

MLCC



CHIP-R



COIL



ABOUT PDC

Milestone 歷史沿革



| | |
|------|---|
| 1990 | PDC former parent company, Taiwan Cement, merged with Mei Da Mei and founded PDC in Nantou. 台泥集團購買美大美電子公司，信昌電子陶瓷正式成立。 |
| 1995 | PDC merged with Taiwan Precision Material Corporation. 信昌電子陶瓷併購台灣精密材料公司。 |
| 2002 | Public Listed in OTC. 信昌電子陶瓷正式上櫃。 |
| 2005 | PDC was strategically allied with Wasin Tech. 與華新科技(股)公司策略聯盟。 |
| 2007 | To be strategically allied with Frontier, and setting up new production lines, Magnetic components. 與弘電電子工業(股)公司策略聯盟，生產磁性材料元件。 |
| 2008 | Positioned as Specialty and Material BG in PSA Group. 集團推動 PSA 被動系統聯盟企業識別，信昌電子陶瓷定位為特殊品及材料事業群。 |

Core Technology 關鍵技術



| | |
|------|--|
| 1988 | Manufacturing and developing ceramic dielectric materials. 生產製造圓板電容粉末、開發。 |
| 1990 | Manufacturing Multilayer Ceramic Capacitors. 生產製造積層陶瓷晶片電容。 |
| 1995 | Manufacturing Ceramic Chip Resistors and Ceramic Chip Coil 生產陶瓷晶片電阻、陶瓷晶片電感。 |
| 2001 | As the 1 st manufacturer and provider in Taiwan for ceramic dielectric powders and multilayer ceramic chip capacitors (MLCC). 臺灣第一家自行供給晶片電容器介電瓷粉之被動元件廠商。 |
| 2001 | With self-made conducting dielectric powder, controlling the complete key technology from material to manufacture. 自製半導體介電瓷粉，掌握由材料至製程的完整關鍵性技術。 |
| 2007 | Manufacturing magnetic components. 生產磁性材料元件。 |

Brand Value 品牌價值



| | |
|------|---|
| 2001 | The first supplier in Asia to get SEMKO product safety certificate. 亞洲第一家獲得 SEMKO 安全規格認證之供應商。 |
| 2003 | ISO 9001 certified. 獲 ISO 9001 驗證通過。 |
| 2004 | Industrial Sustainable Excellence Award. 榮獲經濟部工業局工業精銳獎。 |
| 2004 | TS16949、ISO 14000 and OHSAS 18000 certified. 獲 TS16949、ISO 14000 及 OHSAS 18000 驗證。 |
| 2007 | Common Wealth Magazine Top 1000 Manufacturers in Taiwan Ranked in No. 705. 天下雜誌 1000 大製造業排名第 705 名。 |
| 2008 | IECQ QC080000 HSF certified. 獲 IECQ QC080000 HSF 驗證。 Common Wealth Magazine Top 1000 Manufacturers in Taiwan Ranked in No. 682. 天下雜誌 1000 大製造業排名第 682 名。 |
| 2009 | Common Wealth Magazine Top 1000 Manufacturers in Taiwan Ranked in No. 677. 天下雜誌 1000 大製造業排名第 677 名。 |
| 2012 | Recognition of Winning the Silver Invention Award for Copper or Its Alloy Cofirable Dielectric Ceramics. 榮獲國家發明創作獎 - 發明獎銀牌「可與銅及其合金進行共燒製作的介電陶瓷組成物」 |
| 2013 | SMD High Voltage Chip Resistor passed UL Safety certification in 2013 電阻產品取得安規認證證書 |
| 2015 | MLCC product have obtained the IECQ certificate & the certificate of AS9100 management system for the aerospace industry. 通過 IECQ 第三方認證及 AS9100 航太工業管理系統驗證。 |
| 2016 | Aerospace Quality Management Systems AS 9100 certified. 晶片電容取得車規第三方認證 |
| 2019 | PDC was selected fastest growing Top 100 companies in 2019 by commonwealth magazine PDC 榮獲天下雜誌 2019 年成長 100 強企業 |

Market Performance 市場表現



The only local manufacturer in Taiwan with the capability in specialty products includes multiple-layer ceramic capacitors, chip resistors, and coils.
國內唯一可全數提供特殊電容、電感、電阻之被動元件供應商。
The only local manufacturer in Taiwan entered the supply chain of Japan market.
國內唯一打入日本供應鏈之廠商。

Introduction

Prosperity Dielectrics Co., Ltd. (PDC) was founded in 1990 as the 1st local manufacturer and exporter in Taiwan for ceramic dielectric powders and multiple-layer ceramic chip capacitors (MLCCs). PDC joined to Walsin Technology Corporation (WTC) as an allied company in September 2005, and incorporated Frontier to create solid synergy in 2008. Our product lines expand to SMD magnetic chips, power chokes, coils and transformers.

信昌電子陶瓷成立於 1990 年，為國內少數能自行供給瓷粉原料並同時銷售積層陶瓷電容的被動元件廠商，更是唯一有能力由上游初發原料，向下垂直整合至被動晶片元件的廠商。2005 年信昌電陶與華新集團進行策略聯盟、2008 年正式合併弘電電子，將銷售範圍從介電瓷粉、半導體陶瓷電容器瓷片、積層陶瓷電容、晶片電阻延伸到線圈，成為國內唯一可全數提供特殊電容、電感、電阻之被動元件供應商。

Support You Forward

With niche technology of key materials, PDC can meet the market requirements. The integration of researching and developing from materials to the customer-required components can shorten the time of mass production. To progressively make plans for each product to be with high added value functions, such as Mid and high voltage, high precision, large size capacitors, and high power, high precision, low resistance resistors or other high added value products. In the future, combine with core material technology and advance high frequency and high capacitance further.

由於掌握關鍵性材料的技術利基，信昌電陶可配合市場需求，由材料研發著手，向下整合開發客戶所需要的電子元件，縮短量產時效，並積極規劃各項產品朝高附加價值的零件功能領域邁進，如：中高壓、高精度、大尺寸之晶片電容器及高功率、高精度與低阻值之晶片電阻器等高附加價值產品。未來更將結合材料核心技術，進軍高頻及高容領域。

At present, PDC has developed ceramic dielectric powder used by NME and BME manufacturing process. Self-applied mass production and external sale are simultaneously carried out to improve the proportion to the supply of internal high-level MLCC materials. By the strategy of vertical production capability from ceramic dielectric powder material to MLCC finished goods, bring the high performance of vertical integration.

目前信昌電陶貴金屬製程及卑金屬製程 (BME) 使用的晶片電容器介電瓷粉已陸續開發完成，量產自用與對外銷售並行展開，提升國內高階積層電容瓷粉原料自主供應比率。藉由原料往下游整合至晶片電容器成品的延伸策略，發揮上下垂直整合的高度營運績效。

For the past few years, to extend the production capability of magnetic components series, PDC gradually set up the manufacturing equipments for coil and transformer in Yongzhou and Shenzhen Plant. The improvement of the production capability is able to increase the sales performance.

近年來，為了擴展磁性元件系列產品的產能，信昌電陶陸續在中國永州廠、深圳廠增置電感、變壓器相關製造設備，藉由產能提升，大幅拉升業績。

Vertical integration & Complete key technology:

- Material (Ceramic Dielectric Powder)
- Semi-finished good (Semiconducting Ceramic Chip Capacitor)
- Finished goods (Chip Capacitor, Chip resistor, Coil)

上下游垂直整合，掌握完整關鍵性技術：

- 原料 (介電瓷粉)
- 半成品 (半導體陶瓷電容瓷片)
- 成品 (晶片電容、晶片電阻、線圈)

Business Operation 經營模式分析

- Vertical integration to improve competitiveness.
- Building strategic alliances to strengthen competitiveness.
- Expanding Western and Japanese markets, cultivation high-end products.
- Moving into Chinese market to expand market share.
- 垂直整合發展，擺脫同業競爭
- 運用策略聯盟，產品水平延伸
- 拓展歐美日市場，深耕高階產品
- 跨足中國市場，擴大市佔率

Branding Strategy 品牌經營策略

- Developing specialized products market.
- Enhancing brand value with continuing innovation and R&D ability.
- Improving competitiveness through vertical integration.
- Satisfying customer's need through extending product lines.
- 深耕被動元件特殊品市場及其上游材料產業高階產品
- 持續創新研發能力，提升品牌價值
- 產品垂直整合，強化競爭優勢
- 產品水平延伸，滿足客戶一次購足

Keystothe Success 關鍵成功因素

- The only local manufacturer with vertical production capability from ceramic dielectric powder material to multiple-layer ceramic chip capacitors.
- Differentiating marketing strategy with niche product.
- Diversifying product lines to expand customer base.
- Continuing innovation and R&D ability.
- Focusing core competence with PSA group support.
- 國內唯一有能力由上游初發原料，向下垂直整合至被動晶片元件的廠商，掌握材料與製程的完整關鍵性技術
- 利基產品差異化與行銷差異化策略
- 產品線多元發展，擴大客戶群
- 持續創新與研發，開發新產品與導入新製程
- 共享集團資源，聚焦核心競爭力

Characteristics 企業特色

- PDC is the domestic manufacturer devoting to ceramic dielectric materials.
- 為國內廠商對介電瓷粉材料研發投資最深者

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■ Safety Certified capacitor series (X1/Y2 & X2)

FEATURES

- Safety standard approval by
EN 60384-14: 2013, IEC 60384-14: 2013,
UL 60384-14 (Ed 2.0) / UL 62368-1 (2nd Edition)
- Certificate number:
R 50041666 and R 50359148 by TUV
E346791 (FOWX2/8) by UL, E231248 By UL
- HALOGEN & RoHS compliant

APPLICATION

- DC to DC converter.
- High voltage coupling/DC blocking.
- Back-lighting inverters.
- LAN/WLAN interface.
- Modem.
- Power supplies.



PART NUMBER

| FK | 21 | X | 102 | K | 502 | E | G | G |
|----------------------------------|--|-------------------|---|--------------------------------------|--|--|---------------------------------------|-----------------------------|
| PDC Family | Size | Dielectric | Capacitance | Tolerance | Impulse voltage | Packaging | Thickness | Control Code |
| FK | 06 1206 (3216) | N COG(NPO) | 102 =10x10 ² =1000pF | J = ± 5% | 302: 2.5KV Impulse | E = Tape and 7" Reel, Embossed Tape | Reference Thickness Description | G =RoHS Compliant |
| Safety X1 & Y2 series | 08 1808 (4520) 12 1812 (4532) | X X7R | 100 =10x10 ⁰ =10pF | K = ± 10% M = ± 20% | 502: 5KV Impulse 602: 6KV Impulse | P = Tape and 7" Reel, Paper Tape L = Tape and 13" Reel, Embossed G = Tape and 13"Reel, Paper Tape | | |
| FH Safety X2 series | 21 2211 (5728) 20 2220 (5750) | | | | | | | |

GENERAL ELECTRICAL DATA

| Dielectric | COG (NPO) | X7R | X7R |
|---|--|---|---|
| Size | 1808, 1812, 2211 | 1808, 1812, 2211, 2220 | 1206 |
| Rated voltage | 250VAC | | 2.5KVDC |
| Capacitance range* | X1/Y2 Class(Impulse 6KV) | 4pF ~ 100pF | X1/Y2 Class 100pF ~ 4.7nF |
| | X1/Y2 Class(Impulse 5KV) | 3pF ~ 720pF | X2 Class 150pF ~ 56nF |
| | X2 Class | 3pF ~ 1000pF | |
| Capacitance tolerance | Cap<10pF: | D (± 0.5pF) | J (± 5%) K (± 10%) M (± 20%) |
| | Cap≥10pF: | F (± 1%), G (± 2%), J (± 5%), K (± 10%), M (± 20%) | |
| Tan δ * (Tangent of loss angle) | Cap. Rang | Q Spec. | |
| | Cap<30pF: | Q≥400+20C | ≤2.5% |
| | Cap≥30pF: | Q≥1000 | |
| Measured at the condition of 30~70% related humidity. | | | |
| Capacitance & Tan δ Test Condition | for 25°C at ambient temperature | | Class II MLCC: Perform a heat treatment at 150±10°C for 1 hour, then leave in ambient condition for 24±2 hours before measurement. |
| | Cap. Rang | Test Condition | |
| | Cap≤1000pF | 1.0±0.2Vrms, 1.0MHz±10% | 1.0±0.2Vrms, 1.0kHz±10%, at 25°C ambient temperature. |
| Cap>1000pF | 1.0±0.2Vrms, 1.0kHz±10% | | |
| Insulation resistance | ≥100GΩ or R • C≥1000 whichever is smaller | | ≥10GΩ or R • C≥500Ω-F whichever is smaller |
| Operating temperature | - 55°C to + 125°C | | |
| Temperature coefficient | ± 30ppm / °C | | ± 15% |
| Termination | Cu or Ag / Ni / Sn (lead-free termination) | | |

DIMENSIONS



| Size inch (mm) | L (mm) | W (mm) | T (mm) code | M _B min (mm) |
|----------------|---------------|-----------|-------------|-------------------------|
| 1206 (3216) | 3.30±0.40 | 1.60±0.20 | | 0.5±0.25 |
| 1808 (4520) | 4.50+0.6/-0.3 | 2.00±0.30 | Reference | 0.5±0.25 |
| 1812 (4532) | 4.50+0.6/-0.3 | 3.20±0.40 | Thickness | 0.5±0.25 |
| 2211 (5728) | 5.70±0.50 | 2.80±0.40 | Description | |
| 2220 (5750) | 5.70±0.50 | 5.00±0.50 | | 0.60±0.30 |

FK-FH

■ Safety Certified capacitor series (X1/Y2 & X2)

RATING

| Class | | X1/Y2 (FK Series) | | | | | | | X2 (FH Series) | | | | | | |
|---------------|---------|---------------------------|------|------|------|------|------|------|----------------|-------|------|----------|------|------|-------|
| Rated Voltage | | 250Vac | | | | | | | | | | 2.5KVdc | | | |
| Certificated | | TUV IEC60384-14 /UL-60384 | | | | | | | | | | UL-62368 | | | |
| Dielectric | | COG | | | | X7R | | | | COG | | X7R | | | X7R |
| Cap | Size | 1808 | 1812 | 2211 | 2211 | 1808 | 1812 | 2211 | 2220 | 1808 | 1812 | 1808 | 1812 | 2220 | 1206 |
| | Impulse | 5KV | | | 6KV | 5KV | | | | 2.5KV | | | | | (252) |
| 3pF | 3R0 | D | | | | | | | | D | | | | | |
| 3.3pF | 3R3 | D | | | | | | | | | | | | | |
| 1pF | 4R0 | D | | F | F | | | | | D | | | | | |
| 1.7pF | 4R7 | D | | F | F | | | | | | | | | | |
| 5pF | 5R0 | D | | F | F | | | | | D | | | | | |
| 5.6pF | 5R6 | D | | F | F | | | | | | | | | | |
| 6.0pF | 6R0 | D | | F | F | | | | | D | | | | | |
| 6.8pF | 6R8 | D | | F | F | | | | | | | | | | |
| 7.0pF | 7R0 | D | | F | F | | | | | D | | | | | |
| 8.0pF | 8R0 | D | | F | F | | | | | D | | | | | |
| 8.2pF | 8R2 | D | | F | F | | | | | | | | | | |
| 9.0pF | 9R0 | D | | | | | | | | D | | | | | |
| 10pF | 100 | D | C | F | F | | | | | D | C | | | | |
| 12pF | 120 | D | C | F | F | | | | | D | C | | | | |
| 15pF | 150 | D | C | F | F | | | | | D | C | | | | |
| 18pF | 180 | D | C | F | F | | | | | D | C | | | | |
| 22pF | 220 | D | C | F | F | | | | | D | C | | | | |
| 27pF | 270 | D | C | F | F | | | | | D | C | | | | |
| 33pF | 330 | D | C | F | F | | | | | D | C | | | | |
| 39pF | 390 | E | C | F | F | | | | | E | C | | | | |
| 47pF | 470 | E | C | F | F | | | | | E | C | | | | |
| 56pF | 560 | E | C | F | F | | | | | E | C | | | | |
| 68pF | 680 | E | C | F | G | | | | | E | C | | | | |
| 82pF | 820 | E | C | F | G | | | | | E | C | | | | |
| 0.1nF | 101 | F | C | F | H | E* | | E* | | F | C | | | | C |
| 0.12nF | 121 | F | C | G | | E* | | E* | | F | C | | | | C |
| 0.13nF | 131 | F | C | | | | | E* | | | | | | | C |
| 0.15nF | 151 | F | C | G | | E* | E* | E* | | F | C | E | | | C |
| 0.16nF | 161 | F | C | G | | E* | | | F* | | | E | | | C |
| 0.18nF | 181 | F | C | G | | E* | E* | E* | F* | F | C | E | | | C |
| 0.22nF | 221 | F | F | G | | E* | E* | E* | F* | F | C | E | | | C |
| 0.27nF | 271 | F | F | G | | F* | E* | E* | F* | F | C | E | E | | C |
| 0.3nF | 301 | | F | | | | | | | | | E | E | | C |
| 0.33nF | 331 | | F | G | | F* | E* | E* | F* | F | C | E | E | | C |
| 0.39nF | 391 | | F | G | | F* | E* | E* | F* | F | C | E | E | | C |
| 0.47nF | 471 | | F | G | | F* | E* | F* | F* | F | C | E | E | | C |
| 0.56nF | 561 | | | G | | F* | E* | F* | F* | F | C | E | E | | C |
| 0.68nF | 681 | | | G | | F* | F* | F* | F* | F | F | E | E | | C |
| 0.72nF | 721 | | | | | | | | F* | F | | | E | | C |
| 0.82nF | 821 | | | | | F* | F* | F* | F* | F | F | E | E | | C |
| 1nF | 102 | | | | | F* | G* | G* | F* | F | F | F | E | | C |
| 1.2nF | 122 | | | | | | | G* | G* | | | F | E | | |
| 1.5nF | 152 | | | | | | | G* | G* | | | F | F | | |
| 1.8nF | 182 | | | | | | | G* | G* | | | F | F | | |
| 2.2nF | 222 | | | | | | | G* | G* | | | F | G | | |
| 2.7nF | 272 | | | | | | | H* | G* | | | | G | | |
| 3.3nF | 332 | | | | | | | | G* | | | | G | | |
| 3.9nF | 392 | | | | | | | | G* | | | | G | | |
| 4.7nF | 472 | | | | | | | | G* | | | | G | | |
| 5.6nF | 562 | | | | | | | | | | | | G | | |
| 10nF | 103 | | | | | | | | | | | | | G | |
| 12nF | 123 | | | | | | | | | | | | | G | |
| 15nF | 153 | | | | | | | | | | | | | G | |
| 18nF | 183 | | | | | | | | | | | | | G | |
| 22nF | 223 | | | | | | | | | | | | | H | |
| 27nF | 273 | | | | | | | | | | | | | H* | |
| 33nF | 333 | | | | | | | | | | | | | H* | |
| 39nF | 393 | | | | | | | | | | | | | H* | |
| 47nF | 473 | | | | | | | | | | | | | H* | |
| 56nF | 563 | | | | | | | | | | | | | H* | |

* Surface coating only

MLCC

Chip R

Coil

■ Extra High Voltage Capacitor Series (≥1KV)

FEATURES

- Special interior design offers high voltage rating in a given case size.
- High reliability and stability.
- RoHS & HALOGEN compliant.

APPLICATION

- DC to DC converter.
- High voltage coupling/DC blocking.
- Back-lighting inverters.
- LAN/WLAN interface.
- Modem.
- Power supplies.

PART NUMBER

| FV | 31 | X | 103 | K | 102 | E | E | G |
|----------------------------|---------------------------------------|----------------|--------------------------|-----------|---------------|--|---------------------------------------|---------------------|
| PDC Family | Size | Dielectric | Capacitance | Tolerance | Rated voltage | Packaging | Thickness | Control Code |
| High Voltage Series | 21 0805 (2012) | N COG(NPO) | 102=10x10 [∧] 2 | J= ± 5% | 102=1000V | E= Tape and 7" Reel, Embossed Tape | Reference Thickness Description | G=RoHS Compliant |
| | 31 1206 (3216) | X X7R | =1000pF | K= ± 10% | 152=1500V | | | |
| | 32 1210 (3225) | | 100=10x10 [∧] 0 | M= ± 20% | 202=2000V | P= Tape and 7" Reel, Paper Tape L= Tape and 13" Reel, Embossed G= Tape and 13"Reel, Paper Tape | | |
| | High voltage application with ≥ 1KVdc | 42 1808 (4520) | | =10pF | 302=3000V | | | |
| | 43 1812 (4532) | | | | 402=4000V | | | |
| | 46 1825 (4563) | | | | | | | |
| | 52 2211 (5728) | | | | | | | |
| 55 2220 (5750) | | | | | | | | |
| 56 2225 (5763) | | | | | | | | |

GENERAL ELECTRICAL DATA

| Dielectric | COG(NPO) | X7R |
|---|--|--|
| Size | 0805,1206, 1210, 1808, 1812, 1825, 2220, 2225 | 0805,1206, 1210, 1808, 1812, 1825, 2211, 2220, 2225 |
| Rated voltage (WVDC) | 1KV, 1.5KV, 2KV, 3KV,4KV | 1KV, 1.5KV, 2KV, 3KV,4KV |
| Capacitance range* | 1.5pf ~ 10nF | 100pF ~ 220nF |
| Capacitance tolerance | Cap≤5pF: B (±0.1pF), C (±0.25pF) | J (±5%) |
| | 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) | K (±10%) |
| | Cap≥10pF: F (±1%), G (±2%), J (±5%), K (±10%) | M (±20%) |
| Tan δ * | Cap. Rang | Q Spec. |
| | Cap<30pF: Q≥400+20C | ≤2.5% |
| | Cap≥30pF: Q≥1000 | |
| Measured at the condition of 30~70% related humidity. | | |
| Capacitance & Tan δ Test Condition | for 25°C at ambient temperature | Preconditioning for Class II MLCC: Perform a heat treatment at 150±10°C for 1 hour, then leave in ambient condition for 24±2 hours before measurement. |
| | Cap. Rang | Test Condition |
| | Cap≤1000pF: 1.0±0.2Vrms, 1.0MHz±10% | Cap > 1000pF: 1.0±0.2Vrms, 1.0kHz±10% |
| Insulation resistance | ≥10GΩ or R • C≥ 500Ω-F whichever is smaller | ≥10GΩ or R • C≥100Ω-F whichever is smaller |
| Operating temperature | -55 to +125°C | |
| Temperature coefficient | ±30ppm / °C | ±15% |
| Termination | Ag (or Cu)/Ni/Sn or Au (lead-free termination) | |

DIMENSIONS



| Size inch (mm) | L (mm) | W (mm) | T (mm) code | M _B min (mm) |
|----------------|-----------|-----------|---------------------------------------|-------------------------|
| 0805 (2012) | 2.10±0.20 | 1.25±0.20 | Reference Thickness Description | 0.50±0.20 |
| 1206 (3216) | 3.30±0.30 | 1.60±0.20 | | 0.60±0.20 |
| 1210 (3225) | 3.30±0.40 | 2.50±0.30 | | 0.75±0.35 |
| 1808 (4520) | 4.60+0.50 | 2.00±0.25 | | 0.75±0.35 |
| 1812 (4532) | 4.60+0.50 | 3.20±0.30 | | 0.75±0.35 |
| 1825 (4563) | 4.60+0.50 | 6.30±0.40 | | 0.75±0.35 |
| 2211 (5728) | 5.70±0.50 | 2.80±0.30 | | 0.85±0.35 |
| 2220 (5750) | 5.70±0.50 | 5.00±0.40 | | 0.85±0.35 |
| 2225 (5763) | 5.70±0.50 | 6.30±0.40 | | 0.85±0.35 |

MLCC

Chip R

Coil

Extra High Voltage Capacitor Series ($\geq 1KV$)

RATING

COG (NPO)

| Size | 0805 | 1206 | | | | | 1210 | | | | | 1808 | | | | | 1812 | | | | | 1825 | | | | | 2220 | | | | | 2225 | | | | | |
|---------------|------|------|-----|-------|-----|-----|------|-------|-----|-----|-------|------|-----|-----|-----|-------|------|-----|-----|-----|-------|------|-----|-----|-----|-------|------|-----|-----|-----|-------|------|-----|-----|---|---|--|
| Cap | Code | 1KV | 1KV | 1.5KV | 2KV | 3KV | 1KV | 1.5KV | 2KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | | | |
| 1.5pF | 1R5 | C | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.8pF | 1R8 | C | X | X | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.2pF | 2R2 | C | X | X | X | | | | | | C | C | C | C | C | | | | | | | | | | | | | | | | | | | | | | |
| 2.7pF | 2R7 | C | X | X | X | | | | | | C | C | C | C | C | | | | | | | | | | | | | | | | | | | | | | |
| 3.3pF | 3R3 | C | X | X | X | | | | | | C | C | C | C | C | | | | | | | | | | | | | | | | | | | | | | |
| 3.9pF | 3R9 | C | X | X | X | | | | | | C | C | C | C | C | | | | | | | | | | | | | | | | | | | | | | |
| 4.7pF | 4R7 | C | X | X | X | | | | | | C | C | C | C | C | | | | | | | | | | | | | | | | | | | | | | |
| 5pF | 5R0 | C | X | X | X | | | | | | C | C | C | C | C | | | | | | | | | | | | | | | | | | | | | | |
| 5.6pF | 5R6 | C | X | X | X | | | | | | C | C | C | C | C | | | | | | | | | | | | | | | | | | | | | | |
| 6.8pF | 6R8 | C | X | X | X | | | | | | C | C | C | C | C | | | | | | | | | | | | | | | | | | | | | | |
| 8.2pF | 8R2 | C | X | X | X | | | | | | C | C | C | C | C | | | | | | | | | | | | | | | | | | | | | | |
| 10pF | 100 | C | X | X | X | E | M | M | M | C | C | C | C | C | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 12pF | 120 | C | X | X | X | E | M | M | M | C | C | C | C | C | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 15pF | 150 | C | X | X | X | E | M | M | M | C | C | C | C | C | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 18pF | 180 | C | X | X | X | E | M | M | M | C | C | C | C | C | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 22pF | 220 | C | X | X | X | E | M | M | M | C | C | C | C | E | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 27pF | 270 | C | X | X | X | E | M | M | M | C | C | C | C | E | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 33pF | 330 | C | X | M | M | E | M | M | M | C | C | C | C | F | C | C | C | C | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 39pF | 390 | C | X | M | M | E | M | M | M | C | C | C | C | F | C | C | C | C | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 47pF | 470 | C | X | M | M | E | M | M | M | C | C | C | C | | C | C | C | C | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 56pF | 560 | C | X | C | C | E | M | C | C | C | C | C | C | | C | C | C | C | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 68pF | 680 | C | X | C | C | E | M | C | C | C | C | C | C | | C | C | C | C | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 82pF | 820 | C | X | C | C | E | M | C | C | C | C | C | C | | C | C | C | C | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 100pF | 101 | C | X | C | C | E | C | C | C | C | C | C | F | | C | C | C | C | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 120pF | 121 | C | C | E | E | E | C | C | C | C | C | C | F | | C | C | C | C | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 150pF | 151 | C | C | E | E | | C | E | E | C | F | F | F | | C | C | C | C | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 180pF | 181 | C | E | E | E | | C | E | E | C | F | F | F | | C | C | C | F | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 220pF | 221 | C | E | E | E | | E | E | E | C | F | F | F | | C | C | C | F | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 270pF | 271 | C | E | P | P | | E | F | F | F | F | F | F | | C | F | F | F | | F | F | F | F | F | F | F | F | F | G | F | F | F | F | F | F | | |
| 330pF | 331 | C | E | P | P | | E | F | F | F | F | F | F | | C | F | F | F | | F | F | F | F | F | F | F | F | F | G | F | F | F | F | F | F | | |
| 390pF | 391 | C | E | P | P | | E | G | G | F | F | F | F | | C | F | F | F | | F | F | F | F | F | F | F | F | F | | F | F | F | F | F | F | F | |
| 470pF | 471 | | E | | | | E | C | C | F | F | F | F | | F | F | F | F | | F | F | F | F | F | F | F | F | F | | F | F | F | F | F | F | F | |
| 560pF | 561 | | E | | | | E | G | G | F | F | F | F | | F | F | F | E | | F | F | F | F | F | F | F | F | F | | F | F | F | F | F | F | F | |
| 680pF | 681 | | E | | | | E | G | G | F | F | F | F | | F | F | F | F | | F | F | F | F | F | F | F | F | F | | F | F | F | F | F | F | F | |
| 820pF | 821 | | E | | | | E | G | G | F | F | F | F | | F | F | F | G | | F | F | F | F | F | F | F | F | F | | F | F | F | F | F | F | F | |
| 1000pF | 102 | | E | | | | E | G | G | F | F | F | F | | F | F | F | G | | F | F | F | F | F | F | F | F | F | | F | F | F | F | F | F | F | |
| 1200pF | 122 | | | | | | E | F | F | F | F | F | F | | F | E | E | | | F | F | F | | F | F | F | F | F | | F | F | F | F | F | F | F | |
| 1500pF | 152 | | | | | | F | G | G | F | F | F | F | | F | E | E | | | F | F | F | | F | F | F | F | F | | F | F | F | F | F | F | F | |
| 1800pF | 182 | | | | | | G | G | G | F | F | F | F | | E | F | F | | | F | F | F | | F | F | F | F | F | | F | F | F | F | F | F | F | |
| 2200pF | 222 | | | | | | G | | | F | | | | | E | F | F | | | F | F | F | | F | F | F | F | F | | F | F | F | F | F | F | F | |
| 2700pF | 272 | | | | | | G | | | | | | | | F | G | G | | | F | F | F | | F | F | F | F | F | | F | F | F | F | F | F | G | |
| 3300pF | 332 | | | | | | G | | | | | | | | F | G | G | | | F | F | F | | F | F | F | F | F | | F | F | F | F | F | F | G | |
| 3900pF | 392 | | | | | | G | | | | | | | | G | | | | | F | F | F | | F | F | F | F | F | | F | F | F | F | F | F | F | |
| 4700pF | 472 | | | | | | | | | | | | | | G | | | | | F | F | F | | F | F | F | F | F | | F | F | F | F | F | F | F | |
| 5600pF | 562 | | | | | | | | | | | | | | G | | | | | F | | | | F | | | | | | F | F | F | F | F | F | F | |
| 6800pF | 682 | | | | | | | | | | | | | | | | | | | F | | | | F | | | | | | F | F | F | F | F | F | F | |
| 8200pF | 822 | | | | | | | | | | | | | | | | | | | G | | | | G | | | | | | F | G | G | G | G | G | G | |
| 0.01 μ F | 103 | | | | | | | | | | | | | | | | | | | G | | | | G | | | | | G | G | G | G | G | G | G | G | |
| 0.012 μ F | 123 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

■ Extra High Voltage Capacitor Series (≥1KV)

