

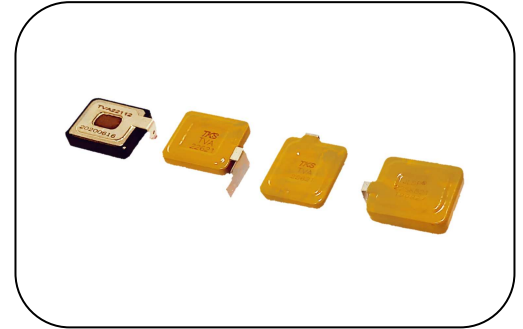
Varistor: TVA22 Series



Strap Type Varistor for Over-Voltage Protection

■ Features

1. RoHS & halogen-free compliant
2. Body size: 22*25mm
3. Agency recognition: UL
4. UL 1449 4th for SPD Type 5 application



■ Recommended Applications

1. EV charging station
2. Inverter
3. Telecommunications
4. AC/DC circuit
5. PV applications
6. SPD (Surge Protection Device)

■ Part Number Code

| | | | | | | | | | | | | | | | | |
|--------------|---------------------------------|------|---------|--------------------------------------|-----|-------------------------------|------|-----------|-------|-----------------|------|-----------|---------|----|----|--|
| T | V | A | 2 | 2 | 2 | 0 | 1 | K | K | Q | B | J | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | |
| Product Type | | Size | | Varistor Voltage (V _{1mA}) | | Tolerance of V _{1mA} | | Structure | | Optional Suffix | | | | | | |
| TVA | THINKING Varistor TVA Series | 22 | 22*25mm | 820 | 82V | 201 | 200V | 102 | 1000V | K | ±10% | AAAA~ZZZZ | 001~999 | | | |

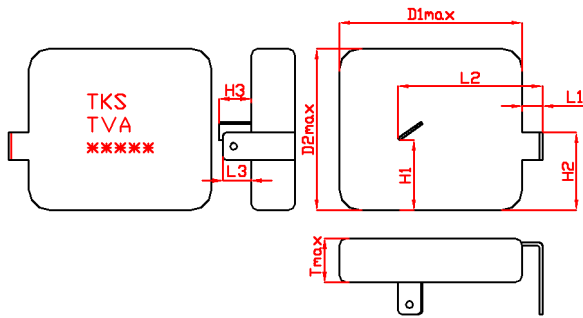
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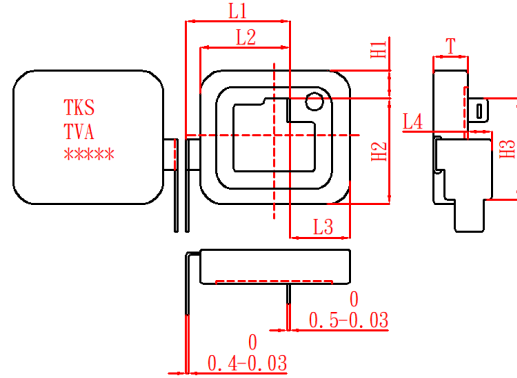


Structures and Dimensions

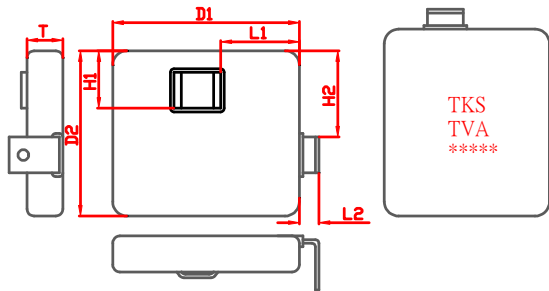
● KQAP Type



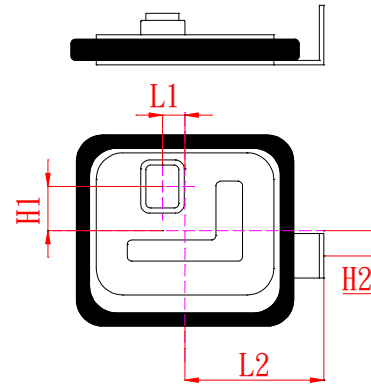
● KQBJ Type



● KQMV Type



● KQMH Type



(Unit: mm)

