

TEAPO

Aluminum Electrolytic Capacitors
铝电解电容器



智宝电子股份有限公司
TEAPO ELECTRONICS CO.,LTD.



Company Profile

Established:	September 11th 1978
Capital :	USD 32 million
Revenue :	USD 59 million
Employees :	900
Listing :	August 29th 1998, Taiwan Stock Exchange
Stock Code :	2375
Product Lines :	Aluminum Electrolytic Capacitor Conductive Polymer Solid Aluminum Capacitor

Milestones:	1956	Set-up Aluminum Capacitor Division at SAMPO Electronic
	1965	Technical cooperation with Elna Japan
	1966	Technical cooperation with Hitachi Japan
	1971	Technical cooperation with Shinyei Japan
	1975	First development and mass production at Low ESR product in Taiwan
	1978	Foundation of Teapo Electronic Capacitor
	1998	Company stock listed in OTC market in Taiwan
	1998	Manufacturing plant in Dongguan ,China
	2001	Dongguan factory certified by ISO9001:2000
	2005	Teapo acquired G-Luxon
	2006	Manufacturing polymer capacitors
	2008	Dongguan factory certified by ISO9001:2008
	2010	Dongguan factory certified by ISO14001:2004
	2014	Dongguan factory certified by ISO/TS16949:2009
	2014	Dongguan factory certified by IECQ/QC080000:2012
	2014	Dongguan factory certified by OHSAS 18001:2007

Catalogue content

● Product Guide

	Page
1. Products Series Table	2
2. Products Group Chart	5
3. Industry Application	8
4. Part Number System	9
5. Taping specifications for Roldal Type	11
6. Lead Cut/Forming for Radial Type	12
7. Terminals for Snap-in Type	13
8. Packaging specification	14
9. Usage conditions of Conductive Polymer Hybrid Capacitors	18
10. Usage conditions of Aluminum Electrolytic Capacitors	21

● Conductive Polymer Aluminum Solid Capacitors

1. Precautions in Using Polymer solid aluminum electrolytic capacitor	26
2. SMD Type Conductive Polymer Aluminum Solid Capacitors	29
3. Radial Type Conductive Polymer Aluminum Solid Capacitors	35

● Aluminum Electrolytic Capacitors

1. Precautions in Using Aluminum Electrolytic Capacitors	51
2. Surface Mount Aluminium Electrolytic Capacitors	55
3. Radial Type Aluminium Electrolytic Capacitors	79
4. Snap-in Type Aluminium Electrolytic Capacitors	142
5. Screw Type Aluminium Electrolytic Capacitors	175

Products Series Table

■ Conductive Polymer Aluminum Solid Capacitors

Classify			Pages	Features	Standard Type	Miniaturization	Long life	Low impedance	High Ripple	Endurance (+R=With ripple)	Rated voltage range (Vdc)
Type	TEAPO	G-LUXON									
SMD Types	VP	VP	29	Standard	*					105°C 2000hours	2.5~25
	VB	VB	31	High capacitance & Low ESR				*		105°C 2000hours	2.5~25
	VS	VS	33	Long Life & Low ESR			*	*		105°C 5000hours	4~20
Radial Types	FG	FG	35	Standard	*					105°C 2000hours	2.5~25
	FR	FR	37	High Ripple & Low ESR					*	105°C 2000hours	2.5~6.3
	FF	FF	39	Large Capacitance				*		105°C 2000hours	2.5~63
	FL	FL	41	Special for Charger NEW	*					105°C 2000hours	6.3~16
	FS	FS	43	Large Capacitance&Long Life&High Voltage			*			105°C 2000~5000hours	25~50
	FP	FP	45	8mm height & Low ESR		*		*		105°C 3000hours	2.5~25
	FH	FH	47	Long life & Low ESR			*			105°C 5000hours	2.5~16
	FT	FT	49	125°C/2000hrs&Low ESR			*			125°C 2000hours	6.3~25

■ Surface Mount Aluminium Electrolytic Capacitors

Classify			Pages	Features	Standard Type	Miniaturization	Long life	Low impedance	High Ripple	Endurance (+R=With ripple)	Rated voltage range (Vdc)
Type	TEAPO	G-LUXON									
Vertical Chip	GV	GV	55	General purpose	*					85°C 2000hours	4~100
	FV	FV	58	Long Life for 85°C			*			85°C 3000~5000hours	4~100
	SV	SV	60	General purpose	*					105°C 1000hours	4~100
	DV	DV	62	General purpose	*					105°C 2000hours	6.3~450
	ZV	ZV	65	Low Impedance				*		105°C 1000hours+R	4~50
	YV	YV	67	Low impedance				*		105°C 1000~2000hours+R	6.3~50
	EV	EV	69	Ultra Low impedance				*		105°C 2000hours+R	6.3~50
	JV	JV	71	Ultra Low Impedance				*		105°C 2000hours+R	6.3~35
	XV	XV	73	Ultra Low impedance · Long life			*	*		105°C 3000~5000hours+R	6.3~50
	HV	HV	75	125°C High temperature			*			125°C 1000~2000hours	6.3~50
	NV	NV	77	Non-polar	*					105°C 2000 hours	6.3~35

■ Radial Type Aluminium Electrolytic Capacitors

Classify			Pages	Features	Standard Type	Miniaturization	Long life	Low impedance	High Ripple	Endurance (+R=With ripple)	Rated voltage range (Vdc)
Type	TEAPO	G-LUXON									
Low profile	D5	SF	/	Low profile EOL		*				85°C 1000hours	6.3~50
	D7	SS	/	Low profile EOL		*				85°C 1000hours	6.3~63
	S5	FX	79	Low profile		*				105°C 1000hours	6.3~50

Products Series Table

■Radial Type Aluminium Electrolytic Capacitors

Classify			Pages	Features	Standard Type	Miniaturization	Long life	Low impedance	High Ripple	Endurance (+R=With ripple)	Rated voltage range (Vdc)
Type	TEAPO	G-LUXON									
Low profice	S7	SX	81	Low profice		*				105°C 1000hours	6.3~63
	H5	H5	83	Low profice		*				105°C 2000 hours	6.3~50
	H7	H7	85	Low profice		*				105°C 2000 hours	6.3~63
General Purpose	SK	GR	87	Standard		*				85°C 2000hours	6.3~500
	SE (SEK)	SE	/	Standard	EOL	*				105°C 1000hours	6.3~450
	SH	SM	90	Standard		*				105°C 2000hours	6.3~500
Low impedance	SZ	LW	94	Ultra low impedance				*		105°C 1000~2000hours+R	6.3~16
	SC	LZ	96	Low impedance 、High Ripple				*		105°C 1000~3000hours+R	6.3~100
	SJ	LU	99	Low impedance 、High Ripple			*	*		105°C 1000~5000hours+R	6.3~100
	SY	LT	102	Low impedance 、Long life			*	*		105°C 2000~6000hours+R	6.3~100
	TA	TA	105	Low impedance 、Long life			*	*		105°C 4000~10000hours+R	6.3~100
	ST	ST	108	Low impedance 、Long life			*	*		105°C 4000~10000hours+R	6.3~100
	TT	TT	111	Low impedance 、Long life 、Miniaturization	NEW	*	*	*		105°C 5000hours+R	6.3~50
	TB	TB	113	Low impedance 、High Ripple			*	*		105°C 5000~6000hours+R	6.3~35
	TC	TC	115	Low impedance 、Long life			*	*		105°C 6000~10000hours+R	6.3~100
High Ripple	SQ	LB	118	High Ripple					*	105°C 2000hours+R	160~450
	SG	LC	120	High Ripple 、Long life			*	*		105°C 3000~5000hours+R	160~500
	SP	SP	123	High Ripple 、Long life	Upgrade		*	*		105°C 8000~10000hours+R	160~500
	SU	SU	125	High Ripple 、Long life			*	*		105°C 10000~12000hours+R	160~450
Special Purpose	RN	RN	127	Non-polar Standard		*	*			85°C 1000hours	6.3~250
	SN	RX	130	Non-polar Standard		*	*			105°C 1000hours	6.3~250
	SB	LX	132	Low leakage current		*				105°C 1000hours	6.3~100
	QC	QC	134	Charger	NEW	*				105°C 2000hours	400~450
	TE	TE	136	LED Lighting 、Ultra Long Life		*	*			105°C 12000~20000hours+R	160~400
	AK	AK	138	High Temperature 、Long Life			*			125°C 2000-5000hours	10~450
	AR	AR	140	High Tem 、Low impedance 、Ultra long Life	NEW		*	*		125°C 3000~5000hours+R	25~63

Products Series Table

■ Snap-in Type Aluminium Electrolytic Capacitors

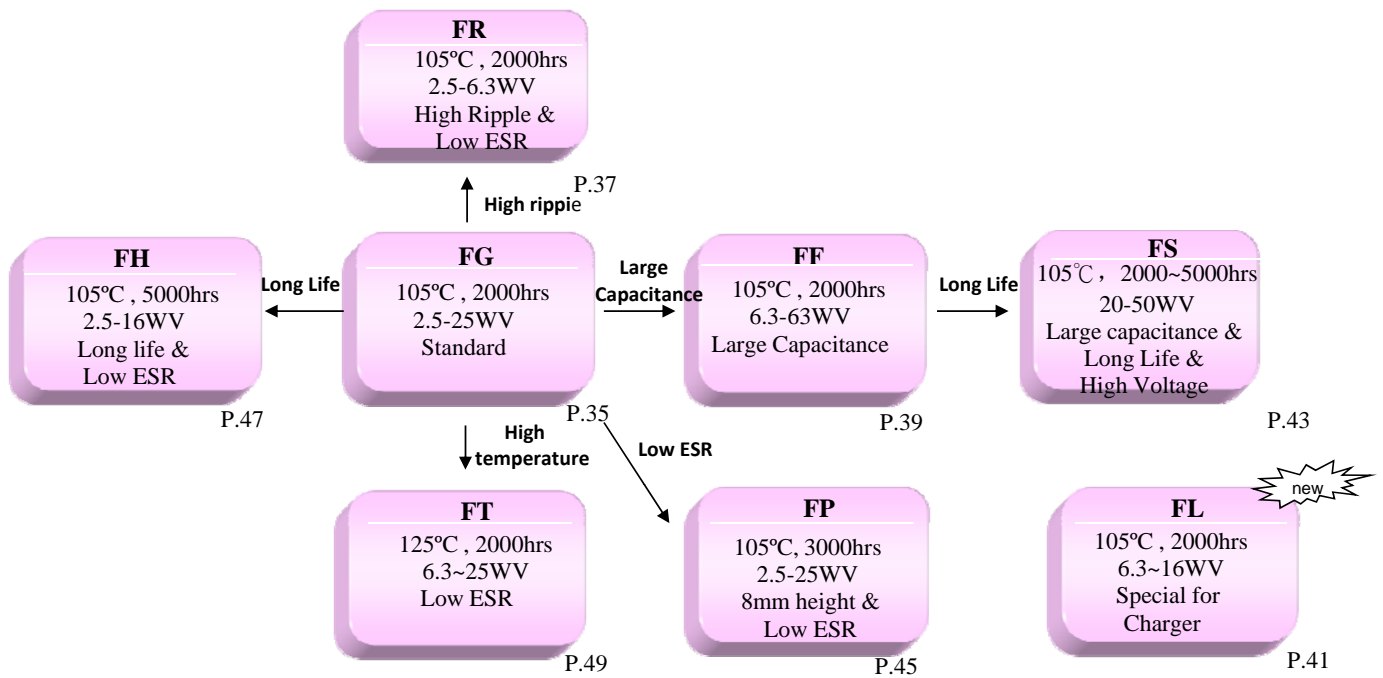
Classify			Pages	Features	Standard Type	Miniaturization	Long life	Low impedance	High Ripple	Endurance (+R=With ripple)	Rated voltage range (Vdc)
Type	TEAPO	G-LUXON									
General Purpose	LH	TW	142	Standard	*					85°C 2000hours+R	6.3~500
	LG	HW	148	Standard	*					105°C 2000hours+R	6.3~500
Long life	LF	LF	154	Long Life			*			85°C 3000hours+R	10~500
	LJ	LJ	159	Long Life			*			105°C 3000hours+R	10~500
	LQ	LQ	164	Long Life			*			105°C 5000hours+R	160~500
	LK	LK	167	Long Life			*			105°C 7000hours+R	160~450
Miniaturization	LS	LS	170	Downsized ∙ Low profile		*				105°C 2000hours+R	160~450
	LM	LM	173	Downsized ∙ Low profile ∙ Long Life		*	*			105°C 3000hours+R	400~450

■ Screw Type Aluminium Electrolytic Capacitors

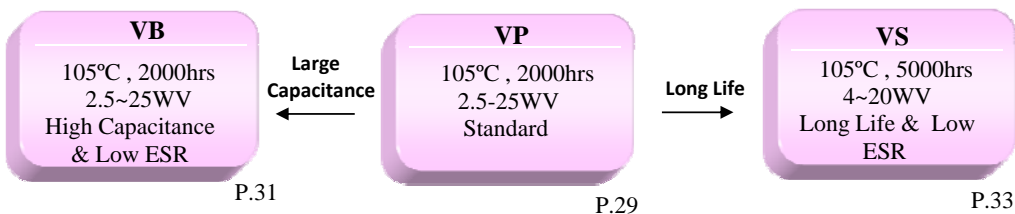
Classify			Pages	Features	Standard Type	Miniaturization	Long life	Low impedance	High Ripple	Endurance (+R=With ripple)	Rated voltage range (Vdc)
Type	TEAPO	G-LUXON									
General Purpose	KP	KP	175	Standard	*				*	85°C 2000hours+R	6.3~450
	WP	WP	179	Standard ∙ High Ripple	*				*	85°C 2000hours+R	160~550
	QP	QP	181	Standard ∙ High Ripple	*				*	105°C 2000hours+R	160~500
	RP	RP	183	Wide temperature range standard	*					105°C 2000hours+R	10~450
Long life	MP	MP	185	High voltage ∙ Long life			*			85°C 5000hours+R	350~450
	XP	XP	187	High voltage ∙ Long life			*	*		105°C 5000hours+R	200~450
	JP	JP	189	High voltage ∙ Long life			*			85°C 10000hours+R	350~450
	EP	EP	191	High voltage ∙ Long life			*			105°C 10000hours+R	350~450

Systematic Diagram of Teapo Capacitor

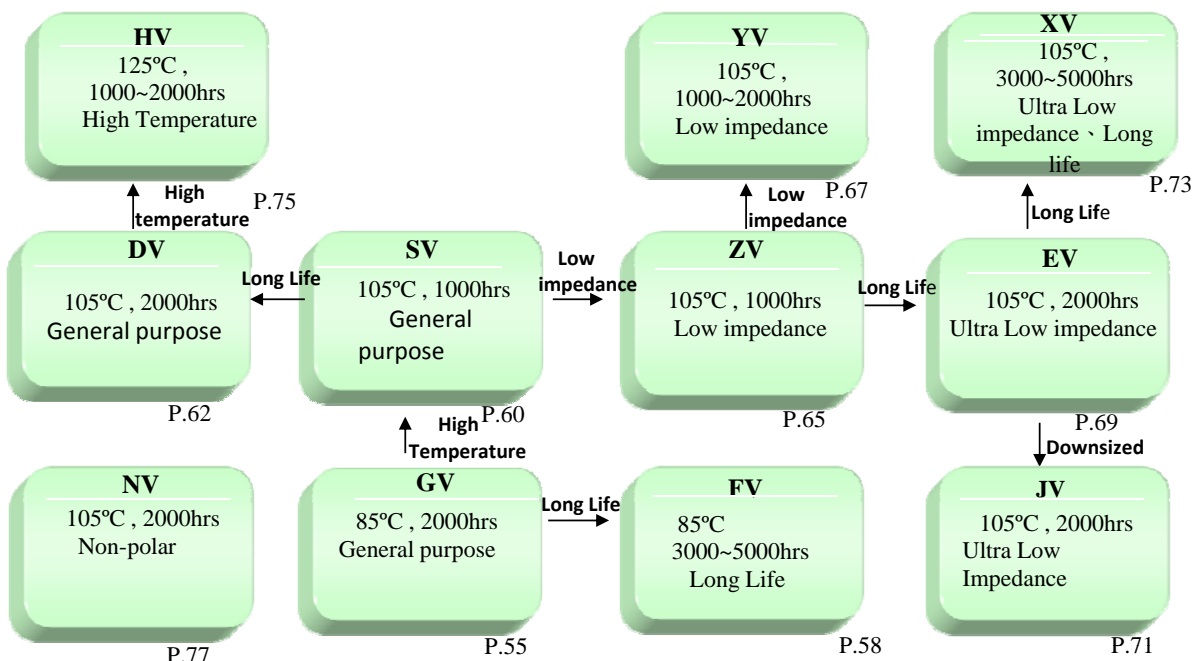
Conductive Polymer Aluminum Solid Capacitors: Radial Type



Conductive Polymer Aluminum Solid Capacitors: SMD Type



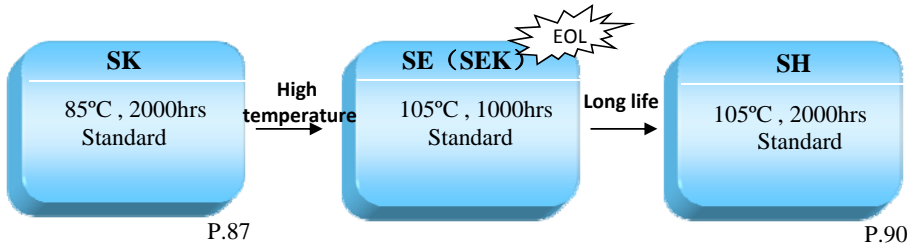
Surface Mount Aluminium Electrolytic Capacitors



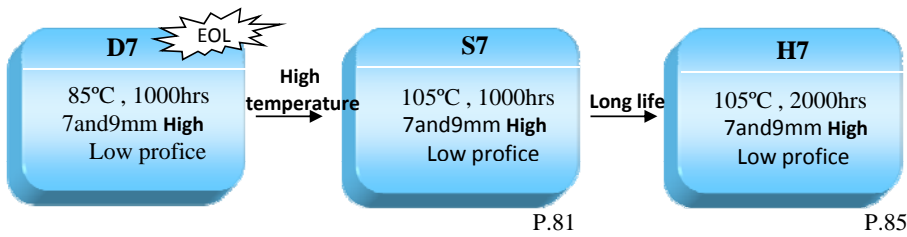
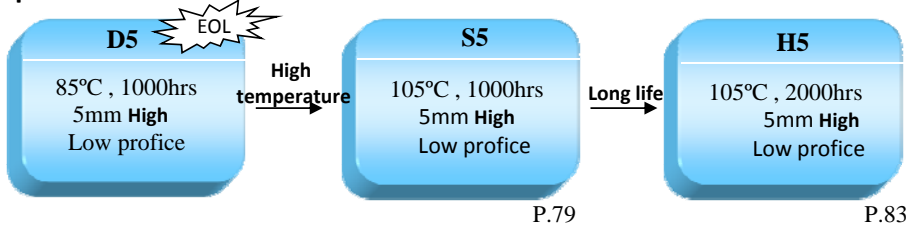
Systematic Diagram of Teapo Capacitor

Radial Type Aluminium Electrolytic Capacitors:

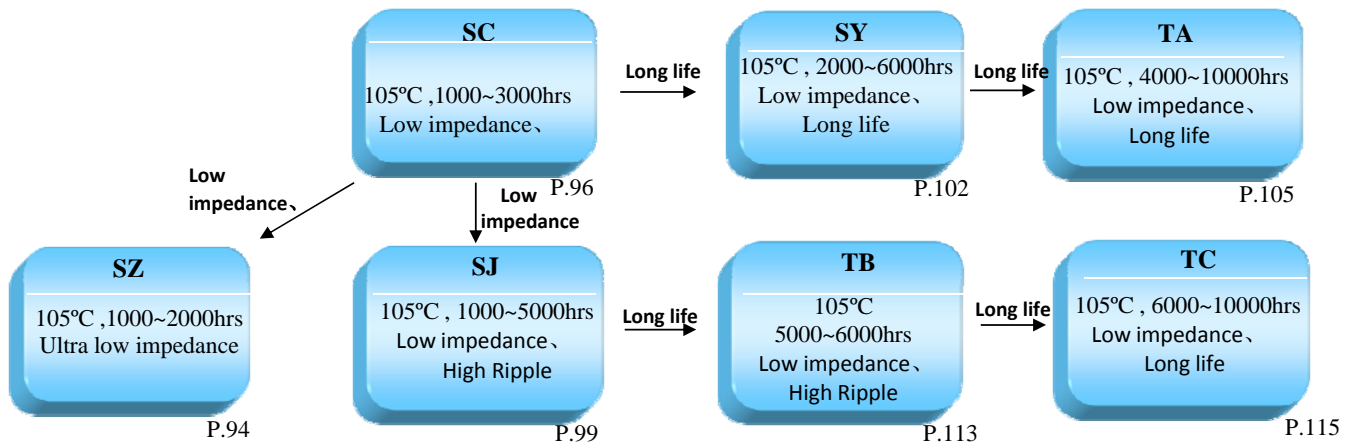
Standard :



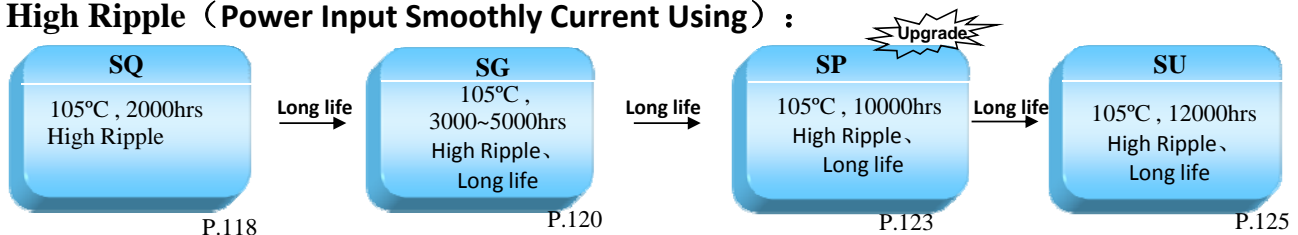
Low profice



Low ESR (For Power Output Smoothly Current Using) :



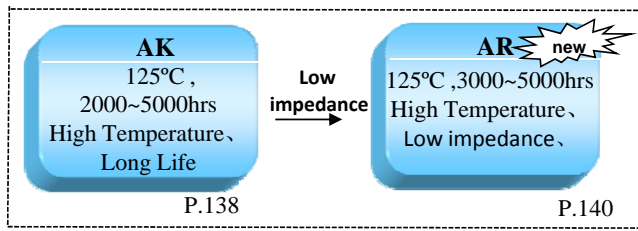
High Ripple (Power Input Smoothly Current Using) :



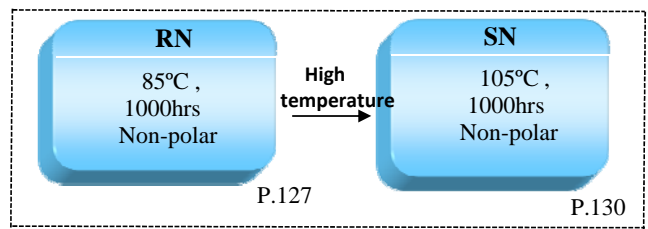
Systematic Diagram of Teapo Capacitor

Products For Special

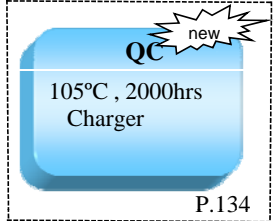
High Temperature (For Vehicle-Mounted)



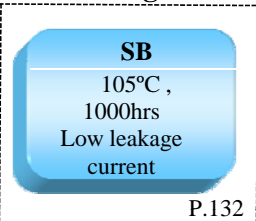
Non-polar (For Audio Coupling Using) :



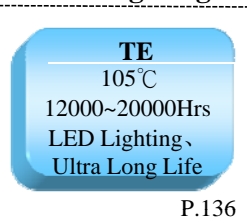
Dedicated For charger



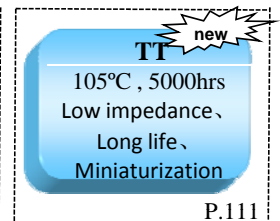
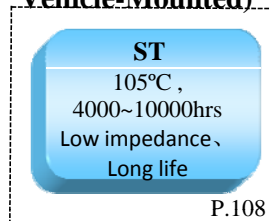
Low leakage current



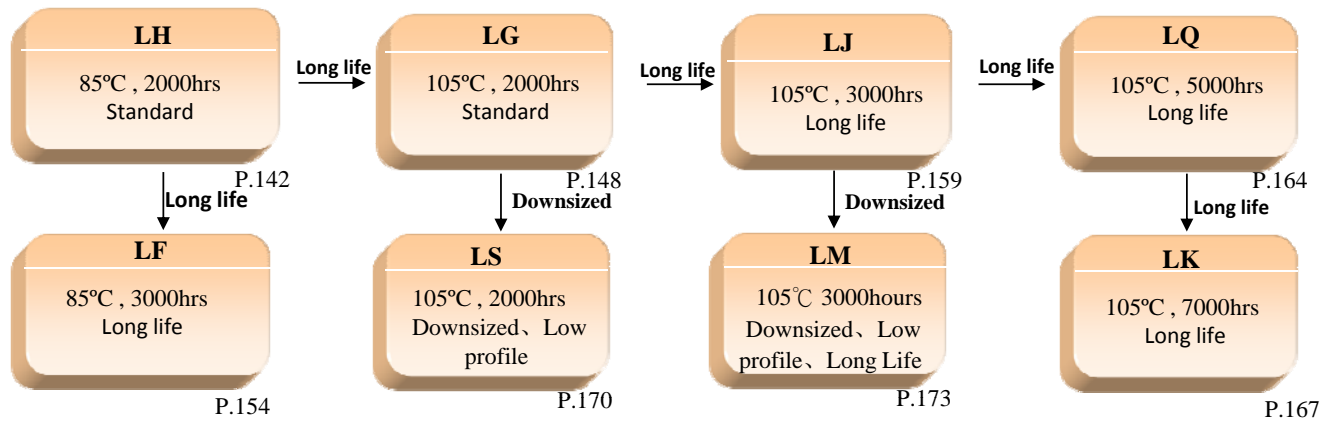
LED Lighting



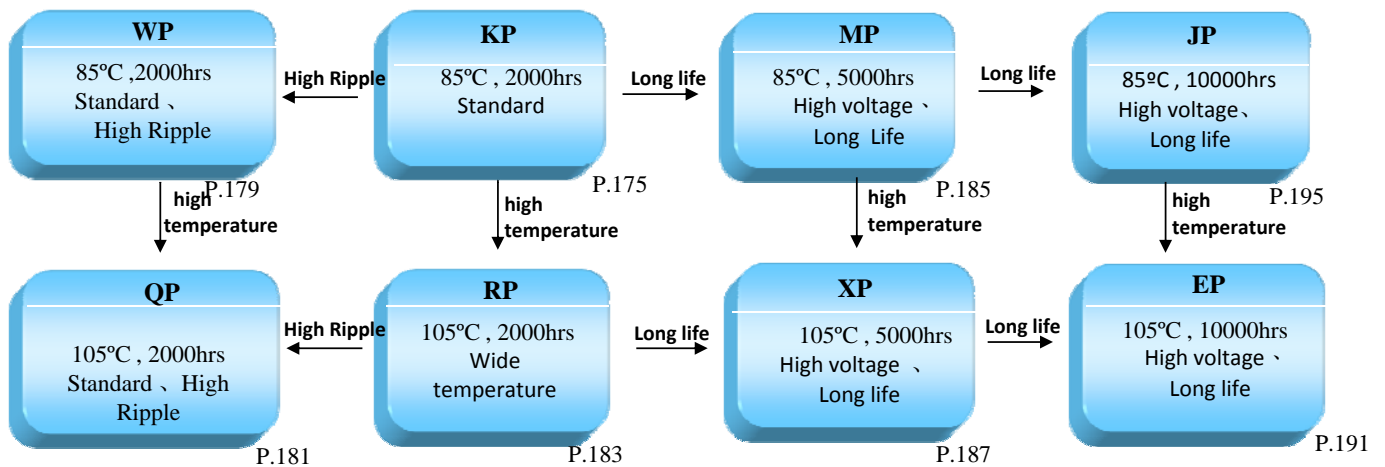
No polarity (LED Lighting & for Vehicle-Mounted)



Snap-in Type Aluminium Electrolytic Capacitors (Power input or output) :



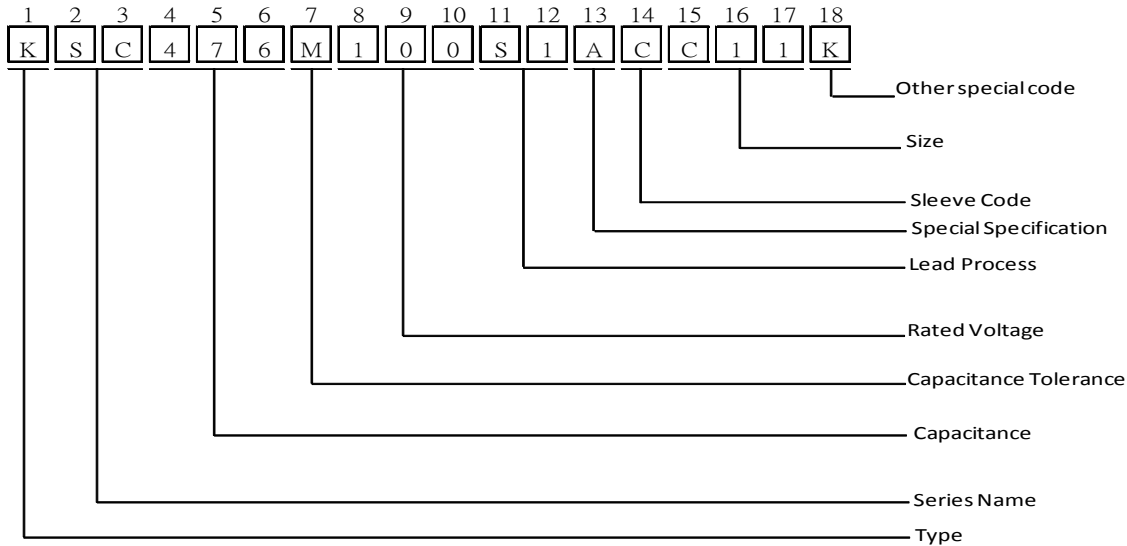
Screw Type Aluminium Electrolytic Capacitors (For Frequency Converter Using)



Industry Application

Recommended Applications	Conductive Polymer Aluminum Solid	SURFACE MOUNT	RADIAL LEAD TYPE 6.3~100V	RADIAL LEAD TYPE 160~500V	SNAP-IN TYPE	SCREW TYPE
Charger	FG、FF、FR、FL	GV、SV、DV、EV、XV	SC、SJ	SH、QC	—	—
Lighting Equipment	FG、FF	HV	ST、TA、TC	TE、SG、SU	—	—
Network Communication	FG、FF	EV、DV、XV、HV	SJ、SY、TA、TC	SG、SP、SU	—	—
Power Supply	FG、FF、FR、FT	GV、SV、DV、EV、XV	SH、SY	SH、SG	—	—
Control Panel	—	GV、SV、DV	SH、SC	SH	—	—
Audio	—	GV、DV、EV、XV、NV	SC、SE、SH、SK	—	LH、LG、LJ	—
Intelligent Electric Meters Intelligent Water Meter Intelligent Gas Meter	—	EV、XV、DV	SH、SY、TA	SH、SG、SQ	LG、LJ	—
UPS	—	DV	—	—	LS、LK	MP
Inside and Outsize Accessories for Automotive	—	EV、XV、DV	GR、SE、SH、SJ、SY、AK、AR	—	—	—
Ethernet Router Interchanger	FG	DV、EV	SC、TA	—	—	—
Servosystem	—	DV、XV	—	SG、SU	LM、LQ	MP
Plastic Working Equipment	—	—	—	—	LM、LQ	MP
Electric Car Equipment Charging pile	—	DV	—	—	LG、LQ	MP、XP
Inverter	—	DV、EV、XV	—	SU	LJ、LQ、LK	MP
Inverter Air-Conditioner Inverter Washer Inverter Refrigerator	—	DV、EV、XV	SH	SP、SU	LG、LJ、LQ、LF、LM	MP、XP
Printer Facsimile Machine	—	DV、EV、XV	—	SQ、SG	LG、LS	—
Elevator	—	DV	SK、SH、ST、TA、SY	SH、SG、SP	LG、LH、LS、LQ	—
Mainboard	—	GV、SV、DV	SK、SE、SH	SK、SE、SH	—	—

Part Number System



Code 1

Type

Code	Model Type
K	TEAPO Radial Type (PET sleeve)
V	SMD (V-chip) Type (Nylon coating)
S	TEAPO Snap-in Type (PET sleeve)
H	Snap-in Type(No Insulating base,PET sleeve)
P	Conductive Polymer Aluminum Solid Capacitor
N	Screw Type(PVC sleeve)
B	Radial Type special for CP line(PET sleeve)
M	Radial Type 8 φ pitch =2.5mm(PET sleeve)
G	G·LUXON Radial Type (PET sleeve)

Code 2~3

Series Name (as content page 2 to page 4)

Code 4~6

Capacitance

Capacitance(uf)	0.47	4.7	47	470	4700	47000	470000	4700000	47000000	470000000
product code	474	475	476	477	478	479	47A	47B	47C	47D

Code 7

Capacitance Tolerance

A : - 8~ + 32%	B : - 5~ + 10%	C : + 10~ + 30%	D : - 40~ + 0%	W : - 15~ + 0%	X : - 15~ + 5%
G : - 30~ + 0%	H : - 5~ + 15%	I : - 20~ + 0%	J : - 5~ + 5%	Q : - 10~ + 30%	R : - 0~ + 20%
M : - 20~ + 20%	N : - 30~ + 30%	O : - 20~ + 10%	P : - 0~ + 30%	K : - 10~ + 10%	L : - 15~ + 15%
S : - 0~ + 50%	T : - 10~ + 50%	U : - 10~ + 75%	V : - 10~ + 20%	E : - 12~ + 20%	F : - 5~ + 20%
Y : - 10~ + 150%	Z : - 20~ + 80%				

Code 8~10

Rated Voltage

Rated Voltage(WV)	2.5	5	6.3	63	100	450
product code	2R5	005	6R3	063	100	450

Code 11~12

Lead Process

processing form	Code		Description
	Code 11	Code 12	
Standard	A	1	Screw type standard type
	S	0	Standard SMD type
Ammo tape		T	1
	1		Standard ammo tape (pitch 5mm for dia .~ 13mm)
	2		Ammo tape with straight lead (available for dia. 4~8mm)
Reel tape	R	4	Ammo formed tape with pitch 2.5mm (available for dia.4~5mm)
		1	Standard reel tape (pitch 5mm for dia.~ 10mm)
		2	Reel tape with straight lead (available for dia. 4~8mm)
Straight cut	C	3	Reel formed tape with pitch 2.5mm (available for dia.4~5mm)
		3	Straight cut lead with L : 3.2+/-0.5mm
		5	Straight cut lead with L : 4.0+/-0.5mm
Kink(Crimp)cut	K	7	Straight cut lead with L : 5.0+/-0.5mm
Formed cut	F	2	Kink cut lead with L : 4,5+/-0,5mm
		6	Forming cut lead with L : 4.0+/-0,5 (Pitch : 5mm)

Code 13 Special Specification

A	Standard	J	SMD is 25pcs each row, the bend of SNAP-IN terminal foot is 90°	S	spacer special DIP special requirement	2	Life & ESR special
B	DF (tanδ)special	K	Above life specified in catalog	T	length of body special	3	Life & Impedance special
C	ESR special	L	Pins or Wire diameter	U	Pack special	4	Life & Ripple current special
D	Impedance special	M	Customer requirements	V	Sleeve special	5	Life & LC special
E	Ripple current special	N	Pitch special	W	Capacitance special	6	life & rubber cover or capacitor cover plate
F	LC special	O	LC & ESR or Impedance special	X	DF & LC & ESR or Impedance special	7	DF & ESR or Impedance special
G	GUM or special for capacitor cover plate or non-salient point in	P	Under life specified in catalog	Y	RC & LC & ESR or Impedance special	8	DF & RC special
H	Customer requirements	Q	DF & Ripple current & ESR or Impedance	Z	Frequency & ESR or Impedance special	9	DF & LC special
I	RC & LC special	R	Shelf is 1000Hrs	1	Life & DF special	0	RC & ESR or Impedance special

Code 14 Sleeve Code (please contact us if the sleeve code in the form cannot corresponding with your requirement.)

Code	Series	Color
1	SK	Dark blue with white printing
5	SH,SG,SP,SB,SY,SJ,RN,SN,SB,SR,BX,SQ,AK,ST,TA,SU,TB,T LH,LG,LJ,LF,LQ,LM,TE,LS,LK,CG,TT,QC,S5,S7,H5,H7,KP,W MP,XP,JP,EP,RP	Black with white printing
6	TC	Black with golden printing
C	SC	Green with golden printing
H	SZ	Royal blue with golden printing
N	GV,FV,SV,DV,ZV,YV,EV,JV,XV,HV,CV,NV FG,FP,FR,FF,FS,FH,FT,FL,VP,VB,VS	SMD standard pack & POLYMER

Code 15~17 Case Size (Please contact us if the case size is required and not shown in the table.)

Code 15 Diameter

Code	A	B	C	D	E	F	G	8	H
Case size	3	4	5	5.5	6.3	7.3	8	8.2	10
Code	9	J	K	L	M	N	7	P	Q
Case size	10.2	12	12.5	13	16	18	18.5	20	22
Code	R	S	T	U	V	W	X	Y	Z
Case size	25	30	35	40	45	51	64	77	90

Code 16~17 Length

For ECAP-DIP & POLYMER-DIP & SNAP-IN & SCREW TYPE :

Code	05	07	09	10	1A	11	1B	12	1C	13
Length	05	07	09	10	10.5	11	11.5	12	12.5	13
Code	14	15	16	17	18	20	25	30	3B	32
Length	14	15	16	17	18	20	25	30	31.5	32
Code	35	3F	36	40	45	50	55	60	65	70
Length	35	35.5	36	40	45	50	55	60	65	70
Code	75	80	90	96	A0	B5	C1	D0	E4	F5
Length	75	80	90	96	100	115	121	130	144	155

For V-CHIP SMD

Code	01	02	03	04	05	06	07	08
Length	5.4	6.2	10.2	7.7	13.5	16、16.5	12.5	5.8

For POLYMER SMD

Code	A1	A2	A3	A4	A5	A6	A7	A8	A9
Length	5.8	6.0	6.7	7.7	10.2	10.4	12.0	12.2	9.0

Code 18 other special code

H: Intelligent instrument	R:Medical	X:Weekly date code	6:Industrial equipment / inverter
K:TEAPO	S:Auto grade	0:G.LUXON	

Cut/Formatted Lead For Radial Lead Type :

Shape	Suitable size	Shape	Suitable size
Code C5 : Straight Cut 	ΦD=4~18	Code K2 : Kink cut, & Crimping 	ΦD=4~18
CodeF* : Molding Truncation type 	ΦD=4~8	CodeV* : Horizontal processing 	ΦD=4~18

unit : mm

C	Code	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H
	L	2.5	2.8	3.2	3.4	4.0	4.5	5.0	5.5	6.5	7.0	8.0	10.0	3.6	6.0	3.2	4.2	2.4
	Code	J	K	L	M	N	P	Q	R	S	T	U	V	X	Y	Z	W	
	L	4.2	3.7	12.0	2.0	2.2	2.5	13.5	9.0	20.0	16.0	18.0	3.0	13.0	12.5	15.0	3.1	

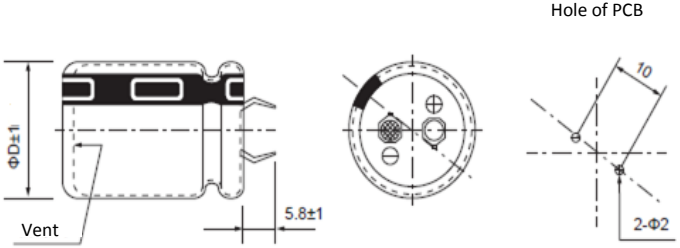
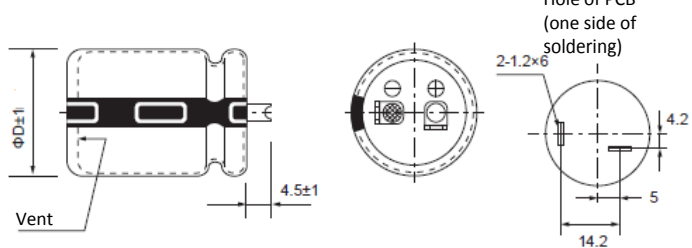
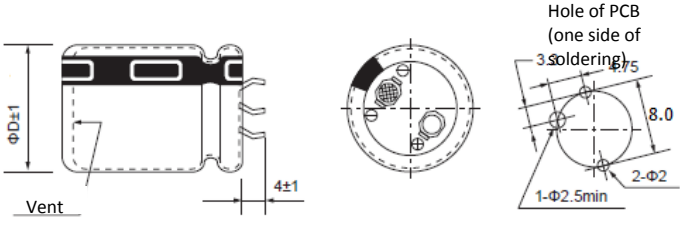
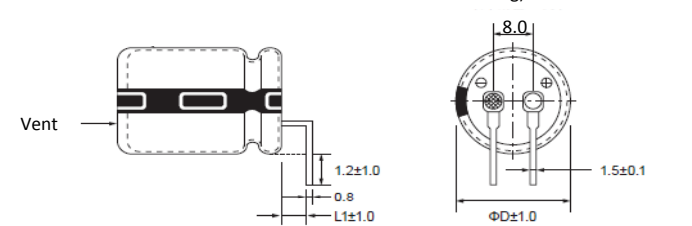
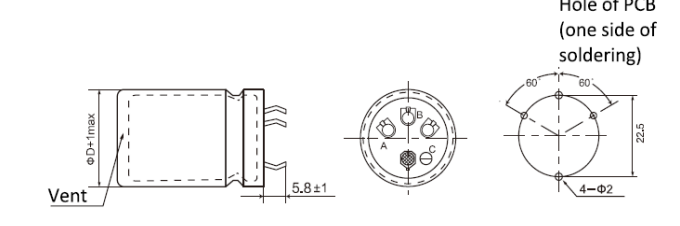
K	Code	1	2	3	4	5	6	7	9
	L	3.2	4.5	5.0	3.5	4.0	4.3	3.5	3.2
	Code	A	B	E	D	F	H	K	L
	L	3.3	3.6	3.6	3.3	18.0	7.0	6.8	4.0

F	Code	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H
	L	3.0	3.1	3.2	3.4	3.5	4.0	4.8	4.5	3.2	6.0	4.3	5.0	3.0	3.6	5.0	3.0	6.5
	Code	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	Z	I	
	L	3.7	2.5	2.2	1.5	2.9	3.7	7.0	4.2	9.0	2.8	3.7	2.4	4.0	3.1	4.5	4.0	

V	Procesn umber	1	2	6	J	Q	F	8	N
	L1	1.25±0.25	2.5±0.5	2.5±0.25	1.0±0.5	1.5±0.5	1.25±0.25	2.0±0.5	2.2±0.5
	L2	2.6±0.3	3.5±0.5	4.1±0.5	3.85±0.25	3.0±0.5	11.5±0.5	4.0±0.5	<3.6
	Procesn umber	5	P	3	Y	R	G	9	Z
	L1	2.5±0.25	5.0±0.5	2.5±0.25	1.0±0.5	1.5±0.5	1.0±0.2	2.0±0.5	2.2±0.5
	L2	3.25±0.25	3.25±0.25	4.1±0.5	3.85±0.25	3.0±0.5	2.4±0.3	4.0±0.5	<3.6
	Procesn umber	B	S	U	H	D	O	E	M
	L1	2.5±0.5	2.0±0.5	3.5±0.3	1.0±0.2	2.0±0.5	2.5±0.5	1.5±0.2	3.3±0.2
	L2	3.3±0.5	3.5±0.3	5.0 +0,-0.5	2.4±0.3	6.7±0.5	7.0±0.5	2.25±0.25	3.25±0.25
	Procesn umber	X	W	V	7	C	A	4(Don't cut the foot)	T
	L1	2.5±0.5	2.0±0.5	1.0±0.5	2.0±0.5	<1.6(containφd)	2.5±0.3	4.0±0.5	<2.0
	L2	5.8±0.5	2.5±0.5	3.5±0.3	3.2±0.4	2.0±0.5	3.7±0.3	15.5±0.5	9.3±0.5

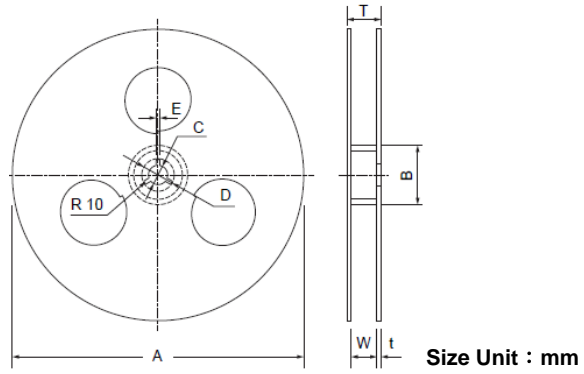
Note: if the above size can not satisfied your need please contact us.

Available Terminals For SNAP-IN Type :

<p>standard product code: S1(the NO.13 code is G) apply to size $\phi 22 \sim \phi 35$</p>  <p>Hole of PCB</p>	<p>code: LL apply to size $\phi 30 \sim \phi 40$</p>  <p>Hole of PCB (one side of soldering)</p>
<p>three terminal code: L3 apply to size $\phi 30, \phi 35$</p>  <p>Hole of PCB (one side of soldering)</p>	<p>Horizontal code: V3 apply to size $\phi 22 \sim \phi 25$</p>  <p>Hole of PCB (one side of soldering)</p>
<p>four terminal code: L4 apply to size $\phi 35 \sim \phi 40$</p>  <p>Hole of PCB (one side of soldering)</p>	

Packaging Specification

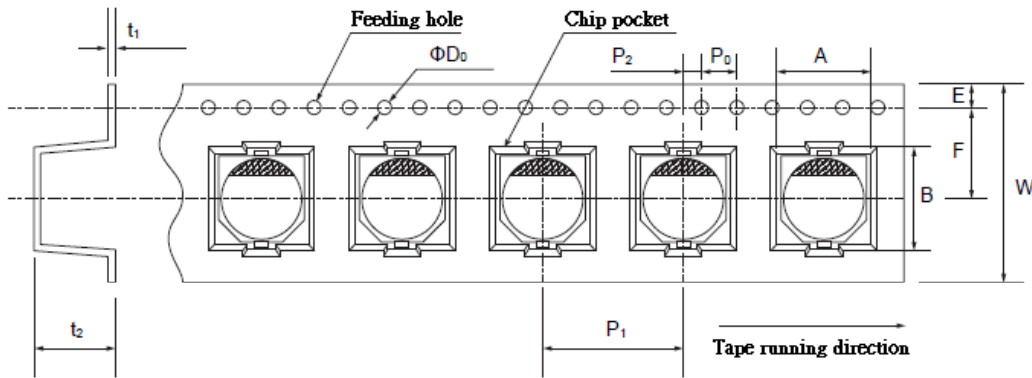
1.SMD Packing Specification



Size Unit : mm

Size	A	B	C	D	E	W	T	t
4Φ ~ 5Φ	380±2	84min	13.0±0.5	42	2.0±0.5	14±1	18±1	2.0
6.3Φ ~ 8×6.7	380±2	84min	13.0±0.5	42	2.0±0.5	18±1	22±1	2.0
8×10.2 ~ 10Φ	380±2	84min	13.0±0.5	42	2.0±0.5	26±1	30±1	2.0
12.5Φ	380±2	84min	13.0±0.5	42	2.0±0.5	32±1	36±1	2.0
16.0Φ	380±2	84min	13.0±0.5	42	2.0±0.5	44±1	48±1	2.0

① Reel Tape



Size Unit : mm

Symbol SizeDxL	W	A	B	Po±0.1	P1	P2±0.1	F	ΦD ₀	t1	E	t2
4x5.4	12.0	4.7	4.7	4.0	8.0	2.0	5.5	1.5+0.1-0	0.4	1.75	5.8
5x5.4(5.8*)	12.0	5.7	5.7	4.0	12.0	2.0	5.5	1.5+0.1-0	0.4	1.75	5.8
6.3x5.4(5.8*)	16.0	7.0	7.0	4.0	12.0	2.0	7.5	1.5+0.1-0	0.4	1.75	5.8
6.3x7.7*	16.0	7.0	7.0	4.0	12.0	2.0	7.5	1.5+0.1-0	0.4	1.75	8.3
8x6.2	16.0	8.7	8.7	4.0	12.0	2.0	7.5	1.5+0.1-0	0.4	1.75	6.8
8x10.2(10.4*)	24.0	8.7	8.7	4.0	16.0	2.0	11.5	1.5+0.1-0	0.4	1.75	11.0
10x10.2*(12.2*)	24.0	10.7	10.7	4.0	16.0	2.0	11.5	1.5+0.1-0	0.4	1.75	11.0
12.5x13.5	32.0	13.4	13.4	4.0	24.0	2.0	14.2	1.5+0.1-0	0.4	1.75	14.0
12.5x16.0	32.0	13.4	13.4	4.0	24.0	2.0	14.2	1.5+0.1-0	0.4	1.75	16.2
16.0x16.5	44.0	17.5	17.5	4.0	28.0	2.0	20.2	1.5+0.1-0	0.4	1.75	16.7

② Packaging Specification

Size DxL(mm)	Q'ty per (pcs)	Inner box (pcs)	Measurement (mm)	gross (kg)	Outer carton (pcs)	Measurement (mm)	gross (kg)
4x5.4	2000	20,000	390x195x395	4	40,000	420x410x414	9
5x5.4(5.8*)	1000	10,000	390x195x395	5	20,000	420x410x414	11
6.3x5.4 (5.8*)	1000	10,000	390x235x405	5	20,000	420x410x492	12
6.3x7.7*	1000	10,000	390x235x405	7	20,000	420x410x492	14
8x6.2	1000	10,000	390x235x405	7	20,000	420x410x492	15
8x10.2(10.4*)	500	4,000	390x255x405	6	8,000	420x410x530	13
10x10.2*(12.2*)	500	4,000	390x255x405	8	8,000	420x410x530	17
12.5x13.5	200	1,200	390x255x405	5	2,400	420x410x530	13
12.5x16.0	150	900	390x255x405	5	1,800	420x410x530	13
16.0x16.5	125	625	390x255x405	5	1,250	420x410x530	13

Note: product size don't marked with "*" mark is an applicable polymer solid aluminium electrolytic capacitor.

More detailed information please contact our company.

Packaging Specification

2. Conductive Polymer Aluminum Solid Capacitors

① Bulk package : Standard

Classification	Standard			
size ΦDxL(mm)	Vinyl bag Qty (pcs)	Inner box (pcs)	Outer carton (pcs)	gross weight (kg)
5×7.5×9,6.3×5.4	2,000	16,000	32,000	11
5.5×9,6.3×6.3×8	1,000	12,000	24,000	10
6.3×10.5	1,000	10,000	20,000	14
8x8,8x9,8x11.5	500	7,500	15,000	17
10×12.5	200	4,000	8,000	15

② Bulk package : Cutting & Forming

Classification	Cutting & Forming			
size ΦDxL(mm)	Vinyl bag Qty (pcs)	Inner box (pcs)	Outer carton (pcs)	gross weight (kg)
5×7.5×9,6.3×5.4	2,000	10,000	40,000	16
5.5×9,6.3×6.3×8	2,000	10,000	40,000	15
6.3×10.5	1,000	7,000	28,000	17
8x8,8x9	500	4,000	16,000	18
8x11.5	500	4,000	16,000	18
10×12.5	200	2,000	8,000	15

③ Ammo Tape(Fig.1)

Classification	Ammo Tape				
size ΦDxL(mm)	Inner box (mm)	Outer carton (pcs)	Outer carton (mm)	Outer carton (pcs)	gross weight (kg)
6.3Φ	340×275×50	2,000	355×297×290	10,000	8
8Φ×5-16L	340×230×50	1,000	355×252×290	5,000	7
10Φ×10~17L	340×230×50	600	355×252×290	3,000	7

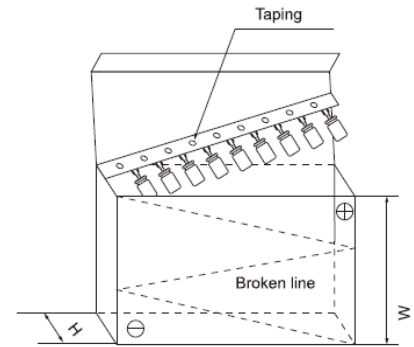


Fig.1

④ Reel Tape(Fig.2)

Classification	Roll Reel braid		
size ΦDxL(mm)	Inner box (pcs)	Outer carton (pcs)	gross weight (kg)
6.3Φ	2,000	10,000	6
8Φ×5-16L	1,600	8,000	12
10Φ×10~17L	1,000	5,000	14

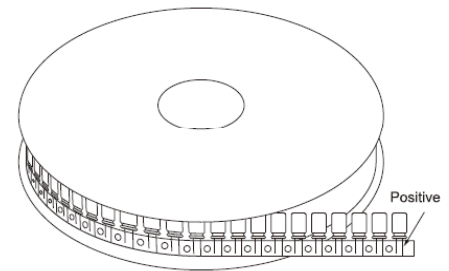


Fig.2

3. Radial Lead Type Aluminium Electrolytic Capacitors

① Bulk package : Standard

Standard					Standard				
Classification	Vinyl bag Qty	Inner box	Outer carton	gross weight	Classification	Vinyl bag Qty	Inner box	Outer carton	gross weight
size DxL(mm)	(pcs)	(pcs)	(pcs)	(kg)	size DxL(mm)	(pcs)	(pcs)	(pcs)	(kg)
4×5	2,000	24,000	48,000	13	13×13,13×15	100	2,400	4,800	15
4×7	2,000	20,000	40,000	11	13×18,13×20	100	1,800	3,600	15
5×5	2,000	20,000	40,000	12	13×25	100	1,200	2,400	14
5×7	2,000	16,000	32,000	13	13×30	100	1,200	2,400	16
5×11	1,000	12,000	24,000	13	13×34,13×36	100	1,000	2,000	14
6.3×5	2,000	16,000	32,000	11	13×38,13×40	100	800	1,600	15
6.3×7	2,000	12,000	24,000	10	16X15,16X20	100	1000	2000	22
6.3×11	1,000	10,000	20,000	14	16X25	100	1000	2000	24
8x7	500	10,000	20,000	14	16X30,16X32	100	800	1600	20
8×9,8×11	500	7,500	15,000	17	16X36,16X40	100	600	1200	22
8×14	500	5,000	10,000	12	16X45	100	500	1000	22
8×16	500	5,000	10,000	16	18X15,18X20	100	800	1600	21
8×20	200	4,000	8,000	14	18X22,18X25	100	800	1600	23
10×12.5	200	4,000	8,000	15	18X30	100	600	1200	25
10×15	200	3,600	7,200	16	18X32,18X36,18X40	100	500	1000	25
10×17	200	3,600	7,200	17	18X45,18X50	100	300	600	21
10×20	200	3,000	6,000	19	22X35,22X40	100	300	600	21
10×25	200	2,400	4,800	17					

② Bulk package : Cutting & Forming

Classification		Cutting & Forming				Classification		Cutting & Forming			
size ΦDxL(mm)	Vinyl bag Qty (pcs)	Inner box (pcs)	Outer carton (pcs)	gross weight (kg)	size ΦDxL(mm)	Vinyl bag Qty (pcs)	Inner box (pcs)	Outer carton (pcs)	gross weight (kg)		
4×5	2,000	20,000	80,000	20	13×13,13×15	200	800	3,200	13		
4×7	2,000	16,000	64,000	17	13×18,13×20	200	600	2,400	10		
5×5	2,000	16,000	64,000	18	13×25	200	600	2,400	14		
5×7	2,000	16,000	64,000	23	13×30	100	500	2,000	14		
5×11	1,000	10,000	40,000	22	13×34,13×36	100	300	1,200	12		
6.3×5	2,000	10,000	40,000	16	13×38,13×40	100	300	1,200	15		
6.3×7	2,000	10,000	40,000	15	16X15,16X20	200	1000	2000	22		
6.3×11	1,000	7,000	28,000	17	16X25	-	500	4000	44		
8x7	500	6,500	26,000	16	16X30,16X32	-	500	3000	37		
8×9,8×11	500	4,000	16,000	18	16X36,16X40	-	500	3000	55		
8×14	500	3,000	12,000	14	18X22,18X25	-	500	2000	28		
8×16	500	2,000	8,000	13	18X32,18X36,18X40	-	500	1000	25		
8×20	200	2,000	8,000	14	18X45,18X50	-	600	1200	40		
10×12.5	200	2,000	8,000	15	20X25	-	400	800	20		
10×15	200	2,000	8,000	18	22X32	-	320	1920	55		
10×17	200	1,600	6,400	15	22X30	-	400	800	25		
10×20	200	1,400	5,600	17	22X35,22X40	-	400	800	27		
10×25	200	1,200	4,800	16							

③ For lattice bar type packing of standard(Fig.3)

size ΦDxL(mm)	Lattice bar of inner carton		Row packing method		Inner box Qty (pcs)	Outer carton (pcs)	gross weight (kg)
	Height (mm)	Qty (pcs)	Row number Layer number	Each row (pcs)			
11.7X26	60	38	20*2	25	1000	2000	9
13x16~13x20	55	18	10*2	25	500	2000	10
16X15-20 L	55	18	10*2	25	500	1000	11
16X21-26 L	60	18	10*2	25	500	1000	12
16X27-32 L	65	18	10*2	25	500	1000	13
16X33-40 L	75	18	10*2	25	500	1000	14
18X15-16 L	50	18	10*2	25	500	1000	12
18X17-26 L	60	18	10*2	25	500	1000	13
18X27-32 L	65	11	12*1	25	300	600	13
18X33-42 L	75	11	12*1	25	300	600	13
18X43-50 L	85	11	12*1	25	300	600	14
20x30-40L	75	9	10*1	20	200	400	13
22x30-40L	75	9	10*1	20	200	400	15
22x41-50L	85	9	10*1	20	200	400	17
25x40-50L	85	9	10*1	20	200	400	19

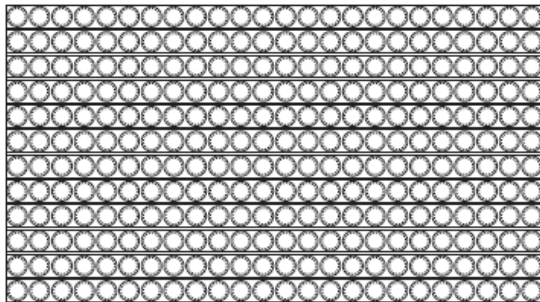


Fig.3

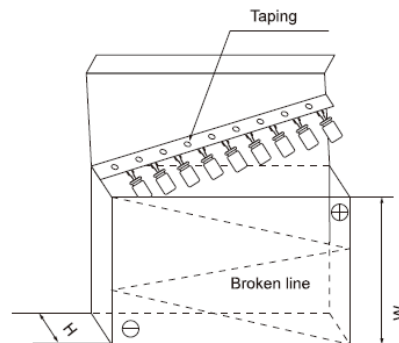


Fig.4

④ For Taping Ammo & Reel(Fig.4)

Classification	Ammo Tape				
size ΦDxL(mm)	inner box (mm)	quantity (pcs/box)	outer carton (mm)	quantity (pcs/box)	gross weight (kg/box)
4Φ	330×275×50	3,000	345×290×278	15,000	6
5Φ	330×230×50	2,000	345×248×280	10,000	6 ~ 7
6.3Φ	330×275×50	2,000	345×290×278	10,000	8
8Φ×5-16L	330×230×50	1,000	345×248×280	5,000	7
8Φ×20L	330×230×58	1,000	345×245×320	5,000	7
10Φ×10~17L	330×230×50	600	345×248×280	3,000	7
10Φ×20~25L	330×230×58	600	345×245×320	3,000	7
10Φ×30L	330×230×65	600	345×245×290	2,400	7
13Φ×32L below	335×235×65	400	352×248×290	1,600	5
13Φ×36L below	335×235×74	400	352×248×325	1,600	5
16Φ×32L below	335×275×65	300	355×297×290	1,200	5
16Φ×36L below	335×275×74	300	355×297×337	1,200	5
18Φ×20~32L below	340×288×63	260	360×305×280	1,040	5

⑤ Roll Reel braid(Fig.5)

Classification		Ammo Tape			
size ΦDxL(mm)	inner box (mm)	quantity (pcs/box)	outer carton (mm)	quantity (pcs/box)	gross weight (kg/box)
4Φ	350*350*110	3,000	370*370*675	15,000	8
5Φ		2,400		12,000	8
6.3Φ		2,000		10,000	6
8Φ×5-16L		1,600		8,000	12
8Φ×20L		1,000		5,000	12
10Φ×10~16L		1,200		6,000	
10Φ×17~20L		1,000		5,000	

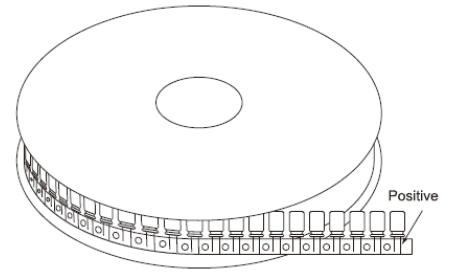


Fig.5

4. SNAP-IN Type Aluminium Electrolytic Capacitors(Fig.6)

size ΦDxL(mm)	weighe (g/pcs)	inner box (pcs)	outer carton (pcs)
22×25 ~ 30	20 ~ 25	300	1200
22×35 ~ 50	25 ~ 30	200	800
25×25 ~ 30	25 ~ 30	240	960
25×35 ~ 50	30 ~ 35	160	640
30×20 ~ 30	30 ~ 35	135	540
30×35 ~ 50	35 ~ 40	90	360
30 x 70	45~50	80	320
35×25 ~ 30	40 ~ 45	105	420
35×35 ~ 50	45 ~ 50	70	280

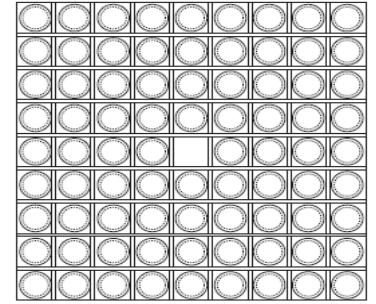


Fig.6

5. SCREW Type Aluminium Electrolytic Capacitors(Fig.7)

size ΦDxL(mm)	inner box (pcs)	outer carton (pcs)
35×50~90High	28	112
35×100~121	28	56
51×70~96	15	60
51×100~130	15	30
64×96~195	8	16
77×96~195	6	12
90*131~196	4	8
90×236		6

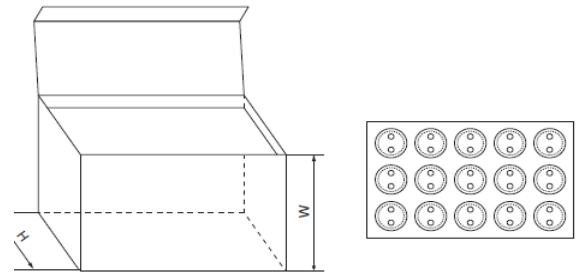


Fig.7

I. Lifetime Estimation

Subject series : FR/FH/FG/FF/FS/FL/FT/FP/VB/VP/VS

Conductive polymer aluminum solid capacitors are finite life electronic components like aluminum electrolytic capacitors. The lifetime is affected by ambient temperature, humidity, ripple current and surge voltage.

The lifetime of aluminum electrolytic capacitors is affected mainly by the loss of electrolyte as the result of the liquid electrolyte evaporating through the rubber seal materials, resulting in capacitance drop and tanδ rise. On the other hand, the lifetime of conductive polymer aluminum solid capacitors is affected mainly by oxidation degradation of the conductive polymer caused by osmose of oxygen or the thermal degradation of the conductive polymer by ambient temperature or self-heating, resulting in ESR rise and tanδ rise. The infiltration rate of the oxygen is depend on the temperature as the liquid electrolyte evaporation and the relationship follows the Arrhenius's Law, too. Similarly, thermal degradation of the conductive polymer by self-heating follows the Arrhenius's Law, too. Therefore, the lifetime estimation has been using the theory of lifetime increasing by 10 times at every 20°C reducing of the ambient temperature.

1. Lifetime Estimation

Equation (1) can be used for estimating the lifetime of the conductive polymer aluminum solid capacitors based on the ambient temperature and the rise of internal temperature due to ripple current.

$$L_x = L_0 \times 10^{(T_0 - T_x)/20} \text{-----(1)}$$

Lx : Estimation of actual lifetime (hour)

Lo : Specified lifetime with the rated voltage at the upper limit of the category temperature (hour)

To : Maximum category temperature (°C)

Tx : Actual ambient temperature of the capacitor (°C)

Longer lifetime is expected by lowering the ripple current and the ambient temperature.

Please consult us about lifetime equations for the series of the category temperature 125°C.

Subject series : FT

An approximate value of ripple current-caused ΔT can be calculated using Equation (2)

$$\Delta T = \Delta T_0 \times (I_x / I_0)^2 \text{-----(2)}$$

ΔT₀ : Rise in internal temperature due to the rated ripple current (20°C) The product that the maximum category temperature is less than 105°C

I_x : Operating ripple current (Arms) actually flowing in the capacitor

I₀ : Rated ripple current (Arms), frequency compensated, at the upper limit of the category temperature range

Please contact us about the product that the maximum category temperature is more than 125°C.

To determine more accurate values of ΔT, they can be actually measured using a thermocouple.

2. Rated Ripple Current Frequency Multipliers

Self-heat rise is generated by the ripple current even though the conductive polymer aluminum solid capacitors have low ESR compared to liquid based electrolyte aluminum electrolytic capacitor. Longer lifetime is expected by lowering the ripple current and the ambient temperature. Table 1 shows Frequency Multipliers of Rated ripple current.

Frequency Multipliers

Frequency [Hz]	120	1k	10k	50k	100k~500k
SMD type	0.05	0.3	0.55	0.7	1
Radial lead type	0.1	0.35	0.6	0.8	1

Conductive polymer aluminum solid capacitors have super low ESR characteristic in high-frequency range. On the whole, ESR in low-frequency range relatively rises. Therefore, they can use only 1 ripple current in low-frequency range.

3. Restriction of calculated lifetime

- (1) The result calculated by the estimated lifetime formula, it is not guaranteed lifetime by Nippon Chemi-Con Corporation.
- (2) When designer calculate the lifetime of apparatus, please include an ample margin in consideration to the estimated lifetime of a capacitor.
- (3) When calculated lifetime result are over 15 years by using the estimated lifetime formula, please consider 15 years to be a maximum in considering that the sealing rubber characteristics vary during the lifetime.
- (4) If 15 years or more may be required as an expected lifetime, please consult us.

II. About failure and shelf-life

Failure rate (failure rate level) subject to 0.5 %/1000 h of JIS C 5003 (Credibility level 60 %)

The main failure mode of polymer solid aluminum electrolytic capacitor of is shown below.

1. Random failure

The main cause of failure mold is short-circuit due to heat stress, electrical stressing and mechanical stress in using environment or welding.

- (1) applied voltage more than rated voltage
- (2) applied reverse voltage
- (3) Excessive mechanical stress
- (4) Applying fast charging and discharging that more than specifications and cause surge current

a. If the short circuit current flows through the solid capacitor will cause the following phenomenon.

- (1) When the electric current is less after short-circuit (φ10 : about below 1 A , φ8 : about below 0.5 A , φ6.3 : about below 0.2 A) PC-CON body will have little heat but appearance is normal even continuous electricity.

(2) When the short circuit current value exceeds the above numerical, internal temperature will increased, encapsulation adhesive pad summoned and the odorous gases to overflow.

b. In order to ensure the safety in case of occurs short circuit, please take the following countermeasures

- (1) Cut off the main power supply and stop using immediately if overflow the odorous gases.
- (2) Due to the different conditions , the odorous gases occurrence generally takes a few seconds to several minutes, When using protection circuits we recommend to start protect function in this period.
- (3) Cleaned immediately if the gas enters into eye · gargle immediately if inhalation into mouth.
- (4) Don't lick the electrolyte if electrolyte contact with the skin please washing with soap immediately.
- (5) PC - CON including combustibile material, current value greatly after the short circuit and short circuit parts will have a possibility of spark. In order to protect safety, please pay attention to the design structure and use protection circuit.

2. The wear failure (Shelf life)

Electrical characteristics can make a big change when more than the guarantee time of durability and high temperature and high humidity test, electrolyte will insulation (degradation) formation of open mode eventually.

Even used within the prescribed scope of electrical and mechanical properties, it may also reducing capacitance and increase ESR, so please take care when design.

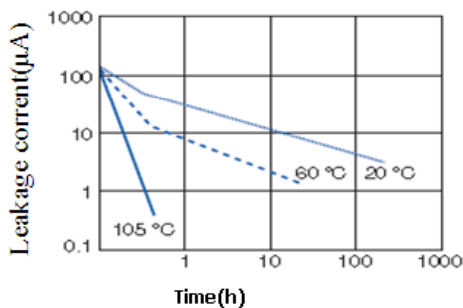
III. Leak Current

The leak current of conductive polymer solid aluminum electrolytic capacitor will increase due to the mechanical stress .

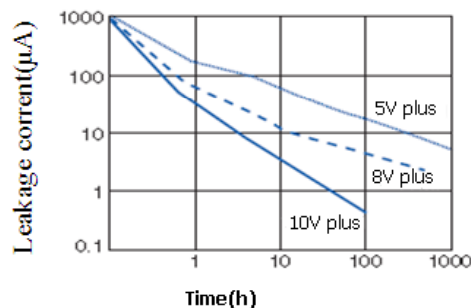
In this case, if the solid capacitor apply voltage below the high using temperature, the repairing effect of leak current will reducing gradually.

If the solid capacitor applies rated voltage within the high using temperature, the repairing speed of leak current will faster.

Conductive polymer solid aluminum electrolytic capacitor
Repairing character of leak current
10μF/16 V.DC (apply 16 V.DC)



Conductive polymer solid aluminum electrolytic capacitor
Repairing character of leak current
33μF/10 V.DC (ambient temperature65°C)
(Test voltage10V.DC)



※In order to show more clearly said repair of leakage current , we use the sample of apply stress to PC-CON that increased leak current on puri

IV. The limited of faster charging and discharging

Faster charging and discharging will lead to large surge current and then result in short-circuit or increase leak current.

When the surge current value as below, we recommend to use protection circuit in order to maintain high reliability.

- (1) more than 10 A
- (2) exceed rated ripple current 10times

V. Correct mounting

1. About the soldering iron soldering

- (a) Avoiding applying stress on PC - CON body when it need to process lead due to unconformity between lead gap and circuit board gap of plug-in mounting.
- (b) Avoiding applying excessive stress on PC - CON body when soldering.
- (c) When need to take out PC-CON after soldering, please melt molten solder sufficient, implement under the condition of not put stress on the PC - CON body.
- (d) Don't let the tip of the soldering iron to touch the PC - CON body.

2. Wave-soldering

- (a) Do not have wave soldering to SMD product.
- (b) Do not dip the PC-CON body into dissolved soldering flux.
- (c) Welding parts only limited between the circuit board and the opposite side of the PC - CON.
- (d) Don't splash other place expectation rosin.
- (e) Avoiding other parts lie down and touching PC-CON when soldering.

3. Reflow soldering

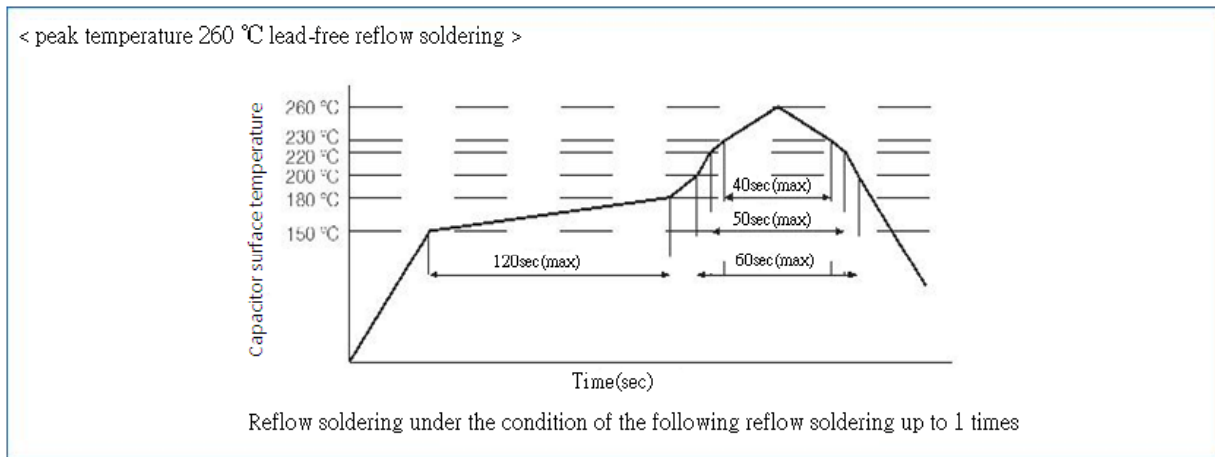
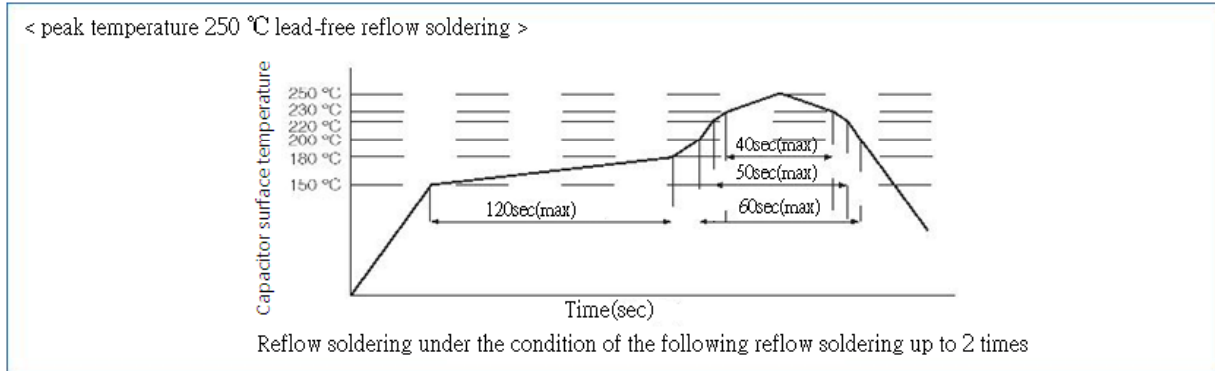
- (a) Do not have reflow soldeering to plug-in mounting product .
- (b) Please consult us when use VPS for solderinig.

4. Precaution after soldering

Take care for not to apply the following excessive stress for polymer solid aluminum electrolytic capacitor.

- (a) Do not tilt down or distorted capacitor.
- (b) Mobile circuit board can not handle PC - CON.
- (c) Do not crash PC-CON.
- (d) Do not make the PC - CON touch PCB circuit boards and other components when stacked.

5. Recommended conditions for solder



6. Solder iron temperature : less than 400°C±10°C ; working hours : within 5s

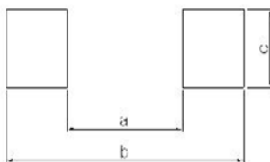
Wave-soldering

	Temperature	Time	Number of Time
Preheat	120°C below (ambient temperature)	less than 120s	once
Welding Condition	260°C+ 5°C below	less than 10+ 1s	less than twice*1

*1 : For 2 times, solder dipping time total of 10 + 1 seconds.

7. Recommend the bonding pad size

Unit : mm



Size Code	a	b	c
φ5.0	1.4	7.4	1.6
φ6.3	2.1	9.1	1.6
φ8.0	2.8	11.1	1.9
φ10.0	4.3	13.1	1.9

1 . Overview of Aluminum Electrolytic Capacitors

1-1 Basic Model of Aluminum Electrolytic Capacitors

1) Capacitors are passive components. Among the various kinds of capacitors, aluminum electrolytic capacitors offer larger CV product per case size and lower cost than the others. In principles of capacitor, its fundamental model is shown in Fig.1 and its capacitance © is expressed by Equation (1) below:

$$C = 8.854 \times 10^{-12} \epsilon S (F) \dots\dots\dots (1)$$

- ε : Dielectric constant
- S : Surface area of dielectric (m²)
- d : Thickness of dielectric (m)

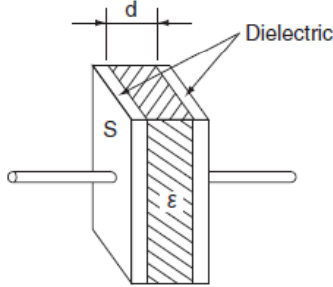


Fig-1 Basic model of capacitor

2) Equation (1) shows that the capacitance (C) increases as the dielectric constant (ε) and/or its surface area (S) increases and/or the dielectric thickness (d) decreases.

An aluminum electrolytic capacitor comprises a dielectric layer of aluminum oxide (Al₂O₃), the dielectric constant (ε) of which is 8 to 10. This value is not significantly larger than those of other types of capacitors

However, by extending the surface area (S) of the aluminum foil electrode by means of etching, and by electrochemically forming a thinner but highly voltage-withstandable layer of oxide layer dielectric, the aluminum electrolytic capacitor can offer a larger CV product per case than other types of capacitors.

3) A basic model of aluminum electrolytic capacitor is shown in Fig. 2.

An aluminum electrolytic capacitor comprises

- Anode ...Aluminum foil
- Dielectric...Electrochemically formed oxide layer (Al₂O₃) on the anode
- Cathode ...A true cathode is electrolytic solution (electrolyte).

Other component materials include a paper separator that holds electrolyte in place and another aluminum foil that functions as a draw-out electrode coming into contact with the true cathode (electrolyte). In general, an aluminum electrolytic capacitor is asymmetrical in structure and polarized. The other capacitor type known as a bi-polar (non-polar) comprises the anodic aluminum foils for both electrodes.

