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突波吸收器（壓敏電阻器）

Features

- Fast response to the rapidly rising surge voltage.
- High performance clamping voltage characteristics.
- Broad products range,Varistor voltage:8V to 1800V.

Applications

- Transistor, diode, IC, thyristor and triac semiconductor protection.
- Surge protection in consumer electronics.
- Surge protection in industrial electronics.
- Surge protection in communication, measuring and controller electronics.
- Surge protection in electronic home appliances and gas and petroleum appliances.
- Electrostatic discharge and noise spike suppression.
  Relay and electromagnetic valve surge absorption.

Part number code

V 1 2 3 4 5 6 7 8 9

Varistor

Varistor Voltage
The first two digits are significant figures and the third one denotes the number of zeros following. Decimal point is expressed by R.

Tolerance	
K	±10%
L	±15%
M	±20%

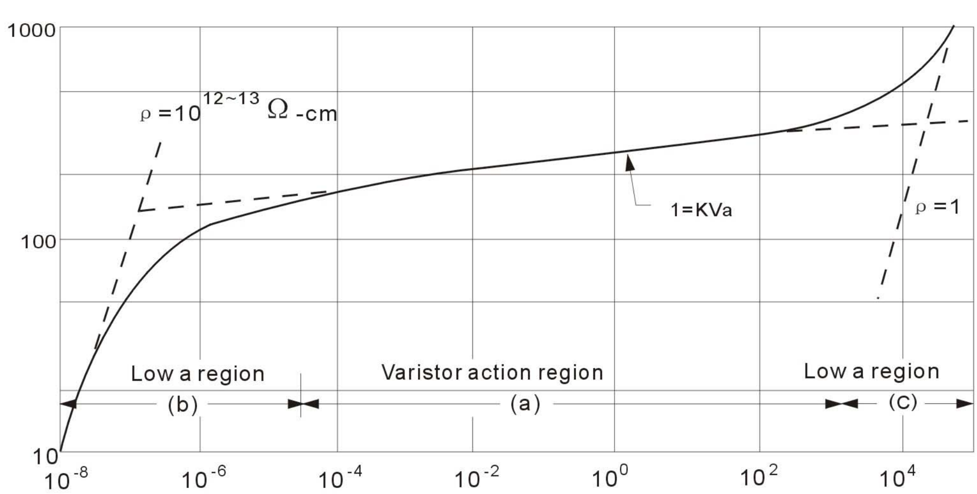
TYPE	
D	Type D
B	Disk

Element Dia.	
05	Φ5 mm
07	Φ7 mm
09	Φ9 mm
10	Φ10 mm
14	Φ14 mm
18	Φ18 mm
20	Φ20 mm

Lead Form	
S	Straight Lead
C	Crimped Lead
O	No Lead
3	3.5mm
6	6.0mm
7	7.0mm
8	8.0mm
9	9.0mm

Packing	
A	Ammo
B	Box
R	No Lead
3	3.5mm
6	6.0mm
7	7.0mm
8	8.0mm
9	9.0mm
Z	7.5mm

Current - voltage characteristics



ZINC OXIDE VARISTOR

SPECIFICATION(D05,D07,D10,D14,D20)

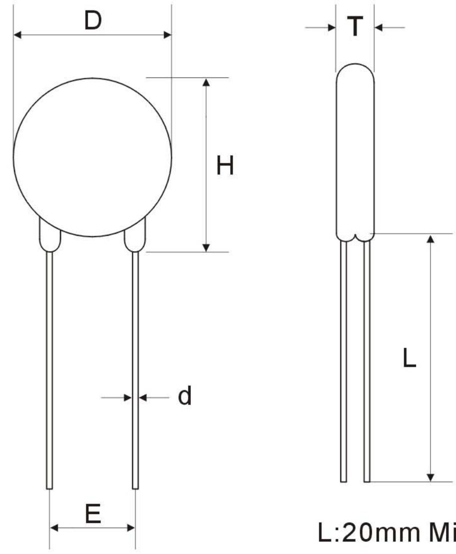
Varistor Voltage(v)	R. W. (W)	D05	R. W. (W)	D07	R. W. (W)	D10	R. W. (W)	D14	R. W. (W)	D20
1500								182KD14		182KD20
1500								152KD14		152KD20
1100						112KD10		112KD14		112KD20
1000						102KD10		102KD14		102KD20
910						911KD10		911KD14		911KD20
820				821KD07		821KD10		821KD14		821KD20
780				781KD07		781KD10		781KD14		781KD20
750		751KD05		751KD07		751KD10		751KD14		751KD20
680		681KD05		681KD07		681KD10		681KD14		681KD20
620		621KD05		621KD07		621KD10		621KD14		621KD20
560		561KD05		561KD07		561KD10		561KD14		561KD20
510		511KD05		511KD07		511KD10		511KD14		511KD20
470	0.01	471KD05	0.02	471KD07	0.05	471KD10	0.1	471KD14	0.2	471KD20
430		431KD05		431KD07		431KD10		431KD14		431KD20
390		391KD05		391KD07		391KD10		391KD14		391KD20
360		361KD05		361KD07		361KD10		361KD14		361KD20
330		331KD05		331KD07		331KD10		331KD14		331KD20
300		301KD05		301KD07		301KD10		301KD14		301KD20
270		271KD05		271KD07		271KD10		271KD14		271KD20
240		241KD05		241KD07		241KD10		241KD14		241KD20
220		221KD05		221KD07		221KD10		221KD14		221KD20
200		201KD05		201KD07		201KD10		201KD14		201KD20
180		181KD05		181KD07		181KD10		181KD14		181KD20
150		151KD05		151KD07		151KD10		151KD14		151KD20
120		121KD05		121KD07		121KD10		121KD14		121KD20
100		101KD05		101KD07		101KD10		101KD14		101KD20
82		820KD05		820KD07		820KD10		820KD14		820KD20
68		680KD05		680KD07		6801KD10		680KD14		680KD20
56		560KD05		560KD07		560KD10		560KD14		560KD20
47		470KD05		470KD07		470KD10		470KD14		470KD20
39	0.01	390KD05	0.02	390KD07	0.05	390KD10	0.1	390KD14	0.2	390KD20
33		330KD05		330KD07		330KD10		330KD14		
27		270KD05		270KD07		270KD10		270KD14		
22		220KD05		220KD07		220KD10		220KD14		
18		180LD05		180LD07		180LD10		180LD14		