| Structure | L1 | L2 | L3 | L4 | H1. | H2 | H3 | D1max | D2max | Tmax |
|-----------|----------|---------------|---------------|-------|--------------|---------------|-----------|-------|-------|------|
| KQAP | 2.9±0.5 | 20.7±0.5 | 4±0.5 | --- | 10.1±0.5 | 11.2±0.5 | 4.6±0.5 | 26.2 | 23.2 | 8 |
| KQBJ | 18±0.3 | 15.75+0.3~0.7 | 10.25+0.3~0.7 | 3±0.5 | 5.05+0.1~0.5 | 17.75+0.4~0.7 | 17.35±0.3 | --- | --- | 7.6 |
| KQMV | 11±0.5 | 2.8±0.5 | --- | --- | 8±0.5 | 12±0.5 | --- | 26.5 | 23.5 | 6.8 |
| KQMH | 2.55±0.5 | 15.65±0.5 | --- | --- | 4.95±0.5 | 2.85±0.5 | --- | --- | --- | --- |

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Electrical Characteristics

| Part No. | Varistor Voltage (@ 1mA DC) | Max. Continuous Voltage | | Max. Clamping Voltage (8/20µs) | | Max. Surge Current (8/20µs) | Surge Operating Duty Test (8/20µs) | | Max. Energy (2ms) | Rated Power | Safety Approvals |
|---------------|-----------------------------|--------------------------|---------------------|--------------------------------|--------------------|-----------------------------|------------------------------------|---------------------|----------------------|-------------|------------------|
| | V _{1mA} (V) | V _{AC(rms)} (V) | V _{DC} (V) | V _P (V) | I _P (A) | I _{max} (KA) | I _{max} (KA) | I _n (KA) | W _{max} (J) | P (W) | UL 1449 & cUL |
| TVA22820K□□□□ | 82 | 50 | 65 | 135 | 175 | 25 | 20 | 10 | 70 | 1.0 | |
| TVA22101K□□□□ | 100 | 60 | 85 | 165 | 175 | 25 | 20 | 10 | 87 | 1.0 | |
| TVA22121K□□□□ | 120 | 75 | 100 | 200 | 175 | 25 | 20 | 10 | 104 | 1.0 | |
| TVA22151K□□□□ | 150 | 95 | 125 | 250 | 175 | 25 | 20 | 10 | 132 | 1.0 | |
| TVA22181K□□□□ | 180 | 115 | 150 | 300 | 175 | 25 | 20 | 10 | 120 | 1.0 | |
| TVA22201K□□□□ | 200 | 130 | 170 | 340 | 175 | 25 | 20 | 10 | 128 | 1.0 | |
| TVA22221K□□□□ | 220 | 140 | 180 | 360 | 175 | 25 | 20 | 10 | 135 | 1.0 | |
| TVA22241K□□□□ | 240 | 150 | 200 | 395 | 175 | 25 | 20 | 10 | 146 | 1.0 | |
| TVA22271K□□□□ | 270 | 175 | 225 | 455 | 175 | 25 | 20 | 10 | 170 | 1.0 | |
| TVA22361K□□□□ | 360 | 230 | 300 | 595 | 175 | 25 | 20 | 10 | 190 | 1.0 | |
| TVA22391K□□□□ | 390 | 250 | 320 | 650 | 175 | 25 | 20 | 10 | 210 | 1.0 | |
| TVA22431K□□□□ | 430 | 275 | 350 | 710 | 175 | 25 | 20 | 10 | 220 | 1.0 | |
| TVA22471K□□□□ | 470 | 300 | 385 | 775 | 175 | 25 | 20 | 10 | 225 | 1.0 | |
| TVA22511K□□□□ | 510 | 320 | 415 | 845 | 175 | 25 | 20 | 10 | 230 | 1.0 | |
| TVA22561K□□□□ | 560 | 350 | 450 | 930 | 175 | 25 | 20 | 10 | 235 | 1.0 | |
| TVA22621K□□□□ | 620 | 385 | 505 | 1025 | 175 | 25 | 20 | 10 | 240 | 1.0 | |
| TVA22681K□□□□ | 680 | 420 | 560 | 1120 | 175 | 25 | 20 | 10 | 250 | 1.0 | |
| TVA22751K□□□□ | 750 | 460 | 615 | 1240 | 175 | 25 | 20 | 10 | 275 | 1.0 | |
| TVA22781K□□□□ | 780 | 485 | 640 | 1290 | 175 | 25 | 20 | 10 | 290 | 1.0 | |
| TVA22821K□□□□ | 820 | 510 | 670 | 1355 | 175 | 25 | 20 | 10 | 300 | 1.0 | |
| TVA22911K□□□□ | 910 | 550 | 745 | 1500 | 175 | 25 | 20 | 10 | 340 | 1.0 | |
| TVA22951K□□□□ | 950 | 575 | 765 | 1570 | 175 | 25 | 20 | 10 | 355 | 1.0 | |
| TVA22102K□□□□ | 1000 | 625 | 825 | 1650 | 175 | 25 | 20 | 10 | 375 | 1.0 | |
| TVA22112K□□□□ | 1100 | 680 | 895 | 1815 | 175 | 25 | 20 | 10 | 390 | 1.0 | |
| TVA22122K□□□□ | 1200 | 750 | 980 | 2000 | 175 | 25 | 20 | 10 | 420 | 1.0 | |

