



## 1. General



### ❖ Description

A varistor is an electronic component with an electrical resistance that varies with the applied voltage. Also known as a voltage-dependent resistor (VDR), it has a nonlinear, non-ohmic current–voltage characteristic that is similar to that of a diode. In contrast to a diode however, it has the same characteristic for both directions of traversing current.

### ❖ Type designation (example)

The type designation shall be in the following form and as specified.

07		D	471	K	T		
Nominal diameter		D Disc type	Varistor voltage 1 <sup>st</sup> two digits are significant figures and 3 <sup>rd</sup> one denotes the number of zeros following Decimal point expressed by R. Examples. 470 47*1 <sup>0</sup> =47V 471 47*10 <sup>1</sup> =470V 102 10*10 <sup>2</sup> =1000V	Tolerance		Packing	
05	5mm	S Square type		K	±10%	B	Bulk
07	7mm	B Block type		L	±15%	R	Reel
10	10mm			M	± 20%	A	Ammo
14	14mm			Custom made			
20	20mm						
25	25mm						
32	32mm						
34	34mm						
40	40mm						
53	53mm						
....	....						

### ❖ Construction

- Round varistor element, leaded
- Coating: epoxy resin, flame-retardant to UL 94 V-0
- Terminals: tinned copper wire



✧ Features

- Wide operating voltage range 11 ... 1100 VRMS
- High surge current ratings up to 8 kA
- No derating up to 85 °C ambient temperature
- PSpice models

✧ General technical data

- Climatic category to IEC 60068-1 40/85/56
- Operating temperature to CECC 42 000 -40 ... + 85°C
- Storage temperature - 40 ... +125°C
- Electric strength to CECC 42 000 ≥2.5 kVRMS
- Insulation resistance to CECC 42 000 ≥10 MΩ
- Response time <25 ns

✧ Application

- 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

✧ Specifications

➤ Series list

-- 05D Series Metal Oxide Varistor
-- 07D Series Metal Oxide Varistor
-- 10D Series Metal Oxide Varistor
-- 14D Series Metal Oxide Varistor
-- 20D Series Metal Oxide Varistor
-- 25D Series Metal Oxide Varistor
-- 32D Series Metal Oxide Varistor
-- 34S Series Metal Oxide Varistor
-- 40D Series Metal Oxide Varistor
-- 53D Series Metal Oxide Varistor
Pls contact our sales to get furthermore info.....

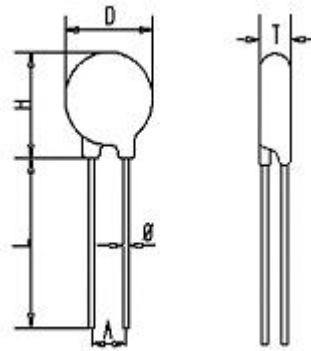
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➤ Dimension(Unit:mm)



Series	MAX.			d ±0.05	F	C ±0.4
	D	H	H0			
05D	7.5	10.5	13	0.6	5±0.08	1.2
07D	9	12	13.5	0.6	5±0.8	
10D	12.5	16.5	17.5	0.8	7.5±0.8	1.4
14D	16.5	20	21	0.8/1.0	7.5±0.8	
20D	23	26.5	28	0.8/1.0	7.5±0.8 / 10±1.0	1.4/1.6
25D	28	32	34	1.0	10±1.0 / 12.7±1.0	1.6



➤ Max. Thickness

Part code	05D	07D	10D	14D	20D	25D	Part code	05D	07D	10D	14D	20D	25D
180L	4.5	4.5	4.6	4.6	4.8	4.8	331K	5.1	5.1	5.8	5.8	6.0	6.1
220K	4.6	4.6	4.7	4.7	4.9	4.9	361K	5.2	5.2	6.0	6.0	6.2	6.4
270K	4.7	4.7	4.8	4.8	5.0	5.0	391K	5.4	5.4	6.2	6.2	6.4	6.6
330K	4.9	4.9	5.0	5.0	5.2	5.2	431K	5.7	5.7	6.5	6.5	6.7	6.9
390K	4.8	4.8	5.3	5.3	5.5	5.5	471K	6.0	6.0	6.7	6.7	6.9	7.1
470K	4.9	4.9	5.4	5.4	5.6	5.6	511K	6.2	6.2	6.8	6.8	7.0	7.2
560K	5.0	5.0	5.6	5.6	5.8	5.8	561K	6.5	6.5	7.0	7.0	7.2	7.4
680K	5.2	5.2	5.6	5.6	5.8	5.8	621K	-	7.1	7.3	7.3	7.5	7.7
820K	4.1	4.1	4.7	4.7	4.9	4.9	681K	-	7.3	7.6	7.6	7.8	8.0
101K	4.3	4.3	4.9	4.9	5.1	5.1	751K	-	-	8.0	8.0	8.2	8.4
121K	4.5	4.5	5.1	5.1	5.3	5.3	781K	-	-	8.1	8.1	8.3	8.5
151K	4.8	4.8	5.4	5.4	5.6	5.6	821K	-	-	8.3	8.3	8.5	8.7
181K	4.3	4.3	4.8	4.8	5.0	5.2	911K	-	-	8.8	8.8	9.0	9.2
201K	4.4	4.4	5.0	5.0	5.2	5.4	102K	-	-	9.3	9.3	9.5	9.7
221K	4.5	4.5	5.1	5.1	5.3	5.5	112K	-	-	9.9	9.9	10.1	10.3
241K	4.6	4.6	5.2	5.2	5.4	5.6	122K	-	-	-	10.4	10.6	10.8
271K	4.9	4.9	5.4	5.4	5.6	5.8	182K	-	-	-	-	13.2	-
301K	5.0	5.0	5.5	5.5	5.7	5.9							



