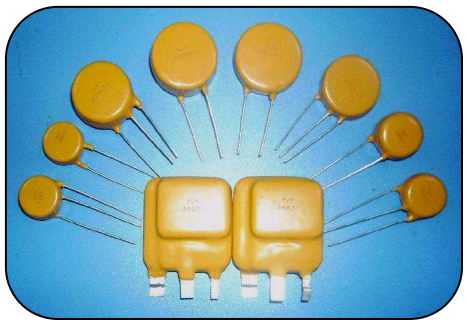
# Metal Oxide Varistor：TVT Type

## Thermally Protected Varistor Series

### ■ Features



1. RoHS compliant
2. 2 leaded or 3 leaded thermally protected metal oxide varistor,
   Three-leaded version available for indication purposes.
3. Body size : 14, 20, 22, 25, 32 and 34 mm in diameter
4. Working voltage: 130 ~ 750 Vac
5. Patent: US 7,453,681
6. Agency approval: pending.
7. Meets UL 1449 3rd test item 39.4 abnormal over- voltage test (10A, 5A, 2.5A, 0.5A and 0.125A).

### ■ Recommended Applications

1. TVSS modules
2. Uninterruptible power supplies
3. Power supplies
4. Lighting products
5. Communication products

### ■ Part Number Code

| T | V | T | 1 | 4 | 2 | 0 | 1 | K | A | K | G | B | 0 | 0 | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

| Product Type | |
|---|---|
| TVT | Thinking varistor TVT type |

| Disc Size | |
|---|---|
| 14 | Φ14mm |
| 20 | Φ20mm |
| 22 | Φ22mm |
| 25 | Φ25mm |
| 32 | Φ32mm |
| 34 | 34*34mm |

| Varistor Voltage($V_{1mA}$) | |
|---|---|
| 180 | $18x10^0$V=18V |
| 241 | $24x10^1$V=240V |
| 102 | $10x10^2$V=1000V |

| Tolerance of $V_{1mA}$ | |
|---|---|
| A | 0~+10% |
| B | 0~-10% |
| J | ±5% |
| K | ±10% |

| Terminal Number | |
|---|---|
| A | 2 terminals |
| B | 3 terminals |

| Packaging | |
|---|---|
| B | Bulk |

| Optional Suffix |
|---|
| 001~999 |

| Terminal Appearance | | | |
|---|---|---|---|
| 11:Wire Diameter & Pitch | | 12:Lead Type | |
| K | Φ0.8mm, pitch:7.5mm (For Φ14, Φ20, and Φ22) | G | Round wire ,straight lead |
| L | Φ1.0mm, pitch:10mm (For Φ25 only) | O | Round wire, outer kink lead |
| M | Φ1.5mm, pitch:15mm (For Φ32 only) | I | Round wire, inner kink lead |
| AU | Flat wire (For 34*34) | | |

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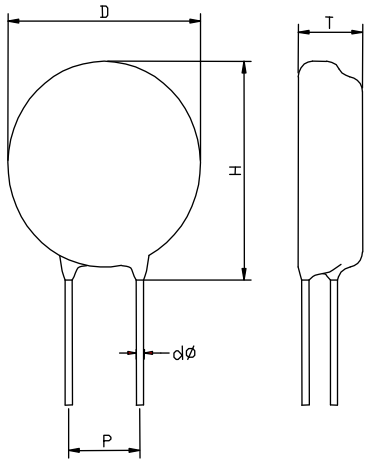
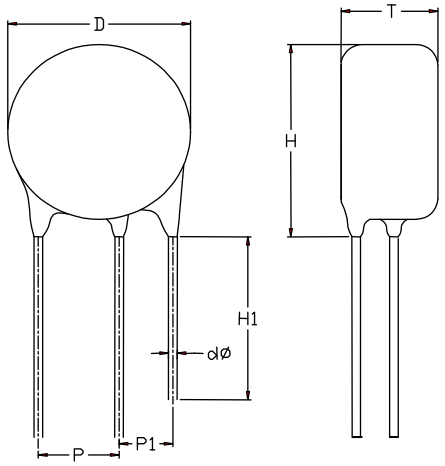
### ■ Structure and Dimensions

Two-Terminal Type

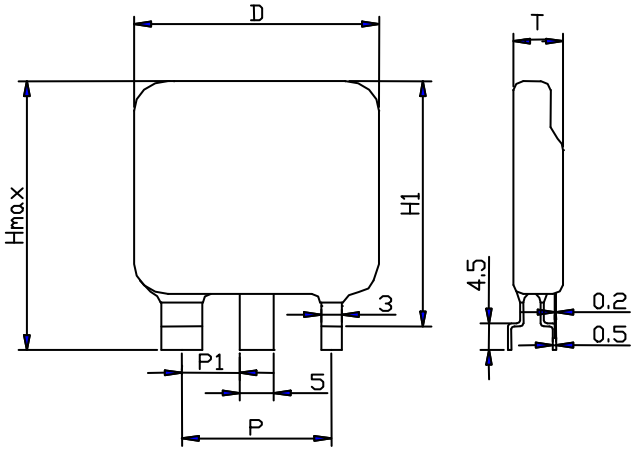



Three-Terminal Type




| Series | Lead Type | D | P | P1 | H | H1 | dΦ | Tmax |
|---|---|---|---|---|---|---|---|---|
| TVT14 | Two terminals | 15.5~19.5 | 6.5~8.5 | | 18.5~22 | | 0.75~0.85 | Show on the Electrical Characteristics |
| TVT14 | Three terminals | 15.5~19.5 | 6.5~8.5 | 4.0~6.0 | 18.5~22 | 7.0~18 | 0.75~0.85 | |
| TVT20 | Two terminals | 19.5~23.5 | 6.5~8.5 | | 21.5~27 | | 0.75~0.85 | |
| TVT20 | Three terminals | 19.5~23.5 | 6.5~8.5 | 4.0~6.0 | 21.5~27 | 12.5~18 | 0.75~0.85 | |
| TVT22 | Two terminals | 22~25.5 | 6.5~8.5 | | 23.5~29 | | 0.75~0.85 | |
| TVT22 | Three terminals | 22~25.5 | 6.5~8.5 | 4.0~6.0 | 23.5~29 | 12.5~21 | 0.75~0.85 | |
| TVT25 | Two terminals | 25.5~29 | 9.0~11.0 | | 26.5~33 | | 0.95~1.05 | |
| TVT25 | Three terminals | 25.5~29 | 9.0~11.0 | 4.0~6.0 | 26.5~33 | 12.5~25 | 0.95~1.05 | |
| TVT32 | Two terminals | 32.5~37 | 14.0~16.0 | | 33.5~41 | | 1.45~1.55 | |
| TVT32 | Three terminals | 32.5~37 | 14.0~16.0 | 7.0~9.0 | 33.5~41 | 12.5~25 | 1.45~1.55 | |

Disk Size 34mm products with Three-Terminal Type




| Series | Lead Type | D | Hmax | H1 | P | P1 | Tmax |
|---|---|---|---|---|---|---|---|
| TVT34 | Three Terminals | 33.5~38 | 47 | 34.5~43 | 22.5~24.5 | 8.5~10.5 | Show on the Electrical Characteristics |

# Metal Oxide Varistor：TVT Type

## Thermally Protected Varistor Series

### ■ Electrical Characteristics

| Part No. | Varistor Voltage (@1mA DC) | Max. Continuous Voltage | | Max. Peak Current (8/20μs) | | Max. Clamping Voltage | | Max. Energy | | Typical Capacitance @1KHZ | Rated Power | Thickness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 10/1000μs | 2ms | | | |
| | $V_{1mA}$ | $V_{AC(rms)}$ | $V_{DC}$ | $1_{time}$ | $2_{times}$ | $V_P$ | $I_P$ | $W_{max}$ | | C | P | $T_{max}$ |
| | (V) | (V) | (V) | (A) | (A) | (V) | (A) | (J) | | (pF) | (W) | (mm) |
| TVT14201 | 200(180~220) | 130 | 170 | 6000 | 4500 | 340 | 50 | 77 | 55 | 700 | 0.6 | 8.0 |
| TVT20201 | 200(180~220) | 130 | 170 | 10000 | 6500 | 340 | 100 | 140 | 100 | 1460 | 1 | 10.3 |
| TVT22201 | 200(180~220) | 130 | 170 | 13000 | 9000 | 340 | 100 | 175 | 125 | 2200 | 1 | 10.3 |
| TVT25201 | 200(180~220) | 130 | 170 | 15000 | 10000 | 340 | 150 | 210 | 150 | 2200 | 1 | 11.6 |
| TVT32201 | 200(180~220) | 130 | 170 | 25000 | 20000 | 340 | 200 | 295 | 210 | 3900 | 1.2 | 11.7 |
| TVT34201 | 200(180~220) | 130 | 170 | 40000 | 30000 | 340 | 300 | 435 | 310 | 5600 | 1.4 | 10.2 |
| TVT14221 | 220(198~242) | 140 | 180 | 6000 | 4500 | 365 | 50 | 86 | 62 | 640 | 0.6 | 8.1 |
| TVT20221 | 220(198~242) | 140 | 180 | 10000 | 6500 | 365 | 100 | 155 | 110 | 1320 | 1 | 10.4 |
| TVT22221 | 220(198~242) | 140 | 180 | 13000 | 9000 | 365 | 100 | 185 | 132 | 1900 | 1 | 10.4 |
| TVT25221 | 220(198~242) | 140 | 180 | 15000 | 10000 | 365 | 150 | 230 | 165 | 2000 | 1 | 11.7 |
| TVT32221 | 220(198~242) | 140 | 180 | 25000 | 20000 | 365 | 200 | 315 | 225 | 3500 | 1.2 | 11.8 |
| TVT34221 | 220(198~242) | 140 | 180 | 40000 | 30000 | 365 | 300 | 480 | 340 | 5000 | 1.4 | 10.3 |
| TVT14241 | 240(216~264) | 150 | 200 | 6000 | 4500 | 395 | 50 | 94 | 68 | 580 | 0.6 | 8.2 |
| TVT20241 | 240(216~264) | 150 | 200 | 10000 | 6500 | 395 | 100 | 170 | 120 | 1200 | 1 | 10.5 |
| TVT22241 | 240(216~264) | 150 | 200 | 13000 | 9000 | 395 | 100 | 198 | 140 | 1700 | 1 | 10.5 |
| TVT25241 | 240(216~264) | 150 | 200 | 15000 | 10000 | 395 | 150 | 255 | 180 | 1900 | 1 | 11.8 |
| TVT32241 | 240(216~264) | 150 | 200 | 25000 | 20000 | 395 | 200 | 340 | 240 | 3300 | 1.2 | 11.9 |
| TVT34241 | 240(216~264) | 150 | 200 | 40000 | 30000 | 395 | 300 | 505 | 360 | 4800 | 1.4 | 10.4 |
| TVT14271 | 270(243~297) | 175 | 225 | 6000 | 4500 | 455 | 50 | 110 | 80 | 520 | 0.6 | 8.4 |
| TVT20271 | 270(243~297) | 175 | 225 | 10000 | 6500 | 455 | 100 | 190 | 135 | 1100 | 1 | 10.7 |
| TVT22271 | 270(243~297) | 175 | 225 | 13000 | 9000 | 455 | 100 | 220 | 158 | 1500 | 1 | 10.7 |
| TVT25271 | 270(243~297) | 175 | 225 | 15000 | 10000 | 455 | 150 | 285 | 205 | 1600 | 1 | 12.0 |
| TVT32271 | 270(243~297) | 175 | 225 | 25000 | 20000 | 455 | 200 | 360 | 255 | 2800 | 1.2 | 12.1 |
| TVT34271 | 270(243~297) | 175 | 225 | 40000 | 30000 | 455 | 300 | 560 | 400 | 4100 | 1.4 | 10.6 |
| TVT14301 | 300(270~330) | 195 | 250 | 6000 | 4500 | 500 | 50 | 118 | 85 | 480 | 0.6 | 8.6 |
| TVT20301 | 300(270~330) | 195 | 250 | 10000 | 6500 | 500 | 100 | 205 | 145 | 1000 | 1 | 10.9 |
| TVT22301 | 300(270~330) | 195 | 250 | 13000 | 9000 | 500 | 100 | 245 | 175 | 1400 | 1 | 10.9 |
| TVT25301 | 300(270~330) | 195 | 250 | 15000 | 10000 | 500 | 150 | 310 | 225 | 1500 | 1 | 12.2 |
| TVT32301 | 300(270~330) | 195 | 250 | 25000 | 20000 | 500 | 200 | 380 | 270 | 2600 | 1.2 | 12.3 |
| TVT34301 | 300(270~330) | 195 | 250 | 40000 | 30000 | 500 | 300 | 590 | 420 | 3800 | 1.4 | 10.8 |

