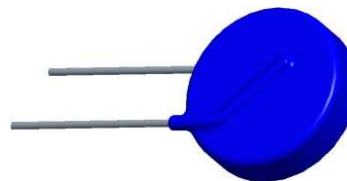


Features

- Wide operating voltage (V_{1mA}) range from 18V to 1800V
- 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: $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$

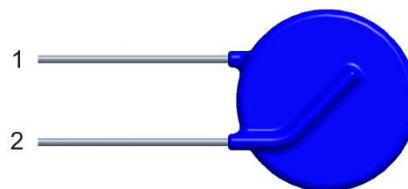
Exterior



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

Package (Top View)



Agency Approvals

Icon	Description
RoHS	Compliance with 2011/65/EU
HF	Compliance with IEC61249-2-21:2003
	Mean lead free

Schematic Symbol



Electrical Characteristics

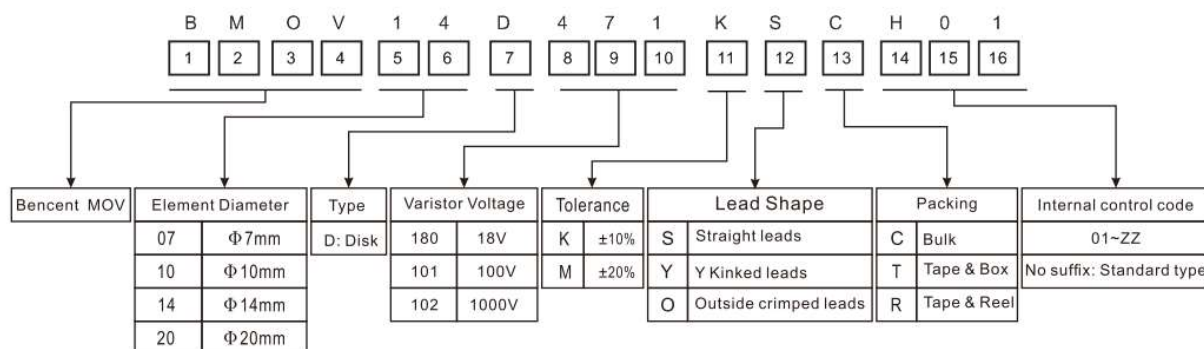
Part Number		Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge Current		Maximum Energy (10/1000μs)		Rated Power	Typical Capacitance (Reference)
Standard	High Surge	V_{AC} (V)	V_{DC} (V)	V_{1mA} (V)	I_P (A)	V_C (V)	I (A) Standard	I (A) High Surge	(J) Standard	(J) High Surge	(W)	@1KHz (pf)
14D180K	14D180KH	11	12	18(15~21.6)	10	36	1000	2000	4.0	7.0	0.1	11100
14D220K	14D220KH	14	18	22(19.5~26)	10	43	1000	2000	5.0	8.0	0.1	9100
14D270K	14D270KH	17	22	27(24~31)	10	53	1000	2000	6.0	10.0	0.1	7400
14D330K	14D330KH	20	26	33(29.5~36.5)	10	65	1000	2000	7.5	12.0	0.1	6100
14D390K	14D390KH	25	31	39(35~43)	10	77	1000	2000	8.6	13.0	0.1	5100
14D470K	14D470KH	30	38	47(42~52)	10	93	1000	2000	10.0	17.0	0.1	4300
14D560K	14D560KH	35	45	56(50~62)	10	110	1000	2000	11.0	20.0	0.1	3600
14D680K	14D680KH	40	56	68(61~75)	10	135	1000	2000	14.0	24.0	0.1	2900
14D820K	14D820KH	50	65	82(74~90)	50	145	4500	6000	22.0	27.0	0.6	2400

