



**THE DATASHEET OF
101KD10J**



DATA SHEET

METAL OXIDE VARISTORS POWER SUPPLY

10D series

RoHS compliant & Halogen free



Product specification— May 08, 2021 V.2



Metal Oxide Varistors (MOV) Data Sheet

Features

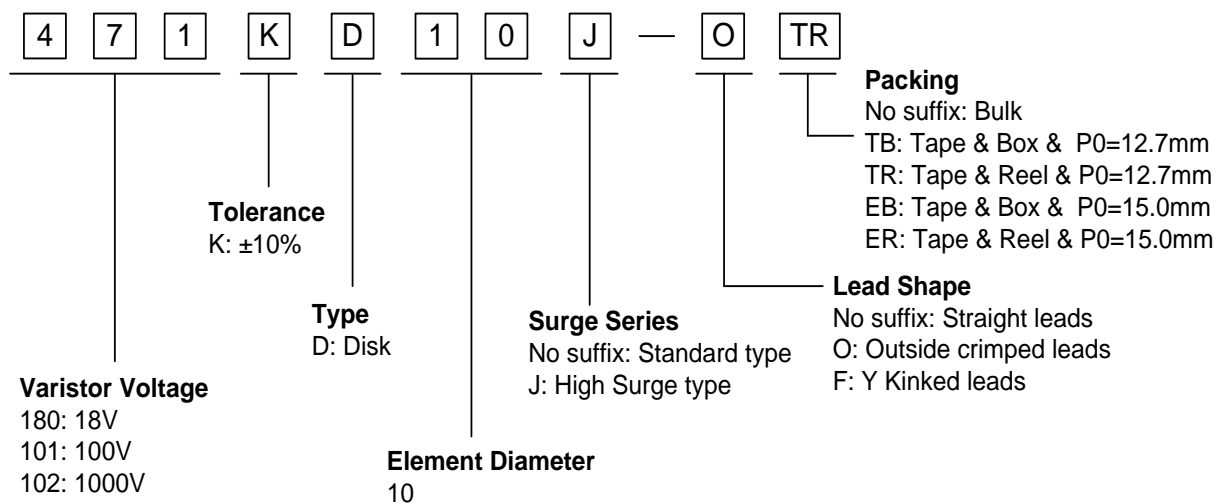
- Wide operating voltage (V_{1mA}) range from 18V to 1100V
- Fast responding to transient over-voltage
- Large absorbing transient energy capability
- Low clamping ratio and no follow-on current
- Meets MSL level 1, per J-STD-020
- Operating Temperature: $-40^{\circ}\text{C} \sim +105^{\circ}\text{C}$
- Storage Temperature: $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$
- Safety certification: UL、CSA、VDE



Applications

- Transistor, diode, IC, thyristor or triac semiconductor protection
- Surge protection in consumer electronics
- Surge protection in industrial electronics
- Surge protection in electronic home appliances, gas and petroleum appliances
- Relay and electromagnetic valve surge absorption

Part Number Code



Dimensions



| Table 1 | |
|----------|-----------|
| Unit: mm | |
| Symbol | Dimension |
| H | 10.5~16.0 |
| H1 | 13.0~17.5 |
| L(min.) | 20.0 |
| L1(min.) | 15.0 |
| D | 10.0~12.5 |
| F(±0.8) | 7.5 |
| T | Table 2 |
| e(±0.8) | Table 2 |
| d(±0.05) | 0.8 |
| d1(±0.4) | 1.4 |

| Table 2 | | | | | |
|----------|---------|-----|-------|---------|-----|
| Unit: mm | | | | | |
| Model | T | e | Model | T | e |
| 180K | 2.0~4.6 | 1.5 | 301K | 2.7~5.5 | 2.5 |
| 220K | 2.1~4.7 | 1.6 | 331K | 2.7~5.8 | 2.5 |
| 270K | 2.1~4.8 | 1.8 | 361K | 2.9~6.0 | 2.7 |
| 330K | 2.2~5.0 | 1.7 | 391K | 3.0~6.2 | 2.8 |
| 390K | 2.1~5.3 | 1.8 | 431K | 3.2~6.5 | 3.0 |
| 470K | 2.2~5.4 | 1.9 | 471K | 3.3~6.7 | 3.2 |
| 560K | 2.3~5.5 | 2.1 | 511K | 3.4~6.8 | 3.4 |
| 680K | 2.4~5.6 | 2.4 | 561K | 3.6~7.0 | 3.6 |
| 820K | 2.1~4.7 | 1.8 | 621K | 3.8~7.3 | 3.9 |
| 101K | 2.4~4.9 | 2.0 | 681K | 4.0~7.6 | 4.2 |
| 121K | 2.4~5.1 | 2.2 | 751K | 4.3~8.0 | 4.3 |
| 151K | 2.2~5.4 | 1.8 | 781K | 4.4~8.1 | 4.4 |
| 181K | 2.3~4.8 | 1.9 | 821K | 4.6~8.3 | 4.6 |
| 201K | 2.4~5.0 | 2.0 | 911K | 4.8~8.8 | 5.0 |
| 221K | 2.5~5.1 | 2.1 | 102K | 5.4~9.3 | 5.0 |
| 241K | 2.6~5.2 | 2.2 | 112K | 5.8~9.9 | 5.4 |
| 271K | 2.6~5.4 | 2.4 | | | |