## ✧ Electrical Characteristics

## ➤ 05D Series Metal Oxide Varistor

Put "J" in free Code Stands For High Surge Series

Part Number	Vac	Vdc	V1mA	Ip (A)	Vc(V)	I(A) Standard	I(A) High Surge	(J) Standard	(J) High Surge	Rated power(W)	C@ 1KHz(pf)
05D180K(J)	11	14	18(15-21.6)	1	40	100	250	0.4	0.6	0.01	1400
05D220K(J)	14	18	22(19.5-26)	1	48	100	250	0.5	0.7	0.01	1150
05D270K(J)	17	22	27(24-31)	1	60	100	250	0.6	0.9	0.01	930
05D330K(J)	20	26	33(29.5-36.5)	1	73	100	250	0.8	1.1	0.01	760
05D390K(J)	25	31	39(35-43)	1	80	100	250	0.9	1.2	0.01	640
05D470K(J)	30	38	47(42-52)	1	104	100	250	1.1	1.5	0.01	530
05D560K(J)	35	45	56(50-62)	1	123	100	250	1.3	1.8	0.01	450
05D680K(J)	40	56	68(61-75)	1	145	100	250	1.6	2.2	0.01	370
05D820K(J)	50	65	82(74-90)	5	150	400	800	2.5	4.0	0.1	300
05D101K(J)	60	85	100(90-110)	5	177	400	800	3.0	4.1	0.1	250
05D121K(J)	75	100	120(108-132)	5	210	400	800	4.0	4.9	0.1	210
05D151K(J)	95	125	150(135-165)	5	260	400	800	4.1	6.5	0.1	165
05D181K(J)	115	150	180(162-198)	5	320	400	800	4.9	7.5	0.1	140
05D201K(J)	130	170	200(180-220)	5	355	400	800	6.5	8.5	0.1	125
05D221K(J)	140	180	220(198-242)	5	380	400	800	7.5	9.0	0.1	110
05D241K(J)	150	200	240(216-264)	5	415	400	800	8.0	10.5	0.1	100
05D271K(J)	175	225	270(243-297)	5	475	400	800	8.5	11	0.1	95
05D301K(J)	190	250	300(270-330)	5	520	400	800	9.0	12	0.1	85
05D331K(J)	210	275	330(297-363)	5	570	400	800	9.5	13	0.1	75
05D361K(J)	230	300	360(324-396)	5	620	400	800	10	16	0.1	70
05D391K(J)	250	320	390(351-429)	5	675	400	800	12	17	0.1	65
05D431K(J)	275	350	430(387-473)	5	745	400	800	13	20	0.1	60
05D471K(J)	300	385	470(423-517)	5	810	400	800	15	21	0.1	55
05D511K(J)	320	415	510(459-561)	5	845	400	800	16	22.5	0.1	50
05D561K(J)	350	460	560(504-616)	5	920	400	800	16	24	0.1	45
05D621K(J)	385	505	620(558-682)	5	1025	400	800	21.0	25.0	0.1	40
05D681K(J)	420	560	680(612-748)	5	1120	400	800	21.0	29.0	0.1	35
05D751K(J)	460	615	750(675-825)	5	1240	400	800	22.4	32.0	0.1	30

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### 07D Series Metal Oxide Varistor

Put "J" in free Code Stands For High Surge Series

Part Number	Vac (V)	Vdc (V)	V1mA (A)	I <sub>p</sub> (A)	Vc (V)	I(A) Standard	I(A) High Surge	(J) Standard	(J) High Surge	Rated power(W)	C@ 1KHz(pf)
07D180K(J)	11	14	18(15-21.6)	2.5	36	250	500	0.9	2.0	0.02	2800
07D220K(J)	14	18	22(19.5-26)	2.5	43	250	500	1.1	2.4	0.02	2300
07D270K(J)	17	22	27(24-31)	2.5	53	250	500	1.4	3.0	0.02	1800
07D330K(J)	20	26	33(29.5-36.5)	2.5	65	250	500	1.7	3.5	0.02	1500
07D390K(J)	25	31	39(35-43)	2.5	77	250	500	2.1	4.0	0.02	1300
07D470K(J)	30	38	47(42-52)	2.5	93	250	500	2.5	5.0	0.02	1100
07D560K(J)	35	45	56(50-62)	2.5	110	250	500	3.1	6.0	0.02	890
07D680K(J)	40	56	68(61-75)	2.5	135	250	500	3.6	7.0	0.02	740
07820K(J)	50	65	82(74-90)	10	135	1200	1750	5.5	10	0.25	600
07D101K(J)	60	85	100(90-110)	10	165	1200	1750	6.5	12	0.25	500
07D121K(J)	75	100	120(108-132)	10	200	1200	1750	7.8	13	0.25	420
07D151K(J)	95	125	150(135-165)	10	250	1200	1750	9.7	13	0.25	330
07D181K(J)	115	150	180(162-198)	10	300	1200	1750	11.7	16	0.25	280
07D201K(J)	130	170	200(180-220)	10	340	1200	1750	13	17	0.25	250
07D221K(J)	140	180	220(198-242)	10	360	1200	1750	14	19	0.25	23007D
07D241K(J)	150	200	240(216-264)	10	395	1200	1750	15	21	0.25	210
07D271K(J)	175	225	270(243-297)	10	455	1200	1750	18	24	0.25	185
07D301K(J)	190	250	300(270-330)	10	500	1200	1750	20	26	0.25	165
07D331K(J)	210	275	330(297-363)	10	550	1200	1750	23	28	0.25	150
07D361K(J)	230	300	360(324-396)	10	595	1200	1750	25	32	0.25	140
07D391K(J)	250	320	390(351-429)	10	650	1200	1750	25	35	0.25	130
07D431K(J)	275	350	430(387-473)	10	710	1200	1750	28	40	0.25	115
07D471K(J)	300	385	470(423-517)	10	775	1200	1750	30	42	0.25	105
07D511K(J)	320	415	510(459-561)	10	845	1200	1750	30	45	0.25	100
07D561K(J)	350	460	560(504-616)	10	925	1200	1750	30	49	0.25	90
07D621K(J)	385	505	620(558-682)	10	1025	1200	1750	33	55	0.25	80
07D681K(J)	420	560	680(612-748)	10	1120	1200	1750	33	60	0.25	75
07D751K(J)	460	615	750(675-825)	10	1240	1200	1750	67.2	65	0.25	70
07D781K(J)	485	640	780(702-858)	10	1290	1200	1750	67.2	65	0.25	70
07D821K(J)	510	670	820(738-902)	10	1355	1200	1750	67.2	70	0.25	60

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## 10D Series Metal Oxide Varistor

