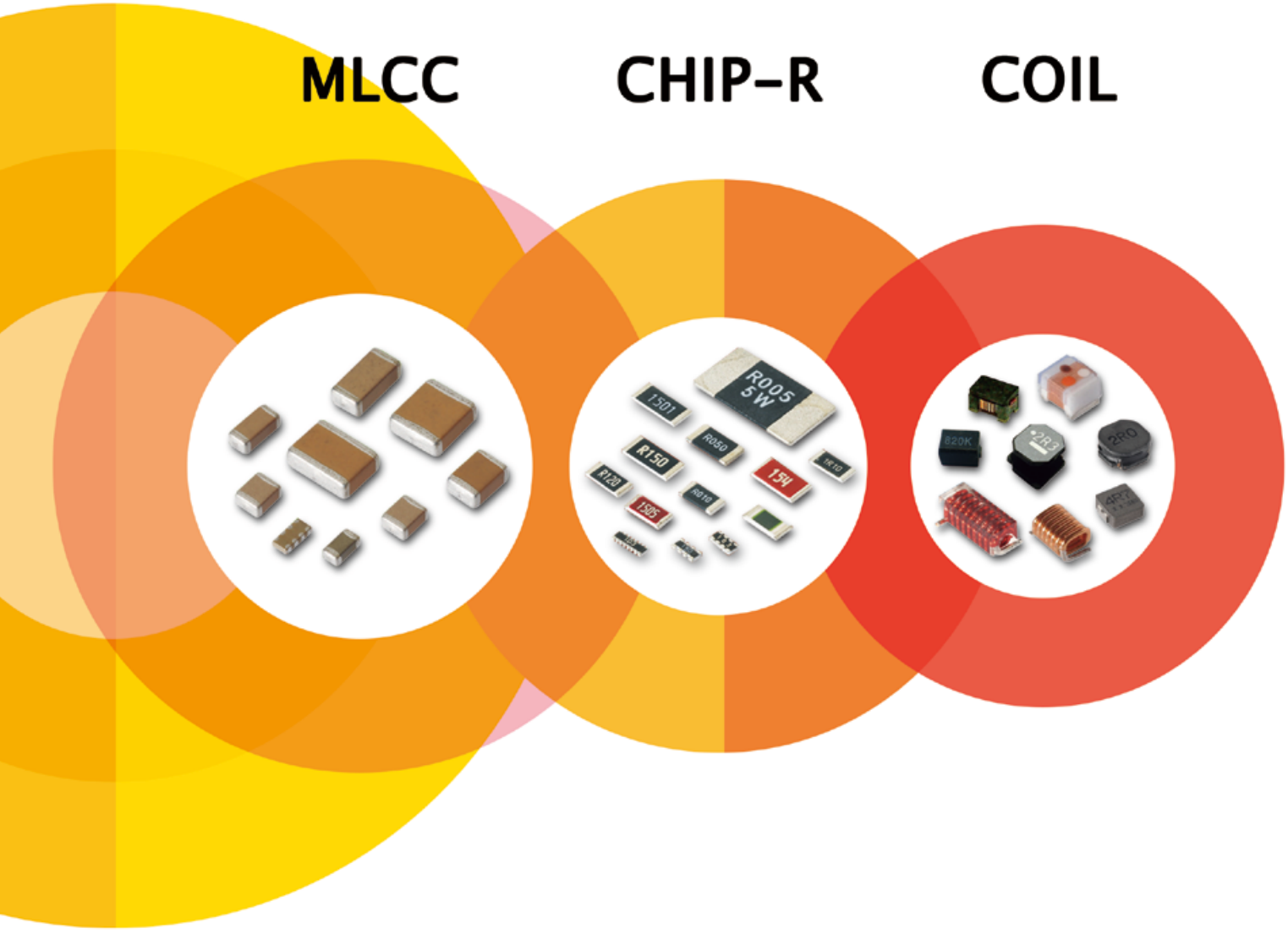
PSA

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

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Multilayer Ceramic Chip Capacitors

MLCC

Chip R

Coil

MLCC-Contents

■ 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.

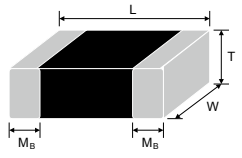
PART NUMBER

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		

■ 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.

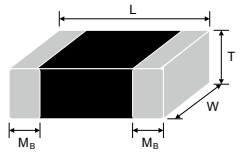
PART NUMBER

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 Cap<30pF: Cap≥30pF:	Q Spec. Q≥400+20C Q≥1000	≤2.5%
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 Cap≤1000pF Cap > 1000pF	Test Condition 1.0±0.2Vrms, 1.0MHz±10% 1.0±0.2Vrms, 1.0kHz±10%	Apply 1.0±0.2Vrms, 1.0kHz±10%, at 25℃ ambient temperature.
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

FV

■ 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
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
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
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
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
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
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
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
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
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
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
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
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
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	
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	
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	
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	
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	
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	
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	
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	
560pF	561		E				E	G	G	F	F	F			F	F	F	E		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	
820pF	821		E				E	G	G	F	F	F			F	F	F	G		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	
1200pF	122						E	F	F	F	F	F			F	E	E			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	
1800pF	182						G	G	G	F	F	F			E	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	
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.

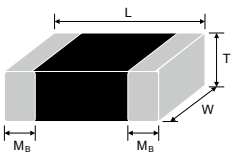
PART NUMBER

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 Cap<30pF: Cap≥30pF:	Q Spec. Q≥400+20C Q≥1000	≤ 2.5%~≤ 10.0%	≤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 Cap≤1000pF Cap > 1000pF	Test Condition 1.0±0.2Vrms, 1.0MHz±10% 1.0±0.2Vrms, 1.0kHz±10%	1.0±0.2Vrms, 1.0kHz±10%, at 25℃ ambient temperature.	1.0±0.2Vrms, 1.0kHz±10%, at 20℃ ambient temperature.
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												

■ 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

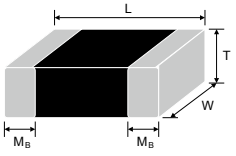
PART NUMBER

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 Cap<30pF: Cap≥30pF:	Q Spec. Q≥400+20C Q≥1000	≤2.5% ~ ≤10%	
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							

■ 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.

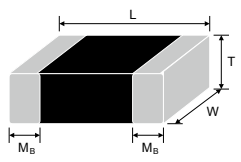
PART NUMBER

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) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) 10pF≤Cap: F (±1%), G (±2%), J (±5%), K (±10%)	J (±5%) K (±10%) M (±20%)
Tan δ	Cap. Rang / Q Spec. Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000	≤2.5% ~ ≤10%
Capacitance & Tan δ Test Condition	Measured at the condition of 30~70% related humidity. for 25℃ at ambient temperature Cap. Rang / Test Condition Cap≤1000pF: 1.0±0.2Vrms, 1.0MHz±10% Cap>1000pF,: 1.0±0.2Vrms, 1.0kHz±10%	Preconditioning for Class II MLCC: Perform a heat treatment at 150±10℃ for 1 hour, then leave in ambient condition for 24±2 hours before measurement. 1.0±0.2Vrms, 1.0kHz±10% for C≤10μF; 0.5±0.2Vrms, 120Hz±20% for C>10μF, at 25℃ ambient temperature
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																											

■ 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.

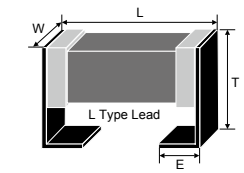
PART NUMBER

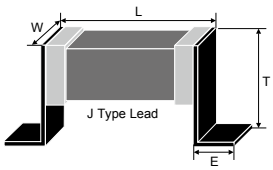
FE	2H	X	106	K	500	L	F	K	M
PDC Family	Chip Q'ty and size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code	Secial Code
Stacked Capacitors Series	The first digit : # of chips in stack Second digit code : chip size (below) **A** 1210 (3225) **C** 1812 (4532) **G** 1825 (4563) **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.

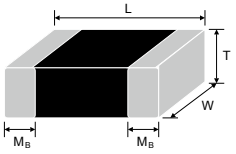
PART NUMBER

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: B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%), K (±10%)	J (±5%) K (±10%) M (±20%)
Tan δ *	Cap. Rang / Q Spec. Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000	≤2.5%
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 Cap≤1000pF: 1.0±0.2Vrms, 1.0MHz±10% Cap>1000pF,: 1.0±0.2Vrms, 1.0kHz±10%	Apply 1.0±0.2Vrms, 1.0kHz±10%, at 25℃ ambient temperature.
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
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.

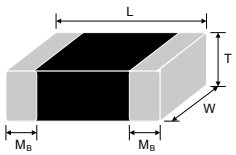
PART NUMBER

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) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%)	J (±5%) K (±10%) M (±20%)
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 Cap≤1000pF: 1.0±0.2Vrms, 1.0MHz±10% Cap>1000pF: 1.0±0.2Vrms, 1.0kHz±10%	1.0±0.2Vrms, 1.0kHz±10%, at 25℃ ambient temperature.
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

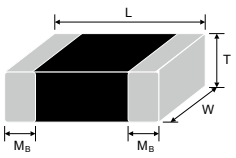
MG	31	X	471	K	251	E	C	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
Automotive Caps without AEC- Q200 certification	**03** 0201 (0603) **15** 0402 (1005) **18** 0603 (1608) **21** 0805 (2012) **31** 1206 (3216) **32** 1210 (3225) **43** 1812 (4532)	**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																	

■ 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.

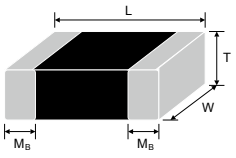
PART NUMBER

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

■ 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.

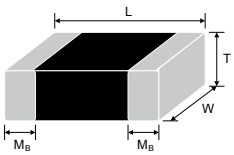
PART NUMBER

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:

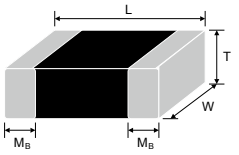
X7R/X5R

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

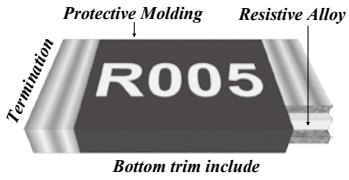
MEMO

MEMO

Chip R-Contents

FMF

■ Metal Strip Type Lead Free Current Sensing Resistors



FEATURES

- High power rating and low TCR.
- Low resistance and high precision (1%).
- Low inductance design, less than 1.0nH available.
- Inductance less than 1.0nH.
- Excellent reliability and suitable cost.
- Suitable for lead free soldering.
- High precision trimming implement.
- RoHS compliant & Halogen Free.

APPLICATION

- Switching model power supply.
- Battery pack.
- Notebook, Tablet PC.
- Test Instrument.
- Power Amplifier.

PART NUMBER

FMF	25	F	P	J	R005	-	BH
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR □	Special Code
FMF Metal strip	**06** 1206 **25** 2512	**F** = ±1% **G** = ±2% **J** = ±5%	**T** = Paper Tape 4Kpcs (For 1206) 5Kpcs (1206 _K) **P** = Plastic Tape 4Kpcs (For 2512) **Q** = Plastic tape 3 Kpcs (For 2512 3W)	**F** = 1/2W **H** = 1W **I** = 1.5W **J** = 2W **K** = 3W	**XXXX** 4 digit **Jumper** : 000_ _ : means blank.	**"–" Standard** **X** = code of 2512 R001. R002.	**LH** = Standard **BH** = Low EMF **K** = K Type AEC-Q200 **LHM** = Standard **BHM** = Low EMF

RATING

Type	Power Rating @ 70℃	Max. Working Current (Voltage)*	Max. Overload Current (Voltage)*	Alloy Type	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance (mΩ)
FMF06 1206	0.5W	12.9A (111mV)	28.9A (250mV)	Low EMF	±1%(F) ±2%(G) ±5%(J)	±70	3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25
		10.0A (111mV)	22.4A (250mV)	Standard		±50	5, 10, 15, 15.5, 18, 20, 25, 30
	1W	18.3A (158mV)	40.8A (354mV)	Low EMF		±70	3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25
		14.1A (173mV)	31.6A (387mV)	Standard		±50	5, 10, 15, 15.518,2 0, 25, 30
FMF25 2512	1W	31.6A (158mV)	70.7A (354mV)	Low EMF	±1%(F) ±2%(G) ±5%(J)	±70	1, 2, 2.5, 3, 4, 5, 10, 15, 20, 25
		18.3A (469mV)	40.8A (1049mV)	Standard		±50	3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 20, 22, 25, 30 33, 35, 40, 50, 60, 70, 75, 80, 100, *200, *220
	2W	44.7A (224mV)	100A (500mV)	Low EMF		±70	1, 2, 2.5, 3, 4, 5, 10, 15, 20, 25
		25.8A (663mV)	57.7A (1483mV)	Standard		±50	3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 20, 22, 25, 30 33, 35, 40, 50, 60, 70, 75, 80, 100, *200, *220
	3W	31.6A (245mV)	70.7A (548mV)	Low EMF		±70	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
						±50	20
		24.5A (812mV)	54.8A (1817mV)	Standard		±70	5, 6, 8, 10
						±50	12, 14, 15, 16, 18, 20, 25, 30, 33, 35, 40, 50 60, 75, 80, 100, *200, *220

Note : *200, *220 Under develop

K TYPE

Type	Power Rating @ 70℃	Max. Working Current*	Max. Overload Current* (2 sec)	Tolerance (%)	Temperauture Coefficient of Resistance (ppm/℃)**	Resistance (mΩ)***
FMF06_K	1W	31.6A	79.1A	±1%(F) ±5%(J)	±100	1
		22.4A	55.9A		±70	2
	1.5W	38.7A	96.8A		±70	1
		27.4A	68.5A		±70	2
FMF25_K	2W	63.2A	158.1A	±5%(J)	±70	0.5

Note :
(1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
RCWV：Rated Continue Working Voltage(V)，P：Rated Power(W)，R：Resistance Value(Ω)
(2) Solder-pad and trace size should be >300 mm^2 and board surface temperature should not exceed 105℃ when applying rated power
(3) * : Related number are depend on specific items only.
** : TCR Hot (+25~+155℃).
*** : Special requests and details please contact factory.

■ Metal Strip Type Lead Free Current Sensing Resistors

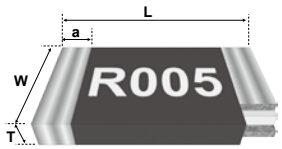
Metal Jumper

Type	Max. Working Current	Max. Overload Current	Resistance
FMF06 1206 (FMF06JTH000 –LH)	80A	100A	Max. 0.2mΩ
FMF25 2512 (FMF25JPJ000 –LH)	120A	150A	Max. 0.1mΩ

GUIDE OF CURRENT SENSING RESISTORS

Series	Product Type	Resistance Range (<1Ω)	Power Type	AEC Q200
FMF	**Metal Strip**	**0mΩ~220mΩ**	**V**	**V**
FOF	Metal Foil	2mΩ~700mΩ	V	
FBF	Metal Paste	10mΩ~ 910mΩ	V	
FPF	High Power	50mΩ~ 910mΩ	V	V
FCF-E	Normal	50mΩ~ 910mΩ		

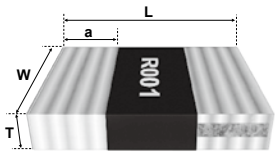
DIMENSIONS



Note. Precise data please refer detail spec. unit: mm

Type	L	W	T	a
FMF06 3m~30m	3.10±0.20	1.65±0.20	0.60±0.20	0.60±0.20
FMF25 2.5m~220m	6.20±0.20	3.25±0.20	0.60±0.20	0.80±0.20
FMF25 3m~220m 3W	6.20±0.20	3.25±0.20	0.65±0.20	0.80±0.20

For FMF25 1m~2m & K Type



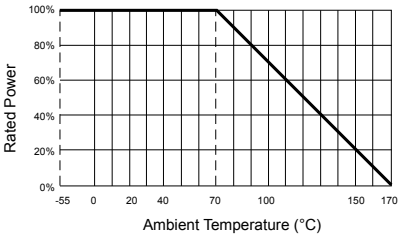
FMF25 1m~2m unit: mm

Type	L	W	T	a
FMF25 1m~2m	6.40±0.20	3.25±0.20	0.70±0.20	2.00±0.20
FMF25 1m~2m 3W	6.40±0.20	3.25±0.20	0.80±0.20	2.00±0.20

K TYPE unit: mm

Type	L	W	T	a	Marking
FMF06 1mΩ	3.20±0.15	1.60±0.15	0.32±0.15	1.10±0.25	01
FMF06 2mΩ	3.20±0.15	1.60±0.15	0.32±0.15	0.50±0.25	02
FMF25_K 0.5m	6.30±0.25	3.10±0.25	0.58±0.15	2.20±0.25	0L50

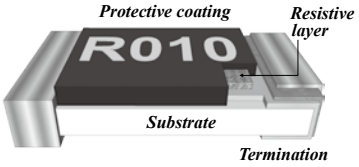
POWER DE-RATING CURVE



Operating Temperature Range: -55 to +170 deg.C

FBF

■ Metal Paste Type High Power Lead Free Chip Resistors



FEATURES

- Low resistance and high precision (1%).
- Excellent reliability and suitable cost.
- Suitable for lead free soldering.
- RoHS compliant & Halogen Free.

APPLICATION

- Consumer electronics, M/B.
- Battery pack, BTC.
- Notebook, Tablet PC.
- Portable Device, Electroni Equipment.

PART NUMBER

FBF	25	F	P	P	R100		
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR	Special Code
FBF Metal Paste	**03** 0603 **05** 0805 **06** 1206 **12** 1210 **20** 2010 **25** 2512	**F** = ±1% **G** = ±2% **J** = ±5%	**T** = Paper Tape 5Kpcs **P** = Plastic Tape 4Kpcs	**" -"** = Standard ***P** = Power Enhance	**XXXX** 4 digit	No special code- Null special code- "-"	**" Null ":** Standard

RATING

Type		Normal Type Power Rating @ 70℃	Power Type Rating Power @ 70℃	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (TCR ; ppm/℃)	Resistance Range (mΩ) Min.	Resistance Range (mΩ) Max.	Standard Resistance Values
FBF03	**0603**	1/8W	*1/4W	±1% , ±2%, ±5%	±200	40	91	E-24 Special Request Please Contact Factory
					±100	100	910	
FBF05	**0805**	1/4W	*1/2W	±1% , ±2%, ±5%	±200	10	46	
					±100	47	910	
FBF06	**1206**	1/3W	*3/4W	±1% , ±2%, ±5%	±200	10	46	
					±100	47	910	
FBF12	**1210**	2/3W	*3/4W	±1% , ±2%, ±5%	±200	10	46	
					±100	47	910	
FBF20	**2010**	3/4W	*1W	±1% , ±2%, ±5%	±200	10	46	
					±100	47	910	
FBF25	**2512**	1W	*2W	±1% , ±2%, ±5%	±200	10	46	
					±100	47	910	

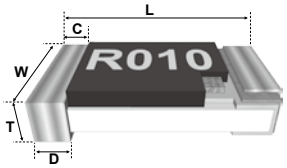
Note : (1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
RCWV：Rated Continue Working Voltage(V)，P：Rated Power(W)，R：Resistance Value(Ω)
(2) Above 2512 size, solder-pad and trace size should be >300 mm^2 and board surface temperature should not exceed 105℃ when applying full rated power.

GUIDE OF CURRENT SENSING RESISTORS

Series	Product Type	Resistance Range (<1Ω)	Power Type	AEC Q200
FMF	Metal Strip	0mΩ~220mΩ	V	V
FOF	Metal Foil	2mΩ~700mΩ	V	
FBF	**Metal Paste**	**10mΩ~910mΩ**	**V**	
FPF	High Power	50mΩ~910mΩ	V	V
FCF-E	Normal	50mΩ~910mΩ		

DIMENSIONS

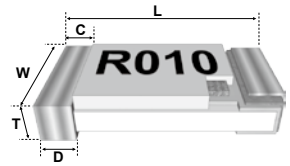
Type 1 : Resistance ≧ 40mΩ



unit: mm

Type 1	L	W	C	D	T
FBF03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FBF05	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FBF06	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FBF12	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FBF20	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
FBF25	6.30±0.20	3.10±0.20	0.60±0.25	0.90±0.25	0.60±0.15

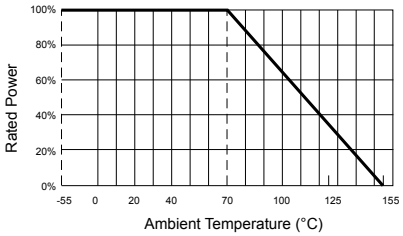
Type 2 : Resistance ≦ 39mΩ



unit: mm

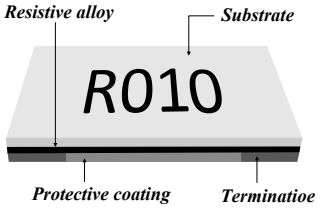
Type 2	L	W	C	D	T
FBF03	1.60±0.10	0.80±0.10	0.30±0.20	0.50±0.20	0.50±0.10
FBF05	2.00±0.10	1.25±0.10	0.40±0.20	0.65±0.20	0.60±0.10
FBF06	3.10±0.10	1.60±0.10	0.50±0.25	0.90±0.25	0.65±0.10
FBF12	3.10±0.10	2.60±0.10	0.50±0.25	0.90±0.25	0.65±0.10
FBF20	5.00±0.20	2.50±0.20	0.60±0.25	1.25±0.25	0.65±0.10
FBF25	6.30±0.20	3.10±0.20	0.60±0.25	1.90±0.25	0.65±0.15

POWER DE-RATING CURVE



Maximum dissipation in percentage of rated power as a function of the ambient temperature for 0603, 0805, 1206, 1210, 2010, 2512

■ Power/Anti-Sulfur Lead Free Current Sensing Resistors



FEATURES

- Ultra low and stable TCR performance.
- High power rating and compact size.
- High reliability and stability.
- Reduced size of final equipment.
- RoHS exemption free & Lead free.
- ASTM B-809 105C 1000hrs compliant.

APPLICATION

- Power supply.
- PDA.
- Digital meter.
- Computer.
- Automotives.
- Battery charger.
- DC-DC power converter.

