



MLCC



CHIP-R



DIODE

ABOUT PDC

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, diode and transformers.

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, Diode and Magnetic components. 與弘電電子工業（股）公司策略聯盟，生產二極體與磁性材料元件。
	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 1st 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 Diode and magnetic components. 生產二極體與磁性材料元件。
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 certificated. 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 certificated. 獲 TS16949、ISO 14000 及 OHSAS 18000 驗證。
	2008 IECQ QC080000 HSF certificated. 獲 IECQ QC080000 HSF 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 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」
	Market Performance 市場表現  PDC ceramic dielectric powder ranks in No.2 in global capacity and No.3 in global market share. 介電陶瓷粉末產品產能全球第二、市占率全球第三。 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。

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、晶片電阻延伸到二極體與線圈，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.

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、晶片電阻延伸到二極體與線圈，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。

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 and semiconductor series, PDC gradually set up the manufacturing equipments for semiconductor in Kun Shan Plant and the manufacturing equipments for coil and transformer in Dong Guan and Hunan Plant. The improvement of the production capability is able to increase the sales performance.

近年來，為了擴展磁性元件及半導體系列產品的產能，信昌電陶陸續在中國昆山廠增置半導體相關製造設備，在東莞廠、湖南廠、重慶廠增置電感、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, Diode)

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、二極體）

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，提升品牌含金量
- 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注最深者

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■ High Reliability for Industrial Grade

FEATURES

- Realize high capacitance in small sizes.
- Capacitor with lead-free termination (pure Tin).
- RoHS compliant.
- HALOGEN 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.

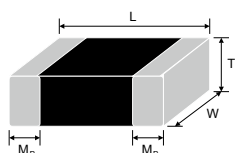
PART NUMBER

FR	32	X	225	K	101	E	G	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
High Quality Equipment Capacitor	18 0603 (1608)	N COG(NPO)	106=10x10 ⁶ =10μF	J= ± 5%	500=50V	E=	Reference	G=RoHS
	21 0805 (2012)	X X7R		K= ± 10 %	101=100V	Tape and 7" Reel,	Thickness	Compliant
	31 1206 (3216)		100=10x10 ⁰ =10pF	M= ± 20 %	201=200V	Embossed Tape	Description	
	32 1210 (3225)				251=250V			
	42 1808 (4520)				401=400V	Tape and 7" Reel,		
	43 1812 (4532)				501=500V	Paper Tape		
	46 1825 (4563)				631=630V			
	52 2211 (5728)				102=1000V	Tape and 13" Reel,		
	55 2220 (5750)				202=2000V	Embossed		
	56 2225 (5763)				302=3000V			
					402=4000V	Tape and 13" Reel,		
						Paper Tape		

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)	50V, 100V, 200V, 250V, 500V, 630V, 1KV, 2KV, 3KV, 4KV	50V, 100V, 200V, 250V, 500V, 630V, 1KV, 2KV, 3KV, 4KV
Capacitance range	0.5pF ~ 150nF	100pF ~ 10μF
Capacitance tolerance	Cap ≤ 5pF: B (±0.1pF), C (±0.25pF)	J (±5%)
	5pF < Cap < 10pF: C (±0.25pF), D (±0.5pF)	K (±10%)
	10pF ≤ Cap: 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	≥ 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	Ag (or Cu)/Ni/Sn (lead-free termination)	
Humidity (Damp Heat) Load	Test Condition • Test temp.: 85 ± 2°C • Humidity: 85% RH • Test time: 500+24/-0hrs. • To apply voltage: 200% rated voltage (Max 100Vdc) • Measurement to be made after keeping at room temp. for 48 ± 4 hrs. (Class II) Requirements. • No remarkable damage.	
	• Cap change: X7R ≥ 10V, within ± 15% NPO within ± 3.0% or ± 2pF whichever is greater. • Q/D.F. value: X7R Rated vol. ≥ 50V, D.F. ≤ 3.0% NPO D.F. ≤ 2 × Initial requirement • I.R.: ≥ 1GΩ or RxC ≥ 50Ω • F whichever is smaller.	

DIMENSIONS



Size inch (mm)	L (mm)	W (mm)	T (mm) code	M ₈ (mm)
0603 (1608)	1.60 ± 0.20	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 ± 0.30/-0.10		0.60 ± 0.20
1210 (3225)	3.30 ± 0.40	2.50 ± 0.30	Reference	0.75 ± 0.35
1808 (4520)	4.60 ± 0.50	2.00 ± 0.20	Thickness	0.75 ± 0.35
1812 (4532)	4.60 ± 0.50	3.20 ± 0.30	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
2225 (5763)	5.70 ± 0.50	6.30 ± 0.40		0.85 ± 0.35

■ High Reliability for Industrial Grade

RATING

NPO

EIA Size		0603			0805					1206							1210					1808								
Cap	VDC Code	50V	100V	200V 250V	50V	100V	200V	250V	500V 630V	1KV	50V	100V	200V	250V	500V 630V	1KV	2KV	50V	100V	200V 250V	500V 630V	1KV	2KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV
0.5pF	0R5	S	S	S	A	A	A	A	A																					
1.0pF	1R0	S	S	S	A	A	A	A	A																					
1.2pF	1R2	S	S	S	A	A	A	A	A																					
1.5pF	1R5	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X													
1.8pF	1R8	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X													
2.2pF	2R2	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X							C	C	C	C	C	C	C
2.7pF	2R7	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X							C	C	C	C	C	C	C
3.3pF	3R3	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X							C	C	C	C	C	C	C
3.9pF	3R9	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X							C	C	C	C	C	C	C
4.7pF	4R7	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X							C	C	C	C	C	C	C
5.6pF	5R6	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X							C	C	C	C	C	C	C
6.8pF	6R8	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X							C	C	C	C	C	C	C
8.2pF	8R2	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X							C	C	C	C	C	C	C
10pF	100	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X	M	M	M	M	M	M	C	C	C	C	C	C	C
12pF	120	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X	M	M	M	M	M	M	C	C	C	C	C	C	C
15pF	150	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X	M	M	M	M	M	M	C	C	C	C	C	C	C
18pF	180	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X	M	M	M	M	M	M	C	C	C	C	C	C	C
22pF	220	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X	M	M	M	M	M	M	C	C	C	C	C	C	C
27pF	270	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X	M	M	M	M	M	M	C	C	C	C	C	C	C
33pF	330	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	M	M	M	M	M	M	M	C	C	C	C	C	C	C
39pF	390	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	M	M	M	M	M	M	M	C	C	C	C	C	C	C
47pF	470	S	S	S	A	A	A	A	A	C	X	X	X	X	X	M	M	M	M	M	M	M	M	C	C	C	C	C	C	C
56pF	560	S	S	S	A	A	A	A	A	C	X	X	X	X	X	M	C	M	M	M	M	M	M	C	C	C	C	C	C	C
68pF	680	S	S	S	A	A	A	A	A	C	X	X	X	X	X	M	C	M	M	M	M	M	M	C	C	C	C	C	C	C
82pF	820	S	S	S	A	A	A	A	X	C	X	X	X	X	X	C	C	M	M	M	M	M	M	C	C	C	C	C	C	C
100pF	101	S	S	S	A	A	A	X	X	C	X	X	X	X	X	C	C	M	M	M	M	M	C	C	C	C	C	C	C	F
120pF	121	S	S	S	A	A	A	X	C	C	X	X	X	X	X	C	E	M	M	M	M	M	C	C	C	C	C	C	C	F
150pF	151	S	S	S	A	A	X	X	C	C	X	X	X	X	X	C	E	M	M	M	M	M	C	E	C	C	C	C	C	F
180pF	181	S	S	S	A	A	X	C	C		X	X	X	X	X	E	E	M	M	M	M	M	C	E	C	C	C	C	C	F
220pF	221	S	S	S	A	A	C	C	C		X	X	X	X	X	E	E	M	M	M	M	E	E	C	C	C	C	C	C	F
270pF	271	S	S	B	A	A	C	C	C		X	X	X	M	M	E	E	M	M	M	M	E	E	C	C	C	F	F	F	F
330pF	331	S	S	B	A	A	C	C	C		X	X	X	M	M	E	E	M	M	M	M	E	E	C	C	C	F	F	F	F
390pF	391	S	S	B	X	X	C	C	C		X	X	X	M	M	E	E	M	M	M	M	E	E	C	C	C	F	F	F	F
470pF	471	S	S	B	X	X	C	C	C		X	X	M	M	M	E	E	M	M	M	M	E	E	C	C	C	F	F	F	F
560pF	561	S	S	B	X	X	C	C	C		X	X	M	C	C	E		M	M	M	M	E	E	C	C	C	F	F	F	F
680pF	681	S	S	B	X	X	C	C	C		X	X	M	C	C	E		M	M	M	M	E	E	C	C	C	F	F	F	
820pF	821	S	S	B	X	X	C	C	C		X	X	M	E	E	E		M	M	M	M	E	E	C	C	C	F	F	F	
1,000pF	102				X	X	C	C	C		X	X	M	E	E	E		M	M	C	C	E	F	C	C	C	F	F	F	
1,200pF	122				X	X	C	C	C		X	X	M	E	E	E		M	M	C	C	E	F	C	C	C	F	F	F	
1,500pF	152				X	X	C	C	C		X	X	C	E	E			M	M	C	C	F	G	C	C	C	F	F	F	
1,800pF	182				X	X	C	C	C		X	X	C	E	E			M	M	C	C	G	G	C	C	C	F	F	F	
2,200pF	222				X	X	C	C	C		X	X	C	E	E			M	M	C	C	G		C	C	C	F	F		
2,700pF	272				C	C					X	X	C	E	E			M	M	C	C	G		C	C	C	F	F		
3,300pF	332				C	C					X	X	C	E	E			M	M	C	C	G		C	C	C	F	F		
3,900pF	392				C	C					X	X	E	E	E			M	M	C	C	G		C	C	C	F			
4,700pF	472				C	C					X	X	E	E	E			C	C	C	C			C	C	C	F			
5,600pF	562				C						X	X	E	E	E			C	C	C	C			C	C	E	F			
6,800pF	682				C						M	M	E	E				E	E	E	E			C	C	E	F			
8,200pF	822										C	C	E	E				E	E	E	E			C	E	F	F			
0.010μF	103										C	C						E	E	F	F			C	E	F	F			
0.012μF	123										T							E	E	F	F			E	F	F				
0.015μF	153										T							E	F	G	G			E	F	F				
0.018μF	183																	F	G	G				F	F					
0.022μF	223																	F	G	G				F	F					
0.027μF	273																	G	G					F						
0.033μF	333																	G	G											
0.039μF	393																	G												
0.047μF	473																	G												
0.056μF	563																													
0.068μF	683																													
0.082μF	823																													
0.10μF	104																													
0.12μF	124																													
0.15μF	154																													
0.18μF	184																													
0.22μF	224																													
0.27μF	274																													

MLCC

Chip R

Diode

■ High Reliability for Industrial Grade

RATING

NPO

EIA Size		1812							1825							2220							2225									
Cap	VDC Code	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	4KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	4KV	
0.5pF	0R5																															
1.0pF	1R0																															
1.2pF	1R2																															
1.5pF	1R5																															
1.8pF	1R8																															
2.2pF	2R2																															
2.7pF	2R7																															
3.3pF	3R3																															
3.9pF	3R9																															
4.7pF	4R7																															
5.6pF	5R6																															
6.8pF	6R8																															
8.2pF	8R2																															
10pF	100	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F		E	E	E	E	F	F	F		
12pF	120	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F		E	E	E	E	F	F	F		
15pF	150	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F		E	E	E	E	F	F	F		
18pF	180	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F		E	E	E	E	F	F	F		
22pF	220	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F		E	E	E	E	F	F	F		
27pF	270	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	E	E	E	E	F	F	F	F	
33pF	330	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	E	E	E	E	F	F	F	F	
39pF	390	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	E	E	E	E	F	F	F	F	
47pF	470	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	E	E	E	E	F	F	F	F	
56pF	560	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	E	E	E	E	F	F	F	F	
68pF	680	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	E	E	E	E	F	F	F	F	
82pF	820	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	E	E	E	E	F	F	F	F	
100pF	101	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	E	E	E	E	F	F	F	F	
120pF	121	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	E	E	E	E	F	F	F	F	
150pF	151	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	E	E	E	E	F	F	F	F	
180pF	181	C	C	C	C	C	C	F	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	E	E	E	E	F	F	F	F	
220pF	221	C	C	C	C	C	C	F	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	E	E	E	E	F	F	F	F	
270pF	271	C	C	C	C	C	F	F	E	E	E	E	F	F	F	E	E	E	E	F	F	F	G	E	E	E	E	F	F	F	F	
330pF	331	C	C	C	C	C	F	F	F	E	E	E	E	F	F	F	E	E	E	E	F	F	G	G	E	E	E	E	F	F	F	G
390pF	391	C	C	C	C	C	F	F	E	E	E	E	E	F	F	F	E	E	E	E	F	F	G		E	E	E	E	F	F	F	
470pF	471	C	C	C	C	F	F	F	E	E	E	E	F	F	F	E	E	E	E	F	F	G		E	E	E	E	F	F	F		
560pF	561	C	C	C	C	F	F	F	E	E	E	E	F	F	F	E	E	E	E	F	F	G		E	E	E	E	F	F	F		
680pF	681	C	C	C	C	F	F	F	E	E	E	E	F	F	G	E	E	E	E	F	F	G		E	E	E	E	F	F	F		
820pF	821	C	C	C	C	F	F	G	E	E	E	E	F	F	G	E	E	E	E	F	F	G		E	E	E	E	F	G	G		
1,000pF	102	C	C	C	C	F	F	G	E	E	E	E	E	F	F	G	E	E	E	E	F	F	G		E	E	E	E	F	G	G	
1,200pF	122	C	C	C	C	F	F		E	E	E	E	F	F	G	E	E	E	E	G	G	G		E	E	E	E	F	G	G		
1,500pF	152	C	C	C	C	F	F		E	E	E	E	F	G	G	E	E	E	E	G	G	G		E	E	E	E	F	G	G		
1,800pF	182	C	C	C	C	F	F		E	E	E	E	F	G	G	E	E	E	E	G	G	G		E	E	E	E	F	G	G		
2,200pF	222	C	C	C	C	F	F		E	E	E	E	F	G	G	E	E	E	E	G	G	G		E	E	E	E	F	G	G		
2,700pF	272	C	C	C	C	F	G		E	E	E	E	F	G	G	E	E	E	E	G	G	G		E	E	E	E	F	G	G		
3,300pF	332	C	C	C	C	F	G		E	E	E	E	E	F	G		E	E	E	E	G	G		E	E	E	E	F	G	G		
3,900pF	392	C	C	C	C	G			E	E	E	E	G	G		E	E	E	E	G	G			E	E	E	E	F	G			
4,700pF	472	C	C	C	C	G			E	E	E	E	G	G		E	E	E	E	G	G			E	E	E	E	F	G			
5,600pF	562	C	C	C	C	G			E	E	E	E	G	G		E	E	E	E	G	G			E	E	E	E	G	G			
6,800pF	682	C	C	C	C				E	E	E	E	G	G		E	E	E	E	G	G			E	E	E	E	G	G			
8,200pF	822	C	C	C	C				E	E	E	E	G	G		E	E	E	E	G	G			E	E	E	E	G	G			
0.010μF	103	C	C	C	C				E	E	E	E	G			E	E	E	E	G				E	E	E	E	G	G			
0.012μF	123	C	C	E	E				E	E	E	E	G			E	E	E	E	G				E	E	E	E	G				
0.015μF	153	C	C	E	E				E	E	E	E				E	E	E	E					E	E	E	E					
0.018μF	183	C	E	F	F				E	E	E	E				E	E	E	E					E	E	E	E					
0.022μF	223	C	E	F	F				E	E	E	E				E	E	E	E					E	E	E	E					
0.027μF	273	C	F	G	G				E	E	E	F				E	E	E	F					E	E	E	E					
0.033μF	333	C	F	G	G				E	E	E	F				E	E	F	F					E	E	E	E					
0.039μF	393	F	G	G					E	E	F	G				E	E	F	G					E	E	F	F					
0.047μF	473	F	G	G					E	E	F	G				E	E	G	G					E	E	F	F					
0.056μF	563	G	G						E	F	G	G				E	F	G	G					E	E	G	G					
0.068μF	683	G	G						E	F	G	G				F	F	G						E	F	G	G					
0.082μF	823	G							F	G	G					G	G	G						F	F	G	G					
0.10μF	104	G							G	G						G	G							F	G	G						
0.12μF	124								G							G	G							G	G	G						
0.15μF	154															G								G	G							
0.18μF	184															G								G	G							

MLCC

Chip R

Diode

■ High Reliability for Industrial Grade

RATING

X7R

EIA Size		0603			0805						1206						1210						1808								
Cap	VDC Code	50V	100V	200V 250V	50V	100V	200V	250V	500V 630V	1KV	50V	100V	200V 250V	500V 630V	1KV	2KV	50V	100V	200V 250V	500V 630V	1KV	2KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	4KV	
100pF	101	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	C														
120pF	121	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	C														
150pF	151	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	C							C	C	C	C	C	C	C	F
180pF	181	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	C							C	C	C	C	C	C	C	F
220pF	221	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	E	C	C	C	C	C	C	C	F
270pF	271	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	E	C	C	C	C	C	C	C	F
330pF	331	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	E	C	C	C	C	C	C	F	F
390pF	391	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	E	C	C	C	C	C	C	F	F
470pF	471	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	E	C	C	C	C	C	C	F	F
560pF	561	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	E	C	C	C	C	C	C	F	F
680pF	681	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	E	C	C	C	C	C	C	F	F
820pF	821	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	E	C	C	C	C	C	C	F	F
1,000pF	102	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	E	C	C	C	C	C	C	F	F
1,200pF	122	S	S	B	X	X	X	X	X	X	X	X	X	C	C	C	E	M	M	M	C	C	F	C	C	C	C	C	F	F	
1,500pF	152	S	S	B	X	X	X	X	X	C	X	X	X	C	C	C	E	M	M	M	C	C	F	C	C	C	C	C	F	F	
1,800pF	182	S	S	B	X	X	X	X	X	C	X	X	X	C	C	C	E	M	M	M	C	C	F	C	C	C	C	C	F	F	
2,200pF	222	S	S	B	X	X	X	X	X	C	X	X	X	C	C	C	E	M	M	M	C	C	F	C	C	C	C	C	F	F	
2,700pF	272	S	S	B	X	X	X	X	X	C	X	X	X	C	C	C	E	M	M	M	C	C	G	C	C	C	C	C	F		
3,300pF	332	S	S	B	X	X	X	X	X	C	X	X	X	C	C	C	E	M	M	M	C	C	G	C	C	C	C	C	F		
3,900pF	392	S	S	B	X	X	X	X	X	C	X	X	X	C	C	C		M	M	M	C	E	G	C	C	C	C	C	F		
4,700pF	472	S	S	B	X	X	X	X	C	C	X	X	X	C	C	C		M	M	M	C	E	G	C	C	C	C	C	F		
5,600pF	562	S	S	B	X	X	X	X	C	C	X	X	X	C	C	C		M	M	M	C	E	G	E	E	E	F	F	F		
6,800pF	682	S	S	B	X	X	X	X	C	C	X	X	X	C	C	C		M	M	M	C	E	G	E	E	E	F	F	F		
8,200pF	822	S	S	B	X	X	C	C	C	C	X	X	X	C	C	C		M	M	M	C	E	G	E	E	E	F	F			
0.010μF	103	S	S	B	X	X	C	C	C		X	X	X	C	C	C		M	M	M	C	E		E	E	E	F	F			
0.012μF	123	S	B	B	X	X	C	C	C		X	X	X	C	C	E		M	M	M	C	E		E	E	E	F	F			
0.015μF	153	S	B	B	X	X	C	C	C		X	X	X	C	C	E		M	M	M	C	E		E	E	E	F	F			
0.018μF	183	S	B		X	X	C	C	C		X	X	X	C	C			M	M	M	C	E		E	E	E	F	F			
0.022μF	223	S	B		X	X	C	C	C		X	X	X	C	E			M	M	M	C	E		E	E	E	F	F			
0.027μF	273	S	B		X	C	C	C			X	X	X	C	E			M	M	M	E	E		E	E	E	F	F			
0.033μF	333	B	B		X	C	C	C			X	X	E	E				M	M	M	E	E		E	E	E	F	F			
0.039μF	393	B	B		X	C	C				X	X	E	E				M	M	M	E	F		E	E	E	F	F			
0.047μF	473	B	B		X	C	C				X	X	E	E				M	M	C	E	G		E	E	E	F	F			
0.056μF	563	B			X	C	C				X	X	E					M	M	C	E	G		E	E	E	F	F			
0.068μF	683	B			X	C	C				X	X	E					M	M	E	F	G		E	E	E	F	F			
0.082μF	823	B			X	C					X	C	E					M	M	E	G			E	E	E	F				
0.10μF	104	B			X	C					X	C	E					M	M	E	G			E	E	E	F				
0.12μF	124				C	C					X	C						M	M	E	G			E	E	E					
0.15μF	154				C	C					M	E						M	C	G	G			E	E	E					
0.18μF	184				C	C					M	E						M	C	G				E	E	F					
0.22μF	224				C	C					M	E						M	C	G				E	E	F					
0.27μF	274				C						M	E						M	E	G				F	F	F					
0.33μF	334				C						M	E						C	E	G				F	F	F					
0.39μF	394										P	E						C	G	G				F	F	F					
0.47μF	474										P	E						C	G	G				F	F	F					
0.56μF	564										P	P						C	G	G				F	F	F					
0.68μF	684										P	P						C	F	G				F	F						
0.82μF	824										P	P						C	F					F	F						
1.00μF	105										P	P						C	F					F	F						
1.20μF	125																	G	G					F							
1.50μF	155																	G	G												
2.20μF	225																	G	G												
2.70μF	275																	G													
3.30μF	335																														
4.70μF	475																														
10.0μF	106																														

