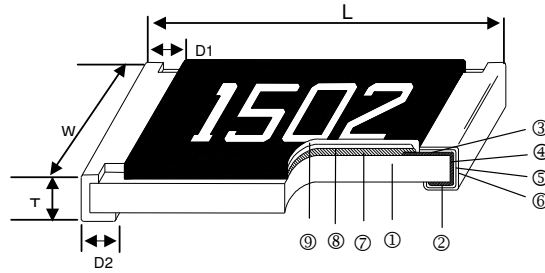
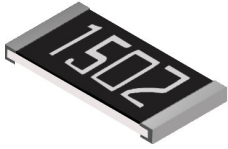


# High Voltage Thick Film Chip Resistor – HVR Series

## Construction



① Alumina Substrate	④ Edge Electrode (NiCr)	⑦ Resistor Layer (RuO <sub>2</sub> /Ag)
② Bottom Electrode (Ag-Pd)	⑤ Barrier Layer (Ni)	⑧ Primary Overcoat (Glass)
③ Top Electrode (Ag)	⑥ External Electrode (Sn)	⑨ Secondary Overcoat (Epoxy)

## Features

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

## Applications

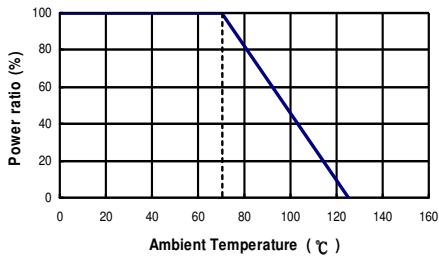
- Inverter
- Outdoor Equipments
- Converter
- Automotive Industry
- High Pulse Equipment

## Dimensions

Unit: mm

Type	Size (Inch)	L	W	T	D1	D2	Weight (g) (1000pcs)
HVR02	0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.20±0.10	0.620
HVR03	0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20	2.042
HVR05	0805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.40±0.20	4.368
HVR06	1206	3.10±0.10	1.55±0.10	0.55±0.10	0.50±0.25	0.50±0.20	8.947
HVR0A	2010	5.00±0.20	2.50±0.15	0.55±0.10	0.60±0.25	0.50±0.20	24.241
HVR12	2512	6.35±0.20	3.20±0.15	0.55±0.10	0.60±0.25	0.50±0.20	39.448

## Derating Curve



## Part Numbering

HVR	03	F	T	E	X	1001
Product Type	Dimensions (L×W)	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	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 ~ +125°C	100V	200V	10Ω - 1MΩ 1.02MΩ - 10MΩ	±100 ±200	
HVR03 (0603)		1/10W		200V	400V			
HVR05 (0805)		1/8W		400V	800V			
HVR06 (1206)		1/4W		500V	1000V			
HVR0A (2010)		1/2W		2000V	3000V			
HVR12 (2512)		1W		3000V	4000V			

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.

## ■ Environmental Characteristics

Item	Requirement		Test Method
	±1%	±5%	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.		-55°C~+125°C, 25°C is the reference temperature
Short Time Overload	±(1.0%+0.05Ω)	±(2.0%+0.05Ω)	RCWV*2.5 or Max. overload voltage for 5 seconds
Insulation Resistance	≥10G		Max. overload voltage for 1 minute
Endurance	±(2.0%+0.10Ω)	±(3.0%+0.10Ω)	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)	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)	at +125°C for 1000 hrs
Bending Strength	±(1.0%+0.05Ω)	±(1.0%+0.05Ω)	Bending once for 5 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm
Solderability	95% min. coverage		245±5°C for 3 seconds
Resistance to Soldering Heat	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)	260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover		1.42 times RCWV (RMS) for 1 minute
Leaching	Individual leaching area ≤5% Total leaching area ≤10%		260±5°C for 30 seconds
Rapid Change of Temperature	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)	-55°C to +125°C, 5 cycles

■ Reference Standards: IEC 60115-1, 60068-2-58; JIS-C 5201-1

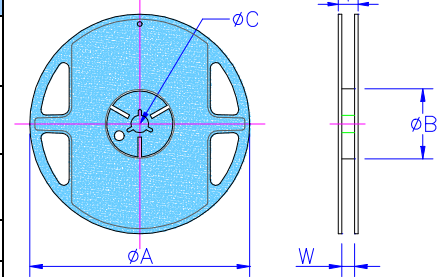
■ Storage Temperature: 25±3°C; Humidity < 80%RH