PART NUMBER

FOF	25	F	P	J	R005	N	SS
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR □	Special Code □□
FOF Metal Foil	**02** 0402 **03** 0603 **05** 0805 **06** 1206 **25** 2512	**D** =±0.5% **F** =±1% **J** =±5%	**T** =Paper tape – 5 Kpcs **V** =Paper tape – 10Kpcs **P** =Plastic tape – 4Kpcs	**E** =1/3W **F** =1/2W **G** =3/4W **H** =1W **J** =2W	**XXXX** 4 digit	**N** =100PPM **X** =70ppm **P** =50PPM	**SS :** Standard

RATING

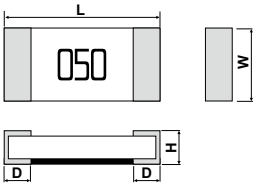
Series No.	FOF25	FOF06	FOF05	FOF03	FOF02
Size code	**2512 (6432)**	**1206 (3216)**	**0805 (2012)**	**0603 (1608)**	**0402 (1005)**
Resistance Tolerance	±5% , ±1%, ±0.5% (only for TC50)				
Resistance Range	2~450, 700 mΩ	3~700 mΩ	3~500 mΩ	5~75 mΩ	5~25 mΩ
TCR (ppm/℃)	2~9mΩ: ±100	3~9mΩ: ±100	3~9mΩ: ±100	5~9mΩ: ±100	5~25mΩ: ±100
	10~700mΩ: ±50	10~700mΩ: ±50	10~500mΩ: ±50	10~75mΩ: ±50	
Max. power at Tamb=70℃	2W	1W	3/4W	1/2W	1/3W
Operation Temperature	-55 ~ +155℃				

Note : (1) Max. Operation Current : So called RCWC (Rated Continuous Working Current) is determined by RCWC = $\sqrt{\text{Rated Power / Resistance Value}}$ listed above

GUIDE OF CURRENT SENSING RESISTORS

Series	Product Type	Resistance Range (<1Ω)	Power Type	AEC Q200
FMF	Metal Strip	0mΩ~220mΩ	V	V
FOF	**Metal Foil**	**2mΩ~700mΩ**	**V**	
FBF	Metal Paste	10mΩ~ 910mΩ	V	
FPF	High Power	50mΩ~ 910mΩ	V	V
FCF-E	Normal	50mΩ~ 910mΩ		

DIMENSIONS

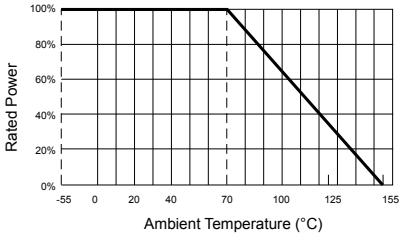


unit: mm

Type	R-value	L	W	H	D
FOF25	R002	6.4±0.30	3.2±0.30	0.65±0.20	2.8±0.30
	R003	6.4±0.30	3.2±0.30	0.65±0.20	2.6±0.30
	R004-R009	6.4±0.30	3.2±0.30	0.65±0.20	1.05±0.30
	R010-R049	6.4±0.30	3.2±0.30	0.65±0.20	1.05±0.30
	R050-R700	6.4±0.30	3.2±0.30	0.65±0.20	1.05±0.30
FOF06	R003	3.3±0.20	1.7±0.20	0.65±0.20	1.20±0.30
	R004-R008	3.3±0.20	1.7±0.20	0.65±0.20	0.68±0.30
	R009-R049	3.3±0.20	1.7±0.20	0.65±0.20	0.68±0.30
	R050-R700	3.3±0.20	1.7±0.20	0.65±0.20	0.68±0.30
FOF05	R003	2.10±0.20	1.35±0.20	0.65±0.20	0.65±0.20
	R004	2.10±0.20	1.35±0.20	0.65±0.20	0.50±0.20
	R005-R007	2.10±0.20	1.35±0.20	0.65±0.20	0.50±0.20
	R008-R049	2.10±0.20	1.35±0.20	0.65±0.20	0.50±0.20
	R050-R500	2.10±0.20	1.35±0.20	0.65±0.20	0.50±0.20
FOF03	R005	1.7±0.20	0.9±0.20	0.65±0.20	0.50±0.20
	R006-R009	1.7±0.20	0.9±0.20	0.65±0.20	0.40±0.20
	R010-R049	1.7±0.20	0.9±0.20	0.65±0.20	0.40±0.20
	R050-R075	1.7±0.20	0.9±0.20	0.65±0.20	0.40±0.20
FOF02	R005-R025	1.0±0.10	0.55±0.10	0.30±0.05	0.23±0.10

POWER DE-RATING CURVE

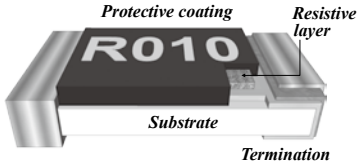
Operating Temperature Range: -55 to +155 deg.C



Maximum dissipation in percentage of rated power as a function of the ambient temperature

FPF-L

■ Current Sensing Thick-film Power Type Chip Resistors



FEATURES

- High power rating to 2W and low TCR.
- Low resistance and high precision (1%).
- Excellent reliability and suitable cost.
- Suitable for lead free soldering.
- Meet AEC-Q200, RoHS compliant & Halogen Free.

APPLICATION

- Consumer electronics, M/B.
- Battery pack, BTC.
- Notebook, Tablet PC.
- Portable Device, Electronic Equipment.

PART NUMBER

FPF	25	F	P	-	R005	-	M
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR	Special Code
FPF Thick Film High Power Low ohm	**03** 0603 **05** 0805 **06** 1206 **12** 1210 **20** 2010 **25** 2512	**F** =±1% **G** =±2% **J** =±5%	**T** =Paper tape – 5 Kpcs **V** =Paper tape – 10Kpcs **W** =Paper tape – 20Kpcs **P** =Plastic tape – 4Kpcs **X** =Plastic tape – 8Kpcs **Y** =Plastic tape – 16Kpcs **Q** =Plastic tape – 3 Kpcs (For 2512 3W)	**"–"** Standard Power boost code **K** =3W (2512)	**XXXX** 4 digit	No special code- Null special code- "–" Power boost code **N** =100ppm **L** =200ppm	**"Null"** Standard **M:** Meet AEC-Q200

RATING

Type		Normal Type Power Rating @ 70℃	Max. RCWV (mV)	Max. Overload Voltage (mV)	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (TCR ; ppm/℃)	Resistance Range (mΩ)		Standard Resistance Values
							Min.	Max.	
FPF03	**0603**	1/4W	477	1066	±1%, ±5%	±250	50	91	E-24 Special request please contact sales window
						±150*	100	910	
FPF05	**0805**	1/3W	551	1232	±1%, ±5%	±200	50	91	
						±100*	100	910	
FPF06	**1206**	1/2W	675	1508	±1%, ±5%	±100*	50	91	
						±100	100	910	
FPF12	**1210**	1/2W	675	1508	±1%, ±5%	±100	100	910	
FPF20	**2010**	1W	954	2133	±1%, ±5%	±100*	50	91	
						±100	100	910	
FPF25	**2512**	2W	1349	3017	±1%, ±5%	±100*	50	91	
						±100	100	910	
FPF25	**2512**	3W	1652	3695	±1%	±100	100	910	
					±5%	±200	100	910	

* Temperature 25~-55℃ , 200ppm for 0603, 150ppm for 0805, 1206, 2010, 2512

Note :

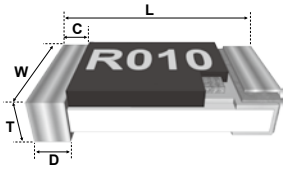
(1) 2512(2W) loading with total solder-pad and trace size of 300 mm^2
2512(3W) Solder-pad and trace size should be >300 mm^2 and board surface temperature should, not exceed 105℃ when applying full rated power.

(2) $E = (P \times R)^{1/2}$ E：Working Voltage(V) , P：Rated Power(W) , R：Resistance Value(Ω)

GUIDE OF CURRENT SENSING RESISTORS

Series	Product Type	Resistance Range (<1Ω)	Power Type	AEC Q200
FMF	Metal Strip	0mΩ~220mΩ	V	V
FOF	Metal Foil	2mΩ~700mΩ	V	
FBF	Metal Type	10mΩ~910mΩ	V	
FPF	**High Power**	**50mΩ~910mΩ**	**V**	**V**
FCF-E	Normal	50mΩ~910mΩ		

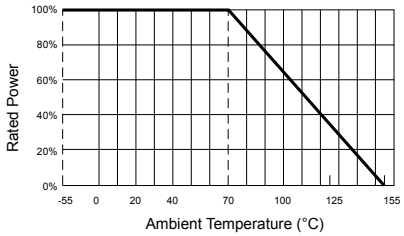
DIMENSIONS



unit: mm

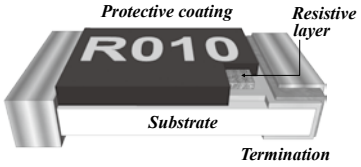
Type	L	W	C	D	T
FPF03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FPF05	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FPF06	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FPF12	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FPF20	5.00±0.20	2.50±0.20	0.65±0.25	0.60±0.25	0.60±0.10
FPF25	6.40±0.20	3.10±0.20	0.60±0.25	1.80±0.25	0.60±0.15
FPF25 3W	6.40±0.20	3.10±0.20	0.45±0.25	1.80±0.25	1.10±0.20

POWER DE-RATING CURVE



Operating Temperature Range: -55 to +155 deg.C

■ Thick-Film Normal Type Chip Resistors



FEATURES

- Low resistance and high precision (1%).
- Excellent reliability and suitable cost.
- Suitable for lead free soldering.
- RoHS compliant & Halogen Free.

APPLICATION

- Consumer electronics, M/B.
- Battery pack, BTC.
- Notebook, Tablet PC.
- Portable Device, Electronic Equipment.

PART NUMBER

FCF	06	F	T	-	R100	-	E
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR □	Special Code □
FCF Thick Film Normal Low ohm	**03** 0603 **05** 0805 **06** 1206 **12** 1210 **20** 2010 **25** 2512	**F** =±1% **J** =±5%	**T** =Paper tape – 5 Kpcs **V** =Paper tape – 10 Kpcs **W** =Paper tape – 20 Kpcs **P** =Plastic tape – 4 Kpcs **X** =Plastic tape – 8 Kpcs **Y** =Plastic tape – 16Kpcs	**"–"** Standard	**XXXX** 4 digits	**"–"** Standard	**E:** Standard Low R

RATING

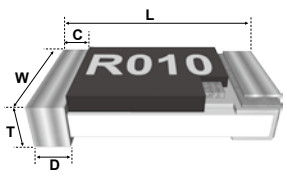
Type		Normal Type Power Rating @ 70℃	Max. RCWV (mV)	Max. Overload Voltage (mV)	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (TCR ; ppm/℃)	Resistance Range (mΩ) Min.	Resistance Range (mΩ) Max.	Standard Resistance Values
FCF03	**0603**	1/8W	337	754	±1%, ±5%	±200	100	910	E-24
						±400	50	91	
FCF05	**0805**	1/4W	477	1067	±1%, ±5%	±200	100	910	
						±400	50	91	
FCF06	**1206**	1/3W	551	1232	±1%, ±5%	±200	100	910	
						±400	50	91	
FCF12	**1210**	2/3W	779	1742	±1%, ±5%	±200	100	910	
						±400	50	91	
FCF20	**2010**	3/4W	826	1847	±1%, ±5%	±200	100	910	
						±400	50	91	
FCF25	**2512**	1W	954	2133	±1%, ±5%	±200	100	910	
						±400	50	91	

Note :
(1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
RCWV：Rated Continue Working Voltage(V)，P：Rated Power(W)，R：Resistance Value(Ω)
(2) Special resistance value request please contact factory.

GUIDE OF CURRENT SENSING RESISTORS

Series	Product Type	Resistance Range (<1Ω)	Power Type	AEC Q200
FMF	Metal Strip	0mΩ~220mΩ	V	V
FOF	Metal Foil	2mΩ~700mΩ	V	
FBF	Metal Type	10mΩ~910mΩ	V	
FPF	High Power	50mΩ~910mΩ	V	V
FCF-E	**Normal**	**50mΩ~910mΩ**		

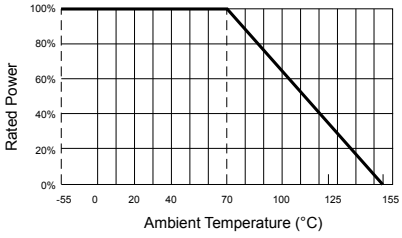
DIMENSIONS



unit: mm

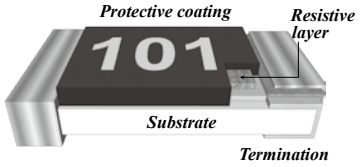
Type	L	W	C	D	T
FCF03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FCF05	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FCF06	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FCF12	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FCF20	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
FCF25	6.30±0.20	3.10±0.20	0.60±0.25	0.90±0.25	0.60±0.15

POWER DE-RATING CURVE



FPF

■ High Rated Power Thick-film Lead Free Chip Resistors



FEATURES

- High power rating to 3W and compact size.
- High reliability and high precision (1%).
- Suitable for lead free soldering.
- Meet AEC-Q200, RoHS compliant & Halogen Free.

APPLICATION

- Power supply.
- Automotive industry.
- Digital meter, Consumer electronics, M/B.
- LED Lighting.
- Industry control board.

PART NUMBER

FPF	06	J	T	G	1R0_	L	
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR	Special Code
FPF High Power Resistors	**03** 0603 **05** 0805 **06** 1206 **12** 1210 **20** 2010 **25** 2512	**F** =±1% **J** =±5%	**T** =Paper tape – 5 Kpcs **V** =Paper tape – 10 Kpcs **W** =Paper tape – 20 Kpcs **P** =Plastic tape – 4 Kpcs **X** =Plastic tape – 8 Kpcs **Y** =Plastic tape – 16Kpcs **Q** =Plastic tape – 3 Kpcs (For 2512 3W)	**"–"** Standard Power boost code **E** =1/3W (0603) **F** =1/2W(0805) **G** =3/4W(1206) **I** =1.5W **K** =3W(2512)	**XXXX** **>=1R** **1%** 4 digit **5%** 3 digit ("_" means a blank)	No special code- Null special code- "–" Power boost code **N** =100ppm **Y** =150ppm **L** =200ppm	**"Null"** Standard **M:** Meet AEC-Q200

RATING

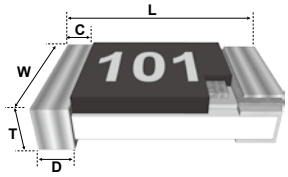
Type		Normal Type Power Rating @ 70℃	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance Range		Standard Resistance Values
							Min.	Max.	
FPF03	**0603**	1/8W *1/3W	50V 75V	100V 125V	±1%(F)	±100	10Ω	1MΩ	E96/E24
					±1%(F)	±200	1Ω	9.76Ω	E96/E24
					±5%(J)	±200	1Ω	1MΩ	E24
FPF05	**0805**	1/4W *1/2W	150V 200V	300V 300V	±1%(F)	±100	10Ω	1MΩ	E96/E24
					±1%(F)	±150	1Ω	9.76Ω	E96/E24
					±5%(J)	±200	1Ω	1MΩ	E24
FPF06	**1206**	1/2W *3/4W	200V 250V	400V 500V	±1%(F)	±100	1Ω	1MΩ	E96/E24
					±5%(J)	±200	1Ω	1MΩ	E24
FPF12	**1210**	1/2W *3/4W	200V 250V	400V 500V	±1%(F)	±100	1Ω	1MΩ	E96/E24
					±5%(J)	±200	1Ω	1MΩ	E24
FPF20	**2010**	1W *2/3W	200V 250V	400V 500V	±1%(F)	±100	1Ω	1MΩ	E96/E24
					±5%(J)	±200	1Ω	1MΩ	E24
FPF25	**2512**	2W *3W	300V	600V	±1%(F)	±100	1Ω	1MΩ	E96/E24
					±5%(J)	±200	1Ω	1MΩ	E24

Type		Description	Max. Rated Current	Resistance Range
FPF03	**0603**	Zero Ohm Jumper	≦ 2A	< 20mΩ
FPF05/06/12	**0805-1210**	Zero Ohm Jumper	≦ 4A	< 20mΩ
FPF20/25	**2010-2512**	Zero Ohm Jumper	≦ 6A	< 20mΩ
FPF25 3W	**2512**	Zero Ohm Jumper	≦ 12A	< 20mΩ

Note :
(1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
RCWV：Working Voltage (V)，P：Rated Power (W)，R：Resistance Value (Ω)
(2) Above 2512 size, solder-pad and trace size should be >300 mm^2 and board surface temperature should not exceed 105℃ when applying full rated power.
(3) 2512 Solder-pad and trace size should be >300 mm^2 and board surface temperature should not exceed 105℃ when applying full rated power.

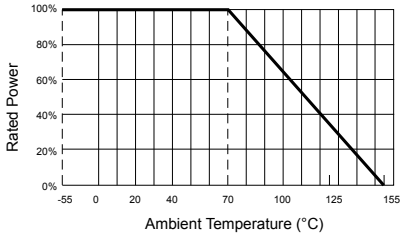
DIMENSIONS

unit: mm



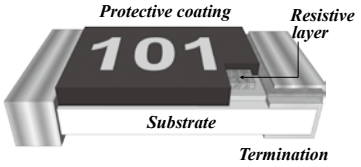
Type	L	W	C	D	T
FPF03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FPF05	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FPF06	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FPF12	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FPF20	5.00±0.20	2.50±0.20	0.65±0.25	0.60±0.25	0.60±0.10
FPF25	6.40±0.20	3.10±0.20	0.60±0.25	1.80±0.25	0.60±0.15
FPF25 3W	6.40±0.20	3.10±0.20	0.45±0.25	1.80±0.25	1.10±0.20

POWER DE-RATING CURVE



Operating Temperature Range: -55 to +155 deg.C

■ Thick Film High Power & Anti-Surge Chip Resistors



FEATURES

- High reliability and high precision (1%).
- Suitable for withstanding surge voltage.
- Suitable for lead free soldering.
- Meet AEC-Q200, RoHS compliant & Halogen Free.

APPLICATION

- Power supply.
- Automotive industry.
- Digital meter, Consumer electronics, M/B.
- LED Lighting.
- Industry control board.

PART NUMBER

FPS	08	F	T	F	1004	N	M
Type	Size	Tolerance	Packing	Watt	R Value	TCR	Special Code
□□□	□□	□	□	□	□□□□		
FPS Thick Film High Power & Anti-Surge	**03** 0603 **05** 0805 **06** 1206 **12** 1210 **20** 2010 **25** 2512	**F** =±1% **J** =±5%	**T** =Paper tape – 5 Kpcs **V** =Paper tape – 10 Kpcs **W** =Paper tape – 20 Kpcs **P** =Plastic tape – 4 Kpcs **X** =Plastic tape – 8Kpcs **Y** =Plastic tape – 16Kpcs	**"–"** Standard Power boost code **E** =1/3W (0603) **F** =1/2W(0805) **G** =3/4W(1206)	**XXXX** **>=1R** **1%** 4 digit **5%** 3 digit ("_" means a blank)	No special code- Null special code- "–" Power boost code **N** =100ppm **Y** =150ppm **L** =200ppm	**"Null"** Standard **M:** Meet AEC-Q200

RATING

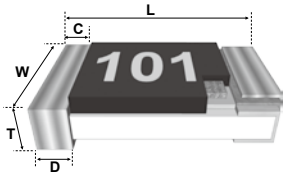
Type		Normal Type Power Rating @ 70℃	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance Range		Standard Resistance Values
							Min.	Max.	
FPS03	**0603**	1/8W *1/3W	50V 75V	100V 125V	±1%(F)	±100	10Ω	1MΩ	E96/E24
					±1%(F)	±200	1Ω	9.76Ω	E96/E24
					±5%(J)	±200	1Ω	1MΩ	E24
FPS05	**0805**	1/4W *1/2W	150V 200V	300V 300V	±1%(F)	±100	10Ω	1MΩ	E96/E24
					±1%(F)	±150	1Ω	9.76Ω	E96/E24
					±5%(J)	±200	1Ω	1MΩ	E24
FPS06	**1206**	1/2W *3/4W	200V 250V	400V 500V	±1%(F)	±100	1Ω	1MΩ	E96/E24
					±5%(J)	±200	1Ω	1MΩ	E24
FPS12	**1210**	1/2W	200V	400V	±1%(F)	±100	1Ω	1MΩ	E96/E24
					±5%(J)	±200	1Ω	1MΩ	E24
FPS20	**2010**	1W	200V	400V	±1%(F)	±100	1Ω	1MΩ	E96/E24
					±5%(J)	±200	1Ω	1MΩ	E24
FPS25	**2512**	2W	300V	600V	±1%(F)	±100	1Ω	1MΩ	E96/E24
					±5%(J)	±200	1Ω	1MΩ	E24

Type		Description	Max. Rated Current	Resistance Range
FPS03	**0603**	Zero Ohm，Jumper	≦ 2A	< 20mΩ
FPS05	**0805**	Zero Ohm，Jumper	≦ 4A	< 20mΩ
FPS06	**1206**	Zero Ohm，Jumper	≦ 4A	< 20mΩ
FPS12	**1210**	Zero Ohm，Jumper	≦ 4A	< 20mΩ
FPS20	**2010**	Zero Ohm，Jumper	≦ 6A	< 20mΩ
FPS25	**2512**	Zero Ohm，Jumper	≦ 6A	< 20mΩ

Note :
(1) 2512 2W loading with total solder-pad and trace size of 300 mm^2
(2) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower. (RCWV：Rated Continue Working Voltage(V)，P：Rated Power(W)，R：Resistance Value(Ω))
(3) Solder-pad and trace size should be evaluated and board surface temperature should not.
(4) Exceed 105℃ when applied full rated power.

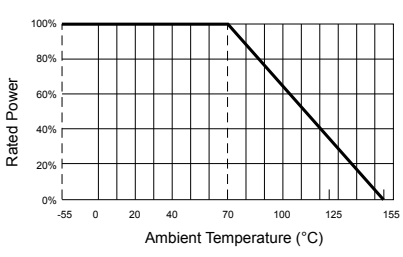
DIMENSIONS

unit: mm

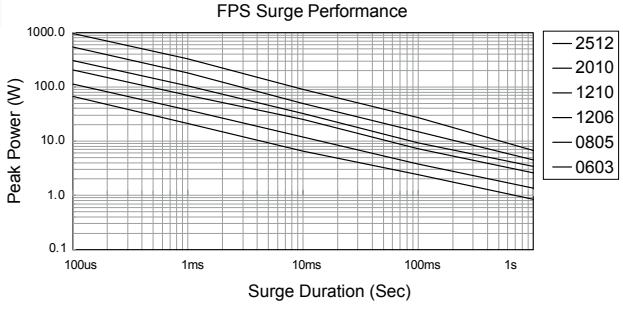


Size	L	W	C	D	T
0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
1206	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
1210	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
2010	5.00±0.20	2.50±0.20	0.65±0.25	0.60±0.25	0.60±0.10
2512	6.40±0.20	3.10±0.20	0.60±0.25	1.80±0.25	0.60±0.15

POWER DE-RATING CURVE

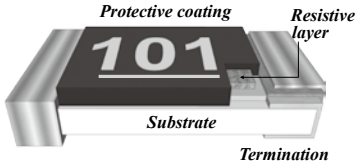


SURGE PERFORMANCE



FNF

■ Anti-Surge Lead Free & Halogen Free Chip Resistors



FEATURES

- High reliability and compact size.
- Suitable for withstanding surge voltage.
- Suitable for lead free soldering.
- RoHS compliant & Halogen Free.
- Meet AEC-Q200

APPLICATION

- Power supply.
- Automotive industry.
- Digital meter, Consumer electronics, M/B.
- LED Lighting.
- Industry control board.