ZINC OXIDE VARISTOR

Dimensions in mm

■ T THICKNESS(max.)

Part Code	DO5	DO7	DO10	DO14	DO20
182K				14.4	14.8
152K				12.0	12.4
112K			9.7	9.7	10.1
102K			9.1	9.1	9.5
911K			8.6	8.6	9.0
821K		7.9	8.1	8.1	8.5
781K		7.7	7.9	7.9	8.3
751K	7.3	7.5	7.8	7.8	8.2
681K	7.1	7.3	7.4	7.4	7.8
621K	7.1	7.1	7.1	7.1	7.5
561K	6.2	6.4	6.5	6.5	7.0
511K	6.2	6.4	6.5	6.5	7.0
471K	6.0	6.0	6.5	6.5	7.0
431K	5.7	5.7	6.2	6.2	6.7
391K	5.4	5.4	5.8	5.8	6.4
361K	5.2	5.2	5.7	5.7	6.2
331K	5.1	5.1	5.6	5.6	6.0
301K	5.0	5.0	5.3	5.3	5.7
271K	4.9	4.9	5.2	5.2	5.6
241K	4.6	4.6	5.0	5.0	5.4
221K	4.5	4.5	4.9	4.9	5.3
201K	4.4	4.4	4.8	4.8	5.2
181K	4.3	4.3	4.8	4.8	5.2
151K	4.8	4.8	5.2	5.2	5.6
121K	4.5	4.5	4.9	4.9	5.3
101K	4.3	4.3	4.7	4.7	5.1
820K	4.1	4.1	4.5	4.5	4.9
680K	4.5	5.2	5.3	5.3	5.8
560K	4.5	5.0	5.1	5.1	5.7
470K	4.5	4.9	5.0	5.0	5.6
390K	4.5	4.8	4.9	4.9	5.5
330K	4.5	4.9	5.0	5.0	
270K	4.5	4.7	4.8	4.8	
220K	4.5	4.6	4.7	4.7	
180L	4.5	4.5	4.6	4.6	



L:20mm Min

SIZE	D MAX.	H MAX.	d	F
D05	7.5	10.5	0.6	50.8
D07	9	12 14	0.6	50.8 5.50.8
D10	14	17 19	0.8	7.50.8 80.8
D14	17	20 22	0.8	7.50.8 80.8
D20	25	28 30	0.8 10	7.50.8 80.8 151.0

