PSA
PASSIVE SYSTEM ALLIANCE

THICK FILM
LEAD FREE CHIP RESISTOR NETWORKS

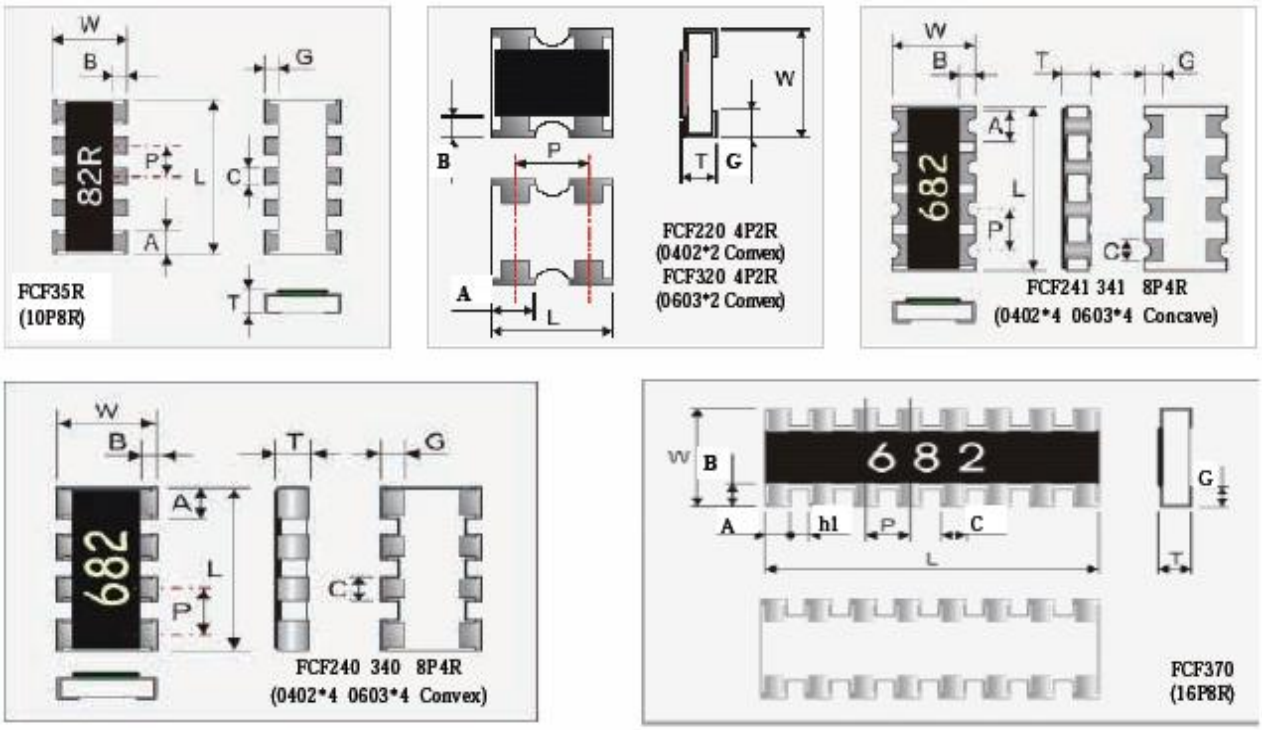
Features

- High density packaging provides higer 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



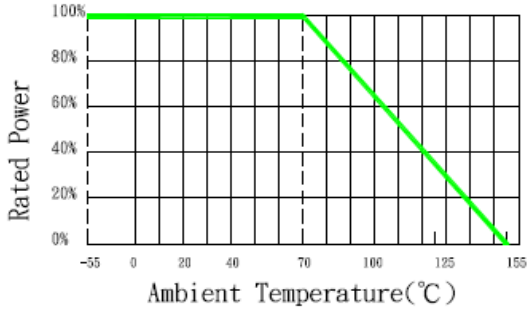
Dimensions

TYPE	L	W	T	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

unit:mm

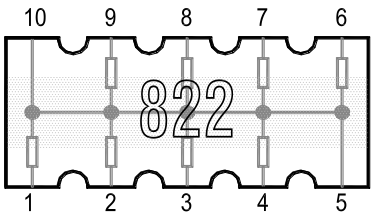
PDC

Power Derating Curve

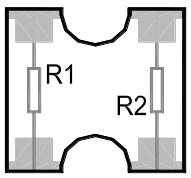


Maximum dissipation in percentage of rated power as a function of the ambient temperature.

