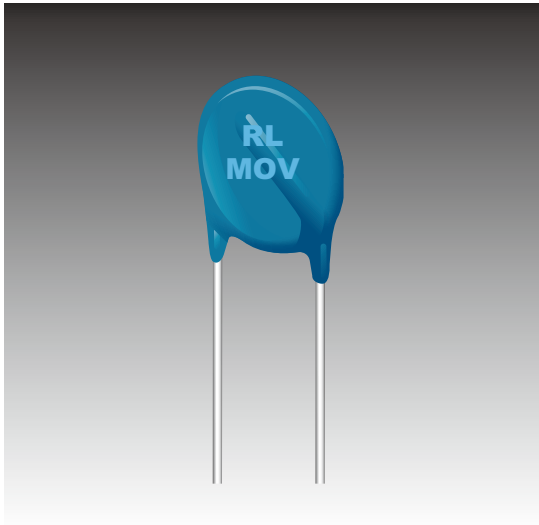


## Metal Oxide Varistors

### Varistor>10D180~182KJ Series



#### 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.

#### Features

- Wide operating voltage (V1mA) range from 8V to 1800V.
- Fast responding to transient over-voltage.
- Large absorbing transient energy capability.
- Low clamping ratio and no following-on current.

#### General Information

The MOV-10DxxxK Series of 10 mm radial leaded varistor devices protects against overvoltage transients such as lightning, power contact and power induction. The metal oxide varistors offer a choice of varistor voltages from 18 V to 1800 V and Vrms voltages from 11 V to 1000 V.

The devices have a high current handling, high energy absorption capability and fast response times to protect against transient faults up to rated limits.

#### General Characteristics

No Radioactive Material

Storage Temperature: -55°C to +125°C

Operating Temperature: -55°C to +85°C

Body: Nickel Plated

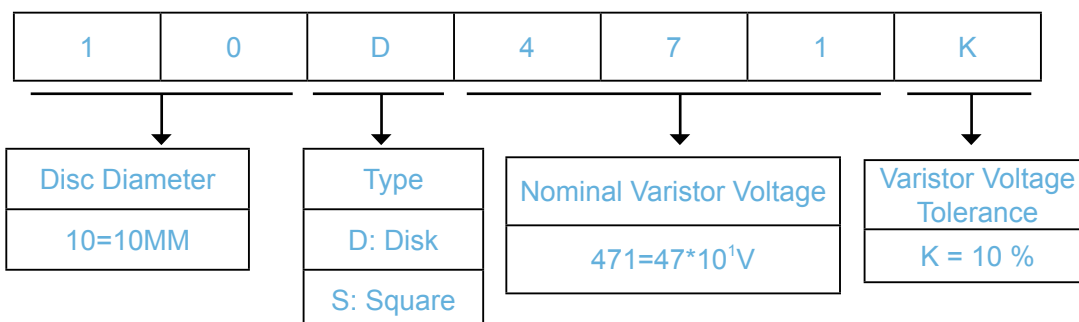
Leads: Surface-mount, Axial Devices: Tin Plated

Devices with No Leads: Nickel Plated

#### Packaging Information

Part Number	Component package	Quantity	Packaging Option	Packaging Specification
10D	10.0	500	BOX	1000