MLCC

Chip R

Diode

■ High Reliability for Industrial Grade

RATING

X7R

EIA Size		1812										1825								2220								2225							
Cap	VDC Code	50V	100V	200V 250V	500V	630V	1KV	2KV	3KV	4KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	4KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	4KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	4KV	
100pF	101																																		
120pF	121																																		
150pF	151																																		
180pF	181																																		
220pF	221																																		
270pF	271	C	C	C	C	C	C	C	E	F								F									F							F	
330pF	331	C	C	C	C	C	C	C	E	F								F									F							F	
390pF	391	C	C	C	C	C	C	C	E	F								F									F							F	
470pF	471	C	C	C	C	C	C	C	E	F								F									F							F	
560pF	561	C	C	C	C	C	C	C	E	F								F									F							F	
680pF	681	C	C	C	C	C	C	C	F	F								F									F							F	
820pF	821	C	C	C	C	C	C	C	F	F								F									F							F	
1,000pF	102	C	C	C	C	C	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	F	F	
1,200pF	122	C	C	C	C	C	C	C	F	G	F	F	F	F	F	F	F	G	F	F	F	F	F	F	F	F	G	F	F	F	F	F	F	G	
1,500pF	152	C	C	C	C	C	C	C	F	G	F	F	F	F	F	F	F	G	F	F	F	F	F	F	F	F	G	F	F	F	F	F	F	G	
1,800pF	182	C	C	C	C	C	C	E	G	G	F	F	F	F	F	F	F	G	F	F	F	F	F	F	F	F	G	F	F	F	F	F	F	G	
2,200pF	222	C	C	C	C	C	C	E	G		F	F	F	F	F	F	F		F	F	F	F	F	F	F		F	F	F	F	F	F			
2,700pF	272	C	C	C	C	C	C	E	G		F	F	F	F	F	F	F		F	F	F	F	F	F	F		F	F	F	F	F	F			
3,300pF	332	C	C	C	C	C	C	F	G		F	F	F	F	F	F	F		F	F	F	F	F	F	F		F	F	F	F	F	F			
3,900pF	392	C	C	C	C	C	C	F			F	F	F	F	F	F	F		F	F	F	F	F	F	F		F	F	F	F	F	F			
4,700pF	472	C	C	C	C	C	C	F			F	F	F	F	F	F	F		F	F	F	F	F	F	F		F	F	F	F	F	F			
5,600pF	562	C	C	C	C	C	C	G			F	F	F	F	F	F	G		F	F	F	F	F	F	F		F	F	F	F	F	F	G		
6,800pF	682	C	C	C	C	C	C	G			F	F	F	F	F	F	G		F	F	F	F	F	F	G		F	F	F	F	F	F	G		
8,200pF	822	C	C	C	C	C	C	G			F	F	F	F	F	F	G		F	F	F	F	F	G	G		F	F	F	F	F	F	G		
0.010μF	103	C	C	C	C	C	E	G			F	F	F	F	F	F	G		F	F	F	F	F	G	G		F	F	F	F	F	F	G		
0.012μF	123	C	C	C	C	C	F				F	F	F	F	F	G	H		F	F	F	F	F	G	H		F	F	F	F	F	G	G		
0.015μF	153	C	C	C	C	C	F				F	F	F	F	F	G	H		F	F	F	F	F	G	H		F	F	F	F	F	G	G		
0.018μF	183	C	C	C	C	C	G				F	F	F	F	F	G	H		F	F	F	F	F	H	H		F	F	F	F	F	G	H		
0.022μF	223	C	C	C	C	C	G				F	F	F	F	F	G			F	F	F	F	F	H			F	F	F	F	F	G			
0.027μF	273	C	C	C	C	C	G				F	F	F	F	F	H			F	F	F	F	F	H			F	F	F	F	F	G			
0.033μF	333	C	C	C	C	C	G				F	F	F	F	F	H			F	F	F	F	F	H			F	F	F	F	F	G			
0.039μF	393	C	C	C	C	C	G				F	F	F	F	F	H			F	F	F	F	F	H			F	F	F	F	F	H			
0.047μF	473	C	C	C	C	C	G				F	F	F	F	F	H			F	F	F	F	F	H			F	F	F	F	F	H			
0.056μF	563	C	C	C	F	F	G				F	F	F	F	F	H			F	F	F	F	F	H			F	F	F	F	F	H			
0.068μF	683	C	C	C	F	F	G				F	F	F	F	F				F	F	F	F	G				F	F	F	F	F				
0.082μF	823	C	C	C	F	F	G				F	F	F	F	G				F	F	F	F	G				F	F	F	F	F				
0.10μF	104	C	E	C	F	F	G				F	F	F	F	G				F	F	F	F	G				F	F	F	F	G				
0.12μF	124	C	E	C	G	G					F	F	F	F	H				F	F	F	F	G				F	F	F	F	H				
0.15μF	154	C	E	F	G	G					F	F	F	F	H				F	F	F	F	H				F	F	F	F	H				
0.18μF	184	C	E	F	G	G					F	F	F	F	H				F	F	F	F	H				F	F	F	F	H				
0.22μF	224	C	E	F	G	G					F	F	F	F	H				F	F	F	F	H				F	F	F	F	H				
0.27μF	274	C	E	F	G						F	F	F	F	H				F	F	F	F	H				F	F	F	F	H				
0.33μF	334	C	E	F	G						F	F	F	F	H				F	F	F	F	H				F	F	F	F	H				
0.39μF	394	C	E	F	G						F	F	F	F					F	F	F	F	H				F	F	F	F	H				
0.47μF	474	C	E	F	G						F	F	F	F					F	F	F	F					F	F	F	F					
0.56μF	564	C	F	G							F	F	F	G					F	F	F	G					F	F	F	F					
0.68μF	684	F	F	G							F	F	F	G					F	F	F	G					F	F	F	F					
0.82μF	824	F	F	G							F	F	F	H					F	F	F	H					F	F	F	G					
1.00μF	105	F	F	G							F	F	F						F	F	F	H					F	F	F	G					
1.20μF	125	F	F								F	F	G						F	F	G						F	F	G	H					
1.50μF	155	F	F								F	F	G						F	F	G						F	F	G	H					
1.80μF	185	F	F								F	F	G						F	F	G						F	F	G						
2.20μF	225	G	G								F	F	G						F	F	G						F	F	G						
2.70μF	275	G	G								F	F	H						F	F	H						F	F	G						
3.30μF	335	G	G								F	F							F	F							F	F	H						
3.90μF	395										F	F							F	F							F	F	H						
4.70μF	475										F	G							F	G							F	G							
5.60μF	565										G	G							G	G							F	G							
6.80μF	685										G	G							G	G							G	G							
8.20μF	825										G	G							G	G							G	G							
10.0μF	106										G	G							G	G							G	G							

MLCC

Chip R

Diode

■ Automotive Capacitor Qualified to AEC-Q200

FEATURES

- A wide selection of sizes is available (0402 to 1206).
- High capacitance in given case size.
- Capacitor with lead-free termination (pure Tin).
- The MT series meet AEC-Q200 requirement.
- RoHS Compliant.

APPLICATION

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

PART NUMBER

MT	18	N	102	J	500	P	S	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
MT = Automotive safe concern (with AEC-Q200 qualification)	15 0402 (1005) 18 0603 (1608) 21 0805 (2012) 31 1206 (3216) 32 1210 (3225)	N NPO(COG) X X7R	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 0R5 =0.5pF 1R0 =1.0pF 102 =10×10 ² =1000pF	A =±0.05pF B =±0.1pF C =±0.25pF D =±0.5pF F =±1% G =±2% J =±5% K =±10% M =±20%	Two significant digits followed by no. of zeros. And R is in place of decimal point. 100 =10 VDC 160 =16 VDC 250 =25 VDC 500 =50 VDC 101 =100 VDC 201 =200 VDC 251 =250 VDC 501 =500 VDC 631 =630 VDC	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 to table1	G =RoHS Compliant

GENERAL ELECTRICAL DATA

Dielectric	NPO	X7R
Size	0402, 0603, 0805, 1206, 1210	0402, 0603, 0805, 1206, 1210
Capacitance range*	0.5pF to 0.01μF	100pF to 1μF
Capacitance tolerance**	Cap ≤ 5pF: A (±0.05pF), B (±0.1pF), C (±0.25pF) 5pF < Cap < 10pF: B (±0.1pF), C (±0.25pF), D (±0.5pF) 10pF ≤ Cap: F (±1%), G (±2%), J (±5%)	J (±5%), K (±10%), M (±20%)
Rated voltage (WVDC)	10V, 16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V	
Insulation resistance at Ur	≥ 10GΩ or RxC ≥ 500Ω×F whichever is less	
Operating temperature	-55 to +125°C	
Capacitance characteristic	±30ppm / °C	±15%
Termination	Ni/Sn (lead-free termination)	

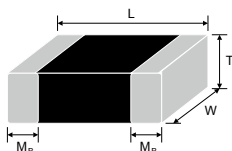
* Measured at the condition of 30~70% related humidity.

NPO: 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

Measured at 1.0±0.2Vrms, 1.0kHz±10% for C ≤ 10μF; 0.5±0.2Vrms, 120Hz±20% for C>10μF, 30~70% related humidity, 25°C ambient temperature for X7R.

** 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.

DIMENSIONS



Size	inch (mm)	L (mm)	W (mm)	T (mm)	code	Remark	M _B (mm)
0402 (1005)		1.00±0.05	0.50±0.05	0.50±0.05	N	#	0.25±0.05/-0.10
0603 (1608)		1.60±0.10	0.80±0.10	0.80±0.07	S		0.40±0.15
		1.60+0.15/-0.10	0.80+0.15/-0.10	0.80+0.15/-0.10	B		
0805 (2012)		2.00±0.15	1.25±0.10	0.60±0.10	A		0.50±0.20
				0.80±0.10	X		
				1.25±0.10	C	#	
				0.80±0.10	X		
1206 (3216)		3.20±0.15	1.60±0.15	0.95±0.10	M		0.60±0.20
				1.25±0.10	C	#	
		3.20±0.20	1.60±0.20	1.15±0.15	J	#	
				1.60±0.20	E	#	
		3.20+0.3/-0.1	1.60+0.3/0.1	1.60+0.30/-0.10	P	#	
1210 (3225)		3.20±0.30	2.20±0.20	0.95±0.10	M	#	0.75±0.25
				1.25±0.10	C	#	
		3.20±0.40	2.20±0.30	1.60±0.20	E	#	
				2.50±0.30	G	#	

Reflow soldering only is recommended.

■ Automotive Capacitor Qualified to AEC-Q200

RATING

NPO																												
EIA Size		0402				0603						0805					1206										1210	
Cap(pF)	VDC Code	10V	16V	25V	50V	10V	16V	25V	50V	100V	200V	10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	200V	250V	500V	630V	250V		
0.5pF	0R5	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A												
0.6pF	0R6	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A												
0.7pF	0R7	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A												
0.8pF	0R8	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A												
0.9pF	0R9	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A												
1.0pF	1R0	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A												
1.2pF	1R2	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A												
1.5pF	1R5	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X		
1.8pF	1R8	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X		
2.2pF	2R2	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X		
2.7pF	2R7	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X		
3.3pF	3R3	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X		
3.9pF	3R9	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X		
4.7pF	4R7	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X		
5.6pF	5R6	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X		
6.8pF	6R8	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X		
8.2pF	8R2	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X		
10pF	100	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
12pF	120	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
15pF	150	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
18pF	180	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
22pF	220	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
27pF	270	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
33pF	330	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
39pF	390	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
47pF	470	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
56pF	560	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
68pF	680	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
82pF	820	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
100pF	101	N	N	N	N	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
120pF	121	N	N	N	N	S	S	S	S	S		A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
150pF	151	N	N	N	N	S	S	S	S	S		A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
180pF	181	N	N	N	N	S	S	S	S	S		A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
220pF	221	N	N	N	N	S	S	S	S	S		A	A	A	A	A	X	X	X	X	X	X	X	X	X	M		
270pF	271	N	N	N	N	S	S	S	S	S		A	A	A	A	A	X	X	X	X	X	M	M	M	M	M		
330pF	331	N	N	N	N	S	S	S	S	S		A	A	A	A	A	X	X	X	X	X	M	M	M	M	M		
390pF	391	N	N	N	N	S	S	S	S	S		X	X	X	X	X	X	X	X	X	X	M	M	M	M	M		
470pF	471	N	N	N	N	S	S	S	S	S		X	X	X	X	X	X	X	X	X	X	M	M	M	M	M		
560pF	561	N	N	N	N	S	S	S	S	S		X	X	X	X	X	X	X	X	X	X	C	C	C	C	M		
680pF	681	N	N	N	N	S	S	S	S	S		X	X	X	X	X	X	X	X	X	X	C	C	C	C	M		
820pF	821	N	N	N	N	S	S	S	S	S		X	X	X	X	X	X	X	X	X	X	E	E	E	E	M		
1,000pF	102	N	N	N	N	S	S	S	S	S		X	X	X	X	X	X	X	X	X	X	E	E	E	E	C		
1,200pF	122											X	X	X	X		X	X	X	X	X	E	E	E	E	C		
1,500pF	152											X	X	X	X		X	X	X	X	X	E	E	E	E	C		
1,800pF	182											X	X	X	X		X	X	X	X	X	E	E	E	E	C		
2,200pF	222											X	X	X	X		X	X	X	X	X	E	E	E	E	C		
2,700pF	272											C	C	C	C		X	X	X	X	X					C		
3,300pF	332											C	C	C	C		X	X	X	X	X					C		
3,900pF	392											C	C	C	C		X	X	X	X	X					C		
4,700pF	472											C	C	C	C		X	X	X	X	X							
5,600pF	562																X	X	X	X	X							
6,800pF	682																M	M	M	M	M							
8,200pF	822																C	C	C	C	C							
0.010μF	103																C	C	C	C	C							
0.012μF	123																											
0.015μF	153																											
0.018μF	183																											
0.022μF	223																											
0.027μF	273																											
0.033μF	333																											
0.039μF	393																											

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 PDC local representative.

MLCC

Chip R

Diode

■ Automotive Capacitor Qualified to AEC-Q200

RATING

X7R

EIA Size		0402				0603					0805								
Cap(pF)	VDC Code	10V	16V	25V	50V	10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	200V	250V	500V	630V
100pF	101	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
120pF	121	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
150pF	151	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
180pF	181	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
220pF	221	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
270pF	271	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
330pF	331	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
390pF	391	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
470pF	471	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
560pF	561	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
680pF	681	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
820pF	821	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
1,000pF	102	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
1,200pF	122	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
1,500pF	152	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
1,800pF	182	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
2,200pF	222	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
2,700pF	272	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
3,300pF	332	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
3,900pF	392	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	X	X
4,700pF	472	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	C	C
5,600pF	562	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	C	C
6,800pF	682	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	C	C
8,200pF	822	N	N	N	N	S	S	S	S	S	X	X	X	X	X	X	X	C	C
0.010μF	103	N	N	N	N	S	S	S	S	S	X	X	X	X	X	C	C	C	C
0.012μF	123					S	S	S	S		X	X	X	X	X	C	C		
0.015μF	153					S	S	S	S		X	X	X	X	X	C	C		
0.018μF	183					S	S	S	S		X	X	X	X	X	C	C		
0.022μF	223					S	S	S	S		X	X	X	X	X	C	C		
0.027μF	273					S	S	S	S		X	X	X	X	C				
0.033μF	333					S	S	S	B		X	X	X	X	C				
0.039μF	393					S	S	S	B		X	X	X	X	C				
0.047μF	473					S	S	S	B		X	X	X	X	C				
0.056μF	563					S	S	S	B		X	X	X	X	C				
0.068μF	683					S	S	S	B		X	X	X	X	C				
0.082μF	823					S	S	S	B		X	X	X	X	C				
0.10μF	104					S	S	S	B		X	X	X	X	C				
0.12μF	124										X	X	X	C					
0.15μF	154										C	C	C	C					
0.18μF	184										C	C	C	C					
0.22μF	224										C	C	C	C					
0.27μF	274										C	C	C						
0.33μF	334										C	C	C						
0.39μF	394										C	C	C						
0.47μF	474										C	C	C						
0.56μF	564										C	C	C						
0.68μF	684										C	C	C						
0.82μF	824										C	C	C						
1.0μF	105										C	C	C						

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 PDC local representative.

