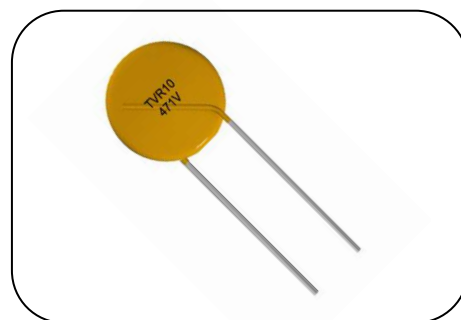


Metal Oxide Varistor : TVR-V Series

Disc Type Varistor for Surge Protection (Medium Surge Series)

■ Features

1. RoHS compliant
2. Halogen-free series are available
3. Body size: $\Phi 10$ and $\Phi 14$ mm
4. Wide operating voltage range: 130Vac ~ 680Vac
5. Operating temperature range: $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
Storage temperature range : $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$
6. Agency recognition: UL 1449 3rd/cUL/VDE/CQC
7. Meet IEC 60950-1:2013 Annex Q requirement

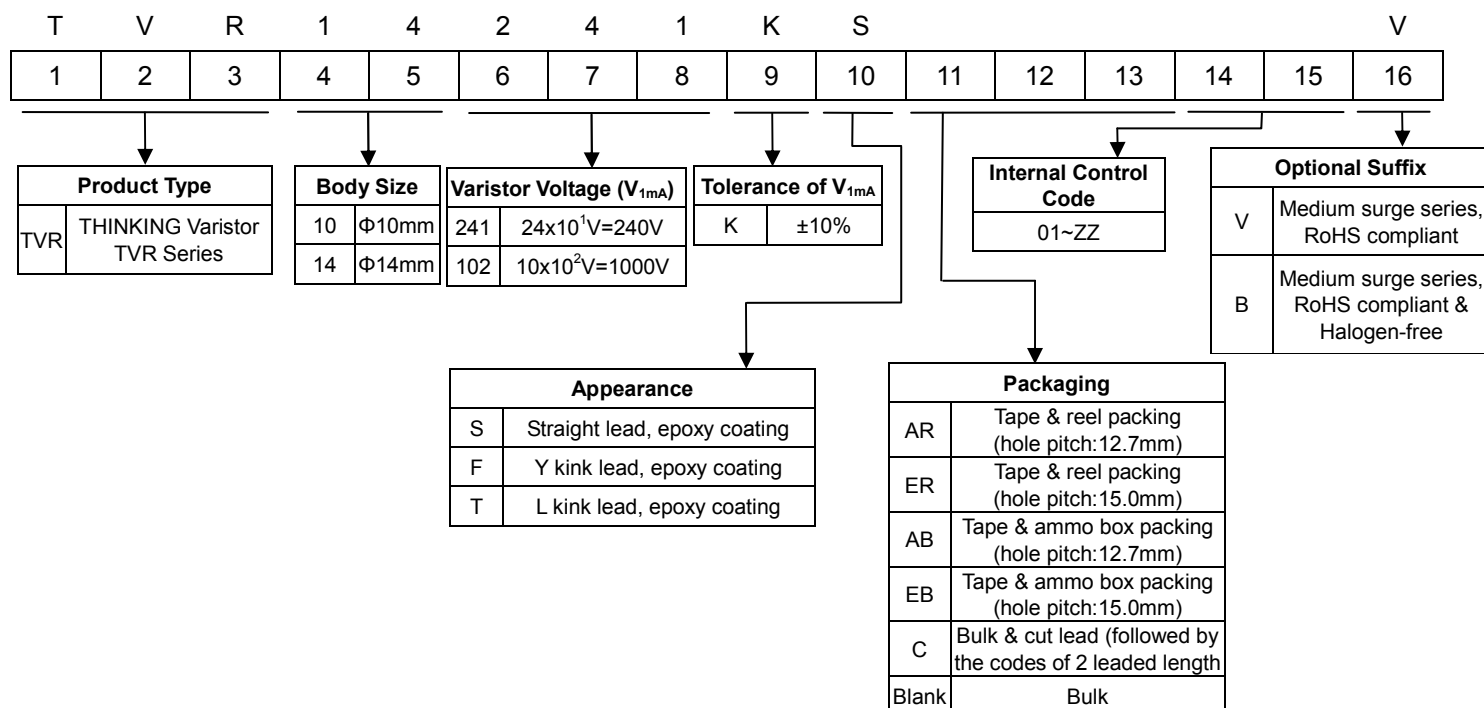


Note: V of the marking stands for TVR-V series

■ Recommended Applications

1. Power supply
2. Home appliance
3. Industrial equipment
4. Telecommunication or telephone system
5. Smart meter
6. PLC (Power line communication)
7. Lighting products
8. Photovoltaic industry

■ Part Number Code



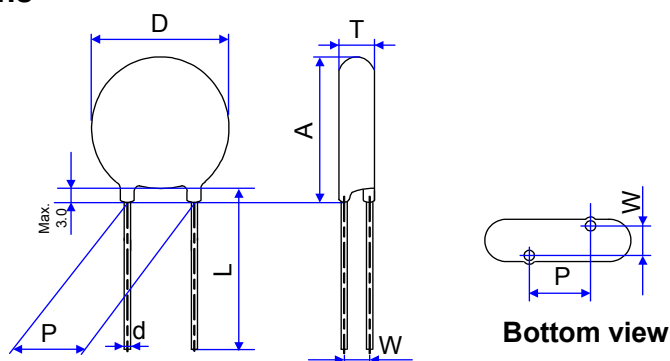
Note: Optional suffix will be the 11th digit if packaging and internal control codes are not coded.

Metal Oxide Varistor : TVR-V Series

Disc Type Varistor for Surge Protection (Medium Surge Series)

■ Structure and Dimensions

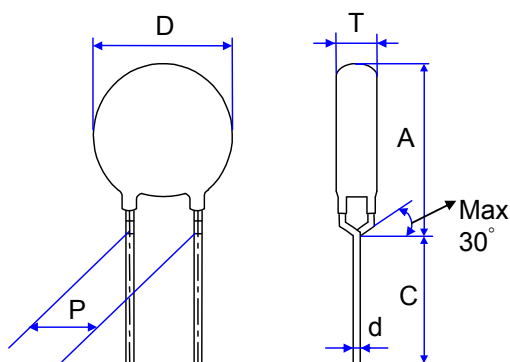
● S Type (Straight lead)



(Unit: mm)

| Series | D | Lmin. | d | P | Amax. | Tmax. | W |
|---------|-----------|-------|----------|-------|--|--|---|
| TVR10-V | 9.5~12.5 | 26.5 | 0.8±0.02 | 7.5±1 | 15.0 | Please refer to Electrical Characteristics Table | |
| TVR14-V | 13.5~16.0 | 26.5 | 0.8±0.02 | 7.5±1 | 18.5 (for TVR14201-511-V) 19.0 (for TVR14561-112-V) | | |

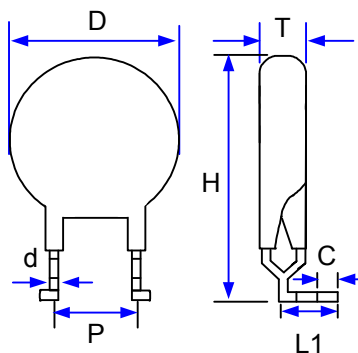
● F Type (Y kink lead)



(Unit: mm)

| Series | D | Cmin. | d | P | Amax. | Tmax. |
|---------|-----------|-------|----------|-------|-------|--|
| TVR10-V | 9.5~12.5 | 20 | 0.8±0.02 | 7.5±1 | 16.0 | Please refer to Electrical Characteristics Table |
| TVR14-V | 13.5~16.0 | 20 | 0.8±0.02 | 7.5±1 | 19.0 | |