RATING

X7R

| Size | Code | 0805 | | | 1206 | | | 1210 | | | 1808 | | | | 1812 | | | | 1825 | | | | 2211 | | 2220 | | | | 2225 | | | | | | | | |
|---------|------|------|-----|-------|------|-------|-----|-------|-----|-----|-------|-----|-----|-------|------|-----|-----|-----|-------|-----|-----|-----|------|-----|------|-------|-----|-----|------|-----|-------|-----|-----|-----|---|----|--|
| | | 1KV | 1KV | 1.5KV | 2KV | 2.5KV | 1KV | 1.5KV | 2KV | 1KV | 1.5KV | 2KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | | | |
| 100pF | 101 | X | C | C | C | C | C | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 120pF | 121 | X | C | C | C | C | C | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 150pF | 151 | X | C | C | C | C | C | C | C | C | C | C | C | C | F* | | | | | | | | | | | | | | | | | | | | | | |
| 180pF | 181 | X | C | C | C | C | C | C | C | C | C | C | C | C | F* | | | | | | | | | | | | | | | | | | | | | | |
| 220pF | 221 | X | C | C | C | C | C | C | E | C | C | C | F* | | | | | | | | | | | | | | | | | | | | | | | | |
| 270pF | 271 | X | C | C | C | C | C | C | E | C | C | C | F* | C | C | F | F* | | | | | | F* | F | F* | | | | | | F* | | | | | F* | |
| 330pF | 331 | X | C | C | C | C | C | C | E | C | C | F | F* | C | C | F | F* | | | | | | F* | F | F* | | | | | F* | | | | | | F* | |
| 390pF | 391 | X | C | C | C | C | C | C | E | C | C | F | F* | C | C | F | F* | | | | | | F* | F | F* | | | | | F* | | | | | | F* | |
| 470pF | 471 | X | C | C | C | C | C | C | E | C | C | F | F* | C | C | F | F* | | | | | | F* | F | F* | | | | | F* | | | | | | F* | |
| 560pF | 561 | X | C | C | C | C | C | C | E | C | C | F | F* | C | C | F | F* | | | | | | F* | F | F* | | | | | F* | | | | | | F* | |
| 680pF | 681 | X | C | C | C | C* | C | C | E | C | C | F | F* | C | C | F | F* | | | | | | F* | F | F* | | | | | F* | | | | | | F* | |
| 820pF | 821 | X | C | C | C | C* | C | C | E | C | C | F | F* | C | C | F | F* | | | | | | F* | F | F* | | | | | F* | | | | | | F* | |
| 1000pF | 102 | X | C | C | C | C* | C | C | E | C | C | F | F* | C | C | F | F* | F | F | F | F | F* | F | F* | F | F | F | F* | F | F | F | F* | F | F | F | F* | |
| 1200pF | 122 | X | C | E | E | E | C | G | F | C | F | F | | C | C | F | G* | F | F | F | F | G* | G | G* | F | F | F | G* | F | F | F | G* | F | F | F | G* | |
| 1500pF | 152 | C | C | E | E | E | C | G | F | C | F | F | | C | C | F | G* | F | F | F | F | G* | G | G* | F | F | F | G* | F | F | F | G* | F | F | F | G* | |
| 1800pF | 182 | C | C | E | E | E | C | G | F | C | F | F | | C | C | G | G* | F | F | F | F | G* | G | G* | F | F | F | G* | F | F | F | G* | F | F | F | G* | |
| 2200pF | 222 | C | C | E | E | E | C | G | F | C | F | F | | C | C | G* | | F | F | F | F* | | G | | F | F | F* | | F | F | F* | | F | F | F | F* | |
| 2700pF | 272 | C | C | E | E | | C | G | G | C | F | F | | C | C | G* | | F | F | F | F* | | G | | F | F | F* | | F | F | F* | | F | F | F | F* | |
| 3300pF | 332 | C | C | E | E | | C | G | G | C | F | F | | C | F | G* | | F | F | F | F* | | G | | F | F | F* | | F | F | F* | | F | F | F | F* | |
| 3900pF | 392 | C | C | E | E | | E | G | G | C | F | | | C | F | G* | | F | F | F | F* | | | | F | F | F* | | F | F | F* | | F | F | F | F* | |
| 4700pF | 472 | C | E | E | | | E | G | G | C | F | | | C | F | | | F | F | F | F* | | | | F | F | F* | | F | F | F* | | F | F | F | F* | |
| 5600pF | 562 | | E | E | | | E | G | G* | F | F | | | C | G | | | F | F | F | G* | | | | F | F | F* | | F | F | F | G* | | F | F | G* | |
| 6800pF | 682 | | E | E | | | E | G | G* | F | F | | | C | G | | | F | F | F | G* | | | | F | F | G* | | F | F | F | G* | | F | F | G* | |
| 8200pF | 822 | | E | E | | | E | G | G* | F | | | | C | G | | | F | F | F | G* | | | | F | G | G* | | F | F | F | G* | | F | F | G* | |
| 0.010μF | 103 | | E | E | | | E | | | F | | | | C | G | | | F | F | F | G* | | | | F | G | G* | | F | F | F | G* | | F | F | G* | |
| 0.012μF | 123 | | E | | | | E | | | F | | | | F | | | | F | G | G | H* | | | | F | G | H* | | F | G | G | G* | | F | G | G* | |
| 0.015μF | 153 | | E | | | | E | | | F | | | | F | | | | F | G | G | H* | | | | F | G | H* | | F | G | G | G* | | F | G | G* | |
| 0.018μF | 183 | | E | | | | E | | | F | | | | G | | | | F | G | G | H* | | | | F | H | H* | | F | G | G | H* | | F | G | H* | |
| 0.022μF | 223 | | E | | | | E | | | F | | | | G | | | | F | G | G | | | | | F | H | | | F | G | G | | | F | G | G | |
| 0.027μF | 273 | | | | | | E | | | F | | | | G | | | | F | H | H | | | | | F | H | | | F | G | G | | | F | G | G | |
| 0.033μF | 333 | | | | | | E | | | F | | | | G | | | | F | H | H | | | | | F | H | | | F | G | G | | | F | G | G | |
| 0.039μF | 393 | | | | | | F | | | F | | | | G | | | | F | H | H | | | | | F | H | | | F | G | H | | | F | G | H | |
| 0.047μF | 473 | | | | | | G | | | F | | | | G | | | | F | H | H | | | | | F | H | | | F | G | H | | | F | G | H | |
| 0.056μF | 563 | | | | | | | | | F | | | | G | | | | F | H | | | | | | F | H | | | F | G | H | | | F | G | H | |
| 0.068μF | 683 | | | | | | | | | | | | | G | | | | F | | | | | | | F | | | | F | G | | | | F | G | | |
| 0.082μF | 823 | | | | | | | | | | | | | G | | | | F | | | | | | | F | | | | F | G | | | | F | G | | |
| 0.10μF | 104 | | | | | | | | | | | | | G | | | | | | | | | | | G | | | | G | G | | | | G | G | | |
| 0.12μF | 124 | | | | | | | | | | | | | | | | | | | | | | | | G | | | | H | | | | | H | | | |
| 0.15μF | 154 | | | | | | | | | | | | | | | | | | | | | | | | H | | | | H | | | | | H | | | |
| 0.18μF | 184 | | | | | | | | | | | | | | | | | | | | | | | | H | | | | H | | | | | H | | | |
| 0.22μF | 224 | | | | | | | | | | | | | | | | | | | | | | | | H | | | | H | | | | | H | | | |
| 0.27μF | 274 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.33μF | 334 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.39μF | 394 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

* Surface coating only

MLCC

Chip R

Coil

FM

Mid-Voltage Capacitor Series (100V~630V)

FEATURES

- Medium Voltage in a given case size.
- High reliability and stability.
- RoHS compliant.

APPLICATION

- DC to DC converter.
- High voltage coupling/DC blocking.
- Back-lighting inverters.
- Sunbbers in high frequency power convertors.

PART NUMBER

| FM | 31 | X | 471 | K | 251 | E | C | G |
|------------------------------|--|---|--|---|--|--|---------------------------------------|--|
| PDC Family | Size | Dielectric | Capacitance | Tolerance | Rated voltage | Packaging | Thickness | Control Code |
| Medium Voltage Series | 15 0402 (1005) 18 0603 (1608) 21 0805 (2012) 31 1206 (3216) 32 1210 (3225) 42 1808 (4520) 43 1812 (4532) 46 1825 (4563) 55 2220 (5750) 56 2225 (5763) | N COG(NPO) X X7R F Y5V | 102 = 10×10^2 =1000pF 100 = 10×10^0 =10pF | J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$ Z = -20/+80% | 101 =100V 201 =200V 251 =250V 501 =500V 631 =630V | E = Tape and 7" Reel, Embossed Tape P = Tape and 7" Reel, Paper Tape L = Tape and 13" Reel, Embossed G = Tape and 13"Reel, Paper Tape | Reference Thickness Description | G =RoHS Compliant Q = Surface Coating (Size 1206~2225) |

GENERAL ELECTRICAL DATA

| Dielectric | COG(NPO) | X7R | Y5V |
|--------------------------------|--|--|----------------------------------|
| Size | 0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225 | 0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225 | 0805, 1206, 1210, 1812 |
| Rated voltage (WVDC) | 100V, 200V, 250V, 500V, 630V | 100V, 200V, 250V, 500V, 630V | 100V, 200V, 250V |
| Capacitance range* | 0.5pF ~ 100nF | 100pF ~ 820nF | 10nF ~ 680nF |
| Capacitance tolerance | Cap \leq 5pF: B (± 0.1 pF), C (± 0.25 pF) 5pF<Cap<10pF: C (± 0.25 pF), D (± 0.5 pF) Cap \geq 10pF: F ($\pm 1\%$), G ($\pm 2\%$), J ($\pm 5\%$), K ($\pm 10\%$) | J ($\pm 5\%$) K ($\pm 10\%$) M ($\pm 20\%$) | M ($\pm 20\%$) Z (-20/+80%) |
| Tan δ | Cap. Rang Q Spec. Cap<30pF: Q \geq 400+20C Cap \geq 30pF: Q \geq 1000 | $\leq 2.5\% \sim \leq 10.0\%$ | $\leq 5\%$ |

Measured at the condition of 30~70% related humidity.

Capacitance & Tan δ Test Condition

for 25°C at ambient temperature

Preconditioning for Class II MLCC: Perform a heat treatment at 150 \pm 10°C for 1 hour, then leave in ambient condition for 24 \pm 2 hours before measurement.

| Cap. Rang | Test Condition | | |
|-------------------|-------------------------------------|---|---|
| Cap \leq 1000pF | 1.0 \pm 0.2Vrms, 1.0MHz \pm 10% | 1.0 \pm 0.2Vrms, 1.0kHz \pm 10%, at 25°C ambient temperature. | 1.0 \pm 0.2Vrms, 1.0kHz \pm 10%, at 20°C ambient temperature. |
| Cap > 1000pF | 1.0 \pm 0.2Vrms, 1.0kHz \pm 10% | | |

Insulation resistance at Ur

$\geq 10G\Omega$ or $R \cdot C \geq 500\Omega \cdot F$ whichever is smaller

$\geq 10G\Omega$ or $R \cdot C \geq 100\Omega \cdot F$ whichever is smaller

Operating temperature

-55 to +125°C

-25 to +85°C

Capacitance characteristic

± 30 ppm / °C

$\pm 15\%$

+30/-80%

Termination

Cu (or Ag)/Ni/Sn or Au (lead-free termination)

DIMENSIONS



| Size inch (mm) | L (mm) | W (mm) | T (mm) code | M _B min (mm) |
|----------------|-----------------|-----------------|---------------------------------------|-------------------------|
| 0402 (1005) | 1.00 \pm 0.20 | 0.50 \pm 0.20 | | 0.25 +0.05/-0.10 |
| 0603 (1608) | 1.60 \pm 0.20 | 0.80 \pm 0.20 | | 0.40 \pm 0.15 |
| 0805 (2012) | 2.10 \pm 0.20 | 1.25 \pm 0.20 | | 0.50 \pm 0.20 |
| 1206 (3216) | 3.30 \pm 0.30 | 1.60 \pm 0.20 | | 0.60 \pm 0.20 |
| 1210 (3225) | 3.20 \pm 0.40 | 2.50 \pm 0.30 | | 0.75 \pm 0.35 |
| 1808 (4520) | 4.60 \pm 0.50 | 2.00 \pm 0.25 | Reference Thickness Description | 0.75 \pm 0.35 |
| 1812 (4532) | 4.60 \pm 0.50 | 3.20 \pm 0.30 | | 0.75 \pm 0.35 |
| 1825 (4563) | 4.60 \pm 0.50 | 6.30 \pm 0.40 | | 0.75 \pm 0.35 |
| 2220 (5750) | 5.70 \pm 0.50 | 5.00 \pm 0.40 | | 0.85 \pm 0.35 |
| 2225 (5763) | 5.70 \pm 0.50 | 6.30 \pm 0.40 | | 0.85 \pm 0.35 |

Mid-Voltage Capacitor Series (100V~630V)

RATING

COG(NPO)

| Size | Code | 0402 | | | 0603 | | | 0805 | | | | | 1206 | | | | | 1210 | | | | | 1808 | | | | | | |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|--|
| | | 100V | 200V | 250V | 100V | 200V | 250V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | | |
| 0.5pF | 0R5 | N | N | N | S | S | S | A | A | A | A | A | | | | | | | | | | | | | | | | | |
| 1pF | 1R0 | N | N | N | S | S | S | A | A | A | A | A | | | | | | | | | | | | | | | | | |
| 1.2pF | 1R2 | N | N | N | S | S | S | A | A | A | A | A | X | | | X | | | | | | | | | | | | | |
| 1.5pF | 1R5 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | | | | | | | | |
| 1.8pF | 1R8 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | | | | | | | | |
| 2.2pF | 2R2 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | | | C | C | C | C | C | |
| 2.7pF | 2R7 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | | | C | C | C | C | C | |
| 3.3pF | 3R3 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | | | C | C | C | C | C | |
| 3.9pF | 3R9 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | | | C | C | C | C | C | |
| 4.7pF | 4R7 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | | | C | C | C | C | C | |
| 5.6pF | 5R6 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | | | C | C | C | C | C | |
| 6.8pF | 6R8 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | | | C | C | C | C | C | |
| 8.2pF | 8R2 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | | | C | C | C | C | C | |
| 10pF | 100 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 12pF | 120 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 15pF | 150 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 18pF | 180 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 22pF | 220 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 27pF | 270 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 33pF | 330 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 39pF | 390 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 47pF | 470 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 56pF | 560 | N | N | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 68pF | 680 | N | N | | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 82pF | 820 | N | N | | S | S | S | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 100pF | 101 | N | N | | S | S | S | A | A | X | X | X | X | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 120pF | 121 | N | | | S | S | S | A | A | X | C | C | C | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 150pF | 151 | N | | | S | S | S | A | X | X | C | C | C | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 180pF | 181 | N | | | S | S | S | A | X | C | C | C | C | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 220pF | 221 | N | | | S | S | S | A | C | C | C | C | C | X | X | X | X | M | M | M | M | M | | C | C | C | C | C | |
| 270pF | 271 | | | | S | B | B | A | C | C | C | C | C | X | X | M | M | M | M | M | M | M | | C | C | C | F | F | |
| 330pF | 331 | | | | S | B | B | A | C | C | C | C | C | X | X | M | M | M | M | M | M | M | | C | C | C | F | F | |
| 390pF | 391 | | | | S | B | B | X | C | C | C | C | C | X | X | M | M | M | M | M | M | M | | C | C | C | F | F | |
| 470pF | 471 | | | | S | B | B | X | C | C | I | I | X | M | M | M | M | M | M | M | M | M | | C | C | C | F | F | |
| 560pF | 561 | | | | S | B | B | X | C | C | I | I | X | M | C | C | C | M | M | M | M | M | | C | C | C | F | F | |
| 680pF | 681 | | | | S | | | X | C | C | I | I | X | M | C | C | C | C | M | M | M | M | | C | C | C | F | F | |
| 820pF | 821 | | | | S | | | X | C | C | I | I | X | M | E | E | E | M | M | M | M | M | | C | C | C | F | F | |
| 1000pF | 102 | | | | S | | | X | C | C | I | I | X | M | E | E | E | M | C | C | C | C | | C | C | C | F | F | |
| 1200pF | 122 | | | | B | | | X | C | C | | | X | M | E | E | E | M | C | C | C | C | | C | C | C | F | F | |
| 1500pF | 152 | | | | B | | | X | C | C | | | X | C | E | E | E | M | C | C | C | C | | C | C | C | F | F | |
| 1800pF | 182 | | | | | | | X | C | C | | | X | C | E | E | E | M | C | C | C | C | | C | C | C | F | F | |
| 2200pF | 222 | | | | | | | X | C | C | | | M | C | E | E | E | M | C | C | C | C | | C | C | C | F | F | |
| 2700pF | 272 | | | | | | | C | C | C | | | M | C | E | E | E | M | C | C | C | C | | C | C | C | F | F | |
| 3300pF | 332 | | | | | | | C | | | | | C | C | E | E | E | M | C | C | C | C | | C | C | C | F | F | |
| 3900pF | 392 | | | | | | | C | | | | | C | E | E | E | E | M | C | C | C | C | | C | C | C | | | |
| 4700pF | 472 | | | | | | | C | | | | | C | E | E | E | E | M | E | E | C | C | | C | C | C | | | |
| 5600pF | 562 | | | | | | | C | | | | | E | E | E | E | E | C | E | E | C | C | | C | C | E | E | | |
| 6800pF | 682 | | | | | | | C | | | | | E | E | E | E | E | C | E | E | E | E | | C | E | E | | | |
| 8200pF | 822 | | | | | | | | | | | | E | E | E | | | C | E | E | E | E | | E | F | F | | | |
| 0.010μF | 103 | | | | | | | | | | | | E | E | E | | | E | F | F | F | F | | E | F | F | | | |
| 0.012μF | 123 | | | | | | | | | | | | P | | | | | E | F | | | | | | | | | | |
| 0.015μF | 153 | | | | | | | | | | | | P | | | | | F | G | | | | | | | | | | |
| 0.018μF | 183 | | | | | | | | | | | | P | | | | | F/G | G | | | | | | | | | | |
| 0.022μF | 223 | | | | | | | | | | | | P | | | | | F/G | G | | | | | | | | | | |
| 0.027μF | 273 | | | | | | | | | | | | | | | | | F | | | | | | | | | | | |
| 0.033μF | 333 | | | | | | | | | | | | | | | | | F | | | | | | | | | | | |
| 0.039μF | 393 | | | | | | | | | | | | | | | | | F | | | | | | | | | | | |
| 0.047μF | 473 | | | | | | | | | | | | | | | | | F | | | | | | | | | | | |
| 0.056μF | 563 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.068μF | 683 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.082μF | 823 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.10μF | 104 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

Mid-Voltage Capacitor Series (100V~630V)

RATING

COG(NPO)

| Size | | 1812 | | | | | 1825 | | | | | 2220 | | | | | 2225 | | | | |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Cap | Code | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V |
| 10pF | 100 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 12pF | 120 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 15pF | 150 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 18pF | 180 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 22pF | 220 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 27pF | 270 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 33pF | 330 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 39pF | 390 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 47pF | 470 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 56pF | 560 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 68pF | 680 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 82pF | 820 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 100pF | 101 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 120pF | 121 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 150pF | 151 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 180pF | 181 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 220pF | 221 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 270pF | 271 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 330pF | 331 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 390pF | 391 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 470pF | 471 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 560pF | 561 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 680pF | 681 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 820pF | 821 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 1000pF | 102 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 1200pF | 122 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 1500pF | 152 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 1800pF | 182 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 2200pF | 222 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 2700pF | 272 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 3300pF | 332 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 3900pF | 392 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 4700pF | 472 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 5600pF | 562 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 6800pF | 682 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 8200pF | 822 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.010μF | 103 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.012μF | 123 | C | E | E | E | E | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.015μF | 153 | C | E | E | E | E | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.018μF | 183 | E | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.022μF | 223 | E | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.027μF | 273 | F | G | G | | | E | E | E | F | | F | F | F | F | | F | F | F | F | F |
| 0.033μF | 333 | F | | | | | E | E | E | F | | F | F | F | F | | F | F | F | F | F |
| 0.039μF | 393 | G | | | | | E | F | F | F | | F | F | F | G | | F | F | F | F | F |
| 0.047μF | 473 | G | | | | | E | F | F | | | F | G | G | G | | F | F | F | F | F |
| 0.056μF | 563 | G | | | | | F | G | G | | | F | G | G | | | F | G | G | G | G |
| 0.068μF | 683 | G | | | | | F | G | G | | | F | G | G | | | F | G | G | H | H |
| 0.082μF | 823 | G | | | | | G | | | | | G | | | | | F | G | G | R | |
| 0.10μF | 104 | G | | | | | G | | | | | G | | | | | G | G | G | | |
| 0.12μF | 124 | | | | | | | | | | | | | | | | | | | | |
| 0.15μF | 154 | | | | | | | | | | | | | | | | | | | | |
| 0.18μF | 184 | | | | | | | | | | | | | | | | | | | | |
| 0.22μF | 224 | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

Mid-Voltage Capacitor Series (100V~630V)

RATING

X7R

| Size | | 0402 | | | | 0603 | | | | 0805 | | | | | 1206 | | | | | 1210 | | | | | 1808 | |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|------|--|
| Cap | Code | 100V | 100V | 200V | 250V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | 500V | 630V | | | | |
| 100pF | 101 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | | | | | | | | | | | |
| 120pF | 121 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | | | | | | | | | | | |
| 150pF | 151 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | | | | | | C | C | | | | |
| 180pF | 181 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | | | | | | C | C | | | | |
| 220pF | 221 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 270pF | 271 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 330pF | 331 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 390pF | 391 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 470pF | 471 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 560pF | 561 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 680pF | 681 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 820pF | 821 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 1000pF | 102 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 1200pF | 122 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 1500pF | 152 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 1800pF | 182 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 2200pF | 222 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 2700pF | 272 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 3300pF | 332 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 3900pF | 392 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 4700pF | 472 | N | S | B | B | X | X | X | X | X | X | C | C | C | C | M | M | M | C | C | C | C | | | | |
| 5600pF | 562 | | S | B | B | X | X | X | C | C | X | C | C | C | C | M | M | M | C | C | F | F | | | | |
| 6800pF | 682 | | S | B | B | X | X | X | C | C | X | C | C | C | C | M | M | M | C | C | F | F | | | | |
| 8200pF | 822 | | S | B | B | X | X | X | C | C | X | C | C | C | C | M | M | M | C | C | F | F | | | | |
| 0.010μF | 103 | | S | B | B | X | C | C | C | C | X | C | C | C | C | M | M | M | C | C | F | F | | | | |
| 0.012μF | 123 | | B | | | X | C | C | C | C | X | C | C | C | C | M | M | M | C | C | F | F | | | | |
| 0.015μF | 153 | | B | | | X | C | C | C | C | X | C | C | C | C | M | M | M | C | C | F | F | | | | |
| 0.018μF | 183 | | B | | | X | C | C | C | C | X | C | C | C | C | M | M | M | C | C | F | F | | | | |
| 0.022μF | 223 | | B | | | X | C | C | C | C | X | C | C | E | E | M | M | M | C | C | F | F | | | | |
| 0.027μF | 273 | | B | | | C | C | C | C | C | X | C | C | E | E | M | M | M | E | E | F | F | | | | |
| 0.033μF | 333 | | B | | | C | C | C | C | | X | E | E | E | E | M | M | M | E | E | F | F | | | | |
| 0.039μF | 393 | | B | | | C | C | C | | | X | E | E | E | E | M | M | M | E | E | F | F | | | | |
| 0.047μF | 473 | | B | | | C | C | C | | | X | E | E | E | E | M | C | C | E | E | F | F | | | | |
| 0.056μF | 563 | | B | | | C | C | C | | | X | E | E | E | E | M | C | E | E | E | F | F | | | | |
| 0.068μF | 683 | | B | | | C | C | C | | | X | E | E | | | M | E | E | F | F | F | F | | | | |
| 0.082μF | 823 | | B | | | C | C | | | | C | E | E | | | M | E | E | F | F | F | F | | | | |
| 0.10μF | 104 | | B | | | C | C | | | | C | E | E | | | M | E | E | F | F | | | | | | |
| 0.12μF | 124 | | | | | I | | | | | C | E | E | | | M | E | E | | | | | | | | |
| 0.15μF | 154 | | | | | I | | | | | E | E | E | | | C | G | G | | | | | | | | |
| 0.18μF | 184 | | | | | I | | | | | E | E | E | | | C | G | G | | | | | | | | |
| 0.22μF | 224 | | | | | I | | | | | E | E | E | | | C | G | G | | | | | | | | |
| 0.27μF | 274 | | | | | I | | | | | E | | | | | E | G | G | | | | | | | | |
| 0.33μF | 334 | | | | | I | | | | | E | | | | | E | G | G | | | | | | | | |
| 0.39μF | 394 | | | | | I | | | | | E | | | | | G | G | G | | | | | | | | |
| 0.47μF | 474 | | | | | I | | | | | E | | | | | G | G | G | | | | | | | | |
| 0.56μF | 564 | | | | | | | | | | P | | | | | G | G | G | | | | | | | | |
| 0.68μF | 684 | | | | | | | | | | P | | | | | G | G | G | | | | | | | | |
| 0.82μF | 824 | | | | | | | | | | P | | | | | G | | | | | | | | | | |
| 1.00μF | 105 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.20μF | 125 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.50μF | 155 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.80μF | 185 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.20μF | 225 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.70μF | 275 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.30μF | 335 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.90μF | 395 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4.70μF | 475 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.60μF | 565 | | | | | | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

Mid-Voltage Capacitor Series (100V~630V)

RATING

X7R

| Size | | 1812 | | | | | 1825 | | | | | 2220 | | | | | 2225 | | | | |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Cap | Code | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V |
| 100pF | 101 | | | | | | | | | | | | | | | | | | | | |
| 120pF | 121 | | | | | | | | | | | | | | | | | | | | |
| 150pF | 151 | | | | | | | | | | | | | | | | | | | | |
| 180pF | 181 | | | | | | | | | | | | | | | | | | | | |
| 220pF | 221 | | | | | | | | | | | | | | | | | | | | |
| 270pF | 271 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 330pF | 331 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 390pF | 391 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 470pF | 471 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 560pF | 561 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 680pF | 681 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 820pF | 821 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 1000pF | 102 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 1200pF | 122 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 1500pF | 152 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 1800pF | 182 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 2200pF | 222 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 2700pF | 272 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 3300pF | 332 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 3900pF | 392 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 4700pF | 472 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 5600pF | 562 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 6800pF | 682 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 8200pF | 822 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.010μF | 103 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.012μF | 123 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.015μF | 153 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.018μF | 183 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.022μF | 223 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.027μF | 273 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.033μF | 333 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.039μF | 393 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.047μF | 473 | C | C | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.056μF | 563 | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.068μF | 683 | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.082μF | 823 | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.10μF | 104 | C | C | C | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.12μF | 124 | C | C | C | G | G | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.15μF | 154 | C | F | F | G | G | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.18μF | 184 | C | F | F | G | G | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.22μF | 224 | C | F | F | G | G | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.27μF | 274 | C | F | F | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.33μF | 334 | C | F | F | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.39μF | 394 | C | F | F | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.47μF | 474 | F | F | F | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 0.56μF | 564 | F | G | G | | | F | F | F | G | G | F | F | F | | | F | F | F | F | F |
| 0.68μF | 684 | F | G | G | | | F | F | F | | | F | F | F | | | F | F | F | | |
| 0.82μF | 824 | F | G | G | | | F | F | F | | | F | F | F | | | F | F | F | | |
| 1.00μF | 105 | | | | | | | | | | | | | | | | | | | | |
| 1.20μF | 125 | | | | | | | | | | | | | | | | | | | | |
| 1.50μF | 155 | | | | | | | | | | | | | | | | | | | | |
| 1.80μF | 185 | | | | | | | | | | | | | | | | | | | | |
| 2.20μF | 225 | | | | | | | | | | | | | | | | | | | | |
| 2.70μF | 275 | | | | | | | | | | | | | | | | | | | | |
| 3.30μF | 335 | | | | | | | | | | | | | | | | | | | | |
| 3.90μF | 395 | | | | | | | | | | | | | | | | | | | | |
| 4.70μF | 475 | | | | | | | | | | | | | | | | | | | | |
| 5.60μF | 565 | | | | | | | | | | | | | | | | | | | | |
| 6.80μF | 685 | | | | | | | | | | | | | | | | | | | | |
| 8.20μF | 825 | | | | | | | | | | | | | | | | | | | | |
| 10.0μF | 106 | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

■ Mid-Voltage Capacitor Series (100V~630V)

RATING

Y5V

| Size | | 0805 | | | 1206 | | | 1210 | | | 1812 | | |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Cap | Code | 100V | 200V | 250V | 100V | 200V | 250V | 100V | 200V | 250V | 100V | 200V | 250V |
| 0.01μF | 103 | B | B | B | B | B | B | C | C | C | D | D | D |
| 0.015μF | 153 | B | B | B | B | B | B | C | C | C | D | D | D |
| 0.022μF | 223 | B | B | B | B | B | B | C | C | C | D | D | D |
| 0.033μF | 333 | B | B | B | B | B | B | C | C | C | D | D | D |
| 0.047μF | 473 | B | B | B | B | B | B | C | C | C | D | D | D |
| 0.068μF | 683 | B | B | B | B | B | B | C | C | C | D | D | D |
| 0.1μF | 104 | B | | | B | B | B | C | C | C | D | D | D |
| 0.15μF | 154 | | | | C | C | C | C | C | C | D | D | D |
| 0.22μF | 224 | | | | C | | | C | | | D | D | D |
| 0.33μF | 334 | | | | | | | C | | | D | D | D |
| 0.47μF | 474 | | | | | | | | | | D | D | D |
| 0.68μF | 684 | | | | | | | | | | D | D | D |
| 1μF | 105 | | | | | | | | | | | | |

MLCC

Chip R

Coil

■ Anti-Bend (Soft termination) Capacitor Series

FEATURES

- High performance to withstanding 3~5mm of substrate bending test guarantee.
- A wide selection of sizes is available (0402 to 2225).
- High capacitance in given case size.
- Capacitor with lead-free termination (pure Tin).
- Reduction in PCB bend failure.
- High reliability and stability.
- RoHS & HALOGEN compliant

APPLICATION

- For general digital circuit.
- For power supply bypass capacitors.
- For consumer electronics.
- For telecommunication.
- DC to DC converter

PART NUMBER

| FP | 32 | X | 225 | K | 101 | E | G | G |
|------------|----------------|------------|--------------------------|-----------|---------------|--------------------|-------------|--------------|
| PDC Family | Size | Dielectric | Capacitance | Tolerance | Rated voltage | Packaging | Thickness | Control Code |
| Anti-bend | 15 0402(1005) | N COG(NPO) | 106=10x10 ^Λ 6 | J= ± 5% | 6R3=6.3V | E= | Reference | G=RoHS |
| General | 18 0603 (1608) | X X7R | =10μF | K=± 10 % | 100=10V | Tape and 7" Reel, | Thickness | Compliant |
| Purpose | 21 0805 (2012) | | 100=10x10 ^Λ 0 | M=± 20 % | 160=16V | Embossed Tape | Description | |
| | 31 1206 (3216) | | =10pF | | 250=25V | P= | | |
| | 32 1210 (3225) | | R47=0.47pF | | 500=50V | Tape and 7" Reel, | | |
| | 42 1808 (4520) | | OR5=0.5pF | | 101=100V | Paper Tape | | |
| | 43 1812 (4532) | | | | 201=200V | L= | | |
| | 46 1825 (4563) | | | | 251=250V | Tape and 13" Reel, | | |
| | 55 2220 (5750) | | | | 501=500V | Embossed | | |
| | 56 2225 (5763) | | | | 631=630V | G= | | |
| | | | | | 102=1000V | Tape and 13"Reel, | | |
| | | | | | 152=1500V | Paper Tape | | |
| | | | | | 202=2000V | | | |
| | | | | | 302=3000V | | | |
| | | | | | 402=4000V | | | |

GENERAL ELECTRICAL DATA

| Dielectric | NPO | X7R |
|---|--|--|
| Size | 0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225 | 0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225 |
| Rated voltage (WVDC) | 10V, 16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V, 1KV, 1.5KV, 2KV, 3KV, 4KV | 6.3V, 10V, 16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V, 1KV, 1.5KV, 2KV, 3KV, 4KV |
| Capacitance range | 0.1pF ~ 330nF | 100pF ~ 22μF |
| Capacitance tolerance | Cap≤5pF: B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%), K (±10%) | J (±5%) K (±10%) M (±20%) |
| Tan δ | Cap. Rang Q Spec. Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000 | ≤2.5% ~ ≤10% |
| Capacitance & Tan δ Test Condition | Cap. Rang Test Condition Cap≤1000pF 1.0±0.2Vrms, 1.0MHz±10% Cap>1000pF, 1.0±0.2Vrms, 1.0kHz±10% | Preconditioning for Class II MLCC: Perform a heat treatment at 150±10°C for 1 hour, then leave in ambient condition for 24±2 hours before measurement. Cap. Rang Test Condition Cap≤10μF 1.0±0.2Vrms, 1.0kHz±10% Cap≥10μF, 0.5±0.2Vrms, 120Hz±20% |
| Insulation resistance | ≥10GΩ or R·C≥500Ω·F whichever is smaller | ≥10GΩ or R·C≥100Ω·F whichever is smaller |
| Operating temperature | | -55 to +125°C |
| Temperature coefficient | ±30ppm/°C | ±15% |
| Termination | Cu / Ag polymer / Ni / Sn (lead-free termination) | |

DIMENSIONS



| Size inch (mm) | L (mm) | W (mm) | T (mm) code | M _b (mm) |
|----------------|-----------|-----------|---------------------------------|---------------------|
| 0402 (1005) | 1.00±0.20 | 0.50±0.20 | | 0.25+0.05/-0.10 |
| 0603 (1608) | 1.60±0.20 | 0.80±0.20 | | 0.40±0.15 |
| 0805 (2012) | 2.10±0.20 | 1.25±0.20 | | 0.50±0.20 |
| 1206 (3216) | 3.30±0.30 | 1.60±0.20 | | 0.60±0.20 |
| 1210 (3225) | 3.30±0.40 | 2.50±0.30 | | 0.75±0.35 |
| 1808 (4520) | 4.60±0.50 | 2.00±0.25 | Reference Thickness Description | 0.75±0.35 |
| 1812 (4532) | 4.60±0.50 | 3.20±0.30 | | 0.75±0.35 |
| 1825 (4563) | 4.60±0.50 | 6.30±0.40 | | 0.75±0.35 |
| 2220 (5750) | 5.70±0.50 | 5.00±0.40 | | 0.85±0.35 |
| 2225 (5763) | 5.70±0.50 | 6.30±0.40 | | 0.85±0.35 |