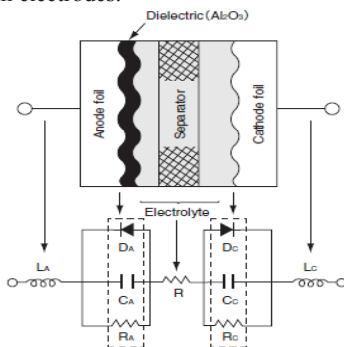


Fig-2 Basic model and equivalent circuit aluminum electrolytic capacitor

- CA, CC : Capacitance due to anode and cathode foils
- DA, DC : Diode effects due to oxide layer on anode and cathode foils
- L : Inductance due to anode and cathode terminals
- R : Resistance of electrolyte and separator
- RA, RC : Internal resistance of oxide layer on anode and cathode foils.

1-2 Structure of Aluminum Electrolytic Capacitor

1) The aluminum electrolytic capacitor has, as shown in Fig. 3, a roll of anode foil, paper separator, cathode foil and electrode terminals (internal and external terminals) with the electrolyte impregnated, which is sealed in an aluminum can case with a sealing material. The terminal draw-out structure, sealing material and structure

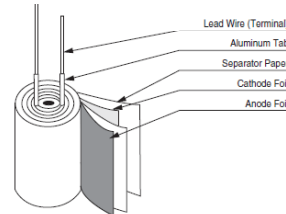


Fig-3 Basic model of element

2) The terminal draw-out structure, sealing material and structure differ depending on the type of the capacitor. Figure 4 shows typical examples.

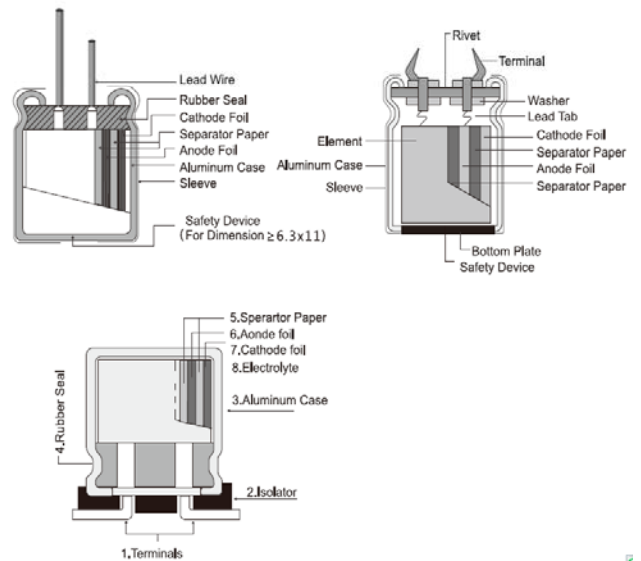


Fig-4 Construction of Aluminum Electrolytic Capacitors

1-3 Features of Capacitor Materials

Aluminum, which is main material in an aluminum electrolytic capacitor, forms an oxide layer (Al₂O₃) on its surface when the aluminum is set as anode and charged with electricity in electrolyte. The aluminum foil with an oxide layer formed thereon, as shown in Fig. 5, is capable of rectifying electric current in electrolyte. Such a metal is called a valve metal.

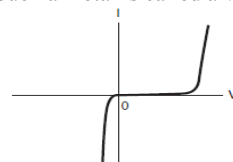


Fig-5 V-I characteristics of aluminum oxide

TEAPO Proper Usage Methods of Liquid Aluminum Electrolytic Capacitor

<Anode aluminum foil>

First, the foil material is electromechanically etched in a chloride solution to extend the surface area of the foil. Secondly, for the foil to form an aluminum oxide layer (Al_2O_3) as a dielectric, more than the rated voltage is applied to the foil in a solution such as ammonium borate. This dielectric layer is as dense and thin as 1.1 - 1.5 nm/volt and showing a high insulation resistance (108 - 109 Ω/m). The thickness of the oxide layer determines withstand voltage according to their direct proportional relationship. For the etching pits to be shaped to the intended thickness of the oxide, the pit patterns have been designed to have efficient surface area extension depending on the intended withstand voltage (see Fig. 6)

<Cathode aluminum foil>

An etching process is performed to the cathode aluminum foil as well as the anode foil. However, the formation process for oxide layer is generally not performed. Therefore, the surface of the cathode foil only has an oxide layer (Al_2O_3) that has spontaneously formed, which gives a withstand voltage of about 0.5 volt

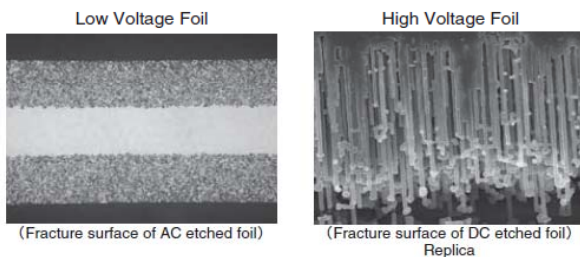


Fig-6 Cross section of aluminum etched foil (SEM)

<Electrolyte>

The electrolyte, an ion-conductive liquid functions as a true coming into contact with the dielectric layer on the surface of the foil. The cathode foil serves as a collector electrode to connect the cathode with the external circuit. Electrolyte is an essential controls the performance of the capacitor (temperature frequency characteristics, service life, etc.).

<Paper separator >

The separator maintains uniform distribution of the electrolyte and keeps the anode-to-cathode foil distance unchanged.

<Can case and sealing materials>

An aluminum can case and seal materials mainly consisting of rubber are used for the purpose of keeping airtightness.

1-4 Manufacturing Process

① Etching (for extending the surface area)

This etching process serves to extend the surface area of the foil. This is an AC or DC current-employed electrochemical process for etching the foil surface in a chloride solution (see Fig. 7)

② Formation (for forming a dielectric)

This is a process for forming a dielectric layer (Al_2O_3), which is normally performed on the anode aluminum foil. (see Fig. 8)

③ Slitting

This is a process for slitting aluminum foils (both the anode and cathode) and separator paper to the specified product size. (see Fig. 9)

④ Winding

This is a process for rolling a set of anode and cathode foils into a cylindrical form with a paper separator inserted between them. During this process, an inner terminal (called a tab) is attached to each of the aluminum foils. The roll made at this process is called a capacitor element.

⑤ Impregnation

This is a process for impregnating the element with electrolyte as a true cathode. The electrolyte also functions to repair the dielectric layer. (see Fig. 11)

⑥ Sealing

This process seals the element using the aluminum can case and sealing materials (rubber, rubber-lined cover, etc.) for keeping the case airtight. (see Fig. 12)

⑦ Aging (reforming)

The process of applying voltage to a post-sealed capacitor at high temperature is called "aging". This serves to repair defective dielectrics that have been made on the foil during the slitting or winding process.

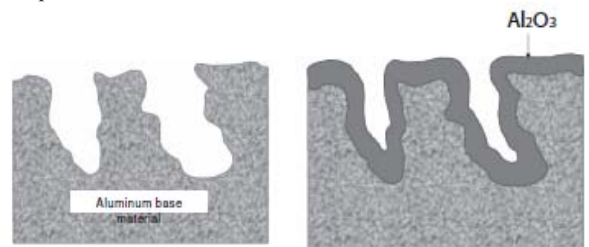
⑧ 100% inspection and packaging

After the aging, all products shall undergo testing for checking their electrical characteristics with chip termination, lead reforming, taping etc. finished, and then be packaged.

⑨ Outgoing inspections

Outgoing inspections are performed as per standard inspection procedures.

⑩ Shipment

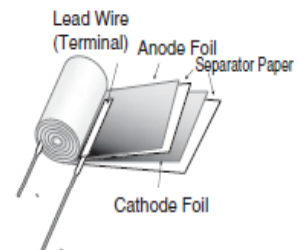


see Fig. 7 Etching Model

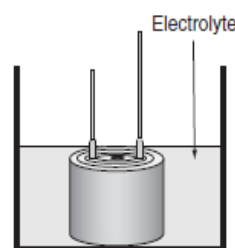
see Fig. 8 Forming Model



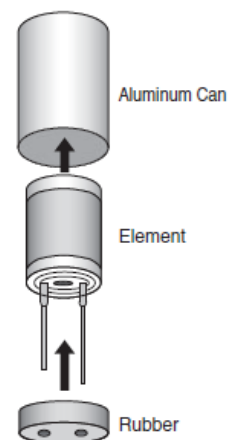
see Fig. 9 Slitting Model



see Fig. 10 Cathode Foil



see Fig. 11 Impregnation



see Fig. 12

2 . Basic Performance

2-1 Basic Electrical Characteristics

2-1-1 Capacitance

The larger the surface area of an electrode is, the higher the capacitance (capacity for storing electricity) is. For aluminum electrolytic capacitors, capacitance is measured under the standard of 20°C and a 120Hz AC signal of about 0.5V. Generally, as the temperature rises, the capacitance increases; as the temperature decreases, the capacitance decreases (Fig. 13). With a higher frequency, the capacitance is smaller; with a lower frequency, the capacitance is larger (Fig. 14).

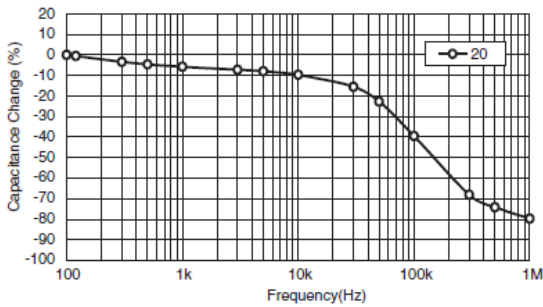
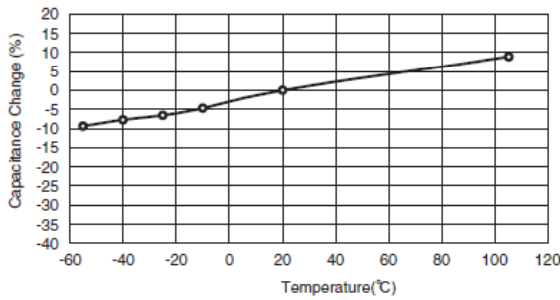


Fig-14 Frequency Characteristics of Capacitance

2-1-2 Tanδ (also called tangent of loss angle or dissipation factor)

(Fig. 15) is a simplified model of the equivalent circuit shown in (F). For an ideal capacitor with an equivalent series resistance of $R = 0$, the $\tan\delta$ shown in (Fig. 10) is zero. For an aluminum electrolytic capacitor, the equivalent series resistance (R) is not zero due to the presence of resistance of the electrolyte and paper separator and other contact resistances. $1/\omega C$ and R are correlated as shown in (Fig. 16) and Equation (2).

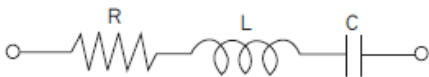


Fig-15 Simplified equivalent circuit

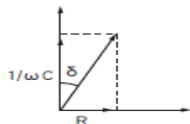


Fig-16 Dissipation Factor ($\tan\delta$)

$$\tan \delta = \frac{R}{1/\omega C} = \omega CR \dots\dots\dots (2)$$

$\omega : 2\pi f$

π = Circular constant, f : Frequency ($f = 120\text{Hz}$)

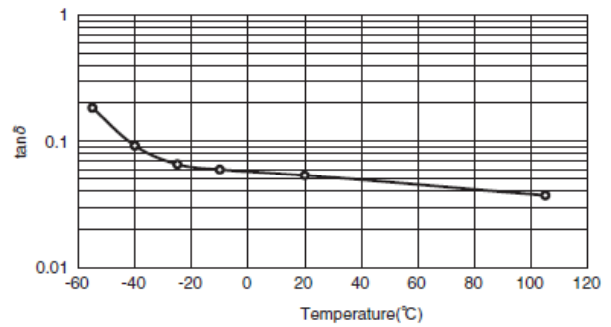


Fig-17 Temperature Characteristics of $\tan\delta$

2-1-3 Leakage Current (LC)

① As a feature of an aluminum electrolytic capacitor, when DC voltage is applied to it, the oxide layer that acts as a dielectric in the electrolyte allows a small amount of electric current to flow in it. The small amount

of current is called a leakage current (LC). An ideal capacitor does not allow the leakage current to flow (this is not the case for charging current).

② The leakage current (LC) changes with time as shown in (Fig. 18) value. Therefore, the specifications of LC are defined as a value of the rated voltage at 20°C. As the temperature rises, the LC increases; as the temperature decreases, the LC decreases (Fig. 19). As the applied voltage decreases, the LC decreases.

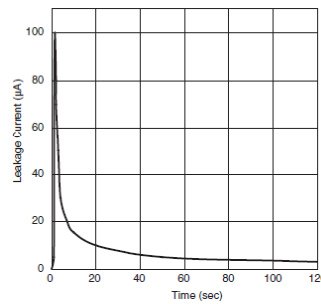


Fig-18 Leakage Current vs. Time

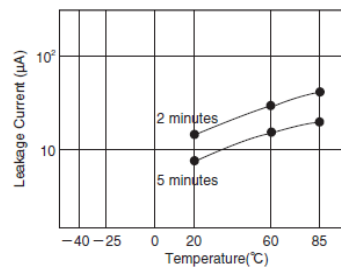


Fig-19 Temperature Characteristics of Leakage Current

2-2 Frequency Characteristics of Impedance (Z)

① When a capacitor is applied with a voltage with the frequency changed, the impedance (Z), a factor of preventing the AC current changes as shown in (Fig. 14). This is the impedance-frequency characteristics of the capacitor.

② (Fig. 15) is a simplified model of an equivalent circuit of an aluminum electrolyte capacitor. (Fig. 20) shows dotted lines representing a breakdown of the impedance-frequency characteristic curve into components (C , R and L). As can be seen in this figure, the impedance-frequency characteristics are a composition of C , R and L frequency characteristics.

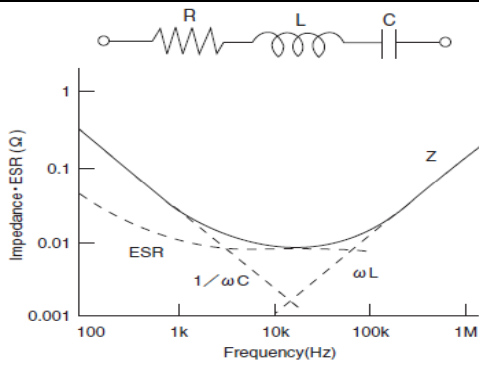


Fig-20 Factor of Impedance Frequency

③ The value $1/\omega C$ shows the pure capacitive reactance graphically presented by a straight line going downward at an angle of 45° , and ωL shows the pure inductive reactance graphically presented by a straight line going upward at 45° . R shows the equivalent series resistance (ESR). At a range of lower frequencies, the R curve goes downward due to the dielectric loss frequency-dependence. At a range of higher frequencies, the R curve tends to be almost flat since resistance of electro-lyte and paper separator is dominant and independent on frequency. Equation (3) shows this tendency.

$$Z = \sqrt{R^2 + \left(\omega L - \frac{1}{\omega C}\right)^2} \dots\dots\dots (3)$$

④ Because the impedance characteristics of an aluminum electrolyte capacitor depend on resistance of the electrolyte and paper separator, the Z value at the self-resonant frequency tends to be shown by the solid line in (Fig.21). The resistance of the electrolyte varies depending on temperature: as the temperature rises, the impedance decreases; and as the temperature decreases, the impedance increases, as shown in (Fig. 22).

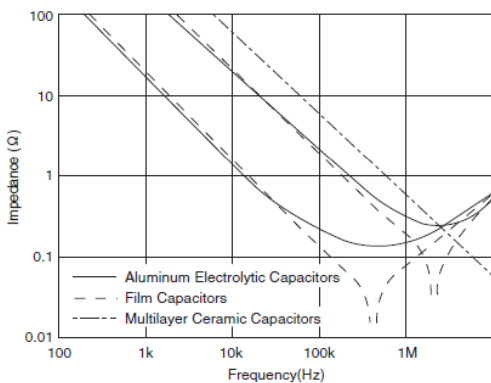


Fig-21 Frequency Characteristics of each Capacitors Impedance

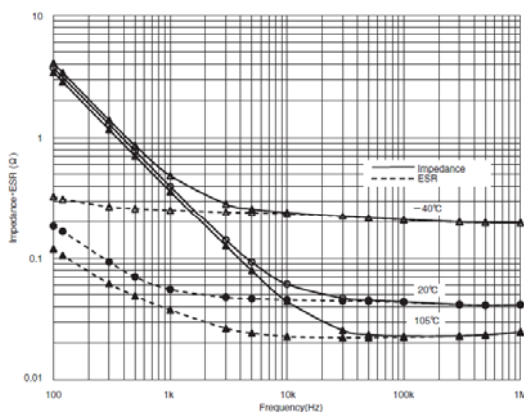


Fig-22 Temperature and Frequency Characteristics of Impedance · ESR

3 . Reliability

For designing the device with aluminum electrolytic capacitors, a failure rate and useful life are necessary to be considered for their reliability. The failure rate of aluminum electrolytic capacitors is approximated by the bathtub curve shown in (Fig.23).

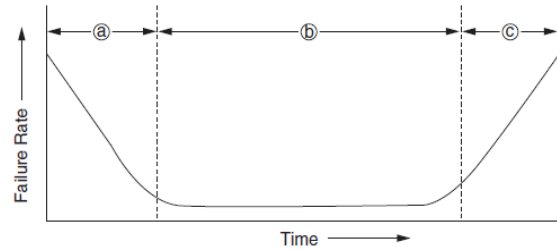


Fig-23 Bathtub curve

- a Early failure period
At the comparatively early periods of use, devices/components fail by deficiencies in design or manufacturing process or incompatibility with operation conditions. For aluminum electrolytic capacitors, these defectives are removed by debugging at one of manufacturing processes before shipments.
- b Random failure period
Failure is stable low in occurrence and appears unrelated to their served term. Aluminum electrolytic capacitors are low in failures in this period compared with semi-conductors and solid tantalum capacitors.
- c Wear-out failure period
In this period, the failure rate increases with the served time. For aluminum electrolytic capacitors, since they were completed in manufacturing, the electrolyte impregnated has gradually evaporated and diffused out of the capacitors through the rubber seal materials with time, which leads to decrease in the capacitance and/or increase $\tan\delta$. When any of these values changes beyond the allowable range of specifications, the capacitors are defined as “fell into the wear-out failure”. The served term until the capacitors fall into the wear-out failure period is called a useful life.

4 . Failure Modes

Aluminum electrolytic capacitors have two categories of failures catastrophic failure and wear-out failure.

<Catastrophic failure>

This is a failure mode that completely destroys the function of the capacitor such as short circuit and open circuit failure

<Wear-out failure>

This is a failure mode where the electrical parameters of the capacitor gradually deteriorate and fail. The criteria for determining if this failure has occurred depend on the purpose of a device. For each series of capacitors, the following electrical parameters have been defined as criteria in the specifications of Endurance in the catalogs or product specifications:

- Change in capacitance
- $\tan\delta$
- Leakage current

① Failure rates are often measured in units of % per 1000 hours (10^{-5} /hour). For higher reliability devices designed with a smaller failure rate, units of Failure In Time (FIT) (10^{-9} /hour) is used.

② Aluminum electrolytic capacitors are considered as components of wear-out failure mode, the electrical characteristics of which gradually deteriorate and their failure rate increases with time. In general, the failure rate in FIT is determined by total component-

TEAPO Proper Usage Methods of Liquid Aluminum Electrolytic Capacitor

hours (product of the number of tested components and test hours).
 ③ Due to the definition of FIT, the same FIT rate can be calculated in both cases of testing on the large number of tested components and also testing for long test periods of time. However, these cases mean differently for aluminum electrolytic capacitors. Using the failure rate is not suited to express the reliability of aluminum electrolytic capacitors, but the electrical characteristics based lifetime in hour should be considered to express the reliability.
 ④ Also, there are MTBF (Mean Time Between Failures) and MTTF (Mean Time To Failure) to express reliability. The latter is applicable for aluminum electrolytic capacitors because they are categorized into a group of non-repairable systems, equipment and devices for which MTTF is applicable. Failure modes depend on the application conditions that lead to fail. (Fig. 24).

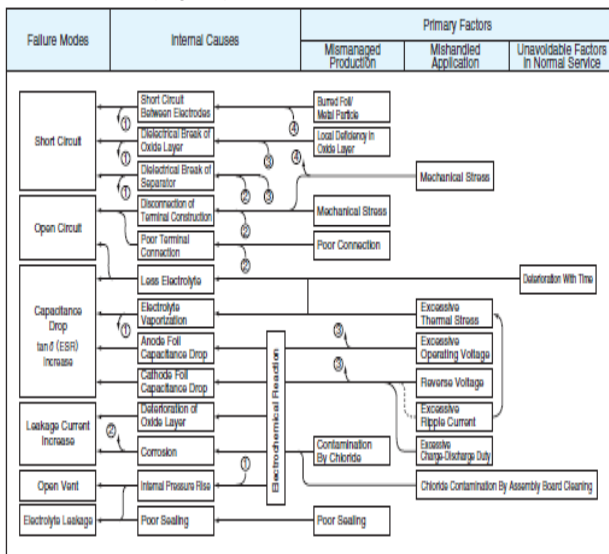


Fig-24 Failure Modes

5. Circuit Design

1) Operating Temperature, Equivalent Series Resistance(ESR), Ripple Current and Load Life

★ MTTF(Mean-Time-TO-Failure) means the useful life at room temperature 25°C.

1-1 Load life:

If the capacitor's max. operating temperature is at 105°C(85°C), then after applying capacitor's rated voltage (WV) for L₀ hours at 105°C(85°C), the capacitor shall meet the requirements in detail specification. where L₀ is called "load life" or "useful life (lifetime) at 105°C(85°C)".

$$L_x = L_0 \times 2^{(T_0 - T_x) / 10} \times K^{-\Delta T_x / 5}$$

where $\Delta T_x = \Delta T_0 \times (I_x / I_0)^2$, $I_x > I_0, K=4$; $I_x \leq I_0, K=2$

1-2 Ripple life:

If the capacitor's max. operating temperature is at 105°C(85°C), then after applying capacitor's rated voltage (WV) with the ripple current for L_r hours at 105°C(85°C), the capacitor shall meet the requirements in detail specification. where L_r is called "ripple life" or "useful ripple life(ripple lifetime) at 105°C(85°C)".

$$L_x = L_r \times 2^{(T_0 - T_x) / 10} \times K^{(\Delta T_0 - \Delta T_x) / 5}$$

where $\Delta T_x = \Delta T_0 \times (I_x / I_0)^2$, $I_x > I_0, K=4$; $I_x \leq I_0, K=2$

The (ripple) life expectancy at a lower temperature than the specified maximum temperature may be estimated by the following equation, but this expectancy formula does not apply for ambient below +40°C.
 L₀= Expected life period (hrs) at maximum operating temperature allowed.

L_r= Expected ripple life period (hrs) at maximum operating temperature allowed

L_x= Expected life period (hrs) at actual operating temperature
 T₀= Maximum operating temperature (°C) allowed
 T_x= Actual operating ambient temperature (°C)
 I_x= Actual applied ripple current (mA_{rms}) at operating frequency f₀ (Hz)

I₀= Rated maximum permissible ripple current IR(mA_{rms}) x frequency multiplier (C_f) at f₀ (Hz)

※Ripple Current calculation: no need Temperature Multiplying Factor.

※For Ripple life, I_x Should be 80% equal or more of I₀, if less than 80%, calculate with 80%.

△T₀ ≤ 5°C= Maximum temperature rise (°C) for applying I₀ (mA_{rms})

△T_c=Temperature rise (°C) of capacitor case for applying I_x (mA_{rms})

△T_x= Temperature rise (°C) of capacitor element for applying I_x (mA_{rms}) = K_c△T_c = K_c(T_c - T_x)

where T_c is the surface temperature (°C) of capacitor case
 T_x is ditto.

K_c= is transfer coefficient between element and case of capacitor from table below :

Φ	≤8	10	12.5/13	16	18	22	25	30	35
K _c	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.50	1.65

※ The estimated life is limited to 15 years, if it exceeds 15 years, take 15 years as standard.

★ The formula of Equivalent Series Resistance (ESR)

The operating frequency of ESR, DF, f & C must be the same, usually they test at 120 Hz.

$$ESR = DF / 2\pi f C \dots \dots \dots (2)$$

Where DF: Dissipation Factor(tanδ) f: Operating frequency(Hz)
 C: Capacitance(F)

★ Estimation of life considering the ripple current

The ripple current affects the life of a capacitor because the internal loss (ESR) generates heat. The generated heat will be:

$$P = I^2 R \dots \dots \dots (3)$$

Where I: Ripple current(A_{rms}) R: ESR(Ω)

At this time the increase in the capacitor temperature will be:

$$\Delta T = I^2 R / AH \dots \dots \dots (4)$$

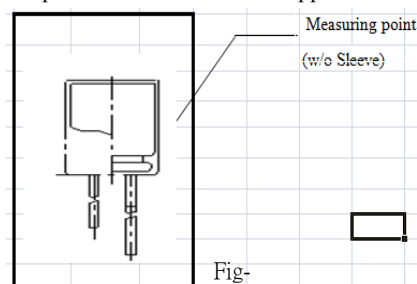
Where ΔT: Temperature increase in the capacitor core(°C)

I: Ripple current(A_{rms}) R: ESR(Ω)

A: Surface area of the capacitor (cm²)

H: Radiation coefficient(Approx. 1.5~2.0 · 10⁻³ W/ cm² · °C)

The above equation (4) shows that the temperature of a capacitor increases in proportion to the square of the applied ripple current and ESR, and in inverse proportion to the surface area. Therefore, the amount of the ripple current determines the heat generation, which affects the life. The values of ΔT varies depending on the capacitor types and operating conditions. The usage is generally desirable if ΔT remains less than 5°C. The measuring point for temperature increase due to ripple current is shown below. (Fig. 25).



Precautions For Conductive Polymer Solid Aluminum Electrolytic Capacitor

I .Device circuits design considerations

1.Prohibited to use circuit

Conductive Polymer Solid Aluminum Electrolytic Capacitor (The following is called capacitor) may cause the leak current occur changing due to the heat stress in welding. Please avoid to use in the below circuit.

- ① High resistance voltage holding circuit.
- ② Coupled circuits.
- ③ The other circuits that affected leakage current larger

2.Circuit design

Please design circuit on the basis of confirming the following content.

- ① As the change of temperature and frequency, electric property of capacitor will changes.Please design circuit after confirming those changes.
- ② When more than 2 capacitors in parallel , please consider the balance of current when design circuit.
- ③ When more than 2 capacitors in series , as the difference of load voltage , it may load overvoltage, so please consulting us when using.
- ④ Please don't install heating components around the capacitor and the back of the printed wiring board.

3.Using capacitors for significantly safety-oriented applications

Consult us about capacitors for a device application affecting human safety (①Aviation and aerospace ②Nuclear ③Medical) or for any device whose failure will make an impact on society.

4.Polarity

Our company conductive polymer capacitor is the solid aluminum electrolytic capacitor with polarity. Never apply a reverse voltage or AC voltage. Connecting with wrong polarity will short-circuit in initial State. About polarity, please confirm product catalogue or the diagram in the product specifications.

5.Operating voltage

Do not apply an over-voltage that exceeds rated voltage, Because even if to load the voltage that more than the rated voltage only for an instant , it can also lead to increased leakage current and short-circuit. The total peak value of the ripple voltage plus the DC voltage must not exceed the rated voltage of the capacitors. In the work, it doesn't need to reduce the voltage. Although capacitors specify a surge voltage, in the temperature range, if under the rated voltage, whatever is the environment temperature; it also has limited and does not assure long-term use.

6.Ripple current

Do not apply an overcurrent that exceeds the rated ripple current specified for the capacitors. Excessive ripple current will increase heat production within the capacitors, shortening the life and short-circuit.

7.Operating temperature

If use beyond working temperature range of environment, can lead to aging and failure performance, please use in working temperature range.

8.Charging and discharging

Don not use capacitor in the circuit of rapid charge and discharge repeatedly. If capacitors are used in the circuits that repeat a charge and discharge, capacitance will decrease and/or the capacitors will be damaged by internal heat generation. When the peak of current value more that 20A, we recommend to use protect circuit in order to keep the reliability.

9.Leakage current

Sometime the leakage current will increase , but if load voltage in working temperature, it will decrease gradually though self-healing effect. In addition, the more closely to the limit temperature, the faster of the reduce speed of leakage current. The reasons for leakage current increase as below :

- ① Welding
- ② High temperature without load, high temperature and high humidity, rapid temperature change test and so on.

10.Failure mode

① Reduce the failure rate by reducing the surrounding temperature, ripple current and load voltage.

② Electrostatic capacity decreases caused by product temperature rise and opening mode wear caused by ESR rise, which are the main failure mode.

Sometimes it will occur short-circuit mode due to the overvoltage and large current.

③ Lead to short-circuit due to load the voltage that more than rated voltage, when the current is larger, the shell will expansion or peeling off, give out bad smell due to the internal pressure rising.

④ The constitute material of products containing flammable materials , the short-circuit parts will fire may due to the spark. The install ways , location , graphic design of the product, please consider the following importance points of design to ensure the absolute safety.

* Setting up protection circuit and protection devices to ensure that equipment safety.

* Setting up long circuit etc. , so that the devices will stabilization even of a single fault.

11.The insulation of the capacitor

The outer sleeve of a capacitor does not assure electrical insulation Please have electrical insulation between the capacitor sleeve and cathode terminal and anode terminal and circuit board.

12.Operating conditions

Do not use/expose capacitors to the following conditions:

- ① Direct contact with water, salt water or oil, or high condensation environment.
- ② Direct sunlight.
- ③ Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and its compounds, bromine and its compounds and ammonium.
- ④ Ozone, ultraviolet rays or radiation.
- ⑤ Extreme vibration or mechanical shock that exceeds limits in the catalogs or product specifications.

13. Capacitor Mounting

① SMD product (mould SMD 、 SMD) solder graphics of the Capacitor printed wiring board, Please refer to the provisions of the catalogue or specifications for graphic design.

② For radial lead type capacitors, please make sure the terminal spacing of a capacitor equals the holes spacing on the PC board.

③ Do not print any copper trace under the seal (terminal) side of a capacitor. Copper traces should be 1 mm (preferably 2mm or more) spaced apart from the side of the capacitor body.

④ In designing a double-sided PC board, do not locate any through-hole via or unnecessary hole underneath a capacitor.

⑤ In designing a double-sided PC board, do not print any circuit pattern underneath a capacitor.

II . Installation

1.Assembling

- ① Do not try to reuse the capacitors once assembled and electrically fixed.

Precautions For Conductive Polymer Solid Aluminum Electrolytic Capacitor

- ② Capacitors may have been spontaneously recharged with time by a recovery voltage phenomenon. In this case, discharge the capacitors through a resistor of approximately 1kΩ before use.
- ③ If non-solid aluminum electrolytic capacitors have been stored at any conditions more than 35°C and 75%RH for long storage periods of time more than the limits specified in the catalogs or product specifications, they may have high leakage current. In this case, discharge by apply-ing the rated voltage through a resistor of approximately 1kΩ.
- ④ Confirm the rated capacitance and voltage of capacitors before installation.
- ⑤ Confirm the polarity of capacitors before installation.
- ⑥ Do not try to use the capacitors that were dropped to the floor and so forth.
- ⑦ Do not deform the can case of a capacitor.
- ⑧ Make sure that the terminal spacing of a capacitor equals the holes spacing on the PC board before installing the capacitor.
- ⑨ Do not apply excessive mechanical force to capacitors more than the limits prescribed in the catalogs or product specifications. If apply excessive force, the terminal will break off or deformation and affect install, even cause short-circuit, break line, increase LC and damage package. Avoid excessive mechanical force while the capacitors are in the process of vacuum-picking, placing and positioning by automatic mounting machines or cutting the lead wires by automatic insertion machines.

2. Soldering and heat resistance

Ensure that the soldering conditions meet the specifications recommended by Nippon Chemi-Con. Note that the leakage current may increase or capacitance may decrease due to thermal stresses that occur during soldering, etc. Furthermore, the leakage current which rose gradually decreases, when voltage is applied at below the category upper limit temperature. Additionally the self repairing action is faster when voltage near the rated voltage rather than at a higher voltage is applied at below the category's upper temperature limit.

1) Verify the following before using a soldering iron:

- ① That the soldering conditions (temperature and time) are within the ranges specified in the catalog or product specifications.
- ② That the tip of the soldering iron does not come into contact with the capacitor itself.

2) Verify the following when flow soldering:

- ① Do not dip the body of a capacitor into the solder bath only dip the terminals in. The soldering must be done on the reverse side of PC board.
- ② Soldering conditions should be within the limits prescribed in the catalog or the product specifications.
- ③ Do not apply flux to any part of capacitors other than their terminals.
- ④ Make sure the capacitors do not come into contact with any other components while soldering.

Please note the SMD product (SMD type) non-corresponding wave-soldering.

3) Verify the following when reflow soldering:

- ① Soldering conditions (preheat, solder temperature and soldering time) should be within the limits prescribed in the catalogs or the product specification.
- ② The heat level should be appropriate. (Note that the thermal stress on the capacitor varies depending on the type and position of the heater in the reflow oven, and the color and material of the capacitor.)

Except for the surface mount type, reflow soldering must not be used for the other capacitors.

4) Do not reuse a capacitor that has already been soldered to PC board and then removed. When using a new capacitor in the same location, remove the flux, etc. first, and then use a soldering iron to solder on the new capacitor in accordance with the specifications.

3. Handling After Soldering

Do not apply any mechanical stress to the capacitor after soldering onto the PC board.

- ① Do not lean or twist the body of the capacitor after soldering the capacitors onto the PC board.
- ② Do not use the capacitors for lifting or carrying the assembly board.
- ③ Do not hit or poke the capacitor after soldering to PC board. When stacking the assembly board, be careful that other components do not touch the aluminum electrolytic capacitors.
- ④ Do not drop the assembled board.

4. Cleaning PC boards

1) Do not wash capacitors by using the following cleaning agents. Solvent resistant capacitors are only suitable for washing using the cleaning conditions prescribed in the catalog or the product specification. In particular, ultrasonic cleaning will accelerate damage to capacitors.

- * Halogenated solvents → cause capacitors to fail due to corrosion.
- * Alkali system solvents → corrode (dissolve) an aluminum case.
- * Petroleum system solvents → cause the rubber seal material to deteriorate.
- * Xylene → causes the rubber seal material to deteriorate
- * Acetone → erases the markings

CFC alternatives or the other cleaners above; please consult with us.

2) Verify the following points when washing capacitors.

- ① Monitor conductivity, pH, specific gravity and the water content of cleaning agents. Contamination adversely affects these characteristics.
- ② Be sure not to expose the capacitors under solvent rich conditions or keep capacitors inside a closed container.

In addition, please dry the solvent sufficiently on the PC board and the capacitor with an air knife (temperature should be less than the maximum rated category temperature of the capacitor) for 10 minutes. Aluminum electrolytic capacitors can be characteristically and catastrophically damaged by halogen ions, particularly by chlorine ions, though the degree of the damage mainly depends upon the characteristics of the electrolyte and rubber seal material. When halogen ions come into contact with the capacitors, the foil corrodes when a voltage is applied. This corrosion causes an extremely high leakage current which results venting and an open circuit.

3) Verify the following when reflow soldering:

① Higher alcohol cleaning agents.

Using these cleaning agents, capacitors are capable of with-standing immersion or ultrasonic cleaning for 10 minutes at a maximum liquid temperature of 60°C. Find optimum condition for washing, rinsing, and drying. Be sure not to rub the marking off the capacitor which can be caused by contact with other components or the PC board. Note that shower cleaning adversely affects the markings on the sleeve.

② Non-Halogenated Solvent Cleaning.

Immersion, ultrasonic or vapor cleaning for 5 minutes. However, from an environmental point of view, these types of solvent will be banned in near future. We would recommend not using them if at all possible.

③ Isopropyl Alcohol (IPA).

IPA (Isopropyl Alcohol) is one of the most acceptable cleaning agents; it is necessary to maintain a flux content in the cleaning liquid at a maximum limit of 2 Wt.%.)

Precautions For Conductive Polymer Solid Aluminum Electrolytic Capacitor

5. Precautions for using adhesives and coating materials

- 1) Do not use any adhesive and coating materials containing.
- 2) Verify the following before using adhesive and coating material.
 - ① Remove flux and dust left over between the rubber seal and the PC board before applying adhesive or coating materials to the capacitor.
 - ② Dry and remove any residual cleaning agents before applying adhesive and coating materials to the capacitors. Do not cover over the whole surface of the rubber seal with the adhesive or coating materials.
 - ③ For permissible heat conditions for curing adhesives or coating materials, please consult with us.
 - ④ Covering over the whole surface of the capacitor rubber seal with resin may result in a hazardous condition because the inside pressure cannot be completely released. Also, a large amount of halogen ions in resins will cause the capacitors to fail because the halogen ions penetrate into the rubber seal and the inside of the capacitor.
 - ⑤ Some coating materials, it cannot be implemented to the capacitor.

6. Fumigation

In many cases when exporting or importing electronic devices, such as capacitors, wooden packaging is used. In order to control insects it may become necessary to fumigate the shipment. Precautions during "Fumigation" using halogenated chemical such as Methyl Bromide must be taken. Halogen gas can penetrate packaging materials such as cardboard boxes and vinyl bags. Penetration of the halogenated gas can cause corrosion of Electrolytic capacitors. Nippon Chemi-Con gives consideration to the packaging materials not to require the Fumigation. Verify whether the assembled PC board, products and capacitors themselves are subjected to Fumigation during their transportation or not.

III. The Operation of Devices

1. Do not touch the capacitor terminals directly.

2. Do not short-circuit the terminal of a capacitor by letting it come into contact with any conductive object.

Also, do not spill electric-conductive liquid such as acid or alkaline solution over the capacitor.

3. Please make sure the assembly of the complete circuit of capacitor installation environment.

Do not use capacitors in circumstances where they would be subject to exposure to the following materials

- ① Oil, water, salty water or damp location.
- ② Direct sunlight.
- ③ Ozone, ultraviolet rays or radiation.
- ④ Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or its compounds, and ammonium.
- ⑤ Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalog or product specification.

IV. Maintenance Inspection

1. Make periodic inspections of capacitors that have been used in industrial applications.

Before inspection, turn off the power supply and carefully discharge the electricity in the capacitors. Verify the polarity when measuring the capacitors with a volt-ohm meter. Do not apply any mechanical stress to the terminals of the capacitors.

2. The following items should be checked during the periodic inspections.

- ① Significant damage in appearance.
- ② Electrical characteristics: leakage current, capacitance, $\tan\delta$ and other characteristics prescribed in the catalog or product specification.

We recommend replacing the capacitors if the parts are out of specification.

V. Contingencies

- 1) If gas has vented from the capacitor during use, there is a short circuit and burning, or the capacitor discharges an odor or smoke, turn off the main power supply to the equipment or unplug the power cord.
- 2) If there is a problem with the capacitor or a fire breaks out, the capacitor may produce a burning gas or reactive gas from the outer resin, etc. If this happens, keep your hands and face away from the gas. If vented gas is inhaled or comes into contact with your eyes, flush your eyes immediately with water and/or gargle. If vented gas comes into contact with the skin, wash the affected area thoroughly with soap and water.

VI. Storage

We recommend the following conditions for storage.

- 1) Store capacitors in a cool, dry place. Store at a temperature between 5 and 35°C, with a humidity of 75% or less. (table-1 Maximum storage term)

The duration, please refer to the table below.

	Before the bag is opened	After the bag is opened
SMD (Resin-Molded chip type)	within six months after delivery	Within 30 days after the bag is opened
Radial lead type	within one year after delivery	Within 7 days after the bag is opened

- ① SMD products are sealed in a PE plastic bag. Use all capacitors in desposit period once the bag is opened.
- ② If the bag have open and need to storage, please return unused capacitors to the bag, and seal it with a zipper.
- ③ Be sure to follow our recommendations for reflow soldering.
- 2) Store the capacitors in a location free from direct contact with water, salt water, and oil.
- 3) Store in a location where the capacitor is not exposed to toxic gas, such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or chlorine compounds, bromine or other halogen gases, methyl bromide or other halogen compounds, ammonia, or similar.
- 4) Store in a location where the capacitor is not exposed to ozone, ultraviolet radiation, or other radiation.
- 5) It is recommended to store capacitors in their original packaging wherever possible.

VII. Disposal

Please consult with a local industrial waste disposal specialist when disposing of aluminum electrolytic capacitors.

VIII. Regarding compliance for EU REACH Regulation

- 1) According to the content of REACH handbook (Guidance on requirements for substances in articles which is published on May 2008), our electronic components are "articles without any intended release". Therefore they are not applicable for "Registration" for EU REACH Regulation Article 7 (1).
Reference: Electrolytic Condenser Investigation Society: "Study of REACH Regulation in EU about Electrolytic Capacitor" (publicized on 13 March 2008)
- 2) Nippon Chemi-Con develops the products without substance of very high concern (SVHC).

IX. Catalogs

Specifications in the catalogs are subject to change without notice. Test data shown in the catalogs are not assured as the whole performance values, but typical values.



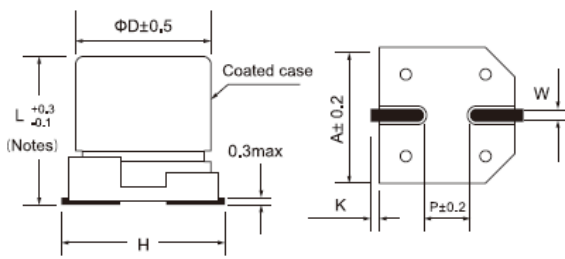
- Endurance: 105°C, 2000hrs
- Recommended Applications: Standard SMD type product
- Corresponding product to RoHS

Specifications

Item	Characteristics	
Category Temperature Range	-55 ~ +105°C	
Rated Voltage Range	2.5~25VDC	
Rated Capacitance Range	22~ 1500 μF	
Capacitance Tolerance	± 20 % (120Hz , 20°C)	
Surge Voltage	Rated voltage (V) x 1.15	
Leakage Current (20°C)	Less than or equal to the value of Table , (After rated voltage applied for 2 minutes) I : Leakage Current (μ A) C : Capacitance(μ F) V : Rated Voltage Range(VDC)	
Dissipation Factor (MAX) (tan δ) (120Hz , 20°C)	WV	2.5~25
	tan δ	0.12
Temperature characteristic Impedance ratio (MAX)	Z(100KHz) / WV	2.5 ~ 25V
	Z-25°C / Z+20°C	≤ 1.15
	Z-55°C / Z+20°C	≤ 1.25
Endurance	After applying rated voltage for 2000 hours at 105°C , the capacitor shall meet the following requirement °	
	Appearance	No significant damage
	Capacitance Change	Within ±20% of the initial value
	Dissipation Factor	Not more than 150% of the initial specified value
	Equivalent Series Resistance	Not more than 150% of the initial specified value
Humidity Test	after subjecting 90 to 95% RH for 1000 hours at 60°C , the capacitors shall meet the requirement as Endurance °	
	Capacitance Change	Within ±10% of the initial value
	Dissipation Factor	Not more than 130% of the initial specified value
	Equivalent Series Resistance	Not more than 130% of the initial specified value
	Leakage Current	Not more than the initial specified value
Resistance to Soldering Heat *	Capacitance Change	Within ±10% of the initial value
	Dissipation Factor	Not more than 130% of the initial specified value
	Equivalent Series Resistance	Not more than 130% of the initial specified value
	Leakage Current	Not more than the initial specified value

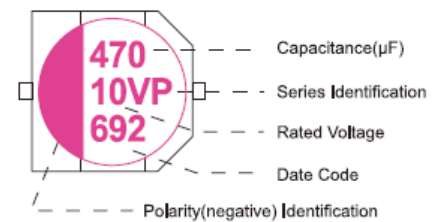
* For any doubt about measured values, measure the leakage current again after the following voltage treatment °
Voltage treatment: Applying DC rated voltage to the capacitors for 2 hours at 105°C °

Diagram of Dimensions



(Notes) Φ8 ~ Φ10&6.3x7.7=L±0.3

Marking : case with red printing



SIZE	Φ D x L	A	H(Max)	W	P	K
CA1	5x5.8	5.3	6.5	0.65±0.15	1.5±0.2	0.35+0.15/-0.2
EA1	6.3x5.8	6.6	7.8	0.65±0.15	1.8±0.2	0.35+0.15/-0.2
EA4	6.3x7.7	6.6	7.8	0.65±0.15	1.8±0.2	0.35+0.15/-0.2
GA6	8x10.4	8.3	10	0.9±0.2	3.1±0.2	0.7±0.2
HA5	10x10.2	10.3	12	0.9±0.2	4.6±0.2	0.7±0.2
HA8	10x12.2	10.3	12	0.9±0.2	4.6±0.2	0.7±0.2

Multiplier for Ripple Current

Frequency(HZ)	120 ≤ F < 1K	1K ≤ F < 10K	10K ≤ F < 100K	100K ≤ F ≤ 500K
Coefficient	0.05	0.30	0.70	1.00

■Dimensions, Rated Ripple Current, Equivalent Series Resistance

Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE (mA/rms, 105 °C 100KHz)	ESR (m Ω , 20°C 100KHz)	LC (μ A max/2min)
2.5 (2.88)	180	5x5.8	1970	30	300
		6.3x5.8	2200	25	300
	220	6.3x5.8	2500	25	300
		6.3x7.7	2720	23	300
	470	6.3x7.7	2720	23	300
		8x10.4	3950	18	500
	1200	10x10.2	4000	12	600
	1500	10x10.2	4000	13	750
10x12.2		5500	12	750	
4(4.6)	100	6.3x5.8	2450	26	300
		6.3x5.8	2450	26	300
		6.3x7.7	2650	25	300
	560	8x10.4	3950	18	448
		8x10.4	3950	18	656
	820	10x12.2	5500	10	656
		10x10.2	4000	12	960
	1200	10x12.2	5500	10	960
10x12.2		5500	10	960	
6.3(7.25)	47	5x5.8	1380	35	300
		6.3x5.8	2400	27	300
	68	6.3x5.8	2400	27	300
		5x5.8	1380	35	300
	100	6.3x5.8	2400	27	300
		6.3x5.8	2400	27	300
	120	6.3x5.8	2400	27	300
		6.3x7.7	2650	25	300
	220	6.3x5.8	2400	27	300
		6.3x7.7	2650	25	300
	330	6.3x5.8	2400	27	415
		6.3x7.7	2650	25	415
	470	6.3x7.7	2650	25	592
		8x10.4	3610	21	592
	680	8x10.4	3610	21	857
		10x10.2	3650	12	857
820	8x10.4	3610	21	1033	
	10x10.2	3650	12	1033	
1000	10x12.2	5500	10	1033	
	8x10.4	3610	21	1260	
1000	10x12.2	5500	10	1260	
	10x12.2	5500	10	1260	
10(11.5)	22	5x5.8	1270	40	300
		5x5.8	1270	40	300
	33	5x5.8	1270	40	300
		5x5.8	1270	40	300
	47	6.3x5.8	2250	31	300
		6.3x5.8	2250	31	300
	56	6.3x5.8	2250	31	300
		6.3x5.8	2250	31	300
100	6.3x5.8	2250	31	300	
	6.3x7.7	2560	27	300	
10(11.5)	150	6.3x7.7	2560	27	300
		8x10.4	3950	18	500
	390	8x10.4	3950	18	500
		10x10.2	4000	12	600
	470	10x10.2	4000	12	600
		10x12.2	5500	12	750
16(18.4)	22	5x5.8	1210	90	300
		6.3x5.8	2050	37	300
	33	6.3x5.8	2050	37	300
		6.3x5.8	2050	37	300
	47	6.3x5.8	1600	50	300
		6.3x7.7	2420	30	300
	82	6.3x7.7	2420	30	300
		6.3x7.7	2420	30	320
	100	6.3x7.7	2420	30	320
		6.3x7.7	2420	30	384
	120	6.3x7.7	2420	30	384
		6.3x7.7	2420	30	480
150	8x10.4	3490	23	480	
	8x10.4	3490	23	576	
180	8x10.4	3490	23	576	
	8x10.4	3490	23	704	
220	8x10.4	3490	23	704	
	10x12.2	5050	14	704	
270	8x10.4	3490	23	864	
	8x10.4	3490	23	864	
330	10x10.2	3100	16	1056	
	10x10.2	3100	16	1056	
330	10x12.2	5050	14	1056	
	10x12.2	5050	14	1056	
390	8x10.4	3000	23	1248	
	8x10.4	3000	23	1248	
470	10x10.2	3100	16	1504	
	10x10.2	3100	16	1504	
470	10x12.2	5050	14	1504	
	10x12.2	5050	14	1504	
560	10x12.2	5050	14	1792	
	10x12.2	5050	14	1792	
680	10x12.2	5050	14	2176	
	10x12.2	5050	14	2176	
820	10x12.2	5050	14	2624	
	10x12.2	5050	14	2624	
20(23)	22	6.3x5.8	1650	50	300
		6.3x7.7	2000	45	300
	47	6.3x7.7	2000	45	300
		6.3x7.7	2000	45	300
100	8x10.4	3320	24	480	
	8x10.4	3320	24	480	
150	10x12.2	4220	21	600	
	10x12.2	4220	21	600	
25(28.75)	22	6.3x5.8	900	65	300
		6.3x7.7	1800	50	300
	27	6.3x5.8	1270	60	300
		6.3x5.8	1270	60	300
	47	6.3x5.8	1300	65	300
		6.3x7.7	1800	45	300
	68	6.3x7.7	1800	45	340
		6.3x7.7	1800	45	340
	100	8x10.4	3320	35	500
		8x10.4	3320	35	500
150	8x10.4	3320	35	750	
	8x10.4	3320	35	750	
180	10x10.2	3100	30	900	
	10x10.2	3100	30	900	
220	8x10.4	3320	35	1100	
	8x10.4	3320	35	1100	
270	10x10.2	3320	30	1350	
	10x10.2	3320	30	1350	
330	10x12.2	3500	28	1650	
	10x12.2	3500	28	1650	

VB High capacitance & low ESR Series

- Endurance: 105°C, 2000hrs
- Recommended Applications: High capacitance & Ultra low ESR Series
- Corresponding product to RoHS

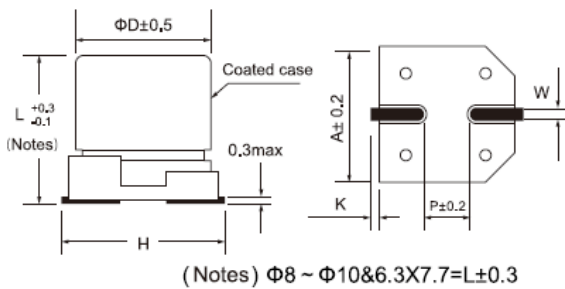


■ Specifications

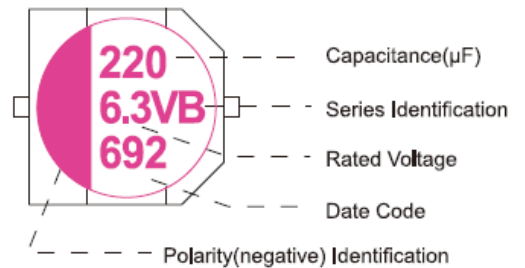
Item	Characteristics	
Category Temperature Range	-55 ~ +105°C	
Rated Voltage Range	2.5~25VDC	
Rated Capacitance Range	33~ 1200 μ F	
Capacitance Tolerance	\pm 20 % (120Hz , 20°C)	
Surge Voltage	Rated voltage (V) x 1.15	
Leakage Current (20°C)	Less than or equal to the value of Table , (After rated voltage applied for 2 minutes) I : Leakage Current (μ A) C : Capacitance(μ F) V : Rated Voltage Range(VDC)	
Dissipation Factor (MAX) (tan δ) (120Hz , 20°C)	WV	2.5~25
	tan δ	0.12
Temperature characteristic Impedance ratio (MAX)	Z(100KHz) / WV	2.5 ~ 25V
	Z-25°C / Z+20°C	\leq 1.15
	Z-55°C / Z+20°C	\leq 1.25
Endurance	After applying rated voltage for 2000 hours at 105°C, the capacitor shall meet the following requirement °	
	Appearance	No significant damage
	Capacitance Change	Within \pm 20% of the initial value
	Dissipation Factor	Not more than 150% of the initial specified value
	Equivalent Series Resistance	Not more than 150% of the initial specified value
Humidity Test	after subjecting 90 to 95% RH for 1000 hours at 60°C , the capacitors shall meet the requirement as Endurance °	
	Capacitance Change	Within \pm 10% of the initial value
	Dissipation Factor	Not more than 130% of the initial specified value
	Equivalent Series Resistance	Not more than 130% of the initial specified value
	Leakage Current	Not more than the initial specified value
Resistance to Soldering Heat *	Capacitance Change	Within \pm 10% of the initial value
	Dissipation Factor	Not more than 130% of the initial specified value
	Equivalent Series Resistance	Not more than 130% of the initial specified value
	Leakage Current	Not more than the initial specified value

* For any doubt about measured values, measure the leakage current again after the following voltage treatment °
Voltage treatment: Applying DC rated voltage to the capacitors for 2 hours at 105°C °

■ Diagram of Dimensions



■ Marking : case with red printing



SIZE	$\Phi D \times L$	A	H(Max)	W	P	K
EA1	6.3x5.8	6.6	7.8	0.65 \pm 0.15	1.8 \pm 0.2	0.35+0.15/-0.2
EA4	6.3x7.7	6.6	7.8	0.65 \pm 0.15	1.8 \pm 0.2	0.35+0.15/-0.2
GA6	8x10.4	8.3	10	0.9 \pm 0.2	3.1 \pm 0.2	0.7 \pm 0.2
HA5	10x10.2	10.3	12	0.9 \pm 0.2	4.6 \pm 0.2	0.7 \pm 0.2
HA8	10x12.2	10.3	12	0.9 \pm 0.2	4.6 \pm 0.2	0.7 \pm 0.2

■ Multiplier for Ripple Current

Frequency(HZ)	120 \leq F<1K	1K \leq F<10K	10K \leq F<100K	100K \leq F \leq 500K
Coefficient	0.05	0.30	0.70	1.00

■Dimensions,Rated Ripple Current,Equivalent Series Resistance

Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE (mA/rms,105 $^{\circ}$ C 100KHz)	ESR (m Ω ,20 $^{\circ}$ C 100KHz)	LC (μ A max/2min)
2.5 (2.88)	330	6.3x5.8	3160	15	300
	390	6.3x5.8	3160	15	300
	470	6.3x5.8	3160	15	300
	560	6.3x5.8	3500	16	300
		6.3x7.7	3600	13	300
	820	8x10.4	4210	12	410
4(4.6)	270	6.3x5.8	3160	15	300
	330	6.3x5.8	3160	15	300
	470	8x10.4	4520	15	376
	560	8x10.4	4520	15	448
6.3(7.25)	100	6.3x5.8	2500	24	300
	120	6.3x5.8	2500	24	300
	150	6.3x5.8	3160	22	300
	220	6.3x5.8	3160	22	300
	330	6.3x5.8	3390	22	415
		6.3x7.7	3500	18	415
		8x10.4	4210	15	415
	470	6.3x7.7	3500	18	592
		8x10.4	4210	15	592
	560	8x10.4	4210	15	705
6.3(7.25)	560	10x10.2	5025	12	705
	820	8x10.4	4210	15	1033
		10x10.2	5025	12	1033
	1200	10x10.2	5025	12	1512
10(11.5)	120	6.3x5.8	2600	22	300
	150	6.3x7.7	2880	21	300
	330	8x10.4	4000	17	660
470	10x10.2	5025	12	940	
16(18.4)	68	6.3x5.8	2440	25	300
		6.3x7.7	2700	24	300
	100	6.3x5.8	2440	25	320
		6.3x7.7	2700	24	320
	180	6.3x7.7	3320	22	576
		8x10.4	3890	18	576
	220	8x10.4	3890	18	704
	270	8x10.4	3890	18	864
	330	10x10.2	4350	16	1056
	470	10x12.2	6100	10	1504
25(28.8)	33	6.3x7.7	2500	45	300
	47	6.3x7.7	2500	45	300

- Endurance: 105°C, 5000hrs
- Recommended Applications: Long Life Series
- Corresponding product to RoHS

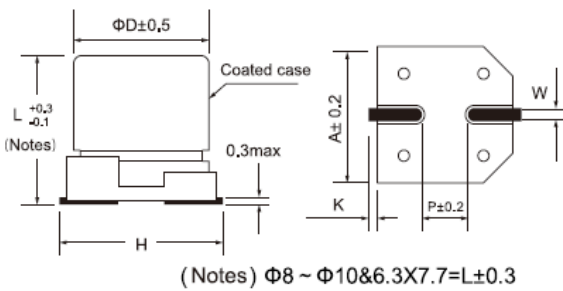


Specifications

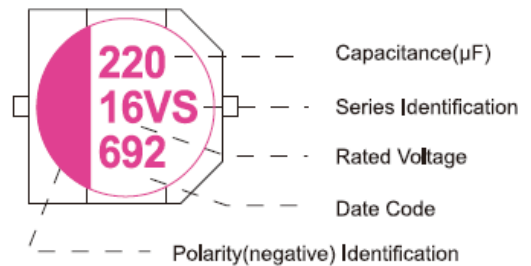
Item	Characteristics	
Category Temperature Range	-55 ~ +105°C	
Rated Voltage Range	4~25VDC	
Rated Capacitance Range	22~ 470 μF	
Capacitance Tolerance	± 20 % (120Hz , 20°C)	
Surge Voltage	Rated voltage (V) x 1.15	
Leakage Current (20°C)	Less than or equal to the value of Table , (After rated voltage applied for 2 minutes) I : Leakage Current (μ A) C : Capacitance(μ F) V : Rated Voltage Range(VDC)	
Dissipation Factor (MAX) (tan δ) (120Hz , 20°C)	WV	4~25
	tan δ	0.12
Temperature characteristic Impedance ratio (MAX)	Z(100KHz) / WV	4 ~ 25V
	Z-25°C / Z+20°C	≤ 1.15
	Z-55°C / Z+20°C	≤ 1.25
Endurance	After applying rated voltage for 2000 hours at 105°C , the capacitor shall meet the following requirement °	
	Appearance	No significant damage
	Capacitance Change	Within ±20% of the initial value
	Dissipation Factor	Not more than 150% of the initial specified value
	Equivalent Series Resistance	Not more than 150% of the initial specified value
Humidity Test	after subjecting 90 to 95% RH for 1000 hours at 60°C , the capacitors shall meet the requirement as Endurance °	
	Capacitance Change	Within ±10% of the initial value
	Dissipation Factor	Not more than 130% of the initial specified value
	Equivalent Series Resistance	Not more than 130% of the initial specified value
	Leakage Current	Not more than the initial specified value
Resistance to Soldering Heat *	Capacitance Change	Within ±10% of the initial value
	Dissipation Factor	Not more than 130% of the initial specified value
	Equivalent Series Resistance	Not more than 130% of the initial specified value
	Leakage Current	Not more than the initial specified value

* For any doubt about measured values, measure the leakage current again after the following voltage treatment °
Voltage treatment: Applying DC rated voltage to the capacitors for 2 hours at 105°C °

Diagram of Dimensions



Marking : case with red printing



SIZE	Φ D x L	A	H(Max)	W	P	K
EA1	6.3x5.8	6.6	7.8	0.65±0.15	1.8±0.2	0.35+0.15/-0.2
EA4	6.3x7.7	6.6	7.8	0.65±0.15	1.8±0.2	0.35+0.15/-0.2
GA6	8x10.4	8.3	10	0.9±0.2	3.1±0.2	0.7±0.2
HA5	10x10.2	10.3	12	0.9±0.2	4.6±0.2	0.7±0.2
HA8	10x12.2	10.3	12	0.9±0.2	4.6±0.2	0.7±0.2

Multiplier for Ripple Current

Frequency(HZ)	120 ≤ F < 1K	1K ≤ F < 10K	10K ≤ F < 100K	100K ≤ F ≤ 500K
Coefficient	0.05	0.30	0.70	1.00

■Dimensions,Rated Ripple Current,Equivalent Series Resistance

Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE (mA/rms,105 $^{\circ}$ C 100KHz)	ESR (m Ω ,20 $^{\circ}$ C 100KHz)	LC (μ A max/2min)
4 (4.6)	150	6.3x5.8	2570	22	300
	330	6.3x5.8	2800	22	300
	470	6.3x7.7	2800	20	376
6.3(7.25)	100	6.3x5.8	2800	22	300
	120	6.3x5.8	2800	22	300
	220	6.3x5.8	2800	22	300
	470	10x10.2	4130	20	592
10(11.5)	47	6.3x5.8	2300	27	300
	56	6.3x5.8	2300	27	300
	68	6.3x5.8	2300	27	300
10(11.5)	120	6.3x5.8	2300	27	300
	470	8x10.4	3000	22	940
16(18.4)	39	6.3x5.8	2200	30	300
	68	6.3x5.8	2200	30	300
	330	10x12.2	3800	14	1056
20(23)	27	6.3x5.8	2450	40	300
	180	10x10.2	3200	25	720
25(28.75)	150	8x10.4	1350	30	750
	220	10x10.2	1800	38	1100
	330	10x12.2	2800	30	1650

FG Standard Series

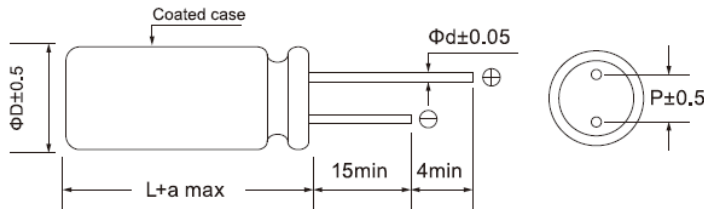
- Endurance: 105°C, 2000hrs
- Recommended Applications: standard
- Corresponding product to RoHS



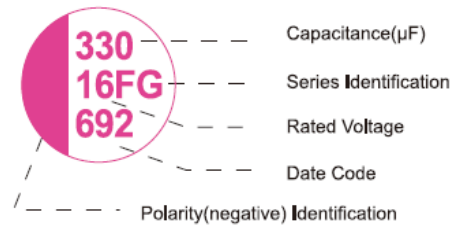
Specifications

Item	Characteristics		
Category Temperature Range	-55 ~ +105°C		
Rated Voltage Range	2.5~25VDC		
Rated Capacitance Range	22~ 2200 μF		
Capacitance Tolerance	± 20 % (120Hz , 20°C)		
Surge Voltage	Rated voltage (V) x 1.15		
Leakage Current (20°C)	I ≤ 0.2CV or 300(μ A) whichever is greater (After rated voltage applied for 2 minutes) I : Leakage Current (μ A) C : Capacitance(μ F) V : Rated Voltage Range(VDC)		
Dissipation Factor (MAX) (tan δ) (120Hz , 20°C)	WV	2.5~10	12~25
	tan δ	0.08	0.12
Temperature characteristic Impedance ratio (MAX)	Z(100KHz) / WV	2.5 ~ 25V	
	Z-25°C / Z+20°C	≤ 1.15	
	Z-55°C / Z+20°C	≤ 1.25	
Endurance	After applying rated voltage for 2000 hours at 105°C, the capacitor shall meet the following requirement °		
	Appearance	No significant damage	
	Capacitance Change	Within ±20% of the initial value	
	Dissipation Factor	Not more than 150% of the initial specified value	
	Equivalent Series Resistance	Not more than 150% of the initial specified value	
Humidity Test	after subjecting 90 to 95% RH for 1000 hours at 60°C , the capacitors shall meet the requirement as Endurance °		
	Surge voltage test After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the requirement as Endurance		
Failure rate(MAX)	1% per 1,000 hours (confidence level 60% at 105°C)		

Diagram of Dimensions



Marking : case with red printing



SIZE	Φ D x L	P	φ d	a
C07	5x7	2.0	0.5	1.5
C09	5x9	2.0	0.5	1.0
D07	5x7	2.5	0.5	1.0
D09	5x9	2.5	0.5	1.0
D11	5x11	2.5	0.5	1.0
E01	6.3x5.4	2.5	0.45	1.0
E06	6.3x6	2.5	0.5	1.5
E07	6.3x7	2.5	0.5	1.5
E08	6.3x8	2.5	0.5 or 0.6	1.0
E09	6.3x9	2.5	0.5	1.0

SIZE	Φ D x L	P	φ d	a
E11	6.3x11	2.5	0.5	1.0
G08	8x8	3.5	0.6	1.5
G09	8x9	3.5	0.6	1.5
G1B	8x11.5	3.5	0.6	1.0
G12	8x12	3.5	0.6	1.0
G15	8x15	3.5	0.6	1.5
H1A	10x10.5	5.0	0.6	1.0
H1C	10x12.5	5.0	0.6	1.0
H13	10x13	5.0	0.6	1.0
H16	10x16	5.0	0.6	1.0

Multiplier for Ripple Current

Frequency(HZ)	120 ≤ F < 1K	1K ≤ F < 10K	10K ≤ F < 100K	100K ≤ F ≤ 500K
Coefficient	0.05	0.30	0.70	1.00

■Dimensions, Rated Ripple Current, Equivalent Series Resistance

Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (mΩ, 20°C 100KHz)	Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (mΩ, 20°C 100KHz)	
2.5 (2.88)	560	6.3x6	4000	10	7.5 (8.62)	390	5x9	3100	15	
		6.3x8	3160	20		470	5x9	3100	15	
	820	6.3x8	3160	20		500	5x9	3100	12	
		8x11.5	5600	7		680	6.3x9	3500	12	
	1500	10x12.5	5600	7	10 (11.5)	68	6.3x5.4	1810	30	
2200	10x12.5	5600	7	100		5x7	3500	11		
4 (4.6)	560	6.3x8	3160			20	6.3x5.4	2320	27	
		6.3x8	3160	20		150	6.3x5.4	2200	30	
	680	8x11.5	5600	7		180	6.3x8	2820	25	
		6.3x9	3160	20		220	6.3x8	2820	25	
	820	10x12.5	5600	7		270	6.3x8	2820	25	
		8x11.5	5600	7		330	6.3x8	2820	25	
1000	10x12.5	5600	7	8x8			3500	11		
	1500	8x11.5	5600	7		470	6.3x9	2820	25	
2200		10x12.5	5600	7			8x11.5	5600	8	
6.3 (7.25)	47	6.3x5.4	1810	30			10x10.5	5050	8	
		100	6.3x5.4	1810		40	560	8x11.5	5600	8
		180	6.3x5.4	1810		30		10x12.5	6100	8
	220	5x7	3500	11		680	8x11.5	5600	8	
		6.3x5.4	1810	30	10x12.5		6100	8		
	270	6.3x6	3160	15	820	8x11.5	5600	8		
		5x7	3500	11		10x12.5	6100	8		
	330	6.3x7	3500	11	1200	10x12.5	6100	8		
		5x7	3500	11		1500	10x12.5	6100	8	
		6.3x5.4	1810	30	22		5x7	2200	30	
	390	6.3x6	3390	22		33	6.3x5.4	2200	30	
		5x9	3500	11	47		6.3x5.4	2490	24	
	450	6.3x9	3500	8		68	6.3x6	1650	35	
		6.3x6	3390	22	100		6.3x5.4	1650	35	
	470	5x9	3190	28		180	6.3x5.4	2490	24	
		6.3x6	3390	22	270		6.3x8	2820	24	
		6.3x8	3800	10		6.3x8	2820	25		
		8x8	4200	8	8x8		3150	22		
	560	6.3x8	4000	10	180	6.3x8	2820	25		
		8x8	4800	12		270	8x8	3500	16	
	680	6.3x9	3500	8	6.3x9		3100	20		
		8x11.5	5600	7		8x8	3800	15		
	820	6.3x9	3500	8	8x11.5	5000	11			
		8x11.5	5600	7		10x10.5	5050	14		
		10x10.5	5050	8	330		10x12.5	6100	10	
		10x12.5	5600	7		470	8x11.5	5000	11	
1000	8x8	4770	10	10x10.5	5050		14			
	8x11.5	5600	7		560	10x12.5	6100	10		
1200	8x11.5	5600	7	8x11.5		5000	11			
	10x10.5	5050	8		10x10.5	5050	11			
1500	8x11.5	5600	7	10x12.5		6100	10			
	10x10.5	5050	8		10x12.5	6100	10			
2200	10x12.5	5600	7	16 (18.4)		6.3x9	3100	20		
6.8 (7.82)	180	5x7	2300		20	330	8x11.5	5000	11	
		220	5x7		2500		20	10x10.5	5050	14
	270	5x7	2500		20	470	10x12.5	6100	10	
		330	5x9		3100		15	560	8x11.5	5000
	390	5x9	3100		15	1000	10x10.5		5050	11
		450	6.3x6	3100	15		10x12.5	6100	10	
	680	6.3x9	3500	11	16 (18.4)	680		8x11.5	5000	11
		820	6.3x9	3500		11	820	10x12.5	6100	10
	1000	6.3x11	4200	10	1000	8x15		5000	10	
		7.5 (8.62)	270	5x9		2690	15	25 (28.75)	33	6.3x8

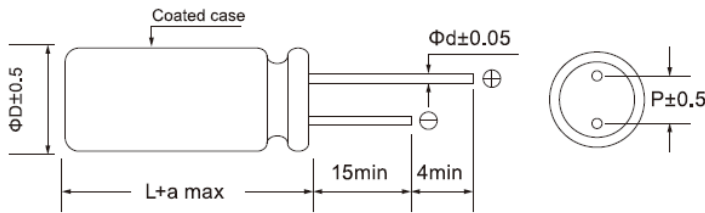
- Endurance: 105°C, 2000hrs
- Recommended Applications: High ripple & low ESR Series
- Corresponding product to RoHS



Specifications

Item	Characteristics	
Category Temperature Range	-55 ~ +105°C	
Rated Voltage Range	2.5~6.3VDC	
Rated Capacitance Range	270~ 2700 μF	
Capacitance Tolerance	± 20 % (120Hz , 20°C)	
Surge Voltage	Rated voltage (V) x 1.15	
Leakage Current (20°C)	I ≤ 0.2CV or 300(μ A) whichever is greater (After rated voltage applied for 2 minutes) I : Leakage Current (μ A) C : Capacitance(μ F) V : Rated Voltage Range(VDC)	
Dissipation Factor (MAX) (tan δ) (120Hz ,20°C)	WV	2.5~6.3
	tan δ	0.10
Temperature characteristic Impedance ratio (MAX)	Z(100KHz) / WV	2.5 ~ 6.3V
	Z-25°C / Z+20°C	≤ 1.15
	Z-55°C / Z+20°C	≤ 1.25
Endurance	After applying rated voltage for 2000 hours at 105°C , the capacitor shall meet the following requirement °	
	Appearance	No significant damage
	Capacitance Change	Within ±20% of the initial value
	Dissipation Factor	Not more than 150% of the initial specified value
	Equivalent Series Resistance	Not more than 150% of the initial specified value
Humidity Test	after subjecting 90 to 95% RH for 1000 hours at 60°C , the capacitors shall meet the requirement as Endurance °	
	Surge voltage test After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds,the capacitors shall meet the requirement as Endurance	
Failure rate(MAX)	1%per 1,000 hours(confidence level 60% at 105°C)	

Diagram of Dimensions



Marking : case with red printing



SIZE	ΦD X L	P	φ d	a
E08	6.3X8	2.5	0.5or0.6	1.0
E1A	6.3X10.5	2.5	0.6	1.0
G08	8X8	3.5	0.6	1.5
G1B	8X11.5	3.5	0.6	1.0
H1C	10X12.5	5.0	0.6	1.0

Multiplier for Ripple Current

Frequency(HZ)	120 ≤ F < 1K	1K ≤ F < 10K	10K ≤ F < 100K	100K ≤ F ≤ 500K
Coefficient	0.05	0.30	0.70	1.00

■Dimensions, Rated Ripple Current, Equivalent Series Resistance

Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ D x L (mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (m Ω , 20°C 100KHz)	Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ D x L (mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (m Ω , 20°C 100KHz)
2.5 (2.88)	560	6.3x8	5000	7	4 (4.6)	1200	8x8	6100	7
		8x8	6100	7		1500	8x11.5	6100	7
	680	8x8	6100	7		1800	10x12.5	6500	9
		8x11.5	6100	7	6.3 (7.25)	270	6.3x8	4700	8
	820	6.3x8	5000	7		330	6.3x8	4700	8
		8x8	6100	7		470	6.3x8	4700	8
		8x11.5	6100	7			8x8	5700	8
	1000	8x8	6100	7		560	6.3x8	4700	8
		8x11.5	6100	7			8x8	5700	8
		1500	8x11.5	6100		7	680	8x8	5700
2700	10x12.5	5600	8	8x11.5		5700		7	
	4 (4.6)	560	6.3x8	5000		7	820	8x8	5700
8x8			6100	7		8x11.5		5700	7
8x11.5			6100	7	1000	8x8		5700	8
680		8x8	6100	7		8x11.5	5700	7	
		8x11.5	6100	7		10x12.5	6100	7	
1000		8x8	6100	7	1500	8x11.5	5700	7	
			8x11.5	6100		7	10x12.5	6100	7
		10x12.5	6100	7					
			6100	7					

FF

Large capacitance Series

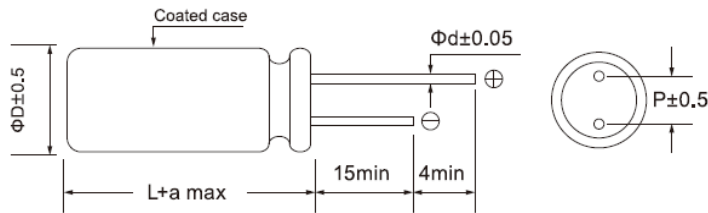
- Endurance: 105°C, 2000hrs
- Recommended Applications: Ultra low ESR & Large capacitance Series
- Corresponding product to RoHS



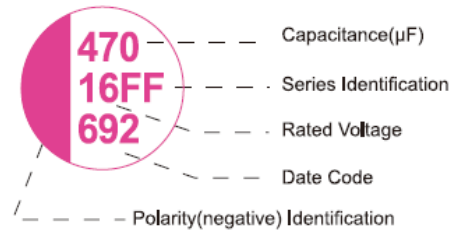
Specifications

Item	Characteristics	
Category Temperature Range	-55 ~ +105°C	
Rated Voltage Range	6.3~63VDC	
Rated Capacitance Range	10~ 2200 μF	
Capacitance Tolerance	± 20 % (120Hz , 20°C)	
Surge Voltage	Rated voltage (V) x 1.15	
Leakage Current (20°C)	I ≤ 0.2CV or 300(μ A) whichever is greater (After rated voltage applied for 2 minutes) I : Leakage Current (μ A) C : Capacitance (μ F) V : Rated Voltage Range (VDC)	
Dissipation Factor (MAX) (tan δ) (120Hz , 20°C)	WV	2.5~63
	tan δ	0.12
Temperature characteristic Impedance ratio (MAX)	Z(100KHz) / WV	2.5 ~ 25V
	Z-25°C / Z+20°C	≤ 1.15
	Z-55°C / Z+20°C	≤ 1.25
Endurance	After applying rated voltage for 2000 hours at 105°C, the capacitor shall meet the following requirement °	
	Appearance	No significant damage
	Capacitance Change	Within ±20% of the initial value
	Dissipation Factor	Not more than 150% of the initial specified value
	Equivalent Series Resistance	Not more than 150% of the initial specified value
Humidity Test	after subjecting 90 to 95% RH for 1000 hours at 60°C , the capacitors shall meet the requirement as Endurance °	
	Surge voltage test	
Surge voltage test	After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the requirement as Endurance	
Failure rate(MAX)	1% per 1,000 hours (confidence level 60% at 105°C)	

Diagram of Dimensions



Marking : case with red printing



SIZE	Φ D x L	P	Φ d	a
E01	6.3x5.4	2.5	0.45	1.0
E06	6.3x6	2.5	0.5	1.5
E08	6.3x8	2.5	0.5 or 0.6	1.0
G08	8x8	3.5	0.6	1.5
G1B	8x11.5	3.5	0.6	1.0
H1A	10x10.5	5.0	0.6	1.0
H1C	10x12.5	5.0	0.6	1.0

Multiplier for Ripple Current

Frequency(HZ)	120 ≤ F < 1K	1K ≤ F < 10K	10K ≤ F < 100K	100K ≤ F ≤ 500K
Coefficient	0.05	0.30	0.70	1.00

■Dimensions, Rated Ripple Current, Equivalent Series Resistance

Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (m Ω , 20°C 100KHz)	Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (m Ω , 20°C 100KHz)
6.3(7.25)	150	6.3x5.4	1810	30	25(28.75)	680	8x15	2500	20
	680	6.3x10.5	2800	28		820	10x13	3500	20
	1000	8x8	3000	10		1000	10x16	3500	20
	1500	8x11.5	4860	8	32(36.8)	22	6.3x8	990	60
		8x11.5	4860	8		47	6.3x8	990	60
		10x10.5	5000	8		100	8x8	1200	50
		10x12.5	5000	7		150	8x8	1500	50
		1800	10x12.5	5000	7	35(40.25)	10	6.3x8	990
2200	10x11.5	5600	7	22	6.3x8		990	60	
	10x12.5	5600	7	33	6.3x6		990	70	
10(11.5)	560	8x8	3000	12	47		6.3x8	990	60
	680	8x8	3000	12	68		6.3x8	990	60
	820	8x11.5	4000	12	100		6.3x10.5	1200	50
	1000	10x12.5	4360	12			8x8	2000	50
16(18.4)	470	8x11.5	4000	12	8x11.5		2300	35	
	560	8x11.5	4000	12	150		8x11.5	2300	35
	820	10x12.5	4000	11	220		8x11.5	2400	35
	1000	10x12.5	4200	11		10x10.5	2400	35	
25(28.75)	22	6.3x5.4	1200	60	270	10x12.5	2500	25	
	47	6.3x5.4	1200	60	330	10x12.5	2500	25	
		6.3x8	1200	35	50(57.5)	33	8x8	1300	48
	68	6.3x6	1200	35		47	8x8	1300	48
		8x8	1500	30		68	8x11.5	1500	45
	100	6.3x8	1500	35			100	10x10.5	2200
		8x8	1500	30		120	10x12.5	2200	40
	120	6.3x8	1500	35			120	10x12.5	2200
		8x8	1500	30	63(72.45)	10	6.3x8	900	80
	150	8x8	1600	28		33	8x8	1100	65
	220	8x8	2280	28		47	8x8	1100	65
	270	8x11.5	2800	28		56	10x12.5	1500	55
	330	8x11.5	2800	25		100	10x12.5	2000	50
		10x10.5	2800	25					
	470	10x12.5	3050	25					
	560	10x12.5	3050	25					

