Metal Oxide Varistors (MOV) Data Sheet

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
- 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：① -40℃ ~ +85℃
  ② -40℃ ~ +125℃*
- Storage Temperature：-40℃ ~ +125℃

Notes:

① Coated with common epoxy powder before May 1st, 2014.

② Changed to high temperature epoxy powder from May 1st, 2014, please refer to PCN file for detail.

Part Number Code

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Varistor Voltage
180: 18V
101: 100V
102: 1000V

Tolerance
K：±10%

Type
D：Disk

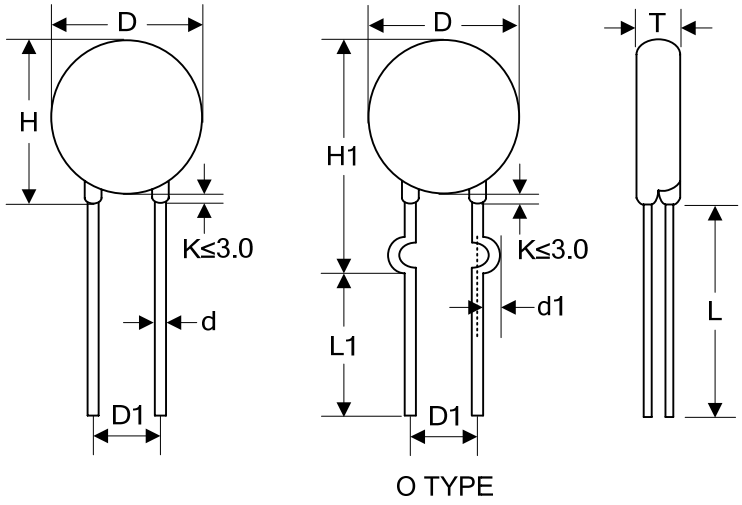
Element Diameter
05~53

Surge Series
No suffix: Standard type
J: High Surge type

Lead Shape
No suffix: Straight leads
O: Outside crimped leads

Packing
No suffix: Bulk
TB: Tape & Box
TR: Tape & Reel

Dimensions



O TYPE

TABLE 1 Unit: mm	
Symbol	Dimension
H(max.)	16.5
H1(max.)	17.5
L(min.)	20.0
L1(min.)	15.0
D(max.)	12.5
D1(±0.8)	7.5
T(max.)	TABLE 2
d(±0.05)	0.8
d1(±0.4)	1.4

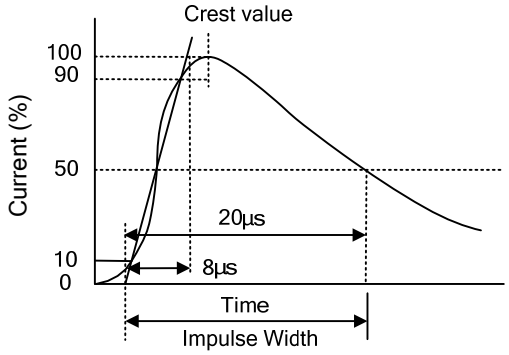
TABLE 2 Unit: mm			
Model	T(max.)	Model	T(max.)
180K	4.60	301K	5.50
220K	4.70	331K	5.80
270K	4.80	361K	6.00
330K	5.00	391K	6.20
390K	5.30	431K	6.50
470K	5.40	471K	6.70
560K	5.50	511K	6.80
680K	5.60	561K	7.00
820K	4.70	621K	7.30
101K	4.90	681K	7.60
121K	5.10	751K	8.00
151K	5.40	781K	8.10
181K	4.80	821K	8.30
201K	5.00	911K	8.80
221K	5.10	102K	9.30
241K	5.20	112K	9.90
271K	5.40		