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| Part No. | Varistor Voltage (@1mA DC) | Max. Continuous Voltage | | Max. Peak Current (8/20μs) | | Max. Clamping Voltage | | Max. Energy | | Typical Capacitance @1KHZ | Rated Power | Thickness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 10/1000μs | 2ms | | | |
| | $V_{1mA}$ | $V_{AC(rms)}$ | $V_{DC}$ | $1_{time}$ | $2_{times}$ | $V_P$ | $I_P$ | $W_{max}$ | | C | P | $T_{max}$ |
| | (V) | (V) | (V) | (A) | (A) | (V) | (A) | (J) | | (pF) | (W) | (mm) |
| TVT14331 | 330(297~363) | 215 | 275 | 6000 | 4500 | 550 | 50 | 127 | 90 | 450 | 0.6 | 8.8 |
| TVT20331 | 330(297~363) | 215 | 275 | 10000 | 6500 | 550 | 100 | 215 | 155 | 950 | 1 | 11.1 |
| TVT22331 | 330(297~363) | 215 | 275 | 13000 | 9000 | 550 | 100 | 268 | 190 | 1300 | 1 | 11.1 |
| TVT25331 | 330(297~363) | 215 | 275 | 15000 | 10000 | 550 | 150 | 325 | 235 | 1400 | 1 | 12.4 |
| TVT32331 | 330(297~363) | 215 | 275 | 25000 | 20000 | 550 | 200 | 400 | 285 | 2400 | 1.2 | 12.5 |
| TVT34331 | 330(297~363) | 215 | 275 | 40000 | 30000 | 550 | 300 | 620 | 440 | 3500 | 1.4 | 11.0 |
| TVT14361 | 360(324~396) | 230 | 300 | 6000 | 4500 | 595 | 50 | 137 | 98 | 430 | 0.6 | 9.0 |
| TVT20361 | 360(324~396) | 230 | 300 | 10000 | 6500 | 595 | 100 | 225 | 160 | 900 | 1 | 11.3 |
| TVT22361 | 360(324~396) | 230 | 300 | 13000 | 9000 | 595 | 100 | 315 | 225 | 1200 | 1 | 11.3 |
| TVT25361 | 360(324~396) | 230 | 300 | 15000 | 10000 | 595 | 150 | 340 | 240 | 1300 | 1 | 12.6 |
| TVT32361 | 360(324~396) | 230 | 300 | 25000 | 20000 | 595 | 200 | 420 | 300 | 2200 | 1.2 | 12.7 |
| TVT34361 | 360(324~396) | 230 | 300 | 40000 | 30000 | 595 | 300 | 645 | 460 | 3200 | 1.4 | 11.2 |
| TVT14391 | 390(351~429) | 250 | 320 | 6000 | 4500 | 650 | 50 | 154 | 110 | 390 | 0.6 | 9.2 |
| TVT20391 | 390(351~429) | 250 | 320 | 10000 | 6500 | 650 | 100 | 240 | 170 | 800 | 1 | 11.5 |
| TVT22391 | 390(351~429) | 250 | 320 | 13000 | 9000 | 650 | 100 | 350 | 250 | 1000 | 1 | 11.5 |
| TVT25391 | 390(351~429) | 250 | 320 | 15000 | 10000 | 650 | 150 | 360 | 250 | 1100 | 1 | 12.8 |
| TVT32391 | 390(351~429) | 250 | 320 | 25000 | 20000 | 650 | 200 | 465 | 330 | 2000 | 1.2 | 12.9 |
| TVT34391 | 390(351~429) | 250 | 320 | 40000 | 30000 | 650 | 300 | 690 | 490 | 2800 | 1.4 | 11.4 |
| TVT14431 | 430(387~473) | 275 | 350 | 6000 | 4500 | 710 | 50 | 170 | 120 | 370 | 0.6 | 9.5 |
| TVT20431 | 430(387~473) | 275 | 350 | 10000 | 6500 | 710 | 100 | 270 | 192 | 700 | 1 | 11.8 |
| TVT22431 | 430(387~473) | 275 | 350 | 13000 | 9000 | 710 | 100 | 380 | 270 | 880 | 1 | 11.8 |
| TVT25431 | 430(387~473) | 275 | 350 | 15000 | 10000 | 710 | 150 | 440 | 310 | 1000 | 1 | 13.1 |
| TVT32431 | 430(387~473) | 275 | 350 | 25000 | 20000 | 710 | 200 | 505 | 360 | 1800 | 1.2 | 13.2 |
| TVT34431 | 430(387~473) | 275 | 350 | 40000 | 30000 | 710 | 300 | 770 | 550 | 2600 | 1.4 | 11.7 |
| TVT14471 | 470(423~517) | 300 | 385 | 6000 | 4500 | 775 | 50 | 192 | 138 | 320 | 0.6 | 9.8 |
| TVT20471 | 470(423~517) | 300 | 385 | 10000 | 6500 | 775 | 100 | 350 | 250 | 620 | 1 | 12.1 |
| TVT22471 | 470(423~517) | 300 | 385 | 13000 | 9000 | 775 | 100 | 405 | 290 | 800 | 1 | 12.1 |
| TVT25471 | 470(423~517) | 300 | 385 | 15000 | 10000 | 775 | 150 | 490 | 345 | 950 | 1 | 13.4 |
| TVT32471 | 470(423~517) | 300 | 385 | 25000 | 20000 | 775 | 200 | 570 | 405 | 1700 | 1.2 | 13.5 |
| TVT34471 | 470(423~517) | 300 | 385 | 40000 | 30000 | 775 | 300 | 835 | 595 | 2400 | 1.4 | 12.0 |

