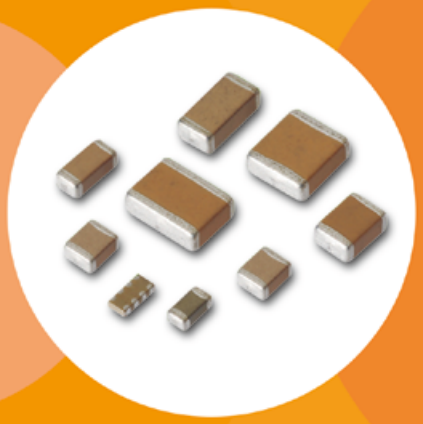
PSA

PASSIVE SYSTEM ALLIANCE

MLCC CHIP-R COIL



PDC

信昌電子陶瓷

Prosperity Dielectrics Co., Ltd.

ABOUT PDC

Milestone 歷史沿革	1990	PDC former parent company, Taiwan Cement, merged with Mei Da Mei and founded PDC in Nantou. 台泥集團購買美大美電子公司，信昌電子陶瓷正式成立。
	1995	PDC merged with Taiwan Precision Material Corporation. 信昌電子陶瓷併購台灣精密材料公司。
	2002	Public Listed in OTC. 信昌電子陶瓷正式上櫃。
	2005	PDC was strategically allied with Wasin Tech. 與華新科技 (股) 公司策略聯盟。
	2007	To be strategically allied with Frontier, and setting up new production lines, Magnetic components. 與弘電電子工業 (股) 公司策略聯盟，生產磁性材料元件。
	2008	Positioned as Specialty and Material BG in PSA Group. 集團推動 PSA 被動系統聯盟企業識別，信昌電子陶瓷定位為特殊品及材料事業群。
Core Technology 關鍵技術	1988	Manufacturing and developing ceramic dielectric materials. 生產製造圓板電容粉末、開發。
	1990	Manufacturing Multilayer Ceramic Capacitors. 生產製造積層陶瓷晶片電容。
	1995	Manufacturing Ceramic Chip Resistors and Ceramic Chip Coil 生產陶瓷晶片電阻、陶瓷晶片電感。
	2001	As the 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. 自製半導性介電瓷粉，掌握由材料至製程的完整關鍵性技術。
	2007	Manufacturing magnetic components. 生產磁性材料元件。
Brand Value 品牌價值	2001	The first supplier in Asia to get SEMKO product safety certificate. 亞洲第一家獲得 SEMKO 安全規格認證之供應商。
	2003	ISO 9001 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。
	2007	Common Wealth Magazine Top 1000 Manufacturers in Taiwan Ranked in No. 705. 天下雜誌 1000 大製造業排名第 705 名。
	2008	IECQ QC080000 HSF certificated. 獲 IECQ QC080000 HSF 驗證。
		Common Wealth Magazine Top 1000 Manufacturers in Taiwan Ranked in No. 682. 天下雜誌 1000 大製造業排名第 682 名。
	2009	Common Wealth Magazine Top 1000 Manufacturers in Taiwan Ranked in No. 677. 天下雜誌 1000 大製造業排名第 677 名。
	2012	Recognition of Winning the Silver Invention Award for Copper or Its Alloy Cofirable Dielectric Ceramics. 榮獲國家發明創作獎 - 發明獎銀牌「可與銅及其合金進行共燒製作的介電陶瓷組成物」
	2013	SMD High Voltage Chip Resistor passed UL Safety certification in 2013 電阻產品取得安規認證證書
	2015	MLCC product have obtained the IECQ certificate & the certificate of AS9100 management system for the aerospace industry. 通過 IECQ 第三方認證及 AS9100 航太工業管理系統驗證。
	2016	Aerospace Quality Management Systems AS 9100 certificated. 晶片電容取得車規第三方認證
	2019	PDC was selected fastest growing Top 100 companies in 2019 by commonwealth magazine PDC 榮獲天下雜誌 2019 年成長 100 強企業
Market Performance 市場表現		The only local manufacturer in Taiwan with the capability in specialty products includes multiple-layer ceramic capacitors, chip resistors, and coils. 國內唯一可全數提供特殊電容、電感、電阻之被動元件供應商。 The only local manufacturer in Taiwan entered the supply chain of Japan market. 國內唯一打入日本供應鏈之廠商。

Introduction

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

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

Support You Forward

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

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

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

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

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

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

Vertical integration & Complete key technology:

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

上下游垂直整合，掌握完整關鍵性技術：

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

Business Operation 經營模式分析

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

Branding Strategy 品牌經營策略

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

Keystothe Success 關鍵成功因素

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

Characteristics 企業特色

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

Notice for PDC Products

Please read this notice before using the PROSPERITY DIELECTRICS CO., LTD.. products.

- Product information in this catalog is updated in Mar. 2020. All of the contents specified herein are subjected to change without notice due to technical improvements, etc. Therefore, please check for the latest information carefully before practical application or usage of the Products.
  Please note that PROSPERITY DIELECTRICS CO., LTD. . shall not be responsible for any defective which is caused by using products without the spec instruction.
- Please contact PROSPERITY DIELECTRICS CO., LTD. . for further details of product specifications as the individual specification is available.
- Please conduct validation and verification of products in actual condition of mounting and operating environment before commercial shipment of the equipment.
- All electronic components listed in this catalog are developed, designed and intended for use in general electronics equipment.(for AV, office automation, household, office supply, information service, telecommunications, (such as mobile phone or PC) etc.). Before incorporating the components or devices into any equipment in the field such as transportation,(automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network (telephone exchange, base station) etc. which may have direct influence to harm or injure a human body, please contact PROSPERITY DIELECTRICS CO., LTD. . for more detail in advance.
- Do not incorporate the products into any equipment in fields such as aerospace, aviation, nuclear control, submarine system, military, etc. where higher safety and reliability are especially required.
- In addition, even electronic components or functional modules that are used for the general electronic equipment, if the equipment or the electric circuit require high safety or reliability function or performances, a sufficient reliability evaluation check for safety shall be performed before commercial shipment and moreover, due consideration to install a protective circuit is strongly recommended at customer's design stage.
- The contents of this catalog are applicable to the products which are purchased from our sales offices or distributors (so called "PDC's official sales channel").
- It is only applicable to the products purchased from any of PDC's official sales channel.
- Please note that PROSPERITY DIELECTRICS CO., LTD. . shall have no responsibility for any controversies or disputes that may occur in connection with a third party's intellectual property rights and other related rights arising from your usage of products in this catalog. PROSPERITY DIELECTRICS CO., LTD. . grants no license for such rights.
- The information of this specification is for reference. For more detailed specification, please refer to the official qualified data.

有關本公司產品的注意事項

請務必在使用本公司產品目錄之前閱讀。

- 本注意事項中記載的內容是2020年3月現在的內容。本產品目錄記載的內容由於產品的改良等原因發生變更時，恕不另行通知。在您定購我司產品之前請確認最新的產品資訊。
  當您於《產品規格書》以外使用我司產品時，所引起應用設備的瑕疵我司將不承擔任何責任。
- 有關詳細產品規格我們準備有《產品規格書》，請向我司諮詢相關事宜。
- 在您使用我司產品時，請務必進行應用設備實裝狀態以及應用產品實際使用環境下的測評。
- 本目錄中電子零組件，適用於一般電子設備。『AV設備，OA設備，家電及辦公設備，資訊/通訊設備（手機，電腦等）』當您計畫把本產品目錄中記載的產品使用於可能會危及第三方 生命安全的應用設備時，請務必提前與我公司取得聯繫，針對產品資訊加以確認。
  【運輸用設備（火車控制設備，船舶控制設備等），交通用信號設備，防災設備，醫療用設備，公共性 高的資訊通信設備..等（電話程式控制交換機，電話，無線電，電視信號等基地局）】另外，請不要在要求高度安全性，可靠性的應用設備上使用本產品目錄中記載的產品。【航太 設備，航空設備，核控制設備，用於海底的設備，軍事設備等】同時，應用於安全性，可靠性要求較高的一般電子設備/電路時，請充分進行安全性測評，必要時請在設計過程中追加保護電路。
- 本目錄中所記載的內容適用于透過我司營業據點，銷售子公司，正式銷售代理商（即正規銷售管道）購買的我司產品。通過其他管道所購買的我司產品不在適用範圍之內。
- 由於使用本目錄記載的產品引起的有關第三方智慧財產權的衝突，我司概不負責。本產品目錄不代表相關權利的實施許諾。
- 內部記載之產品規格僅提供參考，實際規格請依照我司標準承認書為準。

Multilayer Ceramic Chip Capacitors

MLCC

Chip R

Coil

MLCC-Contents

FK-FH **3**

Safety Certified capacitor series (X1/Y2 & X2)

FV **5**

Extra High Voltage Capacitor Series (≥1KV)