METAL OXIDE VARISTORS

10D

Electrical Characteristics

| Part Number | | Maximum Allowable Voltage | | Varistor Voltage | Maximum Clamping Voltage | | Withstanding Surge Current | | Maximum Energy (10/1000µs) | | Rated Power | Typical Capacitance (Reference) |
|-------------|------------|---------------------------|---------------------|----------------------|--------------------------|--------------------|----------------------------|------------------|----------------------------|----------------|-------------|---------------------------------|
| Standard | High Surge | V _{AC} (V) | V _{DC} (V) | V _{1mA} (V) | I _P (A) | V _C (V) | I (A) Standard | I (A) High Surge | (J) Standard | (J) High Surge | (W) | @ 1KHz (pf) |
| 180KD10 | 180KD10J | 11 | 14 | 18(15~21.6) | 5 | 36 | 500 | 1000 | 2.1 | 3.0 | 0.05 | 5600 |
| 220KD10 | 220KD10J | 14 | 18 | 22(19.5~26) | 5 | 43 | 500 | 1000 | 2.5 | 5.0 | 0.05 | 4500 |
| 270KD10 | 270KD10J | 17 | 22 | 27(25~31) | 5 | 53 | 500 | 1000 | 3.0 | 6.0 | 0.05 | 3700 |
| 330KD10 | 330KD10J | 20 | 26 | 33(29.5~36.5) | 5 | 65 | 500 | 1000 | 4.0 | 7.0 | 0.05 | 3000 |
| 390KD10 | 390KD10J | 25 | 31 | 39(35~43) | 5 | 77 | 500 | 1000 | 4.6 | 9.0 | 0.05 | 2400 |
| 470KD10 | 470KD10J | 30 | 38 | 47(42~52) | 5 | 93 | 500 | 1000 | 5.5 | 11.0 | 0.05 | 2100 |
| 560KD10 | 560KD10J | 35 | 45 | 56(50~62) | 5 | 110 | 500 | 1000 | 7.0 | 13.0 | 0.05 | 1800 |
| 680KD10 | 680KD10J | 40 | 56 | 68(61~75) | 5 | 135 | 500 | 1000 | 8.2 | 15.0 | 0.05 | 1500 |
| 820KD10 | 820KD10J | 50 | 65 | 82(74~90) | 25 | 135 | 2500 | 3500 | 12.0 | 17.0 | 0.4 | 1200 |
| 101KD10 | 101KD10J | 60 | 85 | 100(90~110) | 25 | 165 | 2500 | 3500 | 15.0 | 18.0 | 0.4 | 1000 |
| 121KD10 | 121KD10J | 75 | 100 | 120(108~132) | 25 | 200 | 2500 | 3500 | 18.0 | 21.0 | 0.4 | 830 |
| 151KD10 | 151KD10J | 95 | 125 | 150(135~165) | 25 | 250 | 2500 | 3500 | 22.0 | 25.0 | 0.4 | 670 |
| 181KD10 | 181KD10J | 115 | 150 | 180(162~198) | 25 | 300 | 2500 | 3500 | 27.0 | 30.0 | 0.4 | 560 |
| 201KD10 | 201KD10J | 130 | 170 | 200(180~220) | 25 | 340 | 2500 | 3500 | 30.0 | 35.0 | 0.4 | 500 |
| 221KD10 | 221KD10J | 140 | 180 | 220(198~242) | 25 | 360 | 2500 | 3500 | 32.0 | 39.0 | 0.4 | 450 |
| 241KD10 | 241KD10J | 150 | 200 | 240(216~264) | 25 | 395 | 2500 | 3500 | 35.0 | 42.0 | 0.4 | 420 |
| 271KD10 | 271KD10J | 175 | 225 | 270(243~297) | 25 | 455 | 2500 | 3500 | 37.0 | 49.0 | 0.4 | 370 |
| 301KD10 | 301KD10J | 190 | 250 | 300(270~330) | 25 | 500 | 2500 | 3500 | 40.0 | 54.0 | 0.4 | 330 |
| 331KD10 | 331KD10J | 210 | 275 | 330(297~363) | 25 | 550 | 2500 | 3500 | 43.0 | 58.0 | 0.4 | 300 |
| 361KD10 | 361KD10J | 230 | 300 | 360(324~396) | 25 | 595 | 2500 | 3500 | 47.0 | 65.0 | 0.4 | 280 |
| 391KD10 | 391KD10J | 250 | 320 | 390(351~429) | 25 | 650 | 2500 | 3500 | 60.0 | 70.0 | 0.4 | 260 |
| 431KD10 | 431KD10J | 275 | 350 | 430(387~473) | 25 | 710 | 2500 | 3500 | 65.0 | 80.0 | 0.4 | 230 |
| 471KD10 | 471KD10J | 300 | 385 | 470(423~517) | 25 | 775 | 2500 | 3500 | 67.0 | 85.0 | 0.4 | 210 |
| 511KD10 | 511KD10J | 320 | 415 | 510(459~561) | 25 | 845 | 2500 | 3500 | 69.0 | 90.0 | 0.4 | 200 |
| 561KD10 | 561KD10J | 350 | 460 | 560(504~616) | 25 | 925 | 2500 | 3500 | 70.0 | 92.0 | 0.4 | 180 |
| 621KD10 | 621KD10J | 385 | 505 | 620(558~682) | 25 | 1025 | 2500 | 3500 | 72.0 | 95.0 | 0.4 | 160 |
| 681KD10 | 681KD10J | 420 | 560 | 680(612~748) | 25 | 1120 | 2500 | 3500 | 75.0 | 98.0 | 0.4 | 150 |
| 751KD10 | 751KD10J | 460 | 615 | 750(675~825) | 25 | 1240 | 2500 | 3500 | 77.0 | 100.0 | 0.4 | 130 |
| 781KD10 | 781KD10J | 485 | 640 | 780(702~858) | 25 | 1290 | 2500 | 3500 | 80.0 | 105.0 | 0.4 | 125 |
| 821KD10 | 821KD10J | 510 | 670 | 820(738~902) | 25 | 1355 | 2500 | 3500 | 85.0 | 110.0 | 0.4 | 120 |
| 911KD10 | 911KD10J | 550 | 745 | 910(819~1001) | 25 | 1500 | 2500 | 3500 | 93.0 | 130.0 | 0.4 | 110 |
| 102KD10 | 102KD10J | 625 | 825 | 1000(900~1100) | 25 | 1650 | 2500 | 3500 | 102.0 | 140.0 | 0.4 | 100 |
| 112KD10 | 112KD10J | 680 | 895 | 1100(990~1210) | 25 | 1815 | 2500 | 3500 | 115.0 | 155.0 | 0.4 | 90 |

