

## Thick Film Chip Resistor - High Voltage Type HVR Series

### △ Features

- Special material and design for high working voltage requirement
- Suitable for lead free soldering.
- Compatible with flow and reflow soldering.

### △ Applications

- Medical Equipment
- Telecom Equipment
- Consumer Electronics
- Power Supply
- Automotive Industry

### △ Rating

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.	
	1206	1/4W	800V	1600V					
	2010	1/2W	1500V	3000V	± 5%(J)	± 200	100KΩ	1MΩ	E-24
	2512	1W	2000V	4000V					

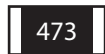
### △ How to Order

#### Part Number

<b>example</b>	<b>HVR</b>	<b>1206</b>	<b>T</b>	<b>J</b>	<b>123</b>	<b>LF</b>
	Type	Size	Packing	Tolerance	Resistance Value	
	HVR	1206	T: Tape	J: ±5%	123 = 12x10 <sup>3</sup> = 12k Ω	LF = Lead Free
		2010				
		2512				

### △ Resistance Marking

E-24 Series



3 digit marking for E24

- ex. 473: 47x10<sup>3</sup> = 47KΩ  
 105: 10x10<sup>5</sup> = 1MΩ  
 1R5: 15x10<sup>-1</sup> = 1.5Ω  
 0: 0Ω



4 digit marking for E241: Ω~10mΩ

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



Thick Film Chip Resistor - High Voltage  
Type HVR Series

Δ Features

ITEM	SPECIFICATION	TEST METHOD
DC Resistance	J ± 5%	IEC 60115-1 4.5 / JIS C 5202 5.1 Measure the resistance value.
Short time Overload	Δ R ≤ ± (1% + 0.1 Ω)	IEC 60115-1 4.13 / JIS C 5202 5.5 2 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	Δ R ≤ ± (1% + 0.1 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)	± 200 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)  $TCR (ppm/^{\circ}C) = \frac{R2-R1}{R1} \times \frac{1}{T2-T1} \times 10^6$ T1: 25 °C T2: Test temperature R1: Resistance at reference temperature (T1) R2: Resistance at test temperature (T2)
Load Life Humidity	Δ R ≤ ± (5% + 0.1 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	Δ R ≤ ± (5% + 0.1 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	Δ R ≤ ± (1% + 0.1 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
Voltage Coefficient of Resistance (VCR)	≤ ± 300 ppm/Volt	JIS C 5202 5.3.1 Measuring Voltage 10V/100V
Bending Strength	Δ R ≤ ± (1% + 0.05 Ω) No mechanical damage	IEC 60115-1 4.33 Resistance change after bended on the 90mm PCB. Bend: 2mm for 1206 , 2010 , 2512

Surface Mount Resistors