FM **8**

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

FP **14**

Anti-Bend (Soft termination) Capacitor Series

FR **21**

High Reliability for Industrial Grade

FE **28**

Mega cap Stacked Capacitors Series

FJ **30**

Anti-Arcing High-Voltage Multilayer Ceramic Chip Capacitors

MT **33**

Automotive Capacitor Qualified to AEC-Q200

MG **38**

Automotive Caps without AEC-Q200 Certification

FS **42**

High Capacitance Capacitor Series (≥1μF)

RF **46**

Ultra High Q & Low ESR Capacitor Series

FN **48**

Genenal purpose Capacitor Series

PACKAGING DIMENSION AND QUANTITY **52**

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

FEATURES

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

APPLICATION

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

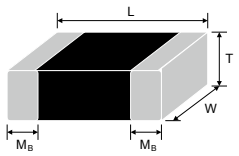
PART NUMBER

FK	21	X	102	K	502	E	G	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Impulse voltage	Packaging	Thickness	Control Code
FK Safety X1 & Y2 series **FH** Safety X2 series	**06** 1206 (3216) **08** 1808 (4520) **12** 1812 (4532) **21** 2211 (5728) **20** 2220 (5750)	**N** COG(NPO) **X** X7R	**102**=10x10^2 =1000pF **100**=10x10^0 =10pF	**J**= ±5% **K**=±10% **M**=±20%	**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

GENERAL ELECTRICAL DATA

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

DIMENSIONS



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

FK-FH

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

RATING

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

• * Surface coating only

■ Extra High Voltage Capacitor Series (≥1KV)

FEATURES

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

APPLICATION

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

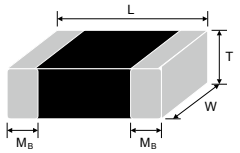
PART NUMBER

FV	31	X	103	K	102	E	E	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
High Voltage Series High voltage application with ≧ 1KVdc	**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	**102**=10x10^2 =1000pF **100**=10x10^0 =10pF	**J**= ±5% **K**=±10% **M**=±20%	**102**=1000V **152**=1500V **202**=2000V **302**=3000V **402**=4000V	**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, 2220, 2225		0805,1206, 1210, 1808, 1812, 1825, 2211, 2220, 2225
Rated voltage (WVDC)	1KV, 1.5KV, 2KV, 3KV,4KV		1KV, 1.5KV, 2KV, 3KV,4KV
Capacitance range*	1.5pf ~ 10nF		100pF ~ 220nF
Capacitance tolerance	Cap≤5pF: 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.	≤2.5%
	Cap<30pF:	Q≥400+20C	
	Cap≥30pF:	Q≥1000	
Capacitance & Tan δ Test Condition	Measured at the condition of 30~70% related humidity.		
	for 25℃ at ambient temperature		Preconditioning for Class II MLCC: Perform a heat treatment at 150±10℃ for 1 hour, then leave in ambient condition for 24±2 hours before measurement.
	Cap. Rang	Test Condition	Apply 1.0±0.2Vrms, 1.0kHz±10%, at 25℃ ambient temperature.
	Cap≤1000pF	1.0±0.2Vrms, 1.0MHz±10%	
	Cap > 1000pF	1.0±0.2Vrms, 1.0kHz±10%	
Insulation resistance	≥10GΩ or R・C≥ 500Ω-F whichever is smaller		≥10GΩ or R・C≥100Ω-F whichever is smaller
Operating temperature	-55 to +125℃		
Temperature coefficient	±30ppm / ℃		±15%
Termination	Ag (or Cu)/Ni/Sn or Au (lead-free termination)		

DIMENSIONS



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

■ Extra High Voltage Capacitor Series (≥1KV)

RATING

COG (NPO)

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

■ Extra High Voltage Capacitor Series (≥1KV)

RATING

X7R

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

• * Surface coating only

FM

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

FEATURES

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

APPLICATION

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

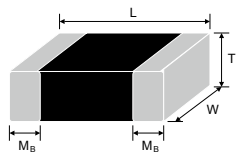
PART NUMBER

FM	31	X	471	K	251	E	C	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
Medium Voltage Series 100V ≦ Rated Voltage ≦ 630V	**15** 0402 (1005) **18** 0603 (1608) **21** 0805 (2012) **31** 1206 (3216) **32** 1210 (3225) **42** 1808 (4520) **43** 1812 (4532) **46** 1825 (4563) **55** 2220 (5750) **56** 2225 (5763)	**N** COG(NPO) **X** X7R **F** Y5V	**102**=10x10^2 =1000pF **100**=10x10^0 =10pF	**J**=±5 % **K**=±10 % **M**=±20 % **Z**= -20/+80%	**101**=100V **201**=200V **251**=250V **501**=500V **631**=630V	**E**= Tape and 7" Reel, Embossed Tape **P**= Tape and 7" Reel, Paper Tape **L**= Tape and 13" Reel, Embossed **G**= Tape and 13"Reel, Paper Tape	Reference Thickness Description	**G**=RoHS Compliant **Q**= Surface Coating (Size 1206~2225)

GENERAL ELECTRICAL DATA

Dielectric	COG(NPO)		X7R	Y5V
Size	0402, 0603, 0805, 1206, 1210, 1808 ,1812, 1825, 2220, 2225		0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225	0805, 1206, 1210, 1812
Rated voltage (WVDC)	100V, 200V, 250V, 500V, 630V		100V, 200V,250V,500V, 630V	100V, 200V, 250V
Capacitance range*	0.5pF ~ 100nF		100pF ~ 820nF	10nF ~ 680nF
Capacitance tolerance	Cap≤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%)	M (±20%) Z (-20/+80%)
Tan δ	Cap. Rang	Q Spec.	≤ 2.5%~≤ 10.0%	≤5%
	Cap<30pF:	Q≥400+20C		
	Cap≥30pF:	Q≥1000		
Capacitance & Tan δ Test Condition	Measured at the condition of 30~70% related humidity.			
	for 25℃ at ambient temperature		Preconditioning for Class II MLCC: Perform a heat treatment at 150±10℃ 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℃ ambient temperature.	1.0±0.2Vrms, 1.0kHz±10%, at 20℃ ambient temperature.
	Cap≤1000pF	1.0±0.2Vrms, 1.0MHz±10%		
	Cap > 1000pF	1.0±0.2Vrms, 1.0kHz±10%		
Insulation resistance at Ur	≥10GΩ or R・C≥ 500Ω-F whichever is smaller		≥10GΩ or R・C≥100Ω-F whichever is smaller	
Operating temperature	-55 to +125℃			-25 to +85℃
Capacitance characteristic	±30ppm / ℃		±15%	+30/-80%
Termination	Cu (or Ag)/Ni/Sn or Au (lead-free termination)			

DIMENSIONS



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

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

RATING

COG(NPO)

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

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

RATING

COG(NPO)

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

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

RATING

X7R

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

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

RATING

		X7R																			
Size		1812					1825					2220					2225				
Cap	Code	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V	100V	200V	250V	500V	630V
100pF	101																				
120pF	121																				
150pF	151																				
180pF	181																				
220pF	221																				
270pF	271	C	C	C	C	C															
330pF	331	C	C	C	C	C															
390pF	391	C	C	C	C	C															
470pF	471	C	C	C	C	C															
560pF	561	C	C	C	C	C															
680pF	681	C	C	C	C	C															
820pF	821	C	C	C	C	C															
1000pF	102	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1200pF	122	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1500pF	152	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1800pF	182	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
2200pF	222	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
2700pF	272	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
3300pF	332	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
3900pF	392	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
4700pF	472	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
5600pF	562	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
6800pF	682	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
8200pF	822	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.010μF	103	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.012μF	123	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.015μF	153	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.018μF	183	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.022μF	223	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.027μF	273	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.033μF	333	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.039μF	393	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.047μF	473	C	C	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.056μF	563	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.068μF	683	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.082μF	823	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.10μF	104	C	C	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.12μF	124	C	C	C	G	G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.15μF	154	C	F	F	G	G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.18μF	184	C	F	F	G	G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.22μF	224	C	F	F	G	G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.27μF	274	C	F	F	G		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.33μF	334	C	F	F	G		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.39μF	394	C	F	F	G		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.47μF	474	F	F	F	G		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
0.56μF	564	F	G	G			F	F	F	G	G	F	F	F			F	F	F	F	F
0.68μF	684	F	G	G			F	F	F			F	F	F			F	F	F		
0.82μF	824	F	G	G			F	F	F			F	F	F			F	F	F		
1.00μF	105																				
1.20μF	125																				
1.50μF	155																				
1.80μF	185																				
2.20μF	225																				
2.70μF	275																				
3.30μF	335																				
3.90μF	395																				
4.70μF	475																				
5.60μF	565																				
6.80μF	685																				
8.20μF	825																				
10.0μF	106																				