PART NUMBER

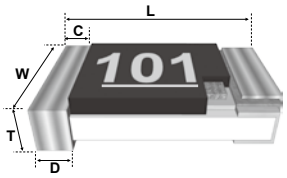
FNF	25	J	P	-	103_	-	M
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR	Special Code
FNF Thick Film Anti-Surge	**03** 0603 **05** 0805 **06** 1206 **12** 1210 **20** 2010 **25** 2512	**J** =±5% **K** =±10% **L** =± 15% **M** =± 20%	**T** =Paper tape – 5 Kpcs **V** =Paper tape – 10 Kpcs **W** =Paper tape – 20 Kpcs **P** =Plastic tape – 4 Kpcs **X** =Plastic tape – 8 Kpcs **Y** =Plastic tape – 16Kpcs	**"–"** Standard	**XXXX** **>=1R** **1%** 4 digit **5%** 3 digit ("_" means a blank)	No special code- Null special code- "–"	**"Null"** Standard **M:** Meet AEC-Q200

RATING

Type		Normal Type Power Rating @ 70℃	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance Range		Standard Resistance Values
							Min.	Max.	
FNF03	**0603**	1/10W	50V	100V	±5%(J) ±10%(K) ±15%(L) ±20%(M)	±100	1Ω	1MΩ	E-24
FNF05	**0805**	1/8W	150V	300V					
FNF06	**1206**	1/4W	200V	400V					
FNF12	**1210**	1/3W	200V	400V					
FNF20	**2010**	3/4W	200V	400V					
FNF25	**2512**	1W	200V	400V					

Note :
• RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower. (RCWV：Rated Continue Working Voltage(V)，P：Rated Power(W)，R：Resistance Value(Ω))

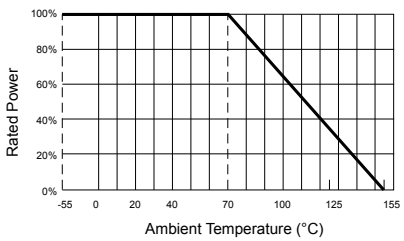
DIMENSIONS



unit: mm

Size	L	W	C	D	T
0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
1206	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
1210	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
2010	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
2512	6.40±0.20	3.20±0.20	0.60±0.25	0.90±0.25	0.60±0.15

POWER DE-RATING CURVE

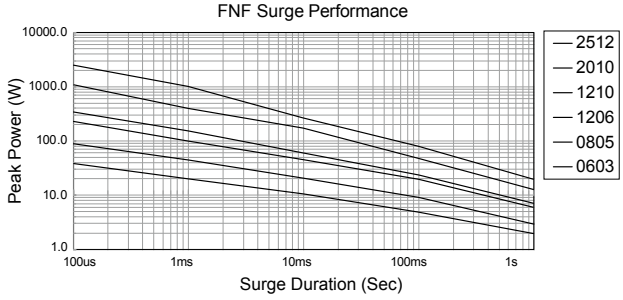


MARKING/SOLDERING

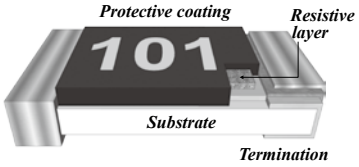
Resistance value identify
E24 ±5%：3 Digits marking with underline to identify the resistance value
0603/0805/1206/1210/2010/2512

301 → $30 \times 10^{1} = 300\Omega$

SURGE PERFORMANCE



■ High Ohmic Lead Free Chip Resistors



FEATURES

- Small size and light weight with size range per int'l standard.
- Highly stable in auto-placement surface mounting application.
- Compatible with flow and reflow soldering.
- RoHS compliant & Halogen Free.

APPLICATION

- Medical equipment.
- Printer.
- Automotive industry.
- Converter.
- Power supply in small size.

PART NUMBER

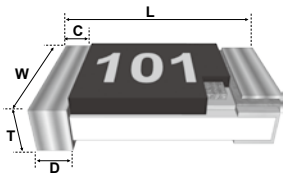
FHF	12	J	T	-	104_		
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR	Special Code
FHF Thick Film High Ohmic	**02** 0402 **03** 0603 **05** 0805 **06** 1206	**F** =±1% **J** =±5%	**T** =Paper tape – 5 Kpcs **V** =Paper tape – 10 Kpcs **W** =Paper tape – 20 Kpcs	**"–"** Standard	**XXXX** **>=1R** **1%** 4 digit **5%** 3 digit ("_" means a blank)	No special code- Null special code- "–"	**"Null"** Standard

RATING

Type		Normal Type Power Rating @ 70℃	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (TCR ; ppm/℃)	Resistance Range		Standard Resistance Values
							Min.	Max.	
FHF02	**0402**	1/16W	50V	100V	±1%(F)	±300	11MΩ	30MΩ	E-24
					±5%(J)	±300	11MΩ	30MΩ	
FHF03	**0603**	1/10W	50V	100V	±1%(F)	±200	11MΩ	22MΩ	E-12
					±5%(J)	±200	11MΩ	100MΩ	
FHF05	**0805**	1/8W	150V	300V	±1%(F)	±200	11MΩ	22MΩ	
					±5%(J)	±200	11MΩ	100MΩ	
FHF06	**1206**	1/4W	200V	400V	±1%(F)	±200	11MΩ	22MΩ	
					±5%(J)	±200	11MΩ	100MΩ	

Note :
(1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
RCWV：Rated Continue Working Voltage(V)，P：Rated Power(W)，R：Resistance Value(Ω)

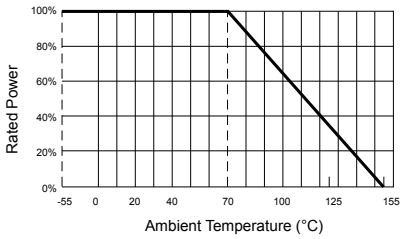
DIMENSIONS



unit: mm

Type 1	L	W	C	D	T
FHF02	1.00±0.05	0.50±0.05	0.20±0.10	0.25±0.10	0.35±0.05
FHF03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FHF05	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FHF06	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.25	0.55±0.10

POWER DE-RATING CURVE



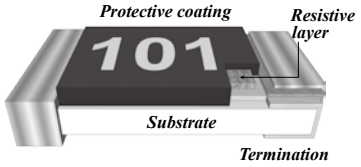
MARKING/SOLDERING

Each resistor is marked with a three digits code on the protective coating to designate the nominal resistance value.

3 digit marking for ±1% ±5%
examples :
306 = 30MΩ
476 = 47MΩ

FGF

■ Non-Magnetic Lead Free Chip Resistors



FEATURES

- Non-Magnetic chip resistors by copper plating on middle termination.
- Non-Magnetic chip resistors pass 3000 gauss magnetic detection.
- Compatible with flow and reflow soldering.
- Suitable for lead free soldering.
- Meet RoHS compliant.
- RoHS compliant & Halogen Free.

APPLICATION

- Medical equipment.
- Automotive industry.
- MRI industry.
- Measurement instrument.

PART NUMBER

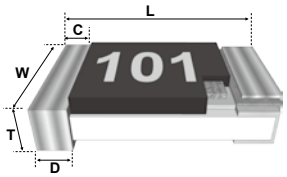
FGF	05	F	T	-	1002		
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR	Special Code
FGF Thick Film Non-Magnetic	**03** 0603 **05** 0805 **06** 1206	**F** =±1% **J** =±5%	**T** =Paper tape – 5 Kpcs **V** =Paper tape – 10 Kpcs **W** =Paper tape – 20 Kpcs	**"–"** Standard	**XXXX** **>=1R** **1%** 4 digit **5%** 3 digit ("_" means a blank)	No special code- Null special code- "–"	**"Null"** Standard

RATING

Type		Normal Type Power Rating @ 70℃	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (TCR ; ppm/℃)	Resistance Range		Standard Resistance Values
							Min.	Max.	
FGF03	**0603**	1/10W	50V	100V	±1%(F)	±100	1Ω	10MΩ	E-96
					±5%(J)	±200	0Ω&1Ω	10MΩ	E-24
FGF05	**0805**	1/8W	150V	300V	±1%(F)	±100	1Ω	10MΩ	E-96
					±5%(J)	±200	0Ω&1Ω	10MΩ	E-24
FGF06	**1206**	1/4W	200V	400V	±1%(F)	±100	1Ω	10MΩ	E-96
					±5%(J)	±200	0Ω&1Ω	10MΩ	E-24

Jumper :
• 0603 size maximum resistance R_{max} < 50mΩ and rated current I_R ≦ 1A
• 0805, 1206 size maximum resistance R_{max} < 50mΩ and rated current I_R ≦ 2A
Note :
(1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
RCWV：Rated Continue Working Voltage(V)，P：Rated Power(W)，R：Resistance Value(Ω)
(2) 1Ω~10Ω: Temperature Coefficient of Resistance for 0603, 0805, 1206 = -300 ~ +500

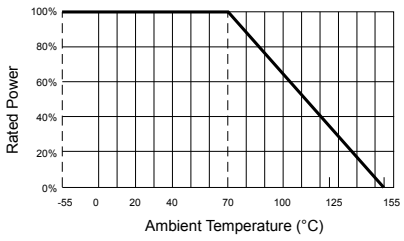
DIMENSIONS



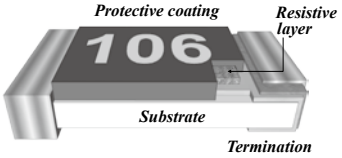
unit: mm

Type	L	W	C	D	T
FGF03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FGF05	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FGF06	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.25	0.55±0.10

POWER DE-RATING CURVE



■ Safety Certified Thick-Film Type High-Voltage Lead Free Chip Resistors



FEATURES

- Special materials and design for higher working
- voltage required.
- Compatible with flow and reflow soldering.
- Suitable for lead free soldering.
- Voltage coefficient resistance 100ppm, Max. below 300ppm.
- Meet AEC-Q200, RoHS compliant & Halogen Free.
- Safety resistor certificate meet
  … UL/IEC 62368 Resistors requirements certificated.
  … UL/IEC 60950-1 certificated.
  … UL/IEC 60065., UL1676 qualified.

APPLICATION

- Power supply.
- Automotive industry.
- Measurement instrument.
- Medical equipment.

PART NUMBER

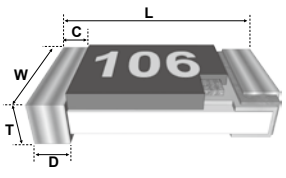
FVS	25	F	P	-	1004	-	M
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR	Special Code
FVS Thick Film High Voltage UL Safety Certification	**03** 0603 **05** 0805 **06** 1206 **20** 2010 **25** 2512	**F** =±1% **J** =±5%	**T** =Paper tape – 5 Kpcs **V** =Paper tape – 10 Kpcs **W** =Paper tape – 20 Kpcs **P** =Plastic tape – 4 Kpcs **X** =Plastic tape – 8Kpcs **Y** =Plastic tape – 16Kpcs	**"–"** Standard	**XXXX** **>=1R** **1%** 4 digit **5%** 3 digit ("_" means a blank)	No special code- Null special code- "–"	**"Null"** Standard **M:** Meet AEC-Q200

RATING

Type		Normal Type Power Rating @ 70℃	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance Range		Standard Resistance Values
							Min.	Max.	
FVS03	**0603**	1/10W	200V	400V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
					±5%(J)	±200	100KΩ	22MΩ	E24
FVS05	**0805**	1/8W	400V	800V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
					±5%(J)	±200	100KΩ	22MΩ	E24
FVS06	**1206**	1/4W	800V	1600V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
					±1%(F)	±200	11MΩ	22MΩ	E24
					±5%(J)	±200	100KΩ	100MΩ	E24
FVS20	**2010**	1/2W	2000V	3000V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
					±1%(F)	±200	11MΩ	22MΩ	E24
					±5%(J)	±200	100KΩ	100MΩ	E24
FVS25	**2512**	1W	3000V	4000V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
					±1%(F)	±200	11MΩ	22MΩ	E24
					±5%(J)	±200	100KΩ	100MΩ	E24

Note :
(1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
RCWV：Rated Continue Working Voltage(V)，P：Rated Power(W)，R：Resistance Value(Ω)

DIMENSIONS

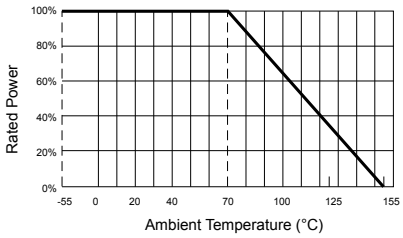


unit: mm

Type	L	W	C	D	T
FVS03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FVS05	2.00±0.10	1.25±0.10	0.35±0.20	0.40±0.20	0.50±0.10
FVS06	3.10±0.10	1.60±0.10	0.45±0.20	0.50±0.20	0.55±0.10
FVS20	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
FVS25	6.40±0.20	3.20±0.20	0.60±0.25	0.90±0.25	0.60±0.15

Resistance value identify：
Top side color is "Red" for identify high voltage product.

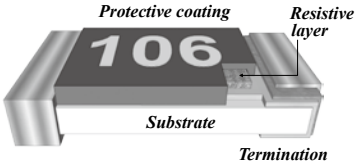
POWER DE-RATING CURVE



Operating Temperature Range: -55 to +155 deg.C

FVF

■ Thick-Film Type High-Voltage Lead Free Chip Resistors



FEATURES

- Special materials and design for higher working voltage required.
- Compatible with flow and reflow soldering.
- Suitable for lead free soldering.
- Max. Voltage coefficient resistance below 300ppm.
- Meet AEC-Q200, RoHS compliant & Halogen Free.

APPLICATION

- Power supply.
- Automotive industry.
- Measurement instrument.
- Medical equipment.

PART NUMBER

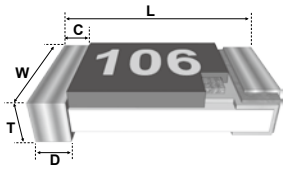
FVF	25	F	P	-	1004	-	M
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR	Special Code
FVF Thick Film High Voltage	**03** 0603 **05** 0805 **06** 1206 **20** 2010 **25** 2512	**F** =±1% **J** =±5%	**T** =Paper tape – 5 Kpcs **V** =Paper tape – 10 Kpcs **W** =Paper tape – 20 Kpcs **P** =Plastic tape – 4 Kpcs **X** =Plastic tape – 8Kpcs **Y** =Plastic tape – 16Kpcs	**"–"** Standard	**XXXX** **>=1R** **1%** 4 digit **5%** 3 digit ("_" means a blank)	No special code- Null special code- "–"	**"Null"** Standard **M:** Meet AEC-Q200

RATING

Type		Normal Type Power Rating @ 70℃	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance Range		Standard Resistance Values
							Min.	Max.	
FVF03	**0603**	1/10W	200V	400V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
					±5%(J)	±200	100KΩ	22MΩ	E24
FVF05	**0805**	1/8W	400V	800V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
					±5%(J)	±200	100KΩ	22MΩ	E24
FVF06	**1206**	1/4W	800V	1600V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
					±1%(F)	±200	11MΩ	22MΩ	E24
					±5%(J)	±200	100KΩ	100MΩ	E24
FVF20	**2010**	1/2W	2000V	3000V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
					±1%(F)	±200	11MΩ	22MΩ	E24
					±5%(J)	±200	100KΩ	100MΩ	E24
FVF25	**2512**	1W	3000V	4000V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
					±1%(F)	±200	11MΩ	22MΩ	E24
					±5%(J)	±200	100KΩ	100MΩ	E24

Note :
(1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
RCWV：Rated Continue Working Voltage(V)，P：Rated Power(W)，R：Resistance Value(Ω)

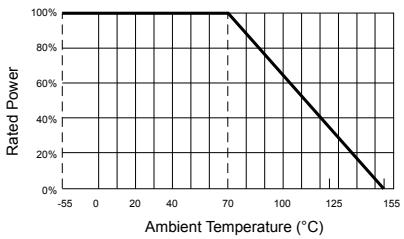
DIMENSIONS



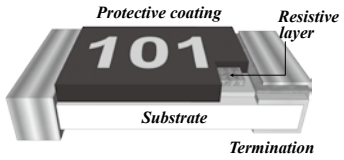
unit: mm

Type	L	W	C	D	T
FVF03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FVF05	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FVF06	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.20	0.55±0.10
FVF20	5.00±0.20	2.50±0.20	0.65±0.25	0.60±0.25	0.60±0.10
FVF25	6.40±0.20	3.20±0.20	0.65±0.25	0.90±0.25	0.60±0.15

POWER DE-RATING CURVE



■ Thick Film Lead Free Chip Resistors



FEATURES

- Meet AEC-Q200 test for Automotive industry.
- Suitable for lead free soldering.
- Compatible with wave and reflow soldering.
- Anti-sulfurate products.
- RoHS compliant & Halogen Free.

APPLICATION

- Automotive industry.
- Digital meter, Consumer electronics, M/B.
- Portable electronic devices

PART NUMBER

FWF	03	F	T	-	1004	-	W
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR	Special Code
FWF Thick Film Automotive	**02** 0402 **03** 0603 **05** 0805 **06** 1206 **12** 1210 **20** 2010 **25** 2512	**F** =±1% **J** =±5%	**T** =Paper tape – 5 Kpcs **V** =Paper tape – 10 Kpcs **W** =Paper tape – 20 Kpcs **P** =Plastic tape – 4 Kpcs **X** =Plastic tape – 8Kpcs **Y** =Plastic tape – 16Kpcs	**"–"** Standard	**XXXX** **>=1R** **1%** 4 digit **5%** 3 digit ("_" means a blank)	No special code- Null special code- "–"	**"Null"** Standard **W:** Anti-sulfur H2S 1000ppm

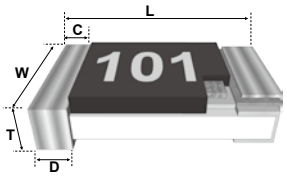
RATING

Type		Normal Type Power Rating @ 70℃	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (TCR ; ppm/℃)	Resistance Range Min.	Resistance Range Max.	Standard Resistance Values
FWF02	**0402**	1/16W	50V	100V	±1(F) ±5(J)	±200	> 1MΩ	10MΩ	±1%(F)：E-96/E-24 ±5%(J)：E-24
						±100	> 10Ω	1MΩ	
						-200~+400	0 & 1Ω	10Ω	
FWF03	**0603**	1/10W	75V	150V	±1(F) ±5(J)	±200	> 1MΩ	10MΩ	
						±100	> 10Ω	1MΩ	
						-200~+400	0 & 1Ω	10Ω	
FWF05	**0805**	1/8W	150V	300V	±1(F) ±5(J)	±200	> 1MΩ	10MΩ	
						±100	> 10Ω	1MΩ	
						-200~+400	0 & 1Ω	10Ω	
FWF06	**1206**	1/4W	200V	400V	±1(F) ±5(J)	±200	> 1MΩ	10MΩ	
						±100	> 10Ω	1MΩ	
						-200~+400	0 & 1Ω	10Ω	
FWF12	**1210**	1/2W	200V	400V	±1(F) ±5(J)	±200	> 1MΩ	10MΩ	
						±100	> 10Ω	1MΩ	
						-200~+400	0 & 1Ω	10Ω	
FWF20	**2010**	1/2W	200V	400V	±1(F) ±5(J)	±200	> 1MΩ	10MΩ	
						±100	> 10Ω	1MΩ	
						±200	0 & 1Ω	10Ω	
FWF25	**2512**	1W	250V	500V	±1(F) ±5(J)	±200	> 1MΩ	10MΩ	
						±100	> 10Ω	1MΩ	
						±200	0 & 1Ω	10Ω	

Type		Description	Max. Rated Current	Resistance Range
FWF02	**0402**	Zero Ohm，Jumper	≦ 1A	< 50mΩ
FWF03	**0603**	Zero Ohm，Jumper	≦ 1A	< 50mΩ
FWF05	**0805**	Zero Ohm，Jumper	≦ 2A	< 50mΩ
FWF06	**1206**	Zero Ohm，Jumper	≦ 2A	< 50mΩ
FWF12	**1210**	Zero Ohm，Jumper	≦ 3A	< 50mΩ
FWF20	**2010**	Zero Ohm，Jumper	≦ 3A	< 50mΩ
FWF25	**2512**	Zero Ohm，Jumper	≦ 3A	< 50mΩ

Note :
(1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
RCWV：Rated Continue Working Voltage(V)，P：Rated Power(W)，R：Resistance Value(Ω)

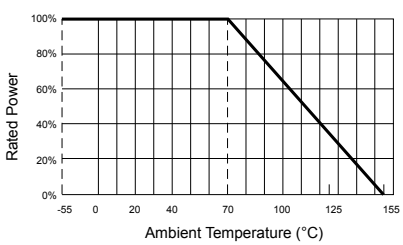
DIMENSIONS



unit: mm

Size	L	W	C	D	T
0402	1.00±0.05	0.50±0.05	0.20±0.10	0.25±0.10	0.35±0.05
0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
1206	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
1210	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
2010	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
2512	6.40±0.20	3.20±0.20	0.60±0.25	0.90±0.25	0.60±0.15

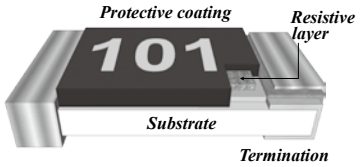
POWER DE-RATING CURVE



Operating Temperature Range: -55 to +155 deg.C

FCF

■ Thick Film Lead Free Chip Resistors



FEATURES

- Suitable for lead free soldering.
- Compatible with wave and reflow soldering.
- RoHS compliant & Halogen free.

APPLICATION

- Portable Devices.
- Measurement instrument.
- Consumer Electronics.
- Computers /Motherboard.

