

Metal Oxide Varistors 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
- Moisture sensitivity level: Level 1
- Operating Temperature: $-40^{\circ}\text{C}\sim+105^{\circ}\text{C}$
- Storage Temperature: $-40^{\circ}\text{C}\sim+125^{\circ}\text{C}$

Application information

- 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

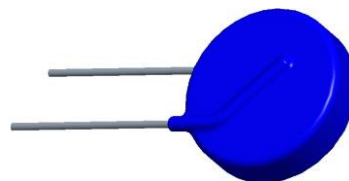
Agency Approvals

Icon	Description
RoHS	Compliance with 2011/65/EU
HF	Compliance with IEC61249-2-21:2003
	Mean lead free
Safety certification	UL、TUV、CQC

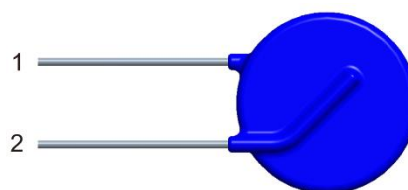
Electrical Characteristics

Part Number		Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge Current		Maximum Energy (10/1000 μs)		Rated Power	Typical Capacitance (Reference)
Standard	High Surge	V_{AC} (V)	V_{DC} (V)	V_{1mA} (V)	IP (A)	VC (V)	I (A) Standard	I (A) High Surge	(J) Standard	(J) High Surge	(W)	@1KHz (pF)
10D180KXX	10D180KXXH	11	12	18(15~21.6)	5	36	500	1000	2.1	3.0	0.05	5600
10D220KXX	10D220KXXH	14	18	22(19.5~26)	5	43	500	1000	2.5	5.0	0.05	4500
10D270KXX	10D270KXXH	17	22	27(24~31)	5	53	500	1000	3.0	6.0	0.05	3700
10D330KXX	10D330KXXH	20	26	33(29.5~36.5)	5	65	500	1000	4.0	7.0	0.05	3000
10D390KXX	10D390KXXH	25	31	39(35~43)	5	77	500	1000	4.6	9.0	0.05	2400
10D470KXX	10D470KXXH	30	38	47(42~52)	5	93	500	1000	5.5	11.0	0.05	2100
10D560KXX	10D560KXXH	35	45	56(50~62)	5	110	500	1000	7.0	13.0	0.05	1800
10D680KXX	10D680KXXH	40	56	68(61~75)	5	135	500	1000	8.2	15.0	0.05	1500
10D820KXX	10D820KXXH	50	65	82(74~90)	25	145	2500	3500	12.0	17.0	0.4	1200

Exterior



Package (Top View)