MLCC

Chip R

Diode

Automotive Capacitor Qualified to AEC-Q200

RATING

X7R																							
EIA Size		1206									1210				1808				1812				
Cap(pF)	VDC Code	10V	16V	25V	50V	100V	200V	250V	500V	630V	50V	100V	200V	250V	50V	100V	200V	250V	50V	100V	200V	250V	
100pF	101						C	C	C	C													
120pF	121						C	C	C	C													
150pF	151						C	C	C	C					C	C	C	C					
180pF	181						C	C	C	C					C	C	C	C					
220pF	221	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C					
270pF	271	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
330pF	331	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
390pF	391	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
470pF	471	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
560pF	561	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
680pF	681	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
820pF	821	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
1,000pF	102	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
1,200pF	122	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
1,500pF	152	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
1,800pF	182	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
2,200pF	222	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
2,700pF	272	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
3,300pF	332	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
3,900pF	392	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
4,700pF	472	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
5,600pF	562	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
6,800pF	682	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
8,200pF	822	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
0.010μF	103	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	C	C	C	C	C	C	
0.012μF	123	X	X	X	X	X	C	C			M	M	M	M	E	E	E	E	C	C	C	C	
0.015μF	153	X	X	X	X	X	C	C			M	M	M	M	E	E	E	E	C	C	C	C	
0.018μF	183	X	X	X	X	X	C	C			M	M	M	M	E	E	E	E	C	C	C	C	
0.022μF	223	X	X	X	X	X	C	C			M	M	M	M	E	E	E	E	C	C	C	C	
0.027μF	273	X	X	X	X	X	C	C			M	M	M	M	E	E	E	E	C	C	C	C	
0.033μF	333	X	X	X	X	X	E	E			M	M	M	M	E	E	E	E	C	C	C	C	
0.039μF	393	X	X	X	X	X	E	E			M	M	M	M	E	E	E	E	C	C	C	C	
0.047μF	473	X	X	X	X	X	E	E			M	M	M	M	E	E	E	E	C	C	C	C	
0.056μF	563	X	X	X	X	X	E	E			M	M	M	M	E	E	E	E	C	C	C	C	
0.068μF	683	X	X	X	X	X	E	E			M	M	M	M	E	E	E	E	C	C	C	C	
0.082μF	823	X	X	X	X	C	E	E			M	M	M	M	E	E	E	E	C	C	C	C	
0.10μF	104	X	X	X	X	C	E	E			M	M	M	M	E	E	E	E	C	C	C	C	
0.12μF	124	X	X	X	X	C					M	M	E	E	E	E	E	E	C	C	C	C	
0.15μF	154	M	M	M	M	E					M	M	E	E	E	E	E	E	C	C	C	C	
0.18μF	184	M	M	M	M	E					M	M	E	E	E	E			C	C	C	C	
0.22μF	224	M	M	M	M	E					M	M	E	E	E	E			C	C	C	C	
0.27μF	274	M	M	M	C						M	M	F	F					C	C	E	E	
0.33μF	334	M	M	M	C						M	M	F	F					C	C	E	E	
0.39μF	394	M	M	J	P						M	C							C	C	F	F	
0.47μF	474	J	J	J	P						M	C							C	C			
0.56μF	564	J	J	J	P						M	E							C	C			
0.68μF	684	J	J	J	P						M	E							C	C			
0.82μF	824	J	J	J	P						C	P							C	C			
1.0μF	105	J	J	J	P						C	P							C	C			
1.2μF	125										P	F							C	C			
1.5μF	155																		C	C			
1.8μF	185																		E	E			

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 PDC local representative.

MLCC

Chip R

Diode

■ 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.

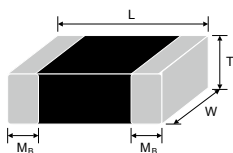
PART NUMBER

MG	31	X	104	K	500	P	X	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
MG = Automotive (without AEC-Q200 qualification)	15 0402 (1005) 18 0603 (1608) 21 0805 (2012) 31 1206 (3216) 32 1210 (3225) 43 1812 (4532)	N NPO(COG) X X7R B X5R	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 0R5 =0.5pF 1R0 =1.0pF 102 =10x10 ² =1000pF	B =±0.1pF C =±0.25pF D =±0.5pF F =±1% G =±2% J =±5% K =±10% M =±20%	Two significant digits followed by no. of zeros. And R is in place of decimal point. 6R3 =6.3 VDC 100 =10 VDC 160 =16 VDC 250 =25 VDC 500 =50 VDC 101 =100 VDC 201 =200 VDC 251 =250 VDC	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 to table1	G =RoHS Compliant

GENERAL ELECTRICAL DATA

Dielectric	NPO		X7R	X5R
Size	0402, 0603, 0805, 1206, 1210, 1812			
Capacitance range*	0.5pF to 0.033μF		100pF to 2.2μF	0.056μF to 10μF
Capacitance tolerance**	Cap ≤ 5pF: 5pF<Cap<10pF: 10pF ≤ Cap:	B (±0.1pF), C (±0.25pF) C (±0.25pF), D (±0.5pF) F (±1%), G (±2%), J (±5%)	J (±5%), K (±10%), M (±20%)	
Rated voltage (WVDC)	16V, 25V, 50V, 100V		10V, 16V, 25V, 50V, 100V, 200V, 250V	6.3V, 10V, 16V, 25V
Tan δ *	Cap<30pF: Cap ≥ 30pF:	Q ≥ 400+20C Q ≥ 1000	Note 1	
Insulation resistance at Ur	≥ 10GΩ or RxC ≥ 500ΩxF whichever is less			
Operating temperature	-55 to +125℃			-55 to +85℃
Capacitance characteristic	± 30ppm / °C			± 15%
Termination	Ni/Sn (lead-free termination)			

DIMENSIONS



Size inch (mm)	L (mm)	W (mm)	T (mm) code	Remark	M _B (mm)
0402 (1005)	1.00±0.05	0.50±0.05	0.50±0.05	N #	0.25+0.05/-0.10
0603 (1608)	1.60±0.10	0.80±0.10	0.80±0.07	S	0.40±0.15
	1.60+0.15/-0.10	0.80+0.15/-0.10	0.80+0.15/-0.10	B	
0805 (2012)	2.00±0.15	1.25±0.10	0.60±0.10	A	0.50±0.20
			0.80±0.10	X	
	2.00±0.20	1.25±0.20	1.25±0.10	C #	
			1.25±0.20	I #	
1206 (3216)	3.20±0.15	1.60±0.15	0.80±0.10	X	0.60±0.20
			0.95±0.10	M	
			1.15±0.15	J #	
	3.20±0.20	1.60±0.20	1.25±0.10	C #	
			1.60±0.20	E #	
			1.60+0.30/-0.10	P #	
1210 (3225)	3.20±0.30	2.20±0.20	0.95±0.10	M #	0.75±0.25
			1.25±0.10	C #	
	3.20±0.40	2.20±0.30	1.60±0.20	E #	
			2.00±0.20	F #	
			2.50±0.30	G #	
1812 (4532)	4.50±0.40	3.20±0.30	1.25±0.10	C #	0.75±0.25
			2.00±0.20	F #	

Reflow soldering only is recommended.

■ Automotive Caps without AEC-Q200 Certification

RATING

NPO																														
EIA Size		0402				0603				0805								1206				1210				1812				
Cap	VDC Code	10V 16V	25V	50V	100V	10V 16V	25V	50V	100V	10V 16V	25V	50V	100V	200V	250V	500V	630V	10V 16V	25V	50V	100V	10V 16V	25V	50V	100V	16V	50V	100V		
0.5pF	0R5	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A													
0.6pF	0R6	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A													
0.7pF	0R7	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A													
0.8pF	0R8	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A													
0.9pF	0R9	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A													
1.0pF	1R0	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A													
1.2pF	1R2	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A													
1.5pF	1R5	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X									
1.8pF	1R8	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X									
2.2pF	2R2	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X									
2.7pF	2R7	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X									
3.3pF	3R3	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X									
3.9pF	3R9	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X									
4.7pF	4R7	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X									
5.6pF	5R6	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X									
6.8pF	6R8	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X									
8.2pF	8R2	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X									
10pF	100	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X					M	C	C	C	
12pF	120	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X					M	C	C	C	
15pF	150	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X					M	C	C	C	
18pF	180	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X					M	C	C	C	
22pF	220	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X	M	M	M	M	M	C	C	C	
27pF	270	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X	M	M	M	M	M	C	C	C	
33pF	330	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X	M	M	M	M	M	C	C	C	
39pF	390	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X	M	M	M	M	M	C	C	C	
47pF	470	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X	M	M	M	M	M	C	C	C	
56pF	560	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X	M	M	M	M	M	C	C	C	
68pF	680	N	N	N	N	S	S	S	S	A	A	A	A	A	A	A	A	X	X	X	X	M	M	M	M	M	C	C	C	
82pF	820	N	N	N	N	S	S	S	S	A	A	A	A	A	A	X	X	X	X	X	X	M	M	M	M	M	C	C	C	
100pF	101	N	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	M	M	M	M	M	C	C	C	
120pF	121	N	N	N	N	S	S	S	S	A	A	A	A	A	X	C	C	C	X	X	X	X	M	M	M	M	M	C	C	C
150pF	151	N	N	N	N	S	S	S	S	A	A	A	A	X	C	C	C	C	X	X	X	X	M	M	M	M	M	C	C	C
180pF	181	N	N	N	N	S	S	S	S	A	A	A	A	X	C	C	C	C	X	X	X	X	M	M	M	M	M	C	C	C
220pF	221	N	N	N	N	S	S	S	S	A	A	A	A	C	C	C	C	C	X	X	X	X	M	M	M	M	M	C	C	C
270pF	271					S	S	S	S	A	A	A	A	C	C	C	C	C	X	X	X	X	M	M	M	M	M	C	C	C
330pF	331					S	S	S	S	A	A	A	A	C	C	C	C	C	X	X	X	X	M	M	M	M	M	C	C	C
390pF	391					S	S	S	S	X	X	X	X	C	C	C	C	C	X	X	X	X	M	M	M	M	M	C	C	C
470pF	471					S	S	S	S	X	X	X	X	C	C			C	X	X	X	X	M	M	M	M	M	C	C	C
560pF	561					S	S	S	S	X	X	X	X	C	C			C	X	X	X	X	M	M	M	M	M	C	C	C
680pF	681					S	S	S	S	X	X	X	X	C	C			C	X	X	X	X	M	M	M	M	M	C	C	C
820pF	821					S	S	S	S	X	X	X	X	C	C			C	X	X	X	X	M	M	M	M	M	C	C	C
1,000pF	102					S	S	S	S	X	X	X	X	C	C			C	X	X	X	X	M	M	M	M	M	C	C	C
1,200pF	122									X	X	X	X	C	C			C	X	X	X	X	M	M	M	M	M	C	C	C
1,500pF	152									X	X	X	X	C	C			C	X	X	X	X	M	M	M	M	M	C	C	C
1,800pF	182									X	X	X	X	C	C			C	X	X	X	X	M	M	M	M	M	C	C	C
2,200pF	222									X	X	X	X	C	C			C	X	X	X	X	M	M	M	M	M	C	C	C
2,700pF	272									C	C	C	C					C	X	X	X	X	M	M	M	M	M	C	C	C
3,300pF	332									C	C	C						C	X	X	X	X	M	M	M	M	M	C	C	C
3,900pF	392									C	C	C						C	X	X	X	X	M	M	M	M	M	C	C	C
4,700pF	472									C	C	C						C	X	X	X	X	M	M	M	M	M	C	C	C
5,600pF	562									C	C	C						C	X	X	X	X	M	M	M	M	M	C	C	C
6,800pF	682									C	C	C						C	M	M	M		M	M	M	M	M	C	C	C
8,200pF	822									C	C	C						C	C	C		M	M	M	M	M	M	C	C	C
0.010μF	103									C	C	C						C	C	C		M	M	M	M	M	C	C	C	C
0.012μF	123																					M	C	C	C	C	C	C	C	C
0.015μF	153																					M	C	C	C	C	C	C	C	C
0.018μF	183																										C	C	C	C
0.022μF	223																										C	C	C	C
0.027μF	273																										C	C	C	C
0.033μF	333																										C	C	C	C
0.039μF	393																													

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

MLCC

Chip R

Diode

■ Automotive Caps without AEC-Q200 Certification

RATING

X7R

EIA Size		0402			0603				0805					1206						1210					1812					
Cap	VDC Code	10V 16V	25V	50V	10V 16V	25V	50V	100V	10V 16V	25V	50V	100V	200V 250V	10V	16V	25V	50V	100V	200V 250V	10V	16V 25V	50V	100V	200V 250V	10V 16V	25V	50V	100V	200V 250V	
100pF	101	N	N	N	S	S	S	S	X	X	X	X	X																	
120pF	121	N	N	N	S	S	S	S	X	X	X	X	X																	
150pF	151	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X											
180pF	181	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X											
220pF	221	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X											
270pF	271	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X											
330pF	331	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X											
390pF	391	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X											
470pF	471	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X											
560pF	561	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X											
680pF	681	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X											
820pF	821	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X											
1,000pF	102	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
1,200pF	122	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
1,500pF	152	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
1,800pF	182	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
2,200pF	222	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
2,700pF	272	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
3,300pF	332	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
3,900pF	392	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
4,700pF	472	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
5,600pF	562	N	N	N	S	S	S	S	X	X	X	X	C	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
6,800pF	682	N	N	N	S	S	S	S	X	X	X	X	C	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
8,200pF	822	N	N	N	S	S	S	S	X	X	X	X	C	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
0.010μF	103	N	N	N	S	S	S	S	X	X	X	X	C	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
0.012μF	123	N	N		S	S	S		X	X	X	X	C	X	X	X	X	X	X	M	M	M	M	M	C	C	C	C	C	
0.015μF	153	N	N		S	S	S		X	X	X	X	C	X	X	X	X	X	M	M	M	M	M	M	C	C	C	C	C	
0.018μF	183	N	N		S	S	S		X	X	X	X	C	X	X	X	X	X	M	M	M	M	M	M	C	C	C	C	C	
0.022μF	223	N	N		S	S	S		X	X	X	X	C	X	X	X	X	X	M	M	M	M	M	M	C	C	C	C	C	
0.027μF	273	N	N		S	S	S		X	X	X	C		X	X	X	X	X	M	M	M	M	M	M	C	C	C	C	C	
0.033μF	333	N	N		S	S	B		X	X	X	C		X	X	X	X	X	E	M	M	M	M	M	C	C	C	C	C	
0.039μF	393	N	N		S	S	B		X	X	X	C		X	X	X	X	X	E	M	M	M	M	M	C	C	C	C	C	
0.047μF	473	N	N		S	S	B		X	X	X	C		X	X	X	X	X	E	M	M	M	M	C	C	C	C	C	C	
0.056μF	563	N			S	S	B		X	X	X	C		X	X	X	X	X	E	M	M	M	M	C	C	C	C	C	C	
0.068μF	683	N			S	S	B		X	X	X	C		X	X	X	X	X	E	M	M	M	M	E	C	C	C	C	C	
0.082μF	823	N			S	S	B		X	X	X	C		X	X	X	X	C	E	M	M	M	M	E	C	C	C	C	C	
0.10μF	104	N	N		S	S	B		X	X	X	C		X	X	X	X	C	E	M	M	M	M	E	C	C	C	C	C	
0.12μF	124				S	B			C	C	C			X	X	X	X	C		M	M	M	M	E	C	C	C	C	C	
0.15μF	154				S	B			C	C	C			M	M	M	M	E		M	M	M	C	G	C	C	C	C	F	
0.18μF	184				S	B			C	C	C			M	M	M	M	E		M	M	M	C	G	C	C	C	C	F	
0.22μF	224				S	B	B		C	C	C			M	M	M	M	E		M	M	M	C	G	C	C	C	C	F	
0.27μF	274				B				C	C				M	M	M	C			M	M	M	E	G	C	C	C	C	F	
0.33μF	334				B				C	C				M	M	M	C			M	M	C	E	G	C	C	C	C	F	
0.39μF	394				B				C	C				M	M	J	P			M	M	C	G	G	C	C	C	C	F	
0.47μF	474				B				C	C				J	J	J	P			M	M	C	G	G	C	C	C	C	F	
0.56μF	564								C	C				J	J	J	P			C	C	C	G		C	C	C	F		
0.68μF	684								C	C				J	J	J	P			C	C	C	F		C	C	F	F		
0.82μF	824								C	C				J	J	J	P			C	C	C	F		C	C	F	F		
1.00μF	105								C	C	I			J	J	J	P			C	C	C	F		C	C	F	F		
1.50μF	155													J	J	P				F	F							F		
2.20μF	225													J	J	P	P			F	F							G		
3.30μF	335																													
4.70μF	475								I	I							P					G								
6.80μF	685																													
10.0μF	106														P	P						G								
22.0μF	226													P						G	G									
47.0μF	476													P						G										

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■ Automotive Caps without AEC-Q200 Certification

RATING

		X5R																	
EIA Size		0402				0603				0805				1206				1210	
Cap	VDC Code	6.3V	10V	16V	25V	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		N																
0.068μF	683		N																
0.082μF	823		N																
0.10μF	104		N	N															
0.15μF	154		N	N															
0.22μF	224	N	N	N					B										
0.27μF	274	N	N				B	B	B										
0.33μF	334	N	N				B	B	B										
0.39μF	394	N					B	B	B										
0.47μF	474	N					B	B	B										
0.68μF	684	N					B	B	B										
0.82μF	824	N				B	B	B	B										
1.0μF	105					B	B	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	P				
10μF	106													P	P				
22μF	226																		

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MLCC

Chip R

Diode

■ Anti-Bend (Soft termination) Capacitor Series

FEATURES

- High performance to withstanding 5mm of substrate bending test guarantee.
- A wide selection of sizes is available (0603 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

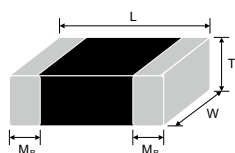
PART NUMBER

FP	21	X	105	K	250	E	I	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
Anti-bend Series	18 0603 (1608)	N COG(NPO)	106=10x10 ⁶	J= ± 5%	500=50V	E=	Reference	G=RoHS
	21 0805 (2012)	X X7R	=10μF	K=± 10 %	101=100V	Tape and 7" Reel,	Thickness	Compliant
	31 1206 (3216)		100=10x10 ⁰	M=± 20 %	201=200V	Embossed Tape	Description	
	32 1210 (3225)		=10pF		251=250V			
	42 1808 (4520)		R47=0.47pF		501=500V	P=		
	43 1812 (4532)		OR5=0.5pF		631=630V	Tape and 7" Reel,		
	46 1825 (4563)				102=1KV	Paper Tape		
	52 2211 (5728)				202=2KV	L=		
	55 2220 (5750)				302=3KV	Tape and 13" Reel,		
	56 2225 (5763)				402=4KV	Embossed		
						G=		
						Tape and 13"Reel,		
						Paper Tape		