PART NUMBER

FCF	05	F	T	-	1002	P	
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR	Special Code
FCF Thick Film Normal	**0A** 01005 **01** 0201 **02** 0402 **03** 0603 **05** 0805 **06** 1206 **12** 1210 **20** 2010 **25** 2512	**B** =±0.1% **C** =±0.25% **D** =±0.5% **F** =±1% **G** =±2% **J** =±5%	**T** =Paper tape – 5 Kpcs **V** =Paper tape – 10 Kpcs **U** =Paper tape – 15Kpcs **W** =Paper tape – 20 Kpcs **P** =Plastic tape – 4 Kpcs **X** =Plastic tape – 8Kpcs **Y** =Plastic tape – 16Kpcs	**"–"** Standard	**XXXX** **>=1R** **1%** 4 digit **5%** 3 digit ("_" means a blank)	No special code- Null special code- "–" for Special TCR **Q** =25ppm **P** =50 ppm	**"Null"** Standard

RATING

Type		Power Rating at 70℃	Max. RCWV	Max. Overload Voltage	Resistance Toleranc (%)	Temperature Coefficient (TCR; ppm/℃)	Resistance Range (Ω)		Standard Resistance Values
							Min.	Max.	
FCF0A	**01005**	1/32W	15V	30V	±1%(F) ±5%(J)	±200	100	1M	±0.1%(B)：E-96/E-24 ±0.5%(D)：E-96/E-24 ±1%(F)：E-96/E-24 ±5%(J)：E-24/Jumper
						±300	10	91	
						-200 ~ +600	0 & 4.7	9.76	
FCF01	**0201**	1/20W	25V	50V	±1%(F) ±5%(J)	±200	10	10M	
						-200 ~ +600	0 & 1	9.76	
FCF02	**0402**	1/16W	50V	100V	±0.1%(B) ±0.5%(D)	±100	10	1M	
					±1%(F)	±100	10.2	10M	
						-200 ~ +400	1	10	
					±5%(J)	±200	10.2	10M	
						-200 ~ +400	0 & 1	10	
FCF03	**0603**	1/10W	75V	100V	±0.1%(B) ±0.5%(D)	±100	10	1M	
					±1%(F)	±100	10.2	10M	
						-200 ~ +400	1	10	
					±5%(J)	±200	10.2	10M	
						-200 ~ +400	0 & 1	10	
FCF05	**0805**	1/8W	150V	300V	±0.1%(B) ±0.5%(D)	±100	10	1M	
					±1%(F)	±100	10.2	10M	
						-200 ~ +400	1	10	
					±5%(J)	±200	10.2	10M	
						-200 ~ +400	0 & 1	10	
FCF06	**1206**	1/4W	200V	400V	±0.1%(B) ±0.5%(D)	±100	10	1M	
					±1%(F)	±100	10.2	10M	
						-200 ~ +400	1	10	
					±5%(J)	±200	10.2	10M	
						-200 ~ +400	0 & 1	10	
FCF12	**1210**	1/3W	200V	400V	±1%(F)	±100	10.2	10M	
						±200	1	10	
					±5%(J)	±200	0 & 1	10M	
FCF20	**2010**	3/4W	200V	400V	±1%(F)	±100	10.2	10M	
						±200	1	10	
					±5%(J)	±200	0 & 1	10M	
FCF25	**2512**	1W	250V	500V	±1%(F)	±100	10.2	10M	
						±200	1	10	
					±5%(J)	±200	0 & 1	10M	

Jumper :

- 01005 size maximum resistance R_{max} < 50m and rated current I_R ≦ 0.8A
- 0201, 0402, 0603 size maximum resistance R_{max} < 50m and rated current I_R ≦ 1A
- 0805, 1206, 1210, 2010, 2512 size maximum resistance R_{max} < 50m and rated current I_R ≦ 2A

Note :

(1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
RCWV：Rated Continue Working Voltage(V)，P：Rated Power(W)，R：Resistance Value(Ω)

■ Thick Film Lead Free Chip Resistors

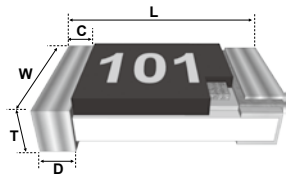
RATING

Special TCR High Precision Type

Type		Normal Type Power Rating @ 70℃	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance Range		Standard Resistance Values
							Min.	Max.	
FCF02	**0402**	1/16W	50V	100V	±0.1%(B) ±0.25%(C) ±0.5%(D)	±50	100	1M	E-96
FCF03	**0603**	1/10W	50V	100V		±25	470	470K	E-96
						±50	20	510K	E-96
FCF05	**0805**	1/8W	150V	300V		±25	470	470K	E-96
						±50	20	510K	E-96
FCF06	**1206**	1/4W	200V	400V		±25	470	470K	E-96
						±50	20	510K	E-96

Note :
(1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
RCWV：Rated Continue Working Voltage(V)，P：Rated Power(W)，R：Resistance Value(Ω)

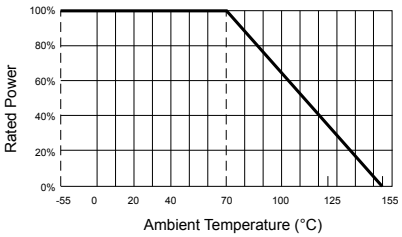
DIMENSIONS



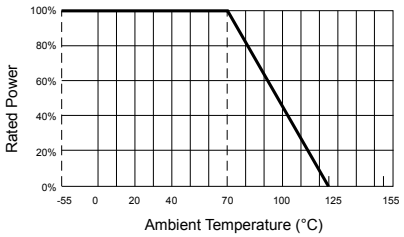
unit: mm

Size	L	W	C	D	T
01005	0.40±0.02	0.20±0.02	0.08±0.03	0.10±0.03	0.13±0.02
0201	0.60±0.03	0.30±0.03	0.10±0.05	0.15±0.05	0.23±0.03
0402	1.00±0.05	0.50±0.05	0.20±0.10	0.25±0.10	0.35±0.05
0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
1206	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.25	0.55±0.10
1210	3.10±0.10	2.60±0.15	0.50±0.25	0.50±0.25	0.55±0.10
2010	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
2512	6.40±0.20	3.20±0.20	0.60±0.25	0.90±0.25	0.60±0.15

POWER DE-RATING CURVE



Maximum dissipation in percentage of rated power as a function of the ambient temperature for 0402, 0603, 0805, 1206, 1210, 2010, 2512



Maximum dissipation in percentage of rated power as a function of the ambient temperature for 0201, 01005

FCF ARRAY

■ Thick Film Lead Free Chip Resistor Networks

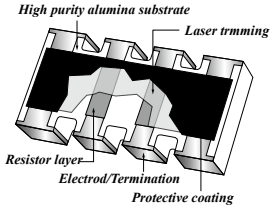


Fig 1. Consctruction of a Chip-R array (convex type)

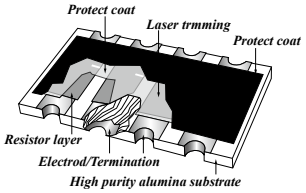


Fig 2. Consctruction of a Chip-R array (concave type)

FEATURES

- High density packaging provides higher productivity.
- Stable convex terminal reduces assembly costs.
- Compatible with flow and reflow soldering.
- RoHS compliant & Halogen Free.

APPLICATION

- Computer.
- Mobile phone.
- Camcorder.
- Portable audio.
- Battery charger.
- Hard Disk Driver.

PART NUMBER

FCF	340	J	T	-	473_		
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR	Special Code
FCF Thick Film Array	**240** 0402x4 (8P4R Convex) **340** 0603x4 (8P4R Convex) **220** 0402x2 (4P2R Convex) **320** 0603x2 (4P2R Convex) **370** 0602x8 (16P8R Convex) **241** 0402x4 (8P4R Concave) **341** 0603x4 (8P4R Concave) **35R** 0402x8 (10P8R Convex)	**F** =±1% **J** =±5%	**Paper tape** **T** =5Kpcs **V** =10Kpcs **W** =20Kpcs	**"–"** Standard	**XXXX** **>=1R** **1%** 4 digit **5%** 3 digit ("_" means a blank)	No special code- Null special code- "–"	**"Null"** Standard

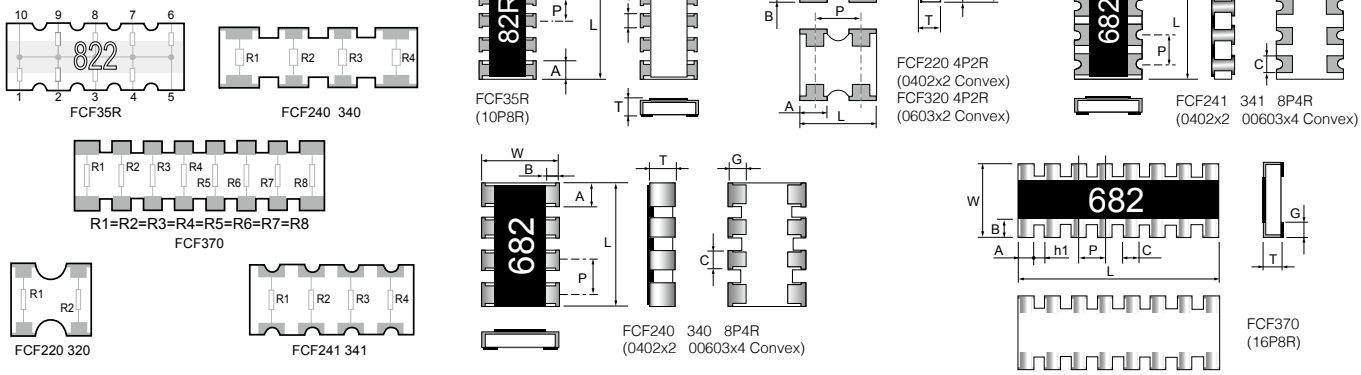
RATING

Type		Termination Construction	Normal Type Power Rating @ 70°C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (TCR ; ppm/°C)	Resistance Range Min.	Resistance Range Max.	Standard Resistance Values
FCF220	**4P2R/0402x2**	Convex	1/16W	25V	50V	±5%(J)	±300	0Ω,10Ω	1MΩ	
							±400	3Ω	9.1Ω	
FCF320	**4P2R/0603x2**	Convex	1/10W	50V	100V	±5%(J)	±200	0Ω,10Ω	1MΩ	
						±1%(F)	-300~+500	1Ω	9.1Ω	
FCF240	**8P4R/0402x4**	Convex	1/16W	50V	100V	±5%(J)	±200	0Ω,10Ω	1MΩ	
							-300~+500	3Ω	9.1Ω	
						±1%(F)	±200	0Ω,10Ω	1MΩ	
FCF340	**8P4R/0603x4**	Convex	1/10W	50V	100V	±5%(J)	±200	0Ω,10Ω	1MΩ	
							-300~+500	1Ω	9.1Ω	E-24
						±1%(F)	±200	0Ω,10Ω	1MΩ	
FCF241	**8P4R/0402x4**	Concave	1/16W	25V	50V	±5%(J) ±1%(F)	±300	0Ω,3Ω	1MΩ	
FCF341	**8P4R/0603x4**	Concave	1/10W	50V	100V	±5%(J) ±1%(F)	±200	0Ω,10Ω	1MΩ	
FCF35R	**10P8R/0402x8**	Convex	1/16W	25V	50V	±5%(J)	±200	10Ω	100KΩ	
FCF370	**10P8R/0602x8**	Convex	1/16W	50V	100V	±5%(J) ±1%(F)	±200	0Ω,10Ω	100KΩ	

Jumper :
・Maximum resistance Rmax < 50mΩ.

Note :
(1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
RCWV：Rated Continue Working Voltage(V)，P：Rated Power(W)，R：Resistance Value(Ω)

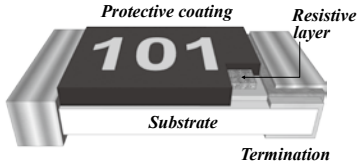
DIMENSIONS



unit: mm

Type	L	W	T	B	G	P	C	A	h1
FCF220	1.00±0.10	1.00±0.10	0.35±0.10	0.20±0.15	0.25±0.17	0.65±0.10	-	0.34±0.10	-
FCF240	2.00±0.10	1.00±0.10	0.45±0.10	0.20±0.10	0.25±0.10	0.50±0.05	0.30±0.05	0.40±0.10	-
FCF241	2.00±0.10	1.00±0.10	0.45±0.10	0.20±0.15	0.25±0.10	0.50±0.05	0.25±0.05	0.25±0.05	-
FCF320	1.60±0.20	1.50±0.10	0.50±0.10	0.30±0.15	0.30±0.15	1.00±0.10	-	0.60±0.10	-
FCF340	3.20±0.20	1.60±0.10	0.50±0.10	0.30±0.20	0.30±0.20	0.80±0.10	0.45±0.10	0.60±0.15	-
FCF341	3.20 +0.20/-0.10	1.60 +0.20/-0.10	0.60±0.10	0.35±0.15	0.50±0.15	0.80±0.10	0.50±0.15	0.60±0.15	-
FCF35R	3.30±0.20	1.60±0.15	0.55±0.10	0.40±0.15	0.40±0.15	0.64±0.05	0.40±0.15	0.50±0.05	-
FCF370	4.00±0.20	1.60±0.15	0.45±0.10	0.30±0.25	0.30±0.20	0.50±0.20	0.30±0.10	0.40±0.20	0.20±0.10

■ RoHS Exemption Free (Pb≤100ppm) Thick-film Lead Free Chip Resistors



FEATURES

- Small size and light weight.
- Suitable for lead free soldering.
- Compatible with wave and reflow soldering.
- RoHS compliant & Halogen free.
- Lead content below100ppm.

APPLICATION

- Mobile phon.
- Digital meter, Consumer electronics, M/B.
- Portable electronics devices.

PART NUMBER

FCF	05	F	T	-	1001	-	G
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR □	Special Code □
FCF Thick Film RoHS Exemption Free	**02** 0402 **03** 0603 **05** 0805 **06** 1206 **12** 1210 **18** 1218 **20** 2010 **25** 2512	**F** =±1% **J** =±5%	**Paper tape** **T** =5Kpcs **V** =10Kpcs **W** =20Kpcs **Plastic tape** **P** = 4Kpcs **Q** =3Kpcs (For 1218)	**"–"** Standard	**XXXX** **>=1R** **1%** 4 digit **5%** 3 digit ("_" means a blank)	No special code- Null special code- "–"	**G:** Green series

RATING

Type		Normal Type Power Rating @ 70℃	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (TCR ; ppm/℃)	Resistance Range Min.	Resistance Range Max.	Standard Resistance Values
FCF02	**0402**	1/16W	50V	100V	±1%(F)	-300/+500	1 Ω	10 Ω	E24 E96
						±100	10.2 Ω	976 KΩ	
						±300	1 MΩ	10 MΩ	
					±5%(J)	-300/+500	1 Ω	10 Ω	E24 Jumper
						±200	11 Ω	910 KΩ	
						±300	1 MΩ	10 MΩ	
FCF03	**0603**	1/10W	50V	100V	±1%(F)	-300/+500	1 Ω	10 Ω	E24 E96
						±100	10.2 Ω	976 KΩ	
						±200	1 MΩ	10 MΩ	
					±5%(J)	-300/+500	1 Ω	10 Ω	E24 Jumper
						±200	11 Ω	910 KΩ	
						±200	1 MΩ	10 MΩ	
FCF05	**0805**	1/8W	150V	300V	±1%(F)	-300/+500	1 Ω	10 Ω	E24 E96
						±100	10.2 Ω	976 KΩ	
						±200	1 MΩ	10 MΩ	
					±5%(J)	-300/+500	1 Ω	10 Ω	E24 Jumper
						±200	11 Ω	910 KΩ	
						±200	1 MΩ	10 MΩ	
FCF06	**1206**	1/4W	200V	400V	±1%(F)	-300/+500	1 Ω	10 Ω	E24 E96
						±100	10.2 Ω	976 KΩ	
						±200	1 MΩ	10 MΩ	
					±5%(J)	-300/+500	1 Ω	10 Ω	E24 Jumper
						±200	11 Ω	910 KΩ	
						±200	1 MΩ	10 MΩ	

FCF-G

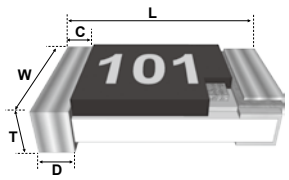
■ RoHS Exemption Free (Pb≤100ppm) Thick-film Lead Free Chip Resistors

RATING

Type		Normal Type Power Rating @ 70℃	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperauture Coefficient of Resistance (TCR ; ppm/℃)	Resistance Range		Standard Resistance Values
							Min.	Max.	
FCF12	**1210**	1/3W	200V	400V	±1%(F)	-300/+500	1 Ω	10 Ω	E24 E96
						±100	10.2 Ω	976 KΩ	
						±200	1 MΩ	10 MΩ	
					±5%(J)	-300/+500	1 Ω	10 Ω	E24 Jumper
						±200	11 Ω	910 KΩ	
						±200	1 MΩ	10 MΩ	
FCF20	**2010**	1/2W	200V	400V	±1%(F)	±100	1 Ω	10 Ω	E24 E96
						±200	10.2 Ω	10 MΩ	
					±5%(J)	±100	1 Ω	10 Ω	E24 Jumper
						±200	11 Ω	10 MΩ	
FCF25	**2512**	1W	250V	500V	±1%(F)	±100	1 Ω	10 Ω	E24 E96
						±200	10.2 Ω	10 MΩ	
					±5%(J)	±100	1 Ω	10 Ω	E24 Jumper
						±200	11 Ω	10 MΩ	
FCF18	**1218**	1W	200V	400V	±1%(F)	±100	1 Ω	10 Ω	E24 E96
						±200	10.2 Ω	10 MΩ	
					±5%(J)	±100	1 Ω	10 Ω	E24 Jumper
						±200	11 Ω	10 MΩ	

Note :
(1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
RCWV：Working Voltage (V)，P：Rated Power (W)，R：Resistance Value (Ω)
Jumper : Max. 50mΩ.

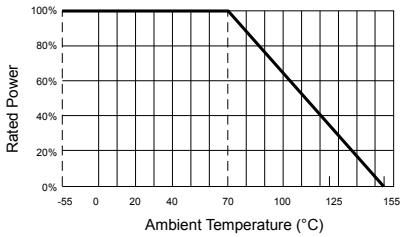
DIMENSIONS



unit: mm

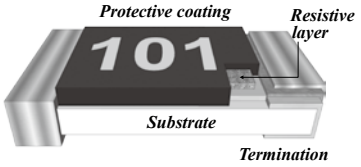
Type 1	L	W	C	D	T
FCF02	1.00±0.05	0.50±0.05	0.20±0.10	0.25±0.10	0.35±0.05
FCF03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FCF05	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FCF06	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.25	0.55±0.10
FCF12	3.10±0.10	2.60±0.15	0.50±0.25	0.50±0.25	0.55±0.10
FCF20	5.00±0.20	2.50±0.20	0.65±0.25	0.60±0.25	0.55±0.10
FCF25	6.40±0.20	3.20±0.20	0.65±0.25	0.90±0.25	0.60±0.10
FCF18	3.05±0.15	4.60±0.20	0.45±0.25	0.50±0.25	0.55±0.10

POWER DE-RATING CURVE



Maximum dissipation in percentage of rated power as a function of the ambient temperature for 0402, 0603, 0805, 1206, 1210, 2010, 2512, 1218

■ Thin Film Lead Free High Precision Chip Resistors



FEATURES

- High reliability and stability of 0.3% and below per customer request.
- Metal Thin Film Ni/Cr/Si,...etc. Resistive element.
- High performance of TCR 50ppm and below per customer request.
- Low current noise.
- Meet AEC-Q200, RoHS compliant.

APPLICATION

- Automotive industry.
- Medical equipment.
- Measuring instrument.
- Portable measuring equipment.
- Communication device

PART NUMBER

FAF	05	F	T	-	1002	P	
Type □□□	Size □□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR	Special Code
FAF Thin Film	**01** 0201 **02** 0402 **03** 0603 **05** 0805 **06** 1206 **12** 1210 **20** 2010 **25** 2512	**T** =±0.01% **A** =±0.05% **B** =±0.1% **C** =±0.25% **D** =±0.5% **F** =±1%	**Paper tape** **T** =5 Kpcs **V** =10Kpcs **U** =15 Kpcs **Plastic tape** **P** =4Kpcs **X** =8Kpcs	**"–"** Standard **A** =1/16W **B** =1/10W **C** =1/8W **D** =1/4W **E** =1/3W **F** =1/2W **G** =3/4W **H** =1W **R** =2/5W **T** =1/20W	**XXXX** **>=1R** **1%** 4 digit **5%** 3 digit ("_" means a blank)	No special code- Null special code- "–" **B** =2PPM **C** =3PPM **W** =5PPM **V** =10PPM **S** =15PPM **Q** =25PPM **P** =50PPM	**"Null"** Standard **HC** =Anti-Sulfuration **M** =Meet AEC-Q200 **MF** =Anti-Sulfuration & AEC-Q200 **MH** =Tantalum nitride Anti- Sulfuration & AEC-Q200

FCF	340	J	T	-	473_		
Type □□□	Size □□□	Tolerance □	Packing □	Watt □	R Value □□□□	TCR □	Special Code
FAF Thin Film Array	**340** 0603x4 (8P4R Convex)	**B** =±0.1% **C** =±0.25% **D** =±0.5% **F** =±1%	**Paper tape** **T** =5 Kpcs **V** =10Kpcs	**"–"** Standard	**XXXX** **>=1R** **1%** 4 digit **5%** 3 digit	No special code- Null special code- "–" **Q** =25PPM **P** =50PPM	**"Null"** Standard

RATING

Standard Type - General High Precision

Standard Type	Power Rating @ 70℃	Max. RCWV (V)	Max. Overload Voltage (V)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance Tolerance (%)	Resistance Range		Resistance Range Meet AEC-Q200		Standard Resistance Values
						Min.	Max.	Min.	Max.	
0201	1/32W	15	30	±25 ±50	±0.1 ±0.25 ±0.5 ±1.0	100Ω	12KΩ	NA	NA	E24 E96
0402	1/16W	50	100			10Ω	255KΩ	10Ω	100KΩ	
0603	1/16W	50	100			3.9Ω	1MΩ	4.7Ω	330KΩ	
0805	1/10W	100	200			4.7Ω	2MΩ	4.7Ω	1MΩ	
1206	1/8W	200	400			1Ω	2.49MΩ	4.7Ω	1MΩ	
1210	1/4W	200	400			4.7Ω	2.49MΩ	10Ω	1MΩ	
2010	1/2W	200	400			4.7Ω	3MΩ	10Ω	1.5MΩ	
2512	3/4W	200	400			1Ω	3MΩ	10Ω	1.5MΩ	
2512	3/4W	200	400					4.7Ω	3MΩ	

Function Type - Power High Precision

Standard Type	Power Rating @ 70℃	Max. RCWV (V)	Max. Overload Voltage (V)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance Tolerance (%)	Resistance Range		Resistance Range Meet AEC-Q200		Standard Resistance Values
						Min.	Max.	Min.	Max.	
0201	1/20W	15	30	±25	±0.5 ±1.0	27Ω	12KΩ	NA	NA	E24 E96
				±50		27Ω	22.1KΩ	NA	NA	
0402	1/10W	50	100	±25 ±50	±0.1 ±0.25 ±0.5 ±1.0	10Ω	255KΩ	10Ω	100KΩ	
0603	1/10W	75	150			3.9Ω	1MΩ	4.7Ω	330KΩ	
0805	1/8W	150	300			4.7Ω	2MΩ	4.7Ω	1MΩ	
1206	1/4W	200	400			1Ω	2.5MΩ	4.7Ω	1MΩ	
1210	2/5W	200	400			4.7Ω	2.5MΩ	10Ω	1MΩ	
2010	3/4W	200	400	±50		4.7Ω	3MΩ	10Ω	1.5MΩ	
2512	1W	200	400			1Ω	3MΩ	10Ω	1.5MΩ	

■ Thin Film Lead Free High Precision Chip Resistors

RATING

Function Type - Special (±10&±15)TCR High Precision

Narrow TCR Type*	Power Rating @ 70℃	Max. RCWV (V)	Max. Overload Voltage (V)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance Tolerance (%)	Resistance Range		Resistance Range Meet AEC-Q200		Standard Resistance Values
						Min.	Max.	Min.	Max.	
0402	1/10W	50	100	±10 ±15	±0.01 ±0.05 ±0.1 ±0.25 ±0.5 ±1.0	10Ω	100KΩ	10Ω	60KΩ	E24 E96
0603	1/10W	75	150			4.7Ω	200KΩ	4.7Ω	150KΩ	
0805	1/8W	150	300			4.7Ω	400KΩ	4.7Ω	400KΩ	
1206	1/4W	200	400			4.7Ω	500KΩ	4.7Ω	500KΩ	
1210	2/5W	200	400			10Ω	600KΩ	10Ω	600KΩ	
2010	3/4W	200	400			10Ω	1MΩ	10Ω	1MΩ	
2512	1W	200	400			10Ω	1.5MΩ	10Ω	1.5MΩ	

Function Type –Special TCR (±2&±3) High Precision

Narrow TCR Type*	Power Rating @ 70℃	Max. RCWV (V)	Max. Overload Voltage (V)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance Tolerance (%)	Resistance Range		Resistance Range Meet AEC-Q200		Standard Resistance Values
						Min.	Max.	Min.	Max.	
0402	1/10W	50	100	±3 ±2	±0.01 ±0.05 ±0.1 ±0.25 ±0.5 ±1.0	10Ω	8KΩ	10Ω	8KΩ	E24 E96
0603	1/10W	75	150			4.7Ω	40KΩ	4.7Ω	40KΩ	
0805	1/8W	150	300			4.7Ω	80KΩ	4.7Ω	80KΩ	
1206	1/4W	200	400			4.7Ω	120KΩ	4.7Ω	120KΩ	
1210	2/5W	200	400			4.7Ω	150KΩ	10Ω	150KΩ	
2010	3/4W	200	400			4.7Ω	360KΩ	10Ω	360KΩ	
2512	1W	200	400			4.7Ω	600KΩ	10Ω	600KΩ	