Notes: 1. The tolerance of varistor voltage between 18V and 27V is more than 10%.

2. Leakage Current (@83% of V_{1mA}): IR≤50µA (180K~680K) IR≤25µA (820K~112K)

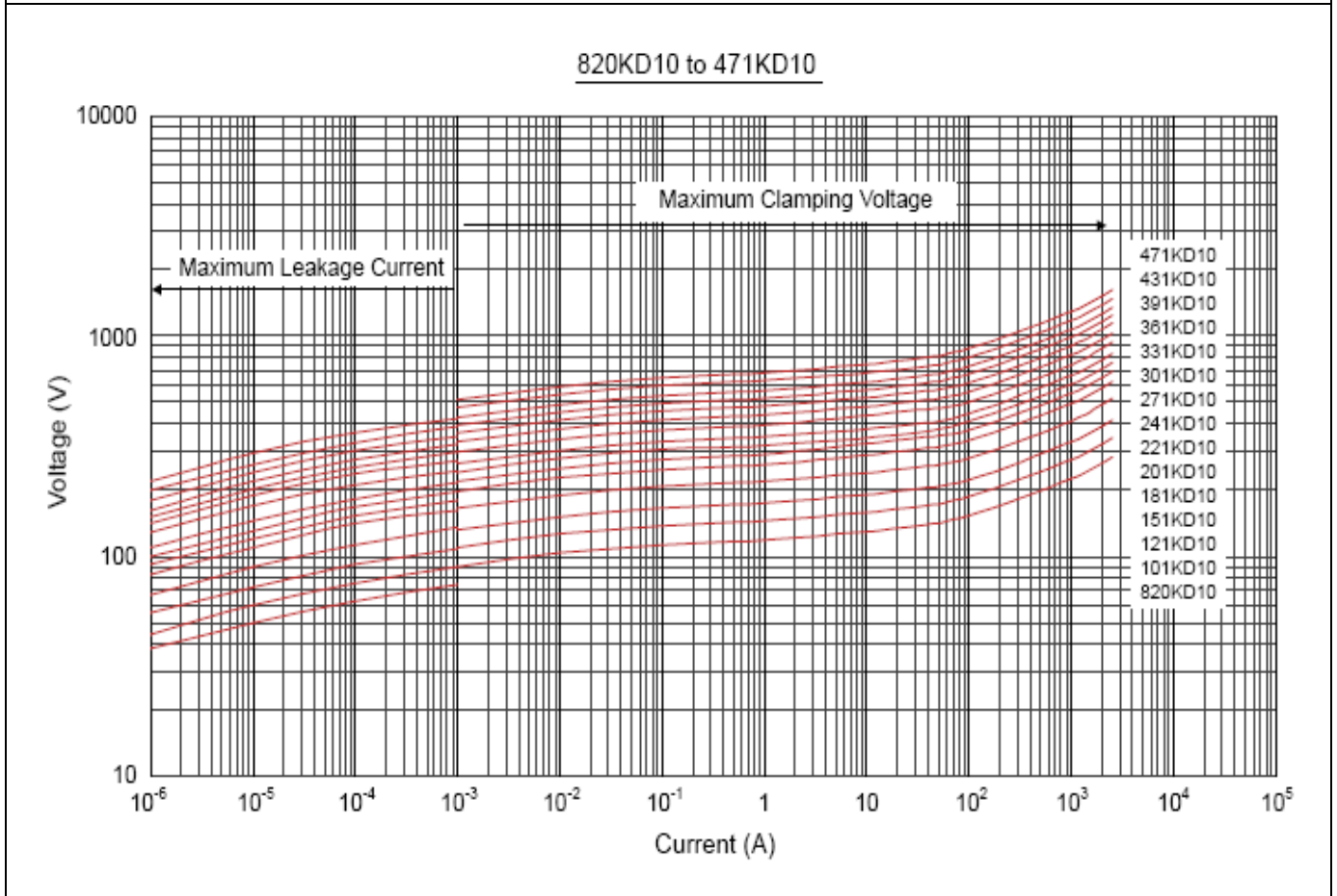
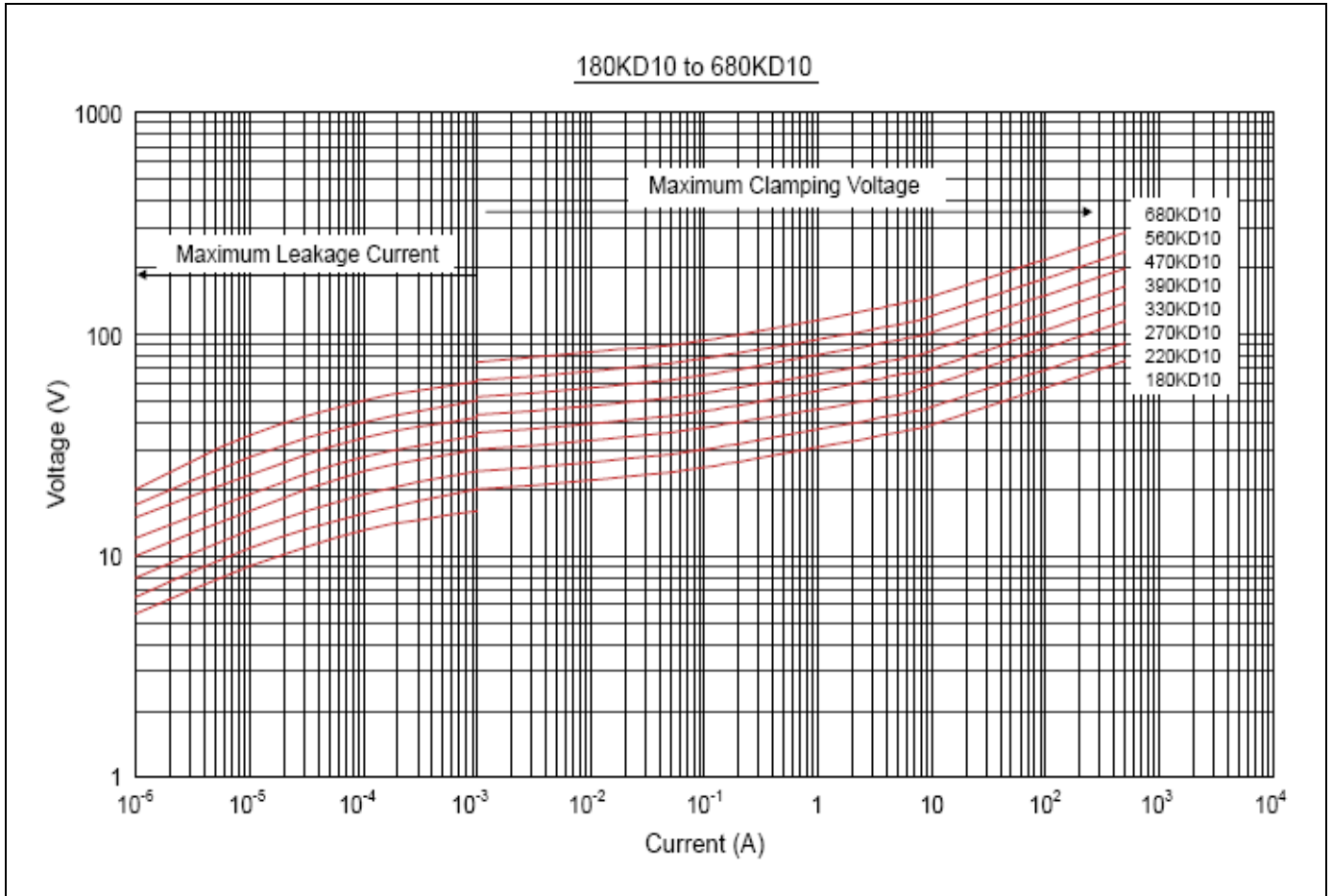
Maximum Surge Current Derating Curve



