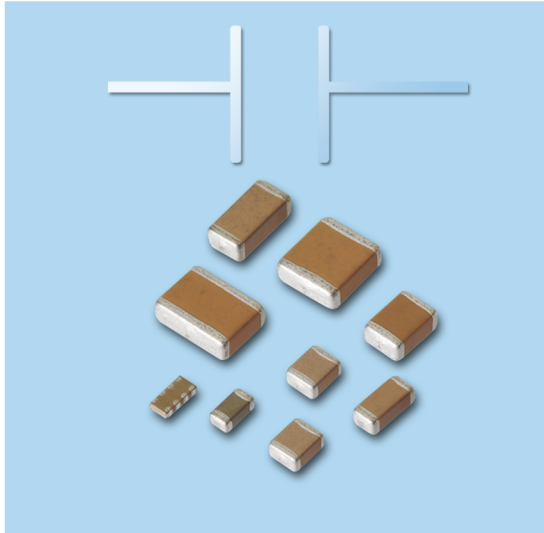
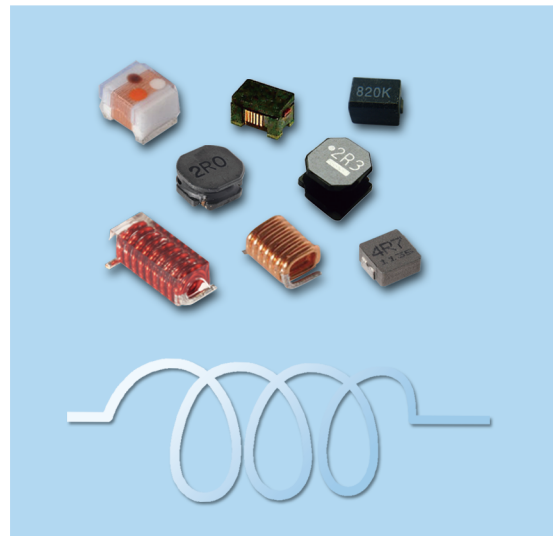
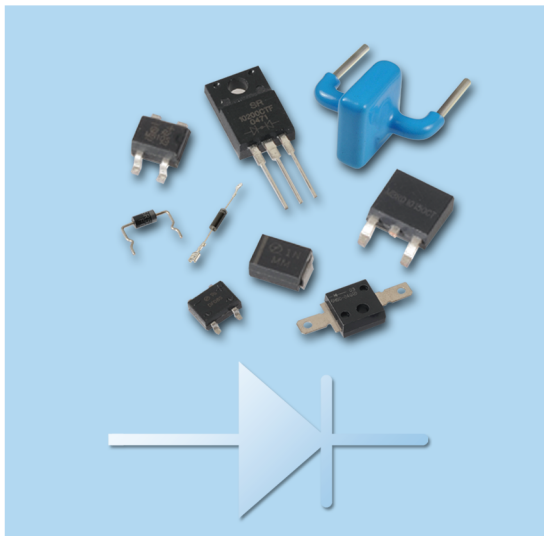
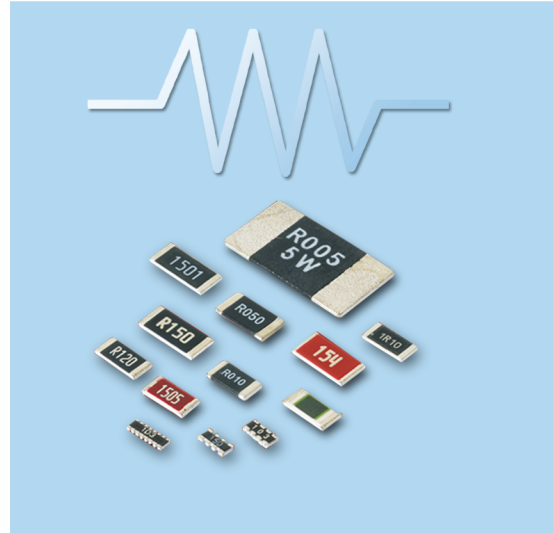


MLCC



CHIP-R



DIODE

COIL

ABOUT PDC

Introduction

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

Milestone 歷史沿革 	<p>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。</p> <p>1995 PDC merged with Taiwan Precision Material Corporation. 信昌電子陶瓷併購台灣精密材料公司。</p> <p>2002 Public Listed in OTC. 信昌電子陶瓷正式上櫃。</p> <p>2005 PDC was strategically allied with Wasin Tech. 與華新科技(股)公司策略聯盟。</p> <p>2007 To be strategically allied with Frontier, and setting up new production lines, Diode and Magnetic components. 與弘電電子工業(股)公司策略聯盟，生產二極體與磁性材料元件。</p> <p>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。</p>
Core Technology 關鍵技術 	<p>1988 Manufacturing and developing ceramic dielectric materials. 生產製造圓板電容粉末、開發。</p> <p>1990 Manufacturing Multilayer Ceramic Capacitors. 生產製造積層陶瓷晶片電容。</p> <p>1995 Manufacturing Ceramic Chip Resistors and Ceramic Chip Coil 生產陶瓷晶片電阻、陶瓷晶片電感。</p> <p>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。</p> <p>2001 With self-made conducting dielectric powder, controlling the complete key technology from material to manufacture. 自製半導體性介電瓷粉，掌握由材料至製程的完整關鍵性技術。</p> <p>2007 Manufacturing Diode and magnetic components. 生產二極體與磁性材料元件。</p>
Brand Value 品牌價值 	<p>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。</p> <p>2003 ISO 9001 certified. 獲 ISO 9001 驗證通過。</p> <p>2004 Industrial Sustainable Excellence Award. 榮獲經濟部工業局工業精銳獎。</p> <p>2004 TS16949、ISO 14000 and OHSAS 18000 certified. 獲 TS16949、ISO 14000 及 OHSAS 18000 驗證。</p> <p>2008 IECQ QC080000 HSF certified. 獲 IECQ QC080000 HSF 驗證。</p> <p>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。</p> <p>2008 Common Wealth Magazine Top 1000 Manufacturers in Taiwan Ranked in No. 682. 天下雜誌 1000 大製造業排名第 682 名。</p> <p>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。</p> <p>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」</p> <p>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。</p>
Market Performance 市場表現 	<p>PDC ceramic dielectric powder ranks in No.2 in global capacity and No.3 in global market share. 介電陶瓷粉末產品產能全球第二、市占率全球第三。</p> <p>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。</p> <p>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。</p>

信昌電子陶瓷成立於 1990 年，為國內少數能自行供給瓷粉原料並同時銷售積層陶瓷電容的被動元件廠商，更是唯一有能力由上游初發原料，向下垂直整合至被動晶片元件的廠商。2005 年信昌電陶與華新集團進行策略聯盟、2008 年正式合併弘電電子，將銷售範圍從介電瓷粉、半導體性陶瓷電容器瓷片、積層陶瓷電容、晶片電阻延伸到二極體與線圈，成為國內唯一可全數提供特殊電容、電感、電阻之被動元件供應商。

Support You Forward

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

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

近年來，為了擴展磁性元件及半導體系列產品的產能，信昌電陶陸續在中國昆山廠增置半導體相關製造設備，在東莞廠、湖南廠、重慶廠增置電感、變壓器相關製造設備，藉由產能提升，大幅拉升業績。

Vertical integration & Complete key technology:

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

上下游垂直整合，掌握完整關鍵性技術：

- 原料(介電瓷粉)
- 半成品(半導體性陶瓷電容瓷片)
- 成品(晶片電容、晶片電阻、線圈、二極體)

Business Operation 經營模式分析

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

Branding Strategy 品牌經營策略

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

Key to the Success 關鍵成功因素

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

Characteristics 企業特色

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

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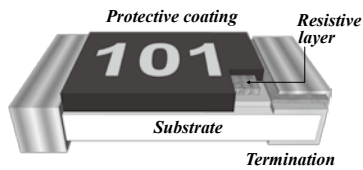
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- 內部記載之產品規格僅提供參考，實際規格請依照我司標準承認書為準。

