

信昌電子陶瓷股份有限公司

Prosperity Dielectrics Co., Ltd.

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SPECIFICATION FOR APPROVAL

DATE:

CUSTOMER: _____ LIMITED COMPANY

PART NAME: Thick Film Lead Free Chip Resistor Networks

CUSTOMER'S DWG. NO. _____

CUSTOMER'S PART NO. _____

PDC PART NO. FCF Array Series Approved

DESCRIPTION. _____

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

OUR ACTION	SIGNATURE
PREPARED BY	<i>Angel Wu</i>
CHECKED BY	<i>James Tseng</i>
APPROVED BY	<i>Roger Hsu</i>

CUSTOMER SIGNATURE FOR ACCEPTANCE

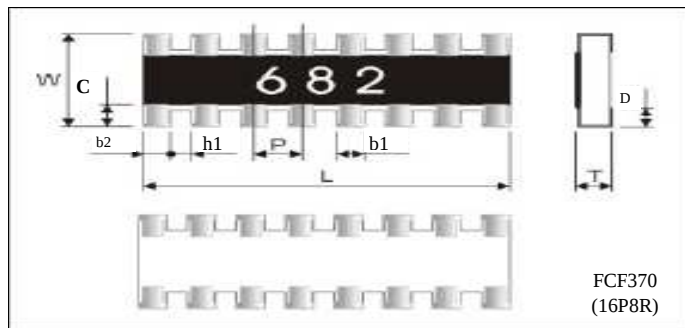
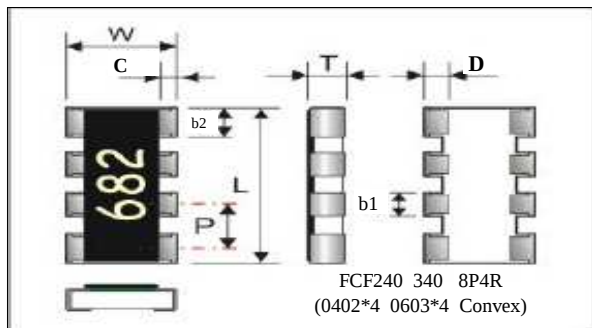
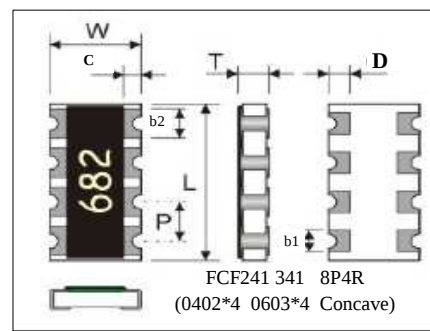
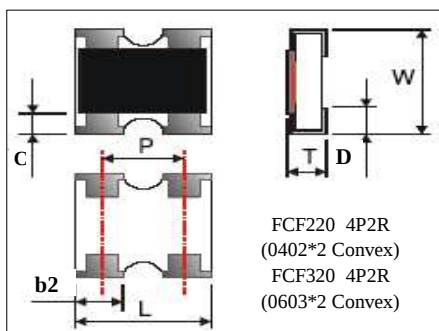
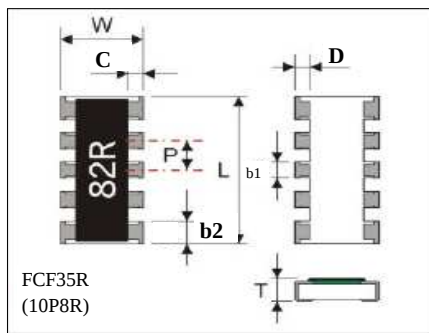
Features