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| Part No. | Varistor Voltage（@1mA DC） | Max. Continuous Voltage | | Max. Peak Current (8/20μs) | | Max. Clamping Voltage | | Max. Energy | | Typical Capacitance @1KHZ | Rated Power | Thickness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 10/1000μs | 2ms | | | |
| | $V_{1mA}$ | $V_{AC(rms)}$ | $V_{DC}$ | $1_{time}$ | $2_{times}$ | $V_P$ | $I_P$ | $W_{max}$ | | C | P | $T_{max}$ |
| | (V) | (V) | (V) | (A) | (A) | (V) | (A) | (J) | | (pF) | (W) | (mm) |
| TVT14511 | 510(459~561) | 320 | 410 | 6000 | 4500 | 845 | 50 | 209 | 150 | 290 | 0.6 | 10.2 |
| TVT20511 | 510(459~561) | 320 | 410 | 10000 | 6500 | 845 | 100 | 386 | 275 | 530 | 1 | 12.5 |
| TVT22511 | 510(459~561) | 320 | 410 | 13000 | 9000 | 845 | 100 | 445 | 318 | 700 | 1 | 12.5 |
| TVT25511 | 510(459~561) | 320 | 410 | 15000 | 10000 | 845 | 150 | 530 | 370 | 900 | 1 | 13.8 |
| TVT32511 | 510(459~561) | 320 | 410 | 25000 | 20000 | 845 | 200 | 605 | 430 | 1600 | 1.2 | 13.9 |
| TVT34511 | 510(459~561) | 320 | 410 | 40000 | 30000 | 845 | 300 | 900 | 640 | 2300 | 1.4 | 12.4 |
| TVT14561 | 560(504~616) | 350 | 450 | 6000 | 4500 | 930 | 50 | 220 | 158 | 260 | 0.6 | 10.6 |
| TVT20561 | 560(504~616) | 350 | 450 | 10000 | 6500 | 930 | 100 | 400 | 285 | 480 | 1 | 12.9 |
| TVT22561 | 560(504~616) | 350 | 450 | 13000 | 9000 | 930 | 100 | 475 | 340 | 630 | 1 | 12.9 |
| TVT25561 | 560(504~616) | 350 | 450 | 15000 | 10000 | 930 | 150 | 560 | 390 | 800 | 1 | 14.2 |
| TVT32561 | 560(504~616) | 350 | 450 | 25000 | 20000 | 930 | 200 | 660 | 470 | 1400 | 1.2 | 14.3 |
| TVT34561 | 560(504~616) | 350 | 450 | 40000 | 30000 | 930 | 300 | 995 | 710 | 2000 | 1.4 | 12.8 |
| TVT14621 | 620(558~682) | 395 | 510 | 6000 | 4500 | 1025 | 50 | 231 | 165 | 240 | 0.6 | 11.0 |
| TVT20621 | 620(558~682) | 395 | 510 | 10000 | 6500 | 1025 | 100 | 425 | 305 | 450 | 1 | 13.3 |
| TVT22621 | 620(558~682) | 395 | 510 | 13000 | 9000 | 1025 | 100 | 490 | 350 | 530 | 1 | 13.3 |
| TVT25621 | 620(558~682) | 395 | 510 | 15000 | 10000 | 1025 | 150 | 590 | 410 | 700 | 1 | 14.6 |
| TVT32621 | 620(558~682) | 395 | 510 | 25000 | 20000 | 1025 | 200 | 770 | 550 | 1250 | 1.2 | 14.7 |
| TVT34621 | 620(558~682) | 395 | 510 | 40000 | 30000 | 1025 | 300 | 1120 | 800 | 1800 | 1.4 | 13.2 |
| TVT14681 | 680(612~748) | 420 | 560 | 6000 | 4500 | 1120 | 50 | 242 | 172 | 230 | 0.6 | 11.4 |
| TVT20681 | 680(612~748) | 420 | 560 | 10000 | 6500 | 1120 | 100 | 455 | 325 | 440 | 1 | 13.7 |
| TVT22681 | 680(612~748) | 420 | 560 | 13000 | 9000 | 1120 | 100 | 500 | 358 | 490 | 1 | 13.7 |
| TVT25681 | 680(612~748) | 420 | 560 | 15000 | 10000 | 1120 | 150 | 620 | 430 | 650 | 1 | 14.8 |
| TVT32681 | 680(612~748) | 420 | 560 | 25000 | 20000 | 1120 | 200 | 840 | 600 | 1150 | 1.2 | 15.1 |
| TVT34681 | 680(612~748) | 420 | 560 | 40000 | 30000 | 1120 | 300 | 1275 | 910 | 1700 | 1.4 | 13.6 |
| TVT14751 | 750(675~825) | 465 | 615 | 6000 | 4500 | 1240 | 50 | 247 | 175 | 220 | 0.6 | 11.0 |
| TVT20751 | 750(675~825) | 465 | 615 | 10000 | 6500 | 1240 | 100 | 509 | 365 | 420 | 1 | 14.1 |
| TVT22751 | 750(675~825) | 465 | 615 | 13000 | 9000 | 1240 | 100 | 525 | 375 | 470 | 1 | 12.3 |
| TVT25751 | 750(675~825) | 465 | 615 | 15000 | 10000 | 1240 | 150 | 630 | 440 | 600 | 1 | 15.0 |
| TVT32751 | 750(675~825) | 465 | 615 | 25000 | 20000 | 1240 | 200 | 925 | 660 | 1100 | 1.2 | 13.7 |
| TVT34751 | 750(675~825) | 465 | 615 | 40000 | 30000 | 1240 | 300 | 1400 | 1000 | 1600 | 1.4 | 12.2 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 10/1000μs | 2ms | | | |
| | $V_{1mA}$ | $V_{AC(rms)}$ | $V_{DC}$ | $1_{time}$ | $2_{times}$ | $V_P$ | $I_P$ | $W_{max}$ | | C | P | $T_{max}$ |
| | (V) | (V) | (V) | (A) | (A) | (V) | (A) | (J) | | (pF) | (W) | (mm) |
| TVT14781 | 780(702~858) | 485 | 640 | 6000 | 4500 | 1290 | 50 | 260 | 180 | 200 | 0.6 | 11.1 |
| TVT20781 | 780(702~858) | 485 | 640 | 10000 | 6500 | 1290 | 100 | 515 | 350 | 400 | 1 | 14.4 |
| TVT22781 | 780(702~858) | 485 | 640 | 13000 | 9000 | 1290 | 100 | 535 | 385 | 460 | 1 | 12.4 |
| TVT25781 | 780(702~858) | 485 | 640 | 15000 | 10000 | 1290 | 150 | 675 | 455 | 550 | 1 | 15.2 |
| TVT32781 | 780(702~858) | 485 | 640 | 25000 | 20000 | 1290 | 200 | 955 | 680 | 1050 | 1.2 | 13.8 |
| TVT34781 | 780(702~858) | 485 | 640 | 40000 | 30000 | 1290 | 300 | 1445 | 1030 | 1500 | 1.4 | 12.3 |
| TVT14821 | 820(738~902) | 510 | 670 | 6000 | 4500 | 1355 | 50 | 270 | 192 | 180 | 0.6 | 11.3 |
| TVT20821 | 820(738~902) | 510 | 670 | 10000 | 6500 | 1355 | 100 | 475 | 340 | 390 | 1 | 14.6 |
| TVT22821 | 820(738~902) | 510 | 670 | 13000 | 9000 | 1355 | 100 | 545 | 390 | 450 | 1 | 12.6 |
| TVT25821 | 820(738~902) | 510 | 670 | 15000 | 10000 | 1355 | 150 | 690 | 480 | 520 | 1 | 15.5 |
| TVT32821 | 820(738~902) | 510 | 670 | 25000 | 20000 | 1355 | 200 | 770 | 550 | 950 | 1.2 | 14.0 |
| TVT34821 | 820(738~902) | 510 | 670 | 40000 | 30000 | 1355 | 300 | 1205 | 860 | 1400 | 1.4 | 12.5 |
| TVT14911 | 910(819~1001) | 550 | 745 | 6000 | 4500 | 1500 | 50 | 280 | 200 | 170 | 0.6 | 11.6 |
| TVT20911 | 910(819~1001) | 550 | 745 | 10000 | 6500 | 1500 | 100 | 509 | 365 | 360 | 1 | 14.9 |
| TVT22911 | 910(819~1001) | 550 | 745 | 13000 | 9000 | 1500 | 100 | 595 | 425 | 410 | 1 | 12.9 |
| TVT25911 | 910(819~1001) | 550 | 745 | 15000 | 10000 | 1500 | 150 | 715 | 500 | 500 | 1 | 15.7 |
| TVT32911 | 910(819~1001) | 550 | 745 | 25000 | 20000 | 1500 | 200 | 870 | 620 | 900 | 1.2 | 14.3 |
| TVT34911 | 910(819~1001) | 550 | 745 | 40000 | 30000 | 1500 | 300 | 1345 | 960 | 1300 | 1.4 | 12.8 |
| TVT14951 | 950(855~1045) | 575 | 765 | 6000 | 4500 | 1570 | 50 | 290 | 210 | 160 | 0.6 | 12.0 |
| TVT20951 | 950(855~1045） | 575 | 765 | 10000 | 6500 | 1570 | 100 | 530 | 380 | 340 | 1 | 15.3 |
| TVT22951 | 950(855~1045) | 575 | 765 | 13000 | 9000 | 1570 | 100 | 620 | 440 | 380 | 1 | 13.3 |
| TVT25951 | 950(855~1045) | 575 | 765 | 15000 | 10000 | 1570 | 150 | 740 | 520 | 450 | 1 | 15.9 |
| TVT32951 | 950(855~1045) | 575 | 765 | 25000 | 20000 | 1570 | 200 | 925 | 660 | 850 | 1.2 | 14.5 |
| TVT34951 | 950(855~1045) | 575 | 765 | 40000 | 30000 | 1570 | 300 | 1400 | 1000 | 1200 | 1.4 | 13.0 |
| TVT14102 | 1000(900~1100) | 625 | 825 | 6000 | 4500 | 1650 | 50 | 305 | 218 | 150 | 0.6 | 13.4 |
| TVT20102 | 1000(900~1100) | 625 | 825 | 10000 | 6500 | 1650 | 100 | 560 | 400 | 330 | 1 | 15.7 |
| TVT22102 | 1000(900~1100) | 625 | 825 | 13000 | 9000 | 1650 | 100 | 640 | 458 | 360 | 1 | 14.7 |
| TVT25102 | 1000(900~1100) | 625 | 825 | 15000 | 10000 | 1650 | 150 | 770 | 550 | 430 | 1 | 16.0 |
| TVT32102 | 1000(900~1100) | 625 | 825 | 25000 | 20000 | 1650 | 200 | 965 | 690 | 800 | 1.2 | 15.0 |
| TVT34102 | 1000(900~1100) | 625 | 825 | 40000 | 30000 | 1650 | 300 | 1470 | 1050 | 1150 | 1.4 | 13.5 |

# Metal Oxide Varistor：TVT Type

## Thermally Protected Varistor Series

| Part No. | Varistor Voltage（@1mA DC） | Max. Continuous Voltage | | Max. Peak Current (8/20μs) | | Max. Clamping Voltage | | Max. Energy | | Typical Capacitance @1KHZ | Rated Power | Thickness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 10/1000μs | 2ms | | | |
| | $V_{1mA}$ | $V_{AC(rms)}$ | $V_{DC}$ | $1_{time}$ | $2_{times}$ | $V_P$ | $I_P$ | $W_{max}$ | | C | P | $T_{max}$ |
| | (V) | (V) | (V) | (A) | (A) | (V) | (A) | (J) | | (pF) | (W) | (mm) |
| TVT14112 | 1100(990~1210) | 680 | 895 | 6000 | 4500 | 1815 | 50 | 340 | 242 | 140 | 0.6 | 14.3 |
| TVT20112 | 1100(990~1210) | 680 | 895 | 10000 | 6500 | 1815 | 100 | 610 | 435 | 310 | 1 | 15.9 |
| TVT22112 | 1100(990~1210) | 680 | 895 | 13000 | 9000 | 1815 | 100 | 700 | 500 | 340 | 1 | 14.9 |
| TVT25112 | 1100(990~1210) | 680 | 895 | 15000 | 10000 | 1815 | 150 | 840 | 600 | 400 | 1 | 16.2 |
| TVT32112 | 1100(990~1210) | 680 | 895 | 25000 | 20000 | 1815 | 200 | 1065 | 760 | 750 | 1.2 | 16.5 |
| TVT34112 | 1100(990~1210) | 680 | 895 | 40000 | 30000 | 1815 | 300 | 1610 | 1150 | 1050 | 1.4 | 15.0 |
| TVT14122 | 1200(1080~1320) | 750 | 980 | 6000 | 4500 | 2000 | 50 | 350 | 260 | 130 | 0.6 | 14.6 |
| TVT20122 | 1200(1080~1320) | 750 | 980 | 10000 | 6500 | 2000 | 100 | 620 | 450 | 290 | 1 | 16.3 |
| TVT22122 | 1200(1080~1320) | 750 | 980 | 13000 | 9000 | 2000 | 100 | 720 | 520 | 320 | 1 | 15.3 |
| TVT25122 | 1200(1080~1320) | 750 | 980 | 15000 | 10000 | 2000 | 200 | 910 | 650 | 650 | 1 | 16.6 |
| TVT32122 | 1200(1080~1320) | 750 | 980 | 25000 | 20000 | 2000 | 200 | 1120 | 800 | 650 | 1.2 | 16.0 |
| TVT34122 | 1200(1080~1320) | 750 | 980 | 40000 | 30000 | 2000 | 300 | 1750 | 1250 | 950 | 1.4 | 15.8 |

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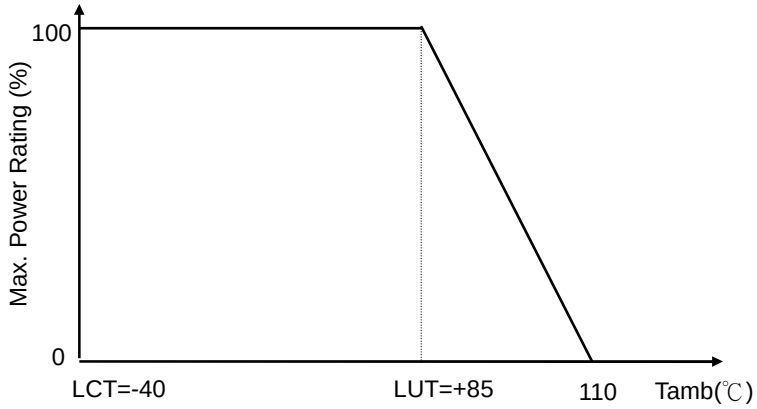
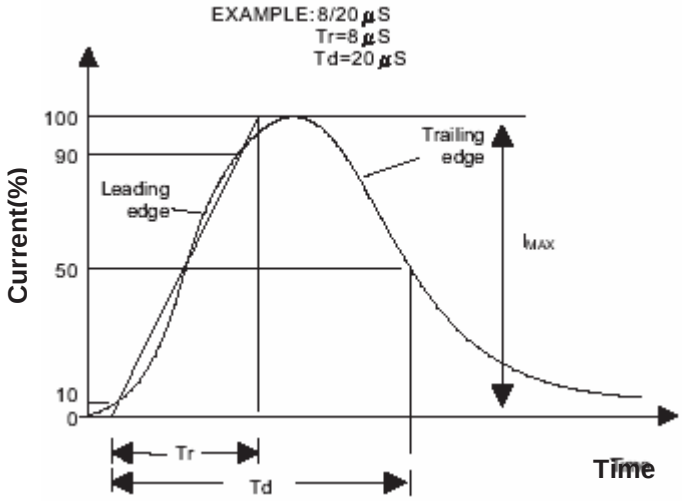
### ■ Operating Temperature vs. Power Derating Curve