FL

Special for Charger series

New

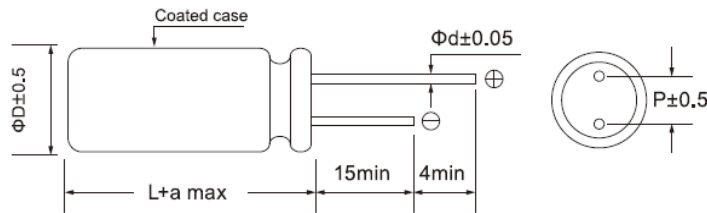
- Endurance: 105°C, 2000hrs
- Recommended Applications: Special charger series
- Corresponding product to RoHS



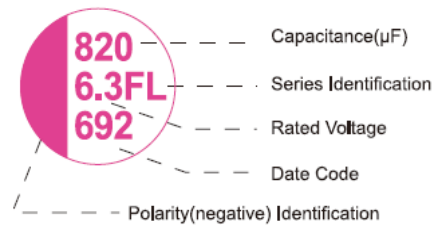
Specifications

Item	Characteristics		
Category Temperature Range	-55 ~ +105°C		
Rated Voltage Range	6.3~16VDC		
Rated Capacitance Range	22~ 2200 μF		
Capacitance Tolerance	± 20 % (120Hz , 20°C)		
Surge Voltage	Rated voltage (V) x 1.15		
Leakage Current (20°C)	I ≤ 0.2CV or 300(μ A) whichever is greater (After rated voltage applied for 2 minutes) I : Leakage Current (μ A) C : Capacitance(μ F) V : Rated Voltage Range(VDC)		
Dissipation Factor (MAX) (tan δ) (120Hz , 20°C)	WV	6.3~10	12~16
	tan δ	0.08	0.12
Temperature characteristic Impedance ratio (MAX)	WV	6.3 ~ 16V	
	Z(100KHz)		
	Z-25°C / Z+20°C	≤ 1.15	
	Z-55°C / Z+20°C	≤ 1.25	
Endurance	After applying rated voltage for 2000 hours at 105°C, the capacitor shall meet the following requirement °		
	Appearance	No significant damage	
	Capacitance Change	Within ±20% of the initial value	
	Dissipation Factor	Not more than 150% of the initial specified value	
	Equivalent Series Resistance	Not more than 150% of the initial specified value	
Humidity Test	after subjecting 90 to 95% RH for 1000 hours at 60°C , the capacitors shall meet the requirement as Endurance °		
	Surge voltage test		
Surge voltage test	After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the requirement as Endurance		
Failure rate(MAX)	1% per 1,000 hours (confidence level 60% at 105°C)		

Diagram of Dimensions



Marking : case with red printing



SIZE	Φ D x L	P	φ d	a
C07	5x7	2.0	0.5	1.5
C09	5x9	2.0	0.5	1.0
D07	5x7	2.5	0.5	1.0
D09	5x9	2.5	0.5	1.0
D11	5x11	2.5	0.5	1.0
E01	6.3x5.4	2.5	0.45	1.0
E06	6.3x6	2.5	0.5	1.5
E07	6.3x7	2.5	0.5	1.5

SIZE	Φ D x L	P	φ d	a
E08	6.3x8	2.5	0.5or0.6	1.0
E09	6.3x9	2.5	0.5	1.0
E11	6.3x11	2.5	0.5	1.0
G08	8x8	3.5	0.6	1.5
G09	8x9	3.5	0.6	1.5
G1B	8x11.5	3.5	0.6	1.0
H1A	10x10.5	5.0	0.6	1.0
H1C	10x12.5	5.0	0.6	1.0

Multiplier for Ripple Current

Frequency(HZ)	120 ≤ F < 1K	1K ≤ F < 10K	10K ≤ F < 100K	100K ≤ F ≤ 500K
Coefficient	0.05	0.30	0.70	1.00

■Dimensions, Rated Ripple Current, Equivalent Series Resistance

Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (m Ω , 20°C 100KHz)	Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (m Ω , 20°C 100KHz)
6.3 (7.25)	47	6.3x5.4	1810	30	7.5 (8.62)	270	5x9	2690	15
	100	6.3x5.4	1810	40		390	5x9	3100	15
	180	6.3x5.4	1810	30		470	5x9	3100	15
	220	5x7	3500	11		500	5x9	3100	12
		6.3x5.4	1810	30		680	6.3x9	3500	12
		6.3x6	3160	15	10 (11.5)	68	6.3x5.4	1810	30
	270	5x7	3500	11		100	5x7	3500	11
	330	5x7	3500	11			6.3x5.4	2320	27
		6.3x5.4	1810	30		150	6.3x5.4	2200	30
		6.3x6	3390	22		180	6.3x8	2820	25
	390	5x9	3500	11		220	6.3x8	2820	25
		6.3x9	3500	8		270	6.3x8	2820	25
	450	5x9	3500	11		330	6.3x8	2820	25
		6.3x6	3390	22			8x8	3500	11
	470	5x9	3190	28		470	6.3x9	2820	25
		6.3x6	3390	22			8x11.5	5600	8
		6.3x8	3800	10			10x10.5	5050	8
		8x8	4200	8			560	8x11.5	5600
	560	6.3x8	4000	10		10x12.5		6100	8
		8x8	4800	12		680	8x11.5	5600	8
	680	6.3x9	3500	8	10x12.5		6100	8	
		820	8x11.5	5600	7	820	8x11.5	5600	8
	6.3x9		3500	8	10x12.5		6100	8	
	8x11.5		5600	7	1200	10x12.5	6100	8	
	10x10.5		5050	8		1500	10x12.5	6100	8
	1000	10x12.5	5600	7	16(18.4)	22	5x7	2200	30
		8x8	4770	14		33	6.3x5.4	2200	30
	1200	8x11.5	5600	7			47	6.3x5.4	2490
8x11.5		5600	7	6.3x5.4		1650		35	
1500	10x10.5	5050	8	68		6.3x6	2610	25	
	8x11.5	5600	7			100	6.3x5.4	1650	35
	10x10.5	5050	8	100			6.3x5.4	2490	24
	10x12.5	5600	7			6.3x8	2820	24	
2200	10x12.5	5600	7	150		6.3x8	2820	25	
	8x8	4770	14			8x8	3150	22	
6.8 (7.82)	180	5x7	2300	20		180	6.3x8	2820	25
	220	5x7	2500	20			8x8	3500	16
	270	5x7	2500	20		270	6.3x9	3100	20
	330	5x9	3100	15			8x8	3800	15
	390	5x9	3100	15			8x11.5	5000	11
	680	6.3x9	3500	11	10x10.5		5050	14	
	820	6.3x9	3500	11					
	1000	6.3x11	4200	10					

FS

Large capacitance & Long Life & High Voltage Series

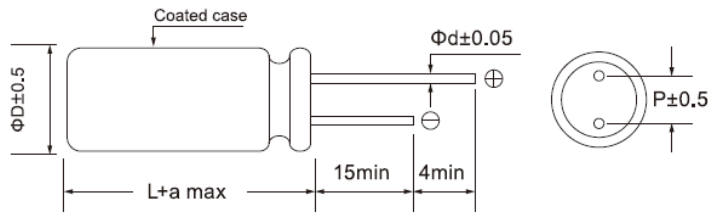
- Endurance: 105°C, 2000/5000hrs
- Recommended Applications: Large capacitance & Long Life & High Voltage Series
- Corresponding product to RoHS



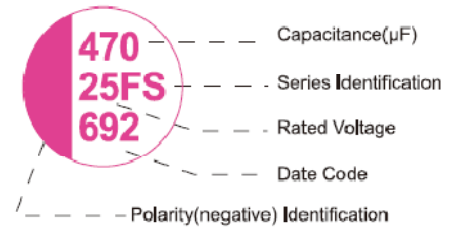
Specifications

Item	Characteristics	
Category Temperature Range	-55 ~ +105°C	
Rated Voltage Range	20~50VDC	
Rated Capacitance Range	39~680 μF	
Capacitance Tolerance	± 20 % (120Hz , 20°C)	
Surge Voltage	Rated voltage (V) x 1.15	
Leakage Current (20°C)	I ≤ 0.2CV or 300(μ A) whichever is greater (After rated voltage applied for 2 minutes) I : Leakage Current (μ A) C : Capacitance (μ F) V : Rated Voltage Range (VDC)	
Dissipation Factor (MAX) (tan δ) (120Hz , 20°C)	WV	20~50
	tan δ	0.12
Temperature characteristic Impedance ratio (MAX)	Z(100KHz) / WV	20 ~ 50V
	Z-25°C / Z+20°C	≤ 1.15
	Z-55°C / Z+20°C	≤ 1.25
Endurance	After applying rated voltage for 2000/5000 hours at 105°C, the capacitor shall meet the following requirement °	
	Appearance	No significant damage
	Capacitance Change	Within ±20% of the initial value
	Dissipation Factor	Not more than 150% of the initial specified value
	Equivalent Series Resistance	Not more than 150% of the initial specified value
Humidity Test	after subjecting 90 to 95% RH for 1000 hours at 60°C , the capacitors shall meet the requirement as Endurance °	
	Surge voltage test	
Surge voltage test	After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the requirement as Endurance	
Failure rate(MAX)	0.5% per 1,000 hours (confidence level 60% at 105°C)	

Diagram of Dimensions



Marking : case with red printing



尺寸代码	ΦD x L	P	Φd	a
G08	8x8	3.5	0.6	1.5
G1B	8x11.5	3.5	0.6	1.0
H1B	10x11.5	5.0	0.6	1.0
H1C	10x12.5	5.0	0.6	1.0

Multiplier for Ripple Current

Frequency(HZ)	120 ≤ F < 1K	1K ≤ F < 10K	10K ≤ F < 100K	100K ≤ F ≤ 500K
Coefficient	0.05	0.30	0.70	1.00

■Dimensions, Rated Ripple Current, Equivalent Series Resistance

Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (m Ω , 20°C 100KHz)
20(23)	390	8x11.5	1760	25
	680	10x11.5	2800	25
25(28.75)	150	8x11.5	1760	25
	220	8x11.5	1760	25
	270	8x11.5	1760	25
	330	10x12.5	2050	25
	390	10x12.5	2050	25
	470	10x12.5	2050	25
35(40.25)	39	8x8	1500	50
	56	8x8	1500	50

Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (m Ω , 20°C 100KHz)
35(40.25)	100	8x8	1500	50
		8x11.5	1760	35
	150	8x11.5	1760	35
	220	8x11.5	1760	35
	270	10x12.5	2050	25
50(57.5)	47	8x11.5	1760	38
	56	8x11.5	1760	38
	82	10x12.5	2050	35
	100	10x12.5	2050	35

FP

8mm height & Low ESR Series

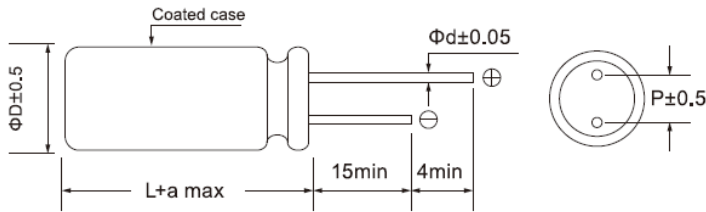
- Endurance:105°C,3000hrs
- Recommended Applications:8mm height & Ultra low ESR Series
- Corresponding product to RoHS



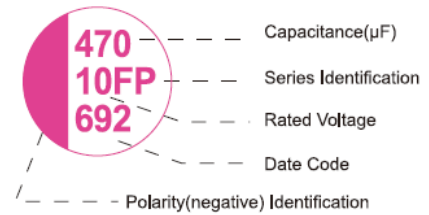
Dimensions, Rated Ripple Current, Equivalent Series Resistance

Item	Characteristics		
Category Temperature Range	-55 ~ +105°C		
Rated Voltage Range	2.5~25VDC		
Rated Capacitance Range	10~ 1200 μF		
Capacitance Tolerance	± 20 % (120Hz , 20°C)		
Surge Voltage	Rated voltage (V) x 1.15		
Leakage Current (20°C)	I ≤ 0.2CV or 300(μ A) whichever is greater (After rated voltage applied for 2 minutes) I : Leakage Current (μ A) C : Capacitance(μ F) V : Rated Voltage Range(VDC)		
Dissipation Factor (MAX) (tan δ) (120Hz ,20°C)	WV	2.5~10	16~25
	tan δ	0.08	0.12
Temperature characteristic Impedance ratio (MAX)	Z(100KHz) / WV	2.5 ~ 25V	
	Z-25°C / Z+20°C	≤ 1.15	
	Z-55°C / Z+20°C	≤ 1.25	
Endurance	After applying rated voltage for 2000 hours at 105°C , the capacitor shall meet the following requirement °		
	Appearance	No significant damage	
	Capacitance Change	Within ±20% of the initial value	
	Dissipation Factor	Not more than 150% of the initial specified value	
	Equivalent Series Resistance	Not more than 150% of the initial specified value	
Humidity Test	after subjecting 90 to 95% RH for 1000 hours at 60°C , the capacitors shall meet the requirement as Endurance °		
	Surge voltage test After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds,the capacitors shall meet the requirement as Endurance		
Failure rate(MAX)	1%per 1,000 hours(confidence level 60% at 105°C)		

Diagram of Dimensions



Marking : case with red printing



SIZE	Φ D x L	P	φ d	a
E08	6.3x8	2.5	0.6	1.0
G08	8x8	3.5	0.6	1.5

Multiplier for Ripple Current

Frequency(HZ)	120 ≤ F < 1K	1K ≤ F < 10K	10K ≤ F < 100K	100K ≤ F ≤ 500K
Coefficient	0.05	0.30	0.70	1.00

FP

8mm height & Low ESR Series

■Dimensions, Rated Ripple Current, Equivalent Series Resistance

Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ D x L(mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (m Ω , 20°C 100KHz)	Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ D x L(mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (m Ω , 20°C 100KHz)
2.5 (2.88)	560	6.3x8	4200	8	10 (11.5)	470	8x8	3500	11
		8x8	5600	8		560	8x8	5000	10
	820	6.3x8	4200	8	16(18.4)	100	6.3x8	2820	25
		8x8	5600	8		150	6.3x8	2820	25
		1200	8x8	5600		8	220	6.3x8	2820
	6.3x8		4200	8		270	8x8	3500	11
6.3 (7.25)	470	8x8	5600	8		330	8x8	3500	11
		6.3x8	4200	8		470	8x8	4200	11
	560	8x8	5600	8	560	8x8	4200	11	
		8x8	5600	8	25 (28.75)	10	6.3x8	1200	80
820	6.3x8	2820	25	22		6.3x8	1650	35	
	220	8x8	3500	11		33	6.3x8	1650	35
10 (11.5)		270	6.3x8	2820		25	56	8x8	1980
	6.3x8		2820	25		68	8x8	1980	35
	330	6.3x8	2820	25					
		8x8	3500	11					

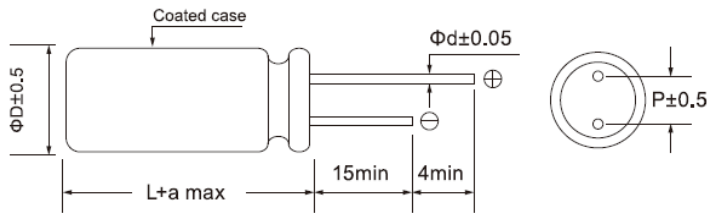
- Endurance: 105°C, 5000hrs
- Recommended Applications: Long life & Ultra low ESR Series
- Corresponding product to RoHS



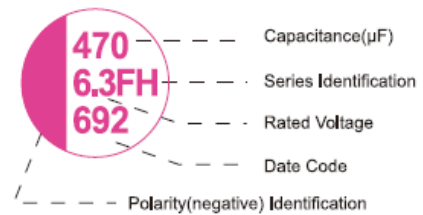
Specifications

Item	Characteristics	
Category Temperature Range	-55 ~ +105°C	
Rated Voltage Range	2.5~16VDC	
Rated Capacitance Range	100~ 1800 μ F	
Capacitance Tolerance	\pm 20 % (120Hz , 20°C)	
Surge Voltage	Rated voltage (V) x 1.15	
Leakage Current (20°C)	I \leq 0.2CV or 300(μ A) whichever is greater (After rated voltage applied for 2 minutes) I : Leakage Current (μ A) C : Capacitance(μ F) V : Rated Voltage Range(VDC)	
Dissipation Factor (MAX) (tan δ) (120Hz , 20°C)	WV	2.5~16
	tan δ	0.12
Temperature characteristic Impedance ratio (MAX)	Z(100KHz) / WV	2.5 ~ 16V
	Z-25°C / Z+20°C	\leq 1.15
	Z-55°C / Z+20°C	\leq 1.25
Endurance	After applying rated voltage for 2000 hours at 105°C , the capacitor shall meet the following requirement °	
	Appearance	No significant damage
	Capacitance Change	Within \pm 20% of the initial value
	Dissipation Factor	Not more than 150% of the initial specified value
	Equivalent Series Resistance	Not more than 150% of the initial specified value
Humidity Test	after subjecting 90 to 95% RH for 1000 hours at 60°C , the capacitors shall meet the requirement as Endurance °	
	Surge voltage test	
Surge voltage test	After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds, the capacitors shall meet the requirement as Endurance	
Failure rate(MAX)	1%per 1,000 hours(confidence level 60% at 105°C)	

Diagram of Dimensions



Marking : case with red printing



SIZE	Φ D x L	P	Φ d	a
E01	6.3x5.4	2.5	0.45	1.0
E08	6.3x8	2.5	0.5or0.6	1.0
G08	8x8	3.5	0.6	1.5
G1B	8x11.5	3.5	0.6	1.0
H1C	10x12.5	5.0	0.6	1.0
G15	8Xx15	3.5	0.6	1.5

Multiplier for Ripple Current

Frequency(HZ)	120 \leq F < 1K	1K \leq F < 10K	10K \leq F < 100K	100K \leq F \leq 500K
Coefficient	0.05	0.30	0.70	1.00

■Dimensions, Rated Ripple Current, Equivalent Series Resistance

Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (m Ω , 20°C 100KHz)
2.5(2.87)	330	6.3x8	3500	8
	560	6.3x5.4	3000	16
		6.3x8	3500	7
		6.3x8	3500	7
	820	8x8	5000	7
4(4.6)	560	6.3x8	3500	8
		8x8	6100	8
	680	8x11.5	6100	7
	1500	10x12.5	6100	7
6.3(7.25)	220	6.3x5.4	1700	45
	330	6.3x8	3500	10
		6.3x8	3500	10
	470	8x8	3500	10
		6.3x8	3500	10
	560	6.3x8	3500	10
	820	8x11.5	3500	8
	1200	8x11.5	3500	8
1500	10x12.5	4500	8	
1800	10x12.5	5000	8	
10(11.5)	220	6.3x8	2500	15
	270	6.3x8	2800	15

Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE (mA/rms, 105°C 100KHz)	ESR (m Ω , 20°C 100KHz)
10(11.5)	330	8x11.5	3500	10
	560	8x11.5	5000	10
	680	8x11.5	5000	10
16(18.4)	100	6.3x5.4	2490	24
		6.3x8	2490	30
	180	6.3x8	2490	25
		8x11.5	3000	15
	220	6.3x8	2500	24
			3500	15
		8x8	3500	15
	270	8x11.5	3500	15
			3500	15
		8x8	3500	15
	330	8x8	3500	15
		8x11.5	3500	15
	470	8x11.5	3500	15
		10x12.5	4200	15
	560	8x11.5	3500	12
10x12.5		6100	10	
680	8x15	3500	11	
	10x12.5	4000	11	
820	10x12.5	4000	11	
1000	10x12.5	4000	11	

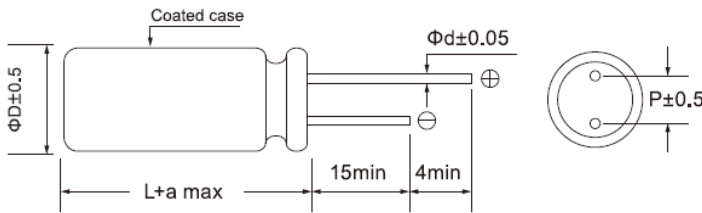
- Endurance:125°C,2000hrs
- Recommended Applications: High temperature resistant products
- Corresponding product to RoHS



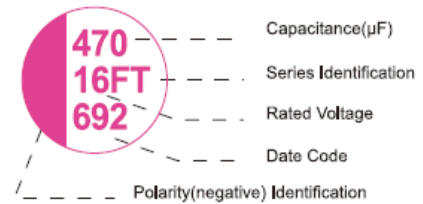
Specifications

Item	Characteristics	
Category Temperature Range	-55 ~ +125°C	
Rated Voltage Range	6.3~25VDC	
Rated Capacitance Range	10~ 1000 μ F	
Capacitance Tolerance	\pm 20 % (120Hz , 20°C)	
Surge Voltage	Rated voltage (V) x 1.15	
Leakage Current (20°C)	I \leq 0.2CV or 300(μ A) whichever is greater (After rated voltage applied for 2 minutes) I : Leakage Current (μ A) C : Capacitance(μ F) V : Rated Voltage Range(VDC)	
Dissipation Factor (MAX) (tan δ) (120Hz ,20°C)	WV	6.3~25
	tan δ	0.12
Temperature characteristic Impedance ratio (MAX)	Z(100KHz) / WV	6.3 ~ 25V
	Z-25°C / Z+20°C	\leq 1.15
	Z-55°C / Z+20°C	\leq 1.25
Endurance	After applying rated voltage for 2000 hours at 105°C, the capacitor shall meet the following requirement °	
	Appearance	No significant damage
	Capacitance Change	Within \pm 20% of the initial value
	Dissipation Factor	Not more than 150% of the initial specified value
	Equivalent Series Resistance	Not more than 150% of the initial specified value
Humidity Test	after subjecting 90 to 95% RH for 1000 hours at 60°C , the capacitors shall meet the requirement as Endurance °	
	Surge voltage test	
Surge voltage test	After subjecting to 1000 cycles each consisting of charge with the surge voltage specified at normal temperature for 30 seconds through a protective resistor and discharge for 5 minutes 30 seconds,the capacitors shall meet the requirement as Endurance	
Failure rate(MAX)	1%per 1,000 hours(confidence level 60% at 105°C)	

Diagram of Dimensions



Marking : case with red printing



SIZE	Φ D x L	P	Φ d	a
E08	6.3x8	2.5	0.5or0.6	1.0
G08	8x8	3.5	0.6	1.5
G1B	8x11.5	3.5	0.6	1.0
G15	8x15	3.5	0.6	1.5
H1C	10x12.5	5.0	0.6	1.0

Multiplier for Ripple Current

Frequency(HZ)	120 \leq F < 1K	1K \leq F < 10K	10K \leq F < 100K	100K \leq F \leq 500K
Coefficient	0.05	0.30	0.70	1.00

■Dimensions,Rated Ripple Current,Equivalent Series Resistance

Rated (Surge) Voltage(V)	Capacitance (μ F)	SIZE Φ DxL(mm)	RIPPLE(mA/rms,100KHz)		ESR (m Ω ,20°C 100KHz)	LC (μ A max/2min)
			Tx : 125°C	Tx : 105°C		
6.3 (7.2)	180	6.3x6	537	1700	45	300
	220	6.3x6	537	1700	45	300
	270	6.3x6	810	2560	45	340
	330	6.3x6	810	2560	45	415
	470	6.3x8	810	2560	35	592
		8x8	810	2560	15	592
		8x8	1332	4210	15	705
	680	8x8	1721	5440	15	856
	820	8x8	1721	5440	15	1033
1000	8x11.5	1721	5440	15	1260	
10 (11.5)	180	6.3x8	537	1700	45	360
	220	8x8	810	2560	35	440
	270	8x8	810	2560	35	540
	330	6.3x8	537	1700	45	660
		8x8	810	2560	35	660
	470	8x8	810	2560	35	940
	680	8x11.5	1332	4210	15	1360
16 (18.4)	82	6.3x8	512	1620	50	300
	100	6.3x8	512	1620	50	320
	120	6.3x8	670	2120	50	384
	150	6.3x8	670	2120	50	480
	180	8x8	1151	3640	20	576
	220	8x8	1151	3640	20	704
	270	8x11.5	1493	4720	20	864
		8x11.5	1151	3640	20	1056
		10x12.5	1493	4720	16	1056
470	10x12.5	1493	4720	16	1504	
20(23)	47	6.3x8	458	1450	60	300
	56	6.3x8	598	1890	60	300
	68	6.3x8	598	1890	60	300
	82	6.3x8	1050	3320	60	328
	100	8x11.5	1050	3320	24	400
	120	8x11.5	1367	4320	24	480
	150	8x11.5	1367	4320	24	600
25(28.75)	10	6.3x8	458	1450	60	300
	22	6.3x8	458	1450	60	300
	33	6.3x8	458	1450	60	300
	47	6.3x8	598	1890	60	300
	56	6.3x8	598	1890	60	300
	68	6.3x8	1050	3320	60	340
	82	6.3x8	1050	3320	60	410
		8x11.5	1050	3320	24	500
		10x12.5	1367	4320	20	500
	150	8x11.5	1367	4320	24	750
	220	8x11.5	1050	3320	24	1100
	270	8x15	1367	4320	20	1350
	330	10x12.5	1367	4320	20	1650

Precautions in Using(Non-Solid Aluminum Electrolytic Capacitor)

I .Device circuits design considerations

1. Confirm installation and operating requirements for capacitors, then use them within the performance limits prescribed in this catalog or product specifications.

2. Polarity

Aluminum electrolytic capacitors are polariz

Never apply a reverse voltage or AC voltage. Connecting with wrong polarity will short-circuit or damage the capacitor with the pressure relief vent opening early on. To identify the polarity of a capacitor, see the relevant diagram in the catalogs or product specifications, or the polarity marking on the body of the capacitor. Incidentally, the rubber end seal bungs of the radial lead type capacitors have a solder-flux gas escaping configuration, which is nothing to do with the polarity of the capacitors. For circuits where the polarity is occasionally reversed, use a bi-polar type of aluminum electrolytic capacitor. However, note that even bi-polar type capacitors must not be used for AC circuits.

3. Operating voltage

Do not apply an over-voltage that exceeds a rated voltage specified for the capacitors. The total peak value of the ripple voltage plus the DC voltage must not exceed the rated voltage of the capacitors. Although capacitors specify a surge voltage that exceeds the full rated voltage, it does not assure long-term use but limited use under specific conditions.

4. Ripple current

Do not apply an overcurrent that exceeds the rated ripple current specified for the capacitors. Excessive ripple current will increase heat production within the capacitors, causing the capacitors to be damaged as follows:

- Shorten lifetime
- Open pressure relief vent
- Short circuit

The rated ripple current is specified along with a specific ripple frequency. Where using the capacitors at any other ripple frequency other specified frequency, calculate the allowable ripple current by multiplying the rated ripple current by a frequency compensation factor(Frequency Multiplier) specified for each product series.

5. Operating temperature (Category temperature)

Do not apply high temperatures that exceed the upper limit of the category temperature range specified for the capacitors. Using the capacitor at temperatures higher than the upper limit will considerably shorten the lifetime of the capacitor and make the pressure relief vent open.

In other words, lowering ambient temperatures will extend the expected lifetime of the capacitors.

6) Lifetime

Select the capacitors to meet the service life requirements of a device

7) Charging and discharging

Do not use capacitors in circuits intended for rapid charge and discharge cycle operations.

If capacitors are used in the circuits that repeat a charge and discharge with a large voltage drop or a rapid charge and discharge at a short interval cycle, capacitance will decrease and/or the capacitors will be damaged by internal heat generation.

Consult us for a heavy charge and discharge type of capacitor so that the capacitor will be designed in accordance with requirements of duty

cycle of charge and discharge, the number of cycles, discharging resistance and operating temperatures.

8. Failure mode of capacitors

Non-solid aluminum electrolytic capacitors have a limited lifetime which ends in an open circuit failure mode, in general. Depending on the product type and operating conditions, the failure mode may involve in opening of the pressure relief vent.

9. Capacitor insulation

Electrically isolate the following sections of a capacitor from the negative terminal, the positive terminal and the circuit patterns.

- The outer can case of a non-solid aluminum capacitor.
- The dummy terminal of a snap-in type non-solid aluminum capacitor, which is designed for mounting stability.

10. Outer sleeve

The outer sleeve of a capacitor does not assure electrical insulation (except for screw-terminal type capacitors). It should not be used where electrical insulation is required.

11. Operating conditions

Do not use/expose capacitors to the following conditions:

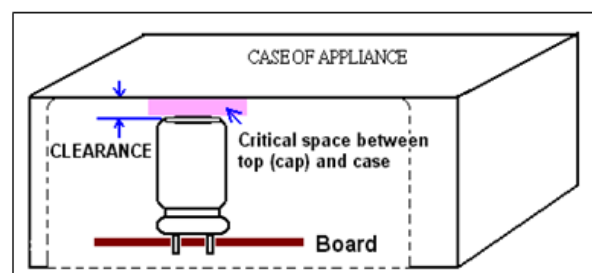
- ① Direct contact with water, salt water or oil, or high condensation environment.
- ② Direct sunlight.
- ③ Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and its compounds, bromine and its compounds and ammonium.
- ④ Ozone, ultraviolet rays or radiation.
- ⑤ Extreme vibration or mechanical shock that exceeds limits in the catalogs or product specifications.

The standard vibration condition is applicable to JIS C 5101-4.

12. Mounting

① Non-solid aluminum electrolytic capacitors contain paper separators and electric-conductive electrolyte that contains organic solvent as main solvent material, both of which are flammable. If the electrolyte leaks onto a printed circuit board, it can erode the device circuit pattern, may short-circuit the copper traces, smoke and burn. Make sure of designing a PC board as follows:

- Provide the appropriate hole spacing on the PC board to match the terminal spacing of a capacitor.
- Provide the following adequate clearance space over the pressure relief vent of a capacitor to avoid blocking the correct opening of the pressure relief vent.



Case diameter	Clearance
Φ6.3 to Φ16 mm	≥ 2 mm
Φ18 to Φ 35 mm	≥ 3 mm
Φ40 mm & 以上	≥ 5 mm

- Do not locate any wire or circuit pattern over the pressure relief vent of a capacitor.
- If a capacitor is mounted with its pressure relief vent facing down on the PC board, provide a ventilation hole in the board beneath it to let gas escape when the vent opens.
- Do not print any copper trace under the seal (terminal) side of a capacitor. Copper traces should be 1 mm (preferably 2mm or more) spaced apart from the side of the capacitor body.
- Avoid locating any heat source components near capacitors or on the opposite side of the PC board under capacitors.
- In designing a double-sided PC board, do not locate any through-hole via or unnecessary hole underneath a capacitor.
- In designing a double-sided PC board, do not print any circuit pattern underneath a capacitor.

② For a screw terminal type capacitor, tightening the terminal screw 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 terminals 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.

③ For a chip type capacitor, design the land patterns of the PC board accordance with the recommended footprint dimensions described in the catalogs or product specifications

13. Using capacitors for significantly safety-oriented applications

Consult us about capacitors for a device application affecting human safety (①Aviation and aerospace ②Nuclear ③Medical ④ or for any device whose failure will make an impact on society. Note that some products such as photoflash use capacitors which have been designed for specific applications cannot be used for any other application

14. Others

Design device circuits taking into consideration the following conditions

- ① Electrical characteristics of a capacitor depend on the temperature and frequency. In designing the device circuits, consider the change in the characteristics.
- ② If using more than one capacitor connected in parallel, design the device circuits to balance the current flow in individual capacitors.
- ③ If using more than one capacitor connected in series, connect shunting resistors in parallel with the individual capacitors to balance the voltage.

II. Installation

1. Assembling

- ① Do not try to reuse the capacitors once assembled and electrified, except only capacitors that are taken from a device for periodic inspection to measure their electrical characteristics.
- ② Capacitors may have been spontaneously recharged with time recovery phenomenon. In this case, through a resistor of approximately 1kΩ before use.
- ③ If non-solid aluminum electrolytic capacitors have been stored at any conditions more than 35°C and 75%RH for long storage periods. If time more limits specified in catalogs or product specifications, they may current. In this case, make pre-conditioning by applying the rated voltage through a resistor of approximately 1kΩ.
- ④ Confirm the rated capacitance and voltage of capacitors before installation.
- ⑤ Confirm the polarity of capacitors before installation.

⑥ Do not try to use the capacitors that were dropped to the floor and so forth.

⑦ Do not deform the can case of a capacitor.

⑧ Make sure that the terminal spacing of a capacitor equals the holes spacing on the PC board before installing the capacitor. For radial lead type capacitors, some standard pre-formed lead types are also available.

⑨ When installing a snap-in type capacitor on the PC board insert the terminals into the holes and press the capacitor down until the body is settled flush on the surface of the PC board (without the body standing off).

⑩ Do not apply excessive mechanical force to capacitors more than the limits prescribed in the catalogs or product specifications. Avoid excessive mechanical force while the capacitors are in the process of vacuum-picking, placing and positioning by automatic mounting machines or cutting the lead wires by automatic insertion machines.

2. Soldering and heat resistance

① For soldering using a soldering iron, consider the following conditions:

• Soldering conditions (temperature and time) should be within the limits prescribed in the catalogs or product specifications.

• If it is necessary to pre-form the terminal spacing of a capacitor to match the hole spacing on the PC board before assembly and soldering, do not make mechanical stress reach into the body of the capacitor but only the lead wires.

• Do not touch the body of a capacitor with the hot tip of the soldering iron.

② For flow soldering, consider the following conditions:

• Do not dip the body of a capacitor into a solder bath. Expose only the terminals to the melt solder with the PC board interposing between the solder and the body of the capacitor. Solder only the reverse side of the PC board where the body of the capacitor is not located.

• Soldering conditions should be within the limits prescribed in the catalogs or product specifications.

• Do not apply flux to any part of a capacitor other than the terminals.

• Do not let any other component lean against nor come into contact with the capacitor while soldering.

③ For reflow soldering, consider the following conditions:

• Soldering conditions (preheat, reflow temperature and time) should be within the limits prescribed in the catalogs or product specifications.

• When using the infrared heater and setting its temperatures, adjust the heating levels taking into consideration that the color and materials of a capacitor vary in their infrared absorbance.

• The allowable number of reflow passes is specified in the catalogs or product specifications.

• When mounting a capacitor on the double-sided PC board, do not place any wiring pattern underneath the capacitor.

• Please consult us about vapor phase soldering (VPS).

④ Do not try to reuse the capacitor that was removed from the PC board after soldering.

⑤ Only use chip type capacitors for reflow soldering. The other type capacitors are not designed for the reflow.

3. Handling after soldering

After soldering the PC board, do not apply the following mechanical stress to the capacitor:

- ① Do not tilt, push down or twist the body of the capacitor.
- ② Do not grab the body of the capacitor to carry the assembly
- ③ Do not hit anything against the capacitor. When stacking the assembled boards, do not put any of the PC boards or other components against the capacitor.
- ④ Do not drop the assembled board.

4. Cleaning assembly boards

- ① Do not clean capacitors with the following cleaning agents:
 - Halogenated solvents: cause capacitor failures due to corrosion.
 - Alkali system solvents: corrode (dissolve) the aluminum can case.
 - Terpene and petroleum system solvents: deteriorate the rubber seal materials.

- Xylene: deteriorates the rubber seal materials as well.
- Acetone: erases the markings printed on a capacitor.

Where cleaning is necessary, use only solvent resistant type that have been assured for the cleaning within the specific conditions prescriber in the catalogs or product specifications.

In particular, carefully set up the conditions for ultrasonic cleaning system.

- ② Where cleaning the solvent resistance type of aluminum electrolytic capacitors, confirm the following conditions:

- Control the contamination (the conductivity, pH, specific gravity, water content, etc.) of the cleaning agents.

- After the cleaning, do not leave the capacitors (assembly boards) an environment of cleaning agent-rich or in a closed container. Sufficiently evaporate the residual cleaning agent from the boards and the capacitors by forced hot air at temperatures less than the upper limit of category temperature range for more than 10

In general, aluminum electrolytic capacitors are sensitive to contamination of halogen ions (particularly to chlorine on the properties of the electrolyte and rubber seal materials used capacitor, the halogen ions lead up to catastrophic failures on the capacitor. Where the inside of a capacitor has been contaminated with more than a certain amount of halogen ions and the capacitor use, the corrosion reaction of aluminum occurs. The corrosion the capacitor to have a significant increase in leakage current with heat produced, open the pressure relief vent and become open. Due to global environmental issues (greenhouse effects and other environmental destruction by depletion of the ozone layer), the conventional cleaning solvents of CFC113, Trichloroethylene and 1,1,1-trichloroethylene were replaced by substitutes.

The following are some substitute cleaning agents and allowable cleaning conditions:

- a) Fatty-alcohol cleaning agents

Pine Alpha ST-100S (Arakawa Chemical)

Clean Through 750H, 750K, 750L and 710M (Kao)

Technocare FRW-14, 15, 16 and 17 (Momentive Performance Materials)

[Cleaning conditions]

Either of immersion or ultrasonic cleaning, for a maximum of 10 and at a maximum liquid temperature of 60°C is acceptable. Make that the markings on the capacitor are not rubbed against any other component or the PC board during cleaning. Note that shower cleaning affects the markings on the capacitor.

- b) HCFC (Freon 225) as Alternative CFCs

AK225AES (Asahi Glass)

[Cleaning conditions]

Solvent resistant type capacitors, which were originally developed to intend to resist Freon TE or Freon TES, are also capable of withstanding any one of immersion, ultrasonic or vapor cleaning, for a maximum of 5 minutes (or 2 minutes for KRE and KRE-BP series capacitors or 3 minutes for SRM series). However, this type of cleaning agent is not recommended to use, as the cleaning materials may be banned in near future in view of global environmental issues.

- c) IPA (Isopropyl Alcohol)

Immersion cleaning with a maximum flux concentration of 2 wt% is acceptable.

5. Adhesives and coating materials

- ① Do not use any adhesive or coating materials containing halogenated solvents.
- ② Make sure of the following conditions before applying adhesive or coating materials to a capacitor,
 - No flux residue nor stain is left between the rubber seal of a capacitor and PC board.
 - Dry the capacitor to remove residual cleaning agents before applying adhesive and coating materials. Do not cover up the entire surface of the rubber seal of the capacitor with adhesives or coating materials.
 - Heating and curing conditions for adhesives and coating materials should be followed as prescribed in the catalogs or product specifications.
 - Covering up the entire surface of the rubber seal with resin mold materials will obstruct the normal diffusion of internal hydrogen gas from a capacitor and result in serious failures. Also, where the adhesive and coating materials contain a large amount of halogen ions, the halogen ions will contaminate the inside of the capacitor through the rubber seal materials, causing the capacitor to become a failure.
 - Depending on solvent materials that the adhesive or coating materials contains, note that the outer sleeve of a capacitor may lose a gloss or whiten in appearance.

6. Fumigation

In exporting or importing electronic devices, they may be exposed to fumigation with halide such as methyl bromide. Where aluminum electrolytic capacitors are exposed to halide such as methyl bromide, the capacitors will be damaged with the corrosion reaction with halogen ions in the same way as cleaning agents. For the export and import, Nippon Chemi-Con considers using some packaging method and so forth so that fumigation is not required. For customers to export or import electronic devices, semi-assembly products or capacitor components, confirm if they will be exposed to fumigation and also consider final condition of packaging. (Note that either cardboard or vinyl package has a risk of fumigation gas penetration.)

III. Precautions during operation of devices

1. Never touch the terminals of a capacitor directly with bare hands.
2. Do not short-circuit between the capacitor terminals with anything conductive. Also, do not spill any conductive liquid such as acid or alkaline solution over a capacitor.

- 3 . Confirm environmental conditions where the device will be placed. Do not use the device in the following environmental
- ① Water or oil spatters, or high condensation environment
 - ② Direct sunlight.
 - ③ Ozone, ultraviolet rays or radiation.
 - ④ Toxic gases such as hydrogen sulfide, sulfuric acid, nitrous acid, chlorine and its compounds, bromine and its compounds and
 - ⑤ Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalog or product specification.
- The standard vibration condition is applicable to JIS C 5101-4.

IV.Maintenance inspections

- 1 . For industrial use capacitors, make periodic inspections the
Before the inspections, turn off the power supply of the device and discharge the electricity of the capacitors. When checking it by a ohm meter, confirm the polarity beforehand. Do not apply stress to the terminals of the capacitors during inspection.
- 2 . Characteristics to be inspected
 - ① Significant damage in appearance: vent opening, electro-lyte etc.
 - ② Electrical characteristics: leakage current, capacitance, $\tan\delta$ and other characteristics prescribed in the catalogs or productIf finding anything abnormal on the characteristics above, check the specifications of the capacitor and take appropriate actions such as replacement.

V.Capacitor venting

- 1 . A capacitor with more than a certain case size has the pressure relief vent functioning to escape abnormal gas pressure increase.
If gas expels from a venting capacitor, disconnect the power supply of the device or unplug the power supply cord. If not disconnecting the power supply, the device circuit may be damaged due to the short circuit failure of the capacitor or short-circuited with the liquid that the gas was condensed to. It may cause secondary damages such as device burnout in the worst case scenario.
The gas that comes out of the open vent is vaporized electro-lyte, smoke.

- 2 . The gas expelled from a venting capacitor is more than 100°C. Never expose your face to the capacitor. If your eyes are exposed to the gas or you inhale it, immediately flush your eyes and/or gargle with water. If the electrolyte comes in contact with the skin, wash with soap and water.

VI.Storage

- 1 . Do not store capacitors at high temperature or high humidity. Store the capacitors indoors at temperatures of 5 to 35°C and humidities of less than 75%RH.
In principle, aluminum electrolytic capacitors should be used within three years after production.
- 2 . Keep capacitors packed in the original packaging material wherever possible.
- 3 . Avoid the following storage environmental conditions:
 - ① Water spattering, high temperatures, high humidity or condensation environment.
 - ② Oil spattering or oil mist filled.
 - ③ Salt water spattering or salt filled.
 - ④ Acidic toxic gases such as hydrogen sulfide, sulfuric acid, nitrous acid, chlorine, bromine and methyl bromide filled.
 - ⑤ Alkaline toxic gases such as ammonium filled.
 - ⑥ Acid or alkaline solutions spattering.
 - ⑦ Direct sunlight, ozone, ultraviolet rays or radiation.
 - ⑧ Extreme vibration or shock loading.
- 4 . JEDEC J-STD-020 is not applicable.

VII.Capacitor disposal

Please consult with a local organization for the proper disposal of industrial waste. For incinerating capacitors, apply a high-temperature incineration (over 800°C). Incinerating them at temperatures lower than that may produce toxic gases such as chlorine. To prevent capacitors from explosion, punch holes in or sufficiently crush the can cases of the capacitors, then incinerate.

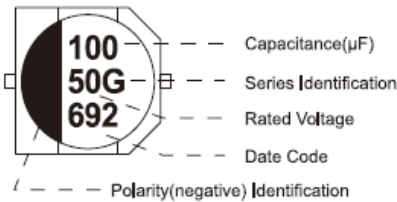


- Endurance: 85°C, 2000 hours
- Recommended Applications: Suitable for AV(TV, Video, Audio), Monitor/Computer, Home appliance, OA/HA/Communication
- Corresponding product to RoHS

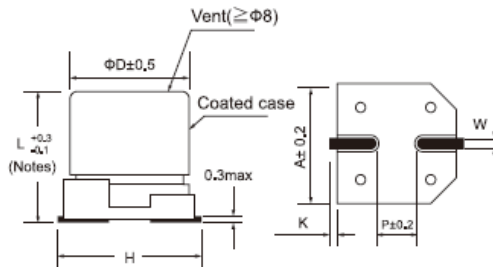
Specifications

Item	Characteristics																														
Category Temperature Range	-55 ~ +85°C																														
Rated Voltage Range	4 ~ 100VDC																														
Rated Capacitance Range	1 ~ 1500 μF																														
Capacitance Tolerance	± 20 % at 120Hz, 20°C																														
Leakage Current (20°C)	$I \leq 0.01CV$ or $3 \mu A$, whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)																														
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	Shown in the table of standard rating																														
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WV Z(120HZ)	4		6.3	10	16	25	35	50	63	100																					
	Z(-25°C) / Z(20°C)		7	4	3	2	2	2	2	2	2																				
	Z(-40°C) / Z(20°C)	15	8	6	4	4	3	3	3	3																					
Endurance	<p>After applying rated voltage for 2000hrs at 85°C, Stay back to 20 °C temperature measurement, the capacitors shall meet the following requirements.</p> <table border="1"> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±20% of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than 200% of the specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> </tbody> </table>	Capacitance Change	Within ±20% of the initial value	Dissipation Factor	Not more than 200% of the specified value	Leakage Current	Not more than the specified value																								
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Leakage Current	Not more than the specified value																														
Shelf Life	After placed at 85°C without voltage applied for 1000 hours, Stay back to 20 °C temperature measurement, the capacitor shall meet the same requirement as Endurance.																														

MARKING



Dimensions [mm]



(Notes) Φ8 ~ Φ10 & 6.3X7.7=L±0.3

Dimensions	ΦD	L	A	H	W	P	K
B01	4.0	5.4	4.3	5.5 Max	0.65±0.1	1.0	0.35+0.15/-0.2
C01	5.0	5.4	5.3	6.5 Max	0.65±0.1	1.5	0.35+0.15/-0.2
E01	6.3	5.4	6.6	7.8 Max	0.65±0.1	1.8	0.35+0.15/-0.2
E04	6.3	7.7	6.6	7.8 Max	0.65±0.1	1.8	0.35+0.15/-0.2
G02	8.0	6.2	8.3	9.5 Max	0.65±0.1	2.2	0.35+0.15/-0.2
G03	8.0	10.2	8.3	10.0 Max	0.90±0.2	3.1	0.70±0.20
H03	10.0	10.2	10.3	12.0 Max	0.90±0.2	4.6	0.70±0.20

Multiplier for Ripple Current

Frequency (Hz)	60	120	1K	10K
Coefficient	0.80	1.00	1.15	1.25

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size ΦDxL(mm)	tan δ	Ripple current (mA/rms 85°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size ΦDxL(mm)	tan δ	Ripple current (mA/rms 85°C) (120Hz)	
4(5)	33	4x5.4	0.35	26	25(32)	10	4x5.4	0.20	24	
	47	4x5.4	0.35	34			5x5.4	0.14	28	
	100	5x5.4	0.35	61			6.3x5.4	0.14	28	
	220	6.3x5.4	0.35	82		22	5x5.4	0.20	35	
	330	6.3x5.4	0.35	80			6.3x5.4	0.14	55	
	470	6.3x7.7	0.35	200		33	5x5.4	0.20	42	
6.3(8)	22	4x5.4	0.26	20			6.3x5.4	0.14	65	
	33	4x5.4	0.26	22		47	6.3x5.4	0.20	70	
		4x5.4	0.26	36			6.3x7.7	0.16	96	
	100	5x5.4	0.26	46			8x6.2	0.16	63	
		5x5.4	0.26	47		100	6.3x5.4	0.20	80	
		6.3x5.4	0.26	71			6.3x7.7	0.16	143	
	6.3x7.7	0.26	143	8x6.2			0.16	143		
	220	6.3x5.4	0.35	74		8x10.2	0.16	180		
		6.3x7.7	0.35	235		180	8x10.2	0.16	210	
	330	6.3x7.7	0.35	280			220	8x10.2	0.16	230
		8x6.2	0.35	280		10x10.2		0.16	310	
	470	8x6.2	0.35	312		330	8x10.2	0.16	270	
		8x10.2	0.35	380			10x10.2	0.16	340	
	1000	8x10.2	0.35	500		470	10x10.2	0.16	380	
		10x10.2	0.35	700			35(44)	2.2	4x5.4	0.12
1500		10x10.2	0.35	750		3.3		4x5.4	0.12	10
10(13)	10	4x5.4	0.30	20		5x5.4		0.12	11	
	22	4x5.4	0.30	28		4.7		4x5.4	0.12	22
		5x5.4	0.30	40	4x5.4			0.16	24	
	33	4x5.4	0.30	29	10	5x5.4		0.12	30	
		5x5.4	0.20	43		22		5x5.4	0.16	36
	47	5x5.4	0.30	43	6.3x5.4			0.12	60	
		6.3x5.4	0.30	66	33	6.3x5.4		0.16	60	
	100	5x5.4	0.30	43		6.3x7.7		0.14	130	
		6.3x5.4	0.26	70	47	6.3x5.4		0.16	70	
	150	6.3x5.4	0.26	86		6.3x7.7		0.14	165	
		220	6.3x5.4	0.26	110	8x6.2		0.14	165	
	6.3x7.7		0.26	250	100	6.3x7.7		0.14	140	
	8x6.2	0.26	250	8x10.2		0.14		180		
	330	8x10.2	0.26	330	10x10.2	0.14	210			
		8x10.2	0.26	390	220	8x10.2	0.14	200		
	470	10x10.2	0.26	400		10x10.2	0.14	310		
		680	8x10.2	0.26	420	150	8x10.2	0.14	180	
	1000	10x10.2	0.26	580	330		10x10.2	0.14	350	
16(20)	1	4x5.4	0.16	10	50(63)	1	4x5.4	0.12	10	
	4.7	4x5.4	0.16	20		2.2	4x5.4	0.12	16	
	10	4x5.4	0.16	28		3.3	4x5.4	0.12	16	
		5x5.4	0.16	28		4.7	4x5.4	0.14	18	
	22	4x5.4	0.26	28			5x5.4	0.12	23	
		5x5.4	0.16	39		10	5x5.4	0.14	27	
	33	4x5.4	0.26	30			6.3x5.4	0.12	35	
		5x5.4	0.26	45		22	6.3x5.4	0.14	40	
	6.3x5.4	0.16	66	6.3x7.7			0.12	90		
	47	5x5.4	0.16	45		33	6.3x7.7	0.12	90	
		6.3x5.4	0.16	70			8x6.2	0.12	95	
		8x6.2	0.16	85			8x10.2	0.12	120	
	100	6.3x5.4	0.20	70		47	6.3x7.7	0.12	90	
		6.3x7.7	0.20	85			8x6.2	0.12	100	
		8x6.2	0.2	85			8x10.2	0.12	120	
	220	6.3x7.7	0.20	162		56	8x10.2	0.12	130	
		8x10.2	0.20	280			100	8x10.2	0.12	200
	330	8x10.2	0.20	320		10x10.2		0.12	250	
		10x10.2	0.20	380	220	10x10.2	0.12	300		
	470	8x10.2	0.20	350		63(79)	4.7	5x5.4	0.18	20
		10x10.2	0.20	420	10		6.3x5.4	0.18	20	
	680	10x10.2	0.20	500	22		6.3x7.7	0.18	40	
	25(32)	4.7	4x5.4	0.14	22					

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$ (%)	Ripple current (mA/rms 85°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$ (%)	Ripple current (mA/rms 85°C) (120Hz)
63(79)	22	8x6.2	0.18	40	100(125)	4.7	6.3x7.7	0.18	50
		8x10.2	0.18	40			8x10.2	0.18	50
	33	8x10.2	0.18	45		10	6.3x7.7	0.18	50
	47	8x10.2	0.18	45			8X10.2	0.18	55
		10x10.2	0.18	55		22	8X10.2	0.18	55
100	10x10.2	0.18	60	10X10.2			0.18	85	
100(125)	3.3	6.3X7.7	0.18	50		33	10X10.2	0.18	90
	4.7	6.3x5.4	0.18	40		47	10x10.2	0.18	95

FV Long Life for 85°C

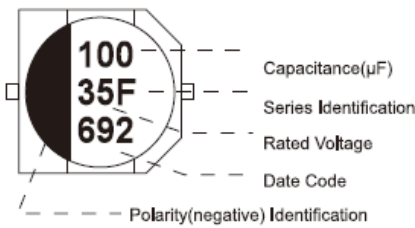
- Endurance: 85°C, 3000~5000 hours
- Recommended Applications: Suitable for AV(TV,Video,Audio),Monitor/Computer, Home appliance, OA/HA/Communication
- Corresponding product to RoHS



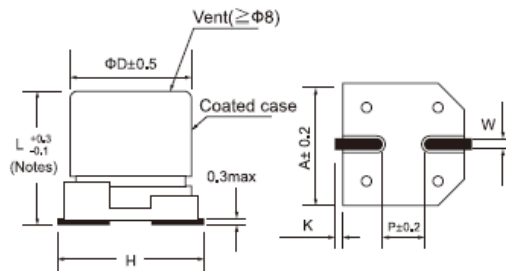
Specifications

Item	Characteristics																																								
Category Temperature Range	-55 ~ +85°C																																								
Rated Voltage Range	4 ~ 100VDC																																								
Rated Capacitance Range	1 ~ 1000 μF																																								
Capacitance Tolerance	± 20 % at 120Hz, 20°C																																								
Leakage Current (20°C)	$I \leq 0.01CV$ or $3 \mu A$, whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)																																								
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	Shown in the table of standard rating																																								
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <thead> <tr> <th>WV</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> </tr> </thead> <tbody> <tr> <td>Z(120HZ)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Z(-25°C) / Z(20°C)</td> <td>7</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-40°C) / Z(20°C)</td> <td>15</td> <td>8</td> <td>6</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	WV	4	6.3	10	16	25	35	50	63	100	Z(120HZ)										Z(-25°C) / Z(20°C)	7	4	3	2	2	2	2	2	2	Z(-40°C) / Z(20°C)	15	8	6	4	4	3	3	3	3
WV	4	6.3	10	16	25	35	50	63	100																																
Z(120HZ)																																									
Z(-25°C) / Z(20°C)	7	4	3	2	2	2	2	2	2																																
Z(-40°C) / Z(20°C)	15	8	6	4	4	3	3	3	3																																
Endurance	<p>After applying rated voltage for 3000~5000hours at 85°C, Stay back to 20 °C temperature measurement, the capacitors shall meet the following requirements.</p> <table border="1"> <tr> <td>Capacitance Change</td> <td>Within ±20% of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than 200% of the specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> </table> <table border="1"> <tr> <td>DΦ</td> <td>4x5.4~6.3x7.7</td> <td>8x10.2~10x10.2</td> </tr> <tr> <td>Life time (hours)</td> <td>3000</td> <td>5000</td> </tr> </table>	Capacitance Change	Within ±20% of the initial value	Dissipation Factor	Not more than 200% of the specified value	Leakage Current	Not more than the specified value	DΦ	4x5.4~6.3x7.7	8x10.2~10x10.2	Life time (hours)	3000	5000																												
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Shelf Life	After placed at 85°C without voltage applied for 1000 hours, Stay back to 20 °C temperature measurement, the capacitor shall meet the same requirement as Endurance.																																								

MARKING



Dimensions [mm]



(Notes) Φ8 ~ Φ10&6.3X7.7=L±0.3

Dimensions	ΦD	L	A	H	W	P	K
B01	4.0	5.4	4.3	5.5 Max	0.65±0.1	1.0	0.35+0.15/-0.2
C01	5.0	5.4	5.3	6.5 Max	0.65±0.1	1.5	0.35+0.15/-0.2
E01	6.3	5.4	6.6	7.8 Max	0.65±0.1	1.8	0.35+0.15/-0.2
E04	6.3	7.7	6.6	7.8 Max	0.65±0.1	1.8	0.35+0.15/-0.2
G03	8.0	10.2	8.3	10.0 Max	0.90±0.2	3.1	0.70±0.20
H03	10.0	10.2	10.3	12.0 Max	0.90±0.2	4.6	0.70±0.20

Multiplier for Ripple Current

Frequency (Hz)	60	120	1K	10K
Coefficient	0.80	1.00	1.15	1.25

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms 85°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms 85°C) (120Hz)
4(5)	22	4x5.4	0.35	19	25(32)	22	6.3x5.4	0.14	55
	33	4x5.4	0.35	26		33	6.3x5.4	0.14	65
	47	4x5.4	0.35	34		47	6.3x5.4	0.20	70
	100	5X5.4	0.35	61			6.3x7.7	0.16	96
	220	6.3X5.4	0.35	82		100	8x10.2	0.16	180
6.3(8)	22	4x5.4	0.26	20		220	10x10.2	0.16	310
	33	5x5.4	0.26	22	35(44)	2.2	4x5.4	0.12	8
	47	5x5.4	0.26	46		3.3	4x5.4	0.12	10
	100	6.3x5.4	0.26	71		4.7	4x5.4	0.12	22
	220	6.3x7.7	0.35	250		10	4x5.4	0.16	24
	330	6.3x7.7	0.35	300			5x5.4	0.12	30
	470	8x10.2	0.35	380		22	6.3x5.4	0.12	60
	1000	10x10.2	0.35	700		33	6.3x7.7	0.14	130
10(13)	22	4x5.4	0.30	28		47	6.3x7.7	0.14	165
	33	4x5.4	0.30	29		100	10x10.2	0.14	210
		5x5.4	0.20	43		220	10x10.2	0.14	310
	47	5x5.4	0.30	43	50(63)	1	4x5.4	0.12	10
	100	6.3x5.4	0.26	70		2.2	4x5.4	0.12	16
	220	6.3x7.7	0.26	250		3.3	4x5.4	0.12	16
	330	8x10.2	0.26	330		4.7	5x5.4	0.12	23
	470	10x10.2	0.26	400		10	6.3x5.4	0.12	35
1000	10x10.2	0.26	580	22		6.3x7.7	0.12	110	
16(20)	4.7	4x5.4	0.16	20		33	8x10.2	0.12	120
	10	4x5.4	0.16	28		47	10X10.2	0.12	130
	22	4x5.4	0.26	27		100	10x10.2	0.12	190
		5x5.4	0.16	39		63(79)	4.7	8X10.2	0.18
	33	5x5.4	0.26	45	10		8X10.2	0.18	25
		6.3x5.4	0.16	66	22		8x10.2	0.18	45
	47	6.3x5.4	0.16	70	33		10x10.2	0.18	45
	100	6.3x5.4	0.20	70	47	10x10.2	0.18	55	
	220	8X10.2	0.20	280	100(125)	3.3	8X10.2	0.18	30
	330	10X10.2	0.2	380		4.7	8X10.2	0.18	80
470	10X10.2	0.2	420	10		8X10.2	0.18	85	
25(32)	4.7	4x5.4	0.14	22		22	10X10.2	0.18	85
	10	4x5.4	0.20	24		33	10X10.2	0.18	90
		5x5.4	0.14	28					

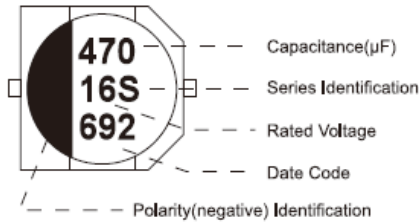


- Endurance: 105°C, 1000 hours
- Recommended Applications: Suitable for AV(TV,Video,Audio),Monitor/Computer, Home appliance, OA/HA/Communication
- Corresponding product to RoHS

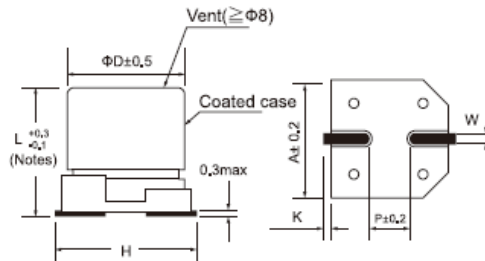
Specifications

Item	Characteristics																														
Category Temperature Range	-55 ~ +105°C																														
Rated Voltage Range	4 ~ 100VDC																														
Rated Capacitance Range	1 ~ 1500 μF																														
Capacitance Tolerance	± 20 % at 120Hz, 20°C																														
Leakage Current (20°C)	$I \leq 0.01CV$ or $3 \mu A$, whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)																														
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	Shown in the table of standard rating																														
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WV Z(120HZ)	4	6.3	10	16	25	35	50	63	100																						
Z(-25°C) / Z(20°C)	7	4	3	2	2	2	2	2	2																						
Z(-40°C) / Z(20°C)	15	8	6	4	4	3	3	3	3																						
Endurance	<p>After applying rated voltage for 1000hrs at 105°C, Stay back to 20 °C temperature measurement, the capacitors shall meet the following requirements.</p> <table border="1"> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±20% of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than 200% of the specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> </tbody> </table>	Capacitance Change	Within ±20% of the initial value	Dissipation Factor	Not more than 200% of the specified value	Leakage Current	Not more than the specified value																								
Capacitance Change	Within ±20% of the initial value																														
Dissipation Factor	Not more than 200% of the specified value																														
Leakage Current	Not more than the specified value																														
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, Stay back to 20 °C temperature measurement, the capacitor shall meet the same requirement as Endurance.																														

MARKING



Dimensions [mm]



(Notes) Φ8 ~ Φ10&6.3X7.7=L±0.3

Dimensions	ΦD	L	A	H	W	P	K
B01	4.0	5.4	4.3	5.5 Max	0.65±0.1	1.0	0.35+0.15/-0.2
C01	5.0	5.4	5.3	6.5 Max	0.65±0.1	1.5	0.35+0.15/-0.2
E01	6.3	5.4	6.6	7.8 Max	0.65±0.1	1.8	0.35+0.15/-0.2
E04	6.3	7.7	6.6	7.8 Max	0.65±0.1	1.8	0.35+0.15/-0.2
G03	8.0	10.2	8.3	10.0 Max	0.90±0.2	3.1	0.70±0.20
H03	10.0	10.2	10.3	12.0 Max	0.90±0.2	4.6	0.70±0.20

Multiplier for Ripple Current

Frequency (Hz)	60	120	1K	10K
Coefficient	0.85	1.00	1.15	1.25

■ STANDARD RATINGS

Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms 105°C) (120Hz)	Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms 105°C) (120Hz)	
4(5)	22	4x5.4	0.35	20	25(32)	22	6.3x5.4	0.14	55	
	33	4x5.4	0.35	26		33	5x5.4	0.14	45	
	47	4x5.4	0.35	34		47	6.3x5.4	0.16	65	
	100	5x5.4	0.35	61			6.3x5.4	0.16	71	
	220	6.3x5.4	0.35	82		100	6.3x7.7	0.16	91	
6.3(8)	22	4x5.4	0.30	29			6.3x7.7	0.16	95	
	33	4x5.4	0.30	43			220	8x10.2	0.16	130
	47	4x5.4	0.30	43		8x10.2		0.16	160	
	47	5x5.4	0.30	46		330	10x10.2	0.16	273	
			0.35	47			8x10.2	0.16	180	
	100	6.3x5.4	0.35	71	470	10x10.2	0.16	340		
		6.3x5.4	0.35	74		10x10.2	0.16	360		
	10(13)	220	6.3x7.7	0.35	120	35(44)	2.2	4x5.4	0.12	15
			6.3x7.7	0.35	175		3.3	4x5.4	0.12	18
		330	8x10.2	0.35	230		4.7	4x5.4	0.12	22
8x10.2			0.35	300	10		4x5.4	0.12	25	
470		8x10.2	0.35	300			5x5.4	0.12	30	
		1000	10x10.2	0.35	400		22	5x5.4	0.14	35
10x10.2			0.35	480	6.3x5.4			0.14	60	
16(20)		1500	10x10.2	0.35	480		33	6.3x5.4	0.14	60
			10x10.2	0.35	480			6.3x7.7	0.14	84
		10	4x5.4	0.30	24		47	6.3x5.4	0.14	60
	4x5.4		0.30	36	6.3x7.7	0.14		84		
	22	4x5.4	0.30	45	100	6.3x7.7	0.14	105		
		5x5.4	0.30	46		8x10.2	0.14	120		
	47	5x5.4	0.30	46	220	8x10.2	0.14	170		
		6.3x5.4	0.30	70		10x10.2	0.14	240		
	100	6.3x5.4	0.30	71	330	10x10.2	0.14	250		
		6.3x7.7	0.30	110		1	4x5.4	0.12	10	
150	6.3x5.4	0.30	86	50(63)	2.2	4x5.4	0.12	16		
220	6.3x7.7	0.3	115		3.3	4x5.4	0.12	16		
	8x10.2	0.26	160		4.7	5x5.4	0.12	23		
330	8x10.2	0.26	200		10	6.3x5.4	0.12	35		
	8x10.2	0.26	230		22	6.3x7.7	0.12	65		
470	10x10.2	0.26	270			33	6.3x7.7	0.12	70	
	10x10.2	0.26	390		8x10.2		0.12	91		
25(32)	4.7	4x5.4	0.16		20	47	6.3x7.7	0.12	75	
		4x5.4	0.16		28		8x10.2	0.12	95	
	10	4x5.4	0.16		28	100	8x10.2	0.12	110	
		5x5.4	0.16	39	10x10.2		0.12	145		
	22	5x5.4	0.20	39	220	10x10.2	0.12	210		
		6.3x5.4	0.20	65		4.7	6.3x5.4	0.18	20	
	47	5x5.4	0.20	39	63(79)	10	6.3x5.4	0.18	20	
		6.3x5.4	0.20	70		22	8x10.2	0.18	30	
	100	6.3x5.4	0.20	70		33	8x10.2	0.18	30	
		6.3x7.7	0.20	130		47	8x10.2	0.18	45	
220	6.3x7.7	0.20	105	100		10x10.2	0.18	60		
	8x10.2	0.20	150			3.3	8x10.2	0.18	30	
330	8x10.2	0.20	170	100(125)	4.7	8x10.2	0.18	50		
	10x10.2	0.20	230		10	8x10.2	0.18	55		
470	8x10.2	0.20	230		22	10x10.2	0.18	60		
	10x10.2	0.20	340		33	10x10.2	0.18	65		
680	10x10.2	0.20	380	47	10x10.2	0.18	65			

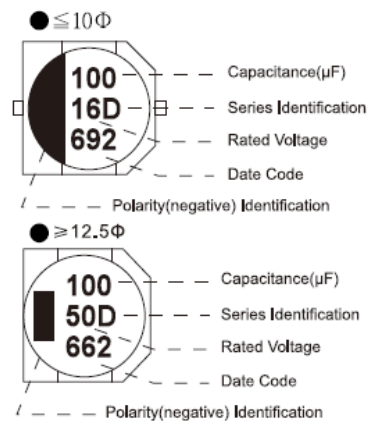


- Endurance: 105°C, 2000 hours
- Recommended Applications: Suitable for AV(TV, Video, Audio), Monitor/Computer, Home appliance, OA/HA/Communication, Industrial, Automobile, Meter.
- Corresponding product to RoHS

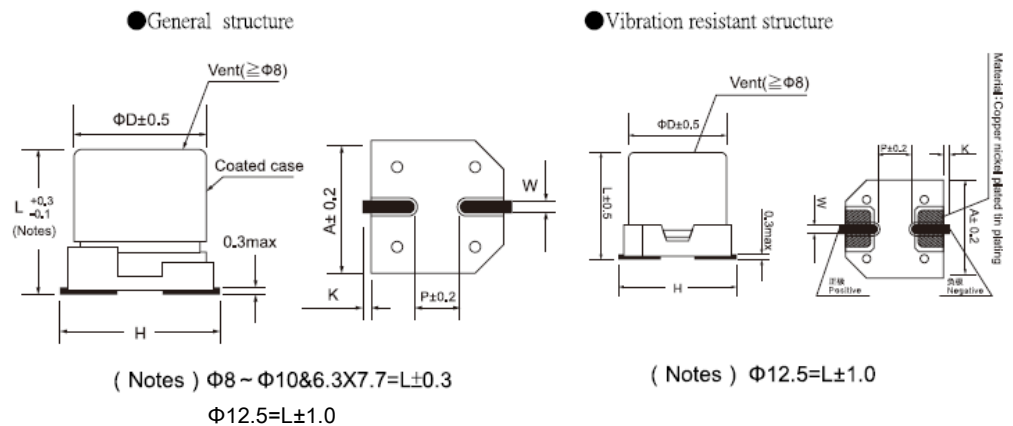
Specifications

Item	Characteristics																													
Category Temperature Range	-55 ~ +105°C	-25 ~ +105°C																												
Rated Voltage Range	6.3 ~ 100VDC	160~450VDV																												
Rated Capacitance Range	1~ 2200 μF																													
Capacitance Tolerance	± 20 % (120Hz, 20°C)																													
Leakage Current (20°C)	4~10Φ	12.5																												
	I ≤ 0.01CV or 3(μA), whichever is greater. I ≤ 0.01CV or 3(μA), whichever is greater.																													
	(After rated voltage applied for 2 minutes)																													
		I ≤ 0.04CV + 100 uA (After rated voltage applied for 2 minutes)																												
I= Leakage Current (μA) C= Nominal Capacitance (μF) V= Rated Voltage (V)																														
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	Shown in the table of standard ratings																													
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <thead> <tr> <th>WV</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35~100</th> <th>160~450</th> </tr> </thead> <tbody> <tr> <td>Z(120HZ)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Z(-25°C) / Z(20°C)</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>4</td> </tr> <tr> <td>Z(-40°C) / Z(20°C)</td> <td>8</td> <td>6</td> <td>4</td> <td>4</td> <td>3</td> <td>—</td> </tr> </tbody> </table>		WV	6.3	10	16	25	35~100	160~450	Z(120HZ)							Z(-25°C) / Z(20°C)	4	3	2	2	2	4	Z(-40°C) / Z(20°C)	8	6	4	4	3	—
	WV	6.3	10	16	25	35~100	160~450																							
	Z(120HZ)																													
Z(-25°C) / Z(20°C)	4	3	2	2	2	4																								
Z(-40°C) / Z(20°C)	8	6	4	4	3	—																								
Endurance	After applying rated voltage for 2000hrs at 105°C, Stay back to 20 °C temperature measurement, the capacitors shall meet the following requirements.																													
	Case (Φ)	4~6.3 Φ																												
	Capacitance Change	Within ±25% of the initial value																												
	Dissipation Factor	Not more than 200% of the specified value																												
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, Stay back to 20 °C temperature measurement, the capacitor shall meet the same requirement as Endurance.																													

MARKING



Dimensions [mm]



Dimensions	ΦD	L	A	H	W	P	K
B01	4.0	5.4	4.3	5.5 Max	0.65±0.1	1.0	0.35+0.15/-0.2
C01	5.0	5.4	5.3	6.5 Max	0.65±0.1	1.5	0.35+0.15/-0.2
E01	6.3	5.4	6.6	7.8 Max	0.65±0.1	1.8	0.35+0.15/-0.2
E04	6.3	7.7	6.6	7.8 Max	0.65±0.1	1.8	0.35+0.15/-0.2
G02	8.0	6.2	8.3	9.5 Max	0.65±0.1	2.2	0.35+0.15/-0.2
G03	8.0	10.2	8.3	10.0 Max	0.90±0.2	3.1	0.70±0.20
H03	10.0	10.2	10.3	12.0 Max	0.90±0.2	4.6	0.70±0.20
K05	12.5	13.5	10.3	15.0 Max	1.20±0.2	4.4	0.70±0.30
K06	12.5	16	10.3	15.0 Max	1.20±0.2	4.4	0.70±0.30
M06	16.0	16.5	10.3	19.0 Max	1.20±0.2	6.4	0.70±0.30

Multiplier for Ripple Current

Frequency (Hz)	60	120	1K	10K
Coefficient	0.85	1.00	1.15	1.25

DV General purpose Series

■ STANDARD RATINGS

Rated Voltage (SurgeVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms 105°C) (120Hz)	Rated Voltage (SurgeVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms 105°C) (120Hz)
6.3(8)	22	4x5.4	0.30	26	25(32)	47	6.3x7.7	0.16	91
	33	4x5.4	0.30	29		100	6.3x7.7	0.16	100
	47	4x5.4	0.30	31			8x6.2	0.16	100
		5x5.4	0.30	46			8x10.2	0.16	230
	100	5x5.4	0.30	47		8x10.2	0.16	230	
		6.3x5.4	0.30	71		10x10.2	0.16	310	
	220	6.3x5.4	0.35	80		330	8x10.2	0.16	290
		6.3x7.7	0.35	120			10x10.2	0.16	380
	330	6.3x7.7	0.35	140		470	10x10.2	0.16	380
		8x6.2	0.35	140		1000	12.5x13.5	0.26	510
		8x10.2	0.35	290		1500	12.5x16	0.26	590
	470	8x10.2	0.35	290		2200	16x16.5	0.26	900
		10x10.2	0.35	380			35(44)	4.7	4x5.4
	1000	8x10.2	0.35	290		6.8		4x5.4	0.12
10x10.2		0.35	410	10	5x5.4	0.12		30	
1500	10x10.2	0.35	460	22	5x5.4	0.14		35	
	2200	12.5x13.5	0.35		680	6.3x5.4		0.14	60
10(13)	10	4x5.4	0.22	20	33	6.3x7.7		0.14	80
	22	4x5.4	0.22	23		8x6.2		0.14	80
	33	4x5.4	0.22	26		47		6.3x5.4	0.14
		5x5.4	0.22	45	6.3x7.7			0.14	100
	47	5x5.4	0.22	60	8x10.2			0.14	210
		6.3x5.4	0.22	70	100	6.3x7.7		0.14	105
	100	5x5.4	0.30	60		8x10.2		0.14	240
		6.3x5.4	0.30	71		10x10.2		0.14	310
		6.3x7.7	0.30	110		12.5x13.5		0.14	390
	220	6.3x7.7	0.30	120	220	8x10.2	0.14	260	
		8x6.2	0.30	120		10x10.2	0.14	350	
		8x10.2	0.26	260	330	10x10.2	0.14	370	
	330	6.3x7.7	0.3	200	470	12.5x13.5	0.22	520	
		8x10.2	0.30	290	680	12.5x13.5	0.22	590	
470	8x10.2	0.30	320	1000	16x16.5	0.22	800		
	10x10.2	0.26	380		1500	16x16.5	0.22	1000	
680	8x10.2	0.3	360	50(63)	1	4x5.4	0.12	10	
1000	10x10.2	0.26	410		2.2	4x5.4	0.12	16	
2200	12.5x13.5	0.30	680		3.3	4x5.4	0.12	16	
16(20)	10	4x5.4	0.16		28	4.7	5x5.4	0.12	23
	22	4x5.4	0.16		29	6.8	5x5.4	0.12	30
		5x5.4	0.16		39	10	5x5.4	0.12	35
	33	5x5.4	0.16		40		6.3x5.4	0.12	40
		47	5x5.4		0.16	42	22	6.3x5.4	0.12
	6.3x5.4		0.16		70	6.3x7.7		0.12	65
	100	6.3x5.4	0.20		71	33	6.3x7.7	0.12	91
		6.3x7.7	0.20		130		8x6.2	0.12	110
		6.3x7.7	0.20		130		47	6.3x7.7	0.12
	220	8x6.2	0.20		130	8x6.2		0.12	110
		8x10.2	0.20		150	8x10.2		0.12	210
		10x10.2	0.20	210	100	8x10.2	0.12	240	
	330	10x10.2	0.20	230		10x10.2	0.12	320	
	470	8x10.2	0.20	240	150	10x10.2	0.12	300	
10x10.2		0.20	380	220	10x10.2	0.12	330		
1000	12.5x13.5	0.34	550	330	12.5x13.5	0.16	490		
2200	16x16.5	0.34	900	470	12.5x16	0.18	550		
25(32)	3.3	4x5.4	0.14	18	100(125)	1000	16x16.5	0.18	800
	4.7	4x5.4	0.14	22		10	6.3x7.7	0.18	50
	6.8	4x5.4	0.14	25		22	8x10.2	0.18	100
	10	4x5.4	0.14	25		33	8x10.2	0.18	120
		5x5.4	0.14	28			10x10.2	0.18	150
	22	5x5.4	0.14	28			47	10x10.2	0.18
		6.3x5.4	0.14	55		12.5x13.5		0.18	250
	33	6.3x5.4	0.14	65		100	12.5x13.5	0.18	300
47	6.3x5.4	0.16	65						

DV General purpose Series

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$ (%)	Ripple current (mA/rms 105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$ (%)	Ripple current (mA/rms 105°C) (120Hz)
160(200)	33	12.5x13.5	0.20	95	250(300)	33	16x16.5	0.20	180
	47	16x16.5	0.20	240		47	16x16.5	0.20	220
	100	16x16.5	0.20	250	400 (450)	3.3	12.5x13.5	0.25	40
200(250)	10	12.5x13.5	0.20	80		4.7	12.5x13.5	0.25	45
	22	12.5x16	0.20	110		10	12.5x13.5	0.25	50
	33	12.5x16	0.20	120		22	16x16.5	0.25	85
	47	16x16.5	0.20	220		33	16x16.5	0.25	85
250(300)	3.3	12.5x13.5	0.20	60	450 (500)	3.3	12.5x13.5	0.25	40
	4.7	12.5x13.5	0.20	65		4.7	12.5x13.5	0.25	45
	10	12.5x13.5	0.20	70		10	12.5x16	0.25	75
	22	12.5x13.5	0.20	105		22	16x16.5	0.25	85

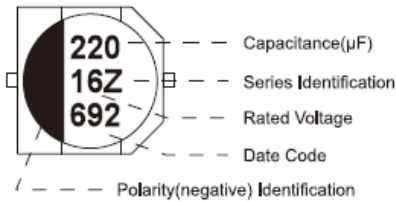


- Endurance: 105°C, 1000 hours
- Recommended Applications: Suitable for AV(TV, Video, Audio), Monitor/Computer, Battery charger, DC/DC converter, SMPS, Noise filter
- Corresponding product to RoHS

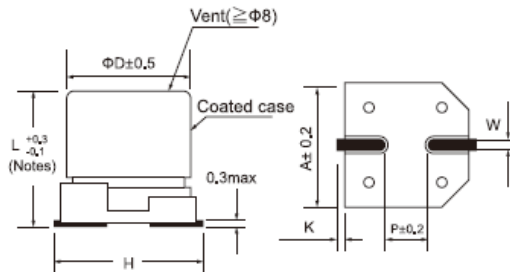
Specifications

Item	Characteristics																								
Category Temperature Range	-55 ~ +105°C																								
Rated Voltage Range	6.3~ 50VDC																								
Rated Capacitance Range	1 ~ 1500 μ F																								
Capacitance Tolerance	$\pm 20\%$ at 120Hz, 20°C																								
Leakage Current (20°C)	$I \leq 0.01CV$ or $3 \mu A$, whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)																								
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	Shown in the table of standard rating																								
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <thead> <tr> <th rowspan="2">WV Z(120HZ)</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>Z(-25°C) / Z(20°C)</td> <td>4</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-40°C) / Z(20°C)</td> <td>8</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	WV Z(120HZ)	4	6.3	10	16	25	35	50	Z(-25°C) / Z(20°C)	4	2	2	2	2	2	2	Z(-40°C) / Z(20°C)	8	4	4	3	3	3	3
WV Z(120HZ)	4		6.3	10	16	25	35	50																	
	Z(-25°C) / Z(20°C)	4	2	2	2	2	2	2																	
Z(-40°C) / Z(20°C)	8	4	4	3	3	3	3																		
Endurance	<p>After applying rated voltage for 1000hrs at 105°C, Stay back to 20 °C temperature measurement, the capacitors shall meet the following requirements.</p> <table border="1"> <tr> <td>Capacitance Change</td> <td>Within $\pm 20\%$ of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than 200% of the specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> </table>	Capacitance Change	Within $\pm 20\%$ of the initial value	Dissipation Factor	Not more than 200% of the specified value	Leakage Current	Not more than the specified value																		
Capacitance Change	Within $\pm 20\%$ of the initial value																								
Dissipation Factor	Not more than 200% of the specified value																								
Leakage Current	Not more than the specified value																								
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, Stay back to 20 °C temperature measurement, the capacitor shall meet the same requirement as Endurance.																								