Contents

Series	Type	Resistance Range	Tolerance	TCR (ppm/°C)	Power Rating	Size	Page
Green							
FCF-G	RoHS Exemption Lead Free resistors	1~10MΩ	±1% ~ ±5%	±100 ~ ±300	1/16W ~ 1W	0402/0603/0805/1206/ 1210/1218/2010/2512	57
Current Sensing							
FMS	Metal Strip Shunt Resistors	0.5mΩ, 1mΩ, 2mΩ	±1% ~ ±5%	±70	5W	5930	59
FMF	Metal Strip Lead Free Current Sensing Resistors	1mΩ~100mΩ	±1%, ±2%, ±5%	±50 ~ ±100	1/2 ~ 5W	1206/2512/5931	60
FBF	Metal Paste Current Sensing Resistors	10mΩ~910mΩ	±1%, ±5%	±100 ~ ±200	1/8 ~ 2W	0603/0805/1206/ 1210/2010/2512	61
	Long-Side electrode Current Sensing Resistors	5mΩ / 10mΩ	±1%, ±2%, ±5%	±100, ±200	1W	1508 (3720)	62
FPF-L	High Power Resistor-Low Resistance	50mΩ~910mΩ	±1%, ±5%	±100 ~ ±250	1/4 ~ 3W	0603/0805/1206/ 1210/2010/2512	63
FCF-L	Thick Film Lead Free Chip Resistor -Low Ohm	510mΩ~910mΩ	±1%, ±5%	±200 ~ ±300	1/10 ~ 1W	0603/0805/1206/ 1210/2010/2512	64
Automotive							
FWF	Automotive Chip Resistor	0Ω ; 1Ω~10MΩ	±1%, ±5%	±100 ~ ±200	1/16 ~ 1W	0402/0603/0805/1206/ 1210/2010/2512	65
FPF	Thick Film High Power Chip Resistors	0Ω ; 1Ω~1MΩ	±1%, ±5%	±100 ~ ±200	1/8 ~ 3W	0603/0805/1206/ 1210/2010/2512	66
High Voltage							
FVS	Safety Certified Thick-Film Type High-Voltage Lead Free Chip Resistors 	100KΩ~100MΩ	±1%, ±5%	±100 ~ ±200	1/10 ~ 1W	0603/0805/1206/ 2010/2512	67
FVF	High Voltage Lead Free Chip-Resistors	100KΩ~100MΩ	±1%, ±5%	±100 ~ ±200	1/10 ~ 1W	0603/0805/1206/ 2010/2512	68
High Reliability							
FPS	Thick Film High Power & Anti-Surge Chip Resistors	0Ω ; 1Ω~1MΩ	±1%, ±5%	±100 ~ ±200	1/8 ~ 2W	0603/0805/1206/ 1210/2010/2512	69
FPF	Thick Film High Power Chip Resistors	0Ω ; 1Ω~1MΩ	±1%, ±5%	±100 ~ ±200	1/8 ~ 2W	0603/0805/1206/ 1210/2010/2512	66
FNF	Anti-Surge Thick Film Chip Resistors	1Ω~1MΩ	±5%, ±10%, ±15%, ±20%	±100	1/10 ~ 1W	0603/0805/1206/ 2010/2512	70
High Precision							
FAF	Thin Film Lead Free High Precision Chip Resistors	4.7Ω~3MΩ	±0.1%, ±0.25%, ±0.5%, ±1%	±5, ±10, ±15, ±25, ±50	1/16 ~ 1W	0402/0603/0805/1206/ 1210/2010/2512	73
Speciality							
FHF	High Ohmic Lead Free Chip Resistors	11MΩ~100MΩ	±1% ~ ±5%	±200	1/10 ~ 1/4W	0603/0805/1206	73
FGF	Non-Magnetic Lead Free Chip Resistors	0Ω ; 1Ω~10MΩ	±1% ~ ±5%	±100 ~ ±200	1/10 ~ 1/4W	0603/0805/1206	74
FTF	Trimable	10Ω~1MΩ	0 ~ -10%(Z) 0 ~ -20%(Y) 0 ~ -30%(X)	±100	1/10 ~ 1W	0603/0805/1206/ 2010/2512	75
Normal Type							
FCF	Thick Film Lead Free Chip Resistor	0Ω ; 1Ω~10MΩ	±0.1% ~ ±5%	±50 ~ ±200	1/20 ~ 1W	0201/0402/0603/0805/ 1206/1210/2010/2512	76
FCF-Array	Chip Array Resistors	0Ω ; 10Ω~1MΩ	±1% ~ 5%	±200 ~ ±300	1/16 ~ 1/10W	4P2R/8P4R/10P8R/16P8R	77

■ 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 below 100ppm.

APPLICATION

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

PART NUMBER

FCF	2	F	P	-	-	G	
Type	Size	Tolerance	Packing	Watt	R Value	TCR	Control Code
FCF	02 0402 03 0603 05 0805 06 1206 12 1210 18 1218 20 2010 25 2512	F = ± 1% J = ± 5%	Paper tape: 0402 V = 10Kpcs 0603/0805/1206/1210 T = 5Kpcs V = 10Kpcs W = 20Kpcs Plastic tape: 2010/2512 P = 4Kpcs 1218 Q = 3Kpcs	—; As Rating Info	XXXX XXX ± 1% = 4 digits ± 5% = 3 digits	—; As Rating Info	G: Green series

RATING

Type	Normal Type Power Rating @ 70°C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient of Resistance (TCR; ppm/°C)	Resistance Range		Standard Resistance Values
						Min.	Max.	
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	

MLCC

Chip R

Diode

Coil

FCF-G

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

RATING

Type	Normal Type Power Rating @ 70°C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient of Resistance (TCR ; ppm/°C)	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	
FCF20 2010	1/2W	200V	400V	±5%(J)	-300/+500	1 Ω	10 Ω	E24 Jumper
					±200	11 Ω	910 KΩ	
					±200	1 MΩ	10 MΩ	
FCF25 2512	1W	250V	500V	±1%(F)	±100	1 Ω	10 Ω	E24 E96
					±200	10.2 Ω	10 MΩ	
					±200	11 Ω	10 MΩ	
FCF18 1218	1W	200V	400V	±5%(J)	±100	1 Ω	10 Ω	E24 E96
					±200	10.2 Ω	10 MΩ	
					±200	11 Ω	10 MΩ	

Note :

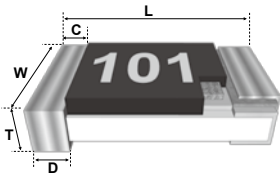
RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.

RCWV : Working Voltage (V) · P : Rated Power (W) · R : Resistance Value (Ω)

Jumper : Max. 50mΩ.

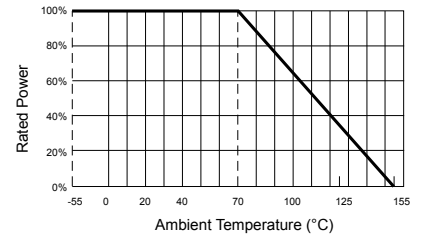
DIMENSIONS

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

■ Metal Strip Shunt Lead Free Current Sensing Resistors



FEATURES

- High power rating and low TCR.
- Low resistance and high precision (1%).
- Inductance less than 1.0nH.
- Robust construction of dual-metal melting.
- Excellent reliability and suitable cost.
- Suitable for lead free reflow soldering.
- RoHS compliant & Halogen Free.

APPLICATION

- Switching model power supply.
- Battery station management.
- Power tools.
- Automotive Converters, Motors.
- Cloud servers.

PART NUMBER

FMS	59	F	P	M	R1L0	X	BH
Type	Size	Tolerance	Packing	Watt	R Value	TCR	Special Code
FMS	59 5930	F = ± 1% G = ± 2% J = ± 5%	P = Plastic Tape 2Kpcs (For 5930)	M = 5W	XXXX 4 digit	X = 70ppm	BH = Low EMF BHM = Meet AEC-Q200

RATING

Type	Power Rating @ 70°C (W)	Max Rated Current	Max Overload Current	Resistance Tolerance (%)	Temperature Coefficient of Resistance (ppm/°C)	Resistance (mΩ)
FMS59 5930	5W	100A	224A	± 1%(F) ± 2%(G) ± 5%(J)	± 70	0.5, 1, 2

Note :

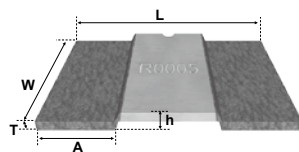
- (1) Rated Current (A) = $\sqrt{P/R}$ or Max. Working Current whichever is lower. P : Rated Power (W) · R : Resistance Value(Ω)
- (2) Solder-pad and trace size should be >300 mm² and board surface temperature should not exceed 105°C when applying rated power
- (3) The resistance value after solder maybe variance due to the pad pattern or solder amount. Please sure the influence to decide value before design

DIMENSIONS AND CONSTRUCTION

Item	Resistance Value	Resistive Element	Terminal
Material	Laser marking	Alloy Metal	Copper

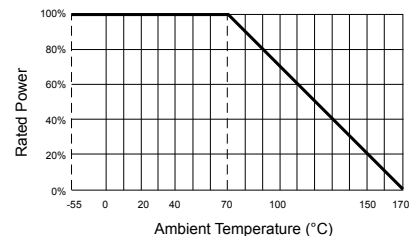
DIMENSIONS

unit: mm



Type	L	W	T	A	h
FMS59 R0L5	15.00±0.20	7.75±0.25	0.56±0.10	4.00±0.25	1.06±0.20
FMS59 R1L0	15.00±0.20	7.75±0.25	0.93±0.10	4.00±0.25	1.43±0.20
FMS59 R2L0	15.00±0.20	7.75±0.25	0.46±0.10	4.00±0.25	0.96±0.20

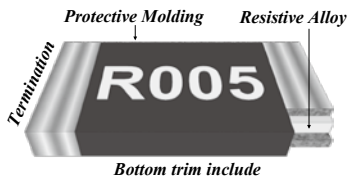
POWER DE-RATING CURVE



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

FMF

■ Metal Strip Type Lead Free Current Sensing Resistors



FEATURES

- High power rating and low TCR.
- Low resistance and high precision (1%).
- Inductance less than 1.0nH.
- Excellent reliability and suitable cost.
- Suitable for lead free soldering.
- 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	06 1206 25 2512 59 5931	F = ±1% G = ±2% J = ±5%	T = Paper Tape 4Kpcs (For 1206) P = Plastic Tape 4Kpcs (For 2512) Q = Plastic Tape 3Kpcs (For 5931)	F = 1/2W H = 1W J = 2W K = 3W M = 5W	XXXX 4 digit	—: As Rating Info X = Trim Type	LH = Standard BH = Low EMF AEC-Q200 LHM = Standard BHM = Low EMF

RATING

Type	Power Rating @ 70°C	Max. Working Voltage	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient of Resistance (ppm/°C)	Resistance (mΩ)
FMF06 1206	0.5W	123mV	274mV	±1%(F) ±2%(G) ±5%(J)	±70	3, 4, 5, 6, 10, 15, 20, 25, 30
	1W	173mV	387mV			1~5(Trim Type) 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 20, 25, 50, 60, 80, 100
FMF25 2512	1W	316mV	707mV	±1%(F) ±2%(G) ±5%(J)	±70	1~5(Trim Type) 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 20, 25, 30, 33, 35, 40, 50, 60, 80, 100
	2W	447mV	1000mV		±70	3, 4, 5, 6, 8, 10
FMF59 5931	3W	300mV	671mV	±1%(F) ±2%(G) ±5%(J)	±70	18, 20, 25, 30, 33, 35, 40, 50
	5W	224mV	500mV	±1%(F) ±2%(G) ±5%(J)	±100 ±70	2, 3 5, 10

Note :

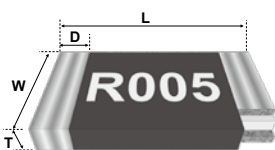
- (1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
- (2) RCWV : Working Voltage (V) · P : Rated Power (W) · R : Resistance Value (Ω)
- (3) Above 2512 size, solder-pad and trace size should be >300mm² and board surface temperature should not exceed 105°C when applying full rated power.