Put "J" in free Code Stands For High Surge Series

Part Number	Vac(V)	Vdc(V)	V1mA(V)	Ip(A)	Vc(V)	I(A)		(J)		Rated power(W)	C@1KHz (pf)
						Standard	High Surge	Standard	High Surge		
10D180K(J)	11	14	18(15-21.6)	5	36	500	1000	2.1	3.0	0.05	5600
10D220K(J)	14	18	22(19.5-26)	5	43	500	1000	2.5	5.0	0.05	4500
10D270K(J)	17	22	27(14-31)	5	53	500	1000	3.0	6.0	0.05	3700
10D330K(J)	20	26	33(29.5-36.5)	5	65	500	1000	4.0	7.0	0.05	3000
10D390K(J)	25	31	39(35-43)	5	77	500	1000	4.6	9.0	0.05	2400
10D470K(J)	30	38	47(42-52)	5	93	500	1000	5.5	11	0.05	2100
10D560K(J)	35	45	56(50-62)	5	110	500	1000	7.0	13	0.05	1800
10D680K(J)	40	56	68(61-75)	5	135	500	1000	8.2	15	0.05	1500
10D820K(J)	50	65	82(74-90)	25	135	2500	3500	12	17	0.4	1200
10D101K(J)	60	85	100(90-110)	25	165	2500	3500	15	18	0.4	1000
10D121K(J)	75	100	120(108-132)	25	200	2500	3500	18	21	0.4	830
10D151K(J)	95	125	150(135-165)	25	250	2500	3500	22	25	0.4	670
10D181K(J)	115	150	180(162-198)	25	300	2500	3500	27	30	0.4	560
10D201K(J)	130	170	200(180-220)	25	340	2500	3500	30	35	0.4	500
10D221K(J)	140	180	220(198-242)	25	360	2500	3500	32	39	0.4	450
10D241K(J)	150	200	240(216-264)	25	395	2500	3500	35	42	0.4	420
10D271K(J)	175	225	270(243-297)	25	455	2500	3500	37	49	0.4	370
10D301K(J)	190	250	300(270-330)	25	500	2500	3500	40	54	0.4	330
10D331K(J)	210	275	330(297-363)	25	550	2500	3500	43	58	0.4	300
10D361K(J)	230	300	360(324-396)	25	595	2500	3500	47	65	0.4	280
10D391K(J)	250	320	390(351-429)	25	650	2500	3500	60	70	0.4	260
10D431K(J)	275	350	430(387-473)	25	710	2500	3500	65	80	0.4	230
10D471K(J)	300	385	470(423-517)	25	775	2500	3500	67	85	0.4	210
10D511K(J)	320	415	510(459-561)	25	845	2500	3500	69	90	0.4	200
10D561K(J)	350	460	560(504-616)	25	925	2500	3500	70	92	0.4	180
10D621K(J)	385	505	620(558-682)	25	1025	2500	3500	72	95	0.4	160
10D681K(J)	420	560	680(612-748)	25	1120	2500	3500	75	98	0.4	150
10D751K(J)	460	615	750(675-825)	25	1240	2500	3500	77	100	0.4	130
10D781K(J)	485	640	780(702-858)	25	1290	2500	3500	80	105	0.4	130
10D821K(J)	510	670	820(738-902)	25	1355	2500	3500	85	110	0.4	120
10D911K(J)	550	745	910(819-1001)	25	1500	2500	3500	93	130	0.4	110
10D102K(J)	625	825	1000(900-1100)	25	1650	2500	3500	102	140	0.4	100
10D112K(J)	680	895	1100(990-1210)	25	1815	2500	3500	115	155	0.4	90

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## Metal Oxide Varistor MOV

### 14D Series Metal Oxide Varistor

Put "J" in free Code Stands For High Surge Series

Part Number	Vac(V)	Vdc(V)	V1mA(V)	I <sub>p</sub> (A)	Vc(V)	I(A)Standard	I(A)High Surge	(J)Standard	(J)High Surge	Rated power(W)	C@ 1KHz (pf)
14D180K(J)	11	14	18(15-21.6)	10	36	1000	2000	4.0	7.0	0.1	11100
14D220K(J)	14	18	22(19.5-26)	10	43	1000	2000	5.0	8.0	0.1	9100
14D270K(J)	17	22	27(24-31)	10	53	1000	2000	6.0	10	0.1	7400
14D330K(J)	20	26	33(29.5-36.5)	10	65	1000	2000	7.5	12	0.1	6100
14D390K(J)	25	31	39(35-43)	10	77	1000	2000	8.6	13	0.1	5100
14D470K(J)	30	38	47(42-52)	10	93	1000	2000	10	17	0.1	4300
14D560K(J)	35	45	56(50-62)	10	110	1000	2000	11	20	0.1	3600
14D680K(J)	40	56	68(61-75)	10	135	1000	2000	14	24	0.1	2900
14D820K(J)	50	65	82(74-90)	50	135	4500	6000	22	27	0.6	2400
14D101K(J)	60	85	100(90-110)	50	165	4500	6000	28	33	0.6	2000
14D121K(J)	75	100	120(108-132)	50	200	4500	6000	32	40	0.6	1700
14D151K(J)	95	125	150(135-165)	50	250	4500	6000	40	53	0.6	1300
14D181K(J)	115	150	180(162-198)	50	300	4500	6000	50	60	0.6	1100
14D201K(J)	130	170	200(180-220)	50	340	4500	6000	57	70	0.6	1000
14D221K(J)	140	180	220(198-242)	50	360	4500	6000	60	78	0.6	900
14D241K(J)	150	200	240(216-264)	50	395	4500	6000	63	84	0.6	830
14D271K(J)	175	225	270(243-297)	50	455	4500	6000	70	99	0.6	740
14D301K(J)	190	250	300(270-330)	50	500	4500	6000	77	108	0.6	670