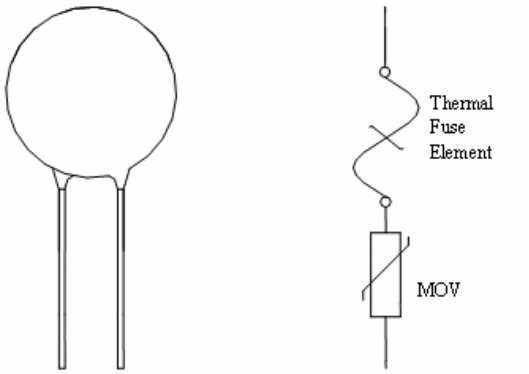



### ■ Surge Current Standard Waveform

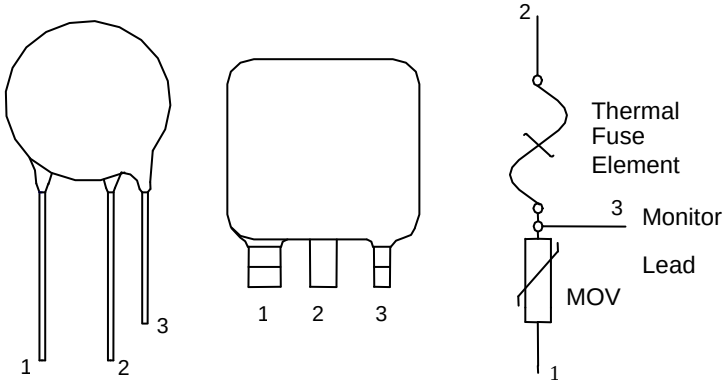



### ■ Lead Configuration

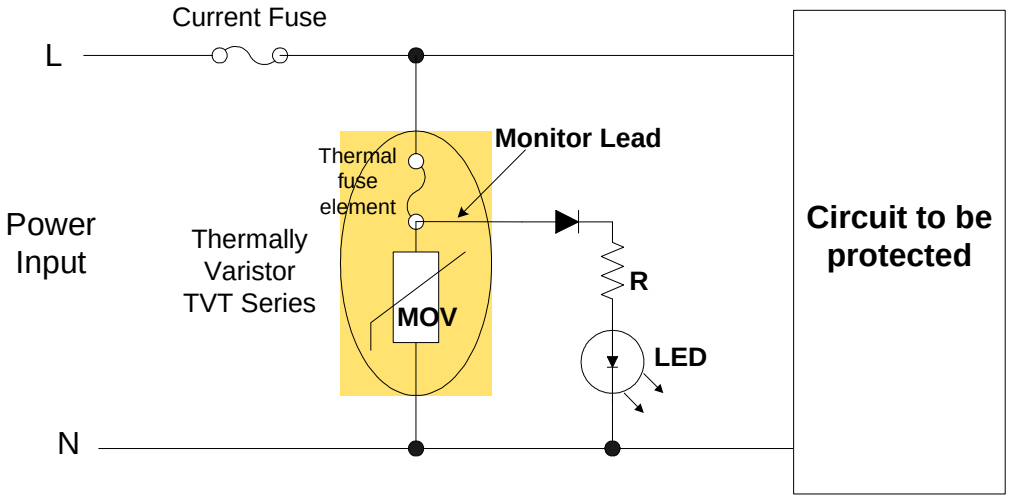
Two-leaded type




Three-leaded type

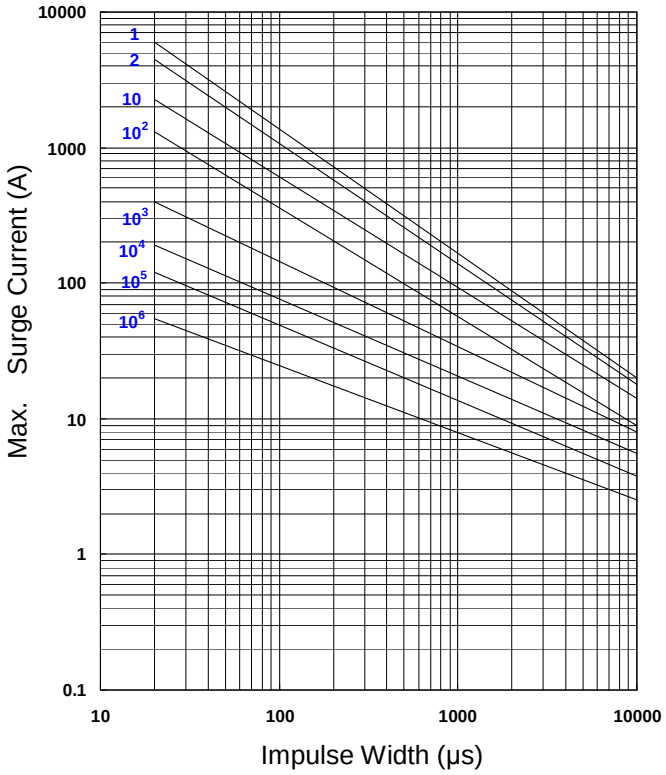



### ■ Typical Application Circuit

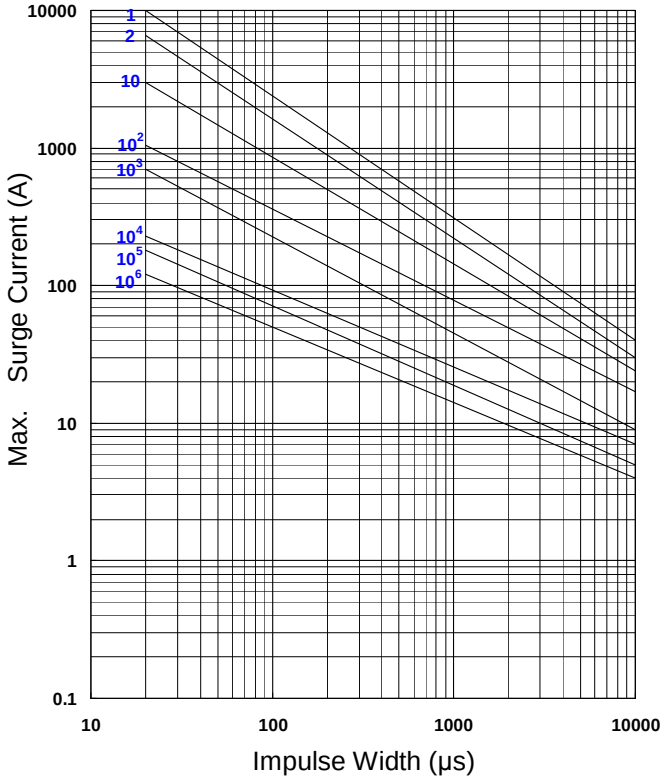


### ■ Max. Surge Current Derating Curves

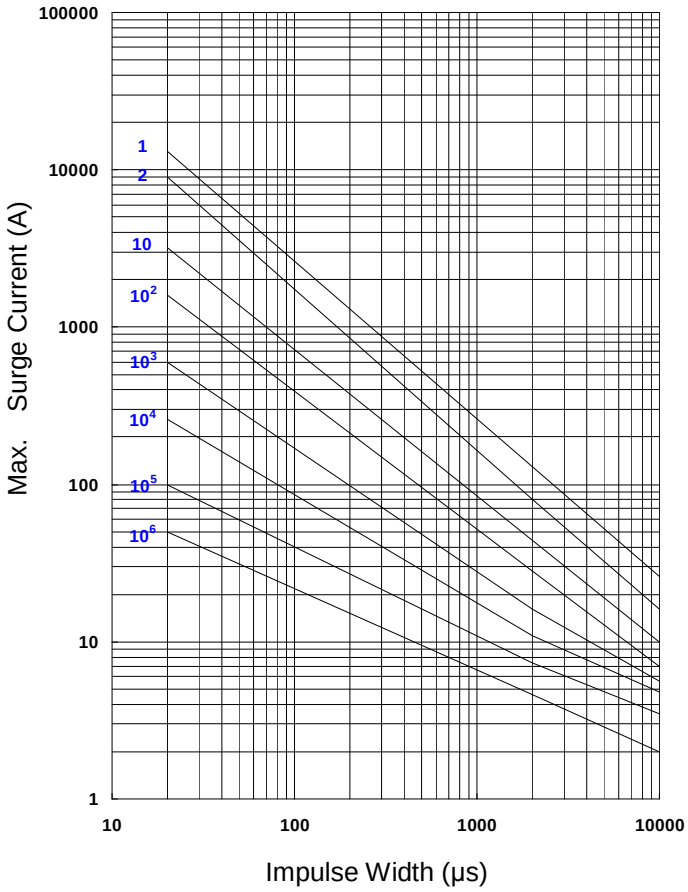
TVT14201 ~ TVT14112



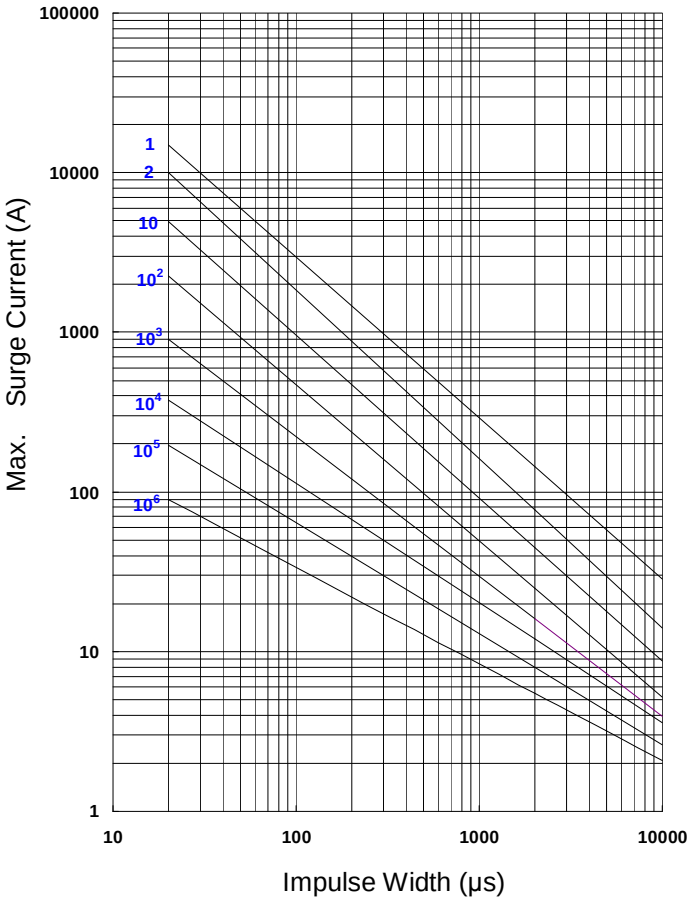