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

RATING

		Y5V											
Size		0805			1206			1210			1812		
Cap	Code	100V	200V	250V	100V	200V	250V	100V	200V	250V	100V	200V	250V
0.01μF	103	B	B	B	B	B	B	C	C	C	D	D	D
0.015μF	153	B	B	B	B	B	B	C	C	C	D	D	D
0.022μF	223	B	B	B	B	B	B	C	C	C	D	D	D
0.033μF	333	B	B	B	B	B	B	C	C	C	D	D	D
0.047μF	473	B	B	B	B	B	B	C	C	C	D	D	D
0.068μF	683	B	B	B	B	B	B	C	C	C	D	D	D
0.1μF	104	B			B	B	B	C	C	C	D	D	D
0.15μF	154				C	C	C	C	C	C	D	D	D
0.22μF	224				C			C			D	D	D
0.33μF	334							C			D	D	D
0.47μF	474										D	D	D
0.68μF	684										D	D	D
1μF	105												

FP

■ Anti-Bend (Soft termination) Capacitor Series

FEATURES

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

APPLICATION

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

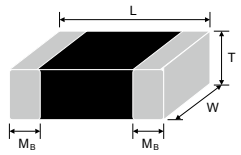
PART NUMBER

FP	32	X	225	K	101	E	G	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
Anti-bend General Purpose	**15** 0402(1005) **18** 0603 (1608) **21** 0805 (2012) **31** 1206 (3216) **32** 1210 (3225) **42** 1808 (4520) **43** 1812 (4532) **46** 1825 (4563) **55** 2220 (5750) **56** 2225 (5763)	**N** COG(NPO) **X** X7R	**106**=10x10^6 =10μF **100**=10x10^0 =10pF **R47**=0.47pF **0R5**=0.5pF	**J**= ±5% **K**=±10 % **M**=±20 %	**6R3**=6.3V **100**=10V **160**=16V **250**=25V **500**=50V **101**=100V **201**=200V **251**=250V **501**=500V **631**=630V **102**=1000V **152**=1500V **202**=2000V **302**=3000V **402**=4000V	**E**= Tape and 7" Reel, Embossed Tape **P**= Tape and 7" Reel, Paper Tape **L**= Tape and 13" Reel, Embossed **G**= Tape and 13"Reel, Paper Tape	Reference Thickness Description	**G**=RoHS Compliant

GENERAL ELECTRICAL DATA

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

DIMENSIONS



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

■ Anti-Bend (Soft termination) Capacitor Series

RATING

NPO

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

FP

■ Anti-Bend (Soft termination) Capacitor Series

RATING

NPO

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

■ Anti-Bend (Soft termination) Capacitor Series

RATING

NPO

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

■ Anti-Bend (Soft termination) Capacitor Series

RATING

X7R

Size		0402					0603						0805										1206										
Cap	Code	6.3V	10V 16V	25V	50V	100V	6.3V	10V 16V	25V	50V	100V	200V 250V	6.3V	10V	16V	25V	50V	100V	200V	250V	500V 630V	1KV	6.3V	10V	16V	25V	50V	100V	200V 250V	500V 630V	1KV	1.5KV	2KV
100pF	101		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X							C	C	C	C	C
120pF	121		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X							C	C	C	C	C
150pF	151		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X		C	C	C	C	C	C	C	C	C	C
180pF	181		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X		C	C	C	C	C	C	C	C	C	C
220pF	221		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X		C	C	C	C	C	C	C	C	C	C
270pF	271		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X		C	C	C	C	C	C	C	C	C	C
330pF	331		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X		C	C	C	C	C	C	C	C	C	C
390pF	391		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X		C	C	C	C	C	C	C	C	C	C
470pF	471		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X		C	C	C	C	C	C	C	C	C	C
560pF	561		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X		C	C	C	C	C	C	C	C	C	C
680pF	681		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X		C	C	C	C	C	C	C	C	C	C
820pF	821		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X		C	C	C	C	C	C	C	C	C	C
1000pF	102		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X		C	C	C	C	C	C	C	C	C	C
1200pF	122		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	X		C	C	C	C	C	C	C	C	E	E
1500pF	152		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	C		C	C	C	C	C	C	C	C	E	E
1800pF	182		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	C		C	C	C	C	C	C	C	C	E	E
2200pF	222		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X	C		C	C	C	C	C	C	C	C	E	E
2700pF	272		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X			C	C	C	C	C	C	C	C	E	E
3300pF	332		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X			C	C	C	C	C	C	C	C	E	E
3900pF	392		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	X			C	C	C	C	C	C	C	C	E	
4700pF	472		K	K	K	K		S	S	S	S	B		C	C	C	C	C	C	C	C			C	C	C	C	C	C	C	C	E	
5600pF	562		K	K	K			S	S	S	S	B		C	C	C	C	C	C	C	C			C	C	C	C	C	C	C	C	E	
6800pF	682		K	K	K			S	S	S	S	B		C	C	C	C	C	C	C	C			C	C	C	C	C	C	C	C	E	
8200pF	822		K	K	K			S	S	S	S	B		C	C	C	C	C	C	C	C			C	C	C	C	C	C	C	C	E	
0.010μF	103		K	K	K			S	S	S	S	B		C	C	C	C	C	C	C	C			C	C	C	C	C	C	C	C	E	
0.012μF	123		K	K				S	S	S	B			C	C	C	C	C	C	C	C			C	C	C	C	C	C	C	E		
0.015μF	153		K	K				S	S	S	B			C	C	C	C	C	C	C	C			C	C	C	C	C	C	C	E		
0.018μF	183		K	K				S	S	S	B			C	C	C	C	C	C	C	C			C	C	C	C	C	C	C			
0.022μF	223		K	K				S	S	S	B			C	C	C	C	C	C	C	C			C	C	C	C	C	C	E			
0.027μF	273		K	K				S	S	S	B			C	C	C	C	C	C	C	C			C	C	C	C	C	C	E			
0.033μF	333		K	K				S	S	B	B			C	C	C	C	C	C	C	C			C	C	C	C	C	E	E			
0.039μF	393		K	K				S	S	B	B			C	C	C	C	C	C	C				C	C	C	C	C	E	E			
0.047μF	473		K	K				S	S	B	B			C	C	C	C	C	C	C				C	C	C	C	C	E	E			
0.056μF	563		K					S	S	B	B			C	C	C	C	C	C	C				C	C	C	C	C	E	E			
0.068μF	683		K					S	S	B	B			C	C	C	C	C	C	C				C	C	C	C	C	E				
0.082μF	823		K					S	S	B	B			C	C	C	C	C	C					C	C	C	C	C	E				
0.100μF	104	K	K					S	S	B	B			C	C	C	C	C	C					C	C	C	C	C	E				
0.120μF	124							S	B					C	C	C	C	I						C	C	C	C	C					
0.150μF	154							S	B					C	C	C	C	I						M	M	M	M	E					
0.180μF	184							S	B					C	C	C	C	I						M	M	M	M	E					
0.220μF	224							S	B	B				C	C	C	C	I						M	M	M	M	E					
0.270μF	274						B	B	B					I	I	I	I							M	M	M	C	E					
0.330μF	334							B	B					I	I	I	I							M	M	M	C	E					
0.390μF	394							B	B					I	I	I	I							M	M	J	P	E					
0.470μF	474						B	B	B					I	I	I	I	I						J	J	J	P	E					
0.560μF	564							B						I	I	I								J	J	J	P	P					
0.680μF	684						B	B						I	I	I								J	J	J	P	P					
0.820μF	824							B						I	I	I								J	J	J	P	P					
1μF	105						B	B						I	I	I	I							J	J	J	P	P					
1.5μF	155													I	I	I							J	J	J	P	P					
2.20μF	225												I	I	I	I							J	J	J	P	P					
3.3μF	335																							P	P	P							
4.7μF	475														I								P	P	P	P							
10μF	106																						P	P	P	P							
12μF	126																																
15μF	156																																
18μF	186																																
22μF	226																							P									
47μF	476																																

■ Anti-Bend (Soft termination) Capacitor Series

RATING

X7R

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

• * Surface coating only

■ Anti-Bend (Soft termination) Capacitor Series

RATING

X7R

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

• * Surface coating only

■ High Reliability for Industrial Grade

FEATURES

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

APPLICATION

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

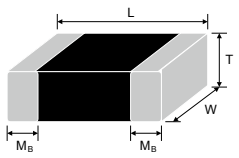
PART NUMBER

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

GENERAL ELECTRICAL DATA

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

DIMENSIONS



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

■ High Reliability for Industrial Grade

RATING

NPO

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

■ High Reliability for Industrial Grade

RATING

NPO

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

FR

■ High Reliability for Industrial Grade

RATING

NPO

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

■ High Reliability for Industrial Grade

RATING

X7R

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

■ High Reliability for Industrial Grade

RATING

X7R

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

• * Surface coating only

■ High Reliability for Industrial Grade

RATING

X7R

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

• * Surface coating only

■ Mega cap Stacked Capacitors

FEATURES

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

APPLICATION

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

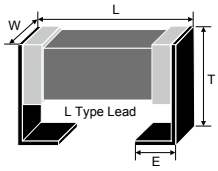
PART NUMBER

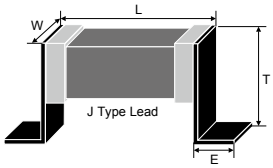
FE	2H	X	106	K	500	L	F	K	M
PDC Family	Chip Q'ty and size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code	Secial Code
Stacked Capacitors Series	The first digit : # of chips in stack Second digit code : chip size (below) **A** 1210 (3225) **C** 1812 (4532) **G** 1825 (4563)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