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## Metal Oxide Varistor MOV

14D331K(J)	210	275	330(297-363)	50	550	4500	6000	85	115	0.6	610
14D361K(J)	230	300	360(324-396)	50	595	4500	6000	93	130	0.6	560
14D391K(J)	250	320	390(351-429)	50	650	4500	6000	100	140	0.6	510
14D431K(J)	275	350	430(387-473)	50	710	4500	6000	115	155	0.6	460
14D471K(J)	300	385	470(423-517)	50	775	4500	6000	125	175	0.6	430
14D511K(J)	320	415	510(459-561)	50	845	4500	6000	125	180	0.6	390
14D561K(J)	350	460	560(504-616)	50	925	4500	6000	125	185	0.6	360
14D621K(J)	385	505	620(558-682)	50	1025	4500	6000	125	190	0.6	320
14D681K(J)	420	560	680(612-748)	50	1120	4500	6000	130	200	0.6	290
14D751K(J)	460	615	750(675-825)	50	1240	4500	6000	143	210	0.6	270
14D781K(J)	485	640	780(702-858)	50	1290	4500	6000	148	220	0.6	260
14D821K(J)	510	670	820(738-902)	50	1355	4500	6000	157	235	0.6	240
14D911K(J)	550	745	910(819-1001)	50	1500	4500	6000	175	255	0.6	220
14D102K(J)	625	825	1000(900-1100)	50	1650	4500	6000	190	280	0.6	200
14D112K(J)	680	895	1100(990-1210)	50	1815	4500	6000	213	310	0.6	180
14D122K(J)	750	990	1200(1080-1320)	50	1980	4500	6000	232	324	0.6	160
14D142K(J)	880	1140	1400(1260-1540)	50	2310	4500	6000	238	327	0.6	150
14D162K(J)	1000	1280	1600(1440-1760)	50	2640	4500	6000	243	331	0.6	140
14D182K(J)	1100	1465	1800(1620-1980)	50	2970	4500	6000	250	335	0.6	130

### ➤ 20D Series Metal Oxide Varistor

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## Metal Oxide Varistor MOV

Put "J" in free Code Stands For High Surge Series

Part Number	Vac (V)	Vdc (V)	V1mA (V)	Ip (A)	Vac (V)	I(A) Standard	I(A) High Surge	(J) Standard	(J) High Surge	Rated power(W)	C@ 1KHz (pf)
20D180K(J)	11	14	18(15-21.6)	20	36	2000	3000	11	13	0.2	28500
20D220K(J)	14	18	22(19.5-26)	20	43	2000	3000	14	16	0.2	18500
20D270K(J)	17	22	27(24-31)	20	53	2000	3000	16	19	0.2	13000
20D330K(J)	20	26	33(29.5-36.5)	20	65	2000	3000	23	24	0.2	11500
20D390K(J)	25	31	39(35-43)	20	77	2000	3000	26	28	0.2	8500
20D470K(J)	30	38	47(42-52)	20	93	2000	3000	30	34	0.2	7400
20D560K(J)	35	45	56(50-62)	20	110	2000	3000	41	41	0.2	6500
20D680K(J)	40	56	68(61-75)	20	135	2000	3000	46	49	0.2	5800
20D820K(J)	50	65	82(74-90)	100	135	6500	10000	38	56	1.0	4900
20D101K(J)	60	85	100(90-110)	100	165	6500	10000	45	70	1.0	4000
20D121K(J)	75	100	120(108-132)	100	200	6500	10000	55	85	1.0	3300
20D151K(J)	95	125	150(135-165)	100	250	6500	10000	70	106	1.0	2700
20D181K(J)	115	150	180(162-198)	100	300	6500	10000	85	130	1.0	2200
20D201K(J)	130	170	200(180-220)	100	340	6500	10000	95	140	1.0	2000
20D221K(J)	140	180	220(198-242)	100	360	6500	10000	100	155	1.0	1800
20D241K(J)	150	200	240(216-264)	100	395	6500	10000	108	168	1.0	1650
20D271K(J)	175	225	270(243-297)	100	455	6500	10000	127	190	1.0	1500
20D301K(J)	190	250	300(270-330)	100	500	6500	10000	136	210	1.0	1300
20D331K(J)	210	275	330(297-363)	100	550	6500	10000	150	228	1.0	1200
20D361K(J)	230	300	360(324-396)	100	595	6500	10000	163	255	1.0	1100
20D391K(J)	250	320	390(351-429)	100	650	6500	10000	180	275	1.0	1000
20D431K(J)	275	350	430(387-473)	100	710	6500	10000	190	305	1.0	930

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## Metal Oxide Varistor MOV

20D471K(J)	300	385	470(423-517)	100	775	6500	10000	220	350	1.0	850
20D511K(J)	320	415	510(459-561)	100	845	6500	10000	220	360	1.0	780
20D561K(J)	350	460	560(504-616)	100	925	6500	10000	220	380	1.0	710
20D621K(J)	385	505	620(558-682)	100	1025	6500	10000	220	390	1.0	650
20D681K(J)	420	560	680(612-748)	100	1120	6500	10000	230	400	1.0	600
20D751K(J)	460	615	750(675-825)	100	1240	6500	10000	255	420	1.0	530
20D781K(J)	485	640	780(702-858)	100	1290	6500	10000	265	440	1.0	510
20D821K(J)	510	670	820(738-902)	100	1355	6500	10000	282	460	1.0	500
20D911K(J)	550	745	910(819-1001)	100	1500	6500	10000	310	510	1.0	440
20D102K(J)	625	825	1000(900-1100)	100	1650	6500	10000	342	565	1.0	400
20D112K(J)	680	895	1100(990-1210)	100	1815	6500	10000	383	620	1.0	360
20D122K(J)	750	990	1200(1080-1320)	100	1980	6500	10000	408	660	1.0	350
20D142K(J)	880	1140	1400(1260-1540)	100	2310	6500	10000	532	784	1.0	340
20D162K(J)	1000	1280	1600(1440-1760)	100	2640	6500	10000	606	896	1.0	330
20D182K(J)	1100	1465	1800(1620-1980)	100	2970	6500	10000	625	990	1.0	320

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## Metal Oxide Varistor MOV

### 25D Series Metal Oxide Varistor

Put "J" in free Code Stands For High Surge Series

Part Number	Vac(V)	Vdc(V)	V1mA(V)	I <sub>p</sub> (A)	V <sub>c</sub> (V)	Withstanding Surge Current I(A)	Maximum Energy 10/1000 $\mu$ s(J)	Rated power(W)	C@1KHz(pF)
25D180K	11	14	18(15-21.6)	30	36	4500	20	0.25	45000
25D220K	14	18	22(19.5-26)	30	43	4500	25	0.25	29000
25D270K	17	22	27(24-31)	30	53	4500	30	0.25	26500
25D330K	20	26	33(29.5-36.5)	30	65	4500	35	0.25	18000
25D390K	25	31	39(35-43)	30	77	4500	40	390	13500
25D470K	30	38	47(42-54)	30	93	4500	50	0.25	11500
25D560K	35	45	56(50-62)	30	110	4500	60	0.25	10500
25D680K	40	56	68(61-75)	30	135	4500	70	0.25	9050
25D820K	50	65	82(74-90)	150	135	15000	80	1.2	7700
25D101K	60	85	100(90-110)	150	165	15000	100	1.2	6300
25D121K	75	100	120(108-132)	150	200	15000	120	1.2	5200
25D151K	95	125	150(135-165)	150	250	1500	160	1.2	4300
25D181K	115	150	180(162-198)	150	300	15000	175	1.2	3500
25D201K	130	170	200(180-220)	150	340	15000	190	1.2	3200
25D221K	140	180	220(198-242)	150	360	15000	200	1.2	2900
25D241K	150	200	240(216-264)	150	395	15000	220	1.2	2650
25D271K	175	225	270(243-297)	150	455	15000	255	1.2	2400
25D301K	190	250	300(270-330)	150	500	15000	275	1.2	2100