● T Type (L kink lead)



(Unit: mm)

| Series | D | Cmin. | d | P | Hmax. | L1 | Tmax. |
|---------|-----------|---------|----------|-------|-------|-------|--|
| TVR10-V | 9.5~12.5 | 3.8±0.8 | 0.8±0.02 | 7.5±1 | 20.0 | 7.0±1 | Please refer to Electrical Characteristics Table |
| TVR14-V | 13.5~16.0 | | | 7.5±1 | 23.5 | 7.0±1 | |

Metal Oxide Varistor : TVR-V Series

Disc Type Varistor for Surge Protection (Medium Surge Series)

■ Electrical Characteristics

10-V Series

| Part No. | Varistor Voltage (@ 1mA DC) | Max. Continuous Voltage | | Max. Clamping Voltage (8/20μs) | | Max. Surge Current (8/20μs) | Rated Power | Max. Energy (10/1000μs) | Reference Capacitance @1KHz | Dimension | | | UL 1449 3 rd SPD Application |
|------------|--------------------------------|-------------------------|-----------------|-----------------------------------|----------------|--------------------------------|-------------|----------------------------|--------------------------------|------------------|------------------|-----------|--|
| | V _{1mA} | V _{AC(rms)} | V _{DC} | V _P | I _P | I _{max} | P | W _{max} | C _p | T _{min} | T _{max} | W ±1.0 | |
| | (V) | (V) | (V) | (V) | (A) | (A) | (W) | (J) | (pF) | (mm) | | | |
| TVR10201-V | 200 (180~220) | 130 | 170 | 340 | 25 | 3500 | 0.4 | 35 | 570 | 2.9 | 4.4 | 1.7 | For SPD Type 3 Application |
| TVR10221-V | 220 (198~242) | 140 | 180 | 360 | 25 | 3500 | 0.4 | 39 | 520 | 3.0 | 4.5 | 1.7 | |
| TVR10241-V | 240 (216~264) | 150 | 200 | 395 | 25 | 3500 | 0.4 | 42 | 480 | 3.1 | 4.6 | 1.8 | |
| TVR10271-V | 270 (243~297) | 175 | 225 | 455 | 25 | 3500 | 0.4 | 49 | 425 | 3.3 | 5.0 | 1.9 | |
| TVR10301-V | 300 (270~330) | 195 | 250 | 500 | 25 | 3500 | 0.4 | 53 | 380 | 3.5 | 5.3 | 2.1 | |
| TVR10331-V | 330 (297~363) | 215 | 275 | 550 | 25 | 3500 | 0.4 | 58 | 350 | 3.8 | 5.7 | 2.2 | |
| TVR10361-V | 360 (324~396) | 230 | 300 | 595 | 25 | 3500 | 0.4 | 65 | 320 | 4.0 | 6.0 | 2.3 | |
| TVR10391-V | 390 (351~429) | 250 | 320 | 650 | 25 | 3500 | 0.4 | 70 | 295 | 4.2 | 6.2 | 2.5 | |
| TVR10431-V | 430 (387~473) | 275 | 350 | 710 | 25 | 3500 | 0.4 | 80 | 260 | 4.3 | 6.5 | 2.5 | |
| TVR10471-V | 470 (423~517) | 300 | 385 | 775 | 25 | 3500 | 0.4 | 85 | 240 | 4.4 | 6.6 | 2.6 | |
| TVR10511-V | 510 (459~561) | 320 | 410 | 845 | 25 | 3500 | 0.4 | 92 | 220 | 4.6 | 6.8 | 2.8 | |
| TVR10561-V | 560 (504~616) | 350 | 450 | 930 | 25 | 3500 | 0.4 | 92 | 200 | 4.7 | 7.1 | 3.0 | |
| TVR10621-V | 620 (558~682) | 395 | 510 | 1020 | 25 | 3500 | 0.4 | 95 | 180 | 4.8 | 7.2 | 3.2 | |
| TVR10681-V | 680 (612~748) | 420 | 560 | 1120 | 25 | 3500 | 0.4 | 98 | 175 | 4.9 | 7.4 | 3.4 | |
| TVR10751-V | 750 (675~825) | 465 | 615 | 1235 | 25 | 3500 | 0.4 | 100 | 160 | 5.1 | 7.6 | 3.7 | |
| TVR10821-V | 820 (738~902) | 510 | 670 | 1355 | 25 | 3500 | 0.4 | 110 | 150 | 5.2 | 7.8 | 3.4 | |
| TVR10911-V | 910 (819~1001) | 550 | 745 | 1500 | 25 | 3500 | 0.4 | 130 | 130 | 5.3 | 8.0 | 3.7 | |
| TVR10102-V | 1000 (900~1100) | 625 | 825 | 1650 | 25 | 3500 | 0.4 | 140 | 120 | 5.3 | 8.3 | 4.0 | |
| TVR10112-V | 1100 (990~1210) | 680 | 895 | 1815 | 25 | 3500 | 0.4 | 155 | 110 | 5.7 | 8.6 | 4.3 | |

Metal Oxide Varistor : TVR-V Series

Disc Type Varistor for Surge Protection (Medium Surge Series)

14-V Series

| Part No. | Varistor Voltage (@ 1mA DC) | Max. Continuous Voltage | | Max. Clamping Voltage (8/20 μ s) | | Max. Surge Current (8/20 μ s) | Nominal Discharge Current ^{*1} (8/20 μ s) | Rated Power | Max. Energy (10/1000 μ s) | Reference Capacitance @1KHz | Dimension | | | UL 1449 3 rd SPD Type ^{*2} |
|------------|--------------------------------|-------------------------|-----------------|---|----------------|--------------------------------------|---|-------------|----------------------------------|--------------------------------|------------------|------------------|----------------|--|
| | V _{1mA} | V _{AC(rms)} | V _{DC} | V _P | I _P | I _{max} | I _n | P | W _{max} | C _p | T _{min} | T _{max} | W ± 1.0 | |
| | (V) | (V) | (V) | (V) | (A) | (A) | (A) | (W) | (J) | (pF) | (mm) | | | |
| TVR14201-V | 200 (180~220) | 130 | 170 | 340 | 50 | 6000 | 3000 | 0.6 | 84 | 970 | 2.9 | 4.4 | 1.7 | Type 5 |
| TVR14221-V | 220 (198~242) | 140 | 180 | 360 | 50 | 6000 | 3000 | 0.6 | 91 | 880 | 3.0 | 4.5 | 1.7 | |
| TVR14241-V | 240 (216~264) | 150 | 200 | 395 | 50 | 6000 | 3000 | 0.6 | 98 | 820 | 3.1 | 4.7 | 1.8 | |
| TVR14271-V | 270 (243~297) | 175 | 225 | 455 | 50 | 6000 | 3000 | 0.6 | 112 | 720 | 3.3 | 4.9 | 1.9 | |
| TVR14301-V | 300 (270~330) | 195 | 250 | 500 | 50 | 6000 | 3000 | 0.6 | 123 | 650 | 3.4 | 5.1 | 2.1 | |
| TVR14331-V | 330 (297~363) | 215 | 275 | 550 | 50 | 6000 | 3000 | 0.6 | 133 | 600 | 3.5 | 5.3 | 2.2 | |
| TVR14361-V | 360 (324~396) | 230 | 300 | 595 | 50 | 6000 | 3000 | 0.6 | 147 | 550 | 3.6 | 5.5 | 2.3 | |
| TVR14391-V | 390 (351~429) | 250 | 320 | 650 | 50 | 6000 | 3000 | 0.6 | 161 | 500 | 3.7 | 5.6 | 2.5 | |
| TVR14431-V | 430 (387~473) | 275 | 350 | 710 | 50 | 6000 | 3000 | 0.6 | 182 | 440 | 3.8 | 5.7 | 2.5 | |
| TVR14471-V | 470 (423~517) | 300 | 385 | 775 | 50 | 6000 | 3000 | 0.6 | 196 | 400 | 3.9 | 5.9 | 2.6 | |
| TVR14511-V | 510 (459~561) | 320 | 420 | 845 | 50 | 6000 | 3000 | 0.6 | 210 | 370 | 4.1 | 6.1 | 2.8 | |
| TVR14561-V | 560 (504~616) | 350 | 460 | 930 | 50 | 6000 | 3000 | 0.6 | 231 | 340 | 4.2 | 6.4 | 3.0 | |
| TVR14621-V | 620 (558~682) | 395 | 510 | 1020 | 50 | 6000 | 3000 | 0.6 | 252 | 300 | 4.5 | 6.7 | 3.2 | |
| TVR14681-V | 680 (612~748) | 420 | 560 | 1120 | 50 | 6000 | 3000 | 0.6 | 266 | 290 | 4.7 | 7.1 | 3.4 | |
| TVR14751-V | 750 (675~825) | 465 | 615 | 1235 | 50 | 6000 | 3000 | 0.6 | 280 | 270 | 5.0 | 7.5 | 3.7 | |
| TVR14821-V | 820 (738~902) | 510 | 670 | 1355 | 50 | 6000 | 3000 | 0.6 | 280 | 250 | 5.2 | 7.9 | 3.4 | |
| TVR14911-V | 910 (819~1001) | 550 | 745 | 1500 | 50 | 6000 | 3000 | 0.6 | 308 | 220 | 5.6 | 8.4 | 3.7 | |
| TVR14102-V | 1000 (900~1100) | 625 | 825 | 1650 | 50 | 6000 | 3000 | 0.6 | 336 | 200 | 5.9 | 8.9 | 4.0 | |
| TVR14112-V | 1100 (990~1210) | 680 | 895 | 1815 | 50 | 6000 | 3000 | 0.6 | 364 | 180 | 6.3 | 9.5 | 4.3 | |

