

## Metal Oxide Varistors (MOV) Data Sheet

### Features

- Wide operating voltage ( $V_{1mA}$ ) range from 18V to 820V
- Fast responding to transient over-voltage
- Large absorbing transient energy capability
- Low clamping ratio and no follow-on current
- Meets MSL level 1, per J-STD-020
- Safety certification: UL: E327997  
CSA: 246579  
VDE: 40027827

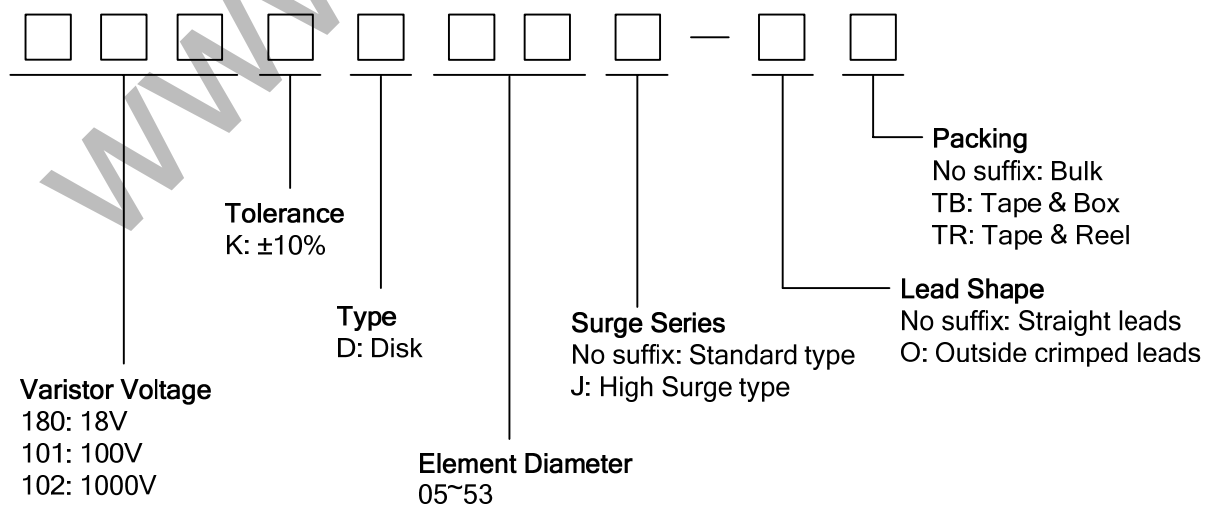
### Applications

- 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

### General Characteristics Definition

- Operating Temperature:  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- Storage Temperature:  $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$

### Part Number Code



**Dimensions**

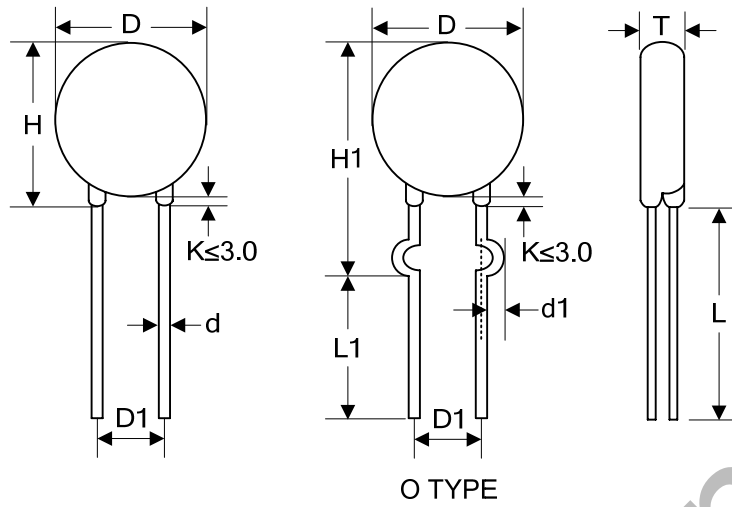


TABLE 1	
Unit: mm	
Symbol	Dimension
H(max.)	12.0
H1(max.)	13.5
L(min.)	20.0
L1(min.)	15.0
D(max.)	9.0
D1(±0.8)	5.0
T(max.)	TABLE 2
d(±0.05)	0.6
d1(±0.4)	1.2

