41 | 2.25 | 22x50 | 2.25 | | | | | | | | | | |
| | | | | | | | | | | 25x25 | 1.24 | 30x30 | 1.42 | 30x30 | 2.39 | 25x45 | 2.47 | | | | |
| | | | | | | | | | | | | | | | | 35x25 | 1.44 | 35x30 | 2.53 | 30x35 | 2.46 |
| | | | | | | | | | | | | | | | | | | | | 25x50 | 2.76 |
| 1200 | 22x30 | 1.16 | 22x40 | 1.42 | 22x50 | 1.60 | 25x45 | 2.71 | 25x50 | 2.76 | | | | | | | | | | | |
| | | | 25x25 | 1.15 | 25x30 | 1.40 | 25x40 | 1.59 | 30x40 | 2.76 | 30x40 | 2.77 | | | | | | | | | |
| | | | | | 30x25 | 1.41 | 30x35 | 1.61 | 35x30 | 2.85 | 35x35 | 2.85 | | | | | | | | | |
| 1500 | 22x35 | 1.32 | 25x35 | 1.62 | 25x50 | 1.86 | 25x50 | 3.09 | 30x45 | 3.17 | | | | | | | | | | | |
| | | | | | 30x40 | 1.87 | 30x45 | 3.16 | 30x50 | 3.20 | | | | | | | | | | | |
| | | | | | 35x30 | 1.85 | 35x40 | 3.21 | 35x35 | 3.22 | | | | | | | | | | | |
| 1800 | 22x40 | 1.49 | 22x50 | 1.84 | 35x35 | 2.06 | 30x50 | 3.53 | 35x45 | 3.73 | | | | | | | | | | | |
| | 25x30 | 1.46 | 25x40 | 1.83 | | | | | | | | | | | | | | | | | |
| | | | 30x30 | 1.79 | | | | | | | | | | | | | | | | | |
| | | | 35x25 | 1.82 | | | | | | | | | | | | | | | | | |
| 2200 | 25x35 | 1.67 | 25x50 | 2.10 | 30x50 | 2.40 | 35x50 | 4.14 | 35x50 | 4.23 | | | | | | | | | | | |
| | 30x30 | 1.68 | 30x35 | 2.06 | | | | | | | | | | | | | | | | | |
| | 35x25 | 1.70 | 35x25 | 2.09 | | | | | | | | | | | | | | | | | |
| 2700 | 22x50 | 1.92 | 30x40 | 2.35 | 35x50 | 2.81 | | | | | | | | | | | | | | | |
| | 25x40 | 1.91 | 35x35 | 2.36 | | | | | | | | | | | | | | | | | |
| | 30x35 | 1.93 | | | | | | | | | | | | | | | | | | | |
| 3300 | 25x50 | 2.20 | 30x50 | 2.75 | | | | | | | | | | | | | | | | | |
| | 35x30 | 2.18 | 35x40 | 2.73 | | | | | | | | | | | | | | | | | |
| 3900 | 30x40 | 2.41 | | | | | | | | | | | | | | | | | | | |
| | 35x35 | 2.43 | | | | | | | | | | | | | | | | | | | |
| 4700 | 30x50 | 2.79 | 35x50 | 3.46 | | | | | | | | | | | | | | | | | |
| | 35x40 | 2.78 | | | | | | | | | | | | | | | | | | | |
| 6800 | 35x50 | 3.55 | | | | | | | | | | | | | | | | | | | |

MZ series

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

| Cap (μF) | V | 200 | | 220 | | 250 | | 315 | |
|----------|---|-------|------|-------|-------|-------|-------|-------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 150 | | | | | | | | 22x25 | 0.80 |
| 180 | | | | | | | | 22x30 | 0.93 |
| | | | | | | | | 25x25 | 0.94 |
| 220 | | 22x25 | 1.00 | | | 22x25 | 1.01 | 22x35 | 1.04 |
| | | | | | | | | 25x25 | 1.16 |
| 270 | | 22x25 | 1.11 | 22x25 | 1.11 | 22x30 | 1.20 | 22x40 | 1.18 |
| | | | | | | | | 25x30 | 1.19 |
| 330 | | | | 22x30 | 1.18 | 25x30 | 1.32 | 22x45 | 1.33 |
| | | | | | | | | 25x35 | 1.37 |
| | | | | | | | | 30x30 | 1.40 |
| | | | | | | | | 35x25 | 1.48 |
| 390 | | 22x30 | 1.38 | 22x35 | 1.39 | 22x40 | 1.44 | 22x50 | 1.49 |
| | | 25x25 | 1.39 | 25x25 | 1.39 | 25x30 | 1.43 | 25x40 | 1.52 |
| | | | | | 30x25 | 1.50 | | | |
| 470 | | 22x35 | 1.55 | 22x35 | 1.55 | 22x45 | 1.62 | 25x45 | 1.70 |
| | | | | 25x30 | 1.56 | 25x35 | 1.70 | 30x35 | 1.71 |
| | | | | 30x25 | 1.62 | 30x30 | 1.74 | 35x30 | 1.81 |
| 560 | | 22x40 | 1.73 | 22x45 | 1.73 | 22x50 | 1.84 | 25x50 | 1.88 |
| | | 25x30 | 1.72 | 25x35 | 1.81 | 25x40 | 1.78 | 30x40 | 1.92 |
| | | | | | 30x35 | 1.83 | 30x45 | 1.97 | |
| | | 30x25 | 1.77 | 30x30 | 1.85 | 35x25 | 1.90 | 35x35 | 1.99 |
| 680 | | 22x45 | 1.82 | 22x50 | 1.98 | 25x45 | 2.04 | 30x50 | 2.21 |
| | | 25x35 | 1.86 | 25x40 | 1.96 | 30x40 | 2.06 | | |
| | | 30x30 | 1.97 | 30x35 | 2.02 | | | 35x30 | 2.14 |
| | | 35x25 | 2.09 | 35x25 | 2.09 | | | | |
| 820 | | 25x50 | 2.17 | 25x45 | 2.24 | 25x50 | 2.28 | 35x45 | 2.57 |
| | | 25x40 | 2.09 | 30x40 | 2.29 | 30x45 | 2.38 | | |
| | | 30x35 | 2.21 | 35x30 | 2.35 | 35x35 | 2.37 | | |
| 1000 | | 25x50 | 2.39 | 25x55 | 2.52 | 30x50 | 2.68 | 35x50 | 2.89 |
| | | 30x40 | 2.53 | 30x45 | 2.58 | | | | |
| | | 35x30 | 2.60 | 35x35 | 2.63 | 35x40 | 2.71 | | |
| 1200 | | 30x45 | 2.85 | 30x50 | 2.89 | 35x45 | 3.05 | | |
| | | 35x40 | 2.88 | 35x40 | 2.97 | | | | |
| 1500 | | 35x45 | 3.34 | 35x45 | 3.41 | 35x50 | 3.49 | | |
| 1800 | | 35x50 | 3.82 | 35x50 | 3.82 | | | | |

MZ series

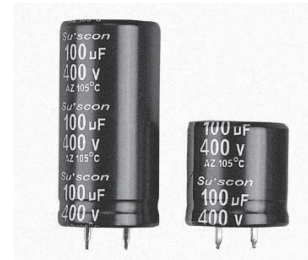
STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

| Cap (µF) | V Item | 350 | | 400 | | 420 | | 450 | |
|----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 82 | | | | | | | | 22x25 | 0.60 |
| 100 | | | | 22x25 | 0.66 | 22x25 | 0.66 | 22x30 | 0.69 |
| | | | | | | | | 25x25 | 0.70 |
| 120 | 22x25 | | 0.72 | 22x30 | 0.75 | 22x30 | 0.76 | 22x35 | 0.76 |
| | | | | | | 25x25 | 0.77 | | |
| 150 | 22x30 | | 0.84 | 22x35 | 0.85 | 22x35 | 0.86 | 22x45 | 0.90 |
| | | | | 25x25 | 0.86 | | | 25x35 | 0.92 |
| | | | | | | | | 30x25 | 0.93 |
| 180 | 25x25 | | 0.94 | 22x40 | 0.96 | 22x45 | 0.98 | 22x50 | 1.01 |
| | | | | 25x30 | 0.97 | 25x35 | 1.01 | 25x40 | 1.02 |
| | | | | 30x25 | 1.03 | 30x25 | 1.02 | 30x30 | 1.03 |
| | | | | | | | | 35x25 | 1.09 |
| 220 | 22x40 | | 1.06 | 22x45 | 1.09 | 22x50 | 1.11 | 25x45 | 1.16 |
| | 25x30 | | 1.07 | 25x35 | 1.12 | 25x40 | 1.13 | 30x35 | 1.17 |
| | 30x25 | | 1.12 | 35x25 | 1.21 | 30x30 | 1.14 | | |
| | | | | | | | 35x25 | 1.21 | 35x30 |
| 270 | 22x45 | | 1.21 | 22x50 | 1.24 | 25x45 | 1.29 | 25x50 | 1.31 |
| | 25x35 | | 1.24 | 25x45 | 1.29 | 30x35 | 1.30 | 30x40 | 1.33 |
| | 30x30 | | 1.27 | | | | | | |
| | 35x25 | | 1.34 | 30x35 | 1.27 | 35x30 | 1.37 | 35x35 | 1.38 |
| 330 | 22x50 | | 1.37 | 25x50 | 1.44 | 25x50 | 1.45 | 30x45 | 1.51 |
| | 25x40 | | 1.39 | 30x35 | 1.43 | 30x40 | 1.48 | | |
| | 30x35 | | 1.42 | 35x30 | 1.51 | 35x35 | 1.54 | | |
| 390 | 25x45 | | 1.55 | 30x40 | 1.61 | 30x45 | 1.65 | 30x50 | 1.67 |
| | 30x40 | | 1.59 | | | | | | |
| | 35x30 | | 1.65 | 35x35 | 1.66 | 35x40 | 1.73 | 35x45 | 1.76 |
| 470 | 25x50 | | 1.73 | 30x50 | 1.85 | 30x50 | 1.85 | 35x50 | 1.98 |
| | 30x45 | | 1.81 | 35x40 | 1.89 | 35x45 | 1.93 | | |
| | 35x35 | | 1.82 | | | | | | |
| 560 | 30x50 | | 2.01 | 35x45 | 2.13 | 35x50 | 2.17 | | |
| | 35x40 | | 2.06 | | | | | | |
| 680 | | | 35x45 | 2.34 | 35x50 | 2.38 | | | |
| 820 | | | 35x50 | 2.62 | | | | | |

AZ series

- Protective countermeasure against DC over-voltage, 105°C 2000hours load life.
- RoHS Compliance
- DC過電壓安全對策，壽命保證 2000小時。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | |
|--|---|---|---------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | |
| Operating Temperature Range 適用溫度範圍 | -25 ~ +105°C | | |
| Rated Voltage Range 額定電壓範圍 | 200VDC、400VDC、420VDC | | |
| Leakage Current 洩漏電流 | $I \leq 3\sqrt{CV}$ (µA) (After 5 minutes application of DC rated voltage, at 20 °C) | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | |
| | Rated Voltage(V) | 200 | 400 |
| | tan δ(Max) | 0.15 | 0.15 |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | |
| | Rated Voltage(V) | 200 | 400、420 |
| | Z(-25°C)/Z(20°C) | 3 | 8 |
| Load Life 負荷壽命 | 2000hours,with application of rated voltage at 105°C | | |
| | Capacitance Change | Within ± 20% of the Initial Value | |
| | tan δ | 200% or less of Initial Specified Value | |
| | Leakage Current | Initial Specified Value or less | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | |
| | Capacitance Change | Within ± 15% of the Initial Value | |
| | tan δ | ≤150% of the Initial Specified Value | |
| | Leakage Current | Initial Specified Value or less | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | |

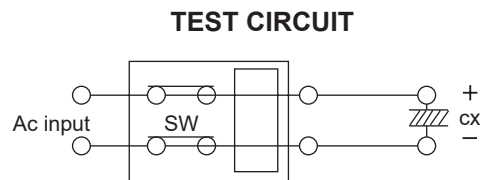
◆ DC over voltage test conditions

The vent will be operated and the capacitor shall become an open circuit without burning materials when the following excess DC voltage is applied.

According to the following experimental conditions, applying below rated voltage and rated current to be evaluated.

TEST DC VOLTAGE

| Rated Voltage | Current Limit | Test DC Voltage |
|---------------|---------------|-----------------|
| 200 Vdc | 1A | 375 V |
| 400 Vdc | 1A | 600 V |
| 420 Vdc | 1A | 630 V |
| 450 Vdc | 1A | 675 V |



Determination: More than 80 percent of products explosion-proof vent operating normally, there is no any short-circuited, spark allowed.

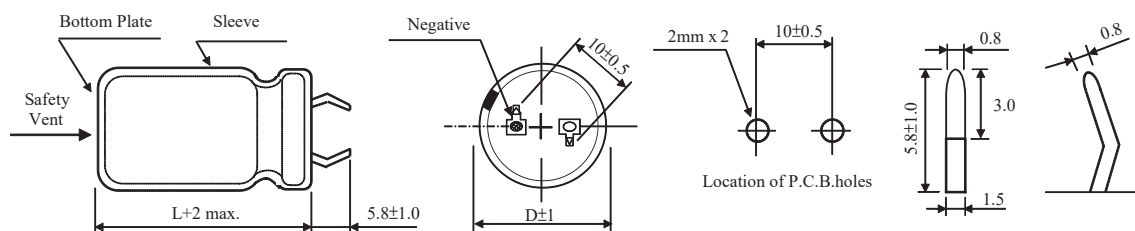
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Frequency (Hz) | | | | | |
|-------------------|----------------|------|------|------|------|-------|
| | 50 | 60 | 120 | 500 | 1K | ≥ 10K |
| 200 | 0.80 | 0.80 | 1.00 | 1.10 | 1.14 | 1.18 |
| 400、420 | 0.80 | 0.80 | 1.00 | 1.05 | 1.10 | 1.15 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

AZ series

DIMENSIONS(mm)



STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

| Cap (µF) | V | 200 | | 400 | | 420 | |
|----------|-------|-------|-------|-------|------|-------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 33 | | | | 22x20 | 0.22 | 22x25 | 0.25 |
| 39 | | | | 22x20 | 0.30 | | |
| 47 | 22x20 | 0.35 | | 22x25 | 0.35 | 22x25 | 0.35 |
| | | | | 25x20 | 0.35 | | |
| | | | | 30x20 | 0.40 | | |
| 56 | | | | 22x25 | 0.38 | 22x25 | 0.38 |
| | | | | 25x20 | 0.38 | | |
| 68 | | | | 22x25 | 0.40 | 22x30 | 0.45 |
| | | | | 25x25 | 0.45 | | |
| | | | | 30x20 | 0.50 | | |
| 82 | | | | 22x30 | 0.50 | 22x35 | 0.64 |
| | | | | 25x25 | 0.50 | | |
| | | | | 30x20 | 0.50 | | |
| 100 | 22x20 | 0.50 | | 22x35 | 0.55 | 22x40 | 0.69 |
| | | | | 25x30 | 0.53 | | |
| | | | | 30x25 | 0.53 | | |
| | | | | 35x20 | 0.55 | | |
| 120 | | | | 22x40 | 0.60 | 22x45 | 0.75 |
| | | | | 25x30 | 0.60 | | |
| | | | | 30x25 | 0.60 | | |
| | | | | 30x30 | 0.75 | | |
| 150 | | | | 22x45 | 0.70 | 25x40 | 0.82 |
| | | | | 25x35 | 0.70 | | |
| | | | | 30x30 | 0.70 | | |
| | | | | 35x25 | 0.70 | | |
| 180 | 22x25 | 0.70 | | 22x50 | 0.80 | 25x45 | 0.90 |
| | | | | 25x40 | 0.80 | | |
| | 30x20 | 0.70 | | 30x30 | 0.80 | 30x35 | 0.90 |
| | | | 35x25 | 0.80 | | | |
| 220 | 22x25 | 0.74 | | 25x45 | 0.90 | 30x40 | 1.00 |
| | | | | 30x35 | 0.90 | | |
| | | | | 35x30 | 0.90 | | |
| 270 | | | | 30x40 | 0.98 | 30x45 | 1.10 |
| | | | | 25x25 | 0.85 | | |
| | | | | 30x20 | 1.10 | | |
| 330 | | | | 35x35 | 0.96 | 35x40 | 1.10 |
| | | | | 22x30 | 1.05 | | |
| | | | | 25x30 | 1.05 | | |
| 390 | | | | 30x50 | 1.21 | 35x45 | 1.20 |
| | | | | 30x25 | 1.05 | | |
| | | | | 22x35 | 1.20 | | |
| 470 | | | | 35x40 | 1.21 | | |
| | | | | 25x30 | 1.20 | | |
| | | | | 30x25 | 1.20 | | |
| 560 | | | | 22x40 | 1.30 | | |
| | | | | 25x35 | 1.30 | | |
| | | | | 30x25 | 1.35 | | |
| 680 | | | | 22x45 | 1.50 | | |
| | | | | 25x40 | 1.50 | | |
| | | | | 30x35 | 1.55 | | |
| 820 | | | | 35x25 | 1.55 | | |
| | | | | 25x50 | 1.70 | | |
| | | | | 30x40 | 1.70 | | |
| 1000 | | | | 35x30 | 1.70 | | |
| | | | | 30x45 | 1.99 | | |
| | | | | 35x35 | 1.99 | | |
| 1200 | | | | 30x50 | 2.10 | | |
| | | | | 35x40 | 2.10 | | |

AZ

LM series

- 85°C 2000hours, LUG terminal type.
- High ripple current resistance.
- Suitable for power supply, control circuit of inverter.
- RoHS Compliance
- 85°C 2000小時 插片式電容。
- 耐高紋波電流。
- 適用於電源供應器、變頻器控制電路。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | |
|--|--|---|--------------|---------|---------|---------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +85°C | | -25 ~ +85°C | | | |
| Rated Voltage Range 額定電壓範圍 | 16 ~ 250VDC | | 315 ~ 450VDC | | | |
| Leakage Current 洩漏電流 | I ≤ 3√CV (μA) or 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20 °C) | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | |
| | Rated Voltage(V) | 16 | 25 | 35~50 | 63~315 | 350~450 |
| | tan δ(Max) | 0.35 | 0.30 | 0.25 | 0.20 | 0.25 |
| When nominal capacitance over 1000μF, tanδ shall be added 0.01 to the listed value with increase of every 1000μF . | | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | | |
| | Rated Voltage(V) | 16~100 | | 160~250 | 315~450 | |
| | Z(-25°C)/Z(20°C) | 6 | | 4 | 8 | |
| | Z(-40°C)/Z(20°C) | 12 | | - | - | |
| Load Life 負荷壽命 | 2000hours, with application of rated voltage at 85°C | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | |
| | Leakage Current | Initial Specified Value or less | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | |
| | tan δ | 200% or less of Initial Specified Value | | | | |
| | Leakage Current | Initial Specified Value or less | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | |

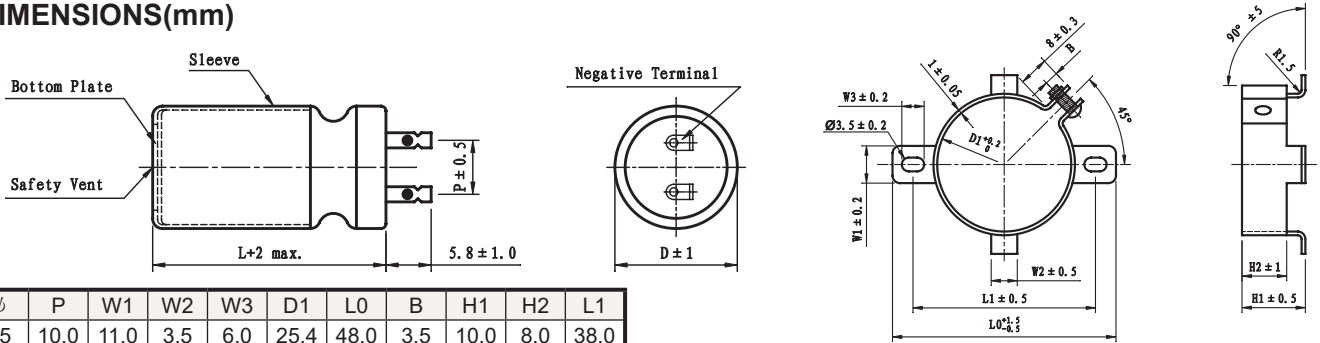
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Frequency (Hz) | | | |
|-------------------|----------------|------|------|------|
| | 50 | 120 | 1K | ≥10K |
| 16 ~ 100 | 0.90 | 1.00 | 1.20 | 1.25 |
| 160 ~ 315 | 0.95 | 1.00 | 1.20 | 1.25 |
| 350 ~ 450 | 0.98 | 1.00 | 1.15 | 1.20 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

LM series

DIMENSIONS(mm)



| φ | P | W1 | W2 | W3 | D1 | L0 | B | H1 | H2 | L1 |
|----|------|------|-----|-----|------|------|-----|------|------|------|
| 25 | 10.0 | 11.0 | 3.5 | 6.0 | 25.4 | 48.0 | 3.5 | 10.0 | 8.0 | 38.0 |
| 30 | 10.0 | 11.0 | 3.5 | 6.0 | 30.0 | 52.0 | 4.0 | 11.0 | 9.0 | 42.0 |
| 35 | 14.0 | 11.0 | 3.5 | 6.0 | 34.9 | 58.0 | 3.5 | 15.0 | 10.0 | 48.0 |
| 40 | 18.0 | 14.0 | 3.5 | 7.0 | 40.0 | 65.0 | 3.0 | 18.5 | 12.5 | 53.5 |
| 51 | 20.0 | 14.0 | 4.0 | 7.0 | 51.0 | 72.0 | 5.5 | 18.5 | 15.0 | 61.0 |

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 85°C 120Hz

| Cap (μF) | V | 16 | | 25 | | 35 | | 40 | | 50 | |
|----------|---|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 3300 | | | | | | | | 25x30 | 2.45 | 25x30 | 2.47 |
| 4700 | | | | | | 25x30 | 2.88 | 25x40 | 3.21 | 25x40 | 3.22 |
| 6800 | | | | 25x30 | 3.12 | 25x40 | 3.73 | 25x50 | 4.07 | 25x50 | 4.09 |
| 10000 | | 25x30 | 3.43 | 25x40 | 4.03 | 25x50 | 4.71 | 25x60 | 5.07 | 30x50 | 5.10 |
| 15000 | | 25x40 | 4.42 | 25x50 | 5.08 | 30x50 | 5.81 | 30x60 | 6.24 | 35x60 | 6.67 |
| 22000 | | 25x50 | 5.44 | 30x50 | 6.15 | 35x60 | 7.45 | 35x60 | 7.48 | 35x80 | 8.34 |
| 33000 | | 30x50 | 6.57 | 35x60 | 7.85 | 35x80 | 9.17 | 35x80 | 9.25 | 40x100 | 10.60 |
| 47000 | | 35x60 | 8.19 | 35x80 | 9.48 | 40x100 | 11.30 | 51x105 | 12.50 | 51x105 | 12.80 |
| 68000 | | 35x80 | 9.85 | 40x100 | 11.60 | 51x105 | 13.20 | | | | |
| 100000 | | 40x100 | 12.10 | 51x105 | 13.50 | | | | | | |
| 150000 | | 51x105 | 13.90 | | | | | | | | |

| Cap (μF) | V | 63 | | 80 | | 100 | | 160 | | 200 | |
|----------|---|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 330 | | | | | | | | 25x30 | 0.92 | 25x30 | 0.95 |
| 470 | | | | | | | | 25x40 | 1.22 | 25x40 | 1.25 |
| 680 | | | | | | | | 25x50 | 1.60 | 25x50 | 1.63 |
| 1000 | | | | | | 25x30 | 1.61 | 25x60 | 2.08 | 30x50 | 2.12 |
| 1500 | | | | 25x30 | 1.91 | 25x40 | 2.13 | 30x60 | 2.68 | 35x50 | 2.87 |
| 2200 | | 25x30 | 2.06 | 25x40 | 2.52 | 25x50 | 2.75 | 35x60 | 3.40 | 35x60 | 3.81 |
| 3300 | | 25x40 | 2.73 | 25x50 | 3.29 | 30x50 | 3.53 | 35x100 | 5.02 | 35x80 | 5.27 |
| 4700 | | 25x50 | 3.50 | 25x60 | 4.14 | 35x60 | 4.76 | 40x100 | 6.15 | 40x100 | 6.81 |
| 6800 | | 25x60 | 4.37 | 30x60 | 5.15 | 35x80 | 6.17 | 51x105 | 7.86 | 51x105 | 8.12 |
| 10000 | | 30x60 | 5.46 | 35x80 | 7.08 | 40x100 | 8.16 | | | | |
| 15000 | | 35x80 | 7.48 | 40x80 | 8.42 | 51x105 | 10.20 | | | | |
| 22000 | | 35x100 | 9.16 | 51x105 | 11.20 | | | | | | |
| 33000 | | 51x105 | 11.70 | | | | | | | | |

| Cap (μF) | V | 250 | | 315 | | 350 | | 400 | | 450 | |
|----------|---|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 68 | | | | | | | | | | 25x30 | 0.38 |
| 100 | | | | | | 25x30 | 0.50 | 25x30 | 0.50 | 25x40 | 0.50 |
| 150 | | | | 25x30 | 0.61 | 25x40 | 0.69 | 25x40 | 0.62 | 25x50 | 0.68 |
| 220 | | 25x30 | 0.75 | 25x40 | 0.84 | 25x50 | 0.91 | 25x50 | 0.81 | 30x50 | 0.88 |
| 330 | | 25x40 | 1.02 | 25x50 | 1.12 | 25x60 | 1.21 | 30x60 | 1.15 | 35x60 | 1.24 |
| 470 | | 25x50 | 1.34 | 25x60 | 1.43 | 30x60 | 1.54 | 35x60 | 1.47 | 35x80 | 1.65 |
| 680 | | 30x50 | 1.73 | 30x60 | 1.85 | 35x60 | 1.98 | 35x80 | 1.98 | 35x100 | 2.18 |
| 1000 | | 30x60 | 2.25 | 35x70 | 2.56 | 35x100 | 2.95 | 40x100 | 2.78 | 51x80 | 2.77 |
| 1500 | | 35x80 | 3.21 | 35x100 | 3.54 | 40x100 | 3.72 | 51x105 | 3.69 | | |
| 2200 | | 35x100 | 4.19 | 40x100 | 4.41 | 51x105 | 4.86 | | | | |
| 3300 | | 51x80 | 5.24 | 51x105 | 5.82 | | | | | | |

LM

LG series

- 105°C 2000hours, LUG terminal type.
- High temperature, high ripple current resistance.
- Suitable for machinery, filter circuit of tele-communication.
- RoHS Compliance
- 105°C 2000小時 插片式電容。
- 耐高溫、高紋波電流。
- 適用於機械、通訊設備的濾波迴路。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | |
|--|---|---|--------------|---------|---------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +105°C | | -25 ~ +105°C | | |
| Rated Voltage Range 額定電壓範圍 | 16 ~ 250VDC | | 315 ~ 450VDC | | |
| Leakage Current 洩漏電流 | $I \leq 3\sqrt{CV}$ or 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20 °C) | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | |
| | Rated Voltage(V) | 16~25 | 35~50 | 63~315 | 350~450 |
| | tan δ(Max) | 0.35 | 0.25 | 0.20 | 0.25 |
| When nominal capacitance over 1000µF, tanδ shall be added 0.01 to the listed value with increase of every 1000µF . | | | | | |
| Low Temperature Stability 低溫特性 Impedance Ratio(Max) 阻抗比率(最大值) | Measurement Frequency: 120Hz. | | | | |
| | Rated Voltage(V) | 16~100 | 160~250 | 315~450 | |
| | Z(-25°C)/Z(20°C) | 6 | 4 | 8 | |
| | Z(-40°C)/Z(20°C) | 12 | 8 | - | |
| Load Life 負荷壽命 | 2000hours,with application of rated voltage at 105°C | | | | |
| | Capacitance Change | Within ± 25% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | |
| | Capacitance Change | Within ± 25% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | |

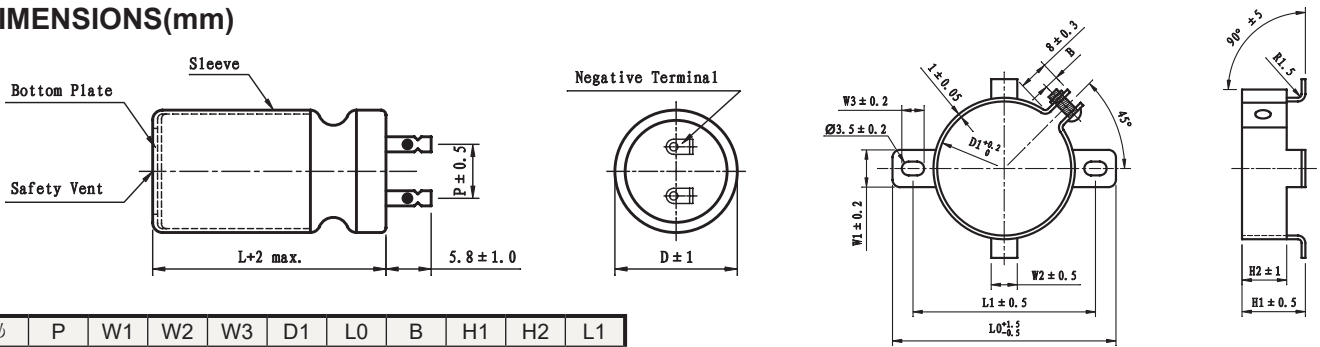
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Frequency (Hz) | | | |
|-------------------|----------------|------|------|------|
| | 50 | 120 | 1K | ≥10K |
| 16 ~ 100 | 0.90 | 1.00 | 1.20 | 1.25 |
| 160 ~ 315 | 0.95 | 1.00 | 1.20 | 1.25 |
| 350 ~ 450 | 0.98 | 1.00 | 1.15 | 1.20 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

