

Metal Oxide Varistor : TVT Series



Thermally Protected Varistor Series

■ Features

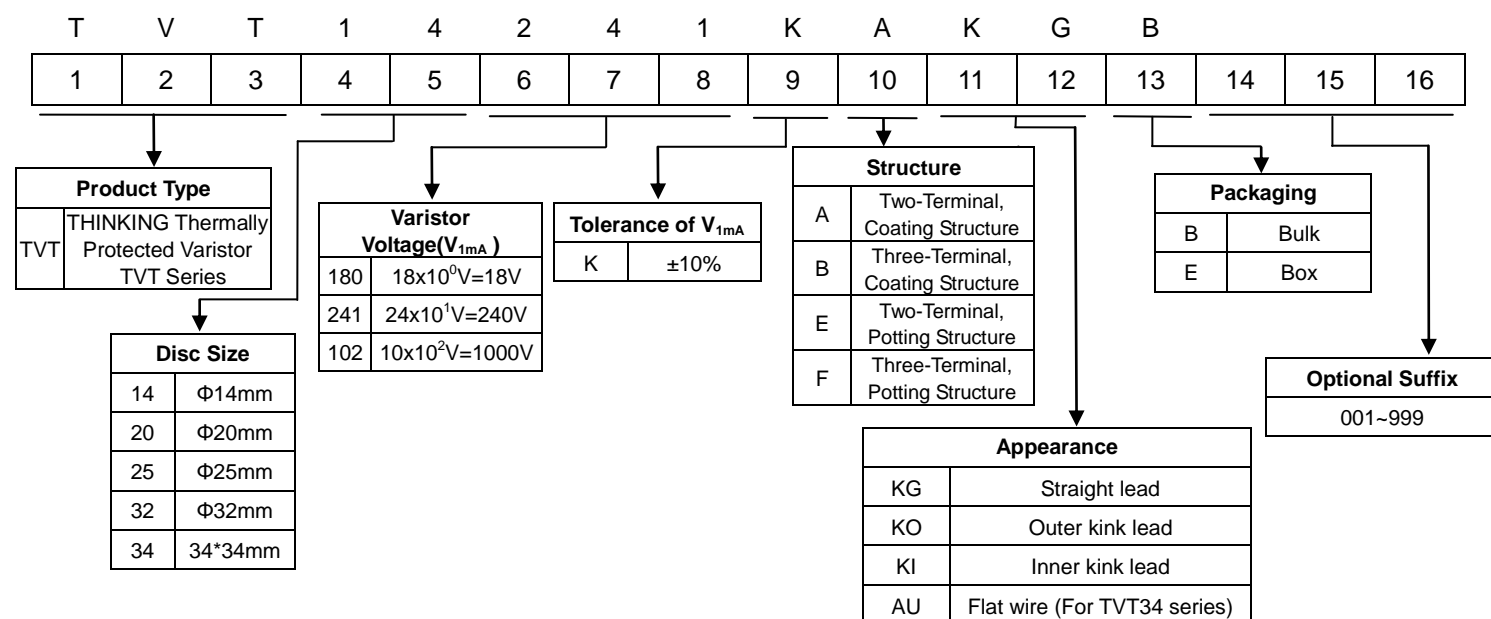
1. RoHS compliant
2. Halogen-free series are available
3. Two-Terminal or Three-Terminal thermally protected metal oxide varistor, Three-Terminal type is available for failure indication.
4. Body size: 14, 20, 25, 32, and 34*34 mm
5. Working voltage: 130Vac ~ 750Vac
6. Operating temperature range : -40°C ~ +85°C
Storage temperature range : -40°C ~ +110°C
7. Agency approval:
 - TVT14 and TVT20 Series: UL1449 4th & cUL/TUV/CQC
 - TVT25 and TVT34 Series: UL1449 4th & cUL/TUV
 - TVT32 Series: UL1449 4th & cUL/TUV
9. UL1449 4th SPD Type: Type 4 Assemblies
10. Suitable for wave flow soldering



■ Recommended Applications

1. TVSS modules
2. Uninterruptible power supplies
3. Power supplies
4. Lighting products
5. Communication products
6. Smart meter
7. Photovoltaic industry

■ Part Number Code



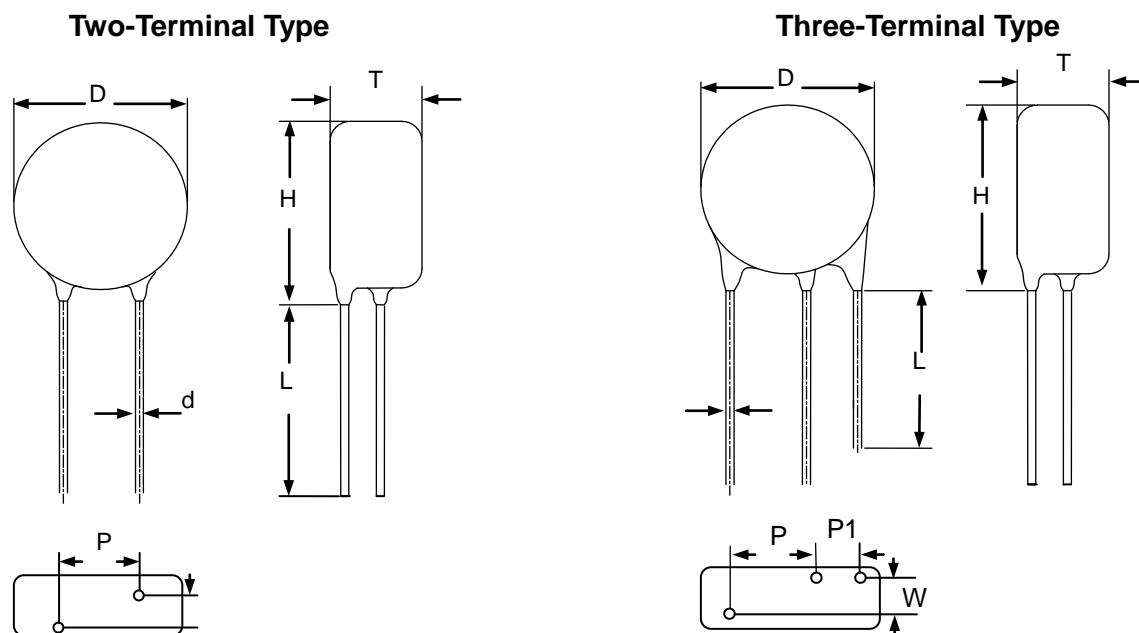
Metal Oxide Varistor : TVT Series



Thermally Protected Varistor Series

■ Structure and Dimensions

● TVT14 ~ TVT20 Series



(Unit: mm)

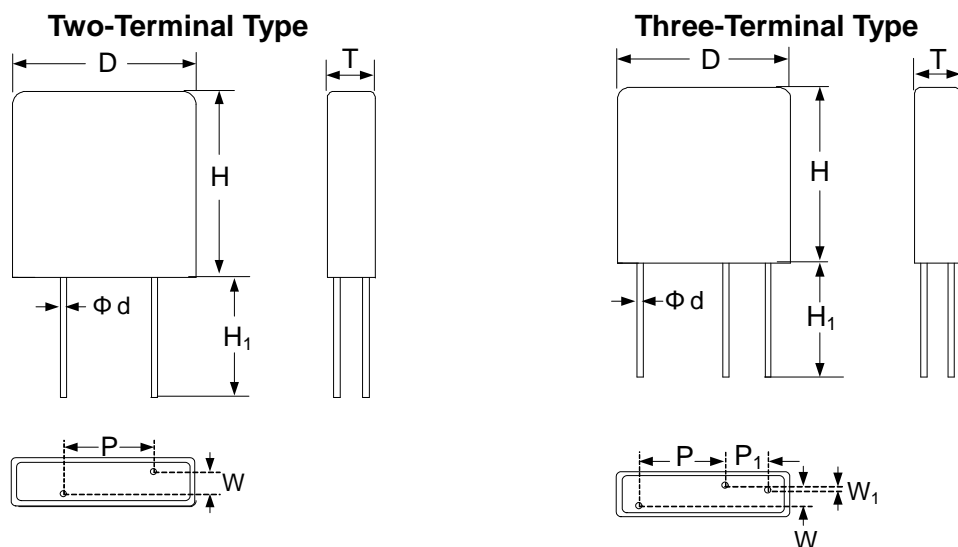
| Series | Lead Type | D | P | P1 | H _{max.} | L _{min.} | d | W | Tmax |
|--------------|----------------|-----------|-------|-------|-------------------|-------------------|----------|--|------|
| TVT14201~112 | Two-Terminal | 15.5~18.0 | 7.5±1 | -- | 22 | 5 | 0.8±0.05 | Please Refer to Electrical Characteristics | |
| TVT14201~112 | Three-Terminal | 15.5~18.0 | 7.5±1 | 5.0±1 | 22 | 5 | 0.8±0.05 | | |
| TVT20201~681 | Two-Terminal | 19.5~23.5 | 7.5±1 | -- | 27 | 5 | 0.8±0.05 | | |
| TVT20751~112 | | | | | | | 1.0±0.05 | | |
| TVT20201~681 | Three-Terminal | 19.5~23.5 | 7.5±1 | 5.0±1 | 27 | 5 | 0.8±0.05 | | |
| TVT20751~112 | | | | | | | 1.0±0.05 | | |