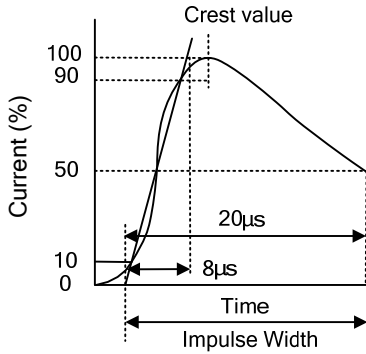
TABLE 2			
Unit: mm			
Model	T(max.)	Model	T(max.)
180K	4.50	241K	4.60
220K	4.60	271K	4.90
270K	4.70	301K	5.00
330K	4.90	331K	5.10
390K	4.80	361K	5.20
470K	4.90	391K	5.40
560K	5.00	431K	5.70
680K	5.20	471K	6.00
820K	4.10	511K	6.20
101K	4.30	561K	6.50
121K	4.50	621K	7.10
151K	4.80	681K	7.30
181K	4.30	751K	7.06
201K	4.40	781K	7.24
221K	4.50	821K	7.48

**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 <sub>AC</sub> (V)	V <sub>DC</sub> (V)	V <sub>1mA</sub> (V)	I <sub>P</sub> (A)	V <sub>C</sub> (V)	I (A) Standard	I (A) High Surge	(J) Standard	(J) High Surge	(W)	@1KHz (pf)
180KD07	180KD07J	11	14	18(15~21.6)	2.5	36	250	500	0.9	2.0	0.02	2800
220KD07	220KD07J	14	18	22(19.5~26)	2.5	43	250	500	1.1	2.4	0.02	2300
270KD07	270KD07J	17	22	27(24~31)	2.5	53	250	500	1.4	3.0	0.02	1800
330KD07	330KD07J	20	26	33(29.5~36.5)	2.5	65	250	500	1.7	3.5	0.02	1500
390KD07	390KD07J	25	31	39(35~43)	2.5	77	250	500	2.1	4.0	0.02	1300
470KD07	470KD07J	30	38	47(42~52)	2.5	93	250	500	2.5	5.0	0.02	1100
560KD07	560KD07J	35	45	56(50~62)	2.5	110	250	500	3.1	6.0	0.02	890
680KD07	680KD07J	40	56	68(61~75)	2.5	135	250	500	3.6	7.0	0.02	740
820KD07	820KD07J	50	65	82(74~90)	10	135	1200	1750	5.0	10.0	0.25	600
101KD07	101KD07J	60	85	100(90~110)	10	165	1200	1750	6.5	12.0	0.25	500
121KD07	121KD07J	75	100	120(108~132)	10	200	1200	1750	7.8	13.0	0.25	420
151KD07	151KD07J	95	125	150(135~165)	10	250	1200	1750	9.7	13.0	0.25	330
181KD07	181KD07J	115	150	180(162~198)	10	300	1200	1750	11.7	16.0	0.25	280
201KD07	201KD07J	130	170	200(180~220)	10	340	1200	1750	13.0	17.0	0.25	250
221KD07	221KD07J	140	180	220(198~242)	10	360	1200	1750	14.0	19.0	0.25	230
241KD07	241KD07J	150	200	240(216~264)	10	395	1200	1750	15.0	21.0	0.25	210
271KD07	271KD07J	175	225	270(243~297)	10	455	1200	1750	18.0	24.0	0.25	185
301KD07	301KD07J	190	250	300(270~330)	10	500	1200	1750	20.0	26.0	0.25	165
331KD07	331KD07J	210	275	330(297~363)	10	550	1200	1750	23.0	28.0	0.25	150
361KD07	361KD07J	230	300	360(324~396)	10	595	1200	1750	25.0	32.0	0.25	140
391KD07	391KD07J	250	320	390(351~429)	10	650	1200	1750	25.0	35.0	0.25	130
431KD07	431KD07J	275	350	430(387~473)	10	710	1200	1750	28.0	40.0	0.25	115
471KD07	471KD07J	300	385	470(423~517)	10	775	1200	1750	30.0	42.0	0.25	105
511KD07	511KD07J	320	415	510(459~561)	10	845	1200	1750	30.0	45.0	0.25	100
561KD07	561KD07J	350	460	560(504~616)	10	925	1200	1750	30.0	49.0	0.25	90
621KD07	621KD07J	385	505	620(558~682)	10	1025	1200	1750	33.0	55.0	0.25	80
681KD07	681KD07J	420	560	680(612~748)	10	1120	1200	1750	33.0	60.0	0.25	75
751KD07	751KD07J	460	615	750(675~825)	10	1240	1200	1750	67.2	65.0	0.25	70
781KD07	781KD07J	485	640	780(702~858)	10	1290	1200	1750	67.2	65.0	0.25	70
821KD07	821KD07J	510	670	820(738~902)	10	1355	1200	1750	67.2	70.0	0.25	60