MARKING



Dimensions [mm]



(Notes) $\Phi 8 \sim \Phi 10 \times 6.3 \times 7.7 = L \pm 0.3$

Dimensions	ΦD	L	A	H	W	P	K
B01	4.0	5.4	4.3	5.5 Max	0.65 ± 0.1	1.0	$0.35 + 0.15 / - 0.2$
C01	5.0	5.4	5.3	6.5 Max	0.65 ± 0.1	1.5	$0.35 + 0.15 / - 0.2$
E01	6.3	5.4	6.6	7.8 Max	0.65 ± 0.1	1.8	$0.35 + 0.15 / - 0.2$
E04	6.3	7.7	6.6	7.8 Max	0.65 ± 0.1	1.8	$0.35 + 0.15 / - 0.2$
G02	8.0	6.2	8.3	9.5 Max	0.65 ± 0.1	2.2	$0.35 + 0.15 / - 0.2$
G03	8.0	10.2	8.3	10.0 Max	0.90 ± 0.2	3.1	0.70 ± 0.20
H03	10.0	10.2	10.3	12.0 Max	0.90 ± 0.2	4.6	0.70 ± 0.20

Multiplier for Ripple Current

Frequency (Hz)	120	1K	10K	100K
Coefficient	0.70	0.80	0.90	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms 105°C)	Impedance (Ω ,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms 105°C)	Impedance (Ω ,20°C) (100KHz)	
4(5)	10	4x5.4	0.35	60	4.0	25(32)	4.7	4x5.4	0.14	60	4.0	
	22	4x5.4	0.35	60	4.0		6.8	4x5.4	0.14	60	4.0	
	33	4x5.4	0.35	60	4.0		10	5x5.4	0.14	95	2.6	
	47	4x5.4	0.35	60	4.0		22	6.3x5.4	0.14	140	1.3	
	68	4x5.4	0.35	60	4.0		33	6.3x5.4	0.14	140	1.3	
	100	5x5.4	0.35	95	3.0		47	6.3x5.4	0.14	140	1.3	
	150	6.3x5.4	0.35	140	2.6		68	6.3x7.7	0.16	230	0.8	
220	6.3x5.4	0.35	140	2.6	100		8x10.2	0.16	450	0.5		
6.3(8)	22	4x5.4	0.26	60	4.0		100	6.3x7.7	0.16	240	0.8	
	33	5x5.4	0.26	95	2.6		150	6.3x7.7	0.16	240	0.8	
	47	5x5.4	0.26	95	2.6		220	10x10.2	0.16	670	0.3	
	68	6.3x5.4	0.26	140	1.3		330	10x10.2	0.16	670	0.3	
	100	6.3x5.4	0.26	140	1.3		470	10x10.2	0.16	670	0.3	
	150	6.3x7.7	0.35	230	0.8		35(44)	1	4x5.4	0.12	60	4.0
	220	6.3x7.7	0.35	230	0.8	2.2		4x5.4	0.12	60	4.0	
	330	8x10.2	0.35	450	0.5	3.3		4x5.4	0.12	60	4.0	
	470	10x10.2	0.35	670	0.3	4.7		4x5.4	0.12	60	4.0	
1000	10x10.2	0.35	670	0.3	6.8	5x5.4		0.12	95	2.6		
1500	10x10.2	0.35	670	0.3	10	5x5.4		0.12	95	2.6		
10(13)	10	4x5.4	0.22	60	4	22		6.3x5.4	0.12	140	1.3	
	22	5x5.4	0.22	95	2.6	33		6.3x7.7	0.14	230	0.8	
	33	5x5.4	0.22	95	2.6	47		6.3x5.4	0.14	170	1.1	
	47	6.3x5.4	0.22	95	1.3	47		6.3x7.7	0.14	230	0.8	
	68	6.3x5.4	0.22	140	1.3	68		8x6.2	0.14	230	0.8	
	100	6.3x5.4	0.22	140	1.3	8x6.2		0.14	230	0.8		
	150	6.3x7.7	0.26	230	0.8	68		8x10.2	0.14	450	0.5	
	220	6.3x7.7	0.26	230	0.8	100		10x10.2	0.14	670	0.3	
	330	8x10.2	0.26	450	0.5	220	10x10.2	0.14	670	0.3		
	470	10x10.2	0.26	670	0.3	330	10x0.2	0.14	670	0.3		
16(20)	10	4x5.4	0.16	60	4.0	50(63)	1	4x5.4	0.12	60	5.0	
	22	5x5.4	0.16	95	2.6		2.2	4x5.4	0.12	60	5.0	
	33	5x5.4	0.16	95	2.6		3.3	4x5.4	0.12	60	5.0	
	47	6.3x5.4	0.16	140	1.3		4.7	5x5.4	0.12	95	4.0	
	68	6.3x7.7	0.20	230	0.8		6.8	6.3x5.4	0.12	140	2.6	
	100	100	6.3x5.4	0.20	140		1.3	10	6.3x5.4	0.12	140	2.6
			6.3x7.7	0.20	230		0.8	22	6.3x7.7	0.12	230	1.3
			8x6.2	0.20	230		0.8	33	8x10.2	0.12	300	1.1
			8x10.2	0.20	450		0.5	47	8x10.2	0.12	300	1.1
	150	8x10.2	0.20	450	0.5		47	10x10.2	0.12	670	0.8	
	220	8x10.2	0.20	450	0.5		68	10x10.2	0.12	670	0.8	
	330	10x10.2	0.20	670	0.3		100	8x10.2	0.12	450	1.1	
	470	470	8x10.2	0.20	450			0.5	10x10.2	0.12	670	0.8
			10x10.2	0.20	670			0.3	220	10x10.2	0.12	670

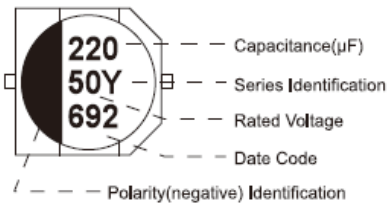


- Endurance: 105°C, 1000~2000 hours
- Recommended Applications: Suitable for AV(TV,Video,Audio),Monitor/Computer, Battery charger,DC/DC converter,SMPS,Noise filter
- Corresponding product to RoHS

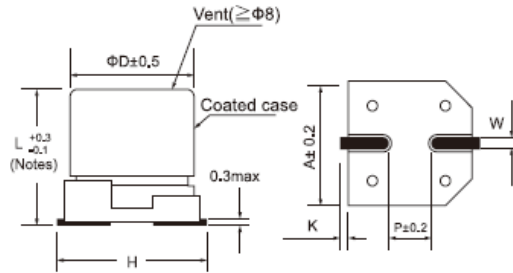
Specifications

Item	Characteristics																												
Category Temperature Range	-55 ~ +105°C																												
Rated Voltage Range	6.3~ 50VDC																												
Rated Capacitance Range	1 ~ 1500 μF																												
Capacitance Tolerance	± 20 % at 120Hz , 20°C																												
Leakage Current (20°C)	$I \leq 0.01CV$ or $3 \mu A$,whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)																												
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	Shown in the table of standard rating																												
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <thead> <tr> <th>WV</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>Z(120HZ)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Z(-25°C) / Z(20°C)</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-40°C) / Z(20°C)</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	WV	6.3	10	16	25	35	50	Z(120HZ)							Z(-25°C) / Z(20°C)	2	2	2	2	2	2	Z(-40°C) / Z(20°C)	4	4	3	3	3	3
WV	6.3	10	16	25	35	50																							
Z(120HZ)																													
Z(-25°C) / Z(20°C)	2	2	2	2	2	2																							
Z(-40°C) / Z(20°C)	4	4	3	3	3	3																							
Endurance	After applying rated voltage for 1000hrs at 105°C ,Stay back to 20 °C temperature measurement,the capacitors shall meet the following requirements.																												
	Capacitance Change	6.3VF Within ±30% of the initial value,10-50VF Within ±20% of the initial value																											
	Dissipation Factor	Not more than 200% of the specified value																											
	Leakage Current	Not more than the specified value																											
		DΦ	4x5.4~6.3x7.7			8x10.2~10x10.2																							
	Life	1000hrs			2000hrs																								
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,Stay back to 20 °C temperature measurement, the capacitor shall meet the same requirement as Endurance.																												

MARKING



Dimensions [mm]



(Notes) Φ8 ~ Φ10&6.3X7.7=L±0.3

Dimensions	ΦD	L	A	H	W	P	K
B01	4.0	5.4	4.3	5.5 Max	0.65±0.1	1.0	0.35+0.15/-0.2
C01	5.0	5.4	5.3	6.5 Max	0.65±0.1	1.5	0.35+0.15/-0.2
E01	6.3	5.4	6.6	7.8 Max	0.65±0.1	1.8	0.35+0.15/-0.2
E04	6.3	7.7	6.6	7.8 Max	0.65±0.1	1.8	0.35+0.15/-0.2
G03	8.0	10.2	8.3	10.0 Max	0.90±0.2	3.1	0.70±0.20
H03	10.0	10.2	10.3	12.0 Max	0.90±0.2	4.6	0.70±0.20

Multiplier for Ripple Current

Frequency (Hz)	120	1K	10K	100K
Coefficient	0.70	0.80	0.90	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms 105°C 100KHz)	Impedance (Ω,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms 105°C 100KHz)	Impedance (Ω,20°C) (100KHz)
6.3(8)	22	4x5.4	0.26	60	3.0	25(32)	22	6.3x5.4	0.14	140	1.0
	33	5x5.4	0.26	95	1.8		33	6.3x5.4	0.14	140	1.0
	47	5x5.4	0.26	95	1.8		47	6.3x5.4	0.14	140	1.0
	100	6.3x5.4	0.26	140	1.0		68	6.3x7.7	0.14	280	0.3
	220	6.3x5.4	0.26	140	1.0		100	6.3x7.7	0.14	280	0.3
	330	6.3x7.7	0.26	280	0.3		220	8x10.2	0.16	450	0.3
	470	8x10.2	0.35	450	0.3		330	8x10.2	0.16	450	0.3
	680	8x10.2	0.35	450	0.3		470	10x0.2	0.16	670	0.15
	1000	8x0.2	0.35	450	0.3		35(44)	4.7	4x5.4	0.12	60
1500	10x10.2	0.35	670	0.15	10	5x5.4		0.12	95	1.8	
10(13)	22	5x5.4	0.22	95	1.8	22		6.3x5.4	0.12	140	1.0
	33	5x5.4	0.22	95	1.8	33		6.3x5.4	0.12	140	1.0
	47	6.3x5.4	0.22	140	1.0	47		6.3x5.4	0.12	140	1.0
	100	6.3x5.4	0.22	140	1.0	68		6.3x7.7	0.12	280	0.34
	220	6.3x7.7	0.22	280	0.3	100		8x10.2	0.14	450	0.3
	330	8x10.2	0.26	450	0.3	220		8x10.2	0.14	450	0.3
	470	8x10.2	0.26	450	0.3	330		10x10.2	0.14	670	0.15
	680	10x10.2	0.26	670	0.15	50(63)	1	4x5.4	0.12	30	5.0
	1000	10x10.2	0.26	670	0.15		2.2	4x5.4	0.12	30	5.0
16(20)	10	4x5.4	0.16	60	3.0		3.3	4x5.4	0.12	30	5.0
	22	5x5.4	0.16	95	1.8		4.7	5x5.4	0.12	50	3.0
	33	6.3x5.4	0.16	140	1.0		10	6.3x5.4	0.12	70	2.0
	47	6.3x5.4	0.16	140	1.0		22	6.3x5.4	0.12	70	2.0
	100	6.3x5.4	0.16	140	1.0		33	6.3x7.7	0.12	170	1.3
	220	6.3x7.7	0.16	280	0.34		47	6.3x7.7	0.12	170	1.3
	330	8x10.2	0.20	450	0.3		68	8x10.2	0.12	300	0.6
	470	8x10.2	0.20	450	0.3		100	8x10.2	0.12	300	0.6
	680	10x10.2	0.20	670	0.15		220	10x10.2	0.12	500	0.3
25(32)	10	5x5.4	0.14	95	1.8						

EV Ultra Low Impedance

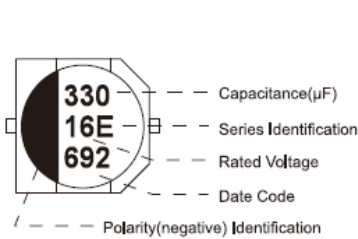


- Endurance: 105°C, 2000 hours
- Recommended Applications: Applying to media (TV, video, audio), monitor /computer, Communication Power industry, car, electricity meter industry, car, electricity meter
- Corresponding product to RoHS

Specifications

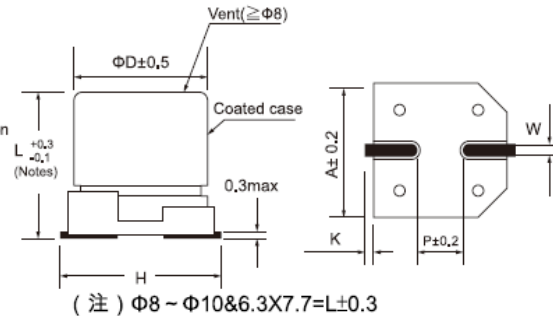
Item	Characteristics																											
Category Temperature Range	-55 ~ +105°C																											
Rated Voltage Range	6.3~ 50VDC																											
Rated Capacitance Range	4.7 ~ 1500 μ F																											
Capacitance Tolerance	\pm 20 % at 120Hz, 20°C																											
Leakage Current (20°C)	\pm 20 % at 120Hz, 20°C $I \leq 0.01CV$ or 3μ A, whichever is greater. (After rated voltage applied for 2 minutes)																											
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	I : Max. leakage current (μ A), C : Nominal capacitance (μ F), V : Rated voltage (V) Shown in the table of standard rating																											
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <thead> <tr> <th rowspan="2">WV Z(120HZ)</th> <th colspan="6">WV</th> </tr> <tr> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>Z(-25°C) / Z(20°C)</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-40°C) / Z(20°C)</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	WV Z(120HZ)	WV						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
WV Z(120HZ)	WV																											
	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																						
Endurance	After applying rated voltage for 2000hrs at 105°C, Stay back to 20 °C temperature measurement, the capacitors shall meet the following requirements. <table border="1"> <tr> <td>Capacitance Change</td> <td>Within \pm30% of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than 200% of the specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> </table>	Capacitance Change	Within \pm 30% of the initial value	Dissipation Factor	Not more than 200% of the specified value	Leakage Current	Not more than the specified value																					
Capacitance Change	Within \pm 30% of the initial value																											
Dissipation Factor	Not more than 200% of the specified value																											
Leakage Current	Not more than the specified value																											
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, Stay back to 20 °C temperature measurement, the capacitor shall meet the same requirement as Endurance.																											

MARKING

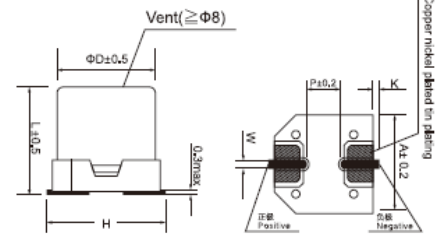


Dimensions [mm]

● General structure



● Vibration resistant structure



Dimensions	ΦD	L	A	H	W	P	K
B01	4.0	5.4	4.3	5.5 Max	0.65 \pm 0.1	1.0	0.35+0.15/-0.2
C01	5.0	5.4	5.3	6.5 Max	0.65 \pm 0.1	1.5	0.35+0.15/-0.2
E01	6.3	5.4	6.6	7.8 Max	0.65 \pm 0.1	1.8	0.35+0.15/-0.2
E04	6.3	7.7	6.6	7.8 Max	0.65 \pm 0.1	1.8	0.35+0.15/-0.2
G03	8.0	10.2	8.3	10.0 Max	0.90 \pm 0.2	3.1	0.70 \pm 0.20
G02	8.0	6.2	8.3	9.5 Max	0.65 \pm 0.1	2.2	0.35+0.15/-0.2
H03	10.0	10.2	10.3	12.0 Max	0.90 \pm 0.2	4.6	0.70 \pm 0.20

Multiplier for Ripple Current

Frequency (Hz)	120	1K	10K	100K
Coefficient	0.70	0.80	0.90	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms 105°C 100KHz)	Impedance (Ω,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms 105°C 100KHz)	Impedance (Ω,20°C) (100KHz)	
6.3(8)	22	4x5.4	0.26	90	1.93	16 (20)	220	8x10.2	0.16	370	0.22	
	33	4x5.4	0.26	90	1.93		330	8x10.2	0.16	600	0.16	
	47	4x5.4	0.26	90	1.93		470	8x10.2	0.16	600	0.16	
		5x5.4	0.26	160	1.00		10x10.2	0.16	650	0.15		
	100	5x5.4	0.26	160	1.00		560	10x10.2	0.16	650	0.12	
		6.3x5.4	0.26	240	0.52		680	10x10.2	0.16	850	0.08	
	150	6.3x5.4	0.26	240	0.52	25 (32)	10	4x5.4	0.14	90	1.93	
		6.3x7.7	0.26	240	0.30		5x5.4	0.14	95	1.80		
	220	6.3x5.4	0.26	240	0.30		22	5x5.4	0.14	160	1.00	
		6.3x7.7	0.26	240	0.30		33	5x5.4	0.14	160	1.00	
	330	8x6.2	0.26	240	0.30		47	6.3x5.4	0.14	240	0.52	
		6.3x7.7	0.26	280	0.34		6.3x7.7	0.14	260	0.45		
	470	8x10.2	0.26	600	0.16		68	6.3x5.4	0.14	240	0.34	
		8x10.2	0.26	600	0.16		100	6.3x7.7	0.14	280	0.16	
	800	8x10.2	0.26	600	0.16		8X6.2	0.14	280	0.34		
1000	10x10.2	0.26	850	0.08	150		8x10.2	0.14	600	0.16		
10 (13)	22	4x5.4	0.19	90	1.93		220	8x10.2	0.14	600	0.16	
	33	4x5.4	0.19	90	1.93		330	8x10.2	0.14	600	0.16	
		5x5.4	0.19	160	1.00	470	10x10.2	0.14	850	0.08		
	47	6.3x5.4	0.19	190	0.52	35 (44)	4.7	4x5.4	0.12	90	1.93	
	100	6.3x5.4	0.19	190	0.52		10	4x5.4	0.12	90	1.93	
	150	6.3x5.4	0.19	200	0.52		5x5.4	0.12	160	1.00		
		6.3x7.7	0.19	240	0.34		22	5x5.4	0.12	160	1.00	
	220	6.3x7.7	0.19	280	0.34		33	6.3x5.4	0.12	200	0.80	
		8x6.2	0.19	280	0.34		47	6.3x5.4	0.12	240	0.52	
	330	8x10.2	0.19	600	0.16		6.3x7.7	0.12	280	0.34		
	470	8x10.2	0.19	600	0.16		68	6.3x7.7	0.12	280	0.34	
	680	10x10.2	0.19	600	0.12		100	6.3x7.7	0.12	280	0.34	
	820	10x10.2	0.19	850	0.08		8x10.2	0.12	600	0.16		
	1000	10x10.2	0.19	850	0.08		150	8x10.2	0.12	600	0.16	
	1200	10x10.2	0.19	850	0.08		220	8x10.2	0.12	600	0.16	
16 (20)	3.3	4x5.4	0.16	60	3.00	330	10x10.2	0.12	850	0.08		
	10	4x5.4	0.16	90	1.93	50 (63)	10	5X5.4	0.12	60	2.90	
	22	4x5.4	0.16	90	1.93		22	6.3x5.4	0.12	70	2.60	
		5x5.4	0.16	160	1.00		33	6.3x7.7	0.12	170	0.80	
	33	5x5.4	0.16	160	1.00		47	6.3x7.7	0.12	170	1.30	
	47	5x5.4	0.16	160	1.00		8X6.2	0.12	170	1.30		
		6.3x5.4	0.16	240	0.52		100	8x10.2	0.12	300	0.40	
	68	6.3x5.4	0.16	240	0.52		10x10.2	0.12	400	0.40		
	100	6.3x5.4	0.16	240	0.52		150	10x10.2	0.12	400	0.35	
		6.3x7.7	0.16	280	0.34		220	10x10.2	0.12	500	0.30	
	150	6.3x7.7	0.16	280	0.34							
	220	6.3x7.7	0.16	280	0.34							
		8x6.2	0.16	280	0.34							

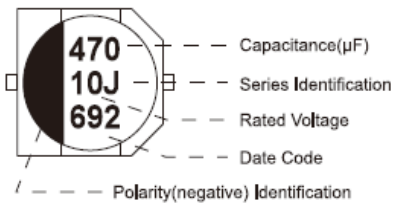
- Endurance: 105°C, 2000 hours
- Recommended Applications: AV(TV,Video,Audio) ,Monitor/Computer,OA/HA/Communication ,SMPS
- Corresponding product to RoHS



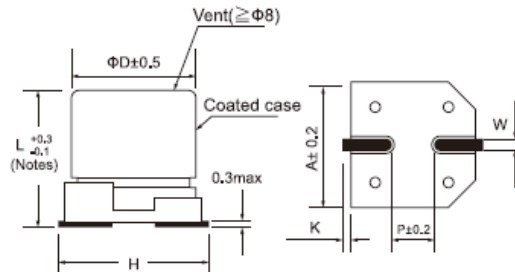
Specifications

Item	Characteristics																		
Category Temperature Range	-55 ~ +105°C																		
Rated Voltage Range	6.3~ 50VDC																		
Rated Capacitance Range	1 ~ 1500 μ F																		
Capacitance Tolerance	$\pm 20\%$ at 120Hz, 20°C																		
Leakage Current (20°C)	$I \leq 0.01CV$ or $3 \mu A$, whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)																		
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	Shown in the table of standard rating																		
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <thead> <tr> <th rowspan="2">WV Z(120HZ)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> </tr> </thead> <tbody> <tr> <td>Z(-25°C) / Z(20°C)</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-40°C) / Z(20°C)</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	WV Z(120HZ)	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
WV Z(120HZ)	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														
Endurance	<p>After applying rated voltage for 2000hrs at 105°C, Stay back to 20 °C temperature measurement, the capacitors shall meet the following requirements.</p> <table border="1"> <tbody> <tr> <td>Capacitance Change</td> <td>Within $\pm 30\%$ of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than 200% of the specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> </tbody> </table>	Capacitance Change	Within $\pm 30\%$ of the initial value	Dissipation Factor	Not more than 200% of the specified value	Leakage Current	Not more than the specified value												
Capacitance Change	Within $\pm 30\%$ of the initial value																		
Dissipation Factor	Not more than 200% of the specified value																		
Leakage Current	Not more than the specified value																		
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, Stay back to 20 °C temperature measurement, the capacitor shall meet the same requirement as Endurance.																		

MARKING



Dimensions [mm]



(Notes) $\Phi 8 \sim \Phi 10 \& 6.3 \times 7.7 = L \pm 0.3$

Dimensions	ΦD	L	A	H	W	P	K
B01	4.0	5.4	4.3	5.5 Max	0.65 ± 0.1	1.0	$0.35 + 0.15 / - 0.2$
C01	5.0	5.4	5.3	6.5 Max	0.65 ± 0.1	1.5	$0.35 + 0.15 / - 0.2$
E01	6.3	5.4	6.6	7.8 Max	0.65 ± 0.1	1.8	$0.35 + 0.15 / - 0.2$
E04	6.3	7.7	6.6	7.8 Max	0.65 ± 0.1	1.8	$0.35 + 0.15 / - 0.2$
G02	8.0	6.2	8.3	9.5 Max	0.65 ± 0.1	2.2	$0.35 + 0.15 / - 0.2$
G03	8.0	10.2	8.3	10.0 Max	0.90 ± 0.2	3.1	0.70 ± 0.20
H03	10.0	10.2	10.3	12.0 Max	0.90 ± 0.2	4.6	0.70 ± 0.20

Multiplier for Ripple Current

Frequency (Hz)	120	1K	10K	100K
Coefficient	0.70	0.80	0.90	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms 105°C 100KHz)	Impedance (Ω,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms 105°C 100KHz)	Impedance (Ω,20°C) (100KHz)
6.3 (8)	47	4x5.4	0.26	90	1.93	16 (20)	47	5x5.4	0.16	160	1.00
	68	4x5.4	0.26	90	1.93		68	5x5.4	0.16	160	1.00
	100	5x5.4	0.26	160	1.00		100	6.3x5.4	0.16	240	0.52
	150	5x5.4	0.26	160	1.00		150	6.3x5.4	0.16	240	0.52
		6.3x5.4	0.26	240	0.52			6.3x7.7	0.16	280	0.34
	220	6.3x5.4	0.26	240	0.52		220	6.3x7.7	0.16	280	0.34
	330	6.3x5.4	0.26	240	0.52		330	6.3x7.7	0.16	280	0.34
		6.3x7.7	0.26	280	0.34			8x10.2	0.16	600	0.16
	470	6.3x7.7	0.26	280	0.34		470	8x10.2	0.16	600	0.16
		8x6.2	0.26	280	0.34			680	8x10.2	0.16	600
	680	8x10.2	0.26	600	0.16		10x10.2		0.16	850	0.08
	1000	8x10.2	0.26	600	0.16		1000	10x10.2	0.16	850	0.08
	1200	8x10.2	0.26	600	0.16		25 (32)	10	4x5.4	0.14	90
0.26			600	0.16	22	4x5.4		0.14	90	1.93	
10x10.2		0.26	850	0.08	33	5x5.4		0.14	160	1.00	
1500	10x10.2	0.26	850	0.08	47	5x5.4		0.14	160	1.00	
1800	10x10.2	0.26	850	0.08		6.3x5.4		0.14	240	0.52	
		0.26	850	0.08	68	6.3x5.4		0.14	240	0.52	
10 (13)	33	4x5.4	0.19	90	1.93	100		6.3x7.7	0.14	280	0.34
		4x5.4	0.19	90	1.93			150	6.3x7.7	0.14	280
	47	4x5.4	0.19	90	1.93	220		8x10.2	0.14	600	0.16
		5x5.4	0.19	160	1.00			330	8x10.2	0.14	600
	68	4x5.4	0.19	90	1.93	470			10x10.2	0.14	850
		5x5.4	0.19	160	1.00			560	10x10.2	0.14	850
	100	5x5.4	0.19	160	1.00	35 (44)			10	4x5.4	0.12
		6.3x5.4	0.19	240	0.52		22	5x5.4	0.12	160	1.00
	150	5x5.4	0.19	160	1.00		33	5x5.4	0.12	160	1.00
		6.3x5.4	0.19	240	0.52			6.3x5.4	0.12	240	0.52
	220	6.3x5.4	0.19	240	0.52		47	6.3x5.4	0.12	240	0.52
		6.3x7.7	0.19	280	0.34			68	6.3x5.4	0.12	240
	330	6.3x7.7	0.19	280	0.34		100		6.3x7.7	0.12	280
470		6.3x7.7	0.19	280	0.34			150	6.3x7.7	0.12	280
	680	8x10.2	0.19	600	0.16		220		8x10.2	0.12	600
1000		8x10.2	0.19	600	0.16			330	8x10.2	0.12	600
	1200	10x10.2	0.19	850	0.08		330		10x10.2	0.12	850
10x10.2		0.19	850	0.08	16 (20)			22	4x5.4	0.16	90
	33	4x5.4	0.16	90			1.93	33	4x5.4	0.16	90
47		4x5.4	0.16	90	1.93	47	4x5.4	0.16	90	1.93	



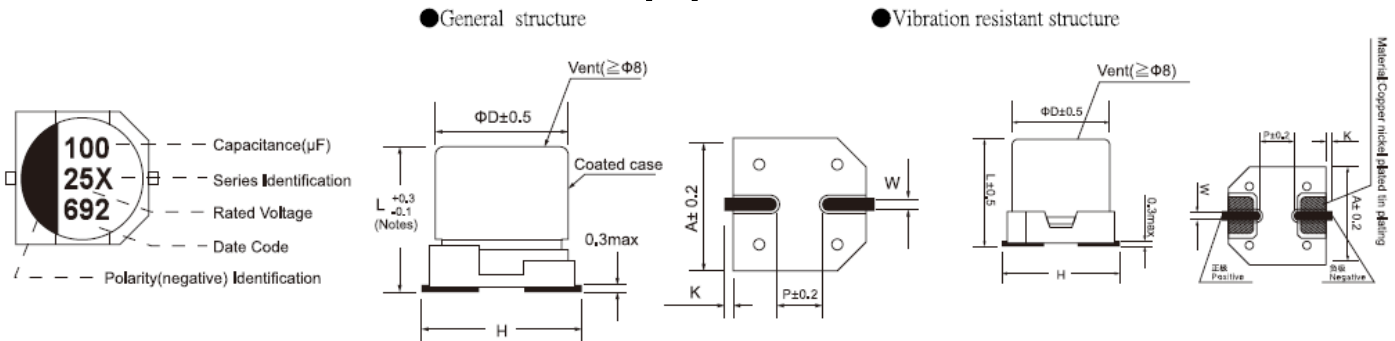
- Endurance: 105°C, 3000~5000 hours
- Recommended Applications: Suitable for AV(TV,Video,Audio),Monitor/Computer, Home appliance, OA/HA/Communication,Industrial, Automobile, Meter.
- Corresponding product to RoHS

Specifications

Item	Characteristics																												
Category Temperature Range	-55 ~ +105°C																												
Rated Voltage Range	6.3~ 50VDC																												
Rated Capacitance Range	1 ~ 1000 μ F																												
Capacitance Tolerance	$\pm 20\%$ at 120Hz, 20°C																												
Leakage Current (20°C)	$I \leq 0.01CV$ or $3 \mu A$, whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)																												
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	Shown in the table of standard rating																												
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <thead> <tr> <th>WV</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>Z(120HZ)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Z(-25°C) / Z(20°C)</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-40°C) / Z(20°C)</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	WV	6.3	10	16	25	35	50	Z(120HZ)							Z(-25°C) / Z(20°C)	2	2	2	2	2	2	Z(-40°C) / Z(20°C)	3	3	3	3	3	3
WV	6.3	10	16	25	35	50																							
Z(120HZ)																													
Z(-25°C) / Z(20°C)	2	2	2	2	2	2																							
Z(-40°C) / Z(20°C)	3	3	3	3	3	3																							
Endurance	<p>After applying rated voltage for 3000~5000hrs at 105°C, Stay back to 20 °C temperature measurement, the capacitors shall meet the following requirements.</p> <table border="1"> <tbody> <tr> <td>Capacitance Change</td> <td>Within $\pm 30\%$ of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than 200% of the specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> <tr> <td>DΦ</td> <td>4x5.4~6.3x7.7</td> <td>8x10.2~10x10.2</td> </tr> <tr> <td>Life</td> <td>3000hrs</td> <td>5000hrs</td> </tr> </tbody> </table>	Capacitance Change	Within $\pm 30\%$ of the initial value	Dissipation Factor	Not more than 200% of the specified value	Leakage Current	Not more than the specified value	D Φ	4x5.4~6.3x7.7	8x10.2~10x10.2	Life	3000hrs	5000hrs																
Capacitance Change	Within $\pm 30\%$ of the initial value																												
Dissipation Factor	Not more than 200% of the specified value																												
Leakage Current	Not more than the specified value																												
D Φ	4x5.4~6.3x7.7	8x10.2~10x10.2																											
Life	3000hrs	5000hrs																											
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, Stay back to 20 °C temperature measurement, the capacitor shall meet the same requirement as Endurance.																												

MARKING

Dimensions [mm]



(Notes) $\Phi 8 \sim \Phi 10 \& 6.3 \times 7.7 = L \pm 0.3$

Dimensions	ΦD	L	A	H	W	P	K
B01	4.0	5.4	4.3	5.5 Max	0.65 \pm 0.1	1.0	0.35+0.15/-0.2
C01	5.0	5.4	5.3	6.5 Max	0.65 \pm 0.1	1.5	0.35+0.15/-0.2
E01	6.3	5.4	6.6	7.8 Max	0.65 \pm 0.1	1.8	0.35+0.15/-0.2
E04	6.3	7.7	6.6	7.8 Max	0.65 \pm 0.1	1.8	0.35+0.15/-0.2
G02	8.0	6.2	8.3	9.5 Max	0.65 \pm 0.1	2.2	0.35+0.15/-0.2
G03	8.0	10.2	8.3	10.0 Max	0.90 \pm 0.2	3.1	0.70 \pm 0.20
H03	10.0	10.2	10.3	12.0 Max	0.90 \pm 0.2	4.6	0.70 \pm 0.20

Multiplier for Ripple Current

Frequency (Hz)	120	1K	10K	100K
Coefficient	0.70	0.80	0.90	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms 105°C 100KHz)	Impedance (Ω,20°C) (100KHz)
6.3 (8)	22	4x5.4	0.26	90	1.93
	33	4x5.4	0.26	90	1.93
	47	5x5.4	0.26	160	1.00
	100	6.3x5.4	0.26	240	0.52
	150	6.3x7.7	0.26	240	0.30
	220	6.3x5.4	0.26	240	0.52
		6.3x7.7	0.26	240	0.30
		8x10.2	0.26	600	0.26
		8x10.2	0.26	600	0.16
	470	8x10.2	0.26	600	0.16
680	10x10.2	0.26	850	0.12	
1000	10x10.2	0.26	850	0.12	
10 (13)	22	4x5.4	0.19	90	1.93
	33	5x5.4	0.19	160	1.00
	47	6.3x5.4	0.19	190	0.52
	100	6.3x5.4	0.19	190	0.52
		6.3x7.7	0.19	190	0.52
	150	6.3x5.4	0.19	190	0.52
		6.3x7.7	0.19	240	0.34
	220	6.3x7.7	0.19	240	0.34
		8x6.2	0.19	240	0.34
		8x10.2	0.19	600	0.16
	330	8x10.2	0.19	600	0.16
	470	8x10.2	0.19	600	0.16
		10x10.2	0.19	850	0.12
	680	10x10.2	0.19	850	0.12
1000	10x10.2	0.19	850	0.12	
16 (20)	10	4x5.4	0.16	90	1.93
	22	5x5.4	0.16	160	1.00
	33	6.3x5.4	0.16	240	0.52
	47	5x5.4	0.16	160	1.00
		6.3x5.4	0.16	240	0.52
	100	6.3x5.4	0.16	240	0.52
		6.3x7.7	0.16	280	0.34
		8x10.2	0.16	300	0.29
	150	6.3x7.7	0.16	280	0.34
		8x10.2	0.16	370	0.22
	220	8x10.2	0.16	370	0.22
	330	8x10.2	0.16	600	0.16

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms 105°C 100KHz)	Impedance (Ω,20°C) (100KHz)
16 (20)	470	8x10.2	0.16	600	0.16
		10x10.2	0.16	850	0.12
		10x10.2	0.16	850	0.12
35 (44)	4.7	4x5.4	0.12	90	1.93
	10	5x5.4	0.12	160	1.00
	15	5x5.4	0.12	160	1.00
	22	5x5.4	0.12	160	1.00
	33	6.3x5.4	0.12	240	0.52
		6.3x5.4	0.12	240	0.52
		6.3x7.7	0.12	280	0.34
		8x6.2	0.12	300	0.26
	47	8x10.2	0.12	280	0.34
		6.3x7.7	0.12	280	0.34
		6.3x7.7	0.12	230	0.40
	100	8x10.2	0.12	600	0.16
		10x10.2	0.12	670	0.16
	150	8x10.2	0.12	600	0.16
		10x10.2	0.12	850	0.12
	220	8x10.2	0.12	600	0.16
		10x10.2	0.12	850	0.12
330	10x10.2	0.12	850	0.12	
50 (63)	1	4x5.4	0.12	60	5.00
	2.2	4x5.4	0.12	60	5.00
	3.3	4x5.4	0.12	60	5.00
	4.7	5x5.4	0.12	95	4.00
	10	6.3x5.4	0.12	140	2.60
	22	6.3x5.4	0.12	70	2.00
		6.3x7.7	0.12	230	1.30
	33	8x10.2	0.12	350	0.50
		6.3x7.7	0.12	230	1.30
	47	8x10.2	0.12	350	0.50
		10x10.2	0.12	670	0.34
		8x10.2	0.12	350	0.50
	68	8x10.2	0.12	350	0.50
		10x10.2	0.12	670	0.34
	100	8x10.2	0.12	350	0.50
		10x10.2	0.12	670	0.34
150	10x10.2	0.12	670	0.34	
	10x10.2	0.12	670	0.34	

HV 125°C High temperature

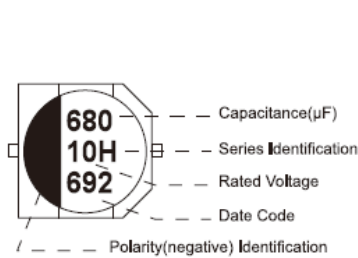


- Endurance: 125°C, 1000~2000 hours
- Recommended Applications: Automatic Mounting and Reflow Soldering, Industrial, Automobile, Meter
- Corresponding product to RoHS

Specifications

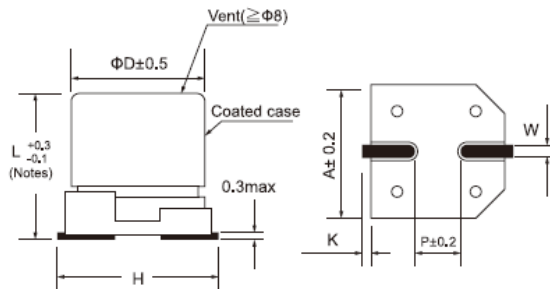
Item	Characteristics																								
Category Temperature Range	-40 ~ +125°C																								
Rated Voltage Range	10 ~ 50VDC																								
Rated Capacitance Range	47~ 1000 μ F																								
Capacitance Tolerance	$\pm 20\%$ at 120Hz, 20°C																								
Leakage Current (20°C)	$I \leq 0.01CV$ or $3 \mu A$, whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)																								
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	Shown in the table of standard rating																								
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <thead> <tr> <th>WV</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>Z(120HZ)</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Z(-25°C) / Z(20°C)</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-40°C) / Z(20°C)</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	WV	10	16	25	35	50	Z(120HZ)						Z(-25°C) / Z(20°C)	2	2	2	2	2	Z(-40°C) / Z(20°C)	3	3	3	3	3
WV	10	16	25	35	50																				
Z(120HZ)																									
Z(-25°C) / Z(20°C)	2	2	2	2	2																				
Z(-40°C) / Z(20°C)	3	3	3	3	3																				
Endurance	<p>After applying rated voltage for 1000~2000hrs at 125°C, Stay back to 20 °C temperature measurement, the capacitors shall meet the following requirements.</p> <table border="1"> <tbody> <tr> <td>Capacitance Change</td> <td colspan="2">Within $\pm 20\%$ of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td colspan="2">Not more than 200% of the specified value</td> </tr> <tr> <td>DΦ</td> <td>6.3x7.7-8x6.2</td> <td>$\geq 8 \times 10.2$</td> </tr> <tr> <td>Life</td> <td>1000hrs</td> <td>2000hrs</td> </tr> <tr> <td>Leakage Current</td> <td colspan="2">Not more than the specified value</td> </tr> </tbody> </table>	Capacitance Change	Within $\pm 20\%$ of the initial value		Dissipation Factor	Not more than 200% of the specified value		D Φ	6.3x7.7-8x6.2	$\geq 8 \times 10.2$	Life	1000hrs	2000hrs	Leakage Current	Not more than the specified value										
Capacitance Change	Within $\pm 20\%$ of the initial value																								
Dissipation Factor	Not more than 200% of the specified value																								
D Φ	6.3x7.7-8x6.2	$\geq 8 \times 10.2$																							
Life	1000hrs	2000hrs																							
Leakage Current	Not more than the specified value																								
Shelf Life	After placed at 125°C without voltage applied for 1000 hours, Stay back to 20 °C temperature measurement, the capacitor shall meet the same requirement as Endurance.																								

MARKING



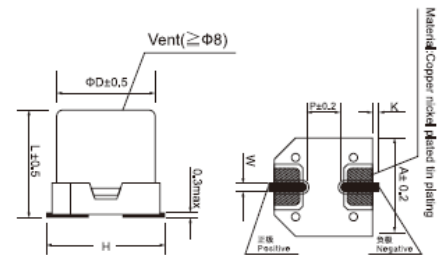
Dimensions [mm]

● General structure



(注) $\Phi 8 \sim \Phi 10 \& 6.3 \times 7.7 = L \pm 0.3$

● Vibration resistant structure



(注) $\geq \Phi 12.5 = L \pm 1.0$

Material: Copper nickel plated in plating

Dimensions	ΦD	L	A	H	W	P	K
E04	6.3	7.7	6.6	7.8 Max	0.65 ± 0.1	1.8	$0.35 + 0.15 / - 0.2$
G02	8.0	6.2	8.3	9.5 Max	0.65 ± 0.1	2.2	$0.35 + 0.15 / - 0.2$
G03	8.0	10.2	8.3	10.0 Max	0.90 ± 0.2	3.1	0.70 ± 0.20
H03	10.0	10.2	10.3	12.0 Max	0.90 ± 0.2	4.6	0.70 ± 0.20

Multiplier for Ripple Current

Frequency (Hz)	120	1K	10K	100K
Coefficient	0.70	0.80	0.90	1.00

HV 125°C High temperature

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$ (%)	Ripple current (mA/rms 125°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$ (%)	Ripple current (mA/rms 125°C) (120Hz)
10(13)	100	8X6.2	0.26	75	35(44)	10	8x6.2	0.14	40
	150	6.3x7.7	0.26	70			8x10.2	0.14	50
		8x6.2	0.26	75		22	6.3x7.7	0.14	70
	220	8x10.2	0.26	130			33	6.3x7.7	0.14
	330	8x10.2	0.26	130		8x6.2		0.14	75
		470	8x10.2	0.26		130	47	6.3x7.7	0.14
	10x10.2		0.26	180		8X6.2		0.14	75
	680	10x10.2	0.26	180		8x10.2		0.14	130
16(20)	470	10x10.2	0.26	180		100	8x6.2	0.14	75
		8x6.2	0.20	70			8x10.2	0.14	130
	100	6.3x7.7	0.20	70		10x10.2	0.14	180	
		8x6.2	0.20	75		120	8x10.2	0.14	130
	150	8x10.2	0.20	130			150	10x10.2	0.14
	220	8x10.2	0.20	130		220		8x10.2	0.14
	330	8x10.2	0.20	180			10x10.2	0.14	180
25(32)	470	10x10.2	0.20	180		50(63)	10	8x6.2	0.12
		6.3x7.7	0.18	70	8x10.2			0.12	75
	47	8x6.2	0.18	75	22		6.3x7.7	0.12	70
		6.3x7.7	0.18	70			8x6.2	0.12	75
	100	8x6.2	0.18	75	33		8x10.2	0.12	130
		8x10.2	0.18	130			47	8x10.2	0.12
	150	8x10.2	0.18	130	82			8x10.2	0.12
		8x10.2	0.18	130			100	10x10.2	0.12
	220	8x10.2	0.18	130	150			10x10.2	0.12
		10x10.2	0.18	180			220	10x10.2	0.12
	330	10x10.2	0.18	180					

NV Non-polar Series

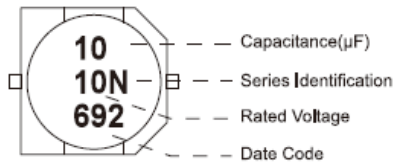
- Endurance: 105°C 2000 hours
- Recommended Applications: Non-polarized, Low profile vertical chip, 5.5mm height ($\leq \Phi 6.3$)
- Corresponding product to RoHS



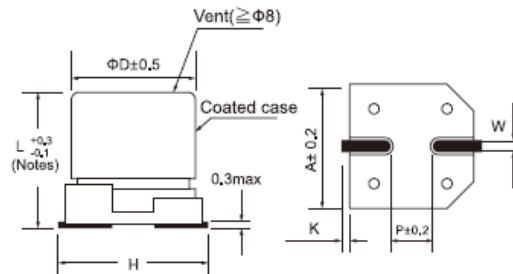
Specifications

Item	Characteristics																							
Category Temperature Range	-55 ~ +105°C																							
Rated Voltage Range	6.3 ~ 50VDC																							
Rated Capacitance Range	1 ~ 47 μ F																							
Capacitance Tolerance	$\pm 20\%$ at 120Hz, 20°C																							
Leakage Current (20°C)	$I \leq 0.01CV$ or $3 \mu A$, whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)																							
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	Shown in the table of standard rating																							
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <thead> <tr> <th rowspan="2">WV Z(120HZ)</th> <th colspan="5">WV</th> </tr> <tr> <th>6.3</th> <th>10</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>Z(-25°C) / Z(20°C)</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-40°C) / Z(20°C)</td> <td>8</td> <td>6</td> <td>4</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	WV Z(120HZ)	WV					6.3	10	25	35	50	Z(-25°C) / Z(20°C)	4	3	2	2	2	Z(-40°C) / Z(20°C)	8	6	4	3	3
WV Z(120HZ)	WV																							
	6.3	10	25	35	50																			
Z(-25°C) / Z(20°C)	4	3	2	2	2																			
Z(-40°C) / Z(20°C)	8	6	4	3	3																			
Endurance	<p>After applying rated voltage for 2000Hrs at 105°C, Stay back to 20 °C temperature measurement, the capacitors shall meet the following requirements.</p> <table border="1"> <tbody> <tr> <td>Capacitance Change</td> <td>Within $\pm 20\%$ of the initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than 200% of the specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Not more than the specified value</td> </tr> </tbody> </table>	Capacitance Change	Within $\pm 20\%$ of the initial value	Dissipation Factor	Not more than 200% of the specified value	Leakage Current	Not more than the specified value																	
Capacitance Change	Within $\pm 20\%$ of the initial value																							
Dissipation Factor	Not more than 200% of the specified value																							
Leakage Current	Not more than the specified value																							
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, Stay back to 20 °C temperature measurement, the capacitor shall meet the same requirement as Endurance.																							

MARKING



Dimensions [mm]



(Notes) $\Phi 8 \sim \Phi 10 \& 6.3 \times 7.7 = L \pm 0.3$

Dimensions	ΦD	L	A	H	W	P	K
B01	4.0	5.4	4.3	5.5 Max	0.65 ± 0.1	1.0	$0.35 + 0.15 / - 0.2$
C01	5.0	5.4	5.3	6.5 Max	0.65 ± 0.1	1.5	$0.35 + 0.15 / - 0.2$
E01	6.3	5.4	6.6	7.8 Max	0.65 ± 0.1	1.8	$0.35 + 0.15 / - 0.2$

Multiplier for Ripple Current

Frequency (Hz)	60	120	1K	10K
Coefficient	0.85	1.00	1.10	1.20

NV Non-polar Series

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms 105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms 105°C) (120Hz)
6.3(8)	22	5x5.4	0.52	29	25(32)	4.7	5x5.4	0.28	21
	33	6.3x5.4	0.52	43		10	6.3x5.4	0.28	28
	47	6.3x5.4	0.52	46	35(44)	2.2	4X5.4	0.24	12
10(13)	10	4X5.4	0.40	25		3.3	5x5.4	0.24	21
	22	6.3x5.4	0.40	39		4.7	5x5.4	0.24	22
	33	6.3x5.4	0.40	43		10	6.3x5.4	0.24	30
16(20)	4.7	4X5.4	0.32	20	50(63)	1	4X5.4	0.24	10
	10	5x5.4	0.32	25		2.2	5x5.4	0.24	16
	22	6.3x5.4	0.32	39		3.3	5x5.4	0.24	21
25(32)	3.3	4X5.4	0.28	12		4.7	6.3x5.4	0.24	31

S5

Low Profile Series

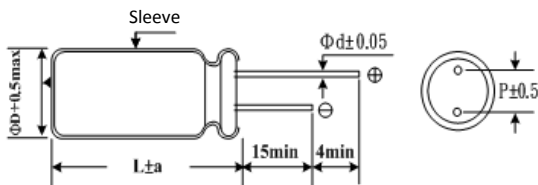
- Endurance: 105°C 1000hours
- Recommended Applications :Applicable for VTR,Camera,Car Audio,Miniaudio and other industrial/commercial applications
- Corresponding product to RoHS



■ SPECIFICATIONS

Item	Characteristics																						
Category Temperature Range	-40 ~ +105°C																						
Rated Voltage Range	6.3 ~ 50VDC																						
Rated Capacitance Range	1 ~ 470 μ F																						
Capacitance Tolerance	$\pm 20\%$ at 120Hz, 20°C																						
Leakage Current (20°C)	I=0.01CV or 3(μ A) whichever is greater.(After rated voltage applied for 2 minutes) I : Max. leakage current (μ A), C : Nominal capacitance (μ F), V : Rated voltage (V)																						
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	<table border="1"> <tr> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>tan δ</td> <td>0.24</td> <td>0.20</td> <td>0.17</td> <td>0.15</td> <td>0.12</td> <td>0.10</td> </tr> </table>	WV	6.3	10	16	25	35	50	tan δ	0.24	0.20	0.17	0.15	0.12	0.10								
WV	6.3	10	16	25	35	50																	
tan δ	0.24	0.20	0.17	0.15	0.12	0.10																	
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <tr> <td rowspan="3">Z(120Hz)</td> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>Z-25°C / Z+20°C</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>8</td> <td>6</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> </tr> </table>	Z(120Hz)	WV	6.3	10	16	25	35	50	Z-25°C / Z+20°C	4	3	2	2	2	2	Z-40°C / Z+20°C	8	6	4	4	3	3
Z(120Hz)	WV		6.3	10	16	25	35	50															
	Z-25°C / Z+20°C		4	3	2	2	2	2															
	Z-40°C / Z+20°C	8	6	4	4	3	3																
Endurance	After apply rated voltage for 1000 hours at 105°C,the capacitors shall meet the following requirements. <table border="1"> <tr> <td>Capacitance change</td> <td>Within $\pm 20\%$ of initial value</td> </tr> <tr> <td>D.F. (tan δ)</td> <td>Not more than 200% of specified value</td> </tr> <tr> <td>Leakage current</td> <td>initial specified value or less</td> </tr> </table>	Capacitance change	Within $\pm 20\%$ of initial value	D.F. (tan δ)	Not more than 200% of specified value	Leakage current	initial specified value or less																
Capacitance change	Within $\pm 20\%$ of initial value																						
D.F. (tan δ)	Not more than 200% of specified value																						
Leakage current	initial specified value or less																						
Shelf Life	After placed at 105°C without voltage applied for 500 hours,the capacitors shall meet the sane requirement as Endurance.																						

■ Dimensions [mm]



ΦD	4.0	5.0	6.3	8.0
P	1.5	2.0	2.5	3.5
Φd	0.45			
a	1.0			

Notes : 8 Φ have ven

■ Multiplier for Ripple Current

Freq. (Hz)	120	300	1K	10K
1~47 μ F	1.00	1.20	1.30	1.50
100~330 μ F	1.00	1.10	1.15	1.20

S5

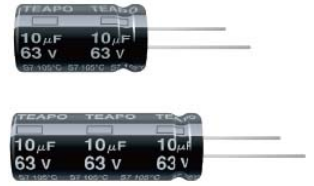
Low profile Series

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)		
6.3 (8)	10	4x5	0.24	18	16 (20)	47	5x5	0.17	54		
	22	4x5	0.24	28			6.3x5	0.17	58		
	33	4x5	0.24	33			6.3x5	0.17	85		
	47	4x5	4x5	0.24	35	25 (32)	100	4x5	0.15	16	
			5x5	0.24	45			4.7	4x5	0.15	20
	100	5x5	5x5	0.24	55			10	4x5	0.15	27
			6.3x5	0.24	70			22	6.3x5	0.15	42
	220	6.3x5	0.24	90	33			5x5	5x5	0.15	45
330	8x5	0.24	115	6.3x5					0.15	53	
470	8x5	8x5	0.24	100	47			6.3x5	5x5	0.15	55
		6.3x5	0.15	65							
10 (13)	10	4x5	0.20	20	100	8x5	0.15	90			
	22	5x5	0.20	33	35 (44)	4.7	4x5	0.12	18		
	33	4x5	0.20	34			10	5x5	0.12	30	
	47	5x5	5x5	0.20	41	22	6.3x5	0.12	48		
			6.3x5	0.20	54	50 (63)	1.0	4x5	0.10	9	
	68	6.3x5	0.20	54	2.2			4x5	0.10	13	
100	6.3x5	0.20	80	3.3	4x5			0.10	17		
4.7	4x5	4x5	0.17	20	4.7			4x5	0.10	17	
		4x5	0.17	23				5x5	0.10	20	
10	4x5	0.17	29	10	6.3x5	6.3x5	0.10	33			
22	4x5	0.17	29			22	6.3x5	6.3x5	0.1	55	
22	5x5	0.17	37								
16 (20)	33	5x5	0.17	44							
		6.3x5	0.17	49							

S7 Low profice Series

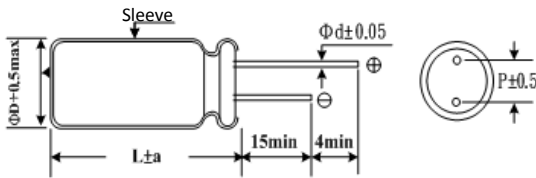
- Endurance: 105°C 1000 hours
- Recommended Applications :For Portable Micro Computer, Disk Driver, Small Calculator and Audio equipmng...etc
- Corresponding product to RoHS



SPECIFICATIONS

Item	Characteristics							
Category Temperature Range	-40 ~ +105°C							
Rated Voltage Range	6.3 ~ 63VDC							
Rated Capacitance Range	1 ~ 470 µF							
Capacitance Tolerance	± 20 % (120Hz , 20°C)							
Leakage Current (20°C)	I=0.01CV or 3(µA) whichever is greater.(After rated voltage applied for 2 minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)							
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	6.3	10	16	25	35	50	63
	tan δ	0.24	0.20	0.17	0.15	0.12	0.10	0.08
Low Temperature Stability Impedance Ratio (MAX)	WV	6.3	10	16	25	35	50	63
	Z(120Hz)							
	Z-25°C / Z+20°C	4	3	2	2	2	2	2
	Z-40°C / Z+20°C	8	6	4	4	3	3	3
Endurance	After applying rated voltage for 1000 hours at 105°C ,the capacitors shall meet the following requirements.							
	Capacitance change	Within ± 20% of initial value						
	D.F. (tan δ)	Not more than 200% of specified value						
	Leakage current	initial specified value or less						
Shelf Life	After placed at 105°C without voltage applied for 500 hours,the capacitors shall meet the sane requirement as Endurance.							

Dimensions [mm]



ΦD	4.0	5.0	6.3	8.0
P	1.5	2.0	2.5	3.5
Φd	0.45			
a	1.0			

Notes : 8 Φ have ven

Multiplier for Ripple Current

Freq. (Hz)	50	120	300	1K	10K
1~47 µF	0.75	1.00	1.20	1.30	1.50
100~330 µF	0.75	1.00	1.10	1.15	1.20

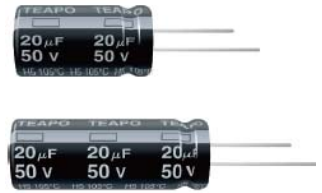
■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)
6.3 (8)	22	4x7	0.24	37	25 (32)	4.7	4x7	0.15	24
	33	5x7	0.24	42		10	4x7	0.15	33
	47	4x7	0.24	46			5x7	0.15	35
		5x7	0.24	55			6.3x7	0.15	35
	100	5x7	0.24	75		22	4x7	0.15	43
		6.3x7	0.24	90			5x7	0.15	51
	220	6.3x7	0.24	130		6.3x7	0.15	53	
330	8x7	0.24	140	33		5x7	0.15	55	
10 (13)	22	4x7	0.20			31	6.3x7	0.15	65
		5x7	0.20	38		47	5x7	0.15	67
	33	4x7	0.20	39			6.3x7	0.15	79
		5x7	0.20	47		100	6.3x7	0.15	120
	47	4x7	0.20	50	8x7		0.15	120	
		5x7	0.20	60	35 (44)		4.7	4x7	0.12
	100	6.3x7	0.20	60		10	5x7	0.12	24
5x7		0.20	85	4x7			0.12	34	
220	6.3x7	0.20	135	22		5x7	0.12	36	
16 (20)	2.2	4x7	0.17			7	6.3x7	0.12	48
		4x7	0.17	13		33	6.3x7	0.12	57
	4.7	4x7	0.17	19		47	6.3x7	0.12	70
	10	4x7	0.17	29	6.3x7		0.12	81	
	22	4x7	0.17	36	50 (63)	1.0	4x7	0.10	10
		5x7	0.17	44		2.2	4x7	0.10	19
	33	4x7	0.17	50		3.3	4x7	0.10	24
		5x7	0.17	57		4.7	4x7	0.10	29
	47	5x7	0.17	75			5x7	0.10	31
		6.3x7	0.17	77		10	4x7	0.10	37
	68	5x7	0.17	84			5x7	0.10	45
	100	5x7	0.17	94	6.3x7	0.10	45		
6.3x7		0.17	110	22	6.3x7	0.10	65		
150	6.3x7	0.17	120	63 (79)	1.0	4x7	0.08	13	
220	8x7	0.17	140		2.2	4x7	0.08	21	
	8x9	0.17	140		3.3	4x7	0.08	26	
330	8x9	0.17	155		4.7	4x7	0.08	26	
470	8x9	0.17	165			6.3x7	0.08	33	
	6.3x7	0.17	165		10	5x7	0.08	42	
						6.3x7	0.08	50	

H5 Low profice Series

- Endurance: 105°C 2000hours
Low proglie/minianure,5mm height
- Recommended Applications :Monitor/Compuer,AV(TV,Video,Audio),
OA/HA/Communication,Small signal
- Corresponding product to RoHS

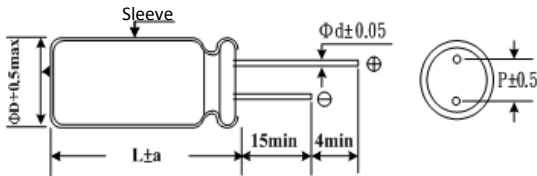
H5
↑
S5 Long Life



SPECIFICATIONS

Item	Characteristics																						
Category Temperature Range	-40 ~ +105°C																						
Rated Voltage Range	6.3~ 50VDC																						
Rated Capacitance Range	1 ~ 330 µF																						
Capacitance Tolerance	± 20 % at 120Hz , 20°C																						
Leakage Current (20°C)	I=0.01CV or 3(µA) whichever is greater.(After rated voltage applied for 2 minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)																						
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	<table border="1"> <tr> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>tan δ</td> <td>0.26</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.13</td> <td>0.12</td> </tr> </table> <p>Down size tan δ add 3%</p>	WV	6.3	10	16	25	35	50	tan δ	0.26	0.24	0.20	0.16	0.13	0.12								
WV	6.3	10	16	25	35	50																	
tan δ	0.26	0.24	0.20	0.16	0.13	0.12																	
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <tr> <td rowspan="3">Z(120Hz) Z-25°C / Z+20°C Z-40°C / Z+20°C</td> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td></td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td></td> <td>8</td> <td>6</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> </table>	Z(120Hz) Z-25°C / Z+20°C Z-40°C / Z+20°C	WV	6.3	10	16	25	35	50		4	3	2	2	2	2		8	6	4	4	4	4
Z(120Hz) Z-25°C / Z+20°C Z-40°C / Z+20°C	WV		6.3	10	16	25	35	50															
			4	3	2	2	2	2															
		8	6	4	4	4	4																
Endurance	After applying rated voltage for 2000 hours at 105°C ,the capacitors shall meet the following requirements. <table border="1"> <tr> <td>Capacitance change</td> <td>Within ± 20% of initial value</td> </tr> <tr> <td>D.F. (tan δ)</td> <td>Not more than 200% of specified value</td> </tr> <tr> <td>Leakage current</td> <td>initial specified value or less</td> </tr> </table>	Capacitance change	Within ± 20% of initial value	D.F. (tan δ)	Not more than 200% of specified value	Leakage current	initial specified value or less																
Capacitance change	Within ± 20% of initial value																						
D.F. (tan δ)	Not more than 200% of specified value																						
Leakage current	initial specified value or less																						
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitors shall meet the sane requirement as Endurance.																						

Dimensions [mm]



ΦD	4.0	5.0	6.3	8.0
P	1.5	2.0	2.5	3.5
Φd	0.45	0.45	0.45	0.45
a	1.0	1.0	1.0	1.0

Notes : 8 Φ have ven

Multiplier for Ripple Current

Freq. (Hz)	50	120	1K	10K
6.3~16V	0.80	1.00	1.10	1.20
25~50V	0.80	1.00	1.50	1.70

H5 Low profile Series

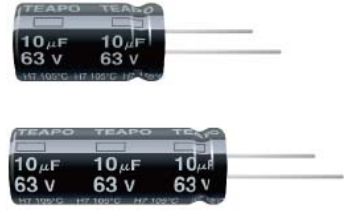
■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)
6.3 (8)	10	4x5	0.26	15	16 (20)	47	6.3x5	0.20	55
	22	4x5	0.26	25		100	6.3x5	0.2	90
	33	5x5	0.26	30	25 (32)	4.7	4x5	0.16	15
	47	5x5	0.26	35		10	4x5	0.16	25
	100	6.3x5	0.26	60		22	6.3x5	0.16	40
	220	8x5	0.26	95		33	6.3x5	0.16	50
	330	8x5	0.26	120	35 (44)	4.7	4x5	0.13	15
10	4x5	0.24	20	10		5x5	0.13	30	
22	5x5	0.24	25	22		6.3x5	0.13	45	
10 (13)	33	5x5	0.24	35	50 (63)	1.0	4x5	0.12	10
	47	6.3x5	0.24	45		2.2	4x5	0.12	15
	100	6.3x5	0.24	70		3.3	4x5	0.12	15
	4.7	4x5	0.20	10		4.7	5x5	0.12	20
	10	4x5	0.20	20		10	6.3x5	0.12	35
22	5x5	0.20	30	22		6.3x5	0.12	55	
16 (20)	33	5x5	0.20	40					

H7 Low profile Series

- Endurance: 105°C 2000 hours
Low profile/minature, 7mm/9mm height
- Recommended Applications : Monitor/Computer, AV(TV, Video, Audio),
OA/HA/Communication, Small signal
- Corresponding product to RoHS

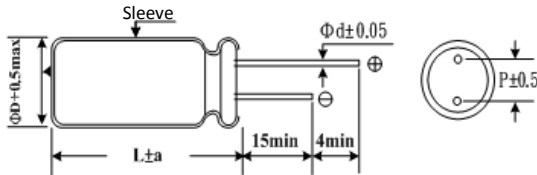
H7
↑ Long Life
S7



■ SPECIFICATIONS

Item	Characteristics																						
Category Temperature Range	-40 ~ +105°C																						
Rated Voltage Range	6.3 ~ 63VDC																						
Rated Capacitance Range	1 ~ 470 µF																						
Capacitance Tolerance	± 20 % at 120Hz , 20°C																						
Leakage Current (20°C)	I=0.01CV or 3(µA) whichever is greater.(After rated voltage applied for 2 minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)																						
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	<table border="1"> <tr> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <td>tan δ</td> <td>0.24</td> <td>0.20</td> <td>0.18</td> <td>0.15</td> <td>0.13</td> <td>0.12</td> <td>0.10</td> </tr> </table> <p>Down size tan δ add 3%</p>	WV	6.3	10	16	25	35	50	63	tan δ	0.24	0.20	0.18	0.15	0.13	0.12	0.10						
WV	6.3	10	16	25	35	50	63																
tan δ	0.24	0.20	0.18	0.15	0.13	0.12	0.10																
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <tr> <td rowspan="3">Z(120Hz) WV</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <td>Z-25°C / Z+20°C</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>8</td> <td>6</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> </table>	Z(120Hz) WV	6.3	10	16	25	35	50	63	Z-25°C / Z+20°C	4	3	2	2	2	2	Z-40°C / Z+20°C	8	6	4	4	4	4
Z(120Hz) WV	6.3		10	16	25	35	50	63															
	Z-25°C / Z+20°C		4	3	2	2	2	2															
	Z-40°C / Z+20°C	8	6	4	4	4	4																
Endurance	After applying rated voltage for 2000 hours at 105°C, the capacitors shall meet the following requirements. <table border="1"> <tr> <td>Capacitance change</td> <td>Within ± 20% of initial value</td> </tr> <tr> <td>D.F. (tan δ)</td> <td>Not more than 200% of specified value</td> </tr> <tr> <td>Leakage current</td> <td>initial specified value or less</td> </tr> </table>	Capacitance change	Within ± 20% of initial value	D.F. (tan δ)	Not more than 200% of specified value	Leakage current	initial specified value or less																
Capacitance change	Within ± 20% of initial value																						
D.F. (tan δ)	Not more than 200% of specified value																						
Leakage current	initial specified value or less																						
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, the capacitors shall meet the same requirement as Endurance.																						

■ Dimensions [mm]



ΦD	4.0	5.0	6.3	8.0
P	1.5	2.0	2.5	3.5
Φd	0.45	0.45	0.45	0.5
a	1.0	1.0	1.0	1.0

Notes : 8 Φ have ven

■ Multiplier for Ripple Current

Freq. (Hz)	50	120	1K	10K
6.3~16V	0.80	1.00	1.1	1.2
25~35V	0.80	1.00	1.5	1.7
50~63V	0.80	1.00	1.6	1.9

H7 Low profile Series

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)
6.3 (8)	33	4x7	0.24	35
	47	5x7	0.24	50
	100	5x7	0.24	70
	220	6.3x7	0.24	110
	330	8x7	0.24	150
	470	8x9	0.24	200
10 (13)	22	4x7	0.20	30
	33	4x7	0.20	40
	47	5x7	0.20	60
	100	6.3x7	0.20	90
	220	6.3x7	0.20	135
	330	8x9	0.20	160
16 (20)	470	8x9	0.20	210
	2.2	4x7	0.18	10
	3.3	4x7	0.18	10
	4.7	4x7	0.18	15
	10	4x7	0.18	25
	22	4x7	0.18	35
	33	5x7	0.18	50
	47	6.3x7	0.18	70
	100	6.3x7	0.18	110
	220	8x9	0.18	180
330	8x9	0.18	210	

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)
25 (32)	4.7	4x7	0.15	20
	10	4x7	0.15	30
	22	5x7	0.15	50
	33	6.3x7	0.15	65
	47	6.3x7	0.15	70
	100	8x7	0.15	115
35 (44)	4.7	4x7	0.13	25
	10	4x7	0.13	35
	22	5x7	0.13	60
	33	6.3x7	0.13	70
	47	8x7	0.13	80
	100	8x9	0.13	145
50 (63)	1.0	4x7	0.12	10
	2.2	4x7	0.12	20
	3.3	4x7	0.12	25
	4.7	4x7	0.12	30
	10	5x7	0.12	35
	22	6.3x7	0.12	65
	33	8x7	0.12	80
	47	8x9	0.12	100
63 (79)	1.0	4x7	0.10	10
	2.2	4x7	0.10	20
	3.3	4x7	0.10	25
	4.7	5x7	0.10	35
	10	6.3x7	0.10	50

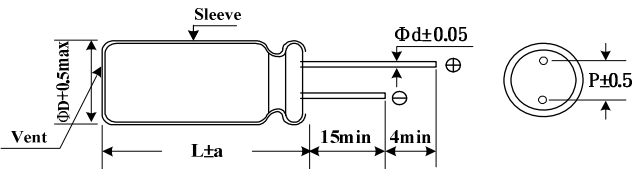


- Endurance: 85°C 2000hours
- Recommended Applications :For general purpose , decoupling , by pass and filtering circuit in entertainment electronics
- Corresponding product to RoHS

■ SPECIFICATIONS

Item	Characteristics	
Category Temperature Range	-40~+85°C	-25~+85°C
Rated Voltage Range	6.3 ~ 100VDC	160 ~ 500VDC
Rated Capacitance Range	1 ~ 22000 µF	1 ~ 470 µF
Capacitance Tolerance	± 20 % (120Hz , 20°C)	± 20 % (120Hz , 20°C)
Leakage Current (20°C)	I=0.01CV or 3 µ A whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (µ A), C : Nominal capacitance (µ F), V : Rated voltage (V)	
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	6.3 10 16 25 35 50 63 100 160~250 350~500
	tan δ	0.24 0.20 0.16 0.14 0.12 0.10 0.10 0.10 0.20 0.24
When nominal capacitance is 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 Impedance Ratio (MAX)	Z(120Hz)	6.3 10 16 25 35~100 160~250 315~350 400~500
	Z-25°C / Z+20°C	8 6 5 3 3 7 10 15
	Z-40°C / Z+20°C	10 8 6 4 3 — — —
Endurance	After applying rated voltage for 2000 hours at 85°C,Stay back to 20 °C temperature measurement, the capacitors shall meet the following requirements.	
	Capacitance change	Within ± 20% of initial value
	D.F. (tan δ)	Not more than 200% of specified value
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied.	

■ Dimensions [mm]



ΦD	5	6.3	8	10	13	16	18	22
P	2.0	2.5	3.5	5.0	7.5	10.0	10.0	10.0
Φd	0.5	0.5	0.6	0.6	0.8	0.8	0.8	0.8
a	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0

■ Multiplier for Ripple Current

Freq. (Hz)	120	300	1K	10~100K
6.3 ~ 100V ≤68 µ F	1.00	1.20	1.30	1.50
6.3 ~ 100V 100 ~ 680 µ F	1.00	1.10	1.15	1.20
6.3 ~ 100V 1000 ~ 22000 µ F	1.00	1.05	1.10	1.15
160 ~ 450V ≤220 µ F	1.00	1.25	1.40	1.40
160 ~ 450V >220 µ F	1.00	1.10	1.13	1.13
500V all volume(µ F)	1.00	1.05	1.10	1.10

■ STANDARD RATINGS

Rated Voltage (Surge Voltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms85°C) (120Hz)	Rated Voltage (Surge Voltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms85°C) (120Hz)	
6.3 (8)	22	5x11	0.24	35	25 (32)	220	8x11	0.14	290	
	33	5x11	0.24	55		330	8x11	0.14	315	
	47	5x11	0.24	75		470	8x15	0.14	420	
	100	5x11	0.24	130			10x12.5	0.14	460	
	220	5x11	0.24	200		680	10x15	0.14	550	
		6.3x11	0.24	240			10x20	0.14	760	
	330	6.3x11	0.24	260		1000	13x16	0.14	760	
	470	6.3x11	0.24	330			13x25	0.14	1300	
	680	8x11	0.24	410		2200	16x25	0.14	1660	
		8x11	0.24	460			16x32	0.14	1950	
	1000	10x12.5	0.24	580		4700	18x36	0.14	2550	
		10x20	0.24	840			22x40	0.14	2800	
	3300	10x20	0.24	1000		15000	22x40	0.14	3200	
	4700	13x20	0.24	1300						
	6800	13x25	0.24	1550						
	10000	16x25	0.24	1900						
15000	16x36	0.24	2500							
22000	18x40	0.24	3650							
10 (13)	10	5x11	0.20	35	35 (44)	10	5x11	0.12	60	
	22	5x11	0.20	55		22	5x11	0.12	95	
	33	5x11	0.20	80		33	5x11	0.12	120	
	47	5x11	0.20	95		47	5x11	0.12	120	
	100	5x11	0.20	180		100	6.3x11	0.12	185	
		6.3x11	0.20	250			220	8x11	0.12	290
	220	6.3x11	0.20	265		330	10x12.5	0.12	420	
	470	6.3x11	0.20	320			10x15	0.12	430	
	680	8x11	0.20	410		680	10x20	0.12	550	
		10x12.5	0.20	580			1000	13x20	0.12	950
	1000	10x20	0.20	880		2200	16x25	0.12	1600	
	3300	13x20	0.20	1250			3300	16x36	0.12	1970
	4700	13x25	0.20	1500		4700		18x32	0.12	2050
		16x25	0.20	1900			18x36	0.12	2400	
	10000	16x36	0.20	2225		6800	22x40	0.12	2600	
		18x32	0.20	2225						
15000	18x36	0.20	2950							
22000	22x40	0.20	3700							
16 (20)	10	5x11	0.16	40	50 (63)	10	5x11	0.10	65	
	22	5x11	0.16	75		22	5x11	0.10	100	
	33	5x11	0.16	110		33	5x11	0.10	105	
	47	5x11	0.16	130		47	6.3x11	0.10	140	
	68	5x11	0.16	150		100	8x11	0.10	230	
	100	5x11	0.16	165			220	10x12.5	0.10	380
	150	6.3x11	0.16	205		330	10x15	0.10	490	
	220	6.3x11	0.16	260			470	10x20	0.10	610
		6.3x11	0.16	290		1000		13x25	0.10	1100
	330	8x11	0.16	360		2200	16x36	0.10	1850	
		8x11	0.16	400			18x32	0.10	1850	
	470	8x11	0.16	400		3300	18x36	0.10	2170	
	680	10x12.5	0.16	510			4700	22x40	0.10	2500
	1000	10x15	0.16	630		63 (79)	10	5x11	0.10	70
	2200	13x20	0.16	1100			22	5x11	0.10	95
	3300	13x25	0.16	1400				33	6.3x11	0.10
16x25		0.16	1800	6.3x11	0.10		130			
4700	16x25	0.16	1800	47	6.3x11		0.10	190		
6800	16x32	0.16	1980		100		10x12.5	0.10	300	
10000	18x36	0.16	2700	220			10x15	0.10	410	
	22x40	0.16	3150		10x20		0.10	490		
15000	22x40	0.16	3800	330	10x20		0.10	540		
	22x40	0.16	3800		470		13x20	0.10	755	
25 (32)	10	5x11	0.14	50	100 (125)		680	13x25	0.10	965
	22	5x11	0.14	90			10	5x11	0.10	65
	33	5x11	0.14	115				22	6.3x11	0.10
	47	5x11	0.14	135			33		8x11	0.10
	68	5x11	0.14	145				47	8x11	0.10
		5x11	0.14	160			10x12.5		0.10	190
	100	6.3x11	0.14	160		68	10x15	0.10	280	
		6.3x11	0.14	160						

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms85°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms85°C) (120Hz)
100 (125)	100	10x20	0.10	400	250 (300)	33	13x20	0.20	140
	150	13x20	0.10	500		47	13x25	0.20	210
	220	13x25	0.10	710		100	16x25	0.20	250
	330	13x25	0.10	720		150	16x32	0.20	330
	470	16x25	0.10	1100		220	18x36	0.20	540
	680	16x36	0.10	1260		350 (400)	1.0	6.3x11	0.24
1000	18x40	0.10	1350	2.2	8x11		0.24	33	
160 (200)	1	5x11	0.20	17	3.3		8x11	0.24	33
		6.3x11	0.20	17	4.7		10x12.5	0.24	39
	2.2	6.3x11	0.20	26	10		10x15	0.24	70
	3.3	6.3x11	0.20	30	22		13x20	0.24	130
	4.7	6.3x11	0.20	32	33		13x25	0.24	170
	10	8x11	0.20	50	47		16x25	0.24	220
	22	10x15	0.20	110	100		16x36	0.24	320
	33	10x15	0.20	135			18x32	0.24	300
		10x20	0.20	150	400 (450)	1.0	6.3x11	0.24	16
	47	10x20	0.20	160			8x11	0.24	19
	68	13x20	0.20	200		2.2	6.3x11	0.24	20
	100	13x25	0.20	250			8x11	0.24	26
	150	16x25	0.20	330		3.3	8x11	0.24	35
	220	16x32	0.20	450		4.7	8x11	0.24	38
330	18x36	0.20	540	10x12.5			0.24	42	
470	18x40	0.20	750	6.8		8x15	0.24	42	
200 (250)	1	5x11	0.20			19	10x12.5	0.24	45
	2.2	6.3x11	0.20	22		10	10x15	0.24	50
	3.3	6.3x11	0.20	30		22	13x20	0.24	100
	4.7	6.3x11	0.20	35		33	13x25	0.24	140
	6.8	8x11	0.20	40		47	16x25	0.24	180
	10	8x11	0.20	45		68	16x32	0.24	250
	22	10x15	0.20	120	18x25		0.24	220	
	33	10x20	0.20	160	100	18x32	0.24	320	
	47	10x20	0.20	170	150	18x40	0.24	420	
		13x20	0.20	200	450 (500)	1.0	8x11	0.24	19
	68	13x25	0.20	230		2.2	10x12.5	0.24	33
	100	16x25	0.20	330		3.3	10x12.5	0.24	40
	220	16x32	0.20	505		4.7	10x12.5	0.24	45
		18x25	0.20	485		6.8	10x15	0.24	50
330	16x40	0.20	710	10		10x20	0.24	58	
	18x32	0.20	685			13x20	0.24	60	
470	18x40	0.20	750	22		13x25	0.24	98	
250 (300)	1	5x11	0.20	17	33	16x25	0.24	145	
		6.3x11	0.20	19	500(550)	2.2	10x12.5	1.24	33
	2.2	6.3x11	0.20	24		3.3	10x15	2.24	43
	8x11	0.2	30	6.8		10x20	3.24	70	
		0.20	30	10		13x20	4.24	93	
	3.3	8x11	0.20	30		22	16x25	5.24	105
	4.7	8x11	0.20	36		33	16x25	6.24	200
	6.8	8x11	0.20	40		47	18x32	7.24	185
10	10x12.5	0.20	65						
22	10x20	0.20	130						

SH

Standard Series

- Endurance: 105°C 2000hours
- Recommended Applications :For high quality , reliability application, high CV product
- Corresponding product to RoHS

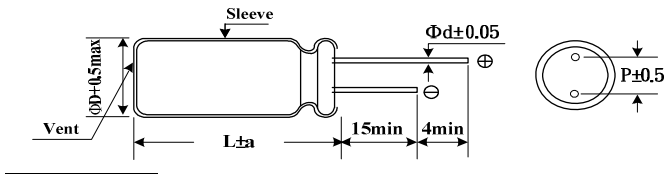
SH
 ↑ High Temperature
 SK



SPECIFICATIONS

Item	Characteristics										
	-40~+105°C	-25~+105°C	-25~+105°C								
Category Temperature Range	-40~+105°C	-25~+105°C	-25~+105°C								
Rated Voltage Range	6.3 ~ 100VDC	160 ~ 450VDC	500VDC								
Rated Capacitance Range	1~ 22000 µ F	1 ~ 470 µ F	2.2~82 µ F								
Capacitance Tolerance	± 20 % (120Hz , 20°C)	± 20 % (120Hz , 20°C)	± 20 % (120Hz , 20°C)								
Leakage Current (20°C)	I=0.01CV or 3(µ A)whichever is greater.	I=0.03CV+10(µ A)	I=0.04CV+100(uA)								
	(After rated voltage applied for 2 minutes)I : Max. leakage current (µ A), C : Nominal capacitance (µ F), V : Rated voltage (V)										
Dissipation Factor(MAX) (tan δ) (120Hz , 20°C)	WV	6.3	10	16	25	35	50	63~100	160~250	350~450	500
	tan δ	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.15	0.20	0.25
	When nominal capacitance is 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 Impedance Ratio (MAX)	WV										
	Z(120Hz)	6.3	10	16	25	35~100	160~250	350~450	500		
	Z-25°C / Z+20°C	4	3	2	2	2	4	4	6		
	Z-40°C / Z+20°C	8	6	4	4	3	—	—	—		
Endurance	After applying rated voltage for 2000 hours at 105°C the capacitors shall meet the following requirements.										
	Capacitance change	Within ± 20% of initial value									
	D.F. (tan δ)	Not more than 200% of specified value									
	Leakage current	initial specified value or less									
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours.the capacitors shall meet the same requirement as Endurance.										