Anti-Sulfuration Type- Power High Precision

Narrow TCR Type*	Power Rating @ 70℃	Max. RCWV (V)	Max. Overload Voltage (V)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance Tolerance (%)	Resistance Range		Resistance Range Meet AEC-Q200		Standard Resistance Values
						Min.	Max.	Min.	Max.	
0402	1/10W	50	100	±25 ±50	±0.1 ±0.25 ±0.5 ±1.0	10Ω	255KΩ	10Ω	100KΩ	E24 E96
0603	1/10W	75	150			4.7Ω	1MΩ	4.7Ω	330KΩ	
0805	1/8W	150	300			4.7Ω	2MΩ	10Ω	1MΩ	
1206	1/4W	200	400			1Ω	2.5MΩ	10Ω	1MΩ	
1210	2/5W	200	400			4.7Ω	2.5MΩ	10Ω	1MΩ	
2010	3/4W	200	400			4.7Ω	3MΩ	10Ω	1.5MΩ	
2512	1W	200	400			1Ω	3MΩ	10Ω	1.5MΩ	

Tantalum nitride Type - Special TCR High Precision

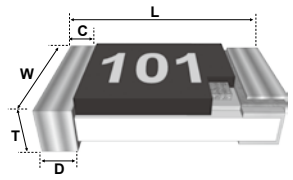
Narrow TCR Type*	Power Rating @ 70℃	Max. RCWV (V)	Max. Overload Voltage (V)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance Tolerance (%)	Resistance Range		Standard Resistance Values
						Min.	Max.	
0402	1/16W	50	100	±10 ±15 ±25 ±50	±0.1 ±0.25 ±0.5 ±1.0	40Ω	35KΩ	E24 E96
0603	3/20W	75	150			40Ω	130KΩ	
0805	1/5W	100	200			10Ω	350KΩ	
1206	2/5W	200	400			10Ω	1MΩ	

Type - Array

Type	Normal Type Power Rating @ 70℃	Max. RCWV (V)	Max. Overload Voltage (V)	Temperauture Coefficient of Resistance (ppm/℃)	Resistance Tolerance (%)	Resistance Range		Standard Resistance Values
						Min.	Max.	
340 : 0603x4	1/10W	75	150	±25 ±50	±0.1 ±0.25 ±0.5 ±1.0	20Ω	200KΩ	E24 E96

■ Thin Film Lead Free High Precision Chip Resistors

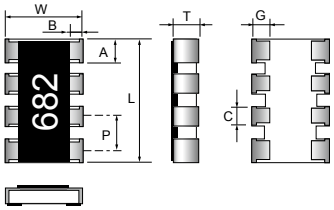
DIMENSIONS



unit: mm

Size	L	W	C	D	T
0201	0.60±0.03	0.30±0.03	0.10±0.05	0.15±0.05	0.23±0.03
0402	1.00±0.10	0.50±0.05	0.30±0.15	0.30±0.15	0.35±0.05
0603	1.55±0.10	0.80±0.10	0.25±0.15	0.30±0.15	0.45±0.15
0805	2.00±0.10	1.25±0.10	0.25±0.20	0.40±0.20	0.50±0.15
1206	3.05±0.15	1.55±0.15	0.40±0.20	0.40±0.20	0.55±0.15
1210	3.10±0.10	2.60±0.15	0.50±0.20	0.50±0.20	0.55±0.10
2010	5.00±0.10	2.50±0.15	0.60±0.20	0.60±0.25	0.55±0.10
2512	6.35±0.10	3.20±0.15	0.60±0.20	0.90±0.25	0.55±0.10

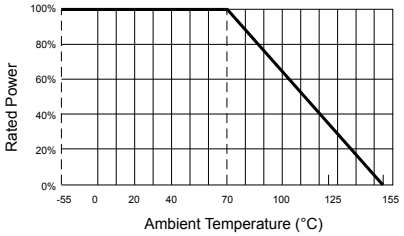
Note : Precise data Pls refer to detail's spec.



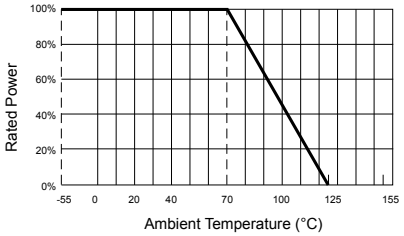
unit: mm

Type	L	W	A	B	P	C	G	T
FAF340 0603x4 Convex Type	3.20±0.15	1.50±0.15	0.60±0.10	0.40±0.15	0.80±0.10	0.40±0.10	0.30±0.15	0.45±0.10

POWER DE-RATING CURVE



for 2512, 2010, 1210, 1206, 0805, 0603, 0402. Array



for 0201

APPENDIX

RESISTANCE MARKING

E 12 series
E 24 series

3 digit marking for ±1%, ±5% E24 / E12 / E6
examples: **473** 47×10^{3} =47KΩ , **1R5** =1.5Ω

E 96 series

4 digit marking for E96
examples: **1542** 154×10^{2} =15K4Ω , **22R1** =22.1Ω

3 digit marking for E96 - 0603
examples: **02C** (Table 1) 102×10^{2} =10K2Ω

- No Marking of 0402 / 0201 / 01005.

0603 1% MARKING TABLE (TABLE 1)

Code	E48	E96	Code	E48	E96	Code	E48	E96	Code	E48	E96
01	100	100	25	178	178	49	316	316	73	562	562
02		102	26		182	50		324	74		576
03	105	105	27	187	187	51	332	332	75	590	590
04		107	28		191	52		340	76		604
05	110	110	29	196	196	53	348	348	77	619	619
06		113	30		200	54		357	78		634
07	115	115	31	205	205	55	365	365	79	649	649
08		118	32		210	56		374	80		665
09	121	121	33	215	215	57	383	383	81	681	681
10		124	34		221	58		392	82		698
11	127	127	35	226	226	59	402	402	83	715	715
12		130	36		232	60		412	84		732
13	133	133	37	237	237	61	422	422	85	750	750
14		137	38		243	62		432	86		768
15	140	140	39	249	249	63	442	442	87	787	787
16		143	40		255	64		453	88		806
17	147	147	41	261	261	65	464	464	89	825	825
18		150	42		267	66		475	90		845
19	154	154	43	274	274	67	487	487	91	866	866
20		158	44		280	68		499	92		887
21	162	162	45	287	287	69	511	511	93	909	909
22		165	46		294	70		523	94		931
23	169	169	47	301	301	71	536	536	95	953	953
24		174	48		309	72		549	96		976

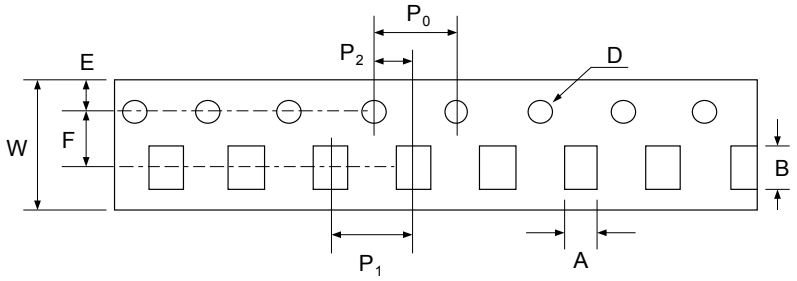
Code	A	B	C	D	E	F	G	H	X	Y	Z
Multiplier	10^{0}	10^{1}	10^{2}	10^{3}	10^{4}	10^{5}	10^{6}	10^{7}	10^{-1}	10^{-2}	10^{-3}

IEC-63 NOMINAL RESISTANCE / CAPACITANCE

E12	**100**																							
E3	**100**								**220**								**470**							
E6	**100**				**150**				**220**				**330**				**470**				**680**			
E12	100		120		150		180		220		270		330		390		470		560		680		820	
E24	100	110	120	130	150	160	180	200	220	240	270	300	330	360	390	430	470	510	560	620	680	750	820	910
E96	100	102	121	124	147	150	178	182	215	221	261	267	316	324	383	392	464	475	562	576	681	698	825	845
	105	107	127	130	154	158	187	191	226	232	274	280	332	340	402	412	487	499	590	604	715	732	866	887
	110	113	133	137	162	165	196	200	237	243	287	294	348	357	422	432	511	523	619	634	750	768	909	931
	115	118	140	143	169	174	205	210	249	255	301	309	365	374	442	453	536	549	649	665	787	806	953	976

TAPE AND REEL PACKAGE

Taping specs are according to EIA RS-481

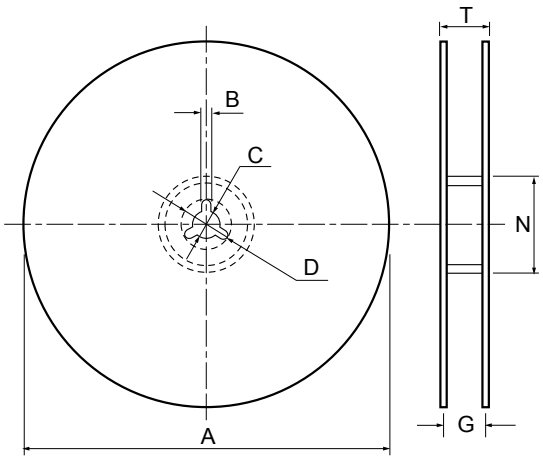


• Accumulated dimensional tolerance 40±0.2mm

unit: mm

Size	A	B	W	F	E	P_1	P_2	P_0	D
01005	0.24±0.03	0.45±0.03	8.00±0.20	3.50±0.05	1.75±0.10	2.00±0.05	2.00±0.05	4.00±0.10	1.50+0.10/-0
0201	0.37±0.05	0.67±0.05	8.00±0.20	3.50±0.05	1.75±0.10	2.00±0.05	2.00±0.05	4.00±0.10	1.50+0.10/-0
0402	0.70±0.10	1.20±0.10	8.00±0.30	3.50±0.05	1.75±0.10	2.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
0603	1.10±0.20	1.90±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
0805	1.65±0.20	2.40±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
1206	2.00±0.20	3.60±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
1210	3.00±0.20	3.60±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
2010	2.80±0.20	5.50±0.20	12.00±0.30	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
2512	3.50±0.20	6.70±0.20	12.00±0.30	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0

Reel Package



unit: mm

Size	Packaging Q'ty	Reel Diameter	A	N	C	D	B	G	T
01005	20Kpcs / Reel	7″ reel	178.0±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	9.0±1.0	14.9 max.
0201 0402	15Kpcs / Reel	7″ reel	178.0±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
	10Kpcs / Reel	7″ reel	178.0±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
	20Kpcs / Reel	10″ reel	254.0±2.0	100.0±1.0	13.5±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
	50Kpcs / Reel	13″ reel	330.0±2.0	100.0±1.0	13.5±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
0603 0805 1206 1210	5Kpcs / Reel	7″ reel	178.0±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
	10Kpcs / Reel	10″ reel	254.0±2.0	100.0±1.0	13.5±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
	20Kpcs / Reel	13″ reel	330.0±2.0	100.0±1.0	13.5±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
2010 2512	4Kpcs / Reel	7″ reel	178.0±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	13.8±1.5	16.7 max.
	8Kpcs / Reel	10″ reel	254.0±2.0	100.0±1.0	13.5±0.5	20min	2.0±0.5	13.8±1.5	16.7 max.
	16Kpcs / Reel	13″ reel	330.0±2.0	100.0±1.0	13.5±0.5	20min	2.0±0.5	13.8±1.5	20.0 max.

APPENDIX

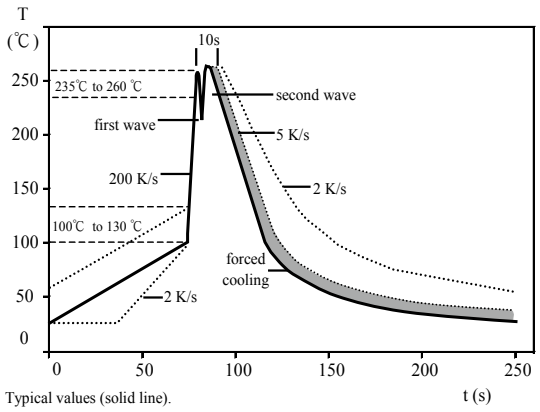
POWER CODE TABLE (TABLE 2)

Code	Power	Code	Power	Code	Power	Code	Power
T	1/20W	**S**	1/5W	**Q**	2/3W	**K**	3W
A	1/16W	**R**	2/5W	**G**	3/4W	**L**	4W
B	1/10W	**D**	1/4W	**H**	1W	**M**	5W
C	1/8W	**E**	1/3W	**I**	1.5W	**N**	10W
U	3/20W	**F**	1/2W	**J**	2W		

TCR CODE TABLE (TABLE 3)

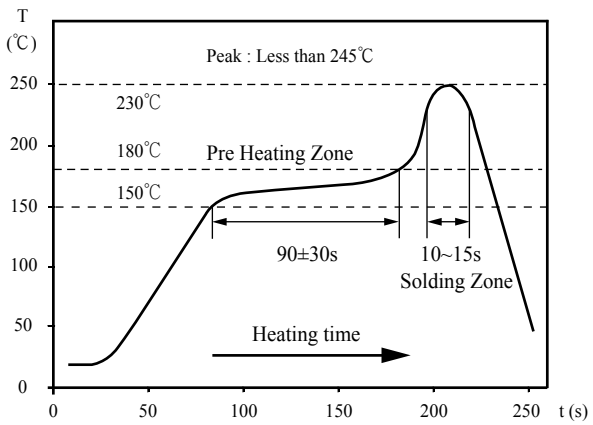
Code	TCR	Code	TCR	Code	TCR	Code	TCR
G	1200	**L**	200	**X**	70	**W**	5
H	1000	**Y**	150	**P**	50	**A**	1
I	800	**Z**	250	**Q**	25	**B**	2
J	600	**M**	350	**S**	15	**C**	3
K	400	**N**	100	**V**	10		

SOLDERING TEMPERATURE CURVE



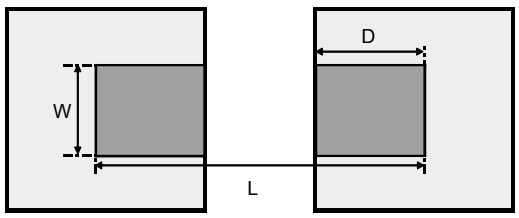
Typical values (solid line).
Process limits (dotted line).

WAVE soldering.



IR Reflow soldering.

RECOMMAND SOLDER PAD DIMENSION



unit: mm

Type	W	D	L
FPF03	0.9	1	3
FPF05	1.3	1.15	3.5
FPF06	1.8	1.3	4.7
FPF12	3	1.3	4.7
FPF20	3	1.5	6.8
FPF25	3.7	2.45	7.6

* FPF/FPS SERIES

MEMO

COIL-CONTENTS

	Product	Product Classification	Photo	Series	Main Dimensions (mm) L	W	H	Inductance	Rated Current	Page
SMD Signal	Inductor	Air Wound Coil		291A	2.92	3.05	3.18	2.5nH~18.5nH	4.0A	84
				291B	5.84	3.05	3.18	17.5nH~43.0nH	4.0A	
				292AR	1.83	1.42	1.37	1.65nH~5.45nH	1.6A	
				292BR	3.66	1.42	1.37	5.6nH~12.55nH	1.6A	
				293A	4.83	3.81	4.20	22nH~120nH	3.5A~1.5A	
				294A	7.98	6.35	5.90	90nH~538nH	3.5A~2.0A	
				29B	5.59	5.84	4.95	3.7nH~17.5nH	7A	
				29CAR	3.94	4.19	2.01	5.5nH~13nH	4A	
				29CBR	6.22	3.43	2.01	16nH~27nH	4A	
				LSQ0806A	2.591	1.829	1.397	5.5nH~19.4nH	2.9A	85
				LSQ0807A	2.591	1.829	1.524	6.9nH~22nH	2.7A	
				LSQ0908A	2.972	2.134	1.829	8.1nH~27.3nH	4.4A	
				LSQ1111A	3.300	2.670	2.790	27nH~47nH	5.5A~4.4A	
				LSQ1515A	6.094	3.738	3.908	47nH~82nH	5.6A~4.9A	
				LSQ2222A	11.940	5.590	5.690	90nH~300nH	5A~3.7A	
				LSQ2929A	14.000	7.490	7.240	330nH~500nH	4.7A~4.3A	
		Ceramic Chip		0402CP	1.19	0.64	0.66	1.0nH~120nH	1360mA~50mA	86
				FEC0603CP	1.80	1.12	1.02	1.6nH~390nH	700mA~100mA	
				FEC0805CP	2.29	1.73	1.52	2.2nH~820nH	800mA~180mA	
				FEC1008CP	2.92	2.79	2.03	10nH~4700nH	1000mA~260mA	87
				1210C	3.42	2.80	2.30	4.7nH~3300nH	1000mA~50mA	
				1812CP	4.95	3.80	3.43	82nH~1200nH	1500mA~480mA	
				0603HQ	1.70	1.02	0.92	1.8nH~390nH	2100mA~170mA	
				0805HQ	2.40	1.65	1.45	6.2nH~51nH	1600mA~1000mA	
				1008HQ	2.92	2.79	2.03	3nH~100nH	1600mA~1000mA	
		Ferrite Chip		0603F-DLRH	1.60	1.00	1.00	2.2uH~22uH	580mA~200mA	88
				0603F-TLRH	1.65	1.15	1.05	0.047uH~10uH	1500mA~270mA	
				0805F-DLRH	2.20	1.40	1.30	1uH~22uH	1300mA~340mA	
				0805F-TLRH	2.40	1.60	1.40	0.47uH~33uH	750mA~145mA	
				1008F-TLRH	2.70	2.30	1.90	1uH~33uH	1000mA~236mA	
				1210F-TLRH	3.60	2.80	2.60	1uH~680uH	1200mA~76mA	
	Balun	Balun Transformer		BIH2012OB	2.20	1.40	1.40	-	-	89
				BIY3520UM-001H	5.80	4.60	3.50	-	-	
				BIY3520UM-002H	5.80	4.60	3.50	-	-	
	Choke	Common Mode Choke		SCM2012F	2.20	1.22	1.22	67Ω~600Ω	400mA~240mA	90
				SCM2012FH	2.20	1.22	1.22	67Ω~120Ω	400mA~330mA	
				SCM3216F	3.20	1.60	1.90	90Ω~2200Ω	400mA~200mA	
				SCM7038F	7.50	6.50	3.80	225Ω~800Ω	5.0A~3.0A	
SMD Power	Inductor	Shielded Power Inductor		MCS20FC-xxxMMP	2.2	1.8	1.0	0.24uH~2.2uH	4.5A~1.5A	90
				MCS20FC-xxxMHC	2.2	1.8	1.0	0.33uH~2.2uH	4.0A~2.0A	
				MCS25GC-xxxMMP	2.7	2.2	1.0	0.22uH~4.7uH	5.3A~1.22A	
				MCS25GC-xxxMHC	2.7	2.2	1.0	0.33uH~4.7uH	4.8A~1.4A	
				MCS25GD-xxxMMP	2.7	2.2	1.2	0.47uH~4.7uH	4.18A~1.4A	
				MCS25GD-xxxMHC	2.7	2.2	1.2	0.47uH~2.2uH	4.9A~2.2A	
				MCS0412-xxxME1	4.75	4.45	1.2	0.15uH~4.7uH	7.5A~1.8A	91
				MCS0420-xxxMN2	4.70	4.3	2.0	0.10uH~10uH	12A~1.2A	
				MCS0420-xxxME1	4.75	4.45	2.0	0.10uH~22uH	13A~1.2A	
				MCS0515-xxxME1	5.70	5.4	1.5	0.47uH~4.7uH	9A~3.5A	
				MCS0518-xxxME1	5.70	5.4	1.8	0.47uH~10uH	10.5A~2.5A	
				MCS0518-xxxMN1	5.70	5.5	1.8	0.47uH~1.0uH	11A~8.5A	
				MCS0530-xxxMN2	5.70	5.5	3.0	0.20uH~10uH	18A~2.5A	
				MCS0530-xxxME1	5.70	5.4	3.0	0.10uH~10uH	25A~3.2A	
				MCS0618-xxxME1	7.30	6.8	1.8	0.10uH~22uH	25A~1.8A	
				MCS0618-xxxMN1	7.40	6.9	1.8	0.10uH~4.7uH	18.0A~3.0A	
				MCS0624-xxxMN1	7.30	6.8	2.4	0.22uH~10uH	21A~2.5A	
				MCS0624-xxxME1	7.30	6.8	2.4	0.22uH~22uH	21A~2.0A	
				MCS0630-xxxMNx	7.30	6.8	3.0	0.22uH~15uH	23A~3.0A	
				MCS0630-xxxME1	7.30	6.8	3.0	0.1uH~33uH	32A~2A	
				MCS1040-xxxMNx	11.50	10.3	4.0	0.22uH~68uH	35A~3.5A	92
				MCS1070-xxxMN1	11.50	7.2	5.0	0.3uH~0.33uH	36A	
				MCS1250-xxxMN1	14.00	13.1	5.0	0.10uH~47uH	55A~2A	
				MCS1265-xxxMN1	14.00	13.1	6.5	0.10uH~68uH	60A~2.0A	
				MCS1770-xxxMN1	18.30	17.10	7.0	0.82uH~100uH	56.5A~5.0A	

