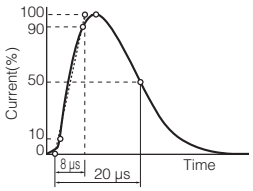
Performance Characteristics

<table>
<tr><th colspan="3">Characteristics</th><th>Test Methods/Description</th><th>Specifications</th></tr>
<tr><td colspan="3">Standard Test Condition</td><td>Electrical measurements (initial/after tests) shall be conducted at temperature of 5 to 35 °C, relative humidity of maximum 85 %</td><td>———</td></tr>
<tr><td rowspan="8">Electrical</td><td colspan="2">Varistor Voltage</td><td>The voltage between two terminals with the specified measuring current C_{mA} DC applied is called VC or V_{CmA}. The measurement shall be made as fast as possible to avoid heat affection.</td><td rowspan="6">To meet the specified value.</td></tr>
<tr><td colspan="2">Maximum Allowable Voltage</td><td>The maximum sinusoidal RMS voltage or maximum DC voltage that can be applied continuously.</td></tr>
<tr><td colspan="2">Clamping Voltage</td><td>The maximum voltage between two terminals with the specified standard impulse current (8/20 μs) illustrated below applied.
 
</td></tr>
<tr><td colspan="2">Rated Power</td><td>The power that can be applied in the specified ambient temperature.</td></tr>
<tr><td colspan="2">Maximum Energy</td><td>The maximum energy within the varistor voltage change of ±10 % when a single impulse current of 2 ms or 10/1000 μs is applied.</td></tr>
<tr><td rowspan="2">Maximum Peak Current (Withstanding Surge Current)</td><td>2 times</td><td>The maximum current within the varistor voltage change of ±10 % when a standard impulse current of 8/20 μs is applied two times with an interval of 5 minutes.</td></tr>
<tr><td>1 time</td><td>The maximum current within the varistor voltage change of ±10 % with a single standard impulse current of 8/20 μs is applied.</td></tr>
<tr><td colspan="2">Temperature Coefficient of Varistor Voltage</td><td>$\frac{V_{CmA} \text{ at } 85\ °C - V_{CmA} \text{ at } 25\ °C}{V_{CmA} \text{ at } 25\ °C} \times \frac{1}{60} \times 100\ (\%/°C)$</td><td>0 to -0.05 %/°C max.</td></tr>
<tr><td colspan="2">Capacitance</td><td>Capacitance shall be measured at 1 kHz ±10 %, 1 Vrms max. (1 MHz ±10 % below 100 pF), 0 V bias and 20±2 °C.</td><td>To meet the specified value</td></tr>
<tr><td colspan="2">Withstanding Voltage (Body Insulation)</td><td>The specified voltage shall be applied between both terminals of the specimen connected together and metal foil closely wrapped round its body for 1 minute.
<table>
<tr><th>Classification (Nominal varistor voltage)</th><th>Test Voltage (AC)</th></tr>
<tr><td>$V_{0.1\ mA}$, $V_{1\ mA} \leqq 330$ V</td><td>1000 Vrms</td></tr>
<tr><td>$V_{0.1\ mA}$, $V_{1\ mA} > 330$ V</td><td>1500 Vrms</td></tr>
</table></td><td>No breakdown</td></tr>
<tr><td colspan="2">Impulse Life</td><td>The change of VC shall be measured after the impulse current listed below is applied 10000 or 100000 times continuously with the interval of 10 seconds at room temperature.
<table>
<tr><th>Item / Times / Part No. / Current</th><th>Impulse Life (I)
×10⁴ Times
Impulse Current</th><th>Impulse Life (II)
×10⁵ Times
Impulse Current</th></tr>
<tr><td>ERZV05D180 to ERZV05D680</td><td>8 A (8/20 μs)</td><td>5 A (8/20 μs)</td></tr>
<tr><td>ERZV07D180 to ERZV07D680</td><td>25 A (8/20 μs)</td><td>15 A (8/20 μs)</td></tr>
<tr><td>ERZV09D180 to ERZV09D680</td><td>50 A (8/20 μs)</td><td>35 A (8/20 μs)</td></tr>
<tr><td>ERZV10D180 to ERZV10D680</td><td>50 A (8/20 μs)</td><td>35 A (8/20 μs)</td></tr>
<tr><td>ERZV14D180 to ERZV14D680</td><td>90 A (8/20 μs)</td><td>50 A (8/20 μs)</td></tr>
<tr><td>ERZV20D180 to ERZV20D680</td><td>130 A (8/20 μs)</td><td>65 A (8/20 μs)</td></tr>
<tr><td>ERZV05D820 to ERZV05D471</td><td>40 A (8/20 μs)</td><td>25 A (8/20 μs)</td></tr>
<tr><td>ERZV07D820 to ERZV07D511</td><td>100 A (8/20 μs)</td><td>60 A (8/20 μs)</td></tr>
<tr><td>ERZV09D820 to ERZV09D511</td><td>150 A (8/20 μs)</td><td>85 A (8/20 μs)</td></tr>
<tr><td>ERZV10D820 to ERZV10D112</td><td>150 A (8/20 μs)</td><td>85 A (8/20 μs)</td></tr>
<tr><td>ERZV10D182CS</td><td>120 A (8/20 μs)</td><td>75 A (8/20 μs)</td></tr>
<tr><td>ERZV14D820 to ERZV14D112</td><td>200 A (8/20 μs)</td><td>110 A (8/20 μs)</td></tr>
<tr><td>ERZV14D182CS</td><td>150 A (8/20 μs)</td><td>90 A (8/20 μs)</td></tr>
<tr><td>ERZV20D820 to ERZV20D112</td><td>250 A (8/20 μs)</td><td>120 A (8/20 μs)</td></tr>
<tr><td>ERZV20D182</td><td>200 A (8/20 μs)</td><td>100 A (8/20 μs)</td></tr>
</table></td><td>$\Delta V_{CmA}/V_{CmA} \leqq \pm 10$ %</td></tr>
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<table>
<tr><th colspan="2">Characteristics</th><th>Test Methods</th><th>Specifications</th></tr>
<tr><td rowspan="5">Mechanical</td><td>Robustness of Terminations (Tensile)</td><td>After gradually applying the force specified below and keeping the unit fixed for 10 seconds, the terminal shall be visually examined for any damage.
