

High Voltage Thick Film Chip Resistor (HVR Series)

Scope

— This specification applies to all sizes of rectangular-type fixed chip resistors with Ruthenium-base as material.

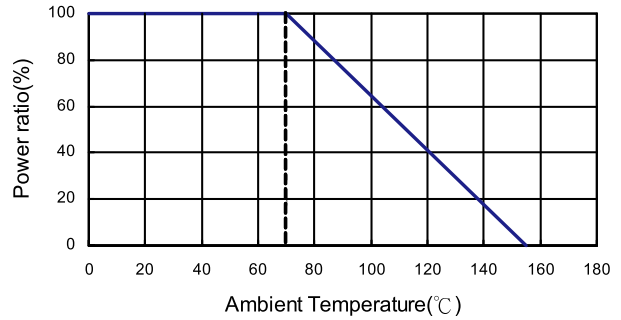
Features

- Highly reliable multilayer electrode construction
- Higher component and equipment reliability
- Excellent performance at high voltage
- Reduced size of final equipment

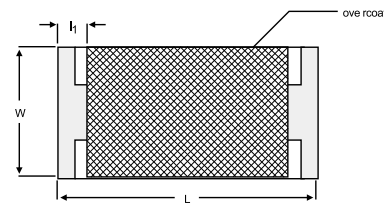
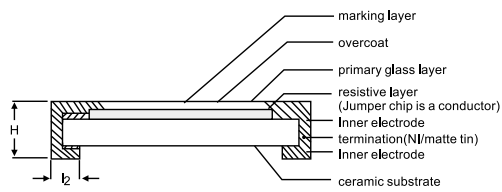
Applications

- Inverter
- Outdoor Equipments
- Converter
- Automotive Industry
- High Pulse Equipment

Derating Curve



Construction



Dimensions

Type	L (mm)	W (mm)	H (mm)	L ₁ (mm)	L ₂ (mm)
HVR0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.20±0.10
HVR0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.15	0.30±0.20
HVR0805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.40±0.20
HVR1206	3.10±0.10	1.55±0.10	0.55±0.10	0.50±0.20	0.50±0.20
HVR2010	5.00±0.10	2.50±0.15	0.55±0.10	0.60±0.15	0.50±0.20
HVR2512	6.35±0.10	3.10±0.15	0.55±0.10	0.60±0.20	0.50±0.20

Part Numbering

HVR	03	F	T	E	X	1001
Product Type	Dimensions	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance
	02: 0402 03: 0603 05: 0805 06: 1206 0A: 2010 12: 2512	F: ±1% J: ±5%	B: Bulk T: Taping Reel	E: ±100 F: ±200 H: ±400	Y: 1/16W X: 1/10W W: 1/8W V: 1/4W U: 1/2W T: 1W	1001: 1KΩ 1004: 1MΩ 1005: 10MΩ

Standard Electrical Specifications

Type	Item	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range		TCR (PPM/°C)
						±1%	±5%	
HVR02 (0402)	1/16W		-55 ~ +155°C	100V	200V	39KΩ - 1MΩ		±100
						1.02MΩ - 10MΩ	1.1MΩ - 20MΩ	±200
						-	22MΩ - 100MΩ	±400
HVR03 (0603)	1/10W		-55 ~ +155°C	200V	400V	56KΩ - 1MΩ		±100
						1.02MΩ - 10MΩ	1.1MΩ - 20MΩ	±200
						-	22MΩ - 100MΩ	±400
HVR05 (0805)	1/8W		-55 ~ +155°C	400V	800V	100KΩ - 1MΩ		±100
						1.02MΩ - 10MΩ	1.1MΩ - 20MΩ	±200
						-	22MΩ - 100MΩ	±400
HVR06 (1206)	1/4W		-55 ~ +155°C	500V	1000V	100KΩ - 1MΩ		±100
						1.02MΩ - 10MΩ	1.1MΩ - 20MΩ	±200
						-	22MΩ - 100MΩ	±400
HVR0A (2010)	1/2W		-55 ~ +155°C	2000V	3000V	51KΩ - 1MΩ		±100
						1.02MΩ - 20MΩ	1.1MΩ - 20MΩ	±200
						-	22MΩ - 100MΩ	±400
HVR12 (2512)	1W		-55 ~ +155°C	3000V	4000V	30KΩ - 1MΩ		±100
						1.02MΩ - 20MΩ	1.1MΩ - 20MΩ	±200
						-	22MΩ - 100MΩ	±400

Operating Voltage= $\sqrt{P \cdot R}$ or Max. operating voltage listed above, whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$ or Max. overload voltage listed above, whichever is lower.

■ Thunder is capable of manufacturing the optional spec based on customer's requirement.

Environmental Characteristics

Item	Requirement		Test Method
	1%	5%	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.		JIS-C-5201-1 4.8 IEC-60115-1 4.8 -55°C ~ +125°C, 25°C is the reference temperature
Short Time Overload	(1.0%+0.05Ω)	(2.0%+0.05Ω)	JIS-C-5201-1 4.13 IEC-60115-1 4.13 RCWV*2.5 or Max. overload voltage for 5 seconds
Insulation Resistance	≥ 10G		JIS-C-5201-1 4.6 IEC-60115-1 4.6 Max. overload voltage for 1 minute
Endurance	(2.0%+0.10Ω)	(3.0%+0.10Ω)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1 70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with Load	(2.0%+0.10Ω)	(3.0%+0.10Ω)	JIS-C-5201-1 4.24 40±2°C, 90~95% R.H., Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Dry Heat	(1.0%+0.05Ω)	(1.5%+0.10Ω)	JIS-C-5201-1 4.23.2 IEC-60115-1 2.23.2 at +155°C for 1000 hrs
Bending Strength	(1.0%+0.05Ω)	(1.0%+0.05Ω)	JIS-C-5201-1 4.33 IEC-60115-1 4.33 Bending once for 5 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm
Solderability	95% min. coverage		JIS-C-5201-1 4.17 IEC-60115-1 4.17 245±5°C for 3 seconds
Resistance to Soldering Heat	(0.5%+0.05Ω)	(1.0%+0.05Ω)	JIS-C-5201-1 4.18 IEC-60115-1 4.18 260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover		JIS-C-5201-1 4.7 IEC-60115-1 4.7 1.42 times RCWV (RMS) for 1 minute
Leaching	Individual leaching area ≤ 5% Total leaching area ≤ 10%		JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1 260±5°C for 30 seconds
Rapid Change of Temperature	(0.5%+0.05Ω)	(1.0%+0.05Ω)	JIS-C-5201-1 4.19 IEC-60115-1 4.19 -55°C to +155°C, 5 cycles

■ Storage Temperature: 25±3°C; Humidity < 80%RH