GUIDE OF CURRENT SENSING RESISTORS

Series	Product Type	Resistance Range (<1Ω)	Power Type	AEC Q200
FMF	Metal Strip	1mΩ~100mΩ	V	V
FBF	Metal Paste	10mΩ~910mΩ	V	
FPF	High Power	50mΩ~910mΩ	V	V
FCF	Normal	510mΩ~910mΩ		

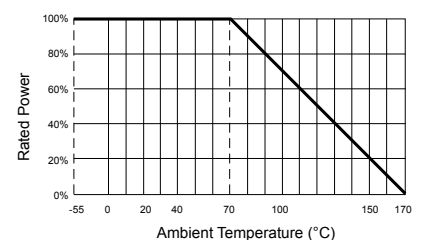
DIMENSIONS

unit: mm



Type	L	W	T	D
FMF06 5m~30m	3.10±0.20	1.65±0.20	0.60±0.20	0.60±0.20
FMF25 1m~2m	6.40±0.20	3.25±0.20	0.70±0.20	2.00±0.20
FMF25 3m~100m	6.40±0.20	3.25±0.20	0.65±0.20	0.80±0.20
FMF59 2~10m	15.0±0.20	7.80±0.20	0.70±0.20	3.50±0.20

POWER DE-RATING CURVE



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

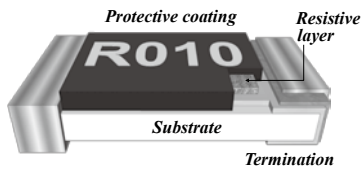
MLCC

Chip R

Diode

Coil

■ 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	06	F	T	-	R100
Type	Size	Tolerance	Packing	Power Code	R Value
FBF Current Sensing Resistors	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	P = Power Enhance	XXXX 4 digit

RATING

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

Note: (1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.

(2) RCWV : Working Voltage (V) · P : Rated Power (W) · R : Resistance Value (Ω)

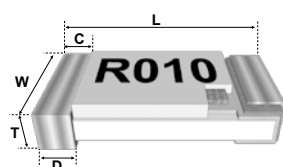
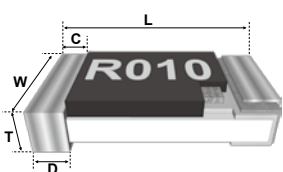
(3) Above 2512 size, solder-pad and trace size should be >300 μm² and board surface temperature should not exceed 105°C when applying full rated power.

GUIDE OF CURRENT SENSING RESISTORS

Series	Product Type	Resistance Range (<1 Ω)	Power Type	AEC Q200
FMF	Metal Strip	1mΩ~100mΩ	V	V
FBF	Metal Paste	10mΩ~910mΩ	V	
FPF	High Power	50mΩ~910mΩ	V	V
FCF	Normal	510mΩ~910mΩ		

DIMENSIONS

unit: mm



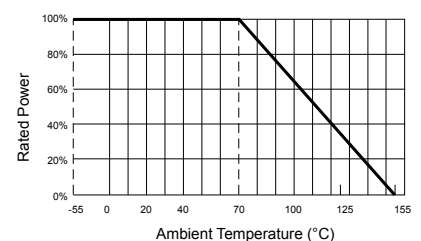
Type 1	L	W	C	D	T
FBF03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FBF05	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FBF06	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FBF12	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FBF20	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
FBF25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

Type 1 : Resistance ≥ 40mΩ

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

Type 2 : Resistance ≤ 39mΩ

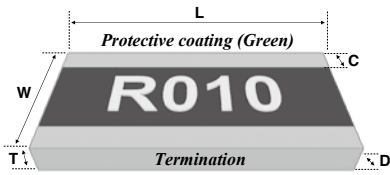
POWER DE-RATING CURVE



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

FBF-L

■ Long-Side Electrode Current Sensing Resistors



FEATURES

- Long side terminal design.
- 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

FBF	08	F	P	H	R010	L	" "
Type	Size	Tolerance	Packing	Watt	R Value	TCR	Special Code
FBF	08 1508 (Metric 3720)	F = ±1% G = ±2% J = ±5%	P = Plastic Tape 4Kpcs	H = 1W	XXXX 4 digit	L = 200 N = 100	" Null " : Standard

RATING

Current Sensing		Power Rating at @ 70°C	Max. RCWV (mV)	Max. Overload Voltage (mV)	Resistance Tolerance (%)	Temperature Coefficient of Resistance (TCR ; ppm/°C)	Resistance (mΩ)
Type	Size (Metric)						
FBF08	1508 (3720)	1W	100	224	±1% ±2% ±5%	±200 ±100	5 10

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)

GUIDE OF CURRENT SENSING RESISTORS

Series	Product Type	Resistance Range (<1Ω)	Power Type	AEC Q200
FMF	Metal Strip	1mΩ~100mΩ	V	V
FBF	Long-Side Electrode Metal Type	5mΩ / 10mΩ	V	
FBF	Metal Paste	10mΩ~910mΩ	V	
FPF	High Power	50mΩ~910mΩ	V	V
FCF	Normal	510mΩ~910mΩ		

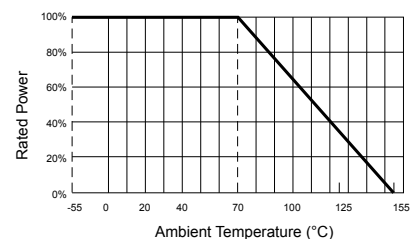
DIMENSIONS

unit: mm



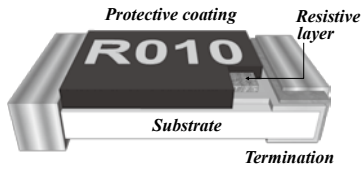
Type	L	W	C	D	T
FBF08	3.65±0.10	2.00±0.10	0.40±0.20	0.40±0.20	0.50±0.10

POWER DE-RATING CURVE



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

■ Current Sensing Thick-film Power Type Chip Resistors



FEATURES

- Meet AEC-Q200.
- High power rating to triple and low TCR.
- Low resistance and high precision.
- 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

FPF	25	F	P	-	R100	-	M
Type	Size	Tolerance	Packing	Watt	R Value (GM)	TCR	Special Code
FPF Power Type	03 0603	F = ±1%	Q =Paper tape – 3 Kpcs	—:	XXXX	—:	"Null"
Current	05 0805	G = ±2%	T =Paper tape – 5 Kpcs	As Rating Info	0603 =3 digit	As Rating Info	Standard
Sensing	06 1206	J = ±5%	V =Paper tape – 10Kpcs	K =3W (2512)	Others =4 digit	N =100ppm	M: Meet AEC-Q200
	12 1210		W =Paper tape – 20Kpcs			L =200ppm	
	20 2010		P =Plastic tape – 4Kpcs				
	25 2512		X =Plastic tape – 8Kpcs				
			Y =Plastic tape – 16Kpcs				

RATING

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

Type	Size	Description	Max. Rated Current	Resistance Range
FPF25 3W	2512	Zero Ohm Jumper	≤ 12A	< 20mΩ

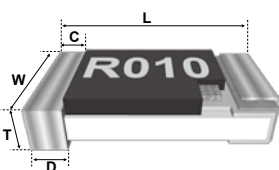
* Temperature 25~55°C, 200ppm for 0603, 150ppm for 0805, 1206, 2010, 2512
Note:
 (1) RCWV = $(P \times R)^{1/2}$ or Max. RCWV listed above, whichever is lower.
 (2) RCWV : Working Voltage (V) · P : Rated Power (W) · R : Resistance Value (Ω)
 (3) Above 2512 size, solder-pad and trace size should be >300 mm² and board surface temperature should not exceed 105°C when applying full rated power.

GUIDE OF CURRENT SENSING RESISTORS

Series	Product Type	Resistance Range (<1 Ω)	Power Type	AEC Q200
FMF	Metal Strip	1mΩ~100mΩ	V	V
FBF	Metal Type	10mΩ~910mΩ	V	
FPF	High Power	50mΩ~910mΩ	V	V
FCF	Normal	510mΩ~910mΩ		

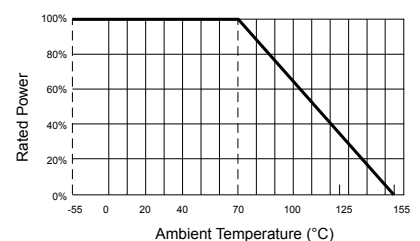
DIMENSIONS

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

MLCC

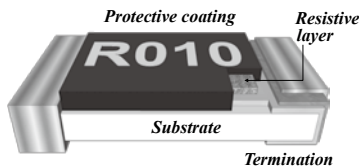
Chip R

Diode

Coil

FCF-L

Thick-Film Normal Type Chip Resistors



FEATURES

- Compatible with wave and reflow soldering.
- High reliability and stability.
- Reduced size of final equipment.
- RoHS compliant and Lead free products.

