

# Radial Lead Metal Oxide Varistor (MOV)

## 05D Series

### Description

The 05D series radial leaded varistors provides an ideal circuit protection solution for lower DC voltage applications by offering higher surge ratings than ever before available in such small discs.

The maximum peak surge current rating can reach up to 0.8KA (8/20  $\mu$ s pulse) to protect against high peak surges, including indirect lightning strike interference, system switching transients and abnormal fast transients from the power source.



### Features

- ◆ Wide operating voltage (V1mA) range from 18V to 750V
- ◆ Fast responding to transient over-voltage
- ◆ Large absorbing transient energy capability
- ◆ Low clamping ratio and no following-on current
- ◆ Meets MSL level 1, per J-STD-020

### 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

<b>Material</b>	No Radioactive Material
<b>Operating Temperature</b>	-40°C ~ +85°C
<b>Storage Temperature</b>	-55°C ~ +125°C
<b>Body</b>	Nickel Plated
<b>Leads</b>	Tin Plated
<b>Devices with No lead</b>	Nickel Plated

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### Specifications – General Characteristics (25±5°C)

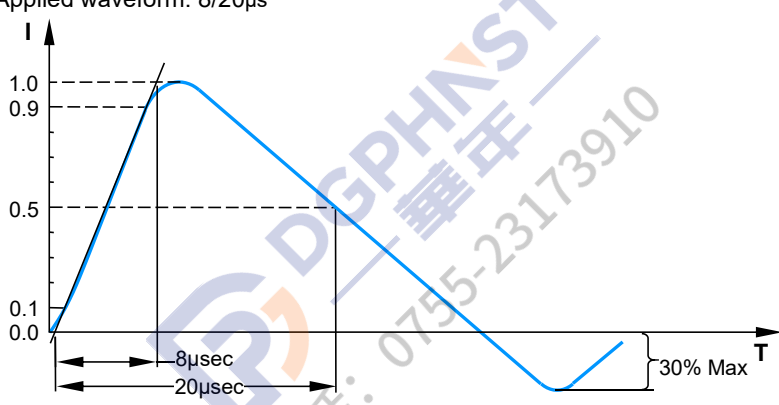
Type Number		Maximum Allowable voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge Current				Maximum Energy (10/1000µs)		Rated Power	Typical Capacitance (Reference)
Standard	High Surge	V <sub>AC</sub> (V)	V <sub>DC</sub> (V)	V <sub>0.1mA</sub> (V)	I <sub>P</sub> (A)	V <sub>C</sub> (V)	I(A) Standard		I(A) High Surge		(J) Standard	(J) High Surge	(W)	@1KHZ (pf)
							1 Time	2 Times	1 Time	2 Times				
05D180K	05D180KJ	11	14	18(15~21.6)	1	40	100	50	250	125	0.4	0.6	0.01	1400
05D220K	05D220KJ	14	18	22(19.5~26)	1	48	100	50	250	125	0.5	0.7	0.01	1150
05D270K	05D270KJ	17	22	27(24~30)	1	60	100	50	250	125	0.6	0.9	0.01	930
05D330K	05D330KJ	20	26	33(29.5~36.5)	1	73	100	50	250	125	0.8	1.1	0.01	760
05D390K	05D390KJ	25	31	39(35~43)	1	80	100	50	250	125	0.9	1.2	0.01	640
05D470K	05D470KJ	30	38	47(42~54)	1	104	100	50	250	125	1.1	1.5	0.01	530
05D560K	05D560KJ	35	45	56(50~62)	1	123	100	50	250	125	1.3	1.8	0.01	450
05D680K	05D680KJ	40	56	68(61~75)	1	150	100	50	250	125	1.6	2.2	0.01	370
05D820K	05D820KJ	50	65	82(74~90)	5	145	400	200	800	600	2.5	4.0	0.1	300
05D101K	05D101KJ	60	85	100(90~110)	5	177	400	200	800	600	3.0	4.1	0.1	250
05D121K	05D121KJ	75	100	120(108~132)	5	210	400	200	800	600	4.0	4.9	0.1	210
05D151K	05D151KJ	95	125	150(135~165)	5	260	400	200	800	600	4.1	6.5	0.1	165
05D181K	05D181KJ	115	150	180(162~198)	5	320	400	200	800	600	4.9	7.5	0.1	140
05D201K	05D201KJ	130	170	200(180~220)	5	355	400	200	800	600	6.5	8.5	0.1	125
05D221K	05D221KJ	140	180	220(198~242)	5	380	400	200	800	600	7.5	9.0	0.1	110
05D241K	05D241KJ	150	200	240(216~264)	5	415	400	200	800	600	8.0	10.5	0.1	100
05D271K	05D271KJ	175	225	270(243~297)	5	475	400	200	800	600	8.5	11.0	0.1	95
05D301K	05D301KJ	190	250	300(270~330)	5	520	400	200	800	600	9.0	12.0	0.1	85
05D331K	05D331KJ	210	275	330(297~363)	5	570	400	200	800	600	9.5	13.0	0.1	75
05D361K	05D361KJ	230	300	360(324~396)	5	620	400	200	800	600	10.0	16.0	0.1	70
05D391K	05D391KJ	250	320	390(351~429)	5	675	400	200	800	600	12.0	17.0	0.1	65
05D431K	05D431KJ	275	350	430(387~473)	5	745	400	200	800	600	13.0	20.0	0.1	60
05D471K	05D471KJ	300	385	470(423~517)	5	810	400	200	800	600	15.0	21.0	0.1	55
05D511K	05D511KJ	320	415	510(459~561)	5	845	400	200	800	600	16.0	22.5	0.1	50
05D561K	05D561KJ	350	460	560(504~616)	5	920	400	200	800	600	16.0	24.0	0.1	50
05D621K	05D621KJ	385	505	620(558~682)	5	1025	400	200	800	600	21.0	25.0	0.1	40
05D681K	05D681KJ	420	560	680(612~748)	5	1120	400	200	800	600	21.0	29.0	0.1	35
05D751K	05D751KJ	460	615	750(675~825)	5	1240	400	200	800	600	22.4	32.0	0.1	30