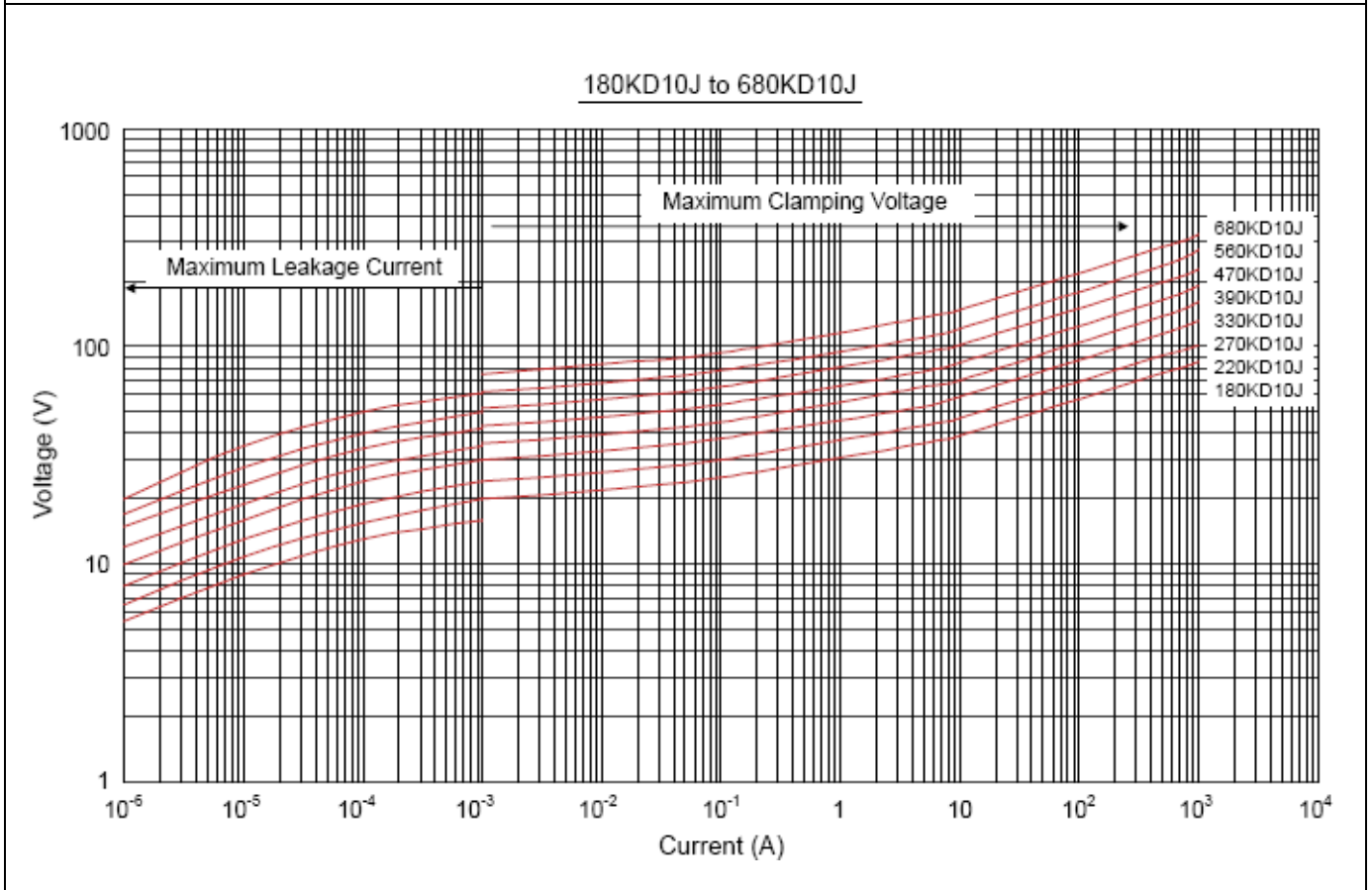
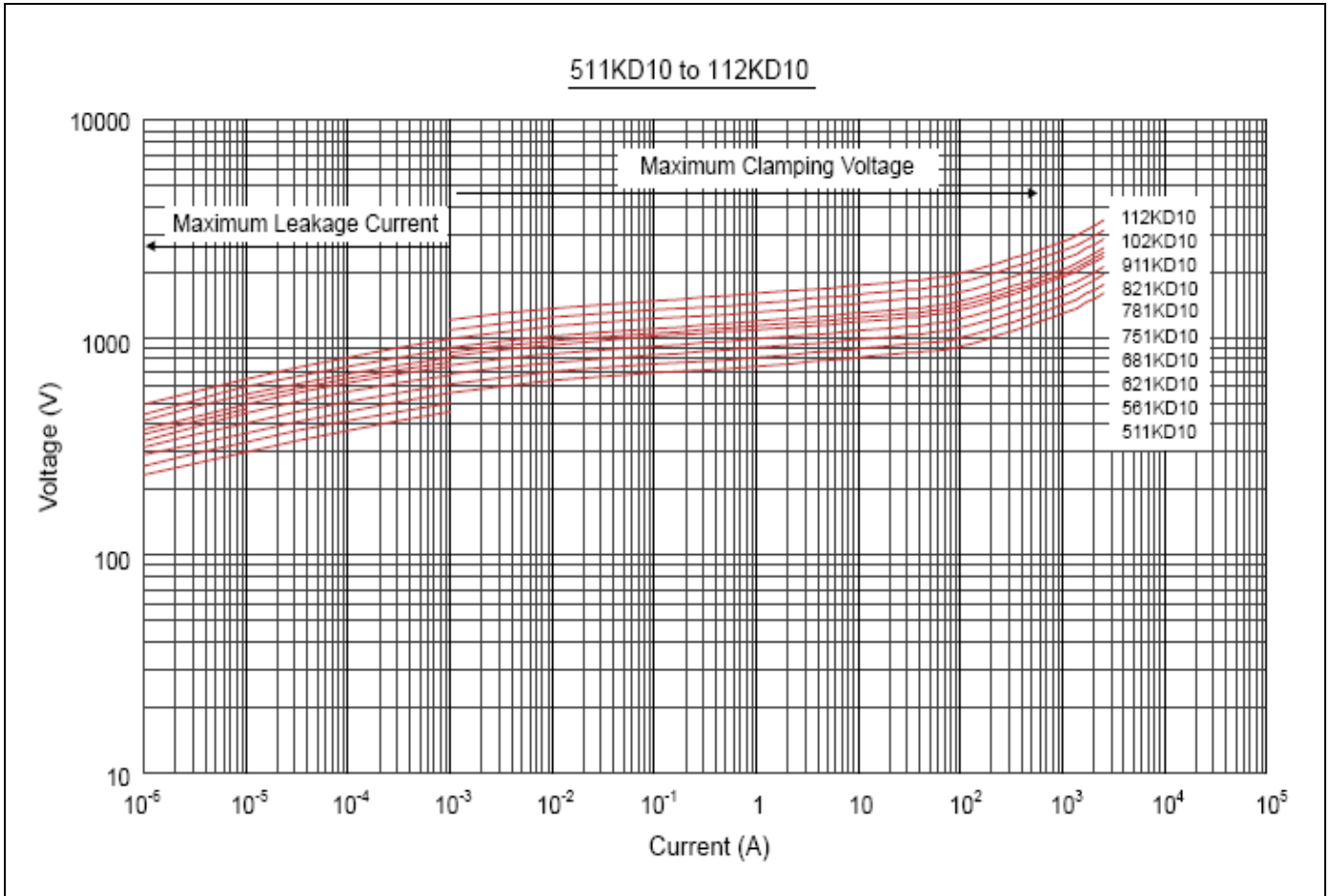
Maximum Leakage Current and Maximum Clamping Voltage Curve