LG series

DIMENSIONS(mm)



| ϕ | P | W1 | W2 | W3 | D1 | L0 | B | H1 | H2 | L1 |
|--------|------|------|-----|-----|------|------|-----|------|------|------|
| 25 | 10.0 | 11.0 | 3.5 | 6.0 | 25.4 | 48.0 | 3.5 | 10.0 | 8.0 | 38.0 |
| 30 | 10.0 | 11.0 | 3.5 | 6.0 | 30.0 | 52.0 | 4.0 | 11.0 | 9.0 | 42.0 |
| 35 | 14.0 | 11.0 | 3.5 | 6.0 | 34.9 | 58.0 | 3.5 | 15.0 | 10.0 | 48.0 |
| 40 | 18.0 | 14.0 | 3.5 | 7.0 | 40.0 | 65.0 | 3.0 | 18.5 | 12.5 | 53.5 |

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

| Cap (μF) | V | 16 | | 25 | | 35 | | 50 | | 63 | | 80 | | 100 | |
|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 470 | | | | | | | | | | 25x25 | 0.60 | 25x25 | 0.62 | 25x25 | 0.85 |
| 680 | | | | | | | | | | 25x25 | 0.80 | 25x25 | 1.03 | 25x25 | 1.10 |
| 1000 | | | | | | 25x25 | 0.50 | 25x25 | 0.80 | 25x25 | 1.10 | 25x35 | 1.30 | 25x40 | 1.40 |
| 1500 | | | | | | 25x25 | 0.80 | 25x25 | 1.10 | 25x25 | 1.50 | 25x35 | 1.70 | 25x40 | 1.80 |
| 2200 | | 25x25 | 0.70 | 25x25 | 1.00 | 25x35 | 1.30 | 25x35 | 1.60 | 25x35 | 1.70 | 25x50 | 1.90 | 30x50 | 2.40 |
| 3300 | | 25x25 | 1.02 | 25x30 | 1.40 | 25x40 | 1.80 | 25x50 | 2.10 | 30x50 | 2.30 | 30x60 | 2.60 | 30x60 | 2.80 |
| 4700 | | 25x30 | 1.50 | 25x35 | 1.90 | 25x50 | 2.00 | 30x50 | 2.60 | 30x60 | 2.80 | 35x60 | 3.10 | 40x60 | 3.70 |
| 6800 | | 25x35 | 2.01 | 25x50 | 2.40 | 30x50 | 2.70 | 35x50 | 3.00 | 35x60 | 3.20 | 40x60 | 3.90 | 40x80 | 5.10 |
| 10000 | | 25x50 | 2.40 | 30x50 | 2.90 | 30x60 | 3.20 | 35x60 | 4.40 | 40x60 | 4.90 | 40x80 | 5.80 | | |

| Cap (μF) | V | 160 | | 200 | | 250 | | 315 | | 350 | | 400 | | 450 | |
|----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 22 | | | | | | | | | | | | | | 25x35 | 0.15 |
| 33 | | | | | | | | | | | | | | 25x50 | 0.21 |
| 47 | | | | | | | | | | | | 25x40 | 0.21 | 25x50 | 0.22 |
| 100 | | | | | | 25x50 | 0.43 | 25x50 | 0.44 | 25x50 | 0.45 | 30x50 | 0.48 | 30x60 | 0.53 |
| 150 | | | | | | 25x50 | 0.51 | 25x50 | 0.62 | 25x50 | 0.61 | 30x50 | 0.61 | 30x60 | 0.61 |
| 220 | | 25x50 | 0.64 | 30x50 | 0.71 | 30x50 | 0.72 | 35x50 | 0.82 | 35x60 | 0.82 | 35x80 | 0.82 | 35x80 | 0.92 |
| 330 | | 30x50 | 0.92 | 30x60 | 0.92 | 35x60 | 1.03 | 35x80 | 1.05 | 35x80 | 1.10 | 40x80 | 1.10 | | |
| 470 | | 30x60 | 1.20 | 35x60 | 1.20 | 35x80 | 1.30 | 40x80 | 1.40 | 40x80 | 1.50 | | | | |
| 680 | | 35x60 | 1.60 | 40x60 | 1.70 | 40x80 | 1.80 | | | | | | | | |
| 1000 | | 35x80 | 2.20 | | | | | | | | | | | | |

LP series

- 85°C 3000hours, Screw terminal type.
- High ripple current resistance.
- Suitable for industrial machinery, power converter, communication sets and test equipment.
- RoHS Compliance
- 85°C 3000小時 螺絲型端子。
- 耐高紋波電流。
- 適用於工業機械、電源轉換器、通訊或檢測設備。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | | |
|---------------------------------------|--|---|------|------|------|------|--------------|------|---------|---------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | -40 ~ +85°C | | | | | | -25 ~ +85°C | | | | |
| Rated Voltage Range 額定電壓範圍 | 16 ~ 250VDC | | | | | | 350 ~ 500VDC | | | | |
| Leakage Current 洩漏電流 | $I \leq 3\sqrt{CV}$ 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20 °C) | | | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | |
| | Rated Voltage(V) | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160~250 | 350~500 | |
| | tan δ(Max) | 35Ø | 0.70 | 0.45 | 0.40 | 0.30 | 0.25 | 0.25 | 0.20 | 0.20 | 0.25 |
| | | 51Ø | 0.90 | 0.60 | 0.60 | 0.45 | 0.35 | 0.30 | 0.20 | 0.20 | 0.25 |
| | | 64Ø | 1.30 | 0.90 | 0.80 | 0.50 | 0.40 | 0.35 | 0.25 | 0.20 | 0.25 |
| | | 76Ø | 2.00 | 1.20 | 0.90 | 0.70 | 0.50 | 0.40 | 0.35 | 0.25 | 0.25 |
| 90Ø | | - | - | - | - | - | - | - | 0.25 | 0.25 | |
| Low Temperature Stability 低溫特性 | Measurement Frequency: 120Hz. | | | | | | | | | | |
| Impedance Ratio(Max) 阻抗比率(最大值) | Rated Voltage(V) | 16~250 | | | | | 350~500 | | | | |
| | Z(-25°C)/Z(20°C) | - | | | | | 8 | | | | |
| | Z(-40°C)/Z(20°C) | 12 | | | | | - | | | | |
| Load Life 負荷壽命 | 3000hours,with application of rated voltage at 85°C | | | | | | | | | | |
| | Capacitance Change | Within ± 15% of Initial Value | | | | | | | | | |
| | tan δ | 175% or less of Initial Specified Value | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | |
| | Capacitance Change | Within ± 15% of Initial Value | | | | | | | | | |
| | tan δ | 175% or less of Initial Specified Value | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | | |

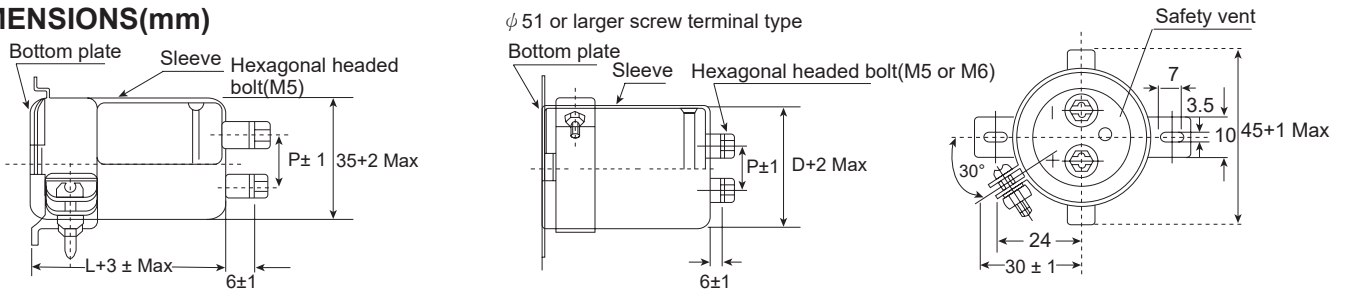
Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Frequency (Hz) | | | |
|-------------------|----------------|------|------|-------|
| | 50 | 120 | 1K | ≥ 10K |
| 16 ~ 100 | 0.90 | 1.00 | 1.15 | 1.15 |
| 160 ~ 250 | 0.88 | 1.00 | 1.15 | 1.20 |
| 350 ~ 500 | 0.82 | 1.00 | 1.30 | 1.40 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

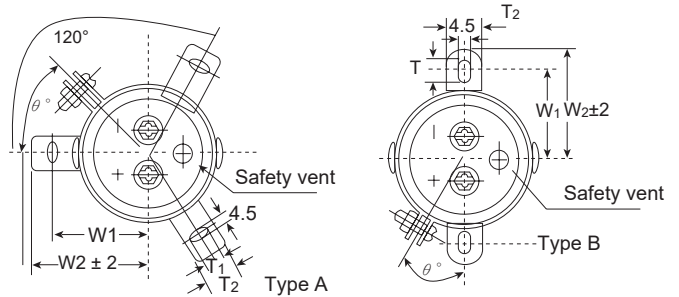
LP series

DIMENSIONS(mm)



DIMENSIONS OF TERMINAL PITCH(P)

| Case dia. (mm) | P (mm) |
|----------------|--------|
| 35 | 12.7 |
| 51 | 22.0 |
| 64 | 28.6 |
| 76 | 31.8 |
| 90 | 31.8 |



DIMENSIONS OF MOUNTING BRACKET

| Cap (μF) | Leg shape φ D | 3-Legs | | | | 2-Legs | | | |
|----------|------------------|--------|------|------|------|--------|------|------|------|
| | | φ 51 | φ 64 | φ 76 | φ 90 | φ 51 | φ 64 | φ 76 | φ 90 |
| | W1 | 32.5 | 38 | 44 | 50.8 | 33.2 | 40.5 | 46.5 | 53 |
| | W2 | 38 | 43 | 49.2 | 57 | 39.5 | 46.5 | 53 | 59 |
| | T1 | 7 | 8 | 7 | 7 | 6 | 6 | 6 | 6 |
| | T2 | 12 | 14 | 16 | 16 | 14 | 14 | 14 | 14 |
| | θ ° | 60 | 60 | 60 | 60 | 30 | 30 | 30 | 30 |

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 85°C 120Hz

| Cap (μF) | V | 16 | | 25 | | 35 | | 50 | | 63 | |
|----------|---|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 10000 | | | | | | | | | | 35x80 | 4.0 |
| 15000 | | | | | | | | 35x80 | 5.4 | 35x100 | 5.5 |
| 22000 | | | | | | | | 35x100 | 6.0 | 35x120 | 7.0 |
| 33000 | | | | 35x80 | 6.0 | 35x80 | 6.2 | 51x80 | 7.0 | 51x80 | 8.8 |
| 47000 | | 35x80 | 6.4 | 35x100 | 8.2 | 35x120 | 8.2 | 51x100 | 8.6 | 51x120 | 11.7 |
| 68000 | | 35x100 | 7.9 | 35x120 | 9.4 | 51x80 | 9.3 | 51x100 | 11.0 | 64x100 | 15.0 |
| 100000 | | 35x120 | 10.6 | 51x100 | 12.0 | 51x120 | 13.6 | 64x100 | 14.2 | 64x140 | 20.8 |
| 150000 | | 51x120 | 11.5 | 51x120 | 15.3 | 64x120 | 16.5 | 76x120 | 18.6 | 76x140 | 26.0 |
| 220000 | | 51x120 | 15.6 | 64x120 | 18.9 | 76x100 | 20.1 | | | | |
| 330000 | | 64x120 | 25.0 | 76x120 | 23.2 | 76x150 | 24.8 | | | | |
| 470000 | | 76x120 | 30.5 | | | | | | | | |
| 500000 | | 76x160 | 32.0 | | | | | | | | |

LP series

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 85°C 120Hz

| Cap (μF) | V | 80 | | 100 | | 160 | | 200 | | 250 | |
|----------|---|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 1000 | | | | | | | | | | 35x80 | 2.4 |
| 1500 | | | | | | | | 35x80 | 2.9 | 35x100 | 3.0 |
| 2200 | | | | | | 35x80 | 3.2 | 35x100 | 3.5 | 51x80 | 4.0 |
| 3300 | | | | | | 35x120 | 4.7 | 51x80 | 4.8 | 51x100 | 5.4 |
| 4700 | | | | 35x80 | 3.7 | 51x80 | 5.0 | 51x100 | 6.3 | 64x100 | 7.3 |
| 6800 | | | | 35x100 | 4.5 | 51x100 | 6.4 | 51x140 | 7.3 | 64x120 | 8.9 |
| 10000 | | 35x80 | 4.2 | 35x120 | 5.3 | 64x100 | 9.0 | 64x120 | 9.8 | 76x120 | 11.8 |
| 15000 | | 35x120 | 6.0 | 51x80 | 6.0 | 76x100 | 12.0 | 76x120 | 13.0 | 90x150 | 16.4 |
| 22000 | | 51x80 | 6.5 | 51x100 | 6.8 | 76x140 | 16.9 | 90x150 | 15.9 | | |
| 33000 | | 51x120 | 9.2 | 51x140 | 10.0 | 90x150 | 19.2 | | | | |
| 47000 | | 64x120 | 12.7 | 64x140 | 14.1 | | | | | | |
| 68000 | | 64x140 | 15.5 | 76x150 | 18.2 | | | | | | |
| 100000 | | 76x150 | 21.3 | | | | | | | | |

| Cap (μF) | V | 350 | | 400 | | 450 | | 500 | | |
|----------|---|--------|-------|------|--------|------|--------|------|--------|------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 470 | | | | | 35x80 | 2.0 | 35x80 | 2.0 | 51x75 | 2.2 |
| 680 | | 35x80 | 2.5 | | 35x100 | 2.6 | 35x120 | 2.9 | 51x100 | 3.1 |
| 1000 | | 51x60 | 3.3 | | 51x80 | 3.3 | 51x80 | 3.6 | 51x130 | 3.8 |
| 1200 | | 51x80 | 3.6 | | 51x80 | 4.2 | 51x100 | 4.2 | 64x100 | 4.6 |
| 1500 | | 51x80 | 4.5 | | 51x100 | 4.8 | 51x120 | 5.0 | 64x120 | 5.4 |
| 1800 | | 51x100 | 5.1 | | 51x120 | 5.4 | 64x100 | 5.4 | 64x130 | 5.8 |
| 2200 | | 51x120 | 6.0 | | 51x140 | 6.3 | 64x120 | 6.6 | 76x120 | 6.9 |
| 2700 | | 51x140 | 6.9 | | 64x120 | 7.2 | 64x140 | 7.5 | 76x150 | 7.9 |
| 3300 | | 64x100 | 8.0 | | 64x140 | 8.4 | 76x120 | 8.4 | 90x140 | 8.6 |
| 3900 | | 64x120 | 9.0 | | 76x100 | 8.7 | 76x150 | 9.6 | 90x150 | 10.0 |
| 4700 | | 76x100 | 9.6 | | 76x150 | 10.5 | 76x150 | 11.4 | 90x190 | 12.0 |
| 5600 | | 76x120 | 11.4 | | 76x150 | 12.3 | 76x150 | 13.2 | | |
| 6800 | | 76x150 | 13.5 | | 76x150 | 13.5 | 90x150 | 14.4 | | |
| 8200 | | 76x150 | 15.0 | | 90x150 | 15.9 | 90x150 | 15.9 | | |
| 10000 | | 90x150 | 16.8 | | 90x150 | 17.7 | 90x190 | 17.5 | | |
| 12000 | | 90x150 | 18.4 | | 90x190 | 20.7 | | | | |
| 15000 | | 90x190 | 22.8 | | | | | | | |