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)
14D101K	14D101KH	60	85	100(90~110)	50	165	4500	6000	28.0	33.0	0.6	2000
14D121K	14D121KH	75	100	120(108~132)	50	200	4500	6000	32.0	40.0	0.6	1700
14D151K	14D151KH	95	125	150(135~165)	50	250	4500	6000	40.0	53.0	0.6	1300
14D181K	14D181KH	115	150	180(162~198)	50	300	4500	6000	50.0	60.0	0.6	1100
14D201K	14D201KH	130	170	200(180~220)	50	340	4500	6000	57.0	70.0	0.6	1000
14D221K	14D221KH	140	180	220(198~242)	50	360	4500	6000	60.0	78.0	0.6	900
14D241K	14D241KH	150	200	240(216~264)	50	395	4500	6000	63.0	84.0	0.6	830
14D271K	14D271KH	175	225	270(243~297)	50	455	4500	6000	70.0	99.0	0.6	740
14D301K	14D301KH	190	250	300(270~330)	50	500	4500	6000	77.0	108	0.6	670
14D331K	14D331KH	210	275	330(297~363)	50	550	4500	6000	85.0	115	0.6	610
14D361K	14D361KH	230	300	360(324~396)	50	595	4500	6000	93.0	130	0.6	560
14D391K	14D391KH	250	320	390(351~429)	50	650	4500	6000	100	140	0.6	510
14D431K	14D431KH	275	350	430(387~473)	50	710	4500	6000	115	155	0.6	460
14D471K	14D471KH	300	385	470(423~517)	50	775	4500	6000	118	175	0.6	430
14D511K	14D511KH	320	415	510(459~561)	50	845	4500	6000	121	180	0.6	390
14D561K	14D561KH	350	460	560(504~616)	50	925	4500	6000	125	185	0.6	360
14D621K	14D621KH	385	505	620(558~682)	50	1025	4500	6000	128	190	0.6	320
14D681K	14D681KH	420	560	680(612~748)	50	1120	4500	6000	130	200	0.6	290
14D751K	14D751KH	460	615	750(675~825)	50	1240	4500	6000	143	210	0.6	270
14D781K	14D781KH	485	640	780(702~858)	50	1290	4500	6000	148	220	0.6	260
14D821K	14D821KH	510	670	820(738~902)	50	1355	4500	6000	157	235	0.6	240
14D911K	14D911KH	550	745	910(819~1001)	50	1500	4500	6000	175	255	0.6	220
14D102K	14D102KH	625	825	1000(900~1100)	50	1650	4500	6000	190	280	0.6	200
14D112K	14D112KH	680	895	1100(990~1210)	50	1815	4500	6000	213	310	0.6	180
14D122K	14D122KH	750	990	1200(1080~1320)	50	1980	4500	6000	232	324	0.6	160
14D142K	14D142KH	880	1140	1400(1260~1540)	50	2310	4500	6000	238	327	0.6	150
14D162K	14D162KH	1000	1280	1600(1440~1760)	50	2640	4500	6000	243	331	0.6	140
14D182K	14D182KH	1100	1465	1800(1620~1980)	50	2970	4500	5000	250	335	0.6	130

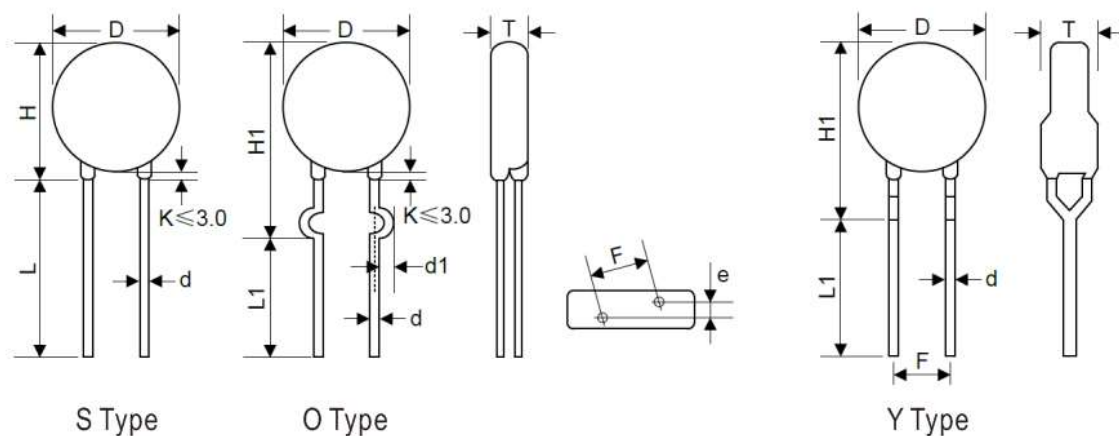
Notes: 1.The tolerance of varistor voltage between 18V and 27V is more than 10%;

2. Leakage Current (@83% of V_{1mA}): IR≤50μA (180K~680K) ; IR≤25μA (820K~182K).

3. The foot shape can be customized according to customer needs.



Dimensions



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

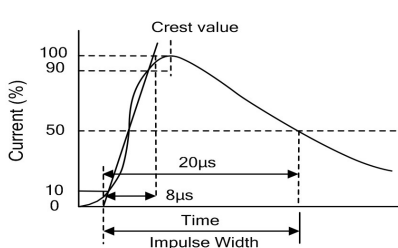
Unit: mm

Table 1	
Symbol	Dimension
H	14.5~20.0
H1	17.0~23.0
L(min)	20
L1(min)	15
D(max)	14.0~18.0
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