Note:




*1: Nominal discharge current is the specification defined in UL 1449 3rd and use 8/20 μ s current waveform to test the varistor.

*2: SPD Type 5 also can be applied for SPD Type 2 application based on selecting suitable "Nominal Discharge Current" rating.

Metal Oxide Varistor : TVR-V Series




Disc Type Varistor for Surge Protection (Medium Surge Series)

■ Safety Approvals

| Certified Model No. | Agency | | | | |
|---------------------|---|---|----------------------------|---|--|
| |  |  | |  | |
| | UL1449 3 rd & cUL: E314979 | 5944 | IEC60950-1:2013 Annex Q | GB/T10193-1997 GB/T10194-1997 CQC10001041748 CQC10001041749 | GB8898-2011 GB4943.1-2011 CQC10001041748 CQC10001041749 |
| TVR10201-V | √ | √ | √ | √ | √ |
| TVR10221-V | √ | √ | √ | √ | √ |
| TVR10241-V | √ | √ | √ | √ | √ |
| TVR10271-V | √ | √ | √ | √ | √ |
| TVR10301-V | √ | √ | √ | √ | √ |
| TVR10331-V | √ | √ | √ | √ | √ |
| TVR10361-V | √ | √ | √ | √ | √ |
| TVR10391-V | √ | √ | √ | √ | √ |
| TVR10431-V | √ | √ | √ | √ | √ |
| TVR10471-V | √ | √ | √ | √ | √ |
| TVR10511-V | √ | √ | √ | √ | √ |
| TVR10561-V | √ | √ | √ | √ | √ |
| TVR10621-V | √ | √ | √ | √ | √ |
| TVR10681-V | √ | √ | √ | √ | √ |
| TVR10751-V | √ | √ | √ | √ | √ |
| TVR10821-V | √ | √ | √ | √ | √ |
| TVR10911-V | √ | √ | √ | √ | √ |
| TVR10102-V | √ | √ | √ | √ | √ |
| TVR10112-V | √ | √ | √ | √ | √ |

Metal Oxide Varistor : TVR-V Series

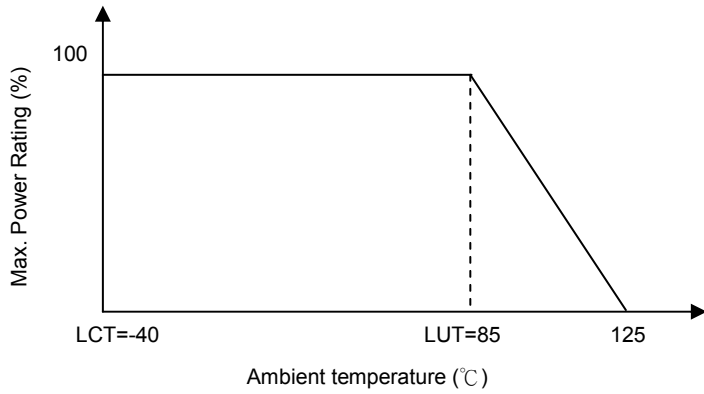
Disc Type Varistor for Surge Protection (Medium Surge Series)

| Certified Model No. | Agency | | | | |
|---------------------|---|---|----------------------------|---|--|
| |  |  | |  | |
| | UL1449 3 rd & cUL: E314979 | 5944 | IEC60950-1:2013 Annex Q | GB/T10193-1997 GB/T10194-1997 CQC10001041748 CQC10001041749 | GB8898-2011 GB4943.1-2011 CQC13001089857 CQC10001041859 |
| TVR14201-V | √ | √ | √ | √ | |
| TVR14221-V | √ | √ | √ | √ | |
| TVR14241-V | √ | √ | √ | √ | |
| TVR14271-V | √ | √ | √ | √ | |
| TVR14301-V | √ | √ | √ | √ | |
| TVR14331-V | √ | √ | √ | √ | |
| TVR14361-V | √ | √ | √ | √ | |
| TVR14391-V | √ | √ | √ | √ | |
| TVR14431-V | √ | √ | √ | √ | √ |
| TVR14471-V | √ | √ | √ | √ | √ |
| TVR14511-V | √ | √ | √ | √ | √ |
| TVR14561-V | √ | √ | √ | √ | √ |
| TVR14621-V | √ | √ | √ | √ | √ |
| TVR14681-V | √ | √ | √ | √ | √ |
| TVR14751-V | √ | √ | √ | √ | √ |
| TVR14821-V | √ | √ | √ | √ | √ |
| TVR14911-V | √ | √ | √ | √ | √ |
| TVR14102-V | √ | √ | √ | √ | √ |
| TVR14112-V | √ | √ | √ | √ | √ |

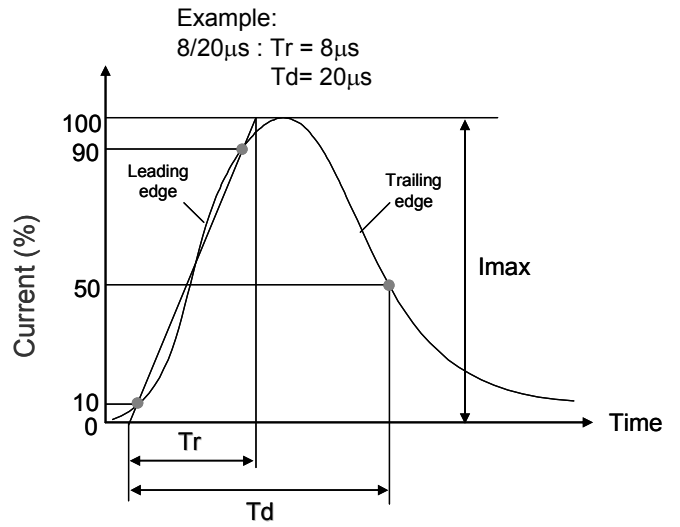
Metal Oxide Varistor : TVR-V Series

Disc Type Varistor for Surge Protection (Medium Surge Series)

