

信昌電子陶瓷股份有限公司
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SPECIFICATION FOR APPROVAL

DATE :

CUSTOMER : _____

PART NAME : _____ High Ohmic Lead Free & Halogen Free Chip-R Resistors

CUSTOMER'S DWG. NO. : _____

CUSTOMER'S PART NO. : _____

PDC PART NO. : **FHF SERIES APPROVED** _____

DESCRIPTION : _____

ACTION	"V"	CUSTOMER'S SIGNATURE	NOTE
RESULT			
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>

CUSTOMER SIGNATURE FOR ACCEPTANCE

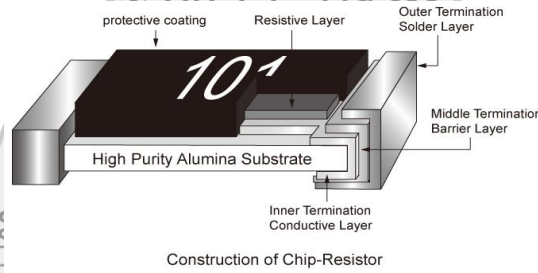
Features

- Small size and lightweight 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

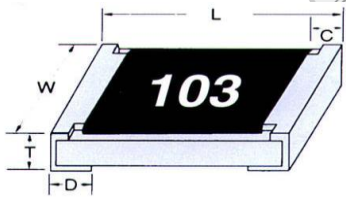
Applications

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

Configuration



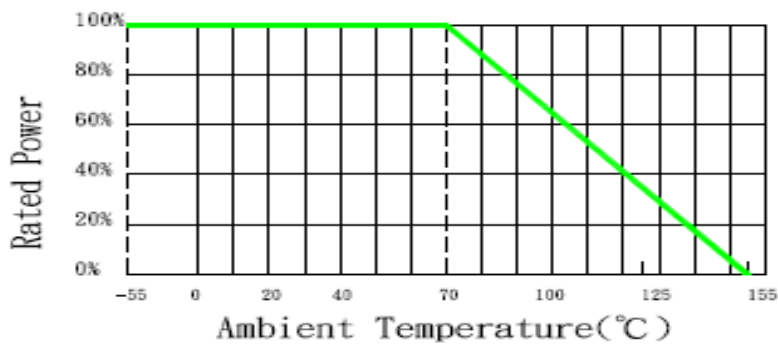
Dimensions



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

(unit: mm)

Power Derating Curve



SPECIFICATION

■ **Rating**

FHF Series

• **HIGH RESISTANCE CHIP RESISTORS**

Type	Size	Power Rating at 70°C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient (TCR; ppm/°C)	Resistance Range		Standard Resistance Values
							Min.	Max.	
FHF03	0603	1/10W	50V	100V	±1%(F)	±200	11MΩ	22MΩ	E-12
FHF05	0805	1/8W	150V	300V	±5%(J)		11MΩ	100MΩ	
FHF06	1206	1/4W	200V	400V					

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

■ **Part Number**

FHF	05	J	T	476
Type	Size	Tolerance	Packing	GM
FHF	03 : 0603 05 : 0805 06 : 1206	J : ± 5% F : ± 1%	T : Paper tape - 5Kpcs V : Paper tape - 10Kpcs W : Paper tape - 20Kpcs	