Dimensions [mm]



φ D	5	6.3	8	10	13	16	18	22
p	2.0	2.5	3.5	5.0		7.5		10.0
φ d	0.5	0.5	0.6	0.6		0.8		0.8
a	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0

Multiplier for Ripple Current

Freq. (Hz)	120	300	1K	10K~100K
6.3 ~ 100V ≤ 68 µ F	1.00	1.30	1.57	2.00
6.3 ~ 100V 100 ~ 470 µ F	1.00	1.23	1.34	1.50
6.3 ~ 100V 471 ~ 22000 µ F	1.00	1.10	1.13	1.15
160 ~ 450V all volume(µ F)	1.00	1.25	1.40	1.60
500Vall volume(µ F)	1.00	1.05	1.10	1.15

■ STANDARD RATINGS

Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms105°C) (120Hz)	Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms105°C) (120Hz)	
6.3 (8)	100	5x11	0.26	100	25 (32)	470	8x15	0.16	420	
	150	5x11	0.26	120			10x12.5	0.16	440	
	220	6.3x11	0.26	165		680	10x15	0.16	560	
	330	6.3x11	0.26	200		1000	10x20	0.16	740	
	470	6.3x11	0.26	230		1500	13x20	0.16	920	
	680	8x11	0.26	350		2200	13x25	0.16	1230	
	1000	8x15	0.26	445		3300	16x25	0.16	1500	
		10x12.5	0.26	470		4700	16x32	0.16	1800	
	1500	10x15	0.26	600		6800	18x36	0.16	2050	
	2200	10x20	0.26	800		35 (44)	10	5x11	0.14	44
	3300	13x20	0.26	1100			15	5x11	0.14	50
	4700	13x20	0.26	1180			22	5x11	0.14	65
	6800	13x25	0.26	1490			33	5x11	0.14	85
	10000	16x32	0.26	1830			47	5x11	0.14	100
15000	16x36	0.26	2090	68	6.3x11		0.14	130		
22000	18x40	0.26	2350	100	6.3x11		0.14	170		
10 (13)	47	5x11	0.22	75	150		8x11	0.14	220	
	68	5x11	0.22	80	220		10x12.5	0.14	315	
	100	5x11	0.22	110	330		10x12.5	0.14	400	
	150	5x11	0.22	120	470		10x15	0.14	480	
	220	6.3x11	0.22	180	680		10x20	0.14	650	
	330	6.3x11	0.22	235	1000		13x20	0.14	900	
		8x11	0.22	255	1500		13x25	0.14	1050	
	470	6.3x11	0.22	250	2200	16x25	0.14	1370		
		8x11	0.22	305	3300	16x36	0.14	1680		
	680	8x11	0.22	365	4700	18x36	0.14	1920		
		10x12.5	0.22	420	50 (63)	1	5x11	0.12	12	
	1000	8x15	0.22	480		2.2	5x11	0.12	18	
	1500	10x12.5	0.22	540		3.3	5x11	0.12	25	
	2200	10x20	0.22	800		4.7	5x11	0.12	30	
3300	10x20	0.22	870	6.8		5x11	0.12	30		
4700	13x20	0.22	1100	10		5x11	0.12	50		
6800	13x25	0.22	1380	15		5x11	0.12	50		
10000	16x25	0.22	1700	22		5x11	0.12	75		
15000	16x36	0.22	1950	33		5x11	0.12	95		
16 (20)	33	5x11	0.18	70		47	6.3x11	0.12	115	
	47	5x11	0.18	85		68	8x11	0.12	159	
	68	5x11	0.18	100		100	8x11	0.12	200	
	100	5x11	0.18	130		150	10x12.5	0.12	289	
	150	6.3x11	0.18	175		220	10x12.5	0.12	360	
	220	6.3x11	0.18	220	10x15		0.12	415		
	330	8x11	0.18	280	330	10x20	0.12	535		
	470	8x11	0.18	375	470	10x20	0.12	630		
		8x15	0.18	450		13x20	0.12	730		
	680	10x12.5	0.18	480	680	13x20	0.12	800		
		10x15	0.18	640	1000	13x25	0.12	1060		
	1000	10x20	0.18	830	1500	16x25	0.12	1300		
	2200	13x20	0.18	1050	2200	16x36	0.12	1600		
	3300	13x25	0.18	1250	3300	18x36	0.12	1780		
4700	16x25	0.18	1650	63 (79)	10	5x11	0.1	55		
6800	16x32	0.18	1900		15	5x11	0.1	65		
10000	18x36	0.18	2070		22	6.3x11	0.1	90		
25 (32)	22	5x11	0.16		60	33	6.3x11	0.1	100	
	33	5x11	0.16		75	47	8x11	0.1	155	
	47	5x11	0.16		90	68	10x12.5	0.1	198	
	68	6.3x11	0.16		125	100	10x12.5	0.10	260	
	100	6.3x11	0.16		145	150	10x15	0.10	330	
	150	8x11	0.16		200	220	10x20	0.10	465	
	220	8x11	0.16		240	330	13x20	0.10	650	
	330	8x11	0.16		300	470	13x20	0.10	700	
		10x12.5	0.16		355	680	16x25	0.10	1000	
						1000	16x32	0.10	1200	

SH

Standard Series

■ STANDARD RATINGS

Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size ΦDxL(mm)	tan δ	Ripple current (mA/rms105°C) (120Hz)	Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size ΦDxL(mm)	tan δ	Ripple current (mA/rms105°C) (120Hz)
63 (79)	1500	16x36	0.10	1450	350 (400)	3.3	8x11	0.20	35
	2200	18x36	0.10	1650		4.7	8x11	0.20	45
100 (125)	10	6.3x11	0.10	65		10	10x15	0.20	80
	15	6.3x11	0.10	75		22	13x20	0.20	150
	22	8x11	0.10	115		33	13x25	0.20	200
	33	8x11	0.10	140		47	16x25	0.20	260
	47	10x12.5	0.10	185	100	18x32	0.20	400	
	68	10x15	0.10	240	400 (450)	1	6.3x11	0.20	17
	100	10x20	0.10	305		2.2	8x11	0.20	31
	150	13x20	0.10	370		3.3	8x11	0.20	35
	220	13x25	0.10	520		4.7	8x11	0.20	45
	330	16x25	0.10	720		4.7	10x12.5	0.20	55
470	16x32	0.10	875	6.8		8x15	0.20	60	
680	16x36	0.10	1200	6.8		10x12.5	0.20	65	
160 (200)	1	5x11	0.15	17		10	10x15	0.2	80
	2.2	6.3x11	0.15	25		15	10x20	0.2	100
	3.3	6.3x11	0.15	36		22	13x20	0.2	150
	4.7	6.3x11	0.15	43		33	13x25	0.2	200
	6.8	8x11	0.15	54		47	16x25	0.2	265
	10	8x11	0.15	70		68	16x32	0.2	410
	15	10x12.5	0.15	90		68	18x25	0.2	390
	22	10x15	0.15	115		100	18x32	0.2	500
	33	10x20	0.15	160	120	18x32	0.2	520	
	47	10x20	0.15	195	120	18x36	0.2	550	
	68	13x20	0.15	255	150	18x40	0.2	620	
	100	13x25	0.15	350	420 (470)	1	6.3x11	0.2	17
	150	16x25	0.15	435		2.2	8x11	0.2	29
	220	16x32	0.15	550		3.3	8x11	0.2	34
	330	18x36	0.15	800		4.7	10x12.5	0.2	55
470	18x40	0.15	900	6.8		10x15	0.2	68	
200 (250)	1	6.3x11	0.15	17		10	10x20	0.20	98
	2.2	6.3x11	0.15	25		15	13x20	0.20	130
	3.3	6.3x11	0.15	36		22	13x25	0.20	155
	4.7	8x11	0.15	50		33	16x25	0.20	205
	6.8	8x11	0.15	60		47	16x25	0.20	235
	10	10x12.5	0.15	80		68	16x32	0.20	400
	15	10x15	0.15	110		68	18x25	0.20	380
	22	10x20	0.15	140		100	18x36	0.20	490
	33	13x20	0.15	200		120	18x40	0.20	530
	47	13x20	0.15	220		150	18x45	0.20	570
	68	13x25	0.15	280	450 (500)	1.0	6.3x11	0.20	18
	100	16x25	0.15	350		1.0	8x11	0.20	22
	150	16x32	0.15	480		2.2	8x11	0.20	30
	220	16x36	0.15	675		2.2	10x12.5	0.20	37
	330	18x36	0.15	750		3.3	8x15	0.20	42
250 (300)	1	6.3x11	0.15	17		3.3	10x12.5	0.20	40
	2.2	6.3x11	0.15	29		4.7	10x12.5	0.20	52
	3.3	8x11	0.15	42		6.8	10x15	0.20	62
	4.7	8x11	0.15	52		10	10x20	0.20	85
	6.8	8x11	0.15	62		15	13x20	0.20	120
	10	10x12.5	0.15	80		22	13x25	0.20	150
	15	10x15	0.15	110		33	16x25	0.20	210
	22	10x20	0.15	140		47	16x25	0.20	260
	33	13x20	0.15	200		68	18x32	0.20	370
	47	13x25	0.15	240		100	18x36	0.20	495
	68	13x25	0.15	290	120	18x40	0.20	565	
	100	16x25	0.15	380	150	18x45	0.20	650	
	150	16x32	0.15	420	500 (550)	2.2	8x11	0.25	25
	220	18x36	0.15	680		3.3	8x16	0.25	30
	350 (400)	1	6.3x11	0.20		16	4.7	8x16	0.25
2.2		8x11	0.20	31		4.7	10x12.5	0.25	38
					6.8	10x16	0.25	50	

SH

Standard Series

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	tan δ	Ripple current (mA/rms105°C) (120Hz)
500 (550)	8.2	10x20	0.25	65
	10	10x20	0.25	70
		13x20	0.25	85
	15	13x25	0.25	100
	22	13x25	0.25	115
		16x25	0.25	130

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	tan δ	Ripple current (mA/rms105°C) (120Hz)
500 (550)	33	18x25	0.25	180
	47	16x32	0.25	180
		18x30	0.25	230
	68	18x32	0.25	250
		18x36	0.25	290
	82	18x40	0.25	335

SZ

Ultra low impedance Series

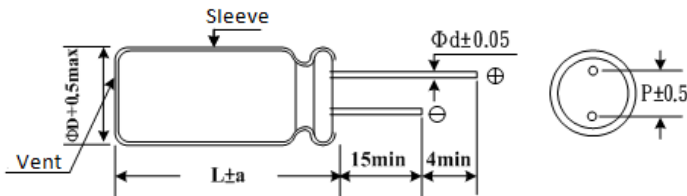
- Endurance: 105°C 1000~2000 hours
- Recommended Applications : Applicable for switching regulator of computer, especially for high frequency
- Corresponding product to RoHS



SPECIFICATIONS

Item	Characteristics													
Category Temperature Range	-40 ~ +105°C													
Rated Voltage Range	6.3 ~ 16VDC													
Rated Capacitance Range	470 ~ 3300 µF													
Capacitance Tolerance	± 20 % (120Hz , 20°C)													
Leakage Current (20°C)	I=0.03CV ,(After rated voltage applied for 2 minutes) I : Max. leakage current (µ A), C : Nominal capacitance (µ F), V : Rated voltage (V)													
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	<table border="1"> <tr> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> </tr> <tr> <td>tan δ</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> </tr> </table> <p>When nominal capacitance is over 1000 µ F,tan δ shall be added 0.02 to the listed value with increase of every 1000 µ F.</p>	WV	6.3	10	16	tan δ	0.22	0.19	0.16					
WV	6.3	10	16											
tan δ	0.22	0.19	0.16											
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <tr> <td rowspan="3">Z(120Hz)</td> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> </tr> <tr> <td>Z-25°C / Z+20°C</td> <td>4</td> <td>3</td> <td>2</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>8</td> <td>6</td> <td>4</td> </tr> </table>	Z(120Hz)	WV	6.3	10	16	Z-25°C / Z+20°C	4	3	2	Z-40°C / Z+20°C	8	6	4
Z(120Hz)	WV		6.3	10	16									
	Z-25°C / Z+20°C		4	3	2									
	Z-40°C / Z+20°C	8	6	4										
Endurance	<p>After applying rated voltage with ripple current for 1000~2000 hours at 105°C, the capacitors shall meet the following requirements.</p> <table border="1"> <tr> <td>Capacitance change</td> <td>Within ± 25% of initial value</td> </tr> <tr> <td>D.F. (tan δ)</td> <td>Not more than 200% of specified value</td> </tr> <tr> <td>Leakage current</td> <td>Not more than the specified value</td> </tr> </table> <p>*If dimension is down size,Endurance will be less 1000 hours than standard.</p>	Capacitance change	Within ± 25% of initial value	D.F. (tan δ)	Not more than 200% of specified value	Leakage current	Not more than the specified value							
Capacitance change	Within ± 25% of initial value													
D.F. (tan δ)	Not more than 200% of specified value													
Leakage current	Not more than the specified value													
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitors shall meet the same requirement as Endurance.													

Dimensions [mm]



ΦD	8	10
P	3.5	5
Φd	0.6	0.6
a	1.5	1.5

Multiplier for Ripple Current

Freq. (Hz)	120	1K	10K	100K
Factor	0.5	0.8	0.9	1.0

SZ

Ultra low impedance Series

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (m Ω ,20°C) (100KHz)
6.3V (8)	820	8 x 11	1036	43
	1200	8 x 15	1355	34
		8 x 20	1740	25
	1500	10 x 12.5	1400	31
		10 x 16	1818	23
	2200	10 x 20	2318	15
10V (13)	3300	10 x 25	2364	14
	680	8 x 11	1036	43
		8 x 15	1355	34
		10 x 12.5	1400	31
1500	8 x 20	1700	25	

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (m Ω ,20°C) (100KHz)
10V (13)	1500	10 x 16	1818	23
	1800	10 x 20	2318	16
	2200	10 x 25	2545	14
16V (20)	470	8 x 11	1036	43
		8 x 15	1355	34
	680	10 x 12.5	1400	31
		8 x 20	1700	25
	1000	10 x 16	1818	23
		1500	10 x 20	2318
1800	10 x 25	2546	14	

SC

Low impedance · High Ripple Series

- Endurance: 105°C 1000~3000 hours
- Recommended Applications : Applicable for switching regulator of computer , especially for high frequency
- Corresponding product to RoHS

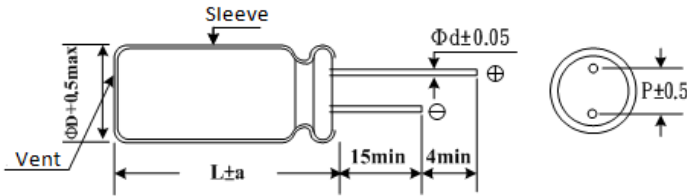
SY
↑ Long Life
SC



SPECIFICATIONS

Item	Characteristics								
Category Temperature Range	-40 ~ +105°C								
Rated Voltage Range	6.3 ~ 100VDC								
Rated Capacitance Range	4.7 ~ 15000 µF								
Capacitance Tolerance	± 20 % (120Hz , 20°C)								
Leakage Current (20°C)	I=0.01CV or 3 µ A whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (µ A), C : Nominal capacitance (µ F), V : Rated voltage (V)								
Dissipation Factor(MAX) (tan δ) (120Hz , 20°C)	WV	6.3	10	16	25	35	50	63	100
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08
When nominal capacitance is 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 Impedance Ratio (MAX)	WV	6.3	10	16	25	35	50	63	100
	Z(120Hz)	4	3	3	3	3	2	2	2
	Z-25°C / Z+20°C	8	6	4	4	4	4	4	4
Endurance	After applying rated voltage with ripple current for 1000~3000 hours at 105°C, the capacitors shall meet the following requirements.								
	Capacitance change	Within ± 20% of initial value							
	D.F. (tan δ)	Not more than 200% of specified value							
	Leakage current	Not more than the specified value							
	Case size (Φ)	5 x 11 ~ 10 x 12.5	10 x 15higher						
Life time (hours)	2000	3000							
*If dimension is down size, Endurance will be less 1000hrs than standard.									
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, the capacitors shall meet the same requirement as Endurance.								

Dimensions [mm]



ΦD	5	6.3	8	10	13	16	18	22
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
Φd	0.50	0.5	0.6	0.6	0.6	0.8	0.8	0.8
a	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0

Multiplier for Ripple Current

Cap (µ F) \ Freq. (Hz)	50	120	300	1K	10K	100K
≤ 4.7 µ F	0.30	0.40	0.50	0.70	0.80	1.00
5.6 ~ 33 µ F	0.40	0.50	0.60	0.80	0.90	1.00
34 ~ 330 µ F	0.60	0.70	0.80	0.90	0.95	1.00
331 ~ 1000 µ F	0.65	0.90	0.90	0.98	1.00	1.00
1200 µ F Above	0.85	0.90	0.95	0.98	1.00	1.00

■ STANDARD RATINGS

Rated Voltage (Surge Voltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)	Rated Voltage (Surge Voltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)
6.3V (8)	150	5x11	200	0.420	16V (20)	220	8x11	550	0.140
	220	6.3x11	250	0.320		330	8x11	550	0.120
	270	6.3x11	250	0.220			8x15	750	0.100
	330	6.3x11	250	0.230		10x12.5	688	0.080	
		8x11	400	0.180		470	8x15	730	0.093
	470	*6.3x11	440	0.180			10x12.5	800	0.085
		8x11	550	0.140		680	10x16	1050	0.064
	680	*8x11	580	0.120		820	10x20	1100	0.044
		8x15	700	0.100		1000	*10x16	1140	0.043
	820	8x20	750	0.085			10x20	1250	0.039
	1000	*8x11	580	0.150		1200	*10x25	1310	0.042
		8x15	700	0.085			13x20	1450	0.038
		8x20	800	0.069		1500	*10x20	1200	0.045
		10x12.5	690	0.080			13x20	1600	0.034
	1200	10x16	1000	0.064		2200	*10x30	1780	0.032
	1500	*8x15	980	0.085			*13x20	1720	0.033
		8x20	800	0.051			13x25	2000	0.028
		*10x16	1070	0.055		*13x40	2200	0.026	
		10x20	1250	0.044		16x25	2200	0.024	
	2200	*10x20	1220	0.051		4700	16x36	2550	0.019
*10x25		1310	0.048	6800	18x36	2800	0.019		
13x20		1450	0.043	25V (32)	10	5x11	50	0.550	
3300		*10x25	1400		0.043	47	5x11	150	0.450
3900	13x25	1700	0.035		56	5x11	150	0.420	
	13x25	1750	0.032		68	6.3x11	200	0.370	
4700	*13x30	1570	0.033		100	6.3x11	250	0.220	
	*13x25	1520	0.032		120	8x11	300	0.200	
6800	16x25	1800	0.028		150	8x11	550	0.140	
	16x32	2000	0.024		220	8x11	550	0.120	
8200	16x32	2350	0.019			8x15	750	0.100	
10000	16x36	2550	0.019		330	*8x15	660	0.100	
15000	18x36	3000	0.019			8x20	800	0.069	
10V (13)	100	5x11	150		0.420	10x16	900	0.086	
	120	5x11	200		0.370	470	8x20	800	0.067
	150	6.3x11	250		0.320		10x12.5	760	0.086
	220	6.3x11	300		0.220	10x16	1050	0.064	
	330	8x11	550		0.140	680	10x20	1100	0.039
	470	8x11	550		0.120	820	10x20	1250	0.039
		8x15	750		0.100	1000	*10x20	1160	0.047
	680	*8x11	640		0.110		*10x25	1310	0.042
		10x12.5	800		0.085	13x20	1450	0.038	
	820	10x16	1050	0.064	1200	13x25	1600	0.035	
	1000	8x20	1080	0.065	1500	*13x30	1750	0.032	
		*10x12.5	930	0.075		16x25	2000	0.028	
		10x16	990	0.085	2200	*13x30	1810	0.029	
		10x20	1100	0.050		*16x25	1660	0.032	
	1200	10x20	1250	0.044	16x32	2200	0.024		
	1500	10x20	1450	0.039	3300	*16x36	2540	0.019	
	2200	*10x20	1330	0.047		18x36	2550	0.019	
		*10x25	1450	0.039	4700	18x36	2800	0.019	
	13x20	1600	0.038	6800	18x36	2800	0.019		
	3300	*10x30	1740	0.032	35V (44)	4.7	5x11	115	1.200
13x25		2000	0.028	6.8		5x11	120	1.000	
4700	*13x25	1860	0.028	10		5x11	140	0.900	
	16x25	2200	0.024	15		5x11	170	0.690	
6800	16x36	2550	0.019	22		5x11	190	0.600	
8200	18x36	2800	0.019	33		5x11	200	0.580	
16V (20)	56	5x11	100	0.630		47	6.3x11	250	0.390
	68	5x11	150	0.420		68	6.3x11	300	0.220
	100	5x11	200	0.370		100	6.3x11	350	0.180
	120	6.3x11	250	0.320			8x11	450	0.140
150	6.3x11	300	0.220	120		8x11	550	0.130	

" * " is down size , Ripple Life is less 1000 hrs than standard

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)	
35V (44)	150	8x15	650	0.100	50V (63)	1000	16x25	1900	0.039	
	220	8x15	650	0.100		1200	16x32	2100	0.025	
		10x12.5	800	0.069		1500	16x36	2550	0.025	
		*10x16	900	0.052		2200	18x40	2800	0.025	
	50V (63)	330	10x20	1050	0.044	63V (79)	10	5x11	140	1.850
		470	10x20	1300	0.039		15	5x11	200	1.700
		680	13x20	1400	0.038		22	6.3x11	250	1.200
		820	13x20	1550	0.034		33	6.3x11	300	0.900
		1000	13x25	1700	0.029		47	8x11	450	0.700
		1200	16x25	1900	0.028		68	8x11	550	0.520
		1500	16x25	2100	0.024		100	8x20	650	0.350
		2200	*16x32	2300	0.021		120	10x16	800	0.300
			16x36	2550	0.019		150	10x16	1050	0.200
18x36			2880	0.019	220		10x20	1300	0.150	
50V (63)	4.7	5x11	115	2.000	330		13x20	1400	0.100	
	6.8	5x11	120	1.850	470		13x25	1550	0.064	
	10	5x11	140	1.700	680		16x25	1700	0.052	
	15	5x11	180	1.200	820		16x32	1900	0.048	
	22	5x11	200	0.700	1000		16x32	2100	0.042	
	33	6.3x11	250	0.600	1200	16x36	2550	0.036		
	47	6.3x11	300	0.520	1500	18x36	2800	0.033		
	68	8x11	450	0.350	100V (125)	10	6.3x11	200	1.500	
	100	8x11	450	0.290		15	6.3x11	250	1.200	
		8x15	550	0.250		22	8x11	300	0.790	
	120	8x20	650	0.210		33	8x15	450	0.590	
	150	10x12.5	800	0.160		47	10x16	550	0.350	
	220	*10x16	1050	0.100		68	10x20	650	0.240	
		10x25	1050	0.068		100	13x20	800	0.180	
	330	10x20	1300	0.072		120	13x25	1050	0.150	
	470	*10x20	1390	0.075		150	13x25	1300	0.110	
		13x20	1400	0.060		220	16x25	1400	0.071	
	680	13x25	1550	0.050		330	16x32	1550	0.049	
	820	16x25	1700	0.040		470	18x36	1770	0.038	

" * " is down size , Ripple Life is less 1000 hrs than standard

SJ

Low impedance · High Ripple Series

- Endurance: 105°C, 1000~5000 hours
- Recommended Applications : Applying to AV(TV, video, audio), monitor /computer, OA/HA /communication, transducer/inverter, adapter, switching power supply
- Corresponding product to RoHS

SJ
↑
SC

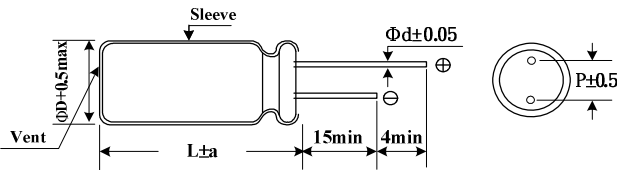
Low impedance



■ SPECIFICATIONS

Item	Characteristics	
Category Temperature Range	-40 ~ +105°C	
Rated Voltage Range	6.3 ~ 100VDC	
Rated Capacitance Range	5.6 ~ 6800 µF	
Capacitance Tolerance	± 20 % (120Hz , 20°C)	
Leakage Current (20°C)	I ≤ 0.01CV or 3 µA ,whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)	
Dissipation Factor(MAX) (tan δ) (120Hz , 20°C)	WV	6.3 10 16 25 35 50 63 100
	tan δ	0.22 0.19 0.16 0.14 0.12 0.10 0.09 0.08
When nominal capacitance is over 1000 µF, tan δ shall be added 0.02 to the listed value with increase of every 1000 µF.		
Low Temperature Stability Impedance Ratio (MAX)	WV	6.3 10 16 25 35 50 63 100
	Z(120Hz)	
	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
Endurance	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 (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105°C.	
	Capacitance change	Within ± 25% of initial value
	D.F. (tan δ)	Not more than 200% of specified value
	Leakage current	Not more than the specified value
	*If dimension is down size, Endurance will be less 1000hrs than standard.	
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours (L=7mm is 500Hours) at 105°C without voltage applied.	
	Case size (Φ)	Life time (hours)
	L=7	1000
	ΦD ≤ 6.3	2000
	ΦD = 8	3000
	ΦD = 10	4000
	ΦD ≥ 13	5000

■ Dimensions [mm]



ΦD	4	5	6.3	8	10	13	16	18
P	1.5	2	2.5	3.5	5.0	5.0	7.5	7.5
Φd	0.45	0.5 (0.45)	0.5 (0.45)	0.6 (0.5)	0.6	0.6	0.8	0.8
a	1.0	1.5 (1.0)	1.5 (1.0)	1.5 (1.0)	1.5	2.0	2.0	2.0

() : L = 7

■ Multiplier for Ripple Current

Freq. (Hz)	50	120	1K	10K	100K
5.6 ~ 390 µF	0.60	0.70	0.85	0.95	1.00
470 ~ 1000 µF	0.65	0.75	0.90	0.98	1.00
1200 ~ 6800 µF	0.75	0.80	0.95	1.00	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)
6.3V (8)	39	4x7	130	0.85	16V (20)	18	4x7	130	0.92
	47	5x7	175	0.7		27	5x7	190	0.61
	56	5x7	190	0.56		33	5x7	210	0.45
	68	5x7	210	0.43		39	5x11	220	0.43
	100	5x11	200	0.43		47	5x11	230	0.36
		6.3x7	240	0.35		56	5x11	250	0.3
	120	5x11	220	0.38		68	6.3x7	300	0.24
		6.3x7	270	0.29		100	6.3x11	370	0.16
	150	5x11	250	0.3			8x7	350	0.18
		6.3x7	300	0.23		120	6.3x11	410	0.13
	180	8x7	340	0.18			8x7	380	0.15
	220	8x7	380	0.15		150	8x11	510	0.12
	270	6.3x11	370	0.16		180	8x11	560	0.11
	330	6.3x11	410	0.13		220	8x11	620	0.1
	470	8x11	680	0.086		270	8x11	690	0.088
	560	8x11	760	0.072		330	8x11	760	0.072
	680	8x15	900	0.062		470	8x15	1000	0.056
	820	8x15	1000	0.056			10x12.5	1030	0.053
	1000	10x12.5	1030	0.053		560	8x20	1140	0.049
	1200	8x20	1250	0.041			10x16	1300	0.046
		10x16	1430	0.038		680	8x20	1250	0.041
	1500	10x20	1820	0.026			10x16	1430	0.038
	1800	10x25	1940	0.025		820	10x20	1650	0.032
	2200	10x25	2150	0.023		1000	10x20	1820	0.026
2700	13x20	2230	0.022	1200	10x25	2150	0.023		
3300	13x20	2360	0.021	1500	13x20	2360	0.021		
3900	13x25	2770	0.018	1800	13x25	2510	0.02		
4700	13x30	3290	0.016	2200	13x25	2770	0.018		
5600	13x35	3400	0.015	2700	13x30	3290	0.016		
	16x20	3140	0.018		16x20	3140	0.018		
6800	16x25	3460	0.016	3300	13x35	3400	0.015		
10V (13)	27	4x7	130	0.89	25V (32)	3900	16x25	3460	0.016
	33	5x7	160	0.75		15	4x7	130	0.94
	39	5x7	175	0.64		18	5x7	170	0.69
	47	5x7	190	0.53		27	5x7	210	0.46
	56	5x7	210	0.44		33	5x11	220	0.42
	68	5x11	210	0.44		39	5x11	230	0.36
	100	5x11	250	0.3		47	5x11	250	0.3
	120	6.3x7	300	0.23		56	6.3x7	300	0.24
	150	8x7	350	0.18		68	6.3x11	340	0.19
	180	8x7	380	0.15			8x7	310	0.22
	220	6.3x11	410	0.13		100	6.3x11	410	0.13
	270	8x11	580	0.12			8x7	380	0.15
	330	8x11	640	0.1		120	8x11	560	0.12
	470	8x11	760	0.072		150	8x11	630	0.105
	560	8x15	910	0.068		180	8x11	690	0.088
		10x12.5	940	0.064		220	8x11	760	0.072
	680	10x12.5	1030	0.053		270	8x15	900	0.068
	820	8x20	1130	0.05			10x12.5	930	0.065
		10x16	1300	0.046		330	10x12.5	1030	0.053
	1000	8x20	1250	0.041		470	8x20	1250	0.041
		10x16	1430	0.038			10x16	1430	0.038
	1200	10x20	1820	0.026		560	10x20	1650	0.032
	1500	10x25	2150	0.023		680	10x20	1820	0.026
	1800	13x20	2230	0.022		820	10x25	2150	0.023
2200	13x20	2360	0.021	1000	13x20	2360	0.021		
2700	13x25	2510	0.02	1200	13x25	2510	0.02		
3300	13x25	2770	0.018	1500	13x25	2770	0.018		
3900	13x30	3290	0.016	1800	13x30	3290	0.016		
	16x20	3140	0.018		16x20	3140	0.018		
4700	13x35	3400	0.015	2200	13x35	3400	0.015		
5600	16x25	3460	0.016	2700	16x25	3460	0.016		

■STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)
35V (44)	10	4x7	130	0.96	63V (79)	39	8x11	308	0.42
	15	5x7	190	0.57		47	8x11	336	0.35
	18	5x7	210	0.47		56	8x11	400	0.35
	27	5x11	230	0.37		68	8x15	488	0.26
	33	5x11	250	0.30			10x12.5	500	0.24
	39	6.3x7	300	0.25		82	8x15	536	0.22
	47	6.3x11	380	0.15			10x12.5	552	0.20
		8x7	350	0.19		100	10x16	640	0.16
	56	6.3x11	410	0.13		120	8x20	656	0.16
		8x7	380	0.16			10x16	760	0.15
	68	8x11	510	0.12		150	10x20	808	0.13
	100	8x11	620	0.105			13x16	832	0.13
	120	8x11	680	0.088		180	10x20	880	0.11
	150	8x11	760	0.072			13x16	912	0.11
	180	8x15	910	0.068		220	10x25	1040	0.099
		10x12.5	930	0.065		270	13x20	1200	0.081
	220	10x12.5	1030	0.053		330	13x25	1480	0.058
	270	8x20	1250	0.041		390	13x30	1640	0.063
	330	10x16	1430	0.038			16x20	1448	0.073
	470	10x20	1820	0.026		470	13x30	1800	0.061
560	10x25	2150	0.023	16x20	1592		0.061		
680	13x20	2360	0.023	560	13x35	1960	0.047		
820	13x25	2510	0.02		16x25	2040	0.043		
1000	13x25	2770	0.018	680	13x40	2224	0.039		
1200	13x30	3290	0.016		18x20	1960	0.051		
	16x20	3140	0.018	820	16x32	2248	0.035		
1500	13x35	3400	0.015		18x25	2224	0.042		
1800	16x25	3460	0.016	1000	16x36	2272	0.028		
50V (63)	5.6	4x7	130		1	18x32	2616	0.034	
	6.8	5x7	170	0.74	1200	16x40	2672	0.026	
	10	5x7	210	0.5		18x36	2648	0.027	
	15	6.3x7	220	0.38	1500	18x40	2736	0.024	
		5x11	215	0.48		10	6.3x11	170	0.95
	22	6.3x7	300	0.26	15	6.3x 11	210	0.57	
		5x11	240	0.34	22	8x11	330	0.44	
	27	8x7	340	0.21	27	8x11	360	0.36	
	33	8x7	380	0.17	33	8x15	375	0.3	
	39	6.3x11	330	0.16	39	8x15	450	0.25	
	47	6.3x11	360	0.15	47	10x12.5	450	0.24	
	56	6.3x11	390	0.14	56	8x20	570	0.19	
	68	8x11	600	0.11	68	10x16	580	0.18	
	82	8x11	660	0.09	82	10x20	750	0.13	
	100	8x11	730	0.074		13x16	740	0.13	
	120	8x15	950	0.065	100	10x25	880	0.12	
	150	10x12.5	980	0.061	120	13x20	1050	0.094	
	180	8x20	1190	0.046	150	13x25	1100	0.085	
	220	10x16	1370	0.042	180	13x25	1200	0.071	
	270	10x20	1580	0.03	220	13x30	1410	0.063	
330	10x25	1870	0.028	16x20		1300	0.071		
390	13x20	1870	0.028	270	13x35	1560	0.052		
470	13x20	2050	0.027		16x25	1600	0.053		
560	13x25	2410	0.023	18x20	1470	0.069			
680	13x30	2860	0.021	330	13x40	1700	0.046		
820	13x35	2960	0.019	390	16x32	1750	0.041		
	16x20	2730	0.023		18x25	1620	0.049		
1000	16x32	3350	0.021	470	16x36	1890	0.033		
63V (79)	15	5x11	136		1.19	18x32	1780	0.039	
	22	6.3x11	176	0.88	560	16x40	2080	0.03	
	27	6.3x11	192	0.58		18x36	2060	0.031	
	33	6.3x11	216	0.47	680	18x40	2570	0.028	

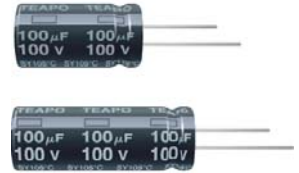
SY

Low impedance · Long life Series

- Features: Low Impedance , high permissible ripple current at high frequency and long life than SC
- Recommended Applications :Used switching regulator applications in computers.
Especially for high frequency.
- Corresponding product to RoHS

SY

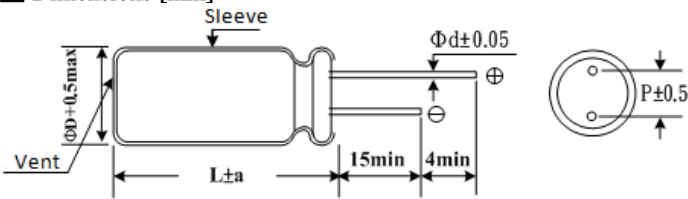
↑ Long Life
SC



SPECIFICATIONS

Item	Characteristics	
Category Temperature Range	-40 ~ +105°C	
Rated Voltage Range	6.3 ~ 100VDC	
Rated Capacitance Range	15 ~ 15000 µF	
Capacitance Tolerance	± 20 % (120Hz , 20°C)	
Leakage Current (20°C)	I=0.01CV or 3 µ A whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (µ A), C : Nominal capacitance (µ F), V : Rated voltage (V)	
Dissipation Factor(MAX) (tan δ) (120Hz , 20°C)	WV	6.3 10 16 25 35 50 63 100
	tan δ	0.22 0.19 0.16 0.14 0.12 0.10 0.09 0.08
When nominal capacitance is 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 Impedance Ratio (MAX)	WV	6.3 10 16 25 35 50 63 100
	Z(120Hz) 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
Endurance	After applying rated voltage with rated ripple current for 6000 hours at 105°C , the capacitors shall meet the following requirements.	
	Capacitance change	Within ± 25% of initial value
	D.F. (tan δ)	Not more than 200% of specified value
	Leakage current	Not more than the specified value
	DΦ	5~6.3 Φ 8~10 Φ x12.5 10x15~12 Φ 13~18 Φ
life(hours)	3000 hrs 4000 hrs 5000 hrs 6000 hrs	
*If dimension is down size,Endurance will be less 1000 hours than standard.		
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitors shall meet the same requirement as Endurance.	

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	0.6	0.6	0.6	0.8	0.8
a	1.5	1.5	1.5	1.5	2.0	2.0	2.0

Multiplier for Ripple Current

Freq. (Hz)	120	1 K	10 K	100 K
15~ 180 µ F	0.40	0.75	0.90	1.00
220 ~ 560 µ F	0.50	0.85	0.94	1.00
680 ~1800 µ F	0.60	0.87	0.95	1.00
2200 ~ 3900 µ F	0.75	0.90	0.95	1.00
≥ 4700 µ F	0.85	0.95	0.98	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)
6.3V (8)	150	5x11	210	0.580	16V(20)	120	6.3x11	340.00	0.220
	330	6.3x11	340	0.220		220	6.3x11	469.00	0.185
	470	6.3x11	510	0.160			8x11	582.00	0.150
	680	8x11	640	0.130		330	8x11	640.00	0.130
	820	10x12.5	865	0.080		470	*8x15	840.00	0.087
	1000	8x15	840	0.087			8x20	950.00	0.078
	1200	8x20	1050	0.069			*10x12.5	865.00	0.080
		10x16	1210	0.060			10x16	1210.00	0.060
	1500	8x20	1050	0.069		680	8x20	1050.00	0.069
		*10x16	1210	0.060		10x16	1210.00	0.060	
		10x20	1400	0.046		1000	8x20	1050.00	0.069
	1800	13x16	1450	0.049			*10x16	1210.00	0.060
	2200	*10x20	1400	0.046			10x20	1400.00	0.046
		10x25	1650	0.042		13x16	1450.00	0.049	
	2700	10x30	1910	0.031		1200	10x25	1650.00	0.042
		16x16	1940	0.042		1500	10x30	1910.00	0.031
	3300	10x25	1650	0.042			13x20	1900.00	0.035
		13x20	1900	0.035			16x16	1940.00	0.042
	3900	13x25	2230	0.027		2200	13x25	2230.00	0.027
		18x16	2210	0.043		18x16	2210.00	0.043	
4700	13x30	2650	0.024	2700	13x30	2650.00	0.024		
5600	13x35	2880	0.020		16x20	2530.00	0.027		
	16x20	2530	0.027	3300	13x35	2880.00	0.020		
6800	13x40	3350	0.017	3900	13x40	3350.00	0.017		
	16x25	2930	0.021		16x25	2930.00	0.021		
	18x20	2860	0.026		18x20	2860.00	0.026		
8200	16x32	3450	0.017	4700	16x32	3450.00	0.017		
10000	16x36	3610	0.015		18x25	3140.00	0.019		
	18x25	3140	0.017	5600	16x36	3610.00	0.015		
12000	18x32	4170	0.015		18x32	4170.00	0.015		
15000	18x36	4220	0.014	6800	16x40	4080.00	0.013		
10V (13)	100	5x11	210	0.580	8200	18x36	4220.00	0.014	
	220	6.3x11	340	0.220	10000	18x40	4280.00	0.012	
	470	8x11	640	0.130	25V (32)	47	5x11	210.00	0.580
	680	8x15	840	0.087		100	6.3x11	340.00	0.220
	820	10x12.5	865	0.080		150	8x11	640.00	0.160
	1000	8x20	1050	0.069		220	8x11	640.00	0.130
		10x16	1210	0.060		330	8x15	840.00	0.087
	1200	10x20	1400	0.046			10x12.5	865.00	0.080
		1500	10x25	1650		0.042	8x20	1050.00	0.069
	13x16		1450	0.049		470	*10x12.5	1050.00	0.070
	2200	10x30	1910	0.031			10x16	1210.00	0.060
		13x20	1900	0.042		680	10x20	1400.00	0.046
	16x16	1940	0.042	820		13x16	1450.00	0.049	
	2700	18x16	2210	0.043		1000	10x25	1650.00	0.042
	3300	10x30	1910	0.031			10x30	1910.00	0.031
		13x25	2230	0.027		13x20	1900.00	0.035	
	3900	13x30	2650	0.024		16x16	1940.00	0.042	
		16x20	2530	0.027		1200	18x16	2210.00	0.043
	4700	13x35	2880	0.020		1500	*13x20	1900.00	0.035
	5600	13x40	3350	0.017			13x25	2230.00	0.027
16x25		2930	0.021	1800		13x30	2650.00	0.024	
18x20		2860	0.026	2200		16x20	2530.00	0.027	
6800	16x32	3450	0.017		13x35	2880.00	0.020		
	18x25	3140	0.019	18x20	2860.00	0.026			
8200	16x36	3610	0.015	2700	13x40	3350.00	0.017		
	18x32	4170	0.015		16x25	2930.00	0.021		
10000	16x40	4080	0.013	3300	16x32	3450.00	0.017		
	18x36	4220	0.014		18x25	3140.00	0.019		
12000	18x40	4280	0.012	3900	18x32	4170.00	0.015		
16V (20)	56	5x11	210	0.580	4700	18x36	4220.00	0.014	
	100	6.3x11	250	0.230	5600	18x40	4280.00	0.012	

* * " is down size , Ripple Life is less 1000 hrs than standard

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size ΦDxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size ΦDxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω,20°C) (100KHz)
35V (44)	33	5x11	210	0.580	50V (63)	1200	18x25	2740	0.026
	47	6.3x11	275	0.390		1500	16x36	3150	0.019
	56	6.3x11	340	0.220		1800	16x40	3710	0.016
	68	6.3x11	500	0.170			18x32	3635	0.021
	82	6.3x11	540	0.160		2200	18x36	3680	0.017
	100	8x11	580	0.150		2700	18x40	3800	0.014
	150	8x11	640	0.130	63V (79)	15	5x11	55	2.3
	220	*8x15	840	0.087		33	6.3x11	115	1.2
		10x12.5	865	0.080		56	8x12	232	0.63
	270	8x20	1050	0.069		82	8x15	300	0.45
		*10x16	1210	0.060			10x12.5	288	0.43
	330	10x20	1400	0.046		120	8x20	362	0.33
		10x20	1400	0.046			10x16	357	0.31
	470	13x16	1450	0.049		180	10x20	466	0.21
		10x25	1650	0.042			13x16	466	0.23
	680	10x30	1910	0.031		220	10x25	531	0.2
		13x20	1900	0.035		270	10x30	663	0.15
		16x16	1940	0.042			13x20	690	0.16
	820	13x20	1900	0.035		330	16x16	795	0.14
		13x25	2230	0.027			390	18x16	920
	1000	18x16	2210	0.043		470	13x30	905	0.1
		13x30	2650	0.024			16x20	1040	0.091
	1200	16x20	2530	0.027		560	13x35	1050	0.083
		13x35	2880	0.020			16x25	1250	0.073
1500	13x40	3350	0.017	680		13x40	1180	0.071	
	16x25	2930	0.021			18x20	1240	0.08	
1800	18x20	2860	0.026	820		16x32	1570	0.054	
	16x32	3450	0.017			18x25	1490	0.057	
2200	18x25	3140	0.019	1000		16x36	1790	0.045	
	16x36	3610	0.015			18x32	1630	0.047	
2700	18x32	4170	0.015	1200	16x40	2020	0.04		
	16x40	4080	0.013		15	6.3x11	115	1.2	
3300	18x36	4220	0.014	27	8x12	232	0.63		
	18x40	4280	0.012	39	8x15	300	0.45		
50V (63)	22	5x11	180	0.700	47	10x12.5	288	0.43	
	33	6.3x11	245	0.490	56	8x20	362	0.33	
	47	6.3x11	300	0.520	68	10x16	357	0.31	
	56	6.3x11	295	0.300	82	10x20	466	0.21	
	100	8x11	555	0.170		13x16	466	0.23	
	120	8x15	730	0.120	100	10x25	531	0.2	
	150	10x12.5	760	0.120		10x30	663	0.15	
	180	8x20	910	0.091	120	13x20	690	0.16	
	220	10x16	1050	0.084		150	16x16	795	0.14
	270	10x20	1220	0.060	180	13x25	784	0.12	
		13x16	1260	0.061		18x16	920	0.12	
	330	*10x20	1400	0.058	220	13x30	905	0.1	
		10x25	1440	0.055		16x20	1040	0.091	
	470	10x30	1690	0.043	270	13x35	1050	0.083	
		13x20	1660	0.045		16x25	1250	0.073	
	560	16x16	1690	0.055	330	13x40	1180	0.071	
		13x25	1950	0.034		18x20	1240	0.08	
	680	18x16	1930	0.054	390	16x32	1570	0.054	
		13x30	2310	0.030		18x25	1490	0.057	
	820	13x35	2510	0.025	470	16x36	1790	0.045	
		16x20	2210	0.034		18x32	1630	0.047	
	1000	13x40	2920	0.021	560	16x40	2020	0.04	
		16x25	2555	0.025		680	18x36	1790	0.04
	1200	18x20	2490	0.036	820	18x40	2330	0.036	
16x32		3010	0.022						

" * " is down size , Ripple Life is less 1000 hrs than standard

TA Low impedance · Long life Series

- Endurance: 105°C 4000~10000hours
- Recommended Applications : Applicable for SMPS, Adaptor,Charger,Monitor/Computer
- Corresponding product to RoHS

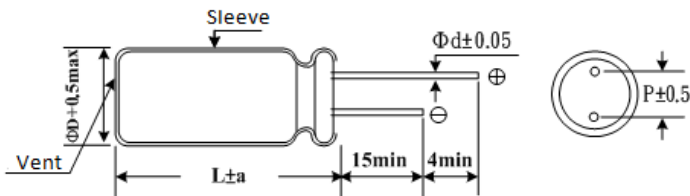
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SY Long Life



■ SPECIFICATIONS

Item	Characteristics								
Category Temperature Range	-40 ~ +105°C								
Rated Voltage Range	6.3~100VDC								
Rated Capacitance Range	22 ~ 8200 μ F								
Capacitance Tolerance	$\pm 20\%$ (120Hz, 20°C)								
Leakage Current (20°C)	I=0.01CV or 3 μ A whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (μ A), C : Nominal capacitance (μ F), V : Rated voltage (V)								
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	WV	6.3	10	16	25	35	50	63	100
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08
When nominal capacitance is 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 Impedance Ratio (MAX)	WV	6.3	10	16	25	35	50	63	100
	Z((120HZ) 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
Endurance	After applying rated voltage with rated ripple current for 4000~10000hours at 105°C, the capacitors shall meet the following requirements.								
	Capacitance change	Within $\pm 25\%$ of initial value							
	D.F. (tan δ)	Not more than 200% of specified value							
	Leakage current	initial specified value or less							
	Φ D	5~6.3 Φ	8~10 Φ	12.5~18 Φ					
6.3~10(V)	4000hrs	6000hrs	8000hrs						
16~100(V)	5000hrs	7000hrs	10000hrs						
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, the capacitors shall meet the same requirement as load life.								

■ 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	0.6	0.6	0.6	0.8	0.8
a	1.5	1.5	1.5	1.5	2.0	2.0	2.0

■ Multiplier for Ripple Current

Freq. (Hz)	120	1K	10K	100K
22 ~ 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 μ F Higher	0.85	0.95	0.98	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size ΦDxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size ΦDxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω,20°C) (100KHz)
6.3V (8)	150	5x11	210	0.58	16V(20)	4700	16x32	3450	0.017
	330	6.3x11	340	0.22			18x25	3140	0.019
	680	8x11	640	0.13		5600	16x36	3610	0.015
	820	10x12.5	865	0.080			18x32	4170	0.015
	1000	8x15	840	0.087		6800	16x40	4080	0.013
	1200	8x20	1050	0.069		8200	18x36	4220	0.014
	1500	10x15	1210	0.060	25V (32)	47	5x11	210	0.580
	1800	10x20	1400	0.046		100	6.3x11	340	0.220
	2200	13x16	1450	0.049		220	8x11	640	0.13
	2700	10x25	1650	0.042		330	8x15	840	0.087
	3300	13x20	1900	0.035			10x12.5	865	0.080
	3900	13x25	2230	0.027		470	8x20	1050	0.069
	4700	13x30	2650	0.024			10x15	1210	0.060
	5600	13x35	2880	0.020		680	10x20	1400	0.046
			2530	0.027			13x16	1450	0.049
	6800	13x40	3350	0.017		820	10x25	1650	0.042
2930			0.021	1000			10x30	1910	0.031
2860			0.026			13x20	1900	0.035	
3450			0.017	1500		13x25	2230	0.027	
10V (13)	100	5x11	210	0.58		1800	13x30	2650	0.024
	220	6.3x11	340	0.220		2200	16x20	2530	0.027
	470	8x11	640	0.130			13x35	2880	0.020
	680	8x15	840	0.087		18x20	2860	0.026	
			865	0.080		2700	13x40	3350	0.017
	1000	8x20	1050	0.069			16x25	2930	0.021
			1210	0.060		3300	16x32	3450	0.017
	1200	10x20	1400	0.046	18x25		3140	0.019	
			1650	0.042	3900	16x36	3610	0.015	
	1500	13x16	1450	0.049		18x32	4170	0.015	
			1910	0.031	4700	16x40	4080	0.013	
	2200	13x20	1900	0.035		18x36	4220	0.014	
			2230	0.027	5600	18x40	4280	0.012	
	3300	13x25	2230	0.027		35V (44)	33	5x11	210
	3900	13x30	2650	0.024	56		6.3x11	340	0.220
	4700	13x35	2530	0.027	150		8x11	640	0.13
			2880	0.020	220		8x15	840	0.087
	5600	13x40	3350	0.017			10x12.5	865	0.080
			2930	0.021	270		8x20	1050	0.069
	6800	16x32	3450	0.017			330	10x15	1210
3140			0.019	470	10x20		1400	0.046	
8200	16x36	3610	0.015		13x16		1450	0.049	
		4170	0.015	560	10x25		1650	0.042	
16V (20)	56	5x11	210		0.58		680	10x30	1910
	120	6.3x11	340	0.22	13x20			1900	0.035
	330	8x11	640	0.130	1000		13x25	2230	0.027
	470	8x15	840	0.087			13x30	2650	0.024
			865	0.080	1200		16x20	2530	0.027
	680	8x20	1050	0.069			1500	13x35	2880
			1210	0.060	1800		13x40	3350	0.017
	1000	10x15	1400	0.046			16x25	2930	0.021
			1450	0.049	2200		18x20	2860	0.026
	1200	10x20	1650	0.042			2700	16x32	3450
			1910	0.031	18x25	3140		0.019	
	1500	13x16	1900	0.035	3300	16x36	3610	0.015	
			2230	0.027		18x32	4170	0.015	
	2200	13x25	2230	0.027	3900	16x40	4080	0.013	
			2650	0.024		18x36	4220	0.014	
	2700	16x20	2530	0.027	50V (63)	18x40	4280	0.012	
2880			0.020	22		5x11	180	0.700	
3300	13x35	2880	0.020	33	6.3x11	245	0.490		
		3350	0.017	47	6.3x11	300	0.520		
		2930	0.021	56	6.3x11	295	0.300		
		2860	0.026						

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)	
50V (63)	100	8x11	555	0.170	63V (79)	330	13x25	784	0.12	
	120	8x15	730	0.120			18x16	920	0.12	
	150	10x12.5	760	0.120		470	13x30	905	0.1	
	180	8x20	910	0.091			16x20	1040	0.091	
	220	10x16	1050	0.084		560	13x35	1050	0.083	
			1220	0.060			16x25	1250	0.073	
	270	13x16	1260	0.061		680	13x40	1180	0.071	
			1440	0.055			18x20	1240	0.08	
	330	10x25	1690	0.043		820	16x32	1570	0.054	
			1660	0.045			18x25	1490	0.057	
			1690	0.055		1000	16x36	1790	0.045	
	470	13x20	1950	0.034			18x32	1630	0.047	
			1930	0.054	1200	16x40	2020	0.04		
	63V (79)	680	13x30	2310	0.030	100V (125)	15	6.3x11	115	1.2
			13x35	2510	0.025		27	8x12	232	0.63
		820	16x20	2210	0.034		39	8x15	300	0.45
				2920	0.021		47	10x12.5	288	0.43
		1000	16x25	2555	0.025		56	8x20	362	0.33
				2490	0.036		68	10x16	357	0.31
				3010	0.022		82	10x20	466	0.21
2740		0.026	13x16	466	0.23					
1500		16x36	3150	0.019	100		10x25	531	0.2	
			3710	0.016	120		10x30	663	0.15	
1800		18x32	3635	0.021			13x20	690	0.16	
			3680	0.017	150		16x16	795	0.14	
2200	18x36	3800	0.014	180	13x25		784	0.12		
		18x40	3800	0.014	220		18x16	920	0.12	
63V (79)	15	5x11	55	2.3			13x30	905	0.1	
	33	6.3x11	115	1.2	16x20		1040	0.091		
	56	8x12	232	0.63	270		13x35	1050	0.083	
	82	8x15	300	0.45			16x25	1250	0.073	
			288	0.43	330		13x40	1180	0.071	
	120	8x20	362	0.33			18x20	1240	0.08	
			357	0.31	390	16x32	1570	0.054		
	180	10x20	466	0.21		18x25	1490	0.057		
			466	0.23	470	16x36	1790	0.045		
	220	10x25	531	0.2		18x32	1630	0.047		
			663	0.15	560	16x40	2020	0.04		
	270	10x30	690	0.16	680	18x36	1790	0.04		
			690	0.16	820	18x40	2330	0.036		
	795	16x16	795	0.14						

ST

Low impedance · Long life Series

- Endurance: 105°C 4000~10000hours
- Recommended Applications : Applicable for SMPS, Adaptor,Charger,Monitor/Computer
- Corresponding product to RoHS

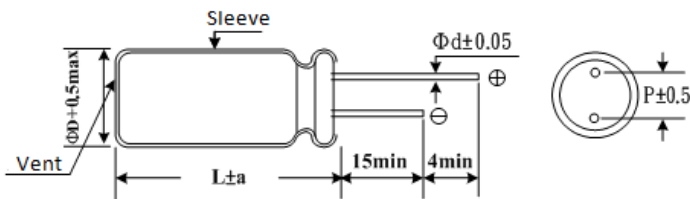
ST
↑
SY Long Life



SPECIFICATIONS

Item	Characteristics																												
Category Temperature Range	-55 ~ +105°C																												
Rated Voltage Range	6.3~100VDC																												
Rated Capacitance Range	10 ~ 15000 µF																												
Capacitance Tolerance	± 20 % (120Hz , 20°C)																												
Leakage Current (20°C)	I=0.01CV or 3 µ A whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (µ A), C : Nominal capacitance (µ F), V : Rated voltage (V)																												
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	<table border="1"> <tr> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>tan δ</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.14</td> <td>0.14</td> <td>0.14</td> </tr> </table> <p>When nominal capacitance is over 1000 µ F,tan δ shall be added 0.02 to the listed value with increase of every 1000 µ F. Down size tan δ add 3%.</p>	WV	6.3	10	16	25	35	50	63	100	tan δ	0.22	0.19	0.16	0.14	0.12	0.14	0.14	0.14										
WV	6.3	10	16	25	35	50	63	100																					
tan δ	0.22	0.19	0.16	0.14	0.12	0.14	0.14	0.14																					
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <tr> <td rowspan="3">Z(120Hz)</td> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>Z-25°C / Z+20°C</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>8</td> <td>6</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table>	Z(120Hz)	WV	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
Z(120Hz)	WV		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																				
Endurance	<p>After applying rated voltage with rated ripple current for 4000~10000hours at 105°C, the capacitors shall meet the following requirements.</p> <table border="1"> <tr> <td>Capacitance change</td> <td colspan="3">Within ± 25% of initial value</td> </tr> <tr> <td>D.F. (tan δ)</td> <td colspan="3">Not more than 200% of specified value</td> </tr> <tr> <td>Leakage current</td> <td colspan="3">initial specified value or less</td> </tr> </table> <table border="1"> <tr> <td>Φ D</td> <td>5~6.3 Φ</td> <td>8~10 Φ</td> <td>12.5~18 Φ</td> </tr> <tr> <td>6.3~10(V)</td> <td>4000hrs</td> <td>6000hrs</td> <td>8000hrs</td> </tr> <tr> <td>16~100(V)</td> <td>5000hrs</td> <td>7000hrs</td> <td>10000hrs</td> </tr> </table>	Capacitance change	Within ± 25% of initial value			D.F. (tan δ)	Not more than 200% of specified value			Leakage current	initial specified value or less			Φ D	5~6.3 Φ	8~10 Φ	12.5~18 Φ	6.3~10(V)	4000hrs	6000hrs	8000hrs	16~100(V)	5000hrs	7000hrs	10000hrs				
Capacitance change	Within ± 25% of initial value																												
D.F. (tan δ)	Not more than 200% of specified value																												
Leakage current	initial specified value or less																												
Φ D	5~6.3 Φ	8~10 Φ	12.5~18 Φ																										
6.3~10(V)	4000hrs	6000hrs	8000hrs																										
16~100(V)	5000hrs	7000hrs	10000hrs																										
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitors shall meet the same requirement as load life.																												

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	0.6	0.6	0.6	0.8	0.8
a	1.5	1.5	1.5	1.5	2.0	2.0	2.0

Multiplier for Ripple Current

Freq. (Hz)	120	1K	10K	100K
10~180	0.4	0.75	0.90	1.00
220~560	0.5	0.85	0.94	1.00
680~1800	0.6	0.87	0.95	1.00
2200~3900	0.75	0.90	0.95	1.00
4700 µ F Higher	0.85	0.95	0.98	1.00

■STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω,25°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω,25°C) (100KHz)
6.3	150	5x11	210	0.720	25	2700	16x25	2930	0.028
	330	6.3x11	340	0.380		3300	16x32	3450	0.025
	680	8x11	640	0.200		3900	18x32	4170	0.015
	820	8x15	840	0.160		4700	18x36	4280	0.014
	1000	10x12	865	0.120		35	33	5x11	210
	1500	8x20	1050	0.110	47		6.3x11	340	0.380
		10x15	1210	0.084	150		8x11	640	0.200
	2200	10x20	1400	0.062	220		8x15	840	0.160
	2700	10x25	1650	0.052	330		10x20	1400	0.062
	3300	13x20	1900	0.046	470		10x25	1650	0.052
	3900	13x25	2230	0.034	680		10x30	1910	0.044
	4700	13x30	2650	0.030			13x20	1900	0.046
	5600	13x35	2880	0.027	820		13x25	2230	0.045
	6800	13x40	3350	0.024	1000		13x25	2230	0.045
		16x25	2930	0.028	1200		13x30	2650	0.030
8200	16x32	3450	0.025	1500	13x35		2880	0.027	
10000	16x36	3610	0.018	1800	13x40		3350	0.024	
12000	18x32	4170	0.015	2200	16x32		3450	0.025	
15000	18x36	4220	0.014	2700	16x36		3610	0.022	
10	100	5x11	210	0.72	3300	18x36	4220	0.020	
	220	6.3x11	340	0.38	50	10	5x11	120	3.50
	470	8x11	640	0.200		22	5x11	210	2.300
	680	8x15	840	0.160		33	6.3x11	340	1.200
	1000	10x15	1210	0.084		47	6.3x11	340	1.200
	1500	10x20	1400	0.062		100	8x11	555	0.630
	2200	10x25	1650	0.052		120	8x15	730	0.450
	2700	13x20	1900	0.046		150	8x20	910	0.330
	3300	13x25	2230	0.034		220	10x16	1050	0.310
	3900	13x30	2650	0.030		330	10x20	1400	0.210
	4700	13x35	2880	0.027		470	10x30	1690	0.150
	5600	13x40	3350	0.024			13x20	1660	0.160
		16x25	2930	0.028		560	13x25	1950	0.120
	6800	16x32	3450	0.025		680	13x30	2310	0.100
	8200	16x36	3610	0.018		820	13x35	2510	0.083
10000	18x36	4220	0.014	1000		16x25	2555	0.073	
16	56	5x11	210	0.720	1200	16x32	3010	0.054	
	100	6.3x11	340	0.380	1500	16x36	3150	0.045	
	220	8x11	640	0.200	1800	18x32	3635	0.047	
	330	8x15	701	0.160	2200	18x36	3680	0.040	
	470	8x15	840	0.160	2700	18x40	3800	0.036	
	680	10x15	1210	0.084	63	10	5x11	55	2.300
	1000	10x20	1400	0.062		33	6.3x11	115	1.200
	1500	10x25	1650	0.052		56	8x11	232	0.630
	2200	13x25	2230	0.034		120	10x16	357	0.310
	2700	13x30	2650	0.030		180	10x20	466	0.210
	3300	13x35	2880	0.027		220	10x25	531	0.200
	3900	13x40	3350	0.024		270	10x30	663	0.150
	4700	16x32	3450	0.028			13x20	690	0.160
	5600	16x36	3610	0.018		330	13x25	784	0.120
		18x32	4170	0.015		470	13x30	905	0.100
6800	18x36	4220	0.014	560		13x35	1050	0.083	
25	47	5x11	210	0.720		680	13x40	1180	0.071
	100	6.3x11	340	0.380		820	16x32	1570	0.054
	150	8x11	640	0.200		1000	16x36	1790	0.045
	220	8x11	640	0.200		1200	16x40	2020	0.040
	330	8x15	840	0.160	100	10	6.3x11	55	5.000
	470	10x15	1210	0.084		15	6.3x11	70	5.000
	680	10x20	1400	0.062		22	8x11	85	2.700
	820	10x25	1650	0.052		33	8x11	95	2.500
	1000	13x20	1900	0.046		47	8x15	150	1.800
	1500	13x25	2230	0.034		56	8x20	200	1.500
	2200	13x35	2880	0.027		68	10x15	230	1.300

ST

Low impedance · Long life Series

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,25°C) (100KHz)
100	82	10x20	250	1.200
	100	10x20	330	0.950
	120	10x25	400	0.800
	150	13x20	460	0.900
	220	13x25	640	0.600
	330	16x25	720	0.570

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,25°C) (100KHz)
100	470	16x32	770	0.550
		18x25	840	0.500
	680	18x36	1400	0.180
	820	18x40	1850	0.130
	1000	18x40	1850	0.130



Low impedance · Long life · Miniaturization Series

New

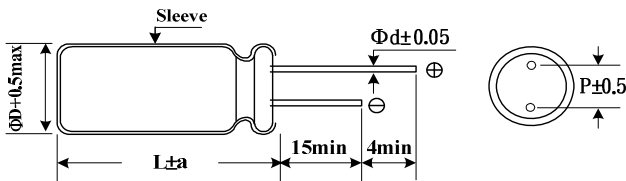
- Endurance: 105°C 5000hrs
- Recommended Applications : Apply to the requirement of long life, low impedance, high reliability, etc.
- Corresponding product to RoHS



SPECIFICATIONS

Item	Characteristics							
Category Temperature Range	-40 ~ +105°C							
Rated Voltage Range	6.3 ~ 50VDC							
Rated Capacitance Range	1~270 µF							
Capacitance Tolerance	± 20 % (120Hz , 20°C)							
Leakage Current (20°C)	I=0.03CV or 3 µA whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)							
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	6.3	10	16	25	35	50	
	tan δ	0.5	0.4	0.35	0.3	0.25	0.25	
Low Temperature Stability Impedance Ratio (MAX)	WV	6.3	10	16	25	35	50	
	Z(120Hz)							
	Z-25°C / Z+20°C	4	3	2	2	2	2	
Z-40°C / Z+20°C	8	6	4	3	3	3		
Endurance	After applying rated voltage with rated ripple current for 5000hours at 105°C, the capacitors shall meet the following requirements.							
	Capacitance change	Within ± 30% of initial value						
	D.F. (tan δ)	Not more than 200% of specified value						
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitors shall meet the same requirement as load life.							
	Capacitance change	Within ± 25% of initial value						
	D.F. (tan δ)	Not more than 200% of specified value						
	Leakage current	Not more than the specified value						

Dimensions [mm]



Vent only for 8 Φ

ΦD	4	5	6.3	8
P	1.5	2.0	2.5	3.5
Φd	0.45	0.45	0.45	0.5
a	1.0	1.0	1.0	1.0

Multiplier for Ripple Current

Freq. (Hz)	120	1 K	10 K	100 K
1~3.3 µF	0.20	0.66	0.90	1.00
4.7~6.8 µF	0.35	0.70	0.90	1.00
10~150 µF	0.40	0.75	0.90	1.00
220~270 µF	0.50	0.85	0.94	1.00



Low impedance · Long life · Miniaturization Series

New

STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω,20°C) (100KHz)
6.3V (8)	33	4x5	37	5.4	25V (32)	15	4x7	44	4.5
	47	4x7	44	4.5		15	5x5	57	3.1
	56	5x5	57	3.1		22	5x7	70	2.5
	82	5x7	70	2.5		33	6.3x5	82	1.7
	100	6.3x5	82	1.7		56	6.3x7	116	1.3
	150	6.3x7	116	1.3		68	8x5	110	1.5
	220	8x5	110	1.5		100	8x7	162	0.9
	270	8x7	162	0.9		35V (44)	4.7	4x5	37
10V (13)	22	4x5	37	5.4	6.8		4x7	44	4.5
	33	4x7	44	4.5	10		5x5	57	3.1
	33	5x5	57	3.1	10		5x7	70	2.5
	47	5x7	70	2.5	22		6.3x5	82	1.7
	68	6.3x5	82	1.7	22		6.3x7	116	1.3
	100	6.3x7	116	1.3	33		8x5	110	1.5
	150	8x5	110	1.5	47		8x7	162	0.9
	220	8x7	162	0.9	50V (63)	1.0	4x5	18	19
16V (20)	15	4x5	37	5.4		2.2	4x5	22	14
	22	4x7	44	4.5		3.3	4x5	26	11
	22	5x5	57	3.1		4.7	4x7	30	9
	33	5x7	70	2.5		4.7	5x5	40	6
	47	6.3x5	82	1.7		6.8	5x7	50	4.8
	68	6.3x7	116	1.3		10	6.3x5	63	2.9
	100	8x5	110	1.5		15	6.3x7	90	2.2
	150	8x7	162	0.9		22	8x5	84	2.6
25V (32)	10	4x5	37	5.4		22	8x7	120	1.6

TB

Low impedance · High Ripple Series

- Endurance: 105°C 5000~6000hours
- Recommended Applications :AV(TV, Video, Audio), Monitor/Computer, OA/HA/Communication, Converter/Inverter, Adapter, SMPS
- Corresponding product to RoHS

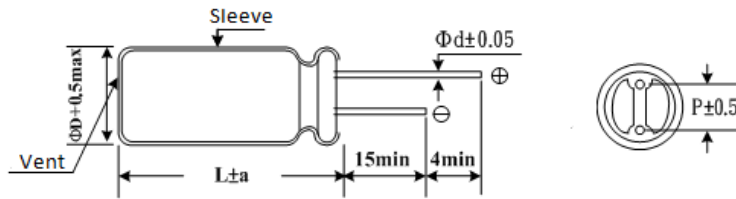
TB
↑
SJ Long Life



■ SPECIFICATIONS

Item	Characteristics																								
Category Temperature Range	-40 ~ +105°C																								
Rated Voltage Range	6.3~35VDC																								
Rated Capacitance Range	47~ 8200 µF																								
Capacitance Tolerance	± 20 % (120Hz , 20°C)																								
Leakage Current (20°C)	I=0.01CV or 3 µ A whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (µ A), C : Nominal capacitance (µ F), V : Rated voltage (V)																								
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	<table border="1"> <tr> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> </tr> <tr> <td>tan δ</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> </tr> </table>	WV	6.3	10	16	25	35	tan δ	0.22	0.19	0.16	0.14	0.12												
	WV	6.3	10	16	25	35																			
tan δ	0.22	0.19	0.16	0.14	0.12																				
When nominal capacitance is over 1000 µF, tan δ shall be added 0.02 to the listed value with increase of every 1000 µF.																									
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <tr> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> </tr> <tr> <td>Z(120Hz)</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Z-25°C / Z+20°C</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table>	WV	6.3	10	16	25	35	Z(120Hz)						Z-25°C / Z+20°C	2	2	2	2	2	Z-40°C / Z+20°C	3	3	3	3	3
	WV	6.3	10	16	25	35																			
	Z(120Hz)																								
Z-25°C / Z+20°C	2	2	2	2	2																				
Z-40°C / Z+20°C	3	3	3	3	3																				
After applying rated voltage with rated ripple current for 5000~6000hours at 105°C, the capacitors shall meet the following requirements.																									
Endurance	<table border="1"> <tr> <td>Capacitance change</td> <td colspan="2">Within ± 25% of initial value(6.3 · 10V : ± 30%)</td> </tr> <tr> <td>D.F. (tan δ)</td> <td colspan="2">Not more than 200% of specified value</td> </tr> <tr> <td>Leakage current</td> <td colspan="2">initial specified value or less</td> </tr> <tr> <td>DΦ</td> <td>5~6.3Φ</td> <td>8~16Φ</td> </tr> <tr> <td>life(hours)</td> <td>5000hrs</td> <td>6000hrs</td> </tr> </table>	Capacitance change	Within ± 25% of initial value(6.3 · 10V : ± 30%)		D.F. (tan δ)	Not more than 200% of specified value		Leakage current	initial specified value or less		DΦ	5~6.3Φ	8~16Φ	life(hours)	5000hrs	6000hrs									
	Capacitance change	Within ± 25% of initial value(6.3 · 10V : ± 30%)																							
	D.F. (tan δ)	Not more than 200% of specified value																							
	Leakage current	initial specified value or less																							
	DΦ	5~6.3Φ	8~16Φ																						
life(hours)	5000hrs	6000hrs																							
*If dimension is down size, Endurance will be less 1000 hours than standard.																									
Shelf Life	After placed at 105°C without voltage applied for 500 hours, the capacitors shall meet the same requirement as Endurance.																								

■ Dimensions [mm]



ΦD	5	6	8	10	13	16
P	2.0	2.5	3.5	5.0	5.0	7.5
Φd	0.5	0.5	0.6	0.6	0.6	0.8
a	1.5	1.5	1.5	1.5	2.0	2.0

■ Multiplier for Ripple Current

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

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)
6.3V (8)	220	5x11	330	0.24	16V (20)	1800	10x25	2250	0.023
	470	6.3x11	500	0.11		2200	13x20	2480	0.023
	820	8x12	900	0.062		2700	13x25	2900	0.020
	1200	8x15	1210	0.048		3300	13x30	3450	0.017
		10x12.5	1240	0.053			16x20	3250	0.018
	1500	8x20	1410	0.041		3900	13x35	3570	0.016
	1800	10x16	1650	0.038		4700	16x25	3630	0.017
	2200	10x20	1960	0.026	25V (32)	68	5x11	330	0.24
	2700	10x25	2250	0.023		150	6.3x11	500	0.11
	3900	13x20	2480	0.023		330	8x12	900	0.062
	4700	13x25	2900	0.020		390	8x15	1210	0.048
	5600	13x30	3450	0.017		470	10x12.5	1240	0.053
	6800	13x35	3570	0.016		560	8x20	1410	0.041
16x20		3250	0.018	680		10x16	1650	0.038	
8200	16x25	3630	0.017	820		10x20	1960	0.026	
10V (13)	150	5x11	330	0.24		1000	10x25	2250	0.023
	330	6.3x11	500	0.11		1500	13x20	2480	0.023
	680	8x12	900	0.062		1800	13x25	2900	0.020
	1000	8x15	1210	0.048		2200	13x30	3450	0.017
		10x12.5	1240	0.053			16x20	3250	0.018
	1500	8x20	1410	0.041	2700	13x35	3570	0.016	
		10x16	1650	0.038	3300	16x25	3630	0.017	
	1800	10x20	1960	0.026	35V (44)	47	5x11	330	0.24
	2200	10x25	2250	0.023		100	6.3*11	500	0.11
	3300	13x20	2480	0.023		220	8x12	900	0.062
	3900	13x25	2900	0.020		270	8x15	1210	0.048
	4700	13x30	3450	0.017		330	10x12.5	1240	0.053
		16x20	3250	0.018		390	8x20	1410	0.041
5600	13x35	3570	0.016	470		10x16	1650	0.038	
6800	16x25	3630	0.017	560		10x20	1960	0.026	
16V (20)	100	5x11	330	0.24		680	10x25	2250	0.023
	220	6.3x11	500	0.11		1000	13x20	2480	0.023
	470	8x12	900	0.062		1200	13x25	2900	0.020
	680	8x15	1210	0.048		1500	13x30	3450	0.017
		10x12.5	1240	0.053			16x20	3250	0.018
	1000	8x20	1410	0.041	1800	13x35	3570	0.016	
		10x16	1650	0.038	2200	16x25	3630	0.017	
	1500	10x20	1960	0.026					

TC

Low impedance · Long life Series

- Endurance: 105°C 6000~10000hours
- Recommended Applications :Applicable forAV(TV,Video,Audio),
OA/HA/Communication, SMPS, Adapter,Monitor/Computer,Converter/Inverter
- Corresponding product to RoHS

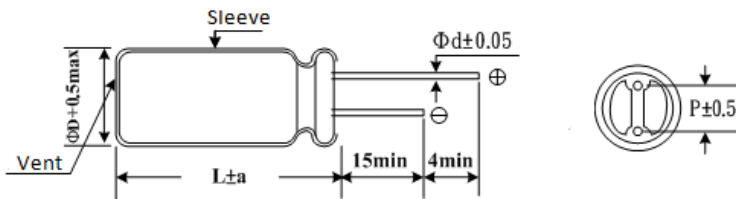
TC
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TB Long Life



■ SPECIFICATIONS

Item	Characteristics									
Category Temperature Range	-40 ~ +105°C									
Rated Voltage Range	6.3~100VDC									
Rated Capacitance Range	8.2 ~ 8200 μ F									
Capacitance Tolerance	$\pm 20\%$ (120Hz, 20°C)									
Leakage Current (20°C)	I=0.01CV or 3 μ A whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (μ A), C : Nominal capacitance (μ F), V : Rated voltage (V)									
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	WV	6.3	10	16	25	35	50	63	80	100
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.08
When nominal capacitance is 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 Impedance Ratio (MAX)	WV	6.3	10	16	25	35	50	63	80	100
	Z(120Hz)	6.3	10	16	25	35	50	63	80	100
	Z-25°C / Z+20°C	4	3	2	2	2	2	2	2	2
	Z-40°C / Z+20°C	8	6	4	3	3	3	3	3	3
Endurance	After applying rated voltage with rated ripple current for 6000~10000hours at 105°C, the capacitors shall meet the following requirements.									
	Capacitance change	Within $\pm 25\%$ of initial value(6.3 · 10V : $\pm 30\%$)								
	D.F. (tan δ)	Not more than 200% of specified value								
	Leakage current	initial specified value or less								
	D Φ	5-6.3 Φ	8 Φ	10~18 Φ						
Life	6000hrs	8000hrs	10000hrs							
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.									