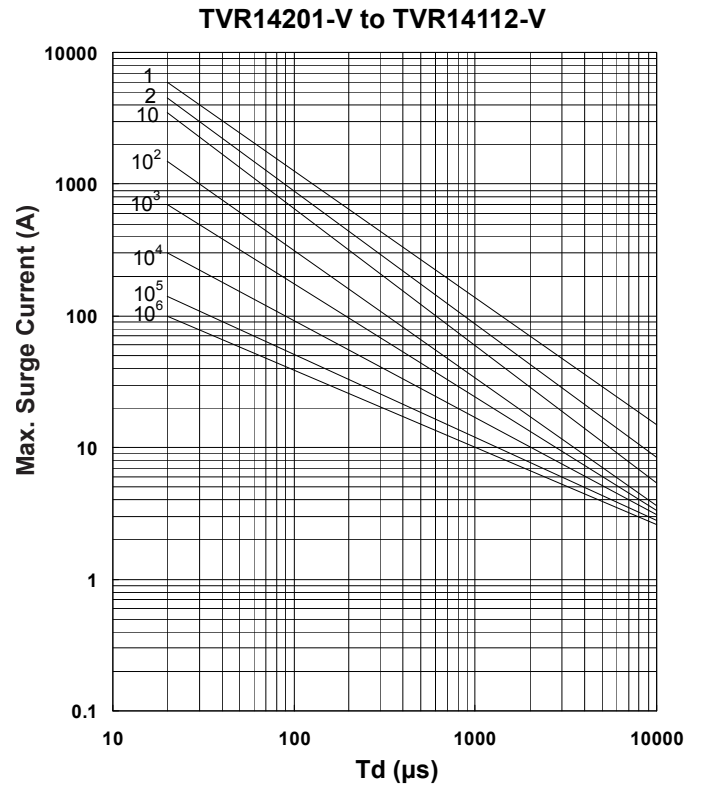
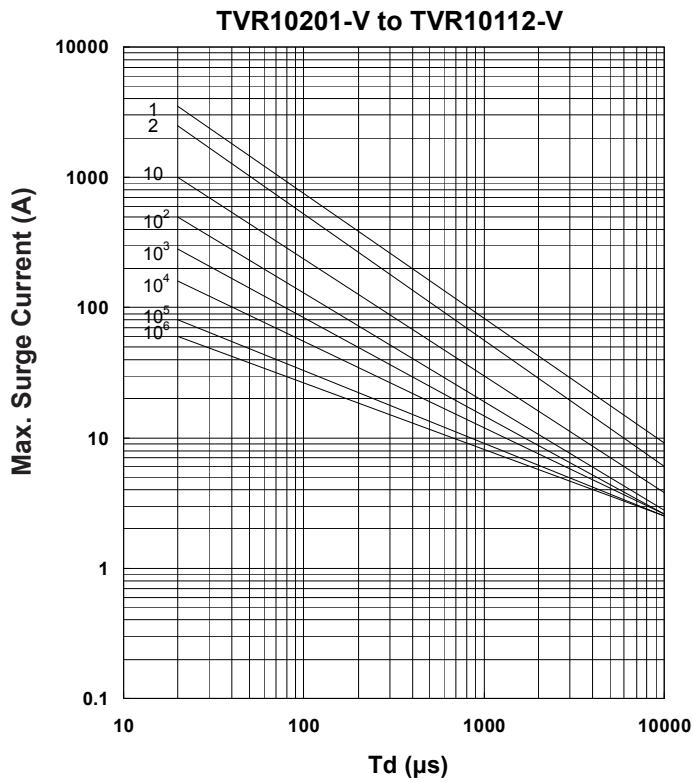
■ Power Derating Curve



