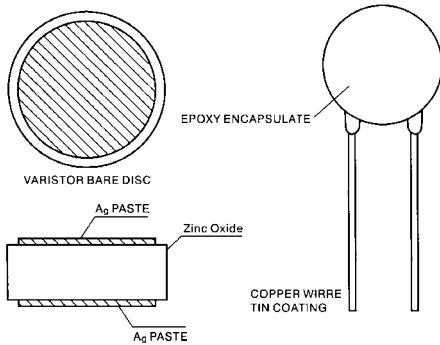
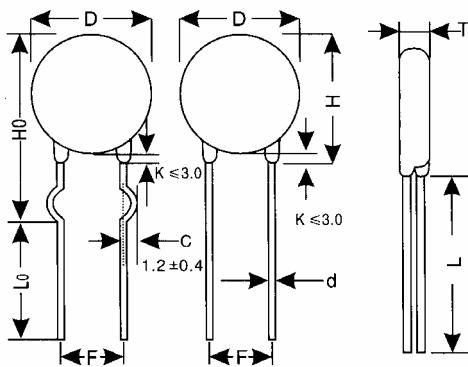


Materials and Marking



DIMENSION



Dimension table

UNIT :mm

Series	D max	H max	Ho max	d	c±0.4	F
05D	7	10.5	13	0.6	1.2	5±0.8
07D	9	12	13.5	0.6	1.2	5±0.8
10D	13	17	17.5	0.8	1.4	7.5±0.8
14D	17	20	21	0.8	1.4	7.5±0.8
		22	23	0.8		*10±1.0
18D	20	24.5	26	0.8	1.4	*7.5±0.8
				1.0		1.6
20D	24	28	30	0.8	1.4	*7.5±0.8
		30	32	1.0		1.6
25D	30	33	34	1.0	1.6	10±0.8
						*12.5±1.0

*non standard lead space, available upon request.

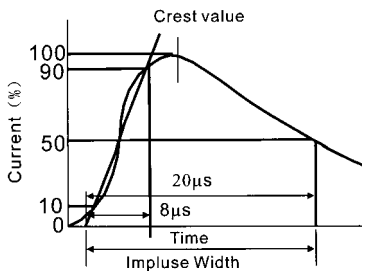
T max. Table

Part No.	05D	07D	10D	14D	18D	20D	25D
180L	4.5	4.5	4.6	4.6	4.8	4.8	4.8
220K	4.6	4.6	4.7	4.7	4.9	5.4	4.9
270K	4.7	4.7	4.8	4.8	5.0	5.5	5.0
330K	4.9	4.9	5.0	5.0	5.2	5.6	5.2
390K	4.8	4.8	4.9	4.9	5.5	5.5	5.5
470K	4.9	4.9	5.0	5.0	5.6	5.6	5.6
560K	5.0	5.0	5.1	5.1	5.7	5.7	5.7
680K	5.2	5.2	5.3	5.3	5.8	5.8	5.8
820K	4.1	4.1	4.5	4.5	4.9	4.9	4.9
101K	4.3	4.3	4.7	4.7	5.1	5.1	5.1
121K	4.5	4.5	4.9	4.9	5.3	5.3	5.3
151K	4.8	4.8	5.2	5.2	5.6	5.6	5.6
181K	4.3	4.3	4.8	4.8	5.0	5.2	5.2
201K	4.4	4.4	4.8	4.8	5.2	5.2	5.4
221K	4.5	4.5	4.9	4.9	5.3	5.3	5.5
241K	4.6	4.6	5.0	5.0	5.4	5.4	5.6
271K	4.9	4.9	5.2	5.2	5.5	5.6	5.8

Part No.	05D	07D	10D	14D	18D	20D	25D
301K	5.0	5.0	5.3	5.3	5.7	5.7	5.9
331K	5.1	5.1	5.6	5.6	6.0	6.0	6.1
361K	5.2	5.2	5.7	5.7	6.2	6.2	6.4
391K	5.4	5.4	5.8	5.8	6.4	6.4	6.6
431K	5.7	5.7	6.2	6.2	6.7	6.7	6.9
471K	6.0	6.0	6.5	6.5	6.9	7.0	7.2
511K	6.2	6.4	6.5	6.5	7.0	7.0	7.2
561K	6.5	6.4	6.5	6.5	7.2	7.0	7.2
621K	-	7.1	7.1	7.1	7.5	7.5	7.7
681K	-	7.3	7.4	7.6	7.8	7.8	8.0
751K	-	-	7.8	7.8	8.2	8.2	8.4
781K	-	-	7.9	7.9	8.3	8.3	8.5
821K	-	-	8.1	8.1	8.5	8.5	8.7
911K	-	-	8.6	8.6	9.0	9.0	9.2
102k	-	-	9.1	9.1	9.5	9.5	9.7
112K	-	-	9.7	9.7	10.1	10.1	10.3
122K				10.4	10.6	10.6	10.8
182K	-	-	-	14.4		13.2	15.2