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)	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	
Capacitance range	0.5pF ~ 270nF		100pF ~ 10μF	
Capacitance tolerance	Cap ≤ 5pF: 5pF<Cap<10pF: Cap ≥ 10pF:	B (±0.1pF), C (±0.25pF) C (±0.25pF), D (±0.5pF) F (±1%), G (±2%), J (±5%), K (±10%)	J (±5%) K (±10%) M (±20%)	
Tan δ	Cap. Rang	Q Spec.	Rated Volt.	D.F. Spec.
	Cap<30pF:	Q ≥ 400+20C	25V	≤ 3.5%
	Cap ≥ 30pF:	Q ≥ 1000	≥ 50V	≤ 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		
	Cap ≤ 1000pF	1.0±0.2Vrms, 1.0MHz±10%	Apply 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 ≥ 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)
0603 (1608)	1.60±0.20	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+0.30/-0.10		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±0.20	Reference	0.75±0.35
1812 (4532)	4.60±0.50	3.20±0.30	Thickness	0.75±0.35
1825 (4563)	4.60±0.50	6.30±0.40	Description	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(COG)																															
EIA Size		0603			0805						1206							1210						1808							
Cap	VDC Code	50V	100V	200V 250V	50V	100V	200V	250V	500V 630V	1KV	50V	100V	200V	250V	500V 630V	1KV	2KV	50V	100V	200V 250V	500V 630V	1KV	2KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	
0.5pF	0R5	S	S	S	A	A	A	A	A																						
1.0pF	1R0	S	S	S	A	A	A	A	A																						
1.2pF	1R2	S	S	S	A	A	A	A	A																						
1.5pF	1R5	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X														
1.8pF	1R8	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X														
2.2pF	2R2	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X								C	C	C	C	C	C	C
2.7pF	2R7	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X								C	C	C	C	C	C	C
3.3pF	3R3	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X								C	C	C	C	C	C	C
3.9pF	3R9	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X								C	C	C	C	C	C	C
4.7pF	4R7	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X								C	C	C	C	C	C	C
5.6pF	5R6	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X								C	C	C	C	C	C	C
6.8pF	6R8	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X								C	C	C	C	C	C	C
8.2pF	8R2	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X								C	C	C	C	C	C	C
10pF	100	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X	M	M	M	M	M	M	M	C	C	C	C	C	C	C
12pF	120	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X	M	M	M	M	M	M	M	C	C	C	C	C	C	C
15pF	150	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X	M	M	M	M	M	M	M	C	C	C	C	C	C	C
18pF	180	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X	M	M	M	M	M	M	M	C	C	C	C	C	C	C
22pF	220	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X	M	M	M	M	M	M	M	C	C	C	C	C	C	C
27pF	270	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	X	M	M	M	M	M	M	M	C	C	C	C	C	C	C
33pF	330	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	M	M	M	M	M	M	M	M	C	C	C	C	C	C	C
39pF	390	S	S	S	A	A	A	A	A	C	X	X	X	X	X	X	M	M	M	M	M	M	M	M	C	C	C	C	C	C	C
47pF	470	S	S	S	A	A	A	A	A	C	X	X	X	X	X	M	M	M	M	M	M	M	M	M	C	C	C	C	C	C	C
56pF	560	S	S	S	A	A	A	A	A	C	X	X	X	X	X	M	C	M	M	M	M	M	M	C	C	C	C	C	C	C	C
68pF	680	S	S	S	A	A	A	A	A	C	X	X	X	X	X	M	C	M	M	M	M	M	M	C	C	C	C	C	C	C	C
82pF	820	S	S	S	A	A	A	A	X	C	X	X	X	X	X	C	C	M	M	M	M	M	M	C	C	C	C	C	C	C	C
100pF	101	S	S	S	A	A	A	X	X	C	X	X	X	X	X	C	C	M	M	M	M	M	C	C	C	C	C	C	C	C	F
120pF	121	S	S	S	A	A	A	X	C	C	X	X	X	X	X	C	E	M	M	M	M	M	C	C	C	C	C	C	C	C	F
150pF	151	S	S	S	A	A	X	X	C	C	X	X	X	X	X	C	E	M	M	M	M	M	C	E	C	C	C	C	C	F	F
180pF	181	S	S	S	A	A	X	C	C		X	X	X	X	X	E	E	M	M	M	M	C	E	C	C	C	C	C	C	F	F
220pF	221	S	S	S	A	A	C	C	C		X	X	X	X	X	E	E	M	M	M	M	E	E	C	C	C	C	C	C	F	F
270pF	271	S	S	B	A	A	C	C	C		X	X	X	M	M	E	E	M	M	M	M	E	E	C	C	C	C	F	F	F	F
330pF	331	S	S	B	A	A	C	C	C		X	X	X	M	M	E	E	M	M	M	M	E	E	C	C	C	C	F	F	F	F
390pF	391	S	S	B	X	X	C	C	C		X	X	X	M	M	E	E	M	M	M	M	E	E	C	C	C	C	F	F	F	F
470pF	471	S	S	B	X	X	C	C	C		X	X	M	M	M	E	E	M	M	M	M	E	E	C	C	C	C	F	F	F	F
560pF	561	S	S	B	X	X	C	C	C		X	X	M	C	C	E		M	M	M	M	E	E	C	C	C	C	F	F	F	F
680pF	681	S	S	B	X	X	C	C	C		X	X	M	C	C	E		M	M	M	M	E	E	C	C	C	C	F	F	F	
820pF	821	S	S	B	X	X	C	C	C		X	X	M	E	E	E		M	M	M	M	E	E	C	C	C	C	F	F	F	
1,000pF	102	S			X	X	C	C	C		X	X	M	E	E	E		M	M	C	C	E	F	C	C	C	C	F	F	F	
1,200pF	122				X	X	C	C	C		X	X	M	E	E	E		M	M	C	C	E	F	C	C	C	C	F	F	F	
1,500pF	152				X	X	C	C	C		X	X	C	E	E			M	M	C	C	F	G	C	C	C	C	F	F	F	
1,800pF	182				X	X	C	C	C		X	X	C	E	E			M	M	C	C	G	G	C	C	C	C	F	F	F	
2,200pF	222				X	X	C	C	C		X	X	C	E	E			M	M	C	C	G		C	C	C	C	F	F		
2,700pF	272				C	C					X	X	C	E	E			M	M	C	C	G		C	C	C	C	F	F		
3,300pF	332				C	C					X	X	C	E	E			M	M	C	C	G		C	C	C	C	F	F		
3,900pF	392				C	C					X	X	E	E	E			M	M	C	C	G		C	C	C	C	F			
4,700pF	472				C	C					X	X	E	E	E			C	C	C	C			C	C	C	C	F			
5,600pF	562				C						X	X	E	E	E			C	C	C	C			C	C	E	F				
6,800pF	682				C						M	M	E	E				E	E	E	E			C	C	E	F				
8,200pF	822										C	C	E	E				E	E	E	E			C	E	F	F				
0.010μF	103										C	C						E	E	F	F			C	E	F	F				
0.012μF	123										T							E	E	F	F			E	F	F					
0.015μF	153										T							E	F	G	G			E	F	F					
0.018μF	183																	F	G	G				F	F						
0.022μF	223																	F	G	G				F	F						
0.027μF	273																	G	G					F							
0.033μF	333																	G	G												
0.039μF	393																	G													
0.047μF	473																	G													
0.056μF	563																														
0.068μF	683																														
0.082μF	823																														
0.10μF	104																														
0.12μF	124																														
0.15μF	154																														
0.18μF	184											</																			

MLCC

Chip R

Diode

■ Anti-Bend (Soft termination) Capacitor Series

RATING

NPO(COG)

EIA Size		1812								1825								2220								2225							
Cap	VDC Code	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	4KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	4KV		
0.5pF	0R5																																
1.0pF	1R0																																
1.2pF	1R2																																
1.5pF	1R5																																
1.8pF	1R8																																
2.2pF	2R2																																
2.7pF	2R7																																
3.3pF	3R3																																
3.9pF	3R9																																
4.7pF	4R7																																
5.6pF	5R6																																
6.8pF	6R8																																
8.2pF	8R2																																
10pF	100	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F			E	E	E	E	F	F	F		
12pF	120	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F			E	E	E	E	F	F	F		
15pF	150	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F			E	E	E	E	F	F	F		
18pF	180	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F			E	E	E	E	F	F	F		
22pF	220	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F			E	E	E	E	F	F	F		
27pF	270	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F		E	E	E	E	F	F	F	F	
33pF	330	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	F	E	E	E	E	F	F	F	F	
39pF	390	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	F	E	E	E	E	F	F	F	F	
47pF	470	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	F	E	E	E	E	F	F	F	F	
56pF	560	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	F	E	E	E	E	F	F	F	F	
68pF	680	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	F	E	E	E	E	F	F	F	F	
82pF	820	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	F	E	E	E	E	F	F	F	F	
100pF	101	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	F	E	E	E	E	F	F	F	F	
120pF	121	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	F	E	E	E	E	F	F	F	F	
150pF	151	C	C	C	C	C	C	C	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	F	E	E	E	E	F	F	F	F	
180pF	181	C	C	C	C	C	C	F	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	F	E	E	E	E	F	F	F	F	
220pF	221	C	C	C	C	C	C	F	E	E	E	E	F	F	F	E	E	E	E	F	F	F	F	F	E	E	E	E	F	F	F	F	
270pF	271	C	C	C	C	C	F	F	E	E	E	E	F	F	F	E	E	E	E	F	F	F	G	G	E	E	E	E	F	F	F	F	
330pF	331	C	C	C	C	C	F	F	E	E	E	E	F	F	F	E	E	E	E	F	F	G	G	G	E	E	E	E	F	F	F	G	
390pF	391	C	C	C	C	C	F	F	E	E	E	E	F	F	F	E	E	E	E	F	F	G			E	E	E	E	F	F	F		
470pF	471	C	C	C	C	F	F	F	E	E	E	E	F	F	F	E	E	E	E	F	F	G			E	E	E	E	F	F	F		
560pF	561	C	C	C	C	F	F	F	E	E	E	E	F	F	F	E	E	E	E	F	F	G			E	E	E	E	F	F	F		
680pF	681	C	C	C	C	F	F	F	E	E	E	E	F	F	G	E	E	E	E	F	F	G			E	E	E	E	F	F	F		
820pF	821	C	C	C	C	F	F	G	E	E	E	E	F	F	G	E	E	E	E	F	F	G			E	E	E	E	F	G	G		
1,000pF	102	C	C	C	C	F	F	G	E	E	E	E	F	F	G	E	E	E	E	F	F	G			E	E	E	E	F	G	G		
1,200pF	122	C	C	C	C	F	F		E	E	E	E	F	F	G	E	E	E	E	G	G	G			E	E	E	E	F	G	G		
1,500pF	152	C	C	C	C	F	F		E	E	E	E	F	G	G	E	E	E	E	G	G	G			E	E	E	E	F	G	G		
1,800pF	182	C	C	C	C	F	F		E	E	E	E	F	G	G	E	E	E	E	G	G	G			E	E	E	E	F	G	G		
2,200pF	222	C	C	C	C	F	F		E	E	E	E	F	G	G	E	E	E	E	G	G	G			E	E	E	E	F	G	G		
2,700pF	272	C	C	C	C	F	G		E	E	E	E	F	G	G	E	E	E	E	G	G	G			E	E	E	E	F	G	G		
3,300pF	332	C	C	C	C	F	G		E	E	E	E	F	G		E	E	E	E	G	G				E	E	E	E	F	G	G		
3,900pF	392	C	C	C	C	G			E	E	E	E	G	G		E	E	E	E	G	G				E	E	E	E	F	G			
4,700pF	472	C	C	C	C	G			E	E	E	E	G	G		E	E	E	E	G	G				E	E	E	E	F	G			
5,600pF	562	C	C	C	C	G			E	E	E	E	G	G		E	E	E	E	G	G				E	E	E	E	G	G			
6,800pF	682	C	C	C	C				E	E	E	E	G	G		E	E	E	E	G	G				E	E	E	E	G	G			
8,200pF	822	C	C	C	C				E	E	E	E	G	G		E	E	E	E	G	G				E	E	E	E	G	G			
0.010μF	103	C	C	C	C				E	E	E	E	G			E	E	E	E	G					E	E	E	E	G	G			
0.012μF	123	C	C	E	E				E	E	E	E	G			E	E	E	E	G					E	E	E	E	G				
0.015μF	153	C	C	E	E				E	E	E	E				E	E	E	E						E	E	E	E					
0.018μF	183	C	E	F	F				E	E	E	E				E	E	E	E						E	E	E	E					
0.022μF	223	C	E	F	F				E	E	E	E				E	E	E	E						E	E	E	E					
0.027μF	273	C	F	G	G				E	E	E	F				E	E	E	F						E	E	E	E					
0.033μF	333	C	F	G	G				E	E	E	F				E	E	F	F						E	E	E	E					
0.039μF	393	F	G	G					E	E	F	G				E	E	F	G						E	E	F	F					
0.047μF	473	F	G	G					E	E	F	G				E	E	G	G						E	E	F	F					
0.056μF	563	G	G						E	F	G	G				E	F	G	G						E	E	G	G					
0.068μF	683	G	G						E	F																							

MLCC

Chip R

Diode

■ Anti-Bend (Soft termination) Capacitor Series

RATING

X7R																																			
EIA Size		0603				0805							1206							1210							1808								
Cap	VDC Code	50V	100V	200V 250V	25V	50V	100V	200V	250V	500V 630V	1KV	25V	50V	100V	200V 250V	500V 630V	1KV	2KV	25V	50V	100V	200V 250V	500V 630V	1KV	2KV	25V	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	4KV	
100pF	101	S	S	B	X	X	X	X	X	X	X		X	X	C	C	C	C																	
120pF	121	S	S	B	X	X	X	X	X	X	X		X	X	C	C	C	C																	
150pF	151	S	S	B	X	X	X	X	X	X	X	X	X	X	C	C	C	C									C	C	C	C	C	C	C	C	F
180pF	181	S	S	B	X	X	X	X	X	X	X	X	X	X	C	C	C	C									C	C	C	C	C	C	C	C	F
220pF	221	S	S	B	X	X	X	X	X	X	X	X	X	X	C	C	C	C		M	M	M	C	C	E	C	C	C	C	C	C	C	C	C	F
270pF	271	S	S	B	X	X	X	X	X	X	X	X	X	X	C	C	C	C		M	M	M	C	C	E	C	C	C	C	C	C	C	C	C	F
330pF	331	S	S	B	X	X	X	X	X	X	X	X	X	X	C	C	C	C		M	M	M	C	C	E	C	C	C	C	C	C	C	C	C	F
390pF	391	S	S	B	X	X	X	X	X	X	X	X	X	X	C	C	C	C		M	M	M	C	C	E	C	C	C	C	C	C	C	C	C	F
470pF	471	S	S	B	X	X	X	X	X	X	X	X	X	X	C	C	C	C		M	M	M	C	C	E	C	C	C	C	C	C	C	C	F	F
560pF	561	S	S	B	X	X	X	X	X	X	X	X	X	X	C	C	C	C		M	M	M	C	C	E	C	C	C	C	C	C	C	C	F	F
680pF	681	S	S	B	X	X	X	X	X	X	X	X	X	X	C	C	C	C		M	M	M	C	C	E	C	C	C	C	C	C	C	C	F	F
820pF	821	S	S	B	X	X	X	X	X	X	X	X	X	X	C	C	C	C		M	M	M	C	C	E	C	C	C	C	C	C	C	C	F	F
1,000pF	102	S	S	B	X	X	X	X	X	X	X	X	X	X	C	C	C	C	M	M	M	M	C	C	E	C	C	C	C	C	C	C	C	F	F
1,200pF	122	S	S	B	X	X	X	X	X	X	X	X	X	X	C	C	C	E	M	M	M	M	C	C	F	C	C	C	C	C	C	C	F	F	
1,500pF	152	S	S	B	X	X	X	X	X	X	C	X	X	X	C	C	C	E	M	M	M	M	C	C	F	C	C	C	C	C	C	C	F	F	
1,800pF	182	S	S	B	X	X	X	X	X	X	C	X	X	X	C	C	C	E	M	M	M	M	C	C	F	C	C	C	C	C	C	C	F	F	
2,200pF	222	S	S	B	X	X	X	X	X	X	C	X	X	X	C	C	C	E	M	M	M	M	C	C	F	C	C	C	C	C	C	C	F	F	
2,700pF	272	S	S	B	X	X	X	X	X	X	C	X	X	X	C	C	C	E	M	M	M	M	C	C	G	C	C	C	C	C	C	C	F		
3,300pF	332	S	S	B	X	X	X	X	X	X	C	X	X	X	C	C	C	E	M	M	M	M	C	C	G	C	C	C	C	C	C	C	F		
3,900pF	392	S	S	B	X	X	X	X	X	X	C	X	X	X	C	C	C		M	M	M	M	C	E	G	C	C	C	C	C	C	C	F		
4,700pF	472	S	S	B	X	X	X	X	X	X	C	C	X	X	X	C	C	C		M	M	M	M	C	E	G	C	C	C	C	C	C	F		
5,600pF	562	S	S	B	X	X	X	X	X	X	C	C	X	X	X	C	C	C		M	M	M	M	C	E	G	E	E	E	F	F	F			
6,800pF	682	S	S	B	X	X	X	X	X	X	C	C	X	X	X	C	C	C		M	M	M	M	C	E	G	E	E	E	F	F	F			
8,200pF	822	S	S	B	X	X	X	C	C	C	C	X	X	X	C	C	C		M	M	M	M	C	E	G	E	E	E	F	F					
0.010μF	103	S	S	B	X	X	X	C	C	C		X	X	X	C	C	C		M	M	M	M	C	E		E	E	E	F	F					
0.012μF	123	S	B	B	X	X	X	C	C	C		X	X	X	C	C	E		M	M	M	M	C	E		E	E	E	F	F					
0.015μF	153	S	B	B	X	X	X	C	C	C		X	X	X	C	C	E		M	M	M	M	C	E		E	E	E	F	F					
0.018μF	183	S	B		X	X	X	C	C	C		X	X	X	C	C	E		M	M	M	M	C	E		E	E	E	F	F					
0.022μF	223	S	B		X	X	X	C	C	C		X	X	X	C	E	E		M	M	M	M	C	E		E	E	E	F	F					
0.027μF	273	S	B		X	X	C	C	C			X	X	X	C	E			M	M	M	M	E	E		E	E	E	F	F					
0.033μF	333	B	B		X	X	C	C	C			X	X	X	E	E			M	M	M	M	E	E		E	E	E	F	F					
0.039μF	393	B	B		X	X	C	C				X	X	X	E	E			M	M	M	M	E	F		E	E	E	F	F					
0.047μF	473	B	B		X	X	C	C				X	X	X	E	E			M	M	M	C	E	G		E	E	E	F	F					
0.056μF	563	B			X	X	C	C				X	X	X	E				M	M	M	C	E	G		E	E	E	F	F					
0.068μF	683	B			X	X	C	C				X	X	X	E				M	M	M	E	F	G		E	E	E	F	F					
0.082μF	823	B			X	X	C					X	X	C	E				M	M	M	E	G			E	E	E	F						
0.10μF	104	B			X	X	C					X	X	C	E				M	M	M	E	G			E	E	E	F						
0.12μF	124				X	C	C					X	X	C					M	M	M	E	G			E	E	E							
0.15μF	154				C	C	C					M	M	E					M	M	C	G	G			E	E	E							
0.18μF	184				C	C	C					M	M	E					M	M	C	G				E	E	F							
0.22μF	224				C	C	C					M	M	E					M	M	C	G				E	E	F							
0.27μF	274				I	C						M	M	E					M	M	E	G				F	F	F							
0.33μF	334				I	C						M	M	E					M	C	E	G				F	F	F							
0.39μF	394				I							J	P	E					M	C	G	G				F	F	F							
0.47μF	474				I							J	P	E					M	C	G	G				F	F	F							
0.56μF	564				I							J	P	P					C	C	G	G				F	F	F							
0.68μF	684				I							J	P	P					C	C	F	G				F	F								
0.82μF	824				I							J	P	P					C	C	F					F	F								
1.00μF	105				I							J	P	P					C	C	F					F	F								
1.20μF	125																			G	G						F								
1.50μF	155											P								G	G														
2.20μF	225											P								E	G	G													
2.70μF	275																			G															
3.30μF	335											P								E															
4.70μF	475											P								F															
10.0μF	106																			F															