■ Surge Current Standard Waveform



■ Max. Surge Current Derating Curves

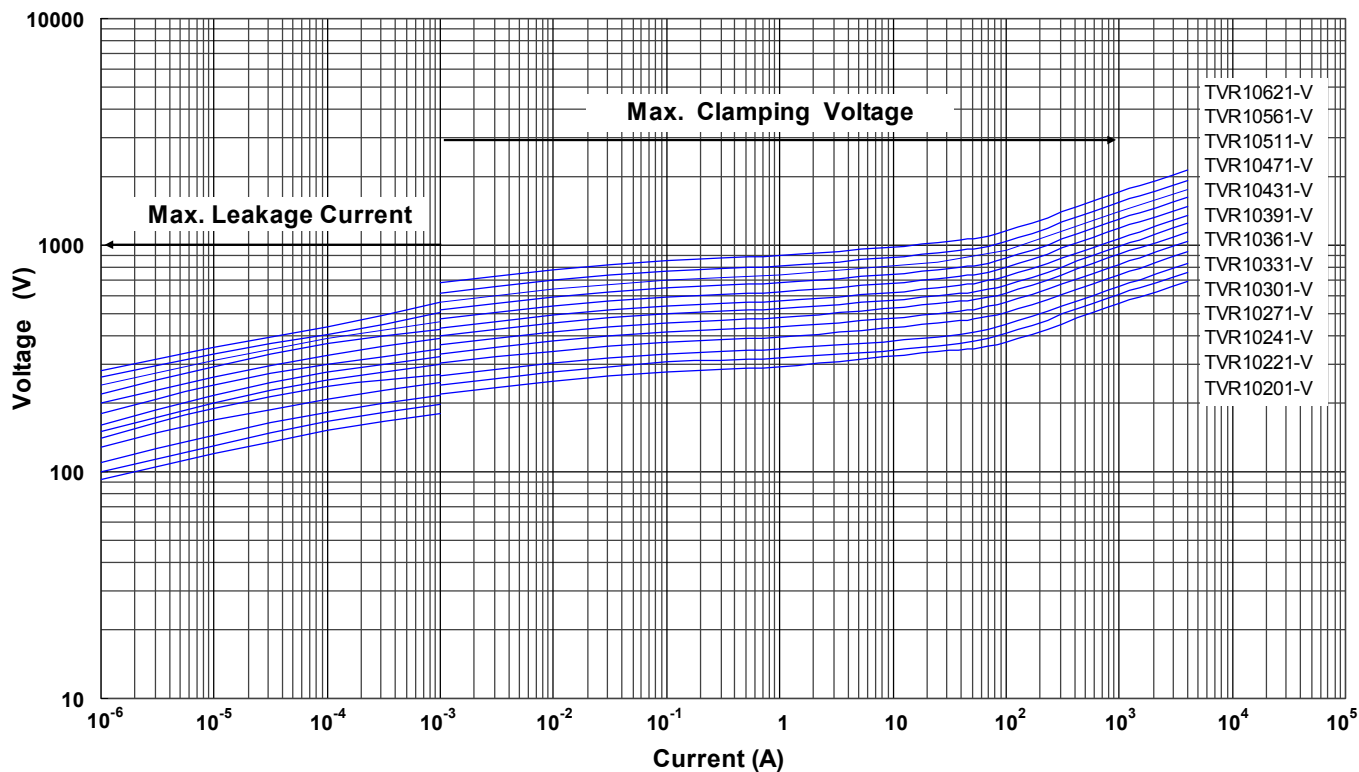


Metal Oxide Varistor : TVR-V Series

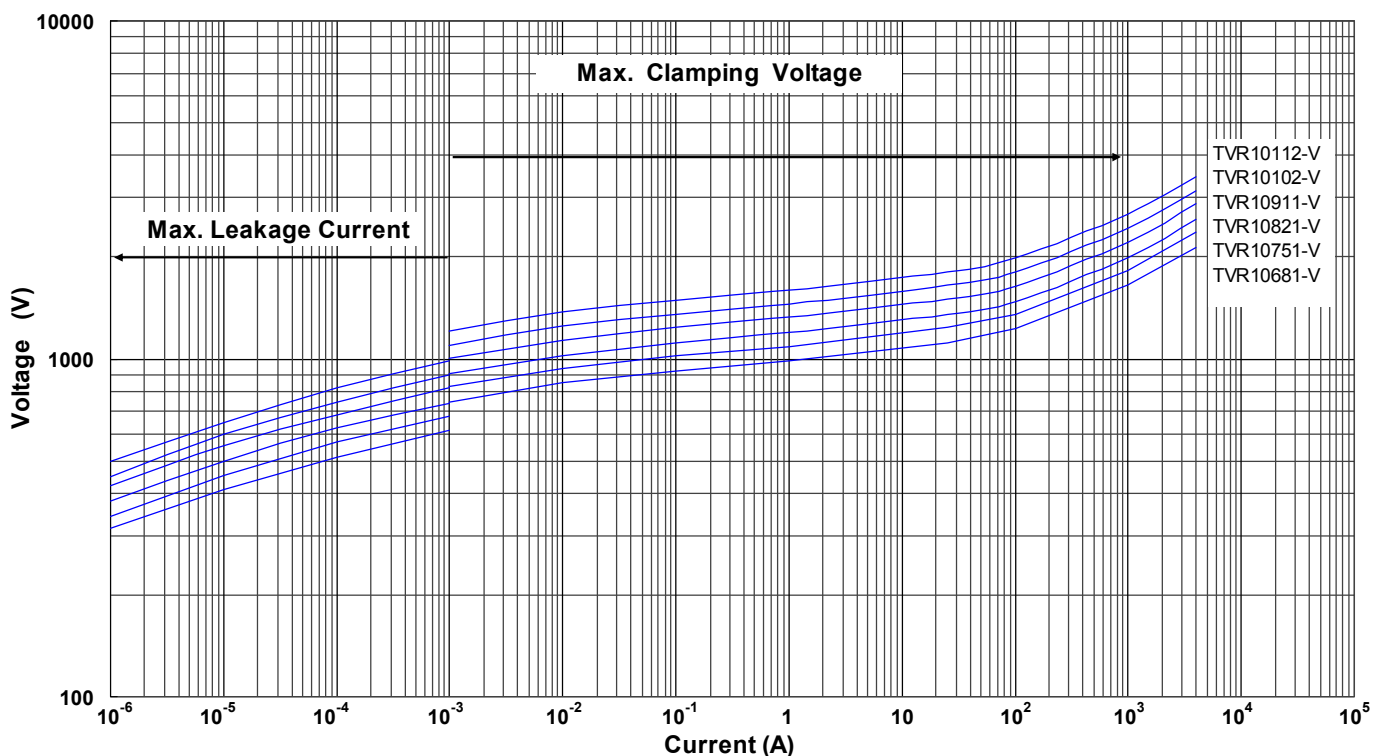
Disc Type Varistor for Surge Protection (Medium Surge Series)

■ Max. Leakage Current and Max. Clamping Voltage Curves

Max. Leakage Current and Max. Clamping Voltage Curves (TVR10201-V to TVR10621-V)



Max. Leakage Current and Max. Clamping Voltage Curves (TVR10681-V to TVR10112-V)