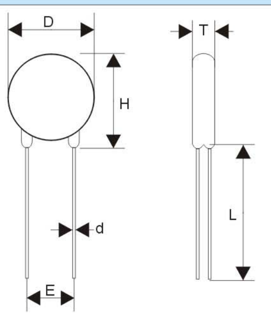
ZINC OXIDE VARISTOR 5∮

Specifications

Part No.	Maximum Allowable Voltage		Maximum Energy		Withstanding Surge Current		Rated Wattage	Varistor Voltage	Maximum Clamping Voltage	Typical Capacitance (Reference)	cULus	CSA	VDE
	ACrms (V)	DC (V)	(10/1000μs) (J)	(2ms) (J)	1 time (A)	2 times (A)	(W)	VImA (V)	V5A (V)	@1KHz (PF)			
751KD05	460	615	22.4	16.0	400	200	0.1	750(675-825)	1240	30			
681KD05	420	560	21.0	15.0				680(612-748)	1120	35			
621KD05	385	505	21.0	15.0				620(558-682)	1025	40			
561KD05	350	460	19.6	14.0				560(504-616)	920	45			
511KD05	320	415	19.6	14.0				510(459-561)	845	50			
471KD05	300	385	18.2	13.0				470(423-517)	810	55	*	*	*
431KD05	275	350	16.8	12.0				430(387-473)	745	60	*	*	*
391KD05	250	320	15.4	11.0				390(351-429)	675	65	*	*	*
361KD05	230	300	14.0	10.0				360(324-396)	620	70	*	*	*
331KD05	210	275	14.0	10.0				330(297-363)	600	75	*	*	*
301KD05	190	250	11.8	8.4				300(270-330)	505	85	*	*	*
271KD05	175	225	10.2	7.3				270(243-297)	475	95	*	*	*
241KD05	150	200	9.9	7.1				240(216-264)	415	100	*	*	*
221KD05	140	180	8.8	6.3				220(198-242)	380	110	*	*	*
201KD05	130	170	7.7	5.5				200(185-225)	355	125	*	*	*
181KD05	115	150	5.6	4.0				180(162-198)	325	140	*		*
151KD05	95	125	4.2	3.0				150(135-165)	265	165	*		*
121KD05	75	100	4.2	3.0				120(108-132)	210	210	*		*
101KD05	60	85	2.8	2.0				100(90-110)	175	250	*		*
820KD05	50	65	2.8	2.0				82(74-90)	145	300	*		*
680KD05	40	56	1.8	1.3	100	50	0.01	68(61-75)	*150	370	*		*
560KD05	35	45	1.5	1.1				56(50-62)	*123	450	*		
470KD05	30	38	1.4	1.0				47(42-52)	*104	530	*		
390KD05	25	31	1.1	0.8				39(35-43)	*86	640	*		
330KD05	20	26	0.8	0.6				33(30-36)	*73	760	*		
270KD05	17	22	0.7	0.5				27(24-30)	*60	930	*		
220KD05	14	18	0.6	0.4				22(18.7-26)	*48	1150	*		
180LD05	10	14	0.4	0.3				18(14.4-21.6)	*42	1400	*		
120MD05	6	8	0.4	0.3				12(9-16)	*32	2100	*		
8R0MD05	4	5.5	0.3	0.2				8(6-11)	*22	3100	*		

*680K--8R0M Max. Clamping Voltage testing current 1A.

Dimensions in mm

Dimensions(mm)	Model No.	T MAX.	D MAX.	H MAX.	d	E ±0.8	L MIN.
	8R0MD05 | 680KD05	4.5	7.5	10.5	0.6	5	20
	820KD05 | 471KD05	4.1 | 6.0	7.5	10.5	0.6	5	20
	511KD05 | 751KD05	6.2 | 7.3	7.5	10.5	0.6	5	20

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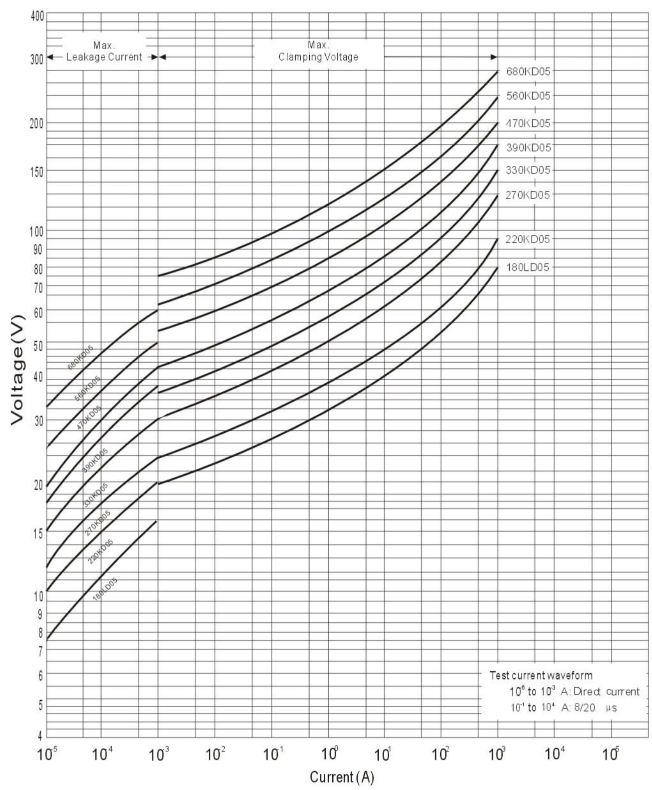
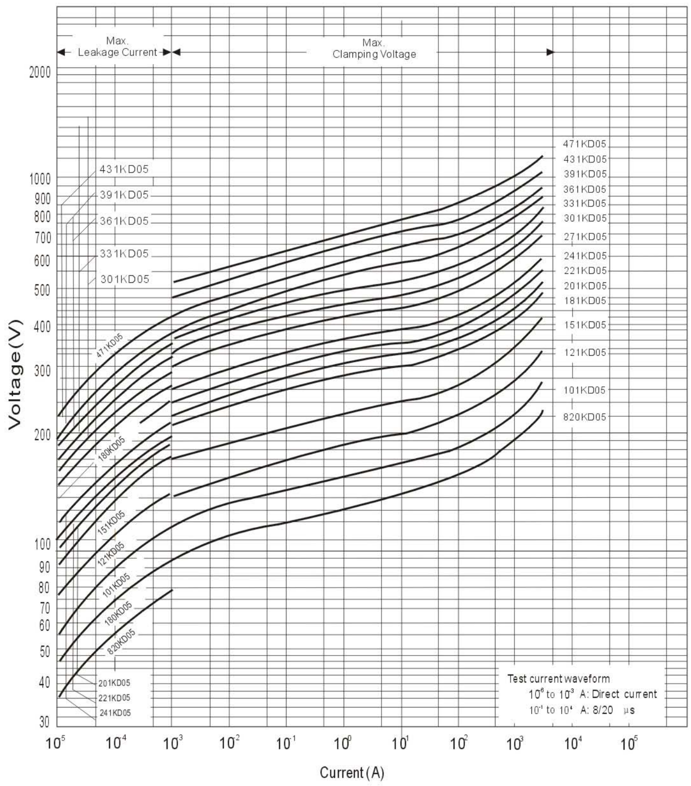
V-I CURVES AND LIFE TIME