LS series

- Load life:85°C 5000Hours Screw terminal type.
- Suitable for use in industrial equipment industrial power,solar pv inverter, wind power, Marine, heavy trucks, and other fields.
- RoHS Compliance
- 85°C 5000小時 螺栓型端子。
- 適用於工業設備工控電源，太陽能光伏逆變器，風力發電，船舶，重型卡車等領域。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | |
|---------------------------------------|--|---|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | |
| Operating Temperature Range 適用溫度範圍 | - 25 ~ +85°C | | | | |
| Rated Voltage Range 額定電壓範圍 | 350 ~ 500VDC | | | | |
| Rated Capacitance Range 容量範圍 | 220 ~ 1,000,000µF | | | | |
| Leakage Current 洩漏電流 | I ≤ 3√CV (µA) or 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20 °C) | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | |
| | Rated Voltage(V) | 350 | 400 | 450 | 500 |
| | tan δ(MAX) | 0.15 | 0.15 | 0.15 | 0.15 |
| Temperature Stability 溫度特性 | Measurement Frequency: 120Hz. | | | | |
| | Capacitance Change C(-25°C)/Z(20°C) ≥ 0.6 | | | | |
| Load Life 負荷壽命 | 5000hours,with application of rated voltage at 85°C | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Standards 參照標準 | JIS C 5101-4-1 (IEC 60384) | | | | |

Frequency Coefficient of Permissible Ripple Current

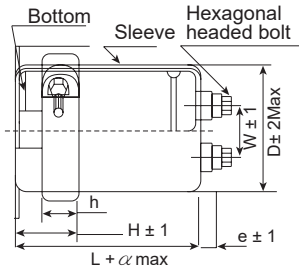
| Rated Voltage (V) | Frequency (Hz) | | | | |
|-------------------|----------------|------|------|------|------|
| | 50 | 120 | 300 | 1K | ≥10K |
| 350 ~ 500 | 0.80 | 1.00 | 1.20 | 1.30 | 1.40 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

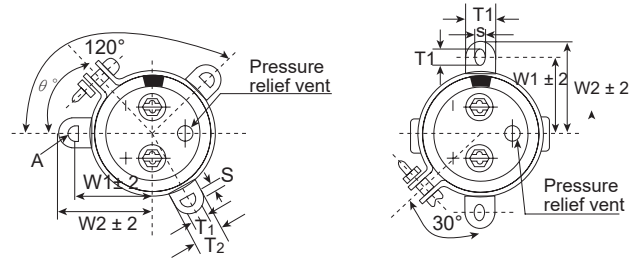
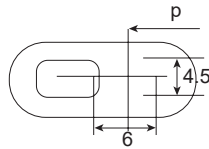
LS series

DIMENSIONS(mm)

Screw terminal type for $\phi 51$ and larger

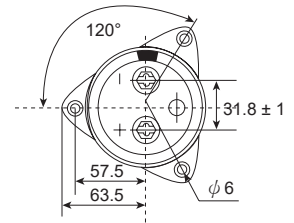
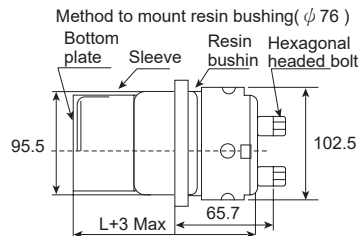
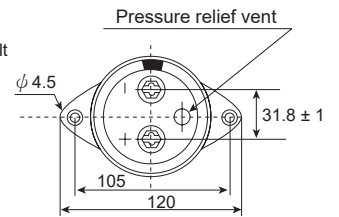
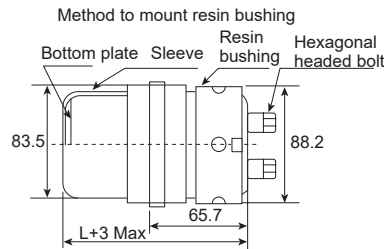


3-leg brackets for $\phi 90$ capacitors have different hole shapes from the ordinary ones as illustrated below.



TERMINAL PITCH(W) & LENGTH (e) TABLE

| ϕD | W | e | α |
|----------|------|----|----------|
| 51 | 22 | 6 | 3 |
| 64 | 28.6 | 6 | 3 |
| 76 | 31.8 | 6 | 3 |
| 90 | 31.8 | 6 | 3 |
| 100 | 41.5 | 10 | 4 |



DIMENSIONS OF MOUNTING BRACKET

| Cap (μF) | Leg shape | 3-Legs | | | | | 2-Legs | | | |
|----------|----------------|----------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|
| | | ϕD | $\phi 51$ | $\phi 64$ | $\phi 76$ | $\phi 90$ | $\phi 100$ | $\phi 51$ | $\phi 64$ | $\phi 76$ |
| | W_1 | 32.5 | 38 | 44.5 | 50.8 | 56.3 | 33.2 | 40.5 | 46.5 | 53 |
| | W_2 | 38.5 | 43 | 49.2 | 57 | 62 | 40 | 46.5 | 53 | 59 |
| | T_1 | 7.5 | 8.0 | 7.0 | 7.0 | 8.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| | T_2 | 12 | 14 | 14 | 16 | 16 | 14 | 14 | 14 | 14 |
| | S | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 4.5 | 4.5 | 4.5 | 4.5 |
| | θ° | 60 | 60 | 60 | 60 | 60 | 30 | 30 | 30 | 30 |
| | H | 20 | 25 | 30 | 35 | 36 | 25 | 35 | 35 | 35 |
| | h | 15 | 20 | 24 | 20 | 30 | 15 | 20 | 20 | 20 |

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 85°C 120Hz

| Cap (μF) | V | 350 | | 400 | | 450 | | 500 | |
|----------|--------|------|-------|--------|-------|--------|-------|--------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 1500 | | | | | | | | 64x115 | 8.6 |
| 1800 | | | | | | 64x95 | 6.7 | 64x130 | 10.0 |
| 2200 | | | | | | 64x100 | 10.4 | 64x155 | 11.7 |
| 2700 | | | | 64x100 | 11.5 | 64x130 | 12.8 | 76x120 | 15 |
| 3300 | | | | 64x130 | 14.2 | 64x155 | 15.2 | 76x145 | 17.5 |
| 3900 | 64x115 | 14.6 | | 64x155 | 16.5 | 64x155 | 16.5 | 76x155 | 20.2 |
| 4700 | 64x130 | 16.9 | | 76x120 | 17.2 | 76x120 | 18.0 | 76x155 | 20.2 |
| 5600 | 64x155 | 19.8 | | 64x155 | 18.1 | 76x145 | 20.8 | 90x135 | 21.8 |
| 6800 | 76x120 | 21.6 | | 76x130 | 20.8 | 90x120 | 21.8 | 90x135 | 21.8 |
| 8200 | 76x145 | 25.0 | | 76x140 | 22.7 | 90x120 | 23.8 | 90x160 | 25.3 |
| 10000 | 90x120 | 26.2 | | 76x160 | 26.6 | 90x135 | 24.9 | 90x160 | 25.3 |
| 12000 | 90x135 | 30.1 | | 90x120 | 27.4 | 90x160 | 29.4 | 90x175 | 29.0 |
| | 76x160 | 29.3 | | 90x135 | 27.4 | 90x160 | 32.2 | | |
| | 90x135 | 30.1 | | 90x160 | 32.2 | 90x160 | 32.2 | | |
| | 90x160 | 35.7 | | 90x160 | 35.7 | 90x175 | 36.9 | | |
| | 90x160 | 39.1 | | | | | | | |

LV series

- Load life:85°C 5000Hours high voltage Screw terminal type.
- Suitable for use in industrial equipment industrial power,solar pv inverter, wind power, Marine, heavy trucks, and other fields.
- RoHS Compliance
- 85°C 5000小時 耐高壓螺栓型端子。
- 適用於在工業設備工控電源，太陽能光伏逆變器，風力發電，船舶，重型卡車等領域。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | |
|---------------------------------------|--|---|------|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | |
| Operating Temperature Range 適用溫度範圍 | - 25 ~ +85°C | | | | |
| Rated Voltage Range 額定電壓範圍 | 500 ~ 650VDC | | | | |
| Rated Capacitance Range 容量範圍 | 220 ~ 1,000,000µF | | | | |
| Leakage Current 洩漏電流 | I ≤ 3√CV (µA) or 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20 °C) | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | |
| | Rated Voltage(V) | 500 | 550 | 600 | 650 |
| | tan δ(MAX) | 0.25 | 0.25 | 0.25 | 0.25 |
| Temperature Stability 溫度特性 | Measurement Frequency: 120Hz. | | | | |
| | Capacitance Change C(-25°C)/Z(20°C) ≥ 0.6 | | | | |
| Load Life 負荷壽命 | 5000hours,with application of rated voltage at 85°C | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | |
| | tan δ | 200% or less of Initial Specified Value | | | |
| | Leakage Current | Initial Specified Value or less | | | |
| Standards 參照標準 | JIS C 5101-4-1 (IEC 60384) | | | | |

Frequency Coefficient of Permissible Ripple Current

| Rated Voltage (V) | Frequency (Hz) | | | | |
|-------------------|----------------|------|------|------|------|
| | 50 | 120 | 360 | 1K | ≥3K |
| 500 ~ 650 | 0.80 | 1.00 | 1.20 | 1.30 | 1.40 |

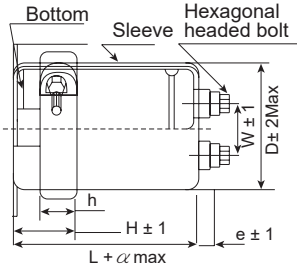
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

LV

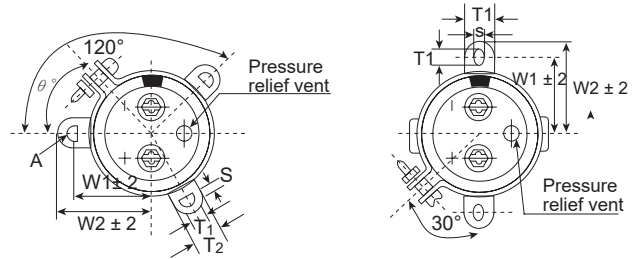
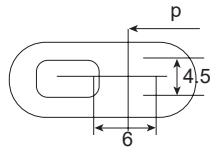
LV series

DIMENSIONS(mm)

Screw terminal type for $\phi 51$ and larger

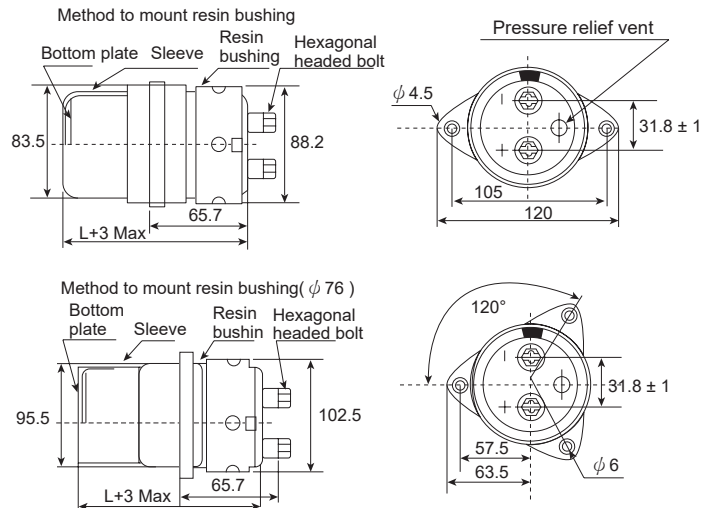


3-leg brackets for $\phi 90$ capacitors have different hole shapes from the ordinary ones as illustrated below.



TERMINAL PITCH(W) & LENGTH (e) TABLE

| ϕD | W | e | α |
|----------|------|----|----------|
| 51 | 22 | 6 | 3 |
| 64 | 28.6 | 6 | 3 |
| 76 | 31.8 | 6 | 3 |
| 90 | 31.8 | 6 | 3 |
| 100 | 41.5 | 10 | 4 |



DIMENSIONS OF MOUNTING BRACKET

| Cap (μF) | Leg shape | 3-Legs | | | | | 2-Legs | | | |
|--------------------|----------------|----------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|
| | | ϕD | $\phi 51$ | $\phi 64$ | $\phi 76$ | $\phi 90$ | $\phi 100$ | $\phi 51$ | $\phi 64$ | $\phi 76$ |
| | W_1 | 32.5 | 38 | 44.5 | 50.8 | 56.3 | 33.2 | 40.5 | 46.5 | 53 |
| | W_2 | 38.5 | 43 | 49.2 | 57 | 62 | 40 | 46.5 | 53 | 59 |
| | T_1 | 7.5 | 8.0 | 7.0 | 7.0 | 8.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| | T_2 | 12 | 14 | 14 | 16 | 16 | 14 | 14 | 14 | 14 |
| | S | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 4.5 | 4.5 | 4.5 | 4.5 |
| | θ° | 60 | 60 | 60 | 60 | 60 | 30 | 30 | 30 | 30 |
| | H | 20 | 25 | 30 | 35 | 36 | 25 | 35 | 35 | 35 |
| | h | 15 | 20 | 24 | 20 | 30 | 15 | 20 | 20 | 20 |

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 85°C 120Hz

| Cap (μF) | V | 500 | | 550 | | 600 | | 650 | | |
|--------------------|---|------|---------|------|---------|------|--------|------|--------|------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 1000 | | | | | 51x95 | 5.4 | | | 64x100 | 6.3 |
| 1200 | | | 51x95 | 5.9 | 51x110 | 6.3 | 64x95 | 6.7 | 64x110 | 7.2 |
| 1500 | | | 51x115 | 7.2 | 51x130 | 7.6 | 64x110 | 8.0 | 64x130 | 8.6 |
| 1800 | | | 51x130 | 8.3 | 64x105 | 8.6 | 64x125 | 9.3 | 64x150 | 10.1 |
| 2200 | | | 51x150 | 9.8 | 64x120 | 10.1 | 64x145 | 11 | 64x170 | 11.7 |
| 2700 | | | 64x120 | 11.2 | 64x150 | 12.4 | 64x170 | 13.1 | 76x150 | 13.6 |
| | | | | | 76x105 | 11.7 | 76x125 | 12.6 | | |
| 3300 | | | 64x140 | 13.3 | 64x170 | 14.5 | 76x145 | 14.9 | 76x170 | 15.8 |
| | | | | | 76x130 | 14.2 | | | | |
| 3900 | | | 64x170 | 15.7 | 76x140 | 15.9 | 76x170 | 17.3 | 90x155 | 15.3 |
| | | | | | | | 76x130 | 15.4 | | |
| 4700 | | | 76x150 | 18.1 | 76x170 | 19.1 | 76x190 | 20.0 | 90x190 | 18.4 |
| | | | | | 90x130 | 15.6 | 90x150 | 16.6 | | |
| 5600 | | | 76x170 | 20.8 | 90x150 | 18.2 | 90x170 | 19.1 | | |
| | | | 90x130 | 17.1 | | | | | | |
| 6800 | | | 90x150 | 20 | 90x170 | 21.1 | | | | |
| 8200 | | | 90x190 | 24.4 | 100x170 | 24.8 | | | | |
| 10000 | | | 90x210 | 28.2 | 100x200 | 29.4 | | | | |
| 12000 | | | 100x210 | 32.9 | | | | | | |
| 15000 | | | 100x250 | 39.8 | | | | | | |

