

Thick Film Chip Resistor - High Power
Type HPR Series

Δ Features

- Rated Power up to 2W
- Suitable for lead free soldering.
- Compatible with flow and reflow soldering.

Δ Applications

- Consumer electronics
- Medical equipment
- Telecom equipment
- ie. Power Supply Motherboards

Δ Rating - High Power Chip Resistor

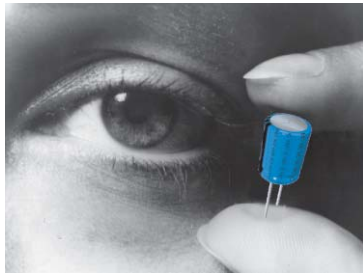
Type	Size	Power Rating at 70 °C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient (TCR; ppm/°C)	Resistance Range		Standard Resistance Values
							Min.	Max.	
	0603	1/8W	50V	100V					
	0805	1/4W	150V	300V	± 1%(F)	± 100	10Ω	1MΩ	E-96
	1206	1/2W	200V	400V					
	2010	1W	200V	400V	± 5%(J)	± 200	1Ω	1MΩ	E-24
	2512	2W	300V	600V					

Jumper: 0603 maximum resistance $R_{max} \leq 20m\Omega$ and rated current $I_R = 2A$
 0805,1206 maximum resistance $R_{max} \leq 20m\Omega$ and rated current $I_R = 4A$
 2010,2512 maximum resistance $R_{max} \leq 20m\Omega$ and rated current $I_R = 6A$

Δ Rating - Low Resistance

Type	Size	Power Rating at 70 °C	Max. RCWV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient (TCR; ppm/°C)	Resistance Range	
							Min.	Max.
	0603	1/8W	337mV	754mV				
	0805	1/4W	477mV	1067mV		± 100	100mΩ	910mΩ
	1206	1/2W	675mV	1508mV	± 1%(F) ± 5%(J)			
	2010	1W	954mV	2133mV		± 150	47mΩ	91mΩ
	2512	2W	1349mV	3017mV				

Surface Mount Resistors



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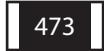
△ How to Order

Part Number

example	HPR	0603	T	J	123	LF
	Type	Size	Packing	Tolerance	Resistance Value	
	HPR	0603	T: Tape	F: ±1%	123 = 12×10^3	LF = Lead Free
		0805		J: ±5%	= 12k Ω	
		1206				
		2010				
		2512				

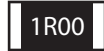
△ Resistance Marking

E-24 Series



3 digit marking for E24

- ex. 473: $47 \times 10^3 = 47K\Omega$
- 105: $10 \times 10^5 = 1M\Omega$
- 1R5: $15 \times 10^{-1} = 1.5\Omega$
- 0: 0Ω



4 digit marking for E241: Ω~10mΩ

- ex. 1R00: 1Ω
- R470 470mΩ
- R010 10mΩ

E-96 Series



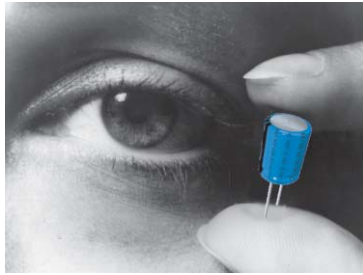
4 digit marking for E96

- ex. 1542: $154 \times 10^2 = 15K4\Omega$



3 digit marking for E96 - 0603

- ex. 0C2 (see table)
- $102 \times 10^2 = 10K2\Omega$

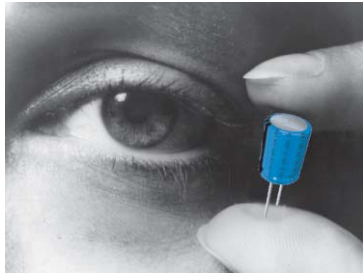


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△ Specifications and Test Methods

ITEM	SPECIFICATION	TEST METHOD
DC Resistance	J: ± 5% , F: ± 1%	IEC 60115-1 4.5 / JIS C 5202 5.1 Measure the resistance value.
Short time Overload	J: Δ R ≤ ± (2% + 0.1 Ω) F: Δ R ≤ ± (1% + 0.05 Ω)	IEC 60115-1 4.13 / JIS C 5202 5.5 5 X 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 4.17 / JIS C 5202 6.5 After immersing flux, dip in the 245 ± 2 °C molten solder bath for 3 ± 0.5 sec.
Resistance to Solder Heat	J: Δ R ≤ ± (1% + 0.1 Ω) F: Δ R ≤ ± (0.5% + 0.05 Ω) No mechanical damage	IEC 60115-1 4.18 / JIS C 5202 6.4 With 260 ± 5 °C for 10 ± 1 sec.
Temperature Coefficient of Resistance (TCR)	J: ± 150 ppm/ °C F: ± 100 ppm/ °C	IEC 60115-1 4.8.4.2 / JIS C 5202 5.2 Test temperature : 25 °C(T1)→ -55 °C(T2) 25 °C(T1)→ 125 °C(T2) $TCR (ppm/°C) = \frac{R2-R1}{R1} \times \frac{1}{T2-T1} \times 10^6$ T1: 25°C T2: Test temperature R1: Resistance at reference temperature (T1) R2: Resistance at test temperature (T2)
Load Life Humidity	J: Δ R ≤ ± (3% + 0.1 Ω) F: Δ R ≤ ± (1% + 0.05 Ω)	IEC 60115-1 4.24.2 / JIS C 5202 7.9 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	J: Δ R ≤ ± (3% + 0.1 Ω) F: Δ R ≤ ± (1% + 0.05 Ω)	IEC 60115-1 4.25.1 / JIS C 5202 7.10 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	J: Δ R ≤ ± (1% + 0.1 Ω) F: Δ R ≤ ± (0.5% + 0.05 Ω) No mechanical damage	IEC 60115-1 4.19 / JIS C 5202 7.4 Repeat 5 cycles as follows -55 °C(30 min.) ~ +25 °C(2~3 min.) +125 °C(30 min.) ~ +25 °C(2~3 min.)
Insulation Resistance	Between termination and coating must be over 1000M Ω	IEC 60115-1 4.6.1.1 / JIS C 5202 5.6 Test voltage: 100 ± 15V
Bending Strength	J: Δ R ≤ ± (1% + 0.1 Ω) F: Δ R ≤ ± (0.5% + 0.05 Ω) No mechanical damage	IEC 60115-1 4.33 Resistance change after bended on the 90mm PCB. Bend: 3mm for 0603 , 0805 2mm for 1206 , 2010 , 2512

Surface Mount Resistors



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