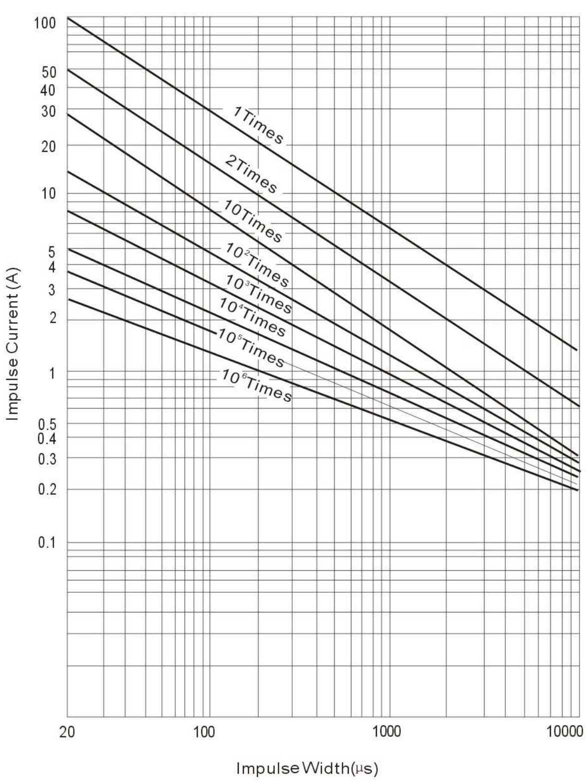
V-I Curve[180LD05 to 680KD05]



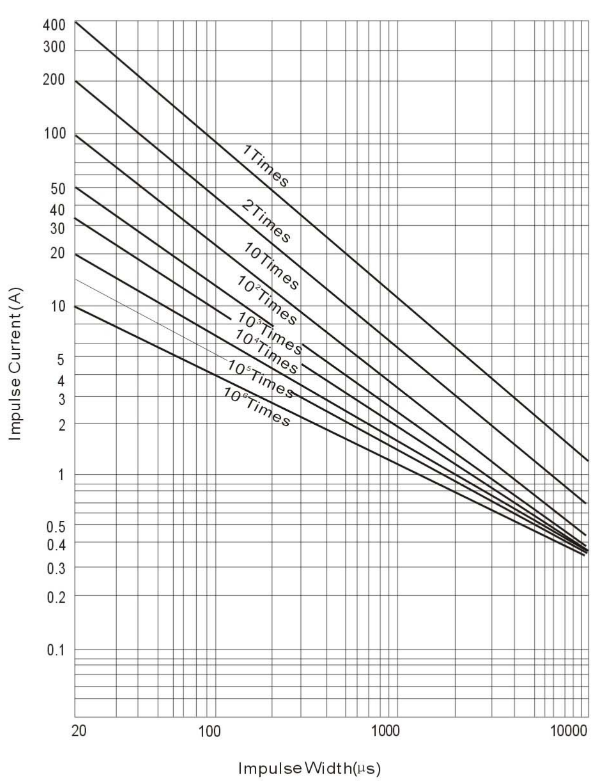
V-I Curve[820KD05 to471KD05]



Surge Life Time Ratings [180LD05 to 680KD05]



Surge Life Time Ratings [820KD05 to 471KD05]