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## Metal Oxide Varistor MOV

25D331K	210	275	330(297-363)	150	550	15000	300	1.2	1900
25D361K	230	300	360(324-396)	150	595	15000	330	1.2	1750
25D391K	250	320	390(351-429)	150	650	15000	360	1.2	1600
25D431K	275	350	430(387-473)	150	710	15000	380	1.2	1500
25D471K	300	385	470(423-517)	150	775	15000	400	1.2	1400
25D511K	320	415	510(459-561)	150	845	15000	420	1.2	1250
25D561K	350	460	560(504-616)	150	925	15000	440	1.2	1150
25D621K	385	505	620(558-682)	150	1025	15000	450	1.2	1050
25D681K	420	560	680(612-748)	150	1120	15000	460	1.2	950
25D751K	460	615	750(675-825)	150	1240	15000	510	1.2	850
25D781K	485	640	780(702-858)	150	1290	15000	530	1.2	850
25D821K	510	670	820(738-902)	150	1355	15000	570	1.2	800
25D911K	550	745	910(819-1001)	150	1500	15000	620	1.2	700
25D102K	625	825	1000(900-1100)	150	1650	15000	685	1.2	650
25D112K	680	895	1100(990-1210)	150	1815	15000	720	1.2	600
25D122K	750	990	1200(1080-1320)	150	1980	15000	792	1.2	550
25D142K	880	1140	1400(1260-1540)	150	2310	15000	850	1.2	500
25D162K	1000	1280	1600(1440-1760)	150	2640	15000	970	1.2	450
25D182K	1100	1465	1800(1620-1980)	150	2970	15000	1092	1.2	400

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## Metal Oxide Varistor MOV

### ▶ 32D Series Metal Oxide Varistor

Part Number	Vac(V)	Vdc(V)	V1mA(V)	Ip(A)	Vc(V)	I(A)	(J)	@1KHz
32D330K	20	26	33(29.5-36.5)	40	65	8000	40	30000
32D390K	25	31	39(35-43)	40	77	8000	50	22000
32D470K	30	38	47(42-52)	40	93	8000	60	19000
32D560K	35	45	56(50-62)	40	110	8000	70	16700
32D680K	40	56	68(61-75)	40	135	8000	85	15000
32D820K	50	65	82(74-90)	200	135	20000	100	12800
32D101K	60	85	100(90-110)	200	165	20000	125	10500
32D121K	75	100	120(108-132)	200	200	20000	150	8700
32D151K	95	125	150(135-165)	200	250	20000	190	7000
32D181K	115	150	180(162-198)	200	300	20000	225	5800
32D201K	130	170	200(180-220)	200	340	25000	250	5200
32D221K	140	180	220(198-242)	200	360	25000	270	5150
32D241K	150	200	240(216-264)	200	395	25000	290	5100
32D271K	175	225	270(243-297)	200	455	25000	300	4800
32D301K	190	250	300(270-330)	200	500	25000	330	4550
32D331K	210	275	330(297-363)	200	550	25000	360	4300
32D361K	230	300	360(324-396)	200	595	25000	380	3900
32D391K	250	320	390(351-429)	200	650	25000	400	3200
32D431K	275	350	430(387-473)	200	710	25000	430	3100
32D471K	300	385	470(423-517)	200	775	25000	460	2800
32D511K	320	415	510(459-561)	200	845	25000	510	2700
32D561K	350	460	560(504-616)	200	925	25000	540	2550
32D621K	385	505	620(558-682)	200	1025	25000	570	2400
32D681K	420	560	680(612-748)	200	1120	25000	600	2200
32D751K	460	615	750(675-825)	200	1240	25000	620	2000
32D781K	485	640	780(702-858)	200	1290	25000	660	1900
32D821K	510	670	820(738-902)	200	1355	25000	700	1800
32D911K	550	745	910(819-1001)	200	1500	25000	750	1300
32D951K	575	765	950(855-1045)	200	1570	25000	780	1200
32D102K	625	825	1000(900-1100)	200	1650	25000	810	1100
32D112K	680	895	1100(990-1210)	200	1815	25000	910	1000
32D122K	750	990	1200(1080-1320)	200	1980	25000	960	920
32D142K	880	1140	1400(1260-1540)	200	2310	25000	1020	800
32D162K	1000	1280	1600(1440-1760)	200	2640	25000	1080	700