APPLICATION

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

PART NUMBER

FCF	06	F	T	-	R680
Type	Size	Tolerance	Packing		GM
FCF Standard	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		

RATING

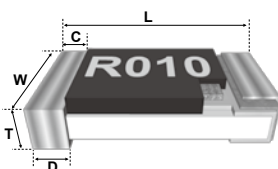
Type	Normal Type Power Rating @ 70°C	Max. RCWV (mV)	Max. Overload Voltage (mV)	Resistance Tolerance (%)	Temperature Coefficient of Resistance (TCR; ppm/°C)	Resistance Range (mΩ)		Standard Resistance Values
						Min.	Max.	
FCF03 0603	1/10W	302	754	±1%, ±5%	±300	510	910	E-24
FCF05 0805	1/8W	337	843	±1%, ±5%	±300	510	910	
FCF06 1206	1/4W	477	1192	±1%, ±5%	±200	510	910	
FCF12 1210	1/3W	551	1377	±1%, ±5%	±200	510	910	
FCF20 2010	3/4W	826	2065	±1%, ±5%	±200	510	910	
FCF25 2512	1W	954	2384	±1%, ±5%	±200	510	910	

GUIDE OF CURRENT SENSING RESISTORS

Series	Product Type	Resistance Range (<1 Ω)	Power Type	AEC Q200
FMF	Metal Strip	1mΩ~100mΩ	V	V
FBF	Metal Type	10mΩ~910mΩ	V	
FPF	High Power	50mΩ~910mΩ	V	V
FCF	Normal	510mΩ~910mΩ		

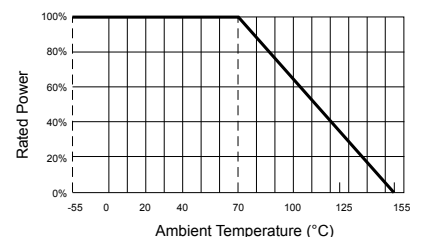
DIMENSIONS

unit: mm



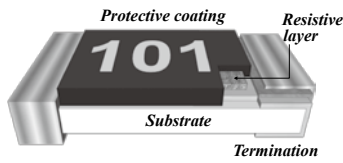
Type	L	W	C	D	T
FCF03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FCF05	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FCF06	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.25	0.55±0.10
FCF12	3.10±0.10	2.60±0.15	0.50±0.25	0.50±0.25	0.55±0.10
FCF20	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
FCF25	6.40±0.20	3.10±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 0603, 0805, 1206, 1210, 2010, 2512

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	05	F	T	-	1002	-	W
Type	Size	Tolerance	Packing	-	GM	-	Specialty
FWF Automotive industry Resistors	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	-	examples : 1002 100x10 ² =10KΩ	-	W =Anti-Sulfurated H2S 1000ppm S =Safety concern application

RATING

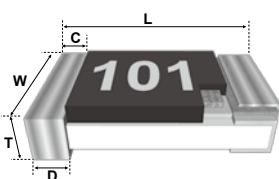
Type	Normal Type Power Rating @ 70°C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient of Resistance (TCR ; ppm/°C)	Resistance Range		Standard Resistance Values
						Min.	Max.	
FWF02 0402	1/16W	50V	100V	±1(F) ±5(J)	±200	> 1MΩ	10MΩ	E-96(F) E-24(J)
					±100	> 10Ω	1MΩ	
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

Jumper :

- 0402, 0603 size maximum resistance $R_{max} < 50m\Omega$ and rated current $I_R \leq 1A$
- 0805, 1206 size maximum resistance $R_{max} < 50m\Omega$ and rated current $I_R \leq 2A$
- 1210, 2010, 2512 size maximum resistance $R_{max} < 50m\Omega$ and rated current $I_R \leq 3A$

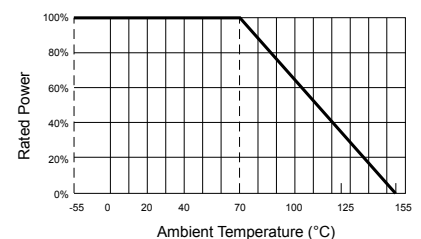
DIMENSIONS

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±0.15	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



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

MLCC

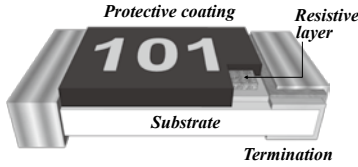
Chip R

Diode

Coil

FPF

High Rated Power Thick-film Lead Free Chip Resistors



FEATURES

- Meet AEC-Q200.
- High power rating to Triple and compact size.
- High reliability and High precision.
- Suitable for lead free soldering.
- RoHS compliant and Halogen Free.

APPLICATION

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

PART NUMBER

FPF	25	F	P	-	1004	-	M
Type	Size	Tolerance	Packing	Watt	GM	TCR	Special code
FPF High Power Resistors	03 0603 05 0805 06 1206 12 1210 20 2010 25 2512	F = ±1% J = ±5%	Q =Paper tape – 3 Kpcs 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	—: As Rating Info E =1/3W (0603) F =1/2W(0805) G =3/4W(1206) K =3W(2512)	0603 =3 digit Others =4 digit	—: As Rating Info N =100ppm Y =150ppm L =200ppm	"Null" Standard M: Meet AEC-Q200

RATING

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

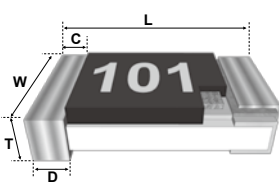
Type	Description	Max. Rated Current	Resistance Range
FPF03 0603	Zero Ohm Jumper	≤ 2A	< 20mΩ
FPF05/06/12 0805-1210	Zero Ohm Jumper	≤ 4A	< 20mΩ
FPF20/25 2010-2512	Zero Ohm Jumper	≤ 6A	< 20mΩ
FPF25 3W 2512	Zero Ohm Jumper	≤ 12A	< 20mΩ

Note :

- (1) RCWV = (P × R)1/2 or Max. RCWV listed above, whichever is lower.
- (2) RCWV : Working Voltage (V) · P : Rated Power (W) · R : Resistance Value (Ω)
- (3) Above 2512 size, solder-pad and trace size should be >300 mm² and board surface temperature should not exceed 105°C when applying full rated power.

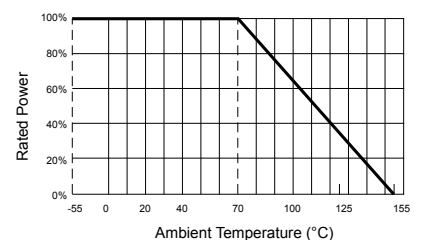
DIMENSIONS

unit: mm



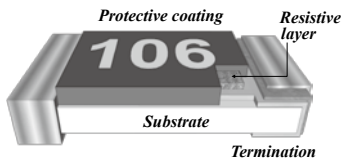
Type	L	W	C	D	T
FPF03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FPF05	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FPF06	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FPF12	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FPF20	5.00±0.20	2.50±0.20	0.65±0.25	0.60±0.25	0.60±0.10
FPF25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

■ 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	20	J	P	-	106	-	-
Type	Size	Tolerance	Packing	Watt	R Value (GM)	TCR	Special Code
FVS Safety High Voltage Resistors	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	—	XXXX XXX 1% = 4 digits 5% = 3 digits	—	"Null" Standard M: Meet AEC-Q200

RATING

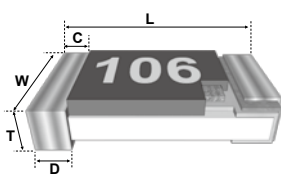
Type	Normal Type Power Rating @ 70°C	Max. RCWW	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Range		Standard Resistance Values
						Min.	Max.	
FVS03 0603	1/10W	200V	400V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
				±5%(J)	±200	100KΩ	22MΩ	E24
FVS05 0805	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
				±5%(J)	±200	100KΩ	22MΩ	E24
FVS20 2010	1/2W	2000V	3000V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
				±5%(J)	±200	100KΩ	100MΩ	E24
FVS25 2512	1W	3000V	4000V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
				±5%(J)	±200	100KΩ	100MΩ	E24

Note :

- (1) RCWW : Rated Continuous Working Voltage.
 (2) $RCWW = \sqrt{\text{Rated Power} \times \text{Resistance Value}}$ or Max. RCWW listed above, whichever is lower.