Metal Oxide Varistor : TVT Series



Thermally Protected Varistor Series

● TVT25 ~ TVT32 Series

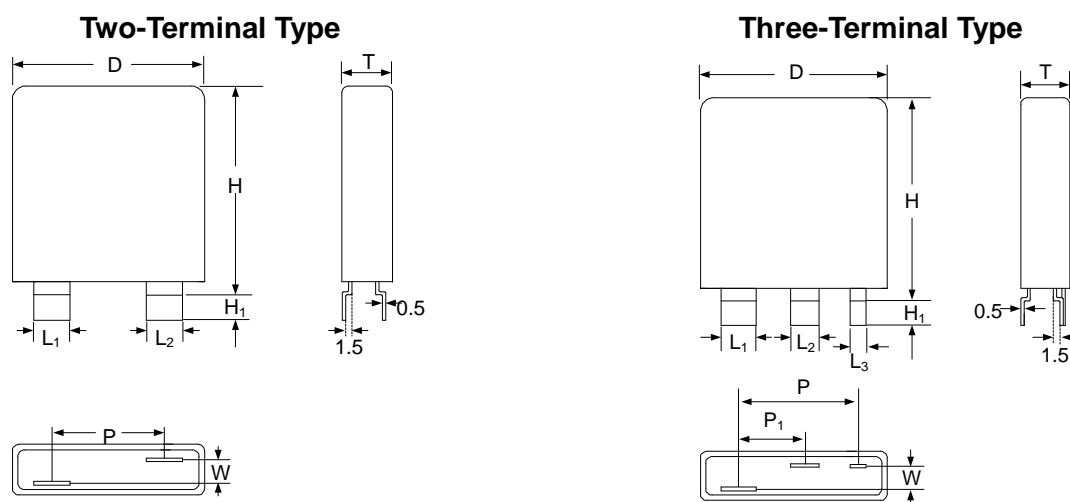


(Unit: mm)

| Series | Lead Type | D±1.0 | H±1.0 | H1min | P±1.0 | P1±1.0 | d±0.05 | W/W ₁ | Tmax |
|--------|----------------|-------|-------|-------|-------|--------|--------|--|------|
| TVT25 | Two-Terminal | 33.0 | 33.5 | 15 | 10.0 | ----- | 1.0 | Please Refer to Electrical Characteristics | |
| | Three-Terminal | | | | 10.0 | 5.0 | | | |

| Series | Lead Type | D±1.0 | H±1.0 | H1min | P±1.5 | P1±1.5 | d±0.05 | W/W ₁ | Tmax |
|--------|----------------|-------|-------|-------|-------|--------|--------|--|------|
| TVT32 | Two-Terminal | 40.0 | 42.0 | 15 | 15.0 | ----- | 1.5 | Please Refer to Electrical Characteristics | |
| | Three-Terminal | | | | 15.0 | 8.0 | | | |

● TVT34 Series



(Unit: mm)

| Series | Type | D±1.0 | Hmax | H1max. | P±2.0 | P1±2.0 | L1±0.1 | L2±0.1 | L3±0.1 | W | Tmax |
|--------|----------------|-------|------|--------|-------|--------|--------|--------|--------|--|------|
| TVT34 | Two-Terminal | 40.0 | 42.0 | 8 | 21.5 | ----- | 6.0 | 6.0 | ----- | Please Refer to Electrical Characteristics | |
| | Three-Terminal | | | | 23.5 | 11 | 6.0 | 5.0 | 3.0 | | |

Metal Oxide Varistor : TVT Series

Thermally Protected Varistor Series



■ Electrical Characteristics

14mm Series

| Part No. | Varistor Voltage (@1mA DC) | Max. Continuous Voltage | | Max. Clamping Voltage (8/20 μ s) | | Max. Surge Current (8/20 μ s) | Rated Power | Max. Energy (10/1000 μ s) | Dimension | |
|----------|---------------------------------|-------------------------|-----------------|---|----------------|--------------------------------------|-------------|----------------------------------|------------------|-------------|
| | V _{1mA} | V _{AC(rms)} | V _{DC} | V _P | I _P | I _{max} | P | W _{max} | T _{max} | W \pm 1.0 |
| | (V) | (V) | (V) | (V) | (A) | (KA) | (W) | (J) | (mm) | |
| TVT14201 | 200 (180~220) | 130 | 170 | 340 | 50 | 6 | 0.6 | 77 | 8.5 | 3.0 |
| TVT14221 | 220 (198~242) | 140 | 180 | 365 | 50 | 6 | 0.6 | 86 | 8.6 | 3.1 |
| TVT14241 | 240 (216~264) | 150 | 200 | 395 | 50 | 6 | 0.6 | 94 | 8.8 | 3.3 |
| TVT14271 | 270 (243~297) | 175 | 225 | 455 | 50 | 6 | 0.6 | 110 | 9.0 | 3.5 |
| TVT14301 | 300 (270~330) | 195 | 250 | 500 | 50 | 6 | 0.6 | 118 | 8.7 | 3.2 |
| TVT14331 | 330 (297~363) | 215 | 275 | 550 | 50 | 6 | 0.6 | 127 | 8.8 | 3.3 |
| TVT14361 | 360 (324~396) | 230 | 300 | 595 | 50 | 6 | 0.6 | 137 | 9.0 | 3.5 |
| TVT14391 | 390 (351~429) | 250 | 320 | 650 | 50 | 6 | 0.6 | 154 | 9.2 | 3.6 |
| TVT14431 | 430 (387~473) | 275 | 350 | 710 | 50 | 6 | 0.6 | 170 | 8.9 | 3.4 |
| TVT14471 | 470 (423~517) | 300 | 385 | 775 | 50 | 6 | 0.6 | 192 | 9.0 | 3.5 |
| TVT14511 | 510 (459~561) | 320 | 410 | 845 | 50 | 6 | 0.6 | 209 | 9.2 | 3.7 |
| TVT14561 | 560 (504~616) | 350 | 450 | 930 | 50 | 6 | 0.6 | 220 | 9.4 | 3.9 |
| TVT14621 | 620 (558~682) | 395 | 510 | 1025 | 50 | 6 | 0.6 | 231 | 9.7 | 4.1 |
| TVT14681 | 680 (612~748) | 420 | 560 | 1120 | 50 | 6 | 0.6 | 242 | 10.0 | 4.4 |
| TVT14751 | 750 (675~825) | 465 | 615 | 1240 | 50 | 6 | 0.6 | 247 | 10.3 | 4.7 |
| TVT14781 | 780 (702~858) | 485 | 640 | 1290 | 50 | 6 | 0.6 | 260 | 9.8 | 4.3 |
| TVT14821 | 820 (738~902) | 510 | 670 | 1355 | 50 | 6 | 0.6 | 270 | 9.9 | 4.5 |
| TVT14911 | 910 (819~1001) | 550 | 745 | 1500 | 50 | 6 | 0.6 | 280 | 10.3 | 4.8 |
| TVT14951 | 950 (855~1045) | 575 | 765 | 1570 | 50 | 6 | 0.6 | 290 | 10.4 | 4.9 |
| TVT14102 | 1000 (900~1100) | 625 | 825 | 1650 | 50 | 6 | 0.6 | 305 | 10.6 | 5.1 |
| TVT14112 | 1100 (990~1210) | 680 | 895 | 1815 | 50 | 6 | 0.6 | 340 | 10.8 | 5.4 |

Metal Oxide Varistor : TVT Series



Thermally Protected Varistor Series

20mm Series

| Part No. | Varistor Voltage (@1mA DC) | Max. Continuous Voltage | | Max. Clamping Voltage (8/20 μ s) | | Max. Surge Current (8/20 μ s) | Rated Power | Max. Energy (10/1000 μ s) | Dimension | |
|----------|-------------------------------|-------------------------|-----------------|---|----------------|--------------------------------------|-------------|----------------------------------|------------------|-------------|
| | V _{1mA} | V _{AC(rms)} | V _{DC} | V _P | I _P | I _{max} | P | W _{max} | T _{max} | W \pm 1.0 |
| | (V) | (V) | (V) | (V) | (A) | (KA) | (W) | (J) | (mm) | |
| TVT20201 | 200 (180~220) | 130 | 170 | 340 | 100 | 10 | 1.0 | 140 | 10.2 | 3.0 |
| TVT20221 | 220 (198~242) | 140 | 180 | 365 | 100 | 10 | 1.0 | 155 | 10.3 | 3.1 |
| TVT20241 | 240 (216~264) | 150 | 200 | 395 | 100 | 10 | 1.0 | 170 | 10.5 | 3.3 |
| TVT20271 | 270 (243~297) | 175 | 225 | 455 | 100 | 10 | 1.0 | 190 | 10.7 | 3.5 |
| TVT20301 | 300 (270~330) | 195 | 250 | 500 | 100 | 10 | 1.0 | 205 | 10.4 | 3.2 |
| TVT20331 | 330 (297~363) | 215 | 275 | 550 | 100 | 10 | 1.0 | 215 | 10.5 | 3.3 |
| TVT20361 | 360 (324~396) | 230 | 300 | 595 | 100 | 10 | 1.0 | 225 | 10.7 | 3.5 |
| TVT20391 | 390 (351~429) | 250 | 320 | 650 | 100 | 10 | 1.0 | 240 | 10.9 | 3.6 |
| TVT20431 | 430 (387~473) | 275 | 350 | 710 | 100 | 10 | 1.0 | 270 | 10.6 | 3.4 |
| TVT20471 | 470 (423~517) | 300 | 385 | 775 | 100 | 10 | 1.0 | 350 | 10.7 | 3.5 |
| TVT20511 | 510 (459~561) | 320 | 410 | 845 | 100 | 10 | 1.0 | 386 | 10.9 | 3.7 |
| TVT20561 | 560 (504~616) | 350 | 450 | 930 | 100 | 10 | 1.0 | 400 | 11.1 | 3.9 |
| TVT20621 | 620 (558~682) | 395 | 510 | 1025 | 100 | 10 | 1.0 | 425 | 11.4 | 4.1 |
| TVT20681 | 680 (612~748) | 420 | 560 | 1120 | 100 | 10 | 1.0 | 455 | 11.7 | 4.4 |
| TVT20751 | 750 (675~825) | 465 | 615 | 1240 | 100 | 10 | 1.0 | 509 | 12.0 | 4.7 |
| TVT20781 | 780 (702~858) | 485 | 640 | 1290 | 100 | 10 | 1.0 | 515 | 11.5 | 4.3 |
| TVT20821 | 820 (738~902) | 510 | 670 | 1355 | 100 | 10 | 1.0 | 475 | 11.6 | 4.5 |
| TVT20911 | 910 (819~1001) | 550 | 745 | 1500 | 100 | 10 | 1.0 | 509 | 12.0 | 4.8 |
| TVT20951 | 950 (855~1045) | 575 | 765 | 1570 | 100 | 10 | 1.0 | 530 | 12.1 | 4.9 |
| TVT20102 | 1000 (900~1100) | 625 | 825 | 1650 | 100 | 10 | 1.0 | 560 | 12.3 | 5.1 |
| TVT20112 | 1100 (990~1210) | 680 | 895 | 1815 | 100 | 10 | 1.0 | 610 | 12.6 | 5.4 |