■ 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	0.6	0.6	0.6	0.8	0.8
a	1.5	1.5	1.5	1.5	2.0	2.0	2.0

■ Multiplier for Ripple Current

Freq. (Hz)	120	1K	10K	100K
8.2 ~ 33	0.42	0.70	0.90	1.00
47 ~ 270	0.50	0.73	0.92	1.00
330 ~680	0.55	0.77	0.94	1.00
820 ~ 1800	0.60	0.80	0.96	1.00
2200 ~8200	0.70	0.85	0.98	1.00

■ STANDARD RATINGS

Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω,20°C) (100KHz)	Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω,20°C) (100KHz)	
6.3V (8)	220	5x11	345	0.242	35V (44)	220	8x12	945	0.056	
	470	6.3x11	540	0.103		270	8x16	1250	0.050	
	820	8x12	945	0.062		330	10x12.5	1330	0.041	
	1200	8x16	1250	0.050		390	8x20	1500	0.032	
		10x12.5	1330	0.043		470	10x16	1760	0.030	
	1500	8x20	1500	0.032		560	10x20	1960	0.025	
	1800	10x16	1760	0.031		680	10x25	2250	0.023	
	2200	10x20	1960	0.022		1000	13x20	2480	0.025	
	2700	10x25	2250	0.020		1200	13x25	2900	0.022	
	3900	13x20	2480	0.019		1500	13x30	3450	0.018	
	4700	13x25	2900	0.017			16x20	3250	0.020	
	5600	13x30	3450	0.014		1800	13x35	3570	0.018	
	6800	16x20	3250	0.017		2200	16x25	3630	0.015	
		13x35	3570	0.013						
8200	16x25	3630	0.014							
10V (13)	150	5x11	345	0.242	50V (63)	27	5x11	238	0.3400	
	330	6.3x11	540	0.103		56	6.3x11	385	0.1400	
	680	8x12	945	0.062		100	8x12	724	0.074	
	1000	8x16	1250	0.050		120	8x16	950	0.061	
		10x12.5	1330	0.043		150	10x12.5	979	0.061	
	1500	8x20	1500	0.032		180	8x20	1190	0.046	
		10x16	1760	0.031		220	10x16	1370	0.042	
	1800	10x20	1960	0.022		270	10x20	1580	0.030	
	2200	10x25	2250	0.020		330	10x25	1870	0.028	
	3300	13x20	2480	0.019		470	13x20	2050	0.027	
	3900	13x25	2900	0.017		560	13x25	2410	0.023	
	4700	13x30	3450	0.014		680	13x30	2860	0.021	
		16x20	3250	0.017		820	13x35	2960	0.019	
	5600	13x35	3570	0.013			16x20	2730	0.023	
6800	16x25	3630	0.014	1000	16x25	3010	0.021			
16V (20)	100	5x11	345	0.242	63V (79)	18	5x11	173	1.000	
	220	6.3x11	540	0.103		47	6.3x11	278	0.560	
	470	8x12	945	0.062		82	8x12	525	0.264	
	680	8x16	1250	0.050		100	8x16	688	0.192	
		10x12.5	1330	0.043		120	10x12.5	725	0.180	
	1000	8x20	1500	0.032		150	8x20	861	0.144	
		10x16	1760	0.031		180	10x16	998	0.132	
	1500	10x20	1960	0.022		270	10x20	1200	0.094	
	1800	10x25	2250	0.020			13x16	1200	0.098	
	2200	13x20	2480	0.019		330	10x25	1410	0.083	
	2700	13x25	2900	0.017		390	13x20	1570	0.072	
	3300	13x30	3450	0.014		470	13x25	1990	0.052	
		16x20	3250	0.017		560	13x30	2410	0.042	
	3900	13x35	3570	0.013			16x20	2100	0.052	
4700	16x25	3630	0.014	680	13x35	2620	0.040			
25V (32)	68	5x11	345	0.242	80V (100)	12	5x11	163	1.400	
	150	6.3x11	540	0.103		33	6.3x11	267	0.570	
	330	8x12	945	0.062		56	8x12	462	0.360	
	390	8x16	1250	0.050		68	8x16	585	0.250	
	470	10x12.5	1330	0.043		82	10x12.5	624	0.230	
	560	8x20	1500	0.032		100	8x20	735	0.190	
	680	10x16	1760	0.031		120	10x16	780	0.170	
	820	10x20	1960	0.022		180	10x20	1040	0.120	
	1000	10x25	2250	0.020			13x16	975	0.130	
	1500	13x20	2480	0.019						
	1800	13x25	2900	0.017						
	2200	13x30	3450	0.014						
		16x20	3250	0.017						
	2700	13x35	3570	0.013						
3300	16x25	3630	0.014							
35V (44)	47	5x11	345	0.2200						
	100	6.3x11	540	0.094						

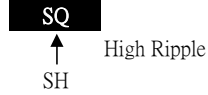
■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	Ripple current (mA/rms105°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)
80V (100)	220	10x25	1170	0.110	100V (125)	68	8x20	735	0.190
	270	13x20	1430	0.085		82	10x16	780	0.170
	330	13x25	1620	0.060		100	10x20	1040	0.120
	390	13x30	1950	0.051			13x16	975	0.130
		16x20	1750	0.058		120	10x25	1170	0.110
	470	13x35	2140	0.043		150	13x20	1430	0.085
	560	13x40	2340	0.036		220	13x25	1620	0.060
		16x25	2210	0.044		270	13x30	1950	0.051
		18x20	1950	0.054			16x20	1750	0.058
		680	16x32	2400		0.033	330	13x35	2140
	820	16x36	2600	0.029		390	13x40	2340	0.036
		18x25	2270	0.038			16x25	2210	0.044
	1000	16x40	2860	0.027			18x20	1950	0.054
		18x32	2470	0.031		470	16x32	2400	0.033
	1200	18x36	2860	0.027			18x25	2270	0.038
1500	18x40	3510	0.026	560	16x36	2600	0.029		
100V (125)	8.2	5x11	163		1.400	18x32	2470	0.031	
	18	6.3x11	267	0.570	680	16x40	2860	0.027	
	33	8x12	462	0.360		18x36	2860	0.027	
	47	8x16	585	0.250	820	18x40	3510	0.026	
	56	10x12.5	624	0.230					

SQ

High Ripple Series

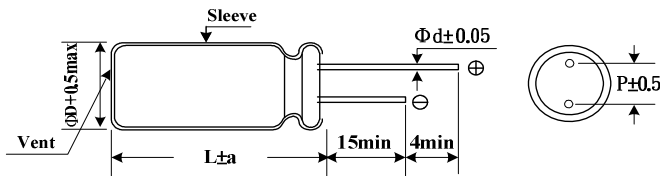
- Endurance: 105°C 2000 hours
- Recommended Applications : AV(TV, Video, Audio); Monitor/Computer; OA/HA/Communication; Converter/Inverter; Energy saving lamp; PFC circuit;SMPS; Ballast; Adapter
- Corresponding product to RoHS



SPECIFICATIONS

Item	Characteristics						
Category Temperature Range	-40~+105°C						
Rated Voltage Range	160 ~ 450VDC						
Rated Capacitance Range	2.2 ~ 220 µF						
Capacitance Tolerance	± 20 % (120Hz , 20°C)						
Leakage Current (20°C)	I=0.03CV +10 µ A (After rated voltage applied for 2 minutes) I : Max. leakage current (µ A), C : Nominal capacitance (µ F), V : Rated voltage (V)						
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	160	200	250	350	400	420~450
	tan δ	0.15	0.15	0.15	0.24	0.24	0.24
Low Temperature Stability Impedance Ratio (MAX)	Z (120Hz)	160	200	250	350	400	420~450
	Z(-25°C) / Z(20°C)	3	3	3	5	5	6
	Z(-40°C) / Z(20°C)	6	6	6	6	6	8
Endurance	After applying rated voltage with rated ripple current for2000 hours at 105°C , the capacitors shall meet the following requirements.						
	Capacitance change	Within ± 20% of initial value					
	D.F. (tan δ)	Not more than 200% of specified value					
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours,the capacitors shall meet the same requirement as Endurance.						

Dimensions [mm]



ΦD	8	10	12.5	13	16	18
P	3.5	5	5.0	5	7.5	7.5
Φd	0.6	0.6	0.6	0.6	0.8	0.8
a	1.5(2.0)	1.5(2.0)	2.0(2.5)	2.0	2.0	2.0

Notes : ():L≥30mm

Multiplier for Ripple Current

Freq. (Hz)		50	120	1K	10K	100K
Coefficient	< 33 µF	0.80	1.00	1.36	1.54	1.80
	≥ 33 µF	0.85	1.00	1.28	1.35	1.40

■ STANDARD RATINGS

Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (120Hz)	Ripple current (mA/rms105°C) (100KHz)	Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (120Hz)	Ripple current (mA/rms105°C) (100KHz)	
160(200)	22	10x20	195	350	400(450)	39	8x52	320	448	
	33	13x20	315	450			10x40	320	448	
	47	13x25	420	600		47	10x45	355	500	
	68	13x25	420	600			12.5x40	365	510	
	100	16x25	665	950			16x25	350	490	
	220	18x36	980	1400			18x32	600	860	
200(250)	22	10x20	195	350		56	10x50	405	566	
	33	13x20	365	520			12.5x40	405	566	
	47	13x25	420	600			68	10x55	460	640
	68	16x25	665	950				12.5x45	460	640
	100	16x32	840	1200		16x30		510	714	
	250(300)	10	10x20	120		220	82	16x32	550	770
22		8x30	200	360		12.5x50		525	735	
		13x25	165	300		18x32		620	868	
27		8x35	215	380		120	18x32	750	1050	
33		8x35	240	336	150		18x36	800	1120	
		13x25	280	400	420(470)	15	8x35	150	270	
39		8x40	260	360		22	8x40	195	350	
		10x30	275	500		27	8x45	220	396	
47		8x45	310	558			10x35	220	396	
		16x25	505	720		33	8x50	285	400	
56		10x40	350	490			10x40	285	400	
		68	10x40	400		560	39	10x42	310	430
16x32			570	810		12.5x35		320	448	
82		10x45	450	630		47	10x45	350	490	
		10x50	525	940			12.5x40	350	490	
100	18x36	735	1050	56		10x52	390	545		
	12.5x45	725	1015			12.5x42	390	545		
350(400)	2.2	10x16	30	50		68	12.5x45	450	630	
	3.3	10x16	35	60		450(500)	82	12.5x52	535	750
	4.7	10x20	45	78			2.2	10x16	60	110
	10	13x20	75	130	3.3		10x20	75	135	
	15	8x30	140	250	4.7		13x20	105	190	
			180	324	10		13x25	140	250	
	22	16x25	115	205	12		8x30	115	210	
		8x40	210	380	15		8x35	135	240	
	27	8x42	240	336	22		8x42	190	340	
			180	255			10x30	190	340	
	33	16x32	180	255			13x20	180	324	
		10x40	280	390			13x25	200	360	
	39	10x45	325	455	16x32		265	480		
			225	320	8x45		210	378		
	47	18x32	225	320	27		10x35	210	378	
		10x50	380	530			33	8x52	290	406
	56	12.5x40	430	602	10x42	290		406		
			500	700	16x25	350		500		
82	12.5x45	630	880	39	18x36	455	650			
		370	530		10x45	320	448			
400(450)	2.2	10x16	80		140	47	12.5x40	330	460	
	3.3	10x20	110	195	10x50		360	500		
	4.7	10x25	120	220	56	12.5x42	370	666		
	15	8x35	170	306		16x25	380	532		
	10	10x16	135	243	68	12.5*50	475	665		
			200	360		18x25	470	658		
	22	8x40	220	395	82	12.5x55	535	750		
			240	432		18x36	520	720		
			265	477	100	18x40	620	860		
			315	570		120	18x40	650	910	
	27	10x35	250	350	120	18x45	720	1000		
			250	350						
	33	8x50	295	410						
			295	410						
			490	700						

- Endurance: 105°C · 5000hours
- Recommended Applications : High ripple current for Electronic Ballast , Power Supply...etc
- Corresponding product to RoHS

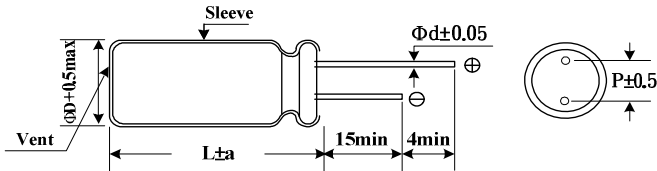
SG
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SQ Long Life



SPECIFICATIONS

Item	Characteristics																																	
Category Temperature Range	-40~+105°C	-25~+105°C																																
Rated Voltage Range	160 ~ 450VDC	500VDC																																
Rated Capacitance Range	3.3 ~ 330 µF	4.7~ 150 µF																																
Capacitance Tolerance	± 20 % (120Hz , 20°C)	± 20 % (120Hz , 20°C)																																
Leakage Current (20°C)	I=0.06CV + 10(µ A) (After rated voltage applied for 2 minutes) I : Max. leakage current (µ A), C : Nominal capacitance (µ F), V : Rated voltage (V)																																	
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	<table border="1"> <tr> <td>WV</td> <td>160</td> <td>200</td> <td>250</td> <td>350</td> <td>400</td> <td>420~450</td> <td>500</td> </tr> <tr> <td>tan δ</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.20</td> <td>0.24</td> <td>0.24</td> <td>0.24</td> </tr> </table>		WV	160	200	250	350	400	420~450	500	tan δ	0.15	0.15	0.15	0.20	0.24	0.24	0.24																
WV	160	200	250	350	400	420~450	500																											
tan δ	0.15	0.15	0.15	0.20	0.24	0.24	0.24																											
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <tr> <td rowspan="3">Z (120Hz)</td> <td colspan="8">WV</td> </tr> <tr> <td>160</td> <td>200</td> <td>250</td> <td>350</td> <td>400</td> <td>420~450</td> <td>500</td> </tr> <tr> <td>Z-25°C / Z+20°C</td> <td>3</td> <td>3</td> <td>3</td> <td>5</td> <td>5</td> <td>6</td> <td>6</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>6</td> <td>6</td> <td>6</td> <td>6</td> <td>6</td> <td>8</td> <td>—</td> </tr> </table>		Z (120Hz)	WV								160	200	250	350	400	420~450	500	Z-25°C / Z+20°C	3	3	3	5	5	6	6	Z-40°C / Z+20°C	6	6	6	6	6	8	—
Z (120Hz)	WV																																	
	160	200		250	350	400	420~450	500																										
	Z-25°C / Z+20°C	3	3	3	5	5	6	6																										
Z-40°C / Z+20°C	6	6	6	6	6	8	—																											
Endurance	After applying rated voltage with rated ripple current for 5000 hours at 105°C , the capacitors shall meet the following requirements. <table border="1"> <tr> <td>Capacitance change</td> <td>Within ± 20% of initial value</td> </tr> <tr> <td>D.F. (tan δ)</td> <td>Not more than 200% of specified value</td> </tr> <tr> <td>Leakage current</td> <td>initial specified value or less</td> </tr> </table>		Capacitance change	Within ± 20% of initial value	D.F. (tan δ)	Not more than 200% of specified value	Leakage current	initial specified value or less																										
Capacitance change	Within ± 20% of initial value																																	
D.F. (tan δ)	Not more than 200% of specified value																																	
Leakage current	initial specified value or less																																	
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitors shall meet the same requirement as Endurance.																																	

Dimensions [mm]



ΦD	8.0	10	12.5	13	16	18	22
P	3.5	5.0	5.0	5.0	7.5	7.5	10.0
Φd	0.6	0.6	0.6	0.6	0.8	0.8	0.8
a	1.5(2.0)	1.5(2.0)	2.0(2.5)	2.0	2.0	2.0	2.0

Notes : () : L ≥ 30mm

Multiplier for Ripple Current

Freq. (Hz)	50,60	120	300	1K	10K~100K
160~450V	0.80	1.00	1.20	1.40	1.60
500V	0.75	1.00	1.20	1.35	1.50

■STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)	
160 (200)	22	10x20	0.15	160	350 (400)	68	16x32	0.2	400	
	33	10x20	0.15	210		82	18x25	0.2	380	
	47	13x20	0.15	260		100	12.5x50	0.2	400	
	68	13x25	0.15	360		100	12.5x55	0.2	460	
	200 (250)	68	16x20	0.15	430	400 (450)	100	18x32	0.2	530
		100	16x25	0.15	475		4.7	※10x16	0.24	60
		150	18x20	0.15	465		6.8	※10x16	0.24	72
		220	16x32	0.15	650		10	※10x16	0.24	85
			18x25	0.15	625		10	10x20	0.24	100
		330	16x32	0.15	750		15	8x35	0.24	110
18x25			0.15	725	22		8x40	0.24	140	
330		18x32	0.15	960			13x20	0.24	145	
		13x20	0.15	210			13x25	0.24	170	
250 (300)		10	※10x16	0.15	80		16x20	0.24	200	
	15	※10x16	0.15	100	8x45	0.24	165			
	22	10x20	0.15	160	10x35	0.24	165			
	33	※10x20	0.15	160	33	8x50	0.24	190		
		13x20	0.15	210		10x40	0.24	190		
	47	13x20	0.15	260	16x25	0.24	230			
	68	13x25	0.15	360	18x20	0.24	250			
		16x20	0.15	430	10x45	0.24	220			
	100	16x25	0.15	475	47	10x50	0.24	255		
		18x20	0.15	465		12.5x40	0.24	255		
150	18x25	0.15	650	16x25		0.24	255			
	220	18x32	0.15	780		16x32	0.24	300		
350 (400)	10	10x20	0.15	100	18x25	0.24	325			
	22	8x30	0.15	130	56	12.5x45	0.24	300		
		※10x25	0.15	145		12.5x50	0.24	350		
	27	13x20	0.15	160	68	16x30	0.24	340		
		8x32	0.15	150		16x32	0.24	350		
	33	8x35	0.15	170		18x36	0.24	420		
		13x20	0.15	210	82	12.5x55	0.24	400		
	39	8x42	0.15	200	100	18x32	0.24	465		
		8x45	0.15	220		18x40	0.24	545		
	47	13x25	0.15	270	150	18x40	0.24	525		
16x20		0.15	275	22x40		0.24	650			
420 (470)	56	10x42	0.15	300	15	8x35	0.24	105		
	68	10x45	0.15	330	22	8x40	0.24	135		
		16x25	0.15	380	27	8x45	0.24	155		
	18x20	0.15	375	10x35		0.24	155			
	82	10x50	0.15	390	33	8x50	0.24	185		
		12.5x42	0.15	440		10x40	0.24	185		
	100	16x32	0.15	520	39	10x45	0.24	215		
		18x25	0.15	500		12.5x35	0.24	215		
	120	12.5x45	0.15	490	47	10x50	0.24	245		
		12.5x50	0.15	560		12.5x40	0.24	245		
150	18x32	0.15	650	56	12.5x45	0.24	290			
	220	18x40	0.15	820	68	12.5x50	0.24	335		
350 (400)	10	10x20	0.20	100	82	12.5x55	0.24	385		
	15	8x35	0.20	120	3.3	10x20	0.24	60		
		8x40	0.20	150	4.7	13x20	0.24	80		
	22	13x20	0.20	160	6.8	※10x20	0.24	90		
		8x45	0.20	170	10	13x20	0.24	110		
	33	8x50	0.20	200		13x25	0.24	110		
		13x25	0.20	230	12	8x35	0.24	110		
	39	16x20	0.20	250	15	8x40	0.24	130		
		10x45	0.20	235		22	8x45	0.24	165	
	47	10x50	0.20	270	10x35		0.24	165		
16x25		0.20	300	13x20	0.24		145			
18x20		0.20	315	16x25	0.24		190			
56	12.5x40	0.20	300	18x20	0.24		200			
68	12.5x45	0.20	350	27	8x52	0.24	195			

※Down Size : 3000Hrs

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)
450 (500)	27	10x40	0.24	195
	33	10x45	0.24	230
		12.5x35	0.24	230
		16x25	0.24	235
		16x32	0.24	275
		18x25	0.24	280
	39	10x50	0.24	265
		12.5x40	0.24	265
	47	10x52	0.24	295
		12.5x45	0.24	310
		16x26	0.24	270
		18x32	0.24	340
	56	12.5x50	0.24	355
	68	12.5x55	0.24	410
		18x25	0.24	335
		18x32	0.24	395
18x40		0.24	460	

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)
450 (500)	100	22x40	0.24	580
500 (550)	4.7	10x20	0.24	70
	6.8	13x20	0.24	100
	10	12.5x25	0.24	130
	22	16x25	0.24	225
		18x20	0.24	220
	33	16x32	0.24	305
		18x25	0.24	295
	47	16x36	0.24	430
		18x32	0.24	435
	68	18x32	0.24	530
		18x36	0.24	555
	82	18x40	0.24	640
		22x35	0.24	675
	100	22x35	0.24	745
	120	22x40	0.24	865
150	22x45	0.24	1020	

※Down Size : 3000Hrs

SP

High Ripple · Long life Series

Upgrade

500V LINEUP

- Endurance: 105°C · 8000~10000hours
- Recommended Applications : Applicable for Electronic Ballast
- Corresponding product to RoHS

SP

↑ Long Life

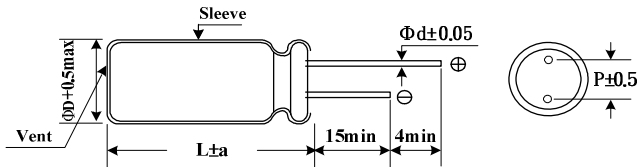
SG



■ SPECIFICATIONS

Item	Characteristics	
Category Temperature Range	-40~+105°C	-25~+105°C
Rated Voltage Range	160 ~ 450VDC	500VDC
Rated Capacitance Range	3.3 ~ 330 µF	10~ 68 µF
Capacitance Tolerance	± 20 % (120Hz , 20°C)	± 20 % (120Hz , 20°C)
Leakage Current (20°C)	I=0.04CV + 100(µ A) ,(After rated voltage applied for 2 minutes) I : Max. leakage current (µ A), C : Nominal capacitance (µ F), V : Rated voltage (V)	
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	160 200 400 420~450 500
	tan δ	0.20 0.20 0.24 0.24 0.24
Low Temperature Stability Impedance Ratio (MAX)	Z(120Hz)	160 200 400 420~450 500
	Z-25°C / Z+20°C	3 3 5 6 6
	Z-40°C / Z+20°C	6 6 6 8 -
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the max ripple current is applies for 10000 hours (8000 hours for φ 10) at 105°C.	
	Capacitance change	Within ± 20% of initial value
	D.F. (tan δ)	Not more than 200% of specified value
Shelf Life	Leakage current	initial specified value or less
	After placed at 105°C without voltage applied for 1000 hours,the capacitors shall meet the same requirement as Endurance.	

■ Dimensions [mm]



ΦD	10	12.5	13	16	18
P	5.0	5.0	7.5	7.5	7.5
Φd	0.6	0.6	0.8	0.8	0.8
a	1.5(2.0)	2(2.5)	2.0	2.0	2.0

Notes : ():L ≥ 30mm

■ Multiplier for Ripple Current

Freq. (Hz)	120	1K	10K	100K
Coefficient	1.0	1.6	1.8	2.0

SP

High Ripple · Long life Series

Upgrade

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (120Hz)	Ripple current (mA/rms105°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (mA/rms105°C) (120Hz)	Ripple current (mA/rms105°C) (100KHz)	
160 (200)	33	10x20	250	500	400 (450)	56	12.5x45	360	720	
	47	10x20	290	580		68	12.5x50	400	800	
		12.5x20	330	660			18x32	435	870	
	68	13x25	360	720	82	12.5x55	460	920		
		16x20	380	760	420(470)	27	10x40	200	400	
	100	13x25	485	970		33	10x45	235	470	
		16x20	560	1120		39	10x50	270	540	
	150	16x25	560	1120		47	12.5x42	310	620	
		18x20	560	1120		56	12.5x45	330	660	
		10x45	410	820		68	12.5x50	390	780	
		16x25	600	1200	82	12.5x55	450	900		
	200 (250)	16x32	650	1300	450 (500)	3.3	10x16	50	100	
		18x25	650	1300		4.7	10x20	70	140	
		180	10x50	470		940	6.8	10x20	75	150
		220	12.5x45	550		1100		12.5x20	90	180
			16x32	650		1300	10	12.5x20	155	310
		270	18x25	650		1300	22	10x40	250	500
			12.5x50	640		1280		16x25	280	560
330		12.5x55	740	1480		18x20	275	550		
		18x36	690	1380		27	10x42	270	540	
			22	10x20		220	440	33	10*45	300
33		10x20	260	520		16x32	310		620	
		12.5x20	290	580		18x25	295		590	
250(300)	47	13x20	330	660	39	10x50	340	680		
	68	13x25	360	720		12.5x40	350	700		
		16x20	380	760		47	12.5x45	420	840	
	100	16x25	560	1120	16x36		440	880		
		10x45	330	660	18x32	440	880			
	120	10x50	430	860	56	12.5x50	480	960		
		150	12.5x45	510	1020	68	12.5x55	530	1060	
			16x32	640	1280	500(550)	10	12.5x20	130	260
		180	12.5x50	590	1180		15	12.5x25	165	330
		220	12.5x52	650	1300			16x20	170	340
			270	12.5x55	750		1500	18	12.5x30	195
	82	10x52	390	780	16x20		185		370	
100		12.5x42	470	940	22		12.5x35	230	460	
	120	12.5x45	480	960			16x25	230	460	
150	12.5x50	540	1080	18x20	225		450			
	180	12.5x55	650	1300	27		12.5x40	270	540	
400 (450)	6.8	10x20	75	150			16x25	250	500	
	10	10x20	90	180	33		16x30	300	600	
	22	16x20	150	300			18x25	295	590	
	33	16x25	260	520	39	16x36	355	710		
	39	10x45	260	520		47	16x40	410	820	
	47	12.5x40	310	620	18x30		385	770		
		16x32	350	700	56	18x36	455	910		
	56	10x52	340	680	68	18x40	515	1030		

SU

High Ripple · Long life Series

- Endurance : 105°C 10000~12000hours
- Recommended Applications : Electronic lighting and power
- Corresponding product to RoHS

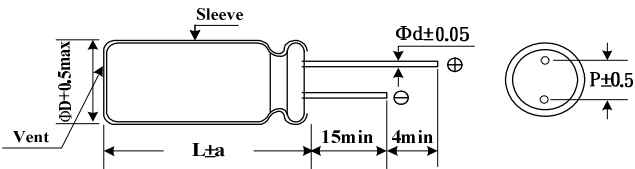
SU
↑
SP Long Life



SPECIFICATIONS

Item	Characteristics							
Category Temperature Range	-40 ~ +105°C							
Rated Voltage Range	160~450VDC							
Rated Capacitance Range	6.8 ~ 330 µF							
Capacitance Tolerance	± 20 % (120Hz , 20°C)							
Leakage Current (20°C)	I=0.04CV +100 µ A . (After rated voltage applied for 2 minutes) I : Max. leakage current (µ A), C : Nominal capacitance (µ F), V : Rated voltage (V)							
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	160	200	250	350	400	450	
	tan δ	0.15	0.15	0.15	0.20	0.20	0.20	
Low Temperature Stability Impedance Ratio (MAX)	Z(120Hz)	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	8	
Endurance	After applying rated voltage with rated ripple current for 10000~12000hours at 105°C , the capacitors shall meet the following requirements.							
	Capacitance change	Within ± 20% of initial value				Φ D×L	Life time (hours)	
	D.F. (tan δ)	Not more than 200% of specified value				10 Φ	10000	
	Leakage current	initial specified value or less				≥ 13 Φ	12000	
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitors shall meet the same requirement as load life.							

Dimensions [mm]



ΦD	10.0	13.0	16.0	18.0
P	5.0	5.0	7.5	7.5
Φd	0.6	0.6	0.8	0.8
a	1.5	2.0	2.0	2.0

Multiplier for Ripple Current

Multiplier for Ripple Current	120	1K	10K	100K
coefficient	0.5	0.8	0.9	1.0

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (100KHz)
160	33	10x16	0.15	500	250	220	18x36	0.15	2753
	47	10x20	0.15	580		330	18x50	0.15	3912
	68	13x20	0.15	720	350	6.8	10x16	0.20	280
	100	13x25	0.15	970		10	10x20	0.20	350
	150	16x25	0.15	1120		22	13x20	0.20	650
	220	16x32	0.15	1300		33	13x25	0.20	900
	330	18x36	0.15	1380		47	16x25	0.20	1000
	560	18x50	0.15	2086		68	16x32	0.20	1100
200	22	10x16	0.15	500	400	6.8	10x16	0.20	140
	33	10x20	0.15	520		10	10x20	0.20	180
	47	13x20	0.15	660		22	13x20	0.20	430
	68	13x25	0.15	720		33	16x25	0.20	520
	100	16x25	0.15	1120		47	16x32	0.20	700
	150	16x32	0.15	1620		68	18x32	0.20	870
	220	18x32	0.15	2080		100	18x50	0.20	1290
	390	18x50	0.15	3380	450	10	10x20	0.20	180
250	10	10x16	0.15	320		15	13x20	0.20	380
	22	10x20	0.15	500		22	13x25	0.20	500
	33	13x20	0.15	800		33	16x25	0.20	560
	47	13x20	0.15	980		47	16x36	0.20	880
	100	16x25	0.15	1530		68	16x36	0.20	1110
	150	18x25	0.15	1940	100	18x50	0.20	1560	

RN Non-polar Standard Series

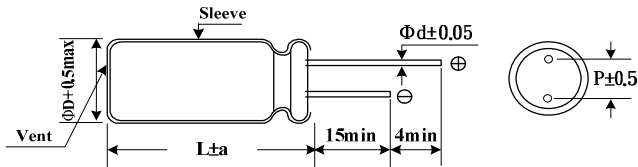


- Endurance: 85°C, 1000hours, Non-polarized/Polarity reversing
- Recommended Applications :Small crossover network, Reversed polarity circuit, Coupling
- Corresponding product to RoHS

■ SPECIFICATIONS

Item	Characteristics	
Category Temperature Range	-40 ~ +85°C	-25~+85°C
Rated Voltage Range	6.3~ 100VDC	160~250VDC
Rated Capacitance Range	1 ~ 4700 µF	1~100 µF
Capacitance Tolerance	± 20 % (120Hz , 20°C)	
Leakage Current (20°C)	I ≤ 0.03CV + 4 µA ; L=7mm, I ≤ 0.05CV or 10 µA whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)	
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	6.3 10 16 25 35 50 63~100 160~250
	tan δ	0.24 0.2 0.17 0.15 0.15 0.15 0.10 0.20
When nominal capacitance is over 1000 µF, tan δ shall be added 0.02 to the listed value with increase of every 1000 µF.		
Low Temperature Stability Impedance Ratio (MAX)	WV	6.3 10 16 25 35 50 63~100 160~250
	Z(120Hz)	
	Z(-25°C) / Z(+20°C)	4 3 2 2 2 2 2 6
Z(-40°C) / Z(+20°C)	8 6 4 4 3 3 3 -	
Endurance	After applying rated voltage for 1000 hours at 85°C, the capacitors shall meet the following requirements. (The polarity shall be reversed every 250 hours)	
	Capacitance change	Within ± 20% of initial value
	D.F. (tan δ)	Not more than 200% of specified value
Shelf Life	After placed at 85°C without voltage applied for 500 hours, the capacitors shall meet the same requirements as load life.	

■ 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(0.45)	0.5(0.45)	0.6	0.6	0.6	0.8	0.8
a	1.0	1.5(1.0)	1.5(1.0)	1.5	1.5	2.0	2.0	2.0

() : L = 7

■ Multiplier for Ripple Current

WV(VDC)	Freq. (Hz)			
	50	120	1K	10K
6.3 ~ 16V	0.8	1.0	1.1	1.2
25 ~ 35V	0.8	1.0	1.5	1.7
50 ~ 100V	0.8	1.0	1.6	1.9
160 ~ 250V	0.8	1.0	1.5	1.6

RN Non-polar Standard Series

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size ΦDxL(mm)	tan δ	Ripple current (mA/rms85°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size ΦDxL(mm)	tan δ	Ripple current (mA/rms85°C) (120Hz)
6.3(8)	22	5x7	0.24	35	35 (44)	4.7	5x7	0.15	25
	33	5x7	0.24	40			5x11	0.15	30
		5x11	0.24	60		10	5x11	0.15	40
	47	5x11	0.24	70			6.3x7	0.15	40
		6.3x7	0.24	50		22	6.3x11	0.15	70
	100	6.3x11	0.24	115			33	8x11	0.15
	220	8x11	0.24	205		47	8x11	0.15	120
	330	8x11	0.24	265		100	10x16	0.15	230
	470	10x12.5	0.24	370		220	13x20	0.15	410
	1000	10x20	0.24	650		330	13x20	0.15	505
	2200	13x25	0.24	1160		470	13x25	0.15	655
	3300	16x25	0.24	1570		1000	16x32	0.15	1140
	4700	16x32	0.24	2020		50 (63)	1	4x7	0.15
6800	18x36	0.24	2600	2.2	5x11			0.15	10
10(13)	10	4x7	0.2		25		3.3	4x7	0.15
	22	5x7	0.2	40	5x11			0.15	20
		33	5x11	0.2	50		4.7	5x7	0.15
	5x11		0.2	65	5x11			0.15	30
	47	6.3x7	0.2	50	10		6.3x7	0.15	30
		5x11	0.2	75			5x11	0.15	30
	6.3x7	5x11	0.2	60	10		6.3x11	0.15	45
		6.3x11	0.2	125	22		8x11	0.15	80
	100	6.3x11	0.2	125	33		8x11	0.15	105
	220	8x11	0.2	215	47		8x15	0.15	140
	330	10x16	0.2	345	100		10x20	0.15	265
	470	10x16	0.2	410	220		13x25	0.15	480
	1000	13x20	0.2	720	330		16x25	0.15	650
2200	16x25	0.2	1280	470	16x32		0.15	835	
3300	16x32	0.2	1690	63 (79)	10		6.3x11	0.10	55
4700	18x36	0.2	2160		22	8x11	0.10	90	
16 (20)	4.7	4x7	0.17		20	33	10x12.5	0.10	135
	10	5x7	0.17		30	47	10x16	0.10	180
		5x11	0.17		40	100	13x20	0.10	320
	22	5x11	0.17		55	220	16x25	0.10	575
		6.3x7	0.17		45	330	16x32	0.10	750
	33	5x11	0.17		70	470	18x36	0.10	965
		6.3x7	0.17		60	80 (100)	10	8x11	0.10
	6.3x7	6.3x7	0.17	70	22		10x16	0.10	105
		6.3x11	0.17	95	33		10x16	0.10	160
	100	8x11	0.17	160	47		10x20	0.10	215
	220	10x12.5	0.17	275	100		13x25	0.10	385
	330	10x16	0.17	375	220		16x32	0.10	690
	470	10x20	0.17	485	330	18x36	0.10	860	
1000	13x25	0.17	855	100 (125)	10	8x11	0.10	70	
2200	16x32	0.17	1510		22	10x16	0.10	135	
3300	18x36	0.17	1980		33	13x20	0.10	220	
25 (32)	3.3	4x7	0.15		15	47	13x20	0.10	240
	4.7	5x7	0.15		20	100	16x25	0.10	425
		5x11	0.15	40	220	18x36	0.10	720	
	10	6.3x7	0.15	35	160 (200)	1	6.3x11	0.20	15
		6.3x7	0.15	50		2.2	8x11	0.20	20
	22	6.3x11	0.15	65		3.3	10x12.5	0.20	30
		6.3x7	0.15	65		4.7	10x12.5	0.20	35
	33	6.3x11	0.15	80		10	10x16	0.20	55
		6.3x11	0.15	95		22	13x25	0.20	105
	100	8x11	0.15	160		33	16x25	0.20	165
	220	10x16	0.15	305		47	16x26	0.20	200
	330	13x20	0.15	450		100	18x36	0.20	360
	470	13x20	0.15	540	200 (250)	1	6.3x11	0.20	15
1000	16x25	0.15	950	2.2		8x11	0.20	20	
2200	18x36	0.15	1620	3.3		10x12.5	0.20	30	
35 (44)	2.2	4x7	0.15	15		4.7	10x16	0.20	40
35 (44)	3.3	5x7	0.15	20					

RN Non-polar Standard Series

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms85°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms85°C) (120Hz)
200 (250)	10	13x20	0.20	70	250 (300)	3.3	10x12.5	0.20	30
	22	13x25	0.20	120		4.7	10x16	0.20	40
	33	16x25	0.20	165		10	13x20	0.20	70
	47	16x32	0.20	220		22	16x25	0.20	135
250 (300)	1	8x11	0.20	15		33	16x32	0.20	180
	2.2	10x12.5	0.20	25		47	16x36	0.20	230

SN

Non-polar Standard Series

- Endurance: 105°C 1000 hours
- Recommended Applications : Non-polar miniature type for used in reversing polarity DC voltage circuits
- Corresponding product to RoHS

SN
↑
RN

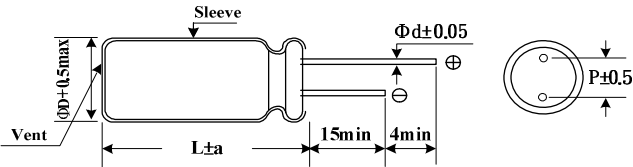
Higher temperature



■ SPECIFICATIONS

Item	Characteristics																													
Category Temperature Range	-40 ~ +105°C	-25~+105°C																												
Rated Voltage Range	6.3 ~ 100VDC	160~250VDC																												
Rated Capacitance Range	1 ~ 2200 µF	1~100 µF																												
Capacitance Tolerance	± 20 % (120Hz , 20°C)																													
Leakage Current (20°C)	I=0.03CV+ 3 µ A; L=7mm, I=0.06CV+ 10 µ A(After rated voltage applied for 2 minutes) I : Max. leakage current (µ A), C : Nominal capacitance (µ F), V : Rated voltage (V)																													
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	<table border="1"> <tr> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>80</td> <td>100</td> <td>160~250</td> </tr> <tr> <td>tan δ</td> <td>0.24</td> <td>0.20</td> <td>0.17</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.10</td> <td>0.10</td> <td>0.10</td> <td>0.20</td> </tr> </table> <p>When nominal capacitance is over 1000uF , tan δ shall be added 0.02 to the listed value with increase of every 1000uF;L=7mm, tan δ shall be added 0.03</p>		WV	6.3	10	16	25	35	50	63	80	100	160~250	tan δ	0.24	0.20	0.17	0.15	0.15	0.15	0.10	0.10	0.10	0.20						
WV	6.3	10	16	25	35	50	63	80	100	160~250																				
tan δ	0.24	0.20	0.17	0.15	0.15	0.15	0.10	0.10	0.10	0.20																				
Low Temperature Stability Impedance Ratio (MAX)	<table border="1"> <tr> <td rowspan="3">Z(120Hz)</td> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63~100</td> <td>160-250</td> </tr> <tr> <td>Z-25°C / Z+20°C</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>6</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>10</td> <td>8</td> <td>6</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>—</td> </tr> </table>		Z(120Hz)	WV	6.3	10	16	25	35	50	63~100	160-250	Z-25°C / Z+20°C	4	3	2	2	2	2	2	6	Z-40°C / Z+20°C	10	8	6	4	3	3	3	—
Z(120Hz)	WV	6.3		10	16	25	35	50	63~100	160-250																				
	Z-25°C / Z+20°C	4		3	2	2	2	2	2	6																				
	Z-40°C / Z+20°C	10	8	6	4	3	3	3	—																					
Endurance	<p>After applying rated voltage for 1000 hours at 105°C,(The polarity shall be reversed every 250 hrs.)</p> <table border="1"> <tr> <td>Capacitance change</td> <td>Within ± 20% of initial value</td> </tr> <tr> <td>D.F. (tan δ)</td> <td>Not more than 200% of specified value</td> </tr> <tr> <td>Leakage current</td> <td>Not more than the specified value</td> </tr> </table>		Capacitance change	Within ± 20% of initial value	D.F. (tan δ)	Not more than 200% of specified value	Leakage current	Not more than the specified value																						
Capacitance change	Within ± 20% of initial value																													
D.F. (tan δ)	Not more than 200% of specified value																													
Leakage current	Not more than the specified value																													
Shelf Life	After placed at 105°C without voltage applied for 500 hours,the capacitors shall meet the same requirement as Endurance.																													

■ Dimensions [mm]



ΦD	4.0	5.0	6.3	8.0	10.0	13.0	16.0	18.0
P	1.5	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Φd	0.45	0.5	0.5	0.6	0.6	0.6	0.8	0.8
a	1.0	1.5	1.5	1.5	1.5	2.0	2.0	2.0

■ Multiplier for Ripple Current

Freq. (Hz)	60	120	300	1K	10K
Factor	0.75	1.00	1.20	1.32	1.65

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size ΦDxL(mm)	tan δ	R.C (mA/rms105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size ΦDxL(mm)	tan δ	R.C (mA/rms105°C) (120Hz)
6.3(8)	33	5x11	0.24	63	50(63)	22	6.3x11	0.15	75
	47	6.3x11	0.24	84			8x11	0.15	97
	100	8x11	0.24	140			10x12.5	0.15	115
	220	10x12.5	0.24	235		33	8x11	0.15	110
	330	10x16	0.24	310			10x16	0.15	150
	470	10x20	0.24	400		47	8x11	0.15	130
	1000	13x25	0.24	690			10x20	0.15	190
2200	16x32	0.24	1250	100		13x20	0.15	310	
10(13)	22	5x11	0.20	57		220	16x25	0.15	570
	33	6.3x11	0.20	77		330	16x36	0.15	790
	47	6.3x11	0.20	93	63(79)	10	8x11	0.10	74
	100	8x11	0.20	193		22	8x11	0.10	95
	220	10x16	0.20	255			10x16	0.10	130
	330	10x20	0.20	380		33	8x11	0.10	115
	470	13x20	0.20	470			10x20	0.10	175
	1000	16x25	0.20	885		47	13x20	0.10	230
2200	16x36	0.20	1450	100		16x25	0.10	410	
16(20)	10	6.3x11	0.17	45		220	16x32	0.10	660
	22	5x11	0.17	59	80(100)	10	10x12.5	0.10	88
		6.3x11	0.17	69		22	10x20	0.10	150
	33	8x11	0.17	98		33	13x20	0.10	205
	47	8x11	0.17	115		47	13x20	0.10	245
	100	8x11	8x11	0.17	140	100	16x25	0.10	435
			10x12.5	0.17	175	100(125)	10	8x11	0.10
		10x16	0.17	205	22		10x12.5	0.10	100
		220	10x20	0.17	330		33	13x20	0.10
	330	13x20	0.17	445	47		13x25	0.10	285
470	13x25	0.17	570	100	16x32		0.10	510	
1000	16x32	0.17	1020	160(200)	1		6.3x11	0.20	21
25(32)	10	5x11	0.15		42	2.2	8x11	0.20	34
	22	6.3x11	0.15		50	3.3	10x12.5	0.20	49
		6.3x11	0.15		69	4.7	10x12.5	0.20	58
	33	8x11	0.15		86	10	10x17	0.20	80
	47	8x11	0.15		105	22	13x25	0.20	180
	100	10x12.5	0.15		140	33	16x26	0.20	220
	220	13x20	0.15		390	47	16x26	0.20	285
	330	16x25	0.15		580	100	18x36	0.20	510
470	16x25	0.15	690		200(250)	1	6.3x11	0.20	21
35(44)	4.7	5x11	0.15	34		2.2	8x11	0.20	34
	10	6.3x11	0.15	54		3.3	10x12.5	0.20	49
	22	8x11	0.15	94		4.7	10x15	0.20	62
	33	10x12.5	0.15	125		10	13x20	0.20	100
	47	10x16	0.15	165		22	13x25	0.20	180
	100	13x20	0.15	285		33	16x26	0.20	220
	220	16x25	0.15	520		47	16x32	0.20	315
	330	16x25	0.15	630	250(300)	1	8*11	0.20	25
470	16x32	0.15	820	2.2		10x12.5	0.20	38	
50(63)	2.2	5x11	0.15	25		3.3	10x12.5	0.20	49
	3.3	6.3x11	0.15	31		4.7	10x17	0.20	66
	4.7	5x11	0.15	34		10	13x20	0.20	100
		6.3x11	0.15	41		22	16x26	0.20	200
	10	6.3x11	0.15	56		33	16x32	0.20	250
		8x11	0.15	70		47	16x36	0.20	330

SB

Low leakage current Series

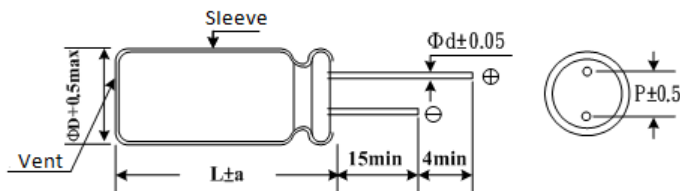
- Endurance : 105°C 1000 hours
- Recommended Applications : in where low leakage current is essential as in coupling of pre-amplifies
Remaining of very low leakage current even after prolonged storage
- Corresponding product to RoHS



■ SPECIFICATIONS

Item	Characteristics									
Category Temperature Range	-40 ~ +105°C									
Rated Voltage Range	6.3 ~ 100VDC									
Rated Capacitance Range	1 ~ 15000 µF									
Capacitance Tolerance	± 20 % (120Hz , 20°C)									
Leakage Current (20°C)	I ≤ 0.002CV or 0.4 µA whichever is greater. (After rated voltage applied for 2 minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)									
Dissipation Factor(MAX) (tan δ) (120Hz , 20°C)	WV	6.3	10	16	25	35	50	63	80	100
	tan δ	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.10	0.10
When nominal capacitance is over 1000 µF, tan δ shall be added 0.02 to the listed value with increase of every 1000 µF.										
Low Temperature Stability Impedance Ratio (MAX)	WV	6.3	10	16	25	35	50	63	80	100
	Z(120Hz)	4	3	2	2	2	2	2	1.5	1.5
	Z(-25°C) / Z(+20°C)	8	6	4	4	3	3	3	2	2
	Z(-40°C) / Z(+20°C)									
Endurance	After applying rated voltage for 1000 hours at 105°C, the capacitors shall meet the following requirements.									
	Capacitance change	Within ± 25% of initial value								
	D.F. (tan δ)	Not more than 200% of specified value								
	Leakage current	Not more than the specified value								
Shelf Life	After 500 hrs at 105°C without applying rated voltage the capacitors shall meet the following requirements.									
	Capacitance change	Within ± 25% of initial value								
	D.F. (tan δ)	Not more than 200% of specified value								
	Leakage current	Not more than 200% of specified value								

■ Dimensions [mm]



φ D	5	6.3	8	10	13	16	18	22
P	2	2.5	3.5	5	5	7.5	7.5	10
φ d	0.5	0.5	0.6	0.6	0.6	0.8	0.8	0.8
a	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0

■ Multiplier for Ripple Current

Freq. (Hz)	50	120	300	1K	10K
6.3 ~ 25 V	0.85	1.00	1.04	1.08	1.19
35 ~ 50 V	0.80	1.00	1.30	1.40	1.43
63 ~ 100 V	0.77	1.00	1.34	1.43	1.48

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)
6.3V (8)	33	5x11	0.28	55	25V (32)	4700	18x36	0.22	2380
	47	5x11	0.28	65		6800	18x40	0.24	2770
	100	5x11	0.28	95	35V (44)	10	5x11	0.14	45
	220	6.3x11	0.28	165		22	5x11	0.14	65
	330	6.3x11	0.28	195		33	5x11	0.14	80
	470	8x11	0.28	270		47	6.3x11	0.14	110
	1000	10x12.5	0.28	465		100	8x11	0.14	180
	2200	13x20	0.30	925		220	10x12.5	0.14	320
	3300	13x20	0.32	1100		330	10x17	0.14	450
	4700	16x26	0.34	1600		470	10x20	0.14	570
	6800	16x26	0.38	1810		1000	13x25	0.14	1060
	10000	16x32	0.46	2210		2200	16x32	0.16	1700
	15000	18x36	0.56	2760		3300	18x36	0.18	2200
10V (13)	22	5x11	0.24	50	4700	18x40	0.20	2610	
	33	5x11	0.24	60	50V (63)	10	5x11	0.12	55
	47	5x11	0.24	75		22	5x11	0.12	75
	100	5x11	0.24	110		33	6.3x11	0.12	100
	220	6.3x11	0.24	180		47	6.3x11	0.12	120
	330	8x11	0.24	250		100	8x11	0.12	200
	470	8x11	0.24	300		220	10x17	0.12	400
	1000	10x17	0.24	600		330	10x20	0.12	520
	2200	13x20	0.26	1000		470	13x20	0.12	730
	3300	13x25	0.28	1300		1000	16x26	0.12	1330
	4700	16x26	0.30	1700		2200	18x36	0.14	2100
	6800	16x32	0.34	2100		63V (79)	10	5x11	0.10
	10000	18x36	0.42	2630	22		6.3x11	0.10	80
16V (20)	10	5x11	0.20	40	33		6.3x11	0.10	100
	22	5x11	0.20	55	47		8x11	0.10	140
	33	5x11	0.20	70	100		10x12.5	0.10	230
	47	5x11	0.20	85	220		10x20	0.10	430
	100	6.3x11	0.20	140	330		13x20	0.10	610
	220	8x11	0.20	230	470	13x25	0.10	800	
	330	8x11	0.20	280	1000	16x32	0.10	1460	
	470	10x12.5	0.20	400	80V (100)	10	6.3x11	0.10	60
	1000	10x17	0.20	660		22	8x11	0.10	110
	2200	13x25	0.22	1210		33	8x11	0.10	130
	3300	16x26	0.24	1610		47	10x12.5	0.10	180
	4700	16x32	0.26	2020		100	10x17	0.10	310
	6800	18x36	0.30	2520		220	13x20	0.10	560
10000	18x40	0.38	2910	330		13x25	0.10	750	
25V (32)	10	5x11	0.16	40	470	16x26	0.10	1020	
	22	5x11	0.16	60	1000	18x36	0.10	1830	
	33	5x11	0.16	75	100V (125)	10	6.3x11	0.10	65
	47	5x11	0.16	90		22	8x11	0.10	115
	100	6.3x11	0.16	140		33	10x12.5	0.10	160
	220	8x11	0.16	250		47	10x17	0.10	230
	330	10x12.5	0.16	360		100	13x20	0.10	410
	470	10x17	0.16	490		220	16x26	0.10	750
	1000	13x20	0.16	880		330	16x26	0.10	920
	2200	16x26	0.18	1550		470	16x32	0.10	1200
3300	16x32	0.20	1860						

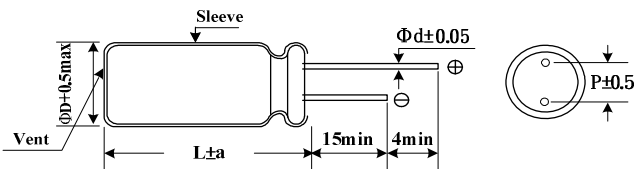


- Endurance : 105°C 12000~20000hrs
- Recommended Applications : For LED Lightingr
- Corresponding product to RoHS

■ SPECIFICATIONS

Item	Characteristics											
Category Temperature Range	-40 ~ +105°C											
Rated Voltage Range	160~400VDC											
Rated Capacitance Range	1.0 ~ 33 μ F											
Capacitance Tolerance	$\pm 20\%$ (120Hz , 20°C)											
Leakage Current (20°C)	CV \leq 1000	CV>1000		I : Max. leakage current (μ A) C : Nominal capacitance (μ F) V : Rated voltage (V)								
	I=0.1CV +40 μ A (1 minute)	I=0.04CV +100 μ A (1minute)										
	I=0.03CV +15 μ A (5 minute)	I=0.02CV +25 μ A (5minute)										
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	160	200	400								
	tan δ	0.24	0.24	0.24								
Low Temperature Stability Impedance Ratio (MAX)	WV	160	200	400								
	Z((120HZ) Z-25°C / Z+20°C	3	3	6								
	Z-40°C / Z+20°C	8	8	10								
Endurance	After applying rated voltage with rated ripple current for 12000~20000hours at 105°C , the capacitors shall meet the following requirements.											
	Capacitance change	Within $\pm 30\%$ of initial value		<table border="1"> <tr> <th>ΦDxL</th> <th>Life time (hours)</th> </tr> <tr> <td>6.3x11,8x9,10x9</td> <td>12000</td> </tr> <tr> <td>8x11,10x12.5</td> <td>15000</td> </tr> <tr> <td>10x16</td> <td>20000</td> </tr> </table>	Φ DxL	Life time (hours)	6.3x11,8x9,10x9	12000	8x11,10x12.5	15000	10x16	20000
	Φ DxL	Life time (hours)										
6.3x11,8x9,10x9	12000											
8x11,10x12.5	15000											
10x16	20000											
D.F. (tan δ)	Not more than 300% of specified value											
Leakage current	initial specified value or less											
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitors shall meet the same requirement as load life.											

■ Dimensions [mm]



Φ D	6.3	8.0	10.0
P	2.5	3.5	5.0
Φ d	0.5	0.6	0.6
a	2.0	2.0	2.0

■ Multiplier for Ripple Current

Freq. (Hz)		120	1K	10K	100K
coefficient	1~5.6 μ F	1.0	1.6	1.8	2.0
	6.8~18 μ F	1.0	1.5	1.7	1.9
	22~33 μ F	1.0	1.4	1.6	1.8

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	$\tan \delta$	Ripple current (mA/rms105°C) (120Hz)
160	5.6	6.3x11	0.24	52	200	18	10x12.5	0.24	113
	10	8x9	0.24	70		27	10x16	0.24	149
	15	8x11	0.24	92	400	1.0	6.3x11	0.24	24
		10x9	0.24	95		1.2	8x9	0.24	28
	22	10x12.5	0.24	121		1.5	8x9	0.24	30
	33	10x16	0.24	158		1.8	8x9	0.24	33
2.2						8x9	0.24	36	
200	2.2	6.3x11	0.24	36		2.2	8x11	0.24	40
	3.3	6.3x11	0.24	42		2.7	8x11	0.24	43
	4.7	6.3x11	0.24	49			8x11	0.24	47
	5.6	8x9	0.24	56		3.3	10x9	0.24	48
	6.8	8x9	0.24	62			3.9	10x12.5	0.24
	8.2	8x9	0.24	66	4.7	10x12.5	0.24	61	
	10	8x11	0.24	80		6.8	10x16	0.24	85
	12	10x9	0.24	88					

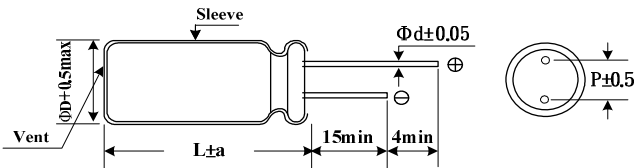
- Endurance: 125°C 2000~5000hrs
- Recommended Applications :Applicable for Electronic Ballast,Lighting Ballast
- Corresponding product to RoHS



SPECIFICATIONS

Item	Characteristics	
Category Temperature Range	-40 ~ +125°C	-25 ~ +125°C
Rated Voltage Range	10~63VDC	160~450VDC
Rated Capacitance Range	47~ 4700 µF	1~150 µF
Capacitance Tolerance	± 20 % (120Hz , 20°C)	
Leakage Current (20°C)	I=0.01CV or 3(µA)whichever is greater.	
	I=0.1CV+40 uA (CV ≤ 1000) I=0.04CV+100 uA (CV > 1000)	
(After rated voltage applied for 2 minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)		
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	10 16 25 35 50 63 160~250 350~450
	tan δ	0.19 0.16 0.14 0.12 0.14 0.14 0.20 0.24
When nominal capacitance is over 1000uF,tan δ shall be added 0.02 to the listed value with increase of every 1000uF. Down Size tan δ added 0.03.		
Low Temperature Stability Impedance Ratio (MAX)	Z(120Hz)	10 16 25 35 50 63 160~250 350~450
	Z-25°C / Z+20°C	3 2 2 2 2 2 3 6
	Z-40°C / Z+20°C	6 4 4 4 4 3 — —
Endurance	After applying rated voltage for 2000~5000hours at 125°C,the capacitors shall meet the following requirements.	
	Rated Voltage Range	10~63VDC 160~450VDC
	Capacitance Change	Within ± 30 % of initial value Within ± 20 % of initial value
	Dissipation Factor	≤ 300% of initial specified value ≤ 200% of the initial specified value
	Leakage Current	≤ initial specified value or less ≤ initial specified value
	Φ	8 Φ 10 Φ ≥ 13 Φ
Life	2000Hrs 3000Hrs 5000Hrs	
Shelf Life	After leaving capacitors under no load at 125°C for 1000 hours.	
	Rated Voltage Range	10~63VDC 160~450VDC
	Capacitance Change	Within ± 30 % of initial value Within ± 20 % of initial value
	Dissipation Factor	≤ 300% of initial specified value ≤ 200% of the initial specified value
	Leakage Current	≤ 500% of initial specified value ≤ 500% of the initial specified value

Dimensions [mm]



ΦD	8	10	13	16	18
P	3.5	5.0	5.0	7.5	7.5
Φd	0.6	0.6	0.6	0.8	0.8
a	1.5	1.5	2.0	2.0	2.0

Multiplier for Ripple Current

Freq. (Hz)		120	1K	10K	50K~100K
10~63WV	CAP ≤ 10	0.40	0.75	0.90	1.00
	10 < CAP ≤ 100	0.50	0.85	0.95	1.00
	100 < CAP ≤ 1000	0.60	0.88	0.96	1.00
	1000 < CAP	0.75	0.90	0.98	1.00
160~450WV	CAP ≤ 33	1.00	1.50	1.75	1.80
	CAP ≥ 47	1.00	1.30	1.40	1.50

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms125°C) (100KHz)
10(13)	220	8x11	0.19	340
	330	10x12.5	0.19	500
	470	10x16	0.19	630
	1000	10x20	0.19	770
	2200	13x25	0.21	1250
	3300	16x25	0.23	1380
16(20)	4700	16x32	0.26	1450
	220	8x11	0.16	340
	330	10x12.5	0.16	500
	470	10x20	0.16	770
	1000	13x20	0.16	920
	2200	16x25	0.19	1380
25(32)	3300	16x32	0.21	1450
	4700	16x32	0.23	1720
	100	8x11	0.14	340
	220	10x12.5	0.14	500
	330	10x16	0.14	630
	470	10x20	0.14	770

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms125°C) (100KHz)
25(32)	1000	13x25	0.14	1250
	2200	16x32	0.16	1450
35(44)	100	10x12.5	0.12	340
	220	10x16	0.12	500
	330	10x20	0.12	770
	470	13x20	0.12	920
	1000	16x25	0.12	1380
50(63)	47	8x11	0.14	245
	100	10x12.5	0.14	415
	220	10x20	0.14	491
	330	13x20	0.14	665
	470	13x25	0.14	995
	1000	16x32	0.14	1280
63(79)	47	8x11	0.14	245
	100	10x15	0.14	455
	220	13x20	0.14	665
	330	13x25	0.14	995
470	16x25	0.14	1000	

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms125°C) (120Hz)
160(200)	3.3	8x11	0.20	28
	4.7	10x12.5	0.20	40
	10	10x16	0.20	60
	22	10 x 20	0.20	115
	33	10 x 25	0.20	154
	47	13 x 20	0.20	187
	68	13 x 25	0.20	245
	100	16 x 25	0.20	329
	150	16 x 32	0.20	434
200(250)	3.3	8x11	0.20	28
	4.7	10x12.5	0.20	40
	10	10 x 20	0.20	78
	22	10 x 25	0.20	126
	33	13 x 20	0.20	157
	47	13 x 25	0.20	204
	68	16 x 20	0.20	250
100	16 x 25	0.20	329	
250(300)	2.2	8x11	0.20	28
	3.3	10x12.5	0.20	32
	4.7	10x16	0.20	45
	10	10 x 20	0.20	78
	22	13 x 20	0.20	128
	33	13 x 25	0.20	171
	47	16 x 25	0.20	225
68	16 x 32	0.20	292	

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (mA/rms125°C) (120Hz)
350(400)	1.0	8x11	0.24	25
	2.2	10x12.5	0.24	32
	3.3	10x16	0.24	45
	4.7	10 x 20	0.24	53
	10	10 x 25	0.24	85
	22	13 x 25	0.24	139
	33	16 x 25	0.24	189
	47	16 x 32	0.24	243
400(450)	1.0	10x12.5	0.24	28
	2.2	10x16	0.24	35
	3.3	10x16	0.24	42
	4.7	10 x 20	0.24	53
	10	10 x 25	0.24	86
	22	13 x 30	0.24	142
	33	16 x 25	0.24	189
47	16 x 32	0.24	243	
450(500)	1.0	8x16	0.24	25
	2.2	10x16	0.24	32
	3.3	10x20	0.24	40
	4.7	10 x 25	0.24	58
	10	13 x 20	0.24	86
	22	16 x 25	0.24	154
33	16 x 32	0.24	203	

AR

High Temperature · Low impedance · Long Life Series

New

- Endurance: 125°C 3000~5000hrs
- Recommended Applications : Applicable for Electronic Ballast,Lighting Ballast
- Corresponding product to RoHS

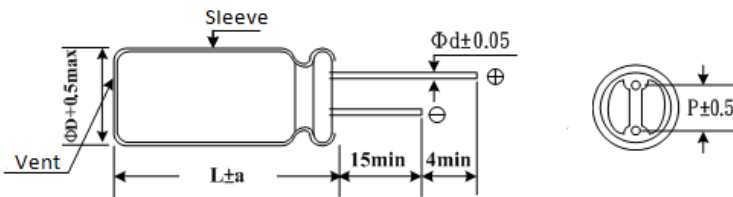
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Downsized



■ SPECIFICATIONS

Item	Characteristics				
Category Temperature Range	-40 ~ +125°C				
Rated Voltage Range	25~63VDC				
Rated Capacitance Range	470~ 6800 µF				
Capacitance Tolerance	± 20 % (120Hz , 20°C)				
Leakage Current (20°C)	I=0.03CV or 4(µA)whichever is greater. (After rated voltage applied for 1 minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)				
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	25	35	50	63
	tan δ	0.14	0.12	0.14	0.14
When nominal capacitance is over 1000 µF,tan δ shall be added 0.02 to the listed value with increase of every 1000 µF.					
Low Temperature Stability Impedance Ratio (MAX)	WV	25	35	50	63
	Z(120Hz)				
	Z-25°C / Z+20°C	2	2	2	2
	Z-40°C / Z+20°C	4	4	4	4
Endurance	After applying rated voltage with rated ripple current for 3000~5000 hours at 125°C, the capacitors shall meet the following requirements.				
	Rated Voltage Range	25~63VDC			
	Capacitance change	Within ±30% of initial value			
	D.F. (tan δ)	Not more than300% of specified value			
	Leakage current	initial specified value or less			
	L(height)	L ≤ 20mm		L ≥ 25mm	
Life	3000Hrs		5000Hrs		
Shelf Life	After placed at 125°C without voltage applied for 1000 hours,the capacitors shall meet the same requirement as Endurance.				
	Rated Voltage Range	25~63VDC			
	Capacitance change	Within ±30% of initial value			
	D.F. (tan δ)	Not more than300% of specified value			
	Leakage current	initial specified value or less			

■ Dimensions [mm]



ΦD	13	16	18
P	5.0	7.5	7.5
Φd	0.6	0.8	0.8
a	2.0	2.0	2.0

■ Multiplier for Ripple Current

Freq. (Hz)		120	1K	10K	100K
25~63WV	CAP:470~560 µF	0.50	0.85	0.94	1.00
	CAP:620~1800 µF	0.60	0.87	0.95	1.00
	CAP:2200~3900 µF	0.75	0.90	0.95	1.00
	CAP:4700~6800 µF	0.85	0.95	0.98	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	Ripple current (mA/rms125°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	Ripple current (mA/rms125°C) (100KHz)	Impedance (Ω ,20°C) (100KHz)	
25(32)	1200	13x20	1820	0.046	35(44)	3300	18x36	3840	0.020	
	1800	13x25	2280	0.040		4700	18x40	4230	0.017	
	2200	16x20	2280	0.036	50(63)	470	13x20	1500	0.095	
		13x30	2560	0.031		680	13x25	1900	0.078	
	2700	13x35	2970	0.027		820	16x20	2040	0.073	
		16x25	2860	0.028		1000	13x35	2510	0.064	
	18x20	2490	0.036	16x25			2620	0.061		
	3300	13x40	3340	0.023			18x20	2240	0.069	
		16x30	3160	0.025		1200	13x40	2870	0.058	
	3900	16x36	3590	0.022			16x30	2940	0.057	
		18x25	3010	0.026			18x25	2750	0.059	
	4700	18x30	3390	0.022		1500	16x36	3300	0.053	
5600	16x40	3970	0.018	1800		18x30	3140	0.056		
	18x36	3840	0.020	2200		16x40	3720	0.050		
6800	18x40	4230	0.017		18x36	3510	0.052			
35(44)	680	13x20	1820	0.046	2700	18x40	3940	0.048		
	1000	13x25	2280	0.040	63(79)	470	16x20	1790	0.105	
	1200	13x30	2560	0.031		680	16x25	2030	0.085	
		16x20	2280	0.036		820	18x20	1910	0.095	
	1500	13x35	2970	0.027		820	16x30	2330	0.073	
		18x20	2490	0.036		1000	16x36	2580	0.064	
	1800	13x40	3340	0.023			18x25	2280	0.069	
		16x25	2860	0.028		1200	16x40	2900	0.056	
	2200	16x30	3160	0.025			18x30	2580	0.061	
		18x25	3010	0.026		1500	18x36	2890	0.055	
	2700	16x36	3590	0.022			1800	18x40	3210	0.050
		18x30	3390	0.022						
	3300	16x40	3970	0.018						

LH Standard Series

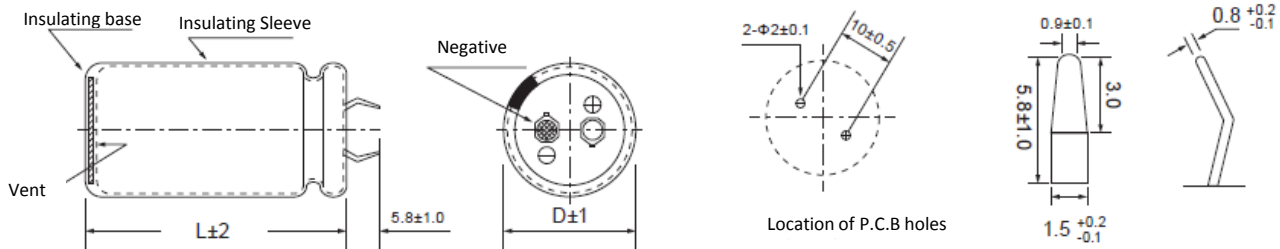


- Endurance: 85°C 2000hours
- Recommended Applications : Applying to switching power supply and other industry/ commercial field
- Corresponding product to RoHS

■ SPECIFICATIONS

Item	Characteristics									
Category Temperature Range	-40~+85°C					-25~+85°C				
Rated Voltage Range	6.3 ~ 100VDC					160 ~ 500VDC				
Rated Capacitance Range	820 ~ 120000 μ F					47 ~ 2700 μ F				
Capacitance Tolerance	$\pm 20\%$ (120Hz , 20°C)									
Leakage Current (20°C)	$I = 3\sqrt{CV}$. (After rated voltage applied for 5minutes) I : Max. leakage current (μ A), C : Nominal capacitance (μ F), V : Rated voltage (V)									
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	6.3	10	16	25	35	50	63~100	160~400	420~500
	tan δ	0.60	0.55	0.55	0.45	0.35	0.30	0.25	0.15	0.20
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz									
	WV	6.3~16	25	35	50~63	80~100	160~400	420~500		
	Z-25°C / Z+20°C	3	3	3	2	2	4	8		
	Z-40°C / Z+20°C	12	10	8	6	5	—	—		
Endurance	After applying rated voltage with rated Ripple current for 2000hrs at 85°C , the capacitor shall meet the following requirements.									
	Capacitance change	Within $\pm 20\%$ of initial value								
	D.F. (tan δ)	Not more than 200% of specified value								
	Leakage current	initial specified value or less								
Shelf Life	After placed at 85°C without voltage applied for 1000 hours,the capacitor shall meet the same requirement as Endurance.									

■ Dimensions [mm]



■ Multiplier for Ripple Current

Freq. (Hz)	50	60	120	1K	10K~100K
6.3~100V	0.88	0.90	1.00	1.15	1.16
160~250V	0.75	0.78	1.00	1.30	1.50
350~450V	0.74	0.76	1.00	1.35	1.45
500V	0.72	0.74	1.00	1.20	1.30

■ STANDARD RATINGS

Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ D x L (mm)	tan δ	Ripple current (A/rms85°C) (120KHz)	Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ D x L (mm)	tan δ	Ripple current (A/rms85°C) (120KHz)
6.3 (8)	15000	22x25	0.60	2.44	16 (20)	18000	22x40	0.55	3.70
	18000	22x30	0.60	2.60			25x35	0.55	3.75
		25x25	0.60	2.62			30x30	0.55	3.80
	22000	22x30	0.60	3.06		22000	22x50	0.55	4.35
		25x25	0.60	3.07			25x40	0.55	4.30
	27000	22x35	0.60	3.49			30x30	0.55	4.25
		25x30	0.60	3.52		35x25	0.55	4.20	
		30x25	0.60	3.57		27000	25x45	0.55	4.70
	33000	22x40	0.60	3.97			30x35	0.55	4.65
		25x35	0.60	4.02			35x30	0.55	4.65
		30x30	0.60	4.05		33000	30x40	0.55	5.35
	35x25	0.60	4.10	35x30			0.55	5.40	
	39000	22x50	0.60	4.56		39000	30x45	0.55	6.00
		25x40	0.60	4.50			35x35	0.55	5.95
		30x30	0.60	4.46		47000	30x50	0.55	6.80
		35x25	0.60	4.51			35x40	0.55	6.75
	47000	25x45	0.60	5.09		56000	35x45	0.55	7.60
		30x35	0.60	5.06		68000	35x50	0.55	8.00
		35x30	0.60	5.03		82000	35x60	0.55	8.50
	56000	25x50	0.60	5.71		25 (32)	5600	22x25	0.45
30x40		0.60	5.70	6800	22x30		0.45	2.40	
		35x30	0.60	5.75	8200		25x25	0.45	2.45
		68000	30x45	0.60			6.48	22x35	0.45
35x35			0.60	6.42	25x25		0.45	2.75	
82000		30x50	0.60	7.32	10000		22x40	0.45	3.10
		35x40	0.60	7.29			25x30	0.45	3.15
100000		35x45	0.60	8.31			30x25	0.45	3.20
120000	35x50	0.60	8.60	12000	22x45		0.45	3.50	
12000	22x25	0.55	2.40		25x35		0.45	3.45	
	22x30	0.55	2.75		30x30		0.45	3.50	
		35x25	0.45		3.55		15000	22x50	0.45
18000	22x35	0.55	3.15		25x40			0.45	3.95
	25x25	0.55	3.05		30x35			0.45	4.00
22000	22x40	0.55	3.55		35x30		0.45	4.05	
	25x30	0.55	3.50		18000		25x45	0.45	4.45
	30x25	0.55	3.55				30x35	0.45	4.45
27000	22x45	0.55	4.05				35x30	0.45	4.60
	25x35	0.55	4.00		22000		30x40	0.45	5.20
	30x30	0.55	4.05				35x35	0.45	5.15
33000	22x50	0.55	4.60	27000	30x45	0.45	5.95		
	25x40	0.55	4.55		35x40	0.45	5.90		
	30x30	0.55	4.50		30x50	0.45	6.70		
	39000	35x25	0.55	4.50	35x45	0.45	6.75		
25x45		0.55	5.10	33000	35x50	0.45	7.55		
30x35		0.55	5.05	39000	35x45	0.45	7.56		
47000	35x30	0.55	5.05	47000	35x50	0.45	8.30		
	25x50	0.55	5.75		3900	22x25	0.35	2.20	
	56000	30x40	0.55	5.70	4700	22x30	0.35	2.40	
35x30		0.55	5.65	25x25		0.35	2.40		
68000		30x45	0.55	6.45	5600	22x35	0.35	2.75	
	35x35	0.55	6.40	25x25		0.35	2.75		
82000	30x50	0.55	7.05	6800	22x40	0.35	2.85		
	35x40	0.55	7.10		25x30	0.35	2.85		
16 (20)	8200	22x25	0.55		2.60	8200	30x25	0.35	2.90
	10000	22x30	0.55	2.70	22x45		0.35	3.15	
		25x25	0.55	2.75	8200	25x35	0.35	3.10	
	12000	22x30	0.55	2.90		30x30	0.35	3.15	
		25x25	0.55	2.95	10000	22x50	0.35	3.55	
	15000	22x35	0.55	3.30		25x40	0.35	3.50	
		25x30	0.55	3.45		30x30	0.35	3.45	
	30x25	0.55	3.50	35x25		0.35	3.40		

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	tan δ	Ripple current (A/rms85°C) (120KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	tan δ	Ripple current (A/rms85°C) (120KHz)				
35(44)	12000	25x45	0.35	3.95	63(79)	8200	35x35	0.25	4.80				
		30x35	0.35	4.00		10000	30x50	0.25	5.50				
		35x30	0.35	4.05			35x40	0.25	5.45				
	15000	25x50	0.35	4.95	12000	35x45	0.25	6.20	80 (100)	1200	22x25	0.25	1.65
		30x40	0.35	4.95		1500	22x30	0.25		1.90			
		35x35	0.35	5.00			1800	25x25		0.25	1.90		
	18000	30x45	0.35	5.50	25x30	22x35		0.25		2.20			
		35x40	0.35	5.55		30x25		25x30		0.25	2.20		
	22000	30x50	0.35	6.00			35x45	30x25		0.25	2.20		
		27000	35x50	0.35	6.90	22x40		22x40		0.25	2.45		
50 (63)	2200		22x25	0.30	1.90		25x30	25x30		0.25	2.45		
			2700	22x30	0.30			2.10		30x25	30x25	0.25	2.50
		25x25		0.30	2.20	2700		22x45			0.25	2.80	
	3300	22x30	0.30	2.35	25x35		25x35	0.25	2.80				
		25x25	0.30	2.35			30x30	30x30	0.25	2.85			
	3900	22x35	0.30	2.65		35x25		35x25	0.25	2.85			
		25x30	0.30	2.65	3300		22x50	0.25	3.15				
			30x25	0.30			2.65	25x40	25x40	0.25	3.20		
	4700	22x40	0.30	3.00		30x30	30x30		0.25	3.20			
		25x35	0.30	3.00	35x25		35x25		0.25	3.20			
30x25			0.30	2.95			3900	25x45	0.25	3.60			
5600	22x45	0.30	3.35	30x35		30x35		0.25	3.60				
	25x40	0.30	3.35		4700	35x30		0.25	3.60				
		30x30	0.30			3.35	25x50	25x50	0.25	4.05			
6800	35x25	0.30	3.40	35x35		35x35		0.25	4.10				
	22x50	0.30	3.80		5600	30x45		0.25	4.55				
		25x40	0.30			3.80	35x35	35x35	0.25	4.50			
	30x30	0.30	3.80	6800		30x50		0.25	5.15				
30x35		0.30	3.85		35x40	35x40	0.25	5.15					
8200	35x30	0.30	3.85			8200	35x45	0.25	5.85				
	25x50	0.30	4.35	10000	35x50		0.25	6.60					
	30x40	0.30	4.35		100 (125)		820	22x25	0.25	1.85			
10000	35x30	0.30	4.40	1000		22x30	0.25	2.10					
	30x45	0.30	5.00			1000	25x25	0.25	2.10				
		35x35	0.30				4.95	1200	22x35	0.25	2.40		
12000	30x50	0.30	5.60	1200		25x30	0.25		2.45				
	15000	35x40	0.30			5.55	1500	22x40	0.25	2.70			
35x45		0.30	6.45	25x30		25x30		0.25	2.75				
		18000	35x50			0.30		6.70	1800	30x25	0.25	2.75	
63 (79)	1800	22x25	0.25	1.85		22x45	22x45	0.25		3.10			
		2200	22x30	0.25			2.30	25x35		25x35	0.25	3.15	
			25x25	0.25	2.30		30x30		30x30	0.25	3.15		
	2700	22x35	0.25	2.45	35x25	35x25			0.25	3.15			
		25x30	0.25	2.45		2200	22x50	0.25	3.50				
			30x25	0.25			2.50	25x40	25x40	0.25	3.55		
	3300	22x40	0.25	2.60	30x30		30x30		0.25	3.55			
		25x30	0.25	2.65		35x25	35x25		0.25	3.60			
			30x25	0.25			2.70	3900	25x45	0.25	4.10		
	3900	22x45	0.25	2.95	30x35		30x35		0.25	4.05			
25x35		0.25	2.95	4700		35x30	0.25		4.05				
		30x30	0.25			3.00	3300	25x50	0.25	4.50			
4700	22x50	0.25	3.40		30x40	30x40		0.25	4.55				
	25x40	0.25	3.35	35x30		35x30		0.25	4.50				
		30x30	0.25			3.35	3900	30x45	0.25	5.15			
	5600	35x25	0.25		3.40	35x35		35x35	0.25	5.10			
25x45		0.25	3.70	4700	35x40		0.25	5.75					
		30x35	0.25		3.75	5600	35x50	0.25	6.20				
6800	35x30	0.25	3.75		270		22x25	0.15	1.15				
	30x40	0.25	4.25	330		22x25	0.15	1.40					
	35x30	0.25	4.20		160 (200)	25x20	0.15	1.35					
8200	30x45	0.25	4.80										

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms85°C) (120KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms85°C) (120KHz)	
160(200)	390	22x30	0.15	1.55	180 (225)	1500	30x45	0.15	3.85	
		25x25	0.15	1.55			35x35	0.15	3.80	
		30x25	0.15	1.50			35x40	0.15	3.80	
	470	22x30	0.15	1.75			1800	35x40	0.15	4.30
		25x25	0.15	1.75				35x45	0.15	4.30
		30x25	0.15	1.70			2200	35x45	0.15	4.90
	560	22x30	0.15	1.95		35x50		0.15	4.90	
		25x30	0.15	1.95		200 (250)	180	22x25	0.15	0.95
		680	30x25	0.15			1.90	220	22x25	0.15
	22x40		0.15	2.20			270	22x25	0.15	1.25
	25x30		0.15	2.20	22x30			0.15	1.25	
	30x25	0.15	2.15	25x25	0.15			1.25		
	820	22x45	0.15	2.50	330		22x25	0.15	1.45	
		25x35	0.15	2.55			22x30	0.15	1.45	
		30x30	0.15	2.50			25x25	0.15	1.45	
		35x25	0.15	2.50	390		22x30	0.15	1.60	
	1000	22x50	0.15	2.85			25x25	0.15	1.55	
		25x40	0.15	2.80	470	22x35	0.15	1.80		
		30x35	0.15	2.80		25x30	0.15	1.80		
	35x25	0.15	2.80	30x25		0.15	1.80			
1200	25x45	0.15	3.15	560	22x40	0.15	2.00			
	30x35	0.15	3.15		25x35	0.15	2.00			
	35x30	0.15	3.20		30x25	0.15	2.00			
1500	30x45	0.15	3.75	680	22x45	0.15	2.35			
	35x30	0.15	3.70		25x35	0.15	2.30			
	35x35	0.15	3.70		30x30	0.15	2.30			
1800	30x50	0.15	4.20		35x25	0.15	2.30			
	35x40	0.15	4.20	820	25x40	0.15	2.60			
2200	35x40	0.15	4.60		25x45	0.15	2.60			
	35x45	0.15	4.80		30x30	0.15	2.60			
180 (225)	2700	35x50	0.15		5.45	30x35	0.15	2.60		
		180	22x20		0.15	1.00	35x30	0.15	2.60	
	220	22x25	0.15		1.10	1000	25x45	0.15	3.00	
		270	22x25		0.15		1.25	25x50	0.15	3.00
	25x20		0.15		1.25		30x35	0.15	3.05	
	330	22x25	0.15		1.40		30x40	0.15	3.05	
		22x30	0.15		1.40	35x30	0.15	3.00		
	390	25x25	0.15	1.40	1200	25x50	0.15	3.30		
		22x30	0.15	1.60		30x40	0.15	3.30		
	470	25x25	0.15	1.60		30x45	0.15	3.30		
22x35		0.15	1.80	35x30		0.15	3.30			
25x30		0.15	1.80	35x35	0.15	3.30				
560	30x25	0.15	1.80	1500	30x45	0.15	3.80			
	22x35	0.15	2.00		30x50	0.15	3.80			
	22x40	0.15	2.00		35x35	0.15	3.80			
680	25x30	0.15	1.95	1800	35x40	0.15	3.80			
	30x25	0.15	2.00		35x45	0.15	4.35			
	22x45	0.15	2.25	2200	35x45	0.15	4.35			
	25x35	0.15	2.20		35x50	0.15	4.95			
820	30x30	0.15	2.20	250 (300)	120	22x20	0.15	0.78		
	35x25	0.15	2.20		150	22x25	0.15	0.90		
	22x50	0.15	2.55		180	22x25	0.15	1.05		
	25x40	0.15	2.55			25x20	0.15	1.00		
1000	30x30	0.15	2.60		220	22x30	0.15	1.15		
	30x35	0.15	2.60			22x35	0.15	1.15		
	35x25	0.15	2.60		270	25x25	0.15	1.15		
25x45	0.15	2.85	22x30			0.15	1.30			
1200	30x35	0.15	2.85		330	25x25	0.15	1.30		
	35x30	0.15	2.90			22x30	0.15	1.50		
	30x40	0.15	3.25	25x25		0.15	1.50			
	35x35	0.15	3.30	30x25		0.15	1.50			

■ STANDARD RATINGS

Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ D x L (mm)	tan δ	Ripple current (A/rms85°C) (120KHz)	Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ D x L (mm)	tan δ	Ripple current (A/rms85°C) (120KHz)
250 (300)	390	22x35	0.15	1.65	400 (450)	150	30x25	0.15	1.15
		25x35	0.15	1.65		180	22x40	0.15	1.20
		30x25	0.15	1.65			22x45	0.15	1.30
	470	22x40	0.15	1.85			25x35	0.15	1.30
		25x35	0.15	1.85		30x30	0.15	1.35	
		30x30	0.15	1.90		220	22x50	0.15	1.50
	35x25	0.15	1.90	25x40			0.15	1.50	
	22x45	0.15	2.10	30x30			0.15	1.50	
	560	25x40	0.15	2.10		270	35x25	0.15	1.50
		30x30	0.15	2.10			22x50	0.15	1.60
		35x25	0.15	2.10			25x40	0.15	1.65
	680	25x45	0.15	2.45		330	30x35	0.15	1.65
		30x35	0.15	2.45			35x30	0.15	1.65
		35x25	0.15	2.45			25x45	0.15	1.75
	820	30x45	0.15	2.75		390	25x50	0.15	1.90
		35x30	0.15	2.75			30x40	0.15	1.90
1000	30x45	0.15	3.30	470	35x30		0.15	1.85	
	35x35	0.15	3.30		30x40	0.15	1.95		
1200	35x40	0.15	3.55		560	30x45	0.15	2.15	
	35x45	0.15	4.05	35x35		0.15	2.10		
1500	35x45	0.15	4.05	680		30x45	0.15	2.20	
	68	22x20	0.15		0.55	30x50	0.15	2.40	
82	22x25	0.15	0.65		100	35x40	0.15	2.40	
	25x20	0.15	0.65	30x50		0.15	2.45		
100	22x30	0.15	0.90	120		35x45	0.15	2.70	
	25x20	0.15	0.90		22x30	0.15	1.00		
120	22x30	0.15	1.00	150	25x25	0.15	1.00		
	25x25	0.15	1.00		22x35	0.15	1.15		
150	22x35	0.15	1.15	180	25x30	0.15	1.15		
	25x30	0.15	1.15		30x25	0.15	1.15		
180	30x25	0.15	1.15		220	22x40	0.15	1.30	
	22x40	0.15	1.30	25x30		0.15	1.25		
220	25x30	0.15	1.25	270		30x25	0.15	1.25	
	30x25	0.15	1.25		22x45	0.15	1.45		
270	22x45	0.15	1.45		330	25x35	0.15	1.45	
	25x35	0.15	1.45	30x30		0.15	1.45		
330	30x30	0.15	1.45	390		35x25	0.15	1.45	
	35x25	0.15	1.45		25x40	0.15	1.65		
390	25x40	0.15	1.65		470	30x35	0.15	1.65	
	30x35	0.15	1.65	35x25		0.15	1.65		
470	35x25	0.15	1.65	560		25x50	0.15	1.80	
	25x50	0.15	1.80		30x40	0.15	1.80		
560	30x40	0.15	1.80		680	35x30	0.15	1.80	
	35x30	0.15	1.80	30x40		0.15	2.00		
680	30x40	0.15	2.00	820		35x30	0.15	2.00	
	35x30	0.15	2.00		30x45	0.15	2.25		
820	30x45	0.15	2.25		1000	35x35	0.15	2.25	
	35x35	0.15	2.25	35x40		0.15	2.50		
1000	35x40	0.15	2.50	1200		35x45	0.15	2.90	
	35x45	0.15	2.90		56	22x20	0.15	0.55	
1200	35x45	0.15	2.90		68	22x25	0.15	0.60	
	68	22x25	0.15	0.60		25x20	0.15	0.60	
1500	68	22x25	0.15	0.80	82	22x25	0.15	0.80	
	82	22x25	0.15	0.80		25x20	0.15	0.80	
2000	82	22x25	0.15	0.85	100	22x25	0.15	0.85	
	100	22x25	0.15	0.90		22x30	0.15	0.90	
2500	100	22x25	0.15	0.90	120	25x25	0.15	0.90	
	120	22x30	0.15	0.95		22x30	0.15	0.95	
3000	120	22x35	0.15	1.05	150	22x35	0.15	1.05	
	150	25x25	0.15	1.05		22x35	0.15	1.15	
3500	150	22x35	0.15	1.15	2000	25x30	0.15	1.15	
	2000	25x30	0.15	1.15		47	22x25	0.20	0.50
4000	2000	25x30	0.15	1.15	56	22x25	0.20	0.65	
	2500	25x30	0.15	1.15		68	22x25	0.20	0.67
4500	2500	25x30	0.15	1.15	82	22x30	0.20	0.70	
	3000	25x30	0.15	1.15		25x25	0.20	0.70	
5000	3000	25x30	0.15	1.15	100	22x30	0.20	0.80	
	3500	25x30	0.15	1.15		25x25	0.20	0.80	
5500	3500	25x30	0.15	1.15	120	22x30	0.20	0.85	
	4000	25x30	0.15	1.15		22x35	0.20	0.95	
6000	4000	25x30	0.15	1.15	150	25x30	0.20	0.95	
	4500	25x30	0.15	1.15		30x25	0.20	0.95	
6500	4500	25x30	0.15	1.15	2000	22x30	0.20	0.95	
	5000	25x30	0.15	1.15		22x40	0.20	1.05	
7000	5000	25x30	0.15	1.15	2500	25x30	0.20	1.05	
	5500	25x30	0.15	1.15		30x25	0.20	1.05	
7500	5500	25x30	0.15	1.15	3000	22x35	0.20	1.05	
	6000	25x30	0.15	1.15		150	22x35	0.20	1.05

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms85°C) (120KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms85°C) (120KHz)
450 (500)	150	22x45	0.20	1.20	450 (500)	470	30x50	0.20	2.30
		25x35	0.20	1.20			35x50	0.20	2.50
		30x30	0.20	1.20			560	35x50	0.20
	25x40	0.20	1.35	680			35x60	0.20	2.90
	180	30x35	0.20	1.35	500(550)	100	22x40	0.20	1.00
		35x25	0.20	1.35			30x25	0.20	0.90
		22x45	0.20	1.40		120	30x30	0.20	1.00
	25x50	0.20	1.55	35x25			0.20	1.00	
	220	30x40	0.20	1.55		150	22x50	0.20	1.40
		35x30	0.20	1.55			30x35	0.20	1.20
		25x50	0.20	1.55		180	30x40	0.20	1.40
	30x45	0.20	1.75	35x30			0.20	1.30	
	270	35x35	0.20	1.70		220	30x45	0.20	1.60
		30x40	0.20	1.75			35x35	0.20	1.50
		30x50	0.20	2.00		270	30x50	0.20	1.80
	35x40	0.20	2.00	35x40			0.20	1.70	
	330	30x45	0.20	2.00	330	35x45	0.20	2.00	
		35x45	0.20	2.25	390	35x50	0.20	2.30	
30x45		0.20	2.00	390		35x50	0.20	2.30	

LG Standard Series

- Endurance: 105°C 2000 hours
- Recommended Applications : Applying to switching power supply and other industry/ commercial field
- Corresponding product to RoHS

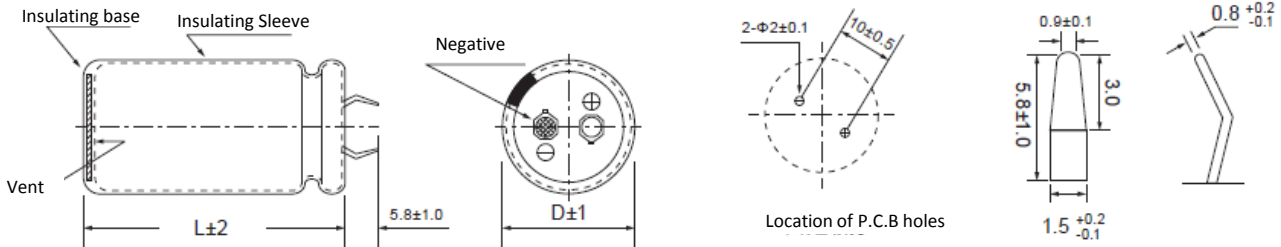
LG
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■ SPECIFICATIONS

Item	Characteristics									
Category Temperature Range	-40 ~ +105°C		-25 ~ +105°C							
Rated Voltage Range	6.3 ~ 100VDC		160 ~ 500VDC							
Rated Capacitance Range	560 ~ 82000 µF		47 ~ 2200 µF							
Capacitance Tolerance	± 20 % (120Hz , 20°C)									
Leakage Current (20°C)	I = 3√CV. (After rated voltage applied for 5minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)									
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	Rated voltage(V)	6.3	10	16	25	35	50	63~100	160~400	420~450
	tan δ	0.60	0.55	0.55	0.45	0.35	0.30	0.25	0.15	0.20
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz									
	Rated voltage(V)	6.3~16	25	35	50~63	80~100	160~400	420~450	500	
	Z-25°C / Z+20°C	4	3	3	2	2	4	8	8	
	Z-40°C / Z+20°C	15	10	8	6	5	—	—	—	
Endurance	After applying rated voltage with rated Ripple current for 2000hrs at 105°C , the capacitor shall meet the following requirements.									
	Capacitance change	Within ± 20% of initial value								
	D.F. (tan δ)	Not more than 200% of specified value								
	Leakage current	initial specified value or less								
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitor shall meet the same requirement as Endurance.									