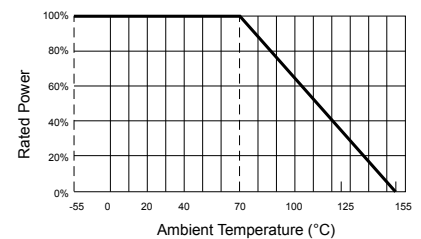
DIMENSIONS

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	0.40±0.20	0.40±0.20	0.50±0.10
FVS06	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.20	0.55±0.10
FVS20	5.00±0.20	2.50±0.20	0.65±0.25	0.60±0.25	0.60±0.10
FVS25	6.40±0.20	3.20±0.20	0.65±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

MLCC

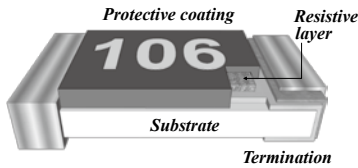
Chip R

Diode

Coil

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	20	J	P	-	106	-	-
Type	Size	Tolerance	Packing	Watt	R Value (GM)	TCR	Special Code
FVF High Voltage Resistors	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	—	0603 =3 digit Others =4 digit	—	"Null" Standard M: Meet AEC-Q200

RATING

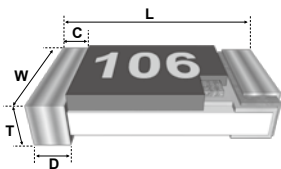
Type	Normal Type Power Rating @ 70°C	Max. RCWW	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Range		Standard Resistance Values
						Min.	Max.	
FVF03 0603	1/10W	200V	400V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
				±5%(J)	±200	100KΩ	22MΩ	E24
FVF05 0805	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
				±5%(J)	±200	100KΩ	100MΩ	E24
FVF20 2010	1/2W	2000V	3000V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
				±5%(J)	±200	100KΩ	100MΩ	E24
FVF25 2512	1W	3000V	4000V	±1%(F)	±100	100KΩ	10MΩ	E96/E24
				±5%(J)	±200	100KΩ	100MΩ	E24

Note :

- (1) RCWW : Rated Continuous Working Voltage.
- (2) RCWW = $\sqrt{\text{Rated Power} \times \text{Resistance Value}}$ or Max. RCWW listed above, whichever is lower.

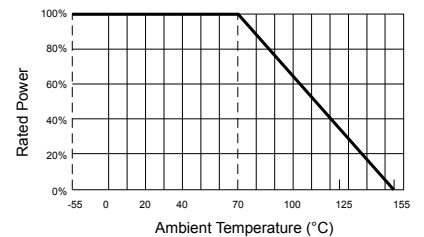
DIMENSIONS

unit: mm

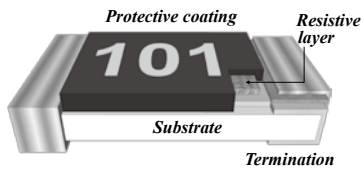


Type	L	W	C	D	T
FVF03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FVF05	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FVF06	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.20	0.55±0.10
FVF20	5.00±0.20	2.50±0.20	0.65±0.25	0.60±0.25	0.60±0.10
FVF25	6.40±0.20	3.20±0.20	0.65±0.25	0.90±0.25	0.60±0.15

POWER DE-RATING CURVE



Thick Film High Power & Anti-Surge Chip Resistors



FEATURES

- High power rating to 2W and compact size.
- 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	25	F	P	-	1004	-	M
Type	Size	Tolerance	Packing	Watt	R Value (GM)	TCR	Special Code
FPS High Power Anti-Surge 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 – 8Kpcs Y = Plastic tape – 16Kpcs	—	0603 = 3 digit Others = 4 digit	—	"Null" Standard M: Meet AEC-Q200

RATING

Type	Normal Type Power Rating @ 70°C	Max. RCWW	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Range		Standard Resistance Values
						Min.	Max.	
FPS03 0603	1/8W	50V	100V	±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	150V	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	200V	400V	±1%(F)	±100	1Ω	1MΩ	E96/E24
				±5%(J)	±200	1Ω	1MΩ	E24
				±1%(F)	±100	1Ω	1MΩ	E96/E24
FPS12 1210	1/2W	200V	400V	±5%(J)	±200	1Ω	1MΩ	E24
				±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
				±1%(F)	±100	1Ω	1MΩ	E96/E24
FPS25 2512	2W	300V	600V	±5%(J)	±200	1Ω	1MΩ	E24
				±1%(F)	±100	1Ω	1MΩ	E96/E24
				±5%(J)	±200	1Ω	1MΩ	E24

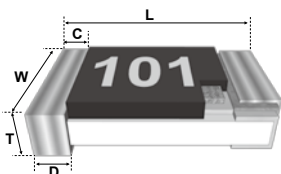
Note :

(1) 2512 2W loading with total solder-pad and trace size of 300mm²

(2) RCWW : Rated Continuous Working Voltage RCWW = √(Rated Power x Resistance Value) or Max. RCWW listed above, whichever is lower.

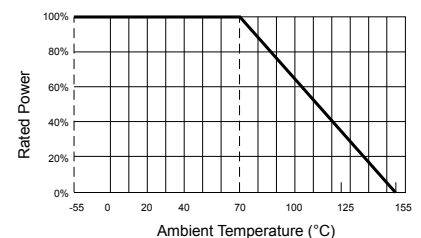
DIMENSIONS

unit: mm



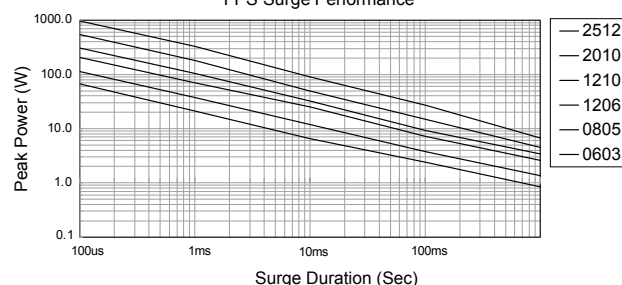
Size	L	W	C	D	T
0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
1206	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
1210	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
2010	5.00±0.20	2.50±0.20	0.65±0.25	0.60±0.25	0.60±0.10
2512	6.40±0.20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

POWER DE-RATING CURVE



SURGE PERFORMANCE

FPS Surge Performance



MLCC

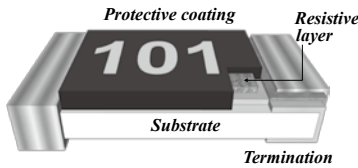
Chip R

Diode

Coil

FNF

■ Anti-Surge Lead Free & Halogen Free Chip Resistors



FEATURES

- Small size and lightweight with size range per int'l standard.
- Highly stable in auto-placement surface mounting application.
- Suitable for withstanding circuit for surge voltage.
- RoHS compliant & Halogen Free.

APPLICATION

- CD-ROM.
- Power supply.
- Automotive industry.
- Measurement instrument.
- Medical or Military equipment.
- Electronic watch and camera.

PART NUMBER

FNF	05	K	T	-	473
Type	Size	Tolerance	Packing	-	GM
FNF Anti-Surge Resistors	03 0603 05 0805 06 1206 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	-	GM

RATING

Type	Normal Type Power Rating @ 70°C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient of Resistance (ppm/°C)	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					
FNF20 2010	3/4W	200V	400V					
FNF25 2512	1W	200V	400V					

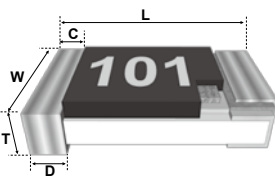
Note :

(1) 2512 2W loading with total solder-pad and trace size of 300 mm²

(2) RCWV : Rated Continuous Working Voltage $RCWV = \sqrt{\text{Rated Power} \times \text{Resistance Value}}$ or Max. RCWV listed above, whichever is lower.

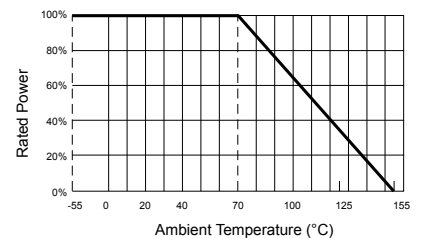
DIMENSIONS

unit: mm

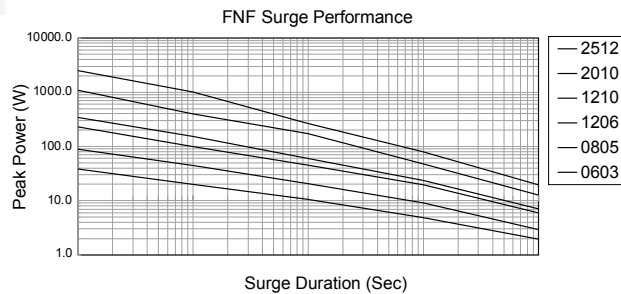


Size	L	W	C	D	T
0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
1206	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.25	0.55±0.10
2010	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
2512	6.40±0.20	3.20±0.20	0.60±0.25	0.90±0.25	0.60±0.15

POWER DE-RATING CURVE



SURGE PERFORMANCE



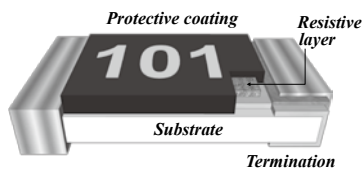
MLCC

Chip R

Diode

Coil

■ Thin Film Lead Free High Precision Chip Resistors



FEATURES

- Meet AEC-Q200, RoHS compliant & Halogen Free.
- Small size and light weight.
- High reliability and stability.
- Reduced size of final equipment.
- Suitable for high density print.

APPLICATION

- Mobile phone.
- PDA.
- Camcorders.
- Palmtop computers.
- Hybrid module.