Metal Oxide Varistor : TVT Series



Thermally Protected Varistor Series

25mm 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) | Dimension | | |
|----------|---------------------------------|-------------------------------|-----------------|---|----------------|--------------------------------------|----------------|-------------------------------|------------------|------------|-----------|
| | V _{1mA} | V _{AC(rms)} | V _{DC} | V _P | I _P | I _{max} | P | W _{max} | T _{max} | W1 ±1.0 | W ±1.0 |
| | (V) | (V) | (V) | (V) | (A) | (KA) | (W) | (J) | (mm) | | |
| TVT25201 | 200 (180~220) | 130 | 170 | 340 | 150 | 20 | 1.0 | 210 | 15 | 1.9 | 5.6 |
| TVT25221 | 220 (198~242) | 140 | 180 | 360 | 150 | 20 | 1.0 | 230 | | | 5.8 |
| TVT25241 | 240 (216~264) | 150 | 200 | 395 | 150 | 20 | 1.0 | 255 | | | 6.0 |
| TVT25271 | 270 (243~297) | 175 | 225 | 455 | 150 | 20 | 1.0 | 285 | | | 6.3 |
| TVT25301 | 300 (270~330) | 195 | 250 | 500 | 150 | 20 | 1.0 | 310 | | | 5.8 |
| TVT25331 | 330 (297~363) | 215 | 275 | 550 | 150 | 20 | 1.0 | 325 | | | 6.1 |
| TVT25361 | 360 (324~396) | 230 | 300 | 595 | 150 | 20 | 1.0 | 340 | | | 6.3 |
| TVT25391 | 390 (351~429) | 250 | 320 | 650 | 150 | 20 | 1.0 | 360 | | | 6.5 |
| TVT25431 | 430 (387~473) | 275 | 350 | 710 | 150 | 20 | 1.0 | 440 | | | 5.7 |
| TVT25471 | 470 (423~517) | 300 | 385 | 775 | 150 | 20 | 1.0 | 490 | | | 5.8 |
| TVT25511 | 510 (459~561) | 320 | 410 | 845 | 150 | 20 | 1.0 | 530 | | | 6.0 |
| TVT25561 | 560 (504~616) | 350 | 450 | 930 | 150 | 20 | 1.0 | 560 | 6.3 | | |
| TVT25621 | 620 (558~682) | 395 | 510 | 1020 | 150 | 20 | 1.0 | 590 | 6.6 | | |
| TVT25681 | 680 (612~748) | 420 | 560 | 1120 | 150 | 20 | 1.0 | 620 | 6.9 | | |
| TVT25751 | 750 (675~825) | 465 | 615 | 1235 | 150 | 20 | 1.0 | 630 | 7.2 | | |
| TVT25781 | 780 (702~858) | 485 | 640 | 1290 | 150 | 20 | 1.0 | 675 | 6.4 | | |
| TVT25821 | 820 (738~902) | 510 | 670 | 1355 | 150 | 20 | 1.0 | 690 | 6.5 | | |
| TVT25911 | 910 (819~1001) | 550 | 745 | 1500 | 150 | 20 | 1.0 | 715 | 6.8 | | |
| TVT25951 | 950 (855~1045) | 575 | 765 | 1570 | 150 | 20 | 1.0 | 740 | 7.0 | | |
| TVT25102 | 1000 (900~1100) | 625 | 825 | 1650 | 150 | 20 | 1.0 | 770 | 7.2 | | |
| TVT25112 | 1100 (990~1210) | 680 | 895 | 1815 | 150 | 20 | 1.0 | 840 | 7.5 | | |
| | | | | | | | | | 19 | | |

Metal Oxide Varistor : TVT Series



Thermally Protected Varistor Series

32mm 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) | Dimension | |
|----------|-------------------------------|-------------------------|-----------------|-----------------------------------|----------------|--------------------------------|----------------|----------------------------|------------------|-------|
| | V _{1mA} | V _{AC(rms)} | V _{DC} | V _P | I _P | I _{max} | C _p | W _{max} | T _{max} | W±1.0 |
| | (V) | (V) | (V) | (V) | (A) | (KA) | (W) | (J) | (mm) | |
| TVT32201 | 200 (180~220) | 130 | 170 | 340 | 200 | 25 | 1.2 | 295 | 16 | 6.2 |
| TVT32221 | 220 (198~242) | 140 | 180 | 360 | 200 | 25 | 1.2 | 315 | | 6.4 |
| TVT32241 | 240 (216~264) | 150 | 200 | 395 | 200 | 25 | 1.2 | 340 | | 6.6 |
| TVT32271 | 270 (243~297) | 175 | 225 | 455 | 200 | 25 | 1.2 | 360 | | 6.9 |
| TVT32301 | 300 (270~330) | 195 | 250 | 500 | 200 | 25 | 1.2 | 380 | | 6.4 |
| TVT32331 | 330 (297~363) | 215 | 275 | 550 | 200 | 25 | 1.2 | 400 | | 6.7 |
| TVT32361 | 360 (324~396) | 230 | 300 | 595 | 200 | 25 | 1.2 | 420 | | 6.9 |
| TVT32391 | 390 (351~429) | 250 | 320 | 650 | 200 | 25 | 1.2 | 465 | | 7.1 |
| TVT32431 | 430 (387~473) | 275 | 350 | 710 | 200 | 25 | 1.2 | 505 | | 6.3 |
| TVT32471 | 470 (423~517) | 300 | 385 | 775 | 200 | 25 | 1.2 | 570 | | 6.4 |
| TVT32511 | 510 (459~561) | 320 | 410 | 845 | 200 | 25 | 1.2 | 605 | | 6.6 |
| TVT32561 | 560 (504~616) | 350 | 450 | 930 | 200 | 25 | 1.2 | 660 | | 20 |
| TVT32621 | 620 (558~682) | 395 | 510 | 1020 | 200 | 25 | 1.2 | 770 | 7.2 | |
| TVT32681 | 680 (612~748) | 420 | 560 | 1120 | 200 | 25 | 1.2 | 840 | 7.5 | |
| TVT32751 | 750 (675~825) | 465 | 615 | 1235 | 200 | 25 | 1.2 | 925 | 7.8 | |
| TVT32781 | 780 (702~858) | 485 | 640 | 1290 | 200 | 25 | 1.2 | 955 | 7.0 | |
| TVT32821 | 820 (738~902) | 510 | 670 | 1355 | 200 | 25 | 1.2 | 770 | 7.1 | |
| TVT32911 | 910 (819~1001) | 550 | 745 | 1500 | 200 | 25 | 1.2 | 870 | 7.4 | |
| TVT32951 | 950 (855~1045) | 575 | 765 | 1570 | 200 | 25 | 1.2 | 925 | 7.6 | |
| TVT32102 | 1000 (900~1100) | 625 | 825 | 1650 | 200 | 25 | 1.2 | 965 | 7.8 | |
| TVT32112 | 1100 (990~1210) | 680 | 895 | 1815 | 200 | 25 | 1.2 | 1065 | 8.1 | |

Metal Oxide Varistor : TVT Series



Thermally Protected Varistor Series

34*34mm 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) | Dimension | |
|----------|---------------------------------|-------------------------|-----------------|-----------------------------------|----------------|--------------------------------|-------------|----------------------------|------------------|-------|
| | V _{1mA} | V _{AC(rms)} | V _{DC} | V _P | I _P | I _{max} | P | W _{max} | T _{max} | W±1.0 |
| | (V) | (V) | (V) | (V) | (A) | (KA) | (W) | (J) | (mm) | |
| TVT34201 | 200 (180~220) | 130 | 170 | 340 | 300 | 40 | 1.4 | 435 | 16 | 6.2 |
| TVT34221 | 220 (198~242) | 140 | 180 | 360 | 300 | 40 | 1.4 | 480 | | 6.4 |
| TVT34241 | 240 (216~264) | 150 | 200 | 395 | 300 | 40 | 1.4 | 505 | | 6.6 |
| TVT34271 | 270 (243~297) | 175 | 225 | 455 | 300 | 40 | 1.4 | 560 | | 6.9 |
| TVT34301 | 300 (270~330) | 195 | 250 | 500 | 300 | 40 | 1.4 | 590 | | 6.4 |
| TVT34331 | 330 (297~363) | 215 | 275 | 550 | 300 | 40 | 1.4 | 620 | | 6.7 |
| TVT34361 | 360 (324~396) | 230 | 300 | 595 | 300 | 40 | 1.4 | 645 | | 6.9 |
| TVT34391 | 390 (351~429) | 250 | 320 | 650 | 300 | 40 | 1.4 | 690 | | 7.1 |
| TVT34431 | 430 (387~473) | 275 | 350 | 710 | 300 | 40 | 1.4 | 770 | | 6.3 |
| TVT34471 | 470 (423~517) | 300 | 385 | 775 | 300 | 40 | 1.4 | 835 | | 6.4 |
| TVT34511 | 510 (459~561) | 320 | 410 | 845 | 300 | 40 | 1.4 | 900 | | 6.6 |
| TVT34561 | 560 (504~616) | 350 | 450 | 930 | 300 | 40 | 1.4 | 995 | 20 | 6.9 |
| TVT34621 | 620 (558~682) | 395 | 510 | 1020 | 300 | 40 | 1.4 | 1120 | | 7.2 |
| TVT34681 | 680 (612~748) | 420 | 560 | 1120 | 300 | 40 | 1.4 | 1275 | | 7.5 |
| TVT34751 | 750 (675~825) | 465 | 615 | 1235 | 300 | 40 | 1.4 | 1400 | | 7.8 |
| TVT34781 | 780 (702~858) | 485 | 640 | 1290 | 300 | 40 | 1.4 | 1445 | | 7.0 |
| TVT34821 | 820 (738~902) | 510 | 670 | 1355 | 300 | 40 | 1.4 | 1205 | | 7.1 |
| TVT34911 | 910 (819~1001) | 550 | 745 | 1500 | 300 | 40 | 1.4 | 1345 | | 7.4 |
| TVT34951 | 950 (855~1045) | 575 | 765 | 1570 | 300 | 40 | 1.4 | 1400 | | 7.6 |
| TVT34102 | 1000 (900~1100) | 625 | 825 | 1650 | 300 | 40 | 1.4 | 1470 | | 7.8 |
| TVT34112 | 1100 (990~1210) | 680 | 895 | 1815 | 300 | 40 | 1.4 | 1610 | | 8.1 |