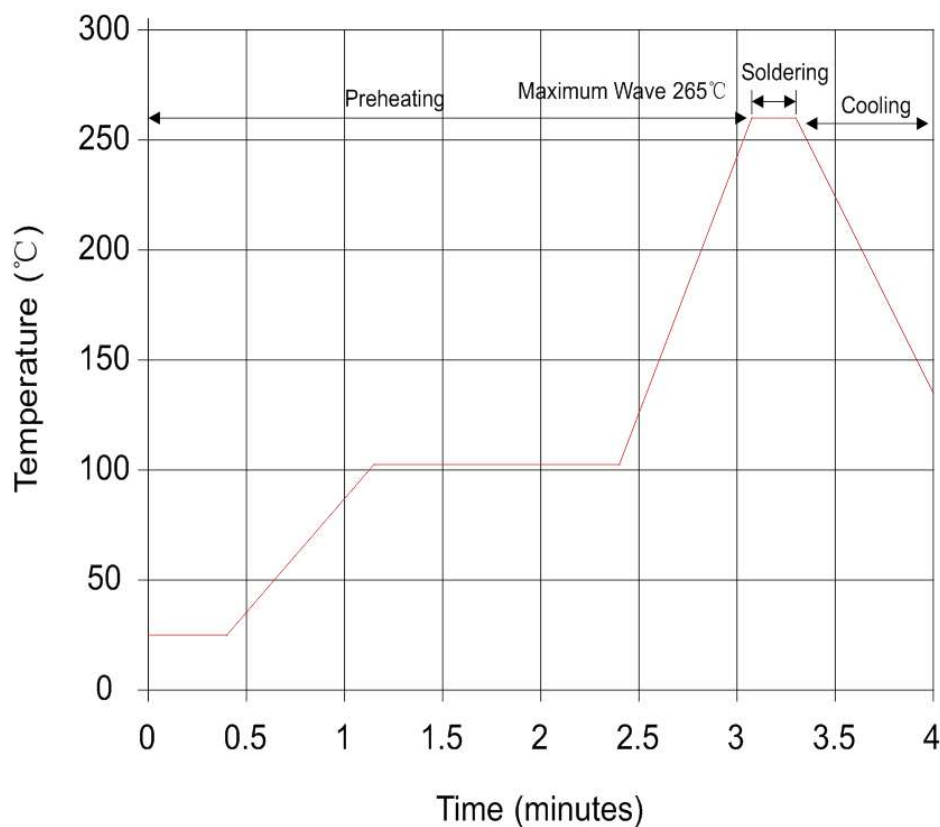
Table 2					
Model	T	e	Model	T	e
180K	2.55~5.30	1.5	361K	3.38~6.70	2.7
220K	2.65~5.44	1.6	391K	3.48~6.88	2.8
270K	2.76~5.64	1.8	431K	3.61~7.13	3.0
330K	2.89~5.83	1.7	471K	3.74~7.37	3.2
390K	2.84~5.61	1.8	511K	3.87~7.62	3.4
470K	2.96~5.83	1.9	561K	4.03~7.92	3.6
560K	3.11~6.08	2.0	621K	4.23~8.29	3.9
680K	3.31~6.37	2.2	681K	4.43~8.66	4.2
820K	2.64~5.31	1.8	751K	4.65~8.73	4.3
101K	2.74~5.48	2.0	781K	4.75~8.79	4.4
121K	2.84~5.68	2.2	821K	4.88~9.01	4.6
151K	2.69~5.47	1.8	911K	5.18~9.05	4.8
181K	2.79~5.66	1.9	102K	5.47~9.50	5.1
201K	2.87~5.82	2.0	112K	5.80~10.0	5.4
221K	2.92~5.84	2.1	122K	6.13~10.5	5.6
241K	2.99~5.97	2.2	142K	6.78~11.5	5.9
271K	3.08~6.15	2.4	162K	7.44~12.5	6.5
301K	3.18~6.33	2.5	182K	8.09~13.5	6.9
331K	3.28~6.52	2.5			