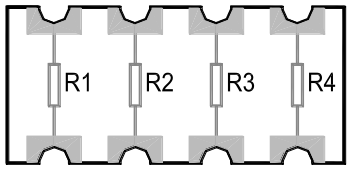
Circuit



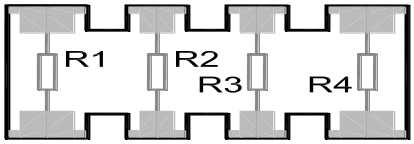
FCF35R



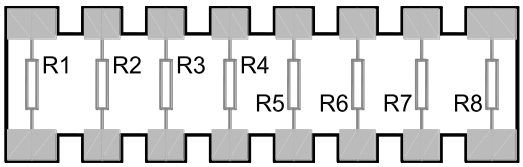
FCF220



FCF241 341



FCF240 340



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

FCF370

Rating

Type	Size	Termination Construction	Power Rating at 70℃	Max. RCWV	Max. Overload Voltage	Tolerance (%)	Temperature Coefficient (TCR; ppm/℃)	Resistance Range		Standard Resistance Values
								Min.	Max.	
FCF220	4P2R 0402*2	Convex	1/16W	25V	50V	±5%(J)	±300 ±400	0Ω/10Ω 3Ω	1MΩ 9.1Ω	E-24
FCF240	8P4R 0402*4	Convex	1/16W	50V	100V	±5%(J)	±200 -300~+500	0Ω/10Ω 3Ω	1MΩ 9.1Ω	E-24
						±1%(F)	±200	0Ω/10Ω	1MΩ	
FCF320	4P2R 0603*2	Convex	1/10W	50V	100V	±5%(J) ±1%(F)	±200 -300~+500	0Ω/10Ω 1Ω	1MΩ 9.1Ω	E-24
FCF340	8P4R 0603*4	Convex	1/10W	50V	100V	±5%(J)	±200 -300~+500	0Ω/10Ω 1Ω	1MΩ 9.1Ω	E-24
						±1%(F)	±200	0Ω/10Ω	1MΩ	
FCF35R	10P8R	Convex	1/16W	25V	50V	±5%(J)	±200	10Ω	100KΩ	E-24
FCF370	16P8R	Convex	1/16W	50V	100V	±5%(J) ±1%(F)	±200	0Ω/10Ω	100KΩ	E-24
FCF241	8P4R 0402*4	Concave	1/16W	25V	50V	±5%(J) ±1%(F)	±300	0Ω/3Ω	1MΩ	E-24
FCF341	8P4R 0603*4	Concave	1/10W	50V	100V	±5%(J) ±1%(F)	±200	0Ω/10Ω	1MΩ	E-24

0Ω(Jumper) : ◎ Maximum resistance Rmax < 50mΩ.

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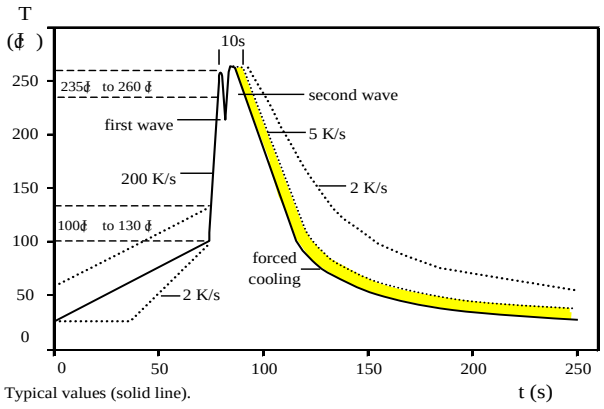
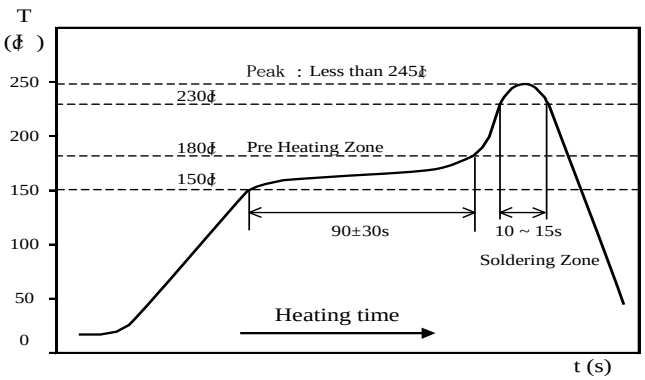
Soldering Temperature Curve



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		
	320 : 0603*2(Convex)				
	340 : 0603*4(Convex)				
	341 : 0603*4(Concave)				
	35R : 10P8R				
	370 : 16P8R				

Resistance Marking

- E - 24 SERIES

3 digit marking for ±1% &. ±5%
examples **682** 68×10^{2} = 6.8 KΩ

No marking for FCF220 chip resistors array.