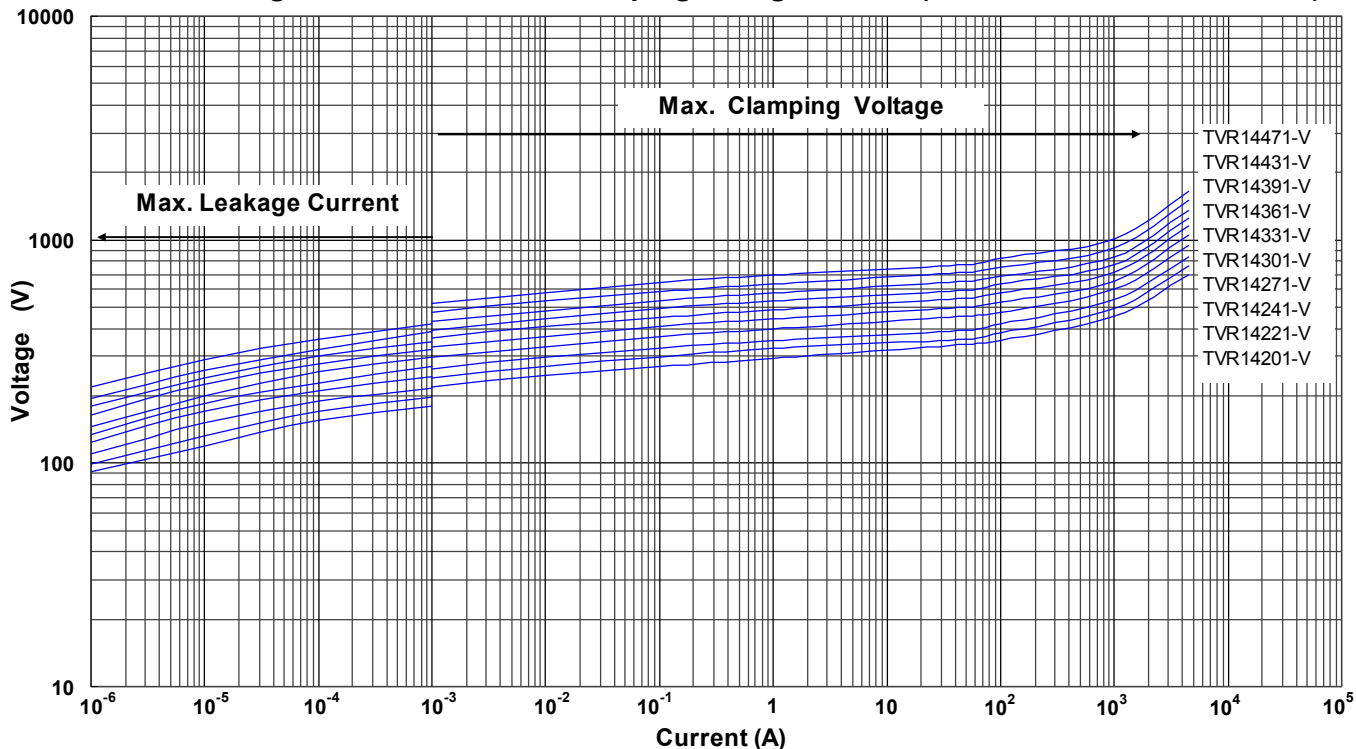


Metal Oxide Varistor : TVR-V Series

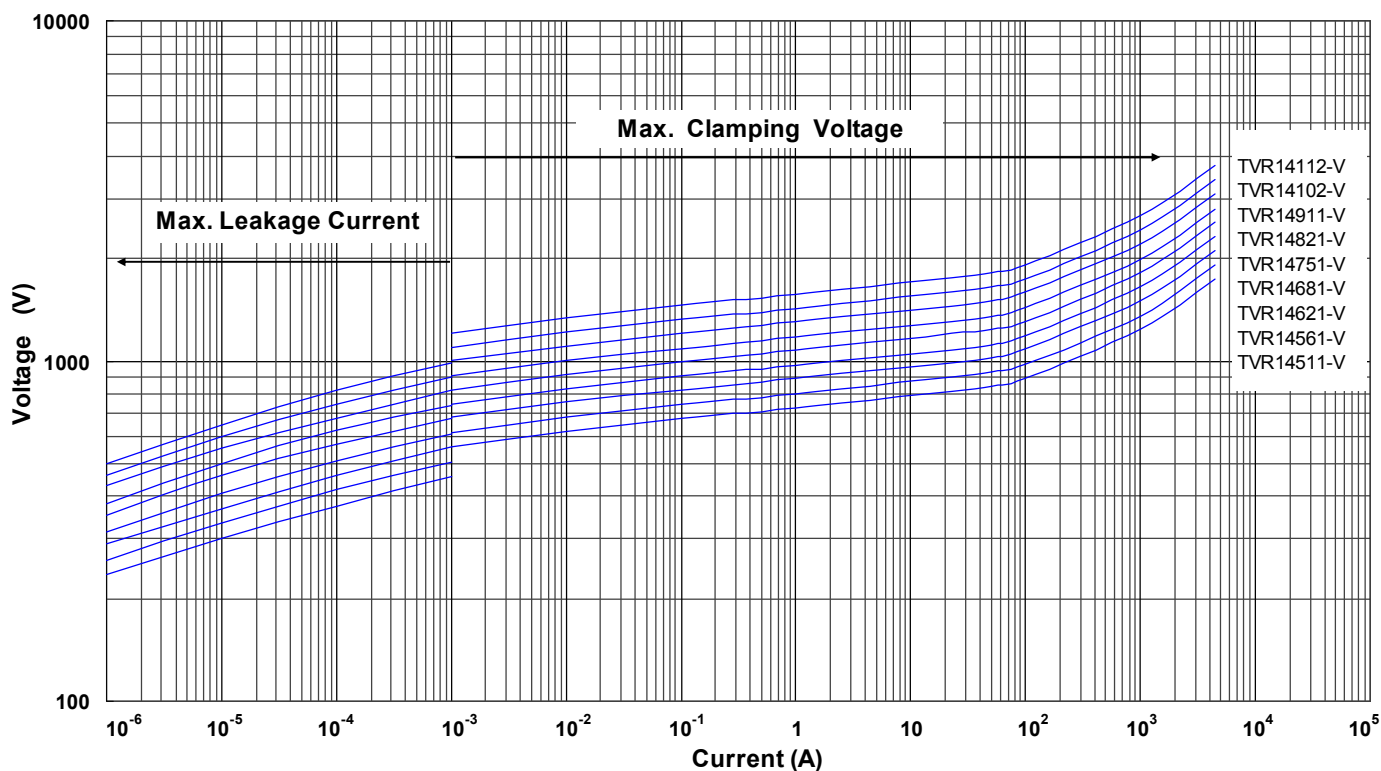
Disc Type Varistor for Surge Protection (Medium Surge Series)

■ Max. Leakage Current and Max. Clamping Voltage Curves

Max. Leakage Current and Max. Clamping Voltage Curves (TVR14201-V to TVR14471-V)



Max. Leakage Current and Max. Clamping Voltage Curves (TVR14511-V to TVR14112-V)

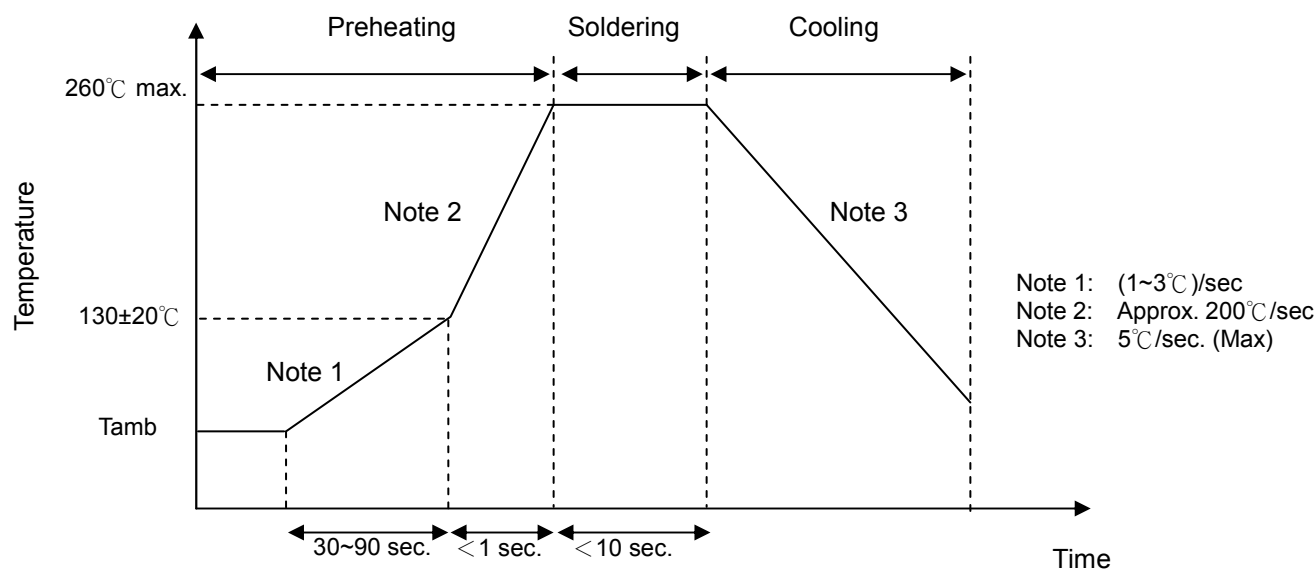


Metal Oxide Varistor : TVR-V Series

Disc Type Varistor for Surge Protection (Medium Surge Series)

■ Soldering Recommendation

● Wave Soldering Profile



● Recommended Reworking Conditions with Soldering Iron

| Item | Conditions |
|-----------------------------------|----------------------------|
| Temperature of Soldering Iron-tip | 360°C (max.) |
| Soldering Time | 3 sec (max.) |
| Distance from Varistor | 2 mm (min.) |

Metal Oxide Varistor : TVR-V Series

Disc Type Varistor for Surge Protection (Medium Surge Series)