MLCC

Chip R

Diode

■ Anti-Bend (Soft termination) Capacitor Series

RATING

X7R

EIA Size		1812									1825								2220								2225							
Cap	VDC Code	50V	100V	200V 250V	500V	630V	1KV	2KV	3KV	4KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	4KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	4KV	50V	100V	200V 250V	500V 630V	1KV	2KV	3KV	4KV
100pF	101																																	
120pF	121																																	
150pF	151																																	
180pF	181																																	
220pF	221																																	
270pF	271	C	C	C	C	C	C	C	E	F								F									F						F	
330pF	331	C	C	C	C	C	C	C	E	F								F									F						F	
390pF	391	C	C	C	C	C	C	C	E	F								F									F						F	
470pF	471	C	C	C	C	C	C	C	E	F								F									F						F	
560pF	561	C	C	C	C	C	C	C	E	F								F									F						F	
680pF	681	C	C	C	C	C	C	C	F	F								F									F						F	
820pF	821	C	C	C	C	C	C	C	F	F								F									F						F	
1,000pF	102	C	C	C	C	C	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	F	
1,200pF	122	C	C	C	C	C	C	C	F	G	F	F	F	F	F	F	F	G	F	F	F	F	F	F	F	G	F	F	F	F	F	F	G	
1,500pF	152	C	C	C	C	C	C	C	F	G	F	F	F	F	F	F	F	G	F	F	F	F	F	F	F	G	F	F	F	F	F	F	G	
1,800pF	182	C	C	C	C	C	C	E	G	G	F	F	F	F	F	F	F	G	F	F	F	F	F	F	F	G	F	F	F	F	F	F	G	
2,200pF	222	C	C	C	C	C	C	E	G		F	F	F	F	F	F	F		F	F	F	F	F	F	F		F	F	F	F	F	F		
2,700pF	272	C	C	C	C	C	C	E	G		F	F	F	F	F	F	F		F	F	F	F	F	F	F		F	F	F	F	F	F		
3,300pF	332	C	C	C	C	C	C	F	G		F	F	F	F	F	F	F		F	F	F	F	F	F	F		F	F	F	F	F	F		
3,900pF	392	C	C	C	C	C	C	F	G		F	F	F	F	F	F	F		F	F	F	F	F	F	F		F	F	F	F	F	F		
4,700pF	472	C	C	C	C	C	C	F	G		F	F	F	F	F	F	F		F	F	F	F	F	F	F		F	F	F	F	F	F		
5,600pF	562	C	C	C	C	C	C	G			F	F	F	F	F	F	G		F	F	F	F	F	F	F		F	F	F	F	F	F	G	
6,800pF	682	C	C	C	C	C	C	G			F	F	F	F	F	F	G		F	F	F	F	F	F	G		F	F	F	F	F	F	G	
8,200pF	822	C	C	C	C	C	C	G			F	F	F	F	F	F	G		F	F	F	F	F	G	G		F	F	F	F	F	F	G	
0.010μF	103	C	C	C	C	C	E	G			F	F	F	F	F	F	G		F	F	F	F	F	G	G		F	F	F	F	F	F	G	
0.012μF	123	C	C	C	C	C	F				F	F	F	F	F	G	H		F	F	F	F	F	G	H		F	F	F	F	F	G	G	
0.015μF	153	C	C	C	C	C	F				F	F	F	F	F	G	H		F	F	F	F	F	G	H		F	F	F	F	F	G	G	
0.018μF	183	C	C	C	C	C	G				F	F	F	F	F	G	H		F	F	F	F	F	H	H		F	F	F	F	F	G	H	
0.022μF	223	C	C	C	C	C	G				F	F	F	F	F	G			F	F	F	F	F	H			F	F	F	F	F	G		
0.027μF	273	C	C	C	C	C	G				F	F	F	F	F	H			F	F	F	F	F	H			F	F	F	F	F	G		
0.033μF	333	C	C	C	C	C	G				F	F	F	F	F	H			F	F	F	F	F	H			F	F	F	F	F	G		
0.039μF	393	C	C	C	C	C	G				F	F	F	F	F	H			F	F	F	F	F	H			F	F	F	F	F	H		
0.047μF	473	C	C	C	C	C	G				F	F	F	F	F	H			F	F	F	F	F	H			F	F	F	F	F	H		
0.056μF	563	C	C	C	F	F	G				F	F	F	F	F	H			F	F	F	F	F	H			F	F	F	F	F	H		
0.068μF	683	C	C	C	F	F	G				F	F	F	F	F				F	F	F	F	G				F	F	F	F	F			
0.082μF	823	C	C	C	F	F	G				F	F	F	F	G				F	F	F	F	G				F	F	F	F	F			
0.10μF	104	C	E	C	F	F	G				F	F	F	F	G				F	F	F	F	G				F	F	F	F	G			
0.12μF	124	C	E	C	G	G					F	F	F	F	H				F	F	F	F	G				F	F	F	F	H			
0.15μF	154	C	E	F	G	G					F	F	F	F	H				F	F	F	F	H				F	F	F	F	H			
0.18μF	184	C	E	F	G	G					F	F	F	F	H				F	F	F	F	H				F	F	F	F	H			
0.22μF	224	C	E	F	G	G					F	F	F	F	H				F	F	F	F	H				F	F	F	F	H			
0.27μF	274	C	E	F	G						F	F	F	F	H				F	F	F	F	H				F	F	F	F	H			
0.33μF	334	C	E	F	G						F	F	F	F	H				F	F	F	F	H				F	F	F	F	H			
0.39μF	394	C	E	F	G						F	F	F	F					F	F	F	F	H				F	F	F	F	H			
0.47μF	474	C	E	F	G						F	F	F	F					F	F	F	F					F	F	F	F				
0.56μF	564	C	F	G							F	F	F	G					F	F	F	G					F	F	F	F				
0.68μF	684	F	F	G							F	F	F	G					F	F	F	G					F	F	F	F				
0.82μF	824	F	F	G							F	F	F	H					F	F	F	H					F	F	F	G				
1.00μF	105	F	F	G							F	F	F						F	F	F	H					F	F	F	G				
1.20μF	125	F	F								F	F	G						F	F	G						F	F	G	H				
1.50μF	155	F	F								F	F	G						F	F	G						F	F	G					
1.80μF	185	F	F								F	F	G						F	F	G						F	F	G					
2.20μF	225	G	G								F	F	G						F	F	G						F	F	G					
2.70μF	275	G	G								F	F	H						F	F	H						F	F	G					
3.30μF	335	G	G								F	F							F	F							F	F	H					
3.90μF	395										F	F							F	F							F	F	H					
4.70μF	475										F	G							F	G							F	G						
5.60μF	565										G	G							G	G							F	G						
6.80μF	685										G	G							G	G							G	G						
8.20μF	825										G	G							G	G							G	G						
10.0μF	106										G	G							G	G							G	G						

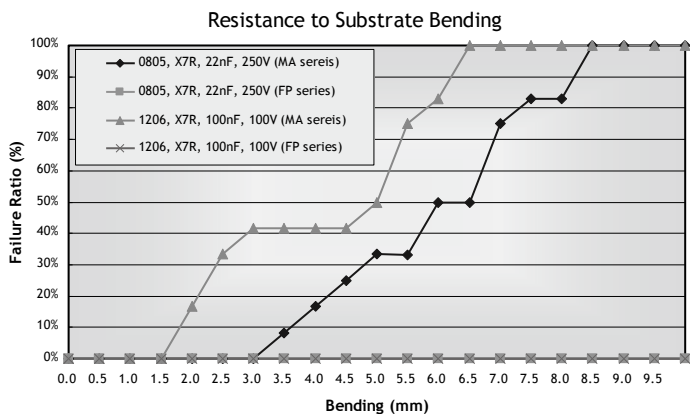
MLCC

Chip R

Diode

■ Anti-Bend (Soft termination) Capacitor Series

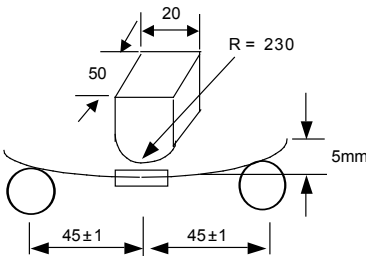
COMPARISON OF BENDING TEST RESULT



PCB TEST RESULT			
Size	Mean Bend FN/MA series (mm)	Mean Bend FP series (mm)	Improvement with Ultra-buffer
0603	≥ 2	≥ 5	300%
0805	≥ 2	≥ 5	300%
1206	≥ 2	≥ 5	300%
1210	≥ 2	≥ 5	300%
1808	≥ 3	≥ 5	300%
1812	≥ 3	≥ 5	140%
1825	≥ 3	≥ 5	117%
2220	≥ 5	≥ 7	114%
2225	≥ 5	≥ 7	114%

RESISTANCE TO FLEXURE OF SUBSTRATE

The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1mm per second until the deflection becomes 5mm.



FK-FH

■ Safety Certified capacitor series (X1/Y2 & X2/Y3)

FEATURES

- Safety standard approval by EN132400:1994+A2+A3+A4, IEC60384-14, Third edition, 2005, EN60384-14:2005 and UL60950UL 60384-14.
- Certificate number:
R 500416666 and R 50118381 by TUV
E231248 by UL, E346791 by UL(FOWX2/8)
HALOGEN compliant.

APPLICATION

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



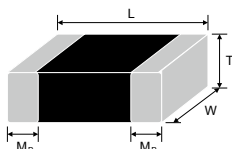
PART NUMBER

FK	21	X	102	K	502	E	G	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Impulsevoltage	Packaging	Thickness	Control Code
FK Safety X1 & Y2 series	06 1206 (3216) 08 1808 (4520) 12 1812 (4532)	N COG(NPO) X X7R	106 =10x10 ⁶ =10μF 100 =10x10 ⁰ =10pF	K =±10 % M =±20 % Z =-20/+80%	302 2.5KV Impulse 502 5KV Impulse 602 6KV Impulse	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
FH Safety X2 & Y3 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 2.0KVDC
Capacitance range	X1/Y2 Class(Impulse 6KV)	4pF ~ 100pF	X1/Y2 Class 100pF ~ 4700pF
	X1/Y2 Class(Impulse 5KV)	3pF ~ 720pF	X2/Y3 Class 150pF ~ 23,000pF
	X2/Y3 Class	3pF ~ 1000pF	1000pF
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%	Apply 1.0 ± 0.2Vrms, 1.0kHz ± 10%, at 25°C ambient temperature.
	Cap > 1000pF	1.0 ± 0.2Vrms, 1.0kHz ± 10%	
Insulation resistance at 500Vdc for 60 seconds	≥ 100GΩ or R • C ≥ 1000 whichever is smaller		≥ 10GΩ or R • C ≥ 500Ω • F whichever is smaller
Operating temperature	- 55 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)	3.20 ± 0.20	1.60 ± 0.20		0.60 ± 0.20
1808 (4520)	4.50 ± 0.50	2.00 ± 0.20	Reference	0.75 ± 0.35
1812 (4532)	4.50 ± 0.50	3.20 ± 0.30	Thickness	0.75 ± 0.35
2211 (5728)	5.70 ± 0.40	2.80 ± 0.30	Description	0.85 ± 0.35
2220 (5750)	5.70 ± 0.40	5.00 ± 0.40		

■ Safety Certified capacitor series (X1/Y2 & X2/Y3)

RATING

Class		X1/Y2 (FK Series)								X2/Y3 (FH Series)						
Rated Voltage		250Vac														2KVDC 2.5KVDC
Dielectric		COG				X7R				COG		X7R				
Certificated		TUV /UL	TUV	TUV	TUV	TUV	TUV /UL	TUV /UL	UL	TUV /UL	TUV	TUV /UL	TUV /UL	UL	UL	
EIA Size		1808	1812	2211	2211	1808	1812	2211	2220	1808	1812	1808	1812	2220	1206	
Cap(pF)	Impulse	5KV			6KV	5KV				2.5KV				---		
3.0	3R0	D								D						
3.3	3R3	D								D						
4.0	4R0	D		F	F					D						
4.7	4R7	D		F	F					D						
5.0	5R0	D		F	F					D						
5.6	5R6	D		F	F					D						
6.8	6R8	D		F	F					D						
8.2	8R2	D		F	F					D						
10	100	D	C	F	F					D	C					
12	120	D	C	F	F					D	C					
15	150	D	C	F	F					D	C					
18	180	D	C	F	F					D	C					
22	220	D	C	F	F					D	C					
27	270	D	C	F	F					D	C					
33	330	D	C	F	F					D	C					
39	390	E	C	F	F					E	C					
47	470	E	C	F	F					E	C					
56	560	E	C	F	F					E	C					
68	680	E	C	F	G					E	C					
82	820	E	C	F	G					E	C					
100	101	F	C	F	H	E				F	C					
120	121	F	C	G		E				F	C					
130	131	F	C/E	G		E	E	E		F	C					
150	151	F	C/F	G		E	E	E		F	C	E				
160	161	F	C	G		E	E	E	F	F	C	E				
180	181	F	C/F	G		E	E	E	F	F	C	E				
220	221	F	C/F	G		E	E	E	F	F	C	E				
270	271	F	F	G		F	E	E	F	F	C/E	E	E			
300	301		F	G		F	E	E	F	F	C/E	E	E			
330	331		F	G		F	E	E	F	F	C/E	E	E			
390	391		F	G		F	E	E	F	F	C/E	E	E			
470	471		F	G		F	E	F	F	F	C/E	E	E			
560	561			G		F	E	F	F	F	C/E	E	E			
680	681			G		F	F	F	F	F	C/E	E	E			
720	721			G		F	F	F	F	F	E	E	E			
820	821					F	F	F	F	F	E	E	E			
1,000	102					F	G	G	F	F	E/F	F	E		C	
1,200	122							G	G			F	E			
1,500	152							G	G			F	F			
1,800	182							G	G			F	F			
2,200	222							G	G			F	G			
2,700	272								G				G			
3,300	332								G				G			
3,900	392								G				G			
4,700	472								G				F/G			
5,600	562												G			
6,800	682															
8,200	822															
10,000	103													G		
12,000	123													G		
15,000	153													G		
18,000	183													G		
22,000	223													H		

MLCC

Chip R

Diode

■ Extra High Voltage Capacitor Series ($\geq 1\text{KV}$)

FEATURES

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

APPLICATION

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

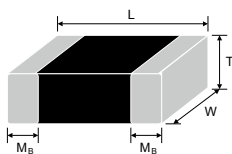
PART NUMBER

FV	42	X	222	K	302	E	G	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
High Voltage Series	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	106 = 10×10^6 =10 μF 100 = 10×10^0 =10pF	K = $\pm 10\%$ M = $\pm 20\%$ Z = $-20/+80\%$	102 =1KV 152 =1.5KV 202 =2KV 302 =3KV 402 =4KV	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
Size	0805, 1206, 1210, 1808, 1812, 1825, 2211, 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 ~ 12nF	100pF ~ 330nF
Capacitance tolerance	Cap $\leq 5\text{pF}$: B ($\pm 0.1\text{pF}$), C ($\pm 0.25\text{pF}$) 5pF < Cap < 10pF: C ($\pm 0.25\text{pF}$), D ($\pm 0.5\text{pF}$) Cap $\geq 10\text{pF}$: F ($\pm 1\%$), G ($\pm 2\%$), J ($\pm 5\%$), K ($\pm 10\%$)	J ($\pm 5\%$) K ($\pm 10\%$) M ($\pm 20\%$)
Tan δ *	Cap. Rang Cap < 30pF: Q $\geq 400+20\text{C}$ Cap $\geq 30\text{pF}$: Q ≥ 1000	$\leq 2.5\%$
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 $150 \pm 10^\circ\text{C}$ for 1 hour, then leave in ambient condition for 24 ± 2 hours before measurement.
	Cap. Rang Cap $\leq 1000\text{pF}$: 1.0 $\pm 0.2\text{Vrms}$, 1.0MHz $\pm 10\%$ Cap > 1000pF: 1.0 $\pm 0.2\text{Vrms}$, 1.0kHz $\pm 10\%$	Apply 1.0 $\pm 0.2\text{Vrms}$, 1.0kHz $\pm 10\%$, at 25°C ambient temperature.
Insulation resistance	$\geq 100\text{G}\Omega$ or $R \cdot C \geq 500\Omega \cdot \text{F}$ whichever is smaller	$\geq 10\text{G}\Omega$ or $R \cdot C \geq 100\Omega \cdot \text{F}$ whichever is smaller
Operating temperature	-55 to +125°C	
Temperature coefficient	$\pm 30\text{ppm}/^\circ\text{C}$	$\pm 15\%$
Termination	Ag (or Cu)/Ni/Sn (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 $\pm 0.30/-0.10$		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 ± 0.20		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

■ Extra High Voltage Capacitor Series (≥1KV)

RATING

COG(NPO)

EIA Size		0805	1206		1210		1808				1812				1825				2220				2225			
Cap(pF)	VDC Code	1KV	1KV	2KV	1KV	2KV	1KV	2KV	3KV	4KV	1KV	2KV	3KV	4KV	1KV	2KV	3KV	4KV	1KV	2KV	3KV	4KV	1KV	2KV	3KV	4KV
0.5	0R5	C																								
1.0	1R0	C																								
1.2	1R2	C																								
1.5	1R5	C	X	X																						
1.8	1R8	C	X	X																						
2.2	2R2	C	X	X			C	C	C	C																
2.7	2R7	C	X	X			C	C	C	C																
3.3	3R3	C	X	X			C	C	C	C																
3.9	3R9	C	X	X			C	C	C	C																
4.7	4R7	C	X	X			C	C	C	C																
5.6	5R6	C	X	X			C	C	C	C																
6.8	6R8	C	X	X			C	C	C	C																
8.2	8R2	C	X	X			C	C	C	C																
10	100	C	X	X	M	M	C	C	C	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F
12	120	C	X	X	M	M	C	C	C	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F
15	150	C	X	X	M	M	C	C	C	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F
18	180	C	X	X	M	M	C	C	C	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F
22	220	C	X	X	M	M	C	C	C	E	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F
27	270	C	X	X	M	M	C	C	C	E	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F
33	330	C	X	M	M	M	C	C	C	F	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F
39	390	C	X	M	M	M	C	C	C	F	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F
47	470	C	M	M	M	M	C	C	C		C	C	C	E	F	F	F	F	F	F	F	F	F	F	F	F
56	560	C	M	C	M	C	C	C	C		C	C	C	E	F	F	F	F	F	F	F	F	F	F	F	F
68	680	C	M	C	M	C	C	C	C		C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F
82	820	C	C	C	M	C	C	C	C		C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F
100	101	C	C	C	C	C	C	C	F		C	C	C		F	F	F	F	F	F	F	F	F	F	F	F
120	121	C	C	E	C	C	C	C	F		C	C	C		F	F	F	F	F	F	F	F	F	F	F	F
150	151	C	C	E	C	E	C	F	F		C	C	C		F	F	F	F	F	F	F	F	F	F	F	F
180	181	C	E	E	C	E	C	F	F		C	C	F		F	F	F	F	F	F	F	F	F	F	F	F
220	221	C	E	E	E	E	C	F	F		C	C	F		F	F	F		F	F	F	F	F	F	F	F
270	271	C	E	E	E	E	F	F	F		C	F	F		F	F	F		F	F	F	G	F	F	F	F
330	331	C	E	E	E	E	F	F	F		C	F	F		F	F	F		F	F	G	G	F	F	F	G
390	391	C	E	E	E	E	F	F	F		C	F	F		F	F	F		F	F	G		F	F	F	
470	471		E	E	E	E	F	F	F		F	F	F		F	F	F		F	F	G		F	F	F	
560	561		E		E	E	F	F	F		F	F	F		F	F	F		F	F	G		F	F	F	
680	681		E		E	E	F	F			F	F	F		F	F	G		F	F	G		F	F	F	
820	821		E		E	E	F	F			F	F	G		F	F	G		F	F	G		F	G	G	
1000	102		E		E	F	F	F			F	F	G		F	F	G		F	F	G		F	G	G	
1200	122		E		E	F	F	F			F	F			F	F	G		G	G	G		F	G	G	
1500	152				F	G	F	F			F	F			F	G	G		G	G	G		F	G	G	
1800	182				G	G	F	F			F	F			F	G	G		G	G	G		F	G	G	
2200	222				G		F				F	F			F	G	G		G	G	G		F	G	G	
2700	272				G		F				F	G			F	G	G		G	G	G		F	G	G	
3300	332				G		F				F	G			F	G			G	G			F	G	G	
3900	392				G						G				G	G			G	G			F	G		
4700	472										G				G	G			G	G			F	G		
5600	562										G				G	G			G	G			G	G		
6800	682														G	G			G	G			G	G		
8200	822														G	G			G	G			G	G		
10000	103														G				G				G	G		
12000	123														G				G				G			