PART NUMBER

FAF	06	F	T	-	1001	Q	-
Type	Size	Tolerance	Packing	Power Code	GM	TCR Code	Special Code
FAF Thin Film Resistors	01 0201 02 0402 03 0603 05 0805 06 1206 12 1210 20 2010 25 2512	A = ±0.05% B = ±0.1% C = ±0.25% D = ±0.5% F = ±1%	0201~1210 Paper tape: T = 5 Kpcs V = 10Kpcs U = 15 Kpcs W = 20Kpcs 2010/2512 Plastic tape: P = 4Kpcs X = 8Kpcs	Standard type fill in: " — " * Function type fill in: A = 1/16W B = 1/10W C = 1/8W D = 1/4W E = 1/3W F = 1/2W G = 3/4W H = 1W	4-Digits 1R00=1Ω 3302=33KΩ 51R0=51Ω 0603: 3-Digits 01C=1KΩ Refer to Table 1.	B = 2PPM C = 3PPM W = 5PPM V = 10PPM S = 15PPM Q = 25PPM P = 50PPM	"Null" Standard MH: Meet AEC-Q200 Au inside to Anti-Sulfur

RATING

Type	Normal Type Power Rating @ 70°C	Max. RCWV (V)	Max. Overload Voltage (V)	Resistance Tolerance (%)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Range		Standard Resistance Values
						Min.	Max.	
0201	1/32W	15	30	B: ±0.1%	±25	100Ω	12KΩ	E24 E96
		15	30		±50	100Ω	12KΩ	
	1/20W	15	30	D: ±0.50%	±25	27Ω	12KΩ	
		15	30		±50	27Ω	22KΩ	
0402	*1/10W	25	50	A: ±0.05%	±2 *	10Ω	8KΩ	
		25	50		±3 *	10Ω	8KΩ	
		25	50		±5 *	10Ω	10KΩ	
		25	50		±10 *	10Ω	20KΩ	
		25	50		±15 *	10Ω	20KΩ	
		25	50		±25	10Ω	255KΩ	
	1/16W	50	100	B: ±0.1%	±50	10Ω	255KΩ	
		50	100		±2 *	4.7Ω	40KΩ	
		50	100		±3 *	4.7Ω	40KΩ	
		50	100		±5 *	4.7Ω	50KΩ	
0603	*1/10W	50	100	C: ±0.25%	±10 *	4.7Ω	100KΩ	
		50	100		±15 *	4.7Ω	100KΩ	
		75	150		±25, ±50	4.7Ω	680KΩ	
		50	100		±25	4.7Ω	1MΩ	
	1/16W	50	100	D: ±0.50%	±50	4.7Ω	1MΩ	
		100	200		±2 *	4.7Ω	80KΩ	
		100	200		±3 *	4.7Ω	80KΩ	
		100	200		±5 *	4.7Ω	100KΩ	
0805	*1/8W	100	200	F: ±1.0%	±10 *	4.7Ω	200KΩ	
		100	200		±15 *	4.7Ω	200KΩ	
		150	300		±25, ±50	4.7Ω	1MΩ	
	1/10W	100	200		±25	4.7Ω	2MΩ	
		100	200		±50	4.7Ω	2MΩ	
		150	300		±2 *	4.7Ω	120KΩ	
1206	1/8W	150	300	C: ±0.25%	±3 *	4.7Ω	120KΩ	
		150	300		±5 *	4.7Ω	150KΩ	
		150	300		±10 *	4.7Ω	300KΩ	
		150	300		±15 *	4.7Ω	300KΩ	
		150	300		±25	4.7Ω	2.49MΩ	
	*1/4W	200	400		±50	4.7Ω	2.49MΩ	
		200	400		±25	10Ω	1MΩ	
		200	400		±50	10Ω	1MΩ	

MLCC

Chip R

Diode

Coil

Thin Film Lead Free High Precision Chip Resistors

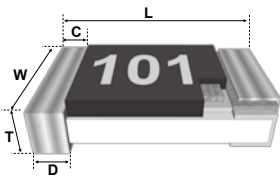
RATING

Type	Normal Type Power Rating @ 70°C	Max. RCWW (V)	Max. Overload Voltage (V)	Resistance Tolerance (%)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Range		Standard Resistance Values		
						Min.	Max.			
1210	1/4W	200	400			±2 *	4.7Ω	400KΩ		
						±3 *	4.7Ω	400KΩ		
						±5 *	4.7Ω	150KΩ		
						±10 *	4.7Ω	400KΩ		
						±15 *	4.7Ω	300KΩ		
						±25	4.7Ω	2.49MΩ		
						±50	4.7Ω	2.49MΩ		
						*1/3W	±25	10Ω		1MΩ
							±50	10Ω		1MΩ
						2010	1/2W	200		400
±3 *	4.7Ω	360KΩ								
±5 *	4.7Ω	360KΩ								
±10 *	4.7Ω	900KΩ								
±15 *	4.7Ω	900KΩ								
±25	4.7Ω	3MΩ								
±50	4.7Ω	3MΩ								
*3/4W	±50	10Ω	1.5MΩ							
	±2 *	4.7Ω	600KΩ							
2512	3/4W	200	400						±3 *	
						±5 *	4.7Ω	600KΩ		
						±10 *	4.7Ω	1.5MΩ		
						±15 *	4.7Ω	1.5MΩ		
						±25	4.7Ω	3MΩ		
						±50	4.7Ω	3MΩ		
						*1W	±50	10Ω	1.5MΩ	
							±2 *	4.7Ω	600KΩ	

Type (MH)	Normal Type Power Rating @ 70°C	Max. RCWW (V)	Max. Overload Voltage (V)	Resistance Tolerance (%)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Range		Standard Resistance Values
						Min.	Max.	
0402	1/16W	50	100	A: ±0.05%	±25	40Ω	35KΩ	E24 E96
0603	0.15W	75	150	B: ±0.1%	±25	40Ω	130KΩ	
0805	0.2W	100	200	C: ±0.25%	±25	10Ω	350KΩ	
1206	0.4W	200	400	D: ±0.50% F: ±1.0%	±25,	10Ω	1MΩ	

DIMENSIONS

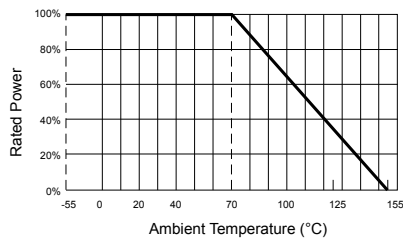
unit: mm



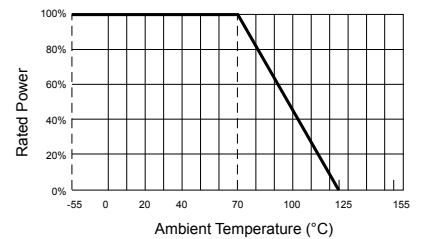
Size	L	W	C	D	T
0201	0.60±0.03	0.30±0.03	0.10±0.05	0.15±0.05	0.23±0.03
0402	1.00±0.10	0.50±0.05	0.20±0.15	0.30±0.10	0.30±0.05
0603	1.55±0.10	0.80±0.10	0.30±0.20	0.30±0.15	0.45±0.15
0805	2.00±0.10	1.25±0.10	0.35±0.20	0.40±0.20	0.50±0.15
1206	3.10±0.10	1.60±0.10	0.45±0.20	0.45±0.20	0.60±0.15
1210	3.10±0.10	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	0.50±0.20	0.55±0.10
2512	6.35±0.10	3.20±0.15	0.60±0.20	0.50±0.20	0.55±0.10

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

POWER DE-RATING CURVE

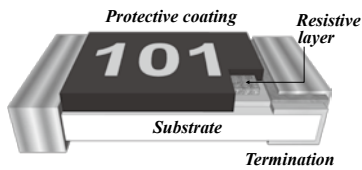


Maximum dissipation in percentage of rated power as a function of the ambient temperature for 2512, 2010, 1210, 1206, 0805, 0603, 0402



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

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

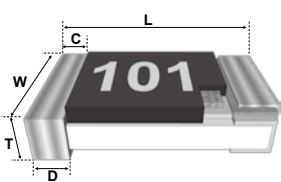
FHF	06	F	P	-	1007
Type	Size	Tolerance	Packing	-	GM
FHF High Ohmic Resistors	03 0603 05 0805 06 1206	F = ±1% J = ±5%	T = Paper tape – 5 Kpcs V = Paper tape – 10 Kpcs W = Paper tape – 20 Kpcs		

RATING

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

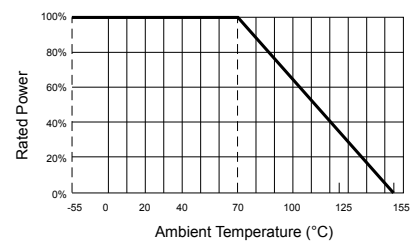
DIMENSIONS

unit: mm



Type 1	L	W	C	D	T
FHF03 0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FHF05 0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FHF06 1206	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.25	0.55±0.10

POWER DE-RATING CURVE



MLCC

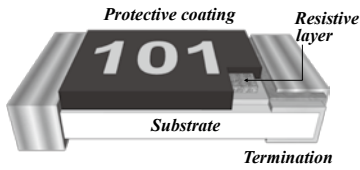
Chip R

Diode

Coil

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	06	F	T	-	1002
Type	Size	Tolerance	Packing	-	GM
FGF Non-Magnetic Resistors	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	-	

RATING

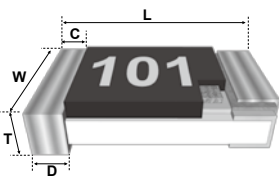
Type	Normal Type Power Rating @ 70°C	Max. RCWW	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient of Resistance (TCR ; ppm/°C)	Resistance Range		Standard Resistance Values
						Min.	Max.	
FGF03 0603	1/10W	50V	100V	± 1%(F) ± 5%(J)	± 100 ± 200	1Ω	10MΩ	E-96 E-24
FGF05 0805	1/8W	150V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

Jumper :

- 0603 size maximum resistance $R_{max} < 50m\Omega$ and rated current $I_r \leq 1A$
- 0805,1206 size maximum resistance $R_{max} < 50m\Omega$ and rated current $I_r \leq 2A$

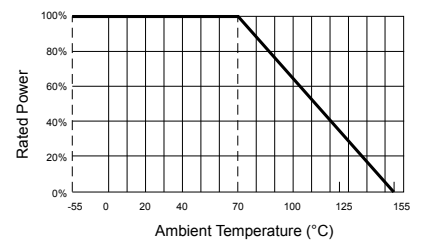
DIMENSIONS

unit: mm



Type	L	W	C	D	T
FGF03 0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FGF05 0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FGF06 1206	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.25	0.55±0.10

POWER DE-RATING CURVE



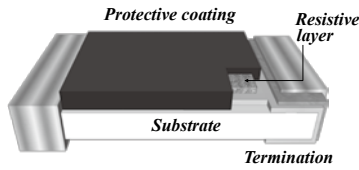
MLCC

Chip R

Diode

Coil

Lead Free Trimmable Chip Resistors



FEATURES

- Small size and light weight with size range per int'l standard.
- Highly stable in auto-placement surface mounting application.
- Available for fine tuning of the resistance value to obtain optimal circuit signals.
- RoHS compliant & Halogen Free.