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)
180KD10	180KD10J	11	14	18(15~21.6)	5	36	500	1000	2.1	3.0	0.05	5600
220KD10	220KD10J	14	18	22(19.5~26)	5	43	500	1000	2.5	5.0	0.05	4500
270KD10	270KD10J	17	22	27(24~31)	5	53	500	1000	3.0	6.0	0.05	3700
330KD10	330KD10J	20	26	33(29.5~36.5)	5	65	500	1000	4.0	7.0	0.05	3000
390KD10	390KD10J	25	31	39(35~43)	5	77	500	1000	4.6	9.0	0.05	2400
470KD10	470KD10J	30	38	47(42~52)	5	93	500	1000	5.5	11.0	0.05	2100
560KD10	560KD10J	35	45	56(50~62)	5	110	500	1000	7.0	13.0	0.05	1800
680KD10	680KD10J	40	56	68(61~75)	5	135	500	1000	8.2	15.0	0.05	1500
820KD10	820KD10J	50	65	82(74~90)	25	135	2500	3500	12.0	17.0	0.4	1200
101KD10	101KD10J	60	85	100(90~110)	25	165	2500	3500	15.0	18.0	0.4	1000
121KD10	121KD10J	75	100	120(108~132)	25	200	2500	3500	18.0	21.0	0.4	830
151KD10	151KD10J	95	125	150(135~165)	25	250	2500	3500	22.0	25.0	0.4	670
181KD10	181KD10J	115	150	180(162~198)	25	300	2500	3500	27.0	30.0	0.4	560
201KD10	201KD10J	130	170	200(180~220)	25	340	2500	3500	30.0	35.0	0.4	500
221KD10	221KD10J	140	180	220(198~242)	25	360	2500	3500	32.0	39.0	0.4	450
241KD10	241KD10J	150	200	240(216~264)	25	395	2500	3500	35.0	42.0	0.4	420
271KD10	271KD10J	175	225	270(243~297)	25	455	2500	3500	37.0	49.0	0.4	370
301KD10	301KD10J	190	250	300(270~330)	25	500	2500	3500	40.0	54.0	0.4	330
331KD10	331KD10J	210	275	330(297~363)	25	550	2500	3500	43.0	58.0	0.4	300
361KD10	361KD10J	230	300	360(324~396)	25	595	2500	3500	47.0	65.0	0.4	280
391KD10	391KD10J	250	320	390(351~429)	25	650	2500	3500	60.0	70.0	0.4	260
431KD10	431KD10J	275	350	430(387~473)	25	710	2500	3500	65.0	80.0	0.4	230
471KD10	471KD10J	300	385	470(423~517)	25	775	2500	3500	67.0	85.0	0.4	210
511KD10	511KD10J	320	415	510(459~561)	25	845	2500	3500	69.0	90.0	0.4	200
561KD10	561KD10J	350	460	560(504~616)	25	925	2500	3500	70.0	92.0	0.4	180
621KD10	621KD10J	385	505	620(558~682)	25	1025	2500	3500	72.0	95.0	0.4	160
681KD10	681KD10J	420	560	680(612~748)	25	1120	2500	3500	75.0	98.0	0.4	150
751KD10	751KD10J	460	615	750(675~825)	25	1240	2500	3500	77.0	100.0	0.4	130
781KD10	781KD10J	485	640	780(702~858)	25	1290	2500	3500	80.0	105.0	0.4	130
821KD10	821KD10J	510	670	820(738~902)	25	1355	2500	3500	85.0	110.0	0.4	120
911KD10	911KD10J	550	745	910(819~1001)	25	1500	2500	3500	93.0	130.0	0.4	110
102KD10	102KD10J	625	825	1000(900~1100)	25	1650	2500	3500	102.0	140.0	0.4	100
112KD10	112KD10J	680	895	1100(990~1210)	25	1815	2500	3500	115.0	155.0	0.4	90