■ Dimensions [mm]



■ Multiplier for Ripple Current

Freq. (Hz)	50	60	120	1K	10K~100K
6.3~100V	0.88	0.90	1.00	1.15	1.16
160~250V	0.85	0.88	1.00	1.30	1.50
315~450V	0.88	0.90	1.00	1.35	1.45
500V	0.70	0.72	1.00	1.30	1.41

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (A/rms105°C) (120KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (A/rms105°C) (120KHz)
6.3 (8)	12000	22x25	0.60	1.55	16 (20)	18000	22x45	0.55	2.90
	15000	22x30	0.60	1.70			25x40	0.55	2.90
		25x25	0.60	1.70			30x30	0.55	2.90
	18000	22x30	0.60	1.95			35x25	0.55	2.95
		25x25	0.60	1.95			22000	25x45	0.55
	22000	22x35	0.60	2.25			30x35	0.55	3.30
		25x30	0.60	2.25			35x30	0.55	3.30
		30x25	0.60	2.25			27000	25x50	0.55
	27000	22x40	0.60	2.55			30x40	0.55	3.75
		25x35	0.60	2.55			35x30	0.55	3.75
		30x30	0.60	2.55			33000	30x45	0.55
	33000	35x25	0.60	2.55			35x35	0.55	4.25
		22x45	0.60	2.90		39000	30x50	0.55	4.80
		25x40	0.60	2.95		35x40	0.55	4.80	
		30x30	0.60	2.90		47000	35x45	0.55	5.45
	39000	35x25	0.60	2.95		56000	35x45	0.55	5.65
		25x50	0.60	3.25		68000	35x50	0.55	6.20
		30x35	0.60	3.25		25 (32)	4700	22x25	0.45
	35x30	0.60	3.30	5600			22x30	0.45	1.65
	47000	25x50	0.60	3.70			25x25	0.45	1.65
30x40		0.60	3.70	6800	22x30		0.45	1.85	
56000	30x45	0.60	4.15	25x25	0.45		1.85		
	35x35	0.60	4.10	8200	22x35		0.45	2.10	
68000	30x50	0.60	4.70	25x30	0.45		2.10		
	35x40	0.60	4.70	30x25	0.45		2.15		
82000	35x45	0.60	5.30	10000	22x40		0.45	2.40	
10 (13)	10000	25x25	0.55	1.55	25x35		0.45	2.40	
	12000	22x30	0.55	1.75	30x30		0.45	2.40	
	15000	22x30	0.55	1.90	35x25		0.45	2.40	
		25x25	0.55	1.90	12000		22x45	0.45	2.70
	18000	22x35	0.55	2.20	25x40		0.45	2.75	
		25x30	0.55	2.25	30x30		0.45	2.70	
	22000	22x40	0.55	2.50	35x25		0.45	2.75	
		25x35	0.55	2.55	15000		25x45	0.45	3.15
	27000	30x25	0.55	2.45	30x35		0.45	3.15	
		22x50	0.55	2.95	35x30		0.45	3.25	
		25x40	0.55	2.90	18000		25x50	0.45	3.55
	33000	30x30	0.55	2.85	30x40	0.45	3.55		
		35x25	0.55	2.80	35x35	0.45	3.55		
		25x45	0.55	3.30	22000	30x45	0.45	4.05	
	39000	30x35	0.55	3.30	35x35	0.45	3.80		
		35x30	0.55	3.30	27000	35x45	0.45	4.70	
		25x50	0.55	3.70	33000	35x50	0.45	5.40	
	47000	30x40	0.55	3.7	39000	35x45	0.45	5.50	
		35x30	0.55	3.65	47000	35x50	0.45	6.00	
	56000	30x45	0.55	4.20	35 (44)	3300	22x25	0.35	1.40
68000	35x40	0.55	4.65	3900		22x30	0.35	1.55	
	35x50	0.55	5.50	25x25		0.35	1.55		
6800	22x25	0.55	1.55	4700		22x35	0.35	1.80	
	22x30	0.55	1.70	25x25		0.35	1.80		
8200	25x25	0.55	1.70	5600		22x35	0.35	1.95	
	22x30	0.55	1.95	25x30		0.35	1.95		
10000	25x25	0.55	1.95	30x25		0.35	2.00		
	22x35	0.55	2.20	6800		22x40	0.35	2.20	
12000	25x30	0.55	2.25	25x35		0.35	2.25		
	30x25	0.55	2.30	30x30		0.35	2.30		
	22x40	0.55	2.55	35x25		0.35	2.35		
15000	25x35	0.55	2.60	8200		22x50	0.35	2.55	
	30x30	0.55	2.60	25x40		0.35	2.50		
	35x25	0.55	2.65	30x30		0.35	2.75		
				35x25		0.35	2.75		
				10000		25x45	0.35	2.85	

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	tan δ	Ripple current (A/rms105°C) (120KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	tan δ	Ripple current (A/rms105°C) (120KHz)
35 (44)	10000	30x35	0.35	2.90	80 (100)	1000	22x30	0.25	1.20
		35x30	0.35	2.95			25x25	0.25	1.20
	12000	25x50	0.35	3.25		1200	22x30	0.25	1.40
		30x40	0.35	3.25			25x25	0.25	1.40
		35x30	0.35	3.15		1500	22x35	0.25	1.60
	15000	30x45	0.35	3.70			25x30	0.25	1.60
		35x35	0.35	3.65			30x25	0.25	1.65
18000	35x40	0.35	4.35	1800		22x40	0.25	1.80	
22000	35x50	0.35	4.90			25x35	0.25	1.85	
						30x25	0.25	1.80	
50 (63)	1800	22x25	0.30	1.30		2200	22x45	0.25	2.05
	2200	22x30	0.30	1.55			25x35	0.25	2.00
		25x25	0.30	1.55			30x30	0.25	2.05
	2700	22x30	0.30	1.70			35x25	0.25	2.05
		25x25	0.30	1.70	2700		25x45	0.25	2.35
	3300	22x35	0.30	1.95			30x35	0.25	2.35
		25x30	0.30	1.85			35x30	0.25	2.35
	3900	22x40	0.30	2.15	3300		25x50	0.25	2.70
		25x35	0.30	2.20			30x40	0.25	2.70
		30x25	0.30	1.95			35x30	0.25	2.55
	4700	22x45	0.30	2.45	3900	30x45	0.25	3.00	
		25x40	0.30	2.45		35x35	0.25	3.00	
		30x30	0.30	2.45	4700	30x50	0.25	3.40	
		35x25	0.30	2.50		35x40	0.25	3.40	
	5600	22x50	0.30	2.75	5600	35x45	0.25	3.80	
		25x40	0.30	2.70	6800	35x50	0.25	3.90	
		30x35	0.30	2.75		560	22x25	0.25	1.05
		35x30	0.30	2.75	680	22x25	0.25	1.20	
	63 (79)	6800	25x50	0.30	3.30	820	22x30	0.25	1.30
			30x40	0.30	3.30		25x25	0.25	1.33
			35x30	0.30	3.25		1000	22x35	0.25
		8200	30x45	0.30	3.60	25x30		0.25	1.50
			35x35	0.30	3.55	1200	22x40	0.25	1.70
		10000	30x50	0.30	4.05		25x35	0.25	1.70
			35x40	0.30	4.00	30x25	0.25	1.70	
	12000	35x45	0.30	4.55	100 (125)	1500	22x45	0.25	1.95
	1200	22x25	0.25	1.20			25x40	0.25	2.00
22x30		0.25	1.30	30x30			0.25	1.95	
1500	25x25	0.25	1.30	35x25		0.25	2.00		
	1800	22x30	0.25	1.50		1800	25x45	0.25	2.20
25x25		0.25	1.50	30x35			0.25	2.50	
2200	22x35	0.25	1.70	2200		35x30	0.25	2.45	
	25x30	0.25	1.75			25x50	0.25	2.55	
	30x25	0.25	1.80			30x40	0.25	2.70	
	2700	22x40	0.25	2.00		2700	35x30	0.25	2.55
25x35		0.25	2.00	30x45	0.25		2.90		
30x25		0.25	1.95	3300	35x35	0.25	2.85		
3300	22x50	0.25	2.30		30x50	0.25	3.25		
	25x40	0.25	2.30	35x40	0.25	3.25			
	30x30	0.25	2.25	3900	35x45	0.25	3.70		
35x25	0.25	2.10	4700		35x50	0.25	3.80		
3900	25x45	0.25	2.55	160 (200)	220	22x20	0.15	0.80	
	30x35	0.25	2.55		270	22x25	0.15	1.00	
		35x30	0.25		2.55	330	22x25	0.15	1.20
	4700	25x50	0.25		2.85		25x20	0.15	1.15
		30x40	0.25		2.85	390	22x30	0.15	1.30
	35x30	0.25	2.80		25x25		0.15	1.30	
5600	30x45	0.25	3.20		470	22x35	0.15	1.40	
	35x35	0.25	3.20			25x25	0.15	1.40	
6800	30x50	0.25	3.65			560	22x40	0.15	1.50
	35x40	0.25	3.65		25x30		0.15	1.50	
8200	35x45	0.25	3.90	80 (100)	820	22x25	0.25	1.10	
10000	35x50	0.25	4.40						

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120KHz)
160 (200)	680	22x45	0.15	1.70	200 (250)	270	22x25	0.15	0.85
		25x35	0.15	1.70			25x25	0.15	0.85
	820	22x50	0.15	1.95		330	22x30	0.15	1.20
		25x40	0.15	2.00			25x25	0.15	1.20
		30x30	0.15	2.00		390	22x30	0.15	1.30
		35x25	0.15	1.90			22x35	0.15	1.30
	1000	25x45	0.15	2.20		25x30	0.15	1.30	
		30x35	0.15	2.20		30x25	0.15	1.30	
		35x30	0.15	2.20		470	22x35	0.15	1.40
	1200	25x50	0.15	2.45			22x40	0.15	1.40
		30x40	0.15	2.45			25x30	0.15	1.40
		35x30	0.15	2.45		30x25	0.15	1.50	
	1500	30x45	0.15	2.80		560	22x45	0.15	1.55
		35x35	0.15	2.80			25x35	0.15	1.55
	1800	30x50	0.15	3.30		680	30x30	0.15	1.55
		35x45	0.15	3.30			22x50	0.15	1.75
2200	35x50	0.15	3.75	25x40	0.15	1.75			
180 (225)	180	22x20	0.15	0.75	30x30	0.15	1.75		
	220	22x25	0.15	0.85	35x25	0.15	1.70		
	270	22x25	0.15	0.95	820	25x50	0.15	2.05	
		25x20	0.15	0.90		30x35	0.15	2.00	
	330	22x25	0.15	1.20	1000	35x30	0.15	2.05	
		22x30	0.15	1.10		30x40	0.15	2.30	
	390	25x25	0.15	1.10	30x45	0.15	2.30		
		22x30	0.15	1.30	35x30	0.15	2.30		
	470	25x25	0.15	1.30	1200	35x35	0.15	2.30	
		22x30	0.15	1.30		30x50	0.15	2.60	
		22x35	0.15	1.35	35x40	0.15	2.65		
		25x30	0.15	1.40	1500	35x45	0.15	3.10	
	560	30x25	0.15	1.40	1800	35x50	0.15	3.15	
		22x40	0.15	1.50	250 (300)	120	22x20	0.15	0.60
		25x35	0.15	1.55		150	22x25	0.15	0.65
	30x25	0.15	1.50	180		22x25	0.15	0.80	
	680	22x45	0.15	1.70		25x20	0.15	0.75	
		22x50	0.15	1.70		220	22x30	0.15	0.95
		25x35	0.15	1.70			25x25	0.15	0.95
		25x40	0.15	1.75		270	22x35	0.15	1.15
	30x30	0.15	1.70	25x30			0.15	1.15	
	35x25	0.15	1.70	30x25		0.15	1.15		
	820	22x50	0.15	1.95		330	22x40	0.15	1.25
		25x40	0.15	2.00			25x30	0.15	1.20
		25x45	0.15	2.00		30x25	0.15	1.25	
		35x25	0.15	1.90		390	22x45	0.15	1.5
1000	25x45	0.15	2.20	25x35			0.15	1.50	
	25x50	0.15	2.20	30x30		0.15	1.50		
	30x35	0.15	2.25	470		22x50	0.15	1.55	
	30x40	0.15	2.25			25x40	0.15	1.55	
35x30	0.15	2.25	30x30	0.15		1.55			
1200	35x30	0.15	2.25	35x25		0.15	1.55		
	25x50	0.15	2.45	560		25x45	0.15	1.80	
	30x40	0.15	2.45			30x35	0.15	1.80	
	30x45	0.15	2.50	35x30		0.15	1.80		
1500	35x35	0.15	2.50	680		25x50	0.15	1.95	
	30x45	0.15	2.80			30x40	0.15	2.00	
	30x50	0.15	2.90	35x35		0.15	2.00		
1800	35x40	0.15	2.90	820		30x45	0.15	2.15	
	30x50	0.15	3.30		35x35	0.15	2.10		
35x50	0.15	3.30	1000	35x40	0.15	2.30			
2200	35x50	0.15	3.60	1500	35x50	0.15	3.63		
200 (250)	150	22x20	0.15	0.65	350 (400)	56	22x20	0.15	0.40
	180	22x20	0.15	0.70		68	22x25	0.15	0.45
	220	22x25	0.15	0.80		82	22x25	0.15	0.55
		25x20	0.15	0.80			25x20	0.15	0.50

■STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120KHz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120KHz)		
350 (400)	100	22x30	0.15	0.70	400 (450)	470	30x50	0.15	1.75		
		25x25	0.15	0.70			35x45	0.15	1.75		
	120	22x35	0.15	0.75		560	560	35x45	0.15	1.80	
		25x30	0.15	0.75				30x60	0.15	1.90	
	150	30x25	0.15	0.75			680	680	35x50	0.15	1.90
		22x40	0.15	0.80					35x50	0.15	2.10
		25x30	0.15	0.80	35x60	0.15	2.15				
	180	30x25	0.15	0.85	420(470)	150	22x35	0.20	0.58		
		22x45	0.15	0.90			22x40	0.20	0.65		
		25x35	0.15	0.90			25x30	0.20	0.70		
		30x30	0.15	0.90		180	22x40	0.20	0.68		
	22x50	0.15	1.05	25x35			0.20	0.68			
	220	25x40	0.15	1.05		220	25x40	0.20	0.85		
		30x30	0.15	1.00	25x45		0.20	0.95			
		35x25	0.15	1.05	30x40		0.20	0.95			
	270	25x45	0.15	1.20	270	25x45	0.20	1.05			
		30x35	0.15	1.20		30x40	0.20	1.05			
		35x30	0.15	1.20		35x30	0.20	1.05			
	330	30x40	0.15	1.35	330	25x50	0.20	1.15			
		35x35	0.15	1.35		30x40	0.20	1.15			
390	30x45	0.15	1.50	390	35x35	0.20	1.15				
	35x35	0.15	1.50		30x45	0.20	1.25				
470	35x40	0.15	1.70	470	30x50	0.20	1.40				
560	35x45	0.15	1.90	560	35x40	0.20	1.35				
400 (450)	47	22x20	0.15	0.35	47	22x25	0.20	0.38			
	56	22x20	0.15	0.40	56	22x25	0.20	0.40			
	68	22x25	0.15	0.50	68	22x30	0.20	0.50			
		25x20	0.15	0.50		25x25	0.20	0.50			
	82	22x25	0.15	0.52	82	22x30	0.20	0.52			
		22x30	0.15	0.60		22x35	0.20	0.55			
	100	25x25	0.15	0.65		25x30	0.20	0.55			
		22x30	0.15	0.60		30x25	0.20	0.55			
		22x35	0.15	0.65	100	22x30	0.20	0.55			
	25x30	0.15	0.65	22x40		0.20	0.65				
	120	22x30	0.15	0.62	120	25x30	0.20	0.60			
		22x35	0.15	0.70		30x25	0.20	0.65			
		25x30	0.15	0.70		150	22x35	0.20	0.60		
		30x25	0.15	0.75			22x45	0.20	0.70		
	22x35	0.15	0.72	25x35	0.20		0.70				
	150	22x40	0.15	0.80	150	30x30	0.20	0.70			
		25x30	0.15	0.85		35x25	0.20	0.70			
		25x35	0.15	0.85		22x40	0.20	0.68			
		30x30	0.15	0.85		22x50	0.20	0.80			
		35x25	0.15	0.80		25x40	0.20	0.80			
	180	22x40	0.15	0.81	180	30x30	0.20	0.75			
		22x50	0.15	0.95		35x25	0.20	0.75			
		25x40	0.15	0.95		220	22x45	0.20	0.75		
		30x30	0.15	0.90			25x45	0.20	0.85		
	220	25x45	0.15	1.05	220	30x35	0.20	0.85			
		30x35	0.15	1.05		35x30	0.20	0.85			
		35x30	0.15	1.10		270	22x50	0.20	0.85		
	25x45	0.15	1.10	25x50	0.20		1.00				
	25x50	0.15	1.20	30x40	0.20		1.00				
	30x40	0.15	1.20	35x30	0.20		1.00				
	270	35x35	0.15	1.20	270	25x50	0.20	1.05			
		25x50	0.15	1.25		30x45	0.20	1.15			
		30x45	0.15	1.40		35x35	0.20	1.15			
	330	35x35	0.15	1.35	330	30x45	0.20	1.25			
		30x45	0.15	1.42		30x50	0.20	1.40			
		35x40	0.15	1.55		35x40	0.20	1.40			
	390	30x45	0.15	1.45	390	30x50	0.20	1.40			
		30x50	0.15	1.55		35x45	0.20	1.55			
		35x40	0.15	1.65							

LG Standard Series

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120KHz)
450 (500)	470	35x45	0.20	1.68
		35x50	0.20	1.70
	560	35x50	0.20	1.80
		35x60	0.20	2.10
500 (550)	47	22x25	0.25	0.51
	56	22x30	0.25	0.58
	68	25x25	0.25	0.65
	82	22x35	0.25	0.72
		25x30	0.25	0.74
	100	22x45	0.25	0.83
		30x25	0.25	0.82
	120	22x50	0.25	0.93
		25x35	0.25	0.93
		30x30	0.25	0.91

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120KHz)
500 (550)	150	25x45	0.25	1.08
		30x35	0.25	1.04
		35x25	0.25	0.99
	180	25x50	0.25	1.20
		30x40	0.25	1.17
		35x30	0.25	1.10
	220	30x45	0.25	1.33
		35x35	0.25	1.23
	270	30x50	0.25	1.50
		35x40	0.25	1.42
	330	35x45	0.25	1.60
	390	35x50	0.25	1.78
	470	35x60	0.25	2.03

LF Long Life Series

- Endurance: 85°C 3000hours
- Recommended Applications : Smoothing circuit, TV/Monitor, Adapter, SMPS
- Corresponding product to RoHS

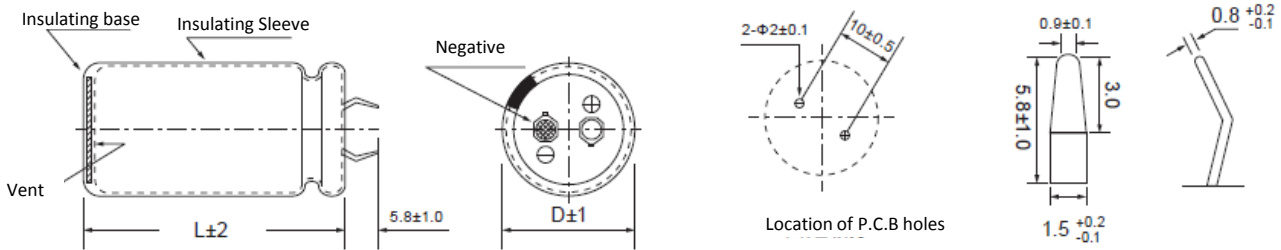
LF
 ↑ Long Life
 LH



■ SPECIFICATIONS

Item	Characteristics								
Category Temperature Range	-40 ~ +85°C				-25 ~ +85°C				
Rated Voltage Range	10 ~ 100VDC				160 ~ 450VDC				
Rated Capacitance Range	820 ~ 56000 μF				56 ~ 2200 μF				
Capacitance Tolerance	± 20 % (120Hz , 20°C)								
Leakage Current (20°C)	I = 3√CV. (After rated voltage applied for 5 minutes) I : Max. leakage current (μ A), C : Nominal capacitance (μ F), V : Rated voltage (V)								
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	10~16	25	35	50	63	80~100	160~400	450
	tan δ	0.55	0.45	0.40	0.35	0.30	0.25	0.15	0.25
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz								
	WV	10~16	25	35	50~63	80~100	160~400	450	
	Z-25°C / Z+20°C	3	3	3	2	2	4	8	
	Z-40°C / Z+20°C	12	10	8	6	5	—	—	
Endurance	After applying rated voltage with rated Ripple current for 3000hrs at 85°C , the capacitor shall meet the following requirement.								
	Capacitance change	Within ± 20% of initial value							
	D.F. (tan δ)	Not more than 200% of specified value							
Shelf Life	After placed at 85°C without voltage applied for 1000 hours,the capacitor shall meet the same requirements as Endurance.								
	Leakage current	initial specified value or less							

■ Dimensions [mm]



■ Multiplier for Ripple Current

Freq. (Hz)	50	60	120	400	1K	2.4K	5K	10K~100K
coefficient	0.8	0.85	1.0	1.14	1.23	1.3	1.36	1.4

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (A/rms85°C) (120Hz)	ESR (Ω,20°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (A/rms85°C) (120Hz)	ESR (Ω,20°C) (120Hz)
10(13)	12000	22x25	2.45	0.061	25(32)	22000	30x45	4.90	0.027
	15000	22x30	2.80	0.049			35x35	4.85	0.027
	18000	22x35	3.34	0.041			30x50	5.45	0.022
		25x25	3.15	0.041	35x40	5.45	0.022		
	22000	22x40	3.67	0.033	33000	35x45	6.15	0.018	
		25x30	3.50	0.033	35(44)	3900	22x25	2.10	0.136
		30x25	3.60	0.033		4700	22x30	2.30	0.113
	27000	22x45	4.12	0.027		25x25	2.30	0.113	
		25x35	4.00	0.027		5600	22x35	2.60	0.095
		30x30	4.16	0.027			25x30	2.62	0.095
	33000	22x50	4.63	0.022			30x25	2.70	0.095
		25x40	4.49	0.022		35x25	2.99	0.095	
		30x30	4.45	0.022		6800	22x40	2.90	0.078
	35x25	4.54	0.022	25x35			2.93	0.078	
	39000	25x45	4.90	0.019			30x30	3.07	0.078
		30x35	4.90	0.019		35x25	3.13	0.078	
		35x30	5.05	0.019		8200	22x45	3.30	0.065
	47000	25x50	5.55	0.016			25x35	3.20	0.065
30x40		5.61	0.016	30x30			3.33	0.065	
56000		35x30	5.50	0.016		35x25	3.42	0.065	
	30x45	6.11	0.013	10000		22x50	3.74	0.053	
35x35	6.05	0.013	25x40			3.64	0.053		
16(20)	8200	22x25	2.45			0.089	30x30	3.60	0.053
	10000	22x30	2.60	0.073	35x25	3.67	0.053		
	12000	22x35	3.10	0.061	12000	25x45	4.00	0.044	
		25x25	2.90	0.061		30x35	4.00	0.044	
	15000	22x40	3.46	0.049		35x30	4.12	0.044	
		25x30	3.30	0.049	15000	30x40	4.60	0.035	
		30x25	3.40	0.049		35x35	4.47	0.035	
	18000	22x45	3.81	0.041		30x45	5.10	0.029	
		25x35	3.70	0.041	35x40	5.30	0.029		
		30x30	3.85	0.041	22000	35x45	5.70	0.024	
	22000	22x50	4.32	0.033	27000	35x50	6.45	0.020	
		25x45	4.40	0.033	50(63)	2200	22x25	1.80	0.211
		30x30	4.15	0.033		2700	22x30	1.95	0.172
		35x25	4.23	0.033		3300	22x35	2.33	0.141
		25x45	4.65	0.027			25x25	2.20	0.141
		27000	30x35	4.65		0.027	3900	22x40	2.52
	35x30		4.79	0.025		25x30		2.40	0.119
	33000		30x40	5.25		0.022	4700	22x45	2.78
35x35		5.41	0.022	25x35		2.70		0.099	
39000	30x45	5.86	0.019	30x30		2.82		0.099	
	35x35	5.80	0.019	35x25		2.89	0.099		
47000	35x40	6.45	0.016	5600		25x35	3.00	0.083	
	25(32)	5600	22x25			2.20	30x30	3.12	0.083
6800		22x30	2.45			0.088	35x25	3.21	0.083
		25x25	2.45	0.088		6800	25x40	3.35	0.068
8200		22x35	2.75	0.073			30x35	3.52	0.068
		25x30	2.75	0.073			35x30	3.62	0.068
10000		22x40	3.25	0.06		8200	25x50	3.74	0.057
		25x30	3.10	0.06			30x40	3.77	0.057
		30x25	3.19	0.06	35x30		3.70	0.057	
12000		22x45	3.50	0.05	10000	30x45	4.24	0.046	
		25x35	3.40	0.05		35x35	4.20	0.046	
		30x30	3.54	0.05		12000	30x50	4.65	0.039
		35x25	3.64	0.05	35x40		4.65	0.039	
15000		25x45	3.90	0.04	15000	35x45	5.30	0.031	
		30x40	4.10	0.04	18000	35x50	5.90	0.026	
		35x30	4.21	0.04	63(79)	1800	22x25	1.80	0.221
18000		25x45	4.30	0.033		2200	22x30	2.00	0.181
		30x40	4.51	0.033		25x25	2.00	0.181	
		35x30	4.39	0.033	2700	22x35	2.30	0.147	

■ **STANDARD RATINGS**

Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (A/rms85°C) (120Hz)	ESR (Ω,20°C) (120Hz)	Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (A/rms85°C) (120Hz)	ESR (Ω,20°C) (120Hz)	
63(79)	2700	25x30	2.30	0.147	100(125)	2200	35x25	3.11	0.151	
	3300	22x40	2.68	0.121		2700	25x45	3.45	0.123	
		25x30	2.55	0.121			30x35	3.45	0.123	
		30x25	2.63	0.121			35x30	3.55	0.123	
		22x45	2.88	0.102			3300	25x50	3.94	0.100
	3900	25x35	2.80	0.102		30x40		3.98	0.100	
		30x30	2.91	0.102		35x30		3.90	0.100	
		22x50	3.28	0.085		3900	30x45	4.34	0.085	
	4700	25x40	3.18	0.085			35x35	4.30	0.085	
		30x30	3.15	0.085			4700	35x40	4.75	0.071
		35x25	3.21	0.085		5600	35x50	5.30	0.059	
	5600	25x45	3.50	0.071		160(200)	330	22x25	1.15	0.603
		30x35	3.50	0.071			390	22x30	1.30	0.510
		35x30	3.60	0.071			470	22x35	1.59	0.423
		6800	25x50	3.94				0.059	25x30	1.62
	30x40		3.98	0.059				560	22x35	1.70
	35x30		3.90	0.059			25x30		1.70	0.355
	8200	30x45	4.39	0.049			680	22x40	1.97	0.293
35x35		4.35	0.049	25x35	1.99			0.293		
10000	30x50	4.90	0.040	820	30x25			1.95	0.293	
	35x40	4.90	0.040		22x50		2.32	0.243		
12000	35x50	5.45	0.033		25x40		2.28	0.243		
80(100)	1200	22x25	1.70	0.276	180(225)		270	22x25	1.10	0.737
	1500	22x30	1.95	0.221			330	22x30	1.25	0.603
		25x25	1.95	0.221			390	22x30	1.40	0.510
	1800	22x35	2.15	0.184				25x25	1.40	0.510
		25x30	2.15	0.184			470	22x35	1.60	0.423
	2200	22x40	2.57	0.151				25x30	1.60	0.423
		25x30	2.45	0.151			560	22x40	1.89	0.355
		30x25	2.52	0.151		25x30		1.80	0.355	
	30x35	2.52	0.151	30x25		1.85		0.355		
	2700	22x45	2.83	0.123		680	22x45	2.11	0.292	
		25x35	2.75	0.123			25x35	2.05	0.292	
		30x30	2.86	0.123			30x30	2.13	0.292	
	3300	22x50	3.22	0.100		820	22x50	2.34	0.234	
		25x40	3.13	0.100			25x40	2.27	0.234	
		30x30	3.10	0.100			30x30	2.25	0.234	
		35x25	3.16	0.100		1000	25x50	2.67	0.199	
	3900	25x45	3.40	0.085			30x35	2.55	0.199	
		30x35	3.40	0.085			35x30	2.63	0.199	
35x30		3.50	0.085	1200	30x40	2.85	0.166			
4700	25x50	3.84	0.071		35x35	2.93	0.166			
	30x40	3.88	0.071		1500	30x50	3.10	0.130		
	35x35	4.04	0.071	35x40		3.10	0.130			
5600	30x45	4.24	0.059	1800		35x45	3.60	0.111		
	35x40	4.43	0.059		200(250)	220	22x25	1.00	0.905	
6800	30x50	4.70	0.049			270	25x25	1.08	0.905	
	35x45	4.93	0.049	22x30			1.15	0.737		
8200	30x50	5.25	0.040	25x25		1.15	0.737			
	820	22x25	1.70	0.404		25x25	1.15	0.737		
100(125)	1000	22x30	1.95	0.332		200(250)	220	22x25	1.00	0.905
		25x25	1.95	0.332				270	22x30	1.15
		1200	22x35	2.15			0.276		220	25x25
	25x30		2.15	0.276			270	22x30		1.15
	1500	22x40	2.57	0.221				220	25x25	1.08
		25x30	2.45	0.221			270		22x30	1.15
		30x25	2.52	0.221				220	25x25	1.08
	1800	22x45	2.83	0.184			270		22x30	1.15
		25x35	2.75	0.184				220	25x25	1.08
		30x30	2.86	0.184			270		22x30	1.15
	2200	22x50	3.17	0.151				220	25x25	1.08
		25x40	3.08	0.151			270		22x30	1.15
		30x30	3.05	0.151				220	25x25	1.08

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (A/rms85°C) (120Hz)	ESR (Ω,20°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (A/rms85°C) (120Hz)	ESR (Ω,20°C) (120Hz)		
200(250)	330	22x30	1.29	0.603	315 (365)	330	25x40	1.60	0.603		
		25x25	1.30	0.603			30x35	1.68	0.603		
	390	22x35	1.45	0.510			35x30	1.74	0.603		
		25x30	1.45	0.510			390	25x45	1.75	0.510	
		30x25	1.51	0.510				30x35	1.75	0.510	
	470	22x40	1.67	0.423				35x30	1.80	0.510	
		25x30	1.68	0.423		470	30x40	2.00	0.423		
		30x25	1.65	0.423			35x35	2.06	0.423		
	560	680	33x56	1.94		0.355	560	30x45	2.20	0.355	
			25x35	1.87		0.355		35x40	2.29	0.355	
			30x30	1.96		0.355	680	35x45	2.50	0.293	
	820	820	22x50	2.14		0.293	820	35x50	2.80	0.243	
			25x45	2.21		0.293	350(400)	82	22x25	0.7	2.426
		30x35	2.20	0.293		100		22x30	0.8	1.989	
		35x30	2.27	0.293		120		22x30	0.85	1.658	
		1000	25x50	2.32				0.243	25x25	0.85	1.658
	30x35		2.22	0.243		150		22x35	1.11	1.326	
	35x30		2.30	0.243				25x25	1.05	1.326	
	1200	1500	30x45	2.63		0.199		180	22x40	1.16	1.105
			35x35	2.60		0.199			25x35	1.17	1.105
250(300)	180	30x50	2.90	0.166	220	30x25		1.15	1.105		
		35x40	2.90	0.166		22x45		1.34	0.905		
		35x45	3.11	0.133	25x35	1.30	0.905				
	220	270	22x25	1.00	1.110	30x30	1.35	0.905			
			22x30	1.15	0.905	35x25	1.39	0.905			
			25x25	1.15	0.905	270	25x45	1.51	0.737		
	330	22x30	1.30	0.737	30x35		1.49	0.737			
		25x25	1.30	0.737	35x25	1.45	0.737				
	390	470	22x35	1.45	0.603	330	25x350	1.67	0.603		
			25x30	1.45	0.603		30x40	1.68	0.603		
			22x40	1.62	0.510	35x30	1.65	0.603			
	560	680	25x35	1.63	0.510	390	30x45	1.87	0.510		
			30x25	1.60	0.510		35x35	1.85	0.510		
			22x45	1.80	0.423	470	30x50	2.10	0.423		
	25x40	1.84	0.423	35x40	2.10		0.423				
	820	1000	30x30	1.80	0.423	560	35x45	2.30	0.355		
			35x25	1.85	0.423		680	35x50	2.60	0.293	
			25x40	2.00	0.355	400(450)	68	22x25	0.65	2.926	
	30x35	2.10	0.355	82	22x25		0.75	2.426			
	35x30	2.20	0.355	100	22x30		0.85	1.989			
680	25x50	2.32	0.293		25x25		0.85	1.989			
	30x40	2.35	0.293	120	22x30		0.99	1.658			
35x30	2.30	0.293	25x25		0.93		1.658				
820	1000	30x45	2.57	0.243	30x25		1.04	1.658			
		35x35	2.55	0.243	150		22x40	1.15	1.326		
1200	1500	30x50	2.90	0.199			25x30	1.10	1.326		
		35x40	2.90	0.199	30x25		1.13	1.326			
315(365)	100	35x45	3.25	0.166	180	22x45	1.24	1.105			
		100	22x25	0.75		1.989	25x35	1.20	1.105		
	120	22x30	0.80	1.658	30x30	1.25	1.105				
		22x30	1.00	1.326	220	22x50	1.40	0.905			
	150	25x25	1.00	1.326		25x40	1.36	0.905			
		25x35	1.10	1.105	30x30	1.35	0.905				
	180	25x30	1.10	1.105	35x25	1.38	0.905				
		22x40	1.31	0.905	270	25x45	1.50	0.737			
	220	25x30	1.25	0.905		30x35	1.50	0.737			
		30x25	1.29	0.905	35x30	1.54	0.737				
		22x45	1.44	0.737	330	25x50	1.70	0.603			
	270	25x35	1.40	0.737		30x40	1.70	0.603			
		30x30	1.46	0.737		35x35	1.77	0.603			
		35x25	1.50	0.737	390	30x45	1.92	0.510			
	330	22x50	1.63	0.603		35x35	1.90	0.510			

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (A/rms85°C) (120Hz)	ESR (Ω ,20°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (A/rms85°C) (120Hz)	ESR (Ω ,20°C) (120Hz)
400(450)	470	35x40	2.10	0.423	450(500)	150	30x30	1.20	2.210
	560	35x50	2.30	0.355		180	25x45	1.40	1.842
450(500)	56	22x25	0.65	5.921			30x35	1.39	1.842
	68	22x30	0.75	4.876				35x25	1.35
	82	22x30	0.85	4.044		25x50			1.51
		25x25	0.85	4.044			220	30x40	1.53
	100	22x35	0.90	3.316		35x30		1.50	1.507
		25x30	0.90	3.316			270	30x45	1.72
	120	22x40	1.11	2.763		35x35		1.70	1.228
		25x35	1.12	2.763			330	30x50	1.90
		30x25	1.10	2.763		35x40		1.90	1.005
	150	22x50	1.25	2.210			390	35x45	2.10
25x40		1.21	2.210	470		35x50		2.23	0.705

- Endurance: 105°C 3000 hours
- Recommended Applications : Smoothing circuit, TV/Monitor, Adapter, SMPS
- Corresponding product to RoHS

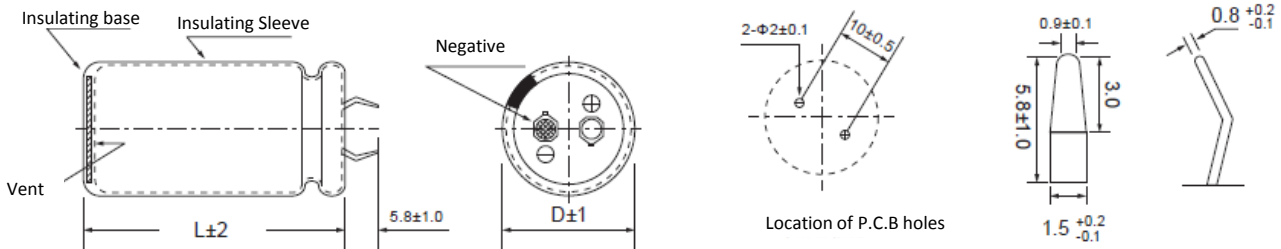
LJ
 ↑ Long Life
 LG



■ SPECIFICATIONS

Item	Characteristics									
Category Temperature Range	-40 ~ +105°C					-25 ~ +105°C				
Rated Voltage Range	10 ~ 100VDC					160 ~ 500VDC				
Rated Capacitance Range	560 ~ 68000 µF					56 ~ 2200 µF				
Capacitance Tolerance	± 20 % (120Hz , 20°C)									
Leakage Current (20°C)	I = 3√CV. (After rated voltage applied for 5minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)									
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	10~16	25	35	50	63	80~100	160~400	450~500	
	tan δ	0.55	0.45	0.4	0.35	0.3	0.25	0.15	0.25	
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz									
	Rated voltage(V)	10~16	25	35	50~63	80~100	160~400	450	500	
	Z-25°C / Z+20°C	4	3	3	2	2	4	8	8	
Z-40°C / Z+20°C	15	10	8	6	5	—	—	—		
Endurance	After applying rated voltage with rated Ripple current for 3000hrs at 105°C , the capacitor shall meet the following requirement.									
	Capacitance change	Within ± 20% of initial value								
	D.F. (tan δ)	Not more than 200% of specified value								
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitor shall meet the same requirements as Endurance.									
	Leakage current	Not more than the specified value								

■ Dimensions [mm]



■ Multiplier for Ripple Current

Freq. (Hz)	50	60	120	400	1K	2.4K	5K	10K~100K
10~450V	0.80	0.85	1.00	1.14	1.23	1.30	1.36	1.40
500V	0.70	0.72	1.00	1.16	1.30	1.32	1.36	1.41

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (A/rms105°C) (120Hz)	ESR (Ω,20°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (A/rms105°C) (120Hz)	ESR (Ω,20°C) (120Hz)		
10(13)	10000	22x25	1.80	0.073	25(32)	12000	25x45	3.22	0.050		
	12000	22x30	2.05	0.061			30x35	3.19	0.050		
		25x25	2.05	0.061			35x25	3.10	0.050		
	15000	22x35	2.45	0.049		15000	25x50	3.43	0.040		
		25x30	2.45	0.049			30x40	3.47	0.040		
		30x25	2.55	0.049			35x30	3.40	0.040		
	18000	22x40	2.94	0.041		18000	30x45	3.94	0.033		
		25x30	2.80	0.041			35x35	3.90	0.033		
		30x30	3.11	0.041		22000	30x50	4.30	0.027		
	22000	22x45	3.24	0.033			35x40	4.30	0.027		
		25x35	3.15	0.033		27000	35x45	4.85	0.022		
		30x30	3.28	0.033			35(44)	2700	22x25	1.45	0.196
	27000	35x25	3.37	0.033		3300		22x30	1.60	0.161	
		25x40	3.50	0.027		3900		22x30	1.80	0.136	
		30x35	3.67	0.027				4700	22x35	2.23	0.113
	33000	35x30	3.78	0.027		5600			25x25	2.10	0.113
		25x45	4.00	0.022				22x40	2.41	0.095	
		30x40	4.20	0.022				25x30	2.30	0.095	
39000	35x30	4.08	0.022	6800	30x25	2.37		0.095			
	25x50	4.45	0.019		22x45	2.68		0.078			
	30x45	4.67	0.019		8200	25x35		2.60	0.078		
47000	35x35	4.63	0.019	8200		30x30		2.70	0.078		
	35x40	4.90	0.016		22x50	3.02		0.065			
	35x45	5.50	0.013		10000	25x40		2.93	0.065		
68000	30x50	6.05	0.011	30x30		2.90		0.065			
16(20)	6800	22x25	1.80	0.107	50(63)	10000		35x25	2.96	0.065	
	8200	22x30	2.05	0.089				12000	25x45	3.20	0.0531
		25x25	2.05	0.089					30x35	3.20	0.0531
	10000	22x35	2.45	0.073		15000			35x30	3.30	0.0531
		25x30	2.45	0.073			18000	25x50	3.64	0.044	
		22x40	2.73	0.061				22000	30x40	3.67	0.044
	12000	25x30	2.60	0.061		3300			35x30	3.60	0.044
		30x25	2.68	0.061			3900		30x45	4.04	0.035
		22x45	2.99	0.049				4700	35x35	4.00	0.035
	15000	25x35	2.90	0.049		5600			35x40	4.60	0.029
		30x30	3.02	0.049			6800		35x50	5.10	0.024
		22x50	3.43	0.041				63(79)	1500	22x25	1.25
	18000	25x40	3.33	0.041		1800			22x30	1.45	0.258
		30x30	3.30	0.041		2200	22x30		1.60	0.211	
		35x25	3.37	0.041			25x25		1.60	0.211	
	22000	25x45	3.70	0.033		2700	22x35		1.80	0.172	
		30x35	3.70	0.033			3300		25x30	1.80	0.172
		35x30	3.81	0.033					3900	22x40	2.05
27000	30x40	4.15	0.027	4700	25x30	1.95				0.141	
	35x35	4.27	0.027		5600	30x25	2.01			0.141	
	30x50	4.65	0.022			6800	22x45		2.27	0.119	
33000	35x40	4.65	0.022	8200			25x35		2.20	0.119	
	39000	35x45	5.25		0.019		10000		30x30	2.29	0.119
	47000	35x50	5.80		0.016	12000			22x50	2.50	0.099
25(32)	3900	22x25	1.50	0.153	4700				25x40	2.42	0.099
	4700	22x30	1.80	0.127			5600		30x30	2.40	0.099
		22x30	1.95	0.107		35x25			2.45	0.099	
	5600	25x25	1.95	0.107	6800	25x45			2.70	0.083	
		22x35	2.20	0.088		8200	30x35		2.70	0.083	
	6800	25x30	2.20	0.088			10000	35x30	2.78	0.083	
		22x40	2.47	0.073	12000			30x40	3.06	0.068	
		25x35	2.50	0.073		25(32)		35x30	3.00	0.068	
	8200	30x25	2.45	0.073			63(79)	30x45	3.38	0.057	
		22x45	2.75	0.060	1200			35x35	3.35	0.057	
		25x40	2.80	0.060		10000		35x40	3.70	0.046	
	10000	30x30	2.75	0.060		12000	35x50	4.20	0.039		
12000		22x50	3.13	0.050							

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (A/rms105°C) (120Hz)	ESR (Ω,20°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (A/rms105°C) (120Hz)	ESR (Ω,20°C) (120Hz)	
63(79)	1500	22x30	1.45	0.265	100(125)	2200	25x50	2.75	0.151	
		22x25	1.45	0.265			30x40	2.75	0.151	
	22x35	1.60	0.221	35x35			2.86	0.151		
	1800	25x30	1.60	0.221		2700	30x45	3.08	0.123	
		22x40	1.89	0.181			35x35	3.05	0.123	
	2200	25x30	1.80	0.181		3300	30x50	3.45	0.100	
		30x25	1.85	0.181			35x40	3.45	0.100	
	2700	22x45	2.06	0.147		3900	35x45	3.90	0.085	
		25x35	2.00	0.147		4700	35x50	4.30	0.071	
		30x30	2.08	0.147		160(200)	270	22x25	0.85	0.737
	3300	25x40	2.32	0.121	330		22x30	1.00	0.603	
		30x30	2.30	0.121	390		22x30	1.15	0.510	
		35x25	2.35	0.121			25x25	1.15	0.510	
	3900	25x45	2.55	0.102	470		22x35	1.30	0.423	
		30x35	2.55	0.102			25x30	1.30	0.423	
		35x30	2.63	0.102	560		22x40	1.57	0.355	
	4700	25x50	2.83	0.085			25x30	1.50	0.355	
		30x40	2.86	0.085			30x25	1.54	0.355	
		35x30	2.80	0.085	680		22x45	1.75	0.293	
	5600	30x45	3.18	0.071		25x35	1.70	0.293		
35x35		3.15	0.071	30x30	1.77	0.293				
6800	30x50	3.50	0.059	820	22x50	2.03	0.243			
	35x40	3.50	0.059		25x40	1.97	0.243			
	35x45	3.90	0.049		30x30	1.95	0.243			
80(100)	820	22x25	1.20	0.404	35x25	1.99	0.243			
	1000	22x30	1.35	0.332	1000	25x45	2.15	0.199		
	1200	22x35	1.59	0.276		30x35	2.15	0.199		
		25x25	1.50	0.276	35x30	2.21	0.199			
	1500	22x40	1.78	0.221	1200	30x40	2.45	0.166		
		25x30	1.70	0.221		35x35	2.52	0.166		
		30x25	1.75	0.221	1500	30x50	2.75	0.133		
	1800	22x45	2.01	0.184		35x40	2.75	0.133		
		25x35	1.95	0.184	1800	35x45	3.00	0.111		
		30x30	2.03	0.184		2200	35x50	3.50	0.090	
	2200	25x40	2.17	0.151	180(225)	270	22x25	0.85	0.737	
		30x30	2.15	0.151		330	22x30	1.10	0.603	
		35x25	2.19	0.151		390	22x35	1.32	0.510	
		2700	25x45	2.45			0.123	25x25	1.25	0.510
			30x35	2.45		0.123	470	22x40	1.47	0.423
			35x30	2.52		0.123		25x30	1.40	0.423
		3300	30x40	2.75		0.100	560	22x45	1.70	0.355
			35x35	2.83		0.100		25x35	1.63	0.355
		3900	30x45	3.13		0.085		30x25	1.60	0.355
			35x35	3.10		0.085	680	22x50	1.87	0.293
4700	35x40	3.40	0.071	25x40	1.82	0.293				
	5600	25x50	3.80	0.059	30x30	1.80		0.293		
100(125)	560	22x25	1.20	0.592	35x25	1.84	0.293			
		22x30	1.35	0.488	820	25x45	2.05	0.243		
	680	22x30	1.50	0.404		30x35	2.05	0.243		
		25x25	1.50	0.404	35x30	2.11	0.243			
	820	22x35	1.70	0.332	1000	25x50	2.27	0.199		
		25x30	1.70	0.332		30x40	2.29	0.199		
	1000	22x40	1.97	0.276	1200	35x30	2.25	0.199		
		25x35	1.99	0.276		30x45	2.57	0.166		
		30x25	1.95	0.276		35x35	2.55	0.166		
	1200	22x45	2.15	0.221	1500	35x40	2.85	0.133		
		25x40	2.19	0.221		1800	35x50	3.10	0.111	
		25x30	2.15	0.221	200(250)	220	22x25	0.85	0.905	
		35x25	2.21	0.221		270	22x30	1.00	0.737	
	1500	25x45	2.45	0.184		330	22x30	1.15	0.603	
		30x30	2.15	0.221	25x25		1.15	0.603		
		1800	30x35	2.45	0.184	390	22x35	1.30	0.510	
	35x30		2.52	0.184						

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (A/rms105°C) (120Hz)	ESR (Ω,20°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	Ripple current (A/rms105°C) (120Hz)	ESR (Ω,20°C) (120Hz)
200(250)	390	25x30	1.30	0.510	315(365)	390	30x45	1.71	0.510
		22x40	1.52	0.423			35x30	1.60	0.510
	470	25x35	1.54	0.423		470	30x50	1.85	0.423
		30x25	1.49	0.423			35x35	1.75	0.423
		22x45	1.70	0.355		560	35x40	2.00	0.355
	560	25x35	1.65	0.355		680	35x45	2.20	0.293
		30x30	1.72	0.355	350(400)	82	22x25	0.60	2.426
	680	25x45	1.97	0.293		100	22x30	0.70	1.989
		30x35	1.97	0.293			25x25	0.70	1.989
		35x30	2.02	0.293			120	22x35	0.80
	820	25x45	2.20	0.243		25x30		0.80	1.658
		30x35	2.10	0.243		150	22x40	0.86	1.326
	1000	35x30	2.16	0.243			25x35	0.87	1.326
		1200	30x45	2.32		0.199	30x25	0.85	1.326
	1500		35x35	2.30		0.199	180	22x45	1.05
30x50		2.75	0.166	25x40		1.07		1.105	
250(300)	150	22x25	0.75	1.330		30x30	1.05	1.105	
		22x30	0.85	1.110		22x50	1.16	0.905	
	220	22x30	1.00	0.905		25x45	1.20	0.905	
		25x25	1.00	0.905		30x35	1.18	0.905	
	270	22x35	1.22	0.737		270	35x25	1.15	0.905
		25x25	1.15	0.737	25x50		1.31	0.737	
	330	22x40	1.36	0.603	30x40	1.33	0.737		
		25x30	1.30	0.603	35x30	1.30	0.737		
	390	22x45	1.54	0.510	330	30x45	1.46	0.603	
		25x35	1.48	0.510		35x35	1.45	0.603	
		30x25	1.45	0.510	390	30x50	1.65	0.510	
		35x25	1.59	0.510		35x40	1.65	0.510	
	470	22x50	1.78	0.423	470	35x45	1.85	0.423	
		25x40	1.75	0.423	560	35x50	2.10	0.355	
		30x30	1.72	0.423	400(450)	68	22x25	0.55	2.926
35x30		1.88	0.423	82		22x30	0.65	2.426	
560	25x40	1.80	0.355			25x25	0.65	2.426	
	30x35	1.89	0.355			100	22x35	0.79	1.989
680	35x30	1.94	0.355	25x25			0.75	1.989	
	25x50	2.10	0.293	120		22x40	0.89	1.658	
820	30x40	2.10	0.293			25x30	0.85	1.658	
	35x35	2.18	0.293	30x25		0.87	1.658		
1000	30x45	2.30	0.243	150		22x45	0.93	1.326	
	35x40	2.39	0.243			25x35	0.90	1.326	
1200	30x50	2.55	0.199	30x30		0.94	1.326		
	35x45	2.65	0.199	35x25		0.96	1.326		
315(365)	82	22x25	0.55	2.426		180	22x50	1.14	1.105
		22x30	0.65	1.989			25x450	1.11	1.105
	100	22x30	0.75	1.658		30x30	1.10	1.105	
		25x25	0.75	1.658	35x25	1.12	1.105		
	120	22x35	0.80	1.326	220	25x45	1.20	0.905	
		25x30	0.80	1.326		30x35	1.20	0.905	
	150	22x40	1.01	1.105	35x30	1.24	0.905		
		25x35	1.02	1.105	270	25x50	1.36	0.737	
	180	30x25	1.00	1.105		30x40	1.38	0.737	
		22x45	1.10	0.905	35x30	1.35	0.737		
	220	25x40	1.12	0.905	330	30x45	1.51	0.603	
		30x30	1.10	0.905		35x35	1.50	0.603	
	270	25x45	1.25	0.737	390	35x50	1.70	0.510	
		30x35	1.25	0.737		35x40	1.70	0.510	
	330	25x50	1.53	0.603	470	35x45	1.90	0.423	
30x40		1.53	0.603	450(500)	56	22x25	0.55	5.921	
35x30		1.50	0.603		68	22x30	0.65	4.876	
			82		22x35	0.80	4.044		
			25x25		0.75	4.044			
			100		22x40	0.89	3.316		

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (A/rms105°C) (120Hz)	ESR (Ω ,20°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (A/rms105°C) (120Hz)	ESR (Ω ,20°C) (120Hz)
450(500)	100	25x30	0.85	3.316	500(550)	68	25x25	0.65	4.876
	120	22x45	0.95	2.763		82	22x35	0.72	4.044
		25x35	0.92	2.763		100	25x30	0.74	4.044
		30x25	0.90	2.763			22x45	0.83	3.316
		150	22x50	1.14		2.210	30x25	0.82	3.316
	25x40		1.11	2.210		120	22x50	0.93	2.763
	30x30		1.10	2.210			25x35	0.93	2.763
	180	25x45	1.25	1.842		30x30	0.91	2.763	
		30x35	1.24	1.842		150	25x45	1.08	2.210
			35x25	1.20			1.842	30x35	1.04
	220	25x50	1.36	1.507			35x25	0.99	2.210
		30x40	1.38	1.507		180	25x50	1.20	1.842
			35x30	1.35			1.507	35x40	1.17
	270	30x45	1.51	1.228		35x30	1.10	1.842	
		35x35	1.50	1.228		220	30x45	1.33	1.507
			30x50	1.70			1.005	35x35	1.23
	330	35x40	1.70	1.005		270	30x50	1.50	1.228
35x45			1.90	0.850	35x40		1.42	1.228	
470		35x50	2.10	0.705	330	35x45	1.60	1.005	
500(550)	47	22x25	0.51	7.055	390	35x50	1.78	0.850	
	56	252x30	0.58	5.912	470	35x60	2.03	0.705	

LQ Long Life Series

- Endurance: 105°C 5000 hours
- Recommended Applications : Smoothing circuit, TV/Monitor,Adapter, SMPS
- Corresponding product to RoHS

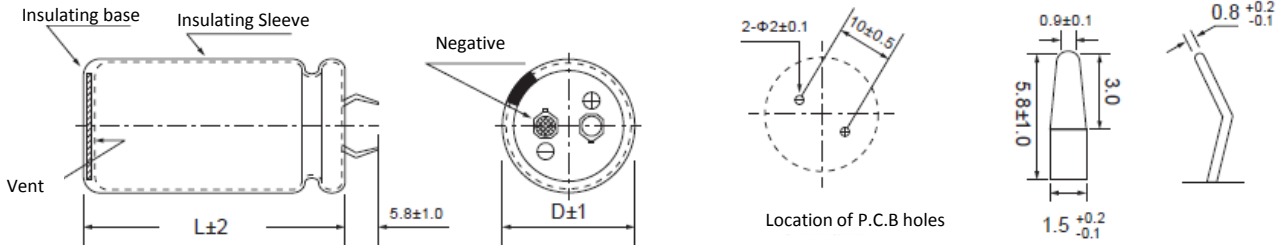
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■ SPECIFICATIONS

Item	Characteristics					
Category Temperature Range	-25 ~ +105°C					
Rated Voltage Range	160 ~ 500VDC					
Rated Capacitance Range	56 ~ 2200 μF					
Capacitance Tolerance	± 20 % at 120Hz , 20°C					
Leakage Current (20°C)	I = 3√CV. (After rated voltage applied for 5 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)					
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	160	180	200	250~400	450~500
	tan δ	0.15	0.15	0.15	0.15	0.25
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz					
	Rated voltage(V)	160~400	450	500		
	Z-25°C / Z+20°C	4	8	8		
Endurance	After applying rated voltage with rated Ripple current for 5000hrs at 105°C , the capacitor shall meet the following requirement.					
	Capacitance change	Within ± 20% of initial value				
	D.F. (tan δ)	Not more than 200% of specified value				
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitor shall meet the same requirements as Endurance.					

■ Dimensions [mm]



■ Multiplier for Ripple Current

Freq. (Hz)	50	60	120	400	1K	2.4K	5K	10K~100K
160~450V	0.80	0.85	1.00	1.14	1.23	1.30	1.36	1.40
500V	0.70	0.72	1.00	1.16	1.30	1.32	1.36	1.41

LQ Long Life Series

■ **STANDARD RATINGS**

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (A/rms105℃) (120Hz)	ESR (Ω,20℃) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (A/rms105℃) (120Hz)	ESR (Ω,20℃) (120Hz)
160(200)	270	22x25	0.85	0.737	200(250)	680	35x30	2.02	0.293
	330	22x30	1.00	0.603		820	25x45	2.20	0.243
	390	22x30	1.15	0.51			30x35	2.10	0.243
		25x25	1.15	0.51			35x30	2.16	0.243
	470	22x35	1.30	0.423		1000	30x45	2.32	0.199
		25x30	1.30	0.423			35x35	2.30	0.199
	560	22x40	1.57	0.355			1200	30x50	2.75
		25x30	1.50	0.355		35x40		2.75	0.166
		30x25	1.54	0.355		1500	35x45	2.90	0.133
	680	22x45	1.75	0.293			250 (300)	150	22x25
		25x35	1.70	0.293	180	22x30		0.85	1.110
		30x30	1.77	0.293	220	22x30		1.00	0.905
	820	22x50	2.03	0.243		25x25		1.00	0.905
		25x40	1.97	0.243		270		22x35	1.22
		30x30	1.95	0.243	22x25			1.15	0.737
	1000	35x25	1.99	0.243	330	22x40		1.36	0.603
		25x45	2.15	0.199		25x30		1.30	0.603
		1200	30x35	2.15	0.199	390		22x45	1.54
	35x30		2.21	0.199	25x35			1.48	0.510
	1500		30x40	2.45	0.166		30x25	1.45	0.510
35x35		2.52	0.166	35x25	1.59	0.510			
1800	30x50	2.75	0.133	470	22x50	1.78	0.423		
	35x40	2.75	0.133		25x40	1.75	0.423		
	2200	35x45	3.00		0.111	30x30	1.72	0.423	
270		22x25	0.85		0.737	35x30	1.88	0.423	
		330	22x30		1.10	0.603	25x40	1.80	0.355
	390	22x35	1.32		0.51	560	30x35	1.89	0.3550
25x25		1.25	0.51		35x30		1.94	0.3550	
22x40		1.47	0.423		25x50		2.10	0.2930	
470	25x30	1.40	0.423		680	30x40	2.10	0.293	
	22x45	1.70	0.355			35x35	2.18	0.293	
	25x35	1.63	0.355	820		30x45	2.30	0.243	
560	30x25	1.60	0.355		35x40	2.39	0.243		
	22x50	1.87	0.293		1000	30x50	2.55	0.199	
	25x40	1.82	0.293	35x45		2.65	0.199		
30x30	1.80	0.293	35x50	2.90		0.166			
680	35x25	1.84	0.293	315(365)	82	22x25	0.55	2.426	
	25x45	2.05	0.243		100	22x30	0.65	1.989	
	30x35	2.05	0.243		120	22x30	0.75	1.658	
820	35x30	2.11	0.243			25x25	0.75	1.658	
	25x50	2.27	0.199		150	22x35	0.80	1.326	
	30x40	2.29	0.199			25x30	0.80	1.326	
1000	35x30	2.25	0.199		180	22x40	1.01	1.105	
	30x45	2.57	0.166			25x35	1.02	1.105	
	35x35	2.55	0.166			30x25	1.00	1.105	
1200	1500	35x40	2.85		0.133	220	22x45	1.10	0.905
	1800	35x50	3.10	0.111	25x40		1.12	0.905	
		220	22x25	0.85	0.905		30x30	1.10	0.905
270			22x30	1.00	0.737	270	25x45	1.25	1.737
330	22x30		1.15	0.603	30x35		1.25	0.737	
	25x25	1.15	0.603	330	25x50		1.53	0.603	
390	22x35	1.30	0.510		30x40	1.53	0.603		
	25x30	1.30	0.510		35x30	1.50	0.603		
470	22x40	1.52	0.423	390	30x45	1.71	0.510		
	25x35	1.54	0.423		35x30	1.50	0.603		
	30x25	1.49	0.423	470	30x50	1.60	0.510		
560	22x45	1.70	0.355		35x50	1.85	0.423		
	25x30	1.65	0.355		35x35	1.75	0.423		
	30x30	1.72	0.355	560	35x40	2.00	0.355		
680	25x45	1.97	0.293		680	35x45	2.20	0.293	
	30x35	1.97	0.293	350(400)	82	22x25	0.60	2.426	
	220	22x25	0.85		0.905	100	22x30	0.70	1.989
270		22x30	1.00		0.737	25x25	0.70	1.989	

LQ Long Life Series

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (A/rms105°C) (120Hz)	ESR (Ω ,20°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	Ripple current (A/rms105°C) (120Hz)	ESR (Ω ,20°C) (120Hz)	
350(400)	120	25x35	0.80	1.658	400(450)	330	30x45	1.51	0.603	
		25x30	0.80	1.658			35x35	1.50	0.603	
	150	22x40	0.86	1.326		390	30x50	1.70	0.510	
		25x35	0.87	1.326			35x40	1.70	0.510	
		30x25	0.85	1.326			470	35x45	1.90	0.423
	180	22x45	1.05	1.105		450(500)	56	22x25	0.55	5.921
		25x40	1.07	1.105	68		22x30	0.65	4.876	
		30x30	1.05	1.105	82		22x35	0.80	4.044	
		220	22x50	1.16			0.905	25x25	0.75	4.044
	25x45		1.20	0.905	100		22x40	0.89	3.316	
	30x35		1.18	0.905			25x30	0.85	3.316	
	270	30x25	1.15	0.905	120		22x45	0.95	2.763	
		25x50	1.31	0.737			25x35	0.92	2.763	
		30x40	1.33	0.737			30x25	0.90	2.763	
	330	35x30	1.30	0.737	150		22x50	1.14	2.210	
		30x45	1.46	0.603			25x40	1.11	2.210	
	390	35x35	1.45	0.603			30x30	1.10	2.210	
		30x50	1.65	0.510	180	25x45	1.25	1.842		
	35x40	1.65	0.510	30x35		1.25	1.842			
	470	35x45	1.85	0.423		35x25	1.20	1.842		
560	35x50	2.10	0.355	220	25x50	1.36	1.507			
400(450)	68	22x25	0.55		2.926	30x40	1.38	1.507		
	82	22x30	0.65		2.426	35x30	1.35	1.507		
		25x25	0.65		2.426	270	30x45	1.51	1.228	
	100	22x35	0.79		1.989		35x35	1.50	1.228	
		25x25	0.50		1.989	330	30x50	1.70	1.005	
	120	22x40	0.89	1.658	35x40		1.70	1.005		
		25x30	0.85	1.658	390	35x45	1.90	0.850		
	30x25	0.87	1.658	470		35x50	2.10	0.705		
	150	22x45	0.93	1.326	500(500)	100	30x25	0.82	3.316	
		25x35	0.90	1.326		120	30x30	0.91	2.763	
		30x30	0.94	1.326			35x25	0.88	2.763	
		35x25	0.96	1.326		150	30x35	1.04	2.210	
		180	22x50	1.14			1.105	180	30x40	1.17
			25x40	1.11		1.105	220	35x30	1.10	1.842
	30x30		1.10	1.105		30x45		1.33	1.507	
	220	35x25	1.12	1.105		35x35	1.23	1.507		
		25x45	1.20	0.905		270	30x50	1.50	1.228	
		35x35	1.20	0.905			35x40	1.42	1.228	
	270	35x30	1.24	0.905		330	35x45	1.60	1.005	
		25x50	1.36	0.737			390	35x50	1.78	0.850
30x40		1.38	0.737	470	35x60		2.03	0.705		
35x30	1.35	0.737								

LK Long Life Series

- Endurance: 105°C 7000hours
- Recommended Applications: Smoothing circuit, TV/Monitor,Adapter, SMPS
- Corresponding product to RoHS

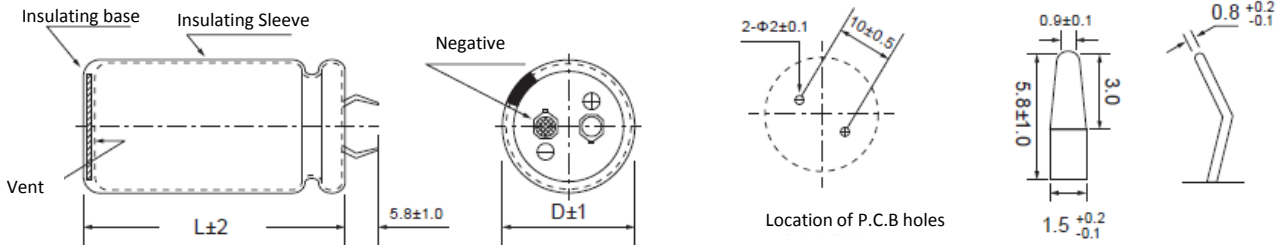
LK
 ↑ Long Life
LQ



■ SPECIFICATIONS

Item	Characteristics	
Category Temperature Range	-25 ~ +105°C	
Rated Voltage Range	160 ~ 450VDC	
Rated Capacitance Range	39 ~ 2200 µF	
Capacitance Tolerance	± 20 % (120Hz , 20°C)	
Leakage Current (20°C)	I = $3\sqrt{CV}$. (After rated voltage applied for 5 minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)	
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	160 180 200 250 315 350 400 450
	tan δ	0.15 0.15 0.15 0.15 0.20 0.20 0.20 0.20
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz	
	Rated voltage(V)	160~400 450
	Z-25°C / Z+20°C	4 8
	Z-40°C / Z+20°C	— —
Endurance	After applying rated voltage with rated Ripple current for 7000hrs at 105°C , the capacitor shall meet the following requirement.	
	Capacitance change	Within ± 20% of initial value
	D.F. (tan δ)	Not more than 200% of specified value
	Leakage current	Not more than the specified value
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitor shall meet the same requirements as Endurance.	