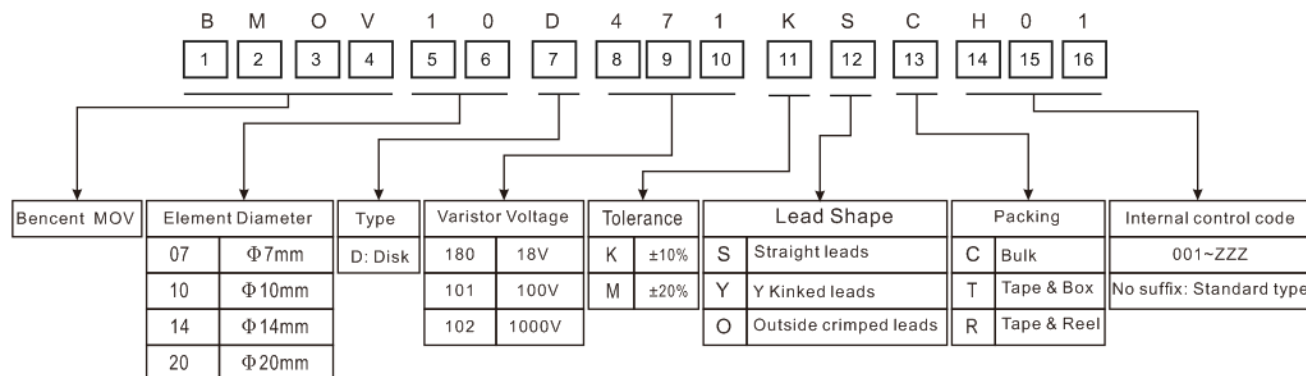


Schematic Symbol

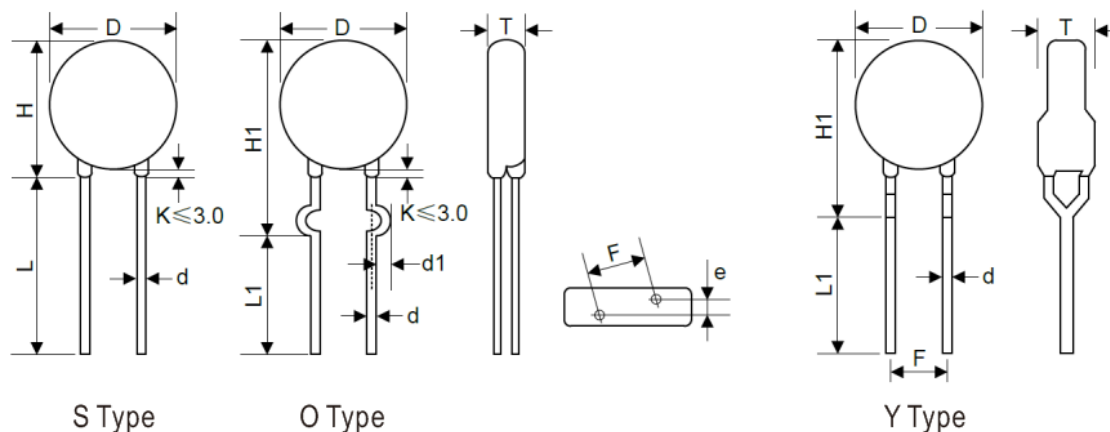


Part Number		Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge Current		Maximum Energy (10/1000μs)		Rated Power	Typical Capacitance (Reference)
Standard	High Surge	V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	IP (A)	VC (V)	I (A) Standard	I (A) High Surge	(J) Standard	(J) High Surge	(W)	@1KHz (pf)
10D101KXX	10D101KXXH	60	85	100(90~110)	25	165	2500	3500	15.0	18.0	0.4	1000
10D121KXX	10D121KXXH	75	100	120(108~132)	25	200	2500	3500	18.0	21.0	0.4	830
10D151KXX	10D151KXXH	95	125	150(135~165)	25	250	2500	3500	22.0	25.0	0.4	670
10D181KXX	10D181KXXH	115	150	180(162~198)	25	300	2500	3500	27.0	30.0	0.4	560
10D201KXX	10D201KXXH	130	170	200(180~220)	25	340	2500	3500	30.0	35.0	0.4	500
10D221KXX	10D221KXXH	140	180	220(198~242)	25	360	2500	3500	32.0	39.0	0.4	450
10D241KXX	10D241KXXH	150	200	240(216~264)	25	395	2500	3500	35.0	42.0	0.4	420
10D271KXX	10D271KXXH	175	225	270(243~297)	25	455	2500	3500	37.0	42.0	0.4	370
10D301KXX	10D301KXXH	190	250	300(270~330)	25	500	2500	3500	40.0	54.0	0.4	330
10D331KXX	10D331KXXH	210	275	330(297~363)	25	550	2500	3500	43.0	58.0	0.4	300
10D361KXX	10D361KXXH	230	300	360(324~396)	25	595	2500	3500	47.0	65.0	0.4	280
10D391KXX	10D391KXXH	250	320	390(351~429)	25	650	2500	3500	60.0	70.0	0.4	260
10D431KXX	10D431KXXH	275	350	430(387~473)	25	710	2500	3500	65.0	80.0	0.4	230
10D471KXX	10D471KXXH	300	385	470(423~517)	25	775	2500	3500	67.0	85.0	0.4	210
10D511KXX	10D511KXXH	320	415	510(459~561)	25	845	2500	3500	69.0	90.0	0.4	200
10D561KXX	10D561KXXH	350	460	560(504~616)	25	925	2500	3500	70.0	92.0	0.4	180
10D621KXX	10D621KXXH	385	505	620(558~682)	25	1025	2500	3500	72.0	95.0	0.4	160
10D681KXX	10D681KXXH	420	560	680(612~748)	25	1120	2500	3500	75.0	98.0	0.4	150
10D751KXX	10D751KXXH	460	615	750(675~825)	25	1240	2500	3500	77.0	100.0	0.4	130
10D781KXX	10D781KXXH	485	640	780(702~858)	25	1290	2500	3500	80.0	105.0	0.4	125
10D821KXX	10D821KXXH	510	670	820(738~902)	25	1355	2500	3500	85.0	110.0	0.4	120
10D911KXX	10D911KXXH	550	745	910(819~1001)	25	1500	2500	3500	93.0	130.0	0.4	110
10D102KXX	10D102KXXH	625	825	1000(900~1100)	25	1650	2500	3500	102.0	140.0	0.4	100
10D112KXX	10D112KXXH	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).
3. The foot shape can be customized according to customer needs.