■ Anti-Bend (Soft termination) Capacitor Series

RATING

| | | NPO | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|------|------|-----|---------|------|------|-----|---------|------|-----------|------|-----|---------|------|------|------|-----------|-----|---------|-----|-----|------|------|------|------|------|-----|-----------|
| Size | | 0402 | | | | 0603 | | | | | 0805 | | | | | 1206 | | | | | | | | | | | | |
| Cap | Code | 10V | 16V | 25V 50V | 100V | 10V | 16V | 25V 50V | 100V | 200V 250V | 10V | 16V | 25V 50V | 100V | 200V | 250V | 500V 630V | 1KV | 10V 16V | 25V | 50V | 100V | 200V | 250V | 500V | 630V | 1KV | 1.5KV 2KV |
| 0.1pF | 0R1 | K | K | K | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.2pF | 0R2 | K | K | K | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.3pF | 0R3 | K | K | K | | S | S | S | | | | | | | | | | | | | | | | | | | | |
| 0.4pF | 0R4 | K | K | K | | S | S | S | | | | | | | | | | | | | | | | | | | | |
| 0.5pF | 0R5 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | | | | | | | | | | |
| 1.0pF | 1R0 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | | | X | | | | | | | |
| 1.2pF | 1R2 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | | | | X | | |
| 1.5pF | 1R5 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 1.8pF | 1R8 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 2pF | 2R0 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 2.2pF | 2R2 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 2.7pF | 2R7 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 3.3pF | 3R3 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 3.9pF | 3R9 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 4.7pF | 4R7 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 5.0pF | 5R0 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 5.6pF | 5R6 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 6.8pF | 6R8 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 8.2pF | 8R2 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 10pF | 100 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 12pF | 120 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 15pF | 150 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 18pF | 180 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 22pF | 220 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 27pF | 270 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X |
| 33pF | 330 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | M |
| 39pF | 390 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | M |
| 47pF | 470 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | M | M |
| 56pF | 560 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | M | C |
| 68pF | 680 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | M | C |
| 82pF | 820 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | A | X | C | X | X | X | X | X | X | X | X | C | C |
| 100pF | 101 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | X | C | C | X | X | X | X | X | X | X | X | C | C |
| 120pF | 121 | K | K | K | K | S | S | S | S | S | A | A | A | A | A | X | C | C | X | X | X | X | X | X | X | X | C | E |
| 150pF | 151 | K | K | K | K | S | S | S | S | S | A | A | A | A | X | C | C | C | X | X | X | X | X | X | X | X | C | E |
| 180pF | 181 | K | K | K | K | S | S | S | S | S | A | A | A | A | X | C | C | C | X | X | X | X | X | X | X | X | E | E |
| 220pF | 221 | K | K | K | K | S | S | S | S | S | A | A | A | A | C | C | C | C | X | X | X | X | X | X | X | X | E | E |
| 270pF | 271 | K | K | K | | S | S | S | S | B | A | A | A | A | C | C | C | C | X | X | X | X | X | M | M | M | E | P |
| 330pF | 331 | K | K | K | | S | S | S | S | B | A | A | A | A | C | C | C | C | X | X | X | X | X | M | M | M | E | P |
| 390pF | 391 | K | K | K | | S | S | S | S | B | X | X | X | X | C | C | C | C | X | X | X | X | X | M | M | M | E | P |
| 470pF | 471 | K | K | K | | S | S | S | S | B | X | X | X | X | C | C | I | | X | X | X | X | M | M | M | M | E | |
| 560pF | 561 | K | K | K | | S | S | S | S | | X | X | X | X | C | C | I | | X | X | X | X | M | C | C | C | E | |
| 680pF | 681 | K | K | K | | S | S | S | S | | X | X | X | X | C | C | I | | X | X | X | X | M | C | C | C | E | |
| 820pF | 821 | K | K | K | | S | S | S | S | | X | X | X | X | C | C | I | | X | X | X | X | M | E | E | E | E | |
| 1000pF | 102 | K | K | K | | S | S | S | S | | X | X | X | X | C | C | I | | X | X | X | X | M | E | E | E | E | |
| 1200pF | 122 | | | | | B | B | B | | | X | X | X | X | C | C | | | X | X | X | X | M | E | E | E | | |
| 1500pF | 152 | | | | | B | B | B | | | X | X | X | X | C | C | | | X | X | X | X | C | E | E | E | | |
| 1800pF | 182 | | | | | B | B | B | | | X | X | X | X | C | C | | | X | X | X | X | C | E | E | E | | |
| 2200pF | 222 | | | | | B | B | B | | | X | X | X | X | C | C | | | X | X | X | X | C | E | E | E | | |
| 2700pF | 272 | | | | | B | B | B | | | C | C | C | C | C | C | | | X | X | X | X | C | E | E | E | | |
| 3300pF | 332 | | | | | B | B | B | | | C | C | C | C | C | C | | | X | X | X | X | C | E | E | E | | |
| 3900pF | 392 | | | | | | | | | | C | C | C | C | | | | | X | X | X | X | E | E | E | E | | |
| 4700pF | 472 | | | | | | | | | | C | C | C | C | | | | | X | X | X | X | E | E | E | E | | |
| 5600pF | 562 | | | | | | | | | | C | C | C | C | | | | | X | X | X | X | E | E | E | | | |
| 6800pF | 682 | | | | | | | | | | C | C | C | C | | | | | M | M | M | M | E | E | E | | | |
| 8200pF | 822 | | | | | | | | | | C | C | C | | | | | | C | C | C | C | E | E | | | | |
| 0.010μF | 103 | | | | | | | | | | C | C | C | | | | | | C | C | C | C | E | E | | | | |
| 0.012μF | 123 | | | | | | | | | | | | | | | | | | P | P | P | P | | | | | | |
| 0.015μF | 153 | | | | | | | | | | | | | | | | | | P | P | P | P | | | | | | |
| 0.018μF | 183 | | | | | | | | | | | | | | | | | | P | P | P | P | | | | | | |
| 0.022μF | 223 | | | | | | | | | | | | | | | | | | P | P | P | P | | | | | | |
| 0.027μF | 273 | | | | | | | | | | | | | | | | | | P | P | P | | | | | | | |
| 0.033μF | 333 | | | | | | | | | | | | | | | | | | P | P | P | | | | | | | |
| 0.039μF | 393 | | | | | | | | | | | | | | | | | | P | P | P | | | | | | | |

MLCC

Chip R

Coil

■ Anti-Bend (Soft termination) Capacitor Series

RATING

| | | NPO | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|------|---------|---------|------|-----------|------|------|-----|-----------|---------|------|-----------|------|------|-----|-----------|-----|-----|---------|-----|-----|------|-----------|------|------|-----|-----------|-----|
| Size | | 1210 | | | | | | | 1808 | | | | | | | 1812 | | | | | | | | | | | | |
| Cap | Code | 10V 16V | 25V 50V | 100V | 200V 250V | 500V | 630V | 1KV | 1.5KV 2KV | 25V 50V | 100V | 200V 250V | 500V | 630V | 1KV | 1.5KV 2KV | 3KV | 4KV | 10V 16V | 25V | 50V | 100V | 200V 250V | 500V | 630V | 1KV | 1.5KV 2KV | 3KV |
| 2.2pF | 2R2 | | | | | | | | C | C | C | C | C | C | C | C | C | | | | | | | | | | | |
| 2.7pF | 2R7 | | | | | | | | C | C | C | C | C | C | C | C | C | | | | | | | | | | | |
| 3.3pF | 3R3 | | | | | | | | C | C | C | C | C | C | C | C | C | | | | | | | | | | | |
| 3.9pF | 3R9 | | | | | | | | C | C | C | C | C | C | C | C | C | | | | | | | | | | | |
| 4.7pF | 4R7 | | | | | | | | C | C | C | C | C | C | C | C | C | | | | | | | | | | | |
| 5.0pF | 5R0 | | | | | | | | C | C | C | C | C | C | C | C | C | | | | | | | | | | | |
| 5.6pF | 5R6 | | | | | | | | C | C | C | C | C | C | C | C | C | | | | | | | | | | | |
| 6.8pF | 6R8 | | | | | | | | C | C | C | C | C | C | C | C | C | | | | | | | | | | | |
| 8.2pF | 8R2 | | | | | | | | C | C | C | C | C | C | C | C | C | | | | | | | | | | | |
| 10pF | 100 | M | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 12pF | 120 | M | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 15pF | 150 | M | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 18pF | 180 | M | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 22pF | 220 | M | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | E | C | C | C | C | C | C | C | C | C | C |
| 27pF | 270 | M | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | E | C | C | C | C | C | C | C | C | C | C |
| 33pF | 330 | M | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | F | C | C | C | C | C | C | C | C | C | C |
| 39pF | 390 | M | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | F | C | C | C | C | C | C | C | C | C | C |
| 47pF | 470 | M | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | | C | C | C | C | C | C | C | C | C | C |
| 56pF | 560 | M | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | | C | C | C | C | C | C | C | C | C | C |
| 68pF | 680 | M | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | | C | C | C | C | C | C | C | C | C | C |
| 82pF | 820 | M | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | | C | C | C | C | C | C | C | C | C | C |
| 100pF | 101 | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | F | | C | C | C | C | C | C | C | C | C | C |
| 120pF | 121 | M | M | M | M | M | M | C | C | C | C | C | C | C | C | C | F | | C | C | C | C | C | C | C | C | C | C |
| 150pF | 151 | M | M | M | M | M | M | C | E | C | C | C | C | C | C | F | F | | C | C | C | C | C | C | C | C | C | C |
| 180pF | 181 | M | M | M | M | M | M | C | E | C | C | C | C | C | C | F | F | | C | C | C | C | C | C | C | C | C | F |
| 220pF | 221 | M | M | M | M | M | M | E | E | C | C | C | C | C | C | F | F | | C | C | C | C | C | C | C | C | C | F |
| 270pF | 271 | M | M | M | M | M | M | E | F | C | C | C | C | C | F | F | F | | C | C | C | C | C | C | C | C | F | F |
| 330pF | 331 | M | M | M | M | M | M | E | F | C | C | C | C | C | F | F | F | | C | C | C | C | C | C | C | C | F | F |
| 390pF | 391 | M | M | M | M | M | M | E | G | C | C | C | C | C | F | F | F | | C | C | C | C | C | C | C | C | F | F |
| 470pF | 471 | M | M | M | M | M | M | E | G | G | C | C | C | C | F | F | | | C | C | C | C | C | C | C | C | F | F |
| 560pF | 561 | M | M | M | M | M | M | E | G | G | C | C | C | C | F | F | | | C | C | C | C | C | C | C | C | F | F |
| 680pF | 681 | M | M | M | M | M | M | E | G | G | C | C | C | C | F | F | | | C | C | C | C | C | C | C | C | F | F |
| 820pF | 821 | M | M | M | M | M | M | E | G | G | C | C | C | C | F | F | | | C | C | C | C | C | C | C | C | F | G |
| 1000pF | 102 | M | M | M | C | C | C | E | G | G | C | C | C | C | F | F | | | C | C | C | C | C | C | C | C | F | G |
| 1200pF | 122 | M | M | M | C | C | C | E | F | C | C | C | C | C | F | F | | | C | C | C | C | C | C | C | C | F | |
| 1500pF | 152 | M | M | M | C | C | C | F | G | C | C | C | C | C | F | F | | | C | C | C | C | C | C | C | C | F | |
| 1800pF | 182 | M | M | M | C | C | C | G | G | C | C | C | C | C | F | F | | | C | C | C | C | C | C | C | E | F | |
| 2200pF | 222 | M | M | M | C | C | C | G | | C | C | C | C | C | F | | | | C | C | C | C | C | C | C | E | F | |
| 2700pF | 272 | M | M | M | C | C | C | G | | C | C | C | C | C | | | | | C | C | C | C | C | C | C | F | G | |
| 3300pF | 332 | M | M | M | C | C | C | G | | C | C | C | C | C | | | | | C | C | C | C | C | C | C | F | G | |
| 3900pF | 392 | M | M | M | C | C | C | G | | C | C | C | | | | | | | C | C | C | C | C | C | C | C | G | |
| 4700pF | 472 | M | M | M | E | E | E | | | C | C | C | | | | | | | C | C | C | C | C | C | C | C | G | |
| 5600pF | 562 | M | M | C | E | E | E | | | C | C | E | | | | | | | C | C | C | C | C | C | C | | | |
| 6800pF | 682 | M | M | C | E | E | E | | | C | C | E | | | | | | | C | C | C | C | C | C | C | | | |
| 8200pF | 822 | M | M | C | E | E | E | | | C | E | F | | | | | | | C | C | C | C | C | C | C | | | |
| 0.010μF | 103 | M | M | E | F | F | F | | | C | E | F | | | | | | | C | C | C | C | C | C | | | | |
| 0.012μF | 123 | C | C | E | | | | | | E | | | | | | | | | C | C | C | C | E | E | E | | | |
| 0.015μF | 153 | C | C | F | | | | | | E | | | | | | | | | C | C | C | C | E | E | E | | | |
| 0.018μF | 183 | F | F | G | | | | | | F | | | | | | | | | C | C | C | E | F | F | F | | | |
| 0.022μF | 223 | F | F | G | | | | | | F | | | | | | | | | C | C | C | E | F | F | F | | | |
| 0.027μF | 273 | G | G | | | | | | | | | | | | | | | | C | E | E | F | G | | | | | |
| 0.033μF | 333 | G | G | | | | | | | | | | | | | | | | C | E | E | F | | | | | | |
| 0.039μF | 393 | G | G | | | | | | | | | | | | | | | | | F | F | G | | | | | | |
| 0.047μF | 473 | | | | | | | | | | | | | | | | | | | F | F | G | | | | | | |
| 0.056μF | 563 | | | | | | | | | | | | | | | | | | | G | G | | | | | | | |
| 0.068μF | 683 | | | | | | | | | | | | | | | | | | | G | G | | | | | | | |
| 0.082μF | 823 | | | | | | | | | | | | | | | | | | | G | G | | | | | | | |
| 0.100μF | 104 | | | | | | | | | | | | | | | | | | | G | G | | | | | | | |
| 0.120μF | 124 | | | | | | | | | | | | | | | | | | | G | G | | | | | | | |
| 0.150μF | 154 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

■ Anti-Bend (Soft termination) Capacitor Series

RATING

NPO

| Size | | 1825 | | | | | | | | | | | | | | | | 2220 | | | | | | | | 2225 | | | | | | | |
|---------|------|---------|------|-----------|------|------|-----|-----------|-----|---------|------|-----------|------|------|-----|-------|-----|------|-----|---------|------|-----------|------|------|-----|-----------|-----|-----|--|--|--|--|--|
| Cap | Code | 25V 50V | 100V | 200V 250V | 500V | 630V | 1KV | 1.5KV 2KV | 3KV | 25V 50V | 100V | 200V 250V | 500V | 630V | 1KV | 1.5KV | 2KV | 3KV | 4KV | 25V 50V | 100V | 200V 250V | 500V | 630V | 1KV | 1.5KV 2KV | 3KV | 4KV | | | | | |
| 10pF | 100 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | | | | | | |
| 12pF | 120 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | | | | | | |
| 15pF | 150 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | | | | | | |
| 18pF | 180 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | | | | | | |
| 22pF | 220 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | | | | | | |
| 27pF | 270 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 33pF | 330 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 39pF | 390 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 47pF | 470 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 56pF | 560 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 68pF | 680 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 82pF | 820 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 100pF | 101 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 120pF | 121 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 150pF | 151 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 180pF | 181 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 220pF | 221 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 270pF | 271 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | G | F | F | F | F | F | F | F | F | F | | | | | |
| 330pF | 331 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | G | F | F | F | F | F | F | F | F | F | | | | | |
| 390pF | 391 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 470pF | 471 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 560pF | 561 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 680pF | 681 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 820pF | 821 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 1000pF | 102 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 1200pF | 122 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 1500pF | 152 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 1800pF | 182 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 2200pF | 222 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | F | | | | | |
| 2700pF | 272 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | G | | | | | |
| 3300pF | 332 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | G | | | | | |
| 3900pF | 392 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | | | | | | |
| 4700pF | 472 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | | F | F | F | F | F | F | F | F | | | | | | |
| 5600pF | 562 | F | F | F | F | F | F | | | F | F | F | F | F | F | | | | | F | F | F | F | F | F | F | F | | | | | | |
| 6800pF | 682 | F | F | F | F | F | F | | | F | F | F | F | F | F | | | | | F | F | F | F | F | F | F | F | | | | | | |
| 8200pF | 822 | F | F | F | F | F | G | | | F | F | F | F | F | G | | | | | F | F | F | F | F | F | F | G | | | | | | |
| 0.010μF | 103 | F | F | F | F | F | G | | | F | F | F | F | F | G | | | | | F | F | F | F | F | G | G | | | | | | | |
| 0.012μF | 123 | F | F | F | F | F | | | | F | F | F | F | F | | | | | | F | F | F | F | F | | | | | | | | | |
| 0.015μF | 153 | F | F | F | F | F | | | | F | F | F | F | F | | | | | | F | F | F | F | F | | | | | | | | | |
| 0.018μF | 183 | F | F | F | F | F | | | | F | F | F | F | F | | | | | | F | F | F | F | F | | | | | | | | | |
| 0.022μF | 223 | F | F | F | F | F | | | | F | F | F | F | F | | | | | | F | F | F | F | F | | | | | | | | | |
| 0.027μF | 273 | F | F | F | F | | | | | F | F | F | F | | | | | | | F | F | F | F | F | | | | | | | | | |
| 0.033μF | 333 | F | F | F | F | | | | | F | F | F | F | | | | | | | F | F | F | F | F | | | | | | | | | |
| 0.039μF | 393 | F | F | F | G | | | | | F | F | F | F | | | | | | | F | F | F | F | F | | | | | | | | | |
| 0.047μF | 473 | F | F | F | G | | | | | F | F | G | G | | | | | | | F | F | F | F | F | | | | | | | | | |
| 0.056μF | 563 | F | F | G | | | | | | F | F | G | | | | | | | | F | F | G | G | G | | | | | | | | | |
| 0.068μF | 683 | F | F | G | | | | | | F | F | G | | | | | | | | F | F | G | G | G | | | | | | | | | |
| 0.082μF | 823 | F | G | | | | | | | F | G | | | | | | | | | F | F | G | G | | | | | | | | | | |
| 0.100μF | 104 | G | G | | | | | | | G | G | | | | | | | | | F | G | G | | | | | | | | | | | |
| 0.120μF | 124 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.150μF | 154 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.180μF | 184 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.220μF | 224 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.270μF | 274 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.330μF | 334 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

■ Anti-Bend (Soft termination) Capacitor Series

RATING

X7R

| Size | | 1210 | | | | | | | | | | 1808 | | | | 1812 | | | | | | | | | | | | | |
|---------|------|------|-----|-----|-----|------|--------------|--------------|-----|-------|-----|--------------|-----|--------------|-----|------|------------|------------|------|--------------|------|------|------|-----|--------------|-----|-----|----|--|
| Cap | Code | 10V | 16V | 25V | 50V | 100V | 200V 250V | 500V 630V | 1KV | 1.5KV | 2KV | 500V 630V | 1KV | 1.5KV 2KV | 3KV | 4KV | 10V 16V | 25V 50V | 100V | 200V 250V | 400V | 500V | 630V | 1KV | 1.5KV 2KV | 3KV | 4KV | | |
| 150pF | 151 | | | | | | | | | | | C | C | C | C | F* | | | | | | | | | | | | | |
| 180pF | 181 | | | | | | | | | | | C | C | C | C | F* | | | | | | | | | | | | | |
| 220pF | 221 | | | M | M | M | M | M | M | M | C | C | C | C | F* | | | | | | | | | | | | | | |
| 270pF | 271 | | | M | M | M | M | M | M | M | C | C | C | C | F* | | C | C | C | C | C | C | C | C | C | C | C | F* | |
| 330pF | 331 | | | M | M | M | M | M | M | M | C | C | C | C | F* | | C | C | C | C | C | C | C | C | C | C | C | F* | |
| 390pF | 391 | | | M | M | M | M | M | M | M | C | C | C | C | F* | | C | C | C | C | C | C | C | C | C | C | C | F* | |
| 470pF | 471 | | | M | M | M | M | M | M | M | C | C | C | C | F* | | C | C | C | C | C | C | C | C | C | C | C | F* | |
| 560pF | 561 | | | M | M | M | M | M | M | M | C | C | C | E | F* | | C | C | C | C | C | C | C | C | C | C | C | F* | |
| 680pF | 681 | | | M | M | M | M | M | M | M | C | C | C | E | F* | | C | C | C | C | C | C | C | C | C | C | C | F* | |
| 820pF | 821 | | | M | M | M | M | M | M | M | C | C | C | E | F* | | C | C | C | C | C | C | C | C | C | C | C | F* | |
| 1000pF | 102 | M | M | M | M | M | M | M | M | C | C | C | C | F | F* | C | C | C | C | C | C | C | C | C | C | C | E | F* | |
| 1200pF | 122 | M | M | M | M | M | M | M | M | E | E | C | C | C | F | | C | C | C | C | C | C | C | C | C | C | F | G* | |
| 1500pF | 152 | M | M | M | M | M | M | M | M | E | E | C | C | C | F | | C | C | C | C | C | C | C | C | C | C | F | G* | |
| 1800pF | 182 | M | M | M | M | M | M | M | M | E | E | C | C | C | F | | C | C | C | C | C | C | C | C | C | C | C | G* | |
| 2200pF | 222 | M | M | M | M | M | M | M | M | F | F | C | C | E | F | | C | C | C | C | C | C | C | C | C | C | C | G* | |
| 2700pF | 272 | M | M | M | M | M | M | M | M | F | G | C | C | F | F | | C | C | C | C | C | C | C | C | C | C | C | G* | |
| 3300pF | 332 | M | M | M | M | M | M | M | M | F | G | C | C | F | F | | C | C | C | C | C | C | C | C | C | E | G* | | |
| 3900pF | 392 | M | M | M | M | M | M | M | M | G | G | C | C | F | | | C | C | C | C | C | C | C | C | C | F | | | |
| 4700pF | 472 | M | M | M | M | M | M | M | M | G | G | C | C | F | | | C | C | C | C | C | C | C | C | C | F | | | |
| 5600pF | 562 | M | M | M | M | M | M | M | M | G | G* | C | C | F | | | C | C | C | C | C | C | C | C | C | G | | | |
| 6800pF | 682 | M | M | M | M | M | M | M | M | G | G* | C | C | F | | | C | C | C | C | C | C | C | C | C | G | | | |
| 8200pF | 822 | M | M | M | M | M | M | M | M | G | G* | C | C | | | | C | C | C | C | C | C | C | C | C | G | | | |
| 0.010μF | 103 | M | M | M | M | M | M | M | C | | | C | C | | | | C | C | C | C | C | C | C | C | C | G | | | |
| 0.012μF | 123 | M | M | M | M | M | M | M | C | | | E | E | | | | C | C | C | C | C | C | C | C | C | | | | |
| 0.015μF | 153 | M | M | M | M | M | M | M | E | | | E | E | | | | C | C | C | C | C | C | C | C | C | | | | |
| 0.018μF | 183 | M | M | M | M | M | M | C | E | | | F | F | | | | C | C | C | C | C | C | C | C | E | | | | |
| 0.022μF | 223 | M | M | M | M | M | M | C | E | | | F | F | | | | C | C | C | C | C | C | C | C | E | | | | |
| 0.027μF | 273 | M | M | M | M | M | M | C | E | | | F | F | | | | C | C | C | C | C | C | C | C | F | | | | |
| 0.033μF | 333 | M | M | M | M | M | M | E | E | | | F | F | | | | C | C | C | C | C | C | C | C | F | | | | |
| 0.039μF | 393 | M | M | M | M | M | M | E | F | | | F | F | | | | C | C | C | C | C | C | C | C | G | | | | |
| 0.047μF | 473 | M | M | M | M | M | C | E | G | | | F | F | | | | C | C | C | C | C | C | C | C | G | | | | |
| 0.056μF | 563 | M | M | M | M | M | C | E | | | | F | F | | | | C | C | C | C | C | E | E | G | | | | | |
| 0.068μF | 683 | M | M | M | M | M | E | F | | | | F | | | | | C | C | C | C | C | E | E | G | | | | | |
| 0.082μF | 823 | M | M | M | M | M | E | F | | | | F | | | | | C | C | C | C | C | E | E | G | | | | | |
| 0.100μF | 104 | M | M | M | M | M | E | F | | | | | | | | | C | C | C | C | C | E | E | G | | | | | |
| 0.120μF | 124 | M | M | M | M | M | E | | | | | | | | | | C | C | C | C | C | F | F | | | | | | |
| 0.150μF | 154 | M | M | M | M | C | E | | | | | | | | | | C | C | C | C | C | F | F | | | | | | |
| 0.180μF | 184 | M | M | M | M | C | E | | | | | | | | | | C | C | C | C | C | G | G | | | | | | |
| 0.220μF | 224 | M | M | M | M | C | E | | | | | | | | | | C | C | C | C | C | G | G | | | | | | |
| 0.270μF | 274 | M | M | M | M | E | F | | | | | | | | | | C | C | C | E | E | G | | | | | | | |
| 0.330μF | 334 | M | M | M | C | E | F | | | | | | | | | | C | C | C | E | E | G | | | | | | | |
| 0.390μF | 394 | M | M | M | C | G | G | | | | | | | | | | C | C | C | F | F | G | | | | | | | |
| 0.470μF | 474 | M | M | M | C | G | G | | | | | | | | | | C | C | C | F | F | G | | | | | | | |
| 0.560μF | 564 | C | C | C | C | G | G | | | | | | | | | | C | C | C | G | | | | | | | | | |
| 0.680μF | 684 | C | C | C | C | F | G | | | | | | | | | | C | C | C | G | | | | | | | | | |
| 0.820μF | 824 | C | C | C | C | F | | | | | | | | | | | C | C | C | G | | | | | | | | | |
| 1μF | 105 | C | C | C | C | F | | | | | | | | | | | C | C | C | G | | | | | | | | | |
| 1.2μF | 125 | | | | | | | | | | | | | | | | | C | C | | | | | | | | | | |
| 1.5μF | 155 | | F | E | G | G | | | | | | | | | | | | C | C | | | | | | | | | | |
| 1.8μF | 185 | | | | | | | | | | | | | | | | | E | E | | | | | | | | | | |
| 2.20μF | 225 | | F | E | G | G | | | | | | | | | | | | E | E | | | | | | | | | | |
| 2.70μF | 275 | | | | | | | | | | | | | | | | | F | F | | | | | | | | | | |
| 3.3μF | 335 | | F | E | G | G | | | | | | | | | | | | F | F | | | | | | | | | | |
| 3.9μF | 395 | | | | | | | | | | | | | | | | | F | F | | | | | | | | | | |
| 4.7μF | 475 | F | F | F | G | | | | | | | | | | | | | G | G | | | | | | | | | | |
| 5.6μF | 565 | | | | | | | | | | | | | | | | | G | | | | | | | | | | | |
| 6.8μF | 685 | | | | | | | | | | | | | | | | | G | | | | | | | | | | | |
| 8.2μF | 825 | | | | | | | | | | | | | | | | | G | | | | | | | | | | | |
| 10μF | 106 | F | F | G | G | | | | | | | | | | | | | G | | | | | | | | | | | |
| 22μF | 226 | | G | | | | | | | | | | | | | | | | | | | | | | | | | | |

* Surface coating only

MLCC

Chip R

Coil

■ Anti-Bend (Soft termination) Capacitor Series

RATING

X7R

| Size | | 1825 | | | | | | | | | | 2220 | | | | | | | | | | 2225 | | | | | | | | | |
|---------|------|---------|------|------|------|-----------|-----|-------|-----|-----|-----|---------|------|-----------|------|-----------|-----|-----------|-----|-----|---------|------|-----------|-----------|-----|-------|-----|-----|-----|----|--|
| Cap | Code | 25V 50V | 100V | 200V | 250V | 500V 630V | 1KV | 1.5KV | 2KV | 3KV | 4KV | 25V 50V | 100V | 200V 250V | 400V | 500V 630V | 1KV | 1.5KV 2KV | 3KV | 4KV | 25V 50V | 100V | 200V 250V | 500V 630V | 1KV | 1.5KV | 2KV | 3KV | 4KV | | |
| 270pF | 271 | | | | | | | | | F* | | | | | | | | | | F* | | | | | | | | | F* | | |
| 330pF | 331 | | | | | | | | | F* | | | | | | | | | | F* | | | | | | | | | F* | | |
| 390pF | 391 | | | | | | | | | F* | | | | | | | | | | F* | | | | | | | | | F* | | |
| 470pF | 471 | | | | | | | | | F* | | | | | | | | | | F* | | | | | | | | | F* | | |
| 560pF | 561 | | | | | | | | | F* | | | | | | | | | | F* | | | | | | | | | F* | | |
| 680pF | 681 | | | | | | | | | F* | | | | | | | | | | F* | | | | | | | | | F* | | |
| 820pF | 821 | | | | | | | | | F* | | | | | | | | | | F* | | | | | | | | | F* | | |
| 1000pF | 102 | F | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F* | F* | |
| 1200pF | 122 | F | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | F | F* | G* | |
| 1500pF | 152 | F | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | F | F* | G* | |
| 1800pF | 182 | F | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | F | F* | G* | |
| 2200pF | 222 | F | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F* | | |
| 2700pF | 272 | F | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F* | | |
| 3300pF | 332 | F | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F* | | |
| 3900pF | 392 | F | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F* | | |
| 4700pF | 472 | F | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F* | | |
| 5600pF | 562 | F | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F* | G* | |
| 6800pF | 682 | F | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | F | F* | G* | |
| 8200pF | 822 | F | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | G | G* | | F | F | F | F | F | F | F | F | F* | G* | |
| 0.010μF | 103 | F | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | G | G* | | F | F | F | F | F | F | F | F | F* | G* | |
| 0.012μF | 123 | F | F | F | F | F | F | G | G | H* | F | F | F | F | F | F | F | G | H* | | F | F | F | F | F | G | G | G* | | | |
| 0.015μF | 153 | F | F | F | F | F | F | G | G | H* | F | F | F | F | F | F | F | G | H* | | F | F | F | F | F | G | G | G* | | | |
| 0.018μF | 183 | F | F | F | F | F | F | G | G | H* | F | F | F | F | F | F | F | H | H* | | F | F | F | F | F | G | G | H* | | | |
| 0.022μF | 223 | F | F | F | F | F | F | G | G | | F | F | F | F | F | F | F | H | | | F | F | F | F | F | G | G | | | | |
| 0.027μF | 273 | F | F | F | F | F | F | H | H | | F | F | F | F | F | F | F | H | | | F | F | F | F | F | G | G | | | | |
| 0.033μF | 333 | F | F | F | F | F | F | H | H | | F | F | F | F | F | F | F | H | | | F | F | F | F | F | G | G | | | | |
| 0.039μF | 393 | F | F | F | F | F | F | H | H | | F | F | F | F | F | F | F | H | | | F | F | F | F | F | G | H | | | | |
| 0.047μF | 473 | F | F | F | F | F | F | H | H | | F | F | F | F | F | F | F | H | | | F | F | F | F | F | G | H | | | | |
| 0.056μF | 563 | F | F | F | F | F | F | H | | | F | F | F | F | F | F | F | H | | | F | F | F | F | F | G | H | | | | |
| 0.068μF | 683 | F | F | F | F | F | F | | | | F | F | F | F | F | F | F | | | | F | F | F | F | F | G | | | | | |
| 0.082μF | 823 | F | F | F | F | F | F | | | | F | F | F | F | F | F | F | | | | F | F | F | F | F | G | | | | | |
| 0.100μF | 104 | F | F | F | F | F | G | | | | F | F | F | F | F | G | | | | | F | F | F | F | G | G | | | | | |
| 0.120μF | 124 | F | F | F | F | F | | | | | F | F | F | F | F | G | | | | | F | F | F | F | H | | | | | | |
| 0.150μF | 154 | F | F | F | F | F | | | | | F | F | F | F | F | H | | | | | F | F | F | F | H | | | | | | |
| 0.180μF | 184 | F | F | F | F | F | | | | | F | F | F | F | F | H | | | | | F | F | F | F | H | | | | | | |
| 0.220μF | 224 | F | F | F | F | F | | | | | F | F | F | F | F | H | | | | | F | F | F | F | H | | | | | | |
| 0.270μF | 274 | F | F | F | F | F | | | | | F | F | F | F | F | | | | | | F | F | F | F | | | | | | | |
| 0.330μF | 334 | F | F | F | F | F | | | | | F | F | F | F | F | | | | | | F | F | F | F | | | | | | | |
| 0.390μF | 394 | F | F | F | F | F | | | | | F | F | F | F | F | | | | | | F | F | F | F | | | | | | | |
| 0.470μF | 474 | F | F | F | F | F | | | | | F | F | F | F | F | | | | | | F | F | F | F | | | | | | | |
| 0.560μF | 564 | F | F | F | F | G | | | | | F | F | F | | | | | | | | F | F | F | F | | | | | | | |
| 0.680μF | 684 | F | F | F | F | | | | | | F | F | F | | | | | | | | F | F | F | | | | | | | | |
| 0.820μF | 824 | F | F | F | F | | | | | | F | F | F | | | | | | | | F | F | F | | | | | | | | |
| 1μF | 105 | F | F | F | F | | | | | | F | F | F | | | | | | | | F | F | F | | | | | | | | |
| 1.2μF | 125 | F | F | G | | | | | | | F | F | G | | | | | | | | F | F | G | | | | | | | | |
| 1.5μF | 155 | F | F | G | | | | | | | F | F | G | | | | | | | | F | F | G | | | | | | | | |
| 1.8μF | 185 | F | F | G | | | | | | | F | F | G | | | | | | | | F | F | G | | | | | | | | |
| 2.20μF | 225 | F | F | G | | | | | | | F | F | G | | | | | | | | F | F | G | | | | | | | | |
| 2.70μF | 275 | F | F | | | | | | | | F | F | | | | | | | | | F | F | G | | | | | | | | |
| 3.3μF | 335 | F | F | | | | | | | | F | F | | | | | | | | | F | F | | | | | | | | | |
| 3.9μF | 395 | F | F | | | | | | | | F | F | | | | | | | | | F | F | | | | | | | | | |
| 4.7μF | 475 | F | F | | | | | | | | F | F | | | | | | | | | F | F | | | | | | | | | |
| 5.6μF | 565 | F | F | | | | | | | | F | F | | | | | | | | | F | F | | | | | | | | | |
| 6.8μF | 685 | F | F | | | | | | | | F | F | | | | | | | | | F | F | | | | | | | | | |
| 8.2μF | 825 | G | G | | | | | | | | G | G | | | | | | | | | G | G | | | | | | | | | |
| 10μF | 106 | G | G | | | | | | | | G | G | | | | | | | | | G | G | | | | | | | | | |
| 12μF | 126 | | | | | | | | | | H | | | | | | | | | | | | | | | | | | | | |
| 15μF | 156 | | | | | | | | | | H | | | | | | | | | | | | | | | | | | | | |
| 18μF | 186 | | | | | | | | | | H | | | | | | | | | | | | | | | | | | | | |
| 22μF | 226 | | | | | | | | | | H | | | | | | | | | | | | | | | | | | | | |

* Surface coating only

MLCC

Chip R

Coil

High Reliability for Industrial Grade

FEATURES

- Realize high capacitance in small sizes.
- Capacitor with lead-free termination (pure Tin).
- RoHS compliant.
- HALOGEM compliant.
- Surface mount suited for wave and reflow soldering.
- High reliability and no polarity.
- Excellent in high frequency characteristic.