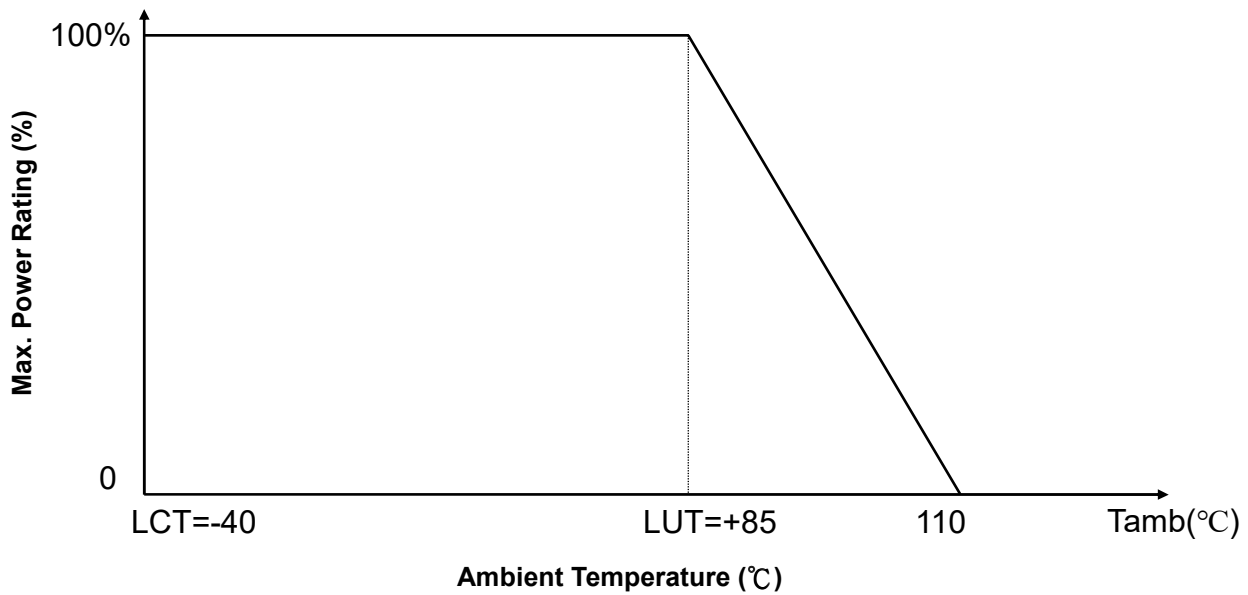
Note: □□□□ is structure code and please refer to "Structures and Dimensions."