TVT20201 ~ TVT20112




TVT22201 ~ TVT22112

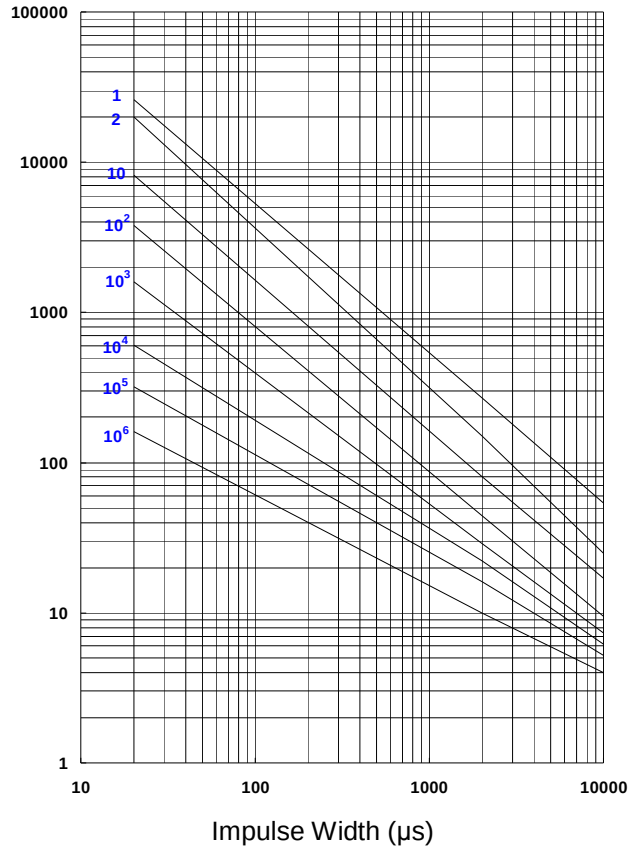



TVT25201 ~ TVT25112

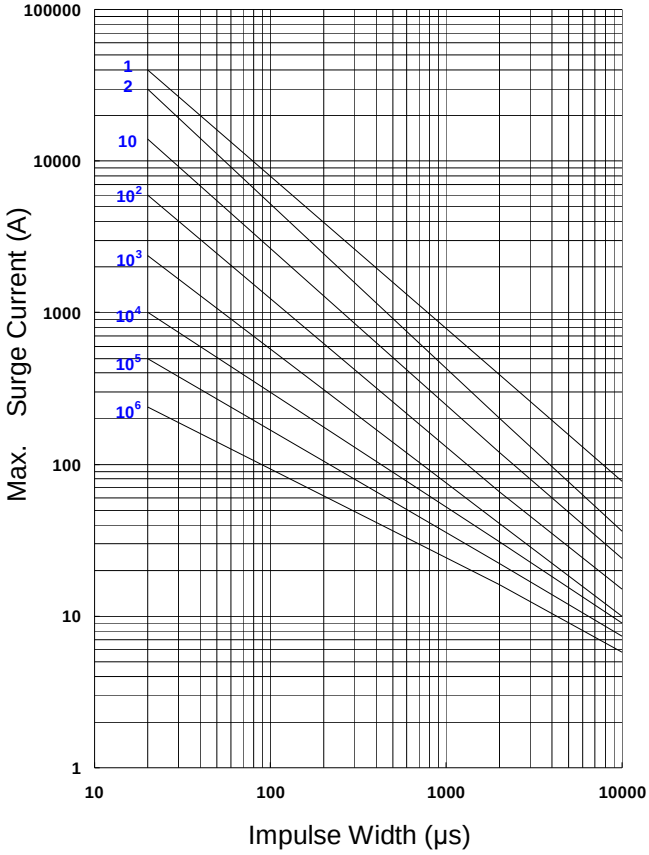


### ■ Max. Surge Current Derating Curves

**TVT32201~TVT32122**

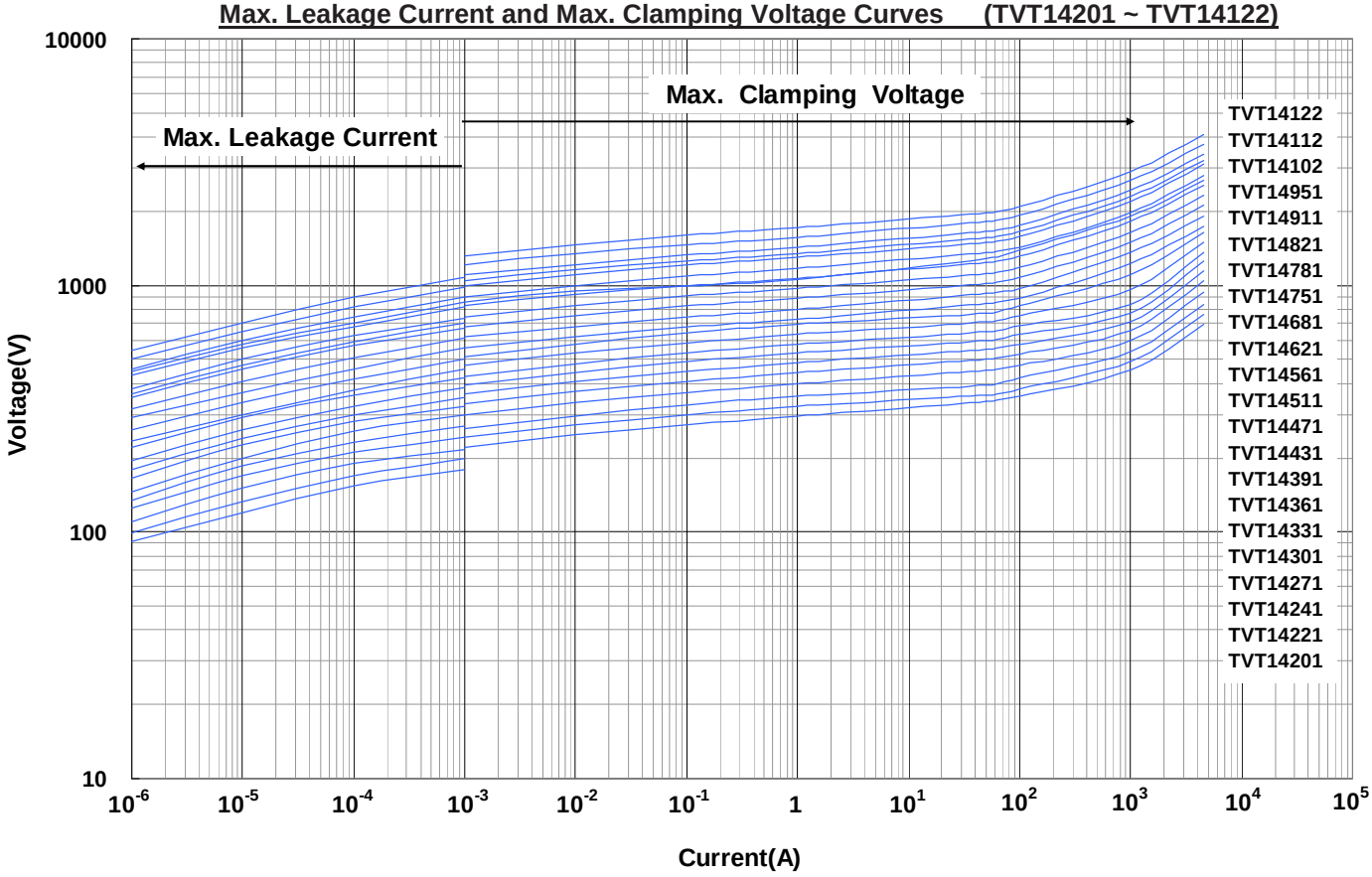



**TVT34201~TVT34122**

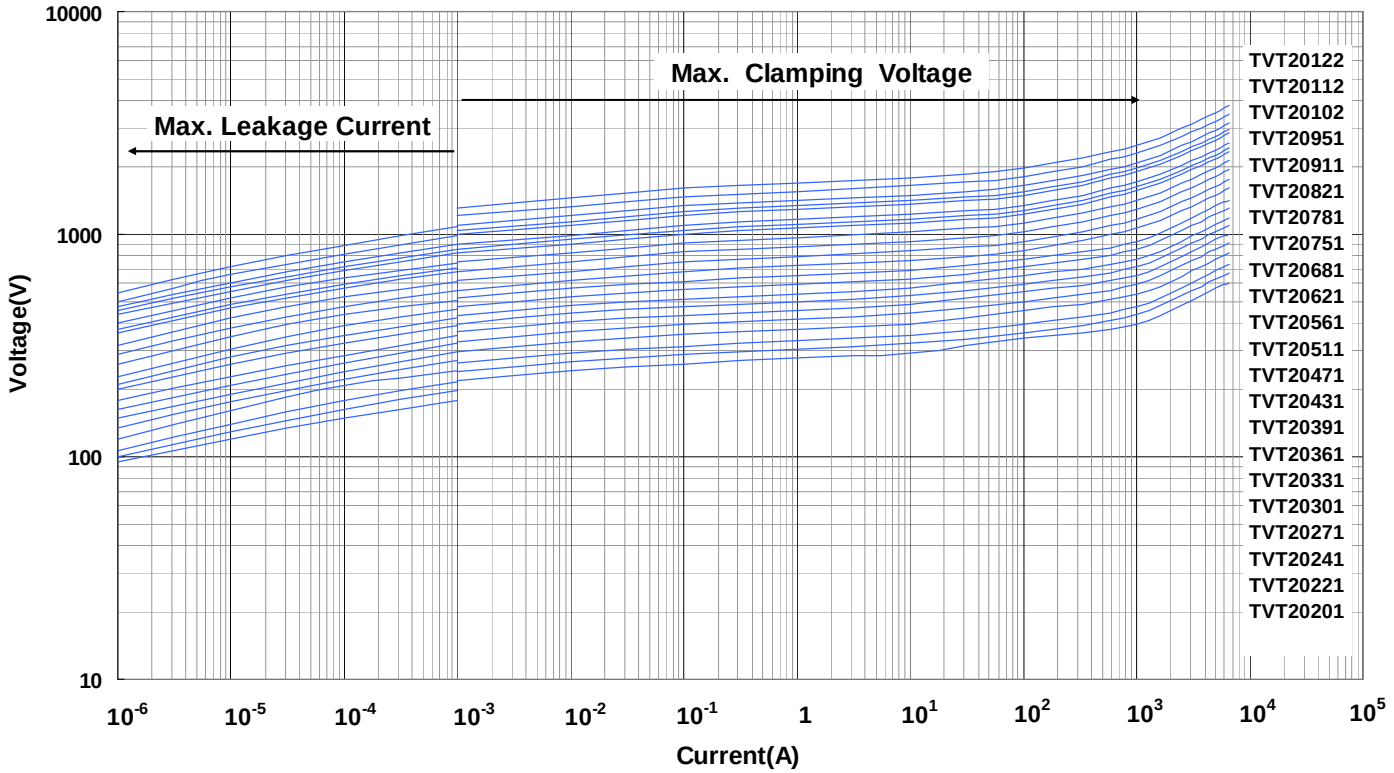


### ■ Max. Leakage Current and Max. Clamping Voltage Curves

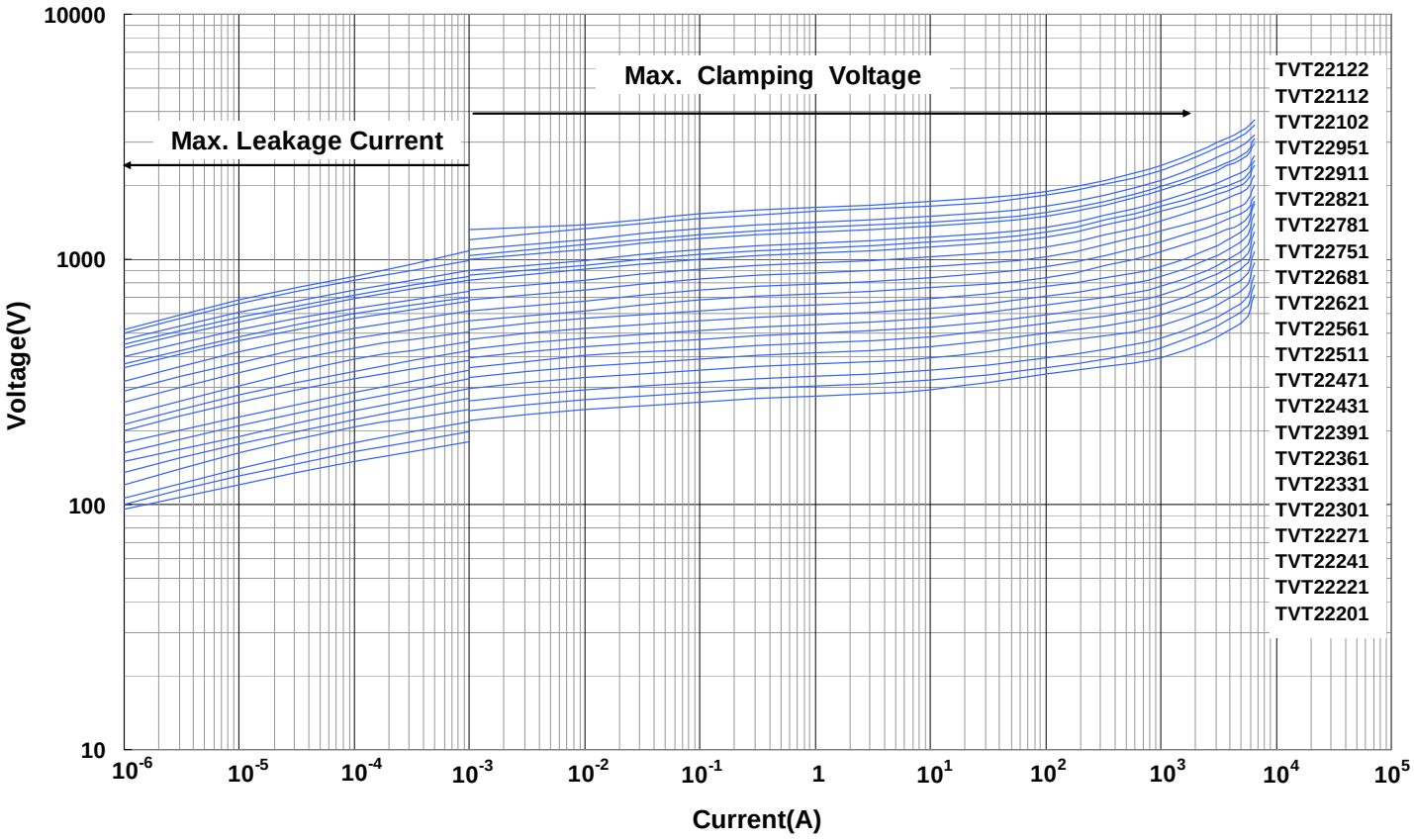
Max. Leakage Current and Max. Clamping Voltage Curves (TVT14201 ~ TVT14122)