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

Applications

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

Configuration

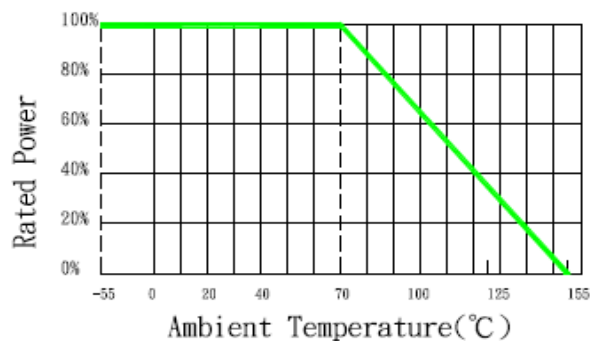


Dimensions

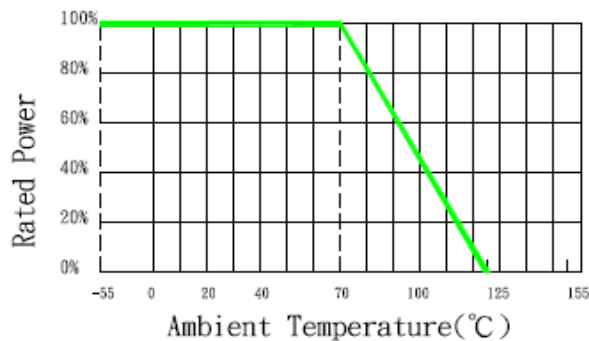
TYPE	L	W	T	C	D	P	b1	b2	h1
FCF220	1.00±0.10	1.00±0.10	0.35±0.10	0.20±0.15	0.25±0.17	0.65±0.10	-	0.34±0.10	-
FCF240	2.00±0.10	1.00±0.10	0.45±0.10	0.20±0.10	0.25±0.10	0.50±0.05	0.30±0.05	0.40±0.10	-
FCF241	2.00±0.10	1.00±0.10	0.45±0.10	0.20±0.15	0.25±0.10	0.50±0.05	0.25±0.05	0.25±0.05	-
FCF340	3.20±0.20	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

unit:mm

Power Derating Curve

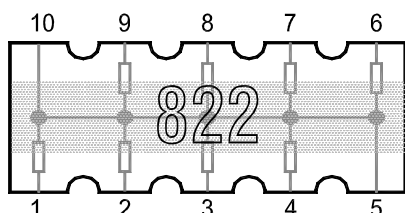


Maximum dissipation in percentage of rated power as a function of the ambient temperature for FCF220 , FCF240 , FCF241 , FCF320, FCF340 , FCF341 , FCF35R

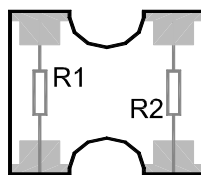


Maximum dissipation in percentage of rated power as a function of the ambient temperature for FCF370

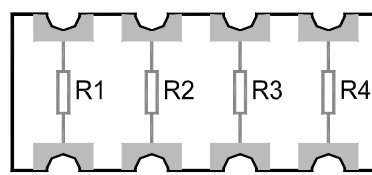
Circuit



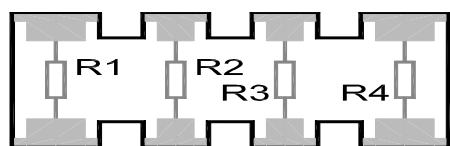
FCF35R



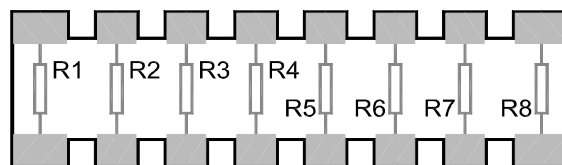
FCF220



FCF241 341



FCF240 340



$R1=R2=R3=R4=R5=R6=R7=R8$

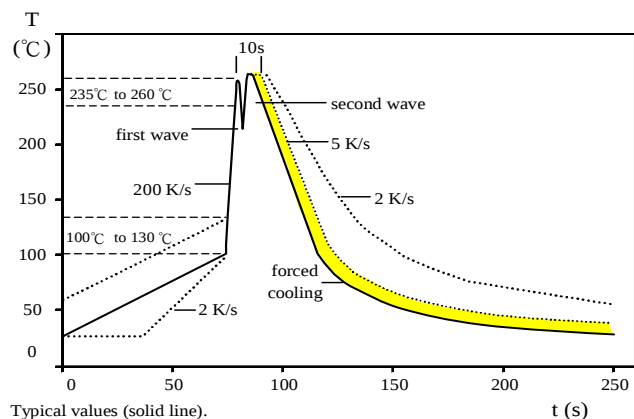
FCF370

Rating

Type	Size	Termination Construction	Power Rating at 70°C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient (TCR; ppm/°C)	Resistance Range (Ω)		Standard Resistance Values
								Min.	Max.	
FCF220	4P2R 0402*2	Convex	1/16W	25V	50V	±5%(J) ±1%(F)	±300	0Ω, 10Ω	1MΩ	E-24
FCF240	8P4R 0402*4	Convex	1/16W	25V	50V	±5%(J) ±1%(F)	±300	0Ω, 10Ω 100Ω	1MΩ 1MΩ	E-24
FCF241	8P4R 0402*4	Concave	1/16W	25V	50V	±5%(J) ±1%(F)	±300	0Ω, 10Ω 10Ω	1MΩ 1MΩ	E-24
FCF340	8P4R 0603*4	Convex	1/10W	50V	100V	±5%(J) ±1%(F)	±200	0Ω, 10Ω	1MΩ	E-24
FCF341	8P4R 0603*4	Concave	1/10W	50V	100V	±5%(J)	±200	0Ω, 10Ω	1MΩ	E-24
FCF35R	10P8R	Convex	1/16W	25V	50V	±5%(J)	±200	10Ω	100KΩ	E-24
FCF370	16P8R	Convex	1/16W	25V	50V	±5%(J) ±1%(F)	±200	0Ω, 10Ω 10Ω	100KΩ 100KΩ	E-24