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	Product	Product Classification	Photo	Series	Main Dimensions (mm) L	W	H	Inductance	Rated Current	Page
SMD Power	Inductor	Shielded Power Inductor		MCS0312-XXXMT1	3.70	3.4	1.2	0.47uH~10uH	4.5A~0.8A	92
				MCS0320-XXXMT1	3.70	3.4	2.0	0.10uH~10uH	9.5A~1.1A	
				MCS0412-XXXxT1	4.70	4.31	1.2	0.10uH~22uH	10A~0.6A	
				MCS0418-XXXxT1	4.70	4.31	1.8	0.56uH~10uH	5.0A~1.4A	
				MCS0420-XXXxT1	4.70	4.31	2.0	0.10uH~22uH	10A~1.0A	
				MCS0512-XXXxT1	6.00	5.40	1.2	0.10uH~15uH	13A~1.2A	93
				MCS0515-XXXxT1	6.00	5.40	1.5	0.15uH~22uH	14A~1.0A	
				MCS0518-XXXMT1	6.00	5.40	1.8	0.22uH~10uH	11A~1.9A	
				MCS0520-XXXxT1	6.00	5.40	2.0	0.10uH~22uH	16A~1.2A	
				MCS0530-XXXxT1	6.00	5.40	3.0	0.10uH~33uH	20A~1.5A	
				MCS0612-XXXxT1	7.30	6.90	1.2	0.15uH~22uH	13A~1.0	
				MCS0615-XXXxT1	7.30	6.90	1.5	0.10uH~22uH	15A~1.2A	
				MCS0618-XXXMT1	7.30	6.90	1.8	0.10uH~10uH	16A~2.0A	
				MCS0620-XXXxT1	7.30	6.90	2.0	0.10uH~22uH	18A~1.2A	
				MCS0624-XXXxT1	7.60	6.90	2.4	0.10uH~22uH	26A~1.4A	
				MCS0630-XXXxT1	7.60	6.90	3.0	0.10uH~47uH	28A~2.0A	94
				MCS0640-XXXxT1	7.60	6.90	4.0	0.12uH~33uH	30A~1.8A	
				MCS0650-XXXMT1	7.60	6.90	5.0	0.33uH~68uH	22A~1.1A	
				MCS1040-XXXxT1	11.50	10.30	4.0	0.15uH~82uH	40A~1.2A	
				MCS1050-XXXxT1	11.50	10.30	5.0	0.22uH~100uH	40A~1.7A	
		Multilayer Power Inductor		FH160810	1.60	0.80	0.95	0.33uH~2.2uH	0.35A~0.65A	94
				FH201610	2.00	1.60	1.00	0.47uH~4.7uH	1.6A~0.9A	
				FH201210	2.00	1.25	1.00	0.47uH~4.7uH	1.2A~0.7A	
				FH252010	2.50	2.00	1.00	0.47uH~4.7uH	1.8A~1.1A	
		Ferrite Resin Shielded Power Inductor		CSM0310D	3.10	3.10	1.00	1.0uH~47uH	1.525A~0.27A	95
				CSM0315D	3.10	3.10	1.50	1.0uH ~ 100uH	2.10A~0.25A	
				CSM0645D	6.20	6.10	4.50	1.0uH~100uH	6.0A~0.8A	
				CSM0840D	8.20	8.20	4.20	0.9uH~100uH	8.0A~1.10A	
				CSMV2012D	2.10	2.10	1.20	1.0uH~4.7uH	1.65A~0.75A	95
				CSMS2012D	2.10	2.10	1.20	1.0uH~4.7uH	1.7A~0.91A	
				CSMH2410D	2.50	2.50	1.00	0.68uH~22uH	1.57A~0.3A	
				CSMH2412D	2.50	2.50	1.20	0.47uH~10uH	2.1A~0.45A	
				CSMH0310D	3.10	3.10	1.00	1.2uH~22uH	1.48A~0.41A	
				CSMH0312D	3.10	3.10	1.20	1.0uH~22uH	1.71A~0.5A	
				CSMS0315D	3.10	3.10	1.50	1.0uH~22uH	2.1A~0.47A	96
				CSMS0410D	4.20	4.20	1.00	1.0uH~22uH	1.9A~0.5A	
				CSMS0412D	4.20	4.20	1.20	1.0uH~22uH	2.2A~0.62A	
				CSMS0418D	4.20	4.20	1.80	1.0uH~100uH	3.2A~0.28A	
				CSMS0510D	5.10	5.10	1.00	1.0uH~22uH	1.75A~0.45A	
				CSMS0512D	5.10	5.10	1.20	1.0uH~15uH	2.3A~0.64A	
				CSMS0514D	5.10	5.10	1.40	0.47uH~22uH	3.3A~0.55A	
				CSMS0520D	5.10	5.10	2.00	1.0uH~22uH	3.6A~1.0A	
				CSMS0540D	5.10	5.10	4.00	1.5uH~47uH	4.5A~0.9A	
				CSMS0610D	6.20	6.20	1.00	1.5uH~22uH	1.9A~0.7A	
				CSMS0612D	6.20	6.20	1.20	2.5uH~100uH	1.8A~0.32A	
				CSMS0620D	6.20	6.20	2.00	0.8uH~22uH	4.1A~0.95A	
				CSMS0628D	6.20	6.20	2.80	0.9uH~100uH	4.6A~0.66A	
				CSMS0645D	6.20	6.20	4.50	1.0uH~100uH	4.5A~0.75A	97
				CSMS0840D	8.20	8.20	4.20	0.9uH~22uH	7.8A~2.2A	
				CSCA2016D	2.10	1.70	1.00	0.24uH~4.7uH	3.0A~0.95A	97
				CSCA2510D	2.50	2.00	1.00	0.47uH~4.7uH	3.2A~1.1A	
				CSCA2520D	2.70	2.20	1.20	0.47uH~4.7uH	3.4A~1.3A	
				CSME0315D	3.00	3.00	1.50	1uH~22uH	2.1A~0.47A	97
				CSME0412D	4.00	4.00	1.20	10	1.1	
				CSME0418D	4.00	4.00	1.85	1uH~100uH	3.2A~0.28A	
				CSME0430D	4.00	4.00	3.00	0.47uH~180uH	3.5A~0.35A	
				CSME0520D	5.00	5.00	2.20	1uH~68uH	3.6A~0.53A	
				CSME0540D	5.00	5.00	4.00	1uH~100uH	4.9A~0.7A	
				CSMW0315D	3.00	3.00	1.50	1uH~47uH	2.35A~0.35A	98
				CSMW0418D	4.00	4.00	1.85	1uH~220uH	2A~0.17A	
				CSMW0430D	4.00	4.00	3.00	1uH~470uH	4.15A~0.2A	
				CSMW0520D	5.20	5.20	2.00	1uH~33uH	3.8A~0.8A	
				CSMW0540D	5.00	5.00	4.00	1.5uH~47uH	4.3A~1A	
				CSMW0840D	8.00	8.00	4.20	1.5uH	7.8	

■ SMD Air Wound Coil

ELECTRICAL SPECIFICATION

Size	291A		291B		292AR		292BR		293A		294A		29B		29CAR		29CBR	
Inductance (nH)	Q	DCR (mΩ)	Q	DCR (mΩ)	Q	DCR (mΩ)	Q	DCR (mΩ)	Q	DCR (mΩ)	Q	DCR (mΩ)	Q	DCR (mΩ)	Q	DCR (mΩ)	Q	DCR (mΩ)
1.65					100	4												
2.5	145	1.1																
2.55					100	5												
3.7													100	2				
3.85					100	6												
5	140	1.8																
5.45					100	8												
5.5															115	2.6		
5.6							100	9										
6.6													100	2				
7.15							100	10										
8	140	2.6																
8.8							100	12										
9															120	3.4		
9.85							100	13										
12													140	2				
12.5	137	3.4																
12.55							100	14										
13															100	3.9		
16																	110	5.2
17.5			112	4.5									140	2				
18																	110	6
18.5	132	3.9																
22			112	5.2					100	4.2								
23																	110	6.8
27									100	4							110	7.9
28			112	6														
33									100	4.8								
35.5			112	6.8														
39									100	4.4								
43			112	7.9														
47									100	5.6								
56									100	6.2								
68									100	8.2								
82									100	9.4								
90											95	15						
100									100	12.3								
111											87	15						
120									100	17.3								
130											87	20						
169											95	25						
206											95	30						
222											92	35						
246											95	35						
307											95	35						
380											95	50						
422											95	60						
491											95	65						
538											87	90						

■ SMD Square Air Wound Coil

ELECTRICAL SPECIFICATION

Size	LSQ0806A		LSQ0807A		LSQ0908A		LSQ1111A		LSQ1515A		LSQ2222A		LSQ2929A	
Inductance (nH)	Q	DCR(mΩ)	Q	DCR(mΩ)	Q	DCR(mΩ)	Q	DCR(mΩ)	Q	DCR(mΩ)	Q	DCR(mΩ)	Q	DCR(mΩ)
5.5	60	3.4												
6	64	6												
6.9			100	6										
8.1					130	6								
8.9	90	7												
10.2			100	7										
11.2			90	6.3										
12.1					130	7								
12.3	90	8												
13.7			100	8										
14.7					90	7.2								
15.7	90	9												
16.6					130	8								
17			100	9										
19.4	90	10												
21.5					130	9								
22			100	10										
23					130	10								
25					130	10								
27							200	8.1						
27.3					130	10								
30							200	8.3						
33					100	12	200	9.5						
36							200	9.8						
39							200	10						
43							200	10.8						
47							200	11.3	230	6.35				
68									230	8.6				
82									230	9.4				
90											140	5.5		
110											140	6.5		
130											140	7.5		
160											140	8.25		
180											140	9.5		
220											140	11		
270											140	12.5		
300											150	13.8		
330													180	12.5
360													180	13.5
390													180	14.5
430													180	15.5
500													180	16.5

FECxxxxCP

■ SMD Wire Wound Ceramic Chip Inductors

ELECTRICAL SPECIFICATION

Size	0402CP		FEC0603CP		FEC0805CP	
Inductance (nH)	Q	Irms (mA)	Q	Irms (mA)	Q	Irms (mA)
1	16	1360				
1.2	16	740				
1.6			24	700		
1.8	16	1040	16	700		
1.9	16	1040				
2	16	1040				
2.1			20	700		
2.2	19	960	20	700	35	600
2.4	15	790				
2.7	16	640			80	600
2.8					80	800
2.9					50	600
3					65	800
3.3	19	840	20	700	35	600
3.6	19	840	22	700		
3.9	19	840	22	700		
4.1	18	700				
4.3	18	700	22	700		
4.7	15	640	20	700		
5.1	20	800	20	700		
5.6	20	760	15	700	65	600
6.1			25	700		
6.2	20	760				
6.8	20	680	27	700	50	600
7.3	20	680				
7.5	22	680	28	700	50	600
8.2	22	680	25	700	50	600
8.4			28	700		
8.5			28	700		
8.7	18	480	28	700	50	400
9	22	680				
9.1	22	680				
9.5	18	480	28	700		
10	21	480	31	700	60	600
11	24	640	33	700		
12	24	640	35	700	50	600
13	24	440				
14			35	700		
15	24	560	35	700	50	600
16	24	560	34	700		
18	25	420	35	700	50	600
19	24	480				
20	25	420	40	700		
22	25	400	38	700	55	500
23	22	400				
24	25	400	37	700	50	500
27	24	400	40	600	55	500
30	25	400	37	600		
33	24	400	40	600	60	500
36	24	320	38	600	55	500
39	25	200	40	600	60	500
40	24	320				
43	25	100	39	600	60	500
47	20	150	38	600	60	500
51	25	100				
56	22	100	38	600	60	500
57	22	100				
62	22	100	37	600		
68	22	100	37	600	60	500
72			34	400		
75	20	50				
82	20	50	34	400	65	400
91	22	50	30	400	65	400
100	20	30	34	400	65	400

Size	0402CP		FEC0603CP		FEC0805CP	
Inductance (nH)	Q	Irms (mA)	Q	Irms (mA)	Q	Irms (mA)
110			32	300	50	400
120	20	50	32	300	50	400
130			30	300		
150			28	280	50	400
160					50	400
180			25	240	50	400
200			25	200	50	400
220			25	200	50	400
240					44	350
250					50	350
260			25	200		
270			24	170	48	350
300					48	300
330			24	185	48	300
360					35	300
390			25	100	48	300
430			25	100	33	190
470			25	80	33	250
560					23	230
620					23	190
680			25	60	23	190
820					23	190
910					24	170
1000					23	170

■ SMD Wire Wound Ceramic Chip Inductors

ELECTRICAL SPECIFICATION

Size	FEC1008CP		1210C		1812CP		0603HQ		0805HQ		1008HQ	
Inductance (nH)	Q	Irms (mA)	Q	Irms (mA)	Q	Irms (mA)	Q	Irms (mA)	Q	Irms (mA)	Q	Irms (mA)
1.8							23	2100				
2.2							13	900				
3											70	1600
3.3							32	1900				
3.6							40	1900				
3.9							35	1600				
4.1											75	1600
4.3							30	1300				
4.7			50	600								
5.6			50	600			48	1700				
6							49	1700				
6.2									88	1600		
6.8							42	1400				
7.2							48	1400				
7.5							41	1300				
7.8											75	1600
8.2	50	1000					46	1400				
8.7							46	1400				
9.1							40	1400				
9.5							49	1400				
10	50	1000	60	600			49	1400			60	1600
11							41	1400				
12	50	1000	60	600			37	1100	80	1600	70	1500
15	50	1000	60	600			48	1200				
16							45	1100	72	1500		
18	50	1000	60	600			41	1200	75	1400	62	1400
20									70	1400		
22	55	1000	60	600			44	850			62	1400
23							40	850				
24	50	1000					42	1100				
27	55	1000	60	600			44	780	75	1300		
30							49	920	65	1200		
33	60	1000	60	600			45	680			75	1300
36	60	1000					44	720			65	1300
39	60	1000	60	600			48	680	65	1100	75	1300
43							45	810				
47	65	1000	60	600			47	680			75	1200
48									65	1200		
51							49	660	65	1000		
56	65	1000	60	600			50	610			75	1200
68	65	1000	60	600			46	600			80	1100
72							46	550				
75							46	500				
82	60	1000	60	600	70	1500	45	510			80	1100
91			60	1000			45	440				
100	60	650	60	1000	70	1150	49	470			62	1000
110							47	440				
120	60	650	60	500	70	1150	47	420				
150	45	580	60	500	75	1150						
180	45	620	60	500	80	1150	48	310				
200	50	500					47	280				
210							48	280				
220	45	500	60	500	80	940	47	280				
240	50	500										
250							45	240				
270	45	500	50	500	85	940	46	260				
300	45	660					47	220				
330	45	450	50	500	80	850	46	180				
360	45	660	50	600			47	170				
390	45	470	50	500	80	850	47	170				
430	45	600										
470	45	470	50	400								
560	45	400	50	400								
620	45	300										
680	45	400	50	400								
750	45	360										
820	45	400	50	350								
910	35	380	50	350								
1000	35	370	45	280								
1200	35	310	45	250	62	480						
1500	28	330	45	220								
1800	28	300	45	180								
2000	25	280										
2200	28	280	45	150								
2700	22	290										
3300	22	290	25	150								
3900	20	260										
4700	20	260										
5600	16	240										
8200	15	170										
10000	15	150										
12000	15	130										
15000	15	120										

0603F / 0805F

■ SMD Wire Wound Ferrite Chip Inductors

ELECTRICAL SPECIFICATION

Size	0603F-DLRH		0603F-TLRH	
Inductance (nH)	Q	Irms (mA)	Q	Irms (mA)
0.047			17	1500
0.072			17	1500
0.1			17	1500
0.15			17	1450
0.18			17	1400
0.33			17	900
0.39			17	1100
0.47			17	1050
0.56			17	850
0.68			17	850
0.82			17	750
0.91			17	670
1			17	600
1.2			17	550
1.5			17	540
1.8			17	520
2.2	16	580	17	500
2.7			17	480
3.3			17	440
3.9			17	430
4.7	16	420	18	420
5.6			18	350
6.8	16	340	19	330
7.8			17	320
8.2			17	300
10	14	280	19	270
15	14	240		
22	14	200		

Size	0805F-DLRH		0805F-TLRH	
Inductance (nH)	Q	Irms (mA)	Q	Irms (mA)
0.47			10	750
0.56			10	730
0.68			10	670
0.82			10	650
1	14	1300	10	615
1.2			10	550
1.5			10	520
1.8			10	500
2.2	13	1040	10	420
2.7			10	410
3.3			10	385
3.9			10	372
4.7	14	840	10	345
5.6			10	335
6.8			10	315
8.2			10	295
10	14	560	10	260
12			10	250
15	15	380	10	215
18			10	195
22	15	340	10	180
27			10	170
33			10	145

1008F / 1210F

■ SMD Wire Wound Ferrite Chip Inductors

ELECTRICAL SPECIFICATION

Size	1008F		1210F	
Inductance (nH)	Q	Irms (mA)	Q	Irms (mA)
1	12	1000	10	1200
1.5	12	850	10	1000
2.2	12	775	10	880
2.7			10	830
3.3	12	715	10	775
4.7	12	505	10	710
6.8	12	432	10	660
8.2	12	410		
10	12	392	10	570
15	12	342	10	440
22	12	260	10	400
33	12	236	10	285
39			10	270
47			10	260
68			10	235
100			10	190
150			10	140
220			10	115
330			10	98
470			10	86
680			10	76

BIH2012OB

■ SMD Balun Transformer

ELECTRICAL SPECIFICATION

BIH2012OB			
Part Number	Impedance (Ω)	Frequency Range	Insertion Loss(dB)
BIH2012OB-001H	50/50	40MHz to 0.86GHz	2.5
BIH2012OB-002H	75/75	50MHz to 1.2GHz	1.2
BIH2012OB-003H	75/75	1.0GHz to 1.5GHz	1.4
BIH2012OB-004H	75/75	50MHz to 1.2GHz	1.2
BIH2012OB-005H	50/50	400MHz to 1.8GHz	2.2
BIH2012OB-006H	75/75	400MHz to 1.8GHz	2
BIH2012OB-007H	75/75	50MHz to 1.2GHz	1.2

BIY3520UM

■ SMD Balun Transformer

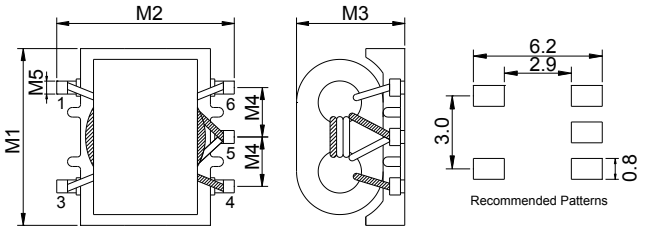
ELECTRICAL SPECIFICATION

Size	BIY3520UM-001H
INSERTION LOSS (Pin 1 – Pin 6)	0.7dB MAX. 5~85MHz
INSERTION LOSS (Pin 1 – Pin 4)	0.7dB MAX. 5~85MHz
AMPLITUDE BALANCE	±0.3dB MAX. 5~85MHz
PHASE BALANCE	±3.0° MAX. 5~85MHz
INPUT RETURN LOSS (Pin 1)	15.0dB MIN. 5~85MHz

DIMENSIONS (Unit: mm)

M1	M2	M3	M4	M5
4.3±0.3	5.5±0.3	3.2±0.3	1.5±0.2	0.5±0.2

BIY3520UM-001H



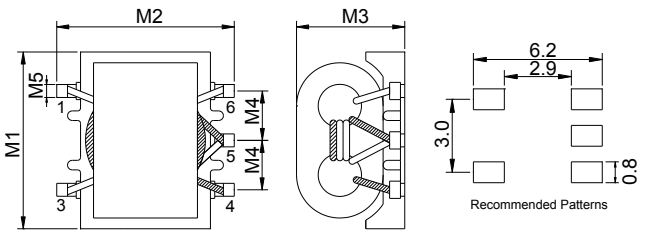
ELECTRICAL SPECIFICATION

Size	BIY3520UM-002H
INSERTION LOSS	1.0dB MAX. 5~200MHz
AMPLITUDE BALANCE (Nominal 0dB)	±0.4dB MAX. 5~200MHz
PHASE BALANCE (Nominal 180°)	±4.0° MAX. 5~200MHz
INPUT RETURN LOSS	14.0dB MIN. 5~200MHz

DIMENSIONS (Unit: mm)

M1	M2	M3	M4	M5
4.3±0.3	5.5±0.3	3.2±0.3	1.5±0.2	0.5±0.2

BIY3520UM-002H



SCM

■ SMD Common Mode Choke

ELECTRICAL SPECIFICATION

Size	SCM2012F		SCM2012FH		SCM2012FH		SCM7038F	
Inductance (Ω)	DCR (Ω)	Irm (mA)	DCR (Ω)	Irms (mA)	DCR (Ω)	Irms (mA)	DCR (Ω)	Irms (mA)
67	0.25	400	0.25	400				
75	0.3	400						
90	0.35	330	0.3	370	0.3	400		
100	0.35	330						
120	0.3	370	0.35	330				
160	0.35	350			0.4	340		
180	0.35	330						
200	0.4	300						
220	0.4	300						
260	0.4	300			0.5	310		
300							0.01	5000
360	0.5	300						
370	0.45	280						
430	0.55	280						
500							0.013	4000
600	0.6	240			0.8	260		
700							0.015	4000
750	0.9	220						
1000					1	230		
1020							0.017	3000
2200					1.2	200		

MCS (MOLDING)

■ High Current Molding Power Chokes

ELECTRICAL SPECIFICATION

Size	MCS20FC-xxxMMP						MCS25GC-xxxMMP						MCS25GD-xxxMMP					
Inductance (μH)	I sat (A)		I rms (A)		DCR (mΩ)		I sat (A)		I rms (A)		DCR (mΩ)		I sat (A)		I rms (A)		DCR (mΩ)	
	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.
0.22							7.90	7.20	5.90	5.30	9	12.5						
0.24	5.60	5.05	5.00	4.50	17	21												
0.33	5.00	4.50	4.10	3.69	24	29	6.60	6.00	4.40	4.00	21	26						
0.47	4.40	4.00	3.50	3.15	33	40	5.00	4.50	3.90	3.51	27	32	5.30	4.95	4.60	4.18	21	25
0.68	3.70	3.33	3.40	3.06	41	49	4.30	3.87	3.40	3.06	37	44	5.00	4.63	3.70	3.36	29	35
1.00	2.90	2.61	2.60	2.26	60	69	3.50	3.15	3.00	2.70	45	54	4.40	4.04	3.50	3.18	41	49
1.50	2.50	2.25	2.00	1.81	114	129	2.60	2.34	2.50	2.25	76	91	3.20	2.91	2.50	2.27	64	77
2.20	1.90	1.71	1.70	1.50	135	150	2.40	2.16	2.30	2.07	99	119	3.00	2.73	2.27	2.06	85	98
3.30													2.10	1.80	2.00	1.80	125	150
4.70							1.80	1.62	1.36	1.22	220	262	1.90	1.58	1.61	1.40	196	235

Size	MCS20FC-xxxMHC						MCS25GC-xxxMHC						MCS25GD-xxxMHC					
Inductance (μH)	I sat (A)		I rms (A)		DCR (mΩ)		I sat (A)		I rms (A)		DCR (mΩ)		I sat (A)		I rms (A)		DCR (mΩ)	
	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.
0.22																		
0.24																		
0.33	6.70	6.10	4.70	4.00	21	26	7.80	7.00	5.60	4.80	17	22						
0.47	6.10	5.30	4.50	4.05	23	30	6.60	6.00	5.20	4.40	23	29	6.80	6.20	5.80	4.90	16	22
1.00	3.90	3.30	3.20	3.00	48	60	4.40	4.00	3.40	3.10	41	52	4.80	4.30	3.90	3.30	36	44
1.50	3.40	3.10	2.40	2.20	86	99												
2.20	2.60	2.45	2.20	2.00	117	140	3.30	3.00	2.40	2.10	88	110	3.50	3.20	2.50	2.20	74	89
4.70							2.20	1.90	1.60	1.40	200	240						