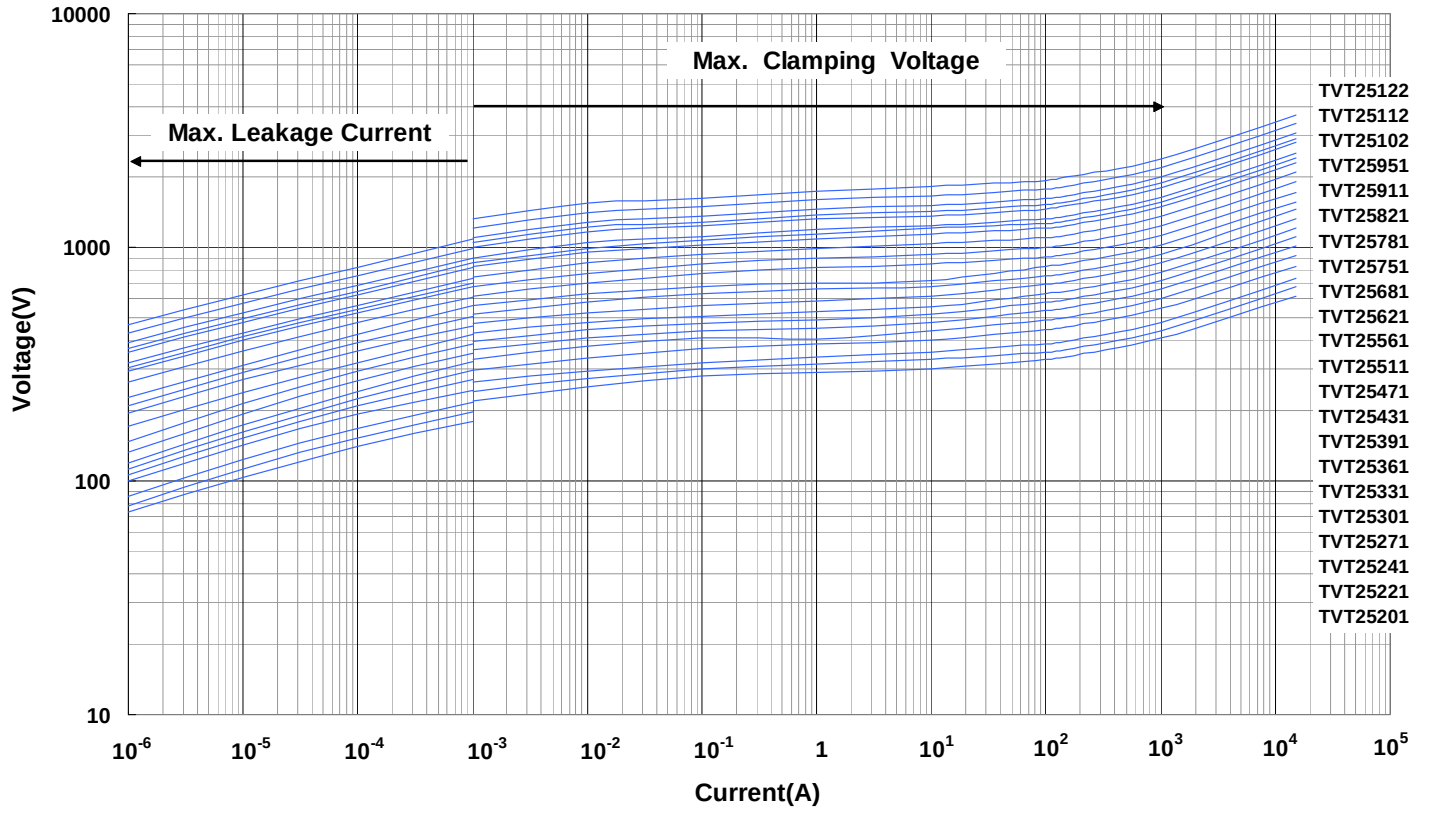

Max. Leakage Current and Max. Clamping Voltage Curves (TVT20201 ~ TVT20122)



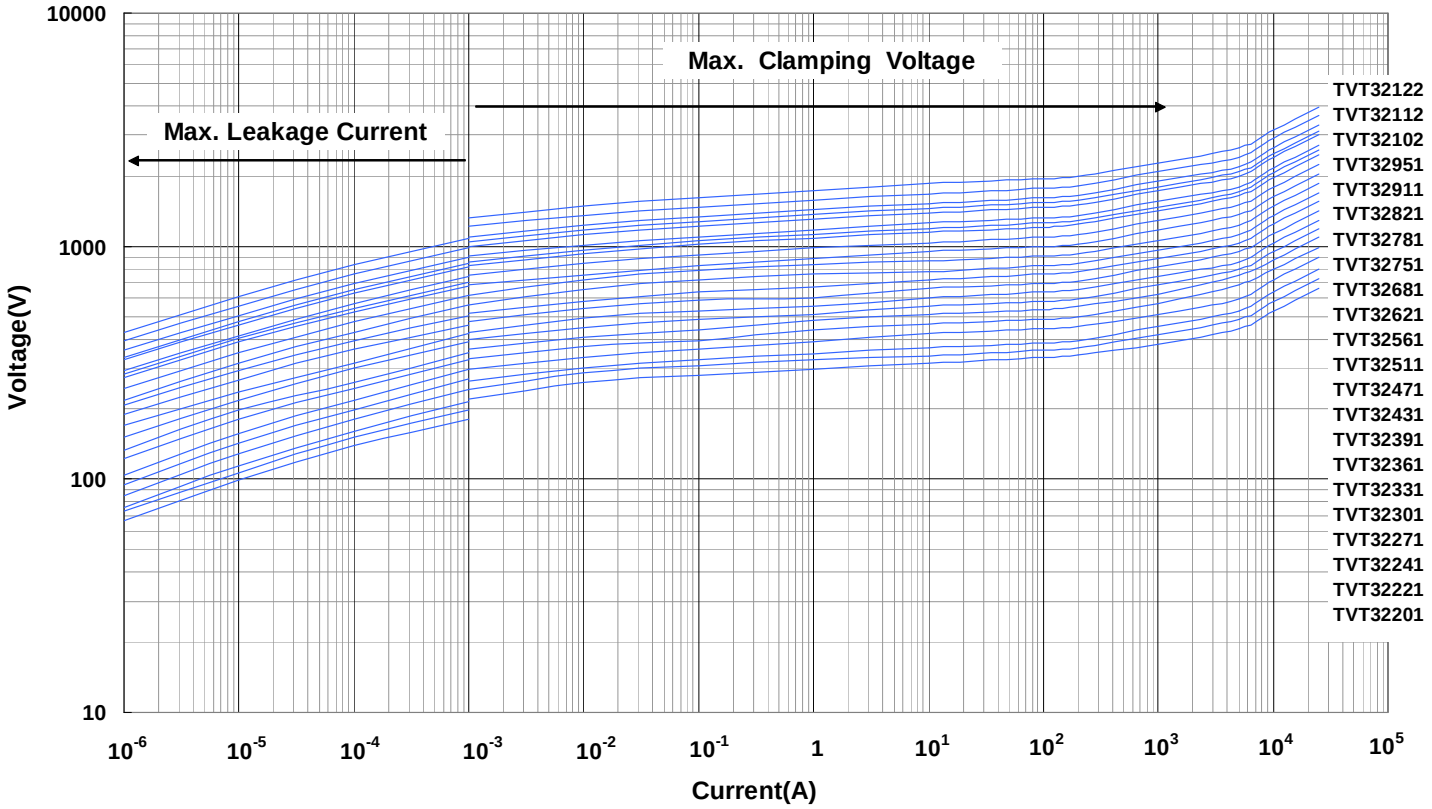
### Max. Leakage Current and Max. Clamping Voltage Curves (TVT22201 ~ TVT22122)



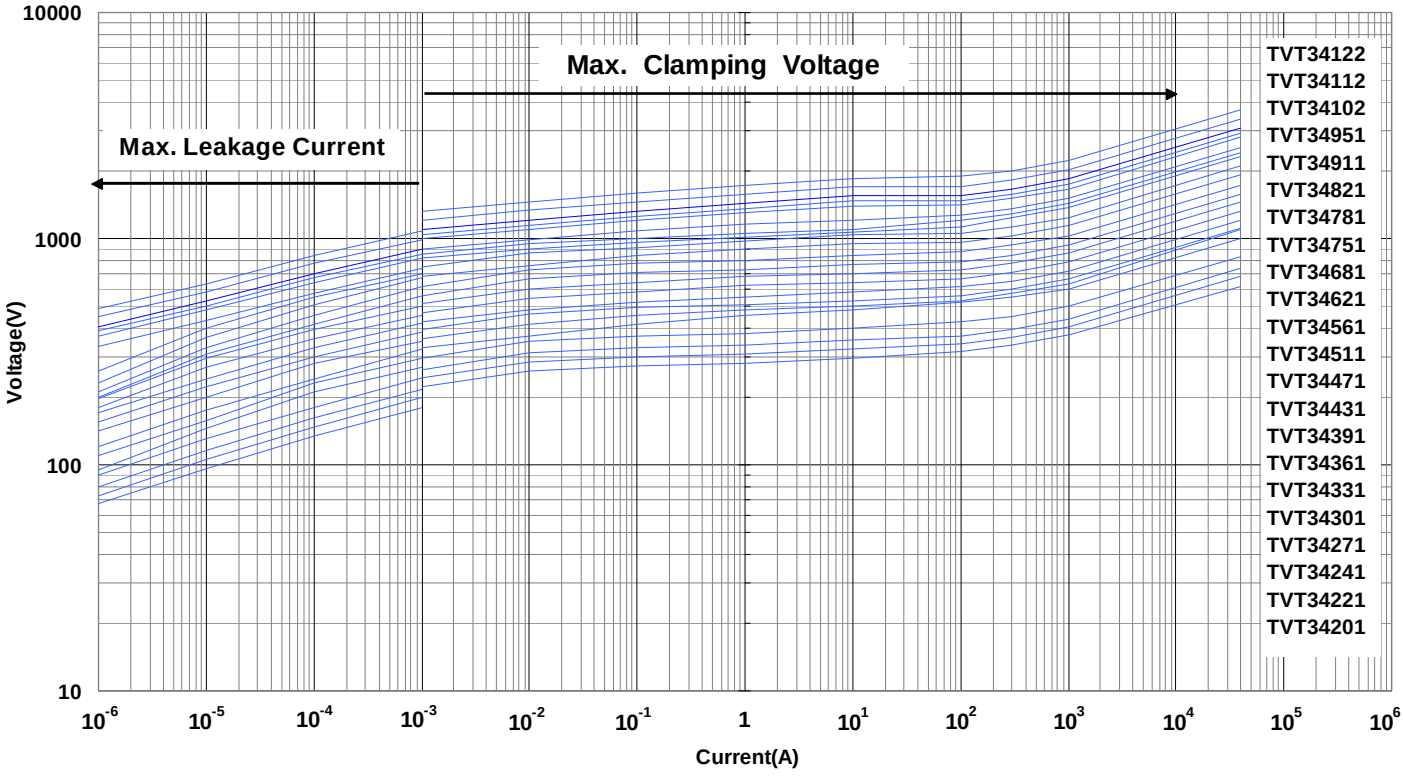

### Max. Leakage Current and Max. Clamping Voltage Curves (TVT25201 ~ TVT25122)



Max. Leakage Current and Max. Clamping Voltage Curves (TVT32201 ~ TVT32122)