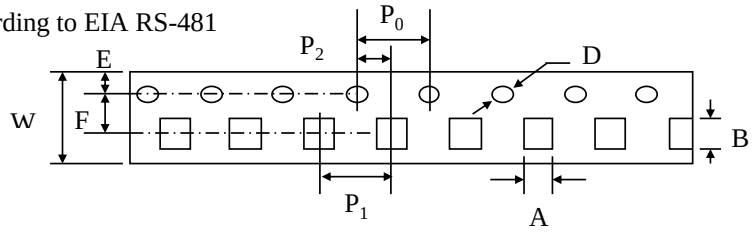
Standard resistance value

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
	51	56	62	68	75	82	91										

SPECIFICATION

■ Tape And Reel Package

Taping specs are according to EIA RS-481

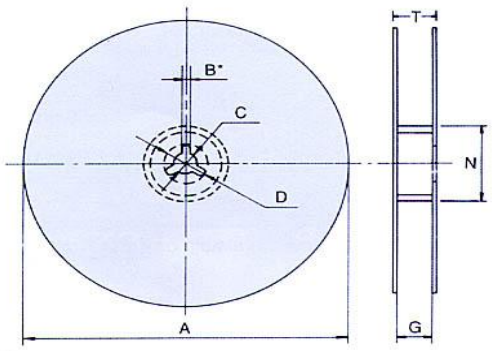


Accumulated dimensional tolerance 40±0.2mm

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 : ±5% , F: ±1% Zero ohm Jumper ＜ 50mΩ	**IEC 60115-1 / JIS C 5201-1 , Clause 4.5** Measure the resistance value.
Short time Overload	J: △R ≦ ± (2% + 0.1Ω) ' F: △R ≦ ± (1% + 0.05Ω)	**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±2℃ molten solder bath for 2±0.5 sec
Resistance to Solder Heat	J: △R ≦ ± (1% + 0.1Ω) ' F: △R ≦ ± (0.5% + 0.05Ω) No mechanical damage	**IEC 60115-1 / JIS C 5201-1 , Clause 4.18** With 260±5℃ for 10±1 sec.
Temperature Coefficient of Resistance (TCR)	Size: 0402*2,0402*4 ± 300 ppm/℃ Size:0603*2, 0603*4, 10P8R, 16P8R ± 200 ppm/℃	**IEC 60115-1 / JIS C 5201-1 , Clause 4.8** Test temperature : 25℃ (T1) → -55℃ (T2) 25℃ (T1) → +155℃ (T2) $TCR\ (ppm/℃) = \frac{R2-R1}{R1} \times \frac{1}{T2-T1} \times 10^6$ T1: 25℃ T2: Test temperature R1: Resistance at reference temperature (T1) R2: Resistance at test temperature (T2)
Load Life Humidity	J: △R ≦ ± (3% + 0.1Ω) ' F: △R ≦ ± (1% + 0.05Ω)	**IEC 60115-1 / JIS C 5201-1 , Clause 4.24** Maintain the temperature of the resistor at 40±2℃ 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 : △R ≦ ± (3% + 0.1Ω) ' F : △R ≦ ± (1% + 0.05Ω)	**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±2℃ ambient
Temperature Cycle	J: △R ≦ ± (1% + 0.1Ω) ' F: △R ≦ ± (0.5% + 0.05Ω) No mechanical damage	**IEC 60115-1 / JIS C 5201-1 , Clause 4.19** Repeat 5 cycles as follows '-55℃(30 min.) + 25℃(2～3 min.) +125℃(30 min.) + 25℃(2～3 min.) for FCF370 -55℃(30 min.) + 25℃(2～3 min.) +155℃(30 min.) + 25℃(2～3 min.) for FCF220,FCF240,FCF241,FCF340,FCF341,FCF35R
Insulation Resistance	Between termination and coating must be over 1000MΩ	**IEC 60115-1 / JIS C 5201-1 , Clause 4.6** Test voltage: 100±15V
Bending Strength	J: △R ≦ ± (1% + 0.1Ω) ' F: △R ≦ ± (0.5% + 0.05Ω) 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