#### Product Name



## Electrical Characteristics (@ TA = 25 °C Unless Otherwise Noted)

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>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)
10D180K	10D180KJ	11	14	18(15~21.6)	5	36	500	1000	2.1	3.0	0.05	5600
10D220K	10D220KJ	14	18	22(19.5~26)	5	43	500	1000	2.5	5.0	0.05	4500
10D270K	10D270KJ	17	22	27(24~30)	5	53	500	1000	3.0	6.0	0.05	3700
10K330K	10K330KJ	20	26	33(29.5~36.5)	5	66	500	1000	4.0	7.0	0.05	3000
10D390K	10D390KJ	25	31	39(35~43)	5	77	500	1000	4.6	9.0	0.05	2400
10D470K	10D470KJ	30	38	47(42~54)	5	93	500	1000	5.5	11.0	0.05	2100
10D560K	10D560KJ	35	45	56(50~62)	5	100	500	1000	7.0	13.0	0.05	1800
10D680K	10D680KJ	40	56	68(61~75)	5	135	500	1000	8.2	15.0	0.05	1500
10D820K	10D820KJ	50	65	82(74~90)	25	135	2500	3500	12.0	17.0	0.4	1200
10D101K	10D101KJ	60	85	100(90~110)	25	165	2500	3500	15.0	18.0	0.4	1000
10D121K	10D121KJ	75	100	120(108~132)	25	200	2500	3500	18.0	21.0	0.4	830
10D151K	10D151KJ	95	125	150(135~165)	25	250	2500	3500	22.0	25.0	0.4	670
10D181K	10D181KJ	115	150	180(162~198)	25	300	2500	3500	27.0	30.0	0.4	560
10D201K	10D201KJ	130	170	200(180~220)	25	340	2500	3500	30.0	35.0	0.4	500
10D221K	10D221KJ	140	180	220(198~242)	25	360	2500	3500	32.0	39.0	0.4	450
10D241K	10D241KJ	150	200	240(216~264)	25	395	2500	3500	35.0	42.0	0.4	420
10D271K	10D271KJ	175	225	270(243~297)	25	455	2500	3500	40.0	49.0	0.4	370
10D301K	10D301KJ	190	250	300(270~330)	25	500	2500	3500	40.0	54.0	0.4	330
10D331K	10D331KJ	210	275	330(297~363)	25	550	2500	3500	40.0	58.0	0.4	300
10D361K	10D361KJ	230	300	360(324~396)	25	595	2500	3500	43.0	65.0	0.4	280
10D391K	10D391KJ	250	320	390(351~429)	25	650	2500	3500	47.0	70.0	0.4	260
10D431K	10D431KJ	275	350	430(387~473)	25	710	2500	3500	60.0	80.0	0.4	230
10D471K	10D471KJ	300	385	470(423~517)	25	775	2500	3500	65.0	85.0	0.4	210
10D511K	10D511KJ	320	415	510(459~561)	25	845	2500	3500	70.0	90.0	0.4	200
10D561K	10D561KJ	350	460	560(504~616)	25	925	2500	3500	70.0	92.0	0.4	180
10D621K	10D621KJ	385	505	620(558~682)	25	1025	2500	3500	70.0	95.0	0.4	160
10D681K	10D681KJ	420	560	680(612~748)	25	1120	2500	3500	70.0	98.0	0.4	150
10D751K	10D751KJ	460	615	750(675~825)	25	1240	2500	3500	70.0	100.0	0.4	130
10D781K	10D781KJ	485	640	780(702~858)	25	1290	2500	3500	80.0	105.0	0.4	130
10D821K	10D821KJ	510	670	820(738~902)	25	1355	2500	3500	85.0	110.0	0.4	120
10D911K	10D911KJ	550	745	910(819~1001)	25	1500	2500	3500	93.0	130.0	0.4	110
10D102K	10D102KJ	625	825	1000(900~1100)	25	1650	2500	3500	102.0	140.0	0.4	100
10D112K	10D112KJ	680	895	1100(990~1210)	25	1815	2500	3500	115.0	155.0	0.4	90
10D182K	10D182KJ	1000	1465	1800(1620~1980)	25	2970	2500	3500	133.0	250.0	0.4	70

## Electrical Rating

Item	Test Condition / Description	Requirement																								
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA.DC applied is call Vb.	To meet the specified value																								
Maximum Allowable Voltage	The recommended maximum sine wave voltage (RMS) or the maximum DC voltage can be applied continuously.																									
Rated Wattaget	The maximum average power that can be applied within the specified ambient temperature.																									
I <sub>Energy</sub>	The maximum energy within the varistor voltage change of ±10% when one impulse of 10/1000µsec. or 2 msec. is applied.																									
Withstanding Surge Current	The maximum current within the varistor voltage change of ±10% with the standard impulse current (8/20µsec.) applied one time.	$\frac{\Delta V_b}{V_b} \leq \pm 10\%$																								
Surge Life	<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"> <tbody> <tr> <td rowspan="2"><b>5D series</b></td> <td><b>180K to 680K</b></td> <td><b>10A (8/20µsec.)</b></td> </tr> <tr> <td><b>820K to 751K</b></td> <td><b>20A (8/20µsec.)</b></td> </tr> <tr> <td rowspan="2"><b>7Dseries</b></td> <td><b>180K to 680K</b></td> <td><b>25A (8/20µsec.)</b></td> </tr> <tr> <td><b>820K to 821K</b></td> <td><b>50A (8/20µsec.)</b></td> </tr> <tr> <td rowspan="2"><b>10D series</b></td> <td><b>180K to 680K</b></td> <td><b>50A (8/20µsec.)</b></td> </tr> <tr> <td><b>820K to 182K</b></td> <td><b>100A (8/20µsec.)</b></td> </tr> <tr> <td rowspan="2"><b>14D series</b></td> <td><b>180K to 680K</b></td> <td><b>75A (8/20µsec.)</b></td> </tr> <tr> <td><b>820K to 182K</b></td> <td><b>150A (8/20µsec.)</b></td> </tr> <tr> <td rowspan="2"><b>20D series</b></td> <td><b>180K to 680K</b></td> <td><b>100A (8/20µsec.)</b></td> </tr> <tr> <td><b>820K to 182K</b></td> <td><b>200A (8/20µsec.)</b></td> </tr> </tbody> </table>		<b>5D series</b>	<b>180K to 680K</b>	<b>10A (8/20µsec.)</b>	<b>820K to 751K</b>	<b>20A (8/20µsec.)</b>	<b>7Dseries</b>	<b>180K to 680K</b>	<b>25A (8/20µsec.)</b>	<b>820K to 821K</b>	<b>50A (8/20µsec.)</b>	<b>10D series</b>	<b>180K to 680K</b>	<b>50A (8/20µsec.)</b>	<b>820K to 182K</b>	<b>100A (8/20µsec.)</b>	<b>14D series</b>	<b>180K to 680K</b>	<b>75A (8/20µsec.)</b>	<b>820K to 182K</b>	<b>150A (8/20µsec.)</b>	<b>20D series</b>	<b>180K to 680K</b>	<b>100A (8/20µsec.)</b>	<b>820K to 182K</b>
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## Current Energy and Power Dissipation Ratings