Maximum Leakage Current and Maximum Clamping Voltage Curve



Maximum Leakage Current and Maximum Clamping Voltage Curve



Maximum Leakage Current and Maximum Clamping Voltage Curve

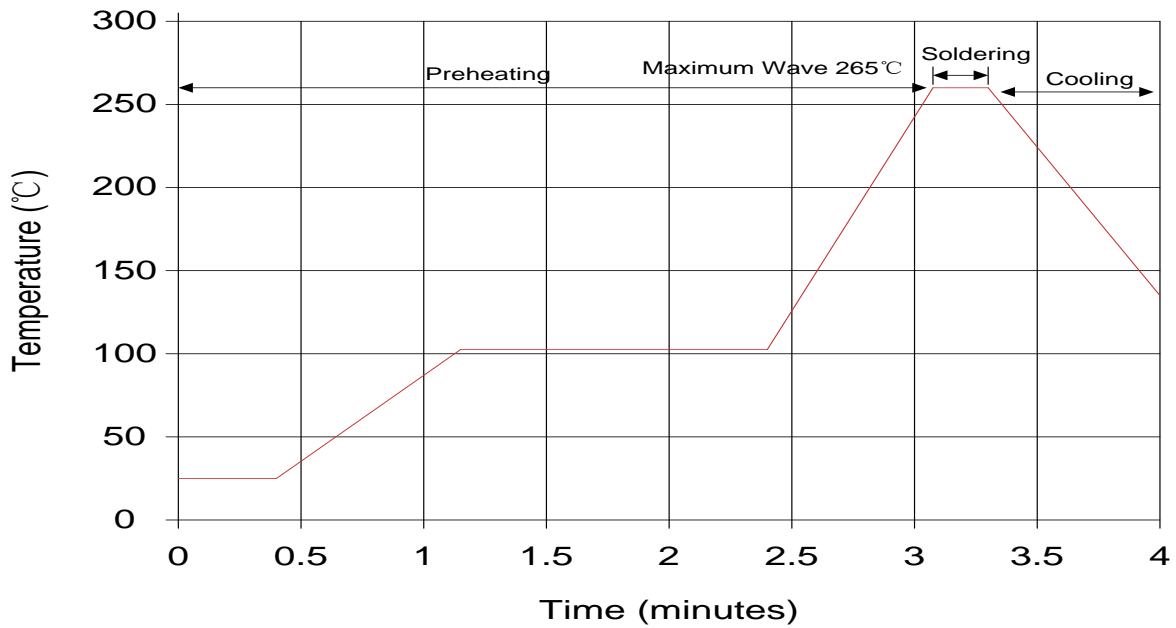


Reliability

| Items | Standard | Test conditions / Methods | Specifications | | | | | | | | | | | | | | | |
|-------------------------------|------------------------|--|--|------------------|------------------|-----|----------------|------|----------|------------------|--|---|-------|------|---|------------------|-----|--|
| Tensile Strength of Terminals | IEC60068-2-21 | Gradually applying the force specified and keeping the unit fixed for 10±1 sec. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Terminal diameter (mm)</th> <th>Force (kg)</th> </tr> </thead> <tbody> <tr> <td>0.5 < d ≤ 0.8</td> <td>1.0</td> </tr> <tr> <td>0.8 < d ≤ 1.25</td> <td>2.0</td> </tr> <tr> <td>1.25 < d</td> <td>4.0</td> </tr> </tbody> </table> | Terminal diameter (mm) | Force (kg) | 0.5 < d ≤ 0.8 | 1.0 | 0.8 < d ≤ 1.25 | 2.0 | 1.25 < d | 4.0 | No visible damage ΔV _{1mA} /V _{1mA} ≤ 5% | | | | | | | |
| Terminal diameter (mm) | Force (kg) | | | | | | | | | | | | | | | | | |
| 0.5 < d ≤ 0.8 | 1.0 | | | | | | | | | | | | | | | | | |
| 0.8 < d ≤ 1.25 | 2.0 | | | | | | | | | | | | | | | | | |
| 1.25 < d | 4.0 | | | | | | | | | | | | | | | | | |
| Bending Strength of Terminals | IEC60068-2-21 | 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. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Terminal diameter (mm)</th> <th>Force (kg)</th> </tr> </thead> <tbody> <tr> <td>0.5 < d ≤ 0.8</td> <td>0.5</td> </tr> <tr> <td>0.8 < d ≤ 1.25</td> <td>1.0</td> </tr> <tr> <td>1.25 < d</td> <td>2.0</td> </tr> </tbody> </table> | Terminal diameter (mm) | Force (kg) | 0.5 < d ≤ 0.8 | 0.5 | 0.8 < d ≤ 1.25 | 1.0 | 1.25 < d | 2.0 | No visible damage ΔV _{1mA} /V _{1mA} ≤ 5% | | | | | | | |
| Terminal diameter (mm) | Force (kg) | | | | | | | | | | | | | | | | | |
| 0.5 < d ≤ 0.8 | 0.5 | | | | | | | | | | | | | | | | | |
| 0.8 < d ≤ 1.25 | 1.0 | | | | | | | | | | | | | | | | | |
| 1.25 < d | 2.0 | | | | | | | | | | | | | | | | | |
| Vibration | IEC60068-2-6 | Frequency range: 10~55 Hz Amplitude: 0.75mm or 98m/s ² Direction: 3 mutually perpendicular directions, 2hrs each. | No visible damage ΔV _{1mA} /V _{1mA} ≤ 5% | | | | | | | | | | | | | | | |