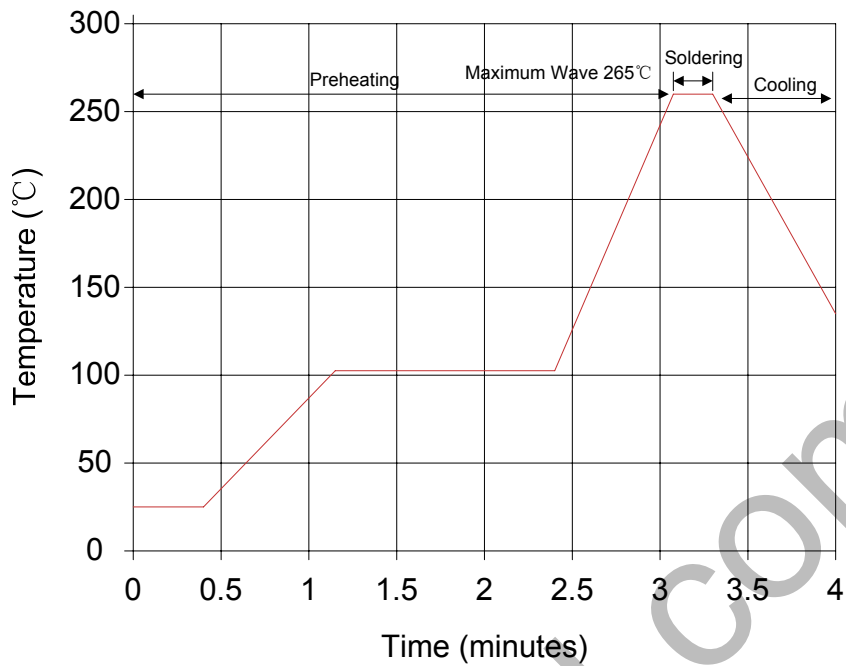
Notes: The tolerance of varistor voltage between 18V and 27V is more than 10%.