GENERAL ELECTRICAL DATA

Dielectric	C0G		X7R	
Size	1210, 1812, 1825, 2220, 2225		1210, 1812, 1825, 2220, 2225	
Rated voltage (WVDC)	50V, 100V, 200V, 250V, 500V, 630V		50V, 100V, 200V, 250V, 500V, 630V	
Capacitance range*	220nF Max.		47μF Max.	
Capacitance tolerance	J (±5%), K (±10%), M (±20%)			
Tan δ *e)	Cap. Rang	Q Spec.	≤2.5% ~ ≤10%	
	Cap<30pF:	Q≥400+20C		
	Cap≥30pF:	Q≥1000		
Capacitance & Tan δ Test Condition	Measured at the condition of 30~70% related humidity			
	for 25℃ at ambient temperature		Preconditioning for Class II MLCC: Perform a heat treatment at 150±10℃ for 1 hour, then leave in ambient condition (25℃) for 24±2 hours before measurement	
	Cap. Rang	Test Condition	Cap. Rang	Test Condition
	Cap≤1000pF	1.0±0.2Vrms, 1.0MHz±10%	Cap≤10μF	1.0±0.2Vrms, 1.0KHz±10%
	Cap>1000pF	1.0±0.2Vrms, 1.0KHz±10%	Cap>10μF	0.5±0.2Vrms, 120KHz±20%
Insulation resistance at 500Vdc for 60 seconds	≥10GΩ or RxC≥ 500Ω-F whichever is smaller		≥10GΩ or RxC≥100Ω-F whichever is smaller	
Operating temperature	- 55 to + 125℃			
Capacitance characteristic	±30ppm / ℃		±15%	
Termination	L / J / Straight type lead			

DIMENSIONS





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

■ Mega cap Stacked Capacitors

CAPACITANCE RANGE (MAX.)

C0G

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

X7R

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

- (M) means M tolerance only.

RATING

TABLE 1

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

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

■ Anti-Arcing High-Voltage Multilayer Ceramic Chip Capacitors

FEATURES

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

APPLICATION

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

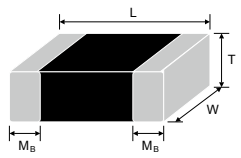
PART NUMBER

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

GENERAL ELECTRICAL DATA

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

DIMENSIONS



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

■ Anti-Arcing High-Voltage Multilayer Ceramic Chip Capacitors

RATING

NPO

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

■ Anti-Arcing High-Voltage Multilayer Ceramic Chip Capacitors

RATING

X7R

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

■ Automotive Capacitor Qualified to AEC-Q200

FEATURES

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

APPLICATION

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

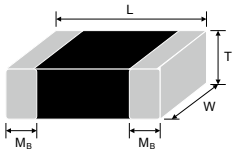
PART NUMBER

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

GENERAL ELECTRICAL DATA

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

DIMENSIONS



Size inch (mm)	**L** (mm)	**W** (mm)	**T** (mm) **code**	**M_B min** (mm)
0201 (0603)	0.6.0±0.03	0.30±0.03	Reference Thickness Description	0.15±0.05
0402 (1005)	1.00±0.10	0.50±0.10		0.25+0.05/-0.10
0603 (1608)	1.60±0.15	0.80±0.15		0.40±0.15
0805 (2012)	2.00±0.20	1.25±0.20		0.50±0.20
1206 (3216)	3.20±0.20	1.60±0.20		0.60±0.20
1210 (3225)	3.20±0.30	2.50±0.30		0.75±0.35

■ Automotive Capacitor Qualified to AEC-Q200

RATING

C0G

Size		0201					0402					0603							0805								
Cap(pF)	Code	10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	200V	250V	10V	16V	25V	50V	100V	200V	250V	500V	630V
0.1	0R1	L	L	L	L	L	N	N	N	N	N																
0.2	0R2	L	L	L	L	L	N	N	N	N	N																
0.3	0R3	L	L	L	L	L	N	N	N	N	N																
0.4	0R4	L	L	L	L	L	N	N	N	N	N																
0.5	0R5	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
0.6	0R6	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
0.7	0R7	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
0.8	0R8	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
0.9	0R9	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
1	1R0	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
1.2	1R2	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
1.5	1R5	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
1.8	1R8	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
2.2	2R2	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
2.7	2R7	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
3.3	3R3	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
3.9	3R9	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
4.7	4R7	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
5.6	5R6	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
6.8	6R8	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
8.2	8R2	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
10	100	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
12	120	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
15	150	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
18	180	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
22	220	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
27	270	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
33	330	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
39	390	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
47	470	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
56	560	L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
68	680	L	L	L	L		N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	A	A
82	820	L	L	L	L		N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	A	A	X	X
100	101	L	L	L	L		N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	X	X	X	X
120	121	L	L	L	L		N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	X	X	C	C
150	151						N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	C	C	C	C
180	181						N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	C	C	C	C
220	221						N	N	N	N	N	S	S	S	S	S	S	S	A	A	A	A	A	C	C	C	C
270	271						N	N	N	N		S	S	S	S	S	B	B	A	A	A	A	A	C	C	C	C
330	331						N	N	N	N		S	S	S	S	S	B	B	A	A	A	A	A	C	C	C	C
390	391						N	N	N	N		S	S	S	S	S	B	B	X	X	X	X	X	C	C	C	C
470	471						N	N	N	N		S	S	S	S	S	B	B	X	X	X	X	X	C	C	I	I
560	561						N	N	N	N		S	S	S	S	S			X	X	X	X	X	C	C	I	I
680	681						N	N	N	N		S	S	S	S	S			X	X	X	X	X	C	C	I	I
820	821						N	N	N	N		S	S	S	S	S			X	X	X	X	X	C	C	I	I
1000	102						N	N	N	N		S	S	S	S	S			X	X	X	X	X	C	C	I	I
1200	122											B	B	B	B				X	X	X	X	X	C	C		
1500	152											B	B	B	B				X	X	X	X	X	C	C		
1800	182											B	B	B	B				X	X	X	X	X	C	C		
2200	222											B	B	B	B				X	X	X	X	X	C	C		
2700	272											B	B	B	B				C	C	C	C	C				
3300	332											B	B	B	B				C	C	C	C	C				
3900	392																		C	C	C	C	C				
4700	472																		C	C	C	C	C				
5600	562																		C	C	C	C	C				
6800	682																		C	C	C	C	C				
8200	822																		C	C	C	C					
10000	103																		C	C	C	C					
12000	123																										
15000	153																										
18000	183																										
22000	223																										
27000	273																										
33000	333																										