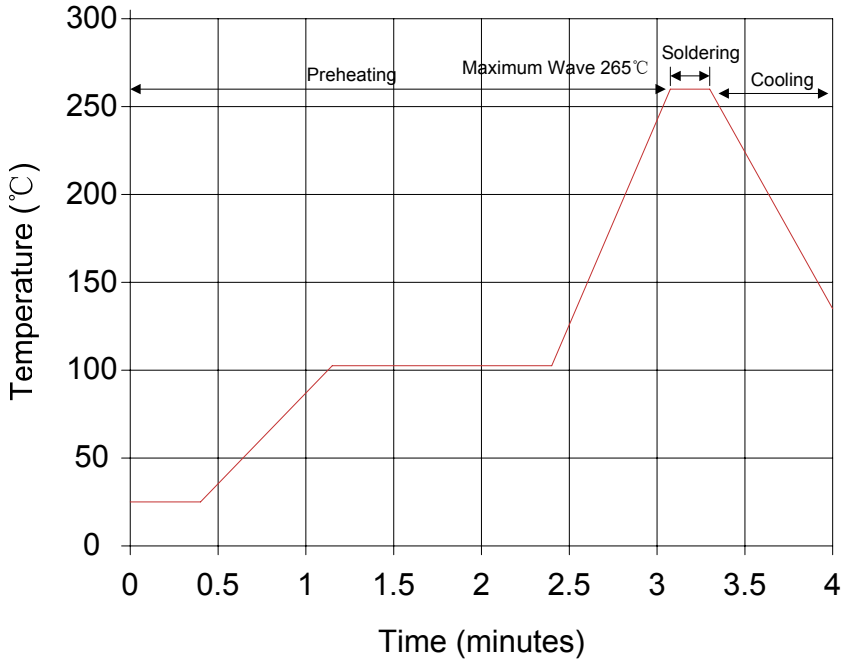
Notes: The tolerance of varistor voltage between 18V and 27V is more than 10%.

Electrical Ratings

<table>
<tr><th>Items</th><th>Test Condition/Description</th><th>Requirement</th></tr>
<tr><td>Varistor Voltage</td><td>The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.</td><td rowspan="6">To meet the Specified value</td></tr>
<tr><td>Maximum Allowable Voltage</td><td>The recommended maximum sine wave voltage (RMS) or the Maximum DC voltage can be applied continuously.</td></tr>
<tr><td>Maximum Clamping Voltage</td><td>The maximum voltage between two terminals with the specification standard impulse current.
Applied waveform: 8/20μs
 
</td></tr>
<tr><td>Rated Wattage</td><td>The maximum average power that can be applied within the specified ambient temperature.</td></tr>
<tr><td>Energy</td><td>The maximum energy within the varistor voltage change of ±10% when one impulse of 10/1000μs or 2ms is applied.</td></tr>
<tr><td>Withstanding Surge Current</td><td>The maximum current within the varistor voltage change of ±10% with the standard impulse current (8/20μs) applied one time.</td></tr>
<tr><td>Varistor Voltage Temp. Coefficient</td><td>$\frac{\text{Vb at 20℃} - \text{Vb at 70℃}}{\text{Vb at 20℃}} \times \frac{1}{50} \times 100(\%/℃)$</td><td>0.05%/℃ max</td></tr>
<tr><td>Surge Life</td><td>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.
<table>
<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>
</table></td><td>$\frac{\Delta Vb}{Vb} \leq \pm 10\%$</td></tr>
</table>