Terminal diameter — Force
ϕ0.6 mm, ϕ0.8 mm — 9.8 N
ϕ1.0 mm — 19.6 N</td><td rowspan="3">No remarkable mechanical damage</td></tr>
<tr><td>Robustness of Terminations (Bending)</td><td>The unit shall be secured with its terminal kept vertical and the force specified below shall be applied in the axial direction.
The terminal shall gradually be bent by 90 ° in one direction, then 90 ° in the opposite direction, and again back to the original position.
The damage of the terminal shall be visually examined.
Terminal diameter — Force
ϕ0.6 mm, ϕ0.8 mm — 4.9 N
ϕ1.0 mm — 9.8 N</td></tr>
<tr><td>Vibration</td><td>After repeadly applying a single harmonic vibration (amplitude: 0.75 mm, double amplitude: 1.5 mm) with 1 minute vibration frequency cycles (10 Hz to 55 Hz to 10 Hz) to each of three perpendicular directions for 2 hours. Thereafter, the unit shall be visually examined.</td></tr>
<tr><td>Solderability</td><td>After dipping the terminals to a depth of approximately 3mm from the body in a soldering bath of 235±5°C for 2±0.5 seconds, the terminal shall be visually examined.</td><td>Approximately 95 % of the termainals shall be covered with new solder uniformly.</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>After each lead shall be dipped into a solder bath having a temperature of 260±5 °C to a point 2.0 to 2.5 mm from the body of the unit, using shielding board (t=1.5 mm), be held there for 10±1 s and then be stored at room temperature and normal humidity for 1 to 2 hours. The change of V_{CmA} and mechanical damages shall be examined.</td><td>$\Delta V_{CmA}/V_{CmA} < \pm 5$ %
No remarkable mechanical damage</td></tr>
<tr><td rowspan="5">Environmental</td><td>High Temperature Storage/ Dry Heat</td><td>The specimen shall be subjected to 125±2 °C for 1000 hours in a thermostatic bath without load and then stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of V_{CmA} shall be measured.</td><td>$\Delta V_{CmA}/V_{CmA} < \pm 5$ %</td></tr>
<tr><td>Humidity</td><td>The specimen shall be subjected to 40±2 °C, 90 to 95 % RH for 1000 hours without load and then stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of V_{CmA} shall be measured.</td><td>$\Delta V_{CmA}/V_{CmA} < \pm 5$ %</td></tr>
<tr><td>Temperature Cycle</td><td>The temperature cycle shown below shall be repeated five cycles and then stored at room temperature and normal humidity for 1 to 2 hours. The change of V_{CmA} and mechanical damage shall be examined.
Step — Temperature (°C) — Period (minutes)
1 — −40±3 — 30±3
2 — Room temperature — 15±3
3 — 125±2 — 30±3
4 — Room temperature — 15±3</td><td>$\Delta V_{CmA}/V_{CmA} < \pm 5$ %
No remarkable mechanical damage</td></tr>
<tr><td>High Temperature Load/ Dry Heat Load</td><td>After being continuously applied the Maximum Allowable Voltage at 85±2 °C for 1000 hours, the specimen shall be stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of V_{CmA} shall be measured.</td><td rowspan="2">$\Delta V_{CmA}/V_{CmA} < \pm 10$ %</td></tr>
<tr><td>Damp Heat Load/ Humidity Load</td><td>The specimen shall be subjected to 40±2 °C, 90 to 95 % RH and the Maximum Allowable Voltage for 1000 hours and then stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of V_{CmA} shall be measured.</td></tr>
<tr><td>Low Temperature Storage/Cold</td><td>The specimen shall be subjected to −40±2 °C without load for 1000 hours and then stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of V_{CmA} shall be measured.</td><td>$\Delta V_{CmA}/V_{CmA} < \pm 5$ %</td></tr>
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