**Remark:** Voltage>33V, K is ±10%

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### Electrical Rating

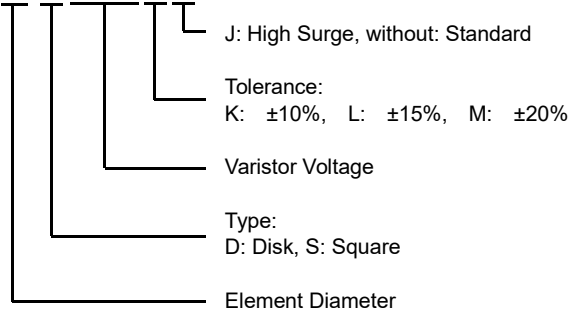
Item	Test Condition / Description	Requirement																									
<b>Maximum Allowable Voltage</b>	The recommended maximum sine wave voltage (RMS) or the maximum DC voltage can be applied continuously.																										
<b>Varistor Voltage</b>	The voltage between two terminals with the specified measuring current 0.1mA.DC applied is call Vb.																										
<b>Maximum Clamping Voltage</b>	<p>The maximum voltage between two terminals with the specification standard impulse current. Applied waveform: 8/20<math>\mu</math>s</p> 		To meet the specified value																								
<b>Rated Wattage</b>	The maximum average power that can be applied within the specified ambient temperature.																										
<b>Energy</b>	The maximum energy within the varistor voltage change of $\pm 10\%$ when one impulse of 10/1000 $\mu$ s. or 2 msec. is applied.																										
<b>Withstanding Surge Current</b>	The maximum current within the varistor voltage change of $\pm 10\%$ with the standard impulse current (8/20 $\mu$ s.) applied one time																										
<b>Varistor Voltage Temp. Coefficient</b>	$\frac{V_b \text{ at } 20^\circ\text{C} - V_b \text{ at } 70^\circ\text{C}}{V_b \text{ at } 20^\circ\text{C}} \times \frac{1}{50} \times 100(\% / ^\circ\text{C})$	0.05% / $^\circ\text{C}$ max																									
<b>Surge Life</b>	<p>The change of Vb shall be measured after the impulse listed below is applied 10,000 times continuously with the interval of ten seconds at room temperature.