## ■ Packaging

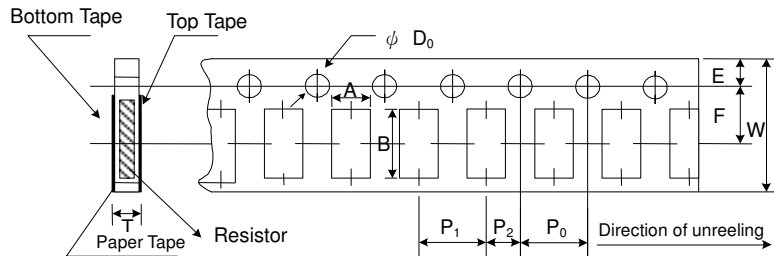
Reel Specifications & Packaging Quantity

Unit: mm

Type	Packaging Quantity	Tape width	Reel Diameter	ΦA	ΦB	ΦC	W	T
HVR02	Paper 10K 20K 40K	8mm	7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.2	9.0±0.5	12.5±0.5
HVR03			10 inch	254±1	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
HVR05 HVR06			13 inch	330±1	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
HVR0A HVR12	Embossed 4K 8K	12mm	7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.5	13.0±0.5	15.5±0.5
			10 inch	250±1	62±0.5	13.0±0.5	12.5±0.5	16.5±0.5



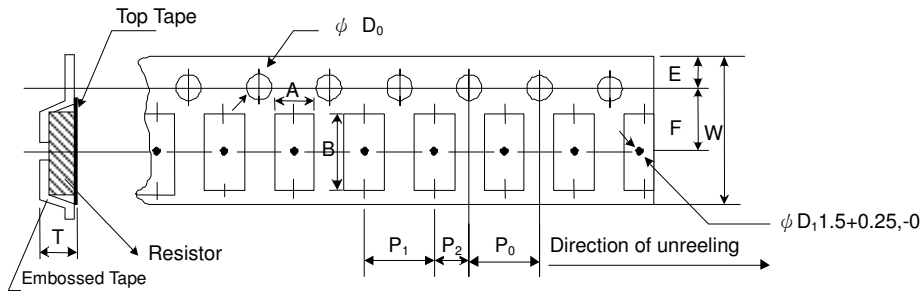
Paper Tape Specifications



Unit: mm

Type	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ΦD <sub>0</sub>	T
HVR02	0.65±0.10	1.15±0.1	8.0±0.2	1.75±0.1	3.50±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.50+0.1,-0	0.45±0.1
HVR03	1.10±0.10	1.90±0.1	8.0±0.2	1.75±0.1	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.70±0.1
HVR05	1.60±0.10	2.40±0.2	8.0±0.2	1.75±0.1	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.1
HVR06	1.90±0.10	3.50±0.2	8.0±0.2	1.75±0.1	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.1

Embossed Plastic Tape Specifications

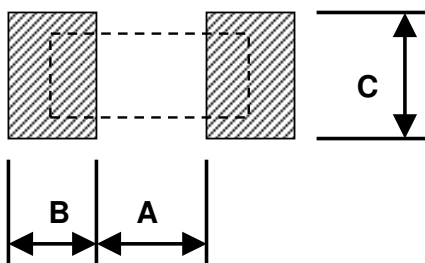


Unit: mm

Type	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ΦD <sub>0</sub>	T
HVR0A	2.8±0.20	5.5±0.20	12.0±0.3	1.75±0.1	5.5±0.05	4.00±0.10	4.00±0.1	2.00±0.05	1.50+0.1,-0	1.2 <sup>+0</sup>
HVR12	3.5±0.20	6.7±0.20	12.0±0.3	1.75±0.1	5.5±0.05	4.00±0.10	4.00±0.1	2.00±0.05	1.50+0.1,-0	1.2 <sup>+0</sup>

## ■ Recommend Land Pattern

Unit: mm



Type	A	B	C
HVR02	0.50	0.45	0.60
HVR03	0.90	0.60	0.90
HVR05	1.20	0.70	1.30
HVR06	2.00	0.90	1.60
HVR0A	3.80	0.90	2.80
HVR12	3.80	1.60	3.50