Performance Characteristic

(A) Electrical

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.	—	
Maximum Allowable Voltage	The maximum sinusoidal RMS voltage or maximum DC voltage that can be applied continuously in the specified environmental temperature range.	To meet the specified value	
Varistor Voltage	The voltage between two terminals with the specified measuring current I_m A DC applied is called V_c or V_{cmA} , the measurement shall be made as fast as fast as possible to avoid heat affection.		
Clamping Voltage	The maximum voltage between two terminals with the specified standard impulse current (8/20 μ s) illustrated below applied. 		
Peak Current (Withstanding Surge Current)	2 times		The maximum current within the varistor voltage change of $\pm 10\%$ with the standard impulse current (8/20 μ s) applied two times with an interval of 5 minutes.
	1 times		The maximum current within the varistor voltage change of $\pm 10\%$ the standard impulse current (8/20 μ s) applied one time.
Maximum Energy	The maximum energy within the varistor voltage change of $\pm 10\%$ when one impulse of 2 ms or 10/1000 μ s is applied.		
Rated Power	The power that can be applied in the specified ambient temperature.		
Capacitance	Capacitance shall be measured at 1 kHz $\pm 10\%$, 1 Vrms max.(1Mhz below 100pF). 0V bias and 20 $\pm 2^\circ$ C		
Dissipation Factor	Dissipation Factor shall be measured at 1 KHz $\pm 10\%$, 1 Vrms max.(1Mhz + %10 below 100pF). 0V bias and 20 $\pm 2^\circ$ C		
Temperature Confident of Varistor Voltage	$\frac{V_c \text{ at } 85^\circ\text{C} - V_c \text{ at } 105^\circ\text{C}}{V_c \text{ at } 25^\circ\text{C}} \times \frac{1}{60} \times 100(\% / .^\circ\text{C})$	$\pm 0.05\% / ^\circ\text{Cmax}$	
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.		
	Classification(Nominal varistor voltage)	Test Voltage(AC)	
	VO.1mA. V1mA \leq 330V	1000 Vrms	
VO.1ma. V1mA $>$ 330V	1500 Vrms		

TO BE CONTINUED

Characteristics	Test Methods/Description	Specifications			
Impulse Life (I)	The change of Vc shall be measured after the impulse listed below is applied 10000 times continuously with the interval of the seconds at room temperature.	$\Delta V_{cmA}/V_{cmA} \leq \pm 10\%$			
			05D Series	VCR-05D180L to VCR-05D680K	0.5A (2ms)
				VCR-05D820K to VCR-05D681K	20A (8/20 μ s)
			07D Series	VCR-07D180K to VCR-07D680K	18A (8/20 μ s)
				VCR-07D820K to VCR-07D471K	50A (8/20 μ s)
			10D Series	VCR-10D180K to VCR-10D680K	50A (8/20 μ s)
				VCR-10D820K to VCR-10D112K	100A (8/20 μ s)
			14D Series	VCR-14D180K to VCR-14D680K	75A (8/20 μ s)
				VCR-14D820K to VCR-14D112K	150A (8/20 μ s)
			20D Series	VCR-20D180K to VCR-20D680K	120A (8/20 μ s)
				VCR-20D820K to VCR-20D182K	200A (8/20 μ s)
			Impulse Life (II)	The change of Vc shall be measured after the impulse listed below is applied 10000 times continuously with the interval of the seconds at room temperature.	$\Delta V_{cmA}/V_{cmA} \leq \pm 10\%$
05D Series	VCR-05D180L to VCR-05D680K	0.45A (2ms)			
	VCR-05D820K to VCR-05D681K	14A (8/20 μ s)			
07D Series	VCR-07D180K to VCR-07D680K	12A (8/20 μ s)			
	VCR-07D820K to VCR-07D471K	35A (8/20 μ s)			
10D Series	VCR-10D180K to VCR-10D680K	35A (8/20 μ s)			
	VCR-10D820K to VCR-10D112K	70A (8/20 μ s)			
14D Series	VCR-14D180K to VCR-14D680K	45A (8/20 μ s)			
	VCR-14D820K to VCR-14D112K	90A (8/20 μ s)			
20D Series	VCR-20D180K to VCR-20D680K	55A (8/20 μ s)			
	VCR-20D820K to VCR-20D182K	100A (8/20 μ s)			
Impulse Response Time	Time lag Between Application of surge and varistor's "turn-on" conduction action.	<50 nanoseconds			
DC Leakage Current	Maximum current with rated DC voltage applied	200 μ A max.			
Current/Energy Detecting	Detecting of Maximum Values when operated above 85°C	-2.5%/°C			