■ High Current Molding Power Chokes

ELECTRICAL SPECIFICATION

Size	MCS0412-xxxME1				MCS0420-xxxMN2				MCS0420-xxxME1				MCS0515-xxxME1				MCS0518-xxxME1			
Inductance (μH)	I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)	
	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.
0.10					22.0	12.0	3.5	4.0	22.0	13.0	3.5	4.0								
0.15	15.0	7.5	8.0	9.0	13.0	9.0	6.0	6.6												
0.22	11.0	7.0	9.5	11.0	12.5	9.0	6.0	6.6	12.5	9.5	6.0	6.6								
0.33	8.4	6.5	17.0	19.0					12.0	10.0	9.0	11.0								
0.47	6.8	6.0	19.0	21.0	9.5	7.0	12.5	14.0	9.5	7.5	12.5	14.0	13.0	9.0	11.0	13.0	15.5	10.5	7.7	9.0
0.56					10.0	6.5	14.0	16.0	10.0	7.0	14.0	16.0					15.0	9.5	8.0	10.0
0.68	6.0	4.7	32.0	36.0	9.0	6.0	16.0	18.0	9.0	7.0	16.0	18.0								
1.0	5.5	4.5	43.0	47.0	7.0	4.5	24.0	27.0	7.0	6.0	24.0	27.0	9.5	7.0	19.0	23.0	9.0	8.0	15.0	17.0
1.2					7.0	4.5	24.0	27.0	7.0	6.0	24.0	27.0								
1.5	4.0	3.25	68.0	75.0	6.0	4.0	38.0	46.0	6.0	5.0	38.0	46.0					9.0	7.5	21.0	26.0
2.2	3.5	2.75	79.4	83.5	5.0	3.0	52.0	58.0	5.0	4.5	52.0	58.0	6.0	4.5	57.0	64.0	6.5	5.0	30.0	35.0
3.3					4.0	2.5	74.0	87.0	4.0	3.3	74.0	87.0					5.0	4.5	52.0	58.0
4.7	2.8	1.8	175.0	195.0	3.5	2.2	98.0	110.0	3.0	2.8	92.0	105.0	4.5	3.5	93.0	103.0	4.0	3.5	78.0	85.0
5.6					3.5	1.8	105.0	115.0												
6.8					2.5	1.5	160.0	175.0	2.5	2.4	160.0	175.0					3.4	2.8	107.0	120.0
10					2.2	1.2	256.0	282.0	2.2	1.6	256.0	282.0					3.0	2.5	140.0	155.0
22									1.65	1.2	330.0	363.0								

Size	MCS0518-xxxMN1				MCS0530-xxxMN2				MCS0530-xxxME1				MCS0618-xxxME1				MCS0618-xxxMN1			
Inductance (μH)	I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)	
	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.
0.10									33.0	25.0	2.4	3.0	38.0	25.0	2.0	2.3	40.0	18.0	3.0	3.5
0.20					14.5	18.0	3.5	3.9	14.5	14.0	3.5	3.9								
0.22													24.0	22.0	3.0	3.5	26.0	14.0	5.3	5.7
0.33									18.0	14.0	4.5	5.5								
0.47	16.0	11.0	7.6	8.5	12.0	13.5	7.4	8.5	12.0	11.0	7.4	8.5	18.0	11.5	8.0	8.4	18.0	11.0	8.4	9.3
0.56	15.5	10.0	8.0	10.0																
0.68					14.0	8.5	11.0	12.0	11.5	9.0	11.0	12.0	17.0	9.5	10.0	12.0	17.0	9.0	12.7	13.9
0.82																	17.0	8.0	13.8	15.9
1.0	10.0	8.5	15.0	18.0	11.0	7.0	13.0	14.0	11.0	8.5	13.0	14.0	14.0	8.5	13.0	16.0	14.0	7.0	17.5	18.3
1.2					11.0	6.5	15.0	16.0	11.0	8.5	15.0	16.0								
1.5					8.5	6.0	20.0	25.0	8.5	8.2	20.0	25.0	9.2	8.0	20.0	26.0				
2.2					7.5	5.5	25.0	29.0	7.5	7.0	25.0	29.0	8.0	7.0	28.0	35.0	11.0	3.75	40.3	46.0
3.3					6.0	5.0	32.0	38.0	6.0	5.5	32.0	38.0	6.5	4.5	43.0	50.0				
4.7					5.0	3.5	50.0	60.0	5.0	4.5	50.0	60.0	5.0	4.0	56.0	62.0	8.0	3.0	76.6	78.0
6.8					4.0	3.0	75.0	90.0	4.0	3.5	75.0	90.0	4.5	3.0	101.0	110.0				
10					3.5	2.5	110.0	125.0	3.5	3.2	110.0	125.0	2.5	2.3	140.0	155.0				
22													2.3	1.8	310.0	350.0				

Size	MCS0624-xxxMN1				MCS0624-xxxME1				MCS0630-xxxMNx				MCS0630-xxxME1			
Inductance (μH)	I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)	
	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.
0.10													56.0	32.0	0.9	1.2
0.22	34.0	21.0	2.9	3.2	34.0	21.0	2.5	3.0	40.0	23.0	2.5	2.8	34.0	24.0	2.5	3.0
0.24													26.0	23.0	2.6	3.1
0.33	22.0	18.0	3.7	4.1	24.5	18.0	3.5	4.1	30.0	20.0	3.5	3.9	25.0	21.0	3.0	3.5
0.47	21.0	13.5	6.0	6.5	22.0	15.0	4.5	5.1	26.0	17.5	4.0	4.2	20.0	18.0	3.5	4.1
0.56					17.0	13.0	5.5	6.5	25.5	16.5	4.7	5.0	18.0	16.5	3.9	4.5
0.68	18.0	11.0	9.4	8.7	16.0	12.0	6.2	7.0	25.0	15.5	5.0	5.5	17.0	16.0	4.8	5.3
0.82	17.0	10.0	10.6	11.8					20.0	13.0	6.7	8.0	16.0	14.0	5.4	6.0
1.0	16.0	9.0	11.0	12.1	16.0	9.0	11.0	13.5	22.0	11.0	9.0	10.0	15.0	12.0	6.7	7.4
1.5					13.5	9.0	17.0	20.0	16.0	9.0	14.0	15.0	14.0	12.0	10.6	12.1
2.2	14.0	6.5	28.0	34.0	11.0	7.0	23.0	28.0	12.0	8.0	17.0	20.0	10.0	9.5	13.5	15.0
3.3	13.0	5.0	36.5	51.6	8.5	5.5	31.0	39.0	10.0	6.0	28.0	30.0	9.5	8.5	18.0	22.0
4.7	9.0	4.5	45.0	63.0	7.5	5.0	45.0	54.0	7.0	5.5	37.0	40.0	6.5	6.0	28.0	33.0
5.6	8.0	4.0	66.0	73.0					6.0	5.5	40.0	44.0	6.0	5.0	37.0	42.0
6.8	7.0	3.6	72.5	95.0	6.0	4.0	57.0	70.0	6.5	4.5	54.0	60.0	6.0	5.0	42.5	48.0
8.2									6.0	4.5	54.0	60.0	6.0	5.0	54.0	60.0
10	6.0	2.5	115.6	129.0	4.5	3.5	92.0	101.0	5.5	4.0	62.0	68.0	5.5	4.5	62.0	67.0
15					3.3	2.5	145.0	160.0	3.5	3.0	110.0	125.0	4.5	3.0	104.0	115.0
22					2.5	2.0	220.0	230.0					3.0	2.3	180.0	200.0
33													2.5	2.0	280.0	310.0

MCS (MOLDING)

■ High Current Molding Power Chokes

ELECTRICAL SPECIFICATION

Size	MCS1040-xxxMNx				MCS1070-xxxMN1				MCS1250-xxxMN1				MCS1265-xxxMN1				MCS1770-xxxMN1			
Inductance (μH)	I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)	
	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.
0.10									80.0	55.0	0.53	0.60	80.0	60.0	0.47	0.50				
0.15													80.0	55.0	0.53	0.60				
0.22	50.0	35.0	0.8	1.0					80.0	51.0	0.64	0.80	80.0	53.0	0.63	0.70				
0.30					55.0	36.0	0.78	0.86					72.0	48.0	0.70	0.80				
0.33					40.0	36.0	0.82	0.9	80.0	42.0	0.85	1.10	65.0	46.0	0.83	0.90				
0.36	40.0	34.0	1.1	1.2																
0.47	35.0	25.0	1.3	1.55					65.0	38.0	1.10	1.30	63.0	41.0	1.00	1.20				
0.56	32.0	25.0	1.6	1.8					55.0	36.0	1.30	1.60	62.0	37.0	1.20	1.40				
0.68	30.0	22.0	2.4	2.7					54.0	34.0	1.50	1.70	60.0	35.0	1.40	1.60				
0.82									53.0	31.0	2.00	2.30	50.0	33.0	1.60	1.90	45.0	56.5	0.98	1.08
1.0	28.0	18.0	3.0	3.3					50.0	29.0	2.10	2.50	49.0	32.0	1.70	2.00	32.0	55.5	1.21	1.27
1.2									49.0	25.0	2.80	3.50	48.0	30.0	2.10	2.50				
1.5	21.0	16.0	3.8	4.2					38.0	23.0	3.40	4.10	45.0	27.0	2.50	3.00	31.0	48.0	1.54	1.62
1.8									35.0	19.0	4.20	4.90	41.0	24.0	2.80	3.20				
2.2	18.0	12.0	6.7	7.0					32.0	20.0	4.60	5.50	40.0	22.0	3.50	4.20	28.0	43.5	1.85	1.98
3.3	16.0	10.0	10.8	11.8					32.0	15.0	7.70	9.20	35.0	18.0	5.70	6.80	27.0	35.0	2.79	2.93
4.7	15.0	8.5	17.0	20.0					27.0	12.0	12.80	15.00	30.0	13.5	9.30	11.20	21.0	30.0	3.98	4.18
5.6									22.0	11.5	14.00	16.50	26.5	12.0	11.80	12.80	21.0	28.0	4.23	4.44
6.8	9.0	6.5	22.5	25.0					21.0	11.0	15.40	18.50	16.5	11.5	13.10	14.00	18.5	22.5	5.86	6.15
7.8									18.0	10.0	17.20	20.50								
8.2	9.0	7.0	26.0	29.0					18.0	9.5	18.90	22.50	16.0	10.5	14.50	15.50	18.0	21.0	7.71	8.10
10	8.5	7.5	27.0	30.0					16.0	9.0	21.40	25.50	15.5	10.0	15.80	16.80	17.0	19.0	8.89	9.33
15	7.0	6.25	40.0	45.0					9.0	6.0	44.00	48.00	9.0	6.0	25.00	29.00	12.0	14.0	13.70	14.40
22	5.5	5.0	60.0	66.0					8.0	5.5	50.00	58.00	7.5	5.0	34.00	39.50	9.5	12.0	20.00	21.00
33	5.0	4.4	85.0	92.0					6.0	3.5	75.00	84.00	6.0	4.0	55.00	65.00	9.0	10.7	35.10	37.00
47	3.5	3.3	130.0	145.0					4.0	2.0	138.00	152.00	5.0	3.0	80.00	92.00	8.6	8.7	40.70	42.70
56																	4.2	7.2	55.00	57.80
68	2.6	3.5	190.0	200.0									3.5	2.0	122.00	134.00	4.5	6.1	72.10	75.70
82																	4.5	5.5	87.30	91.70
100																	4.0	5.0	105.00	110.00

Size	MCS0312-XXXMT1				MCS0320-XXXMT1				MCS0412-XXXxT1				MCS0418-XXXxT1				MCS0420-XXXxT1			
Inductance (μH)	I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)	
	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.
0.10					14.0	10.5	6.6	9	25.0	11.5	4.3	5.5					35.0	14.0	3.2	4.0
0.15									21.5	10.0	5.5	6.8								
0.18																	28.0	13.5	4.6	5.4
0.22					11.2	9.0	11.0	14.0	20.0	8.5	6.6	8.0					24.0	13.0	6.6	7.3
0.33					10.0	8.0	17.0	21.0	11.0	7.0	13.6	16.0					18.0	10.0	7.8	8.6
0.36									8.5	6.5	15.5	18.0								
0.47	7.2	5.0	25	30	9.0	7.0	19.7	23	6.5	6.0	18.0	20.0					12.0	8.0	11.2	14.0
0.56	6.6	4.5	31	36									9.0	6.0	16	20	10.0	7.3	13.5	16.0
0.60									6.0	5.3	22.5	26.0								
0.68	6.1	4.0	34	40	7.0	5.5	25.5	29	6.0	5.0	32.0	37.0	8.5	5.8	18.5	22	10.0	7.0	16.0	19.0
0.82	5.8	3.5	41	48																
1.0	5.5	3.3	50	60	5.0	4.0	32	38	6.0	4.0	41.0	47.0	6.9	4.8	24.5	30	8.5	5.0	22.0	27.0
1.2									5.0	3.5	48.0	56.0					7.8	4.8	25.0	30.0
1.5	4.0	3.0	71	85	4.0	3.8	42	50	4.0	3.0	55.0	63.3					7.0	4.5	34.8	42.0
2.2	3.4	2.7	98	115	3.7	3.5	65	75	3.5	2.8	69.2	80.0	4.2	3.5	39	45	6.0	4.0	51.0	61.0
3.3	3.1	2.0	191	210	3.5	3.0	125	145	3.0	2.3	84.0	97.0	3.6	3.0	82	100	4.0	3.5	69.0	76.0
4.7	2.8	1.6	266	293	3.0	2.6	172	200	2.5	2.0	128.0	145.0	3.0	2.3	106	130	3.5	2.6	95.0	105.0
5.6	2.2	1.5	310	360	2.6	2.2	205	238	2.3	1.7	180.0	208.0					3.0	2.2	112.0	125.0
6.8	2.0	1.4	360	400	2.2	1.9	260	300	1.7	1.5	300.0	360.0					2.8	2.1	150.0	172.0
8.2	1.7	1.2	420	463	1.9	1.6	340	390	1.6	1.4	313.0	376.0					2.5	2.0	158.0	180.0
10	1.4	1.0	498	550	1.6	1.4	366	422	1.4	1.3	410.0	463.0	2.10	1.65	220	265	2.3	1.8	215.0	243.0
15																	1.9	1.5	325.0	374.0
22									1.0	0.8	950.0	1050.0					1.4	1.2	470.0	500.0

■ High Current Molding Power Chokes

ELECTRICAL SPECIFICATION

Size	MCS0512-XXXxT1				MCS0515-XXXxT1				MCS0518-XXXMT1				MCS0520-XXXxT1				MCS0530-XXXxT1			
Inductance (μH)	I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)	
	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.
0.10	14.5	14.0	4.3	5.2									45.0	18.0	3.6	4.0	27.0	23.0	2.5	3.0
0.15					25.0	16.0	3.6	4.1					27.0	16.0	3.8	4.6				
0.22	14.0	10.7	5.5	6.7	20.0	12.0	5.0	6.5	22.0	13.0	4.2	5.0	25.0	15.0	4.0	5.5	21.0	15.5	3.7	4.4
0.33	13.5	8.5	7.8	9.4	16.0	9.0	8.5	9.8	15.0	11.0	7.5	8.6	21.3	12.0	6.3	7.3	18.0	14.0	4.3	5.0
0.36	13.0	8.0	10.0	11.5	15.5	8.5	10.0	12.5												
0.47	11.0	7.0	13.6	15.8	15.0	8.0	12.0	13.8	14.0	10.0	9.8	11.3	18.0	11.5	7.3	8.6	16.0	12.0	6.4	7.4
0.56																	15.0	10.0	8.0	10.0
0.68	9.0	6.0	21.5	24.5	13.0	7.0	14.0	16.2	13.0	9.0	12.4	14.3	12.8	10.0	11.0	12.4	14.0	8.5	10.0	12.0
1.0	6.0	5.0	26	30	9.0	6.0	22.0	25.3	10.0	6.8	18.2	21.0	13.7	7.0	17.5	20.0	11.0	7.0	13.0	14.0
1.2	5.5	4.5	33	40									11.0	6.2	23.0	28.0	11.0	6.5	14.0	16.0
1.5	5.0	4.0	38	44	7.0	4.5	39	45	9.0	6.0	26	30	9.8	5.5	26.5	30.5	10.0	6.0	16.0	25.0
2.2	4.0	3.5	65	75	6.0	4.0	45	52	7.5	4.5	42	48.3	9.0	4.2	42	50	9.0	5.5	25.0	35.0
3.3	3.8	3.0	75	86	4.5	3.2	78	90	5.0	3.5	60	69	7.3	3.3	66	76	8.0	5.0	32.0	38.0
4.7	3.2	2.5	100	115	4.0	2.7	103	118	4.5	3.0	85	98	5.0	2.8	103	116	6.0	4.6	50.0	53.0
5.6	3.2	2.4	175	201	3.2	2.4	126	152	4.0	2.5	110	127	4.0	2.5	112	122	4.5	4.25	55.0	63.0
6.8	3.0	2.0	193	222	3.0	2.3	142	171	3.5	2.4	118	137	3.8	2.4	130	150	4.3	4.0	68.0	76.2
8.2	2.8	1.7	327	378	2.6	2.1	175	210	3.0	2.3	143	165	3.5	2.3	148	171				
10	1.8	1.5	335	385	2.3	2.0	210	235	2.8	2.3	165	190	3.4	2.3	180	199	3.5	2.75	110	128
15	1.6	1.3	410	470									2.8	1.9	240	270	2.6	2.1	165	190
18																	2.3	2.0	195	230
22					1.7	1.2	405	466					1.8	1.5	350	390	1.7	1.9	220	250
33																	1.60	1.60	380	440

Size	MCS0612-XXXxT1				MCS0615-XXXxT1				MCS0618-XXXMT1				MCS0620-XXXxT1				MCS0624-XXXxT1			
Inductance (μH)	I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)	
	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.
0.10					35.0	17.5	2.5	3.1	45.0	18.0	2.1	2.5	40.0	21.0	2.0	2.4	70.0	30.0	1.4	1.7
0.12					30.0	17.0	3.0	3.6												
0.15	24.0	14.0	4.9	5.7	25.0	16.0	3.7	4.5					39.0	18.0	2.3	2.7	45.0	30.0	1.8	2.3
0.22	19.0	11.0	6.5	7.5	22.0	14.0	4.3	5.2	26.0	16.0	2.5	3.0	32.0	15.0	3.5	4.0	34.0	21.0	2.0	3.2
0.33	16.0	9.5	9	10	18.0	11.0	6.6	7.6	22.0	14.0	4.8	5.8	25.0	14.0	4.5	5.0	30.0	18.0	3.6	4.4
0.47	12.0	8.5	13	17	16.0	9.5	9.0	10.3	18.0	12.0	6.4	7.4	20.0	11.7	7.1	8.3	26.0	15.0	4.8	5.1
0.56					15.5	9.0	12.5	14.0					18.0	11.0	7.9	9.3	24.0	13.0	5.5	6.5
0.68	9.0	7.0	17	19	15.0	7.5	13.8	15.2	17.0	10.0	9.5	11.0	16.0	10.5	8.3	10.0	21.0	13.0	6.4	7.2
0.82					14.0	7.0	20.0	24.0	15.5	8.5	11.5	14.0					17.0	11.0	8.0	9.5
1.0	7.0	6.0	27	30	12.0	6.5	23.0	25.8	14.0	7.0	14.5	17.0	14.0	8.0	16.5	18.0	16.0	11.0	10.5	13.5
1.2	6.8	5.0	31	36	10.5	5.6	29.0	34.0	13.5	6.5	20.0	24.0	13.0	7.5	19.0	23.0				
1.5	6.5	4.5	35	40	9.5	5.0	37	42.5	13.0	6.0	21	25.2	12.0	7.0	23.0	27.0	15.0	9.0	17.0	20.0
2.2	5.0	4.0	53	61	6.5	4.5	48	55	11.0	6.0	31	35	10.0	6.0	32	37	14.0	7.0	23.0	28.0
3.3	4.0	3.2	90	103	6.0	4.2	62	74	9.0	5.0	40	46	8.0	5.0	43	48	10.0	6.0	34.0	39.0
4.7	3.8	2.5	130	150	5.0	3.8	96	111	7.0	4.0	68	76	7.0	4.5	53	60	9.0	5.5	41.0	50.0
5.6					4.5	3.0	115	138	6.0	3.5	78	86	6.0	4.0	59	68	8.0	5.00	56.0	62.0
6.8	3.0	2.1	172	198	3.5	2.6	128	148	5.5	3.0	93	104	5.5	4.0	63	73	7.0	4.0	65.0	72.0
8.2					3.2	2.4	153	184	4.5	2.6	123	140	5.0	3.2	101	116	6.0	3.6	81.0	95.0
10	2.5	1.8	280	290	2.8	2.3	180	216	3.5	2.3	143	160	4.0	2.8	134	154	5.0	3.20	92	101
15													3.3	2.1	190	210	3.5	2.50	150	180
22	1.7	1.2	540	600	2.5	1.5	420	504					2.5	1.5	236	280	3.0	1.8	185	215

MCS (MOLDING)

■ High Current Molding Power Chokes

ELECTRICAL SPECIFICATION

Size	MCS0630-XXXxT1				MCS0640-XXXxT1				MCS0650-XXXMT1				MCS1040-XXXxT1				MCS1050-XXXxT1			
Inductance (μH)	I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)		I sat (A)	I rms (A)	DCR (mΩ)	
	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.	Typ.	Typ.	Typ.	Max.
0.10	60.0	32.5	1.2	1.7																
0.12					64.0	32.0	0.7	1.0												
0.15	45.0	27.0	1.5	1.9	55.0	30.0	0.9	1.2					75.0	43.0	0.5	0.6				
0.22	40.0	23.0	2.1	2.8									60.0	35.0	0.80	1.0	70.0	45.0	0.45	0.5
0.33	32.0	20.0	3.5	3.9					32.0	25.0	2.5	3.0	60.0	31.0	1.0	1.2				
0.47	26.0	17.5	4.0	4.2	28.0	23.0	3.0	3.4	30.0	22.0	3.5	3.9	43.0	28.0	1.3	1.5				
0.56	25.5	16.5	4.7	5.0	26.0	20.0	3.8	4.3	27.0	20.0	3.6	4.2	40.0	25.0	1.6	1.8				
0.68	25.0	15.5	4.8	5.5	24.0	16.0	4.1	4.5	24.0	18.0	4.0	4.5	39.0	22.0	2.4	2.7				
0.82	24.0	13.0	6.7	8.0					22.0	16.5	4.6	4.9								
1.0	22.0	11.0	8.3	10.0					20.0	15.0	6.1	6.5	36.0	18.0	3.0	3.3	30.0	22.0	2.8	3.5
1.2	20.0	10.0	10.0	12.0					18.0	14.0	6.7	7.5	33.0	17.0	3.3	3.8	28.0	20.0	2.9	3.5
1.5	18.0	9.0	13.0	15.0	20.0	12.0	10	12.0	16.5	12.0	8.6	9.0	33.0	16.0	4.0	4.6	27.0	19.0	3.5	4.1
2.2	14.0	8.0	18.0	20.0	14.0	9.0	11.5	14	14.0	10.0	11.2	12	27.0	12.0	6.5	7.0	24.0	16.0	5.4	6.0
3.3	13.5	6.0	28.0	30.0					12.0	8.0	19	20.9	20.0	11.0	10.8	11.8	22.0	14.0	9.0	10.4
4.7	10.0	5.5	37.0	40.0	11.0	6.0	28	32.5	10.0	6.5	28	30.8	17.0	10.0	15	15.5				
5.6	9.0	5.0	43.0	48.0					9.0	6.0	43.5	49	14.0	9.0	17	19.3				
6.8	8.0	4.5	54.0	60.0	8.5	4.5	44	50	8.5	5.5	46	51.5	13.5	8.5	17.5	23.3				
8.2	7.5	4.0	64.0	68.0	8.0	4.5	55	64	8.0	5.0	56	63	12.5	8.0	20	22.5	14.5	9.0	18.5	24.0
10	6.0	3.5	75.0	85.0	7.0	4.0	64	72	7.5	4.0	60	69	12.0	7.5	27	30	13.5	8.0	25	29
15					4.0	3.0	80	90	6.0	3.5	81	92	10.0	6.25	40	45	9.5	5.5	37	45
22	3,5	2.0	165.0	190.0	3.5	2.5	120	145	5.5	2.5	140	170	7.0	5.0	64	74	9.0	5.0	50	60
33	2.5	2.0	200.0	240.0	3.2	2.0	180	210	3.5	2.0	173	200	5.0	3.5	92	112	7.5	4.3	80	92
47	2.0	1.75	302.0	363.0					2.7	1.9	290	330	4.5	3.0	145	167	6.5	3.8	125	145
56									2.1	1.6	342	396								
68									2.0	1.2	386	445	3.0	2.0	205	240	4.0	2.5	176	205
100																	3.0	2.0	315	380

