

信昌電子陶瓷股份有限公司

Prosperity Dielectrics Co., Ltd.

No.220-1, Sec. 2, Nanshan Rd., Lujhu, Taoyuan 33860, Taiwan, R.O.C.

Tel. : 886-3-3224471 Fax : 886-3-3212216

SPECIFICATION FOR APPROVAL

DATE:

CUSTOMER: _____

PART NAME: Thick Film Lead Free & Halogen Free Chip Resistors

CUSTOMER'S DWG. NO. _____

CUSTOMER'S PART NO. _____

PDC PART NO. FCF-LOW OHM SERIES APPROVED

DESCRIPTION. _____

RESULT \ ACTION	" √ "	CUSTOMER'S SIGNATURE	NOTE
FULL APPROVED			
CONDITIONAL APPROVED			
REJECTED			

OUR ACTION	SIGNATURE
PREPARED BY	<i>Jenny Tseng</i>
CHECKED BY	<i>Tony Chou</i>
APPROVED BY	<i>Byron Tsai</i>

<p>CUSTOMER SIGNATURE FOR ACCEPTANCE</p>



Current Sensing Resistors

FCF Series

Thick-Film Normal Type Chip Resistors

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1. SCOPE

1.1 Purpose

Fixed Thick-Film Low Resistance Chip Resistors.

Standard Rated power and apply to Current Sensing in :

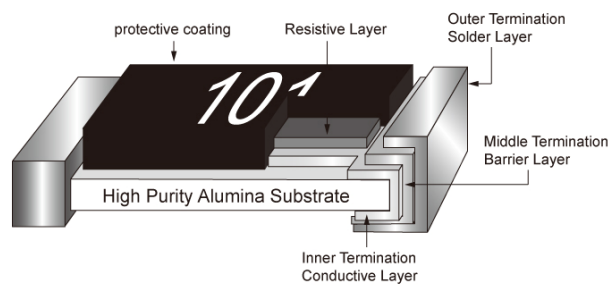
Consumer Electronics 、 **SMPS** 、 **M/B**

BTC 、 **Portable Device** 、 **Electronic equipment...etc.**

The product is RoHS compliant & Halogen Free

<i>Guide of Current Sensing Resistors</i>		
Series	Product Type	Resistance Range (<math><1\Omega</math>)
FMF	Metal Strip	3m Ω ~50m Ω
FBF	Metal Type	40m Ω ~500m Ω
FCF	Normal	510mΩ ~ 910mΩ
FPF	High Power	200m Ω ~ 910m Ω

1.2 Configuration



Construction of Chip-Resistor

1.3 Part Number:

FCF	25	F	P	-	R680
Type	Size	Tolerance	Packing		GM
FCF	03 : 0603	F : $\pm 1\%$	T : Paper tape – 5 Kpcs		
<u>Standard</u>	05 : 0805	J : $\pm 5\%$	V : Paper tape – 10 Kpcs		
	06 : 1206		W : Paper tape – 20 Kpcs		
	12 : 1210		P : Plastic tape – 4 Kpcs		
	20 : 2010		X : Plastic tape – 8 Kpcs		
	25 : 2512		Y : Plastic tape – 16Kpcs		

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Resistance Marking (E-24 Series)