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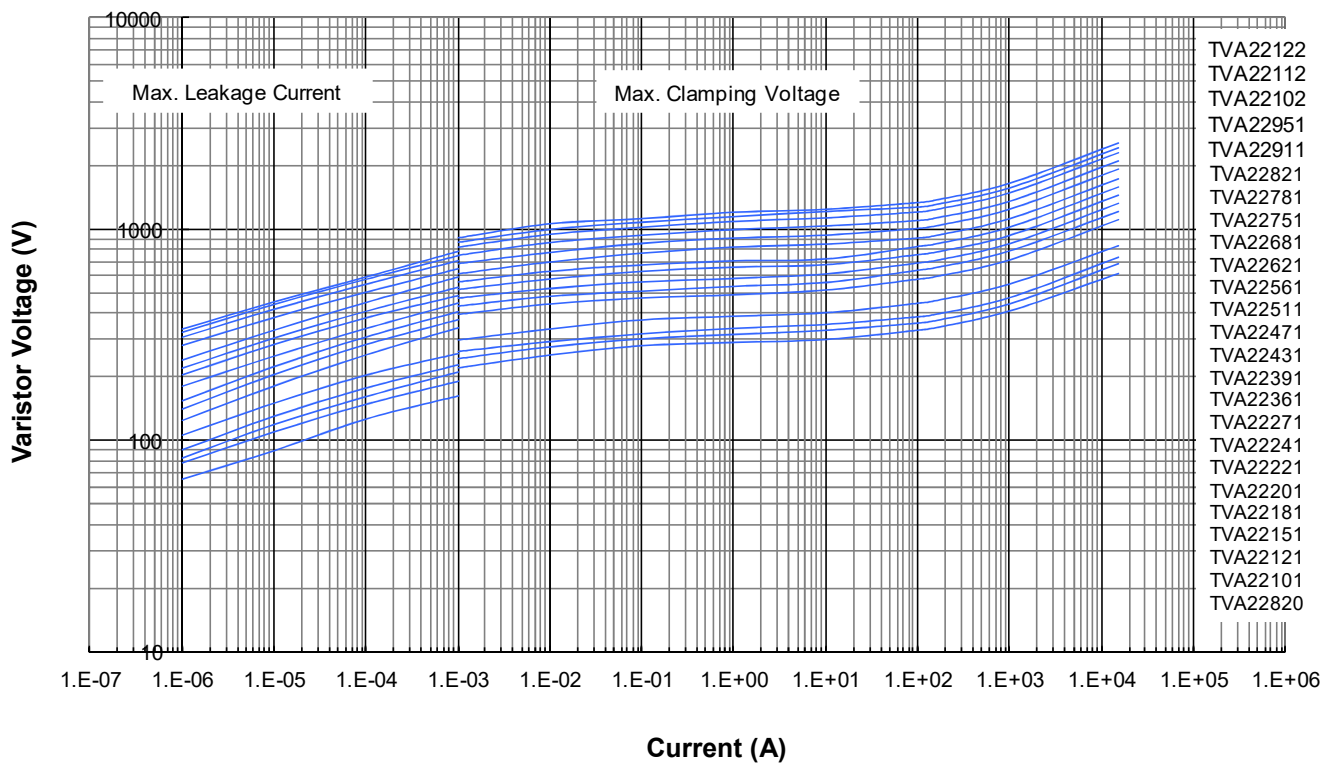