Dimensions



Notes: The foot shape can be customized according to customer needs.

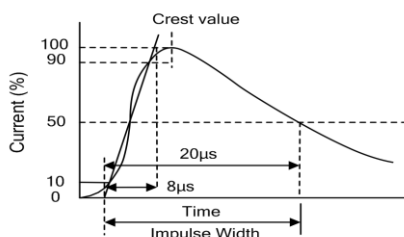
Unit: mm

Table 1	
Symbol	Dimension
H	10.5~16.5
H1	13.5~18.5
L(min)	20
L1(min)	15
D(max)	14
F	7.5±0.8
T	Table 2
e(±0.8)	Table 2
d(±0.05)	0.8
d1(±0.4)	1.4

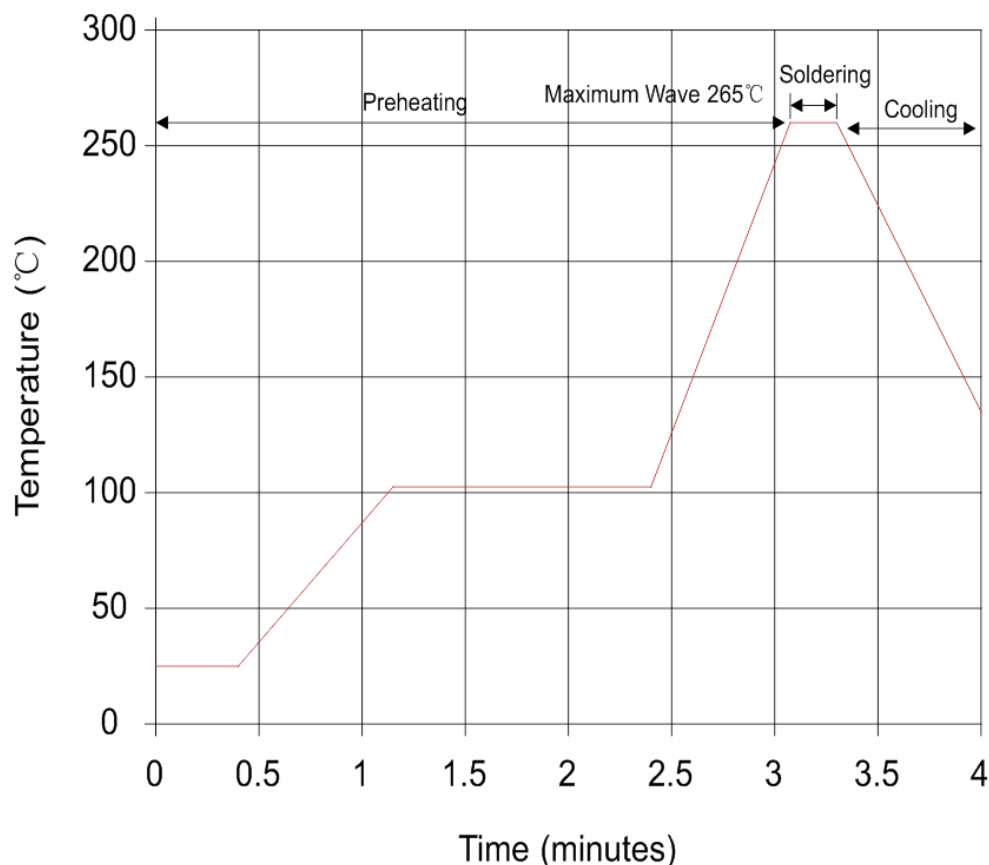
Unit: mm

Table 2					
Model	T	e	Model	T	e
180K	2.44~5.27	1.5	301K	3.06~6.28	2.5
220K	2.54~5.41	1.6	331K	3.16~6.46	2.5
270K	2.65~5.61	1.8	361K	3.26~6.64	2.7
330K	2.77~5.79	1.7	391K	3.35~6.82	2.8
390K	2.73~5.58	1.8	431K	3.48~7.06	3.0
470K	2.85~5.80	1.9	471K	3.61~7.29	3.2
560K	2.99~6.04	2.0	511K	3.74~7.53	3.4
680K	3.19~6.32	2.2	561K	3.90~7.83	3.6
820K	2.58~5.30	1.8	621K	4.09~8.29	3.9
101K	2.69~5.47	2.0	681K	4.29~8.54	4.2
121K	2.81~5.67	2.2	751K	4.51~8.63	4.3
151K	2.58~5.39	1.8	781K	4.61~8.69	4.4
181K	2.68~5.57	1.9	821K	4.74~8.90	4.6
201K	2.76~5.72	2.0	911K	5.03~8.95	5.0
221K	2.81~5.81	2.1	102K	5.31~9.39	5.1
241K	2.87~5.93	2.2	112K	5.64~9.88	5.4
271K	2.97~6.11	2.4			