R510

4 digit marking for $\pm 1\%$, $\pm 5\%$ 0805, 1206, 1210, 2010, 2512

Examples. **R510 = 510 mΩ**, **R820 = 820 mΩ**

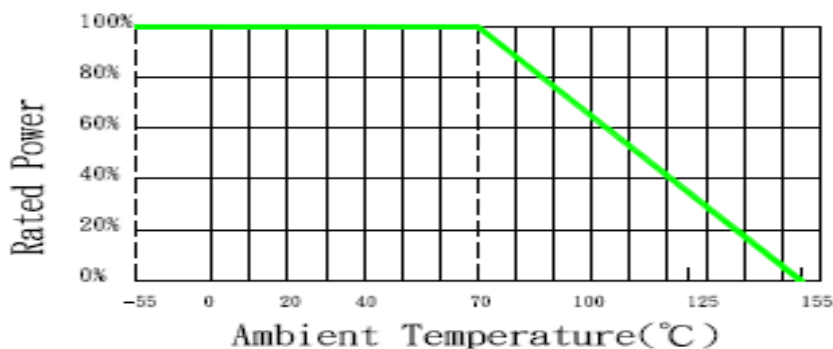
R62

3 digit marking for $\pm 1\%$, $\pm 5\%$ 0603

Examples. **R62 = 620 mΩ**

2. PERFORMANNCE CHARACTERISTICS

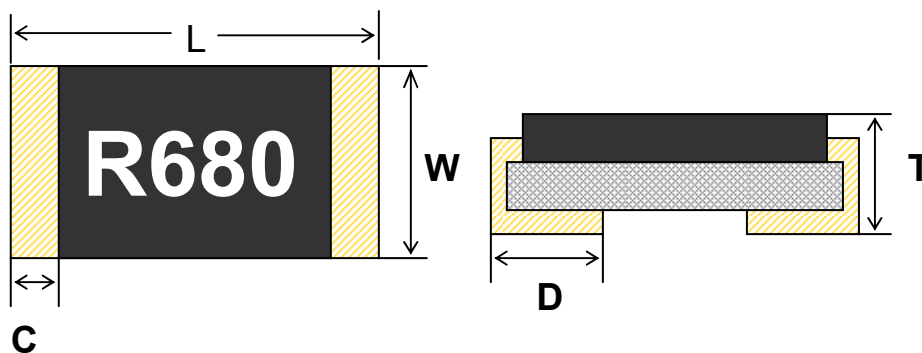
2.1 Power Derating Curve by Ambient Temperature



2.2 Mechanical Dimensions

unit: mm.

Type	DIMENSIONS				
	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



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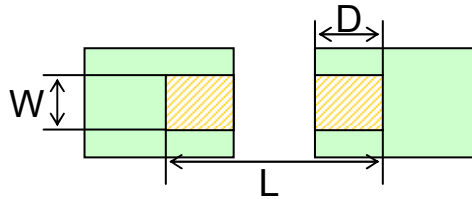
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2.3 Recommended Solder Pad Dimensions



Type	W	D	L
FCF25	3.70 _{mm}	1.60 _{mm}	7.60 _{mm}
FCF20	3.00 _{mm}	1.50 _{mm}	6.80 _{mm}
FCF12	3.00 _{mm}	1.30 _{mm}	4.70 _{mm}
FCF06	1.80 _{mm}	1.30 _{mm}	4.70 _{mm}
FCF05	1.30 _{mm}	1.15 _{mm}	3.50 _{mm}
FCF03	0.90 _{mm}	1.00 _{mm}	3.00 _{mm}

3. SPECIFICATION

3.1 Rating Table.

Standard		Power Rating at 70°C	Max. RCWV (mV)	Max. Overload Voltage (mV)	Resistance Tolerance (%)	Temperature Coefficient (TCR; ppm/°C)	Resistance Range (mΩ)		Standard Resistance Values
Type	Size						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	

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

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3.2 Reliability Performance		
Test Item	Specification	Test Method
DC Resistance	F : $\pm 1\%$; J : $\pm 5\%$	IEC 60115-1 / JIS C 5201-1 , Clause 4.5 Measure the resistance Value.
Short Time Overload	J: $\Delta R \leq \pm(2\% + 0.5m\Omega)$ F: $\Delta R \leq \pm(1\% + 0.5m\Omega)$	IEC 60115-1 / JIS C 5201-1 , Clause 4.13 2.5xRated Voltage for 5 sec.
Solderability	Over 95% of termination must be covered with solder	IEC 60115-1 / JIS C 5201-1 , Clause 4.17 After immersing flux, dip in the $245 \pm 2^\circ\text{C}$ molten solder bath for 3 ± 0.5 sec
Resistance to solder Heat	J: $\Delta R \leq \pm(1\% + 0.5m\Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.5m\Omega)$ No mechanical damage	IEC 60115-1 / JIS C 5201-1 , Clause 4.18 With $260 \pm 5^\circ\text{C}$ for 10 ± 1 sec.
Load Life Humidity	J: $\Delta R \leq \pm(3\% + 0.5m\Omega)$ F: $\Delta R \leq \pm(1\% + 0.5m\Omega)$	IEC 60115-1 / JIS C 5201-1 , Clause 4.24 $40 \pm 2^\circ\text{C}$ with relative humidity 90% ~ 95% D.C. rated voltage for 1.5 hours ON 30 minutes OFF.
Temperature Coefficient of Resistance (TCR)	Test temperature: $-55 \sim +155^\circ\text{C}$ Refer to rating table	IEC 60115-1 / JIS C 5201-1 , Clause 4.8 Test temperature : $25^\circ\text{C} \sim -55^\circ\text{C}$ $25^\circ\text{C} \sim +155^\circ\text{C}$ TCR(ppm/ $^\circ\text{C}$)= $[(R_2 - R_1) / R_1] \times [1 / (T_2 - T_1)] \times 10^6$
Load Life	J : $\Delta R \leq \pm(3\% + 0.5m\Omega)$ F : $\Delta R \leq \pm(1\% + 0.5m\Omega)$	IEC 60115-1 / JIS C 5201-1 , Clause 4.25 Rated voltage for 1.5hours for followed by a pause 0.5 hour at $70 \pm 2^\circ\text{C}$. Cycle repeated 1000 hours
Temperature Cycle	J : $\Delta R \leq \pm(1\% + 1m\Omega)$ F : $\Delta R \leq \pm(0.5\% + 1m\Omega)$ No mechanical damage	IEC 60115-1 / JIS C 5201-1 , Clause 4.19 Repeat 5 cycles as follows -55°C (30min.) + 25°C (2~3min.) + 155°C (30min.) + 25°C (2~3min.)
Insulation Resistance	Between termination and coating must be over 1000M Ω	IEC 60115-1 / JIS C 5201-1 , Clause 4.6 Test voltage : $100 \pm 15\text{V}$
Bending strength	J : $\Delta R \leq \pm(1\% + 1m\Omega)$ F : $\Delta R \leq \pm(0.5\% + 1m\Omega)$ No mechanical damage	IEC 60115-1 / JIS C 5201-1 , Clause 4.33 Resistance change after bended on the 90mm PCB. Bending width : 3mm for 0603 0805 2mm for 1206 1210 2010 2512