■ Power Derating Curve



■ Max. Leakage Current and Max. Clamping Voltage Curves

Max. Leakage Current and Max. Clamping Voltage Curves (TVA22820 – TVT22122)



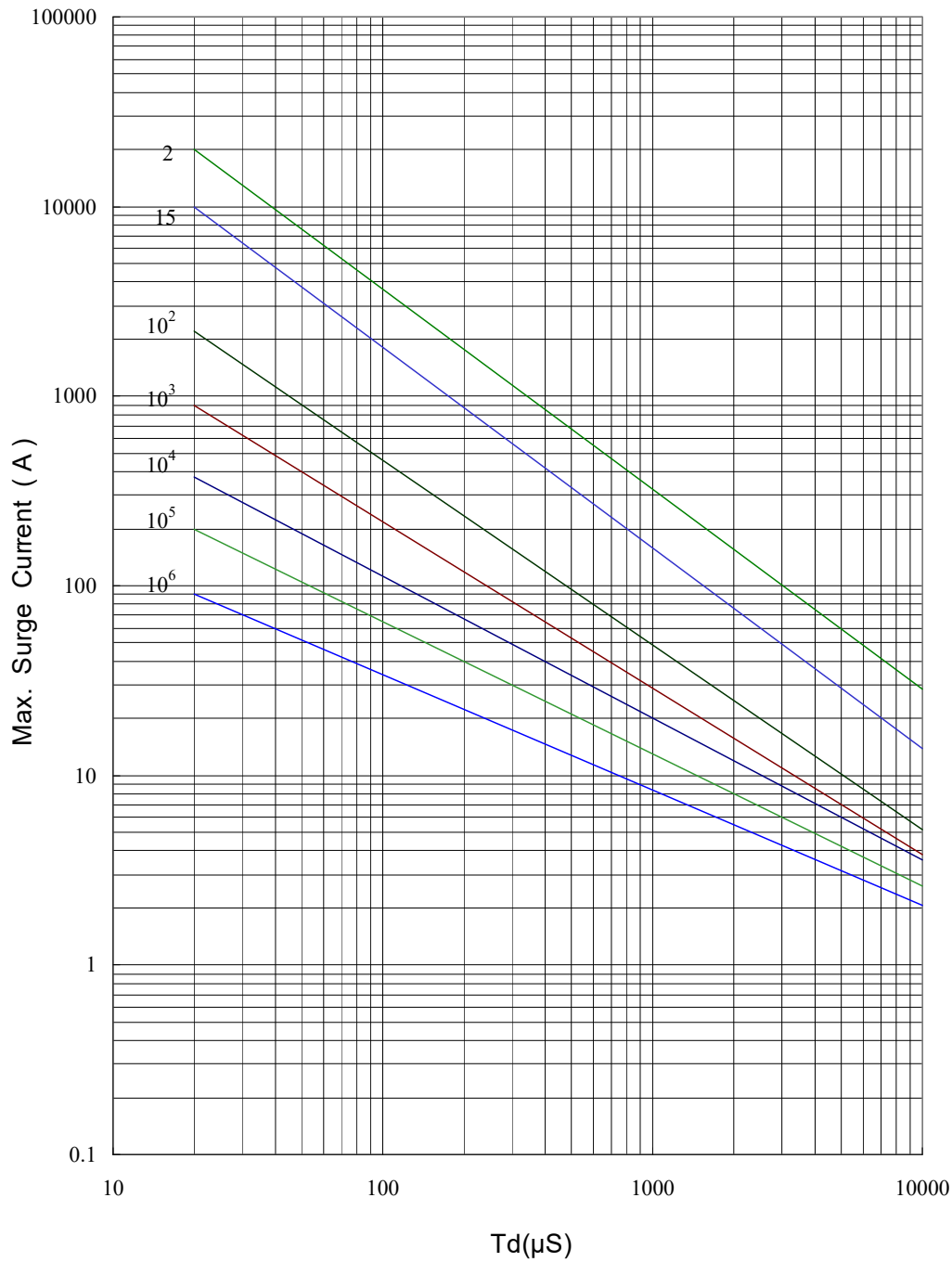
Varistor: TVA22 Series

Strap Type Varistor for Over-Voltage Protection



■ Surge Life Time Ratings

Surge Life Times Ratings (TVA22820 – TVT22122)