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 $\pm 10\%$ when one impulse of 10/1000 μ s or 2ms is applied.						
Withstanding Surge Current	The maximum current within the varistor voltage change of $\pm 10\%$ with the standard impulse current (8/20 μ s) applied one time.						
Varistor Voltage Temp. Coefficient	$\left \frac{V_{1mA@105^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{80} \times 100\% (^{\circ}C) \right $	$\leq 0.05\%/^{\circ}C$					
	$\left \frac{V_{1mA@-40^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{65} \times 100\% (^{\circ}C) \right $						
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 border="1"> <tr> <td rowspan="2">14Φ series</td><td>180K to 680K</td><td>75A (8/20μs)</td></tr> <tr> <td>820K to 182K</td><td>150A (8/20μs)</td></tr> </table>	14 Φ series	180K to 680K	75A (8/20 μ s)	820K to 182K	150A (8/20 μ s)	$\frac{\Delta V_b}{V_b} \leq \pm 10\%$
14 Φ series	180K to 680K		75A (8/20 μ s)				
	820K to 182K	150A (8/20 μ s)					

Soldering Recommendation

Lead-free Wave Soldering Recommendation



Item	Conditions
Peak Temperature	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

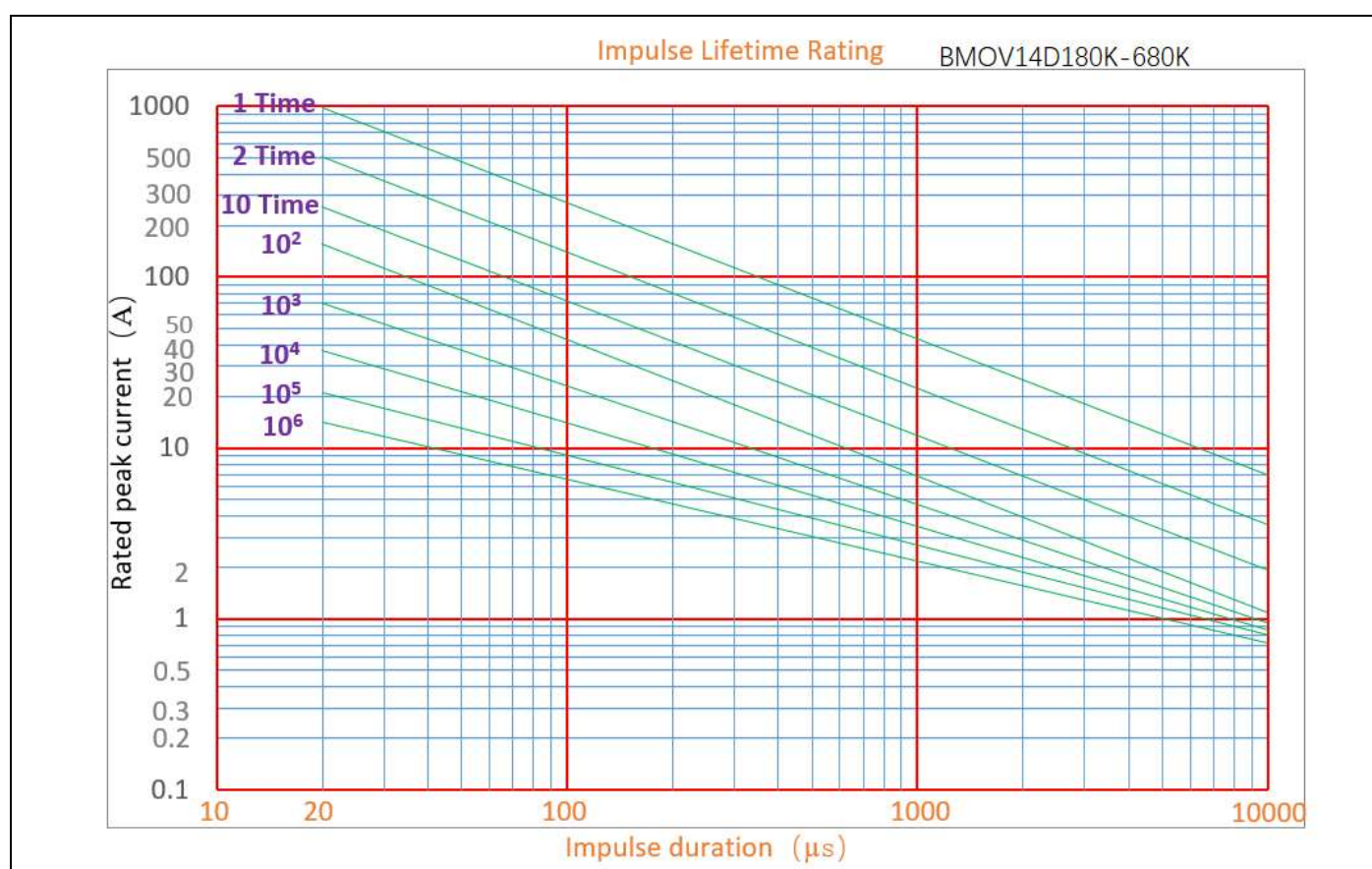
Items	Test conditions / Methods	Specifications
Tensile Strength of Terminals	Gradually applying the force specified and keeping the unit fixed for 10±1 sec	No visible damage ΔV1mA/V1mA ≤5%
	Terminal diameter (mm)	
	Force (kg)	
	0.5 < d ≤ 0.8	
	0.8 < d ≤ 1.25	
Bending Strength of Terminals	Hold specimen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