Electrical Ratings

Items	Test Condition/Description			Requirement					
Varistor Voltage	The voltage between the two terminals with the specified measuring current 1mA.DC applied is called V _{1mA} .			To meet the Specified value					
Maximum Allowable Voltage	The recommended maximum sine wave voltage (RMS) or the Maximum DC voltage can be applied continuously.								
Maximum Clamping Voltage	The maximum voltage between the two terminals with the specification standard impulse current. Applied waveform: 8/20μs 								
Rated Wattage	The maximum average power that can be applied within the specified ambient temperature.								
Energy	The maximum energy within the varistor voltage change of ±10%when one impulse of 10/1000μs or 2ms is applied.								
Withstanding Surge Current	The maximum current within the varistor voltage change of ±10% withthe standard impulse current (8/20μs) applied one time.								
Varistor Voltage Temp. Coefficient	$\frac{V_{1mA@105^{\circ}C}-V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{80} \times 100\%(%/^{\circ}C)$ $\frac{V_{1mA@-40^{\circ}C}-V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{65} \times 100\%(%/^{\circ}C)$			≤0.05%/°C					
Surge Life	The change of V_b shall be measured after the impulse listed below which is applied 10,000 times continuously with the interval of ten seconds at room temperature. <table><tr><td rowspan="2">10Φ series</td><td>180K to 680K</td><td>50A (8/20μs)</td></tr><tr><td>820K to 112K</td><td>100A (8/20μs)</td></tr></table>			10Φ series	180K to 680K	50A (8/20μs)	820K to 112K	100A (8/20μs)	$\frac{\Delta V_b}{V_b} \leq \pm 10\%$
10Φ series	180K to 680K	50A (8/20μs)							
	820K to 112K	100A (8/20μs)							

Lead-free Wave Soldering Recommendation



	Item	Conditions
Preheating	Room Temp. to 110 (100-110) °C	30-50 seconds
	100-110°C	60-70s seconds
	110°C to Soldering Temp.	30-50s seconds
Soldering	Peak Temp.	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
Soldering Time	3 seconds (max)
Distance from Varistor	2mm (min)