Varistor: TVA22 Series

Strap Type Varistor for Over-Voltage Protection



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 cross-sectional area (mm²)</th> <th>Terminal diameter (mm)</th> <th>Force (Kg)</th> </tr> </thead> <tbody> <tr> <td>0.5<S≤1.2</td> <td>0.8<d≤1.25</td> <td>2.0</td> </tr> <tr> <td>1.2<S</td> <td>1.25<d</td> <td>4.0</td> </tr> </tbody> </table> | Terminal cross-sectional area (mm ²) | Terminal diameter (mm) | Force (Kg) | 0.5<S≤1.2 | 0.8<d≤1.25 | 2.0 | 1.2<S | 1.25<d | 4.0 | $ \Delta V_{1mA} / V_{1mA} \leq 5\%$ No visible damage | | | | | | |
| Terminal cross-sectional area (mm ²) | Terminal diameter (mm) | Force (Kg) | | | | | | | | | | | | | | | | |
| 0.5<S≤1.2 | 0.8<d≤1.25 | 2.0 | | | | | | | | | | | | | | | | |
| 1.2<S | 1.25<d | 4.0 | | | | | | | | | | | | | | | | |
| Vibration (Optional) | IEC 60068-2-6 | Frequency range: 10~55Hz Amplitude: 0.75mm or 98m/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 (For Lead wire structure) | 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±2°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 (optional) | 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>≤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>≤3</td> </tr> </tbody> </table> | Step | Temperature (°C) | Period (minutes) | 1 | -40±3 | 30±3 | 2 | Room temperature | ≤3 | 3 | 85±2 | 30±3 | 4 | Room temperature | ≤3 | $ \Delta V_{1mA} / V_{1mA} \leq 5\%$ No visible damage |
| Step | Temperature (°C) | Period (minutes) | | | | | | | | | | | | | | | | |
| 1 | -40±3 | 30±3 | | | | | | | | | | | | | | | | |
| 2 | Room temperature | ≤3 | | | | | | | | | | | | | | | | |
| 3 | 85±2 | 30±3 | | | | | | | | | | | | | | | | |
| 4 | Room temperature | ≤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 Operating Duty Test | IEC 61643-11 | a. Measured limiting voltage @ 0.1In, 0.2In, 0.5In, 1.0In, I _{max} b. Operating duty test: In*15 times | $ \Delta V_{1mA} / V_{1mA} \leq 10\%$ No visible damage | | | | | | | | | | | | | | | |
| Climatic Sequence | IEC 61051-1 | a. Dry heat at 85°C, 16hrs b. Damp heat, 1st cycle: 55°C, 95RH, 24hrs (IEC60068-2-30) c. Cold, -40°C, 2 hrs d. Damp heat, additional 5 cycles, 120 hrs | $ \Delta V_{1mA} / V_{1mA} \leq 10\%$ No visible damage Insulation Resistance ≥100MΩ | | | | | | | | | | | | | | | |
| Voltage Proof | IEC 61051-1 | Metal balls method, 2500 V _{ac} 1 min | No visible damage | | | | | | | | | | | | | | | |

Varistor: TVA22 Series

Strap Type Varistor for Over-Voltage Protection



■ Packaging

● Bulk Packing

| Product Series | Quantity (pcs/bag) |
|----------------|--------------------|
| TVA22*KQAP | 112 |
| TVA22*KQBJ | |
| TVA22*KQMV | |
| TVA22*KQMH | |

■ Warehouse Storage Conditions of Products

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