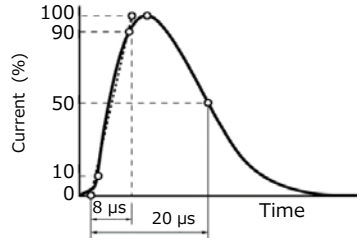
Performance Characteristics (Series E-S1)

Characteristics			Test Methods/Description	Specifications
Standard Test Condition			Electrical measurements (initial/after tests) shall be conducted at temperature of 5 to 35 °C, relative humidity of maximum 85 %.	——
Electrical	Varistor Voltage		The voltage betwen two terminals with the specified measuring current 1mA DC applied is called V_1 or V_{1mA}. The measurement shall be made as fast as possible to avoid heat affection.	To meet the specified value.
	Maximum Allowable Voltage		The maximum sinusoidal RMS voltage or maximum DC voltage that can be applied continuously. (max. 125 °C)	
	Clamping Voltage		The maximum voltage between two terminals with the specified standard impulse current (8/20 μs) illustrated below applied. 	
	Rated Power		The power that can be applied in the specified ambient temperature.	
	Maximum Energy		The maximum energy within the varistor voltage change of ±10 % when a single impulse current of 2 ms or 10/1000 μs is applied.	
	Maximum Peak Current (Withstanding Surge Current)	2 times	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. (at max. 125 °C)	
		1 time	The maximum current within the varistor voltage change of ±10 % with a single standard impulse current of 8/20 μs is applied. (at max. 125 °C)	
	Temperature Coefficient of Varistor Voltage		$\frac{V_{1\,mA}\text{ at }125\,°C - V_{1\,mA}\text{ at }25\,°C}{V_{1\,mA}\text{ at }25\,°C} \times \frac{1}{100} 100(\%/°C)$	0 to -0.05 %/ ℃ max.
	Capacitance		Capacitance shall be measured at 1 kHz ±10 %, 1 Vrms max. (1 MHz ±10 % below 100 pF), 0 V bias and 20±2 °C.	To meet the specified value.
	Withstanding Voltage (Body Insulation)		AC 1500 Vrms shall be applied between both terminals of the specimen connected together and metal foil closely wrapped round its body for 1 minute.	No breakdown
	Impulse Life		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.	$\Delta V_{1\,mA}/V_{1\,mA} \leqq$ 0 to +20%

Item	Impulse Life(Ⅰ)	Impulse Life(Ⅱ)
Times	$\times 10^4$ Times	$\times 10^5$ Times
Part No. / Current	Impulse Current	
ERZE11A201S1 to ERZE11A112S1	200 A (8/20 μs)	110 A (8/20 μs)
ERZE14A201S1 to ERZE14A112S1	250 A (8/20 μs)	120 A (8/20 μs)

Performance Characteristics (Series E-S1)

<table>
<tr><th colspan="2">Characteristics</th><th>Test Methods/Description</th><th>Specifications</th></tr>
<tr><td rowspan="4">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.
<table><tr><th>Terminal diameter</th><th>Force</th></tr><tr><td>ø0.6 mm, ø0.8 mm</td><td>9.8 N</td></tr><tr><td>ø1.0 mm</td><td>19.6 N</td></tr></table></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.
<table><tr><th>Terminal diameter</th><th>Force</th></tr><tr><td>ø0.6 mm, ø0.8 mm</td><td>4.9 N</td></tr><tr><td>ø1.0 mm</td><td>9.8 N</td></tr></table></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 3 mm 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>$\Delta V_{1\ mA}/V_{1\ mA} \leqq \pm 5$ %</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>$\Delta V_{1\ mA}/V_{1\ mA} \leqq \pm 5$ %</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>$\Delta V_{1\ mA}/V_{1\ mA} \leqq \pm 5$ %</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.
<table><tr><th>Step</th><th>Temperature (°C)</th><th>Period (minutes)</th></tr><tr><td>1</td><td>−40±3</td><td>30±3</td></tr><tr><td>2</td><td>Room temperature</td><td>15±3</td></tr><tr><td>3</td><td>125±2</td><td>30±3</td></tr><tr><td>4</td><td>Room temperature</td><td>15±3</td></tr></table></td><td>$\Delta V_{1\ mA}/V_{1\ mA} \leqq \pm 5$ %
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 125±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">$\Delta V_{1\ mA}/V_{1\ mA} \leqq \pm 10$ %</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>$\Delta V_{1\ mA}/V_{1\ mA} \leqq \pm 5$ %</td></tr>
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