■ Reliability

| Item | Standard | Test conditions / Methods | Specifications | | | | | | | | | | | | | | | |
|------------------------------------|-------------------------|--|---|------------------|------------------|---|-------|------|---|------------------|-----|---|------|------|---|------------------|-----|--|
| Tensile Strength of Terminals | IEC 60068-2-21 | Gradually apply the specified force and keep the unit fixed for 10±1 sec. Terminal diameter (mm) Force (Kg) <hr/> 0.5<d≤0.8 1.0 0.8<d≤1.25 2.0 | $ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage | | | | | | | | | | | | | | | |
| Bending Strength of Terminals | IEC 60068-2-21 | Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, then return to the original position. Repeat the procedure in the opposite direction. Terminal diameter (mm) Force (Kg) <hr/> 0.5<d≤0.8 0.5 0.8<d≤1.25 1.0 | $ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage | | | | | | | | | | | | | | | |
| Vibration | IEC 60068-2-6 | Frequency range: 10 ~ 55 Hz Amplitude: 0.75mm or 98 m/s ² Direction: 3 mutually perpendicular directions, 2 hrs each. | $ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage | | | | | | | | | | | | | | | |
| Solderability | IEC 60068-2-20 | 245 ± 3 °C, 3 ± 0.3 sec | At least 95% of terminal electrode is covered by new solder | | | | | | | | | | | | | | | |
| Resistance to Soldering Heat | IEC 60068-2-20 | 260 ± 3 °C, 10 ± 1 sec | $ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage | | | | | | | | | | | | | | | |
| High Temperature Storage | IEC 60068-2-2 | 125±5°C x 1000± 24 hrs | $ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage | | | | | | | | | | | | | | | |
| Damp Heat, Steady State | IEC 60068-2-78 | a. 40±2°C, 90 ~ 95 % RH, 1344 hrs b. 40±2°C, 90 ~ 95 % RH, at 10%Vdc, 1344 hrs | $ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage Insulation Resistance ≥ 100MΩ | | | | | | | | | | | | | | | |
| Rapid Change of Temperature | IEC 60068-2-14 | The conditions shown below shall be repeated 5 cycles <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>5±3</td> </tr> <tr> <td>3</td> <td>85±2</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>5±3</td> </tr> </tbody> </table> | Step | Temperature (°C) | Period (minutes) | 1 | -40±3 | 30±3 | 2 | Room temperature | 5±3 | 3 | 85±2 | 30±3 | 4 | Room temperature | 5±3 | $ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage |
| Step | Temperature (°C) | Period (minutes) | | | | | | | | | | | | | | | | |
| 1 | -40±3 | 30±3 | | | | | | | | | | | | | | | | |
| 2 | Room temperature | 5±3 | | | | | | | | | | | | | | | | |
| 3 | 85±2 | 30±3 | | | | | | | | | | | | | | | | |
| 4 | Room temperature | 5±3 | | | | | | | | | | | | | | | | |
| High Temp. Load | MIL-STD-202 Method 108 | 85±2°C, 1000±24 hrs at V _{DC} or V _{rms} (Max. Continuous Voltage) | $ \Delta V_{1mA}/V_{1mA} \leq 10\%$ No visible damage | | | | | | | | | | | | | | | |
| 8/20μs Surge Life | IEC 61051-1 | 8/20μs waveform, 10 surge currents, unipolar, interval 30 sec, amplitude corresponding to max. surge current derating curves for 20μs. | $ \Delta V_{1mA}/V_{1mA} \leq 10\%$ No visible damage | | | | | | | | | | | | | | | |
| 10/1000μs Surge Life | IEC 61051-1 | 10/1000μs waveform, 10 surge currents, unipolar, interval 2 mins, amplitude corresponding to max. surge current derating curves for 1000μs. | $ \Delta V_{1mA}/V_{1mA} \leq 10\%$ No visible damage | | | | | | | | | | | | | | | |
| Operating Duty Cycle Test | UL 1449 3 rd | 6KV/3KA 1.2/50μs +8/20μs combination waveform with Vac(@ Deg 90) for 15 times. Interval time between tests is 60 sec. (For TVR10-V series test only) | $ \Delta V_p / V_p \leq 10\%$ No visible damage | | | | | | | | | | | | | | | |
| Nominal Discharge Current Test | UL 1449 3 rd | Refer to UL 1449 3 rd item 37A, the test condition is 3KA 8/20μs surge current waveform for 15 times. (For TVR14-V (SPD Type 5) series test only) | $ \Delta V_{1mA}/V_{1mA} \leq 10\%$ No visible damage | | | | | | | | | | | | | | | |
| Voltage Proof | IEC 61051-1 | Metal balls method, 2500 Vac 1 min | No visible damage | | | | | | | | | | | | | | | |
| Varistor Voltage Temp. Coefficient | Specification Standard | $\frac{V_{1mA@85^\circ C} - V_{1mA@25^\circ C}}{V_{1mA@25^\circ C}} \times \frac{1}{60} \times 100\% (\% / ^\circ C)$, $\frac{V_{1mA@-40^\circ C} - V_{1mA@25^\circ C}}{V_{1mA@25^\circ C}} \times \frac{1}{65} \times 100\% (\% / ^\circ C)$ | -0.05 ≤ TC ≤ 0.05 (%/°C) | | | | | | | | | | | | | | | |

Metal Oxide Varistor : TVR-V Series

Disc Type Varistor for Surge Protection (Medium Surge Series)

■ Packaging

● Taping Specification

S Type (Straight lead)

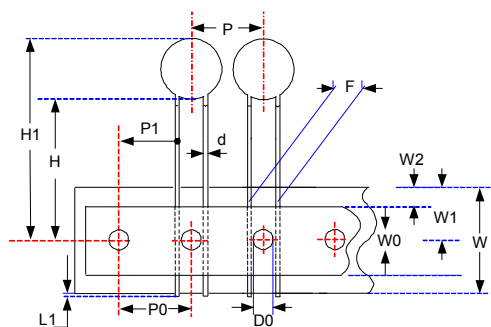


Figure A

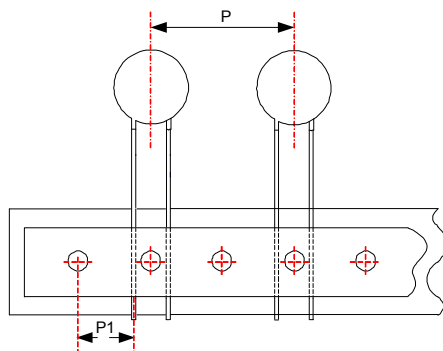


Figure B

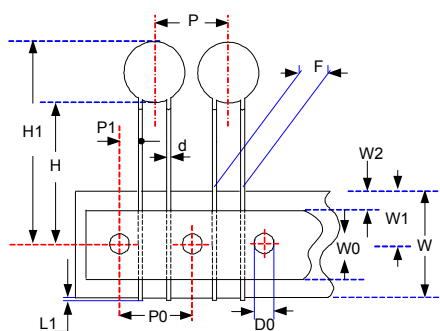
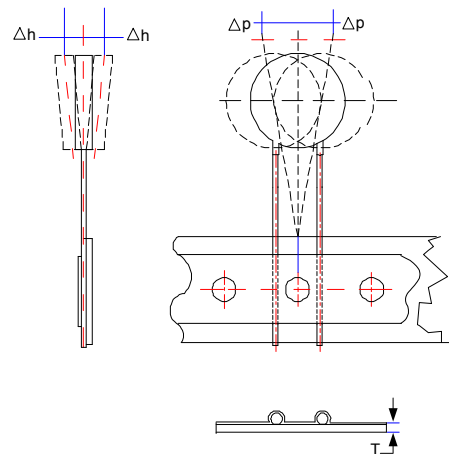


Figure C

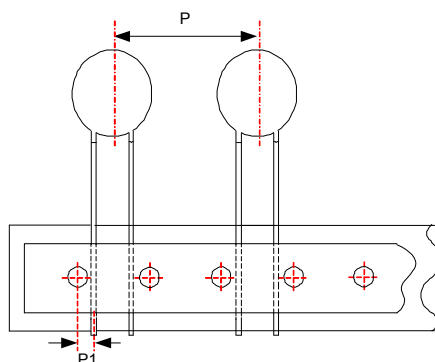


Figure D

(Unit: mm)

| Taping Code | Series | P ₀ | F | P | P ₁ | H | H ₁ | d | W ₀ | W ₁ | W ₂ | W | ΔP | Δh | L ₁ | D ₀ | T | Figure |
|-----------------------------|--------|----------------|-----|------|----------------|-------|----------------|-------|----------------|----------------|----------------|-------------|------|------|----------------|----------------|------|--------|
| | | ±0.3 | ±1 | ±1 | ±0.7 | +2/-0 | Max. | ±0.02 | ±1 | +0.75/ -0.5 | Max | +1/ -0.5 | Max. | Max. | Max. | ±0.2 | ±0.2 | |
| A (P ₀ :12.7) | 10-V | 12.7 | 7.5 | 12.7 | 8.95 | 18 | 33.5 | 0.8 | 12 | 9 | 3 | 18 | 1 | 2 | 0.5 | 4 | 0.6 | A |
| | 14-V | 12.7 | 7.5 | 25.4 | 8.95 | 18 | 38.0 | 0.8 | 12 | 9 | 3 | 18 | 1 | 2 | 0.5 | 4 | 0.6 | B |
| E (P ₀ :15.0) | 10-V | 15 | 7.5 | 15.0 | 3.75 | 18 | 33.5 | 0.8 | 12 | 9 | 3 | 18 | 1 | 2 | 0.5 | 4 | 0.6 | C |
| | 14-V | 15 | 7.5 | 30.0 | 3.75 | 18 | 38.0 | 0.8 | 12 | 9 | 3 | 18 | 1 | 2 | 0.5 | 4 | 0.6 | D |

