chanhvinh.com

Internal

# High Voltage Thick Film Chip Resistor

## Features

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

## RS PRO High Voltage Thick Film Chip Resistor
## RSPHVR Series




RS PRO is the own brand of RS. The RS PRO Seal of Approval is your assurance of professional quality, a guarantee that every part is rigorously tested, inspected, and audited against demanding standards. Making RS PRO the Smart Choice for our customers.

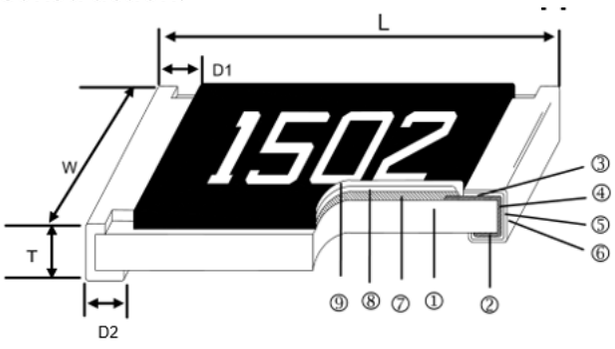
# High Voltage Thick Film Chip Resistor

## Product Description

Applications Include:

- Inverter - Outdoor Equipment
- Converter – High Pulse Equipment

Construction:




| | | | | | |
|---|---|---|---|---|---|
| ① | Alumina Substrate | ④ | Edge Electrode | ⑦ | Resistor Layer |
| ② | Bottom Electrode | ⑤ | Barrier Layer | ⑧ | Primary Overcoat |
| ③ | Top Electrode | ⑥ | External Electrode | ⑨ | Secondary Overcoat |

## Dimensions

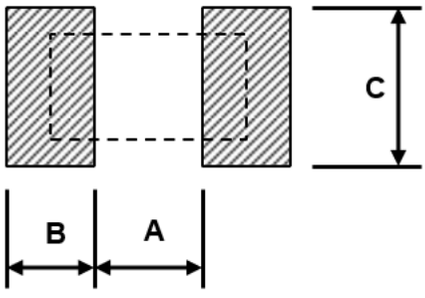
| Type | Size (Inch) | L (mm) | W (mm) | T (mm) | D1 (mm) | D2 (mm) | Weight (g) (1000pcs) |
|---|---|---|---|---|---|---|---|
| RSPHVR05 | 0805 | 2.00±0.10 | 1.25±0.10 | 0.50±0.10 | 0.35±0.20 | 0.40±0.20 | 4.368 |
| RSPHVR06 | 1206 | 3.10±0.10 | 1.55±0.10 | 0.55±0.10 | 0.50±0.25 | 0.50±0.20 | 8.947 |
| RSPHVR0A | 2010 | 5.00±0.10 | 2.50±0.15 | 0.55±0.10 | 0.60±0.25 | 0.50±0.20 | 24.241 |
| RSPHVR12 | 2512 | 6.35±0.10 | 3.10±0.15 | 0.55±0.10 | 0.60±0.25 | 0.50±0.20 | 39.448 |

## Part Number Make Up

| Product Type | Dimensions | Resistance Tolerance | Packaging Code | TCR (PPM/°C) | Power Rating | Resistance |
|---|---|---|---|---|---|---|
| RSPHVR | 05: 0805<br>06: 1206<br>0A: 2010<br>12: 2512 | F: ±1%<br>J: ±5% | T: 7” Taping Reel | E: ±100<br>F: ±200<br>H: ±400 | W: 1/8W<br>V: 1/4W<br>U: 1/2W<br>T: 1W | 1003: 100KΩ<br>1004: 1MΩ<br>1005: 10MΩ |