Metal Oxide Varistor : TVT Series

Thermally Protected Varistor Series



■ Safety Approvals

| Certified Model No. | Agency | | | | |
|---------------------|------------------------------|---|-----------------------|------------------------------------|--------------------------------|
| | | | | | |
| | UL1449 4 th & cUL | IEC 61051-1 IEC 61051-2 IEC 61051-2-2 | IEC60950-1 Annex Q | GB/T 10193-1997 GB/T 10194-1997 | GB 8898-2011 GB 4943.1-2011 |
| | E314979 | J 50179371 | | CQC13001104230 | |
| TVT14201-□ | √ | √ | √ | √ | |
| TVT14221-□ | √ | √ | √ | √ | |
| TVT14241-□ | √ | √ | √ | √ | |
| TVT14271-□ | √ | √ | √ | √ | |
| TVT14301-□ | √ | √ | √ | √ | |
| TVT14331-□ | √ | √ | √ | √ | |
| TVT14361-□ | √ | √ | √ | √ | |
| TVT14391-□ | √ | √ | √ | √ | |
| TVT14431-□ | √ | √ | √ | √ | √ |
| TVT14471-□ | √ | √ | √ | √ | √ |
| TVT14511-□ | √ | √ | √ | √ | √ |
| TVT14561-□ | √ | √ | √ | √ | √ |
| TVT14621-□ | √ | √ | √ | √ | √ |
| TVT14681-□ | √ | √ | √ | √ | √ |
| TVT14751-□ | √ | √ | √ | √ | √ |
| TVT14781-□ | √ | √ | √ | √ | √ |
| TVT14821-□ | √ | √ | √ | √ | √ |
| TVT14911-□ | √ | √ | √ | √ | √ |
| TVT14951-□ | √ | √ | √ | √ | √ |
| TVT14102-□ | √ | √ | √ | √ | √ |
| TVT14112-□ | √ | √ | √ | √ | √ |




□ is the code for Two-Terminal or Three-Terminal type.

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■ Safety Approvals

| Certified Model No. | Agency | | | | |
|---------------------|---|---|---------------------------------------|---|--------------------------------|
| |  |  | |  | |
| | UL1449 4 th & cUL | IEC 61051-1 IEC 61051-2 IEC 61051-2-2 | IEC60950-1 2 nd Annex Q | GB/T 10193-1997 GB/T 10194-1997 | GB 4943.1-2011 GB 8898-2011 |
| | E314979 | J 50179389 | | CQC13001104230 | |
| TVT20201-□ | √ | √ | √ | √ | |
| TVT20221-□ | √ | √ | √ | √ | |
| TVT20241-□ | √ | √ | √ | √ | |
| TVT20271-□ | √ | √ | √ | √ | |
| TVT20301-□ | √ | √ | √ | √ | |
| TVT20331-□ | √ | √ | √ | √ | |
| TVT20361-□ | √ | √ | √ | √ | |
| TVT20391-□ | √ | √ | √ | √ | |
| TVT20431-□ | √ | √ | √ | √ | √ |
| TVT20471-□ | √ | √ | √ | √ | √ |
| TVT20511-□ | √ | √ | √ | √ | √ |
| TVT20561-□ | √ | √ | √ | √ | √ |
| TVT20621-□ | √ | √ | √ | √ | √ |
| TVT20681-□ | √ | √ | √ | √ | √ |
| TVT20751-□ | √ | √ | √ | √ | √ |
| TVT20781-□ | √ | √ | √ | √ | √ |
| TVT20821-□ | √ | √ | √ | √ | √ |
| TVT20911-□ | √ | √ | √ | √ | √ |
| TVT20951-□ | √ | √ | √ | √ | √ |
| TVT20102-□ | √ | √ | √ | √ | √ |
| TVT20112-□ | √ | √ | √ | √ | √ |


□ is the code for Two-Terminal or Three-Terminal type.



Metal Oxide Varistor : TVT Series

Thermally Protected Varistor Series



■ Safety Approvals

| Part No. | Agency | |
|------------|---|---|
| |  |  |
| | UL1449 4 th & cUL | IEC 61051-1 IEC 61051-2 IEC 61051-2-2 |
| | E314979 | J 50226398 |
| TVT25201-□ | √ | √ |
| TVT25221-□ | √ | √ |
| TVT25241-□ | √ | √ |
| TVT25271-□ | √ | √ |
| TVT25301-□ | √ | √ |
| TVT25331-□ | √ | √ |
| TVT25361-□ | √ | √ |
| TVT25391-□ | √ | √ |
| TVT25431-□ | √ | √ |
| TVT25471-□ | √ | √ |
| TVT25511-□ | √ | √ |
| TVT25561-□ | √ | √ |
| TVT25621-□ | √ | √ |
| TVT25681-□ | √ | √ |
| TVT25751-□ | √ | √ |
| TVT25781-□ | √ | √ |
| TVT25821-□ | √ | √ |
| TVT25911-□ | √ | √ |
| TVT25951-□ | √ | √ |
| TVT25102-□ | √ | √ |
| TVT25112-□ | √ | √ |

| Part No. | Agency | |
|------------|---|---|
| |  |  |
| | UL1449 4 th & cUL | IEC 61051-1 IEC 61051-2 IEC 61051-2-2 |
| | E314979 | J 50226398 |
| TVT32201-□ | √ | √ |
| TVT32221-□ | √ | √ |
| TVT32241-□ | √ | √ |
| TVT32271-□ | √ | √ |
| TVT32301-□ | √ | √ |
| TVT32331-□ | √ | √ |
| TVT32361-□ | √ | √ |
| TVT32391-□ | √ | √ |
| TVT32431-□ | √ | √ |
| TVT32471-□ | √ | √ |
| TVT32511-□ | √ | √ |
| TVT32561-□ | √ | √ |
| TVT32621-□ | √ | √ |
| TVT32681-□ | √ | √ |
| TVT32751-□ | √ | √ |
| TVT32781-□ | √ | √ |
| TVT32821-□ | √ | √ |
| TVT32911-□ | √ | √ |
| TVT32951-□ | √ | √ |
| TVT32102-□ | √ | √ |
| TVT32112-□ | √ | √ |



□ is the code for Two -Terminal or Three -Terminal type.

Metal Oxide Varistor : TVT Series

Thermally Protected Varistor Series



■ Safety Approvals

| Part No. | Agency | |
|------------|---|---|
| |  |  |
| | UL1449 4 th & cUL: E314979 | J 50226398 |
| TVT34201-□ | √ | √ |
| TVT34221-□ | √ | √ |
| TVT34241-□ | √ | √ |
| TVT34271-□ | √ | √ |
| TVT34301-□ | √ | √ |
| TVT34331-□ | √ | √ |
| TVT34361-□ | √ | √ |
| TVT34391-□ | √ | √ |
| TVT34431-□ | √ | √ |
| TVT34471-□ | √ | √ |
| TVT34511-□ | √ | √ |
| TVT34561-□ | √ | √ |
| TVT34621-□ | √ | √ |
| TVT34681-□ | √ | √ |
| TVT34751-□ | √ | √ |
| TVT34781-□ | √ | √ |
| TVT34821-□ | √ | √ |
| TVT34911-□ | √ | √ |
| TVT34951-□ | √ | √ |
| TVT34102-□ | √ | √ |
| TVT34112-□ | √ | √ |

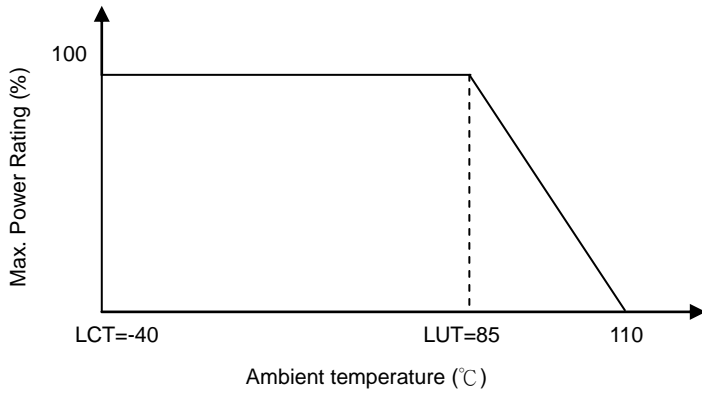
□ is the code for Two-Terminal or Three-Terminal type.

