



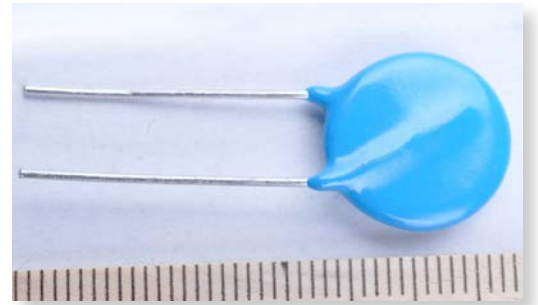
Metal Oxide Varistors

05D Series

Metal Oxide Varistors - 05D Series

Features

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



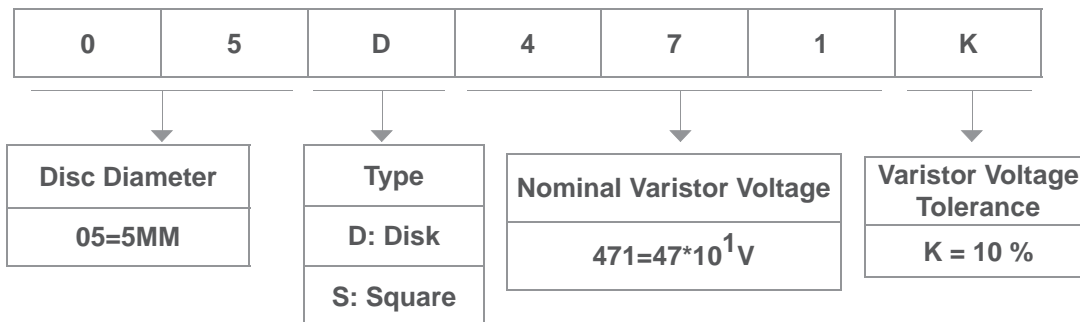
General Information

The MOV-05DxxxK Series of 5 mm radial leaded varistor devices protects against overvoltage transients such as lightning, powercontact and power induction. The metal oxide varistors offer a choice of varistor voltages from 18 V to 750 V and Vrms voltages from 11 V to 460 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

Product Name



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Electrical Characteristics

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

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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.			
IEnergy	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	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.			
	5D series	180K to 680K	10A (8/20µsec.)	
		820K to 751K	20A (8/20µsec.)	
	7Dseries	180K to 680K	25A (8/20µsec.)	
		820K to 821K	50A (8/20µsec.)	
	10D series	180K to 680K	50A (8/20µsec.)	
		820K to 182K	100A (8/20µsec.)	
	14D series	180K to 680K	75A (8/20µsec.)	
		820K to 182K	150A (8/20µsec.)	
	20D series	180K to 680K	100A (8/20µsec.)	
820K to 182K		200A (8/20µsec.)		

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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

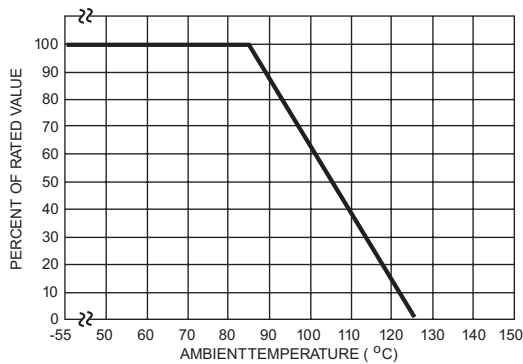
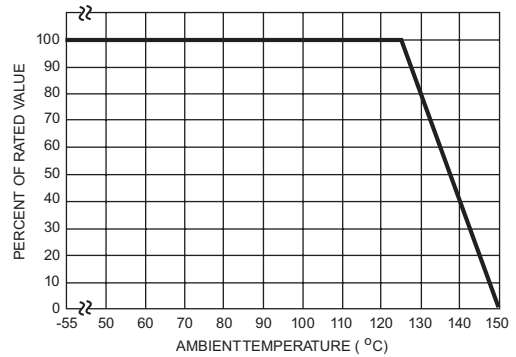
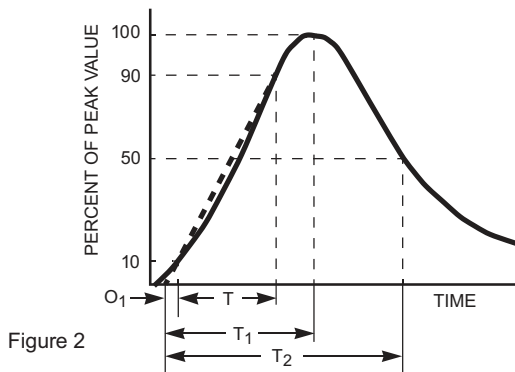


Figure 1B - Power Derating for Pholenic Coated



Peak Pulse Current Test Waveform



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

Packaging

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
5D	5.0	1000	BOX	2000

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Package Dimensions

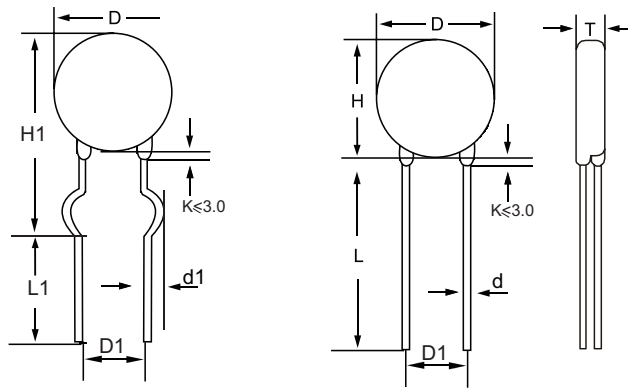


TABLE 1

Symbol	Dimensions
H(max.)	10.5
H1(max.)	13.0
L(min.)	20.0
L1(min.)	15.0
D(max.)	7.5
D1(±0.8)	5.0
T(max.)	TABLE 2
d(±0.05)	0.6
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

Warehouse Storage Conditions of Products

- Storage Conditions:
 1. Storage Temperature: -10°C~+40°C
 2. Relative Humidity: ≤75%RH
 3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year

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