APPLICATION

- Tuner.
- Camcorder.
- Photo sensor.
- Mobile phone.
- Portable audio.
- Portable measuring equipment.

PART NUMBER

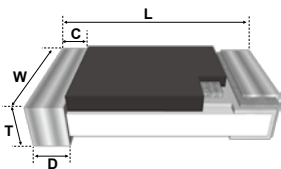
FTF	05	X	T	-	103
Type	Size	Tolerance	Packing	-	GM
FTF Trimable Resistors	03 0603 05 0805 06 1206 20 2010 25 2512	X =0 ~ -30% Y =0 ~ -20% Z =0 ~ -10%	T =Paper tape – 5 Kpcs V =Paper tape – 10 Kpcs W =Paper tape – 20 Kpcs P =Plastic tape – 4 Kpcs X =Plastic tape – 8 Kpcs Y =Plastic tape – 16Kpcs	-	

RATING

Type	Normal Type Power Rating @ 70°C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Range		Standard Resistance Values
						Min.	Max.	
FTF03 0603	1/10W	50V	100V					
FTF05 0805	1/8W	150V	300V	0 ~ -30%(X)				
FTF06 1206	1/4W	200V	400V	0 ~ -20%(Y)	±100	10Ω	1MΩ	E-24
FTF20 2010	1/2W	200V	400V	0 ~ -10%(Z)				
FTF25 2512	1W	200V	400V					

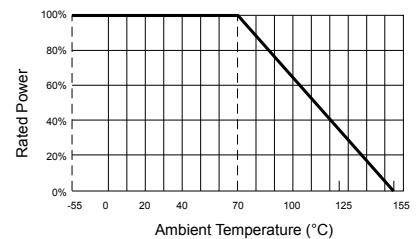
DIMENSIONS

unit: mm



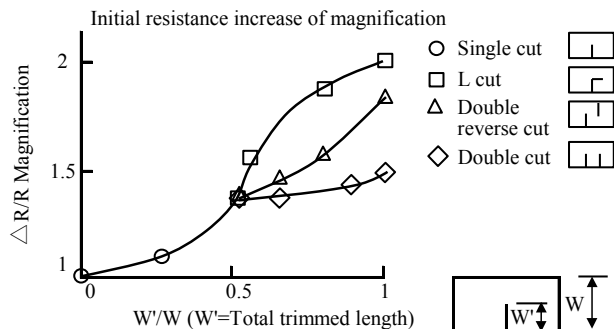
Size	L	W	C	D	T
0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
1206	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.25	0.55±0.10
2010	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
2512	6.40±0.20	3.20±0.20	0.60±0.25	0.90±0.25	0.60±0.15

POWER DE-RATING CURVE



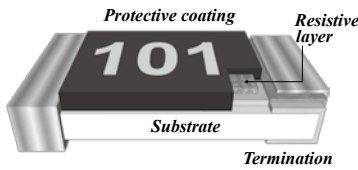
RESISTANCE RISING RATE

Trimming shall be performed by laser. The resistance rising limits the initial resistance value up to 2 times and the differences are depending on trimming patterns as shown at the left.



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	25	F	P	R680	-
Type	Size	Tolerance	Packing	GM	TCR
FCF Standard	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 – 8 Kpcs Y = Plastic tape – 16Kpcs		"—" = As Rating Table P = 50 ppm N = 100 ppm for 1Ω~10Ω (1% only)

RATING

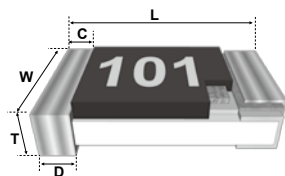
Type	Normal Type Power Rating @ 70°C	Max. RCWW	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Range		Standard Resistance Values
						Min.	Max.	
FCF01 0201	1/20W	25V	50V	±1%(F)	±200	1Ω	3.3MΩ	E-96
				±5%(J)		0Ω, 1Ω	10MΩ	E-24
				±0.1%(B)		10Ω	1MΩ	E-96
FCF02 0402	1/16W	50V	100V	±0.5%(D)	±100	10Ω	1MΩ	E-96
				±1%(F)		1Ω	10MΩ	E-96
				±5%(J)		0Ω, 1Ω	10MΩ	E-24
FCF03 0603	1/10W	50V	100V	±0.1%(B)	±50	20Ω	510KΩ	E-96
				±0.25%(C)				E-96
				±0.5%(D)				E-96
FCF05 0805	1/8W	150V	300V	±1%(F)	±100	1Ω	10MΩ	E-96
				±2%(G)		1Ω	10MΩ	E-24
				±5%(J)		0Ω, 1Ω	10MΩ	E-24
FCF06 1206	1/4W	200V	400V	±1%(F)	±100	1Ω	10MΩ	E-96
				±5%(J)		0Ω, 1Ω	10MΩ	E-24
				±1%(F)		1Ω	10MΩ	E-96
FCF12 1210	1/3W	200V	400V	±5%(J)	±200	0Ω, 1Ω	10MΩ	E-24
				±1%(F)		1Ω	10MΩ	E-96
				±5%(J)		0Ω, 1Ω	10MΩ	E-24
FCF20 2010	3/4W	200V	400V	±1%(F)	±100	1Ω	10MΩ	E-96
				±5%(J)		0Ω, 1Ω	10MΩ	E-24
				±1%(F)		1Ω	10MΩ	E-96
FCF25 2512	1W	200V	400V	±1%(F)	±100	1Ω	10MΩ	E-96
				±5%(J)		0Ω, 1Ω	10MΩ	E-24
				±1%(F)		1Ω	10MΩ	E-96

Jumper:

- 0402, 0603 size maximum resistance Rmax < 50mΩ and rated current IR ≤ 1A
- 0805, 1206, 1210, 2010, 2512 size maximum resistance Rmax < 50mΩ and rated current IR ≤ 2A
- 1Ω~10Ω: Temperature Coefficient of Resistance for 0402,0603,0805,1206 = -200 ~ +400 / 2010,2512 = ±300/ 0201 = -200 ~ +600

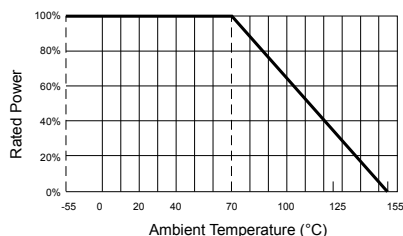
DIMENSIONS

unit: mm

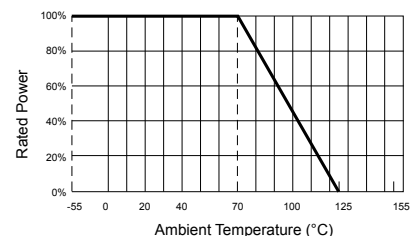


Size	L	W	C	D	T
0201	0.60±0.03	0.30±0.03	0.10±0.05	0.15±0.05	0.23±0.03
0402	1.00±0.05	0.50±0.05	0.20±0.10	0.25±0.10	0.35±0.05
0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
0805	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
1206	3.10±0.10	1.60±0.10	0.50±0.20	0.50±0.25	0.55±0.10
1210	3.10±0.10	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

FCF ARRAY

Thick Film Lead Free Chip Resistor Networks

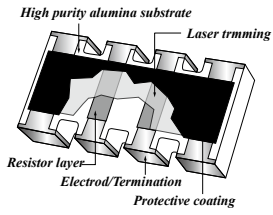


Fig 1. Construction of a Chip-R array (convex type)

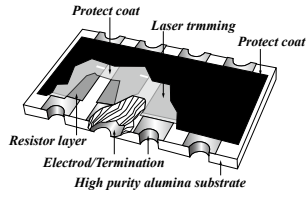


Fig 2. Construction of a Chip-R array (concave type)

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	-	GM
FCF Chip Array Resistors	220 0402x2 240 0402x4 (Convex) 241 0402x4 (Concave) 320 0603x2 (Convex) 340 0603x4 (Convex) 341 0603x4 (Concave) 35R 10P8R 370 16P8R	F = ± 1% J = ± 5%	5Kpcs 10Kpcs 20Kpcs	-	-