Metal Oxide Varistor : TVT Series

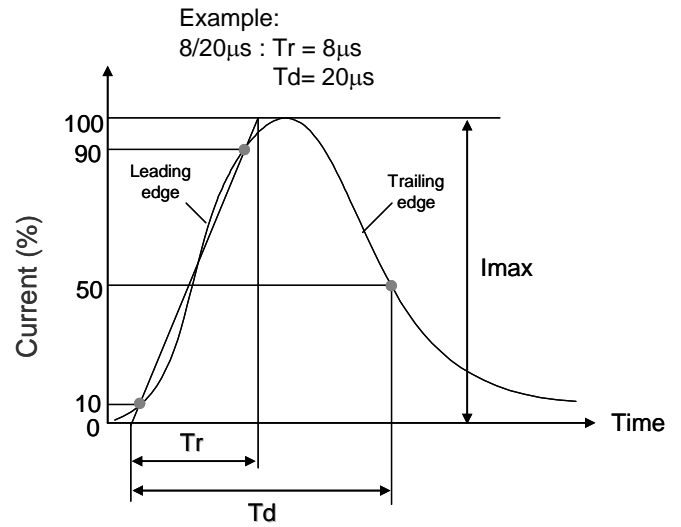


Thermally Protected Varistor Series

Power Derating Curve

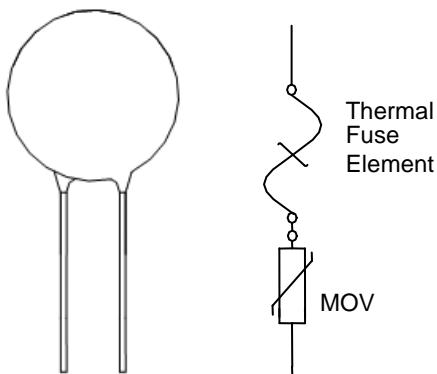


Surge Current Standard Waveform

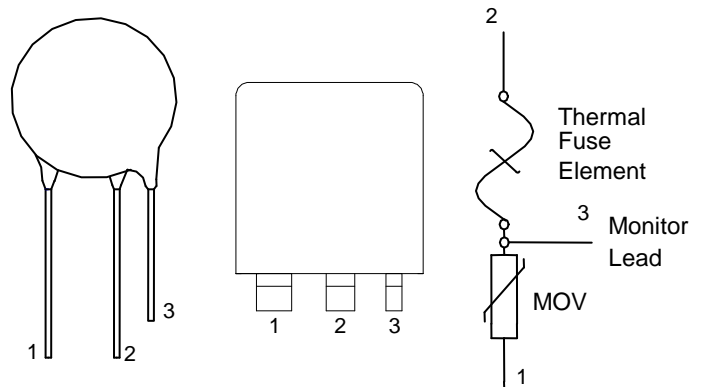


Lead Configuration

Two-Terminal Type



Three-Terminal Type

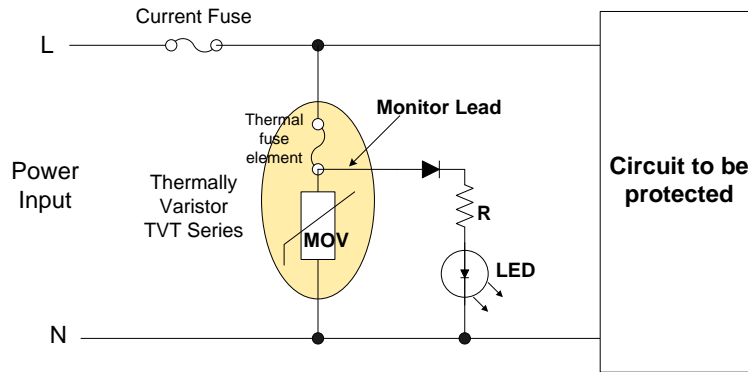


Metal Oxide Varistor : TVT Series



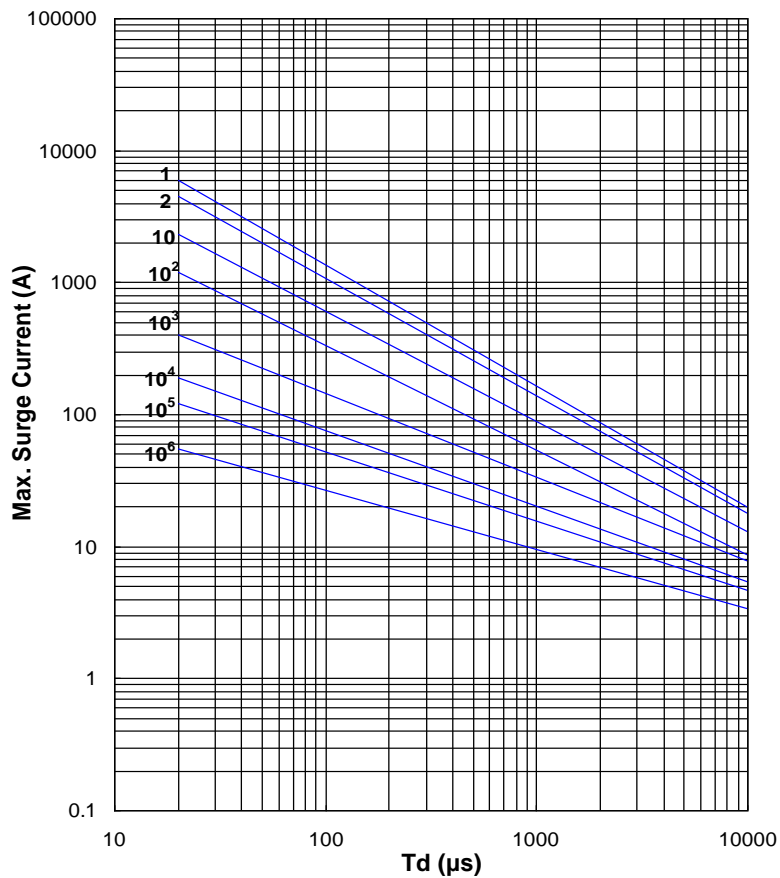
Thermally Protected Varistor Series

■ Typical Application Circuit

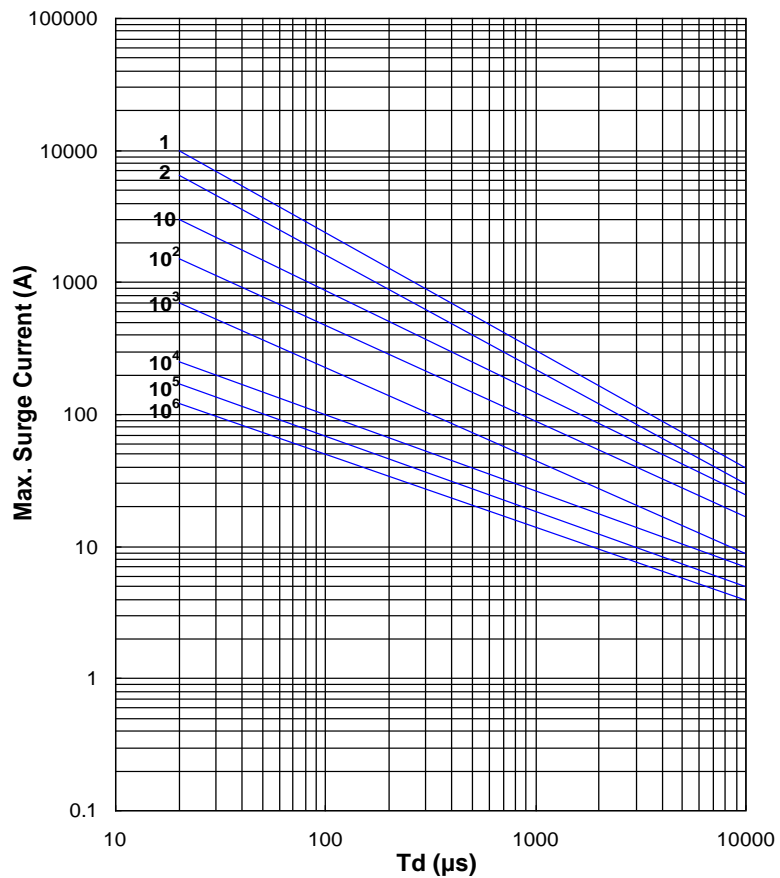


■ Max. Surge Current Derating Curves

TVT14201 ~ TVT14112