■ Dimensions [mm]



■ Multiplier for Ripple Current

Freq. (Hz)	60(50)	120	500	1K	≥ 10K
160~250WV	0.80	1.00	1.20	1.30	1.50
315~450WV	0.80	1.00	1.20	1.25	1.40

■ STANDARD RATINGS

Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ D x L (mm)	tan δ	Ripple current (A/rms105°C) (120Hz)	Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ D x L (mm)	tan δ	Ripple current (A/rms105°C) (120Hz)		
160(200)	270	22x25	0.15	1.10	200(250)	470	25x35	0.15	1.40		
	330	22x25	0.15	1.20			30x25	0.15	1.40		
	390	22x30	0.15	1.30		560	22x45	0.15	1.55		
		25x25	0.15	1.30			25x35	0.15	1.53		
	470	22x35	0.15	1.40			30x30	0.15	1.53		
		25x30	0.15	1.40		680	22x50	0.15	1.73		
	560	22x40	0.15	1.50			25x40	0.15	1.75		
		25x30	0.15	1.50			30x30	0.15	1.73		
		30x25	0.15	1.50		820	25x45	0.15	2.00		
	680	22x45	0.15	1.70			30x35	0.15	2.00		
		25x35	0.15	1.70			35x30	0.15	2.00		
		30x30	0.15	1.70		1000	30x40	0.15	2.20		
	820	22x250	0.15	2.00			35x35	0.15	2.30		
		25x40	0.15	2.00			1200	30x45	0.15	2.40	
		30x30	0.15	2.00		35x40		0.15	2.45		
	1000	25x45	0.15	2.20		250(300)	180	22x30	0.15	0.90	
		30x35	0.15	2.20				25x25	0.15	0.90	
		35x30	0.15	2.20				220	22x30	0.15	1.00
		1200	25x50	0.15			2.40		25x25	0.15	1.00
			30x40	0.15			2.42		270	22x35	0.15
1500			35x35	0.15	2.43		25x30	0.15		1.10	
	30x45	0.15	2.70	30x25	0.15		1.10				
	1800	35x35	0.15	2.70	330		22x40	0.15	1.20		
30x50		0.15	2.90	25x30			0.15	1.20			
2200	35x40	0.15	2.90	30x25			0.15	1.20			
	35x45	0.15	3.10	315(365)	390		22x45	0.15	1.30		
220	22x25	0.15	1.00				25x35	0.15	1.30		
	270	22x25	0.15				1.10	30x30	0.15	1.30	
330	22x30	0.15	1.20		470		22x50	0.15	1.40		
	25x25	0.15	1.20				25x40	0.15	1.40		
390	22x30	0.15	1.30			30x35	0.15	1.40			
	25x25	0.15	1.30		35x30	0.15	1.40				
470	22x35	0.15	1.40		560	25x45	0.15	1.60			
	25x30	0.15	1.40			30x35	0.15	1.60			
560	30x25	0.15	1.40			35x30	0.15	1.60			
	22x40	0.15	1.50		680	25x50	0.15	1.80			
25x35	0.15	1.50	30x40			0.15	1.83				
680	22x45	0.15	1.70			35x35	0.15	1.83			
	25x35	0.15	1.70		820	30x45	0.15	2.10			
	30x30	0.15	1.70			35x35	0.15	2.05			
820	25x40	0.15	2.00	1000		30x50	0.15	2.30			
	30x35	0.15	2.00		35x40	0.15	2.30				
	35x30	0.15	2.00		1200	35x45	0.15	2.40			
1000	25x50	0.15	2.20	82		22x25	0.20	0.64			
	30x35	0.15	2.20	100	22x30	0.20	0.69				
	35x30	0.15	2.20	120	22x30	0.20	0.75				
1200	30x40	0.15	2.40		25x25	0.20	0.75				
	1500	35x35	0.15	2.40	150	22x35	0.20	0.82			
30x50		0.15	2.70	25x30		0.20	0.82				
1800	35x40	0.15	2.70	30x25		0.20	0.82				
	35x45	0.15	2.90	180	22x40	0.20	0.90				
2200	35x50	0.150	3.10		25x30	0.20	0.90				
	200(250)	220	22x25		0.15	1.00	30x25	0.20	0.90		
270		22x30	0.15	1.10	220	22x45	0.20	1.05			
		25x25	0.15	1.10		25x35	0.20	1.05			
330		22x30	0.15	1.20		30x30	0.20	1.05			
		25x25	0.15	1.20	270	25x40	0.20	1.20			
390		22x35	0.15	1.30		30x35	0.20	1.20			
		25x30	0.15	1.30		35x30	0.20	1.20			
		30x25	0.15	1.30	330	25x50	0.20	1.35			
470		22x40	0.15	1.40		30x40	0.20	1.35			

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120Hz)		
315(365)	330	35x30	0.20	1.35	400(450)	120	30x25	0.20	0.75		
	390	30x40	0.20	1.50		150	22x45	0.20	0.82		
		35x35	0.20	1.50			25x35	0.20	0.82		
	470	30x45	0.20	1.60			30x30	0.20	0.82		
		35x40	0.20	1.60		180	22x50	0.20	0.93		
	560	35x45	0.20	1.70			25x40	0.20	0.93		
680		35x50	0.20	1.90			30x30	0.20	0.95		
350(400)	82	22x25	0.20	0.64			35x25	0.20	0.95		
	100	22x30	0.20	0.69		220	25x45	0.20	1.03		
		25x25	0.20	0.69			30x35	0.20	1.03		
	120	22x35	0.20	0.75		270	35x30	0.20	1.02		
		25x30	0.20	0.75			30x40	0.20	1.21		
	150	22x40	0.20	0.85	330	35x35	0.20	1.20			
		25x30	0.20	0.85		30x45	0.20	1.40			
		180	30x25	0.20	0.85	390	35x40	0.20	1.38		
			22x45	0.20	0.95		35x45	0.20	1.50		
	350(400)	180	25x35	0.20	0.95	470	35x50	0.20	1.60		
			30x30	0.20	0.95	450(500)	39	22x25	0.20	0.40	
		220	22x50	0.20	1.05		47	22x30	0.20	0.46	
			25x40	0.20	1.05		56	22x35	0.20	0.52	
		270	30x30	0.20	1.05			25x25	0.20	0.52	
			330	25x45	0.20		1.20	68	22x40	0.20	0.58
		30x35		0.20	1.21		25x30		0.20	0.58	
		35x30		0.20	1.21		82	22x45	0.20	0.65	
		390	30x40	0.20	1.35			25x35	0.20	0.65	
			35x35	0.20	1.35			30x25	0.20	0.65	
		400(450)	390	30x45	0.20		1.45	100	22x50	0.20	0.73
				35x35	0.20		1.45		25x40	0.20	0.73
	470		30x50	0.20	1.55		120	30x30	0.20	0.73	
			35x40	0.20	1.55	25x45		0.20	0.82		
	560	35x50	0.20	1.70	150	30x30	0.20	0.82			
400(450)	56	22x25	0.20	0.51		25x50	0.20	0.96			
	68	22x30	0.20	0.56	180	30x40	0.20	0.96			
		25x25	0.20	0.56		35x30	0.20	0.96			
	82	22x30	0.20	0.64	220	30x45	0.20	1.07			
		25x25	0.20	0.64		35x35	0.20	1.07			
	100	22x35	0.20	0.69	270	30x50	0.20	1.21			
25x30		0.20	0.69	35x40		0.20	1.21				
120	22x40	0.20	0.75	330	35x45	0.20	1.40				
	25x30	0.20	0.75	35x50	0.20	1.60					

LS

Downsized · Low profile Series

- Endurance: 105°C 2000 hours
- Recommended Applications : Applying to switching power supply and other industry/ commercial field
- Corresponding product to RoHS

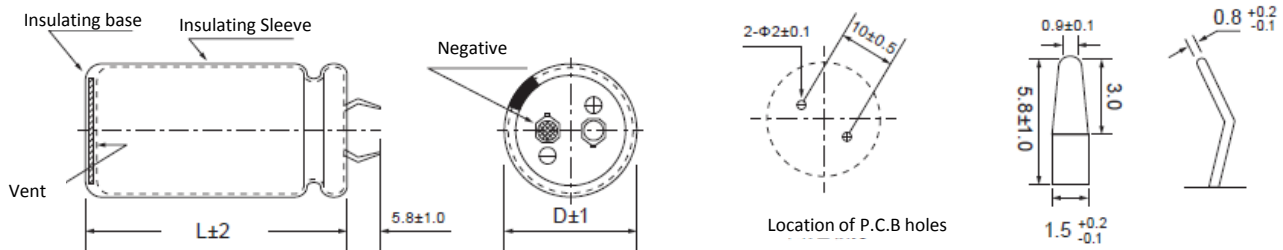
LS
↑ Smaller size
LG



■ SPECIFICATIONS

Item	Characteristics												
Category Temperature Range	-25 ~ +105°C												
Rated Voltage Range	160 ~ 450VDC												
Rated Capacitance Range	100 ~ 3300 µF												
Capacitance Tolerance	± 20 % (120Hz , 20°C)												
Leakage Current (20°C)	$I = 3\sqrt{CV}$. (After rated voltage applied for 5 minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)												
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	<table border="1"> <tr> <td>WV</td> <td>160</td> <td>200</td> <td>220~400</td> <td>420</td> <td>450</td> </tr> <tr> <td>tan δ</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.20</td> <td>0.20</td> </tr> </table>	WV	160	200	220~400	420	450	tan δ	0.15	0.15	0.15	0.20	0.20
WV	160	200	220~400	420	450								
tan δ	0.15	0.15	0.15	0.20	0.20								
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz <table border="1"> <tr> <td>WV</td> <td>160</td> <td>200</td> <td>220~400</td> <td>420</td> <td>450</td> </tr> <tr> <td>Z-25°C / Z+20°C</td> <td>4</td> <td>4</td> <td>4</td> <td>8</td> <td>8</td> </tr> </table>	WV	160	200	220~400	420	450	Z-25°C / Z+20°C	4	4	4	8	8
WV	160	200	220~400	420	450								
Z-25°C / Z+20°C	4	4	4	8	8								
Endurance	After applying rated voltage with rated Ripple current for 2000hrs at 105°C ,the capacitor shall meet the following requirements. <table border="1"> <tr> <td>Capacitance change</td> <td>Within ± 20% of initial value</td> </tr> <tr> <td>D.F. (tan δ)</td> <td>Not more than 200% of specified value</td> </tr> <tr> <td>Leakage current</td> <td>initial specified value or less</td> </tr> </table>	Capacitance change	Within ± 20% of initial value	D.F. (tan δ)	Not more than 200% of specified value	Leakage current	initial specified value or less						
Capacitance change	Within ± 20% of initial value												
D.F. (tan δ)	Not more than 200% of specified value												
Leakage current	initial specified value or less												
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitor shall meet the same requirement as Endurance.												

■ Dimensions [mm]



■ Multiplier for Ripple Current

Freq. (Hz)	50	60	120	1K	10K~100K
160~250V	0.85	0.88	1.00	1.30	1.50
315~450V	0.88	0.9	1.00	1.35	1.45

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	tan δ	Ripple current (A/rms105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	tan δ	Ripple current (A/rms105°C) (120Hz)
160 (200)	560	22x30	0.15	1.40	250 (300)	470	22x35	0.15	1.17
	680	22x35	0.15	1.50			25x30	0.15	1.30
		25x30	0.15	1.70		560	22x40	0.15	1.40
	820	22x40	0.15	2.00			25x35	0.15	1.50
		25x35	0.15	2.00			30x25	0.15	1.26
	1000	22x50	0.15	2.10		680	22x45	0.15	1.35
		25x40	0.15	2.20			25x40	0.15	1.70
		30x30	0.15	2.20		820	30x30	0.15	1.70
	1200	25x45	0.15	2.30			25x45	0.15	2.00
		30x35	0.15	2.30			30x35	0.15	2.00
	1500	25x50	0.15	2.50		1000	35x30	0.15	2.00
		30x40	0.15	2.50			25x50	0.15	2.20
		35x30	0.15	2.50		1200	30x40	0.15	2.20
	1800	30x45	0.15	2.70			35x30	0.15	2.00
35x35		0.15	2.55	1500	30x45	0.15	2.30		
2200	30x50	0.15	2.90		35x35	0.15	2.20		
	35x45	0.15	2.90	1800	35x40	0.15	2.30		
2700	35x50	0.15	3.00		35x50	0.15	2.50		
	3300	35x60	0.15	3.10	400 (450)	120	22x25	0.15	0.61
200 (250)	470	22x30	0.15	1.20		180	22x30	0.15	0.68
	560	22x35	0.15	1.48		25x25	0.15	0.66	
		25x30	0.15	1.48		220	22x35	0.15	0.80
	680	22x40	0.15	1.60			25x30	0.15	0.77
		25x35	0.15	1.60		270	22x40	0.15	0.95
	820	22x45	0.15	1.75			25x35	0.15	1.00
		25x40	0.15	1.75			30x25	0.15	0.93
		30x30	0.15	1.75		330	22x50	0.15	1.04
	1000	25x45	0.15	2.04			25x40	0.15	1.04
		30x35	0.15	2.04			30x30	0.15	1.08
	1200	25x50	0.15	2.30		390	35x25	0.15	1.04
		30x40	0.15	2.30			25x45	0.15	1.26
		35x30	0.15	2.30			30x35	0.15	1.26
	1500	30x45	0.15	2.57	470	35x30	0.15	1.55	
35x35		0.15	2.57	30x40		0.15	1.40		
1800		30x50	0.15	2.41	35x30	0.15	1.46		
	35x40	0.15	2.68	560	30x45	0.15	1.56		
2200	35x45	0.15	2.63		35x35	0.15	1.54		
	2700	35x55	0.15	3.27	680	30x50	0.15	1.72	
220 (270)	330	22x25	0.15	1.26		35x40	0.15	1.70	
	390	22x30	0.15	1.34	420(470)	820	35x45	0.15	1.91
		22x35	0.15	1.48		120	22x25	0.20	0.46
	470	25x30	0.15	1.40		150	22x30	0.20	0.54
		22x40	0.15	1.45			25x25	0.20	0.65
	560	25x30	0.15	1.45		180	22x35	0.20	0.64
		22x40	0.15	1.49			25x30	0.20	0.64
	680	25x35	0.15	1.78		220	22x40	0.20	0.80
		30x30	0.15	1.65			25x35	0.20	0.80
		22x50	0.15	1.93			30x25	0.20	0.80
	820	25x40	0.15	1.93		270	22x50	0.20	1.00
		30x30	0.15	1.85			25x40	0.20	1.00
		35x25	0.15	1.93			30x30	0.20	1.00
	1000	25x45	0.15	2.15		330	25x45	0.20	1.10
30x35		0.15	2.33	30x35			0.20	1.10	
35x30		0.15	2.33	35x30	0.20		1.10		
1200	30x40	0.15	2.50	390	25x50	0.20	1.20		
	35x30	0.15	2.12		30x40	0.20	1.20		
1500	30x45	0.15	2.30	470	35x30	0.20	1.20		
	35x35	0.15	2.25		30x45	0.20	1.30		
1800	35x40	0.15	2.43	560	35x35	0.20	1.30		
2200	35x50	0.15	2.95		30x50	0.20	1.60		
	250 (300)	390	22x30	0.15	1.08	35x40	0.20	1.60	
		25x25	0.15	1.08	680	35x45	0.20	2.00	

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	tan δ	Ripple current (A/rms105°C) (120Hz)
420(470)	820	35x50	0.20	2.30
450 (500)	100	22x25	0.20	0.50
	120	22x30	0.20	0.60
	150	22x35	0.20	0.72
		25x25	0.20	0.73
	180	22x40	0.20	0.79
		25x30	0.20	0.71
	220	22x45	0.20	0.87
		25x35	0.20	0.78
		30x25	0.20	0.83
	270	22x50	0.20	0.95
		25x40	0.20	0.90

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ D \times L(mm)	tan δ	Ripple current (A/rms105°C) (120Hz)
450 (500)	270	30x35	0.20	1.05
		35x25	0.20	0.95
	330	25x50	0.20	1.20
		30x35	0.20	1.14
		35x30	0.20	1.20
	390	30x40	0.20	1.31
		35x35	0.20	1.38
	470	30x45	0.20	1.48
		35x35	0.20	1.47
	560	35x40	0.20	1.62
	680	35x50	0.20	1.91

LM Downsized · Low profile · Long Life Series

- Endurance: 105°C 3000hours
- Recommended Applications : Smoothing circuit, TV/Monitor,Adapter, SMPS
- Corresponding product to RoHS

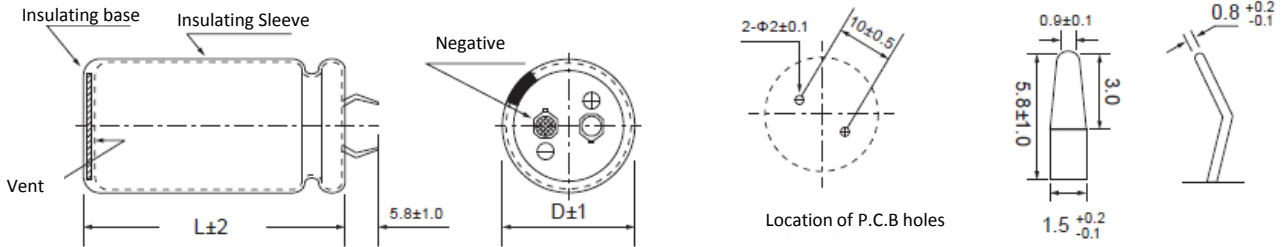
LM
 ↑ Smaller size
 LJ



■ SPECIFICATIONS

Item	Characteristics			
Category Temperature Range	-25 ~ +105°C			
Rated Voltage Range	400 ~ 450VDC			
Rated Capacitance Range	82 ~ 1000 μF			
Capacitance Tolerance	± 20 % (120Hz , 20°C)			
Leakage Current (20°C)	I = 3√CV. (After rated voltage applied for 5 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)			
Dissipation Factor(MAX) (tan δ) (120Hz ,20°C)	WV	400	420	450
	tan δ	0.15	0.20	0.20
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz			
	Rated voltage(V)	400	420	450
	Z-25°C / Z+20°C	4	8	8
	Z-40°C / Z+20°C	—	—	—
Endurance	After applying rated voltage with rated Ripple current for 3000hrs at 105°C , the capacitor shall meet the following requirement.			
	Capacitance change	Within ± 20% of initial value		
	D.F. (tan δ)	Not more than 200% of specified value		
	Leakage current	Not more than the specified value		
Shelf Life	After placed at 105°C without voltage applied for 1000 hours,the capacitor shall meet the same requirements as Endurance.			

■ Dimensions [mm]



■ Multiplier for Ripple Current

Freq. (Hz)	50	120	300	1K	10K	50K
400~450V	0.77	1.00	1.16	1.30	1.41	1.43

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120Hz)
400 (450)	120	22x25	0.15	0.77	420(470)	330	35x30	0.20	1.55
	150	22x30	0.15	0.9		390	30x45	0.20	1.70
	180	22x35	0.15	1.02			35x35	0.20	1.71
		25x25	0.15	0.99		470	30x50	0.20	1.90
	220	22x40	0.15	1.15			35x40	0.20	1.95
		25x30	0.15	1.13		560	35x45	0.20	2.17
	270	22x45	0.15	1.29		680	35x50	0.20	2.45
		25x35	0.15	1.30	450 (500)	82	22x25	0.20	0.64
	330	30x25	0.15	1.29		120	22x30	0.20	0.81
		22x50	0.15	1.47			22x35	0.20	0.83
		25x40	0.15	1.47			25x25	0.20	0.81
	390	30x30	0.15	1.45		150	22x40	0.20	0.94
		35x25	0.15	1.52			25x30	0.20	0.93
		25x45	0.15	1.63		180	22x45	0.20	1.06
	25x50	0.15	1.66	25x35			0.20	1.06	
	30x35	0.15	1.61	30x25			0.20	1.06	
	470	30x40	0.15	1.82		220	22x50	0.20	1.20
		35x30	0.15	1.85			25x40	0.20	1.20
	560	30x45	0.15	2.04			30x30	0.20	1.18
		30x50	0.15	2.07		35x25	0.20	1.24	
35x35		0.15	2.05	270		25x45	0.20	1.36	
680	35x40	0.15	2.34			25x50	0.20	1.38	
	35x45	0.15	2.40		30x35	0.20	1.34		
820	35x50	0.15	2.69		35x30	0.20	1.40		
1000	35x60	0.15	2.75	330	30x40	0.20	1.52		
420(470)	220	22x45	0.20	1.17	390	30x45	0.20	1.70	
		22x50	0.20	1.20		30x50	0.20	1.73	
		25x35	0.20	1.18		35x35	0.20	1.71	
		30x30	0.20	1.18	470	35x40	0.20	1.95	
	25x40	0.20	1.33	35x45		0.20	1.99		
	270	25x45	0.20	1.36	560	35x50	0.20	2.22	
		35x25	0.20	1.38	680	35x55	0.20	2.30	
		25x50	0.20	1.52	820	35x60	0.20	2.42	
	330	30x35	0.20	1.48	1000	35x65	0.20	2.77	
		30x40	0.20	1.52					

KP

Standard Series

- Endurance: 85°C 2000hours
- Recommended Applications : UPS 、 service system 、 press working equipment 、 charging equipment 、 inverter 、 converter
- Corresponding product to RoHS



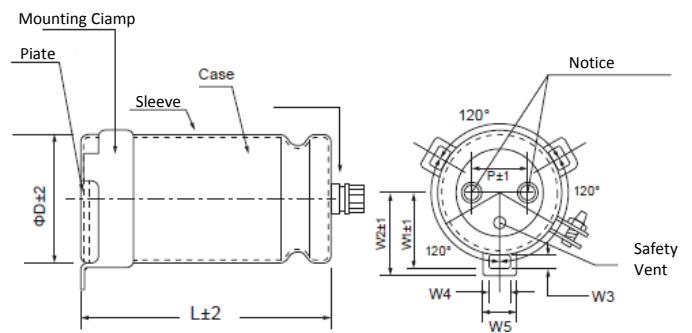
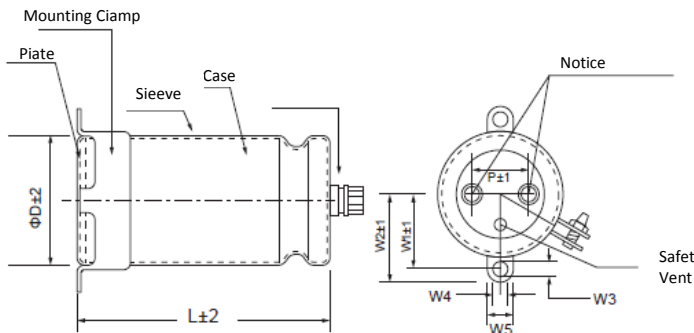
SPECIFICATIONS

Item	Characteristics												
Category Temperature Range	-40 ~ +85°C	-25 ~ +85°C											
Rated Voltage Range	6.3~ 100VDC	160~450VDC											
Capacitance Tolerance	± 20 % (120Hz , 20°C)												
Leakage Current (20°C)	I ≤ 0.02CV or 5mA whichever is greater. (After rated voltage applied for 5 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)												
Dissipation Factor(MAX) (tan δ) (120Hz , 20°C)	WV	6.3~10	16	25	35	50	63	80	100	160~250	350~450		
	tan δ	φ 35	0.75	0.60	0.40	0.30	0.25	0.20	0.20	0.15	0.15	0.20	
		φ 51	1.00	0.70	0.50	0.50	0.30	0.25	0.20	0.20	0.15	0.20	
		φ 64	1.30	0.80	0.70	0.60	0.50	0.30	0.25	0.25	0.20	0.25	
		φ 77	1.50	1.00	0.80	0.70	0.60	0.40	0.30	0.25	0.20	0.25	
φ 90	1.50	1.00	0.80	0.70	0.60	0.40	0.30	0.25	0.20	0.25			
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz												
	Rated voltage(V)	10~100	160~450										
	Z-25°C / Z+20°C	-	8										
	Z-40°C / Z+20°C	12	-										
Endurance	After applying rated voltage with ripple current for 2000 hours at 85°C, the capacitors shall meet the following requirements.												
	Capacitance change	Within ± 15% of initial value											
	D.F. (tan δ)	Not more than 175% of specified value											
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, the capacitor shall meet the same requirements as Endurance.												
	Leakage current	Not more than the specified value											

Dimensions [mm]

Fixed with two hoies

Fixed with three hoies



φ D	W1	W2	W3	W4	W5	P
35	24.0	30.0	7.0	3.5	10.0	12.7
51	32.5	37.5	4.5	7.0	13.0	21.8
64	38.5	42.8	4.5	7.0	13.0	28.2
77	44.8	49.0	4.5	7.0	13.0	31.4
90	50.8	56.0	4.5	8.0	16.0	31.4

Multiplier for Ripple Current

Freq. (Hz)	60	120	1K	10K	100K
W.V	coefficient				
6.3~35V	0.90	1.00	1.05	1.10	1.10
50~100V	0.90	1.00	1.10	1.15	1.15
160~450V	0.80	1.00	1.20	1.40	1.40

Temperature	≤60	70	85
coefficient	1.8	1.6	1.00

■ STANDARD RATINGS

Rated Voltage (Surge Voltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	R.C (A/rms,85°C) (120Hz)	Rated Voltage (Surge Voltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	R.C (A/rms,85°C) (120Hz)
6.3 (8)	47000	35x50	0.75	4.94	35(44)	10000	35x50	0.30	3.53
	56000	35x60	0.75	4.96		12000	35x50	0.30	3.87
	68000	35x60	0.75	5.47		15000	35x60	0.30	3.96
	82000	35x80	0.75	6.82		18000	35x60	0.30	4.34
	100000	35x80	0.75	7.53		22000	35x80	0.30	4.93
	120000	35x121	0.75	9.15		27000	35x80	0.30	5.46
	150000	51x80	1.00	9.51		33000	35x121	0.30	7.20
	180000	51x80	1.00	10.42		39000	35x121	0.30	7.83
	220000	51x100	1.00	12.39		47000	51x80	0.50	8.26
	270000	64x100	1.30	13.68		56000	51x80	0.50	9.02
	330000	64x100	1.30	15.12		68000	51x100	0.50	10.35
	390000	64x121	1.30	16.97		82000	51x100	0.50	11.36
	470000	64x121	1.30	18.63		100000	64x100	0.60	11.48
	560000	77x121	1.50	18.80		120000	64x121	0.60	13.13
680000	77x121	1.50	20.71	150000	64x144	0.60	15.42		
10 (13)	33000	35x50	0.75	4.14	180000	64x144	0.60	16.89	
	39000	35x50	0.75	4.50	220000	77x144	0.70	17.79	
	47000	35x60	0.75	5.35	50(63)	6800	35x50	0.25	3.26
	56000	35x80	0.75	6.63		8200	35x50	0.25	3.58
	68000	35x80	0.75	7.31		10000	35x60	0.25	4.27
	82000	35x80	0.75	8.02		12000	35x60	0.25	4.68
	100000	35x121	0.75	9.21		15000	35x80	0.25	5.94
	120000	51x80	1.00	9.23		18000	35x80	0.25	6.51
	150000	51x80	1.00	10.32		22000	35x121	0.25	6.70
	180000	51x90	1.00	11.50		27000	35x121	0.25	7.42
	220000	51x121	1.00	13.66		33000	51x80	0.30	7.55
	270000	51x121	1.00	15.13		39000	51x80	0.30	8.20
	330000	64x121	1.30	17.25		47000	51x100	0.30	9.80
	390000	64x121	1.30	18.75		56000	51x100	0.30	10.70
470000	77x121	1.50	19.25	68000		64x100	0.50	11.34	
560000	77x121	1.50	21.01	82000		64x100	0.50	12.46	
16 (20)	22000	35x50	0.60	4.16	100000	64x144	0.50	12.81	
	33000	35x60	0.60	5.51	120000	64x144	0.50	14.03	
	39000	35x80	0.60	6.80	150000	77x144	0.60	15.86	
	47000	35x80	0.60	7.47	63 (79)	5600	35x50	0.20	2.97
	56000	35x100	0.60	9.03		6800	35x50	0.20	3.28
	68000	35x121	0.60	9.88		8200	35x60	0.20	3.89
	82000	35x121	0.60	10.85		10000	35x80	0.20	4.77
	100000	51x80	0.70	10.86		12000	35x80	0.20	5.23
	120000	51x90	0.70	11.74		15000	35x100	0.20	5.88
	150000	51x121	0.70	12.48		18000	35x121	0.20	6.16
	180000	51x121	0.70	13.67		22000	51x80	0.25	7.73
	220000	64x100	0.80	14.75		27000	51x80	0.25	8.56
	270000	64x115	0.80	17.37		33000	51x100	0.25	8.76
	330000	77x121	1.00	18.19		39000	51x121	0.25	10.22
390000	77x121	1.00	19.78	47000		64x100	0.30	11.88	
25(32)	18000	35x50	0.40	3.35		56000	64x100	0.30	12.96
	22000	35x60	0.40	4.01		68000	64x144	0.30	13.63
	27000	35x80	0.40	5.04	100000	77x144	0.40	15.86	
	33000	35x80	0.40	5.58	80 (100)	4700	35x50	0.20	2.72
	39000	35x80	0.40	6.06		5600	35x60	0.20	3.22
	47000	35x121	0.40	7.54		6800	35x80	0.20	4.03
	56000	35x121	0.40	8.23		8200	35x80	0.20	4.42
	68000	51x100	0.50	9.13		10000	35x100	0.20	5.41
	82000	51x100	0.50	10.03		12000	35x121	0.20	6.47
	100000	51x121	0.50	11.27		15000	51x80	0.20	7.63
	120000	51x121	0.50	12.33		18000	51x80	0.20	8.35
	150000	64x100	0.70	12.69		22000	51x100	0.20	8.76
	180000	64x100	0.70	13.89		27000	51x100	0.20	9.70
	220000	64x144	0.70	16.05		33000	64x100	0.25	10.22
270000	77x115	0.80	17.80	39000		64x100	0.25	11.11	
330000	77x144	0.80	20.38	47000		64x144	0.25	14.33	

■ STANDARD RATINGS

Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	R.C (A/rms,85°C) (120Hz)	Rated Voltage (Surge Voltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	R.C (A/rms,85°C) (120Hz)
80 (100)	56000	64x144	0.25	15.64	250 (300)	820	35x60	0.15	2.37
	68000	77x144	0.30	16.27		1000	35x80	0.15	2.87
100 (125)	2200	35x50	0.15	2.15		1200	35x80	0.15	3.15
	2700	35x50	0.15	2.38		1500	35x100	0.15	3.49
	3300	35x50	0.15	2.64		1800	35x100	0.15	3.83
	3900	35x60	0.15	3.10		2200	51x70	0.15	4.28
	4700	35x80	0.15	3.87		2700	51x70	0.15	4.74
	5600	35x80	0.15	4.22		3300	51x90	0.15	5.38
	6800	35x100	0.15	5.15		3900	51x115	0.15	6.23
	8200	35x121	0.15	5.83		4700	64x96	0.20	7.06
	10000	51x80	0.20	6.03		5600	64x96	0.20	7.71
	12000	51x80	0.20	6.60		6800	64x115	0.20	9.19
	15000	51x121	0.20	8.86		8200	64x115	0.20	10.09
	18000	51x121	0.20	9.71		10000	64x130	0.20	11.76
	22000	64x100	0.25	9.79		12000	77x115	0.20	13.01
	27000	64x100	0.25	10.85		15000	77x130	0.20	14.70
33000	64x144	0.25	12.80	18000		77x155	0.20	17.40	
39000	77x115	0.25	13.11	22000		90x157	0.20	20.19	
47000	77x144	0.25	14.81	350 (400)	390	35x50	0.20	1.74	
160 (200)	1200	35x50	0.15		2.64	470	35x80	0.20	2.35
	1500	35x60	0.15		3.20	560	35x80	0.20	2.57
	1800	35x70	0.15		3.63	680	35x80	0.20	2.83
	2200	35x80	0.15		4.26	820	35x100	0.20	3.18
	2700	35x100	0.15		4.68	1000	35x100	0.20	3.51
	3300	35x121	0.15		5.22	1200	51x70	0.20	3.94
	3900	51x70	0.15		5.70	1500	51x70	0.20	4.41
	4700	51x70	0.15		6.26	1800	51x90	0.20	5.38
	5600	51x90	0.15		7.00	2200	51x90	0.20	5.95
	6800	51x90	0.15		7.72	2700	51x130	0.20	6.91
	8200	51x115	0.15		9.04	3300	51x130	0.20	7.63
	10000	64x96	0.20		10.30	3900	64x115	0.25	8.71
	12000	64x96	0.20		11.29	4700	64x130	0.25	9.81
	15000	64x130	0.20		13.83	5600	77x115	0.25	11.26
	18000	64x130	0.20		15.15	6800	77x130	0.25	13.08
	22000	77x130	0.20		18.57	8200	77x155	0.25	15.53
	27000	77x130	0.20		20.58	10000	90x157	0.25	17.71
	33000	90x131	0.20	23.90	12000	90x157	0.25	19.40	
39000	90x157	0.20	28.10	15000	90x196	0.25	23.93		
200 (250)	680	35x50	0.15	1.99	18000	90x236	0.25	28.51	
	820	35x50	0.15	2.19	400 (450)	330	35x80	0.20	1.97
	1000	35x60	0.15	2.62		390	35x80	0.20	2.14
	1200	35x60	0.15	2.87		470	35x80	0.20	2.35
	1500	35x80	0.15	3.52		560	35x80	0.20	2.57
	1800	35x80	0.15	3.85		680	35x100	0.20	2.90
	2200	35x100	0.15	4.23		820	35x100	0.20	3.18
	2700	35x121	0.15	4.72		1000	51x70	0.20	3.60
	3300	51x70	0.15	5.24		1200	51x70	0.20	3.94
	3900	51x70	0.15	5.70		1500	51x90	0.20	4.91
	4700	51x90	0.15	6.42		1800	51x90	0.20	5.38
	5600	51x115	0.15	7.47		2200	51x130	0.20	6.23
	6800	51x130	0.15	8.70		2700	64x96	0.25	7.09
	8200	64x96	0.20	9.33		3300	64x115	0.25	8.01
	10000	64x96	0.20	10.30		3900	64x130	0.25	8.94
	12000	77x96	0.20	12.56		4700	77x115	0.25	10.32
	15000	77x96	0.20	14.04		5600	77x130	0.25	11.87
	18000	77x130	0.20	16.80		6800	77x155	0.25	14.14
22000	77x155	0.20	20.07	8200		90x157	0.25	16.03	
27000	90x131	0.20	21.62	10000	90x157	0.25	17.71		
33000	90x157	0.20	25.85	12000	90x196	0.25	21.40		
250 (300)	470	35x50	0.15	1.66	15000	90x236	0.25	26.02	
	560	35x50	0.15	1.81	450 (500)	270	35x50	0.20	1.45
	680	35x50	0.15	1.99		330	35x80	0.20	1.97

KP

Standard Series

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	R.C (A/rms,85°C) (120Hz)
450 (500)	390	35x80	0.20	2.14
	470	35x80	0.20	2.35
	560	35x100	0.20	2.63
	680	35x100	0.20	2.90
	820	51x70	0.20	3.26
	1000	51x70	0.20	3.60
	1200	51x90	0.20	4.39
	1500	51x115	0.20	5.17
	1800	51x130	0.20	5.64
	2200	64x96	0.25	6.40

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	R.C (A/rms,85°C) (120Hz)
450 (500)	2700	64x115	0.25	7.25
	3300	64x130	0.25	8.22
	3900	77x115	0.25	9.40
	4700	77x130	0.25	10.88
	5600	77x155	0.25	12.83
	6800	90x157	0.25	14.60
	8200	90x157	0.25	16.03
	10000	90x196	0.25	19.53
	12000	90x236	0.25	23.28



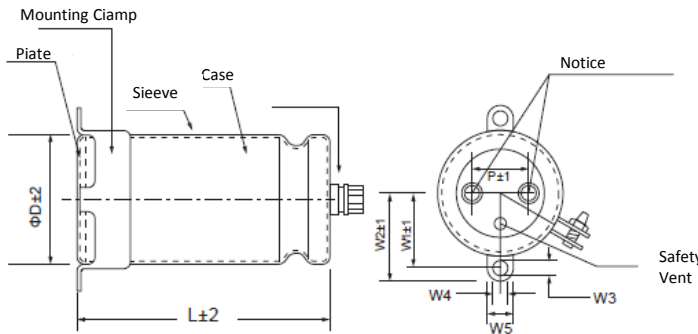
- Endurance: 85°C 2000hours
- Recommended Applications : UPS · service system · press working equipment · charging equipment · inverter · converter
- Corresponding product to RoHS

■ SPECIFICATIONS

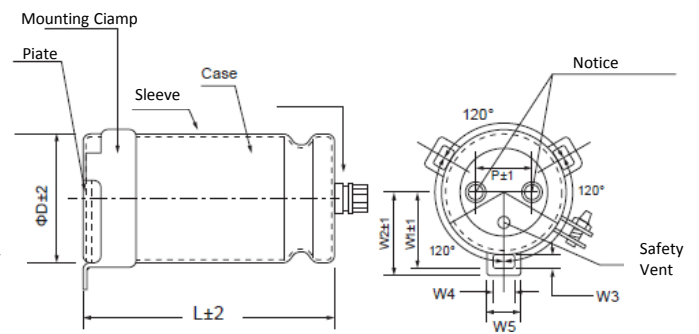
Item	Characteristics					
Category Temperature Range	-25 ~ +85°C					
Rated Voltage Range	160 ~ 550VDC					
Capacitance Tolerance	± 20 % (120Hz , 20°C)					
Leakage Current (20°C)	I ≤ 0.02CV or 5mA whichever is greater. (After rated voltage applied for 5 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)					
Dissipation Factor(MAX) (tan δ) (120Hz , 20°C)	WV	160	200	250	350~450	500~550
	tan δ	0.15	0.15	0.15	0.15	0.20
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz					
	Rated voltage(V)	160~550				
	Z-25°C / Z+20°C	8				
Endurance	After applying rated voltage with ripple current for 2000 hours at 85°C , the capacitors shall meet the following requirements.					
	Capacitance change	Within ± 20% of initial value				
	D.F. (tan δ)	Not more than 200% of specified value				
	Leakage current	Not more than the specified value				
Shelf Life	After placed at 85°C without voltage applied for 1000 hours, the capacitor shall meet the same requirements as Endurance.					

■ Dimensions [mm]

Fixed with two hoies



Fixed with three holes



φ	W1	W2	W3	W4	W5	P
51	32.5	37.5	4.5	7.0	13.0	22.2
64	38.5	42.8	4.5	7.0	13.0	28.5
77	44.8	49.0	4.5	7.0	13.0	31.8
90	52.3	58.8	5.0	8.0	16.0	31.6

■ Multiplier for Ripple Current

Freq. (Hz)	60	120	300	1K	≥ 10K
coefficient	0.70	1.00	1.10	1.30	1.40

Temperature	40	60	85
coefficient	1.89	1.67	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (A/rms 85°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μF)	Case size Φ DxL(mm)	tan δ	Ripple current (A/rms 85°C) (120Hz)
160 (200)	3900	51x75	0.15	7.51	400 (450)	18000	90x236	0.15	40.25
	4700	51x75	0.15	8.25		1000	51x75	0.15	4.76
	5600	51x96	0.15	10.02		1200	51x80	0.15	5.36
	6800	51x96	0.15	11.04		1500	51x96	0.15	6.48
	8200	51x115	0.15	13.15		1800	51x96	0.15	7.10
	10000	64x96	0.15	14.27		2200	51x130	0.15	9.00
	12000	64x96	0.15	15.64		2700	64x96	0.15	9.64
	15000	64x130	0.15	19.96		3300	64x115	0.15	11.53
	18000	64x130	0.15	21.87		3900	64x130	0.15	13.23
	22000	77x130	0.15	25.91		4700	77x96	0.15	11.90
	27000	77x130	0.15	28.71		5600	77x115	0.15	14.10
	33000	90x131	0.15	33.60		6800	77x130	0.15	16.23
39000	90x157	0.15	39.50	8200	77x155	0.15	19.32		
200 (250)	3300	51x75	0.15	6.91	8200	90x157	0.15	22.64	
	3900	51x75	0.15	7.51	10000	90x157	0.15	25.00	
	4700	51x96	0.15	9.18	12000	90x196	0.15	30.22	
	5600	51x115	0.15	10.86	15000	90x236	0.15	36.74	
	6800	51x130	0.15	12.65	450 (500)	820	51x75	0.15	4.31
	8200	64x96	0.15	12.93		1000	51x80	0.15	4.89
	10000	64x100	0.15	14.53		1200	51x96	0.15	5.8
	12000	77x96	0.15	16.82		1500	51x115	0.15	7.03
	15000	77x96	0.15	18.80		1800	54x130	0.15	8.14
	18000	77x130	0.15	23.44		2200	64x100	0.15	8.86
	22000	77x155	0.15	28.00		2700	64x115	0.15	10.43
	27000	90x131	0.15	30.39		3300	64x130	0.15	12.17
33000	90x157	0.15	36.33	3900		77x115	0.15	12.85	
250 (300)	2200	51x75	0.15	5.64		4700	77x130	0.15	14.87
	2700	51x75	0.15	6.25		5600	77x155	0.15	17.54
	3300	51x96	0.15	7.69		6800	90x157	0.15	20.62
	3900	51x115	0.15	9.07	8200	90x157	0.15	22.64	
	4700	64x96	0.15	9.79	10000	90x196	0.15	27.58	
	5600	64x96	0.15	10.68	12000	90x236	0.15	32.87	
	6800	64x115	0.15	12.73	500 (550)	470	51x75	0.20	2.96
	8200	64x115	0.15	13.98		680	51x96	0.20	3.97
	10000	64x130	0.15	16.30		820	51x115	0.20	4.72
	12000	77x115	0.15	18.15		1000	51x130	0.20	5.52
	15000	77x130	0.15	21.40		1000	64x96	0.20	5.34
	18000	77x155	0.15	25.33		1500	64x115	0.20	7.08
22000	90x157	0.15	29.67	1500		77x96	0.20	6.75	
350 (400)	1200	51x75	0.15	5.21		1800	64x130	0.20	8.18
	1500	51x80	0.15	5.99		2200	77x115	0.20	8.82
	1800	51x96	0.15	7.10		2700	77x155	0.20	11.13
	2200	51x96	0.15	7.85		3900	90x157	0.20	14.29
	2700	51x130	0.15	9.97		550 (600)	390	51x75	0.20
	3300	51x130	0.15	11.02	560		51x96	0.20	3.60
	3900	64x96	0.15	10.66	560		64x96	0.20	4.00
	4700	64x115	0.15	12.53	680		51x115	0.20	4.30
	4700	64x130	0.15	14.53	680		64x115	0.20	4.76
	5600	77x96	0.15	13.07	820		51x130	0.20	4.99
	5600	77x115	0.15	15.39	820		64x130	0.20	5.52
	6800	77x130	0.15	17.89	1200		77x96	0.20	6.04
8200	77x155	0.15	21.22	1500	77x115		0.20	7.28	
10000	90x157	0.15	25.00	1800	77x130		0.20	8.41	
12000	90x157	0.15	27.39	2200	77x155		0.20	10.05	
15000	90x196	0.15	33.78	3300	90x157		0.20	13.15	

QP

Standard · High Ripple Series

- Endurance: 105°C 2000hours
- Recommended Applications : UPS · service system · press working equipment · charging equipment · inverter · converter
- Corresponding product to RoHS

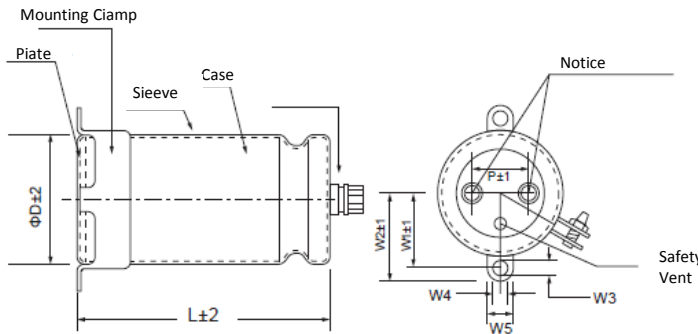


■ SPECIFICATIONS

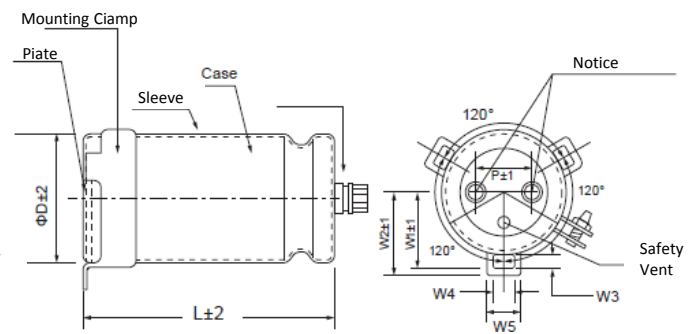
Item	Characteristics					
Category Temperature Range	-25~ +105°C					
Rated Voltage Range	160 ~ 500VDC					
Capacitance Tolerance	± 20 % (120Hz , 20°C)					
Leakage Current (20°C)	I ≤ 0.02CV or 5mA whichever is greater. (After rated voltage applied for 5 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)					
Dissipation Factor(MAX) (tan δ) (120Hz , 20°C)	WV	160	200	250	350	400~500
	tan δ	0.15	0.15	0.15	0.15	0.15
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz					
	Rated voltage(V)	160~500				
Endurance	After applying rated voltage with ripple current for 2000 hours at 105°C, the capacitors shall meet the following requirements.					
	Capacitance change	Within ± 20% of initial value				
	D.F. (tan δ)	Not more than 200% of specified value				
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, the capacitor shall meet the same requirements as Endurance.					

■ Dimensions [mm]

Fixed with two hoies



Fixed with three holes



φD	W1	W2	W3	W4	W5	P
51	32.5	37.5	4.5	7.0	13.0	22.2
64	38.5	42.8	4.5	7.0	13.0	28.5
77	44.8	49.0	4.5	7.0	13.0	31.8
90	52.3	58.8	5.0	8.0	16.0	31.6

■ Multiplier for Ripple Current

Freq. (Hz)	60	120	300	1K	≥ 10K
coefficient	0.70	1.00	1.10	1.30	1.40

Temperature	40	60	85	105
coefficient	2.44	2.16	2.00	1.00

QP

Standard · High Ripple Series

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120Hz)	
160 (200)	4700	51x80	0.15	6.81	350 (400)	8200	77x155	0.15	18.11	
	5600	51x96	0.15	8.05		10000	90x157	0.15	21.94	
	6800	64x96	0.15	8.80	400 (450)	1000	51x75	0.15	4.08	
	8200	64x96	0.15	9.66		1200	51x96	0.15	4.97	
	10000	77x96	0.15	11.34		1500	51x96	0.15	5.56	
	15000	77x130	0.15	15.81		2200	64x96	0.15	7.65	
	22000	90x131	0.15	19.87		3300	64x130	0.15	10.70	
200 (250)	3300	51x80	0.15	5.23		3900	64x155	0.15	12.59	
	4700	51x96	0.15	6.76		4700	77x130	0.15	14.16	
	5600	64x96	0.15	7.99		5600	77x155	0.15	16.70	
	6800	64x115	0.15	9.52		6800	90x157	0.15	16.83	
	8200	77x66	0.15	10.27		8200	90x157	0.15	18.48	
	10000	77x115	0.15	12.24	10000	90x196	0.15	22.52		
	15000	90x131	0.15	16.47	450 (500)	1000	51x96	0.15	4.54	
250 (300)	2200	51x75	0.15	4.53		1200	51x115	0.15	5.39	
	3300	51x96	0.15	6.18		1500	51x115	0.15	6.02	
	3900	64x96	0.15	6.69		2200	64x115	0.15	8.28	
	4700	64x115	0.15	7.94		3300	64x130	0.15	10.70	
	5600	77x96	0.15	8.91		3900	77x121	0.15	12.50	
	6800	77x115	0.15	10.60		4700	77x144	0.15	14.81	
	8200	77x130	0.15	12.27		5600	90x145	0.15	15.49	
	10000	77x155	0.15	14.65		6800	90x196	0.15	19.50	
	15000	90x157	0.15	17.81		8200	90x196	0.15	21.41	
350 (400)	1000	51x75	0.15	4.08	500 (550)	820	51x115	0.20	3.86	
	1200	51x75	0.15	4.47		1000	51x130	0.20	4.50	
	1500	51x96	0.15	5.56			64x96	0.2	4.37	
	1800	51x96	0.15	6.09		1200	64x115	0.20	5.18	
	2200	51x115	0.15	7.29		1500	64x130	0.20	6.12	
	2700	64x96	0.15	8.48			77x96	0.2	5.66	
	3300	64x115	0.15	10.13		1800	77x115	0.20	6.69	
	3900	64x115	0.15	11.02		2700	77x155	0.20	9.33	
	4700	64x130	0.15	12.77		1900	90x157	0.20	11.70	
	5600	77x130	0.15	15.46		6800	90x236	0.20	18.54	
	6800	77x130	0.15	17.03						

RP

Wide temperature range standard Series

- Endurance: 105°C 2000hours
- Recommended Applications :UPS、service system、press working equipment、charging equipment、inverter、converter
- Corresponding product to RoHS

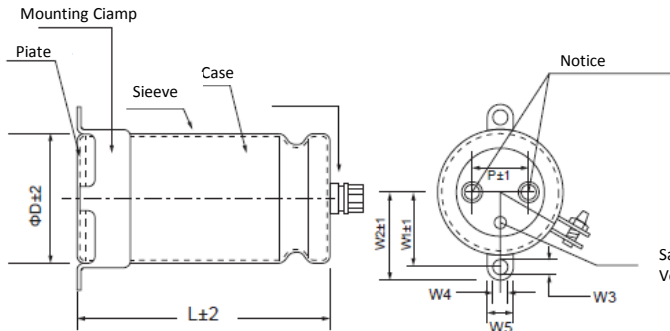


■ SPECIFICATIONS

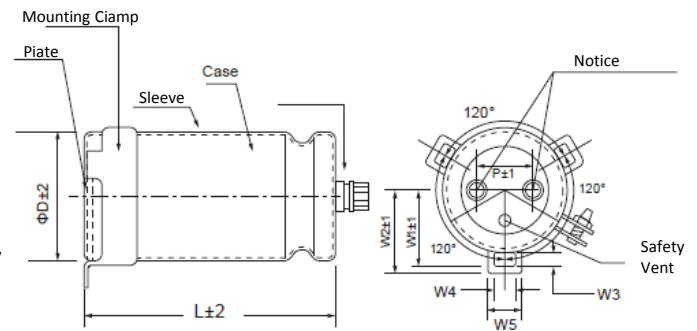
Item	Characteristics	
Category Temperature Range	-40 ~ +105°C	-25 ~ +105°C
Rated Voltage Range	10~ 100VDC	160~450VDC
Capacitance Tolerance	± 20 % (120Hz, 20°C)	
Leakage Current (20°C)	I ≤ 0.02CV or 5mA whichever is greater. (After rated voltage applied for 5 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)	
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	Shown in the table of standard rating	
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz	
	Rated voltage(V)	10~100 160~450
	Z-25°C / Z+20°C	- 8
	Z-40°C / Z+20°C	12 -
Endurance	After applying rated voltage with ripple current for 2000 hours at 105°C, the capacitors shall meet the following requirements.	
	Capacitance change	Within ± 20% of initial value
	D.F. (tan δ)	Not more than 200% of specified value
	Leakage current	Not more than the specified value
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, the capacitor shall meet the same requirements as Endurance.	

■ Dimensions [mm]

Fixed with two hoies



Fixed with three holes



φ D	W1	W2	W3	W4	W5	P
35	24.0	30.0	7.0	3.5	10.0	12.7
51	32.5	37.5	4.5	7.0	13.0	21.8
64	38.5	42.8	4.5	7.0	13.0	28.2
77	44.8	49.0	4.5	7.0	13.0	31.4
90	53.2	55.6	4.5	7.0	14.0	31.4

■ Multiplier for Ripple Current

Freq. (Hz)	120	1K	10K	100K
W.V	coefficient			
10~35V	1.00	1.05	1.10	1.10
50~100V	1.00	1.10	1.15	1.15
160~450V	1.00	1.20	1.30	1.35
Temperature	55	70	85	105
coefficient ≤ 250V	2.50	2.00	1.40	1.00
	≥ 350V	2.00	1.50	1.20

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	R.C (A/rms,105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	R.C (A/rms,105°C) (120Hz)	
10 (13)	33000	35x50	0.80	3.72	160 (200)	47000	90x131	0.25	15.05	
	47000	35x60	0.80	4.81		1000	35x50	0.15	1.50	
	56000	35x70	0.80	5.61		1500	35x60	0.15	1.98	
	68000	35x80	0.80	6.57		2200	35x70	0.15	2.57	
	100000	51x70	1.00	7.67		3300	35x90	0.15	3.52	
	150000	51x90	1.00	10.46		4700	51x80	0.15	4.54	
	220000	64x96	1.20	13.53		5600	51x90	0.15	5.22	
330000	64x115	1.20	17.92	6800		64x96	0.15	5.89		
16 (20)	22000	35x50	0.70	3.25		8200	64x96	0.15	6.46	
	33000	35x60	0.70	4.31		10000	77x96	0.15	7.56	
	47000	35x80	0.70	5.84		15000	77x130	0.15	10.54	
	56000	35x90	0.70	6.72		22000	90x131	0.15	13.30	
	68000	51x70	0.90	6.66		200 (250)	1000	35x60	0.15	1.62
	100000	51x90	0.90	9.00			1500	35x70	0.15	2.12
	150000	64x96	1.00	11.22	2200		35x90	0.15	2.88	
	220000	64x115	1.00	14.69	3300		51x80	0.15	3.49	
330000	77x115	1.20	18.24	4700	51x90		0.15	4.38		
22000	35x60	0.35	4.59	5600	64x96		0.15	5.34		
33000	35x80	0.35	6.39	6800	64x115		0.15	6.37		
47000	35x90	0.35	8.04	8200	77x96		0.15	6.85		
25 (32)	56000	51x70	0.40	8.31	10000	77x115	0.15	8.16		
	68000	51x90	0.40	10.21	15000	90x131	0.15	10.98		
	100000	64x96	0.40	11.28	250 (300)	1000	35x70	0.15	1.73	
	150000	64x115	0.80	12.94		1500	35x90	0.15	2.38	
	220000	77x115	1.00	14.83		2200	51x70	0.15	2.94	
	330000	90x131	1.00	19.94		3300	51x90	0.15	4.01	
	15000	35x60	0.30	4.09		3900	64x96	0.15	4.46	
22000	35x80	0.30	5.63	4700		64x115	0.15	5.29		
33000	51x70	0.45	6.56	5600		77x96	0.15	5.94		
47000	51x80	0.45	8.29	6800		77x115	0.15	7.07		
35 (44)	56000	51x90	0.45	9.53	8200	77x130	0.15	8.18		
	68000	51x115	0.50	11.11	10000	77x155	0.15	9.76		
	100000	64x115	0.60	12.20	15000	90x157	0.15	11.87		
	150000	77x115	0.70	13.90	350 (400)	1000	51x65	0.15	2.40	
	220000	90x131	0.70	17.42		1500	51x70	0.15	3.03	
	8200	35x60	0.25	3.18		2200	51x96	0.15	4.21	
	10000	35x70	0.25	3.75		3300	64x96	0.15	5.47	
	15000	35x80	0.25	4.88		3900	64x115	0.15	6.43	
22000	51x70	0.35	5.57	4700		64x130	0.15	7.45		
33000	51x90	0.35	7.60	5600		77x115	0.15	7.94		
47000	64x96	0.40	9.48	6800		77x130	0.15	9.23		
50 (63)	56000	64x96	0.40	10.34	8200	77x155	0.15	10.95		
	68000	64x115	0.45	11.62	10000	90x157	0.15	12.25		
	100000	77x115	0.50	14.14	400 (450)	1000	51x70	0.15	2.47	
	150000	90x131	0.50	19.02		1500	51x90	0.15	3.38	
	8200	35x60	0.20	3.31		2200	64x96	0.15	4.46	
	10000	35x80	0.20	3.86		3300	64x130	0.15	6.24	
	15000	35x90	0.20	4.50		3900	64x155	0.15	7.34	
	22000	51x70	0.25	4.95		4700	77x130	0.15	7.97	
33000	51x90	0.25	6.68	5600		77x155	0.15	9.39		
47000	64x96	0.30	8.73	6800		90x157	0.15	10.94		
63 (79)	56000	64x115	0.35	10.43	8200	90x157	0.15	12.01		
	68000	77x96	0.40	10.96	10000	90x196	0.15	14.64		
	8200	35x80	0.20	3.86	450 (500)	1000	51x90	0.15	2.94	
	10000	35x90	0.20	4.50		1500	51x115	0.15	4.02	
	15000	51x70	0.25	4.95		2200	64x115	0.15	5.17	
	22000	51x90	0.25	6.68		3300	64x130	0.15	6.69	
	33000	64x96	0.30	8.73		3900	77x121	0.15	7.82	
	47000	64x115	0.35	10.43		4700	77x144	0.15	9.26	
56000	77x96	0.40	10.96	5600		90x145	0.15	11.06		
68000	77x115	0.40	13.03	6800		90x196	0.15	13.93		
100 (125)	100000	90x131	0.40	17.36	100 (125)	5600	35x90	0.15	4.59	
	5600	35x90	0.15	4.59		6800	51x70	0.15	5.16	
	6800	51x70	0.15	5.16		8200	51x80	0.15	6.00	
	8200	51x80	0.15	6.00		10000	51x90	0.15	6.97	
	10000	51x90	0.15	6.97		15000	64x96	0.15	7.57	
	15000	64x96	0.15	7.57		22000	77x96	0.25	8.69	
	22000	77x96	0.25	8.69		33000	77x130	0.25	12.11	

MP High voltage · Long life Series

- Endurance: 85°C 5000hours
- Recommended Applications : UPS · service system · press working equipment · charging equipment · inverter · converter
- Corresponding product to RoHS

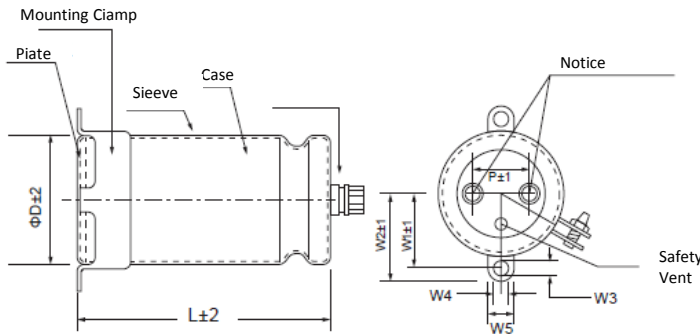


■ SPECIFICATIONS

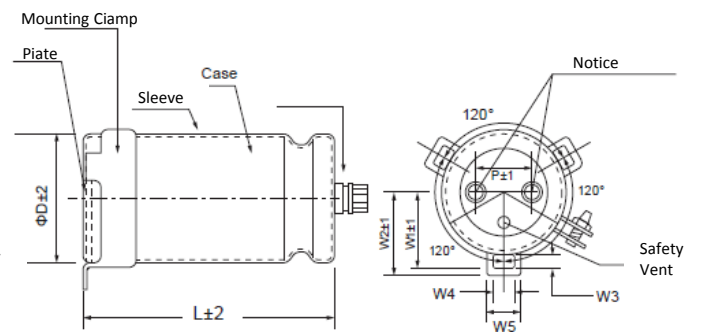
Item	Characteristics			
Category Temperature Range	-40 ~ +85°C			
Rated Voltage Range	350 ~ 450VDC			
Capacitance Tolerance	± 20 % (120Hz , 20°C)			
Leakage Current (20°C)	I ≤ 0.02CV or 5mA whichever is greater. (After rated voltage applied for 5 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)			
Dissipation Factor(MAX) (tan δ) (120Hz , 20°C)	WV	350	400	450
	tan δ	0.15	0.15	0.15
Low Temperature Stability Impedance Ratio (MAX)	Rated voltage(V)			
	Rated voltage(V)	350~450		
Endurance	After applying rated voltage with ripple current for 5000 hours at 85°C , the capacitors shall meet the following requirements.			
	Capacitance change	Within ± 20% of initial value		
	D.F. (tan δ)	Not more than 200% of specified value		
Shelf Life	Leakage current	Not more than the specified value		
	After placed at 85°C without voltage applied for 1000 hours, the capacitor shall meet the same requirements as Endurance.			

■ Dimensions [mm]

Fixed with two hoies



Fixed with three holes



ϕ D	W1	W2	W3	W4	W5	P
51	32.5	37.5	4.5	7.0	13.0	22.0
64	38.5	42.8	4.5	7.0	13.0	28.5
77	44.8	49.0	4.5	7.0	13.0	32.0
90	52.3	58.8	5.0	8.0	16.0	32.0

■ Multiplier for Ripple Current

Freq. (Hz)	60	120	300	1K	≥ 10K
coefficient	0.70	1.00	1.10	1.30	1.40

Temperature	40	60	85
coefficient	1.89	1.67	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms85°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms85°C) (120Hz)
350 (400)	1200	51x75	0.15	5.21	400 (450)	4700	64x155	0.15	15.72
	1500	51x75	0.15	5.82			77x115	0.15	14.10
	1800	51x96	0.15	7.1		5600	64x195	0.15	19.06
	2200	51x96	0.15	7.85			77x130	0.15	16.23
	2700	51x130	0.15	9.97		6800	77x155	0.15	19.33
	3300	51x130	0.15	11.02		8200	90x157	0.15	22.64
	3900	64x115	0.15	12.5		10000	90x157	0.15	25.00
	4700	64x130	0.15	14.53		12000	90x196	0.15	30.22
	5600	64x155	0.15	17.16		15000	90x236	0.15	36.74
			77x115	0.15		15.39	450 (500)	1000	51x75
	6800	64x195	0.15	21	1200	51x96		0.15	6.1
		77x130	0.15	17.88	1500	51x115		0.15	7.4
		8200	77x155	0.15	21.22	1800		51x130	0.15
	10000	90x157	0.15	25	2200	64x96		0.15	8.93
	12000	90x157	0.15	27.39	2700	64x115		0.15	10.69
15000	90x196	0.15	33.78	3300	64x130	0.15		12.48	
18000	90x236	0.15	40.25	3900	64x155	0.15		14.68	
400 (450)	1000	51x75	0.15		4.76	77x115		0.15	13.56
	1200	51x75	0.15	5.21	4700	64x195		0.15	17.91
	1500	51x96	0.15	6.48		77x130	0.15	15.69	
	1800	51x96	0.15	7.10	5600	77x155	0.15	18.51	
	2200	51x130	0.15	8.99	6800	90x157	0.15	21.21	
	2700	64x96	0.15	9.64	8200	90x157	0.15	23.29	
	3300	64x115	0.15	11.53	10000	90x196	0.15	28.37	
	3900	64x130	0.15	13.23	12000	90x236	0.15	33.80	

XP

High voltage · Long life Series

- Endurance: 105°C 5000hours
- Recommended Applications : UPS 、 service system 、 press working equipment 、 charging equipment 、 inverter 、 converter
- Corresponding product to RoHS

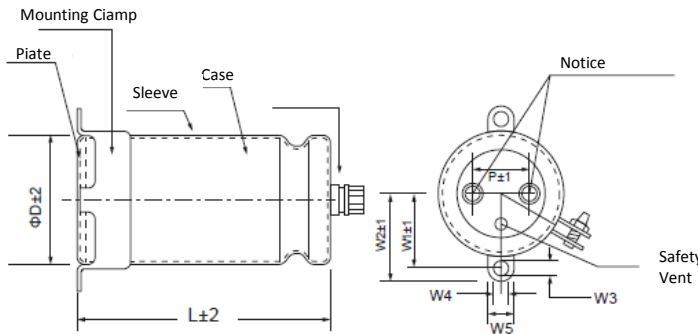


■ SPECIFICATIONS

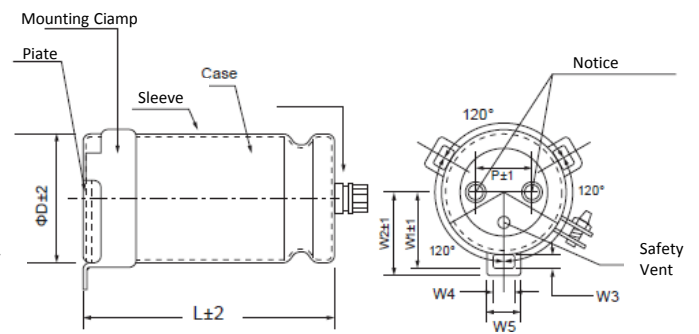
Item	Characteristics					
Category Temperature Range	-40 ~ +105°C					
Rated Voltage Range	200 ~ 450VDC					
Capacitance Tolerance	± 20 % (120Hz , 20°C)					
Leakage Current (20°C)	I ≤ 0.02CV or 5mA whichever is greater. (After rated voltage applied for 5 minutes) I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)					
Dissipation Factor(MAX) (tan δ) (120Hz , 20°C)	WV	200	250	350	400	450
	tan δ	0.15	0.15	0.15	0.15	0.15
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz					
	Rated voltage(V)	200~450				
Endurance	After applying rated voltage with ripple current for 5000 hours at 105°C , the capacitors shall meet the following requirements.					
	Capacitance change	Within ± 20% of initial value				
	D.F. (tan δ)	Not more than 200% of specified value				
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, the capacitor shall meet the same requirements as Endurance.					

■ 尺寸图

Fixed with two hoies



Fixed with three holes



φD	W1	W2	W3	W4	W5	P
51	32.5	37.5	4.5	7.0	13.0	22.0
64	38.5	42.8	4.5	7.0	13.0	28.5
77	44.8	49.0	4.5	7.0	13.0	32.0
90	53.7	56.2	4.5	7.0	14.0	32.0

■ 纹波电流频率修正系数

Freq. (Hz)	60(50)	120	300	1K	≥ 10K
coefficient	0.70	1.00	1.10	1.30	1.40

Temperature	40	60	85	105
coefficient	2.44	2.16	2.00	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120Hz)
200 (250)	2200	51x80	0.20	2.92	400 (450)	1200	51x96	0.15	4.14
	3300	51x100	0.20	3.94		1500	51x115	0.15	5.02
	4700	64x100	0.20	5.13		1800	51x130	0.15	5.81
	6800	64x121	0.20	6.71		2200	51x130	0.15	6.43
	10000	77x121	0.20	8.31			64x96	0.15	6.22
	15000	77x144	0.20	10.98		2700	64x115	0.15	7.45
	22000	90x145	0.20	11.40		3300	64x130	0.15	8.69
	33000	90x236	0.20	17.34		3900	64x155	0.15	10.23
250 (300)	1500	51x80	0.20	2.41			77x115	0.15	9.18
	2200	51x100	0.20	3.21		4700	64x195	0.15	12.47
	3300	64x100	0.20	4.47			77x130	0.15	10.62
	4700	64x121	0.20	5.80		5600	64x195	0.15	13.61
	6800	77x121	0.20	7.15			77x155	0.15	12.53
	10000	90x145	0.20	9.36		6800	90x157	0.15	14.73
	15000	90x171	0.20	12.36		8200	90x157	0.15	16.17
	22000	90x236	0.20	17.30		10000	90x196	0.15	19.70
350 (400)	1000	51x75	0.15	3.06	12000	90x236	0.15	23.48	
	1200	51x75	0.15	3.35	450 (500)	1000	51x96	0.15	4.25
	1500	51x96	0.15	4.17		1200	51x115	0.15	5.05
	1800	51x96	0.15	4.57		1500	51x130	0.15	5.97
	2200	51x130	0.15	5.78		1800	64x96	0.15	6.20
	2700	64x96	0.15	6.00		2200	64x115	0.15	7.41
	3300	64x115	0.15	7.18		2700	64x130	0.15	8.67
	3900	64x130	0.15	8.24			77x115	0.15	8.69
	4700	64x155	0.15	9.79		3300	64x155	0.15	10.37
		77x115	0.15	8.95			77x130	0.15	10.14
	5600	64x196	0.15	11.87		3900	64x195	0.15	12.53
		77x130	0.15	10.30		4700	77x155	0.15	13.07
	6800	77x130	0.15	12.27		5600	77x195	0.15	15.82
	8200	90x157	0.15	13.86			90x157	0.15	14.89
	10000	90x157	0.15	15.31		6800	90x196	0.15	18.10
	12000	90x196	0.15	18.50		8200	90x196	0.15	19.88
15000	90x236	0.15	22.50	10000		90x236	0.15	23.88	
400 (450)	1000	51x75	0.15	3.40					

- Endurance: 85°C 10000hours
- Recommended Applications : UPS · service system · press working equipment · charging equipment · inverter · converter
- Corresponding product to RoHS

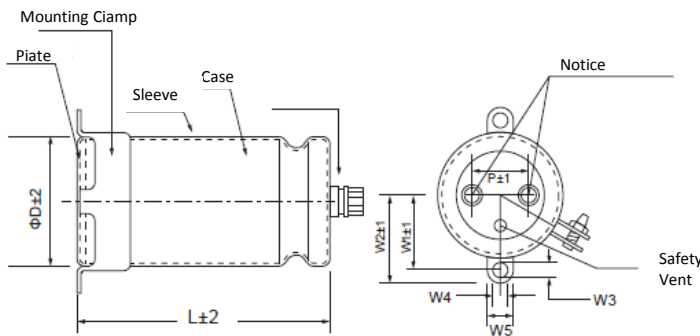


SPECIFICATIONS

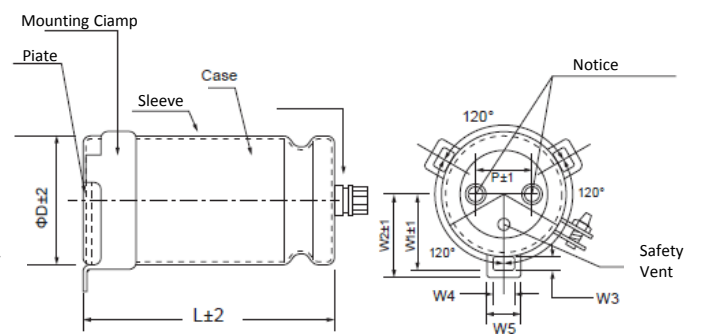
Item	Characteristics			
Category Temperature Range	-40 ~ +85°C			
Rated Voltage Range	350 ~ 450VDC			
Capacitance Tolerance	± 20 % (120Hz , 20°C)			
Leakage Current (20°C)	I ≤ 0.02CV or 5mA whichever is greater. (After rated voltage applied for 5 minutes) I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V)			
Dissipation Factor(MAX) (tan δ) (120Hz , 20°C)	WV	350	400	450
	tan δ	0.15	0.15	0.15
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz			
	Rated voltage(V)	350~450		
Endurance	Z-25°C / Z+20°C	8		
	After applying rated voltage with ripple current for 10000 hours at 85°C , the capacitors shall meet the following requirements.			
	Capacitance change	Within ± 20% of initial value		
D.F. (tan δ)	Not more than 200% of specified value			
Leakage current	Not more than the specified value			
Shelf Life	After placed at 85°C without voltage applied for 1000 hours, the capacitor shall meet the same requirements as Endurance.			

Dimensions [mm]

Fixed with two hoies



Fixed with three holes



φ D	W1	W2	W3	W4	W5	P
51	32.5	37.5	4.5	7.0	13.0	22.0
64	38.5	42.8	4.5	7.0	13.0	28.5
77	44.8	49.0	4.5	7.0	13.0	32.0
90	52.3	58.8	5.0	8.0	16.0	32.0

Multiplier for Ripple Current

Freq. (Hz)	60	120	300	1K	≥ 10K
coefficient	0.70	1.00	1.10	1.30	1.40

Temperature	40	60	85
coefficient	1.89	1.67	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms85°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms85°C) (120Hz)
350 (400)	1000	51x75	0.15	5.7	400 (450)	3900	77x115	0.15	12.8
	1200	51x75	0.15	6.3		4700	64x195	0.15	16.6
	1500	51x96	0.15	7.8			77x130	0.15	14.9
	1800	51x96	0.15	8.5		5600	64x195	0.15	17.6
	2200	51x130	0.15	10.8			77x155	0.15	17.0
	2700	64x96	0.15	11.5		6800	90x157	0.15	19.8
	3300	64x115	0.15	13.7		8200	90x157	0.15	21.7
	3900	64x130	0.15	15.8		10000	90x196	0.15	25.5
	4700	64x155	0.15	18.7		12000	90x236	0.15	20.4
			77x115	0.15		17.6	450 (500)	1000	51x96
	5600	64x195	0.15	22	1200	51x115		0.15	7
		77x130	0.15	20.3	1500	51x130		0.15	8.3
	6800	77x155	0.15	23.4	1800	64x96		0.15	8.7
	8200	90x157	0.15	27.2	2200	64x115		0.15	10.5
	10000	90x157	0.15	30	2700	64x130		0.15	12.2
12000	90x196	0.15	36.3	77x115		0.15		12.5	
15000	90x236	0.15	42.5	3300	64x155	0.15		14.6	
400 (450)	1000	51x75	0.15		4.6	77x130		0.15	14.5
	1200	51x96	0.15	5.6	3900	64x195		0.15	17.7
	1500	51x115	0.15	6.7	4700	77x155	0.15	18.1	
	1800	51x130	0.15	7.8	5600	77x195	0.15	21.9	
	2200	64x96	0.15	8.3		90x157	0.15	21.00	
	2700	64x115	0.15	9.9	6800	90x196	0.15	25.40	
	3300	64x130	0.15	11.6	8200	90x196	0.15	28	
	3900	64x155	0.15	13.6	10000	90x236	0.15	32.4	

EP

High voltage · Long life Series

- Endurance: 105°C 10000hours
- Recommended Applications : UPS · service system · press working equipment · charging equipment · inverter · converter
- Corresponding product to RoHS

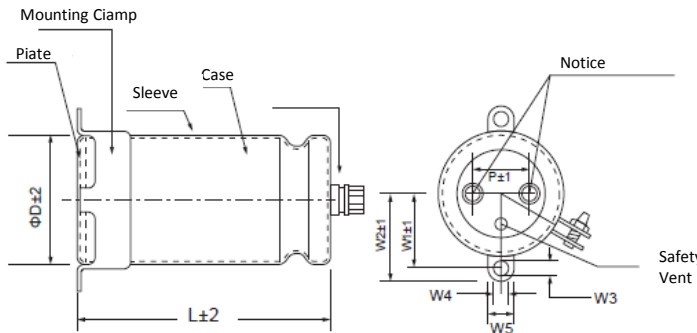


■ SPECIFICATIONS

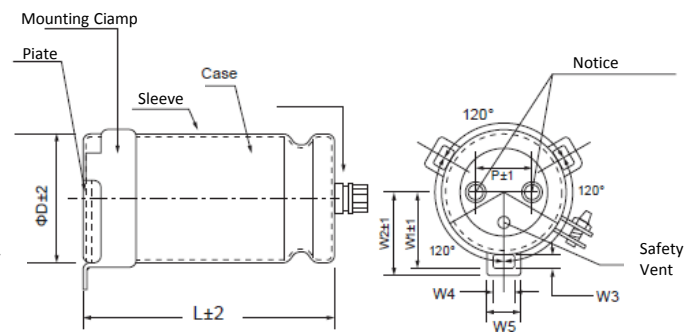
Item	Characteristics								
Category Temperature Range	-40 ~ +105°C								
Rated Voltage Range	350 ~ 450VDC								
Rated Capacitance Range	1000 ~ 15000 μ F								
Capacitance Tolerance	$\pm 20\%$ (120Hz, 20°C)								
Leakage Current (20°C)	$I \leq 0.02CV$ or 5mA whichever is greater. (After rated voltage applied for 5 minutes) I : Max. leakage current (μ A), C : Nominal capacitance (μ F), V : Rated voltage (V)								
Dissipation Factor(MAX) (tan δ) (120Hz, 20°C)	<table border="1"> <tr> <td>WV</td> <td>350</td> <td>400</td> <td>450</td> </tr> <tr> <td>tan δ</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> </tr> </table>	WV	350	400	450	tan δ	0.15	0.15	0.15
WV	350	400	450						
tan δ	0.15	0.15	0.15						
Low Temperature Stability Impedance Ratio (MAX)	Measurement frequency : 120Hz <table border="1"> <tr> <td>Rated voltage(V)</td> <td>350~450</td> </tr> <tr> <td>Z-25°C / Z+20°C</td> <td>8</td> </tr> </table>	Rated voltage(V)	350~450	Z-25°C / Z+20°C	8				
Rated voltage(V)	350~450								
Z-25°C / Z+20°C	8								
Endurance	After applying rated voltage with ripple current for 10000 hours at 105°C, the capacitors shall meet the following requirements. <table border="1"> <tr> <td>Capacitance change</td> <td>Within $\pm 20\%$ of initial value</td> </tr> <tr> <td>D.F. (tan δ)</td> <td>Not more than 200% of specified value</td> </tr> <tr> <td>Leakage current</td> <td>Not more than the specified value</td> </tr> </table>	Capacitance change	Within $\pm 20\%$ of initial value	D.F. (tan δ)	Not more than 200% of specified value	Leakage current	Not more than the specified value		
Capacitance change	Within $\pm 20\%$ of initial value								
D.F. (tan δ)	Not more than 200% of specified value								
Leakage current	Not more than the specified value								
Shelf Life	After placed at 105°C without voltage applied for 1000 hours, the capacitor shall meet the same requirements as Endurance.								

■ 尺寸图

Fixed with two hoies



Fixed with three hoies



ϕ D	W1	W2	W3	W4	W5	P
51	32.5	37.5	4.5	7.0	13.0	22.0
64	38.5	42.8	4.5	7.0	13.0	28.5
77	44.8	49.0	4.5	7.0	13.0	31.8
90	52.3	58.8	5.0	8.0	16.0	31.6

■ Multiplier for Ripple Current

Freq. (Hz)	60(50)	120	300	1K	$\geq 10K$
coefficient	0.70	1.00	1.10	1.30	1.40

Temperature	40	60	85	105
coefficient	2.44	2.16	2.00	1.00

■ STANDARD RATINGS

Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120Hz)	Rated Voltage (SurageVoltage) (V)	Cap (μ F)	Case size Φ DxL(mm)	$\tan \delta$	Ripple current (A/rms105°C) (120Hz)
350 (400)	1000	51x75	0.15	5.6	400 (450)	3900	77x115	0.15	15.3
	1200	51x75	0.15	6.1		4700	64x195	0.15	19.8
	1500	51x96	0.15	7.6			77x130	0.15	17.7
	1800	51x96	0.15	8.3		5600	64x195	0.15	21.6
	2200	51x130	0.15	10.5			77x155	0.15	20.9
	2700	64x96	0.15	10.9		6800	90x157	0.15	23.7
	3300	64x115	0.15	13.1		8200	90x157	0.15	26.1
	3900	64x130	0.15	15.0		10000	90x196	0.15	31.8
	4700	64x155	0.15	17.8		12000	90x236	0.15	37.8
			77x115	0.15		16.8	450 (500)	1000	51x96
	5600	64x195	0.15	21.6	1200	51x115		0.15	7.4
		77x130	0.15	19.3	1500	51x130		0.15	8.7
	6800	77x144	0.15	22.3	1800	64x115		0.15	9.7
	8200	90x157	0.15	26.1	2200	64x115		0.15	10.7
	10000	90x157	0.15	28.8	2700	64x130		0.15	12.5
12000	90x196	0.15	34.8	77x115		0.15		12.7	
15000	90x236	0.15	42.3	3300	64x155	0.15		14.9	
400 (450)	1000	51x75	0.15		5.6	77x130		0.15	14.8
	1200	51x96	0.15	6.8	3900	64x195		0.15	18
	1500	51x115	0.15	8.2	4700	77x155	0.15	19.1	
	1800	51x130	0.15	9.5	5600	77x195	0.15	23.20	
	2200	64x96	0.15	9.7		90x157	0.15	21.50	
	2700	64x115	0.15	11.8	6800	90x196	0.15	26.2	
	3300	64x130	0.15	13.8	8200	90x196	0.15	28.8	
	3900	64x155	0.15	16.2	10000	90x236	0.15	34.5	

Quality and Environmental Management
System Certification

Standara	Certificate Number
ISO 9001 : 2015	N° 2014/58801.1
IATF 16949 : 2016	N°58802 N° IATF : 0182450
IECQ QC 080000 : 2017	IECQ-H KTL 14.0026
ISO 14001 : 2015	GTE14032
OHSAS 18001 : 2007	GTO14032
CQC	201300103010100174

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