Mechanical Characteristics

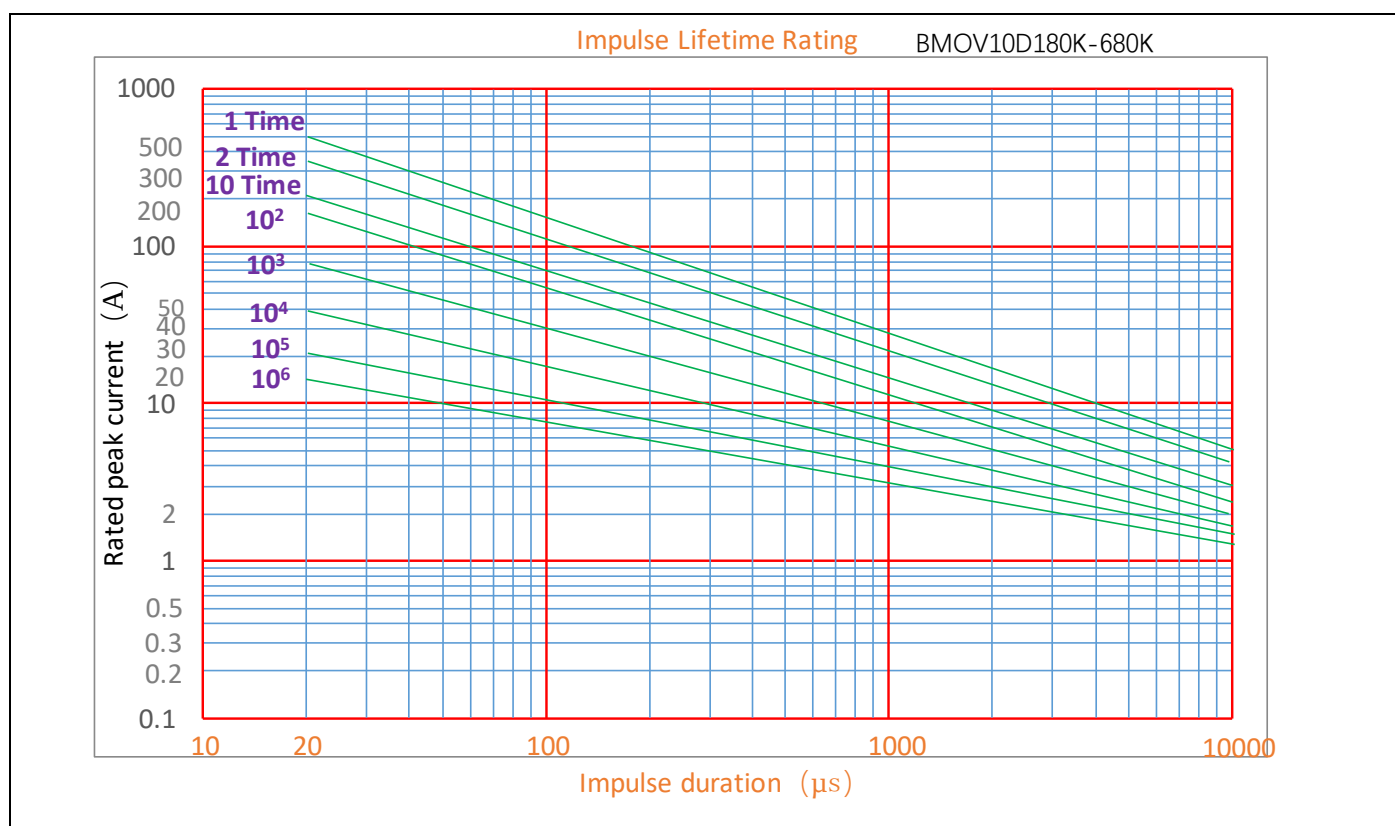
Items	Test conditions / Methods	Specifications								
Tensile Strength of Terminals	Gradually applying the force specified and keeping the unit fixed for 10±1 sec <table><tr><th>Terminal diameter (mm)</th><th>Force (kg)</th></tr><tr><td>0.5 < d ≤ 0.8</td><td>1.0</td></tr><tr><td>0.8 < d ≤ 1.25</td><td>2.0</td></tr><tr><td>1.25 < d</td><td>4.0</td></tr></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 ΔV1mA/V1mA ≤ 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	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><tr><th>Terminal diameter (mm)</th><th>Force (kg)</th></tr><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></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 ΔV1mA/V1mA ≤ 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	Frequency range: 10~55 Hz Amplitude: 0.75mm or 98m/s² Direction: 3 mutually perpendicular directions, 2hrs each.	No visible damage ΔV1mA/V1mA ≤ 5%								
Solder ability	Solder Temp: 245±5℃ Dipping Time: 2±0.5 sec	Atleast 95% of terminal electrode is covered by new solder								
Resistance to Soldering Heat	Solder Temp: 260±5℃ Dipping Time: 10±1 sec	No visible damage ΔV1mA/V1mA ≤ 10%								