| Solderability | IEC60068-2-20 | Solder Temp: 245±5°C Dipping Time: 2±0.5 sec | At least 95% of terminal electrode is covered by new solder | | | | | | | | | | | | | | | |
| Resistance to Soldering Heat | IEC60068-2-20 | Solder Temp: 260±5°C Dipping Time: 10±1 sec | No visible damage ΔV _{1mA} /V _{1mA} ≤ 5% | | | | | | | | | | | | | | | |
| High Temperature Storage | IEC60068-2-2 | Ambient Temp: 125±2°C Duration: 1000±24hrs | No visible damage ΔV _{1mA} /V _{1mA} ≤ 5% | | | | | | | | | | | | | | | |
| Low Temperature Storage | IEC60068-2-1 | Ambient Temp: -40±2°C Duration: 1000±24hrs | No visible damage ΔV _{1mA} /V _{1mA} ≤ 5% | | | | | | | | | | | | | | | |
| Damp Heat, Steady State | IEC60068-2-78 | The test is divided into two groups . a. 40±2°C , 90~95% RH for 1344±24hrs b. 40±2°C , 90~95% RH, at 10%VDC , 1344±24 hrs | No visible damage ΔV _{1mA} /V _{1mA} ≤ 10% Insulation Resistance ≥ 100MΩ | | | | | | | | | | | | | | | |
| High Temperature Load | MIL-STD-202 Method 108 | Ambient Temp: 105±2°C Duration: 1000±24hrs Load: Max. Allowable Voltage In AC. | ΔV _{1mA} /V _{1mA} ≤ 10% | | | | | | | | | | | | | | | |
| Temperature Cycle | IEC60068-2-14 | The conditions shown below shall be repeated 5 cycles <table border="1" style="margin-left: auto; margin-right: auto;"> <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>125±3</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 | 125±3 | 30±3 | 4 | Room temperature | 5±3 | No visible damage ΔV _{1mA} /V _{1mA} ≤ 5% |
| Step | Temperature (°C) | Period (minutes) | | | | | | | | | | | | | | | | |
| 1 | -40±3 | 30±3 | | | | | | | | | | | | | | | | |
| 2 | Room temperature | 5±3 | | | | | | | | | | | | | | | | |
| 3 | 125±3 | 30±3 | | | | | | | | | | | | | | | | |
| 4 | Room temperature | 5±3 | | | | | | | | | | | | | | | | |
| 8/20uS Surge Life | IEC61051-1 | 8/20μS waveform, 10 surge currents, unipolar, interval 30secs, amplitude corresponding to max. surge current derating curves for 20μS. | No visible damage ΔV _{b(1mA)} ≤ ±10% | | | | | | | | | | | | | | | |
| 10/1000μS Surge Life | IEC61051-1 | 10/1000μS waveform, 10 surge currents, unipolar, interval 2mins, amplitude corresponding to max. surge current derating curves for 1000μS. | No visible damage ΔV _{1mA} /V _{1mA} ≤ 10% | | | | | | | | | | | | | | | |
| Voltage Proof | IEC61051-1 | Metal balls method, 2500Vac 1 min. | No visible damage | | | | | | | | | | | | | | | |