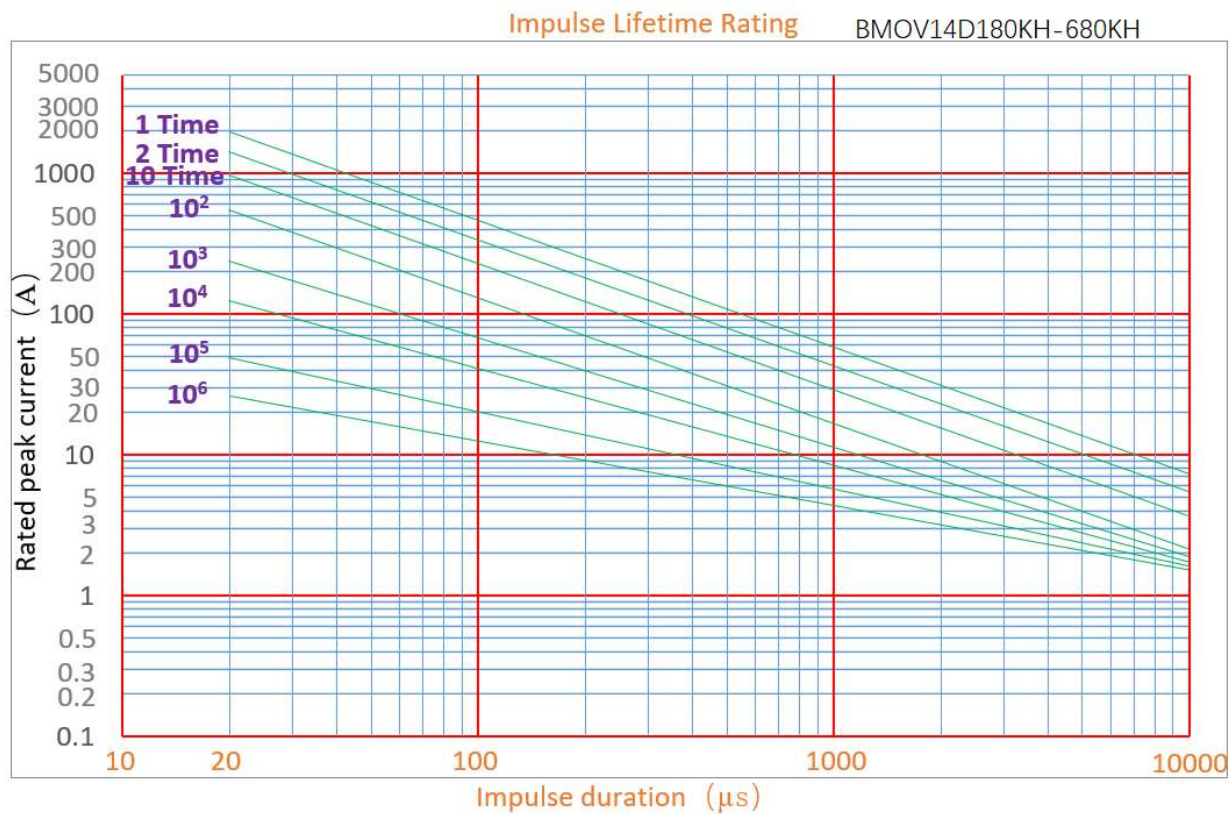
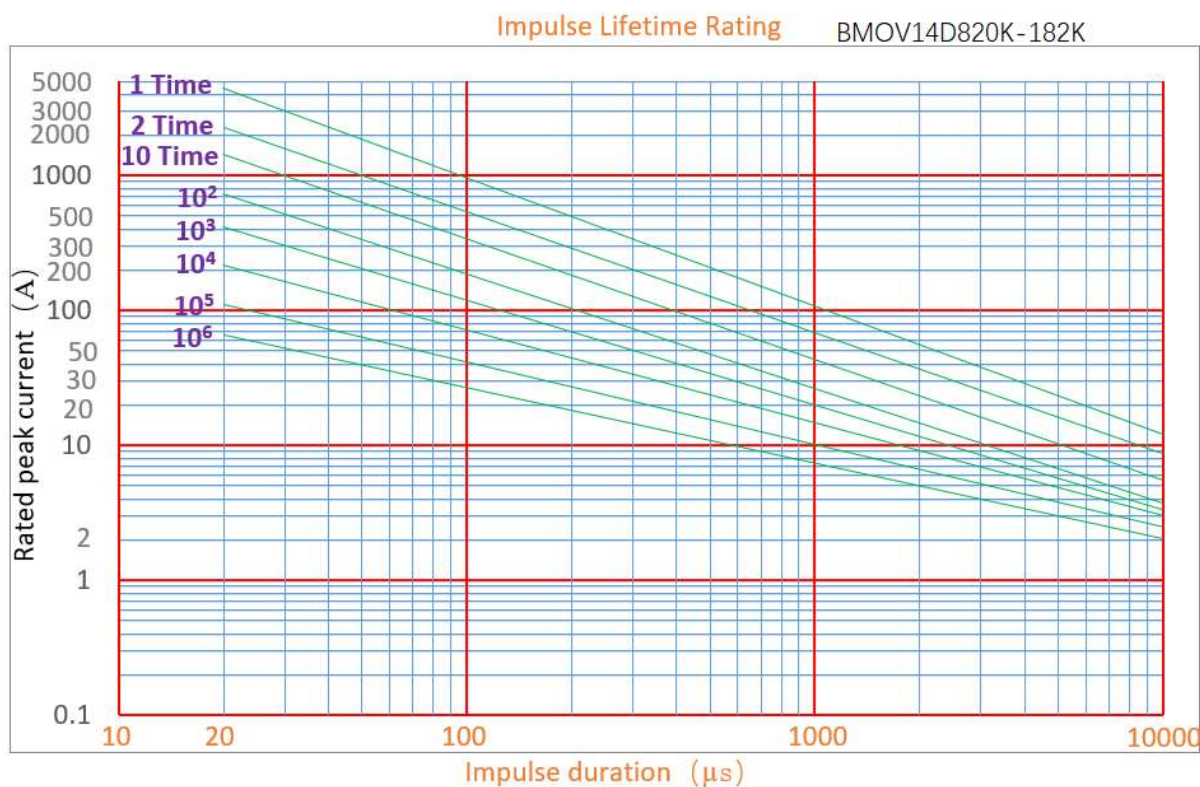
Reliability