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ZINC OXIDE VARISTOR

Zonkas®

DISK SPECIFICATION

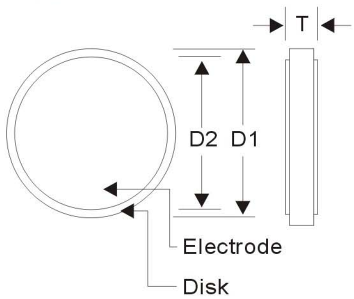
	B05	B07	B10	B14	B20
SURGE CURRENT Amp(1 pules)	600	1200	2500	4500	6500

Part Code	B05 B07 B10 B14 B20			
	V1mA(V)		V10μA(V)	α (1-0.1mA)
	min	max	min	min
182K	1625	1980	1465	35
152K	1355	1650	1300	
112K	995	1210	895	
102K	903	1100	825	
911K	822	1001	745	
821K	741	902	670	
781K	705	858	640	
751K	678	825	615	
681K	615	748	560	
832K	561	682	505	
561K	507	616	460	
511K	462	560	415	
471K	426	517	385	
431K	390	473	350	
391K	354	429	320	
361K	327	396	300	
331K	300	363	275	
271K	246	397	225	
241K	219	364	200	
221K	201	242	180	
201K	188	225	170	
181K	165	198	150	
151K	138	167	125	25
121K	111	134	100	
101K	93	112	85	
820K	77	92	65	
680K	64	77	56	21
560K	53	64	45	
470K	45	54	38	
390K	38	45	31	
330K	33	38	26	15
270K	27	32	22	
220K	22	27	18	
180L	18	23	14	

$$\alpha \text{ value} = \frac{1}{\log(V1mA/V0.1mA)}$$

DISK TEICKNESS

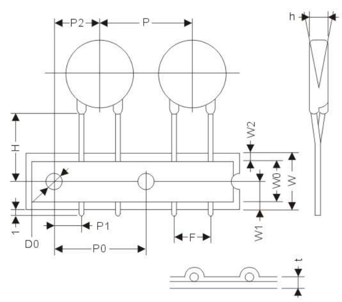
DISK



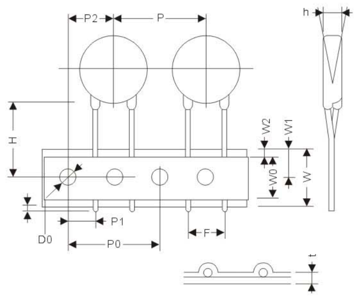
Unit : mm	B05	B07	B10	B14	B20
D1	5.0 ± 0.3	7.0 ± 0.3	9.9 ± 0.3	14.0 ± 0.3	20.0 ± 0.3
D2	3.5 ± 0.5	5.0 ± 0.5	8.0 ± 0.5	12.0 ± 1.0	17.0 ± 1.0
Part Code(T)	B05	B07	B10	B14	B20
182k				7.20 ± 0.5	
152k				6.10 ± 0.5	
112k				4.40 ± 0.4	
102k				4.21 ± 0.4	
911k				3.83 ± 0.4	
821k				3.46 ± 0.3	
781k				3.28 ± 0.3	
751k		2.86		3.46	
681k		2.56		3.16	
832k		2.31		2.91	
561k		2.27		2.67	
511k		2.20		2.60	
471k		1.96		2.56	
431k		1.90		2.46	
391k		1.85		2.25	
361k		1.69		2.09	
331k		1.54		1.94	
271k		1.22		1.62	
241k		1.06		1.46	
221k		0.96		1.36	
201k		0.80		1.20	
181k		0.70		1.10	
151k		1.47		1.87	
121k		1.12		1.52	
101k		0.91		1.31	
820k		0.71		1.11	
680k		1.50		1.90	
560k		1.20		1.60	
470k		0.98		1.88	
390k		0.78		1.56	
330k		0.90		1.52	
270k		0.70		1.42	
220k		0.53		1.20	
180k		0.40		1.01	

TAPING SPECIFICATION

Straight Leads (D05,D07,D09,D10)

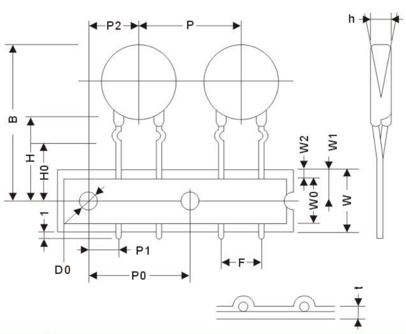


Straight Leads (D14,D18,D20)