</p> <table border="1" data-bbox="375 1489 1173 1892"> <tbody> <tr> <td rowspan="2">5D Series</td> <td>180K to 680K</td> <td>10A (8/20<math>\mu</math>s)</td> </tr> <tr> <td>820K to 751K</td> <td>20A (8/20<math>\mu</math>s)</td> </tr> <tr> <td rowspan="2">7D Series</td> <td>180K to 680K</td> <td>25A (8/20<math>\mu</math>s)</td> </tr> <tr> <td>820K to 821K</td> <td>50A (8/20<math>\mu</math>s)</td> </tr> <tr> <td rowspan="2">10D Series</td> <td>180K to 680K</td> <td>50A (8/20<math>\mu</math>s)</td> </tr> <tr> <td>820K to 112K</td> <td>100A (8/20<math>\mu</math>s)</td> </tr> <tr> <td rowspan="2">14D Series</td> <td>180K to 680K</td> <td>75A (8/20<math>\mu</math>s)</td> </tr> <tr> <td>820K to 182K</td> <td>150A (8/20<math>\mu</math>s)</td> </tr> <tr> <td rowspan="2">20D Series</td> <td>180K to 680K</td> <td>100A (8/20<math>\mu</math>s)</td> </tr> <tr> <td>820K to 182K</td> <td>200A (8/20<math>\mu</math>s)</td> </tr> </tbody> </table>	5D Series	180K to 680K	10A (8/20 $\mu$ s)	820K to 751K	20A (8/20 $\mu$ s)	7D Series	180K to 680K	25A (8/20 $\mu$ s)	820K to 821K	50A (8/20 $\mu$ s)	10D Series	180K to 680K	50A (8/20 $\mu$ s)	820K to 112K	100A (8/20 $\mu$ s)	14D Series	180K to 680K	75A (8/20 $\mu$ s)	820K to 182K	150A (8/20 $\mu$ s)	20D Series	180K to 680K	100A (8/20 $\mu$ s)	820K to 182K	200A (8/20 $\mu$ s)	$\Delta V_b / V_b \leq \pm 10\%$
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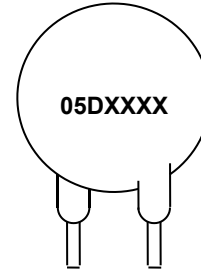
## 05D Series

### Part Numbering

#### 05 D XXX K J



### Part Marking



### Packaging Information

Part Number	Quantity	Packaging Option	Packaging Specification
05DXXXXX	1000	Plastic bag	Bulk Pack

### Package Dimensions Unit: mm

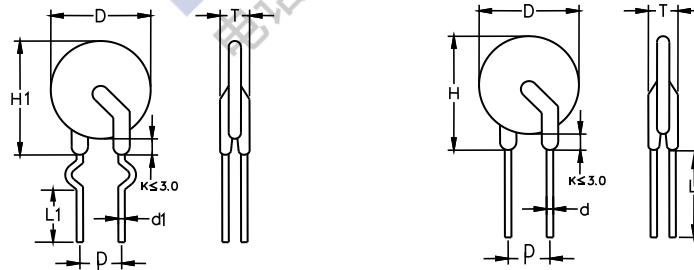


TABLE1

Symbol	Dimensions
H(max.)	9.0
H1(max.)	9.0
L(min.)	15.0
L1(min.)	15.0
D(max.)	7.0
P( $\pm 0.8$ )	5.0
T(max.)	TABLE2
d( $\pm 0.05$ )	0.6
d1( $\pm 0.05$ )	0.6

TABLE2

Model	T(max.)	Model	T(max.)
180K	4.5	221K	4.5
220K	4.6	241K	4.6
270K	4.7	271K	4.9
330K	4.9	301K	5.0
390K	4.8	331K	5.1
470K	4.9	361K	5.2
560K	5.0	391K	5.4
680K	5.2	431K	5.7
820K	4.1	471K	6.0
101K	4.3	511K	6.2
121K	4.5	561K	6.5
151K	4.8	621K	6.4
181K	4.3	681K	6.5
201K	4.4	751K	6.5