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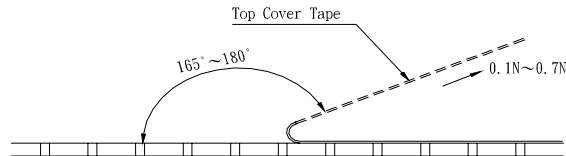
Thick-Film Normal Type Chip Resistors

4. PACKAGING

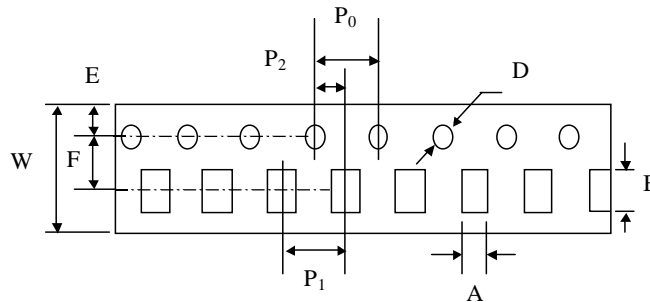
4.1 Peel Strength of Top Cover Tape

The peel speed shall be about 300 mm/min

The peel force of top cover tape shall be between 0.1 to 0.7N



4.2 Tape Packaging Dimensions



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

Size	A	B	W	F	E	P1	P2	P0	D
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

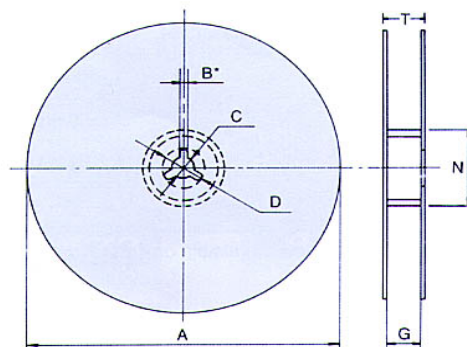
unit : mm

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4.3 Reel Dimensions



Size	Packaging Q'ty	A	N	C	D	B	G	T
0603	5kpcs/Reel	178.0±2.0	60.0±0.5	13.0±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.
0805	10kpcs/Reel	254.0±2.0	100.0±1.0	13.5±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.
1206	20kpcs/Reel	330.0±2.0	100.0±1.0	13.5±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.
2010 2512	4kpcs/Reel	178.0±2.0	60.0±0.5	13.0±0.5	20(Min.)	2.0±0.5	13.8±1.5	16.7max.
	8kpcs/Reel	254.0±2.0	100.0±1.0	13.0±0.5	20(Min.)	2.0±0.5	13.8±1.5	20.0max.
	16kpcs/Reel	330.0±2.0	100.0±1.0	13.5±0.5	20(Min.)	2.0±0.5	13.8±1.5	20.0max.

unit : mm

All product specification and data are subject to change without notice

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