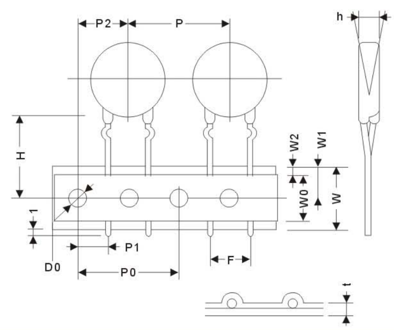


Symbol	Parameter	Series						
		05D	07D	09D	10D	14D	18D	20D
P	Pitch of Compontnt	12.7±1.0	12.7±1.0	12.7±1.0	15.0±1.0	25.4±1.0	25.4±1.0	25.4±1.0
P0	Feed Hole Pitch	12.7±0.3	12.7±0.3	12.7±0.3	15.0±0.3	25.4±0.3	25.4±1.0	25.4±1.0
P1	Feed Hole Center to Lead	3.85±0.7	3.85±0.7	3.85±0.7	3.75±0.7	8.95±0.7	7.7±0.7	7.7±0.7
P2	Hole Center to Component Center	6.35±1.3	6.35±1.3	6.35±1.3	7.5±1.3	1.27±1.3	12.7±1.3	12.7±1.3
F	Lead to Lead Distance	5.0±0.5	5.0±0.5	5.0±0.5	7.5±0.5	7.5±0.5	10.0±0.5	10.0±0.5
△h	Component Alignment	0±2	0±2	0±2	0±2	0±4	0±4	0±4
W	Tape Width	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0
W0	Hold Down Tape Width	12.5min	12.5min	12.5min	12.5min	12.5min	12.5min	12.5min
W1	Hold Position	9.0±0.5	9.0±0.5	9.0±0.5	9.0±0.5	9.0±0.5	9.0±0.5	9.0±0.5
W2	Hole Down Tape Position	3.0max	3.0max	3.0max	3.0max	3.0max	3.0max	3.0max
H	Height from Tape Center to Component	20.0±2.0	20.0±2.0	20.0±2.0	20.0±2.0	20.0±2.0	20.0±2.0	20.0±2.0
1	Length of Clipped Lead	1.0max	1.0max	1.0max	1.0max	1.0max	1.0max	1.0max
D0	Feed Hole Diameter	4.0±0.2	4.0±0.2	4.0±0.2	4.0±0.2	4.0±0.2	4.0±0.2	4.0±0.2
t	Total Tape Thickness	0.6±0.3	0.6±0.3	0.6±0.3	0.6±0.3	0.6±0.3	0.6±0.3	0.6±0.3
	Unit:mm							

Crimped Leads (D05,D07,D09,D10)



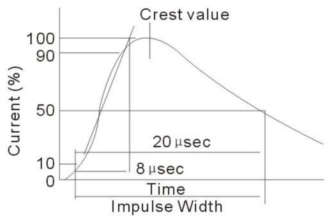
Crimped Leads (D14,D18,D20)



Symbol	Parameter	Series						
		05D	07D	09D	10D	14D	18D	20D
P	Pitch of Compontnt	12.7±1.0	12.7±1.0	12.7±1.0	15.0±1.0	25.4±1.0	25.4±1.0	25.4±1.0
P0	Feed Hole Pitch	12.7±0.3	12.7±0.3	12.7±0.3	15.0±0.3	25.4±0.3	25.4±1.0	25.4±1.0
P1	Feed Hole Center to Lead	3.85±0.7	3.85±0.7	3.85±0.7	3.75±0.7	8.95±0.7	7.7±0.7	7.7±0.7
P2	Hole Center to Component Center	6.35±1.3	6.35±1.3	6.35±1.3	7.5±1.3	1.27±1.3	12.7±1.3	12.7±1.3
F	Lead to Lead Distance	5.0±0.5	5.0±0.5	5.0±0.5	7.5±0.5	7.5±0.5	10.0±0.5	10.0±0.5
△h	Component Alignment	0±2	0±2	0±2	0±2	0±4	0±4	0±4
W	Tape Width	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0	18.0±1.0
W0	Hold Down Tape Width	12.5min	12.5min	12.5min	12.5min	12.5min	12.5min	12.5min
W1	Hold Position	9.0±0.5	9.0±0.5	9.0±0.5	9.0±0.5	9.0±0.5	9.0±0.5	9.0±0.5
W2	Hole Down Tape Position	3.0max	3.0max	3.0max	3.0max	3.0max	3.0max	3.0max
H	Height from Tape Center to Component	20.0±2.0	20.0±2.0	20.0±2.0	20.0±2.0	20.0±2.0	20.0±2.0	20.0±2.0
1	Length of Clipped Lead	1.0max	1.0max	1.0max	1.0max	1.0max	1.0max	1.0max
D0	Feed Hole Diameter	4.0±0.2	4.0±0.2	4.0±0.2	4.0±0.2	4.0±0.2	4.0±0.2	4.0±0.2
t	Total Tape Thickness	0.6±0.3	0.6±0.3	0.6±0.3	0.6±0.3	0.6±0.3	0.6±0.3	0.6±0.3
	Unit:mm							