MLCC

Chip R

Diode

■ Extra High Voltage Capacitor Series (≥1KV)

RATING

X7R

EIA Size	0805	1206				1210			1808					1812					1825					2220					2225				
Cap(pF)	VDC Code	1KV	1KV	1.5KV	2KV	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
100	101	X	C	C	C																												
120	121	X	C	C	C																												
150	151	X	C	C	C				C	C	C	C	F																				
180	181	X	C	C	C				C	C	C	C	F																				
220	221	X	C	C	C	C	C	E	C	C	C	C	F																				
270	271	X	C	C	C	C	C	E	C	C	C	C	F	C	C	C	E	F				F					F						
330	331	X	C	C	C	C	C	E	C	C	C	F	F	C	C	C	E	F				F					F						F
390	391	X	C	C	C	C	C	E	C	C	C	F	F	C	C	C	E	F				F					F						F
470	471	X	C	C	C	C	C	E	C	C	C	F	F	C	C	C	E	F				F					F						F
560	561	X	C	C	C	C	C	E	C	C	C	F	F	C	C	C	E	F				F					F						F
680	681	X	C	C	C	C	C	E	C	C	C	F	F	C	C	C	F	F				F					F						F
820	821	X	C	C	C	C	C	E	C	C	C	F	F	C	C	C	F	F				F					F						F
1000	102	X	C	C	C	C	C	E	C	C	C	F	F	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1200	122	X	C	E	E	C	F	F	C	F	F	F		C	C	C	F	G	F	F	F	F	G	F	F	F	F	G	F	F	F	F	G
1500	152	C	C	E	E	C	F	F	C	F	F	F		C	C	C	F	G	F	F	F	F	G	F	F	F	F	G	F	F	F	F	G
1800	182	C	C	E	E	C	F	F	C	F	F	F		C	C	E	G	G	F	F	F	F	G	F	F	F	F	G	F	F	F	F	G
2200	222	C	C	E	E	C	F	F	C	F	F	F		C	C	E	G		F	F	F	F		F	F	F	F		F	F	F	F	
2700	272	C	C	E	E	C	G	G	C	F	F			C	C	E	G		F	F	F	F		F	F	F	F		F	F	F	F	
3300	332	C	C	E	E	C	G	G	C	F	F			C	F	F	G		F	F	F	F		F	F	F	F		F	F	F	F	
3900	392	C	C	E		E	G	G	C	F	F			C	F	F	G		F	F	F	F		F	F	F	F		F	F	F	F	
4700	472	C	C	E		E	G	G	C	F	F			C	F	F	G		F	F	F	F		F	F	F	F		F	F	F	F	
5600	562	C	C	E		E	G	G	F	F	F			C	G	G			F	F	F	G		F	F	F	F		F	F	F	G	
6800	682	C	C	E		E	G	G	F	F	F			C	G	G			F	F	F	G		F	F	F	G		F	F	F	G	
8200	822	C	C			E	G	G	F					C	G	G			F	F	F	G		F	G	G	G		F	F	F	G	
10000	103		C			E			F					E	G	G			F	F	F	G		F	G	G	G		F	F	F	G	
12000	123		E			E			F					F					F	G	G	H		F	G	G	H		F	G	G	G	
15000	153		E			E			F					F					F	G	G	H		F	G	G	H		F	G	G	G	
18000	183		E			E			F					G					F	G	G	H		F	H	H	H		F	G	G	H	
22000	223		E			E			F					G					F	G	G			F	H	H			F	G	G		
27000	273					E			F					G					F	H	H			F	H	H			F	G	G		
33000	333					E			F					G					F	H	H			F	H	H			F	G	G		
39000	393					F			F					G					F	H	H			F	H	H			F	H	H		
47000	473					G			F					G					F	H	H			F	H	H			F	H	H		
56000	563					G			F					G					F	H	H			F	H	H			F	H	H		
68000	683					G			F					G					F					G					F				
82000	823													G					G					G					F				
100000	104													G					G					G					G				
120000	124																		H					G					H				
150000	154																		H					H					H				
180000	184																		H					H					H				
220000	224																		H					H					H				
270000	274																		H					H					H				
330000	334																		H					H					H				
390000	394																						H						H				

MLCC

Chip R

Diode

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

FEATURES

- High 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

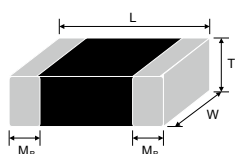
FM	42	X	104	K	101	E	G	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
Medium Voltage Series	15 0404 (1005) 18 0603 (1608) 21 0805 (2012) 31 1206 (3216) 32 1210 (3225) 42 1808 (4520) 43 1812 (4532) 46 1825 (4563) 52 2211 (5728) 55 2220 (5750) 56 2225 (5763)	N COG(NPO) X X7R F Y5V	106 =10x10 ⁶ =10μF 100 =10x10 ⁰ =10pF	J =±5 % K =±10 % M =±20 % Z =-20/+80%	101 =100V 201 =200V 251 =250V 401 =400V 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

100V ≤
Rated Voltage
≤ 630V

GENERAL ELECTRICAL DATA

Dielectric	COG(NPO)	X7R	Y5V
Size	0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225	0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225	0805, 1206, 1210, 1812
Rated voltage (WVDC)	100V, 200V, 250V, 500V, 630V	100V, 200V, 250V, 400V, 500V, 630V	100V, 200V, 250V
Capacitance range*	0.5pF ~ 180nF	100pF ~ 820nF	10nF to 820nF
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%)	M (±20%) Z (-20/+80%)
Tan δ *	Cap. Rang Q Spec. Cap < 30pF: Q ≥ 400+20C Cap ≥ 30pF: Q ≥ 1000	≤ 2.5%	≤ 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	1.0±0.2Vrms, 1.0kHz±10%, at 25°C ambient temperature.	1.0±0.2Vrms, 1.0kHz±10%, at 20°C ambient temperature.
	Cap ≤ 1000pF 1.0±0.2Vrms, 1.0kHz±10%		
	Cap > 1000pF 1.0±0.2Vrms, 1.0kHz±10%		
Insulation resistance at Ur	≥ 100GΩ or R • C ≥ 500Ω • F whichever is smaller	≥ 10GΩ or R • C ≥ 100Ω • F whichever is smaller	
Operating temperature	-55 to +125°C		-25 to +85°C
Capacitance characteristic	±30ppm / °C	±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)
0402 (1005)	1.00±0.15/-1.0	0.50±0.15/-1.0		0.25±0.05/-0.10
0603 (1608)	1.60±0.20	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±0.30/-0.10		0.60±0.20
1210 (3225)	3.30±0.40	2.50±0.30	Reference Thickness Description	0.75±0.35
1808 (4520)	4.60±0.50	2.00±0.20		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±0.40	6.30±0.40		0.85±0.35

MLCC

Chip R

Diode

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

RATING

COG(NPO)

EIA Size		0402				0603					0805					1206					1210					1808				
Cap(pF)	VDC Code	100V	100V	200V	250V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V
0.5	0R5	N	S	S	S	A	A	A	A	A																				
1.0	1R0	N	S	S	S	A	A	A	A	A																				
1.2	1R2	N	S	S	S	A	A	A	A	A	X			X																
1.5	1R5	N	S	S	S	A	A	A	A	A	X	X	X	X	X															
1.8	1R8	N	S	S	S	A	A	A	A	A	X	X	X	X	X															
2.2	2R2	N	S	S	S	A	A	A	A	A	X	X	X	X	X											C	C	C	C	C
2.7	2R7	N	S	S	S	A	A	A	A	A	X	X	X	X	X											C	C	C	C	C
3.3	3R3	N	S	S	S	A	A	A	A	A	X	X	X	X	X											C	C	C	C	C
3.9	3R9	N	S	S	S	A	A	A	A	A	X	X	X	X	X											C	C	C	C	C
4.7	4R7	N	S	S	S	A	A	A	A	A	X	X	X	X	X											C	C	C	C	C
5.6	5R6	N	S	S	S	A	A	A	A	A	X	X	X	X	X											C	C	C	C	C
6.8	6R8	N	S	S	S	A	A	A	A	A	X	X	X	X	X											C	C	C	C	C
8.2	8R2	N	S	S	S	A	A	A	A	A	X	X	X	X	X											C	C	C	C	C
10	100	N	S	S	S	A	A	A	A	A	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
12	120	N	S	S	S	A	A	A	A	A	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
15	150	N	S	S	S	A	A	A	A	A	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
18	180	N	S	S	S	A	A	A	A	A	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
22	220	N	S	S	S	A	A	A	A	A	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
27	270	N	S	S	S	A	A	A	A	A	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
33	330	N	S	S	S	A	A	A	A	A	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
39	390	N	S	S	S	A	A	A	A	A	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
47	470	N	S	S	S	A	A	A	A	A	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
56	560	N	S	S	S	A	A	A	A	A	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
68	680	N	S	S	S	A	A	A	A	A	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
82	820	N	S	S	S	A	A	A	X	X	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
100	101	N	S	S	S	A	A	X	X	X	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
120	121	N	S	S	S	A	A	X	C	C	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
150	151	N	S	S	S	A	X	X	C	C	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
180	181	N	S	S	S	A	X	C	C	C	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
220	221	N	S	S	S	A	C	C	C	C	X	X	X	X	X	M	M	M	M	M						C	C	C	C	C
270	271		S	B	B	A	C	C	C	C	X	X	M	M	M	M	M	M	M	M						C	C	C	F	F
330	331		S	B	B	A	C	C	C	C	X	X	M	M	M	M	M	M	M	M						C	C	C	F	F
390	391		S	B	B	X	C	C	C	C	X	X	M	M	M	M	M	M	M	M						C	C	C	F	F
470	471		S	B	B	X	C	C	C	C	X	M	M	M	M	M	M	M	M	M						C	C	C	F	F
560	561		S	B	B	X	C	C	C	C	X	M	C	C	C	M	M	M	M	M						C	C	C	F	F
680	681		S	B	B	X	C	C	C	C	X	M	C	C	C	M	M	M	M	M						C	C	C	F	F
820	821		S	B	B	X	C	C	C	C	X	M	E	E	E	M	M	M	M	M						C	C	C	F	F
1000	102		S			X	C	C	C	C	X	M	E	E	E	M	C	C	C	C						C	C	C	F	F
1200	122		B			X	C	C	C	C	X	M	E	E	E	M	C	C	C	C						C	C	C	F	F
1500	152		B			X	C	C	C	C	X	C	E	E	E	M	C	C	C	C						C	C	C	F	F
1800	182					X	C	C	C	C	X	C	E	E	E	M	C	C	C	C						C	C	C	F	F
2200	222					X	C	C	C	C	X	C	E	E	E	M	C	C	C	C						C	C	C	F	F
2700	272					C					X	C	E	E	E	M	C	C	C	C						C	C	C	F	F
3300	332					C					X	C	E	E	E	M	C	C	C	C						C	C	C	F	F
3900	392					C					X	E	E	E	E	M	C	C	C	C						C	C	C	F	F
4700	472					C					X	E	E	E	E	C	C	C	C	C						C	C	C	F	F
5600	562					C					X	E	E	E	E	C	C	C	C	C						C	E	E	F	F
6800	682					C					M	E	E			E	E	E	E	E						C	E	E	F	F
8200	822										C	E	E			E	E	E	E	E						E	F	F	F	F
10000	103										C					E	F	F	F	F						E	F	F	F	F
12000	123										T					E	F	F	F	F						F	F	F		
15000	153										T					F	G	G	G	G						F	F	F		
18000	183										T					G	G	G								F				
22000	223										T					G	G	G								F				
27000	273															G														
33000	333															G														
39000	393																													
47000	473																													
56000	563																													
68000	683																													

MLCC

Chip R

Diode

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

RATING

		COG(NPO)																			
EIA Size		1812					1825					2220					2225				
Cap(pF)	VDC Code	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V
10	100	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
12	120	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
15	150	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
18	180	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
22	220	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
27	270	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
33	330	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
39	390	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
47	470	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
56	560	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
68	680	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
82	820	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
100	101	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
120	121	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
150	151	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
180	181	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
220	221	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
270	271	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
330	331	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
390	391	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
470	471	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
560	561	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
680	681	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
820	821	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
1000	102	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
1200	122	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
1500	152	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
1800	182	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2200	222	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2700	272	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
3300	332	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
3900	392	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
4700	472	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
5600	562	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
6800	682	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
8200	822	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
10000	103	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
12000	123	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
15000	153	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
18000	183	E	F	F	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
22000	223	E	F	F	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
27000	273	F	G	G	G	G	E	E	E	F	F	E	E	E	F	F	E	E	E	E	E
33000	333	F	G	G	G	G	E	E	E	F	F	E	F	F	F	F	E	E	E	E	E
39000	393	G	G	G			E	F	F	G	G	E	F	F	G	G	E	F	F	F	F
47000	473	G	G	G			E	F	F	G	G	E	G	G	G	G	E	F	F	F	F
56000	563	G					F	G	G	G	G	F	G	G	G	G	E	G	G	G	G
68000	683	G					F	G	G	G	G	F	G	G			F	G	G	G	G
82000	823						G	G	G			G	G	G			F	G	G	G	G
100000	104						G					G					G	G	G		
120000	124											G					G	G	G		
150000	154																G				
180000	184																G				

MLCC

Chip R

Diode

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

RATING

X7R

EIA Size		0603			0805					1206					1210					1808				
Cap(pF)	VDC Code	100V	200V	250V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V
100	101	S	B	B	X	X	X	X	X	X	C	C	C	C										
120	121	S	B	B	X	X	X	X	X	X	C	C	C	C										
150	151	S	B	B	X	X	X	X	X	X	C	C	C	C						C	C	C	C	C
180	181	S	B	B	X	X	X	X	X	X	C	C	C	C						C	C	C	C	C
220	221	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
270	271	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
330	331	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
390	391	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
470	471	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
560	561	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
680	681	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
820	821	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
1000	102	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
1200	122	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
1500	152	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
1800	182	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
2200	222	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
2700	272	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
3300	332	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
3900	392	S	B	B	X	X	X	X	X	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
4700	472	S	B	B	X	X	X	C	C	X	C	C	C	C	M	M	M	C	C	C	C	C	C	C
5600	562	S	B	B	X	X	X	C	C	X	C	C	C	C	M	M	M	C	C	E	E	E	F	F
6800	682	S	B	B	X	X	X	C	C	X	C	C	C	C	M	M	M	C	C	E	E	E	F	F
8200	822	S	B	B	X	C	C	C	C	X	C	C	C	C	M	M	M	C	C	E	E	E	F	F
10000	103	S	B	B	X	C	C	C	C	X	C	C	C	C	M	M	M	C	C	E	E	E	F	F
12000	123	B	B	B	X	C	C	C	C	X	C	C	C	C	M	M	M	C	C	E	E	E	F	F
15000	153	B	B	B	X	C	C	C	C	X	C	C	C	C	M	M	M	C	C	E	E	E	F	F
18000	183	B			X	C	C	C	C	X	C	C	C	C	M	M	M	C	C	E	E	E	F	F
22000	223	B			X	C	C	C	C	X	C	C	E	E	M	M	M	C	C	E	E	E	F	F
27000	273	B			C	C	C			X	C	C	E	E	M	M	M	E	E	E	E	E	F	F
33000	333	B			C	C	C			X	E	E	E	E	M	M	M	E	E	E	E	E	F	F
39000	393	B			C	C	C			X	E	E	E	E	M	M	M	E	E	E	E	E	F	F
47000	473	B			C	C	C			X	E	E	E	E	M	C	C	E	E	E	E	E	F	F
56000	563	B			C	C	C			X	E	E	E	E	M	C	C	E	E	E	E	E	F	F
68000	683	B			C	C	C			X	E	E			M	E	E	F	F	E	E	E	F	F
82000	823	B			C	C				C	E	E			M	E	E	G	G	E	E	E	F	F
100000	104	B			C	C				C	E	E			M	E	E	G	G	E	E	E	F	F
120000	124				C					C					M	E	E	G	G	E	E	E		
150000	154				C					E					C	G	G	G	G	E	E	E		
180000	184				C					E					C	G	G			E	F	F		
220000	224				C					E					C	G	G			E	F	F		
270000	274									E					E	G	G			F	F	F		
330000	334									E					E	G	G			F	F	F		
390000	394									E					G	G	G			F	F	F		
470000	474				I					E					G	G	G			F	F	F		
560000	564									P					G	G	G			F	F	F		
680000	684									P					F	G	G			F				
820000	824									P					F					F				

MLCC

Chip R

Diode

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

RATING

X7R

EIA Size		1812					1825					2220					2225				
Cap(pF)	VDC Code	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V
100	101																				
120	121																				
150	151																				
180	181																				
220	221																				
270	271	C	C	C	C	C															
330	331	C	C	C	C	C															
390	391	C	C	C	C	C															
470	471	C	C	C	C	C															
560	561	C	C	C	C	C															
680	681	C	C	C	C	C															
820	821	C	C	C	C	C															
1000	102	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1200	122	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1500	152	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1800	182	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
2200	222	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
2700	272	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
3300	332	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
3900	392	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
4700	472	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
5600	562	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
6800	682	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
8200	822	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
10000	103	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
12000	123	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
15000	153	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
18000	183	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
22000	223	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
27000	273	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
33000	333	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
39000	393	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
47000	473	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
56000	563	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
68000	683	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
82000	823	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
100000	104	E	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
120000	124	E	C	C	G	G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
150000	154	E	F	F	G	G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
180000	184	E	F	F	G	G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
220000	224	E	F	F	G	G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
270000	274	E	F	F	G		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
330000	334	E	F	F	G		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
390000	394	E	F	F	G		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
470000	474	E	F	F	G		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
560000	564	F	G	G			F	F	F	G	G	F	F	F	G	G	F	F	F	F	F
680000	684	F	G	G			F	F	F	G	G	F	F	F	G	G	F	F	F	F	F
820000	824	F	G	G			F	F	F	H	H	F	F	F	H	H	F	F	F	G	G

MLCC

Chip R

Diode

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

RATING

Y5V

EIA Size		0805			1206			1210			1812		
Cap(pF)	VDC Code	100V	200V	250V	100V	200V	250V	100V	200V	250V	100V	200V	250V
10	103	X	X	X	X	X	X	M	M	M	C	C	C
15	153	X	X	X	X	X	X	M	M	M	C	C	C
22	223	X	X	X	X	X	X	M	M	M	C	C	C
33	333	X	X	X	X	X	X	M	M	M	C	C	C
47	473	X	X	X	X	X	X	M	M	M	C	C	C
68	683	X	X	X	X	X	X	M	M	M	C	C	C
100	104	X			X	X	X	M	M	M	C	C	C
150	154				M	M	M	M	M	M	C	C	C
220	224				M			M			C	C	C
330	334							M			C	C	C
470	474										C	C	C
680	684										C	C	C

MLCC

Chip R

Diode

■ 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.