TVT20201 ~ TVT20112



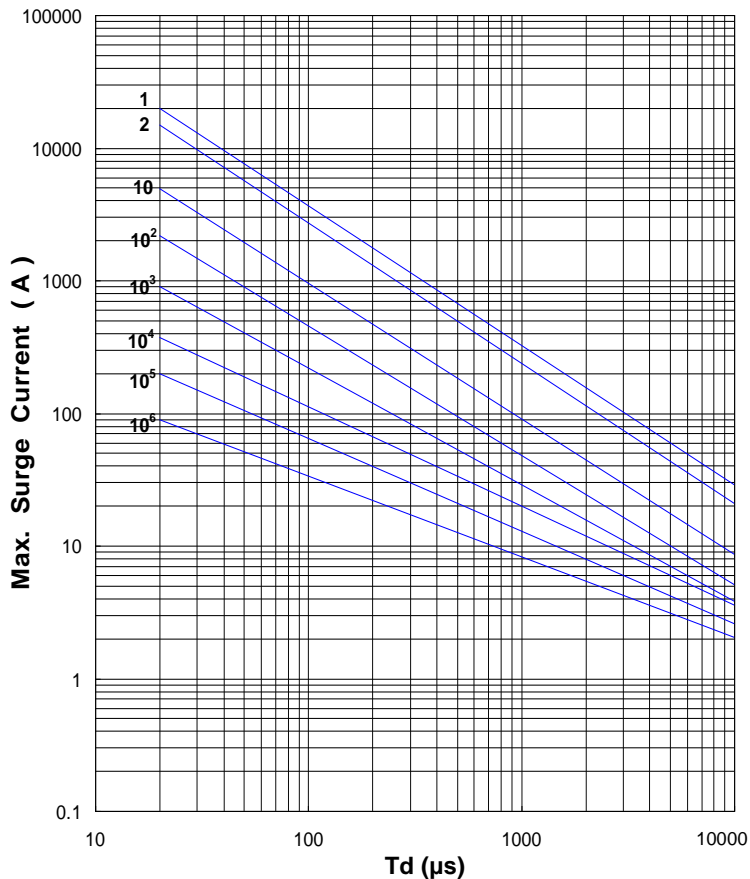
Metal Oxide Varistor : TVT Series



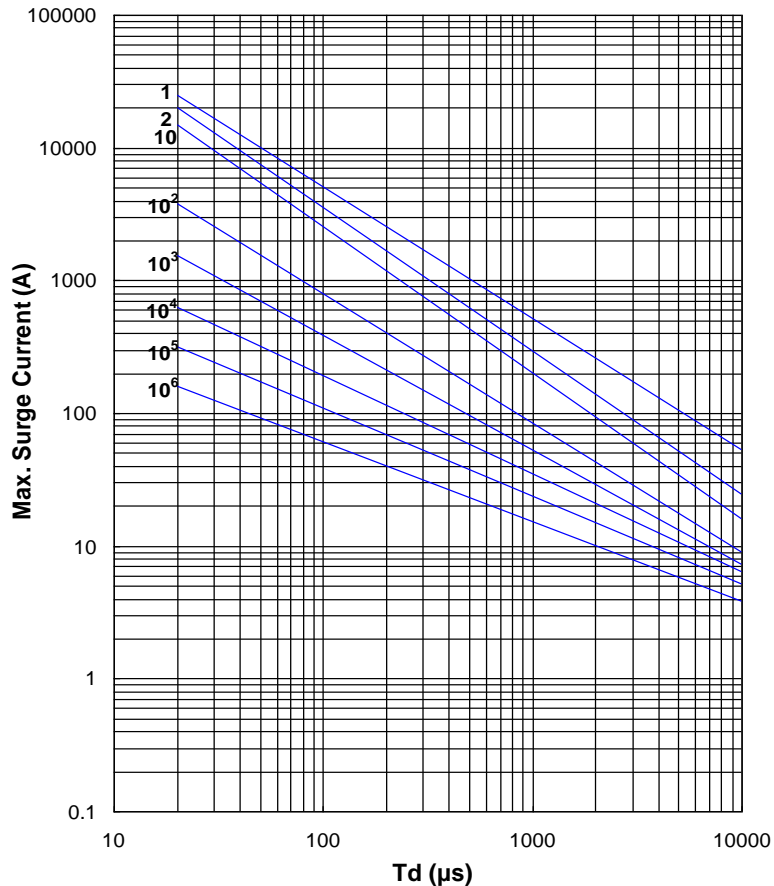
Thermally Protected Varistor Series

■ Max. Surge Current Derating Curves

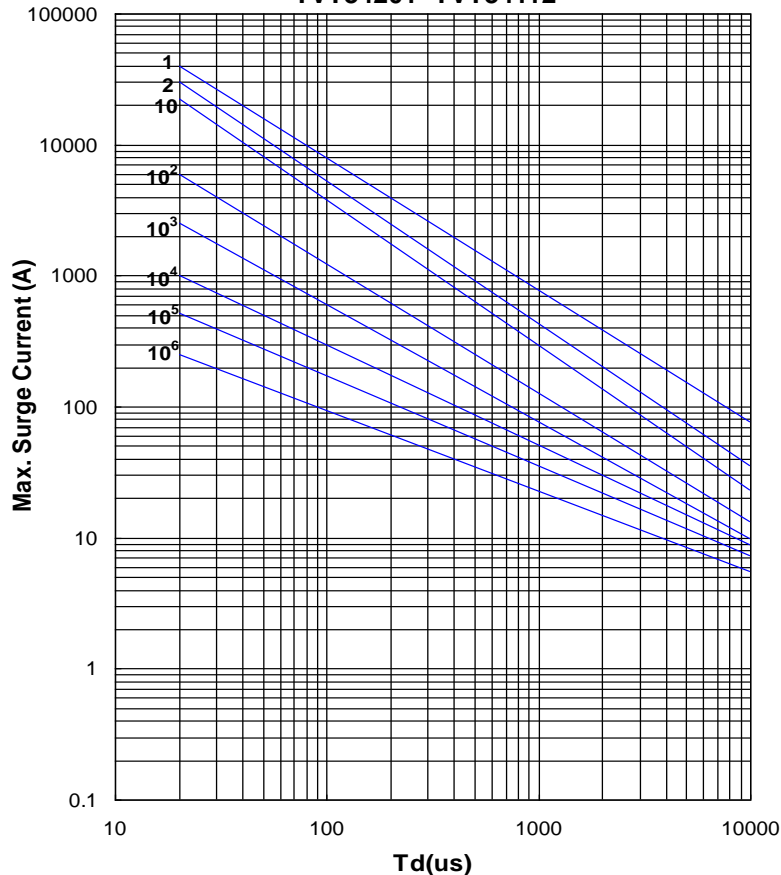
TVT25201 ~ TVT25112



TVT32201~TVT32112



TVT34201~TVT34112



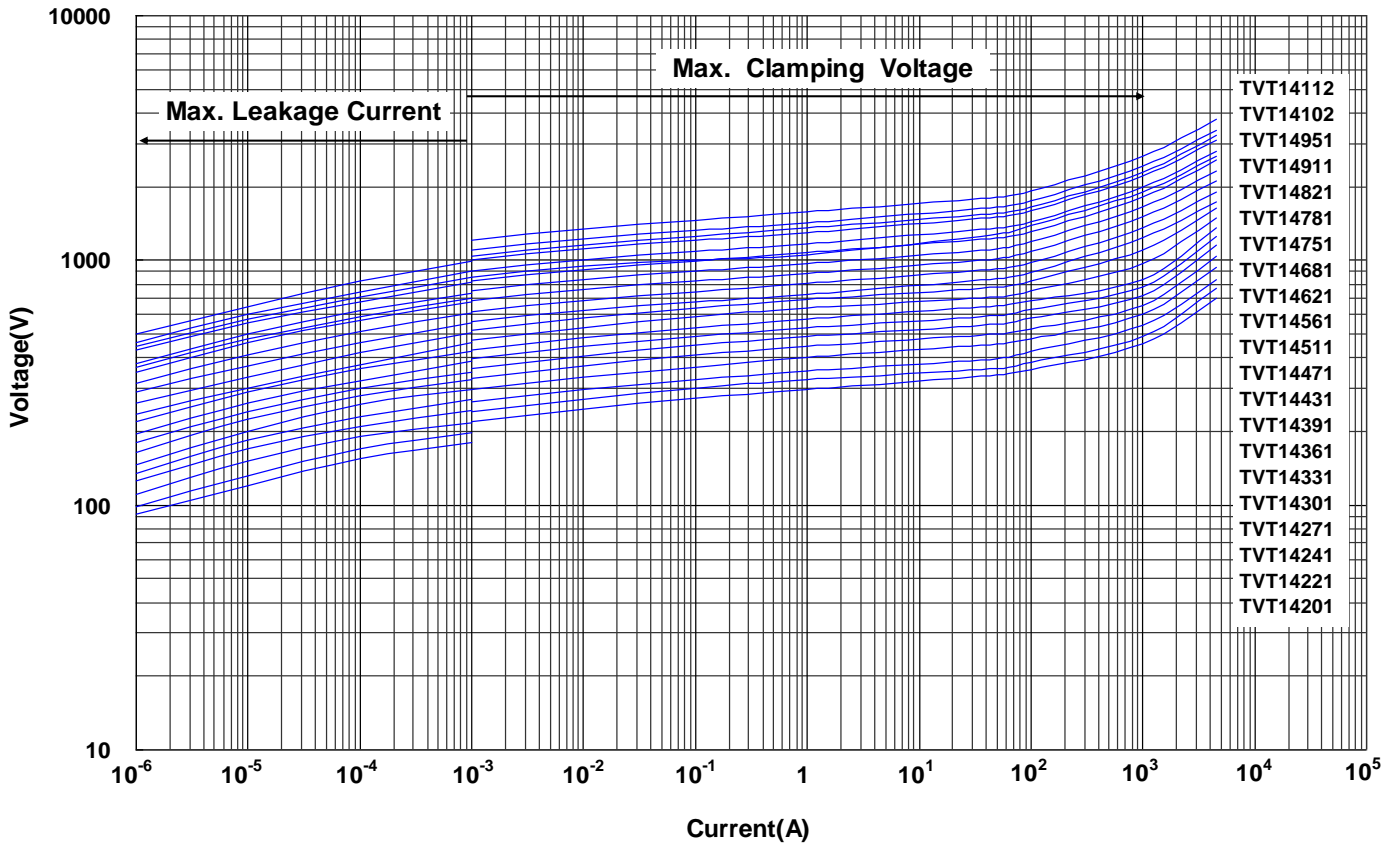
Metal Oxide Varistor : TVT Series



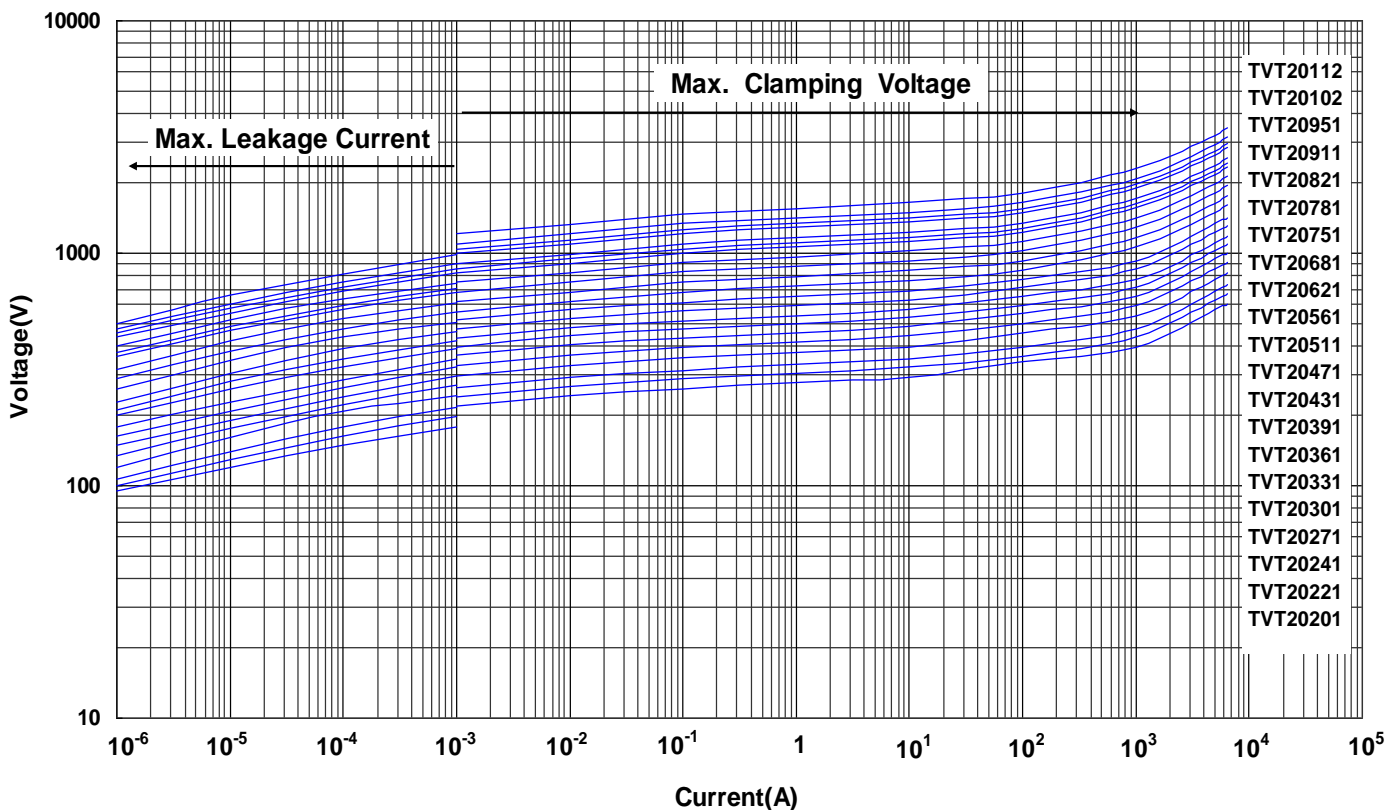
Thermally Protected Varistor Series

Max. Leakage Current and Max. Clamping Voltage Curves

Max. Leakage Current and Max. Clamping Voltage Curves (TVT14201 ~ TVT14112)