Soldering Recommendation

Lead-free Wave Soldering Recommendation

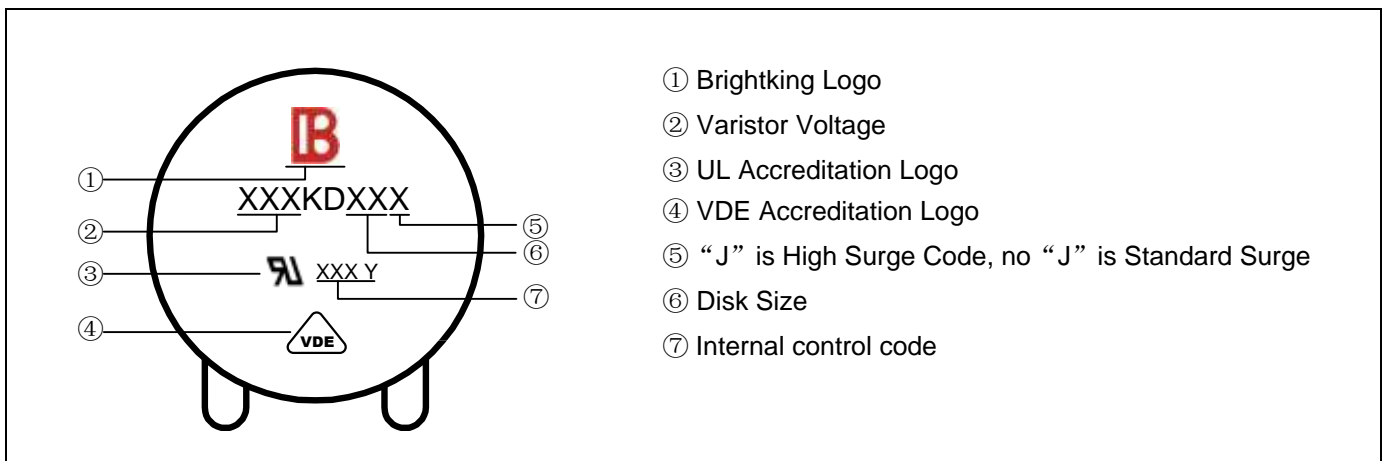


| Item | Conditions |
|------------------|-------------------|
| Peak Temperature | 265°C |
| Dipping Time | 10 seconds (max.) |
| Soldering | 1 time |

Recommendation Reworking Conditions with Soldering Iron

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

Marking Code



Taping Dimensions



Taping Dimensions



Taping Dimensions



Quantity

| Packaging Dimensions (Unit: mm) | Quantity |
|---|--|
| <p>In bulk for Terminals Untrimmed Products</p>  | 500pcs/bag 4bags/box (180K~621K) |
| | 400pcs/bag 4bags/box (681K~112K) |
| | 300pcs/bag 4bags/box (122K~182K) |
| <p>In bulk for Terminals Trimmed Products</p>  | 500pcs/bag 4bags/box (180K~621K) |
| | 400pcs/bag 4bags/box (681K~112K) |
| | 300pcs/bag 4bags/box (122K~182K) |
| Packaging Dimensions (Unit: mm) | Quantity |
| <p>Tape & Box & P0=12.7mm</p>  | 750pcs/box (180K~241K) |
| | 600pcs/box (271K~391K) |
| | 500pcs/box (431K~621K) |
| | 300pcs/box (681K~112K) |
| <p>Tape & Reel & P0=12.7mm</p>  | 1000pcs/reel (180K~391K) |
| | 750pcs/reel (431K~621K) |
| | 500pcs/reel (681K~112K) |

Quantity

| Packaging Dimensions (Unit: mm) | Quantity |
|--|-----------------------------|
| <p>Tape & Box & P0=15.0mm</p>  | 1000pcs/box (180K~391K) |
| | 750pcs/box (431K~621K) |
| | 600pcs/box (681K~751K) |
| | 500pcs/box (781K~112K) |
| <p>Tape & Reel & P0=15.0mm</p>  | 1000pcs/reel (180K~391K) |
| | 750pcs/reel (431K~751K) |
| | 500pcs/reel (781K~112K) |

Storage Condition of Products

(I) Storage Conditions :

- 1.Storage Temperature : -10℃ ~ +40℃
- 2.Relative Humidity : ≦ 80%RH
- 3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year

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