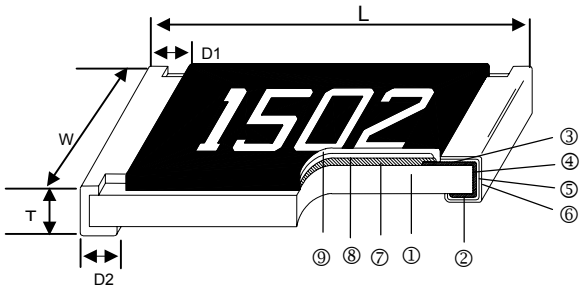
# High Voltage Thick Film Chip Resistor－HVR Series


## ■Construction




| | | | | | |
|---|---|---|---|---|---|
| ① | Alumina Substrate | ④ | Edge Electrode (NiCr) | ⑦ | Resistor Layer ($RuO_2$/Ag) |
| ② | Bottom Electrode (Ag) | ⑤ | Barrier Layer (Ni) | ⑧ | Primary Overcoat (Glass) |
| ③ | Top Electrode (Ag-Pd) | 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

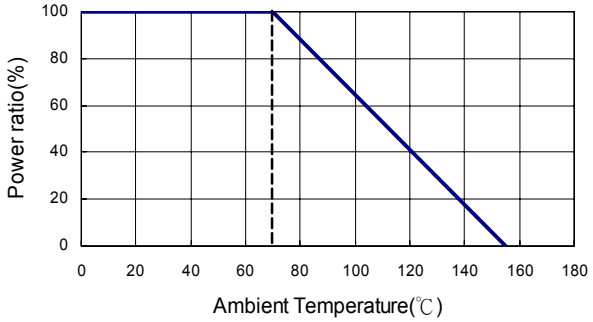
Unit: mm

| 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±0.10 | 2.50±0.15 | 0.55±0.10 | 0.60±0.25 | 0.50±0.20 | 24.241 |
| HVR12 | 2512 | 6.35±0.10 | 3.10±0.15 | 0.55±0.10 | 0.60±0.25 | 0.50±0.20 | 39.448 |

## ■Part Numbering

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

## ■Derating Curve



## ■Standard Electrical Specifications

| Item / Type | 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 | 10Ω - 1MΩ | | ±100 |
| | | | | | 1.02MΩ - 10MΩ | 1.1MΩ - 20MΩ | ±200 |
| | | | | | - | 22MΩ - 100MΩ | ±400 |
| HVR03 (0603) | 1/10W | | 200V | 400V | 10Ω - 1MΩ | | ±100 |
| | | | | | 1.02MΩ - 10MΩ | 1.1MΩ - 20MΩ | ±200 |
| | | | | | - | 22MΩ - 100MΩ | ±400 |
| HVR05 (0805) | 1/8W | | 400V | 800V | 10Ω - 1MΩ | | ±100 |
| | | | | | 1.02MΩ - 10MΩ | 1.1MΩ - 20MΩ | ±200 |
| | | | | | - | 22MΩ - 100MΩ | ±400 |
| HVR06 (1206) | 1/4W | | 500V | 1000V | 10Ω - 1MΩ | | ±100 |
| | | | | | 1.02MΩ - 10MΩ | 1.1MΩ - 20MΩ | ±200 |
| | | | | | - | 22MΩ - 100MΩ | ±400 |
| HVR0A (2010) | 1/2W | | 2000V | 3000V | 10Ω - 1MΩ | | ±100 |
| | | | | | 1.02MΩ - 20MΩ | 1.1MΩ - 20MΩ | ±200 |
| | | | | | - | 22MΩ - 100MΩ | ±400 |
| HVR12 (2512) | 1W | | 3000V | 4000V | 10Ω - 1MΩ | | ±100 |
| | | | | | 1.02MΩ - 20MΩ | 1.1MΩ - 20MΩ | ±200 |
| | | | | | - | 22MΩ - 100MΩ | ±400 |

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

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

■ Viking 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. | | -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 +155°C for 1000 hrs |
| Bending Strength | ±(1.0%+0.05Ω) | ±(1.0%+0.05Ω) | Bending once for 5 seconds<br>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%<br>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 +155°C, 5 cycles |

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

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