Soldering Recommendation

Wave Lead Free Soldering Recommendation

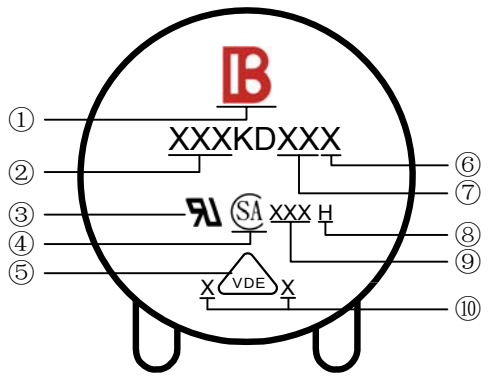


Item	Conditions
Peak Temperature	265℃
Dipping Time	10 seconds
Soldering	1 time

Recommendation Reworking Conditions with Soldering Iron

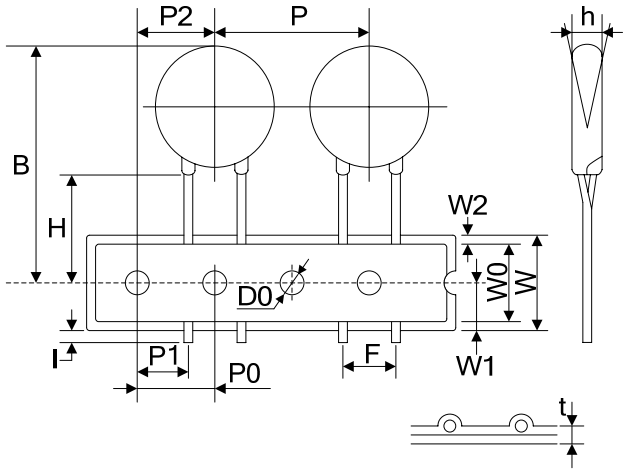
Item	Conditions
Temperature of Soldering Iron-tip	360℃ (max.)
Soldering Time	3 seconds (max.)
Distance from Varistor	2mm (min.)

Marking Code



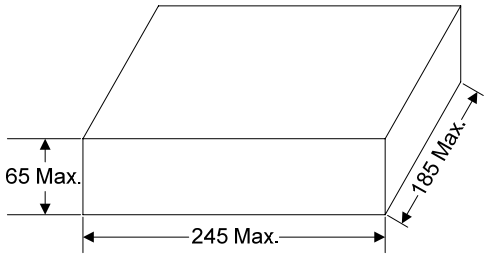
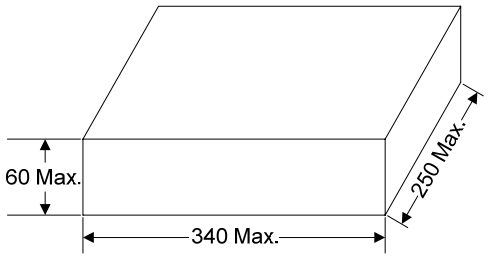
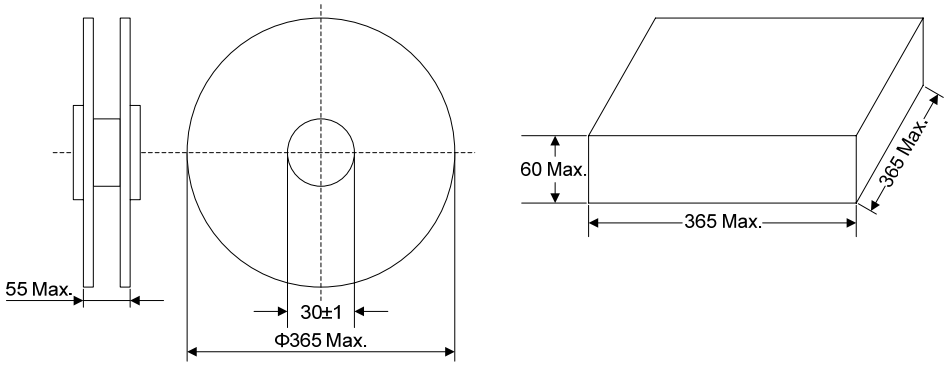
① Brightking Logo
② Varistor Voltage
③ UL Accreditation Logo
④ CSA Accreditation Logo
⑤ VDE Accreditation Logo
⑥ “J” is High Surge Code, no “J” is Standard Surge
⑦ Disk Size
⑧ “H” is Halogen Free Code, no “H” is Halogen
⑨ Date Code
⑩ Product Line Code

Taping Dimensions



Symbol	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	1.0max
D0	4.0±0.2
t	0.6±0.3
B	36max

Quantity

Packaging Dimensions (Unit: mm)	Quantity
Bulk  	500pcs/bag 2bags/box (180K~621K)
	400pcs/bag 2bags/box (681K~112K)
Tape & Box  	750pcs/box (180K~391K)
	500pcs/box (431K~621K)
	300pcs/box (681K~751K)
Tape & Reel  	1000pcs/reel (180K~391K)
	750pcs/reel (431K~621K)
	500pcs/reel (681K~751K)