Zonkas®

ELECTRICAL RATINGS

<table>
<tr><th>Item</th><th>Test Condition/Descriptio</th><th>Requirement</th></tr>
<tr><td>Varistor Voltage</td><td>The voltage between two terminals with the specified measuring current
1 mA DC applied is called Vb.
The measurement shall be made as fast as possible to avoid heat affection.</td><td></td></tr>
<tr><td>Maximum Allowable Voltage</td><td>The recommended maximum
sine wave voltage(rms) or the maximum DC
voltage that can be applied continuously.</td><td></td></tr>
<tr><td>Maximum Clamping Voltage</td><td>The maximum voltage between two terminals with the specified sta-nadard impulse current (8*20 μ sec) illustrated below applied.
</td><td>To meet the specified value.</td></tr>
<tr><td>Rated wattage</td><td>The maximum power that cam
be applied within the specified ambient temperature.</td><td></td></tr>
<tr><td>Energy</td><td>The maximum energy within the Varistor voltage change of ±10%
with the standard impulse of 2ms is applied.
The maximum energy which is figured out as follows.
E = Vm*m*T E : Energy
Im : Maximum allowable single surge current of 2ms.
Vm : Maximum clamping voltage at Im
T : Duration of surge current (2ms.)</td><td></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*20 μ sec.)
Applied one time.</td><td></td></tr>
<tr><td>Varistor Voltage Temperature Coefficient</td><td>$\frac{\text{Vb at 20℃(68°F)-Vb at 70℃(158°F)}}{\text{Vb at 20℃(68° F)}} \times \frac{1}{50} \times 100(\%/℃)$</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 is applied 10,000 time continuously with the interval of ten seconds at room temperature
<table>
<tr><td rowspan="2">5 Series</td><td>8R0M to 680K</td><td>0.5A(2ms)</td></tr>
<tr><td>820K to 471K</td><td>20A(8*20 μ sec.)</td></tr>
<tr><td rowspan="2">7 Series</td><td>8R0M to 680K</td><td>1.5A(2ms)</td></tr>
<tr><td>820K to 471K</td><td>50A(8*20 μ sec.)</td></tr>
<tr><td rowspan="2">9 Series</td><td>8R0M to 680K</td><td>50A(8*20 μ sec.)</td></tr>
<tr><td>820K to 821K</td><td>100A(8*20 μ sec.)</td></tr>
<tr><td rowspan="2">10 Series</td><td>8R0M to 680K</td><td>50A(8*20 μ sec.)</td></tr>
<tr><td>820K to 821K</td><td>100A(8*20 μ sec.)</td></tr>
<tr><td rowspan="2">14 Series</td><td>8R0M to 680K</td><td>75A(8*20 μ sec.)</td></tr>
<tr><td>820K to 821K</td><td>150A(8*20 μ sec.)</td></tr>
<tr><td>18 Series</td><td>201K to 821K</td><td>200A(8*20 μ sec.)</td></tr>
<tr><td>20 Series</td><td>201K to 821K</td><td>200A(8*20 μ sec.)</td></tr>
</table></td><td>$\frac{\triangle Vb}{Vb} \leqslant \pm 10\%$</td></tr>
</table>

ENVIRONMENTAL RATINGS

Item	Test Condition/Description	Requirement
High Temperature storage	The specimen shall be subjected to 125℃(257°F)for 1000 hours in a thermostatic bath without load and then stored at room temperature and humidity for one to two hours. Thereafter, the change of Vb shall be measured	$\frac{\triangle Vb}{Vb} \leqslant \pm 10\%$
Humidity	The specimen shall be subjected to 40℃(104°F).90 to 95% R,H,for 1000 hours without load and then stored at room temperature and humidity for one to two hours. Thereafter, the change of Vb shall be measured.	
Thermal shock	The temperature cycle shown below shall be repeated five times and then stored at room temperature and humidity for one to two hours. The change of Vb as well as mechanical damage shall be examined Step / Temperature / Period 1 / -25℃(-13°F) / 30 Minutes 2 / 85℃(-185°F) / 30 Minutes	
High Temperature Operation	After being continuously applied the maximum all owable voltage at 85℃(185°F) for 1000 hours, the specimen shall be stored at room temperature and humidity for one to two hours. Thereafter, the change of Vb shall be measured.	$\frac{\triangle Vb}{Vb} \leqslant \pm 10\%$

MECHANICAL RATINGS

Item	Test Condition/Description	Requirement
Terminal pull strength	After gradually applying the load specified below and keeping the unit fixed for ten seconds, the terminal shall be visually examined for any damage. Terminal diameter / Load 0.6mm(.024″) / 0.5kg(1.1lbs) 0.8mm(.031″) / 1.0kg(2.2lbs) 1.0mm(.039″) / 2.0kg(4.4lbs)	No outstanding damage
Terminal Bending strength	The unit shall be secured with its terminal kept vertical and the weight specified below be applied in the axial direction. The terminal shall gradually be bent by 90° in one direction, then 90° in the opposite direction, and again back to the original position. The damage of the terminal shall be visually examined. Terminal diameter / Load 0.6mm(.024″) / 0.25kg(1.1lbs) 0.8mm(.031″) / 0.5kg(2.2lbs) 1.0mm(.039″) / 1.0kg(4.4lbs)	
Solderability	After dipping the terminal to a depth of approximately 3mm(.118″)from the body in a soldering bath of 260℃ (500°F)for three seconds, the terminal shall be visually examined.	Almost all the surface should be covered with solder uniformly
Resistance to Soldering Heat	The terminal shall be dipped into a soldering bath having a temperature of 350℃(660°F)to a point 3 mm(.118″)from the body of the unit and then be held there for three seconds. The change of Vb and mechani-cal damage shall be examined.	$\triangle vb/vb \leqslant \pm 5\%$ No outstanding damage

