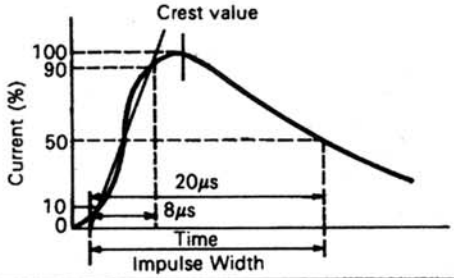
Electrical Performance Characteristics

Characteristics	Test Methods/Description	Specifications
Standard Test Condition	Environmental conditions under which every measuring is done without doubt on the measuring results. Unless specially specified, temperature, relative humidity are 5 to 35°C, 45 to 85% RH.	—
varistor Voltage	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.	To meet the specified value
Maximum Allowable Voltage	The maximum sinusoidal RMS voltage or maximum DC voltage that can be applied continuously in the specified environmental temperature range.	
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 one impulse 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 % with the standard impulse current (8/20 μs) applied two times with an interval of 5 minutes.	
Maximum Peak Current (Withstanding Surge Current) — 1 time	The maximum current within the varistor voltage change of ±10% with the standard impulse current (8/20 μs) applied one time.	
Temperature Coefficient of Varistor Voltage	$\frac{Vc \text{ at } 85\,^{\circ}C - Vc \text{ at } 25^{\circ}C}{Vc \text{ at } 25\,^{\circ}C} \times \frac{1}{60} \times 100$ (%/°C)	−0.05%/°C max
Capacitance	Capacitance shall be measured at 1 KHz±10%, 1 Vrms max. 0V bias and 20±2°C.	To meet the specified value
Dissipation Factor	Dissipation Factor shall be measured at 1KHz±10%, 1Vrms max. 0V bias and 20±2°C.	
Withstanding Voltage (Body Insulation)	The specified voltage shall be applied both terminals of the specimen connected together and metal foil closely wrapped round its body for 1 minute. Electrical breakdown shall be examined.	No breakdown
Impulse Life (I)	The change of Vc shall be measured after the impulse listed below is applied 10000 times continuously with the interval of ten seconds at room temperature.	$\Delta V_{CmA}/V_{CmA} \leqq \pm 10\%$

Classification (Nominal varistor voltage)	Test Voltage (AC)
$V_{0.1\,mA}$, $V_{1\,mA} \leqq 330V$	1000 Vrms
$V_{0.1\,mA}$, $V_{1\,mA} > 330V$	1500 Vrms

Ø5 Series	J05K011 to J05K040	0.5A (2 ms)
	J05K050 to J05K300	20A (8/20 μs)
Ø7 Series	J07K011 to J07K040	18A (8/20 μs)
	J07K050 to J07K300	50A (8/20 μs)
Ø10 Series	J10K011 to J10K040	50A (8/20 μs)
	J10K050 to J10K680	100A (8/20 μs)
Ø14 Series	J14K011 to J14K040	75A (8/20 μs)
	J14K050 to J14K1000	150A (8/20 μs)
Ø20 Series	J20K011 to J20K040	120A (8/20 μs)
	J20K050 to J20K1000	200A (8/20 μs)

Note:Varistor voltage change of forwàre direction shall be measured in the test of uni-pole surge life and DC load life

Electrical Performance Characteristics

Characteristics	Test Methods			Specifications
Impulse Life (II)	The change of Vc shall be measured after the impulse listed below is applied 100000 times continuously with the interval of ten seconds at room temperature.	Ø 5 Series	J05K011 to J05K040	0.45A (2 ms)	$\Delta V_{cmA}/V_{cmA} \leqq \pm 10\%$
			J05K050 to J05K300	14A (8/20 μs)	
		Ø 7 Series	J07K011 to J07K040	12A (8/20 μs)	
			J07K050 to J07K300	35A (8/20 μs)	
		Ø 10 Series	J10K011 to J10K040	35A (8/20 μs)	
			J10K050 to J10K680	70A (8/20 μs)	
		Ø 14 Series	J14K011 to J14K040	45A (8/20 μs)	
			J14K050 to J14K1000	90A (8/20 μs)	
		Ø 20 Series	J20K011 to J20K040	55A (8/20 μs)	
			J20K050 to J20K1000	100A (8/20 μs)	

Note : Varistor voltage change of forward direction shall be measured in the test of uni-pole surge life and DC load life.

Mechanical Performance Characteristics

Characteristics	Test Methods	Specifications
Robustness of Terminations (Tensile)	After gradually applying the force specified below and keeping the unit fixed for ten seconds, the terminal shall be visually examined for any damage. Terminal diameter — Force ϕ 0.6 mm — 9.8 N (1.0 Kgf) ϕ 0.8 mm — 9.8 N (1.0 Kgf) ϕ 1.0 mm — 19.6 N (2.0 Kgf)	No outstanding damage
Robustness of Terminations (Bending)	The unit shall be secured with its terminal kept vertical and the force specified below 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 ϕ 0.6 mm — 4.9 N(0.5 Kgf) ϕ 0.8 mm — 4.9 N(0.5 Kgf) ϕ 1.0 mm — 9.8 N(1.0 Kgf)	
Vibration	After repeadly applying a single harmonic vibration (amplitude: 0.75 mm) double amplitude: 1.5mm 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.	
Solderability	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.	Approximately 95% of the terminals shall be covered with solder uniformly.
Resistance to Soldering Heat	After each lead shall be dipped into a solder bath having a temperature 260 ±5°C (3 series: 250±5°C)to a point 2.0 to 2.5 mm from the body of the unit, using shielding board (t=1.5mm), be held there for specified time (3 series: 3±1 s, 5 series: 5±1 s and others: 10±1 s), and then be stored at room temperature and humidity for 1 to 2 hours. The change of Vc and mechanical damages are examined.	$\Delta V_{cmA}/V_{cmA} \leqq \pm 5\%$ No outstanding damage

Environmental Performance Characteristics

<table>
<tr><th>Characteristics</th><th>Test Methods</th><th>Specifications</th></tr>
<tr><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 humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured.</td><td rowspan="3">$\Delta V_{CmA}/V_{CmA} \leqq \pm 5\%$</td></tr>
<tr><td>Damp Heat/ Humidity (Steady State)</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 humidity for one to two hours. Thereafter, the change of Vc shall be measured.</td></tr>
<tr><td>Temperature Cycle</td><td>The temperature cycle shown below shall be repeated five times and then stored at room temperature and humidity for one to two hours. The change of Vc 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></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 humidity for one to two hours Thereafter, the change of Vc shall be measured.</td><td>$\Delta V_{CmA}/V_{CmA} \leqq \pm 10\%$</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 humidity for one to two hours. Thereafter, the change of Vc shall be measured.</td><td>$\Delta V_{CmA}/V_{CmA} \leqq \pm 10\%$</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 for one to two hours. Thereafter, the change of Vc shall be measured.</td><td>$\Delta V_{CmA}/V_{CmA} \leqq \pm 5\%$</td></tr>
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