APPLICATION

- Digital circuit coupling or decoupling applications.
- For high frequency and high-density type power suppliers.
- For bypassing.
- Ideal for smoothing circuits.
- DC to DC converter.

PART NUMBER

| FR | 31 | X | 471 | K | 251 | E | C | G |
|----------------------------------|--|---------------------|--|------------------------------|--|---|---------------------------------|--|
| PDC Family | Size | Dielectric | Capacitance | Tolerance | Rated voltage | Packaging | Thickness | Control Code |
| High Quality Equipment Capacitor | 18 0603 (1608) 21 0805 (2012) 31 1206 (3216) 32 1210 (3225) 42 1808 (4520) 43 1812 (4532) 46 1825 (4563) 55 2220 (5750) 56 2225 (5763) | N COG(NPO) X X7R | 106=10x10 ⁶ =10μF 100=10x10 ⁰ =10pF | J= ±5% K= ±10% M= ±20% | 500=50V 101=100V 201=200V 251=250V 401=400V 501=500V 631=630V 102=1000V | E= Tape and 7" Reel, Embossed Tape P= Tape and 7" Reel, Paper Tape L= Tape and 13" Reel, Embossed G= Tape and 13" Reel, Paper Tape | Reference Thickness Description | G=RoHS Compliant Q=Surface Coating (Size 1206~2225) |

GENERAL ELECTRICAL DATA

| Dielectric | NPO | X7R |
|---|--|--|
| Size | 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225 | 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225 |
| Rated voltage (WVDC) | 25V, 50V, 100V, 200V, 250V, 500V, 630V, 1000V, 1500V, 2000V, 3000V, 4000V | 25V, 50V, 100V, 200V, 250V, 500V, 630V, 1000V, 1500V, 2000V, 3000V, 4000V |
| Capacitance range | 0.5pF ~ 330nF | 100pF ~ 22μF |
| Capacitance tolerance | Cap≤5pF: B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) 10pF≤Cap: F (±1%), G (±2%), J (±5%), K (±10%) | J (±5%) K (±10%) M (±20%) |
| Tan δ | Cap. Rang Q Spec. Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000 | ≤2.5% ~ ≤10% |
| Measured at the condition of 30~70% related humidity. | | |
| Capacitance & Tan δ Test Condition | for 25°C at ambient temperature | Preconditioning for Class II MLCC: Perform a heat treatment at 150±10°C for 1 hour, then leave in ambient condition for 24±2 hours before measurement. |
| Cap. Rang | Test Condition | |
| Cap≤1000pF | 1.0±0.2Vrms, 1.0MHz±10% | 1.0±0.2Vrms, 1.0kHz±10% for C≤10μF; 0.5±0.2Vrms, 120Hz±20% for C>10μF, at 25°C ambient temperature |
| Cap>1000pF | 1.0±0.2Vrms, 1.0kHz±10% | |
| Insulation resistance | ≥100GΩ or R•C≥500Ω·F whichever is smaller | ≥10GΩ or R•C≥100Ω·F whichever is smaller |
| Operating temperature | | -55 to +125°C |
| Temperature coefficient | ±30ppm / °C | ±15% |
| Termination | Cu (or Ag)/Ni/Sn or Au(lead-free termination) | |

DIMENSIONS



| Size inch (mm) | L (mm) | W (mm) | T (mm) code | M _B (mm) |
|----------------|-----------|-----------|---------------------------------|---------------------|
| 0603 (1608) | 1.60±0.20 | 0.80±0.20 | | 0.40±0.15 |
| 0805 (2012) | 2.10±0.20 | 1.25±0.20 | | 0.50±0.20 |
| 1206 (3216) | 3.30±0.30 | 1.60±0.20 | | 0.60±0.20 |
| 1210 (3225) | 3.30±0.40 | 2.50±0.30 | | 0.75±0.35 |
| 1808 (4520) | 4.60±0.50 | 2.00±0.25 | Reference Thickness Description | 0.75±0.35 |
| 1812 (4532) | 4.60±0.50 | 3.20±0.30 | | 0.75±0.35 |
| 1825 (4563) | 4.60±0.50 | 6.30±0.40 | | 0.75±0.35 |
| 2220 (5750) | 5.70±0.50 | 5.00±0.40 | | 0.85±0.35 |
| 2225 (5763) | 5.70±0.50 | 6.30±0.40 | | 0.85±0.35 |

High Reliability for Industrial Grade

RATING

NPO

| Size | | 0603 | | | | | 0805 | | | | | | | 1206 | | | | | | | | | | | |
|---------|------|------|-----|------|------|------|------|-----|------|------|------|------|------|------|-----|-----|------|------|------|------|------|-----|-------|-----|-----|
| Cap | Code | 25V | 50V | 100V | 200V | 250V | 25V | 50V | 100V | 200V | 250V | 500V | 630V | 1KV | 25V | 50V | 100V | 200V | 250V | 500V | 630V | 1KV | 1.5KV | 2KV | 3KV |
| 0.5pF | 0R5 | S | S | S | S | S | A | A | A | A | A | A | A | | | | | | | | | | | | |
| 0.6pF | 0R6 | S | S | S | S | S | A | A | A | A | A | A | A | | | | | | | | | | | | |
| 0.7pF | 0R7 | S | S | S | S | S | A | A | A | A | A | A | A | | | | | | | | | | | | |
| 0.8pF | 0R8 | S | S | S | S | S | A | A | A | A | A | A | A | | | | | | | | | | | | |
| 0.9pF | 0R9 | S | S | S | S | S | A | A | A | A | A | A | A | | | | | | | | | | | | |
| 1.0pF | 1R0 | S | S | S | S | S | A | A | A | A | A | A | A | | | | | | | | | | | | |
| 1.2pF | 1R2 | S | S | S | S | S | A | A | A | A | A | A | A | | X | X | X | | | | | | | | |
| 1.5pF | 1R5 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | X |
| 1.8pF | 1R8 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | X |
| 2.2pF | 2R2 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | X |
| 2.7pF | 2R7 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | X |
| 3.3pF | 3R3 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | X |
| 3.9pF | 3R9 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | X |
| 4.7pF | 4R7 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | X |
| 5.0pF | 5R0 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | X |
| 5.6pF | 5R6 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | X |
| 6.8pF | 6R8 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | X |
| 8.2pF | 8R2 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | X |
| 10pF | 100 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | E |
| 12pF | 120 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | E |
| 15pF | 150 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | E |
| 18pF | 180 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | E |
| 22pF | 220 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | E |
| 27pF | 270 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | X | X | E |
| 33pF | 330 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | M | M | E |
| 39pF | 390 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | X | M | M | E |
| 47pF | 470 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | M | M | M | E |
| 56pF | 560 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | M | C | C | E |
| 68pF | 680 | S | S | S | S | S | A | A | A | A | A | A | A | C | X | X | X | X | X | X | X | M | C | C | E |
| 82pF | 820 | S | S | S | S | S | A | A | A | A | A | X | X | C | X | X | X | X | X | X | X | C | C | C | E |
| 100pF | 101 | S | S | S | S | S | A | A | A | A | X | X | X | C | X | X | X | X | X | X | X | C | C | C | |
| 120pF | 121 | S | S | S | S | S | A | A | A | A | X | C | C | C | X | X | X | X | X | X | X | C | E | E | |
| 150pF | 151 | S | S | S | S | S | A | A | A | X | X | C | C | C | X | X | X | X | X | X | X | C | E | E | |
| 180pF | 181 | S | S | S | S | S | A | A | A | X | C | C | C | C | X | X | X | X | X | X | X | E | E | E | |
| 220pF | 221 | S | S | S | S | S | A | A | A | C | C | C | C | C | X | X | X | X | X | X | X | E | E | E | |
| 270pF | 271 | S | S | S | B | B | A | A | A | C | C | C | C | C | X | X | X | X | M | M | M | E | E | E | |
| 330pF | 331 | S | S | S | B | B | A | A | A | C | C | C | C | | X | X | X | X | M | M | M | E | E | E | |
| 390pF | 391 | S | S | S | B | B | X | X | X | C | C | C | C | | X | X | X | X | M | M | M | E | | | |
| 470pF | 471 | S | S | S | B | B | X | X | X | C | C | C | C | | X | X | X | M | M | M | M | E | | | |
| 560pF | 561 | S | S | S | B | B | X | X | X | C | C | C | C | | X | X | X | M | C | C | C | E | | | |
| 680pF | 681 | | | | | | X | X | X | C | C | C | C | | X | X | X | M | C | C | C | E | | | |
| 820pF | 821 | | | | | | X | X | X | C | C | C | C | | X | X | X | M | E | E | E | E | | | |
| 1000pF | 102 | | | | | | X | X | X | C | C | C | C | | X | X | X | M | E | E | E | E | | | |
| 1200pF | 122 | | | | | | X | X | X | C | C | | | | X | X | X | M | E | E | E | | | | |
| 1500pF | 152 | | | | | | X | X | X | C | C | | | | X | X | X | C | E | E | E | | | | |
| 1800pF | 182 | | | | | | X | X | X | C | C | | | | X | X | X | C | E | E | E | | | | |
| 2200pF | 222 | | | | | | X | X | X | C | C | | | | X | X | X | C | E | E | E | | | | |
| 2700pF | 272 | | | | | | C | C | C | C | C | | | | X | X | X | C | E | E | E | | | | |
| 3300pF | 332 | | | | | | C | C | C | | | | | | X | X | X | C | E | E | E | | | | |
| 3900pF | 392 | | | | | | C | C | C | | | | | | X | X | X | C | E | E | E | | | | |
| 4700pF | 472 | | | | | | C | C | C | | | | | | X | X | X | E | E | E | E | | | | |
| 5600pF | 562 | | | | | | C | C | | | | | | | X | X | X | E | E | E | | | | | |
| 6800pF | 682 | | | | | | | | | | | | | | M | M | M | E | E | | | | | | |
| 8200pF | 822 | | | | | | | | | | | | | | C | C | C | E | E | | | | | | |
| 0.010μF | 103 | | | | | | | | | | | | | | C | C | C | E | E | | | | | | |
| 0.012μF | 123 | | | | | | | | | | | | | | P | P | | | | | | | | | |
| 0.015μF | 153 | | | | | | | | | | | | | | P | P | | | | | | | | | |
| 0.018μF | 183 | | | | | | | | | | | | | | P | P | | | | | | | | | |
| 0.022μF | 223 | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.027μF | 273 | | | | | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

High Reliability for Industrial Grade

RATING

NPO

| Size | | 1210 | | | | | | | | | | 1808 | | | | | | 1812 | | | | | | | | | | | |
|---------|------|------|-----|------|--------------|------|------|-----|--------------|-----|------------|------|--------------|------|------|-----|--------------|------|-----|------------|------|--------------|------|------|-----|--------------|-----|-----|---|
| Cap | Code | 25V | 50V | 100V | 200V 250V | 500V | 630V | 1KV | 1.5KV 2KV | 3KV | 25V 50V | 100V | 200V 250V | 500V | 630V | 1KV | 1.5KV 2KV | 3KV | 4KV | 25V 50V | 100V | 200V 250V | 500V | 630V | 1KV | 1.5KV 2KV | 3KV | 4KV | |
| 1.2pF | 1R2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.5pF | 1R5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.8pF | 1R8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.2pF | 2R2 | | | | | | | | | C | C | C | C | C | C | C | C | C | C | | | | | | | | | | |
| 2.7pF | 2R7 | | | | | | | | | C | C | C | C | C | C | C | C | C | C | | | | | | | | | | |
| 3.3pF | 3R3 | | | | | | | | | C | C | C | C | C | C | C | C | C | C | | | | | | | | | | |
| 3.9pF | 3R9 | | | | | | | | | C | C | C | C | C | C | C | C | C | C | | | | | | | | | | |
| 4.7pF | 4R7 | | | | | | | | | C | C | C | C | C | C | C | C | C | C | | | | | | | | | | |
| 5.0pF | 5R0 | | | | | | | | | C | C | C | C | C | C | C | C | C | C | | | | | | | | | | |
| 5.6pF | 5R6 | | | | | | | | | C | C | C | C | C | C | C | C | C | C | | | | | | | | | | |
| 6.8pF | 6R8 | | | | | | | | | C | C | C | C | C | C | C | C | C | C | | | | | | | | | | |
| 8.2pF | 8R2 | | | | | | | | | C | C | C | C | C | C | C | C | C | C | | | | | | | | | | |
| 10pF | 100 | M | M | M | M | M | M | M | M | F | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 12pF | 120 | M | M | M | M | M | M | M | M | F | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 15pF | 150 | M | M | M | M | M | M | M | M | F | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 18pF | 180 | M | M | M | M | M | M | M | M | F | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 22pF | 220 | M | M | M | M | M | M | M | M | F | C | C | C | C | C | C | C | C | E | C | C | C | C | C | C | C | C | C | C |
| 27pF | 270 | M | M | M | M | M | M | M | M | F | C | C | C | C | C | C | C | C | E | C | C | C | C | C | C | C | C | C | C |
| 33pF | 330 | M | M | M | M | M | M | M | M | F | C | C | C | C | C | C | C | C | F | C | C | C | C | C | C | C | C | C | C |
| 39pF | 390 | M | M | M | M | M | M | M | M | F | C | C | C | C | C | C | C | C | F | C | C | C | C | C | C | C | C | C | C |
| 47pF | 470 | M | M | M | M | M | M | M | M | F | C | C | C | C | C | C | C | C | | C | C | C | C | C | C | C | C | C | C |
| 56pF | 560 | M | M | M | M | M | M | M | C | F | C | C | C | C | C | C | C | C | | C | C | C | C | C | C | C | C | C | C |
| 68pF | 680 | M | M | M | M | M | M | M | C | F | C | C | C | C | C | C | C | C | | C | C | C | C | C | C | C | C | C | C |
| 82pF | 820 | M | M | M | M | M | M | M | C | F | C | C | C | C | C | C | C | C | | C | C | C | C | C | C | C | C | C | C |
| 100pF | 101 | M | M | M | M | M | M | C | C | F | C | C | C | C | C | C | C | F | | C | C | C | C | C | C | C | C | C | C |
| 120pF | 121 | M | M | M | M | M | M | C | C | F | C | C | C | C | C | C | C | F | | C | C | C | C | C | C | C | C | C | C |
| 150pF | 151 | M | M | M | M | M | M | C | E | F | C | C | C | C | C | C | F | F | | C | C | C | C | C | C | C | C | C | C |
| 180pF | 181 | M | M | M | M | M | M | C | E | F | C | C | C | C | C | C | F | F | | C | C | C | C | C | C | C | C | F | F |
| 220pF | 221 | M | M | M | M | M | M | E | E | F | C | C | C | C | C | C | F | F | | C | C | C | C | C | C | C | C | F | F |
| 270pF | 271 | M | M | M | M | M | M | E | E | G | C | C | C | F | F | F | F | F | | C | C | C | C | C | C | F | F | F | F |
| 330pF | 331 | M | M | M | M | M | M | E | E | | C | C | C | F | F | F | F | F | | C | C | C | C | C | C | F | F | F | F |
| 390pF | 391 | M | M | M | M | M | M | E | E | | C | C | C | F | F | F | F | F | | C | C | C | C | C | C | F | F | F | F |
| 470pF | 471 | M | M | M | M | M | M | E | E | | C | C | C | F | F | F | F | F | | C | C | C | C | C | C | F | F | F | F |
| 560pF | 561 | M | M | M | M | M | M | E | E | | C | C | C | F | F | F | F | F | | C | C | C | C | C | F | F | F | F | F |
| 680pF | 681 | M | M | M | M | M | M | E | E | | C | C | C | F | F | F | F | F | | C | C | C | C | C | F | F | F | F | F |
| 820pF | 821 | M | M | M | M | M | M | E | E | | C | C | C | F | F | F | F | F | | C | C | C | C | C | F | F | F | G | G |
| 1000pF | 102 | M | M | M | C | C | C | E | F | | C | C | C | F | F | F | F | F | | C | C | C | C | C | F | F | F | G | G |
| 1200pF | 122 | M | M | M | C | C | C | E | F | | C | C | C | F | F | F | F | F | | C | C | C | C | C | F | F | F | | |
| 1500pF | 152 | M | M | M | C | C | C | E | G | | C | C | C | F | F | F | F | F | | C | C | C | C | C | F | F | F | | |
| 1800pF | 182 | M | M | M | C | C | C | G | G | | C | C | C | F | F | F | F | F | | C | C | C | C | C | F | F | F | | |
| 2200pF | 222 | M | M | M | C | C | C | G | | | C | C | C | F | F | F | F | F | | C | C | C | C | C | F | F | F | | |
| 2700pF | 272 | M | M | M | C | C | C | | | | C | C | C | F | F | | | | | | C | C | C | C | C | F | G | | |
| 3300pF | 332 | M | M | M | C | C | C | | | | C | C | C | F | F | | | | | | C | C | C | C | C | F | G | | |
| 3900pF | 392 | M | M | M | C | C | C | | | | C | C | C | F | F | | | | | | C | C | C | C | C | G | | | |
| 4700pF | 472 | M | C | C | C | C | C | | | | C | C | C | F | F | | | | | | C | C | C | C | C | G | | | |
| 5600pF | 562 | M | C | C | C | C | C | | | | C | C | E | F | F | | | | | | C | C | C | C | C | | | | |
| 6800pF | 682 | M | E | E | E | E | E | | | | C | C | E | | | | | | | | C | C | C | C | C | | | | |
| 8200pF | 822 | M | E | E | E | E | E | | | | C | E | F | | | | | | | | C | C | C | C | C | | | | |
| 0.010μF | 103 | M | E | E | F | F | F | | | | C | E | F | | | | | | | | C | C | C | C | C | | | | |
| 0.012μF | 123 | C | E | E | | | | | | | E | F | | | | | | | | | C | C | E | E | E | | | | |
| 0.015μF | 153 | C | E | F | | | | | | | E | | | | | | | | | | C | C | E | E | E | | | | |
| 0.018μF | 183 | F | F | G | | | | | | | F | | | | | | | | | | C | E | F | F | F | | | | |
| 0.022μF | 223 | F | F | G | | | | | | | F | | | | | | | | | | C | E | F | F | F | | | | |
| 0.027μF | 273 | F | G | | | | | | | | | | | | | | | | | | C | F | G | | | | | | |
| 0.033μF | 333 | F | G | | | | | | | | | | | | | | | | | | C | F | | | | | | | |
| 0.039μF | 393 | G | G | | | | | | | | | | | | | | | | | | F | G | | | | | | | |
| 0.047μF | 473 | | | | | | | | | | | | | | | | | | | | F | G | | | | | | | |
| 0.056μF | 563 | | | | | | | | | | | | | | | | | | | | G | | | | | | | | |
| 0.068μF | 683 | | | | | | | | | | | | | | | | | | | | G | | | | | | | | |
| 0.082μF | 823 | | | | | | | | | | | | | | | | | | | | G | | | | | | | | |
| 0.10μF | 104 | | | | | | | | | | | | | | | | | | | | G | | | | | | | | |
| 0.12μF | 124 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.15μF | 154 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

■ High Reliability for Industrial Grade

RATING

NPO

| Size | | 1825 | | | | | | | | 2220 | | | | | | 2225 | | | | | | | | | | | |
|---------|------|---------|------|-----------|------|------|-----|-----------|-----|---------|------|-----------|------|------|-----|-----------|-----|-----|---------|------|-----------|------|------|-----|-----------|-----|-----|
| Cap | Code | 25V 50V | 100V | 200V 250V | 500V | 630V | 1KV | 1.5KV 2KV | 3KV | 25V 50V | 100V | 200V 250V | 500V | 630V | 1KV | 1.5KV 2KV | 3KV | 4KV | 25V 50V | 100V | 200V 250V | 500V | 630V | 1KV | 1.5KV 2KV | 3KV | 4KV |
| 10pF | 100 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | F | F | F | F | F | F | |
| 12pF | 120 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | F | F | F | F | F | F | |
| 15pF | 150 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | F | F | F | F | F | F | |
| 18pF | 180 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | F | F | F | F | F | F | |
| 22pF | 220 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | F | F | F | F | F | F | F | F | |
| 27pF | 270 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 33pF | 330 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 39pF | 390 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 47pF | 470 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 56pF | 560 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 68pF | 680 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 82pF | 820 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 100pF | 101 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 120pF | 121 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 150pF | 151 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 180pF | 181 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 220pF | 221 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 270pF | 271 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | G | F | F | F | F | F | F | F | F | F |
| 330pF | 331 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | G | G | F | F | F | F | F | F | F | F | F |
| 390pF | 391 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | G | | F | F | F | F | F | F | F | F | F |
| 470pF | 471 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | G | | F | F | F | F | F | F | F | F | F |
| 560pF | 561 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | G | | F | F | F | F | F | F | F | F | F |
| 680pF | 681 | F | F | F | F | F | F | F | G | F | F | F | F | F | F | F | G | | F | F | F | F | F | F | F | F | F |
| 820pF | 821 | F | F | F | F | F | F | F | G | F | F | F | F | F | F | F | G | | F | F | F | F | F | F | F | G | G |
| 1000pF | 102 | F | F | F | F | F | F | F | G | F | F | F | F | F | F | F | G | | F | F | F | F | F | F | F | G | G |
| 1200pF | 122 | F | F | F | F | F | F | F | G | F | F | F | F | F | G | G | G | | F | F | F | F | F | F | F | G | G |
| 1500pF | 152 | F | F | F | F | F | F | G | G | F | F | F | F | F | G | G | G | | F | F | F | F | F | F | F | G | G |
| 1800pF | 182 | F | F | F | F | F | F | G | G | F | F | F | F | F | G | G | | | F | F | F | F | F | F | F | G | G |
| 2200pF | 222 | F | F | F | F | F | F | G | | F | F | F | F | F | G | G | | | F | F | F | F | F | F | F | G | G |
| 2700pF | 272 | F | F | F | F | F | F | G | | F | F | F | F | F | G | G | | | F | F | F | F | F | F | F | G | G |
| 3300pF | 332 | F | F | F | F | F | F | G | | F | F | F | F | F | G | G | | | F | F | F | F | F | F | F | G | G |
| 3900pF | 392 | F | F | F | F | F | G | G | | F | F | F | F | F | G | G | | | F | F | F | F | F | F | F | G | |
| 4700pF | 472 | F | F | F | F | F | G | G | | F | F | F | F | F | G | G | | | F | F | F | F | F | F | F | G | |
| 5600pF | 562 | F | F | F | F | F | G | | | F | F | F | F | F | G | | | | F | F | F | F | F | F | F | G | |
| 6800pF | 682 | F | F | F | F | F | G | | | F | F | F | F | F | G | | | | F | F | F | F | F | F | G | G | |
| 8200pF | 822 | F | F | F | F | F | G | | | F | F | F | F | F | G | | | | F | F | F | F | F | F | G | G | |
| 0.010μF | 103 | F | F | F | F | F | G | | | F | F | F | F | F | G | | | | F | F | F | F | F | F | G | G | |
| 0.012μF | 123 | F | F | F | F | F | | | | F | F | F | F | F | | | | | F | F | F | F | F | F | G | | |
| 0.015μF | 153 | F | F | F | F | F | | | | F | F | F | F | F | | | | | F | F | F | F | F | F | | | |
| 0.018μF | 183 | F | F | F | F | F | | | | F | F | F | F | F | | | | | F | F | F | F | F | F | | | |
| 0.022μF | 223 | F | F | F | F | F | | | | F | F | F | F | F | | | | | F | F | F | F | F | F | | | |
| 0.027μF | 273 | F | F | F | F | F | | | | F | F | F | F | F | | | | | F | F | F | F | F | F | | | |
| 0.033μF | 333 | F | F | F | F | F | | | | F | F | F | F | | | | | | F | F | F | F | F | F | | | |
| 0.039μF | 393 | F | F | F | G | | | | | F | F | F | G | | | | | | F | F | F | F | F | F | | | |
| 0.047μF | 473 | F | F | F | G | | | | | F | F | G | | | | | | | F | F | F | F | F | F | | | |
| 0.056μF | 563 | F | F | G | G | | | | | F | F | G | | | | | | | F | F | G | G | G | | | | |
| 0.068μF | 683 | F | F | G | | | | | | F | F | G | | | | | | | F | F | G | G | G | | | | |
| 0.082μF | 823 | F | G | | | | | | | G | G | | | | | | | | F | F | G | G | | | | | |
| 0.10μF | 104 | G | G | | | | | | | G | G | | | | | | | | F | G | G | | | | | | |
| 0.12μF | 124 | | | | | | | | | | | | | | | | | | G | G | | | | | | | |
| 0.15μF | 154 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.18μF | 184 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.22μF | 224 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.27μF | 274 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.33μF | 334 | | | | | | | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

High Reliability for Industrial Grade

RATING

X7R

| Size | | 0603 | | | | 0805 | | | | | | 1206 | | | | | | | |
|---------|------|------|-----|------|--------------|------|-----|------|--------------|--------------|-----|------|-----|------|--------------|--------------|-----|-------|-----|
| Cap | Code | 25V | 50V | 100V | 200V 250V | 25V | 50V | 100V | 200V 250V | 500V 630V | 1KV | 25V | 50V | 100V | 200V 250V | 500V 630V | 1KV | 1.5KV | 2KV |
| 100pF | 101 | S | S | S | B | X | X | X | X | X | X | X | X | X | C | C | C | C | C |
| 120pF | 121 | S | S | S | B | X | X | X | X | X | X | X | X | X | C | C | C | C | C |
| 150pF | 151 | S | S | S | B | X | X | X | X | X | X | X | X | X | C | C | C | C | C |
| 180pF | 181 | S | S | S | B | X | X | X | X | X | X | X | X | X | C | C | C | C | C |
| 220pF | 221 | S | S | S | B | X | X | X | X | X | X | X | X | X | C | C | C | C | C |
| 270pF | 271 | S | S | S | B | X | X | X | X | X | X | X | X | X | C | C | C | C | C |
| 330pF | 331 | S | S | S | B | X | X | X | X | X | X | X | X | X | C | C | C | C | C |
| 390pF | 391 | S | S | S | B | X | X | X | X | X | X | X | X | X | C | C | C | C | C |
| 470pF | 471 | S | S | S | B | X | X | X | X | X | X | X | X | X | C | C | C | C | C |
| 560pF | 561 | S | S | S | B | X | X | X | X | X | X | X | X | X | C | C | C | C | C |
| 680pF | 681 | S | S | S | B | X | X | X | X | X | X | X | X | X | C | C | C | C | C |
| 820pF | 821 | S | S | S | B | X | X | X | X | X | X | X | X | X | C | C | C | C | C |
| 1000pF | 102 | S | S | S | B | X | X | X | X | X | X | X | X | X | C | C | C | C | C |
| 1200pF | 122 | S | S | S | B | X | X | X | X | X | | X | X | X | C | C | C | E | E |
| 1500pF | 152 | S | S | S | B | X | X | X | X | X | | X | X | X | C | C | C | E | E |
| 1800pF | 182 | S | S | S | B | X | X | X | X | X | | X | X | X | C | C | C | E | E |
| 2200pF | 222 | S | S | S | B | X | X | X | X | X | | X | X | X | C | C | C | E | E |
| 2700pF | 272 | S | S | S | B | X | X | X | X | X | | X | X | X | C | C | C | E | E |
| 3300pF | 332 | S | S | S | B | X | X | X | X | X | | X | X | X | C | C | C | E | E |
| 3900pF | 392 | S | S | S | B | X | X | X | X | X | | X | X | X | C | C | C | E | |
| 4700pF | 472 | S | S | S | B | X | X | X | X | C | | X | X | X | C | C | C | E | |
| 5600pF | 562 | S | S | S | B | X | X | X | X | C | | X | X | X | C | C | C | | |
| 6800pF | 682 | S | S | S | B | X | X | X | X | C | | X | X | X | C | C | C | | |
| 8200pF | 822 | S | S | S | B | X | X | X | C | C | | X | X | X | C | C | C | | |
| 0.010μF | 103 | S | S | S | B | X | X | X | C | C | | X | X | X | C | C | C | | |
| 0.012μF | 123 | S | S | B | | X | X | X | C | C | | X | X | X | C | C | E | | |
| 0.015μF | 153 | S | S | B | | X | X | X | C | C | | X | X | X | C | C | E | | |
| 0.018μF | 183 | S | S | B | | X | X | X | C | C | | X | X | X | C | C | E | | |
| 0.022μF | 223 | S | S | B | | X | X | X | C | C | | X | X | X | C | E | E | | |
| 0.027μF | 273 | S | S | B | | X | X | C | C | | | X | X | X | C | E | | | |
| 0.033μF | 333 | B | B | B | | X | X | C | C | | | X | X | X | E | E | | | |
| 0.039μF | 393 | B | B | B | | X | X | C | | | | X | X | X | E | E | | | |
| 0.047μF | 473 | B | B | B | | X | X | C | | | | X | X | X | E | E | | | |
| 0.056μF | 563 | B | B | B | | X | X | C | | | | X | X | X | E | | | | |
| 0.068μF | 683 | B | B | B | | X | X | C | | | | X | X | X | E | | | | |
| 0.082μF | 823 | B | B | | | X | X | C | | | | X | X | C | E | | | | |
| 0.10μF | 104 | B | B | | | X | X | C | | | | X | X | C | E | | | | |
| 0.12μF | 124 | | | | | X | C | C | | | | X | X | C | | | | | |
| 0.15μF | 154 | | | | | C | C | C | | | | M | M | E | | | | | |
| 0.18μF | 184 | | | | | C | C | C | | | | M | M | E | | | | | |
| 0.22μF | 224 | | | | | C | C | C | | | | M | M | E | | | | | |
| 0.27μF | 274 | | | | | C | I | C | | | | M | C | E | | | | | |
| 0.33μF | 334 | | | | | C | I | C | | | | M | C | E | | | | | |
| 0.39μF | 394 | | | | | C | I | C | | | | J | P | E | | | | | |
| 0.47μF | 474 | | | | | C | I | I | | | | J | P | E | | | | | |
| 0.56μF | 564 | | | | | C | I | | | | | J | P | P | | | | | |
| 0.68μF | 684 | | | | | C | I | | | | | J | P | P | | | | | |
| 0.82μF | 824 | | | | | C | I | | | | | J | P | P | | | | | |
| 1.0μF | 105 | | | | | C | I | | | | | J | P | P | | | | | |
| 1.2μF | 125 | | | | | | | | | | | P | P | | | | | | |
| 1.5μF | 155 | | | | | | | | | | | P | P | | | | | | |
| 1.8μF | 185 | | | | | | | | | | | P | P | | | | | | |
| 2.2μF | 225 | | | | | | | | | | | P | P | | | | | | |
| 2.7μF | 275 | | | | | | | | | | | | | | | | | | |
| 3.3μF | 335 | | | | | | | | | | | | | | | | | | |
| 3.9μF | 395 | | | | | | | | | | | | | | | | | | |
| 4.7μF | 475 | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