■ Automotive Capacitor Qualified to AEC-Q200

RATING

NPO

Size		1206										1210									
Cap(pF)	Code	10V	16V	25V	50V	100V	200V	250V	500V	630V	1000V	10V	16V	25V	50V	100V	200V	250V	500V	630V	1000V
0.1	0R1																				
0.2	0R2																				
0.3	0R3																				
0.4	0R4																				
0.5	0R5																				
0.6	0R6																				
0.7	0R7																				
0.8	0R8																				
0.9	0R9																				
1	1R0																				
1.2	1R2	X	X	X	X	X	X	X	X	X											
1.5	1R5	X	X	X	X	X	X	X	X	X	X										
1.8	1R8	X	X	X	X	X	X	X	X	X	X										
2.2	2R2	X	X	X	X	X	X	X	X	X	X										
2.7	2R7	X	X	X	X	X	X	X	X	X	X										
3.3	3R3	X	X	X	X	X	X	X	X	X	X										
3.9	3R9	X	X	X	X	X	X	X	X	X	X										
4.7	4R7	X	X	X	X	X	X	X	X	X	X										
5.6	5R6	X	X	X	X	X	X	X	X	X	X										
6.8	6R8	X	X	X	X	X	X	X	X	X	X										
8.2	8R2	X	X	X	X	X	X	X	X	X	X										
10	100	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	M	M	M	M	M
12	120	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	M	M	M	M	M
15	150	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	M	M	M	M	M
18	180	X	X	X	X	X	X	X	X	X	X	M	M	M	M	M	M	M	M	M	M
22	220	X	X	X	X	X	X	X	X	X	C	M	M	M	M	M	M	M	M	M	M
27	270	X	X	X	X	X	X	X	X	X	C	M	M	M	M	M	M	M	M	M	M
33	330	X	X	X	X	X	X	X	X	X	C	M	M	M	M	M	M	M	M	M	M
39	390	X	X	X	X	X	X	X	X	X	C	M	M	M	M	M	M	M	M	M	M
47	470	X	X	X	X	X	X	X	X	X	C	M	M	M	M	M	M	M	M	M	M
56	560	X	X	X	X	X	X	X	X	X	C	M	M	M	M	M	M	M	M	M	M
68	680	X	X	X	X	X	X	X	X	X	C	M	M	M	M	M	M	M	M	M	M
82	820	X	X	X	X	X	X	X	X	X	C	M	M	M	M	M	M	M	M	M	M
100	101	X	X	X	X	X	X	X	X	X	C	M	M	M	M	M	M	M	M	M	C
120	121	X	X	X	X	X	X	X	X	X	C	M	M	M	M	M	M	M	M	M	C
150	151	X	X	X	X	X	X	X	X	X	C	M	M	M	M	M	M	M	M	M	C
180	181	X	X	X	X	X	X	X	X	X	E	M	M	M	M	M	M	M	M	M	C
220	221	X	X	X	X	X	X	X	X	X	E	M	M	M	M	M	M	M	M	M	E
270	271	X	X	X	X	X	X	M	M	M	E	M	M	M	M	M	M	M	M	M	E
330	331	X	X	X	X	X	X	M	M	M	E	M	M	M	M	M	M	M	M	M	E
390	391	X	X	X	X	X	X	M	M	M	E	M	M	M	M	M	M	M	M	M	E
470	471	X	X	X	X	X	M	M	M	M	E	M	M	M	M	M	M	M	M	M	E
560	561	X	X	X	X	X	M	C	C	C	E	M	M	M	M	M	M	M	M	M	E
680	681	X	X	X	X	X	M	C	C	C	E	M	M	M	M	M	M	M	M	M	E
820	821	X	X	X	X	X	M	E	E	E	E	M	M	M	M	M	M	M	M	M	E
1000	102	X	X	X	X	X	M	E	E	E	E	M	M	M	M	M	C	C	C	C	E
1200	122	X	X	X	X	X	M	E	E	E		M	M	M	M	M	C	C	C	C	
1500	152	X	X	X	X	X	C	E	E	E		M	M	M	M	M	C	C	C	C	
1800	182	X	X	X	X	X	C	E	E	E		M	M	M	M	M	C	C	C	C	
2200	222	X	X	X	X	X	C	E	E	E		M	M	M	M	M	C	C	C	C	
2700	272	X	X	X	X	X	C	E	E	E		M	M	M	M	M	C	C	C	C	
3300	332	X	X	X	X	X	C	E	E	E		M	M	M	M	M	C	C	C	C	
3900	392	X	X	X	X	X	C	E	E	E		M	M	M	M	M	C	C	C	C	
4700	472	X	X	X	X	X	C	E	E	E		M	M	M	M	M	E	E			
5600	562	X	X	X	X	X						M	M	M	M	M	E	E			
6800	682	M	M	M	M	M						M	M	M	M	M	E	E			
8200	822	C	C	C	C	C						M	M	M	M	M	E	E			
10000	103	C	C	C	C	C						M	M	M	M	M	E	E			
12000	123											C	C	C	C	C					
15000	153											C	C	C	C	C					
18000	183											F	F	F	F	F					
22000	223											F	F	F	F	F					
27000	273											F	F	F	F	F					
33000	333											F	F	F	F	F					
47000	473											F	F	F	F	F					

■ Automotive Capacitor Qualified to AEC-Q200

RATING

X7R

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

■ Automotive Capacitor Qualified to AEC-Q200

RATING

X7R

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

MG

■ Automotive Caps without AEC-Q200 Certification

FEATURES

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

APPLICATION

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

PART NUMBER

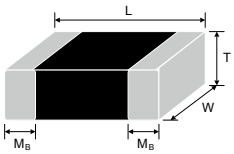
MG	31	X	471	K	251	E	C	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
Automotive Caps without AEC- Q200 certification	**03** 0201 (0603) **15** 0402 (1005) **18** 0603 (1608) **21** 0805 (2012) **31** 1206 (3216) **32** 1210 (3225) **43** 1812 (4532)	**N** NPO **B** X5R **X** X7R	**106**=10x10^6 =10μF **100**=10x10^0 =10pF	**J**= ±5% **K**=±10% **M**=±20%	**6R3**=6.3V **100**=10V **160**=16V **250**=25V **500**=50V **101**=100V **201**=200V **251**=250V	**E**= Tape and 7" Reel, Embossed Tape **P**= Tape and 7" Reel, Paper Tape **L**= Tape and 13" Reel, Embossed **G**= Tape and 13"Reel, Paper Tape	Reference Thickness Description	**G**=RoHS Compliant

GENERAL ELECTRICAL DATA

Dielectric	NPO	X7R	X5R
Size	0201, 0402, 0603, 0805, 1206, 1210, 1812		
Capacitance range*	0.1pF to 0.047μF	100pF to 2.2μF	0.068μF to 6.8μF
Capacitance tolerance**	Cap≤5pF: B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) 10pF≤Cap: F (±1%), G (±2%), J (±5%)	J (±5%), K (±10%), M (±20%)	
Rated voltage (WVDC)	10V, 16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V, 1000V		6.3V, 10V, 16V, 25V,
Tan δ *	Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000	1.0±0.2Vrms, 1.0kHz±10%, at 25℃ ambient temperature.	
Insulation resistance at Ur	≥10GΩ or RxC≥500Ω-F whichever is less		
Operating temperature	-55 to +125℃		-55 to +85℃
Capacitance characteristic	±30ppm / ℃	±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℃ 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℃ ambient temperature for X7R, X5R.
** Preconditioning for Class II MLCC: Perform a heat treatment at 150±10℃ for 1 hour, then leave in ambient condition for 24±2 hours before measurement.

DIMENSIONS



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

■ Automotive Caps without AEC-Q200 Certification

RATING

NPO

Size		0201			0402			0603				0805					1206							1210							1812		
Cap	Code	10V 16V	25V 50V	100V	10V 16V	25V 50V	100V	10V 16V	25V 50V	100V	200V 250V	10V 16V	25V 50V	100V	200V 250V	500V 630V	10V 16V	25V 50V	100V	200V	250V	500V 630V	1KV	10V 16V	25V 50V	100V	200V	250V	500V 630V	1KV	10V 16V	25V 50V	100V
0.1pF	0R1	L	L	L	N	N	N																										
0.2pF	0R2	L	L	L	N	N	N																										
0.3pF	0R3	L	L	L	N	N	N																										
0.4pF	0R4	L	L	L	N	N	N																										
0.5pF	0R5	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A																	
0.6pF	0R6	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A																	
0.7pF	0R7	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A																	
0.8pF	0R8	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A																	
0.9pF	0R9	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A																	
1.0pF	1R0	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A																	
1.2pF	1R2	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X											
1.5pF	1R5	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
1.8pF	1R8	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
2.0pF	2R0	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
2.2pF	2R2	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
2.7pF	2R7	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
3.0pF	3R0	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
3.3pF	3R3	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
3.9pF	3R9	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
4.0pF	4R0	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
4.7pF	4R7	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
5.0pF	5R0	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
5.6pF	5R6	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
6.0pF	6R0	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
6.8pF	6R8	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
7.0pF	7R0	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
8.0pF	8R0	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
8.2pF	8R2	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
9.0pF	9R0	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X										
10pF	100	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	M	M	M	M	M	M	M			C
12pF	120	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	M	M	M	M	M	M	M			C
15pF	150	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	M	M	M	M	M	M	M			C
18pF	180	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	X	M	M	M	M	M	M	M			C
22pF	220	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	C	M	M	M	M	M	M	M			C
27pF	270	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	C	M	M	M	M	M	M	M			C
33pF	330	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	C	M	M	M	M	M	M	M			C
39pF	390	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	C	M	M	M	M	M	M	M			C
47pF	470	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	C	M	M	M	M	M	M	M			C
56pF	560	L	L	L	N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	C	M	M	M	M	M	M	M			C
68pF	680	L	L		N	N	N	S	S	S	S	A	A	A	A	A	X	X	X	X	X	X	C	M	M	M	M	M	M	M			C
82pF	820	L	L		N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	X	X	X	C	M	M	M	M	M	M	M			C
100pF	101	L	L		N	N	N	S	S	S	S	A	A	A	X	X	X	X	X	X	X	X	C	M	M	M	M	M	M	C			C
120pF	121	L	L		N	N	N	S	S	S	S	A	A	A	X	C	X	X	X	X	X	X	C	M	M	M	M	M	M	C			C
150pF	151				N	N	N	S	S	S	S	A	A	A	C	C	X	X	X	X	X	X	C	M	M	M	M	M	M	C			C
180pF	181				N	N	N	S	S	S	S	A	A	A	C	C	X	X	X	X	X	X	E	M	M	M	M	M	M	C			C
220pF	221				N	N	N	S	S	S	S	A	A	A	C	C	X	X	X	X	X	X	E	M	M	M	M	M	M	E			C
270pF	271				N	N		S	S	S	B	A	A	A	C	C	X	X	X	X	M	M	E	M	M	M	M	M	M	E			C
330pF	331				N	N		S	S	S	B	A	A	A	C	C	X	X	X	X	M	M	E	M	M	M	M	M	M	E			C
390pF	391				N	N		S	S	S	B	X	X	X	C	C	X	X	X	X	M	M	E	M	M	M	M	M	M	E			C
470pF	471				N	N		S	S	S	B	X	X	X	C		X	X	X	M	M	M	E	M	M	M	M	M	M	E			C
560pF	561				N	N		S	S	S		X	X	X	C		X	X	X	M	C	C	E	M	M	M	M	M	M	E			C
680pF	681				N	N		S	S	S		X	X	X	C		X	X	X	M	C	C	E	M	M	M	M	M	M	E			C
820pF	821				N	N		S	S	S		X	X	X	C		X	X	X	M	E	E	E	M	M	M	M	M	M	E			C
1000pF	102				N	N		S	S	S		X	X	X	C		X	X	X	M	E	E	E	M	M	M	C	C	C	E	C	C	C
1200pF	122							B	B			X	X	X	C		X	X	X	M	E	E		M	M	M	C	C	C		C	C	C
1500pF	152							B	B			X	X	X	C		X	X	X	C	E	E		M	M	M	C	C	C		C	C	C
1800pF	182							B	B			X	X	X	C		X	X	X	C	E	E		M	M	M	C	C	C		C	C	C
2200pF	222							B	B			X	X	X	C		X	X	X	C	E	E		M	M	M	C	C	C		C	C	C
2700pF	272							B	B			C	C	C			X	X	X	C	E			M	M	M	C	C	C		C	C	C
3300pF	332							B	B			C	C	C			X	X	X	C	E			M	M	M	C	C	C		C	C	C
3900pF	392											C	C	C			X	X	X	C	E			M	M	M	C	C	C		C	C	C
4700pF	472											C	C	C			X	X	X	C	E			M	M	M	E	E	E		C	C	C
5600pF	562											C	C	C			X	X	X					M	M	M	E	E	E		C	C	C
6800pF	682											C	C	C			M	M	M					M	M	M	E	E	E		C	C	C
8200pF	822											C	C				C	C	C					M	M	M	E	E	E		C	C	C
0.010μF	103											C	C				C	C	C					M	M	M	E	E	F		C	C	C
0.012μF	123																							C	C	C		G	G		C	C	C
0.015μF	153																							C	C	C		G	G		C	C	C
0.018μF	183																							F	F	F					C	C	C
0.022μF	223																							F	F	F					C	C	C
0.027μF	273																							F	F	F					C	C	C
0.033μF	333																							F	F	F					C	C	C
0.039μF	393																							F	F	F							
0.047μF	473																							F	F	F							