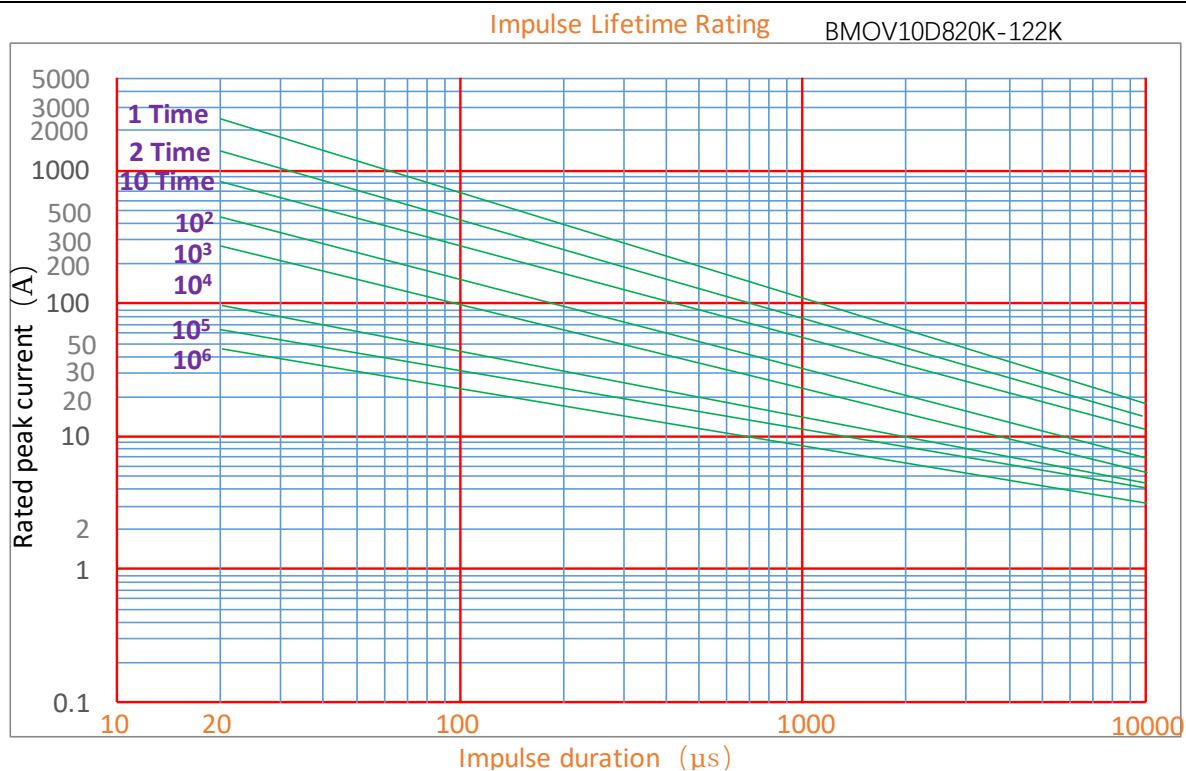
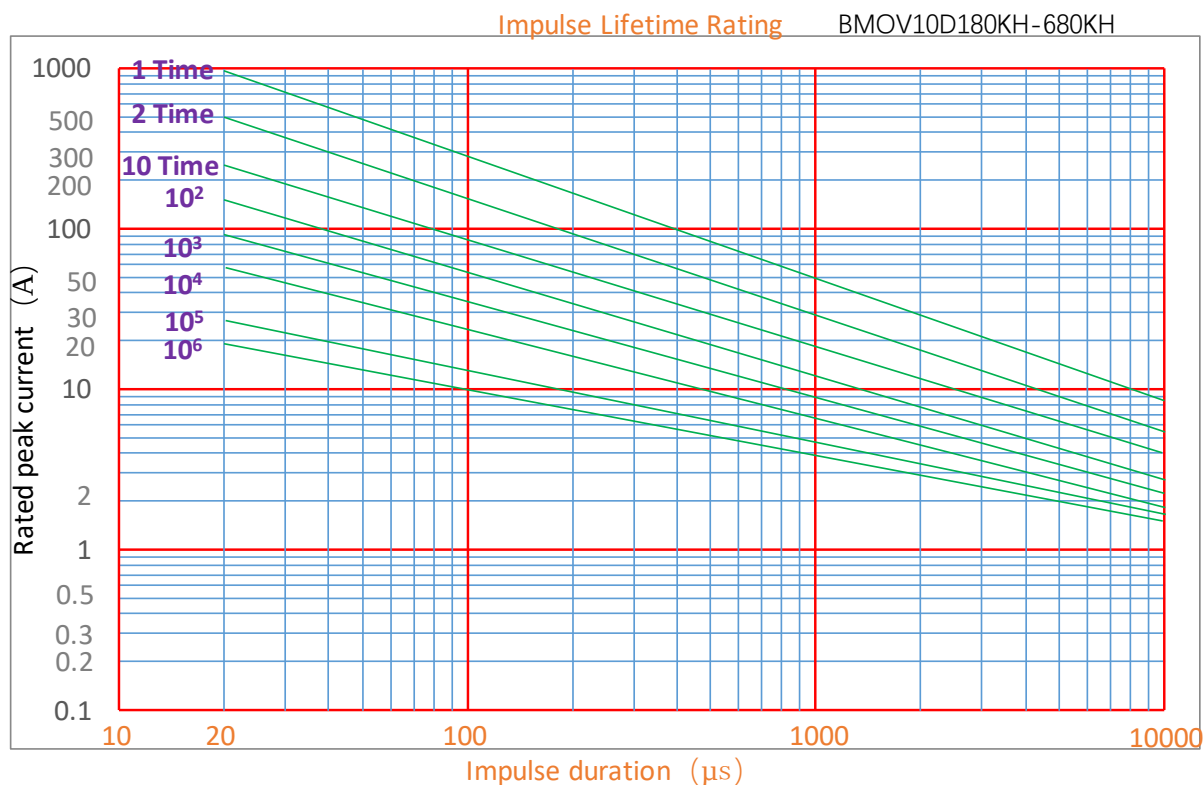
Reliability