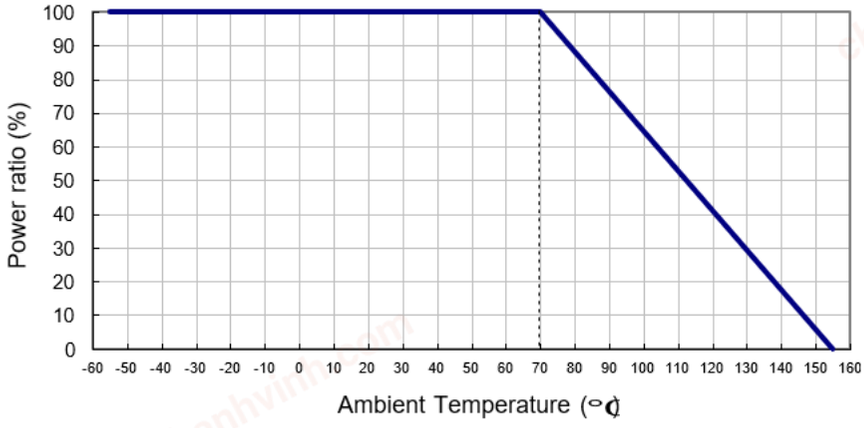
# High Voltage Thick Film Chip Resistor

## Recommended Land Pattern

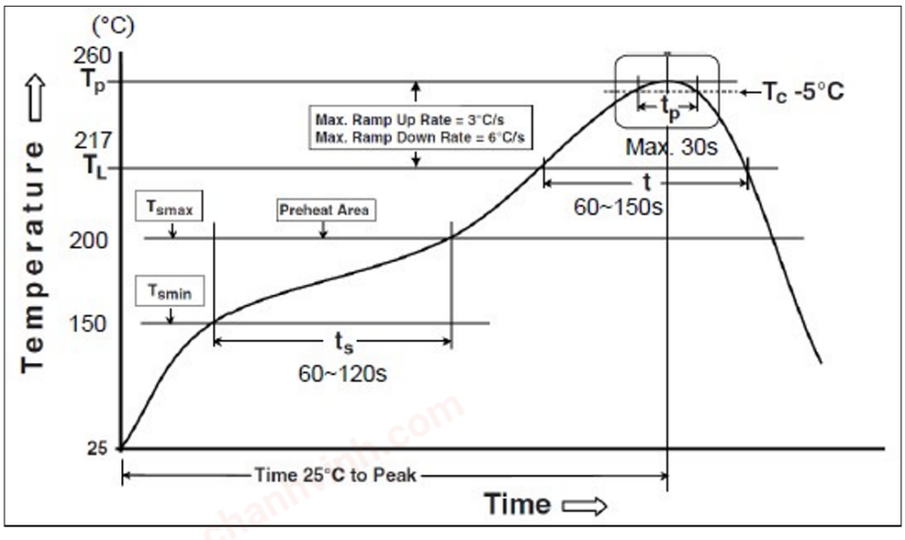



| Type | A (mm) | B (mm) | C (mm) |
|---|---|---|---|
| RSPHVR05 | 1.20 | 0.70 | 1.30 |
| RSPHVR06 | 2.00 | 0.90 | 1.60 |
| RSPHVR0A | 3.80 | 0.90 | 2.80 |
| RSPHVR12 | 4.90 | 1.60 | 3.50 |

## Derating Curve




## Soldering Conditions



# High Voltage Thick Film Chip Resistor

| Reflow Profiles | |
|---|---|
| Profile Feature | Pb-Free Assembly |
| Preheat<br>Min. Temperature (Tsmin)<br>Max Temperature (Tsmax)<br>Preheating time (ts) from (Tsmin to Tsmax) | <br>150 °C<br>200 °C<br>60-120 seconds |
| Ramp-up rate ($T_L$ to Tp) | 3 °C/second max. |
| Liquidous temperature ($T_L$)<br>Time ($t_L$) maintained above $T_L$ | 217 °C<br>60-150 seconds |
| Min. Peak temperature (Tp min) | 235°C |
| Max. Peak temperature (Tp max) | 260°C |
| Time (tp) within 5 °C of the specified classification temperature (Tc) | 30 seconds max. |
| Ramp-down rate (Tp to $T_L$) | 6 °C/second max. |
| Time 25 °C to peak temperature | 8 minutes max. |