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

■ Automotive Caps without AEC-Q200 Certification

RATING

X7R

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

■ Automotive Caps without AEC-Q200 Certification

RATING

X5R

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

FS

■ High capacitance capactior series (≥1uF)

FEATURES

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

APPLICATION

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

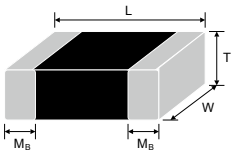
PART NUMBER

FS	55	X	106	K	500	E	G	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
High Capacitance Series Capacitor ≧ 1.0μF Series Product	**03** 0201 (0603) **15** 0402 (1005) **18** 0603 (1608) **21** 0805 (2012) **31** 1206 (3216) **32** 1210 (3225) **43** 1812 (4532) **46** 1825 (4563) **55** 2220 (5750) **56** 2225 (5763)	**B** X5R **S** X6S **X** X7R **F** Y5V **A** X7S	**106**=10x10^6 =10μF	**J**=±5 % **K**=±10 % **M**=±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

GENERAL ELECTRICAL DATA

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

DIMENSIONS



Size inch (mm)	**L** (mm)	**W** (mm)	**T** (mm) **code**	**M_B min** (mm)
0201 (0603)	0.60±0.03	0.30±0.03	Reference Thickness Description	0.15±0.05
	0.60±0.05 (Cap.≥0.68μF)	0.30±0.05 (Cap.≥0.68μF)		
	0.60±0.09 (Cap.≥1.0μF)	0.30±0.09 (Cap.≥1.0μF)		
0402 (1005)	1.00±0.10	0.50±0.10		0.25+0.05/-0.10
	1.00±0.20#1	0.50±0.20#1		
0603 (1608)	1.60±0.15	0.80±0.15		0.40±0.15
	1.60±0.20#2	0.80±0.20#2		
0805 (2012)	2.10±0.20	1.25±0.20		0.50±0.20
1206 (3216)	3.30±0.30	1.60±0.20		0.60±0.20
1210 (3225)	3.30±0.40	2.50±0.30		0.75±0.35
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

• #1 For 0402 size K thickness products.
• #2 For 0603/Cap.≥10μF or 0603(≤6.3V)/Cap.≥4.7μFor 0603(>10V)/Cap.>1μF products.

■ High capacitance capactior series (≥1uF)

RATING

X7R

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

X7R

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

■ High capacitance capactior series (≥1uF)

RATING

X7S

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

X6S

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

• * Means M Tolerance only

■ High capacitance capactior series (≥1uF)

RATING

X5R

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

Y5V

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

• * Means M Tolerance only

RF

■ 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 ±0.05pF.
- Quality improvement of telephone calls for low power loss and better performance.
- RoHS compliant.
- HALOGEM compliant.

APPLICATION

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

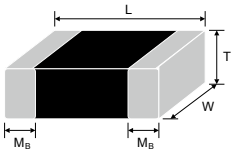
PART NUMBER

RF	21	N	101	J	251	C	T
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Termination	Packaging
Ultra High Q & Low ESR	**02** 01005 (0402) **03** 0201 (0603) **11** 0505 (1414) **15** 0402 (1005) **18** 0603 (1608) **21** 0805 (2012) **22** 1111 (2828	**N**=COG (NPO)	**0R5**=0.5pF **1R0**=1.0pF **100**=10x10^0 =10pF	**A**=±0.05pF **B**=±0.1pF **C**=±0.25pF **D**=±0.5pF **F**=±1% **G**=±2% **J**=±5%	**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, 0505, 0603, 0805, 1111
Capacitance*	0.1pF to 1000pF
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) Cap≥10pF: F (±1%), G (±2%), J (±5%)
Rated voltage (WVDC)	6.3V, 10V, 25V, 50V, 100V, 200V, 250V, 500V, 1500V
Q*	01005, 0201, 0402/25V~50V: Cap<30pF:Q≥400+20C; Cap≥30pF:Q≥1000; 0402/100V~200V, 0603, 0805, 0505, 1111: Cap<30pF:Q≥800+20C; Cap≥30pF:Q≥1400
Insulation resistance at Ur	≥10GΩ or RxC≥100Ω-F whichever is smaller
Operating temperature	-55 to +125℃
Capacitance change	±30ppm/℃ ; 0201 Cap≥22pF, ±60ppm/℃
Termination	Ni/Sn (lead-ree termination)

DIMENSIONS



Size inch (mm)	**L** (mm)	**W** (mm)	**T** (mm)	**Symbol**	**Remark**	**M_B** (mm)
01005 (0402)	0.40±0.02	0.20±0.02	0.20±0.02	V	#	0.10±0.03
0201 (0603)	0.60±0.03	0.30±0.03	0.30±0.03	L	#	0.15±0.05
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	0.50±0.10	H		
0805 (2012)	2.00±0.15	1.25±0.10	0.60±0.10	A		0.50±0.20
	2.00±0.20	1.25±0.20	0.85±0.10	T		
0505 (1414)	1.40+0.38/-0.25	1.40±0.38	1.15±0.15	J	#	0.25+0.25/-0.13
1111 (2828)	2.79+0.51/-0.25	2.79±0.38	≤1.78	G	#	0.38±0.25