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## Metal Oxide Varistor MOV

### ▶ 34S Series Metal Oxide Varistor

Part Number	Vac(V)	Vdc(V)	V1mA(V)	I <sub>p</sub> (A)	V <sub>c</sub> (V)	I(A)	(J)	@iKHz(pF)
34S330K	20	26	33(30-36)	60	65	12000	50	43000
34S390K	25	31	39(35-43)	60	77	12000	65	31500
34S470K	30	38	47(42-52)	60	93	12000	75	28000
34S560K	35	45	56(50-62)	60	110	12000	90	24500
34S680K	40	56	68(61-75)	60	135	12000	110	21500
34S820K	50	65	82(74-90)	300	135	30000	135	19500
34S101K	60	85	100(90-110)	300	165	30000	165	15500
34S121K	75	100	120(108-132)	300	200	30000	200	13000
34S151K	95	125	150(135-165)	300	250	30000	260	11000
34S181K	115	150	180(162-198)	300	300	30000	300	9000
34S201K	130	170	200(180-220)	300	340	40000	330	8000
34S221K	140	180	220(198-242)	300	360	40000	360	7800
34S241K	150	200	240(216-264)	300	395	40000	390	7600
34S271K	175	225	270(243-297)	300	455	40000	420	7200
34S301K	190	250	300(270-330)	300	500	40000	460	7000
34S331K	210	275	330(300-360)	300	550	40000	500	6400
34S361K	230	300	360(324-396)	300	595	40000	510	6000
34S391K	250	320	390(351-429)	300	650	40000	530	4800
34S431K	275	350	430(387-473)	300	710	40000	600	4600
34S471K	300	385	470(423-517)	300	775	40000	650	4100
34S511K	320	415	510(459-561)	300	845	40000	700	4000
34S561K	350	460	560(504-616)	300	925	40000	730	3800
34S621K	385	505	620(558-682)	300	1025	40000	780	3600
34S681K	420	560	680(612-748)	300	1120	40000	810	3300
34S751K	460	615	750(675-825)	300	1240	40000	850	3000
34S781K	485	640	780(702-858)	300	1290	40000	930	2850
34S821K	510	670	820(738-902)	300	1355	40000	970	2700
34S911K	550	745	910(819-1001)	300	1500	40000	1050	2100
34S951K	575	765	950(855-1045)	300	1570	40000	1080	1900
34S102K	625	825	1000(900-1100)	300	1650	40000	1120	1700
34S112K	680	895	1100(990-1210)	300	1815	40000	1250	1520
34S122K	750	990	1200(1080-1320)	300	1980	40000	1340	1400
34S142K	880	1140	1400(1260-1540)	300	2310	40000	1400	1200
34S162K	1000	1280	1600(1440-1760)	300	2640	40000	1500	1100

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## Metal Oxide Varistor MOV

### 40D Series Metal Oxide Varistor

Part Number	Vac(V)	Vdc(V)	V1mA(V)	I <sub>p</sub> (A)	V <sub>c</sub> (V)	I(A)	(J)	@1KHz(pF)
40D330K	20	26	33(29.5-36.5)	60	65	12000	55	48000
40D390K	25	31	39(35-43)	60	77	12000	70	35000
40D470K	30	38	47(42-52)	60	93	12000	85	31000
40D560K	35	45	56(50-62)	60	110	12000	100	27000
40D680K	40	56	68(61-75)	60	135	12000	125	24000
40D820K	50	65	82(74-90)	300	135	30000	150	20500
40D121K	75	100	120(108-132)	300	200	30000	225	13500
40D151K	95	125	150(135-165)	300	250	30000	285	11100
40D181K	115	150	180(162-198)	300	300	30000	335	9500
40D201K	130	170	200(180-220)	300	340	40000	370	8400
40D221K	140	180	220(198-242)	300	360	40000	400	8200
40D241K	150	200	240(216-264)	300	395	40000	430	8000
40D271K	175	225	270(243-297)	300	455	40000	470	7600
40D301K	190	250	300(270-330)	300	500	40000	510	7300
40D331K	210	275	330(297-363)	300	550	40000	550	6700
40D361K	230	300	360(324-396)	300	595	40000	570	6200
40D391K	250	320	390(351-429)	300	650	40000	590	5100
40D431K	275	350	430(387-473)	300	710	40000	660	4900
40D471K	300	385	470(423-517)	300	775	40000	720	4300
40D511K	320	415	510(459-561)	300	845	40000	770	4200
40D561K	350	460	560(504-616)	300	925	40000	810	4000
40D621K	385	505	620(558-682)	300	1025	40000	860	3800
40D681K	420	560	680(612-748)	300	1120	40000	900	3500
40D751K	460	615	750(675-825)	300	1240	40000	940	3200
40D781K	485	640	780(702-858)	300	1290	40000	980	3000
40D821K	510	670	820(738-902)	300	1355	40000	1080	2900
40D911K	550	745	910(819-1001)	300	1500	40000	1150	2200
40D951K	575	765	950(855-1045)	300	1570	40000	1200	2000
40D102K	625	825	1000(900-1100)	300	1650	40000	1260	1800
40D112K	680	895	1100(990-1210)	300	1815	40000	1380	1600
40D122K	750	990	1200(1080-1320)	300	1980	40000	1460	1500
40D142K	880	1140	1400(1260-1540)	300	2310	40000	1550	1300
40D162K	1000	1280	1600(1440-1760)	300	2640	40000	1700	1150
40D101K	60	85	100(90-110)	300	165	30000	185	16500

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## Metal Oxide Varistor MOV

### 53D Series Metal Oxide Varistor

Part Number	Vac(V)	Vdc(V)	V1mA(V)	Ip(A)	Vc(V)	I(A)	(J)	@1KHz(pF)
53D330K	20	26	33(29.5-36.5)	100	65	20000	85	81000
53D390K	25	31	39(35-43)	100	77	20000	105	60000
53D470K	30	38	47(42-52)	100	93	20000	130	52000
53D560K	35	45	56(50-62)	100	110	20000	150	46000
53D680K	40	56	68(61-75)	100	135	20000	190	41000
53D820K	50	65	82(74-90)	500	135	70000	225	35000
53D101K	60	85	100(90-110)	500	165	70000	280	28500
53D121K	75	100	120(108-132)	500	200	70000	340	23500
53D151K	95	125	150(135-165)	500	250	70000	430	19000
53D181K	115	150	180(162-198)	500	300	70000	500	17000
53D201K	130	170	200(180-220)	500	340	70000	550	15000
53D221K	140	180	220(198-242)	500	360	70000	600	13750
53D241K	150	200	240(216-264)	500	395	70000	650	12500
53D271K	175	225	270(243-297)	500	455	70000	700	11000
53D301K	190	250	300(270-330)	500	500	70000	765	10000
53D331K	210	275	330(297-363)	500	550	70000	825	9000
53D361K	230	300	360(324-396)	500	595	70000	850	8500
53D391K	250	320	390(351-429)	500	650	70000	885	7500
53D431K	275	350	430(387-473)	500	710	70000	990	7000
53D471K	300	385	470(423-517)	500	775	70000	1080	6500
53D511K	320	415	510(459-561)	500	845	70000	1150	6000
53D561K	350	460	560(504-616)	500	925	70000	1200	5500
53D621K	385	505	620(558-682)	500	1025	70000	1300	5000
53D681K	420	560	680(621-748)	500	1120	70000	1350	4500
53D751K	460	615	750(675-825)	500	1240	70000	1400	4000
53D781K	485	640	780(702-858)	500	1290	70000	1450	3900
53D821K	510	670	820(738-902)	500	1355	70000	1600	3700
53D911K	550	745	910(819-1001)	500	1500	70000	1700	3300
53D951K	575	765	950(855-1045)	500	1570	70000	1800	3200
53D102K	625	825	1000(900-1100)	500	1650	70000	1890	3000
53D112K	680	895	1100(990-1210)	500	1815	70000	2050	2700
53D122K	750	990	1200(1080-1320)	500	1980	70000	2160	2500
53D142K	880	1140	1400(1260-1540)	500	2310	70000	2300	2150
53D162K	1000	1280	1600(1440-1760)	500	2640	70000	2500	1900