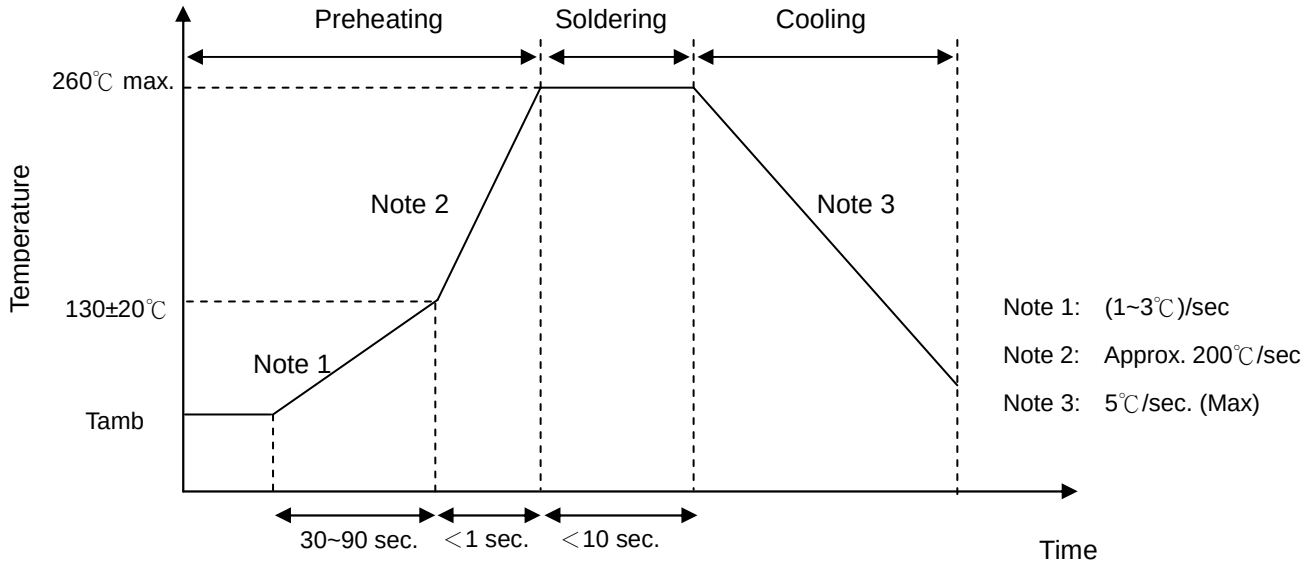



Max. Leakage Current and Max. Clamping Voltage Curves ( TVT34201 ~ TVT34122 )



### ■ Soldering Recommendation

#### ● Wave Soldering Profile




#### ● Recommended Reworking Conditions With Soldering Iron

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

### ■ Reliability

<table>
<tr><th>Item</th><th>Standard</th><th>Test Conditions / Methods</th><th>Specifications</th></tr>
<tr><td>Tensile Strength of Terminals</td><td>IEC60068-2-21</td><td>Gradually applying the force specified and keeping the unit fixed for 10±1 sec.<br><br>For TVT14~TVT32 Series<br>Terminal diameter (mm) / Force (Kg)<br>0.5<d≦0.8 : 1.0<br>0.8<d≦1.25 : 2.0<br>1.25<d : 4.0<br><br>For TVT34 Series<br>Terminal cross-sectional area ($mm^2$) / Terminal diameter (mm) / Force (Kg)<br>0.5<S≦1.2 : 0.8<d≦1.25 : 2.0<br>1.2<S : 1.25<d : 4.0</td><td>No visible damage<br>$|\triangle V/V_{1mA}| \leqq 5\%$</td></tr>
<tr><td>Bending Strength of Terminals</td><td>IEC 60068-2-21</td><td>Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, then return to the original positi on. Repeat the procedure in the opposite direction.<br><br>For TVT14~TVT32 Series<br>Terminal diameter (mm) / Force (Kg)<br>0.5<d≦0.8 : 0.5<br>0.8<d≦1.25 : 1.0<br>1.25<d : 2.0<br><br>For TVT34 Series<br>Terminal cross-sectional area ($mm^2$) / Terminal diameter (mm) / Force (Kg)<br>0.2<S≦0.5 : 0.5<d≦0.8 : 0.5<br>0.5<S≦1.2 : 0.8<d≦1.25 : 1.0<br>1.2<S : 1.25<d : 2.0</td><td>No visible damage<br>$|\triangle V/V_{1mA}| \leqq 5\%$</td></tr>
<tr><td>Vibration</td><td>IEC 1051-1</td><td>Frequency range: 10 ~ 55 Hz<br>Amplitude: 0.75mm or 98 $m/s^2$<br>Direction: 3 mutually perpendicular directions,2hrs each.</td><td>$|\triangle V/V_{1mA}| \leqq 5\%$<br>No visible damage</td></tr>
<tr><td>Solderability</td><td>IEC 60068-2-20</td><td>235±5℃ , 2±0.5 sec</td><td>At least 95% of terminal electrode is covered by new solder</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>IEC 60068-2-20</td><td>260±5℃ , 5±1 sec</td><td>$|\triangle V/V_{1mA}| \leqq 5\%$<br>No visible damage</td></tr>
<tr><td>High Temperature Storage</td><td>IEC60068-2-2</td><td>110±5℃ x 1000± 24 hrs</td><td>$|\triangle V/V_{1mA}| \leqq 5\%$</td></tr>
<tr><td>Damp Heat, Steady State</td><td>IEC 60068-2-3</td><td>a. 40±2℃, 90 ~ 95 % RH, 1344 hrs<br>b. 40±2℃, 90 ~ 95 % RH, at 10%Vdc,1344 hrs</td><td>$|\triangle V/V_{1mA}| \leqq 10\%$<br>No visible damage</td></tr>
<tr><td>Rapid Change of Temperature*1</td><td>IEC 60068-2-14</td><td>The conditions shown below shall be repeated 5 cycles<br>Step / Temperature (℃) / Period (minutes)<br>1 / -40±3 / 30±3<br>2 / Room temperature / 5±3<br>3 / 85±2 / 30±3<br>4 / Room temperature / 5±3</td><td>$|\triangle V/V_{1mA}| \leqq 5\%$<br>No visible damage</td></tr>
</table>

# Metal Oxide Varistor：TVT Type

## Thermally Protected Varistor Series

IEC61051-4.20

| Item | Standard | Test Conditions / Methods | Specifications |
|---|---|---|---|
| Endurance at Upper Category Temperature | IEC61051-4.20 | 85±2℃, 1000±24 hrs at $V_{DC}$ or $V_{rms}$ (Max. Allowable Voltage) | $\lvert \triangle V/V_{1mA} \rvert \leqq 10\ \%$<br>$R \geqq 1000M\Omega$<br>No visible damage |
| Low Temperature Storage (Optional) | CECC42000 | –40±5℃, 1000±24 hrs | $\lvert \triangle V/V_{1mA} \rvert \leqq 5\%$ |
| 8/20μs Surge Life | CECC42000 | 8/20 μs waveform, 10,000 surge currents, unipolar, interval 10 secs amplitude corr. to max. Surge current derating curves for 20 μs. | $\lvert \triangle V/V_{1mA} \rvert \leqq 10\ \%$<br>No visible damage |
| Varistor Voltage Temp. Coefficient | Specification Standard | $\frac{V_{1mA}\text{ at }85℃ - V_{1mA}\text{ at }25℃}{V_{1mA}\text{ at }25℃} \times \frac{1}{60} \times 100\ (\%/℃)$ | $-0.05 \leqq T_C \leqq 0\ (\%/℃)$ |
| Voltage Proof | IEC61051 | Metal balls method, 2500 $V_{ac}$ 1 min | No visible damage |
| Limited current abnormal overvoltage test | UL1449 3rd | Test voltage:<br>Varistor voltage / Test Voltage (V)<br>201-391 / 240 Vac<br>431-621 / 480 Vac<br>681-122 / 600 Vac<br>Each test voltage is applied with a short circuit current of 0.5A , 2.5A ,5A and , 10A respectively across the varistor.<br>The power supply is to incorporate a series variable resistor that can be adjusted to obtain the short-circuit current. | The varistor must be energized for 7 hours, or until the varistor becomes disconnected from the AC Line.<br>The cheesecloth draped on the varistor shall not be charring, glowing, or flaming. There are no any live parts to be accessibility after testing. |

### ■ Packaging

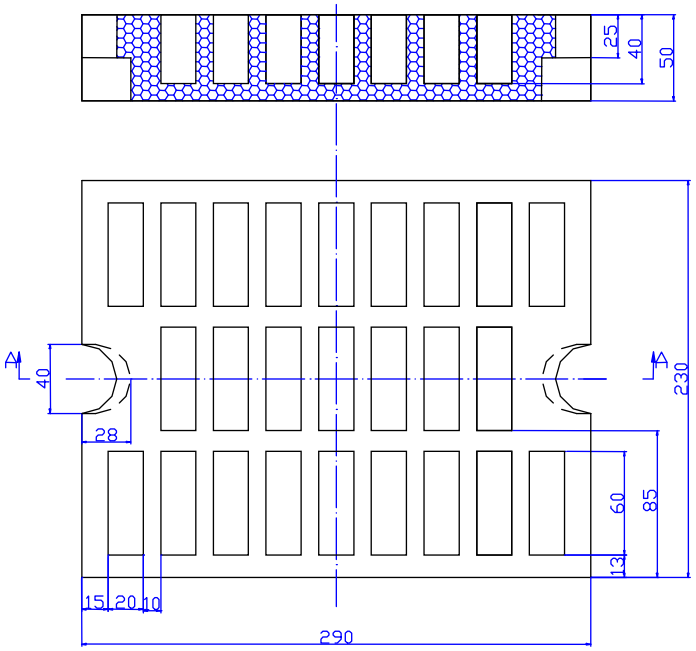
- 14, 20, 22,25,32 mm :

**Bulk Packing**

| Disc Size (mm) | Quantity (PCS/ Bag) |
|---|---|
| 14Φ | 50 |
| 20Φ | 20 |
| 22Φ | 20 |
| 25Φ | 20 |
| 32Φ | 10 |

- 34x34 mm

**Box Packing**




| Slot/Box | Pieces/Slot | Total Qty |
|---|---|---|
| 25 | 2 | 50 |

unit：mm

### ■ Storage Conditions of Products

- Storage Conditions :

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

- Period of Storage: 1 year.