High Reliability for Industrial Grade

RATING

X7R

| Size | | 1210 | | | | | | | | 1808 | | | | | | | | 1812 | | | | | | | | | | | |
|---------|------|------|-----|------|--------------|--------------|-----|-------|-----|------------|------|--------------|--------------|-----|--------------|-----|-----|------|-----|------|--------------|------|------|-----|--------------|-----|-----|----|--|
| Cap | Code | 25V | 50V | 100V | 200V 250V | 500V 630V | 1KV | 1.5KV | 2KV | 25V 50V | 100V | 200V 250V | 500V 630V | 1KV | 1.5KV 2KV | 3KV | 4KV | 25V | 50V | 100V | 200V 250V | 500V | 630V | 1KV | 1.5KV 2KV | 3KV | 4KV | | |
| 100pF | 101 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 120pF | 121 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 150pF | 151 | | | | | | | | | C | C | C | C | C | C | C | F* | | | | | | | | | | | | |
| 180pF | 181 | | | | | | | | | C | C | C | C | C | C | C | F* | | | | | | | | | | | | |
| 220pF | 221 | M | M | M | M | C | C | E | E | C | C | C | C | C | C | C | F* | | | | | | | | | | | | |
| 270pF | 271 | M | M | M | M | C | C | E | E | C | C | C | C | C | C | C | F* | C | C | C | C | C | C | C | C | C | E | F* | |
| 330pF | 331 | M | M | M | M | C | C | E | E | C | C | C | C | C | C | F | F* | C | C | C | C | C | C | C | C | C | E | F* | |
| 390pF | 391 | M | M | M | M | C | C | E | E | C | C | C | C | C | C | F | F* | C | C | C | C | C | C | C | C | C | E | F* | |
| 470pF | 471 | M | M | M | M | C | C | E | E | C | C | C | C | C | C | F | F* | C | C | C | C | C | C | C | C | C | E | F* | |
| 560pF | 561 | M | M | M | M | C | C | E | E | C | C | C | C | C | C | F | F* | C | C | C | C | C | C | C | C | C | E | F* | |
| 680pF | 681 | M | M | M | M | C | C | E | E | C | C | C | C | C | C | F | F* | C | C | C | C | C | C | C | C | C | F | F* | |
| 820pF | 821 | M | M | M | M | C | C | E | E | C | C | C | C | C | C | F | F* | C | C | C | C | C | C | C | C | C | F | F* | |
| 1000pF | 102 | M | M | M | M | C | C | E | E | C | C | C | C | C | C | F | F* | C | C | C | C | C | C | C | C | C | F | F* | |
| 1200pF | 122 | M | M | M | M | C | C | F | F | C | C | C | C | C | F | F | | C | C | C | C | C | C | C | C | C | F | G* | |
| 1500pF | 152 | M | M | M | M | C | C | F | F | C | C | C | C | C | F | F | | C | C | C | C | C | C | C | C | C | F | G* | |
| 1800pF | 182 | M | M | M | M | C | C | F | F | C | C | C | C | C | F | F | | C | C | C | C | C | C | C | C | E | G* | G* | |
| 2200pF | 222 | M | M | M | M | C | C | F | F | C | C | C | C | C | F | F | | C | C | C | C | C | C | C | C | E | G* | | |
| 2700pF | 272 | M | M | M | M | C | C | G | G | C | C | C | C | C | F | | | C | C | C | C | C | C | C | C | E | G* | | |
| 3300pF | 332 | M | M | M | M | C | C | G | G | C | C | C | C | C | F | | | C | C | C | C | C | C | C | C | F | G* | | |
| 3900pF | 392 | M | M | M | M | C | E | G | G | C | C | C | C | C | F | | | C | C | C | C | C | C | C | C | F | G* | | |
| 4700pF | 472 | M | M | M | M | C | E | G | G | C | C | C | C | C | F | | | C | C | C | C | C | C | C | C | F | G* | | |
| 5600pF | 562 | M | M | M | M | C | E | G | G* | C | C | C | F | F | F | | | C | C | C | C | C | C | C | C | G | | | |
| 6800pF | 682 | M | M | M | M | C | E | G | G* | C | C | C | F | F | F | | | C | C | C | C | C | C | C | C | G | | | |
| 8200pF | 822 | M | M | M | M | C | E | G | G* | C | C | C | F | F | | | | C | C | C | C | C | C | C | C | G | | | |
| 0.010µF | 103 | M | M | M | M | C | E | G | G* | C | C | C | F | F | | | | C | C | C | C | C | C | E | G | | | | |
| 0.012µF | 123 | M | M | M | M | C | E | | | E | E | E | F | F | | | | C | C | C | C | C | C | F | | | | | |
| 0.015µF | 153 | M | M | M | M | C | E | | | E | E | E | F | F | | | | C | C | C | C | C | C | F | | | | | |
| 0.018µF | 183 | M | M | M | M | C | E | | | E | E | E | F | F | | | | C | C | C | C | C | C | G | | | | | |
| 0.022µF | 223 | M | M | M | M | C | E | | | E | E | E | F | F | | | | C | C | C | C | C | C | G | | | | | |
| 0.027µF | 273 | M | M | M | M | E | E | | | E | E | E | F | F | | | | C | C | C | C | C | C | G | | | | | |
| 0.033µF | 333 | M | M | M | M | E | E | | | E | E | E | F | F | | | | C | C | C | C | C | C | G | | | | | |
| 0.039µF | 393 | M | M | M | M | E | F | | | E | E | E | F | F | | | | C | C | C | C | C | C | G | | | | | |
| 0.047µF | 473 | M | M | M | C | E | G | | | E | E | E | F | F | | | | C | C | C | C | C | C | G | | | | | |
| 0.056µF | 563 | M | M | M | C | E | | | | E | E | E | F | F | | | | C | C | C | C | F | F | G | | | | | |
| 0.068µF | 683 | M | M | M | E | F | | | | E | E | E | F | | | | | C | C | C | C | F | F | G | | | | | |
| 0.082µF | 823 | M | M | M | E | G | | | | E | E | E | F | | | | | C | C | C | C | F | F | G | | | | | |
| 0.10µF | 104 | M | M | M | E | G | | | | E | E | E | | | | | | C | C | E | C | F | F | G | | | | | |
| 0.12µF | 124 | M | M | M | E | G | | | | E | E | | | | | | | C | C | E | C | G | G | | | | | | |
| 0.15µF | 154 | M | M | C | G | | | | | E | E | | | | | | | C | C | E | F | G | G | | | | | | |
| 0.18µF | 184 | M | M | C | G | | | | | | | | | | | | | C | C | E | F | G | G | | | | | | |
| 0.22µF | 224 | M | M | C | G | | | | | | | | | | | | | C | C | E | F | G | G | | | | | | |
| 0.27µF | 274 | M | M | E | G | | | | | | | | | | | | | C | C | E | F | G | | | | | | | |
| 0.33µF | 334 | M | C | E | G | | | | | | | | | | | | | C | C | E | F | G | | | | | | | |
| 0.39µF | 394 | M | C | G | G | | | | | | | | | | | | | C | C | E | F | G | | | | | | | |
| 0.47µF | 474 | M | C | G | G | | | | | | | | | | | | | C | C | E | F | G | | | | | | | |
| 0.56µF | 564 | C | C | G | G | | | | | | | | | | | | | C | C | F | G | | | | | | | | |
| 0.68µF | 684 | C | C | F | G | | | | | | | | | | | | | C | F | F | G | | | | | | | | |
| 0.82µF | 824 | C | C | F | | | | | | | | | | | | | | C | F | F | G | | | | | | | | |
| 1.0µF | 105 | C | C | F | | | | | | | | | | | | | | C | F | F | G | | | | | | | | |
| 1.2µF | 125 | C | G | G | | | | | | | | | | | | | | C | F | F | | | | | | | | | |
| 1.5µF | 155 | E | G | G | | | | | | | | | | | | | | C | F | F | | | | | | | | | |
| 1.8µF | 185 | G | G | G | | | | | | | | | | | | | | E | F | F | | | | | | | | | |
| 2.2µF | 225 | G | G | G | | | | | | | | | | | | | | E | F | G | | | | | | | | | |
| 2.7µF | 275 | G | G | G | | | | | | | | | | | | | | F | F | G | | | | | | | | | |
| 3.3µF | 335 | G | G | G | | | | | | | | | | | | | | F | F | G | | | | | | | | | |
| 3.9µF | 395 | G | G | | | | | | | | | | | | | | | F | F | G | | | | | | | | | |
| 4.7µF | 475 | G | G | | | | | | | | | | | | | | | G | G | G | | | | | | | | | |
| 5.6µF | 565 | | | | | | | | | | | | | | | | | G | G | | | | | | | | | | |
| 6.8µF | 685 | | | | | | | | | | | | | | | | | G | G | | | | | | | | | | |
| 8.2µF | 825 | | | | | | | | | | | | | | | | | G | G | | | | | | | | | | |
| 10.0µF | 106 | | | | | | | | | | | | | | | | | G | G | | | | | | | | | | |

* Surface coating only

MLCC

Chip R

Coil

High Reliability for Industrial Grade

RATING

X7R

| Size | Code | 1825 | | | | | | | | 2220 | | | | | | | | 2225 | | | | | | | | |
|---------|------|---------|------|-----------|-----------|-----|-----------|-----|-----|---------|------|-----------|-----------|-----|-----------|-----|-----|---------|------|-----------|-----------|-----|-------|-----|-----|-----|
| | | 25V 50V | 100V | 200V 250V | 500V 630V | 1KV | 1.5KV 2KV | 3KV | 4KV | 25V 50V | 100V | 200V 250V | 500V 630V | 1KV | 1.5KV 2KV | 3KV | 4KV | 25V 50V | 100V | 200V 250V | 500V 630V | 1KV | 1.5KV | 2KV | 3KV | 4KV |
| 100pF | 101 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 120pF | 121 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 150pF | 151 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 180pF | 181 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 220pF | 221 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 270pF | 271 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 330pF | 331 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 390pF | 391 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 470pF | 471 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 560pF | 561 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 680pF | 681 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 820pF | 821 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1000pF | 102 | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F* | F | F | F | F | F | F | F | F | F* |
| 1200pF | 122 | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | F | G* |
| 1500pF | 152 | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | F | G* |
| 1800pF | 182 | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | G* | F | F | F | F | F | F | F | F | G* |
| 2200pF | 222 | F | F | F | F | F | F | F* | | F | F | F | F | F | F | F* | | F | F | F | F | F | F | F | F | F* |
| 2700pF | 272 | F | F | F | F | F | F | F* | | F | F | F | F | F | F | F* | | F | F | F | F | F | F | F | F | F* |
| 3300pF | 332 | F | F | F | F | F | F | F* | | F | F | F | F | F | F | F* | | F | F | F | F | F | F | F | F | F* |
| 3900pF | 392 | F | F | F | F | F | F | F* | | F | F | F | F | F | F | F* | | F | F | F | F | F | F | F | F | F* |
| 4700pF | 472 | F | F | F | F | F | F | F* | | F | F | F | F | F | F | F* | | F | F | F | F | F | F | F | F | F* |
| 5600pF | 562 | F | F | F | F | F | F | G* | | F | F | F | F | F | F | F* | | F | F | F | F | F | F | F | F | G* |
| 6800pF | 682 | F | F | F | F | F | F | G* | | F | F | F | F | F | F | G* | | F | F | F | F | F | F | F | F | G* |
| 8200pF | 822 | F | F | F | F | F | F | G* | | F | F | F | F | F | G | G* | | F | F | F | F | F | F | F | F | G* |
| 0.010μF | 103 | F | F | F | F | F | F | G* | | F | F | F | F | F | G | G* | | F | F | F | F | F | F | F | F | G* |
| 0.012μF | 123 | F | F | F | F | F | G | H* | | F | F | F | F | F | G | H* | | F | F | F | F | F | G | G | G | G* |
| 0.015μF | 153 | F | F | F | F | F | G | H* | | F | F | F | F | F | G | H* | | F | F | F | F | F | G | G | G | G* |
| 0.018μF | 183 | F | F | F | F | F | G | H* | | F | F | F | F | F | H | H* | | F | F | F | F | F | G | G | G | H* |
| 0.022μF | 223 | F | F | F | F | F | G | | | F | F | F | F | F | H | | | F | F | F | F | F | G | G | | |
| 0.027μF | 273 | F | F | F | F | F | H | | | F | F | F | F | F | H | | | F | F | F | F | F | G | G | | |
| 0.033μF | 333 | F | F | F | F | F | H | | | F | F | F | F | F | H | | | F | F | F | F | F | G | G | | |
| 0.039μF | 393 | F | F | F | F | F | H | | | F | F | F | F | F | H | | | F | F | F | F | F | G | H | | |
| 0.047μF | 473 | F | F | F | F | F | H | | | F | F | F | F | F | H | | | F | F | F | F | F | G | H | | |
| 0.056μF | 563 | F | F | F | F | F | | | | F | F | F | F | F | H | | | F | F | F | F | F | G | H | | |
| 0.068μF | 683 | F | F | F | F | F | | | | F | F | F | F | G | | | | F | F | F | F | F | G | | | |
| 0.082μF | 823 | F | F | F | F | G | | | | F | F | F | F | G | | | | F | F | F | F | F | G | | | |
| 0.10μF | 104 | F | F | F | F | G | | | | F | F | F | F | G | | | | F | F | F | F | G | G | | | |
| 0.12μF | 124 | F | F | F | F | | | | | F | F | F | F | G | | | | F | F | F | F | H | | | | |
| 0.15μF | 154 | F | F | F | F | | | | | F | F | F | F | H | | | | F | F | F | F | H | | | | |
| 0.18μF | 184 | F | F | F | F | | | | | F | F | F | F | H | | | | F | F | F | F | H | | | | |
| 0.22μF | 224 | F | F | F | F | | | | | F | F | F | F | H | | | | F | F | F | F | H | | | | |
| 0.27μF | 274 | F | F | F | F | | | | | F | F | F | F | | | | | F | F | F | F | | | | | |
| 0.33μF | 334 | F | F | F | F | | | | | F | F | F | F | | | | | F | F | F | F | | | | | |
| 0.39μF | 394 | F | F | F | F | | | | | F | F | F | F | | | | | F | F | F | F | | | | | |
| 0.47μF | 474 | F | F | F | F | | | | | F | F | F | F | | | | | F | F | F | F | | | | | |
| 0.56μF | 564 | F | F | F | G | | | | | F | F | F | G | | | | | F | F | F | F | | | | | |
| 0.68μF | 684 | F | F | F | | | | | | F | F | F | G | | | | | F | F | F | | | | | | |
| 0.82μF | 824 | F | F | F | | | | | | F | F | F | H | | | | | F | F | F | | | | | | |
| 1.0μF | 105 | F | F | F | | | | | | F | F | F | H | | | | | F | F | F | | | | | | |
| 1.2μF | 125 | F | F | | | | | | | F | F | G | | | | | | F | F | G | | | | | | |
| 1.5μF | 155 | F | F | | | | | | | F | F | G | | | | | | F | F | G | | | | | | |
| 1.8μF | 185 | F | F | | | | | | | F | F | G | | | | | | F | F | G | | | | | | |
| 2.2μF | 225 | F | F | | | | | | | F | F | G | | | | | | F | F | G | | | | | | |
| 2.7μF | 275 | F | F | | | | | | | F | F | | | | | | | F | F | G | | | | | | |
| 3.3μF | 335 | F | F | | | | | | | F | F | | | | | | | F | F | | | | | | | |
| 3.9μF | 395 | F | F | | | | | | | F | F | | | | | | | F | F | | | | | | | |
| 4.7μF | 475 | F | G | | | | | | | F | F | | | | | | | F | G | | | | | | | |
| 5.6μF | 565 | G | G | | | | | | | F | F | | | | | | | F | F | | | | | | | |
| 6.8μF | 685 | G | G | | | | | | | F | F | | | | | | | F | F | | | | | | | |
| 8.2μF | 825 | G | G | | | | | | | G | G | | | | | | | G | G | | | | | | | |
| 10.0μF | 106 | G | G | | | | | | | G | G | | | | | | | G | G | | | | | | | |
| 12.0μF | 126 | | | | | | | | | H | | | | | | | | | | | | | | | | |
| 15.0μF | 156 | | | | | | | | | H | | | | | | | | | | | | | | | | |
| 18.0μF | 186 | | | | | | | | | H | | | | | | | | | | | | | | | | |
| 22.0μF | 226 | | | | | | | | | H | | | | | | | | | | | | | | | | |

* Surface coating only

MLCC

Chip R

Coil

Mega cap Stacked Capacitors

FEATURES

- High reliability and stability.
- Higher mechanical endurance.
- Anti thermal stress and mechanical stress.
- Improved vibration performance
- More capacitance without changing footprint.

APPLICATION

- DC to DC converter.
- High voltage coupling/DC blocking.
- Back-lighting inverters.
- Snubbers in high frequency power converters.
- Power supplies.
- Surge protection.
- Filtering, smoothing, and decoupling application.

PART NUMBER

| FE | 2H | X | 106 | K | 500 | L | F | K | M |
|---------------------------|---|----------------------|---|---------------------------------|--|---|-------------------------------|---|---------------|
| PDC Family | Chip Q'ty and size | Dielectric | Capacitance | Tolerance | Rated voltage | Packaging | Thickness | Control Code | Serial Code |
| Stacked Capacitors Series | The first digit : # of chips in stack Second digit code : chip size (below) A 1210 (3225) C 1812 (4532) G 1825 (4563) H 2220 (5750) I 2225 (5763) | N COG (NPO) X X7R | 105=10x10 ^Λ 5 =1μF 106=10x10 ^Λ 6 =10μF | J= ± 5% K= ± 10% M= ± 20% | 500=50V 101=100V 201=200V 251=250V 501=500V 631=630V 102=1000V | B=Bulk T=Tray package L=Tape and 13" Reel, Embossed Tape | Reference Thickness (Toble I) | L=L type lead J=J type lead K= K type lead B= B type lead S= Straight type lead | M= Automotive |

GENERAL ELECTRICAL DATA

| Dielectric | COG | X7R | | |
|---|---|--|---|-------------------------|
| Size | 1210, 1812, 1825, 2220, 2225 | 1210, 1812, 1825, 2220, 2225 | | |
| Rated voltage (WVDC) | 50V, 100V, 200V, 250V, 500V, 630V | 50V, 100V, 200V, 250V, 500V, 630V | | |
| Capacitance range* | 220nF Max. | 47μF Max. | | |
| Capacitance tolerance | J (± 5%), K (± 10%), M (± 20%) | | | |
| Tan δ *e) | Cap. Rang | Q Spec. | | |
| | Cap<30pF: | Q≥400+20C | | |
| | Cap≥30pF: | Q≥1000 | | |
| Measured at the condition of 30~70% related humidity | | | | |
| Capacitance & Tan δ Test Condition | for 25°C at ambient temperature | | Preconditioning for Class II MLCC: Perform a heat treatment at 150±10°C for 1 hour, then leave in ambient condition (25°C) for 24±2 hours before measurement | |
| | Cap. Rang | Test Condition | Cap. Rang | Test Condition |
| | Cap≤1000pF | 1.0±0.2Vrms, 1.0MHz±10% | Cap≤10μF | 1.0±0.2Vrms, 1.0KHz±10% |
| Cap>1000pF | 1.0±0.2Vrms, 1.0KHz±10% | Cap>10μF | 0.5±0.2Vrms, 120KHz±20% | |
| Insulation resistance at 500Vdc for 60 seconds | ≥10GΩ or RxC≥ 500Ω-F whichever is smaller | ≥10GΩ or RxC≥100Ω-F whichever is smaller | | |
| Operating temperature | - 55 to + 125°C | | | |
| Capacitance characteristic | ± 30ppm / °C | ± 15% | | |
| Termination | L / J / Straight type lead | | | |

DIMENSIONS



| Size inch (mm) | L (mm) | W (mm) | T (mm) code | E (mm) |
|----------------|-----------|-----------|-------------|-----------|
| 1210 (3225) | 3.50±0.40 | 2.50±0.40 | | 1.70±0.15 |
| 1812 (4532) | 4.80±0.40 | 3.20±0.40 | Reference | 1.70±0.15 |
| 1825 (4563) | 4.80±0.40 | 6.30±0.50 | Thickness | 1.70±0.15 |
| 2220 (5750) | 6.00±0.50 | 5.00±0.50 | Description | 1.70±0.15 |
| 2225 (5763) | 6.00±0.50 | 6.30±0.50 | | 1.70±0.15 |

■ Mega cap Stacked Capacitors

CAPACITANCE RANGE (MAX.)

COG

| Size | Code | Rated Voltage | | | | | |
|------|------|---------------|---------|---------|---------|---------|---------|
| | | 50V | 100V | 200V | 250V | 500V | 630V |
| 1210 | 1A | 393 | 223 | 103 | 103 | 103 | 103 |
| 1812 | 1C | 104 | 473 | 273 | 273 | 223 | 223 |
| | 2C | 224 (M) | 104 | 563 | 563 | 473(M) | 473 (M) |
| 1825 | 1G | 104 | 104 | 683 | 683 | 473 | 223 |
| | 2G | 224 (M) | 224 (M) | 134 | 134 | 104 | 473 (M) |
| 2220 | 1H | 104 | 104 | 683 | 683 | 473 | 223 |
| | 2H | 224 (M) | 224 (M) | 134 | 134 | 104 | 473 (M) |
| 2225 | 1I | 104 | 104 | 104 | 104 | 823 | 683 |
| | 2I | 224 (M) | 224 (M) | 224 (M) | 224 (M) | 184 (M) | 134 |

X7R

| Size | Code | Rated Voltage | | | | | |
|------|------|---------------|---------|---------|---------|---------|---------|
| | | 50V | 100V | 200V | 250V | 500V | 630V |
| 1210 | 1A | 475 | 335 | 684 | 684 | 104 | 104 |
| 1812 | 1C | 106 | 475 | 105 | 105 | 474 | 224 |
| | 2C | 226 (M) | 106 | 225 (M) | 225 (M) | 105 | 474 (M) |
| 1825 | 1G | 106 | 106 | 105 | 105 | 564 | 564 |
| | 2G | 226 (M) | 226 (M) | 225 (M) | 225 (M) | 125 (M) | 125 (M) |
| 2220 | 1H | 226 | 106 | 225 | 225 | 474 | 474 |
| | 2H | 476 (M) | 226 (M) | 475 (M) | 475 (M) | 105 | 105 |
| 2225 | 1I | 106 | 106 | 275 | 275 | 564 | 564 |
| | 2I | 226 (M) | 226 (M) | 565 | 565 | 125 (M) | 125 (M) |

• (M) means M tolerance only.

RATING

TABLE 1

| Code | Description | Code | Description | Code | Description |
|------|--------------|------|---------------|------|---------------|
| A | 3.00±0.35 mm | J | 7.80±0.35 mm | S | 12.60±0.35 mm |
| B | 3.60±0.35 mm | K | 8.40±0.35 mm | T | 13.20±0.35 mm |
| C | 4.20±0.35 mm | L | 9.00±0.35 mm | U | 1.70±0.25 mm |
| D | 4.80±0.35 mm | M | 9.60±0.35 mm | V | 2.10±0.25 mm |
| E | 5.40±0.35 mm | N | 10.20±0.35 mm | W | 2.50±0.25 mm |
| F | 6.00±0.35 mm | P | 10.80±0.35 mm | | |
| G | 6.60±0.35 mm | Q | 11.40±0.35 mm | | |
| H | 7.20±0.35 mm | R | 12.00±0.35 mm | | |

For more information about products with special capacitance or data, please contact PDC local representative.

MLCC

Chip R

Coil

■ Anti-Arcing High-Voltage Multilayer Ceramic Chip Capacitors

FEATURES

- Special interior design offers high voltage rating in a given case size.
- High reliability and stability.
- Anti-Arcing
- RoHS compliant

APPLICATION

- DC to DC converter.
- High voltage coupling/DC blocking.
- Back-lighting inverters.
- LAN/WLAN interface.
- Modem.
- Power supplies.

PART NUMBER

| FJ | 31 | X | 102 | K | 102 | E | C | G |
|---------------------------------------|-----------------------|-------------------|--------------------------------|-----------------|-------------------|--------------------|-------------|----------------|
| PDC Family | Size | Dielectric | Capacitance | Tolerance | Rated voltage | Packaging | Thickness | Control Code |
| Anti-Arcing | 31 1206 (3216) | N COG(NPO) | 102 =10x10 ² | J = ±5% | 102 =1000V | E = | Reference | G =RoHS |
| High voltage application with ≥ 1KVdc | 32 1210 (3225) | X X7R | =1000pF | K =± 10% | 152 =1500V | Tape and 7" Reel, | Thickness | Compliant |
| | 42 1808 (4520) | | 100 =10x10 ⁰ | M =± 20% | 202 =2000V | Embossed Tape | Description | |
| | 43 1812 (4532) | | =10pF | | 302 =3000V | P = | | |
| | 46 1825 (4563) | | | | 402 =4000V | Tape and 7" Reel, | | |
| | 55 2220 (5750) | | | | | Paper Tape | | |
| | 52 2211(5728) | | | | | L = | | |
| | 56 2225 (5763) | | | | | Tape and 13" Reel, | | |
| | | | | | | Embossed | | |
| | | | | | | G = | | |
| | | | | | | Tape and 13"Reel, | | |
| | | | | | | Paper Tape | | |

GENERAL ELECTRICAL DATA

| Dielectric | NPO | X7R |
|---|--|--|
| Size | 1206, 1210, 1808, 1812, 1825, 2220, 2225 | 1206, 1210, 1808, 1812, 1825, 2211, 2220, 2225 |
| Rated voltage (WVDC) | 1KV, 1.5KV, 2KV, 3KV, 4KV | 1KV, 1.5KV, 2KV, 3KV, 4KV |
| Capacitance range* | 1.5pF ~ 10nF | 100pF ~ 220nF |
| Capacitance tolerance | Cap≤5pF: B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%), K (±10%) | J (±5%) K (±10%) M (±20%) |
| Tan δ * | Cap. Rang Q Spec. Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000 | ≤2.5% |
| Measured at the condition of 30~70% related humidity. | | |
| Capacitance & Tan δ Test Condition | for 25°C at ambient temperature | Preconditioning for Class II MLCC: Perform a heat treatment at 150±10°C for 1 hour, then leave in ambient condition for 24±2 hours before measurement. |
| | Cap. Rang Test Condition | Apply 1.0±0.2Vrms, 1.0kHz±10%, at 25°C ambient temperature. |
| | Cap≤1000pF 1.0±0.2Vrms, 1.0MHz±10% | |
| | Cap>1000pF, 1.0±0.2Vrms, 1.0kHz±10% | |
| Insulation resistance | ≥10GΩ or R·C≥ 500Ω·F whichever is smaller | ≥10GΩ or R·C≥100Ω·F whichever is smaller |
| Operating temperature | | - 55 to + 125°C |
| Temperature coefficient | ±30ppm / °C | ±15% |
| Termination | Ag or Cu / Ni / Sn (lead-free termination) | |

DIMENSIONS



| Size inch (mm) | L (mm) | W (mm) | T (mm) code | M _b (mm) |
|----------------|-----------|-----------|---------------------------------|---------------------|
| 1206 (3216) | 3.3±0.30 | 1.60±0.20 | | 0.60±0.20 |
| 1210 (3225) | 3.30±0.40 | 2.50±0.30 | | 0.75±0.35 |
| 1808 (4520) | 4.60±0.50 | 2.00±0.25 | | 0.75±0.35 |
| 1812 (4532) | 4.60±0.50 | 3.20±0.30 | Reference Thickness Description | 0.75±0.35 |
| 1825 (4563) | 4.60±0.50 | 6.30±0.40 | | 0.75±0.35 |
| 2220 (5750) | 5.70±0.50 | 5.00±0.40 | | 0.85±0.35 |
| 2211 (5728) | 5.70±0.50 | 2.80±0.30 | | 0.85±0.35 |
| 2225 (5763) | 5.70±0.50 | 6.30±0.40 | | 0.85±0.35 |

■ Anti-Arcing High-Voltage Multilayer Ceramic Chip Capacitors

RATING

| | | NPO | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|------|------|-------|-----|-----|------|-------|-----|-----|------|-------|-----|-----|-----|------|-------|-----|-----|-----|------|-------|-----|-----|------|-------|-----|-----|-----|------|-------|-----|-----|-----|---|---|---|--|
| Size | | 1206 | | | | 1210 | | | | 1808 | | | | | 1812 | | | | | 1825 | | | | 2220 | | | | | 2225 | | | | | | | | |
| Cap | Code | 1KV | 1.5KV | 2KV | 3KV | 1KV | 1.5KV | 2KV | 3KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | | | | |
| 1.5pF | 1R5 | C | C | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.8pF | 1R8 | C | C | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.2pF | 2R2 | C | C | C | | | | | | D | D | D | D | D | | | | | | | | | | | | | | | | | | | | | | | |
| 2.7pF | 2R7 | C | C | C | | | | | | D | D | D | D | D | | | | | | | | | | | | | | | | | | | | | | | |
| 3.3pF | 3R3 | C | C | C | | | | | | D | D | D | D | D | | | | | | | | | | | | | | | | | | | | | | | |
| 3.9pF | 3R9 | C | C | C | | | | | | D | D | D | D | D | | | | | | | | | | | | | | | | | | | | | | | |
| 4.7pF | 4R7 | C | C | C | | | | | | D | D | D | D | D | | | | | | | | | | | | | | | | | | | | | | | |
| 5pF | 5R0 | C | C | C | | | | | | D | D | D | D | D | | | | | | | | | | | | | | | | | | | | | | | |
| 5.6pF | 5R6 | C | C | C | | | | | | D | D | D | D | D | | | | | | | | | | | | | | | | | | | | | | | |
| 6.8pF | 6R8 | C | C | C | | | | | | D | D | D | D | D | | | | | | | | | | | | | | | | | | | | | | | |
| 8.2pF | 8R2 | C | C | C | | | | | | D | D | D | D | D | | | | | | | | | | | | | | | | | | | | | | | |
| 10pF | 100 | C | C | C | E | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 12pF | 120 | C | C | C | E | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 15pF | 150 | C | C | C | E | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 18pF | 180 | C | C | C | E | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 22pF | 220 | C | C | C | E | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 27pF | 270 | C | C | C | E | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 33pF | 330 | C | C | C | E | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 39pF | 390 | C | C | C | E | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 47pF | 470 | C | C | C | E | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 56pF | 560 | C | C | C | E | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 68pF | 680 | C | C | C | E | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 82pF | 820 | C | C | C | E | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 100pF | 101 | C | C | C | | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 120pF | 121 | C | E | E | | G | G | G | G | D | D | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 150pF | 151 | C | E | E | | G | G | G | G | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 180pF | 181 | E | E | E | | G | G | G | G | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 220pF | 221 | E | E | E | | G | G | G | G | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 270pF | 271 | E | E | E | | G | G | G | G | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | | |
| 330pF | 331 | E | E | E | | G | G | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | |
| 390pF | 391 | E | E | E | | G | G | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | |
| 470pF | 471 | E | | | | G | G | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | |
| 560pF | 561 | E | | | | G | G | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | |
| 680pF | 681 | E | | | | G | G | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | |
| 820pF | 821 | E | | | | G | G | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | |
| 1000pF | 102 | E | | | | G | G | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | |
| 1200pF | 122 | | | | | G | G | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | |
| 1500pF | 152 | | | | | G | G | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | |
| 1800pF | 182 | | | | | G | G | G | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | |
| 2200pF | 222 | | | | | G | | | | F | | | | | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | |
| 2700pF | 272 | | | | | | | | | | | | | | F | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | |
| 3300pF | 332 | | | | | | | | | | | | | | F | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | |
| 3900pF | 392 | | | | | | | | | | | | | | G | | | | | | | | | | | | | | | | | | | | | | |
| 4700pF | 472 | | | | | | | | | | | | | | G | | | | | | | | | | | | | | | | | | | | | | |
| 5600pF | 562 | | | | | | | | | | | | | | G | | | | | | | | | | | | | | | | | | | | | | |
| 6800pF | 682 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8200pF | 822 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.010μF | 103 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.012μF | 123 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