Items	Test conditions / Methods	Specifications															
High Temperature Storage	Ambient Temp: 125±2°C Duration: 1000hrs	ΔV1mA/V1mA ≤ 5%															
Low Temperature Storage	Ambient Temp: -40±2°C Duration: 1000hrs	ΔV1mA/V1mA ≤ 5%															
Humidity	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs	ΔV1mA/V1mA ≤ 5%															
Temperature Cycle	The conditions shown below shall be repeated 5 cycles <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±3</td><td>30±3</td></tr> <tr> <td>4</td><td>Room temperature</td><td>15±3</td></tr> </table>	Step	Temperature (°C)	Period (minutes)	1	-40±3	30±3	2	Room temperature	15±3	3	125±3	30±3	4	Room temperature	15±3	No visible damage ΔV1mA/V1mA ≤ 5%
Step	Temperature (°C)	Period (minutes)															
1	-40±3	30±3															
2	Room temperature	15±3															
3	125±3	30±3															
4	Room temperature	15±3															

Items	Test conditions / Methods	Specifications
High Temperature Load	Ambient Temp: 105±2°C Duration: 1000hrs Load: Max. Allowable Voltage In AC Load.	$ \Delta V_{1mA}/V_{1mA} \leq 10\%$
Damp Heat Load	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs Load: Max. Allowable Voltage	No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 10\%$
Voltage Proof	Metal balls method, 1000Vac 1 min.(180K~331K), 1500Vac 1 min.(361K~112K)	No visible damage