LW series

- Load life:85°C 10000Hours Screw terminal type.
- Suitable for use in industrial equipment industrial power,solar pv inverter, wind power, Marine, heavy trucks, and other fields.
- RoHS Compliance
- 85°C 10000小時 螺栓型端子。
- 適用於工業設備工控電源，太陽能光伏逆變器，風力發電，船舶，重型卡車等領域。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | |
|---------------------------------------|--|---|------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | |
| Operating Temperature Range 適用溫度範圍 | - 25 ~ +85°C | | | |
| Rated Voltage Range 額定電壓範圍 | 350 ~ 450VDC | | | |
| Rated Capacitance Range 容量範圍 | 220 ~ 1,000,000µF | | | |
| Leakage Current 洩漏電流 | $I \leq 3\sqrt{CV}$ (µA) or 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20 °C) | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | |
| | Rated Voltage(V) | 350 | 400 | 450 |
| | tan δ(MAX) | 0.15 | 0.15 | 0.15 |
| Temperature Stability 溫度特性 | Measurement Frequency: 120Hz. | | | |
| | Capacitance Change C(-25°C)/Z(20°C) ≥ 0.6 | | | |
| Load Life 負荷壽命 | 10000hours,with application of rated voltage at 85°C | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | |
| | tan δ | 200% or less of Initial Specified Value | | |
| | Leakage Current | Initial Specified Value or less | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | |
| | tan δ | 200% or less of Initial Specified Value | | |
| | Leakage Current | Initial Specified Value or less | | |
| Standards 參照標準 | JIS C 5101-4-1 (IEC 60384) | | | |

Frequency Coefficient of Permissible Ripple Current

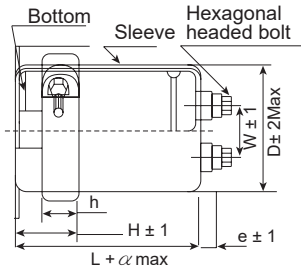
| Rated Voltage (V) | Frequency (Hz) | | | | |
|-------------------|----------------|------|------|------|------|
| | 50 | 120 | 300 | 1K | ≥10K |
| 350 ~ 450 | 0.80 | 1.00 | 1.20 | 1.30 | 1.40 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

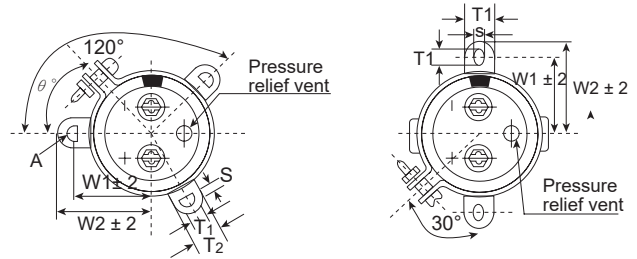
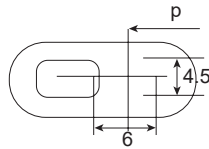
LW series

DIMENSIONS(mm)

Screw terminal type for $\phi 51$ and larger

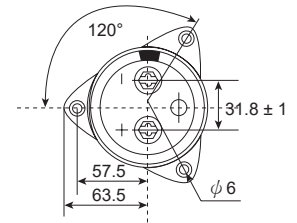
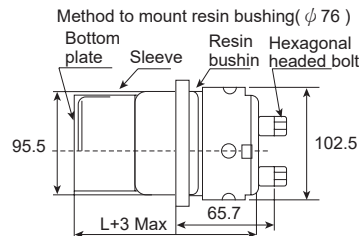
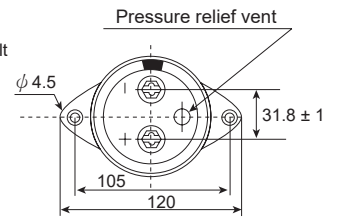
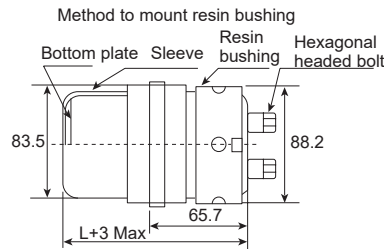


3-leg brackets for $\phi 90$ capacitors have different hote shapes from the ordinary ones as illustrated below.



TERMINAL PITCH(W) & LENGTH (e) TABLE

| ϕD | W | e | α |
|----------|------|----|----------|
| 51 | 22 | 6 | 3 |
| 64 | 28.6 | 6 | 3 |
| 76 | 31.8 | 6 | 3 |
| 90 | 31.8 | 6 | 3 |
| 100 | 41.5 | 10 | 4 |



DIMENSIONS OF MOUNTING BRACKET

| Cap (μF) | Leg shape | 3-Legs | | | | | 2-Legs | | | | |
|-----------------|----------------|----------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|
| | | ϕD | $\phi 51$ | $\phi 64$ | $\phi 76$ | $\phi 90$ | $\phi 100$ | $\phi 51$ | $\phi 64$ | $\phi 76$ | $\phi 90$ |
| | W_1 | | 32.5 | 38 | 44.5 | 50.8 | 56.3 | 33.2 | 40.5 | 46.5 | 53 |
| | W_2 | | 38.5 | 43 | 49.2 | 57 | 62 | 40 | 46.5 | 53 | 59 |
| | T_1 | | 7.5 | 8.0 | 7.0 | 7.0 | 8.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| | T_2 | | 12 | 14 | 14 | 16 | 16 | 14 | 14 | 14 | 14 |
| | S | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 4.5 | 4.5 | 4.5 | 4.5 |
| | θ° | | 60 | 60 | 60 | 60 | 60 | 30 | 30 | 30 | 30 |
| | H | | 20 | 25 | 30 | 35 | 36 | 25 | 35 | 35 | 35 |
| | h | | 15 | 20 | 24 | 20 | 30 | 15 | 20 | 20 | 20 |

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 85°C 120Hz

| Cap (μF) | V | 350 | | 400 | | 500 | | |
|-----------------|---|------|--------|------|--------|------|--------|------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 1000 | | | 51x85 | 5.5 | 51x85 | 5.0 | 51x85 | 5.0 |
| 1200 | | | 51x85 | 5.5 | 51x85 | 5.5 | 51x95 | 6.0 |
| 1500 | | | 51x85 | 6.1 | 51x95 | 6.7 | 51x115 | 7.2 |
| 1800 | | | 51x95 | 7.4 | 51x95 | 7.4 | 51x130 | 8.3 |
| 2200 | | | 51x95 | 8.2 | 51x130 | 9.2 | 64x95 | 9.0 |
| 2700 | | | 51x130 | 10.2 | 64x95 | 9.9 | 64x115 | 10.7 |
| 3300 | | | 51x130 | 11.3 | 64x115 | 11.8 | 64x130 | 12.4 |
| 3900 | | | 64x115 | 12.8 | 64x130 | 13.5 | 76x115 | 13.6 |
| 4700 | | | 64x130 | 14.8 | 76x115 | 14.9 | 76x130 | 15.6 |
| 5600 | | | 76x115 | 16.3 | 76x130 | 17.0 | 76x155 | 18.3 |
| 6800 | | | 76x130 | 18.8 | 76x155 | 20.2 | 90x155 | 21.4 |
| 8200 | | | 76x155 | 22.1 | 90x155 | 23.5 | 90x155 | 23.5 |
| 10000 | | | 90x155 | 25.9 | 90x155 | 25.9 | 90x195 | 28.3 |
| 12000 | | | 90x155 | 28.4 | 90x195 | 31.0 | | |
| 15000 | | | 90x195 | 34.6 | | | | |

LW

HP series

- 105°C 5000hours, Screw terminal type.
- High temperature, high ripple current resistance and long life.
- RoHS Compliance
- 105°C 5000小時 螺栓型端子。
- 耐高溫、高紋波電流、長壽命。



SPECIFICATIONS

| Items 項目 | Characteristics 特性 | | | | | | | | | | | | |
|---------------------------------------|---|---|---------|------|------|------|---------------|---------|------|------|---------|---------|------|
| Capacitance Tolerance 靜電容量誤差 | ± 20%(120Hz,20°C) | | | | | | | | | | | | |
| Operating Temperature Range 適用溫度範圍 | - 40 ~ +105°C | | | | | | - 25 ~ +105°C | | | | | | |
| Rated Voltage Range 額定電壓範圍 | 10 ~ 100VDC | | | | | | 160 ~ 450VDC | | | | | | |
| Rated Capacitance Range 容量範圍 | 220 ~ 1,000,000µF | | | | | | | | | | | | |
| Leakage Current 洩漏電流 | I ≤ 3√CV (µA) or 5mA, which is greater. (After 5 minutes application of DC rated voltage, at 20 °C) | | | | | | | | | | | | |
| Dissipation Factor 散逸因素(tan δ) | Measurement Frequency: 120Hz. Temperature: 20°C | | | | | | | | | | | | |
| | Rated Voltage(V) | | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160~250 | 350~450 | |
| | tan δ (MAX) | 35Ø | 80~140 | 0.65 | 0.45 | 0.40 | 0.30 | 0.25 | 0.25 | 0.20 | 0.12 | 0.15 | 0.20 |
| | | 51Ø | 80~140 | 0.90 | 0.60 | 0.50 | 0.40 | 0.25 | 0.25 | 0.20 | 0.15 | 0.15 | 0.20 |
| | | 64Ø | 120~190 | 1.20 | 0.80 | 0.70 | 0.50 | 0.35 | 0.30 | 0.25 | 0.20 | 0.20 | 0.20 |
| | | 76Ø | 120~190 | 2.00 | 1.20 | 0.90 | 0.70 | 0.55 | 0.50 | 0.35 | 0.30 | 0.20 | 0.20 |
| 90Ø | | 150~190 | 2.40 | 2.00 | 1.50 | 1.00 | 0.75 | 0.60 | 0.40 | 0.30 | 0.25 | 0.20 | |
| 100Ø | 220 | 2.00 | 2.00 | 1.50 | 1.00 | 0.75 | 0.60 | 0.40 | 0.30 | 0.25 | 0.20 | | |
| Low Temperature Stability 低溫特性 | Measurement Frequency: 120Hz. | | | | | | | | | | | | |
| Impedance Ratio(Max) 阻抗比率(最大值) | Rated Voltage(V) | 10~100 | | | | | | 160~450 | | | | | |
| | Z(-25°C)/Z(20°C) | - | | | | | | 8 | | | | | |
| | Z(-40°C)/Z(20°C) | 12 | | | | | | - | | | | | |
| Load Life 負荷壽命 | 5000hours(10~250V,2000hours),with application of rated voltage at 105°C | | | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | | | |
| | tan δ | 300% or less of Initial Specified Value | | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | | |
| Shelf Life 放置壽命 | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. | | | | | | | | | | | | |
| | Capacitance Change | Within ± 20% of Initial Value | | | | | | | | | | | |
| | tan δ | 300% or less of Initial Specified Value | | | | | | | | | | | |
| | Leakage Current | Initial Specified Value or less | | | | | | | | | | | |
| Standards 參照標準 | JIS C 5101-4 (IEC 60384) | | | | | | | | | | | | |

Frequency Coefficient of Permissible Ripple Current

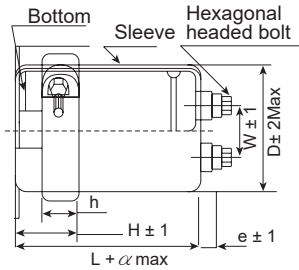
| Rated Voltage (V) | Frequency (Hz) | | | | |
|-------------------|----------------|------|------|------|------|
| | 60 | 120 | 360 | 1K | ≥10K |
| 10 ~ 100 | 0.90 | 1.00 | 1.08 | 1.15 | 1.15 |
| 160 ~ 250 | 0.88 | 1.00 | 1.08 | 1.15 | 1.20 |
| 350 ~ 450 | 0.82 | 1.00 | 1.20 | 1.35 | 1.40 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use , the rms ripple current has to be reduced.

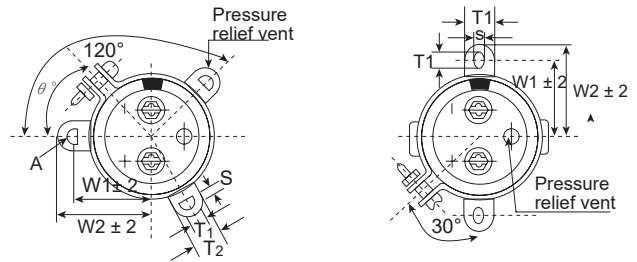
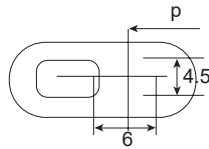
HP series

DIMENSIONS(mm)

Screw terminal type for $\phi 51$ and larger

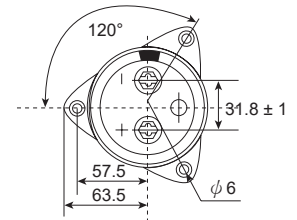
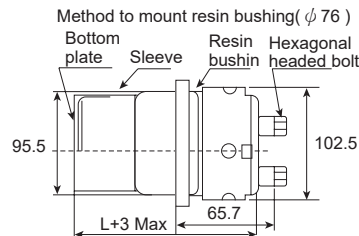
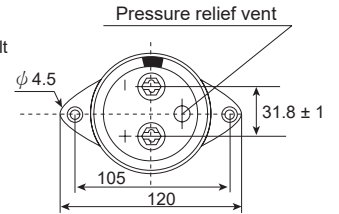
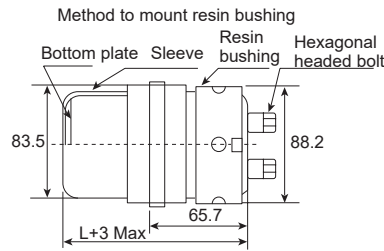


3-leg brackets for $\phi 90$ capacitors have different hote shapes from the ordinary ones as illustrated below.