(B) Mechanical

Characteristics	Test Methods/Description	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. <table border="1"> <thead> <tr> <th>Terminal diameter</th> <th>Force</th> </tr> </thead> <tbody> <tr> <td>Ø0.6mm</td> <td>9.8N(1.0Kgf)</td> </tr> <tr> <td>Ø 0.8mm</td> <td>9.8N(1.0Kgf)</td> </tr> <tr> <td>Ø 1.0mm</td> <td>19.6N(2.0Kgf)</td> </tr> </tbody> </table>	Terminal diameter	Force	Ø0.6mm	9.8N(1.0Kgf)	Ø 0.8mm	9.8N(1.0Kgf)	Ø 1.0mm	19.6N(2.0Kgf)	
Terminal diameter	Force									
Ø0.6mm	9.8N(1.0Kgf)									
Ø 0.8mm	9.8N(1.0Kgf)									
Ø 1.0mm	19.6N(2.0Kgf)									
Robustness of Terminations (Bending)	The unit shall be secured with its terminal 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. <table border="1"> <thead> <tr> <th>Terminal diameter</th> <th>Force</th> </tr> </thead> <tbody> <tr> <td>Ø 0.6 mm</td> <td>9.8N(1.0Kgf)</td> </tr> <tr> <td>Ø 0.8 mm</td> <td>9.8N(1.0Kgf)</td> </tr> <tr> <td>Ø 1.0mm</td> <td>19.6N(2.0Kgf)</td> </tr> </tbody> </table>	Terminal diameter	Force	Ø 0.6 mm	9.8N(1.0Kgf)	Ø 0.8 mm	9.8N(1.0Kgf)	Ø 1.0mm	19.6N(2.0Kgf)	No outstanding damage
Terminal diameter	Force									
Ø 0.6 mm	9.8N(1.0Kgf)									
Ø 0.8 mm	9.8N(1.0Kgf)									
Ø 1.0mm	19.6N(2.0Kgf)									
Vibration	After repeating apply a single harmonic vibration (amplitude:0.75mm)double amplitude: 1.5mm with 1 minute vibration frequency cycles(10 Hz to 55 Hz to 10Hz) to each of three perpendicular directions for 2 hours. Thereafter. The unit shall be visually examined.									
Solder ability	After dipping the terminals to a depth of approximately 3 mm from the body in a soldering bath of 235±°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 To a point 2.0 to 2.5mm from the body of the unit. Using shielding board (t=1.5mm). be held there for specified time(5 series:5±1us and others: 10±1us). And then be stored at room temperature and humidity for 1 to 2 hours. The change of Vc and mechanical damages are examined.	ΔVcmA/VcmA ≤ ±5% NO outstanding damage								

(C) Environmental

Characteristics	Test Methods/Description	Specifications															
High Temperature Storage/Dry Heat.	The specimen shall be subjected to 125±°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.																
Damp Heat/Humidity (Steady State)	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.																
Temperature Cycle	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 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>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> </tbody> </table>	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	ΔVcmA/VcmA ≤ ±5%
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															
High Temperature Load/Dry heat load	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.	ΔVcmA/VcmA ≤ ±10%															
Damp Heat Load/ Humidity Load	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.	ΔVcmA/VcmA ≤ ±10%															
Low Temperature Storage/Cold	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.	ΔVcmA/VcmA ≤ ±5%															