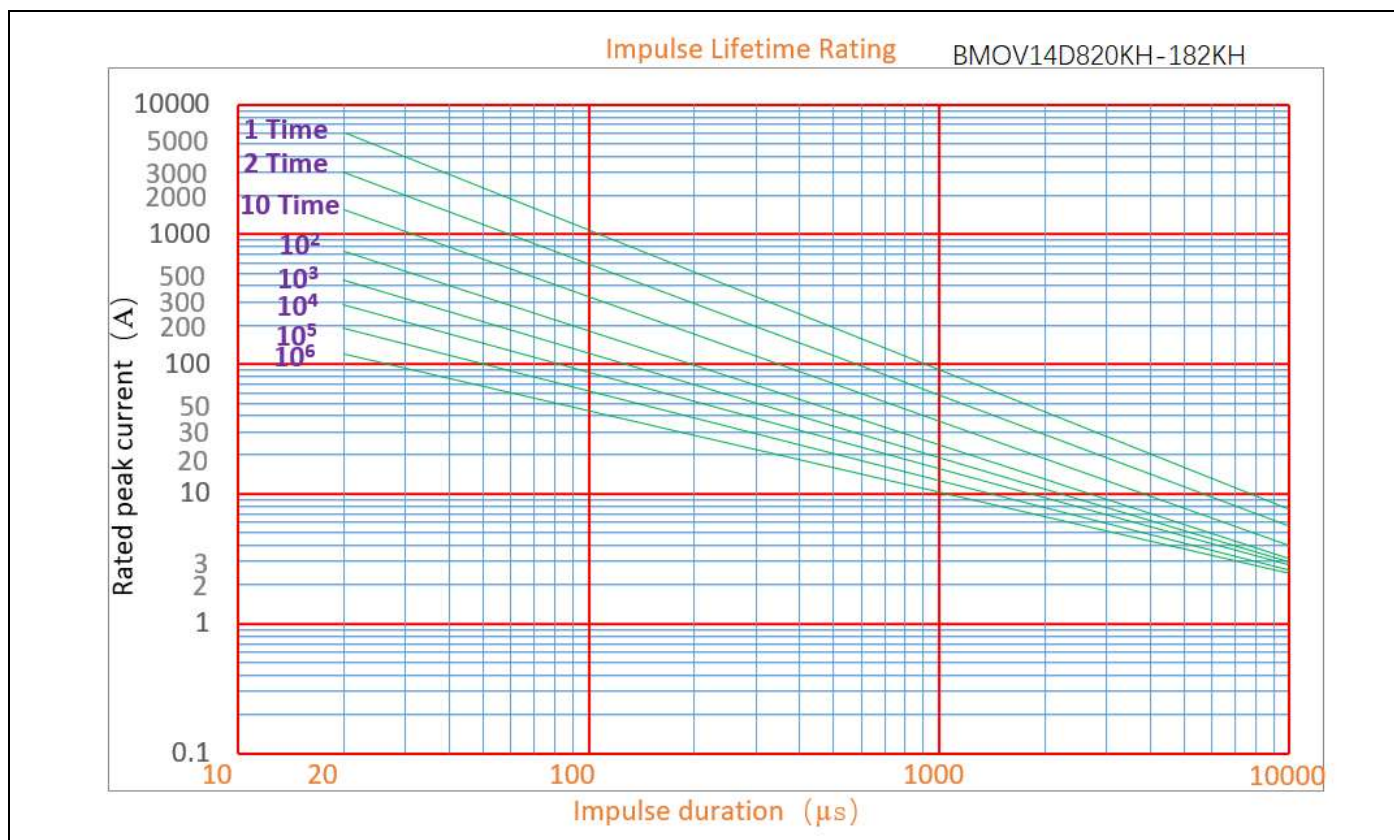
Items	Test conditions / Methods	Specifications
High Temperature Storage	Ambient Temp: 125±2°C Duration: 1000hrs	ΔV1mA/V1mA ≤5%
Low Temperature Storage	Ambient Temp: -40±2°C Duration: 1000hrs	ΔV1mA/V1mA ≤5%
Humidity	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs	ΔV1mA/V1mA ≤5%
Temperature Cycle	The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