Max. Leakage Current and Max. Clamping Voltage Curves (TVT20201 ~ TVT20112)

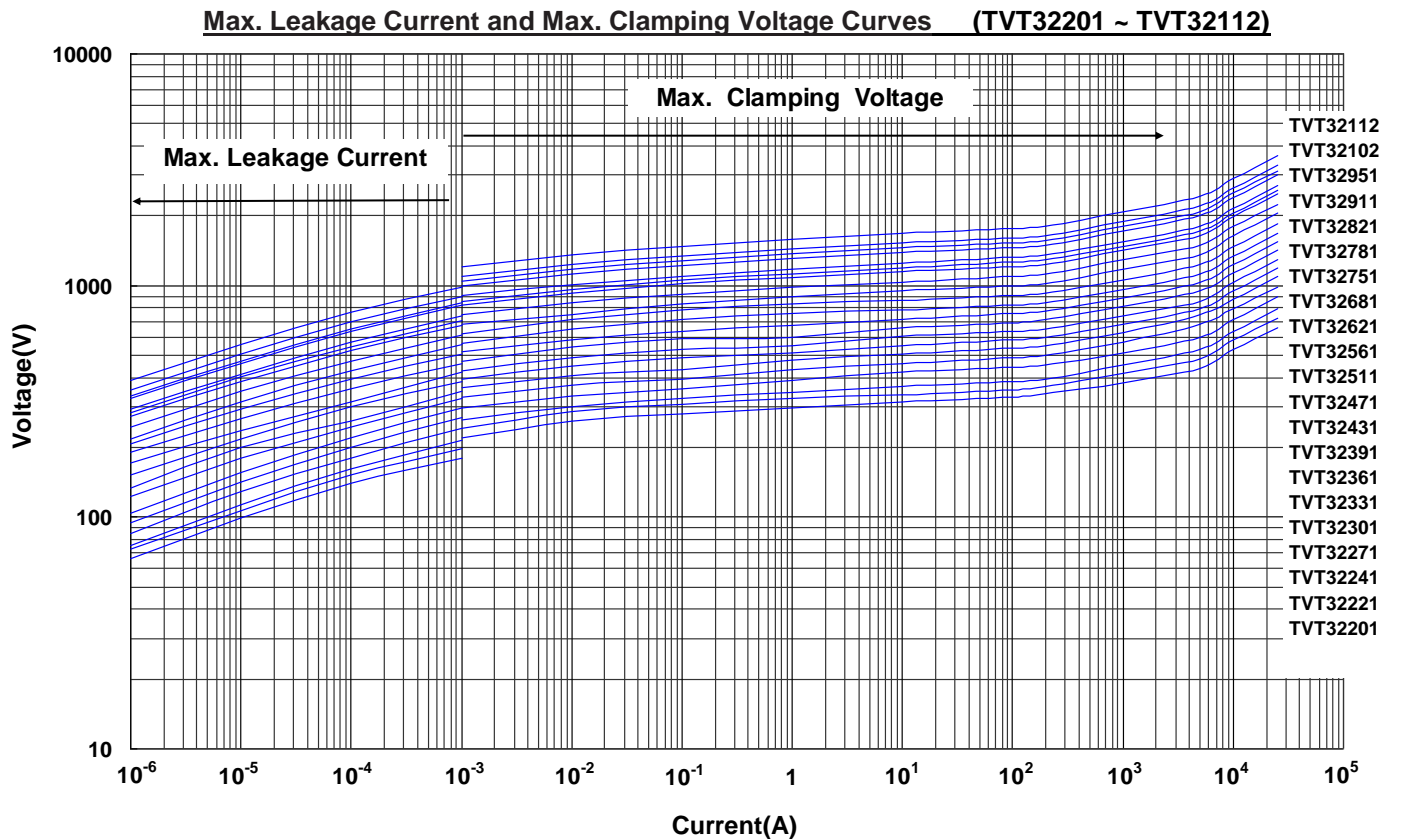
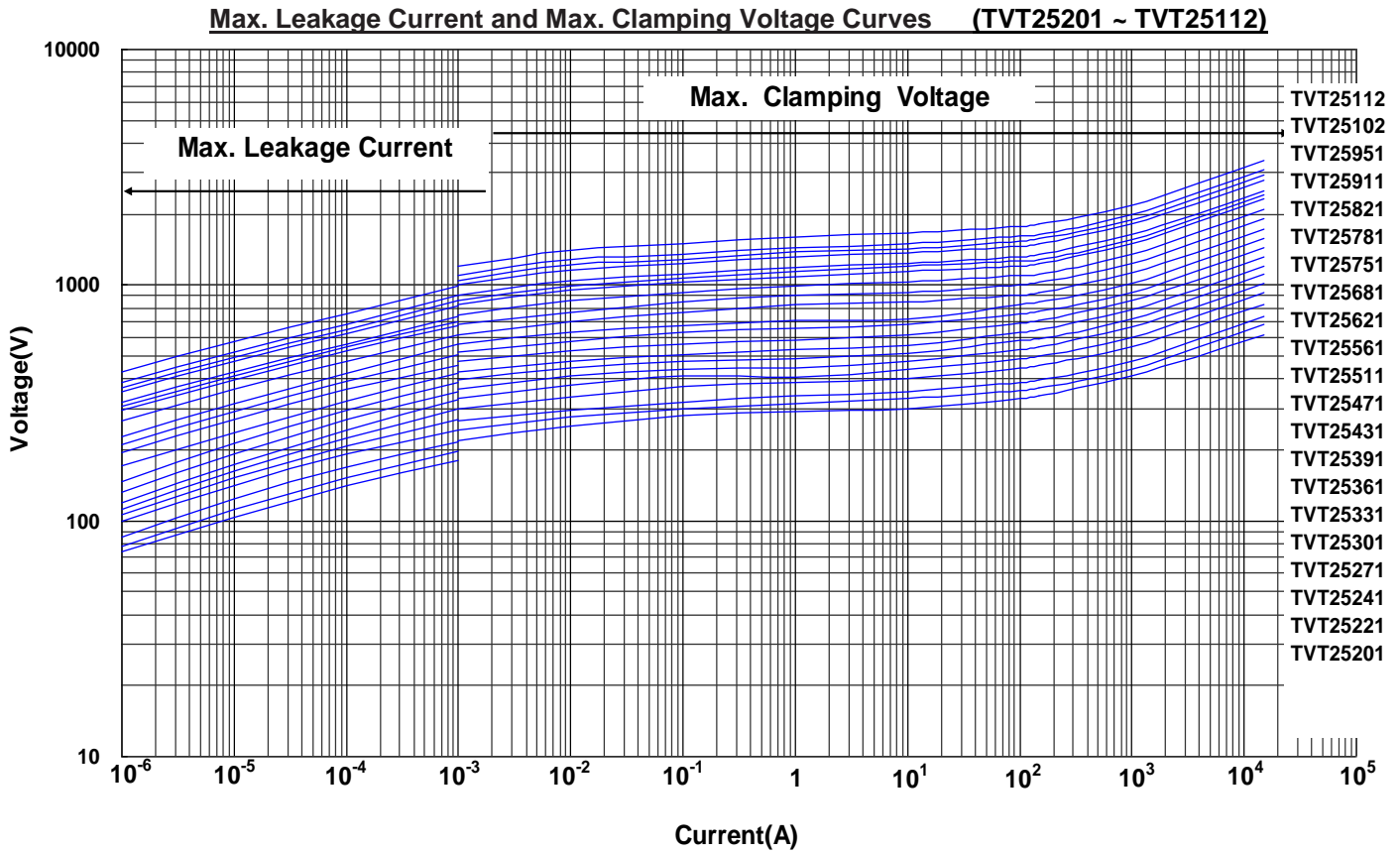


Metal Oxide Varistor : TVT Series



Thermally Protected Varistor Series

■ Max. Leakage Current and Max. Clamping Voltage Curves



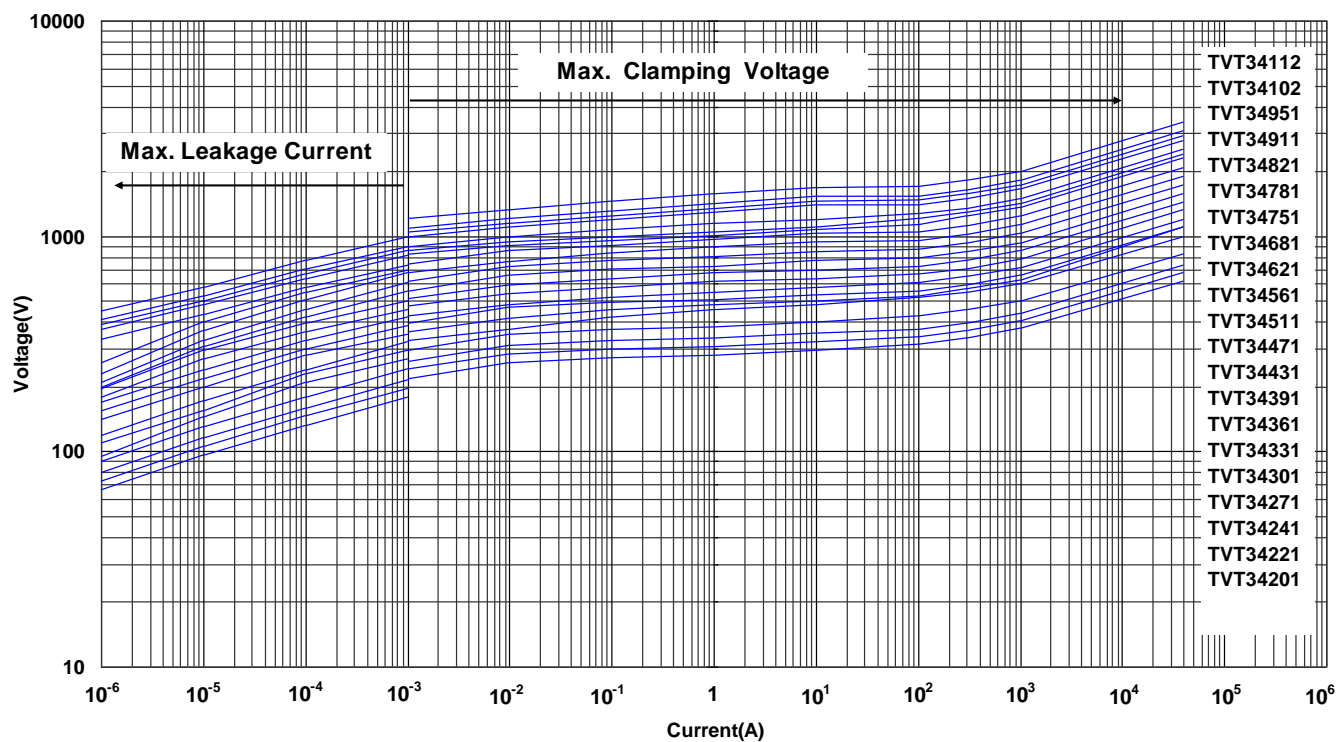
Metal Oxide Varistor : TVT Series

Thermally Protected Varistor Series



■ Max. Leakage Current and Max. Clamping Voltage Curves

Max. Leakage Current and Max. Clamping Voltage Curves (TVT34201 ~ TVT34112)