## Electrical Specifications

| Type | Power Rating | Operating Temp. Range | Max. Operating Voltage | Max. Overload Voltage | Resistance Range | | TCR (PPM/°C) |
|---|---|---|---|---|---|---|---|
| | | | | | ±1%(E24 , E96) | ±5%(E24) | |
| RSPHVR05 (0805) | 1/8W | +55 ~ +155°C | 400V | 800V | 100KΩ - 1MΩ | | ±100 |
| | | | | | 1.02MΩ – 10MΩ | 1.1MΩ – 20MΩ | ±200 |
| | | | | | - | 22MΩ – 100MΩ | ±400 |
| RSPHVR06 (1206) | 1/4W | | 500V | 1000V | 100KΩ - 1MΩ | | ±100 |
| | | | | | 1.02MΩ – 10MΩ | 1.1MΩ – 20MΩ | ±200 |
| | | | | | - | 22MΩ – 100MΩ | ±400 |
| RSPHVR0A (2010) | 1/2W | | 2000V | 3000V | 51KΩ - 1MΩ | | ±100 |
| | | | | | 1.02MΩ – 20MΩ | 1.1MΩ – 20MΩ | ±200 |
| | | | | | - | 22MΩ – 100MΩ | ±400 |
| RSPHVR12 (2512) | 1W | | 3000V | 4000V | 30KΩ - 1MΩ | | ±100 |
| | | | | | 1.02MΩ – 20MΩ | 1.1MΩ – 20MΩ | ±200 |
| | | | | | - | 22MΩ – 100MΩ | ±400 |

Operating Voltage=√(P*R) or Max. Operating Voltage listed above, whichever is lower.

Overload Voltage=2.5*√(P*R) or Max. Overload Voltage listed above, whichever is lower.

# High Voltage Thick Film Chip Resistor

## Environmental Characteristics

| Item | Requirement | | Test Method |
|---|---|---|---|
| | □1% | □5% | |
| Temperature Coefficient of Resistance (T.C.R.) | As Spec. | | JIS-C-5201-1 4.8<br>IEC-60115-1 4.8<br>At 25□C/-55□C and 25□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<br>IEC-60115-1 4.13<br>RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds |
| Insulation Resistance | □10G | | JIS-C-5201-1 4.6<br>IEC-60115-1 4.6<br>Max. Overload Voltage for 1 minute |
| Endurance | □(2.0%+0.10Ω) | □(3.0%+0.10Ω) | JIS-C-5201-1 4.25<br>IEC-60115-1 4.25.1<br>70□2□C, RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hr “OFF” |
| Damp Heat with Load | □(2.0%+0.10Ω) | □(3.0%+0.10Ω) | JIS-C-5201-1 4.24<br>IEC-60115-1 4.24<br>40□2□C, 90~95% R.H., RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hr “OFF” |
| Dry Heat | □(1.0%+0.05Ω) | □(1.5%+0.10Ω) | JIS-C-5201-1 4.23 IEC-60115-1 4.23.2 at +155□C for 1000 hrs |
| Bending Strength | □(1.0%+0.05Ω) | □(1.0%+0.05Ω) | JIS-C-5201-1 4.33<br>IEC-60115-1 4.33<br>Bending once for 60 seconds<br>2010, 2512 sizes: 2mm Other sizes: 3mm |
| Solderability | 95% min. coverage | | JIS-C-5201-1 4.17 IEC-60115-1 4.17<br>245□5□C for 3 seconds |
| Resistance to Soldering Heat | □(0.5%+0.05Ω) | □(1.0%+0.05Ω) | JIS-C-5201-1 4.18<br>IEC-60115-1 4.18<br>260□5□C for 10 seconds |
| Voltage Proof | No breakdown or flashover | | JIS-C-5201-1 4.7<br>IEC-60115-1 4.7<br>HVR02: 150V for 1 minute<br>HVR03: 300V for 1 minute<br>HVR05/HVR06/HVR0A/HVR12: 500V for 1 minute |
| Leaching | Individual leaching area ≦5%<br>Total leaching area ≦ 10% | | JIS-C-5201-1 4.18<br>IEC-60068-2-58 8.2.1<br>260□5□C for 30 seconds |
| Rapid Change of Temperature | □(0.5%+0.05Ω) | □(1.0%+0.05Ω) | JIS-C-5201-1 4.19<br>IEC-60115-1 4.19<br>-55□C to +155□C, 5 cycles |