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### ✧ Mechanical Requirements

Mechanical Requirements			
1	Tensile of Terminations	No Outstanding Damage	1Kgf, 10Sec
2	Bending of Terminations	No Outstanding Damage	0.5Kgs,90°,3Times
3	Vibration	No Outstanding Damage	Freq: 10-55hz Amp: 0.75 mm, 1Min
4	Solderability	Min.95% of The Terminal Should Be Covered With Solder Uniformly	Solder Temp:230±5°C Immersed Time:2±0.5Sec
5	Resistance of soldering Heat	$\Delta V_{1mA}/V_{1mA} \leq \pm 5\%$	Solder Temp:260±5°C
			Immersed Time:10±1Sec

### ✧ Environmental Requirements

Environmental Requirements					
1	High Temperature Storage	$\Delta V_{1mA}/V_{1mA} \leq \pm 5\%$	Ambient Temp:125±2°C Duration: 1000h		
2	Low Temperature Storage	$\Delta V_{1mA}/V_{1mA} \leq \pm 5\%$	Ambient Temp:-40±2°C Duration: 1000h		
3	High Humidity Storage/Damp Heat	$\Delta V_{1mA}/V_{1mA} \leq \pm 5\%$	Ambient Temp:40±2°C 90-95%R.H. Duration: 1000h		
4	Temperature Cycle	$\Delta V_{1mA}/V_{1mA} \leq \pm 5\%$	Ste p		
			1	Temperature	Period
			2	-40°C	30min
			3	Room Temp	15min
4	125°C	30min			
4	Room Temp	15min			
5	High Temperature Load	$\Delta V_{1mA}/V_{1mA} \leq \pm 10\%$	Ambient Temp:85±2°C Duration:1000h Load : Max Allowable Voltage		
6	High Humidity load	$\Delta V_{1mA}/V_{1mA} \leq \pm 10\%$	Ambient Temp:125±2°C Duration:1000h Load : Max Allowable Voltage		
7	Operating Temperature Range	-40°C ~ +85°C	-40°C ~ +85°C		
8	Storage Temperature Range	-40°C ~ +125°C	-40°C ~ +125°C		



## ✧ Application Example

Model Number Φ5mm	Model Number Φ5mm	Model Number Φ5mm	Model Number Φ5mm	Model Number Φ5mm	Recommended Applications
05D180L 05D220K 05D270K 05D330K 05D390K 05D470K 05D560K 05D680K	07D180L 07D220K 07D270K 07D330K 07D390K 07D470K 07D560K 07D680K	10D180L 10D220K 10D270K 10D330K 10D390K 10D470K 10D560K 10D680K	14D180L 14D220K 14D270K 14D330K 14D390K 14D470K 14D560K 14D680K	20D180L 20D220K 20D270K 20D330K 20D390K 20D470K 20D560K 20D680K	<ul style="list-style-type: none"> <li>● Protection of various kinds of semiconductors</li> <li>● Protection of automobile equipment</li> <li>● Absorption of switching surge from various kinds of relays and electro-magnetic valves (DC below 48V)</li> <li>● Protection of electronic equipment from electrostatic discharge</li> <li>● Cellular phone</li> </ul>
05D820K 05D101K 05D121K 05D151K	07D820K 07D101K 07D121K 07D151K	10D820K 10D101K 10D121K 10D151K	14D820K 14D101K 14D121K 14D151K	20D820K 20D101K 20D121K 20D151K	<ul style="list-style-type: none"> <li>● Telephone. Communication line (DC 48V)</li> </ul>
05D181K 05D201K 05D221K	07D181K 07D201K 07D221K	10D181K 10D201K 10D221K	14D181K 14D201K 14D221K	20D181K 20D201K 20D221K	<ul style="list-style-type: none"> <li>● AC 100V Line-Line Applications(Japan )</li> </ul>
05D241K 05D271K 05D301K	07D241K 07D271K 07D301K	10D241K 10D271K 10D301K	14D241K 14D271K 14D301K	20D241K 20D271K 20D301K	<ul style="list-style-type: none"> <li>● AC 100V to 120V,Line-Line Applications (Japan.,U.S.,Canada)</li> </ul>
05D331K 05D361K 05D391K	07D331K 07D361K 07D391K	10D331K 10D361K 10D391K	14D331K 14D361K 14D391K	20D331K 20D361K 20D391K	<ul style="list-style-type: none"> <li>● Telephone Line Application (250V insulation Resistance Test Applicable)</li> </ul>
05D431K 05D471K	07D431K 07D471K	10D431K 10D471K	14D431K 14D471K	20D431K 20D471K	<ul style="list-style-type: none"> <li>● AC200/220V Line-Line Applications</li> <li>● AC100V to 220V.Line-Ground Applications</li> </ul>
05D561K	07D561K 07D621K 07D681K	10D561K 10D621K 10D681K	14D561K 14D621K 14D681K	20D561K 20D621K 20D681K	<ul style="list-style-type: none"> <li>● AC 240V Line-Line Applications (U.K.,Australia,Middle East Countries)</li> </ul>
		10D751K 10D781K 10D821K	14D751K 10D781K 10D821K	20D751K 20D781K 20D821K	<ul style="list-style-type: none"> <li>● AC 380V,Line-Line and Line-Ground Applications</li> </ul>
		10D911K	14D911K	20D911K	<ul style="list-style-type: none"> <li>● AC 415V,Line-Line and Line-Ground Applications</li> </ul>
		10D102K 10D112K	14D102K 14D112K	20D102K 20D112K	<ul style="list-style-type: none"> <li>● AC 480V,Line-Line and Line-Ground Applications</li> </ul>
			14D182K	20D182K	<ul style="list-style-type: none"> <li>● Line-Ground Applications (For AC 1200V Withstanding Test)</li> </ul>

## ✧ Select of fuse in conformity to ZOV Varistor

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➤ **If confirm with diameter:**

Part No.	Metal Oxide Varistor 05D series	Metal Oxide Varistor 07D series	Metal Oxide Varistor 10D series	Metal Oxide Varistor 14D series	Metal Oxide Varistor 20D series
Fuse rating	1 to 2 A	2 to 3 A	3 to 5 A	3 to 10 A	5 to 15 A

➤ **If confirm with Max.Peak Current:**

Max.Peak Current 8/20us 1 time (A)	Up to 500	501 to 2000	2001 to 6000
Fuse rating	3A	5A	10A

❖ **How to Select a ZOV ZnO varistor**

For most applications, the selection has six processes:

1) Normal operating conditions of varistor

Varistor voltage: the voltage value under 1mA constant current test.