■ Anti-Arcing High-Voltage Multilayer Ceramic Chip Capacitors

RATING

X7R

| Size | 1206 | | | | 1210 | | | 1808 | | | | 1812 | | | | 1825 | | | | 2211 | | 2220 | | | | 2225 | | | | | | | | | | | |
|---------|------|------|-----|-------|------|-------|-----|-------|-----|-----|-------|------|-----|-----|-----|-------|-----|-----|-----|------|-------|------|-----|-----|-----|------|-----|-------|-----|-----|-----|-----|-------|-----|-----|-----|--|
| | Cap | Code | 1KV | 1.5KV | 2KV | 2.5KV | 1KV | 1.5KV | 2KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | 1KV | 1.5KV | 2KV | 3KV | 4KV | |
| 100pF | 101 | C | C | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 120pF | 121 | C | C | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 150pF | 151 | C | C | C | | | | | D | D | D | D | F | | | | | | | | | | | | | | | | | | | | | | | | |
| 180pF | 181 | C | C | C | | | | | D | D | D | D | F | | | | | | | | | | | | | | | | | | | | | | | | |
| 220pF | 221 | C | C | C | | G | G | G | D | D | D | D | F | | | | | | | | | | | | | | | | | | | | | | | | |
| 270pF | 271 | C | C | C | | G | G | G | D | D | D | D | F | F | F | F | F | F | | | | | | F | F | F | | | | | | | | | | F | |
| 330pF | 331 | C | C | C | | G | G | G | D | D | D | F | F | F | F | F | F | F | | | | | F | F | F | | | | | | | | | | | F | |
| 390pF | 391 | C | C | C | | G | G | G | D | D | D | F | F | F | F | F | F | F | | | | | F | F | F | | | | | | | | | | | F | |
| 470pF | 471 | C | C | C | | G | G | G | D | D | D | F | F | F | F | F | F | F | | | | | F | F | F | | | | | | | | | | | F | |
| 560pF | 561 | C | C | C | | G | G | G | D | D | D | F | F | F | F | F | F | F | | | | | F | F | F | | | | | | | | | | | F | |
| 680pF | 681 | C | C | C | C | G | G | G | D | D | D | F | F | F | F | F | F | F | | | | | F | F | F | | | | | | | | | | | F | |
| 820pF | 821 | C | C | C | C | G | G | G | D | D | D | F | F | F | F | F | F | F | | | | | F | F | F | | | | | | | | | | | F | |
| 1000pF | 102 | C | C | C | C | G | G | G | D | D | D | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | |
| 1200pF | 122 | C | E | E | | G | G | G | D | F | F | F | | F | F | F | G | F | F | F | F | G | G | F | F | F | F | F | G | F | F | F | F | F | G | | |
| 1500pF | 152 | C | E | E | | G | G | G | D | F | F | F | | F | F | F | G | F | F | F | F | G | G | F | F | F | F | G | F | F | F | F | F | F | G | | |
| 1800pF | 182 | C | E | E | | G | G | G | D | F | F | F | | F | F | F | G | G | F | F | F | F | G | G | F | F | F | F | G | F | F | F | F | F | F | G | |
| 2200pF | 222 | C | E | E | | G | G | G | D | F | F | F | | F | F | F | G | | F | F | F | F | G | | F | F | F | F | | F | F | F | F | | | | |
| 2700pF | 272 | C | E | E | | G | G | G | D | F | F | F | | F | F | F | G | | F | F | F | F | G | | F | F | F | F | | F | F | F | F | | | | |
| 3300pF | 332 | C | E | E | | G | G | G | D | F | F | F | | F | F | F | G | | F | F | F | F | G | | F | F | F | F | | F | F | F | F | | | | |
| 3900pF | 392 | C | | | | G | G | G | D | F | F | | | F | F | F | G | | F | F | F | F | | | F | F | F | F | | F | F | F | F | | | | |
| 4700pF | 472 | C | | | | G | G | G | D | F | F | | | F | F | F | | | F | F | F | F | | | F | F | F | F | | F | F | F | F | | | | |
| 5600pF | 562 | C | | | | G | G | G | F | F | F | | | F | G | G | | | F | F | F | G | | | F | F | F | F | | F | F | F | G | | | | |
| 6800pF | 682 | C | | | | G | G | G | F | F | F | | | F | G | G | | | F | F | F | G | | | F | F | F | G | | F | F | F | G | | | | |
| 8200pF | 822 | C | | | | G | G | G | F | | | | | F | G | G | | | F | F | F | G | | | F | G | G | G | | F | F | F | G | | | | |
| 0.010uF | 103 | C | | | | G | | | F | | | | | F | G | G | | | F | F | F | G | | | F | G | G | G | | F | F | F | G | | | | |
| 0.012uF | 123 | E | | | | G | | | F | | | | | F | | | | | F | G | G | H | | | F | G | G | H | | F | G | G | G | | | | |
| 0.015uF | 153 | E | | | | G | | | F | | | | | F | | | | | F | G | G | H | | | F | G | G | H | | F | G | G | G | | | | |
| 0.018uF | 183 | E | | | | G | | | F | | | | | G | | | | | F | G | G | H | | | F | H | H | H | | F | G | G | H | | | | |
| 0.022uF | 223 | E | | | | G | | | F | | | | | G | | | | | F | G | G | | | | F | H | H | | F | G | G | | | | | | |
| 0.027uF | 273 | | | | | G | | | F | | | | | G | | | | | F | H | H | | | | F | H | H | | F | G | G | | | | | | |
| 0.033uF | 333 | | | | | G | | | F | | | | | G | | | | | F | H | H | | | | F | H | H | | F | G | G | | | | | | |
| 0.039uF | 393 | | | | | G | | | F | | | | | G | | | | | F | H | H | | | | F | H | H | | F | G | H | | | | | | |
| 0.047uF | 473 | | | | | G | | | F | | | | | G | | | | | F | H | H | | | | F | H | H | | F | G | H | | | | | | |
| 0.056uF | 563 | | | | | | | | F | | | | | G | | | | | F | | | | | | F | H | H | | F | G | H | | | | | | |
| 0.068uF | 683 | | | | | | | | | | | | | G | | | | | F | | | | | | G | | | | F | G | | | | | | | |
| 0.082uF | 823 | | | | | | | | | | | | | G | | | | | G | | | | | | G | | | | F | G | | | | | | | |
| 0.10uF | 104 | | | | | | | | | | | | | G | | | | | G | | | | | | G | | | | G | G | | | | | | | |
| 0.12uF | 124 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.15uF | 154 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.18uF | 184 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.22uF | 224 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.27uF | 274 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.33uF | 334 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.39uF | 394 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

■ Automotive Capacitor Qualified to AEC-Q200

FEATURES

- A wide selection of sizes is available (0201 to 1210).
- High capacitance in given case size.
- Capacitor with lead-free termination (pure Tin).
- The MT series meet AEC-Q200 requirement

APPLICATION

- For Navigation & Information equipments.
- For entertainment equipments.
- For comfortable equipments.
- For Automotive electronic equipment.

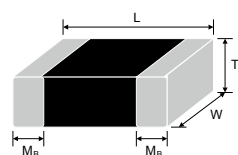
PART NUMBER

| MT | 31 | X | 471 | K | 251 | E | C | G |
|--|--|------------------------------|--|---|---|--|---------------------------------------|-----------------------------|
| PDC Family | Size | Dielectric | Capacitance | Tolerance | Rated voltage | Packaging | Thickness | Control Code |
| Automotive Capacitor Qualified to AEC-Q200 | 03 0201 (0603) 15 0402 (1005) 18 0603 (1608) 21 0805 (2012) 31 1206 (3216) 32 1210 (3225) | N NPO X X7R | 102 =10x10 [∧] 2 =1000pF 100 =10x10 [∧] 0 =10pF | J = ± 5% K =± 10% M =± 20% | 6R3 =6.3V 100 =10V 101 =100V 251 =250V | E = Tape and 7" Reel, Embossed Tape P = Tape and 7" Reel, Paper Tape L = Tape and 13" Reel, Embossed G = Tape and 13"Reel, Paper Tape | Reference Thickness Description | G =RoHS Compliant |

GENERAL ELECTRICAL DATA

| Dielectric | NPO(C0G) | X7R |
|---|--|--|
| Size | 0201, 0402, 0603, 0805, 1206, 1210 | 0402, 0603, 0805, 1206, 1210 |
| Rated voltage (WVDC) | 10V, 16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V, 1000V | |
| Capacitance range* | 0.1pF ~ 47nF | 100pF ~ 2.2μF |
| Capacitance tolerance** | Cap≤5pF: B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%) | J (±5%) K (±10%) M (±20%) |
| Measured at the condition of 30~70% related humidity. | | |
| Capacitance & Tan δ Test Condition | for 25°C at ambient temperature | Preconditioning for Class II MLCC: Perform a heat treatment at 150±10°C for 1 hour, then leave in ambient condition for 24±2 hours before measurement. |
| | Cap. Rang | Test Condition |
| | Cap≤1000pF | 1.0±0.2Vrms, 1.0MHz±10% |
| | Cap>1000pF | 1.0±0.2Vrms, 1.0kHz±10% |
| Tan δ * | Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000 | ≤ 2.5% |
| Insulation resistance at Ur | ≥10GΩ or R·C≥ 500Ω·F whichever is smaller | Follow No.17 Of 8. Reliability Test Conditions and Requirements |
| Operating temperature | -55 to +125°C | |
| Capacitance characteristic | ± 30ppm / °C | ± 15% |
| Termination | Cu/Ni/Sn (lead-free termination) | |

DIMENSIONS



| Size inch (mm) | L (mm) | W (mm) | T (mm) code | M _b min (mm) |
|----------------|-----------|-----------|---------------------------------------|-------------------------|
| 0201 (0603) | 0.60±0.03 | 0.30±0.03 | | 0.15±0.05 |
| 0402 (1005) | 1.00±0.10 | 0.50±0.10 | | 0.25+0.05/-0.10 |
| 0603 (1608) | 1.60±0.15 | 0.80±0.15 | Reference Thickness Description | 0.40±0.15 |
| 0805 (2012) | 2.00±0.20 | 1.25±0.20 | | 0.50±0.20 |
| 1206 (3216) | 3.20±0.20 | 1.60±0.20 | | 0.60±0.20 |
| 1210 (3225) | 3.20±0.30 | 2.50±0.30 | | 0.75±0.35 |

Automotive Capacitor Qualified to AEC-Q200

RATING

COG

| Size | | 0201 | | | | | 0402 | | | | | 0603 | | | | | 0805 | | | | | | | | | | |
|---------|------|------|-----|-----|-----|------|------|-----|-----|-----|------|------|-----|-----|-----|------|------|------|-----|-----|-----|-----|------|------|------|------|------|
| Cap(pF) | Code | 10V | 16V | 25V | 50V | 100V | 10V | 16V | 25V | 50V | 100V | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 500V | 630V |
| 0.1 | OR1 | L | L | L | L | L | N | N | N | N | | | | | | | | | | | | | | | | | |
| 0.2 | OR2 | L | L | L | L | L | N | N | N | N | | | | | | | | | | | | | | | | | |
| 0.3 | OR3 | L | L | L | L | L | N | N | N | N | | | | | | | | | | | | | | | | | |
| 0.4 | OR4 | L | L | L | L | L | N | N | N | N | | | | | | | | | | | | | | | | | |
| 0.5 | OR5 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 0.6 | OR6 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 0.7 | OR7 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 0.8 | OR8 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 0.9 | OR9 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 1 | 1R0 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 1.2 | 1R2 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 1.5 | 1R5 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 1.8 | 1R8 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 2.2 | 2R2 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 2.7 | 2R7 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 3.3 | 3R3 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 3.9 | 3R9 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 4.7 | 4R7 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 5.6 | 5R6 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 6.8 | 6R8 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 8.2 | 8R2 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 10 | 100 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 12 | 120 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 15 | 150 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 18 | 180 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 22 | 220 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 27 | 270 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 33 | 330 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 39 | 390 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 47 | 470 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 56 | 560 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 68 | 680 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | A | A |
| 82 | 820 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | A | A | X | X |
| 100 | 101 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | X | X | X | X |
| 120 | 121 | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | X | X | C | C |
| 150 | 151 | | | | | | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | C | C | C | C |
| 180 | 181 | | | | | | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | C | C | C | C |
| 220 | 221 | | | | | | N | N | N | N | N | S | S | S | S | S | S | S | A | A | A | A | A | C | C | C | C |
| 270 | 271 | | | | | | N | N | N | N | N | S | S | S | S | S | B | B | A | A | A | A | A | C | C | C | C |
| 330 | 331 | | | | | | N | N | N | N | N | S | S | S | S | S | B | B | A | A | A | A | A | C | C | C | C |
| 390 | 391 | | | | | | N | N | N | N | N | S | S | S | S | S | B | B | X | X | X | X | X | C | C | C | C |
| 470 | 471 | | | | | | N | N | N | N | N | S | S | S | S | S | B | B | X | X | X | X | X | C | C | I | I |
| 560 | 561 | | | | | | N | N | N | N | N | S | S | S | S | S | | | X | X | X | X | X | C | C | I | I |
| 680 | 681 | | | | | | N | N | N | N | N | S | S | S | S | S | | | X | X | X | X | X | C | C | I | I |
| 820 | 821 | | | | | | N | N | N | N | N | S | S | S | S | S | | | X | X | X | X | X | C | C | I | I |
| 1000 | 102 | | | | | | N | N | N | N | N | S | S | S | S | S | | | X | X | X | X | X | C | C | I | I |
| 1200 | 122 | | | | | | | | | | | B | B | B | B | | | | X | X | X | X | X | C | C | | |
| 1500 | 152 | | | | | | | | | | | B | B | B | B | | | | X | X | X | X | X | C | C | | |
| 1800 | 182 | | | | | | | | | | | B | B | B | B | | | | X | X | X | X | X | C | C | | |
| 2200 | 222 | | | | | | | | | | | B | B | B | B | | | | X | X | X | X | X | C | C | | |
| 2700 | 272 | | | | | | | | | | | B | B | B | B | | | | C | C | C | C | C | | | | |
| 3300 | 332 | | | | | | | | | | | B | B | B | B | | | | C | C | C | C | C | | | | |
| 3900 | 392 | | | | | | | | | | | | | | | | | | C | C | C | C | C | | | | |
| 4700 | 472 | | | | | | | | | | | | | | | | | | C | C | C | C | C | | | | |
| 5600 | 562 | | | | | | | | | | | | | | | | | | C | C | C | C | C | | | | |
| 6800 | 682 | | | | | | | | | | | | | | | | | | C | C | C | C | C | | | | |
| 8200 | 822 | | | | | | | | | | | | | | | | | | C | C | C | C | | | | | |
| 10000 | 103 | | | | | | | | | | | | | | | | | | C | C | C | C | | | | | |
| 12000 | 123 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15000 | 153 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18000 | 183 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22000 | 223 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27000 | 273 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33000 | 333 | | | | | | | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

Automotive Capacitor Qualified to AEC-Q200

RATING

NPO

| Size | | 1206 | | | | | | | | | | 1210 | | | | | | | | | | |
|---------|------|------|-----|-----|-----|------|------|------|------|------|-------|------|-----|-----|-----|------|------|------|------|------|-------|---|
| Cap(pF) | Code | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 500V | 630V | 1000V | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 500V | 630V | 1000V | |
| 0.1 | OR1 | | | | | | | | | | | | | | | | | | | | | |
| 0.2 | OR2 | | | | | | | | | | | | | | | | | | | | | |
| 0.3 | OR3 | | | | | | | | | | | | | | | | | | | | | |
| 0.4 | OR4 | | | | | | | | | | | | | | | | | | | | | |
| 0.5 | OR5 | | | | | | | | | | | | | | | | | | | | | |
| 0.6 | OR6 | | | | | | | | | | | | | | | | | | | | | |
| 0.7 | OR7 | | | | | | | | | | | | | | | | | | | | | |
| 0.8 | OR8 | | | | | | | | | | | | | | | | | | | | | |
| 0.9 | OR9 | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1R0 | | | | | | | | | | | | | | | | | | | | | |
| 1.2 | 1R2 | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | |
| 1.5 | 1R5 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | |
| 1.8 | 1R8 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | |
| 2.2 | 2R2 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | |
| 2.7 | 2R7 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | |
| 3.3 | 3R3 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | |
| 3.9 | 3R9 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | |
| 4.7 | 4R7 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | |
| 5.6 | 5R6 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | |
| 6.8 | 6R8 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | |
| 8.2 | 8R2 | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | |
| 10 | 100 | X | X | X | X | X | X | X | X | X | X | M | M | M | M | M | M | M | M | M | M | M |
| 12 | 120 | X | X | X | X | X | X | X | X | X | X | M | M | M | M | M | M | M | M | M | M | M |
| 15 | 150 | X | X | X | X | X | X | X | X | X | X | M | M | M | M | M | M | M | M | M | M | M |
| 18 | 180 | X | X | X | X | X | X | X | X | X | X | M | M | M | M | M | M | M | M | M | M | M |
| 22 | 220 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | M | M |
| 27 | 270 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | M | M |
| 33 | 330 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | M | M |
| 39 | 390 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | M | M |
| 47 | 470 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | M | M |
| 56 | 560 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | M | M |
| 68 | 680 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | M | M |
| 82 | 820 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | M | M |
| 100 | 101 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | M | C |
| 120 | 121 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | M | C |
| 150 | 151 | X | X | X | X | X | X | X | X | X | C | M | M | M | M | M | M | M | M | M | M | C |
| 180 | 181 | X | X | X | X | X | X | X | X | X | E | M | M | M | M | M | M | M | M | M | M | C |
| 220 | 221 | X | X | X | X | X | X | X | X | X | E | M | M | M | M | M | M | M | M | M | M | E |
| 270 | 271 | X | X | X | X | X | X | M | M | M | E | M | M | M | M | M | M | M | M | M | M | E |
| 330 | 331 | X | X | X | X | X | X | M | M | M | E | M | M | M | M | M | M | M | M | M | M | E |
| 390 | 391 | X | X | X | X | X | X | M | M | M | E | M | M | M | M | M | M | M | M | M | M | E |
| 470 | 471 | X | X | X | X | X | M | M | M | M | E | M | M | M | M | M | M | M | M | M | M | E |
| 560 | 561 | X | X | X | X | X | M | C | C | C | E | M | M | M | M | M | M | M | M | M | M | E |
| 680 | 681 | X | X | X | X | X | M | C | C | C | E | M | M | M | M | M | M | M | M | M | M | E |
| 820 | 821 | X | X | X | X | X | M | E | E | E | E | M | M | M | M | M | M | M | M | M | M | E |
| 1000 | 102 | X | X | X | X | X | M | E | E | E | E | M | M | M | M | M | C | C | C | C | C | E |
| 1200 | 122 | X | X | X | X | X | M | E | E | E | | M | M | M | M | M | C | C | C | C | C | |
| 1500 | 152 | X | X | X | X | X | C | E | E | E | | M | M | M | M | M | C | C | C | C | C | |
| 1800 | 182 | X | X | X | X | X | C | E | E | E | | M | M | M | M | M | C | C | C | C | C | |
| 2200 | 222 | X | X | X | X | X | C | E | E | E | | M | M | M | M | M | C | C | C | C | C | |
| 2700 | 272 | X | X | X | X | X | C | E | E | E | | M | M | M | M | M | C | C | C | C | C | |
| 3300 | 332 | X | X | X | X | X | C | E | E | E | | M | M | M | M | M | C | C | C | C | C | |
| 3900 | 392 | X | X | X | X | X | C | E | E | E | | M | M | M | M | M | C | C | C | C | C | |
| 4700 | 472 | X | X | X | X | X | C | E | E | E | | M | M | M | M | M | E | E | | | | |
| 5600 | 562 | X | X | X | X | X | | | | | | M | M | M | M | M | E | E | | | | |
| 6800 | 682 | M | M | M | M | M | | | | | | M | M | M | M | M | E | E | | | | |
| 8200 | 822 | C | C | C | C | C | | | | | | M | M | M | M | M | E | E | | | | |
| 10000 | 103 | C | C | C | C | C | | | | | | M | M | M | M | M | E | E | | | | |
| 12000 | 123 | | | | | | | | | | | C | C | C | C | C | | | | | | |
| 15000 | 153 | | | | | | | | | | | C | C | C | C | C | | | | | | |
| 18000 | 183 | | | | | | | | | | | F | F | F | F | F | | | | | | |
| 22000 | 223 | | | | | | | | | | | F | F | F | F | F | | | | | | |
| 27000 | 273 | | | | | | | | | | | F | F | F | F | F | | | | | | |
| 33000 | 333 | | | | | | | | | | | F | F | F | F | F | | | | | | |
| 47000 | 473 | | | | | | | | | | | F | F | F | F | F | | | | | | |

MLCC

Chip R

Coil

Automotive Capacitor Qualified to AEC-Q200

RATING

X7R

| Size | | 0201 | | | | 0402 | | | | 0603 | | | | | 0805 | | | | | | | | |
|---------|------|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|------|-----|-----|-----|------|------|------|------|------|
| Cap(pF) | Code | 10V | 16V | 25V | 50V | 10V | 16V | 25V | 50V | 10V | 16V | 25V | 50V | 100V | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 500V | 630V |
| 100 | 101 | L | L | L | L | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 120 | 121 | L | L | L | L | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 150 | 151 | L | L | L | L | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 180 | 181 | L | L | L | L | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 220 | 221 | L | L | L | L | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 270 | 271 | L | L | L | L | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 330 | 331 | L | L | L | L | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 390 | 391 | L | L | L | L | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 470 | 471 | L | L | L | L | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 560 | 561 | L | L | L | L | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 680 | 681 | L | L | L | L | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 820 | 821 | L | L | L | L | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 1000 | 102 | L | L | L | L | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 1200 | 122 | L | L | L | | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 1500 | 152 | L | L | L | | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 1800 | 182 | L | L | L | | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 2200 | 222 | L | L | L | | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 2700 | 272 | L | L | L | | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 3300 | 332 | L | L | L | | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 3900 | 392 | L | L | L | | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | X | X |
| 4700 | 472 | L | L | L | | N | N | N | N | S | S | S | S | S | X | X | X | X | X | X | X | C | C |
| 5600 | 562 | L | L | L | | N | N | N | N | S | S | S | S | S | X | X | X | X | X | C | C | C | C |
| 6800 | 682 | L | | | | N | N | N | N | S | S | S | S | S | X | X | X | X | X | C | C | C | C |
| 8200 | 822 | L | | | | N | N | N | N | S | S | S | S | S | X | X | X | X | X | C | C | C | C |
| 10000 | 103 | L | | | | N | N | N | N | S | S | S | S | S | X | X | X | X | X | C | C | C | C |
| 12000 | 123 | | | | | N | N | N | | S | S | S | S | B | X | X | X | X | X | C | C | | |
| 15000 | 153 | | | | | N | N | N | | S | S | S | S | B | X | X | X | X | X | C | C | | |
| 18000 | 183 | | | | | N | N | N | | S | S | S | S | B | X | X | X | X | X | C | C | | |
| 22000 | 223 | | | | | N | N | N | | S | S | S | S | B | X | X | X | X | X | C | C | | |
| 27000 | 273 | | | | | N | N | N | | S | S | S | S | B | X | X | X | X | C | | | | |
| 33000 | 333 | | | | | N | N | N | | S | S | S | B | B | X | X | X | X | C | | | | |
| 39000 | 393 | | | | | N | N | N | | S | S | S | B | B | X | X | X | X | C | | | | |
| 47000 | 473 | | | | | N | N | N | | S | S | S | B | B | X | X | X | X | C | | | | |
| 56000 | 563 | | | | | N | N | | | S | S | S | B | | X | X | X | X | C | | | | |
| 68000 | 683 | | | | | N | N | | | S | S | S | B | | X | X | X | X | C | | | | |
| 82000 | 823 | | | | | N | N | | | S | S | S | B | | X | X | X | C | C | | | | |
| 100000 | 104 | | | | | N | N | | | S | S | S | B | | X | X | X | C | C | | | | |
| 120000 | 124 | | | | | | | | | B | B | B | | | X | X | X | C | | | | | |
| 150000 | 154 | | | | | | | | | B | B | B | B | | C | C | C | C | | | | | |
| 180000 | 184 | | | | | | | | | B | B | B | | | C | C | C | C | | | | | |
| 220000 | 224 | | | | | | | | | B | B | B | B | | C | C | C | C/I | | | | | |
| 270000 | 274 | | | | | | | | | | | | | | C | C | C | | | | | | |
| 330000 | 334 | | | | | | | | | B | B | B | B | | C | C | C | | | | | | |
| 390000 | 394 | | | | | | | | | | | | | | C | C | C | | | | | | |
| 470000 | 474 | | | | | | | | | | | | | | C | C | C | | | | | | |
| 560000 | 564 | | | | | | | | | | | | | | C | C | C | | | | | | |
| 680000 | 684 | | | | | | | | | | | | | | C | C | C | | | | | | |
| 820000 | 824 | | | | | | | | | | | | | | C | C | C | | | | | | |
| 1000000 | 105 | | | | | | | | | | | | | | C | C | C | | | | | | |

MLCC

Chip R

Coil

Automotive Capacitor Qualified to AEC-Q200

RATING

X7R

| Size | | 1206 | | | | | | | | | 1210 | | | | | | | |
|---------|------|------|-----|-----|-----|------|------|------|------|------|------|-----|-----|-----|------|------|------|-------|
| Cap(pF) | Code | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 500V | 630V | 10V | 16V | 25V | 50V | 100V | 250V | 500V | 1000V |
| 100 | 101 | | | | | | C | C | C | C | | | | | | C | C | C |
| 120 | 121 | | | | | | C | C | C | C | | | | | | C | C | C |
| 150 | 151 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C |
| 180 | 181 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C |
| 220 | 221 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C |
| 270 | 271 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C |
| 330 | 331 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C |
| 390 | 391 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C |
| 470 | 471 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C |
| 560 | 561 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C |
| 680 | 681 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C |
| 820 | 821 | X | X | X | X | X | C | C | C | C | | | | | | C | C | C |
| 1000 | 102 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C |
| 1200 | 122 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C |
| 1500 | 152 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C |
| 1800 | 182 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C |
| 2200 | 222 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C |
| 2700 | 272 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C |
| 3300 | 332 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | C |
| 3900 | 392 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | E |
| 4700 | 472 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | E |
| 5600 | 562 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | E |
| 6800 | 682 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | E |
| 8200 | 822 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | E |
| 10000 | 103 | X | X | X | X | X | C | C | C | C | M | M | M | M | M | M | C | E |
| 12000 | 123 | X | X | X | X | X | C | C | | | M | M | M | M | M | M | C | |
| 15000 | 153 | X | X | X | X | X | C | C | | | M | M | M | M | M | M | C | |
| 18000 | 183 | X | X | X | X | X | C | C | | | M | M | M | M | M | M | C | |
| 22000 | 223 | X | X | X | X | X | C | C | | | M | M | M | M | M | M | C | |
| 27000 | 273 | X | X | X | X | X | | | | | M | M | M | M | M | M | | |
| 33000 | 333 | X | X | X | X | X | | | | | M | M | M | M | M | M | | |
| 39000 | 393 | X | X | X | X | X | | | | | M | M | M | M | M | M | | |
| 47000 | 473 | X | X | X | X | X | | | | | M | M | M | M | M | C | | |
| 56000 | 563 | X | X | X | X | X | | | | | M | M | M | M | M | | | |
| 68000 | 683 | X | X | X | X | X | | | | | M | M | M | M | M | | | |
| 82000 | 823 | X | X | X | X | C | | | | | M | M | M | M | M | | | |
| 100000 | 104 | X | X | X | X | C | | | | | M | M | M | M | M | | | |
| 120000 | 124 | X | X | X | X | C | | | | | M | M | M | M | | | | |
| 150000 | 154 | M | M | M | M | E | | | | | M | M | M | M | | | | |
| 180000 | 184 | M | M | M | M | E | | | | | M | M | M | M | | | | |
| 220000 | 224 | M | M | M | M | E | | | | | M | M | M | M | | | | |
| 270000 | 274 | M | M | M | C | | | | | | M | M | M | M | | | | |
| 330000 | 334 | M | M | M | C | | | | | | M | M | M | C | | | | |
| 390000 | 394 | M | M | J | P | | | | | | M | M | M | C | | | | |
| 470000 | 474 | J | J | J | P | | | | | | M | M | M | C | | | | |
| 560000 | 564 | J | J | J | P | | | | | | C | C | C | C | | | | |
| 680000 | 684 | J | J | J | P | | | | | | C | C | C | C | | | | |
| 820000 | 824 | J | J | J | P | | | | | | C | C | C | C | | | | |
| 1000000 | 105 | J | J | J | P | | | | | | C | C | C | C | | | | |
| 1500000 | 155 | | | | | | | | | | | F | | | | | | |
| 2200000 | 225 | | | | | | | | | | | F | | | | | | |

MLCC

Chip R

Coil

■ Automotive Caps without AEC-Q200 Certification

FEATURES

- A wide selection of sizes is available (0402 to 1812).
- High capacitance in given case size.
- Capacitor with lead-free termination (pure Tin).
- RoHS Compliant
- HALOGEN compliant

APPLICATION

- For Navigation & Information equipments.
- For entertainment equipments
- For comfortable equipments.
- For Automotive electronic equipment.

PART NUMBER

| MG | 31 | X | 471 | K | 251 | E | C | G |
|---|---|--|--|--|--|--|---------------------------------------|-----------------------------|
| PDC Family | Size | Dielectric | Capacitance | Tolerance | Rated voltage | Packaging | Thickness | Control Code |
| Automotive Caps without AEC- Q200 certification | 03 0201 (0603) 15 0402 (1005) 18 0603 (1608) 21 0805 (2012) 31 1206 (3216) 32 1210 (3225) 43 1812 (4532) | N NPO B X5R X X7R | 106 = 10×10^6 =10 μ F 100 = 10×10^0 =10pF | J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$ | 6R3 =6.3V 100 =10V 160 =16V 250 =25V 500 =50V 101 =100V 201 =200V 251 =250V | E = Tape and 7" Reel, Embossed Tape P = Tape and 7" Reel, Paper Tape L = Tape and 13" Reel, Embossed G = Tape and 13"Reel, Paper Tape | Reference Thickness Description | G =RoHS Compliant |

GENERAL ELECTRICAL DATA

| Dielectric | NPO | X7R | X5R |
|------------------------------------|--|---|------------------------------|
| Size | 0201, 0402, 0603, 0805, 1206, 1210, 1812 | | |
| Capacitance range* | 0.1pF to 0.047 μ F | 100pF to 2.2 μ F | 0.068 μ F to 6.8 μ F |
| Capacitance tolerance** | Cap \leq 5pF: B (± 0.1 pF), C (± 0.25 pF) 5pF<Cap<10pF: C (± 0.25 pF), D (± 0.5 pF) 10pF \leq Cap: F ($\pm 1\%$), G ($\pm 2\%$), J ($\pm 5\%$) | J ($\pm 5\%$), K ($\pm 10\%$), M ($\pm 20\%$) | |
| Rated voltage (WVDC) | 10V, 16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V, 1000V | 6.3V, 10V, 16V, 25V, | |
| Tan δ * | Cap<30pF: Q \geq 400+20C Cap \geq 30pF: Q \geq 1000 | 1.0 ± 0.2 Vrms, 1.0kHz $\pm 10\%$, at 25 $^{\circ}$ C ambient temperature. | |
| Insulation resistance at Ur | ≥ 10 G Ω or RxC ≥ 500 Ω -F whichever is less | | |
| Operating temperature | -55 to +125 $^{\circ}$ C | | -55 to +85 $^{\circ}$ C |
| Capacitance characteristic | ± 30 ppm / $^{\circ}$ C | $\pm 15\%$ | |
| Termination | Ni/Sn (lead-free termination) | | |

* Measured at the condition of 30~70% related humidity.

NPO: Apply 1.0 ± 0.2 Vrms, 1.0MHz $\pm 10\%$ for Cap ≤ 1000 pF and 1.0 ± 0.2 Vrms, 1.0kHz $\pm 10\%$ for Cap > 1000 pF, 25 $^{\circ}$ C at ambient temperature

Measured at 1.0 ± 0.2 Vrms, 1.0kHz $\pm 10\%$ for C ≤ 10 μ F; 0.5 ± 0.2 Vrms, 120Hz $\pm 20\%$ for C > 10 μ F, 30~70% related humidity, 25 $^{\circ}$ C ambient temperature for X7R, X5R.