TERMINAL PITCH(W) & LENGTH (e) TABLE

| ϕD | W | e | α |
|----------|------|----|----------|
| 51 | 22.0 | 6 | 3 |
| 64 | 28.6 | 6 | 3 |
| 76 | 31.8 | 6 | 3 |
| 90 | 31.8 | 6 | 3 |
| 100 | 41.5 | 10 | 4 |



DIMENSIONS OF MOUNTING BRACKET

| Cap (μF) | Leg shape | 3-Legs | | | | | 2-Legs | | | | |
|--------------------|----------------|----------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|
| | | ϕD | $\phi 51$ | $\phi 64$ | $\phi 76$ | $\phi 90$ | $\phi 100$ | $\phi 51$ | $\phi 64$ | $\phi 76$ | $\phi 90$ |
| | W_1 | | 32.5 | 38 | 44.5 | 50.8 | 56.3 | 33.2 | 40.5 | 46.5 | 53 |
| | W_2 | | 38.5 | 43 | 49.2 | 57 | 62 | 40 | 46.5 | 53 | 59 |
| | T_1 | | 7.5 | 8.0 | 7.0 | 7.0 | 8.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| | T_2 | | 12 | 14 | 14 | 16 | 16 | 14 | 14 | 14 | 14 |
| | S | | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 4.5 | 4.5 | 4.5 | 4.5 |
| | θ° | | 60 | 60 | 60 | 60 | 60 | 30 | 30 | 30 | 30 |
| | H | | 20 | 25 | 30 | 35 | 36 | 25 | 35 | 35 | 35 |
| | h | | 15 | 20 | 24 | 20 | 30 | 15 | 20 | 20 | 20 |

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

| Cap (μF) | V | 10 | | 16 | | 25 | | 35 | |
|--------------------|---|--------|-------|--------|-------|--------|-------|--------|-------|
| | | Item | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L |
| 10000 | | | | | | | | 35x100 | 4.3 |
| 15000 | | | | | | | | 35x100 | 5.0 |
| 22000 | | | | | | 35x100 | 4.4 | 35x120 | 5.2 |
| 33000 | | 35x80 | 4.7 | 35x80 | 4.8 | 35x120 | 6.0 | 35x140 | 7.0 |
| 47000 | | 35x100 | 6.0 | 35x100 | 6.0 | 51x100 | 8.0 | 51x120 | 8.0 |
| 68000 | | 51x80 | 6.5 | 51x80 | 6.5 | 51x140 | 10.0 | 51x140 | 12.0 |
| 100000 | | 51x100 | 8.2 | 51x100 | 9.0 | 64x120 | 11.0 | 64x140 | 13.2 |
| 150000 | | 51x120 | 10.2 | 51x120 | 11.4 | 64x140 | 13.5 | 76x150 | 15.0 |
| 220000 | | 64x120 | 13.0 | 64x120 | 14.5 | 76x150 | 16.5 | 90x150 | 17.1 |
| 330000 | | 76x120 | 15.2 | 76x120 | 17.0 | 90x150 | 20.2 | 90x190 | 21.0 |
| 470000 | | 90x140 | 16.0 | 90x140 | 20.2 | 90x190 | 22.0 | | |
| 680000 | | 90x170 | 18.0 | 90x170 | 22.0 | | | | |
| 1000000 | | 90x180 | 20.0 | 90x190 | 23.5 | | | | |

HP series

STANDARD RATINGS

D×L(mm) ; R.C.(A rms) at 105°C 120Hz

| Cap (μF) | V | 50 | | 63 | | 80 | | 100 | |
|----------|---|---------|------|---------|------|---------|------|---------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 2200 | | | | | | | | 35x100 | 2.0 |
| 3300 | | | | | | | | 35x100 | 3.0 |
| 4700 | | | | | | 35x100 | 3.1 | 35x120 | 3.4 |
| 6800 | | | | | | 35x120 | 3.4 | 51x100 | 5.0 |
| 10000 | | 35x100 | 4.5 | 35x120 | 4.5 | 51x100 | 5.0 | 51x120 | 6.2 |
| 15000 | | 35x120 | 5.2 | 51x100 | 5.5 | 51x120 | 6.0 | 64x120 | 7.4 |
| 22000 | | 51x100 | 6.0 | 51x120 | 6.5 | 64x120 | 8.0 | 76x120 | 9.5 |
| 33000 | | 51x140 | 7.5 | 64x120 | 9.0 | 76x120 | 9.5 | 76x150 | 12.3 |
| 47000 | | 64x120 | 9.5 | 64x140 | 11.0 | 76x150 | 13.0 | 90x150 | 16.5 |
| 68000 | | 64x140 | 12.5 | 76x150 | 13.2 | 90x150 | 16.5 | 90x190 | 18.0 |
| 100000 | | 76x150 | 16.5 | 90x150 | 17.3 | 90x190 | 18.2 | 100x220 | 20.2 |
| 150000 | | 90x150 | 19.5 | 90x190 | 20.5 | 100x220 | 21.2 | | |
| 220000 | | 90x190 | 21.5 | 100x220 | 23.2 | | | | |
| 330000 | | 100x220 | 24.0 | | | | | | |

| Cap (μF) | V | 160 | | 200 | | 250 | |
|----------|---|--------|------|--------|------|--------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 680 | | | | | | 35x100 | 1.4 |
| 1000 | | 35x100 | 1.6 | 35x100 | 1.7 | 35x120 | 1.9 |
| 1500 | | 35x100 | 2.1 | 35x120 | 2.3 | 51x100 | 2.4 |
| 2200 | | 35x120 | 2.7 | 51x100 | 2.9 | 51x120 | 3.2 |
| 3300 | | 51x100 | 3.8 | 51x120 | 3.9 | 64x120 | 4.3 |
| 4700 | | 51x120 | 4.5 | 64x120 | 5.1 | 64x140 | 5.9 |
| 6800 | | 64x120 | 6.8 | 64x140 | 7.0 | 76x150 | 7.1 |
| 10000 | | 64x150 | 7.8 | 76x150 | 8.2 | 90x150 | 9.6 |
| 15000 | | 76x150 | 9.8 | 76x150 | 10.4 | 90x190 | 12.7 |
| 22000 | | 76x150 | 12.5 | 90x150 | 15.1 | | |
| 33000 | | 90x150 | 13.4 | | | | |

| Cap (μF) | V | 350 | | 400 | | 450 | |
|----------|---|--------|------|--------|------|--------|------|
| | | D x L | R.C. | D x L | R.C. | D x L | R.C. |
| 220 | | | | 35x100 | 1.2 | 35x100 | 1.4 |
| 330 | | 35x100 | 2.0 | 35x100 | 2.0 | 35x120 | 2.0 |
| 470 | | 35x100 | 2.4 | 35x120 | 3.0 | 51x100 | 3.0 |
| 680 | | 51x100 | 4.0 | 51x100 | 4.0 | 51x120 | 4.0 |
| 1000 | | 51x100 | 6.2 | 51x100 | 6.2 | 51x120 | 6.5 |
| 1500 | | 51x120 | 8.2 | 51x140 | 9.0 | 51x140 | 9.0 |
| 2200 | | 51x140 | 10.6 | 64x120 | 11.2 | 64x120 | 11.4 |
| 2700 | | 64x120 | 12.2 | 64x120 | 13.0 | 64x140 | 13.4 |
| 3300 | | 64x120 | 14.0 | 64x140 | 15.0 | 76x120 | 14.1 |
| 3900 | | 64x140 | 16.4 | 64x170 | 17.5 | 64x170 | 16.2 |
| 4700 | | 64x140 | 19.4 | 76x120 | 18.0 | 76x150 | 17.0 |
| 5600 | | 76x150 | 22.0 | 64x190 | 20.3 | 64x190 | 18.0 |
| 6800 | | 76x170 | 26.0 | 76x150 | 20.0 | 76x170 | 21.3 |
| 8200 | | 76x170 | 30.0 | 76x170 | 23.3 | 76x190 | 26.0 |
| 33000 | | 90x150 | 29.0 | 76x190 | 27.2 | 90x170 | 24.0 |
| | | 90x170 | 32.0 | 90x170 | 26.5 | 90x190 | 28.0 |
| | | | | 90x190 | 29.5 | | |

HP

Taping Specification for Automatic insertion

APPLICATIONS

- These specifications include taped single-ended electrolytic capacitors with the body diameters from 4.0 to 16mm.
- Suitable to be used in automatic lead preparation and insertion machines.

DESCRIPTION

- Body tape requirements are shown from Fig.1 to Fig.6
- Polarity of capacitors shall be oriented in one direction.
- Leader tapes shall not be provided before the first and after the last capacitor on tape.
- Up to 3 capacitor consecutively missing on tape is permitted but a designed quantity of capacitors shall be packed in each case.
- Removal faulty capacitors from the tape shall be by pulling out or by cutting off leads. Cut off leads remaining on tape shall not protrude more than 2.0 mm from tape edge.

DIAGRAM OF TAPING DIMENSIONS

(Unit=mm)

Fig.1(φ 4-φ 8)

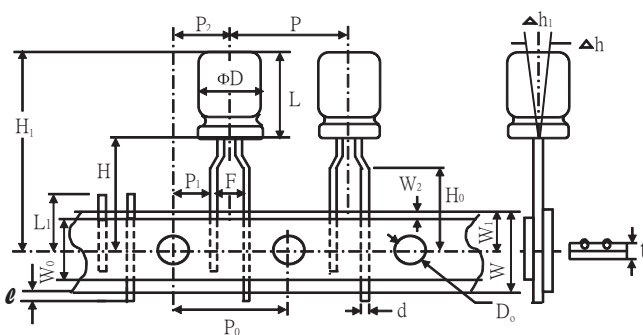


Fig.2(φ 4-φ 5)

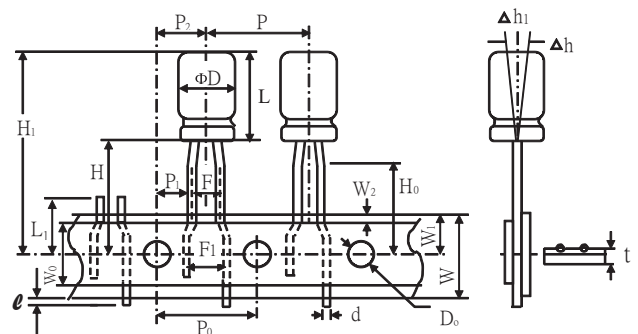


Fig.3(φ 5-φ 8)

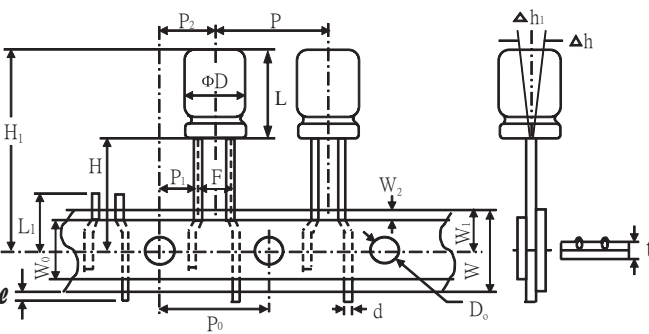


Fig.4(φ 10)

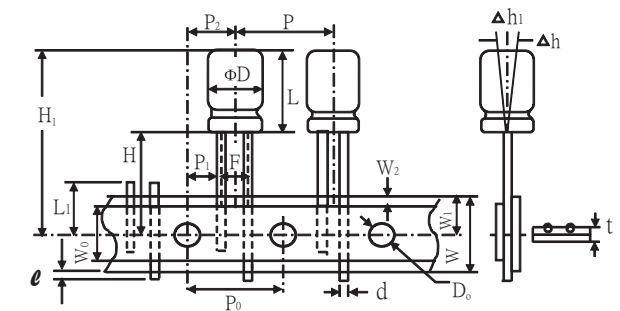


Fig.5(φ 12~φ 13)

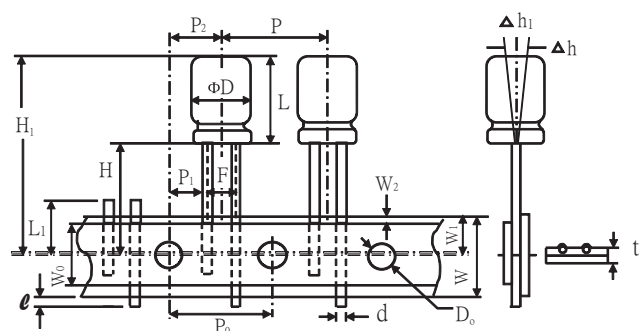
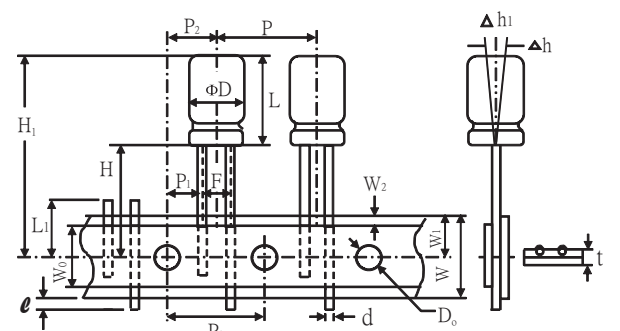


Fig.6(φ 16)



For Automatic Insertion Taping Capacitors

TAPING DIMENSIONS (mm)

| Items | Symbol | Case Size | | | | | | | | | Tolerance | Remark | | | |
|---|-----------------|-----------|-------|------|------|-------|------|------|--------|------|-----------|-------------|-------------|-------|-------|
| | | 4x5 | 5x5 | | 4x7 | 5x7 | | 5x11 | 6.3x11 | 8x12 | | | 10x13 | 10x16 | 10x20 |
| | | | 6.3x5 | 8x5 | | 6.3x7 | 8x7 | | | | | | | | |
| Lead Wire Diameter | d | 0.45 | 0.45 | 0.45 | 0.5 | 0.5 | | | 0.6 | | | ±0.05 | | | |
| Body Height | L | 6 | | 8 | | 12 | | 13 | 14 | 18 | 22 | max | | | |
| Intervals of Bodies | P | 12.7 | | | | | | | | | ±1.0 | | | | |
| Intervals of Punched Holes | P ₀ | 12.7 | | | | | | | | | ±0.2 | | | | |
| Distance between Holes and Lead Wire | P ₁ | 3.85 | | | | | | | | | ±0.7 | Fig.1 Fig.4 | | | |
| | | 5.35 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | 5.10 | | Fig.2 | | | |
| Distance between Holes and Body Center | P ₂ | 6.35 | | | | | | | | | ±1.0 | | | | |
| | | 5.00 | | | | | | | | | | +0.8 | Fig.1 Fig.4 | | |
| Distance between Lead and Lead | F | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | | | | | | | Fig.2 | | |
| | | 1.5 | 2.0 | | 2.5 | | 2.0 | 2.5 | 3.5 | | | | | Fig.3 | |
| | | | 2.5 | | 3.5 | | | | | | | | | | |
| Distance between Lead and Lead | F1 | 5.0 | | | | | | | | | | Fig.2 Fig.3 | | | |
| Base Tape Width | W | 18.0 | | | | | | | | | ±0.5 | | | | |
| Adhesive Tape Width | W ₀ | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | | | 12.0 | | | min | | | |
| | | | 12.0 | | 12.0 | | | | | | | | | | |
| Deviation between Holes and Base Tape | W ₁ | 9.0 | | | | | | | | | ±0.5 | | | | |
| Deviation between Adhesive and Base Tape | W ₂ | 1.5 | | | | | | | | | max | | | | |
| Deviation between Body Bottom and Tape Center | H | 17.5 | | | | 18.5 | | | | | ±0.75 | Fig.1 Fig.4 | | | |
| | | 17.5 | 18.5 | 17.5 | 18.5 | 18.5 | | | | | | Fig.2 Fig.3 | | | |
| Lead Wire Clinched Height | H ₀ | 15.0 | | | | 16.0 | | | | | ±0.5 | | | | |
| | | 15.0 | 16.0 | 15.0 | 16.0 | | | | | | | | | | |
| Distance between Body Top and Tape Center | H ₁ | 27.5 | | | 32.5 | | | 33.0 | 36.0 | 41.0 | max | | | | |
| Punched Hole Diameter | D ₀ | 4.0 | | | | | | | | | ±0.3 | | | | |
| Lead Wire Protrusion | l | 1.0 | | | | | | | | | max | | | | |
| Length of not Good Lead Slit | L ₁ | 11.0 | | | | | | | | | max | | | | |
| Base and Adhesive Tape Thickness | t | 0.7 | | | | | | | | | ±0.2 | | | | |
| Deviation of Body Alignment | Δh | 0 | | | | | | | | | ±2.0 | | | | |
| Deviation of Body Alignment | Δh ₁ | 0 | | | | | | | | | ±2.0 | | | | |