Select the ZnO with higher voltage.

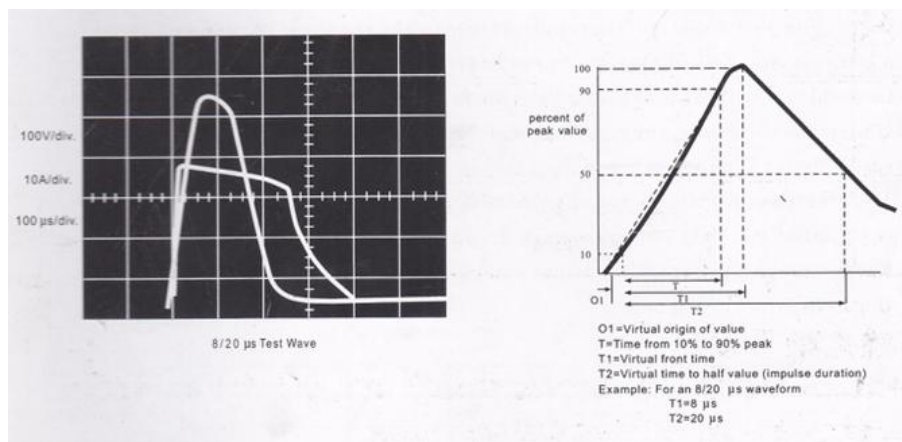
A.C./D.C.: max.rms.or DC voltage. Select the max. Voltage equal or higher than the peak working voltage.

2) The transient energy absorbed by the ZnO

To determine the energy absorbed in the ZnO., the following equation can apply:

$$E=K*IP*Vc*T$$

Where K is constant. K value are 1.0 for a rectangular waveform, 1.4 for a 10/1000 us and 8/20 us waveform. And IP is the peak current applied, Vc is the clamping voltage which was current applied. T is the pulse width.



It must note one thing that the rated energy and the energy absorbed in a Varistor may not be identical

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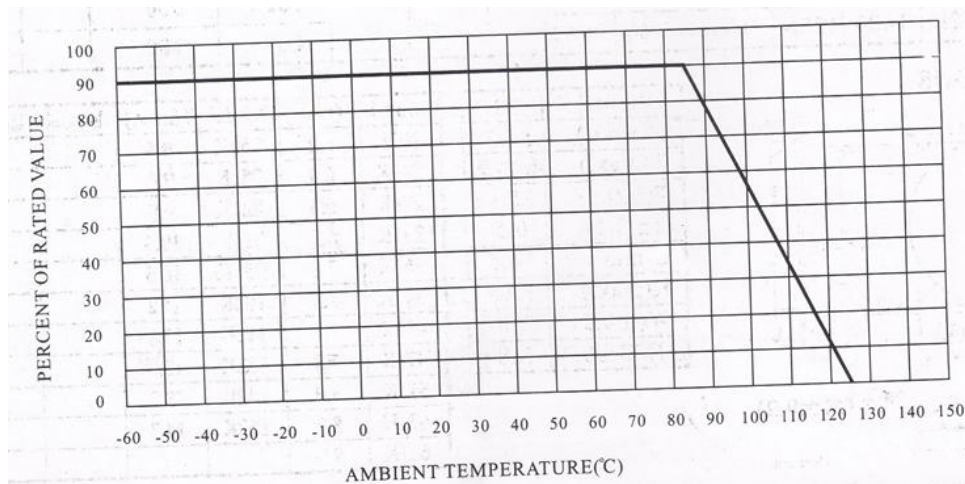
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It has a situation that a ZnO Varistor with better clamping voltage will absorb less energy. It is very important to emphasize that poorer ZnO Varistor will absorb higher energy in the ZnO Varistor itself and the better ZnO Varistor which performs a lower clamping voltage will absorb less energy, yet actually provides a better over-voltage protection.

- 3) Max. Transient voltage that the equipment to be protected can withstand. Select lower clamping voltage than the equipment can endure. It is easy to find ZnO Varistor clamping voltage from V-I curve when the transient current is known.
- 4) Max. The peak transient current that the Varistor can withstand. The peak transient current can be measured in the circuit. If the transient is generated by an inductor, the peak current will not be more than the inductor change current. When the transient voltage and the circuit line impedance is known, the transient current can get by using a graphical analysis.
- 5) Number of transient currents expected surge during life evaluate the total transient numbers in the circuit and the max. Peak current then selects the suitable model ZnO Varistor that can endure.
- 6) Determine power dissipation requirements. If the transients generate heat in a ZnO Varistor too quickly, it can not be transferred during the pulse interval and will cause the ZnO Varistor fail.

Under this condition, the power dissipation so developed must be within the specifications shown on the ratings tables. It is to be noted that ZnO Varistor can only dissipate a repetitive applications that involve substantial amounts average energy dissipation. Furthermore, the operating values will decrease at high temperature as shown in following figure.



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✦ Package

➤ Bulk Packaging:

Model	Specifications	Quantity per carton (K)	Gross weight (Kg)
5D	180K-821K	24	8-11
7D	180K-471K	18	8-12
	511K-821K	12	10-11
10D	180K-561K	9	8-15
	681K-821K	6	11-16
14D	180K-681K	6	10-18
	751K-122K	3	10-13
20D	180K-471K	3	8-14
	561K-122K	1.5	8-11
Remarks	Special requirements can be packed at the request of clients		

➤ Taping Packaging:

Packing	Dimensions in mm	Series	Quantity(pcs)
Box		03D.05D.07D	1500
		10D.14D	1000
		18D.20D	500
Ammo		03D.05D.07D	1500
		10D.14D	750
		18D.20D	500
Reel		03D.05D.07D	1500
		10D.14D	750
		18D.20D	500

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