■ Ultra High Q & Low ESR Capacitor Series

RATING

NPO

Size		01005		0201					0402				0603				0805				0505			1111						Tolerance
Cap	Code	16V	25V	6.3V	10V	25V	50V	100V	25V	50V	100V	200V	25V	50V	100V	250V	50V	100V	250V	500V	50V	100V	250V	50V	100V	200V	250V	500V	1.5KV	
0.1pF	0R1			L	L	L	L	L	N	N	N	N	H	H	H	H														A, B
0.2pF	0R2	V	V	L	L	L	L	L	N	N	N	N	H	H	H	H	A	A	A	A										A, B
0.3pF	0R3	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T										A, B
0.4pF	0R4	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J							A, B
0.5pF	0R5	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J							A, B, C
0.6pF	0R6	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J							A, B, C
0.7pF	0R7	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J							A, B, C
0.75pF	R75	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J							A, B, C
0.8pF	0R8	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J							A, B, C
0.9pF	0R9	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J							A, B, C
1.0pF	1R0	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	A, B, C
1.2pF	1R2	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	A, B, C
1.5pF	1R5	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	A, B, C
1.8pF	1R8	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	A, B, C
2.0pF	2R0	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	A, B, C
2.2pF	2R2	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	A, B, C
2.7pF	2R7	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	A, B, C
3.0pF	3R0	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	A, B, C
3.3pF	3R3	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	A, B, C
3.9pF	3R9	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	A, B, C
4.0pF	4R0	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	A, B, C
4.7pF	4R7	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	A, B, C
5.0pF	5R0	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	A, B, C
5.6pF	5R6	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	B, C, D
6.0pF	6R0	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	B, C, D
6.8pF	6R8	V		L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	B, C, D
7.0pF	7R0	V		L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	B, C, D
8.0pF	8R0	V		L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	B, C, D
8.2pF	8R2	V		L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	B, C, D
9.0pF	9R0	V		L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	B, C, D
10pF	100	V	V	L	L	L	L	L	N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	F, G, J
12pF	120	V	V	L	L	L	L		N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	F, G, J
15pF	150	V	V	L	L	L	L		N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	F, G, J
18pF	180	V	V	L	L	L	L		N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	F, G, J
20pF	200	V	V	L	L	L	L		N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	F, G, J
22pF	220	V	V	L	L	L			N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	F, G, J
24pF	240			L	L	L			N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	F, G, J
27pF	270			L	L	L			N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	F, G, J
30pF	300			L	L	L			N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	F, G, J
33pF	330			L	L	L			N	N	N	N	S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G	G	F, G, J
36pF	360								N	N	N		S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G		F, G, J
39pF	390								N	N	N		S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G		F, G, J
43pF	430								N	N	N		S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G		F, G, J
47pF	470								N	N	N		S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G		F, G, J
56pF	560								N	N	N		S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G		F, G, J
68pF	680								N	N			S	S	S	S	T	T	T	T	J	J	J	G	G	G	G	G		F, G, J
82pF	820								N	N			S	S	S	S	T	T	T		J	J	J	G	G	G	G	G		F, G, J
100pF	101								N	N			S	S	S	S	T	T	T		J	J	J	G	G	G	G	G		F, G, J
120pF	120												S	S			T	T	T					G	G	G	G	G		F, G, J
150pF	150												S	S			T	T	T					G	G	G	G	G		F, G, J
180pF	180												S	S			T	T	T					G	G	G	G	G		F, G, J
220pF	221												S	S			T	T	T					G	G	G	G	G		F, G, J
270pF	271																							G	G	G	G	G		F, G, J
330pF	331																							G	G	G	G	G		F, G, J
390pF	391																							G	G	G	G	G		F, G, J
470pF	471																							G	G	G	G	G		F, G, J
560pF	561																							G	G	G	G	G		F, G, J
680pF	681																							G	G	G	G	G		F, G, J
820pF	821																							G	G	G	G	G		F, G, J
1000pF	102																							G	G	G	G	G		F, G, J

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

FN

■ Genenal purpose capacitor series

FEATURES

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

APPLICATION

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

PART NUMBER

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

GENERAL ELECTRICAL DATA

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

* Measured at the condition of 30~70% related humidity.
COG: Apply 1.0±0.2Vrms, 1.0MHz±10% for Cap≤1000pF and 1.0±0.2Vrms, 1.0kHz±10% for Cap>1000pF, 25℃ at ambient temperature.
X7R/X5R: Apply 1.0±0.2Vrms, 1.0kHz±10%, at 25℃ ambient temperature.
Y5V: Apply 1.0±0.2Vrms, 1.0kHz±10%, at 20℃ ambient temperature.

Note 1:

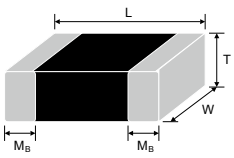
X7R/X5R

Rated vol.	D.F.	Exception of D.F.	
50V	≤2.5%	≤3.5%	0201(50V); 0603≥0.047μF; 0805≥0.1μF; 1206≥0.47μF
		≤5%	0201≥0.01uF
		≤10%	0402≥0.12μF; 0603>0.1μF
25V	≤3.5%	≤5%	0201≥0.01μF
		≤7%	0603≥0.33μF
		≤10%	0201≥0.1μF; 0402≥0.10μF; 0603≥0.47μF
		≤12.5%	0402≥0.47μF
16V	≤3.5%	≤5%	0201≥0.01μF; 0402≥0.033μF; 0603≥0.15μF; 0805≥0.68μF
		≤10%	0201≥0.1uF(0201/X7R≥0.022μF); 0402≥0.22uF; 0603≥0.68μF
10V	≤5.0%	≤10%	0201≥0.012μF; 0402≥0.33μF(0402/X7R≥0.22μF); 0603≥0.33μF
		≤15%	0201≥0.1μF
6.3V	≤10%	≤15%	0201≥0.1μF
4V	≤15%	---	---

Y5V

Rated vol.	D.F.	Exception of D.F.	
50V	≤5.0%	7.0%	0603≥0.1μF; 0805≥0.47μF
35V	≦ 7%	---	---
25V	≤5.0%	≤7%	0402≥0.047μF; 0603≥0.1μF; 0805≥0.33μF
		≤9%	0402≥0.068μF; 0603≥0.47μF
16V (C<1.0μF)	≤7.0%	≤9%	0402≥0.068μF; 0603≥0.68μF
		≤12.5%	0402≥0.22μF
10V	≤12.5%	≤20%	0402≥0.47μF
6.3V	≤20%	---	---

DIMENSIONS



Size inch (mm)	L (mm)	W (mm)	T (mm) code	M_B min (mm)
0201 (0603)	0.60±0.03	0.30±0.03	Reference Thickness Description	0.15±0.05
0402 (1005)	1.00±0.10	0.50±0.10		0.25+0.05/-0.10
0603 (1608)	1.60±0.15	0.80±0.15		0.40±0.15
0805 (2012)	2.10±0.20	1.25±0.20		0.50±0.20
1206 (3216)	3.30±0.30	1.60±0.20		0.60±0.20
1210 (3225)	3.30±0.40	2.50±0.30		0.75±0.35
1808 (4520)	4.60±0.50	2.00±0.25		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

■ Genenal purpose capacitor series

RATING

NPO

Size		0201				0402				0603				0805				1206				1210				1808		1812				1825		2220		2225	
Cap	Code	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	25V	50V	10V	16V	25V	50V	25V	50V	25V	50V	25V	50V
0.1pF	0R1	L	L	L	L	N	N	N	N																												
0.2pF	0R2	L	L	L	L	N	N	N	N																												
0.3pF	0R3	L	L	L	L	N	N	N	N	S	S	S	S																								
0.4pF	0R4	L	L	L	L	N	N	N	N	S	S	S	S																								
0.5pF	0R5	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A																				
1pF	1R0	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A				X																
1.2pF	1R2	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X																
1.5pF	1R5	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X																
1.8pF	1R8	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X																
2.2pF	2R2	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X					C	C										
2.7pF	2R7	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X					C	C										
3.3pF	3R3	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X					C	C										
3.9pF	3R9	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X					C	C										
4.7pF	4R7	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X					C	C										
5.6pF	5R6	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X					C	C										
6.8pF	6R8	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X					C	C										
8.2pF	8R2	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X					C	C										
10pF	100	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
12pF	120	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
15pF	150	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
18pF	180	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
22pF	220	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
27pF	270	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
33pF	330	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
39pF	390	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
47pF	470	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
56pF	560	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
68pF	680	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
82pF	820	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
100pF	101	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
120pF	121	L	L	L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
150pF	151			L	L	N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
180pF	181					N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
220pF	221					N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
270pF	271			L		N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
330pF	331			L		N	N	N	N	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
390pF	391			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	C	F	F	F	F	F	F
470pF	471			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	C	F	F	F	F	F	F
560pF	561			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	C	F	F	F	F	F	F
680pF	681					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	C	F	F	F	F	F	F
820pF	821					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	C	F	F	F	F	F	F
1000pF	102					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	C	F	F	F	F	F	F
1200pF	122									B	B	B	B	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
1500pF	152									B	B	B	B	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
1800pF	182									B	B	B	B	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
2200pF	222									B	B	B	B	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
2700pF	272									B	B	B	B	C	C	C	C	X	X	X	X	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
3300pF	332									B	B	B	B	C	C	C	C	X	X	M	M	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
3900pF	392									B	B	B	B	C	C	C	C	X	X	M	M	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
4700pF	472									B	B	B	B	C	C	C	C	X	X	C	C	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
5600pF	562									B	B	B	B	C	C	C	C	X	X	C	C	M	M	M	M	C	C	C	C	C	C	F	F	F	F	F	F
6800pF	682									B	B	B	B	C	C	C	C	M	M	C	C	M	M	C	C	C	C	C	C	C	C	F	F	F	F	F	F
8200pF	822									B	B	B	B	C	C	C	C	C	C	E	E	M	M	C	C	C	C	C	C	C	C	F	F	F	F	F	F
0.010μF	103									B	B	B	B	C	C	C	C	C	C	E	E	M	M	C	C	C	C	C	C	C	C	F	F	F	F	F	F
0.012μF	123													T	T	T	T	P	P	P	P	C	C	E	E	E	E	C	C	C	C	F	F	F	F	F	F
0.015μF	153													T	T	T	T	P	P	P	P	C	C	E	E	E	E	C	C	C	C	F	F	F	F	F	F
0.018μF	183													C	C	C	C	P	P	P	P	F	F	F	F	F	F	C	C	C	C	F	F	F	F	F	F
0.022μF	223													C	C	C	C	P	P	P	P	F	F	F	F	F	F	C	C	C	C	F	F	F	F	F	F
0.027μF	273																	P	P	P	P	F	F	G	G			C	C	E	E	F	F	F	F	F	F
0.033μF	333																	P	P	P	P	F	F	G	G			C	C	E	E	F	F	F	F	F	F
0.039μF	393																	P	P	P	P	F	F	G	G			G	G	G	G	F	F	F	F	F	F
0.047μF	473																	J	J	J	J	F	F	G	G			G	G	G	G	F	F	F	F	F	F
0.056μF	563																											G	G	G	G	F	F	F	F	F	F
0.068μF	683																	E	E	E	E							G	G	G	G	F	F	F	F	F	F
0.082μF	823																											G	G	G	G	F	F	F	F	F	F
0.10μF	104																											G	G	G	G	G	G	G	G	F	F
0.12μF	124																																				