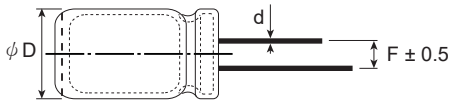
TAPING DIMENSIONS (mm)

| Items | Symbol | Case Size | | | | | | | Tolerance | Remark | | |
|---|-----------------|-----------|-------|-------|-------|-------|-------|-------|-----------|-----------|-------------|-------------|
| | | 12.5x21 | 13x21 | 13x25 | 13x30 | 16x26 | 16x32 | 16x36 | | | | |
| Lead Wire Diameter | d | 0.6 | | | 0.8 | | | | ±0.05 | | | |
| Body Height | L | 23.0 | 23.0 | 27.0 | 32.0 | 28.0 | 34.0 | 38.0 | max | | | |
| Intervals of Bodies | P | 15.0 | | | | 30.0 | | | ±1.0 | | | |
| Intervals of punched Holes | P ₀ | 15.0 | | | | | | | | | ±0.2 | |
| Distance between Holes and Lead Wire | P ₁ | 5.0 | | | | 3.75 | | | | ±0.7 | | |
| Distance between Holes and Bodies | P ₂ | 7.5 | | | | | | | | ±1.0 | | |
| Distance between Lead and Lead | F | 5.0 | | | | 7.5 | | | | +0.8 -0.2 | Fig.5 Fig.6 | |
| Base Tape Width | W | 18.0 | | | | | | | | ±0.5 | | |
| Adhesive Tape Width | W ₀ | 12.0 | | | | 15.0 | | | | min | | |
| Deviation between Holes and Base Tape | W ₁ | 9.0 | | | | | | | | | ±0.5 | |
| Deviation between Adhesive and Base Tape | W ₂ | 1.5 | | | | | | | | | max | |
| Deviation between Body Bottom and Tape Center | H | 18.5 | | | | | | | | | ±0.75 | Fig.5 Fig.6 |
| Distance between Body Top and Tape Center | H ₁ | 40.5 | 40.5 | 45.5 | 50.5 | 46.5 | 53.5 | 56.5 | max | | | |
| Punched Hole Diameter | D ₀ | 4.0 | | | | | | | | | ±0.3 | |
| Lead Wire Protrusion | l | 1.0 | | | | | | | | | max | |
| Length of not Good Lead Slit | L ₁ | 11.0 | | | | | | | | | max | |
| Base and Adhesive Tape Thickness | t | 0.7 | | | | | | | | | ±0.2 | |
| Deviation of Body Alignment | Δh | 0 | | | | | | | | | ±2.0 | |
| Deviation of Body Alignment | Δh ₁ | 0 | | | | | | | | | ±2.0 | |

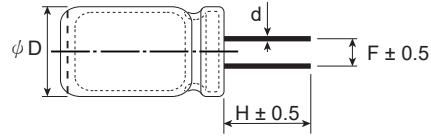
Lead Cutting and Forming

With Terminals or Forms as below, Easier Inserting the Units into P.C. Board and Contributing to Higher Mounting Efficiency.

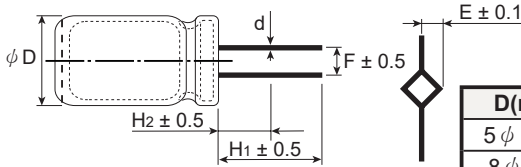
SHAPE (S)



SHAPE (C)

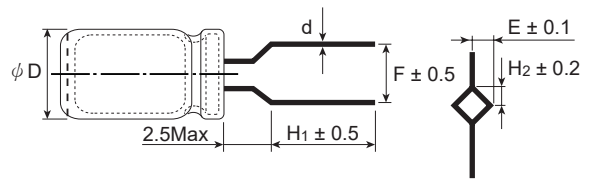


SHAPE (D)

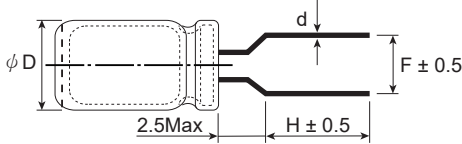


| D(mm) | E(mm) |
|-------------|-------|
| 5 ϕ - 6.3 ϕ | 1.12 |
| 8 ϕ - 18 ϕ | 1.32 |
| 20 ϕ - 25 ϕ | 1.50 |

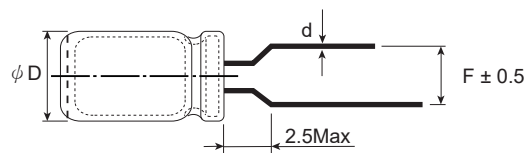
SHAPE (H)



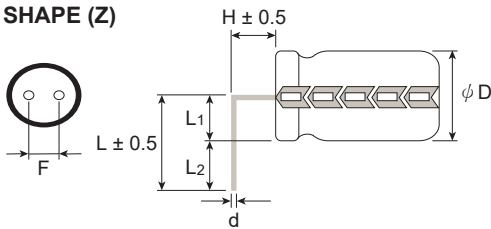
SHAPE (F)



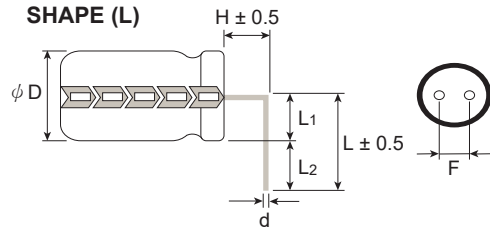
SHAPE (B)



SHAPE (Z)



SHAPE (L)



SPECIFICATION INFORMATION

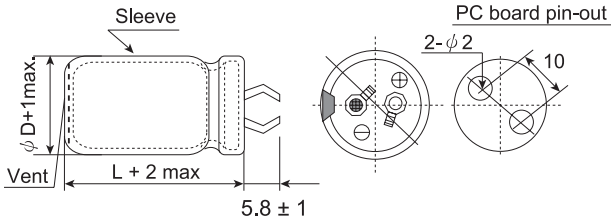
| Shape No. | Cutting & Forming Methods | D ϕ | 4 ϕ | 5 ϕ | 6.3 ϕ | 8 ϕ | 10 ϕ | 12.5 ϕ | 13 ϕ | 16 ϕ | 18 ϕ | 22 ϕ | | |
|-----------|---------------------------|----------------|------|-----|-------|-------------------|------|--------|------|------|------|------|-----|--|
| S | Long Lead | F | 1.5 | 2.0 | 2.5 | 3.5 | 5 | 5 | 5 | 7.5 | 7.5 | 10 | | |
| | | d | 0.45 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | |
| C | Lead Cut Only | F | 1.5 | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 5.0 | 7.5 | 7.5 | 10.0 | | |
| | | H | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | |
| | | d | 0.45 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | |
| D | Lead Cut and Crimp | F | — | — | — | — | 5.0 | 5.0 | 5.0 | 7.5 | 7.5 | 10 | | |
| | | H ₁ | — | — | — | — | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | |
| | | H ₂ | — | — | — | — | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | | |
| F | Lead Cut and Form | F | 5.0 | 5.0 | 5.0 | 5.0 | — | — | — | — | — | — | | |
| | | H | 4.0 | 5.0 | 5.0 | 5.0 | — | — | — | — | — | — | | |
| | | d | 0.45 | 0.5 | 0.5 | 0.5 | — | — | — | — | — | — | | |
| H | Lead Cut, Crimp and Form | F | 5.0 | 5.0 | 5.0 | 5.0 | — | — | — | — | — | — | | |
| | | H ₁ | 4.0 | 5.0 | 5.0 | 5.0 | — | — | — | — | — | — | | |
| | | H ₂ | 1.8 | 1.8 | 1.8 | 1.8 | — | — | — | — | — | — | | |
| | | d | 0.45 | 0.5 | 0.5 | 0.5 | — | — | — | — | — | — | | |
| B | Forming Only | F | 5.0 | 5.0 | 5.0 | 5.0 | — | — | — | — | — | — | | |
| | | d | 0.45 | 0.5 | 0.5 | 0.5 | — | — | — | — | — | — | | |
| L / Z | Lead Cutting and Bending | F | 1.5 | 2.0 | 2.5 | 3.5 | 5 | 5 | 5 | 7.5 | 7.5 | 10 | | |
| | | H | 2.0 | 2.0 | 2.0 | 2.5 or 3.5 or 5.0 | | | | | | | | |
| | | L ₁ | 2.2 | 2.7 | 3.6 | 4.5 | 5.3 | 6.6 | 6.8 | 8.4 | 9.4 | 11.4 | | |
| | | L ₂ | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | |
| | | d | 0.45 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | | |

Terminals Diagram for Capacitors

(mm)

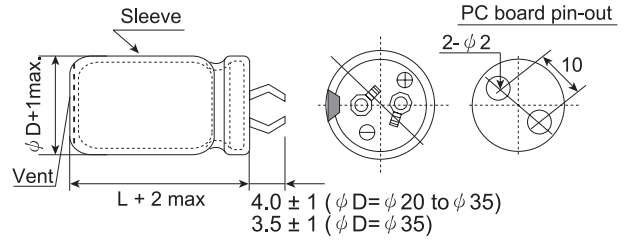
D= ϕ 22 to ϕ 35 mm

YL



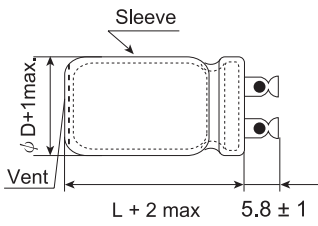
D= ϕ 22 to ϕ 35mm

YS



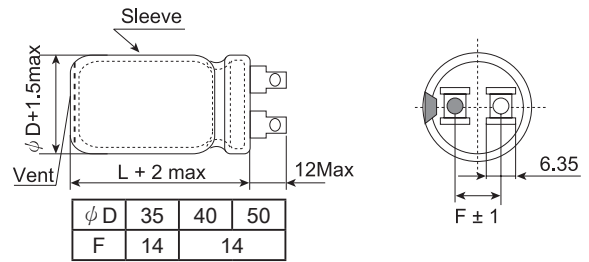
D= ϕ 25 to ϕ 51 mm

G



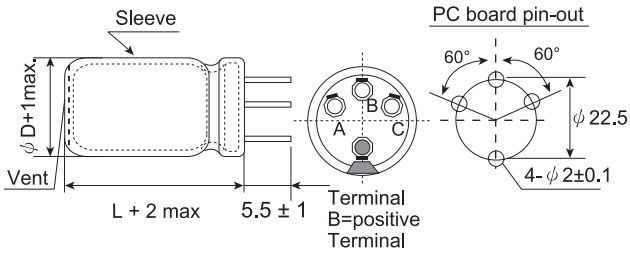
D= ϕ 35 to ϕ 51mm

ST



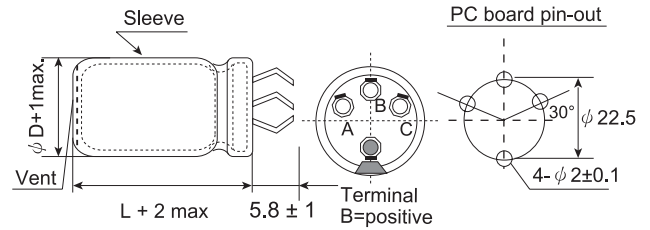
D= ϕ 35 to ϕ 40 mm

PCS



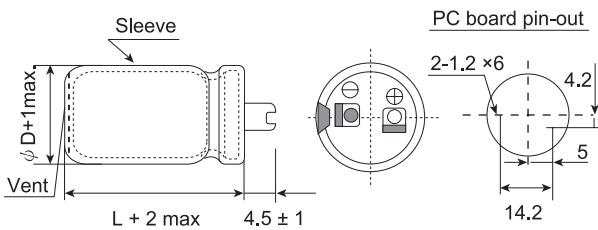
D= ϕ 35 to ϕ 40mm

PCY



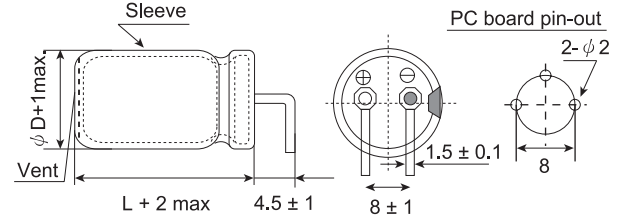
D= ϕ 35 to ϕ 40 mm

PCU



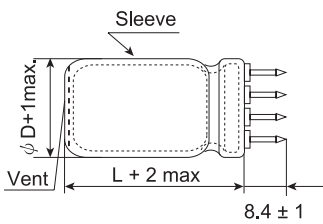
D= ϕ 22 to ϕ 30mm

PCB



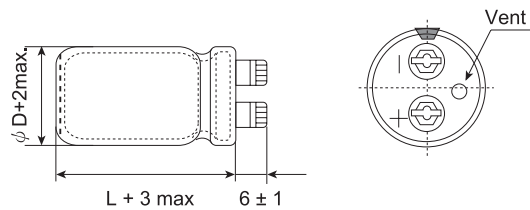
D= ϕ 40 to ϕ 50 mm

U



D= ϕ 35 to ϕ 100mm

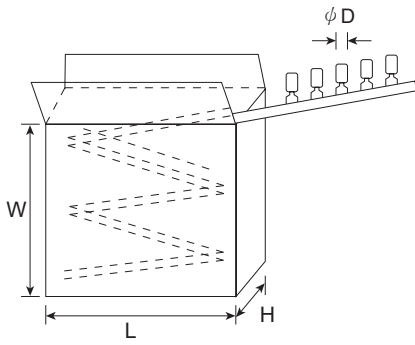
W



CAUTION :

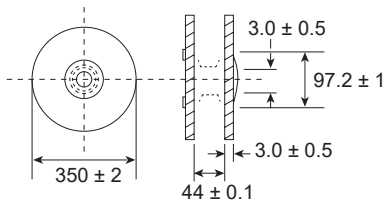
- Use the blank terminals for mechanical support only.
- The blank terminals must not be connected any copper on PC board.
- Be sure to electrically isolate from negative the positive terminals.