Items	Test conditions / Methods	Specifications
High Temperature Load	Ambient Temp: 105±2°C Duration: 1000hrs Load: Max. Allowable Voltage In AC eara.	$ \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, 2500Vac 1 min.	No visible damage

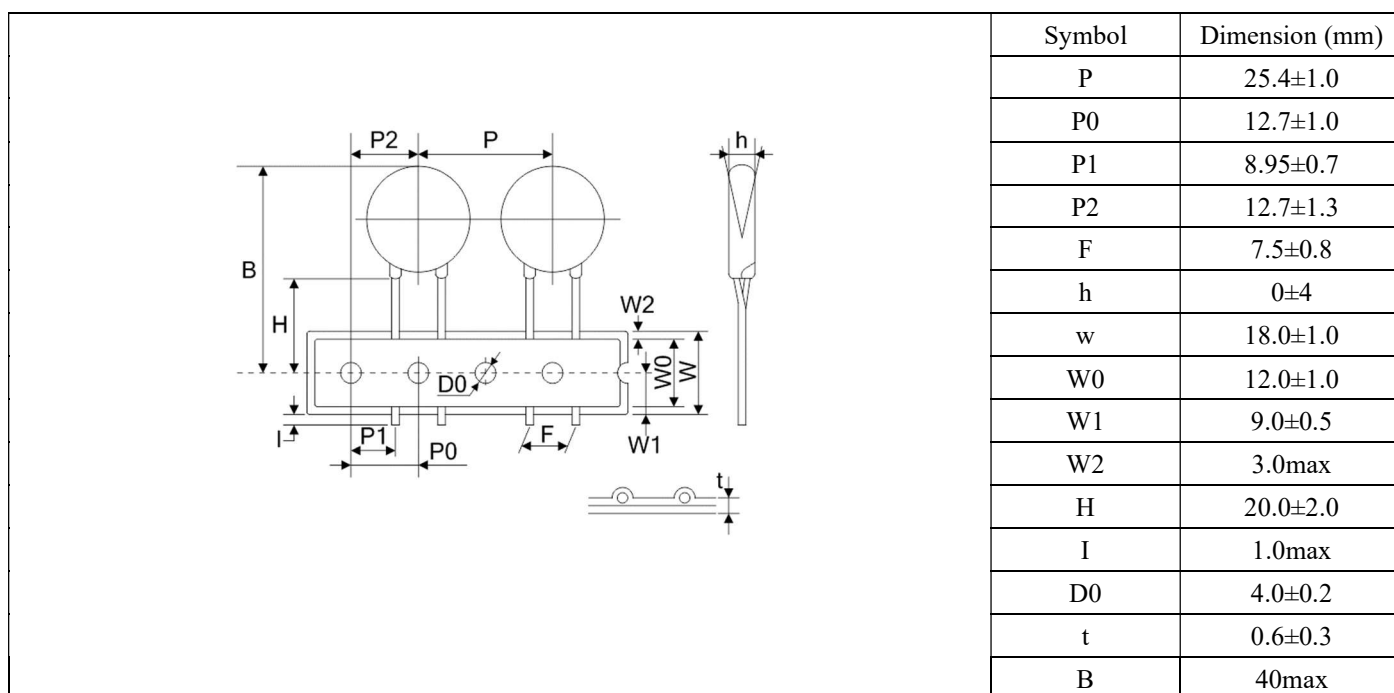
Maximum Surge Current Derating Curve

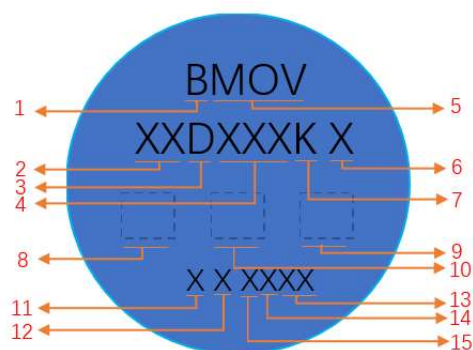






Taping Dimensions

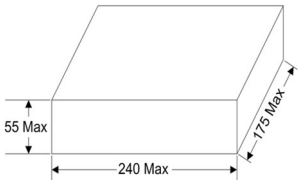
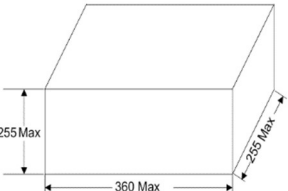
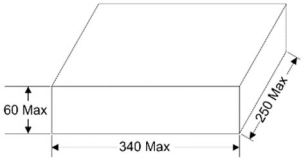
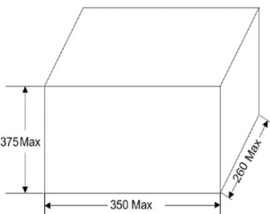


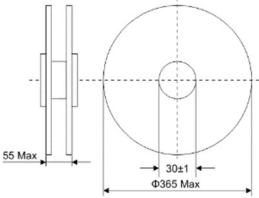
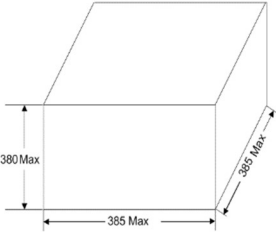


- 1 B:Bencent
- 2 XX:Disk size (mm): 07、10、14、20、25...
- 3 D:Round; S:Square; R:Superposition;N/M/E:TMOV
- 4 XXX:Varistor voltage specifications
- 5 MOV:Metal Oxide Varistor
- 6 X:High Surge Code, no "X" is standard Surge
- 7 K:The varistor voltage range, $\pm 10\%$; L: $\pm 15\%$; M: $\pm 20\%$
- 8 UL Mark; 9 CSA Mark; 10 TUV Mark
- 11 X:Disk product line Code ; 12 X:Finished line code
- 13 XX:Date Code, 1、2、3...29、30、31
- 14 X:Month Code, A、B、C...J、K、L
- 15 X:Year Code, A、B、C...X、Y、Z

Quantity

Packaging Dimensions (Unit: mm)

Inner box size	Outer box size	Quantity
Bulk 		400pcs/bag 2bags/box (180K~331K)
		300pcs/bag 2bags/box (361K~621K)
		250pcs/bag 2bags/box (681K~112K)
		150pcs/bag 2bags/box (122K~182K)
Tape & Box 		750pcs/box (180K~331K)
		500pcs/box (361K~621K)
		500pcs/box (681K~112K)
		500pcs/box (122K~182K)

Reel size	Inner box size	Outer box size	Quantity
Tape & Reel 			750 pcs/reel (180K~331K)
			500 pcs/reel (361K~621K)
			500 pcs/reel (681K~112K)
			500 pcs/reel (122K~182K)