### ■ Cross Reference

- **Dimensions：14mm**

THINKING： The part no. A is for 2- leaded structure and B is for 3- leaded structure.

Littelfuse： The part no. E is for 2- leaded structure and M is for 3- leaded structure.

EPCOS： 3- Leaded structure series only.

Walsin： The part no. B is for 2- leaded structure and C is for 3- leaded structure.

| Size(mm) | Vac(rms) | THINKING | Littelfuse | EPCOS | Walsin |
|---|---|---|---|---|---|
| 14 | 130 | TVT14201K(A/B) | TMOV14RP130(E/M) | ETFV14K130E2 | FSR201K(B/C)14ES |
| 14 | 140 | TVT14221K(A/B) | TMOV14RP140(E/M) | ETFV14K140E2 | FSR221K(B/C)14ES |
| 14 | 150 | TVT14241K(A/B) | TMOV14RP150(E/M) | ETFV14K150E2 | FSR241K(B/C)14ES |
| 14 | 175 | TVT14271K(A/B) | TMOV14RP175(E/M) | ETFV14K175E2 | FSR271K(B/C)14ES |
| 14 | 195 | TVT14301K(A/B) | TMOV14RP200(E/M) | -- | FSR311K(B/C)14ES |
| 14 | 215 | TVT14331K(A/B) | -- | ETFV14K210E2 | FSR331K(B/C)14ES |
| 14 | 230 | TVT14361K(A/B) | TMOV14RP230(E/M) | ETFV14K230E2 | FSR361K(B/C)14ES |
| 14 | 250 | TVT14391K(A/B) | TMOV14RP250(E/M) | ETFV14K250E2 | FSR391K(B/C)14ES |
| 14 | 275 | TVT14431K(A/B) | TMOV14RP275(E/M) | ETFV14K275E2 | FSR431K(B/C)14ES |
| 14 | 300 | TVT14471K(A/B) | TMOV14RP300(E/M) | ETFV14K300E2 | FSR471K(B/C)14ES |
| 14 | 320 | TVT14511K(A/B) | TMOV14RP320(E/M) | ETFV14K320E2 | FSR511K(B/C)14ES |
| 14 | 350 | TVT14561K(A/B) | -- | ETFV14K350E2 | FSR561K(B/C)14ES |
| 14 | 395 | TVT14621K(A/B) | TMOV14RP385(E/M) | ETFV14K385E2 | FSR621K(B/C)14ES |
| 14 | 420 | TVT14681K(A/B) | TMOV14RP420(E/M) | ETFV14K420E2 | FSR681K(B/C)14ES |
| 14 | 465 | TVT14751K(A/B) | TMOV20RP460(E/M) | -- | -- |
| 14 | 485 | TVT14781K(A/B) | -- | -- | -- |
| 14 | 510 | TVT14821K(A/B) | -- | -- | -- |
| 14 | 550 | TVT14911K(A/B) | -- | -- | -- |
| 14 | 575 | TVT14951K(A/B) | -- | -- | -- |
| 14 | 625 | TVT14102K(A/B) | -- | -- | -- |
| 14 | 680 | TVT14112K(A/B) | -- | -- | -- |
| 14 | 750 | TVT14122K(A/B) | -- | -- | -- |

# Metal Oxide Varistor：TVT Type

## Thermally Protected Varistor Series

- **Dimensions：20mm**

THINKING： The part no. A is for 2- leaded structure and B is for 3- leaded structure.

Littelfuse： The part no. E is for 2- leaded structure and M is for 3- leaded structure.

EPCOS： 3- Leaded structure series only.

Walsin： The part no. B is for 2- leaded structure and C is for 3- leaded structure.

| Size(mm) | Vac(rms) | THINKING | Littelfuse | EPCOS | Walsin |
|---|---|---|---|---|---|
| 20 | 130 | TVT20201K(A/B) | TMOV20RP130(E/M) | ETFV20K130E2 | FSR201 K(B/C)20ES |
| 20 | 140 | TVT20221K(A/B) | TMOV20RP140(E/M) | ETFV20K140E2 | FSR221 K(B/C)20ES |
| 20 | 150 | TVT20241K(A/B) | TMOV20RP150(E/M) | ETFV20K150E2 | FSR241 K(B/C)20ES |
| 20 | 175 | TVT20271K(A/B) | TMOV20RP175(E/M) | ETFV20K175E2 | FSR271 K(B/C)20ES |
| 20 | 195 | TVT20301K(A/B) | TMOV20RP200(E/M) | -- | FSR311 K(B/C)20ES |
| 20 | 215 | TVT20331K(A/B) | -- | ETFV20K210E2 | FSR331 K(B/C)20ES |
| 20 | 230 | TVT20361K(A/B) | TMOV20RP230(E/M) | ETFV20K230E2 | FSR361 K(B/C)20ES |
| 20 | 250 | TVT20391K(A/B) | TMOV20RP250(E/M) | ETFV20K250E2 | FSR391 K(B/C)20ES |
| 20 | 275 | TVT20431K(A/B) | TMOV20RP275(E/M) | ETFV20K275E2 | FSR431 K(B/C)20ES |
| 20 | 300 | TVT20471K(A/B) | TMOV20RP300(E/M) | ETFV20K300E2 | FSR471 K(B/C)20ES |
| 20 | 320 | TVT20511K(A/B) | TMOV20RP320(E/M) | ETFV20K320E2 | FSR511 K(B/C)20ES |
| 20 | 350 | TVT20561K(A/B) | -- | ETFV20K350E2 | FSR561 K(B/C)20ES |
| 20 | 395 | TVT20621K(A/B) | TMOV20RP385(E/M) | ETFV20K385E2 | FSR621 K(B/C)20ES |
| 20 | 420 | TVT20681K(A/B) | TMOV20RP420(E/M) | ETFV20K420E2 | FSR681 K(B/C)20ES |
| 20 | 465 | TVT20751K(A/B) | -- | ---- | FSR751 K(B/C)20ES |
| 20 | 485 | TVT20781K(A/B) | -- | | FSR781K(B/C)20ES |
| 20 | 510 | TVT20821K(A/B) | TMOV20RP510(E/M) | -- | FSR821 K(B/C)20ES |
| 20 | 550 | TVT20911K(A/B) | TMOV20RP550(E/M) | -- | FSR911 K(B/C)20ES |
| 20 | 575 | TVT20951K(A/B) | TMOV20RP575(E/M) | -- | FSR951K(B/C)20EL |
| 20 | 625 | TVT20102K(A/B) | TMOV20RP625(E/M) | -- | FSR102 K(B/C)20ES |
| 20 | 680 | TVT20112K(A/B) | -- | -- | FSR112 K(B/C)20ES |
| 20 | 750 | TVT20122K(A/B) | TMOV20RP750(E/M) | -- | FSR122K(B/C)20EL |

# Metal Oxide Varistor：TVT Type

## Thermally Protected Varistor Series

- **Dimensions：25mm**

THINKING： The part no. A is for 2- leaded structure and B is for 3- leaded structure.

Littelfuse： No 25mm series.

EPCOS： 3- Leaded structure series only.

Walsin： The part no. B is for 2- leaded structure and C is for 3- leaded structure.

| Size(mm) | Vac(rms) | THINKING | Littelfuse | EPCOS | Walsin |
|---|---|---|---|---|---|
| 25 | 130 | TVT25201K | -- | ETFV25K130E4 | FSR201KC25DS |
| 25 | 140 | TVT25221K | -- | ETFV25K140E4 | FSR221KC25DS |
| 25 | 150 | TVT25241K | -- | ETFV25K150E4 | FSR241KC25DS |
| 25 | 175 | TVT25271K | -- | ETFV25K175E4 | FSR271KC25DS |
| 25 | 195 | TVT25301K | -- | | FSR301KC25DS |
| 25 | 215 | TVT25331K | -- | ETFV25K210E4 | FSR331KC25DS |
| 25 | 230 | TVT25361K | -- | ETFV25K230E4 | FSR361KC25DS |
| 25 | 250 | TVT25391K | -- | ETFV25K250E4 | FSR391KC25DS |
| 25 | 275 | TVT25431K | -- | ETFV25K275E4 | FSR431KC25DS |
| 25 | 300 | TVT25471K | -- | ETFV25K300E4 | FSR471KC25DS |
| 25 | 320 | TVT25511K | -- | ETFV25K320E4 | FSR511KC25DS |
| 25 | 395 | TVT25561K | -- | ETFV25K350E4 | FSR561KC25DS |
| 25 | 420 | TVT25621K | -- | ETFV25K385E4 | FSR621KC25DS |
| 25 | 465 | TVT25681K | -- | ETFV25K420E4 | FSR681KC25DS |
| 25 | 485 | TVT25751K | -- | -- | FSR751KC25DS |
| 25 | 510 | TVT25781K | -- | -- | FSR781KC25DS |
| 25 | 550 | TVT25821K | -- | -- | FSR821KC25DL |
| 25 | 575 | TVT25911K | -- | -- | FSR911KC25DL |
| 25 | 625 | TVT25951K | -- | -- | -- |
| 25 | 680 | TVT25102K | -- | -- | FSR102KC25DL |
| 25 | 750 | TVT25122K | -- | -- | FSR112KC25DL |

# Metal Oxide Varistor：TVT Type

## Thermally Protected Varistor Series

- **Dimensions：34*34mm**

  3- leaded structure series only

| Size(mm) | Vac(rms) | THINKING | Littelfuse | EPCOS | Walsin |
|---|---|---|---|---|---|
| 34*34 | 130 | TVT34201KB | TMOV34S131MP | -- | FSR201K34R |
| 34*34 | 140 | TVT34221KB | TMOV34S141MP | -- | FSR221K34R |
| 34*34 | 150 | TVT34241KB | TMOV34S151MP | -- | FSR241K34R |
| 34*34 | 175 | TVT34271KB | TMOV34S181MP | -- | FSR271K34R |
| 34*34 | 195 | TVT34301KB | TMOV34S201MP | -- | FSR321K34R |
| 34*34 | 215 | TVT34331KB | -- | -- | -- |
| 34*34 | 230 | TVT34361KB | -- | -- | -- |
| 34*34 | 250 | TVT34391KB | TMOV34S251MP | -- | FSR391K34R |
| 34*34 | 275 | TVT34431KB | TMOV34S271MP | -- | FSR431K34R |
| 34*34 | 300 | TVT34471KB | TMOV34S301MP | -- | FSR471K34R |
| 34*34 | 320 | TVT34511KB | TMOV34S321MP | -- | FSR511K34R |
| 34*34 | 350 | TVT34561KB | TMOV34S351MP | -- | FSR561K34R |
| 34*34 | 395 | TVT34621KB | TMOV34S391MP | -- | FSR621K34R |
| 34*34 | 420 | TVT34681KB | TMOV34S421MP | -- | FSR681K34R |
| 34*34 | 465 | TVT34751KB | TMOV34S461MP | -- | FSR751K34R |
| 34*34 | 485 | TVT34781KB | TMOV34S481MP | -- | FSR781K34R |
| 34*34 | 510 | TVT34821KB | TMOV34S511MP | -- | FSR821K34R |
| 34*34 | 550 | TVT34911KB | TMOV34S551MP | -- | FSR911K34R |
| 34*34 | 575 | TVT34951KB | TMOV34S571MP | -- | FSR951K34R |
| 34*34 | 625 | TVT34102KB | TMOV34S621MP | -- | FSR102K34R |
| 34*34 | 680 | TVT34112KB | TMOV34S681MP | -- | FSR112K34R |
| 34*34 | 750 | TVT34122KB | TMOV34S751MP | -- | FSR122K34R |