** Preconditioning for Class II MLCC: Perform a heat treatment at 150 ± 10 $^{\circ}$ C for 1 hour, then leave in ambient condition for 24 ± 2 hours before measurement.

DIMENSIONS



| Size inch (mm) | L (mm) | W (mm) | T (mm) code | M _b min (mm) |
|----------------|-----------------|-----------------|---------------------------------------|-------------------------|
| 0201 (0603) | 0.6 ± 0.03 | 0.3 ± 0.03 | Reference Thickness Description | 0.15 ± 0.05 |
| 0402 (1005) | 1.00 ± 0.05 | 0.50 ± 0.05 | | 0.25+0.05/-0.10 |
| 0603 (1608) | 1.60 ± 0.10 | 0.80 ± 0.10 | | 0.40 ± 0.15 |
| 0805 (2012) | 2.00 ± 0.20 | 1.25 ± 0.20 | | 0.50 ± 0.20 |
| 1206 (3216) | 3.20 ± 0.20 | 1.60 ± 0.20 | | 0.60 ± 0.20 |
| 1210 (3225) | 3.20 ± 0.30 | 2.50 ± 0.20 | | 0.75 ± 0.25 |
| 1812 (4532) | 4.50 ± 0.40 | 3.20 ± 0.30 | | 0.75 ± 0.25 |

Automotive Caps without AEC-Q200 Certification

RATING

| | | NPO | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------|------|---------|---------|------|---------|---------|------|---------|---------|------|-----------|---------|---------|------|-----------|-----------|---------|---------|------|------|------|-----------|-----|---------|---------|------|------|------|-----------|-----|---------|---------|------|---|---|---|--|
| Size | | 0201 | | | 0402 | | | 0603 | | | | 0805 | | | | 1206 | | | | 1210 | | | | | 1812 | | | | | | | | | | | | |
| Cap | Code | 10V 16V | 25V 50V | 100V | 10V 16V | 25V 50V | 100V | 10V 16V | 25V 50V | 100V | 200V 250V | 10V 16V | 25V 50V | 100V | 200V 250V | 500V 630V | 10V 16V | 25V 50V | 100V | 200V | 250V | 500V 630V | 1KV | 10V 16V | 25V 50V | 100V | 200V | 250V | 500V 630V | 1KV | 10V 16V | 25V 50V | 100V | | | | |
| 0.1pF | OR1 | L | L | L | N | N | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.2pF | OR2 | L | L | L | N | N | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.3pF | OR3 | L | L | L | N | N | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.4pF | OR4 | L | L | L | N | N | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.5pF | OR5 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | | | | | | | | | | | | | | | | | | | | | |
| 0.6pF | OR6 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | | | | | | | | | | | | | | | | | | | | | |
| 0.7pF | OR7 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | | | | | | | | | | | | | | | | | | | | | |
| 0.8pF | OR8 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | | | | | | | | | | | | | | | | | | | | | |
| 0.9pF | OR9 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | | | | | | | | | | | | | | | | | | | | | |
| 1.0pF | 1R0 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | | | | | | | | | | | | | | | | | | | | | |
| 1.2pF | 1R2 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | | | | | | | | | | | | | | | |
| 1.5pF | 1R5 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 1.8pF | 1R8 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 2.0pF | 2R0 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 2.2pF | 2R2 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 2.7pF | 2R7 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 3.0pF | 3R0 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 3.3pF | 3R3 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 3.9pF | 3R9 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 4.0pF | 4R0 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 4.7pF | 4R7 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 5.0pF | 5R0 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 5.6pF | 5R6 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 6.0pF | 6R0 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 6.8pF | 6R8 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 7.0pF | 7R0 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 8.0pF | 8R0 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 8.2pF | 8R2 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 9.0pF | 9R0 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | | | | | | | | | | | | | | |
| 10pF | 100 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 12pF | 120 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 15pF | 150 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 18pF | 180 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 22pF | 220 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 27pF | 270 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 33pF | 330 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 39pF | 390 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 47pF | 470 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 56pF | 560 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 68pF | 680 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 82pF | 820 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 100pF | 101 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 120pF | 121 | L | L | L | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 150pF | 151 | | | | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 180pF | 181 | | | | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 220pF | 221 | | | | N | N | N | S | S | S | S | A | A | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | C | |
| 270pF | 271 | | | | N | N | | S | S | S | B | A | A | A | A | C | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | | C | |
| 330pF | 331 | | | | N | N | | S | S | S | B | A | A | A | A | C | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | | C | |
| 390pF | 391 | | | | N | N | | S | S | S | B | X | X | X | X | C | X | X | X | X | X | X | M | M | M | M | M | M | M | | | | | | | C | |
| 470pF | 471 | | | | N | N | | S | S | S | B | X | X | X | X | C | X | X | X | M | M | M | M | M | M | M | M | M | M | | | | | | | C | |
| 560pF | 561 | | | | N | N | | S | S | S | | X | X | X | C | | X | X | X | M | C | C | E | M | M | M | M | M | M | | | | | | | C | |
| 680pF | 681 | | | | N | N | | S | S | S | | X | X | X | C | | X | X | X | M | C | C | E | M | M | M | M | M | M | | | | | | | C | |
| 820pF | 821 | | | | N | N | | S | S | S | | X | X | X | C | | X | X | X | M | C | E | E | M | M | M | M | M | M | | | | | | | C | |
| 1000pF | 102 | | | | N | N | | S | S | S | | X | X | X | C | | X | X | X | M | E | E | E | M | M | M | C | C | C | E | | | | C | C | C | |
| 1200pF | 122 | | | | | | | B | B | | | X | X | X | C | | X | X | X | M | E | E | | M | M | M | C | C | C | | | | C | C | C | | |
| 1500pF | 152 | | | | | | | B | B | | | X | X | X | C | | X | X | X | M | E | E | | M | M | M | C | C | C | | | | C | C | C | | |
| 1800pF | 182 | | | | | | | B | B | | | X | X | X | C | | X | X | X | M | E | E | | M | M | M | C | C | C | | | | C | C | C | | |
| 2200pF | 222 | | | | | | | B | B | | | X | X | X | C | | X | X | X | M | E | E | | M | M | M | C | C | C | | | | C | C | C | | |
| 2700pF | 272 | | | | | | | B | B | | | C | C | C | | | X | X | X | M | E | E | | M | M | M | C | C | C | | | | C | C | C | | |
| 3300pF | 332 | | | | | | | B | B | | | C | C | C | | | X | X | X | M | E | E | | M | M | M | C | C | C | | | | C | C | C | | |
| 3900pF | 392 | | | | | | | C | C | | | C | C | C | | | X | X | X | M | E | E | | M | M | M | C | C | C | | | | C | C | C | | |
| 4700pF | 472 | | | | | | | C | C | | | C | C | C | | | X | X | X | M | E | E | | M | M | M | E | E | E | | | | C | C | C | | |
| 5600pF | 562 | | | | | | | C | C | | | C | C | C | | | X | X | X | | | | | | | | | | | | | | | | | | |

Automotive Caps without AEC-Q200 Certification

RATING

X7R

| Size | Code | 0201 | | | 0402 | | | 0603 | | | | 0805 | | | | | | 1206 | | | | | 1210 | | | | | 1812 | | | | | | | | | | | |
|---------|------|------|------------|-----|------|------------|-----|------|------------|-----|-----|------|------|------------|-----|-----|------|--------------|--------------|------------|-----|-----|------|--------------|--------------|------------|-----|------|------|------|------|------|-----|------------|-----|-----|------|--------------|---|
| | | 10V | 16V 25V | 50V | 6.3V | 10V 16V | 25V | 50V | 10V 16V | 25V | 50V | 100V | 6.3V | 10V 16V | 25V | 50V | 100V | 200V 250V | 500V 630V | 10V 16V | 25V | 50V | 100V | 200V 250V | 500V 630V | 10V 16V | 25V | 50V | 100V | 200V | 250V | 500V | 1KV | 10V 16V | 25V | 50V | 100V | 200V 250V | |
| 100pF | 101 | L | L | L | | N | N | N | S | S | S | S | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | |
| 120pF | 121 | L | L | L | | N | N | N | S | S | S | S | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | | | | |
| 150pF | 151 | L | L | L | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | |
| 180pF | 181 | L | L | L | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | |
| 220pF | 221 | L | L | L | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | |
| 270pF | 271 | L | L | L | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | |
| 330pF | 331 | L | L | L | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | |
| 390pF | 391 | L | L | L | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | |
| 470pF | 471 | L | L | L | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | |
| 560pF | 561 | L | L | L | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | |
| 680pF | 681 | L | L | L | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | |
| 820pF | 821 | L | L | L | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | |
| 1000pF | 102 | L | L | L | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | M | M | M | M | M | M | M | M | M | M | C | C | C | C | C |
| 1200pF | 122 | L | L | | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | M | M | M | M | M | M | M | M | M | M | C | C | C | C | C |
| 1500pF | 152 | L | L | | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | M | M | M | M | M | M | M | M | M | M | C | C | C | C | C |
| 1800pF | 182 | L | L | | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | M | M | M | M | M | M | M | M | M | M | C | C | C | C | C |
| 2200pF | 222 | L | L | | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | M | M | M | M | M | M | M | M | M | M | C | C | C | C | C |
| 2700pF | 272 | L | L | | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | M | M | M | M | M | M | M | M | M | M | C | C | C | C | C |
| 3300pF | 332 | L | L | | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | M | M | M | M | M | M | M | M | M | M | C | C | C | C | C |
| 3900pF | 392 | L | L | | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | M | M | M | M | M | M | M | M | M | M | C | G | C | C | C |
| 4700pF | 472 | L | L | | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | M | M | M | M | M | M | M | M | M | M | C | E | C | C | C |
| 5600pF | 562 | L | L | | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | M | M | M | M | M | M | M | M | M | M | C | E | C | C | C |
| 6800pF | 682 | L | | | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | M | M | M | M | M | M | M | M | M | M | C | E | C | C | C |
| 8200pF | 822 | L | | | | N | N | N | S | S | S | S | X | X | X | X | X | X | X | X | X | X | X | | M | M | M | M | M | M | M | M | M | M | C | E | C | C | C |
| 0.010µF | 103 | L | | | | N | N | N | S | S | S | S | X | X | X | X | X | C | C | X | X | X | X | | M | M | M | M | M | M | M | M | M | C | E | C | C | C | |
| 0.012µF | 123 | | | | | N | N | | S | S | S | B | X | X | X | X | X | C | | X | X | X | X | | M | M | M | M | M | M | M | C | | C | C | C | C | | |
| 0.015µF | 153 | | | | | N | N | | S | S | S | B | X | X | X | X | X | C | | X | X | X | X | | M | M | M | M | M | M | M | C | | C | C | C | C | | |
| 0.018µF | 183 | | | | | N | N | | S | S | S | B | X | X | X | X | X | C | | X | X | X | X | | M | M | M | M | M | M | M | C | | C | C | C | C | | |
| 0.022µF | 223 | | | | | N | N | | S | S | S | B | X | X | X | X | X | C | | X | X | X | X | | M | M | M | M | M | M | M | C | | C | C | C | C | | |
| 0.027µF | 273 | | | | | N | N | | S | S | S | B | X | X | X | X | X | | | X | X | X | X | | M | M | M | M | M | M | | | | C | C | C | C | C | |
| 0.033µF | 333 | | | | | N | N | | S | S | B | B | X | X | X | X | C | | | X | X | X | X | | M | M | M | M | M | M | | | | C | C | C | C | C | |
| 0.039µF | 393 | | | | | N | N | | S | S | B | B | X | X | X | X | C | | | X | X | X | X | | M | M | M | M | M | M | | | | C | C | C | C | C | |
| 0.047µF | 473 | | | | | N | N | | S | S | B | B | X | X | X | X | C | | | X | X | X | X | | M | M | M | M | C | C | | | | C | C | C | C | C | |
| 0.056µF | 563 | | | | | N | | | S | S | B | | X | X | X | X | C | | | X | X | X | X | | M | M | M | M | C | C | | | | C | C | C | C | C | |
| 0.068µF | 683 | | | | | N | | | S | S | B | | X | X | X | X | C | | | X | X | X | X | | M | M | M | M | E | E | | | | C | C | C | C | C | |
| 0.082µF | 823 | | | | | N | | | S | S | B | | X | X | X | X | C | | | X | X | X | X | | M | M | M | M | E | E | | | | C | C | C | C | C | |
| 0.10µF | 104 | | | | | N | N | | S | S | B | | X | X | X | X | C | | | X | X | X | X | | M | M | M | M | E | E | | | | C | C | C | C | C | |
| 0.12µF | 124 | | | | | | | | S | B | | | X | X | X | C | | | | X | X | X | X | | M | M | M | M | E | E | | | | C | C | C | C | C | |
| 0.15µF | 154 | | | | | | | | S | B | B | | C | C | C | | | | | M | M | M | E | | C | C | C | C | G | G | | | | C | C | C | C | F | |
| 0.18µF | 184 | | | | | | | | S | B | | | C | C | C | | | | | M | M | M | E | | C | C | C | C | G | G | | | | C | C | C | C | F | |
| 0.22µF | 224 | | | | | | | | S | B | B | | C | C | C | | | | | M | M | M | E | | C | C | C | C | G | G | | | | C | C | C | C | F | |
| 0.27µF | 274 | | | | | | | | B | B | | | C | C | | | | | | M | M | C | | | C | C | C | E | G | G | | | | C | C | C | C | F | |
| 0.33µF | 334 | | | | | | | | B | B | B | | C | C | | | | | | M | M | C | | | C | C | C | E | G | G | | | | C | C | C | C | F | |
| 0.39µF | 394 | | | | | | | | B | B | | | C | C | | | | | | M | J | P | | | C | C | C | G | G | G | | | | C | C | C | C | F | |
| 0.47µF | 474 | | | | | | | | B | B | | | C | C | | | | | | J | J | P | | | C | C | C | G | G | G | | | | C | C | C | F | F | |
| 0.56µF | 564 | | | | | | | | | | | | C | C | | | | | | J | J | P | | | C | C | C | G | | | | | | C | C | C | F | | |
| 0.68µF | 684 | | | | | | | | | | | | C | C | | | | | | J | J | P | | | C | C | C | F | | | | | | C | C | F | F | | |
| 0.82µF | 824 | | | | | | | | | | | | C | C | | | | | | J | J | P | | | C | C | C | F | | | | | | C | C | F | F | | |
| 1.0µF | 105 | | | | | | | | | | | | C | C | | | | | | J | J | P | | | C | C | C | F | | | | | | C | C | F | F | | |
| 1.5µF | 155 | | | | | | | | | | | | | | | | | | | J | P | | | | | F | E | | | | | | | | | | F | | |
| 2.2µF | 225 | | | | | | | | | | | | | | | | | | | J | P | | | | | F | E | | | | | | | | | | | G | |
| 4.7µF | 475 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10µF | 106 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

■ Automotive Caps without AEC-Q200 Certification

RATING

X5R

| Size | | 0402 | | | 0603 | | | | 0805 | | | | 1206 | | | | 1210 | |
|---------|------|------|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|
| Cap | Code | 6.3V | 10V | 16V | 6.3V | 10V | 16V | 25V | 6.3V | 10V | 16V | 25V | 6.3V | 10V | 16V | 25V | 10V | 16V |
| 0.027μF | 273 | | | | | | | | | | | | | | | | | |
| 0.033μF | 333 | | | | | | | | | | | | | | | | | |
| 0.039μF | 393 | | | | | | | | | | | | | | | | | |
| 0.047μF | 473 | | | | | | | | | | | | | | | | | |
| 0.056μF | 563 | | | | | | | | | | | | | | | | | |
| 0.068μF | 683 | | N | | | | | | | | | | | | | | | |
| 0.082μF | 823 | | | | | | | | | | | | | | | | | |
| 0.10μF | 104 | | N | N | | | | | | | | | | | | | | |
| 0.15μF | 154 | | | | | | | | | | | | | | | | | |
| 0.22μF | 224 | N | N | N | | | | | | | | | | | | | | |
| 0.27μF | 274 | | | | | | | | | | | | | | | | | |
| 0.33μF | 334 | N | N | | | B | B | B | | | | | | | | | | |
| 0.39μF | 394 | | | | | | | | | | | | | | | | | |
| 0.47μF | 474 | N | | | | B | B | B | | | | | | | | | | |
| 0.68μF | 684 | N | | | | B | | | | | | | | | | | | |
| 0.82μF | 824 | | | | | | | | | | | | | | | | | |
| 1.0μF | 105 | | | | B | B | | | | | | | | | | | | |
| 1.5μF | 155 | | | | | | | | I | I | | | | J | J | P | F | F |
| 2.2μF | 225 | | | | | | | | I | I | I | I | | J | J | P | F | F |
| 3.3μF | 335 | | | | | | | | | | I | I | P | P | P | P | F | F |
| 4.7μF | 475 | | | | | | | | | | I | I | P | P | P | P | F | F |
| 6.8μF | 685 | | | | | | | | | | | | P | | | | | |
| 10μF | 106 | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

High capacitance capacitor series ($\geq 1\mu\text{F}$)

FEATURES

- Realize high capacitance in small sizes.
- Capacitor with lead-free termination (pure Tin).
- RoHS compliant.
- HALOGEM compliant.
- Surface mount suited for wave and reflow soldering.
- High reliability and no polarity.
- Excellent in high frequency characteristic.

APPLICATION

- Digital circuit coupling or decoupling applications.
- For high frequency and high-density type power suppliers.
- For bypassing.
- Ideal for smoothing circuits.
- Suitable for DC-DC converter, personal computer and peripherals, telecommunication and general electronic equipment.

PART NUMBER

| FS | 55 | X | 106 | K | 500 | E | G | G |
|--|--|--|--|--|---|--|---------------------------------------|-----------------------------|
| PDC Family | Size | Dielectric | Capacitance | Tolerance | Rated voltage | Packaging | Thickness | Control Code |
| High Capacitance Series | 03 0201 (0603) 15 0402 (1005) 18 0603 (1608) 21 0805 (2012) | B X5R S X6S X X7R F Y5V A X7S | 106 = 10×10^6 = $10\mu\text{F}$ | J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$ Z = $-20/+80\%$ | 6R3 =6.3V 100 =10V 101 =100V 251 =250V | E = Tape and 7" Reel, Embossed Tape P = Tape and 7" Reel, Paper Tape L = Tape and 13" Reel, Embossed G = Tape and 13"Reel, Paper Tape | Reference Thickness Description | G =RoHS Compliant |
| Capacitor $\geq 1.0\mu\text{F}$ Series Product | 31 1206 (3216) 32 1210 (3225) 43 1812 (4532) 46 1825 (4563) 55 2220 (5750) 56 2225 (5763) | | | | | | | |

GENERAL ELECTRICAL DATA

| Dielectric | X7R | X7S | X6S | X5R | Y5V |
|-----------------------------------|--|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Size | 0402, 0603, 0805, 1206, 1210, 1812, 1825, 2220, 2225 | 0402, 0603, 0805, 1206, 1210 | 0201, 0402, 0603, 0805, 1206, 1210 | 0201, 0402, 0603, 0805, 1206, 1210 | 0402, 0603, 0805, 1206, 1210, 1812, |
| Capacitance range* | 1 μF to 47 μF | 1 μF to 100 μF | 1 μF to 100 μF | 1 μF to 220 μF | 1 μF to 100 μF |
| Capacitance tolerance** | K($\pm 10\%$), M($\pm 20\%$) | K($\pm 10\%$), M($\pm 20\%$) | K($\pm 10\%$), M($\pm 20\%$) | K($\pm 10\%$), M($\pm 20\%$) | Z ($-20/+80\%$) |
| Rated voltage (WVDC) | 6.3V, 10V, 16V, 25V, 50V, 100V, 250V, 500V, 630V | 6.3V, 10V, 16V, 25V, 50V, 100V | 6.3V, 10V, 16V, 25V, 35V, 50V | 4V, 6.3V, 10V, 16V, 25V, 35V, 50V | 6.3V, 10V, 16V, 25V, 35V, 50V, 100V |
| Tan δ * | Pls refer to our sales spec | | | | |
| Operating temperature | -55 to +25 $^{\circ}\text{C}$ | -55 to +125 $^{\circ}\text{C}$ | -55 to +105 $^{\circ}\text{C}$ | -55 to +85 $^{\circ}\text{C}$ | -25 to +85 $^{\circ}\text{C}$ |
| Capacitance characteristic | $\pm 15\%$ | $\pm 22\%$ | $\pm 22\%$ | $\pm 15\%$ | +30/-80% |
| Termination | Cu or Ag/Ni/Sn (lead-free termination) | | | | |

DIMENSIONS



| Size inch (mm) | L (mm) | W (mm) | T (mm) code | M _b min (mm) |
|----------------|---|---|---------------------------------------|-------------------------|
| 0201 (0603) | 0.60 \pm 0.03 | 0.30 \pm 0.03 | Reference Thickness Description | 0.15 \pm 0.05 |
| | 0.60 \pm 0.05 (Cap. \geq 0.68 μF) | 0.30 \pm 0.05 (Cap. \geq 0.68 μF) | | |
| | 0.60 \pm 0.09 (Cap. \geq 1.0 μF) | 0.30 \pm 0.09 (Cap. \geq 1.0 μF) | | |
| 0402 (1005) | 1.00 \pm 0.10 | 0.50 \pm 0.10 | | 0.25+0.05/-0.10 |
| | 1.00 \pm 0.20 ^{#1} | 0.50 \pm 0.20 ^{#1} | | |
| 0603 (1608) | 1.60 \pm 0.15 | 0.80 \pm 0.15 | | 0.40 \pm 0.15 |
| | 1.60 \pm 0.20 ^{#2} | 0.80 \pm 0.20 ^{#2} | | |
| 0805 (2012) | 2.10 \pm 0.20 | 1.25 \pm 0.20 | | 0.50 \pm 0.20 |
| 1206 (3216) | 3.30 \pm 0.30 | 1.60 \pm 0.20 | | 0.60 \pm 0.20 |
| 1210 (3225) | 3.30 \pm 0.40 | 2.50 \pm 0.30 | | 0.75 \pm 0.35 |
| 1812 (4532) | 4.60 \pm 0.50 | 3.20 \pm 0.30 | | 0.75 \pm 0.35 |
| 1825 (4563) | 4.60 \pm 0.50 | 6.30 \pm 0.40 | | 0.75 \pm 0.35 |
| 2220 (5750) | 5.70 \pm 0.50 | 5.00 \pm 0.40 | | 0.85 \pm 0.35 |
| 2225 (5763) | 5.70 \pm 0.50 | 6.30 \pm 0.40 | | 0.85 \pm 0.35 |

• #1 For 0402 size K thickness products.

• #2 For 0603/Cap. $\geq 10\mu\text{F}$ or 0603($\leq 6.3\text{V}$)/Cap. $\geq 4.7\mu\text{F}$ For 0603($> 10\text{V}$)/Cap. $> 1\mu\text{F}$ products.

High capacitance capacitor series ($\geq 1\mu\text{F}$)

RATING

X7R

| Size | | 0402 | | | | | 0603 | | | | | 0805 | | | | | 1206 | | | | | 1210 | | | | |
|---------|------|------|------|-----|-----|-----|------|------|-----|-----|-----|------|------|-----|-----|-----|------|-----|------|------|-----|------|-----|-----|------|--|
| Cap(pF) | Code | 6.3V | 6.3V | 10V | 16V | 25V | 50V | 6.3V | 10V | 16V | 25V | 50V | 6.3V | 10V | 16V | 25V | 35V | 50V | 100V | 6.3V | 10V | 16V | 25V | 50V | 100V | |
| 1.0 | 105 | | B | B | B | B | B | | C | C | C | I | | J | J | J | | P | P | | C | C | C | C | F | |
| 1.2 | 125 | | | | | | | | | | | | | | | P | | P | | | | | | G | G | |
| 1.5 | 155 | | | | | | | | I | I | I | | J | J | J | P | | P | | | | E | E | G | G | |
| 1.8 | 185 | | | | | | | | | | | | | | | P | | P | | | | | | G | G | |
| 2.2 | 225 | | B | B | B | | | I | I | I | I | I | J | J | J | P | | P | | | | E | E | G | G | |
| 2.7 | 275 | | | | | | | | | | | | | | | | | | | | | | | G | G | |
| 3.3 | 335 | | | | | | | | | | | | | P | P | P | | | | | | E | E | G | G | |
| 3.9 | 395 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4.7 | 475 | | B | | | | | I | I | I | I | | P | P | P | P | | P | | | F | F | F | G | | |
| 5.6 | 565 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.8 | 685 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8.2 | 825 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10.0 | 106 | | | | | | | I | I | | | | P | P | P | P | P | | | | F | F | | G | | |
| 12.0 | 126 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15.0 | 156 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18.0 | 186 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22.0 | 226 | | | | | | | | | | | | P | P | P* | | | | | | G | G | G | | | |
| 47.0 | 476 | | | | | | | | | | | | | | | | | | | G | G | | | | | |

X7R

| Size | | 1812 | | | | | | 1825 | | | | | 2220 | | | | | 2225 | | | | | | |
|---------|------|------|-----|-----|-----|------|------|------|-----|-----|------|------|------|-----|-----|------|------|------|-----|-----|------|------|------|---|
| Cap(pF) | Code | 10V | 16V | 25V | 50V | 100V | 200V | 250V | 25V | 50V | 100V | 200V | 250V | 25V | 50V | 100V | 200V | 250V | 25V | 50V | 100V | 200V | 250V | |
| 1.0 | 105 | C | C | C | F | F | G | G | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 1.2 | 125 | | | C | F | F | | | F | F | F | | | F | F | F | G | G | F | F | F | G | G | |
| 1.5 | 155 | | | C | F | F | | | F | F | F | | | F | F | F | G | G | F | F | F | G | G | |
| 1.8 | 185 | | | E | F | F | | | F | F | F | | | F | F | F | G | G | F | F | F | G | G | |
| 2.2 | 225 | | | E | F | G | | | F | F | F | | | F | F | F | G | G | F | F | F | G | G | |
| 2.7 | 275 | | | F | F | G | | | F | F | F | | | F | F | F | | | F | F | F | G | G | |
| 3.3 | 335 | | | F | F | G | | | F | F | F | | | F | F | F | | | F | F | F | | | |
| 3.9 | 395 | | | F | F | G | | | F | F | F | | | F | F | F | | | F | F | F | | | |
| 4.7 | 475 | | | G | G | G | | | F | F | G | | | F | F | F | | | F | F | G | | | |
| 5.6 | 565 | | | G | G | | | | G | G | G | | | F | F | F | | | F | F | G | | | |
| 6.8 | 685 | | | G | G | | | | G | G | G | | | F | F | F | | | F | F | G | | | |
| 8.2 | 825 | | | G | G | | | | G | G | G | | | G | G | G | | | G | G | G | | | |
| 10.0 | 106 | | | G | G | | | | G | G | G | | | G | G | G | | | G | G | G | | | |
| 12.0 | 126 | | | | | | | | | | | | | H | H | | | | | | | | | |
| 15.0 | 156 | | | | | | | | | | | | | H | H | | | | | | | | | |
| 18.0 | 186 | | | | | | | | | | | | | H | H | | | | | | | | | |
| 22.0 | 226 | | | | | | | | | | | | | H | H | | | | | | | | | |
| 47.0 | 476 | | | | | | | | | | | | | | | | | | | | | | | |

MLCC

Chip R

Coil

■ High capacitance capacitor series (≥1μF)

RATING

X7S

| Size | | 0402 | | | | 0603 | | | | | 0805 | | | | | | 1206 | | | | 1210 | | | | |
|---------|------|------|-----|-----|-----|------|-----|-----|-----|------|------|-----|-----|-----|-----|------|------|-----|-----|-----|------|-----|-----|------|--|
| Cap(μF) | Code | 6.3V | 10V | 16V | 25V | 6.3V | 10V | 16V | 25V | 100V | 6.3V | 10V | 16V | 25V | 50V | 100V | 6.3V | 10V | 16V | 25V | 6.3V | 10V | 16V | 100V | |
| 0.1 | 104 | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.15 | 154 | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.22 | 224 | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.33 | 334 | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.47 | 474 | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.68 | 684 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 105 | | K | | | | | | | | | | | | I | | | | | | | | | | |
| 1.5 | 155 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.2 | 225 | K | K | | | | | B | B | | | | | | | | | | | | | | | | |
| 3.3 | 335 | | | | | | | | | | | | | | | | | | | | | | | | |
| 4.7 | 475 | | | | | | | B | | | | | | I | | | | | | | | | | | |
| 6.8 | 685 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 106 | | | | | | | | | | | | I | I | | | | | | | | | | | |
| 22 | 226 | | | | | | | | | | | | | | | | | | | | | | | | |
| 47 | 476 | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 107 | | | | | | | | | | | | | | | | | | | | | | | | |

X6S

| Size | | 0201 | | 0402 | | | | 0603 | | | | | 0805 | | | | | | 1206 | | | | | 1210 | | | | | | |
|---------|------|------|------|------|-----|-----|-----|------|------|-----|-----|-----|------|----|------|-----|-----|-----|------|------|-----|-----|-----|------|------|-----|-----|-----|------|----|
| Cap(μF) | Code | 4V | 6.3V | 6.3V | 10V | 16V | 25V | 4V | 6.3V | 10V | 16V | 25V | 50V | 4V | 6.3V | 10V | 16V | 25V | 50V | 6.3V | 10V | 16V | 25V | 50V | 6.3V | 10V | 16V | 25V | 100V | |
| 1 | 105 | L | L* | K | K | K | K | | | | | | | | | | | | | | | | | | | | | | | |
| 1.5 | 155 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.2 | 225 | | | K | K | K | | | B | B | B | B | | | | | I | | | | | | | | | | | | | |
| 3.3 | 335 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4.7 | 475 | | | | | K* | | | B | | | | | | | | | | I | | | | | | | | | | | F |
| 6.8 | 685 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 106 | | | K* | | | | | B* | B* | B* | | | | I | I | I | | | | | | | | | | | | | |
| 22 | 226 | | | | | | | | B* | B* | | | | | I | I* | I* | I* | | | | | | | | | | | | G |
| 47 | 476 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | G |
| 100 | 107 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | G* |

* Means M Tolerance only

MLCC

Chip R

Coil

■ High capacitance capacitor series ($\geq 1\mu\text{F}$)

RATING

X5R

| Size | | 0201 | | | 0402 | | | | 0603 | | | | | 0805 | | | | | 1206 | | | | | 1210 | | | | | | | | | | |
|---------|------|------|-----|-----|------|------|-----|-----|------|----|------|-----|-----|------|-----|----|------|-----|------|-----|-----|----|------|------|-----|-----|-----|----|------|-----|-----|-----|-----|-----|
| Cap(pF) | Code | 6.3V | 10V | 16V | 4V | 6.3V | 10V | 16V | 25V | 4V | 6.3V | 10V | 16V | 25V | 50V | 4V | 6.3V | 10V | 16V | 25V | 50V | 4V | 6.3V | 10V | 16V | 25V | 50V | 4V | 6.3V | 10V | 16V | 25V | 35V | 50V |
| 1.0 | 105 | L* | L* | L* | | K | K | N | N | | B | B | B | B | B | | | C | C | C | I | | | | | | P | | | | | | | |
| 1.5 | 155 | | | | | | | | | | B | | | | | | | I | I | I | I | | | J | J | | | | | F | F | | | |
| 2.2 | 225 | L* | | | | N | N | K | | | B | B | B | B | | | | I | I | I | I | | | J | J | P | P | | | F | F | | | |
| 3.3 | 335 | | | | | | | | | | B | B | | | | | | I | I | I | I | | | P | P | P | | | | | | | | |
| 4.7 | 475 | | | | | K | K | | | | B | B | B | B | | | | I | I | I | I | | | P | P | P | P | | | F | F | F | | |
| 6.8 | 685 | | | | | | | | | | | | | | | | | | | | | | P | P | | | | | | | | | | |
| 10.0 | 106 | | | | K* | K* | | | | | B | B | B | B | B* | | | I | I | I | I | | | P | P | P | P | | F | F | F | F | G | G |
| 22.0 | 226 | | | | | | | | | | B | B | B* | | | | | I | I* | I* | I* | | | P | P | P | P | | G | G | G | G | G | |
| 47.0 | 476 | | | | | | | | | B* | B* | | | | | | | I* | I* | | | | P | P | P* | | | G | G | G | G* | | | |
| 100.0 | 107 | | | | | | | | | | | | | | | | | I* | I* | | | | | | | | | G* | G* | G* | | | | |
| 220.0 | 227 | | | | | | | | | | | | | | | | | | | | | | | | | | | G* | G* | | | | | |

Y5V

| Size | | 0603 | | | 0805 | | | | | 1210 | | | | | | 1812 | | | | | | | | | |
|---------|------|------|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Cap(μF) | code | 6.3V | 10V | 16V | 6.3V | 10V | 16V | 25V | 50V | 10V | 16V | 25V | 35V | 50V | 6.3V | 10V | 16V | 25V | 35V | 50V | 10V | 16V | 25V | 50V | 100V |
| 1.0 | 105 | | S | B | | X | X | C | C | M | M | M | | M | | M | M | M | | M | C | C | C | C | C |
| 1.5 | 155 | | S | | | C | C | | | M | M | M | | | | M | M | M | | | C | C | C | C | |
| 2.2 | 225 | S | S | | | C | C | | | M | M | M | | | | M | M | M | | E | C | C | C | C | |
| 3.3 | 335 | | | | | C | C | | | J | J | J | | | | M | M | M | | | C | C | C | C | |
| 4.7 | 475 | | | | | C | C | | | J | J | J | J | | | M | M | C | | E | C | C | C | C | |
| 6.8 | 685 | | | | | | I | | | J | J | | | | | M | M | C | | | C | C | C | C | |
| 10.0 | 106 | | | | I | I | | | | J | J | | | | | C | C | E | F | | C | C | C | C | |
| 22.0 | 226 | | | | | | | | | | | | | | | F | F | | | | | | | | |
| 47.0 | 476 | | | | | | | | | | | | | | F | F | | | | | | | | G | |
| 100.0 | 107 | | | | | | | | | | | | | | G | | | | | | | | | | |

* * Means M Tolerance only

MLCC

Chip R

Coil

Ultra High Q & Low ESR Capacitor Series

FEATURES

- High Q and low ESR performance at high frequency.
- Ultra low capacitance to 0.1pF.
- Can offer high precision tolerance to $\pm 0.05\text{pF}$.
- Quality improvement of telephone calls for low power loss and better performance.
- RoHS compliant.
- HALOGEM compliant.