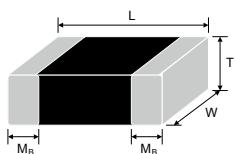
PART NUMBER

FS	32	X	226	K	101	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 X X7R F Y5V	106 = 10×10^6 =10 μF 100 = 10×10^0 =10pF	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
Rated voltage $\leq 250\text{Vdc}$	31 1206 (3216) 32 1210 (3225)							
Capacitance $\geq 1.0\mu\text{F}$ Series Product	42 1808 (4520) 43 1812 (4532) 46 1825 (4563) 52 2211 (5728) 55 2220 (5750) 56 2225 (5763)							

GENERAL ELECTRICAL DATA

Dielectric	X7R	X5R	Y5V	X6S
Size	0201, 0402, 0603, 0805, 1206, 1210, 1812, 1825, 2220, 2225			
Capacitance range*	1 μF to 10 μF	1 μF to 100 μF	1 μF to 100 μF	1 μF to 100 μF
Capacitance tolerance**	J ($\pm 5\%$) K ($\pm 10\%$) M ($\pm 20\%$)	J ($\pm 5\%$) K ($\pm 10\%$) M ($\pm 20\%$)	M ($\pm 20\%$) Z (-20/+80%)	J ($\pm 5\%$) K ($\pm 10\%$) M ($\pm 20\%$)
Rated voltage (WVDC)	6.3V, 10V, 16V, 25V, 35V, 50V, 100V, 250V, 500V, 630V			4V, 6.3V, 10V, 16V, 25V, 50V
Tan δ *	Please, refer to our sales spec.			
Insulation resistance at Ur	$\geq 10\text{G}\Omega$ or $R \cdot C \geq 100\Omega \cdot \text{F}$ whichever is smaller			
Operating temperature	-55 to +125° C	-55 to +85°C	-25 to +85°C	-55 to +105°C
Capacitance characteristic	$\pm 15\%$		+30/-80%	$\pm 22\%$
Termination	Ni/Sn (lead-free termination)			

DIMENSIONS



Size inch (mm)	L (mm)	W (mm)	T (mm) code	M _b min (mm)
0201 (0603)	0.60 $\pm$ 0.05	0.30 $\pm$ 0.05	Reference Thickness Description	0.15 $\pm$ 0.05
0402 (1005)	1.00 $\pm$ 0.15/-1.0	0.50 $\pm$ 0.15/-1.0		0.25 $\pm$ 0.05/-0.10
0603 (1608)	1.60 $\pm$ 0.20	0.80 $\pm$ 0.15		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 $\pm$ 0.30/-0.10		0.60 $\pm$ 0.20
1210 (3225)	3.30 $\pm$ 0.40	2.50 $\pm$ 0.30		0.75 $\pm$ 0.35
1808 (4520)	4.60 $\pm$ 0.50	2.00 $\pm$ 0.20		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

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

RATING

X7R

EIA Size	0402	0603					0805					1206					1210							1808				
Cap(μF)	VDC Code	6.3V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	100V	6.3V	10V	16V	25V	35V	50V	100V	50V	100V	
1.0	105	N	B	B	B	B	B		C	C	C	I		J	J	J	P	P		C	C	C		C	F	F	F	
1.2	125																							G	G	F		
1.5	155								I	I	I			J	J	J	P				E	E		G	G			
1.8	185																							G	G			
2.2	225		B	B	B				I	I	I	I	I	J	J	J	P	P	P			E	E		G	G		
2.7	275																							G				
3.3	335														P	P	P				E	E						
4.7	475								I	I	I	I		P	P	P	P	P			F	F	F		G			
6.8	685																											
10.0	106								I	I	I			P	P	P	P				F	F	F	G	G			
22.0	226													P	P	P					G	G	G					
47.0	476																			G	G							

X7R

EIA Size		1812							1825				2220						2225					
Cap(μF)	VDC Code	10V	16V	25V	50V	100V	200V	250V	50V	100V	200V	250V	50V	100V	200V	250V	500V	630V	50V	100V	200V	250V	500V	630V
1.0	105	C	C	C	F	F	G	G	F	F	F	F	F	F	F	F	H	H	F	F	F	F	G	G
1.2	125				F	F			F	F	G	G	F	F	G	G			F	F	G	G	H	H
1.5	155				F	F			F	F	G	G	F	F	G	G			F	F	G	G	H	H
1.8	185				F	F			F	F	G	G	F	F	G	G			F	F	G	G		
2.2	225				G	G			F	F	G	G	F	F	G	G			F	F	G	G		
2.7	275				G	G			F	F	H	H	F	F	H	H			F	F	G	G		
3.3	335				G	G			F	F			F	F					F	F	H	H		
3.9	395								F	F			F	F					F	F	H	H		
4.7	475								F	G			F	G					F	G				
5.6	565								G	G			G	G					F	G				
6.8	685								G	G			G	G					G	G				
8.2	825								G	G			G	G					G	G				
10.0	106								G	G			G	G					G	G				

X5R

EIA Size		0201		0402				0603					0805					1206					1210							
Cap(μF)	VDC Code	6.3V	10V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	50V	4V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	4V	6.3V	10V	16V	25V	35V	50V
1.0	105	L	L	N	N	N	N	B	B	B	B	B			C	C	C	I					P							
1.2	125																													
1.5	155							B						I	I	I	I			J	J					F	F	F		
1.8	185																													
2.2	225	L			N	N	K	K	B	B	B	B	B		I	I	I	I	I		J	J	P	P		F	F	F		
2.7	275																													
3.3	335							B	B					I	I	I	I			P	P	P								
3.9	395																													
4.7	475				K	K	K		B	B	B	B		I	I	I	I	I	P	P	P	P	P		F	F	F	F		
5.6	565																													
6.8	685																		P	P										
8.2	825																													
10.0	106				K	K			B	B		B		I	I	I	I	I	P	P	P	P	P		F	F	F	F	G	G
22.0	226								B	B				I	I	I	I		P	P	P	P			G	G	G	G		
47.0	476													I	I				P	P					G	G	G			
100.0	107												I						P						G	G				
220.0	227																							G						

■ High capacitance capacitor series (≥1uF)

RATING

Y5V																													
EIA Size		0402		0603				0805					1206						1210						1812				
Cap(μF)	VDC Code	6.3V	10V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	35V	50V	6.3V	10V	16V	25V	35V	50V	10V	16V	25V	50V	100V
1.0	105	N	N		S	B	B		X	X	C	C		M	M	M		M		M	M	M		M	C	C	C	C	C
1.2	125																												
1.5	155				S				C	C				M	M	M				M	M	M			C	C	C	C	
1.8	185																												
2.2	225			S	S	B			C	C	I			M	M	M		J		M	M	M		E	C	C	C	C	
2.7	275																												
3.3	335								C	C				J	J	J				M	M	M			C	C	C	C	
3.9	395																												
4.7	475			B	B				C	C	I			J	J	J	J	P		M	M	C		E	C	C	C	C	
5.6	565																												
6.8	685								I					J	J					M	M	C		F	C	C	C	C	
8.2	825																												
10.0	106							I	I	I				J	J	P				C	C	E	F	F	C	C	C	F	
22.0	226							I	I					P	P					F	F								
47.0	476												P						F	F						G			
100.0	107																		G										

X6S																											
EIA Size	0201	0402					0603						0805						1206					1210			
Cap(μF)	VDC Code	4V	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
1.0	105	L	N	K	K	K																					
1.2	125																										
1.5	155																										
1.8	185																										
2.2	225		N	K	K					B						I											
2.7	275																										
3.3	335																										
3.9	395																										
4.7	475							B		B	B						I	I									
5.6	565																										
6.8	685																										
8.2	825																										
10.0	106							B	B	B			I	I	I	I	I					E					
22.0	226						B	B						I	I	I				P	P						G
47.0	476												I						P						G	G	G
100.0	107																							G			

MLCC

Chip R

Diode

■ 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

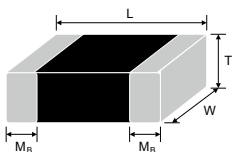
RF	15	N	100	J	500	C	T
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging
RF =Ultra High Q & Low ESR	02 01005 (0402) 03 0201 (0603) 15 0402 (1005) 18 0603 (1608) 21 0805 (2012)	N =COG (NPO)	0R5 =0.5pF 1R0 =1.0pF 100 =10x10 ⁻¹⁰ =10pF	A = $\pm 0.05\text{pF}$ B = $\pm 0.1\text{pF}$ C = $\pm 0.25\text{pF}$ D = $\pm 0.5\text{pF}$ F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$	Two significant digits followed by no. of zeros. And R is in place of decimal point. 6R3 =6.3V 100 =10V 250 =25V 500 =50V 101 =100V 251 =250V 501 =500V	C =Cu/Ni/Sn	T =7" reeled G =13" reeled

GENERAL ELECTRICAL DATA

Dielectric	NPO
Size	01005, 0201, 0402, 0603, 0805
Capacitance*	0.1pF to 100pF
Capacitance tolerance	Cap $\leq 5\text{pF}$: 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 $\geq 10\text{pF}$: F ($\pm 1\%$), G ($\pm 2\%$), J ($\pm 5\%$)
Rated voltage (WVDC)	6.3V, 10V, 25V, 50V, 100V, 250V, 500V
Q*	01005, 0201, 0402/25V~50V: Cap < 30pF: Q $\geq 400+20\text{C}$; Cap $\geq 30\text{pF}$: Q ≥ 1000 0402/100V~200V, 0603, 0805, 0505: Cap < 30pF: Q $\geq 800+20\text{C}$; Cap $\geq 30\text{pF}$: Q ≥ 1400
Insulation resistance at Ur	$\geq 10\text{G}\Omega$ or $\text{RxC} \geq 100\Omega\cdot\text{F}$ whichever is smaller
Operating temperature	-55 to +125°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)

* Measured at the conditions of 25°C ambient temperature and 30~70% related humidity.
Apply $1.0 \pm 0.2\text{Vrms}$, $1.0\text{MHz} \pm 10\%$ for Cap $\leq 1000\text{pF}$ and $1.0 \pm 0.2\text{Vrms}$, $1.0\text{kHz} \pm 10\%$ for Cap > 1000pF.

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
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		

■ Ultra High Q & Low ESR Capacitor Series

RATING

NPO

EIA Size		01005		0201				0402				0603			0805				0505			Tolerance
Cap (pF)	VDC Code	16V	25V	6.3V	10V	25V	50V	25V	50V	100V	200V	50V	100V	250V	50V	100V	250V	500V	50V	100V	250V	
0.1pF	0R1			L	L	L	L	N	N	N	N	U	U	U								B
0.2 pF	0R2	V	V	L	L	L	L	N	N	N	N	U	U	U	A	A	A	A				A, B
0.3 pF	0R3	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T				A, B
0.4 pF	0R4	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B
0.5 pF	0R5	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
0.6 pF	0R6	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
0.7 pF	0R7	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
0.75 pF	R75	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
0.8 pF	0R8	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
0.9 pF	0R9	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
1.0 pF	1R0	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
1.2 pF	1R2	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
1.5 pF	1R5	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
1.8 pF	1R8	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
2.0 pF	2R0	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
2.2 pF	2R2	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
2.7 pF	2R7	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
3.0 pF	3R0	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
3.3 pF	3R3	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
3.9 pF	3R9	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
4.0 pF	4R0	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
4.7 pF	4R7	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
5.0 pF	5R0	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	A, B, C
5.6 pF	5R6	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	B, C, D
6.0 pF	6R0	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	B, C, D
6.8 pF	6R8	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	B, C, D
7.0 pF	7R0	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	B, C, D
8.0pF	8R0	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	B, C, D
8.2pF	8R2	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	B, C, D
9.0pF	9R0	V		L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	B, C, D
10pF	100	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	F, G, J
12pF	120	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	F, G, J
15pF	150	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	F, G, J
18pF	180	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	F, G, J
20pF	200	V	V	L	L	L	L	N	N	N	N	S	S	S	T	T	T	T	J	J	J	F, G, J
22pF	220	V	V	L	L	L		N	N	N	N	S	S	S	T	T	T	T	J	J	J	F, G, J
27pF	270			L	L	L		N	N	N	N	S	S	S	T	T	T	T	J	J	J	F, G, J
33pF	330			L	L	L		N	N	N	N	S	S	S	T	T	T	T	J	J	J	F, G, J
39pF	390							N	N	N		S	S	S	T	T	T	T	J	J	J	F, G, J
47pF	470							N	N	N		S	S	S	T	T	T	T	J	J	J	F, G, J
56pF	560							N	N	N		S	S	S	T	T	T	T	J	J	J	F, G, J
68pF	680							N				S	S	S	T	T	T	T	J	J	J	F, G, J
82pF	820							N				S	S	S	T	T	T		J	J	J	F, G, J
100pF	101							N				S	S	S	T	T	T		J	J	J	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 DATAa, please contact WTC local representative.

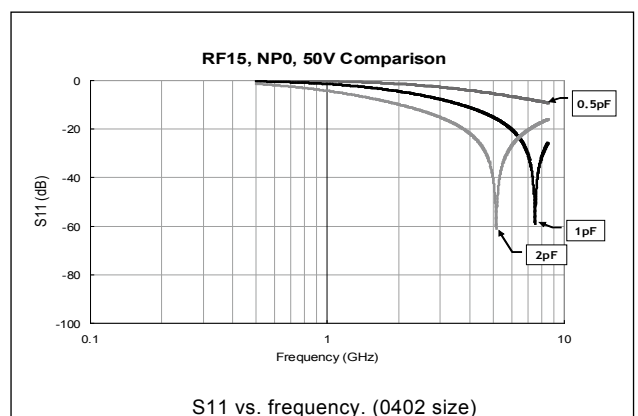
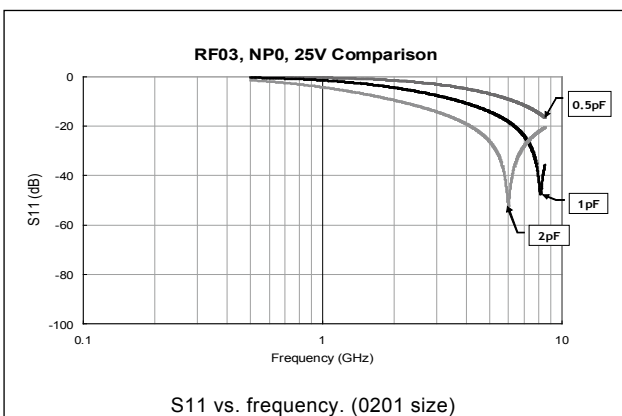
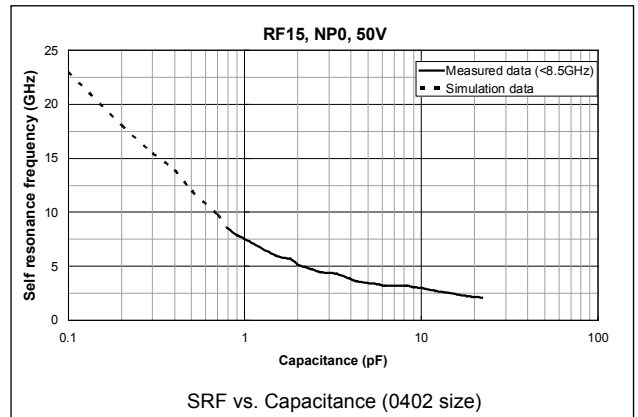
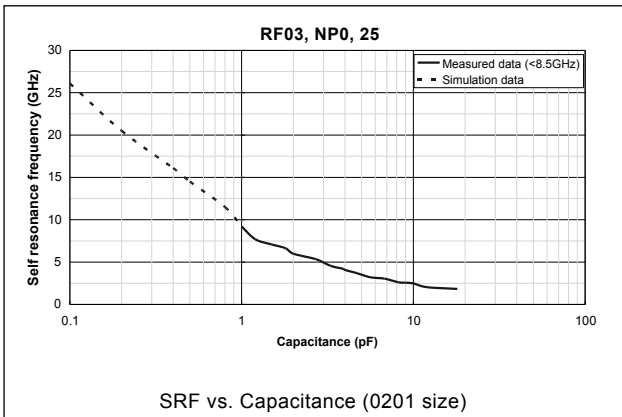
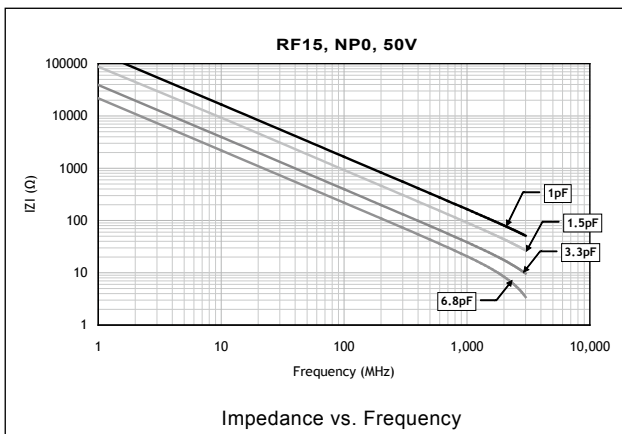
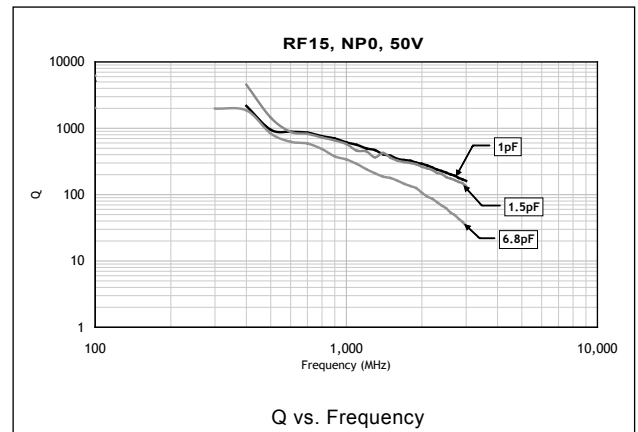
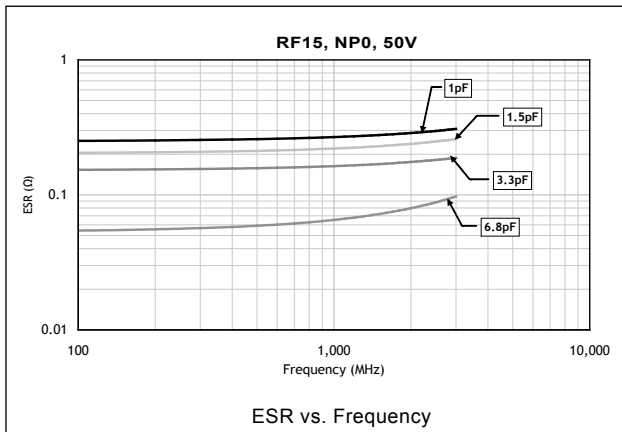
MLCC

Chip R

Diode

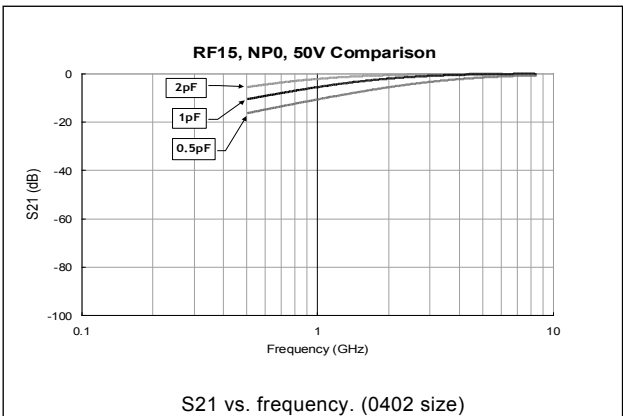
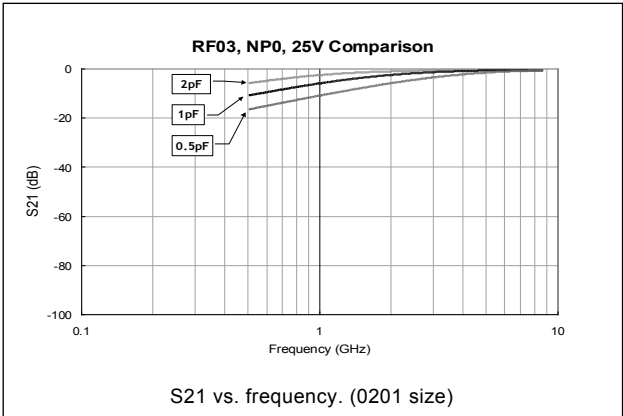
■ Ultra High Q & Low ESR Capacitor Series

ELECTRICAL CHARACTERISTICS (CON.)