Jumper : ◎ 8P4R size maximum resistance $R_{max} < 50m\Omega$ and rated current $I_R \leq 1A$

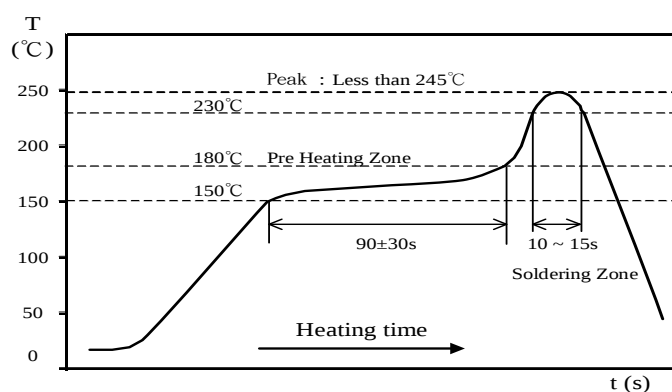
■ Soldering Temperature Curve



Typical values (solid line).

Process limits (dotted line).

WAVE soldering.



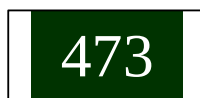
IR Reflow Soldering

■ Part Number

FCF	340	J	T	- 473
Type	Size	Tolerance	Packing	GM
FCF	220 : 0402*2	F : ± 1%	T : Paper tape - 5Kpcs	
	240 : 0402*4(Convex)	J : ± 5%	V : Paper tape - 10Kpcs	
	241 : 0402*4(Concave)		W : Paper tape - 20Kpcs	
	340 : 0603*4(Convex)			
	341 : 0603*4(Concave)			
	35R : 10P8R			
	370 : 16P8R			

■ Resistance Marking

• E - 24 SERIES



3 digit marking for E24

examples : **473** $47 \times 10^3 = 47K\Omega$

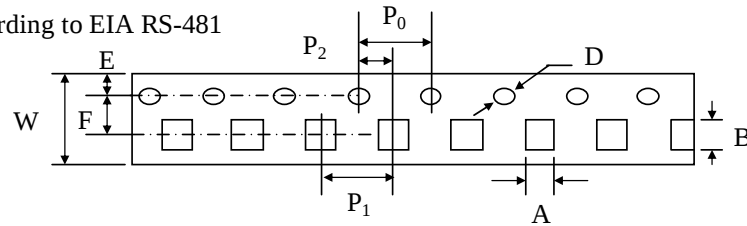
■ Standard resistance value

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
	51	56	62	68	75	82	91									

SPECIFICATION

Tape And Reel Package

Taping specs are according to EIA RS-481

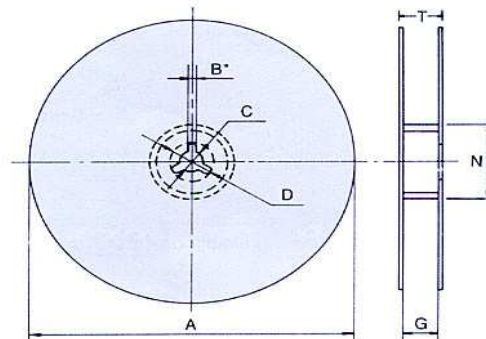


Accumulated dimensional tolerance $40 \pm 0.2 \text{ mm}$

Size	A	B	W	F	E	P1	P2	P0	D
0402*2	1.15 ± 0.10	1.15 ± 0.10	8.00 ± 0.30	3.50 ± 0.20	1.75 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	4.00 ± 0.10	$1.50 + 0.10 / - 0$
0402*4 (Convex Concave)	1.20 ± 0.20	2.20 ± 0.20	8.00 ± 0.30	3.50 ± 0.20	1.75 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	4.00 ± 0.10	$1.50 + 0.10 / - 0$
0603*2 (Convex)	1.80 ± 0.10	1.80 ± 0.10	8.00 ± 0.30	3.50 ± 0.10	1.75 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	$1.50 + 0.10 / - 0$
8P4R (Convex Concave)	2.00 ± 0.20	3.60 ± 0.20	8.00 ± 0.30	3.50 ± 0.20	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50 + 0.10 / - 0$
10P8R	$1.85 + 0.20 / - 0$	$3.45 + 0.20 / - 0$	8.00 ± 0.30	3.50 ± 0.20	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50 + 0.10 / - 0$
16P8R	$1.80 + 0.20 / - 0$	$4.20 + 0.20 / - 0$	12.00 ± 0.10	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)

• Reel Package



Size	Packaging Q'ty	A	N	C	D	B	G	T
0402*2 0402*4 (Convex , Concave) 0603*2 (Convex) 8P4R (Convex , Concave) 10P8R 16P8R	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.
8P4R	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.
	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.