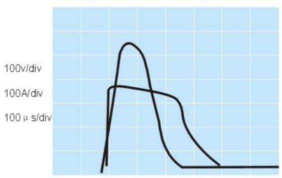
HOW TO SELECT A VARISTOR

For most applications,the selection has six processes:
1) Normal operating conditions of the Varistor.
Varistor voltage: the voltage value under 1 mA 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.

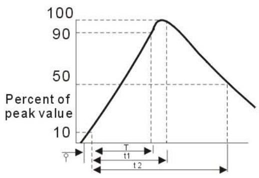
2) The transient energy absorbed by the ZnO
To determine the energy absorbed in the ZnO, the following equation can apply;

E=K*IP*Vc*T

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



8/20μs Test Wave

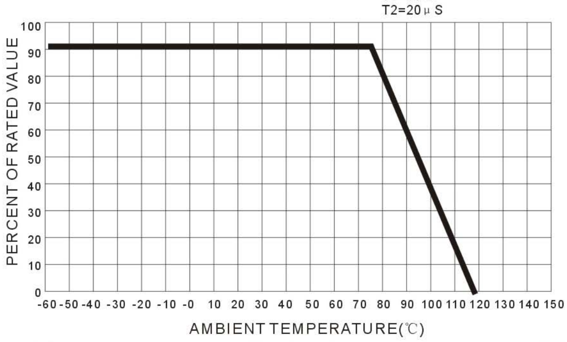


O1=virtual origin value
T =Time from 10% to 90% peak
T1=Virtual front time
T2=Virtual time to half value (impulse duration)
Example;For an 8/20μs waveform
T1=8μS
T2=20μS

It must note one thing that the rated energy and the energy absorbed on a Varistor may not be identical. It has a situation that a ZnO varistor with better clamping voltage will absorb less energy.

It is very important to emphasize that the 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 it actually provides a better over-voltage protection.

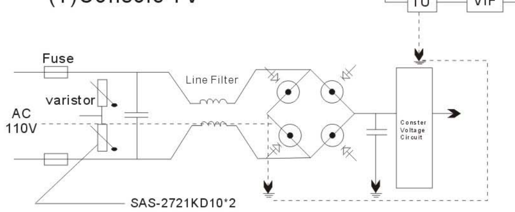
3)Max,transient voltage that the equipment to be protected can withstand.
Select lower clamping voltage than the equipment can endure,
It is easy to find ZnO Varistor clamping voltage from V-I curve when the transient current is known.
4)Max.the peak transient current that the Varistor can withstand
the peak transient current can be measured in the circuit. If the transient is generated by a 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.



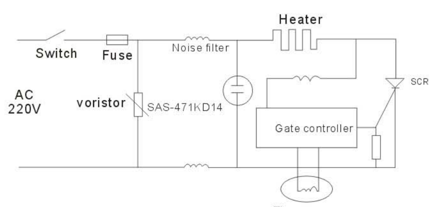
6) Determine power dissipation requirements. If the transients generate heat in a ZnO Varistor too quickly, it can not be transferred during the pulse interval and will cause the ZnO Varistor fail.
Under this condition, the power dissipation so developed must be within the specifications shown on the ratings tables.
It is to be noted that ZnO varistors can only dissipate a relatively small amount or heat (energy) and therefore are not suitable for repetitive applications that involve substantial amounts average energy dissipation.
Furthermore, the operating values will be decreased at high temperature as shown in following figure.

APPLICATION EXAMPLES

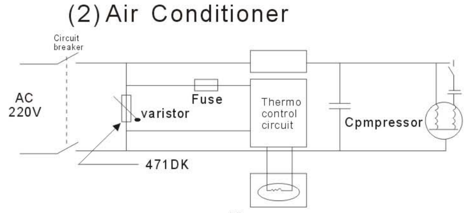
(1)Console TV



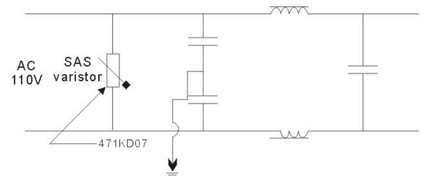
(3)Heater Controller



(2) Air Conditioner



(4)Business Phone



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