■ Genenal purpose capacitor series

RATING

X7R

Size		0201					0402					0603					0805					1206				1210				1812				1825		2220		2225	
Cap	Code	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	25V	50V	25V	50V	25V	50V
100pF	101			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X			X	X														
120pF	121			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X			X	X														
150pF	151			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X	X	X	X	X														
180pF	181			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X	X	X	X	X														
220pF	221			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X	X	X	X	X			M	M										
270pF	271			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X	X	X	X	X			M	M			C	C						
330pF	331			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X	X	X	X	X			M	M			C	C						
390pF	391			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X	X	X	X	X			M	M			C	C						
470pF	471			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X	X	X	X	X			M	M			C	C						
560pF	561			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X	X	X	X	X			M	M			C	C						
680pF	681			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X	X	X	X	X			M	M			C	C						
820pF	821			L	L	L		N	N	N	N		S	S	S	S		X	X	X	X	X	X	X	X			M	M			C	C						
1000pF	102	L	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	F	F	F	F	F	F
1200pF	122	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	F	F	F	F	F	F
1500pF	152	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	F	F	F	F	F	F
1800pF	182	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	F	F	F	F	F	F
2200pF	222	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	F	F	F	F	F	F
2700pF	272	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	F	F	F	F	F	F
3300pF	332	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	F	F	F	F	F	F
3900pF	392	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	F	F	F	F	F	F
4700pF	472	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	F	F	F	F	F	F
5600pF	562	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	F	F	F	F	F	F
6800pF	682	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	F	F	F	F	F	F
8200pF	822	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	F	F	F	F	F	F
0.010μF	103	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	F	F	F	F	F	F
0.012μF	123							N	N	N	K		S	S	S	S		X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.015μF	153							N	N	N	K		S	S	S	S		X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.018μF	183							N	N	N	K		S	S	S	S		X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.022μF	223		L	L			N	N	N	N	K		S	S	S	S		X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.027μF	273							N	N	N	K		S	S	S	S		X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.033μF	333							N	N	N	K		S	S	B	B		X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.039μF	393							N	N	N	K		S	S	B	B		X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.047μF	473							N	N	N	K		S	S	B	B		X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.056μF	563							N	N	N	K		S	S	B	B		X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.068μF	683							N	N	N	K		S	S	B	B		X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.082μF	823							N	N	N	K		S	S	B	B		X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.10μF	104						N	N	N	N	K		S	S	B	B		X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.12μF	124												S	S	B			X	X	X	C	X	X	X	X	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.15μF	154												S	S	B			C	C	C	C	M	M	M	M	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.18μF	184												S	S	B			C	C	C	C	M	M	M	M	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.22μF	224						N	N	N	N			S	S	B	B		C	C	C	C	M	M	M	M	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.27μF	274											B	B	B	B		C	C	C	C	I	M	M	M	C	M	M	M	M	C	C	C	C	F	F	F	F	F	F
0.33μF	334												B	B	B	B		C	C	C	I	M	M	M	C	M	M	M	C	C	C	C	C	F	F	F	F	F	F
0.39μF	394												B	B	B			C	C	C	I	M	M	C	P	M	M	M	C	C	C	C	C	F	F	F	F	F	F
0.47μF	474						N	N				B	B	B	B	B		C	C	C	I	J	J	C	P	M	M	M	C	C	C	C	C	F	F	F	F	F	F
0.56μF	564												B	B				C	C	C	I	J	J	C	P	C	C	C	C	C	C	C	C	F	F	F	F	F	F
0.68μF	684											B	B	B				C	C	C	I	J	J	C	P	C	C	C	C	C	C	C	F	F	F	F	F	F	F
0.82μF	824												B	B				C	C	C	I	J	J	E	P	C	C	C	C	C	C	C	F	F	F	F	F	F	F

■ Genenal purpose capacitor series

RATING

X5R

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

Y5V

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

Packaging Dimension and Quantity

Size	Thickness(mm)/Symbol		Paper tape		Plastic tape		Tray packaged
			7" reel	13" reel	7" reel	13" reel	(pcs/tray)
01005(0402)	0.20±0.02	V	20K				
0201(0603)	0.30±0.03	L	15k	70k			
0402 (1005)	0.50±0.05	N	10k	50K			
	0.50 +0.02/-0.05	Q	10k	50K			
	0.50±0.20	K	10k				
0603 (1608)	0.50±0.10	U	4k				
	0.80±0.07	S	4k	15k			
	0.80+0.15/-0.10	B	4k	15k			
0805 (2012)	0.50±0.10	U	4k	15k			
	0.60±0.10	A	4k	15k			
	0.80±0.10	X	4k	15k			
	0.85±0.10	T	4k	15k			
	1.25±0.10	C			3k	10k	
	1.25±0.20	I			3k	10k	
1206 (3216)	0.80±0.10	X	4k	15k			
	0.85±0.10	T	4k	15k			
	0.95±0.10	M			3k	10k	
	1.15±0.15	J			3k	10k	
	1.25±0.10	C			3k	10k	
	1.60±0.20	E			2k	10k	
	1.60 +0.30/-0.10	P			2k	9k	
1210 (3225)	0.85±0.10	T			4k	10k	
	0.95±0.10	M			3k	10k	
	1.25±0.10	C			3k	10k	
	1.60±0.20	E			2k		
	2.00±0.20	F			1k	6k	
	2.50±0.30	G			1k		
0505 (1414)	1.15±0.15	J			3K	-	
1808 (4520)	1.25±0.10	C			2k	10k	
	1.60±0.20	E			2k	8k	
	2.00±0.20	F			1k	6k	
1812 (4532)	1.25±0.10	C			1k		
	1.60±0.20	E			1k		
	2.00±0.20	F			1k		
	2.50±0.30	G			0.5k	3k	
	2.80±0.30	H			0.5k		
1825 (4563)	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		
1111 (2828)	≤ 1.78	G			2K	-	
2020	2.80±0.30 3.10±0.30 3.50±0.30	H R O					
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
S*	3.95±0.25 (For≥2225)
T	0.85±0.10
U	0.50±0.10
V	0.20±0.02
X	0.80±0.10
X*	4.45±0.25 (For≥2225)
Z	0.25±0.03

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

Sales offices

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

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

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

Plants

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

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

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

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

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

http: //www.pdc.com.tw
Update: 2020. Mar.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Multilayer Ceramic Capacitors MLCC - SMD/SMT ***category:***

Click to view products by Prosperity ***manufacturer:***

Other Similar products are found below :

M39014/01-1467 M39014/02-1218V M39014/02-1225V M39014/02-1262V M39014/02-1301 M39014/22-0631 1210J5000102JCT 1210J2K00102KXT 1210J5000103KXT 1210J5000223KXT D55342E07B379BR-TR D55342E07B523DR-T/R 1812J1K00103KXT 1812J1K00473KXT 1812J2K00680JCT 1812J4K00102MXT 1812J5000102JCT 1812J5000103JCT 1812J5000682JCT NIN-FB391JTRF NIN-FC2R7JTRF NPIS27H102MTRF C1206C101J1GAC C1608C0G1E472JT000N C2012C0G2A472J 2220J2K00101JCT KHC201E225M76N0T00 LRC-LRF1206LF-01R025FTR1K 1812J1K00222JCT 1812J2K00102KXT 1812J2K00222KXT 1812J2K00472KXT 2-1622820-7-CUT-TAPE 2220J3K00102KXT 2225J2500824KXT CCR07CG103KM CGA2B2C0G1H010C CGA2B2C0G1H040C CGA2B2C0G1H050C CGA2B2C0G1H060D CGA2B2C0G1H070D CGA2B2C0G1H151J CGA2B2C0G1H1R5C CGA2B2C0G1H2R2C CGA2B2C0G1H3R3C CGA2B2C0G1H680J CGA2B2C0G1H6R8D CGA2B2X8R1H221K CGA2B2X8R1H472K CGA3E1X7R1C474K