■ **Resistance Marking**

• **E - 12 SERIES**



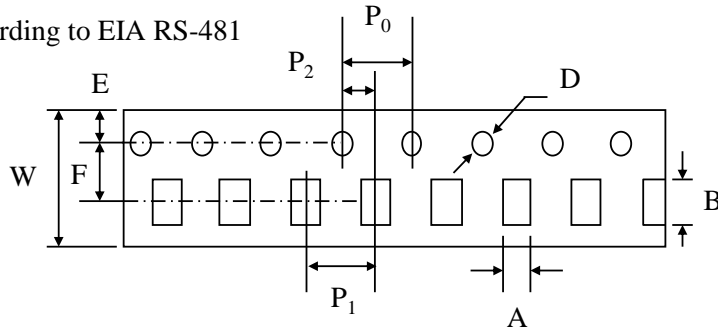
3 digit marking for ±1% ±5% E12

examples : **476** $47 \times 10^6 = 47M\Omega$

SPECIFICATION

■ Tape And Reel Package

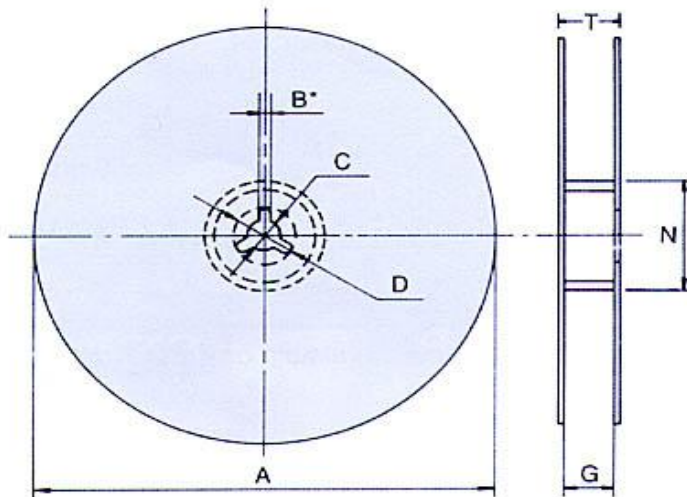
- Taping specs are according to EIA RS-481



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

Size	A	B	W	F	E	P1	P2	P0	D
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	$1.50+0.10/-0$

(unit: mm)



Size	Packaging Q'ty	A	N	C	D	B	G	T
0603 0805 1206	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.
	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.
	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.

SPECIFICATION

Specification And Test Methods

ITEM	SPECIFICATION	TEST METHOD
DC Resistance	F : ±1% J : ±5%	IEC 60115-1 / JIS C 5201-1 , Clause 4.5 Measure the resistance value.
Short time Overload	F , J : $\Delta R \leq \pm 2\%$	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 245±2°C molten solder bath for 3±0.5 sec
Resistance to Solder Heat	F , J : $\Delta R \leq \pm 2\%$	IEC 60115-1 / JIS C 5201-1 , Clause 4.18 With 260±5°C for 10±1 sec.
Temperature Coefficient of Resistance (TCR)	F , J : ± 200 ppm/°C	IEC 60115-1 / JIS C 5201-1 , Clause 4.8 Test temperature : 25°C (T1) → -55°C (T2) 25°C (T1) → +155°C (T2) $TCR (ppm/^{\circ}C) = \frac{R2-R1}{R1} \times \frac{1}{T2-T1} \times 10^6$ T1: 25°C T2: Test temperature R1: Resistance at reference temperature (T1) R2: Resistance at test temperature (T2)
Load Life Humidity	F , J : $\Delta R \leq \pm 5\%$	IEC 60115-1 / JIS C 5201-1 , Clause 4.24 Maintain the temperature of the resistor at 40±2°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	F , J : $\Delta R \leq \pm 5\%$	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°C ambient
Temperature Cycle	F , J : $\Delta R \leq \pm 5\%$	IEC 60115-1 / JIS C 5201-1 , Clause 4.19 Repeat 5 cycles as follows -55°C (30 min.) + 25°C (2~3 min.) +155°C (30 min.) + 25°C (2~3 min.)
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	F , J : $\Delta R \leq \pm 2\%$	IEC 60115-1 / JIS C 5201-1 , Clause 4.33 Resistance change after bended on the 90mm PCB. Bend: 3mm for 0603 、0805 , 2mm for 1206
Voltage Coefficient of Resistance (VCR)	$\leq \pm 300ppm/V$	JIS C 5201 4.11 Measuring Voltage 10V/100V

All product specification and data are subject to change without notice

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