Should transients occur in rapid succession, the average power dissipation is the energy (watt-seconds) per pulse times the number of pulses per second. The power so developed must be within the specifications shown on the Device Ratings and Specifications Table for the specific

device. The operating values of a MOV need to be derated at high temperatures as shown above. Because varistors only dissipate a relatively small amount of average power they are not suitable for repetitive applications that involve substantial amounts of average power dissipation.

Figure 1A - Power Derating for Epoxy Coated

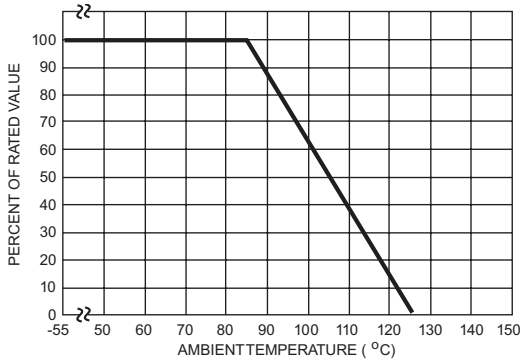
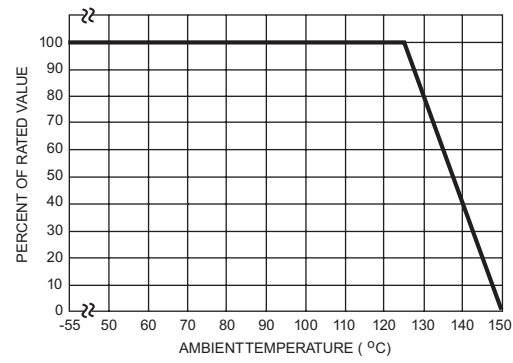


Figure 1B - Power Derating for Pholenic Coated



## Peak Pulse Current Test Waveform

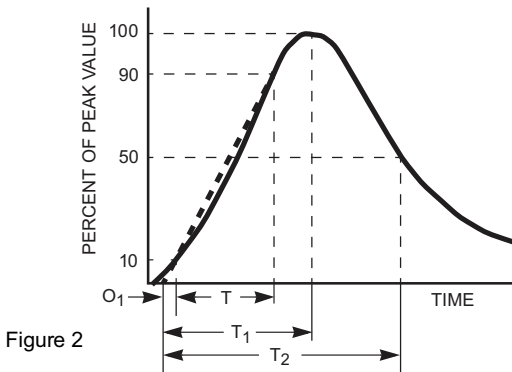


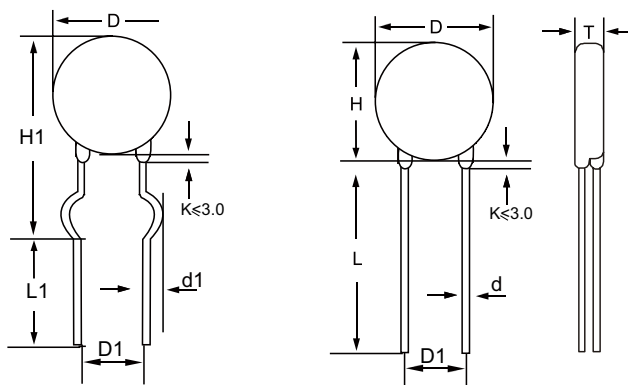
Figure 2

- $O_1$  = Virtual Origin of Wave
- $T$  = Time from 10% to 90% of Peak
- $T_1$  = Rise Time =  $1.25 \times T$
- $T_2$  = Decay Time

Example - For an 8/20  $\mu$ s Current Waveform:

- $8\mu\text{s} = T_1 = \text{Rise Time}$
- $20\mu\text{s} = T_2 = \text{Decay Time}$

## Package Dimensions



Unit:mm

TABLE 1

Symbol	Dimensions
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)	0.8
d1(±0.4)	1.2

TABLE 2

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

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