■ Ultra High Q & Low ESR Capacitor Series

ELECTRICAL CHARACTERISTICS (CON.)



MLCC

Chip R

Diode

■ 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	104	K	500	E	G	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
General	02 01R5 (0402)	N COG(NPO)	106=10x10 ⁶ =10μF	B= ±0.10pF C= ±0.25pF	6R3=6.3V 100=10V	E=	Reference	G=RoHS
Purpose	03 0201 (0603)	X X7R	100=10x10 ⁴ =10pF	D= ±0.50pF F= ±1%	160=16V 250=25V	Tape and 7" Reel, Embossed Tape	Thickness	Compliant
product	15 0402 (1005)	B X5R		G= ±2%	500=50V	P=	Description	
≤ 50Vdc	18 0603 (1608)	F Y5V		J= ±5%		Tape and 7" Reel, Paper Tape		
	21 0805 (2012)			K= ±10%		L=		
	31 1206 (3216)			M= ±20%		Tape and 13" Reel, Embossed		
	32 1210 (3225)			Z= -20/+80%		G=		
	42 1808 (4520)					Tape and 13" Reel, Paper Tape		
	43 1812 (4532)							
	46 1825 (4563)							
	55 2220 (5750)							
	56 2225 (5763)							

GENERAL ELECTRICAL DATA

Dielectric	COG(NPO)	X7R	Y5V	X5R
Size	01R5 to 2225	01R5 to 2225	0402 to 1812	01R5 to 0603,
Capacitance range*	0.1pF to 270nF	100pF to 820nF	10nF to 820nF	100pF to 820nF
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%)	M (±20%) Z (-20/+80%)	J (±5%) K (±10%) M (±20%)
Rated voltage (WVDC)	10V, 16V, 25V, 50V	10V, 16V, 25V, 50V	6.3V, 10V, 16V, 25V, 50V	6.3V, 10V, 16V, 25V, 50V
Tan δ*	Cap<30pF: Q ≥ 400+20C Cap ≥ 30pF: Q ≥ 1000	-	-	-
Insulation resistance at Ur	≥ 10GΩ	≥ 10GΩ or Rx ≥ 100ΩxF whichever is less	-	-
Operating temperature	-55 to +125°C	-	-25 to +85°C	-55 to +85°C
Capacitance characteristic	±30ppm	±1%	-37.5	±15%
Termination	Cu (or Ag)/Ni/Sn (lead-free termination)			

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

COG(NPO): 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: 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:

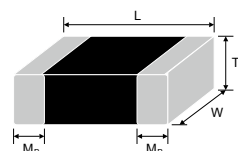
X7R/X5R

Rated vol.	D.F.	Exception of D.F.
≥ 50V	≤ 2.5%	≤ 3% 0603 ≥ 0.047μF; 0805 ≥ 0.18μF, 1206 ≥ 0.47μF
25V	≤ 3.5%	≤ 5% 0805 ≥ 1μF; 1210 ≥ 10μF ≤ 7% 0603 ≥ 0.33μF
16V	≤ 3.5%	≤ 5% 0402 ≥ 0.033μF; 0603 ≥ 0.15μF; 0805 ≥ 0.68μF; 1206 ≥ 2.2μF ≤ 10% 1210 ≥ 22μF; 0603 ≥ 0.68μF
10V	≤ 5.0%	≤ 10% 0603 ≥ 1μF; 0805 ≥ 2.2μF

Y5V

Rated vol.	D.F.	Exception of D.F.
≥ 50V	≤ 5.0%	7.0% 0603 ≥ 0.1μF; 0805 ≥ 0.47μF
25V	≤ 5.0%	≤ 7% 0402 ≥ 0.047μF; 0603 ≥ 0.1μF; 0805 ≥ 0.33μF; 1206 ≥ 1μF ≤ 9% 0402 ≥ 0.068μF; 0603 ≥ 0.47μF
16V (C<1.0μF)	≤ 7.0%	≤ 9% 0402 ≥ 0.068μF; 0603 ≥ 0.68μF
16V (C ≥ 1.0μF)	≤ 9.0%	≤ 12.5% 0805 ≥ 4.7μF; 1206 ≥ 10μF; 1210 ≥ 22μF; 1812 ≥ 47μF
10V	≤ 12.5%	---

DIMENSIONS



Size inch (mm)	L (mm)	W (mm)	T (mm) code	Mb min (mm)
01R5 (0402)	0.40±0.02	0.20±0.02		0.10±0.03
0201 (0603)	0.60±0.05	0.30±0.05		0.1
0402 (1005)	1.00±0.05	0.50±0.05		0.15
0603 (1608)	1.60±0.20	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+0.30/-0.10		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±0.20		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

Reference
Thickness
Description

■ General purpose capacitor series

RATING

NPO																																				
EIA Size		01R5		0201			0402				0603				0805				1206				1210				1808		1812					1825	2220	2225
Cap	VDC Code	16V	25V	10V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	50V	10V	16V	25V	50V	50V	50V	50V		
0.1pF	0R1			L	L	L	N	N	N	N																										
0.2pF	0R2	V		L	L	L	N	N	N	N																										
0.3pF	0R3	V		L	L	L	N	N	N	N																										
0.4pF	0R4	V		L	L	L	N	N	N	N																										
0.5pF	0R5	V	V	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A																		
1.0pF	1R0	V	V	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A					X													
1.2pF	1R2	V	V	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X														
1.5pF	1R5	V	V	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X														
1.8pF	1R8	V		L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X														
2.0pF	2R0	V	V	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X														
2.2pF	2R2	V		L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X				C										
2.7pF	2R7	V		L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X				C										
3.0pF	3R0	V	V	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X														
3.3pF	3R3	V		L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X				C										
3.9pF	3R9	V		L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X				C										
4.0pF	4R0	V	V	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X														
4.7pF	4R7	V		L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X				C										
5.0pF	5R0	V	V	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X														
5.6pF	5R6	V		L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X				C										
6.0pF	6R0	V	V	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X														
6.8pF	6R8	V	V	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X				C										
7.0pF	7R0	V	V																																	

MLCC

Chip R

Diode

■ General purpose capacitor series

RATING

X7R

EIA Size	01R5	0201				0402				0603				0805				1206				1210				1808	1812				1825	2220	2225	
Cap	VDC Code	10V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	50V	10V	16V	25V	50V	50V	50V	50V
100pF	101	V	L	L	L	L	N	N	N	N	S	S	S	S	X	X	X	X				X												
120pF	121		L	L	L	L	N	N	N	N	S	S	S	S	X	X	X	X				X												
150pF	151	V	L	L	L	L	N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X					C							
180pF	181		L	L	L	L	N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X					C							
220pF	221	V	L	L	L	L	N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X				M	C							
270pF	271		L	L	L	L	N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X				M	C				C			
330pF	331	V	L	L	L	L	N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X				M	C				C			
390pF	391		L	L	L	L	N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X				M	C				C			
470pF	471	V	L	L	L	L	N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X				M	C				C			
560pF	561		L	L	L	L	N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X				M	C				C			
680pF	681		L	L	L	L	N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X				M	C				C			
820pF	821		L	L	L	L	N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X				M	C				C			
1,000pF	102	V	L	L	L	L	N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	C	F	F	F
1,200pF	122		L	L	L		N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	C	F	F	F
1,500pF	152		L	L	L		N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	C	F	F	F
1,800pF	182		L	L			N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	C	F	F	F
2,200pF	222		L	L			N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	C	F	F	F
2,700pF	272		L	L			N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	C	F	F	F
3,300pF	332		L	L	L		N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	C	F	F	F
3,900pF	392		L	L			N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	C	F	F	F
4,700pF	472		L	L			N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	C	F	F	F
5,600pF	562		L				N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
6,800pF	682		L				N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
8,200pF	822		L				N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.010μF	103		L	L			N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.012μF	123						N	N	N		S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.015μF	153						N	N	N		S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.018μF	183						N	N	N		S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.022μF	223						N	N	N	N	S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.027μF	273						N	N	N		S	S	S	S	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.033μF	333						N	N	N	N	S	S	S	B	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.039μF	393						N	N	N		S	S	S	B	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.047μF	473						N	N	N	N	S	S	S	B	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.056μF	563						N	N	N	N	S	S	S	B	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.068μF	683						N	N		N	S	S	S	B	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.082μF	823						N	N			S	S	S	B	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.10μF	104						N	N	N	N	S	S	S	B	X	X	X	X	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.12μF	124										S	S	B		X	X	X	C	X	X	X	X	M	M	M	M	E	C	C	C	C	F	F	F
0.15μF	154										S	S	B		C	C	C	C	M	M	M	M	M	M	M	E	C	C	C	C	F	F	F	
0.18μF	184										S	S	B		C	C	C	C	M	M	M	M	M	M	M	E	C	C	C	C	F	F	F	
0.22μF	224						N	N	N		S	S	B	B	C	C	C	C	M	M	M	M	M	M	M	E	C	C	C	C	F	F	F	
0.27μF	274										B	B	B		C	C	C	I	M	M	M	C	M	M	M	M	F	C	C	C	C	F	F	F
0.33μF	334										B	B	B		C	C	C	I	M	M	M	C	M	M	M	C	F	C	C	C	C	F	F	F
0.39μF	394										B	B	B		C	C	C	I	M	M	M	J	P	M	M	C	F	C	C	C	C	F	F	F
0.47μF	474						N				B	B	B	B	C	C	C	I	J	J	J	P	M	M	M	C	F	C	C	C	C	F	F	F
0.56μF	564										B	B			C	C	C		J	J	J	P	C	C	C	C	F	C	C	C	C	F	F	F
0.68μF	684										B	B			C	C	C		J	J	J	P	C	C	C	C	F	C	C	C	F	F	F	F
0.82μF	824										B	B			C	C	C		J	J	J	P	C	C	C	C	F	C	C	C	F	F	F	F

MLCC

Chip R

Diode

■ General purpose capacitor series

RATING

X5R

EIA Size		01R5		0201					0402					0603				
Cap	VDC Code	6.3V	10V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
100pF	101		V			L	L	L										
120pF	121					L	L	L										
150pF	151		V			L	L	L										
180pF	181					L	L	L										
220pF	221		V			L	L	L										
270pF	271					L	L	L										
330pF	331		V			L	L	L										
470pF	471		V			L	L	L										
560pF	561					L	L	L										
680pF	681		V			L	L	L										
820pF	821					L	L	L										
1,000pF	102	V	V		L	L	L	L										
1,500pF	152		V		L	L												
2,200pF	222		V		L	L												
2,700pF	272	V	V		L	L												
3,300pF	332		V		L	L												
4,700pF	472		V		L	L												
6,800pF	682		V		L													
0.010μF	103		V	L	L	L	L											
0.022μF	223	V		L	L													
0.027μF	273			L	L						N							
0.033μF	333	V		L	L						N							
0.039μF	393			L	L						N							
0.047μF	473	V		L	L						N							
0.056μF	563			L	L					N	N							
0.068μF	683	V		L	L					N	N							
0.082μF	823			L	L				N	N	N							
0.10μF	104	V		L	L	L	L		N	N	N	N	N			S		
0.15μF	154								N	N	N	N						
0.22μF	224			L	L				N	N	N	N	N		B	B	B	B
0.27μF	274									N					B	B	B	
0.33μF	334								N	N				B	B	B	B	
0.39μF	394														B	B	B	
0.47μF	474			L					N	N	K	K	K	B	B	B	B	B
0.68μF	684								N	N				B	B	B	B	
0.82μF	824													B	B	B		

Y5V

EIA Size		0402				0603					0805				1206				1210				1812			
Cap	VDC 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	N	N				S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C
0.22μF	224	N	N			S	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C
0.33μF	334	N	N			S	S	S	S	B	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C
0.47μF	474	N	N			S	S	S	B	B	X	X	X	X/C	X	X	X	X	M	M	M	M	C	C	C	C
0.68μF	684	N				S	S	B	B		X	X	C	C	X	X	X	X	M	M	M	M	C	C	C	C

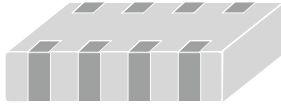
MLCC

Chip R

Diode

CAP ARRAY

■ 0612/0508 size Cap Array Series



FEATURES

- High density mounting due to mounting space saving.
- Mounting cost saving.
- Increased throughput.
- RoHS compliant.
- HALOGEM compliant.

APPLICATION

- For use as a bypass for digital and analog signal line noise.
- Computer motherboards and peripherals.
- The other common electronic circuits.

PART NUMBER

Y	4C	3	X	103	K	500	C	T
Series	Cap. Nr.	Termination pitch	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging
Y=Capacitor array	4C=4xCap	3=0.03" pitch 2=0.02" pitch	N=COG(NPO) X=X7R F=Y5V	Two significant digits followed by no. of zeros. And R is in place of decimal point.	J=±5% K=±10% M=±20% Z=-20/+80%	Two significant digits followed by no. of zeros. And R is in place of decimal point.	C=Cu/Ni/Sn	T=7" reeled

Y4C3: 4x0603 (0612)
Y4C2: 4x0402 (0508)

eg.:
103=10x103
=10,000pF
=10nF

eg.:
100=10 VDC
160=16 VDC
250=25 VDC
500=50 VDC
101=100 VDC

GENERAL ELECTRICAL DATA

Dielectric	NPO		X7R		Y5V
Size	4x0402 0508 (1220)	4x0603 0612 (1632)	4x0402 0508 (1220)	4x0603 0612 (1632)	4x0603 0612 (1632)
Capacitance*	10pF to 270pF	10pF to 470pF	1000pF to 100nF	180pF to 100nF	10nF to 100nF
Capacitance tolerance**	J (± 5%), K (± 10%)		K (± 10%), M (± 20%)		Z (-20/+80%)
Rated voltage (WVDC)	25, 50V,100V		10V, 16V, 25V,50V	16V, 25V, 50V	16V, 25V, 50V
Q/Tan δ *	Cap<30pF: Q ≥ 400+20C Cap ≥ 30pF: Q ≥ 1000		Ur=50V, ≤ 2.5% Ur=25V & 16V, ≤ 3.5% Ur=10V, ≤ 5.0%		Ur=50V, ≤ 5% Ur=16V, ≤ 7%
Insulation resistance at Ur	≥ 10GΩ		≥ 10GΩ or RxC ≥ 500ΩxF whichever is less		
Operating temperature			-55 to +125℃		-25 to +85℃
Capacitance characteristic	± 30ppm		± 15%		+30/-80%
Termination	Ni/Sn (lead-free termination)				

* Measured at 30~70% related humidity.

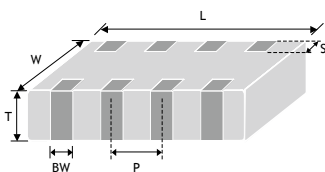
NPO: Apply 1.0±0.2Vrms, 1.0MHz±10% at the conditions of 25°C ambient temperature.

X7R: Apply 1.0±0.2Vrms, 1.0kHz±10%, at the conditions of 25°C ambient temperature.

Y5V: Apply 1.0±0.2Vrms, 1.0kHz±10%, at the conditions of 20°C 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.

DIMENSIONS



Size	inch (mm)	L (mm)	W (mm)	T (mm)	Symbol	S (mm)	BW (mm)	P (mm)
4x0402 0508 (1220)		2.00±0.15	1.25±0.15	0.85±0.10	T	0.20±0.10	0.25±0.10	0.50±0.10
4x0603 0612 (1632)		3.20±0.15	1.60±0.15	0.80±0.10	B	0.30±0.20	0.40±0.15	0.80±0.15

CAP ARRAY

■ 0612/0508 size Cap Array Series

RATING

Dielectric		NPO	X7R				NPO		X7R			Y5V		
EIA Size		4 x 0402					4 x 0603							
Cap	VDC Code	25V 50V 100V	10V	16V	25V	50V	25V	50V 100V	16V	25V	50V	16V 25V	50V	
10pF	100	T					B	B						
15pF	150	T					B	B						
22pF	220	T					B	B						
33pF	330	T					B	B						
47pF	470	T					B	B						
68pF	680	T					B	B						
100pF	101	T					B	B						
150pF	151	T					B	B						
180pF	181	T					B	B		B	B			
220pF	221	T					B	B		B	B			
270pF	271	T					B	B		B	B			
330pF	331						B	B		B	B			
470pF	471						B	B		B	B			
6,80pF	681									B	B			
1,000pF	102		T	T	T	T				B	B			
1,500pF	152		T	T	T	T				B	B			
2,200pF	222		T	T	T	T				B	B			
3,300pF	332		T	T	T	T				B	B			
4,700pF	472		T	T	T	T			B	B	B			
6,800pF	682		T	T	T	T				B	B			
0.010μF	103		T	T	T	T				B	B		B	
0.015μF	153		T	T	T				B	B	B		B	
0.022μF	223		T	T	T				B	B	B		B	
0.033μF	333		T	T	T				B				B	
0.047μF	473		T	T	T				B				B	
0.068μF	683		T	T	T				B					
0.10μF	104		T	T	T				B			B	B	

MLCC

Chip R

Diode

Packaging Dimension and Quantity

Size	Thickness(mm)/Symbol		Paper tape		Plastic tape		Tray packaged (pcs/tray)
			7" reel	13" reel	7" reel	13" reel	
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	
1808 (4520)	2.50±0.30	G			1k		
	1.25±0.10	C			2k	10k	
	1.60±0.20	E			2k	8k	
1812 (4532)	2.00±0.20	F			1k	6k	
	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		
	2.50±0.30	G			0.5k		
2211 (5728)	2.00±0.20	F			1k		
	2.50±0.30	G			0.5k		
2220 (5750)	2.00±0.20	F			1k		
	2.50±0.30	G			0.5k		
2225 (5763)	2.00±0.20	F			1k		
	2.50±0.30	G			0.5k		
2020	2.80±0.30 3.10±0.30 3.50±0.30	H R O					50pcs
3035							50pcs
3333							50pcs
3530							50pcs
3640							50pcs
3940							50pcs
4045							50pcs
4238							25pcs
4252							25pcs
4540							25pcs
5550							25pcs
5780							25pcs
5868							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
T	0.85±0.10
U	0.50±0.10
V	0.20±0.02
X	0.80±0.10
Z	0.25±0.03

MLCC

Chip R

Diode