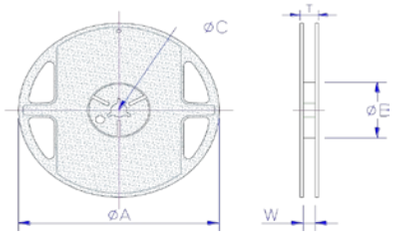
RCWV(Rated Continuous Working Voltage)=√(P*R) or Max. Operating Voltage whichever is lower.

Storage Temperature: 15~28°C; Humidity < 80%RH
Shelf Life: 2 years from production date.

# High Voltage Thick Film Chip Resistor

## Packaging

Reel Specifications




| Type | Packaging Quantity | | Tape Width | Reel Diameter | ΦA (mm) | ΦB (mm) | ΦC (mm) | W (mm) | T (mm) |
|---|---|---|---|---|---|---|---|---|---|
| RSPHVR05 RSPHVR06 | Paper | 5K | 8mm | 7 inch | 178.5±1.5 | 60+1/-0 | 13.0±0.2 | 9.0±0.5 | 12.5±0.5 |
| | | 10K | 8mm | 10 inch | 254±1.0 | 100±0.5 | 13.0±0.2 | 9.5±0.5 | 13.5±0.5 |
| | | 20K | 8mm | 13 inch | 330±1.0 | 100±0.5 | 13.0±0.2 | 9.5±0.5 | 13.5±0.5 |
| RSPHVR0A RSPHVR12 | Embossed | 4K | 12mm | 7 inch | 178.5±1.5 | 60+1/-0 | 13.0±0.5 | 13.0±0.5 | 15.5±0.5 |
| | | 8K | 12mm | 10 inch | 250±1.0 | 62±0.5 | 13.0±0.5 | 12.5±0.5 | 16.5±0.5 |