Metal Oxide Varistor : TVR-V Series

Disc Type Varistor for Surge Protection (Medium Surge Series)

F Type (Y kink lead)

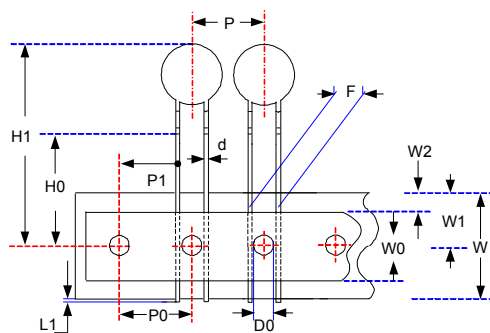


Figure A

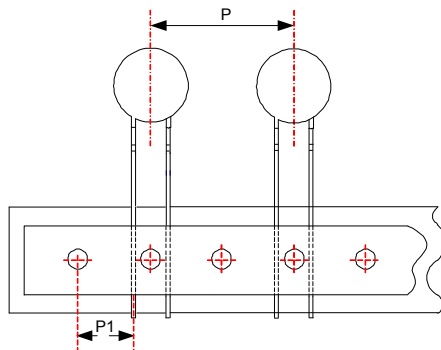


Figure B

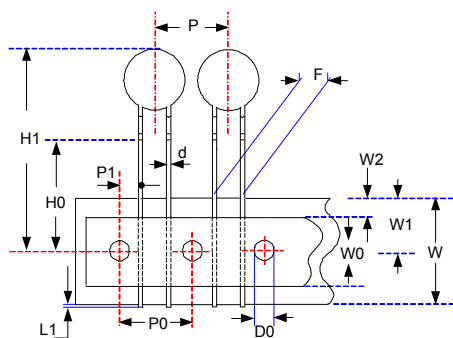
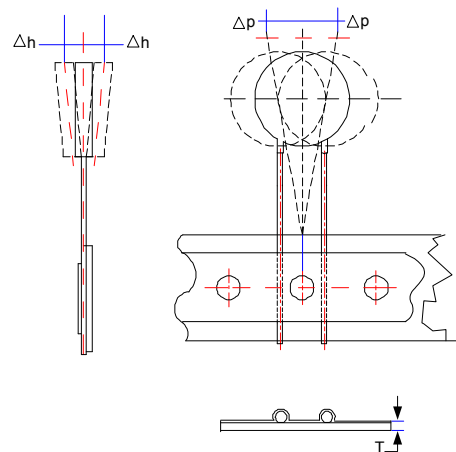


Figure C

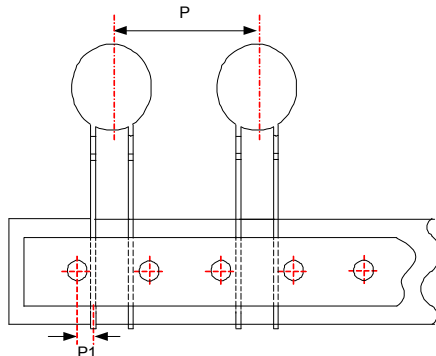


Figure D

(Unit: mm)

| Taping Code | Series | P ₀ | F | P | P ₁ | H ₀ | H ₁ | d | W ₀ | W ₁ | W ₂ | W | ΔP | Δh | L ₁ | D ₀ | T | Figure |
|-----------------------------|--------|----------------|-----|------|----------------|----------------|----------------|-------|----------------|----------------|----------------|-------------|------|------|----------------|----------------|------|--------|
| | | ±0.3 | ±1 | ±1 | ±0.7 | ±0.5 | Max. | ±0.02 | ±1 | +0.75/ -0.5 | Max | +1/ -0.5 | Max. | Max. | Max. | ±0.2 | ±0.2 | |
| A (P ₀ :12.7) | 10-V | 12.7 | 7.5 | 12.7 | 8.95 | 16 | 33.5 | 0.8 | 12 | 9 | 3 | 18 | 1 | 2 | 0.5 | 4 | 0.6 | A |
| | 14-V | 12.7 | 7.5 | 25.4 | 8.95 | 16 | 38.0 | 0.8 | 12 | 9 | 3 | 18 | 1 | 2 | 0.5 | 4 | 0.6 | B |
| E (P ₀ :15.0) | 10-V | 15.0 | 7.5 | 15.0 | 3.75 | 16 | 33.5 | 0.8 | 12 | 9 | 3 | 18 | 1 | 2 | 0.5 | 4 | 0.6 | C |
| | 14-V | 15.0 | 7.5 | 30.0 | 3.75 | 16 | 38.0 | 0.8 | 12 | 9 | 3 | 18 | 1 | 2 | 0.5 | 4 | 0.6 | D |

Metal Oxide Varistor : TVR-V Series

Disc Type Varistor for Surge Protection (Medium Surge Series)

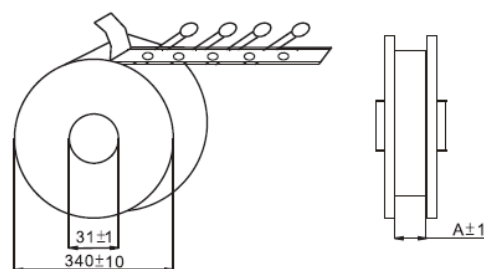
■ Quantity

● Bulk Packing

| Series | Quantity (pcs/bag) |
|---------|--------------------|
| TVR10-V | 200 |
| TVR14-V | 100 |

● Reel Packing

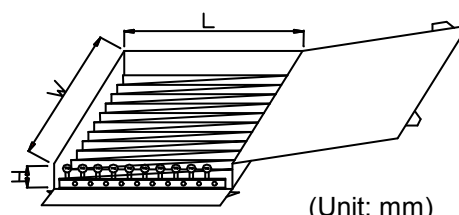
| Series | A (mm) | Quantity (pcs/reel) |
|------------------|--------|---------------------|
| TVR10(201~471)-V | 46 | 750 |
| TVR10(511~112)-V | | 500 |
| TVR14(201~391)-V | | 750 |
| TVR14(431~112)-V | | 500 |



(Unit: mm)

● Ammo Packing

| Series | Quantity (pcs/box) |
|------------------|--------------------|
| TVR10(201~361)-V | 750 |
| TVR10(391~621)-V | 500 |
| TVR10(681~112)-V | 400 |
| TVR14(201~271)-V | 500 |
| TVR14(301~112)-V | 250 |



(Unit: mm)

| Series | W±5 | L±5 | H±5 |
|---------|-----|-----|-----|
| TVR10-V | 348 | 275 | 60 |
| TVR14-V | 348 | 185 | 60 |

■ Warehouse Storage Conditions of Products

● Storage Conditions:

1. Storage Temperature: $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
2. Relative Humidity: $\leq 75\% \text{RH}$
3. Keep away from corrosive atmosphere and sunlight.

● Period of Storage: 1 year