RATING

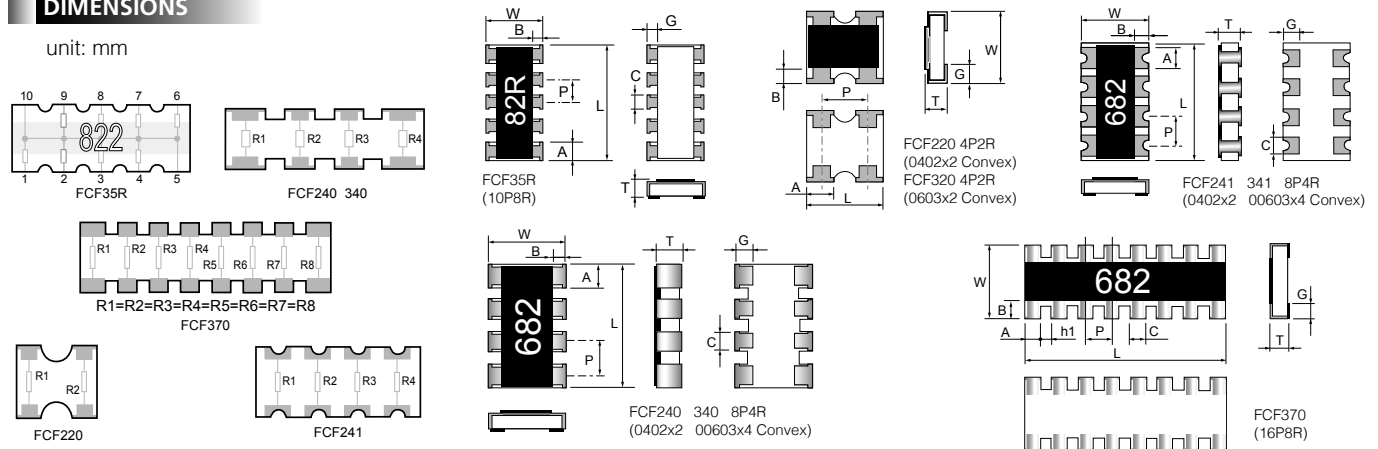
Type	Termination Construction	Normal Type Power Rating @ 70°C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient of Resistance (TCR ; ppm/°C)	Resistance Range		Standard Resistance Values
							Min.	Max.	
FCF220 4P2R/0402x2	Convex	1/16W	25V	50V	± 5%(J)	± 300	0Ω, 10Ω	1MΩ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

Jumper :

- 0402, 0603 size maximum resistance $R_{max} < 50m\Omega$ and rated current $IR \leq 1A$
- 0805, 1206, 1210, 2010, 2512 size maximum resistance $R_{max} < 50m\Omega$ and rated current $IR \leq 2A$
- 1Ω~10Ω: Temperature Coefficient of Resistance for 0402, 0603, 0805, 1206 = -200 ~ +400 / 2010, 2512 = ± 300 / 0201 = -200 ~ +600

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

MLCC

Chip R

Diode

Coil

APPENDIX

RESISTANCE MARKING

E 24 series

473

3 digit marking for $\pm 5\%$ E24
examples: **473** $47 \times 10^3 = 47K\Omega$, **1R5** $47 \times 10^3 = 1.5K\Omega$

E 96 series

1542

4 digit marking for E96
examples: **1542** $154 \times 10^2 = 15K4\Omega$, **22R1** $47 \times 10^3 = 22.1K\Omega$

02C

3 digit marking for E96 - 0603
examples: **02C** (Table 1) $102 \times 10^2 = 10K2\Omega$

• No Marking of 0402 / 0201.

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}

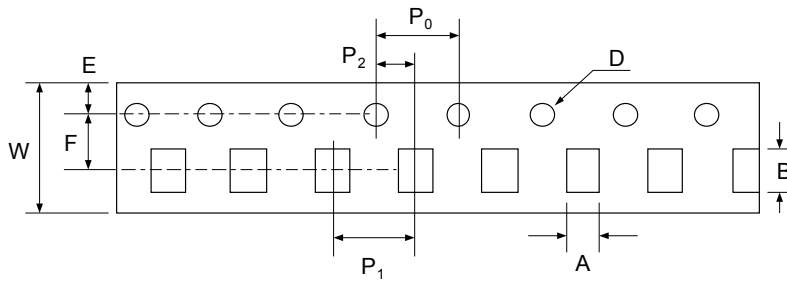
STANDARD RESISTANCE VALUE

E3	10				22				47								
E6	10		15		22		33		47		68						
E12	10	12	15	18	22	27	33	39	47	56	68	82					
E24	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47
E96	51	56	62	68	75	82	91										
E96	100	102	105	107	110	113	115	118	121	124	127	130	133	137	140	143	147
E96	150	154	158	162	165	169	174	178	182	187	191	196	200	205	210	215	221
E96	226	232	237	243	249	255	261	267	274	280	287	294	301	309	316	324	332
E96	340	348	357	365	374	383	392	402	412	422	432	442	453	464	475	487	499
E96	511	523	536	549	563	576	590	604	619	634	649	665	681	698	715	732	750
E96	768	787	806	825	845	866	887	909	931	953	976						

APPENDIX

TAPE AND REEL PACKAGE

Taping specs are according to EIA RS-481

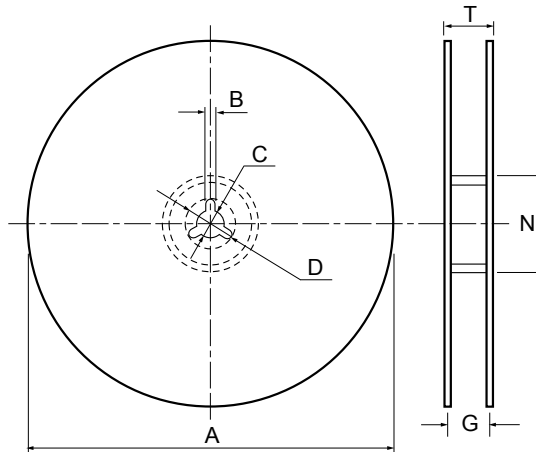


• Accumulated dimensional tolerance $40 \pm 0.2 \text{ mm}$

unit: mm

Size	A	B	W	F	E	P ₁	P ₂	P ₀	D
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	A	N	C	D	B	G	T
0201	15Kpcs / 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.
0402	10Kpcs / 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.
0603	1Kpcs / Reel	100.0 ± 0.5	52.0 ± 0.5	13.0 ± 0.5	20min	2.0 ± 0.5	9.0 ± 0.5	12.5 max.
0805	5Kpcs / 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.
1206	10Kpcs / 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.
1210	20Kpcs / 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	4Kpcs / 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.
2512	8Kpcs / 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	330.0 ± 2.0	100.0 ± 1.0	13.5 ± 0.5	20min	2.0 ± 0.5	13.8 ± 1.5	20.0 max.

MLCC

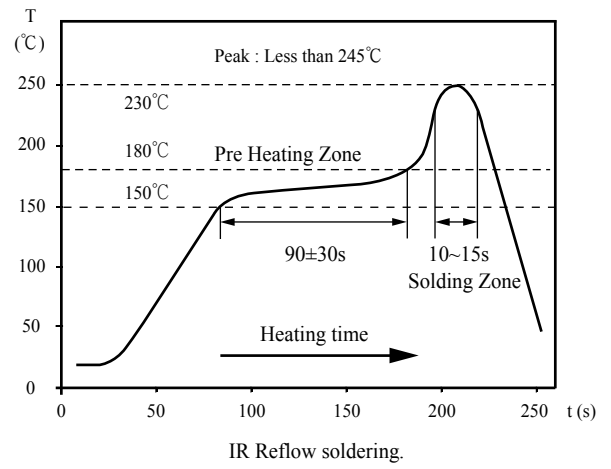
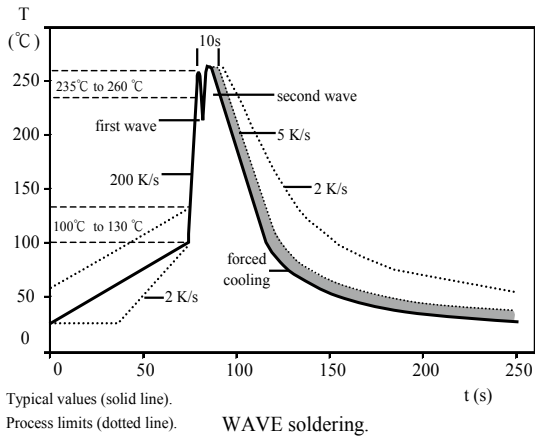
Chip R

Diode

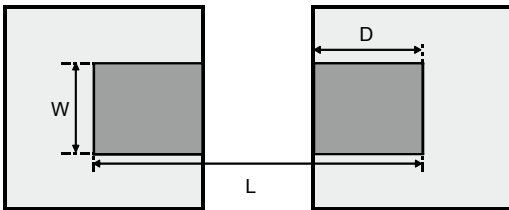
Coil

APPENDIX

SOLDERING TEMPERATURE CURVE



RECOMMEND SOLDER PAD DIMENSION



unit: mm

Type	W	D	L
2512	3.70	1.60*	7.60
2010	3.00	1.50	6.80
1210	3.00	1.30	4.70
1206	1.80	1.30	4.70
0805	1.30	1.15	3.50
0603	0.90	1.00	3.00
0402	0.60	0.50	1.50

*:FPF/FPS-2512 series, "D" would be modified to 2.45mm.

MLCC

Chip R

Diode

Coil



信昌電子陶瓷

Prosperity Dielectrics Co., Ltd.

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