# High Voltage Thick Film Chip Resistor

## Similar Products

| MPN | RS PRO Article | | |
|---|---|---|---|
| | SSM | P Part | MPQ |
| RSPHVR05FTEW1003 | 2567723 | 2567723P | 2567722 |
| RSPHVR05FTEW1004 | 2567725 | 2567725P | 2567724 |
| RSPHVR05FTEW1503 | 2567727 | 2567727P | 2567726 |
| RSPHVR05FTEW2203 | 2567729 | 2567729P | 2567728 |
| RSPHVR05FTEW4993 | 2567731 | 2567731P | 2567730 |
| RSPHVR05FTEW6803 | 2567733 | 2567733P | 2567732 |
| RSPHVR05FTFW1504 | 2567735 | 2567735P | 2567734 |
| RSPHVR05FTFW2204 | 2567737 | 2567737P | 2567736 |
| RSPHVR05FTFW3604 | 2567739 | 2567739P | 2567738 |
| RSPHVR06FTEV1003 | 2567741 | 2567741P | 2567740 |
| RSPHVR06FTEV1004 | 2567743 | 2567743P | 2567742 |
| RSPHVR06FTEV1103 | 2567745 | 2567745P | 2567744 |
| RSPHVR06FTEV1503 | 2567747 | 2567747P | 2567746 |
| RSPHVR06FTEV1803 | 2567749 | 2567749P | 2567748 |
| RSPHVR06FTEV2203 | 2567751 | 2567751P | 2567750 |
| RSPHVR06FTEV2703 | 2567753 | 2567753P | 2567752 |
| RSPHVR06FTEV3903 | 2567755 | 2567755P | 2567754 |
| RSPHVR06FTEV4703 | 2567757 | 2567757P | 2567756 |
| RSPHVR06FTEV4993 | 2567759 | 2567759P | 2567758 |
| RSPHVR06FTEV5103 | 2567761 | 2567761P | 2567760 |
| RSPHVR06FTEV5113 | 2567763 | 2567763P | 2567762 |
| RSPHVR06FTEV6803 | 2567765 | 2567765P | 2567764 |
| RSPHVR06FTEV7503 | 2567767 | 2567767P | 2567766 |
| RSPHVR06FTEV9103 | 2567769 | 2567769P | 2567768 |
| RSPHVR06FTFV1005 | 2567771 | 2567771P | 2567770 |
| RSPHVR06FTFV1804 | 2567773 | 2567773P | 2567772 |
| RSPHVR06FTFV3004 | 2567775 | 2567775P | 2567774 |
| RSPHVR0AFTEU1004 | 2567777 | 2567777P | 2567776 |
| RSPHVR0AFTEU1103 | 2567779 | 2567779P | 2567778 |
| RSPHVR0AFTEU1503 | 2567781 | 2567781P | 2567780 |
| RSPHVR0AFTEU2200 | 2567783 | 2567783P | 2567782 |
| RSPHVR0AFTEU3300 | 2567785 | 2567785P | 2567784 |
| RSPHVR0AFTFU1005 | 2567787 | 2567787P | 2567786 |
| RSPHVR0AFTFU1504 | 2567789 | 2567789P | 2567788 |
| RSPHVR0AFTFU3304 | 2567791 | 2567791P | 2567790 |
| RSPHVR0AFTFU5104 | 2567793 | 2567793P | 2567792 |
| RSPHVR0AFTFU7504 | 2567795 | 2567795P | 2567794 |
| RSPHVR0AJTHU2205 | 2567797 | 2567797P | 2567796 |
| RSPHVR12FTET1003 | 2567799 | 2567799P | 2567798 |
| RSPHVR12FTET1004 | 2567801 | 2567801P | 2567800 |
| RSPHVR12FTET1803 | 2567803 | 2567803P | 2567802 |

# High Voltage Thick Film Chip Resistor

| | | | |
|---|---|---|---|
| RSPHVR12FTET2003 | 2567805 | 2567805P | 2567804 |
| RSPHVR12FTET2703 | 2567807 | 2567807P | 2567806 |
| RSPHVR12FTET3004 | 2567809 | 2567809P | 2567808 |
| RSPHVR12FTET3303 | 2567811 | 2567811P | 2567810 |
| RSPHVR12FTET3903 | 2567813 | 2567813P | 2567812 |
| RSPHVR12FTET4702 | 2567815 | 2567815P | 2567814 |
| RSPHVR12FTET4753 | 2567817 | 2567817P | 2567816 |
| RSPHVR12FTET4993 | 2567819 | 2567819P | 2567818 |
| RSPHVR12FTET6803 | 2567821 | 2567821P | 2567820 |
| RSPHVR12FTET7503 | 2567823 | 2567823P | 2567822 |
| RSPHVR12FTET8203 | 2567825 | 2567825P | 2567824 |
| RSPHVR12FTFT1005 | 2567827 | 2567827P | 2567826 |
| RSPHVR12FTFT1504 | 2567829 | 2567829P | 2567828 |
| RSPHVR12FTFT2004 | 2567831 | 2567831P | 2567830 |
| RSPHVR12FTFT2005 | 2567833 | 2567833P | 2567832 |
| RSPHVR12FTFT3304 | 2567835 | 2567835P | 2567834 |
| RSPHVR12FTFT3904 | 2567837 | 2567837P | 2567836 |
| RSPHVR12FTFT4304 | 2567839 | 2567839P | 2567838 |
| RSPHVR12FTFT6804 | 2567841 | 2567841P | 2567840 |
| RSPHVR12JTHT1006 | 2567843 | 2567843P | 2567842 |