(unit: mm)

SPECIFICATION

■ Specification And Test Methods

ITEM	SPECIFICATION	TEST METHOD
DC Resistance	J: $\pm 5\%$, F: $\pm 1\%$ Zero ohm Jumper $< 50m\Omega$	IEC 60115-1 / JIS C 5201-1 , Clause 4.5 Measure the resistance value.
Short time Overload	J: $\Delta R \leq \pm (2\% + 0.1\Omega)$ F: $\Delta R \leq \pm (1\% + 0.05\Omega)$	IEC 60115-1 / JIS C 5201-1 , Clause 4.13 2.5×Rated voltage or Max. Overload Voltage for 5 sec. measure resistance after 30 minutes
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 $235\pm 2^\circ\text{C}$ molten solder bath for 2 ± 0.5 sec.
Resistance to Solder Heat	J: $\Delta R \leq \pm (1\% + 0.1\Omega)$ F: $\Delta R \leq \pm (0.5\% + 0.05\Omega)$ No mechanical damage	IEC 60115-1 / JIS C 5201-1 , Clause 4.18 With $260\pm 5^\circ\text{C}$ for 10 ± 1 sec.
Temperature Coefficient of Resistance (TCR)	Size: 0402*2, 0402*4 $\pm 300 \text{ ppm}/^\circ\text{C}$ Size: 0603*2, 0603*4, 10P8R, 16P8R $\pm 200 \text{ ppm}/^\circ\text{C}$	IEC 60115-1 / JIS C 5201-1 , Clause 4.8 Test temperature : 25°C (T1) $\rightarrow -55^\circ\text{C}$ (T2) 25°C (T1) $\rightarrow +155^\circ\text{C}$ (T2) $\text{TCR (ppm}/^\circ\text{C}) = \frac{R2-R1}{R1} \times \frac{1}{T2-T1} \times 10^6$ T1: 25°C T2: Test temperature R1: Resistance at reference temperature (T1) R2: Resistance at test temperature (T2)
Load Life Humidity	J: $\Delta R \leq \pm (3\% + 0.1\Omega)$ F: $\Delta R \leq \pm (1\% + 0.05\Omega)$	IEC 60115-1 / JIS C 5201-1 , Clause 4.24 Maintain the temperature of the resistor at $40\pm 2^\circ\text{C}$ and 90~95% R.H. with the rated voltage applied. Cycle ON for 1.5 hours and OFF for 0.5 hour for 1000+48/- 0 hours. After 1~4 hour, measure the resistance value.
Load Life	J: $\Delta R \leq \pm (3\% + 0.1\Omega)$ F: $\Delta R \leq \pm (1\% + 0.05\Omega)$	IEC 60115-1 / JIS C 5201-1 , Clause 4.25 Permanent resistance change after 1000+48/-0 hours (1.5 hours ON , 0.5 hour OFF) at RCWV or Max. Keep the resistor at $70\pm 2^\circ\text{C}$ ambient
Temperature Cycle	J: $\Delta R \leq \pm (1\% + 0.1\Omega)$ F: $\Delta R \leq \pm (0.5\% + 0.05\Omega)$ No mechanical damage	IEC 60115-1 / JIS C 5201-1 , Clause 4.19 Repeat 5 cycles as follows -55 $^\circ\text{C}$ (30 min.) + 25 $^\circ\text{C}$ (2~3 min.) +125 $^\circ\text{C}$ (30 min.) + 25 $^\circ\text{C}$ (2~3 min.) for FCF370 -55 $^\circ\text{C}$ (30 min.) + 25 $^\circ\text{C}$ (2~3 min.) +155 $^\circ\text{C}$ (30 min.) + 25 $^\circ\text{C}$ (2~3 min.) for FCF220, FCF240, FCF241, FCF340, FCF341, FCF35R
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: $\Delta R \leq \pm (1\% + 0.1\Omega)$ F: $\Delta R \leq \pm (0.5\% + 0.05\Omega)$ No mechanical damage	IEC 60115-1 / JIS C 5201-1 , Clause 4.33 Resistance change after bended on the 90mm PCB. Bend: 1mm for FCF370 2mm for FCF220, FCF240, FCF241, FCF320, FCF340, FCF341, FCF35R

All product specification and data are subject to change without notice