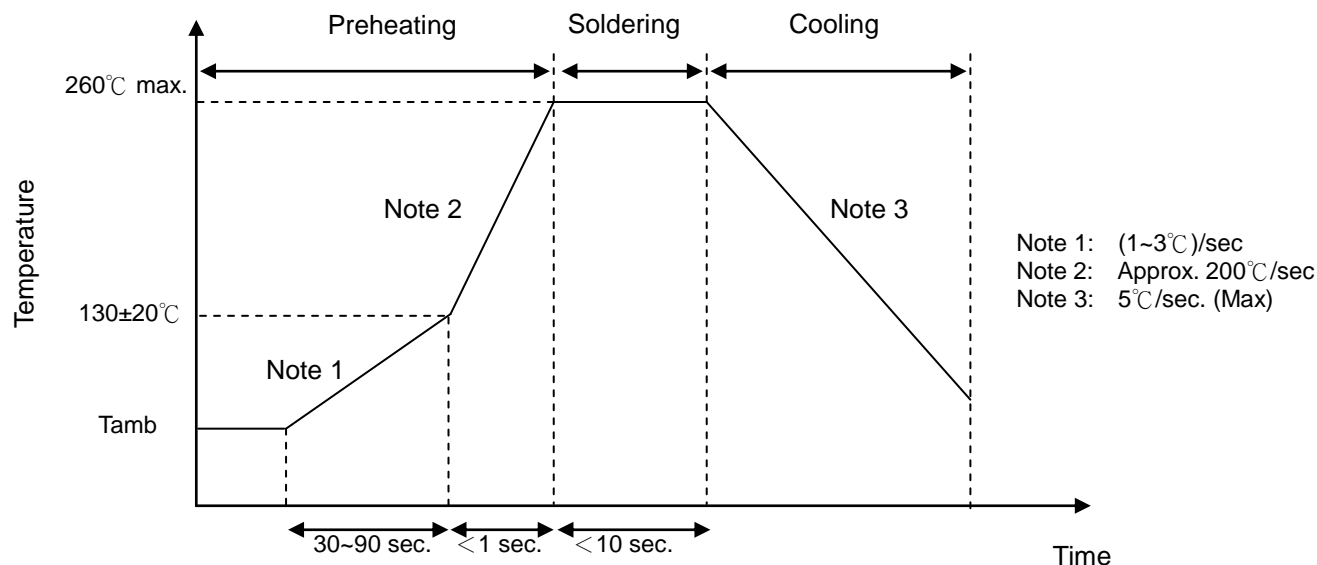
Metal Oxide Varistor : TVT Series

Thermally Protected Varistor 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 : TVT Series



Thermally Protected Varistor Series

■ Reliability

| Item | Standard | Test Conditions / Methods | Specifications | | | | | | | | | | | | | | | |
|-------------------------------|--|---|--|--|------------------|-----------|-----------|------|------------|------------------|-----|--------|-------|------|--|------------------|-----|--|
| Tensile Strength of Terminals | IEC 60068-2-21 | <p>Gradually apply the specified force and keep the unit fixed for 10±1 sec.</p> <table border="1"> <thead> <tr> <th>Terminal diameter (mm)</th> <th>Terminal cross-sectional area (mm²)</th> <th>Force (Kg)</th> </tr> </thead> <tbody> <tr> <td>0.5<d≤0.8</td> <td>0.2<S≤0.5</td> <td>1.0</td> </tr> <tr> <td>0.8<d≤1.25</td> <td>0.5<S≤1.2</td> <td>2.0</td> </tr> <tr> <td>1.25<d</td> <td>1.2<S</td> <td>4.0</td> </tr> </tbody> </table> | Terminal diameter (mm) | Terminal cross-sectional area (mm ²) | Force (Kg) | 0.5<d≤0.8 | 0.2<S≤0.5 | 1.0 | 0.8<d≤1.25 | 0.5<S≤1.2 | 2.0 | 1.25<d | 1.2<S | 4.0 | $ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage | | | |
| Terminal diameter (mm) | Terminal cross-sectional area (mm ²) | Force (Kg) | | | | | | | | | | | | | | | | |
| 0.5<d≤0.8 | 0.2<S≤0.5 | 1.0 | | | | | | | | | | | | | | | | |
| 0.8<d≤1.25 | 0.5<S≤1.2 | 2.0 | | | | | | | | | | | | | | | | |
| 1.25<d | 1.2<S | 4.0 | | | | | | | | | | | | | | | | |
| Bending Strength of Terminals | IEC 60068-2-21 | <p>Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, and then return to the original position. Repeat the procedure in the opposite direction.</p> <table border="1"> <thead> <tr> <th>Terminal diameter (mm)</th> <th>Terminal cross-sectional area (mm²)</th> <th>Force (Kg)</th> </tr> </thead> <tbody> <tr> <td>0.5<d≤0.8</td> <td>0.2<S≤0.5</td> <td>0.5</td> </tr> <tr> <td>0.8<d≤1.25</td> <td>0.5<S≤1.2</td> <td>1.0</td> </tr> <tr> <td>1.25<d</td> <td>1.2<S</td> <td>2.0</td> </tr> </tbody> </table> | Terminal diameter (mm) | Terminal cross-sectional area (mm ²) | Force (Kg) | 0.5<d≤0.8 | 0.2<S≤0.5 | 0.5 | 0.8<d≤1.25 | 0.5<S≤1.2 | 1.0 | 1.25<d | 1.2<S | 2.0 | $ \Delta V_{1mA}/V_{1mA} \leq 5\%$ No visible damage | | | |
| Terminal diameter (mm) | Terminal cross-sectional area (mm ²) | Force (Kg) | | | | | | | | | | | | | | | | |
| 0.5<d≤0.8 | 0.2<S≤0.5 | 0.5 | | | | | | | | | | | | | | | | |
| 0.8<d≤1.25 | 0.5<S≤1.2 | 1.0 | | | | | | | | | | | | | | | | |
| 1.25<d | 1.2<S | 2.0 | | | | | | | | | | | | | | | | |
| 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 | 110±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 10\%$ 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 secs, 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 | | | | | | | | | | | | | | | |

Metal Oxide Varistor : TVT Series



Thermally Protected Varistor Series

■ Reliability

| Item | Standard | Test Conditions / Methods | Specifications | | | | | | |
|---|-------------------------|--|--------------------------------------|-------------------------|-------|------------------------|-------|---------------------|----------|
| Limited Current Abnormal Overvoltage Test | UL 1449 4 th | Test voltage: refer to UL 1449 4 th Table 44.1 Short current condition: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Series</th> <th>Short Current (Isc , A)</th> </tr> </thead> <tbody> <tr> <td>TVT14</td> <td>0.125A, 0.5A, 2.5A, 5A</td> </tr> <tr> <td>TVT20</td> <td>0.5A, 2.5A, 5A, 10A</td> </tr> </tbody> </table> Each of four previously untested TVT samples to be connected to an ac power supply having an open circuit voltage equal to Uoc. The power supply is to incorporate a series variable resistor that can be adjusted to obtain the short-circuit values (Isc) respectively. The four samples are to be energized for 7 hrs, or until current to, or body temperature attain equilibrium, or until the sample becomes disconnected from the ac supply. | Series | Short Current (Isc , A) | TVT14 | 0.125A, 0.5A, 2.5A, 5A | TVT20 | 0.5A, 2.5A, 5A, 10A | No flame |
| Series | Short Current (Isc , A) | | | | | | | | |
| TVT14 | 0.125A, 0.5A, 2.5A, 5A | | | | | | | | |
| TVT20 | 0.5A, 2.5A, 5A, 10A | | | | | | | | |
| Voltage Proof | IEC 61051-1 | Metal balls method, 2500 V _{ac} 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 ≤ T _c ≤ 0.05 (%/°C) | | | | | | |

■ Packaging

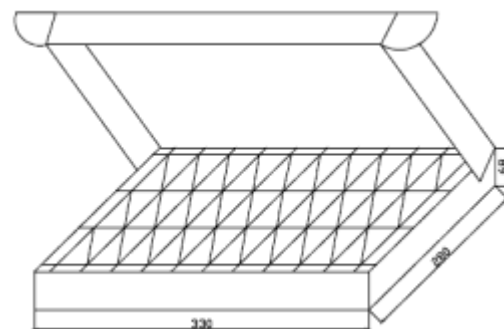
● Bulk Packing

| Series | Quantity (pcs/bag) |
|--------|--------------------|
| TVT14 | 50 |
| TVT20 | 20 |

● Box Packing (for Potting Structure)

| Series | Quantity (pcs/box) |
|--------------|--------------------|
| TVT**201~112 | 30 |

Note : ** is for 25, 32 or 34mm.



(unit: mm)

■ Warehouse Storage Conditions of Products

● Storage Conditions:

1. Storage temperature: -10°C ~ +40°C
2. Relative humidity: ≤ 75%RH
3. Keep away from corrosive atmosphere and sunlight.

● Period of Storage: 1 year