Taping Package



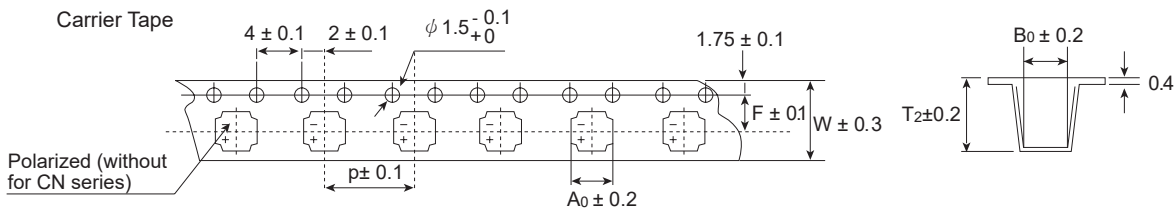
| Item | Taping Packing | | | | | | Tape and Reel |
|--------------------|----------------|----------------|----------------|----------------|------------|-------------|---------------|
| | ϕD (mm) | W \pm 5 (mm) | L \pm 5 (mm) | H \pm 5 (mm) | Qty. (pcs) | G.W. kg/box | Box /Carton |
| 4 | 235 | 327 | 54 | 2,500 | 0.89 | 10 | 1800 |
| 5 | 235 | 327 | 54 | 2,000 | 0.99 | 10 | 1200 |
| 6.3 | 235 | 327 | 54 | 1,500 | 1.12 | 10 | 1000 |
| 8 | 265 | 327 | 51 | 1,000 | 1.48 | 10 | 800 |
| 10 (L \leq 16) | 235 | 330 | 57 | 600 | 1.29 | 10 | 600 |
| 10 (L \leq 20) | 235 | 330 | 57 | 600 | 1.48 | 10 | 600 |
| 12.5 (L \leq 21) | 280 | 315 | 65 | 400 | 1.73 | 6 | 400 |
| 13 (L \leq 21) | 280 | 315 | 65 | 400 | 1.95 | 6 | 400 |
| 13 (L \leq 25) | 280 | 315 | 65 | 400 | 2.35 | 6 | |
| 13 (L \leq 30) | 290 | 310 | 72 | 400 | 2.65 | 6 | |
| 16 (L \leq 26) | 290 | 310 | 72 | 250 | 1.85 | 6 | |
| 16 (L \leq 32) | 290 | 310 | 72 | 250 | 2.25 | 6 | |
| 16 (L \leq 36) | 290 | 310 | 72 | 250 | 2.45 | 6 | |

Taping and Reel



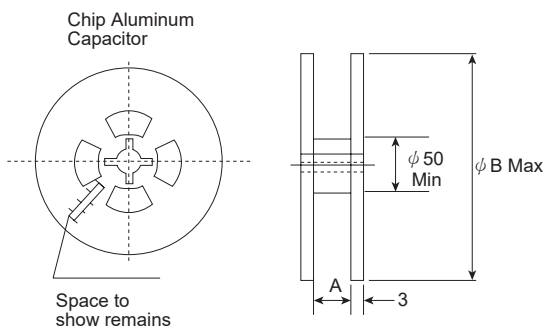
Chip Packing

unreel direction



| Size | Item | | | | | |
|-------------------------|------|------|------|----------------|----------------|----------------|
| | W | P | F | A ₀ | B ₀ | T ₂ |
| $\phi 4 \times 5.4$ L | 12.0 | 8.0 | 5.5 | 5.0 | 5.0 | 5.8 |
| $\phi 5 \times 5.4$ L | 12.0 | 12.0 | 5.5 | 6.0 | 6.0 | 5.8 |
| $\phi 6.3 \times 5.4$ L | 16.0 | 12.0 | 7.5 | 7.0 | 7.0 | 5.8 |
| $\phi 6.3 \times 7.7$ L | 16.0 | 12.0 | 7.5 | 7.0 | 7.0 | 8.0 |
| $\phi 8 \times 10$ L | 24.0 | 16.0 | 11.5 | 8.7 | 8.7 | 11 |
| $\phi 10 \times 10$ L | 24.0 | 16.0 | 11.5 | 10.7 | 10.7 | 11 |

Chip Reel



Package Quantity

| Size | Q'ty / Reel |
|-------------------------|-------------|
| $\phi 4 \times 5.4$ L | 2000pcs |
| $\phi 5 \times 5.4$ L | 1000pcs |
| $\phi 6.3 \times 5.4$ L | 1000pcs |
| $\phi 6.3 \times 7.7$ L | 1000pcs |
| $\phi 8 \times 10$ L | 500pcs |
| $\phi 10 \times 10$ L | 500pcs |

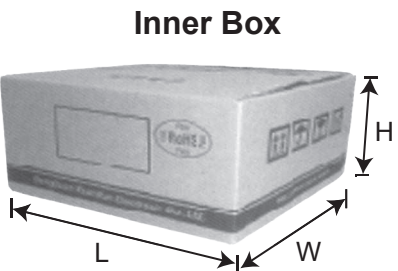
| Size | $\phi 4 \times 5.4$ | $\phi 5 \times 5.4$ | $\phi 6.3 \times 5.4$ | $\phi 6.3 \times 7.7$ | $\phi 8 \times 10$ | $\phi 10 \times 10$ |
|------|---------------------|---------------------|-----------------------|-----------------------|--------------------|---------------------|
| A | 14 | 14 | 18 | 18 | 26 | 26 |
| B | 382 | 382 | 382 | 382 | 382 | 382 |

Package Information

Unit:(mm)

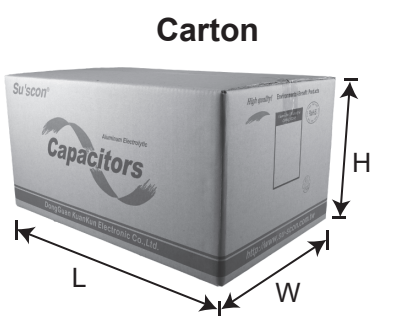
| Type of Product | Dim. (DxL) | Bags / Inner Box | Layer Quantity | Quantity (pcs/bag) | Total Quantity (pcs/Carton) | Wt (kg/bag) | Size of Inner Box (mm) | Size of Out Box (mm) |
|------------------------|------------|------------------|----------------|--------------------|-----------------------------|-------------|-----------------------------|-----------------------------|
| Radial (Standard Bulk) | 4x5 | 20 | 2 | 1000 | 40,000 | 0.19 | 267 X 260 X 135 | 546 X 279 X 160 |
| | 4x7 | 20 | 2 | 1000 | 40,000 | 0.23 | | |
| | 5x5 | 15 | 2 | 1000 | 30,000 | 0.25 | | |
| | 5x7 | 10 | 2 | 1000 | 20,000 | 0.32 | | |
| | 5x11 | 10 | 2 | 1000 | 20,000 | 0.43 | | |
| | 6.3x5 | 10 | 2 | 1000 | 20,000 | 0.37 | | |
| | 6.3x7 | 10 | 2 | 1000 | 20,000 | 0.45 | | |
| | 6.3x11 | 8 | 2 | 1000 | 16,000 | 0.60 | | |
| | 8x5 | 10 | 2 | 500 | 10,000 | 0.23 | | |
| | 8x9 | 10 | 2 | 500 | 10,000 | 0.42 | | |
| | 8x12 | 10 | 2 | 500 | 10,000 | 0.49 | | |
| | 8x14 | 8 | 2 | 500 | 8,000 | 0.63 | | |
| | 8x16 | 6 | 2 | 500 | 6,000 | 0.69 | | |
| | 8x20 | 6 | 2 | 500 | 6,000 | 0.71 | | |
| | 10x13 | 11 | 2 | 200 | 4,400 | 0.38 | | |
| 10x16 | 9 | 2 | 200 | 3,600 | 0.45 | | | |
| Radial (Special Bulk) | 4x5 | 15 | 2 | 1000 | 30,000 | 0.13 | 365 X 245 X 230 | 365 X 245 X 230 |
| | 4x7 | 15 | 2 | 1000 | 30,000 | 0.18 | | |
| | 5x5 | 10 | 2 | 1000 | 20,000 | 0.19 | | |
| | 5x7 | 10 | 2 | 1000 | 20,000 | 0.27 | | |
| | 5x11 | 10 | 2 | 1000 | 20,000 | 0.40 | | |
| | 6.3x5 | 10 | 2 | 1000 | 20,000 | 0.31 | | |
| | 6.3x7 | 10 | 2 | 1000 | 20,000 | 0.40 | | |
| | 6.3x11 | 10 | 2 | 1000 | 20,000 | 0.55 | | |
| | 8x5 | 20 | 2 | 250 | 10,000 | 0.11 | | |
| | 8x7 | 20 | 2 | 250 | 10,000 | 0.15 | | |
| | 8x9 | 20 | 2 | 250 | 10,000 | 0.20 | | |
| | 8x12 | 20 | 2 | 250 | 10,000 | 0.23 | | |
| | 8x14 | 20 | 2 | 250 | 10,000 | 0.28 | | |
| | 8x16 | 20 | 2 | 250 | 10,000 | 0.33 | | |
| | 8x20 | 18 | 2 | 250 | 9,000 | 0.39 | | |
| 8x25 | 14 | 2 | 250 | 7,000 | 0.48 | | | |
| Cutting | 4x5 | 30 | 2 | 1000 | 60,000 | 0.13 | 267 X 260 X 135 | 546 X 279 X 160 |
| | 4x7 | 30 | 2 | 1000 | 60,000 | 0.18 | | |
| | 5x5 | 20 | 2 | 1000 | 40,000 | 0.19 | | |
| | 5x7 | 20 | 2 | 1000 | 40,000 | 0.27 | | |
| | 5x11 | 15 | 2 | 1000 | 30,000 | 0.40 | | |
| | 6.3x5 | 15 | 2 | 1000 | 30,000 | 0.31 | | |
| 6.3x7 | 15 | 2 | 1000 | 30,000 | 0.40 | | | |

PACKAGE BOX



Inner Box Size: (L) X (W) X (H)

| Type of Product | Dim. (DxL) | Quantity (pcs/Inner Box) | Layer Quantity | Total Quantity (pcs/Carton) | Unit Wt. (kg/pcs) | Gross (kg/Inner Box) | Size of Inner Box (mm) | Size of Out Box (mm) |
|-----------------|----------------|--------------------------|----------------|-----------------------------|-------------------|----------------------|-----------------------------|-----------------------------|
| Snap-In, LUG | 20x50 | 200 | 4 | 800 | 0.022 | 4.61 | 272 X 272 X 146 | 564 X 282 X 312 |
| | 22x25 | 300 | 4 | 1200 | 0.013 | 4.11 | | |
| | 22x30 | 300 | 4 | 1200 | 0.016 | 5.01 | | |
| | 22x35 | 200 | 4 | 800 | 0.020 | 4.21 | | |
| | 22x40 | 200 | 4 | 800 | 0.022 | 4.61 | | |
| | 22x45 | 200 | 4 | 800 | 0.023 | 4.81 | | |
| | 22x50 | 200 | 4 | 800 | 0.030 | 6.21 | | |
| | 25x25 | 300 | 4 | 1200 | 0.016 | 5.05 | | |
| | 25x30 | 300 | 4 | 1200 | 0.017 | 5.35 | | |
| | 25x35 | 300 | 4 | 1200 | 0.022 | 6.85 | | |
| | 25x40 | 200 | 4 | 800 | 0.028 | 5.85 | | |
| | 25x45 | 200 | 4 | 800 | 0.032 | 6.65 | | |
| | 25x50 | 200 | 4 | 800 | 0.035 | 7.25 | | |
| | 30x25 | 75 | 4 | 300 | 0.024 | 1.92 | | |
| | 30x30 | 75 | 4 | 300 | 0.027 | 2.15 | | |
| | 30x35 | 75 | 4 | 300 | 0.036 | 2.82 | | |
| | 30x40 | 50 | 4 | 200 | 0.040 | 2.12 | | |
| | 30x45 | 50 | 4 | 200 | 0.045 | 2.37 | | |
| | 30x50 | 50 | 4 | 200 | 0.050 | 2.62 | | |
| | 30x55 | 50 | 4 | 200 | 0.055 | 2.87 | | |
| | 35x30 | 75 | 4 | 300 | 0.036 | 2.87 | | |
| | 35x35 | 75 | 4 | 300 | 0.039 | 3.06 | | |
| | 35x40 | 50 | 4 | 200 | 0.046 | 2.44 | | |
| | 35x50 | 50 | 4 | 200 | 0.061 | 3.19 | | |
| | Screw Terminal | 35x120 | 25 | 4 | 100 | 0.161 | 16.24 | 204x204x146 |
| 51x100 | | 40 | 1 | 40 | 0.278 | 11.83 | 515x337x210 | 515x337x210 |
| 51x120 | | 40 | 1 | 40 | 0.326 | 13.75 | | |
| 51x170 | | 36 | 1 | 36 | 0.412 | 15.76 | 515x337x260 | 515x337x260 |
| 64x120 | | 24 | 1 | 24 | 0.485 | 12.35 | 515x337x210 | 515x337x210 |
| 64x140 | | 20 | 1 | 20 | 0.558 | 12.09 | | |
| 64x170 | | 20 | 1 | 20 | 0.775 | 16.43 | 515x337x260 | 515x337x260 |
| 64x195 | | 16 | 1 | 16 | 0.510 | 9.31 | 515x337x310 | 515x337x310 |
| 76x140 | | 12 | 1 | 12 | 0.714 | 9.50 | | |
| 76x150 | | 12 | 1 | 12 | 0.603 | 8.17 | 515x337x260 | 515x337x260 |
| 76x170 | | 12 | 1 | 12 | 1.012 | 13.07 | | |
| 76x190 | | 9 | 1 | 9 | 1.209 | 12.03 | 515x337x310 | 515x337x310 |
| 76x220 | | 9 | 1 | 9 | 1.472 | 14.39 | | |
| 90x170 | | 12 | 1 | 12 | 1.237 | 15.77 | 515x337x260 | 515x337x260 |
| 90x190 | | 7 | 1 | 7 | 1.635 | 12.59 | 515x337x310 | 515x337x310 |



Carton Size: (L) X (W) X (H)

冠坤電子企業股份有限公司

KUAN KUN ELECTRONIC ENTERPRISE CO., LTD.

新北市23511中和區建八路2號5樓之3
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TEL:886-2-8226-9699 FAX:886-2-8226-9670
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廣東省523648東莞市清溪鎮銀河工業區銀瓶路41號
YIN HE INDUSTRIAL ZONE, QING XI TOWN,
DONG GUAN CITY, GUANG DONG 523648, CHINA
TEL:86-769-39019168 FAX:86-769-39019167

東莞冠坤電子有限公司

DONG GUAN KUAN KUN ELECTRONIC CO., LTD.

廣東省523648東莞市清溪鎮銀河工業區銀瓶路41號
YIN HE INDUSTRIAL ZONE, QING XI TOWN,
DONG GUAN CITY, GUANG DONG 523648, CHINA
TEL:86-769-87318000 FAX:86-769-87318008

東莞冠宜電子有限公司蘇州分公司

DONG GUAN KUAN YI ELECTRONIC CO., LTD SUZHOU BRANCH

蘇州工業園區啟月街288號紫金東方商務廣場1商幢2-1008室
ROOM 2-1008, ZIJIN ORIENTAL PLAZA, NO.288, QIYUE STREET,
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