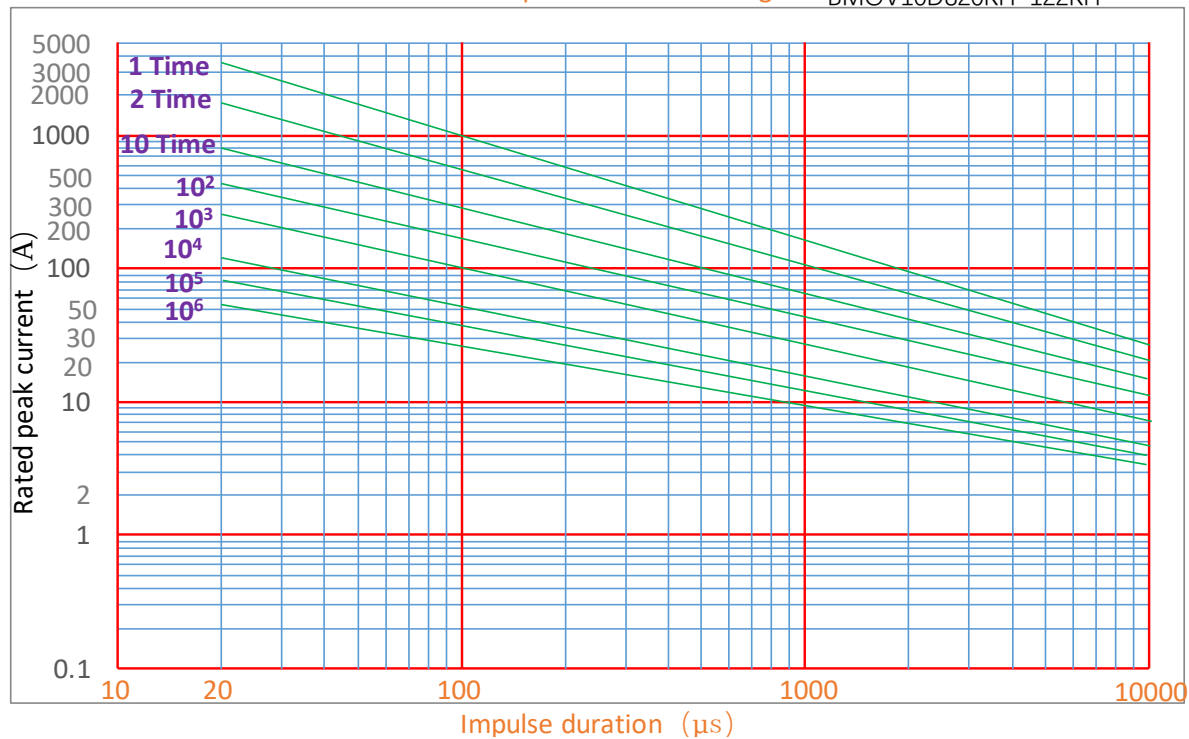
Maximum Surge Current Derating Curve



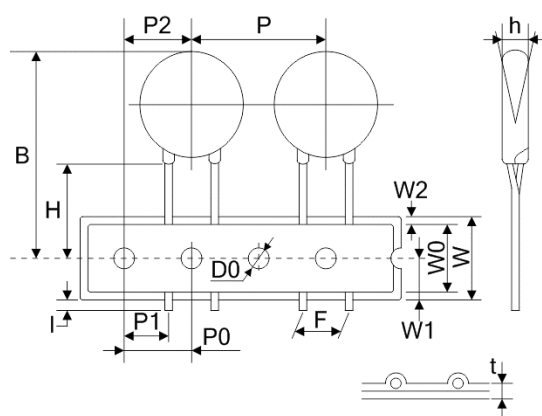


Impulse Lifetime Rating

BMOV10D820KH-122KH

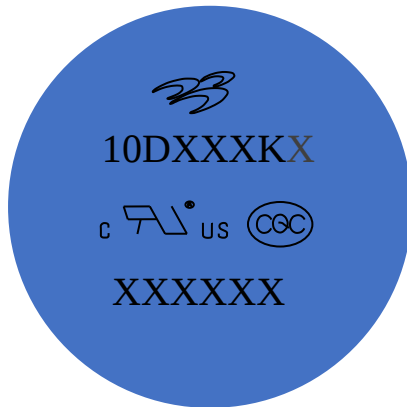


Taping Dimensions



Symbol	Dimension (mm)
P	25.4±1.0
P0	12.7±1.0
P1	8.95±0.7
P2	12.7±1.3
F	7.5±0.8
h	0±2
w	18.0±1.0
W0	12.0±1.0
W1	9.0±0.5
W2	3.0max
H	20.0±2.0
I	0
D0	4.0±0.2
t	0.6±0.3
B	36max

Marking Code


 : Bencent

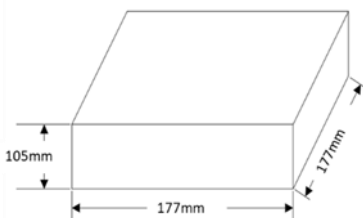
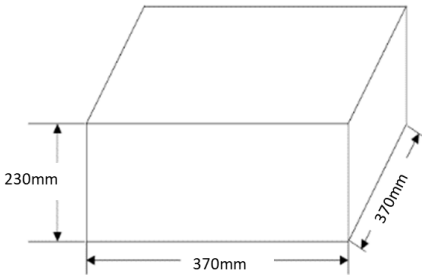
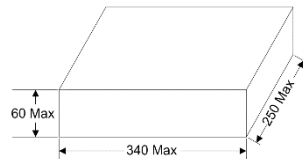
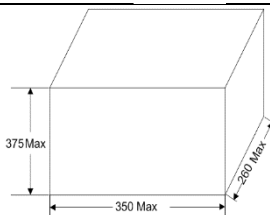
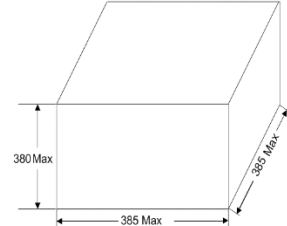
10: Disk 10mm; D:Rotundity; XXXK: Varistor Voltage
X:High surge code, no 'X' is standard

 : UL\CQC Mark

XX: Control code; X: Year ; X: Month
XX: Date

Quantity

Packaging Dimensions (Unit: mm)

Inner box size		Outer box size	Quantity
Bulk			500pcs/bag 2bags/box (180K~621K)
			400pcs/bag 2bags/box (681K~112K)
Tape & Box			1000pcs/box (180K~331K)
			750pcs/box (361K~621K)
			500pcs/box (681K~112K)
Reel size	Inner box size	Outer box size	Quantity
Tape & Reel			750pcs/reel (180K~331K)
			500pcs/reel (361K~621K)
			300pcs/reel (681K~112K)