**Electrical Ratings**

Items	Test Condition/Description	Requirement																									
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.																										
Maximum Allowable Voltage	The recommended maximum sine wave voltage (RMS) or the Maximum DC voltage can be applied continuously.																										
Maximum Clamping Voltage	<p>The maximum voltage between two terminals with the specification standard impulse current. Applied waveform: 8/20μs</p> 	To meet the Specified value																									
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% with the standard impulse current (8/20μs) applied one time.																										
Varistor Voltage Temp. Coefficient	$\frac{V_b \text{ at } 20^{\circ}\text{C} - V_b \text{ at } 70^{\circ}\text{C}}{V_b \text{ at } 20^{\circ}\text{C}} \times \frac{1}{50} \times 100(\%/^{\circ}\text{C})$	0.05%/°C max																									
Surge Life	<p>The change of Vb shall be measured after the impulse listed below which is applied 10,000 times continuously with the interval of ten seconds at room temperature.</p> <table border="1" data-bbox="443 1460 1203 1928"> <tbody> <tr> <td rowspan="2">5Φ series</td> <td>180K to 680K</td> <td>10A (8/20μs)</td> </tr> <tr> <td>820K to 751K</td> <td>20A (8/20μs)</td> </tr> <tr> <td rowspan="2">7Φ series</td> <td>180K to 680K</td> <td>25A (8/20μs)</td> </tr> <tr> <td>820K to 821K</td> <td>50A (8/20μs)</td> </tr> <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> <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> <tr> <td rowspan="2">20Φ series</td> <td>180K to 680K</td> <td>100A (8/20μs)</td> </tr> <tr> <td>820K to 182K</td> <td>200A (8/20μs)</td> </tr> </tbody> </table>	5Φ series	180K to 680K	10A (8/20μs)	820K to 751K	20A (8/20μs)	7Φ series	180K to 680K	25A (8/20μs)	820K to 821K	50A (8/20μs)	10Φ series	180K to 680K	50A (8/20μs)	820K to 112K	100A (8/20μs)	14Φ series	180K to 680K	75A (8/20μs)	820K to 182K	150A (8/20μs)	20Φ series	180K to 680K	100A (8/20μs)	820K to 182K	200A (8/20μs)	$\frac{\Delta V_b}{V_b} \leq \pm 10\%$
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**Soldering Recommendation**

Wave Lead Free Soldering Recommendation



Item	Conditions
Peak Temperature	265°C
Dipping Time	10 seconds
Soldering	1 time

Recommendation Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C (max.)
Soldering Time	3 seconds (max.)
Distance from Varistor	2mm (min.)


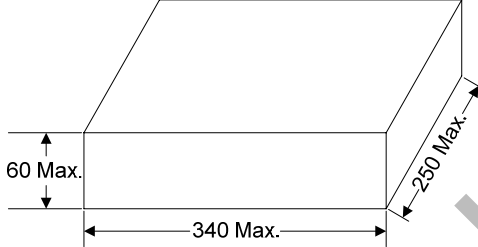
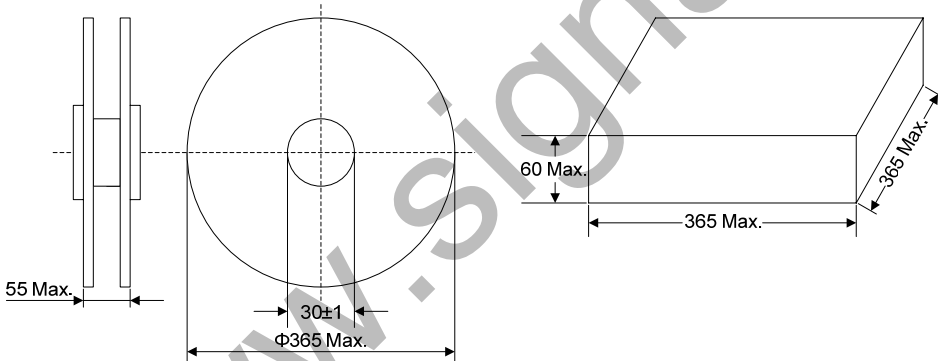
**Marking Code**

① Brightking Logo  
 ② Varistor Voltage  
 ③ UL Accreditation Logo  
 ④ CSA Accreditation Logo  
 ⑤ VDE Accreditation Logo  
 ⑥ “J” is High Surge Code, no “J” is Standard Surge  
 ⑦ Disk Size  
 ⑧ “H” is Halogen Free Code, no “H” is Halogen  
 ⑨ Date Code  
 ⑩ Product Line Code

**Taping Dimensions**

Symbol	Dimensions (mm)
P	12.7±1.0
P0	12.7±0.3
P1	3.85±0.7
P2	6.35±1.3
F	5.0±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	1.0max
D0	4.0±0.2
t	0.6±0.3
B	32max

Quantity

Packaging Dimensions (Unit: mm)	Quantity
<p>Bulk</p> 	<p>1000pcs/bag 2bags/box</p>
<p>Tape &amp; Box</p> 	<p>1500pcs/box (180K~391K)</p>
<p>Tape &amp; Reel</p> 	<p>2000pcs/reel (180K~331K)</p>
	<p>1500pcs/reel (361K~821K)</p>