FH (SHIELDED)

■ Multilayer Power Inductors

ELECTRICAL SPECIFICATION

Size	FH160810		FH201210		FH201610		FH252010	
Inductance (μH)	DCR (Ω)	Irms (A)	DCR (Ω)	Irms (A)	DCR (Ω)	Irms (A)	Isat (A)	Irms (A)
0.33	0.35	0.35						
0.47			0.08	1.2	0.075	1.6	0.05	1.8
0.5	0.15	0.9	0.08	1.2				
1	0.2	0.75	0.14	1	0.12	1.3	0.08	1.4
1.5			0.2	0.8	0.13	1.2	0.09	1.3
2.2	0.3	0.65	0.2	0.8	0.14	1.2	0.09	1.3
3.3			0.24	0.7	0.16	1.1	0.12	1.2
4.7			0.28	0.7	0.2	0.9	0.15	1.1

■ SMD Wire Wound Power Inductors

ELECTRICAL SPECIFICATION

Size	CSM0310D		CSM0315D		CSM0645D		CSM0840D	
Inductance (μH)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)
0.9							12	8
1	1.7	1.525	2.1	2.1	8.5	6		
1.3					8	5.2		
1.4							10.8	7.8
1.5	1.4	1.47	1.8	1.9				
1.8			1.75	1.7	7	5		
2							9	7.4
2.2	1.25	1.27	1.48	1.6			7.5	6
2.3					6	4.5		
3					5	4		
3.3	0.9	1.13	1.21	1.45			7	5.1
3.6							6	4.9
4.5					4	3.7		
4.7	0.85	0.925	1.08	1.25			5.5	4.6
5.1			1.08	1.09				
5.6	0.72	0.82						
6.3					3.8	3.5		
6.8	0.66	0.71	0.9	0.9			5	4.4
10	0.53	0.63	0.75	0.87	3	2.8	4	3.8
12			0.7	0.68				
15	0.42	0.475	0.58	0.65	2.3	2.3	3	2.8
18	0.42	0.47	0.56	0.59				
22	0.36	0.43	0.47	0.55	1.9	1.7	2.8	2.6
27	0.3	0.35						
33	0.28	0.345	0.39	0.45	1.5	1.5	2	1.8
39	0.28	0.28						
47	0.24	0.27	0.32	0.4	1.3	1.3	1.9	1.75
56			0.3	0.34				
68					1	1	1.7	1.45
82					0.9	0.9		
100			0.23	0.25	0.8	0.8	1.1	1.1

(SHIELDED) CSMV / CSMS / CSMH

■ SMD Wire Wound Power Inductors

ELECTRICAL SPECIFICATION

Size	CSMV2012D		CSMS2012D		CSMH2410D		CSMH2412D		CSMH0310D		CSMH0312D	
Inductance (μH)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)
0.47							2.9	2.1				
0.68					2.2	1.57						
0.8												
0.9												
1	2.35	1.83	2.05	1.85	1.8	1.41	2.35	1.3			2.2	1.71
1.2									1.7	1.48		
1.3												
1.4												
1.5	1.95	1.55	1.8	1.65	1.55	1.16	2.1	1.15	1.44	1.37	1.7	1.6
1.8												
2												
2.2	1.7	1.35	1.5	1.5	1.29	0.97	1.7	1	1.3	1.3	1.5	1.37
2.3												
2.5												
3												
3.3	1.35	1.04	1.15	1.1	1	0.77	1.4	0.75	1	1.03	1.2	1.21
3.6												
4.5												
4.7	1.15	0.85	1.05	1	0.88	0.67	1.15	0.65	0.85	0.9	1	1.06
5.3												
6												
6.3												
6.8					0.75	0.57	0.95	0.55	0.7	0.745	0.85	0.89
10					0.55	0.45	0.81	0.45	0.6	0.62	0.73	0.72
15					0.47	0.37			0.45	0.48	0.53	0.57
22					0.39	0.3			0.38	0.41	0.5	0.5
33												
47												
68												
100												
150												
220												

CSMS (SHIELDED)

■ SMD Wire Wound Power Inductors

ELECTRICAL SPECIFICATION

Size	CSMS0315D		CSMS0410D		CSMS0412D		CSMS0418D		CSMS0510D		CSMS0512D	
Inductance (μH)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)
0.47												
0.68												
0.8												
0.9												
1	2.1	2.1	2	1.9	2.8	2.2	4	3.2	2.35	1.75	4.5	2.3
1.2												
1.3												
1.4												
1.5	1.8	1.82					3.3	2.4			3.8	2.2
1.8												
2												
2.2	1.48	1.5	1.2	1.5	1.65	1.9	3	2.2	1.5	1.4	3.1	2
2.3												
2.5												
3												
3.3	1.21	1.23	1.1	1.4	1.4	1.7	2.3	2	1.4	1.25	2.4	1.45
3.6												
4.5												
4.7	1.02	1.04	0.95	1.2	1.2	1.5	2	1.7	1.2	1.15	2.2	1.4
5.3												
6												
6.3												
6.8	0.87	0.88	0.8	1	0.9	1.3	1.6	1.45	1	1	1.7	1.1
10	0.7	0.71	0.62	0.75	0.8	1.1	1.3	1.2	0.85	0.9	1.4	0.85
15			0.54	0.6	0.65	0.75	1.1	0.85	0.68	0.65	1.2	0.64
22	0.47	0.47	0.45	0.5	0.5	0.62	0.9	0.72	0.55	0.45		
33							0.7	0.55				
47							0.6	0.44				
68							0.52	0.32				
100							0.42	0.28				
150							0.34	0.22				
220							0.275	0.17				

Size	CSMS0514D		CSMS0520D		CSMS0540D		CSMS0610D		CSMS0612D		CSMS0620D	
Inductance (μH)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)
0.47	5.8	3.3										
0.68												
0.8											6.4	4.1
0.9												
1			4	3.6								
1.2	3.8	2.4										
1.3												
1.4												
1.5			3.35	3.2	6.4	4.5	2.4	1.9			4.3	3.6
1.8												
2												
2.2	2.8	2	2.9	2.9	5	3.7	1.9	1.7			3.2	2.9
2.3												
2.5									2.1	1.8		
3												
3.3	2.35	1.7	2.4	2.4	4	3.3	1.6	1.5	1.8	1.7	2.8	2.75
3.6												
4.5												
4.7	2.05	1.4	2	2	3.3	3.1	1.3	1.4	1.6	1.55	2.4	2.15
5.3									1.5	1.55		
6												
6.3												
6.8	1.6	1.2	1.6	1.65	2.8	2.4	1.2	1.2	1.3	1.35	2	1.8
10	1.4	1.05	1.3	1.45	2.3	2.1	1	1.1	1	1.2	1.9	1.5
15	1.1	0.65	1.1	1.2	2	1.8			0.8	0.8		
22	0.9	0.55	0.9	1	1.5	1.4	0.65	0.7	0.76	0.65	1.25	0.95
33					1.3	1.2			0.59	0.55		
47					1.1	0.9			0.52	0.46		
68									0.44	0.41		
100									0.35	0.32		
150												
220												

(SHIELDED) CSMS / CSCA

■ SMD Wire Wound Power Inductors

ELECTRICAL SPECIFICATION

Size	CSMS0628D		CSMS0645D		CSMS0840D		CSCA2016D		CSCA2520D		CSCA2510D	
Inductance (μH)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)
0.24							4.2	3				
0.47							2.8	2.8	4	3.4	3.9	3.2
0.68									3	3	3.7	2.9
0.8												
0.9	6.7	4.6			13	7.8						
1			9.8	4.5			2.2	2.2	2.7	2.7	2.7	2.5
1.2												
1.3			8.2	4.2								
1.4					10	7						
1.5	5.1	4.2					1.6	1.65	2.6	2.4		
1.8			7.2	3.9								
2					8.1	6.3						
2.2	4.2	3.7					1.5	1.5	1.9	1.9	1.9	1.5
2.3			6.4	3.6								
2.5												
3	3.6	3.4	5.6	3.3								
3.3							1.15	1.2	1.6	1.7		
3.6					6.4	4.9						
4.5			4.4	3.1								
4.7	2.7	3			5.4	4.1	1	0.95	1.3	1.3	1.3	1.1
5.3												
6	2.5	2.5										
6.3			3.6	3								
6.8					4.4	3.7						
10	1.9	1.9	3.1	2.4	3.8	3.1						
15	1.6	1.8	2.5	1.9	2.9	2.4						
22	1.3	1.4	2	1.6	2.4	2.2						
33	1.1	1.1	1.65	1.4								
47	1	0.92	1.4	1.15								
68	0.8	0.77	1.1	0.95								
100	0.65	0.66	0.9	0.75								
150												
220												

(SHIELDED) CSME

■ SMD Wire Wound Power Inductors

ELECTRICAL SPECIFICATION

Size	CSME0315D		CSME0412D		CSME0418D		CSME0430D		CSME0520D		CSME0540D	
Inductance (μH)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)
0.47							7.5	3.5				
0.68	2.1	2.1			4	3.2	5.9	3.4				
0.8												
0.9												
1	1.8	1.82			3.3	2.4	4.85	3.3	4	3.6	7.35	4.9
1.2												
1.3												
1.4	1.48	1.5			3	2.2	4.1	2.95				
1.5									3.35	3.2	6.4	4.5
1.8												
2												
2.2	1.21	1.23			2.3	2	3.3	2.4	2.9	2.9	5	3.7
2.3							3.1	2.3				
2.5												
3	1.02	1.04			2	1.7	2.9	2				
3.3							2.75	1.95	2.4	2.4	4	3.3
3.6	0.87	0.88			1.6	1.45	2.6	1.7				
4.5							2.2	1.65				
4.7							2.1	1.6	2	2	3.3	3.1
5.3	0.7	0.71	0.8	1.1	1.3	1.2	1.95	1.5				
6							1.7	1.35				
6.3					1.1	0.85	1.65	1.15				
6.8							1.4	1.1	1.6	1.65	2.8	2.4
10	0.47	0.47			0.9	0.72	1.3	1	1.3	1.45	2.3	2.1
15					0.7	0.55	1.1	0.84	1.1	1.2	2	1.8
22							0.9	0.72	0.9	1	1.5	1.4
33							0.85	0.65			1.3	1.2
47							0.75	0.55			1.1	0.9
68							0.68	0.5	0.7	0.53		
100					0.42	0.28	0.6	0.45			0.75	0.7
150							0.5	0.35				
220							0.4	0.35				

CSMW (SHIELDED)

■ SMD Wire Wound Power Inductors

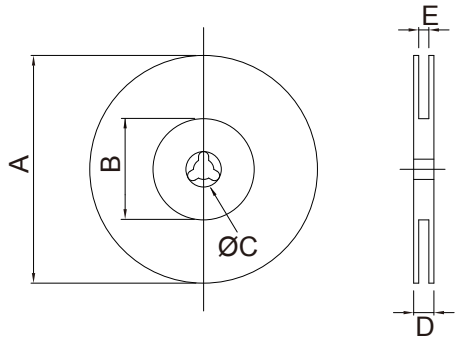
ELECTRICAL SPECIFICATION

Size	CSMW0315D		CSMW0418D		CSMW0430D	
Inductance (μH)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)
0.47						
1	2.32	2.35	4.8	2	5.3	4.15
1.2						
1.3						
1.4						
1.5	2.3	1.7	3	1.8	5.2	3.34
1.8						
2						
2.2	1.6	1.6	2.7	1.65	4.75	2.95
2.3						
2.5						
3						
3.3	1.32	1.36	2.45	1.23	3.3	2.4
3.9					3	2.1
4.5						
4.7	1.1	1.09	1.7	1.2	2.9	2
5.3						
6						
6.3						
6.8	0.85	0.85	1.45	1.06	2.7	1.6
10	0.72	0.77	1.3	0.84	1.95	1.5
15	0.66	0.65	0.94	0.65	1.85	1.1
22	0.52	0.57	0.8	0.59	1.3	1
33	0.44	0.43	0.65	0.49	1	0.84
47	0.35	0.35	0.57	0.42	0.95	0.72
51					0.88	0.7
68			0.47	0.32	0.85	0.52
100			0.4	0.25		
120					0.55	0.42
150			0.31	0.22		
220			0.27	0.17		
470					0.25	0.2

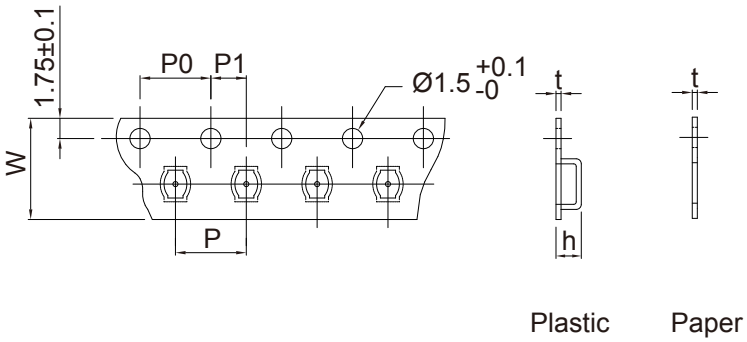
Size	CSMW0520D		CSMW0540D		CSMW0840D	
Inductance (μH)	Isat (A)	Irms (A)	Isat (A)	Irms (A)	Isat (A)	Irms (A)
0.24						
0.47						
1	4.33	3.8				
1.2						
1.3						
1.4						
1.5	4.1	3.2	6.3	4.3	10	7.8
1.8						
2						
2.2	3.6	2.9	4.9	3.8		
2.3						
2.5						
3						
3.3	3.25	2.9	3.95	3.4		
3.9						
4.5						
4.7	2.5	2.2	3.5	3		
5.3						
6						
6.3						
6.8	2.05	1.8	2.9	2.5		
10	1.55	1.55	2.35	2.1		
15			2	2		
22	1.15	1.1	1.6	1.5		
33	1	0.8	1.3	1.2		
47			1.1	1		
51						
68						
100						
120						
150						
220						
470						

Tape and Reel Specifications

CARRIER TAPE REELS



TAPE DIMENSIONS (mm)



Plastic Paper

SMD AIR COILS

Series P/N	Reel dimensions (mm)					Tape dimensions (mm)						Parts per reel		Quantity per	
	A	B	C	D	E	W	P	P0	P1	h	t	7"	13"	BOX	CARTON
291A	180	75	13	16.5	12.5	12	8	4	2	3.30	0.25	500	----	2,000	12,000
291B	180	75	13	20.5	16.5	16	8	4	2	3.30	0.25	500	----	1,500	9,000
292AR	180	75	13	12.5	8.4	8	4	4	2	1.70	0.30	2,000	----	10,000	60,000
292BR	180	50	13	16.5	12.5	12	4	4	2	1.75	0.35	2,000	----	6,000	36,000
293A	340	100	13	25.5	16.5	16	12	4	2	4.40	0.30	----	1,000	1,000	10,000
294A	340	100	13	30.4	24.5	24	12	4	2	5.30	0.35	----	1,000	1,000	8,000
29B	340	100	13	18.4	12.5	12	12	4	2	6.00	0.40	----	1,000	3,000	9,000
29CAR	180	75	13	16.5	12.5	12	8	4	2	2.80	0.35	1,000	----	4,000	24,000
29CBR	180	75	13	16.5	12.5	12	8	4	2	2.80	0.35	1,000	----	4,000	24,000

SMD SQUARE TYPE AIR COILS

Series P/N	Reel dimensions (mm)					Tape dimensions (mm)						Parts per reel		Quantity per	
	A	B	C	D	E	W	P	P0	P1	h	t	7"	13"	BOX	CARTON
LSQ0806A	180	50	13	16.4	12.5	12	4	4	2	1.75	0.23	2,000	----	8,000	48,000
LSQ0807A	180	50	13	16.4	12.5	12	4	4	2	1.86	0.23	2,000	----	8,000	48,000
LSQ0908A	180	50	13	16.4	12.5	12	4	4	2	2.10	0.25	2,000	----	8,000	48,000
LSQ1515A	340	100	13	18.4	12.5	12	8	4	2	4.50	0.40	----	2,000	4,000	12,000

SMD RF CHIP INDUCTORS

Series P/N	Reel dimensions (mm)					Tape dimensions (mm)						Parts per reel		Quantity per	
	A	B	C	D	E	W	P	P0	P1	h	t	7"	13"	BOX	CARTON
0402CP	180	75	13	12.5	8.4	8	2	4	2	---	0.60	4,000	----	20,000	120,000
FEC0603CP	180	75	13	12.5	8.4	8	4	4	2	1.07	0.25	4,000	----	20,000	120,000
FEC0805CP	180	75	13	12.5	8.4	8	4	4	2	1.38	0.25	3,000	----	15,000	90,000
FEC1008CP	180	75	13	12.5	8.4	8	4	4	2	2.30	0.25	2,000	----	10,000	60,000
1210C	180	75	13	12.5	8.4	8	4	4	2	2.43	0.23	1,500	----	7,500	45,000
1812CP	180	50	13	18.4	12.4	12	8	4	2	3.60	0.35	600	----	3,000	18,000
0805F	180	75	13	12.5	8.4	8	4	4	2	1.38	0.25	3,000	----	15,000	90,000
1008F	180	75	13	12.5	8.4	8	4	4	2	2.52	0.25	2,000	----	10,000	60,000

Tape and Reel Specifications

SMD COMMON MODE CHIP COILS

Series P/N	Reel dimensions (mm)					Tape dimensions (mm)						Parts per reel		Quantity per	
	A	B	C	D	E	W	P	P0	P1	h	t	7"	13"	BOX	CARTON
SCM2012F	180	75	13	12.5	8.4	8	4	4	2	1.45	0.22	2,000	----	10,000	60,000
SCM2012FH	180	75	13	12.5	8.4	8	4	4	2	1.45	0.22	2,000	----	10,000	60,000
SCM7038F	340	100	13	22.4	16.5	16	12	4	2	4.25	0.35	----	1,000	2,000	6,000

SMD BALUN TRANSFORMER

Series P/N	Reel dimensions (mm)					Tape dimensions (mm)						Parts per reel		Quantity per	
	A	B	C	D	E	W	P	P0	P1	h	t	7"	13"	BOX	CARTON
BIH2012OB	180	75	13	12.5	8.4	8	4	4	2	1.45	0.22	2,000	----	10,000	60,000

SMD MOLDING TYPE HIGH CURRENT POWER CHOKES

Series P/N	Reel dimensions (mm)					Tape dimensions (mm)						Parts per reel		Quantity per	
	A	B	C	D	E	W	P	P0	P1	h	t	7"	13"	BOX	CARTON
MCS0420	330	100	13	16.6	12.4	12	8	4	2	2.5	0.3	----	2,000	2,000	12,000
MCS0530	330	100	13	16.6	12.4	12	8	4	2	3.6	0.4	----	2,000	2,000	12,000
MCS0630	330	100	13	16.6	21.2	16	12	4	2	3.4	0.4	----	1,000	1,000	6,000
MCS1040	330	100	13	24.6	29.2	24	16	4	2	4.25	0.4	----	500	500	3,000

SMD COATING RESIN TYPE POWER CHOKES

Series P/N	Reel dimensions (mm)					Tape dimensions (mm)						Parts per reel		Quantity per	
	A	B	C	D	E	W	P	P0	P1	h	t	7"	13"	BOX	CARTON
CSM0310D	180	60	13	12.5	8.4	8	4	4	2	1.40	0.23	2,000	----	12,000	72,000
CSM0315D	180	60	13	12.5	8.4	8	4	4	2	1.70	0.23	2,000	----	12,000	72,000
CSM0645D	330	80	13	18.5	13.5	12	8	4	2	4.65	0.40	----	1,500	3,000	9,000
CSM0840D	330	100	13	22.4	16.4	16	12	4	2	4.40	0.35	----	1,000	2,000	6,000
CSMV2012D	180	60	13	16.5	11.5	8	4	4	2	1.30	0.25	2,500	----	12,500	75,000
CSMH2410D	180	60	13	16.5	11.5	8	4	4	2	1.30	0.25	2,500	----	12,500	75,000
CSMH2412D	180	60	13	16.5	11.5	8	4	4	2	1.30	0.25	2,500	----	12,500	75,000
CSMH0310D	180	60	13	16.5	11.5	8	4	4	2	1.40	0.30	2,000	----	12,000	72,000
CSMH0312D	180	60	13	16.5	11.5	8	4	4	2	1.60	0.30	2,000	----	12,000	72,000
CSMS2012D	180	60	13	16.5	11.5	8	4	4	2	1.30	0.25	2,500	----	12,500	75,000
CSMS0315D	180	60	13	16.5	11.5	8	4	4	2	2.00	0.30	2,000	----	12,000	72,000
CSMS0410D	330	80	13	18.5	13.5	12	8	4	2	1.40	0.30	-----	5,000	10,000	40,000
CSMS0412D	330	80	13	18.5	13.5	12	8	4	2	1.60	0.30	----	4,500	9,000	36,000
CSMS0418D	330	80	13	18.5	13.5	12	8	4	2	2.10	0.30	----	3,500	7,000	28,000
CSMS0510D	180	60	13	20.5	15.5	12	8	4	2	1.40	0.30	1,000	----	4,000	24,000
CSMS0512D	180	60	13	20.5	15.5	12	8	4	2	1.40	0.30	1,000	----	4,000	24,000
CSMS0514D	180	60	13	20.5	15.5	12	8	4	2	2.00	0.30	1,000	----	4,000	24,000
CSMS0520D	180	60	13	20.5	15.5	12	8	4	2	2.30	0.30	800	----	3,200	19,200
CSMS0540D	330	80	13	18.5	13.5	12	8	4	2	4.20	0.40	----	1,500	3,000	9,000
CSMS0610D	180	60	13	20.5	15.5	12	8	4	2	1.40	0.40	1,000	----	4,000	24,000
CSMS0612D	180	60	13	20.5	15.5	12	8	4	2	1.60	0.40	1,000	----	4,000	24,000
CSMS0620D	330	80	13	18.5	13.5	12	8	4	2	2.30	0.40	----	2,500	5,000	15,000
CSMS0628D	330	80	13	18.5	13.5	12	8	4	2	3.10	0.40	----	2,000	4,000	24,000
CSMS0645D	330	80	13	18.5	13.5	12	8	4	2	4.70	0.40	----	1,500	3,000	12,000
CSMS0840D	330	80	13	22.5	17.5	16	12	4	2	4.50	0.50	----	1,000	2,000	8,000
CSCA2016D	180	60	13	16.5	11.5	8	4	4	2	1.35	0.25	3,000	----	15,000	90,000
CSCA2520D	180	60	13	16.5	11.5	8	4	4	2	1.75	0.30	3,000	----	15,000	90,000
CSCD2012D	180	60	13	16.5	11.5	8	4	4	2	1.60	0.25	2,500	----	12,500	75,000

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