APPLICATION

- Telecommunication products & equipments: Mobile phone, WLAN, Base station.
- RF module: Power amplifier, VCO.
- Tuners.

PART NUMBER

| RF | 21 | N | 101 | J | 251 | C | T |
|------------------------|-----------------|--------------|-------------------------|------------------------|---------------|-------------|--------------|
| PDC Family | Size | Dielectric | Capacitance | Tolerance | Rated voltage | Termination | Packaging |
| Ultra High Q & Low ESR | 02 01005 (0402) | N=COG (NPO) | 0R5=0.5pF | A= $\pm 0.05\text{pF}$ | 6R3=6.3V | C=Cu/Ni/Sn | T=7" reeled |
| | 03 0201 (0603) | | 1R0=1.0pF | B= $\pm 0.1\text{pF}$ | 100=10V | | G=13" reeled |
| | 11 0505 (1414) | | 100=10x10 ^{^0} | C= $\pm 0.25\text{pF}$ | 250=25V | | |
| | 15 0402 (1005) | | =10pF | D= $\pm 0.5\text{pF}$ | 500=50V | | |
| | 18 0603 (1608) | | | F= $\pm 1\%$ | 101=100V | | |
| | 21 0805 (2012) | | | G= $\pm 2\%$ | 251=250V | | |
| 22 1111 (2828) | | J= $\pm 5\%$ | 501=500V | | | | |

GENERAL ELECTRICAL DATA

| Dielectric | NPO |
|------------------------------------|---|
| Size | 01005, 0201, 0402, 0505, 0603, 0805, 1111 |
| Capacitance* | 0.1pF to 1000pF |
| Capacitance tolerance | Cap \leq 5pF: A ($\pm 0.05\text{pF}$), B ($\pm 0.1\text{pF}$), C ($\pm 0.25\text{pF}$) 5pF<Cap<10pF: B ($\pm 0.1\text{pF}$), C ($\pm 0.25\text{pF}$), D ($\pm 0.5\text{pF}$) Cap \geq 10pF: F ($\pm 1\%$), G ($\pm 2\%$), J ($\pm 5\%$) |
| Rated voltage (WVDC) | 6.3V, 10V, 25V, 50V, 100V, 200V, 250V, 500V, 1500V |
| Q* | 01005, 0201, 0402/25V~50V: Cap<30pF:Q \geq 400+20C; Cap \geq 30pF:Q \geq 1000; 0402/100V~200V, 0603, 0805, 0505, 1111: Cap<30pF:Q \geq 800+20C; Cap \geq 30pF:Q \geq 1400 |
| Insulation resistance at Ur | $\geq 10\text{G}\Omega$ or Rx $\text{C}\geq 100\Omega\cdot\text{F}$ whichever is smaller |
| Operating temperature | -55 to +125 $^{\circ}\text{C}$ |
| Capacitance change | $\pm 30\text{ppm}/^{\circ}\text{C}$; 0201 Cap $\geq 22\text{pF}$, $\pm 60\text{ppm}/^{\circ}\text{C}$ |
| Termination | Ni/Sn (lead-ree termination) |

DIMENSIONS



| Size | inch (mm) | L (mm) | W (mm) | T (mm) | Symbol | Remark | M _B (mm) |
|--------------|-----------|-----------------|-----------------|-----------------|--------|--------|---------------------|
| 01005 (0402) | | 0.40 \pm 0.02 | 0.20 \pm 0.02 | 0.20 \pm 0.02 | V | # | 0.10 \pm 0.03 |
| 0201 (0603) | | 0.60 \pm 0.03 | 0.30 \pm 0.03 | 0.30 \pm 0.03 | L | # | 0.15 \pm 0.05 |
| 0402 (1005) | | 1.00 \pm 0.05 | 0.50 \pm 0.05 | 0.50 \pm 0.05 | N | # | 0.25+0.05/-0.10 |
| 0603 (1608) | | 1.60 \pm 0.10 | 0.80 \pm 0.10 | 0.80 \pm 0.07 | S | | 0.40 \pm 0.15 |
| | | 1.60+0.15/-0.10 | 0.80+0.15/-0.10 | 0.50 \pm 0.10 | H | | |
| 0805 (2012) | | 2.00 \pm 0.15 | 1.25 \pm 0.10 | 0.60 \pm 0.10 | A | | 0.50 \pm 0.20 |
| | | 2.00 \pm 0.20 | 1.25 \pm 0.20 | 0.85 \pm 0.10 | T | | |
| 0505 (1414) | | 1.40+0.38/-0.25 | 1.40 \pm 0.38 | 1.15 \pm 0.15 | J | # | 0.25+0.25/-0.13 |
| 1111 (2828) | | 2.79+0.51/-0.25 | 2.79 \pm 0.38 | ≤ 1.78 | G | # | 0.38 \pm 0.25 |

MLCC

Chip R

Coil

■ Ultra High Q & Low ESR Capacitor Series

RATING

NPO

| Size | 01005 | | 0201 | | | | 0402 | | | | 0603 | | | | 0805 | | | | 0505 | | | 1111 | | | | | | Tolerance | | | | |
|--------|-------|------|------|-----|------|-----|------|-----|------|-----|------|------|------|-----|------|------|------|-----|------|------|------|------|------|------|-----|------|------|-----------|------|------|---------|---------|
| | Cap | Code | 16V | 25V | 6.3V | 10V | 25V | 50V | 100V | 25V | 50V | 100V | 200V | 25V | 50V | 100V | 250V | 50V | 100V | 250V | 500V | 50V | 100V | 250V | 50V | 100V | 200V | | 250V | 500V | 1.5KV | |
| 0.1pF | OR1 | | | | L | L | L | L | L | N | N | N | N | H | H | H | H | | | | | | | | | | | | | | | A, B |
| 0.2pF | OR2 | V | V | L | L | L | L | L | L | N | N | N | N | H | H | H | H | A | A | A | A | | | | | | | | | | | A, B |
| 0.3pF | OR3 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | | | | | | | | | | | A, B |
| 0.4pF | OR4 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | | | | | | | | A, B |
| 0.5pF | OR5 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | | | | | | | | A, B, C |
| 0.6pF | OR6 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | | | | | | | | A, B, C |
| 0.7pF | OR7 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | | | | | | | | A, B, C |
| 0.75pF | R75 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | | | | | | | | A, B, C |
| 0.8pF | OR8 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | | | | | | | | A, B, C |
| 0.9pF | OR9 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | | | | | | | | A, B, C |
| 1.0pF | 1R0 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | A, B, C |
| 1.2pF | 1R2 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | A, B, C |
| 1.5pF | 1R5 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | A, B, C |
| 1.8pF | 1R8 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | A, B, C |
| 2.0pF | 2R0 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | A, B, C |
| 2.2pF | 2R2 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | A, B, C |
| 2.7pF | 2R7 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | A, B, C |
| 3.0pF | 3R0 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | A, B, C |
| 3.3pF | 3R3 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | A, B, C |
| 3.9pF | 3R9 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | A, B, C |
| 4.0pF | 4R0 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | A, B, C |
| 4.7pF | 4R7 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | A, B, C |
| 5.0pF | 5R0 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | A, B, C |
| 5.6pF | 5R6 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | B, C, D |
| 6.0pF | 6R0 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | B, C, D |
| 6.8pF | 6R8 | V | | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | B, C, D |
| 7.0pF | 7R0 | V | | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | B, C, D |
| 8.0pF | 8R0 | V | | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | B, C, D |
| 8.2pF | 8R2 | V | | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | B, C, D |
| 9.0pF | 9R0 | V | | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | B, C, D |
| 10pF | 100 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | F, G, J |
| 12pF | 120 | V | V | L | L | L | L | L | L | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | F, G, J |
| 15pF | 150 | V | V | L | L | L | L | L | | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | F, G, J |
| 18pF | 180 | V | V | L | L | L | L | | | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | F, G, J |
| 20pF | 200 | V | V | L | L | L | L | | | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | F, G, J |
| 22pF | 220 | V | V | L | L | L | | | | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | F, G, J |
| 24pF | 240 | | | L | L | L | | | | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | F, G, J |
| 27pF | 270 | | | L | L | L | | | | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | F, G, J |
| 30pF | 300 | | | L | L | L | | | | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | F, G, J |
| 33pF | 330 | | | L | L | L | | | | N | N | N | N | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | G | F, G, J |
| 36pF | 360 | | | | | | | | | N | N | N | | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | | F, G, J |
| 39pF | 390 | | | | | | | | | N | N | N | | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | | F, G, J |
| 43pF | 430 | | | | | | | | | N | N | N | | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | | F, G, J |
| 47pF | 470 | | | | | | | | | N | N | N | | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | | F, G, J |
| 56pF | 560 | | | | | | | | | N | N | N | | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | | F, G, J |
| 68pF | 680 | | | | | | | | | N | N | | | S | S | S | S | T | T | T | T | J | J | J | G | G | G | G | G | G | | F, G, J |
| 82pF | 820 | | | | | | | | | N | N | | | S | S | S | S | T | T | T | | J | J | J | G | G | G | G | G | G | | F, G, J |
| 100pF | 101 | | | | | | | | | N | N | | | S | S | S | S | T | T | T | | J | J | J | G | G | G | G | G | G | | F, G, J |
| 120pF | 120 | | | | | | | | | | | | | S | S | | | T | T | T | | | | | G | G | G | G | G | | F, G, J | |
| 150pF | 150 | | | | | | | | | | | | | S | S | | | T | T | T | | | | | G | G | G | G | G | | F, G, J | |
| 180pF | 180 | | | | | | | | | | | | | S | S | | | T | T | T | | | | | G | G | G | G | G | | F, G, J | |
| 220pF | 221 | | | | | | | | | | | | | S | S | | | T | T | T | | | | | G | G | G | G | G | | F, G, J | |
| 270pF | 271 | | | | | | | | | | | | | | | | | | | | | | | | | G | G | G | G | G | | F, G, J |
| 330pF | 331 | | | | | | | | | | | | | | | | | | | | | | | | | G | G | G | G | G | | F, G, J |
| 390pF | 391 | | | | | | | | | | | | | | | | | | | | | | | | | G | G | G | G | G | | F, G, J |
| 470pF | 471 | | | | | | | | | | | | | | | | | | | | | | | | | G | G | G | G | G | | F, G, J |
| 560pF | 561 | | | | | | | | | | | | | | | | | | | | | | | | | G | G | G | G | G | | F, G, J |
| 680pF | 681 | | | | | | | | | | | | | | | | | | | | | | | | | G | G | G | G | G | | F, G, J |
| 820pF | 821 | | | | | | | | | | | | | | | | | | | | | | | | | G | G | G | G | G | | F, G, J |
| 1000pF | 102 | | | | | | | | | | | | | | | | | | | | | | | | | G | G | G | G | G | | F, G, J |

1. The letter in cell is expressed the symbol of product thickness.
 2. For more information about products with special capacitance or other Data, please contact local representative.

MLCC

Chip R

Coil

General purpose capacitor series

FEATURES

- A wide selection of sizes is available (0201 to 2225).
- High capacitance in given case size.
- Capacitor with lead-free termination (pure Tin).
- RoHS & HALOGEN compliant.

APPLICATION

- For general digital circuit.
- For power supply bypass capacitors.
- For consumer electronics.
- For telecommunication.
- DC to DC converter.

PART NUMBER

| FN | 21 | X | 471 | K | 500 | P | X | G |
|---------------------------------|--|---|--|--|--|---|---------------------------------|--------------------------|
| PDC Family | Size | Dielectric | Capacitance | Tolerance | Rated voltage | Packaging | Thickness | Control Code |
| General Purpose product ≤ 50Vdc | 03 0201 (0603) 15 0402 (1005) 18 0603 (1608) 21 0805 (2012) 31 1206 (3216) 32 1210 (3225) 42 1808 (4520) 43 1812 (4532) 46 1825 (4563) 52 2211 (5728) 55 2220 (5750) 56 2225 (5763) | N COG(NPO) X X7R B X5R F Y5V | 102 =10x10 ^Λ 2 =1000pF 100 =10x10 ^Λ 0 =10pF | J =±5% K =±10% M =±20% Z =-20%~+80% | 6R3 =6.3V 100 =10V 160 =16V 250 =25V 500 =50V | E = Tape and 7" Reel, Embossed Tape P = Tape and 7" Reel, Paper Tape L = Tape and 13" Reel, Embossed G = Tape and 13" Reel, Paper Tape | Reference Thickness Description | G =RoHS Compliant |

GENERAL ELECTRICAL DATA

| Dielectric | COG(NPO) | X7R | Y5V | X5R |
|-----------------------------------|---|--|--------------------------|------------------------------|
| Size | 0201 to 2225 | 0201 to 2225 | 0201 to 1812 | 0201 to 0603 |
| Capacitance range* | 0.1pF ~ 100nF | 100pF ~ 820nF | 10nF ~ 680nF | 100pF ~ 820nF |
| Capacitance tolerance | B(±0.1pF), C(±0.25pF), D(±0.5pF), F(±1%), G(±2%), J(±5%), K(±10%) | J(±5%) K(±10%) M(±20%) | Z(-20/+80%) | J(±5%) K(±10%) M(±20%) |
| Rated voltage (WVDC) | 10V, 16V, 25V, 50V | 6.3V, 10V, 16V, 25V, 50V | 6.3V, 10V, 16V, 25V, 50V | 6.3V, 4V, 10V, 16V, 25V, 50V |
| Tan δ* | Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000 | | Note 1 | |
| Operating temperature | | -55 to +125°C | -25 to +85°C | -55 to +85°C |
| Capacitance characteristic | ±30ppm | ±15% | +30/-80% | ±15% |
| Termination | | Cu (or Ag)/Ni/Sn or Au (lead-free termination) | | |

* Measured at the condition of 30~70% related humidity.

COG: Apply 1.0±0.2Vrms, 1.0MHz±10% for Cap≤1000pF and 1.0±0.2Vrms, 1.0kHz±10% for Cap>1000pF, 25°C at ambient temperature.

X7R/X5R: Apply 1.0±0.2Vrms, 1.0kHz±10%, at 25°C ambient temperature.

Y5V: Apply 1.0±0.2Vrms, 1.0kHz±10%, at 20°C ambient temperature.

Note 1:

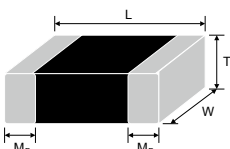
X7R/X5R

| Rated vol. | D.F. | Exception of D.F. |
|------------|--------|---|
| 50V | ≤2.5% | ≤3.5% 0201(50V); 0603≥0.047μF; 0805≥0.1μF; 1206≥0.47μF |
| | ≤5% | 0201≥0.01μF |
| | ≤10% | 0402≥0.12μF; 0603>0.1μF |
| 25V | ≤5% | 0201≥0.01μF |
| | ≤7% | 0603≥0.33μF |
| | ≤10% | 0201≥0.1μF; 0402≥0.10μF; 0603≥0.47μF |
| | ≤12.5% | 0402≥0.47μF |
| 16V | ≤5% | 0201≥0.01μF; 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF |
| | ≤10% | 0201≥0.1μF(0201/X7R≥0.022μF); 0402≥0.22μF; 0603≥0.68μF |
| 10V | ≤10% | 0201≥0.012μF; 0402≥0.33μF(0402/X7R≥0.22μF); 0603≥0.33μF |
| | ≤15% | 0201≥0.1μF |
| 6.3V | ≤10% | 0201≥0.1μF |
| 4V | ≤15% | --- |

Y5V

| Rated vol. | D.F. | Exception of D.F. |
|---------------|--------|---|
| 50V | ≤5.0% | 7.0% 0603≥0.1μF; 0805≥0.47μF |
| | ≤7% | --- |
| 25V | ≤5.0% | ≤7% 0402≥0.047μF; 0603≥0.1μF; 0805≥0.33μF |
| | ≤9% | 0402≥0.068μF; 0603≥0.47μF |
| 16V (C<1.0μF) | ≤7.0% | ≤9% 0402≥0.068μF; 0603≥0.68μF |
| | ≤12.5% | 0402≥0.22μF |
| 10V | ≤12.5% | ≤20% 0402≥0.47μF |
| 6.3V | ≤20% | --- |

DIMENSIONS



| Size inch (mm) | L (mm) | W (mm) | T (mm) code | M _B min (mm) |
|----------------|-----------|-----------|---------------------------------|-------------------------|
| 0201 (0603) | 0.60±0.03 | 0.30±0.03 | | 0.15±0.05 |
| 0402 (1005) | 1.00±0.10 | 0.50±0.10 | | 0.25+0.05/-0.10 |
| 0603 (1608) | 1.60±0.15 | 0.80±0.15 | | 0.40±0.15 |
| 0805 (2012) | 2.10±0.20 | 1.25±0.20 | | 0.50±0.20 |
| 1206 (3216) | 3.30±0.30 | 1.60±0.20 | | 0.60±0.20 |
| 1210 (3225) | 3.30±0.40 | 2.50±0.30 | | 0.75±0.35 |
| 1808 (4520) | 4.60±0.50 | 2.00±0.25 | Reference Thickness Description | 0.75±0.35 |
| 1812 (4532) | 4.60±0.50 | 3.20±0.30 | | 0.75±0.35 |
| 1825 (4563) | 4.60±0.50 | 6.30±0.40 | | 0.75±0.35 |
| 2220 (5750) | 5.70±0.50 | 5.00±0.40 | | 0.85±0.35 |
| 2225 (5763) | 5.70±0.50 | 6.30±0.40 | | 0.85±0.35 |

■ General purpose capacitor series

RATING

X5R

| Size | | 0201 | | | | | | 0402 | | | | | 0603 | | | | |
|---------|------|------|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|
| Cap | Code | 4V | 6.3V | 10V | 16V | 25V | 50V | 6.3V | 10V | 16V | 25V | 50V | 6.3V | 10V | 16V | 25V | 50V |
| 100pF | 101 | | | | L | L | L | | | | | | | | | | |
| 120pF | 121 | | | | L | L | L | | | | | | | | | | |
| 150pF | 151 | | | | L | L | L | | | | | | | | | | |
| 180pF | 181 | | | | L | L | L | | | | | | | | | | |
| 220pF | 221 | | | | L | L | L | | | | | | | | | | |
| 270pF | 271 | | | | L | L | L | | | | | | | | | | |
| 330pF | 331 | | | | L | L | L | | | | | | | | | | |
| 390pF | 391 | | | | L | L | L | | | | | | | | | | |
| 470pF | 471 | | | | L | L | L | | | | | | | | | | |
| 560pF | 561 | | | | L | L | L | | | | | | | | | | |
| 680pF | 681 | | | | L | L | L | | | | | | | | | | |
| 820pF | 821 | | | | L | L | L | | | | | | | | | | |
| 1000pF | 102 | | | L | L | L | L | | | | | | | | | | |
| 1500pF | 152 | | | L | L | L | | | | | | | | | | | |
| 2200pF | 222 | | | L | L | L | | | | | | | | | | | |
| 2700pF | 272 | | | L | L | L | | | | | | | | | | | |
| 3300pF | 332 | | | L | L | L | | | | | | | | | | | |
| 4700pF | 472 | | | L | L | L | | | | | | | | | | | |
| 6800pF | 682 | | | L | L | L | | | | | | | | | | | |
| 0.01μF | 103 | | L | L | L | L | L | | | | | | | | | | |
| 0.015μF | 153 | | L | L | | | | | | | | | | | | | K |
| 0.022μF | 223 | | L | L | | | | | | | | N | | | | | K |
| 0.027μF | 273 | | L | L | | | | | | | N | | | | | | K |
| 0.033μF | 333 | | L | L | | | | | | | N | | | | | | K |
| 0.039μF | 393 | | L | L | | | | | | | N | | | | | | K |
| 0.047μF | 473 | | L | L | | | | N | N | N | | | | | | | K |
| 0.056μF | 563 | | L | L | | | | N | N | N | | | | | | | K |
| 0.068μF | 683 | | L | L | | | | N | N | N | | | | | | | K |
| 0.082μF | 823 | | L | L | | | | N | N | N | | | | | | | K |
| 0.1μF | 104 | | L | L | L | L | | N | N | N | N | | | | | | S |
| 0.15μF | 154 | | | | | | | N | N | N | N | | | | | | |
| 0.22μF | 224 | | | | | | | N | N | N | N | N | | B | B | B | B |
| 0.27μF | 274 | | | | | | | | N | | | | | | B | B | |
| 0.33μF | 334 | | L | | | | | N | N | | | | | B | B | B | B |
| 0.39μF | 394 | | | | | | | | N | | | | | B | B | B | B |
| 0.47μF | 474 | L | L | | | | | N | N | K | K | K | | B | B | B | B |
| 0.68μF | 684 | | | | | | | N | N | | | | | B | B | B | B |
| 0.82μF | 824 | | | | | | | | | | | | | B | B | B | B |

Y5V

| Size | | 0402 | | | | 0603 | | | | | 0805 | | | | 1206 | | | | 1210 | | | | 1812 | | | |
|---------|------|------|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|
| Cap | Code | 10V | 16V | 25V | 50V | 6.3V | 10V | 16V | 25V | 50V | 10V | 16V | 25V | 50V | 10V | 16V | 25V | 50V | 10V | 16V | 25V | 50V | 10V | 16V | 25V | 50V |
| 0.010μF | 103 | N | N | N | N | | S | S | S | S | A | A | A | A | X | X | X | X | | | | | | | | |
| 0.015μF | 153 | N | N | N | N | | S | S | S | S | A | A | A | A | X | X | X | X | | | | | | | | |
| 0.022μF | 223 | N | N | N | N | | S | S | S | S | A | A | A | A | X | X | X | X | | | | | | | | |
| 0.033μF | 333 | N | N | N | N | | S | S | S | S | A | A | A | A | X | X | X | X | | | | | | | | |
| 0.047μF | 473 | N | N | N | | | S | S | S | S | A | A | A | A | X | X | X | X | | | | | | | | |
| 0.068μF | 683 | N | N | N | | | S | S | S | S | A | A | A | A | X | X | X | X | | | | | | | | |
| 0.10μF | 104 | N | N | N | | | S | S | S | S | A | A | A | A | X | X | X | X | M | M | M | M | C | C | C | C |
| 0.15μF | 154 | | | | | | S | S | S | S | A | A | A | A | X | X | X | X | M | M | M | M | C | C | C | C |
| 0.22μF | 224 | | | | | S | S | S | S | S | A | A | A | A | X | X | X | X | M | M | M | M | C | C | C | C |
| 0.33μF | 334 | | | | | | | | | | X | X | X | X | X | X | X | X | M | M | M | M | C | C | C | C |
| 0.47μF | 474 | | | | | | | | | | X | X | X | C | X | X | X | X | M | M | M | M | C | C | C | C |
| 0.68μF | 684 | | | | | | | | | | X | X | C | C | X | X | X | X | M | M | M | M | C | C | C | C |

MLCC

Chip R

Coil

Packaging Dimension and Quantity

| Size | Thickness(mm)/Symbol | V | Paper tape | | Plastic tape | | Tray packaged (pcs/tray) |
|-------------|----------------------|---|------------|----------|--------------|----------|-----------------------------|
| | | | 7" reel | 13" reel | 7" reel | 13" reel | |
| 01005(0402) | 0.20±0.02 | V | 20K | | | | |
| 0201(0603) | 0.30±0.03 | L | 15k | 70k | | | |
| | 0.50±0.05 | N | 10k | 50K | | | |
| 0402 (1005) | 0.50 +0.02/-0.05 | Q | 10k | 50K | | | |
| | 0.50±0.20 | K | 10k | | | | |
| 0603 (1608) | 0.50±0.10 | U | 4k | | | | |
| | 0.80±0.07 | S | 4k | 15k | | | |
| | 0.80±0.15/-0.10 | B | 4k | 15k | | | |
| 0805 (2012) | 0.50±0.10 | U | 4k | 15k | | | |
| | 0.60±0.10 | A | 4k | 15k | | | |
| | 0.80±0.10 | X | 4k | 15k | | | |
| | 0.85±0.10 | T | 4k | 15k | | | |
| | 1.25±0.10 | C | | | 3k | 10k | |
| | 1.25±0.20 | I | | | 3k | 10k | |
| 1206 (3216) | 0.80±0.10 | X | 4k | 15k | | | |
| | 0.85±0.10 | T | 4k | 15k | | | |
| | 0.95±0.10 | M | | | 3k | 10k | |
| | 1.15±0.15 | J | | | 3k | 10k | |
| | 1.25±0.10 | C | | | 3k | 10k | |
| | 1.60±0.20 | E | | | 2k | 10k | |
| | 1.60 +0.30/-0.10 | P | | | 2k | 9k | |
| 1210 (3225) | 0.85±0.10 | T | | | 4k | 10k | |
| | 0.95±0.10 | M | | | 3k | 10k | |
| | 1.25±0.10 | C | | | 3k | 10k | |
| | 1.60±0.20 | E | | | 2k | | |
| | 2.00±0.20 | F | | | 1k | 6k | |
| | 2.50±0.30 | G | | | 1k | | |
| 0505 (1414) | 1.15±0.15 | J | | | 3K | - | |
| | 1.25±0.10 | C | | | 2k | 10k | |
| 1808 (4520) | 1.60±0.20 | E | | | 2k | 8k | |
| | 2.00±0.20 | F | | | 1k | 6k | |
| 1812 (4532) | 1.25±0.10 | C | | | 1k | | |
| | 1.60±0.20 | E | | | 1k | | |
| | 2.00±0.20 | F | | | 1k | | |
| | 2.50±0.30 | G | | | 0.5k | 3k | |
| 1825 (4563) | 2.80±0.30 | H | | | 0.5k | | |
| | 2.00±0.20 | F | | | 1k | | |
| 2211 (5728) | 2.50±0.30 | G | | | 0.5k | | |
| | 2.00±0.20 | F | | | 1k | | |
| 2220 (5750) | 2.50±0.30 | G | | | 0.5k | | |
| | 2.00±0.20 | F | | | 1k | | |
| 2225 (5763) | 2.00±0.20 | F | | | 1k | | |
| | 2.50±0.30 | G | | | 0.5k | | |
| 1111 (2828) | ≤ 1.78 | G | | | 2K | - | |
| 2020 | | | | | | | |
| 3035 | | | | | | | 50pcs |
| 3333 | | | | | | | 50pcs |
| 3530 | | | | | | | 50pcs |
| 3640 | | | | | | | 50pcs |
| 3940 | | | | | | | 50pcs |
| 4045 | | | | | | | 50pcs |
| 4238 | | | | | | | 25pcs |
| 4252 | | | | | | | 25pcs |
| 4540 | | | | | | | 25pcs |
| 5550 | 2.80±0.30 | H | | | | | 25pcs |
| 5780 | 3.10±0.30 | R | | | | | 25pcs |
| 5868 | 3.50±0.30 | O | | | | | 25pcs |
| 6560 | | | | | | | 25pcs |
| 7680 | | | | | | | 25pcs |
| 7875 | | | | | | | 25pcs |
| 7880 | | | | | | | 25pcs |
| 8550 | | | | | | | 25pcs |
| 8840 | | | | | | | 25pcs |
| 42102 | | | | | | | 25pcs |
| 10642 | | | | | | | 25pcs |
| 13060 | | | | | | | 25pcs |

| THICKNESS DESCRIPTION | |
|-----------------------|----------------------|
| Code | Description |
| A | 0.60±0.10 |
| B | 0.8±0.15/-0.10 |
| C | 1.25±0.10 |
| D | 1.40±0.15 |
| E | 1.60±0.20 |
| F | 2.00±0.20 |
| G | 2.50±0.30 |
| H | 2.80±0.30 |
| I | 1.25±0.20 |
| J | 1.15±0.15 |
| K | 0.50±0.20 |
| L | 0.30±0.03 |
| M | 0.95±0.10 |
| N | 0.50±0.05 |
| O | 3.50±0.20 |
| P | 1.60+0.3/-0.10 |
| Q | 0.50+0.02/-0.05 |
| R | 3.10±0.30 |
| S | 0.80±0.07 |
| S* | 3.95±0.25 (For≥2225) |
| T | 0.85±0.10 |
| U | 0.50±0.10 |
| V | 0.20±0.02 |
| X | 0.80±0.10 |
| X* | 4.45±0.25 (For≥2225) |
| Z | 0.25±0.03 |

MLCC

Chip R

Coil



信昌電子陶瓷
Prosperity Dielectrics Co., Ltd.

■ Sales offices

台灣營業處 Taiwan Sales Office
總公司營業處 Sales Office - Headquarter
32668 桃園市楊梅區高獅路 566-1 號
No. 566-1, Kao-Shi Rd., Yangmei,
Taoyuan 32668, Taiwan
Tel: +886-3-475-3355
Fax: +886-3-485-4959
E-mail: service@pdc.com.tw

桃園營業處 Sales Office - Tao Yuan
33860 桃園市蘆竹區南山路二段 220-1 號
No. 220-1, Sec. 2, Nanshan Rd., Lujhu,
Taoyuan 33860, Taiwan
Tel: +886-3-322-4471
Fax: +886-3-322-9671
E-mail: service@pdc.com.tw
service-powder@pdc.com.tw

中國營業處 China Sales Office
東莞營業處 Sales Office - Dong Guan, China
523799 中國廣東省東莞市大朗鎮
犀牛陂象山工業區美景西路 638 號
No. 638, Mei Jing West Road Xiniupo
Administrative Zone Dalang Town,
Dong Guan City, Guangdong Province, China
Tel: +86-769-8555-0979
Fax: +86-769-8555-0972
E-mail: service@pdc.com.tw

■ Plants

楊梅廠 (MLCC) Yang Mei Plant
32668 桃園市楊梅區高獅路 566-1 號
No. 566-1, Kaoshi Rd., Yangmei,
Taoyuan 32668, Taiwan
Tel: +886-3-475-3355
Fax: +886-3-485-4959

桃園廠 (Chip-R, Powder) Tao Yuan Plant
33860 桃園市蘆竹區南山路二段 220-1 號
No. 220-1, Sec. 2, Nanshan Rd., Lujhu,
Taoyuan 33860, Taiwan
Tel: +886-3-322-4471
Fax: +886-3-322-9671

吳江廠 (Powder) Wu Jiang Plant
215200 中國江蘇省吳江市連東經濟開發區
龐金路 2588 路
No.2588, Pangjin Rd., Economic Development Zone,
Wujiang, Jiangsu 215200
Tel: +86-512-6300-8899
Fax: +86-512-6300-9988

永州廠 (Coil) Yong Zhou Plant
425000 中國湖南省永州市冷水灘區鳳凰園
陶源西路 136 號
No.136, Taoyuan West Road,
Phoenix Industrial Park, Lengshuitan District,
Yongzhou City, Hunan Province, China 42500
Tel: +86-746-8610-180
Fax: +86-746-8610-616

深圳廠 (Molding) Shen Zhen Plant
518104 中國廣東省深圳市寶安區
沙井街道步涌大興一路 16 號
No. 16, Daxing 1st Road, Dajing street, Baoan District,
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Tel: +86-755-2720-8041

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