Innovative Service Around the Globe YAGEO

DATA SHEET

METAL OXIDE VARISTORS
POWER SUPPLY

10D series

RoHS compliant & Halogen free

Product specification– May 08, 2021 V.2

Metal Oxide Varistors (MOV) Data Sheet

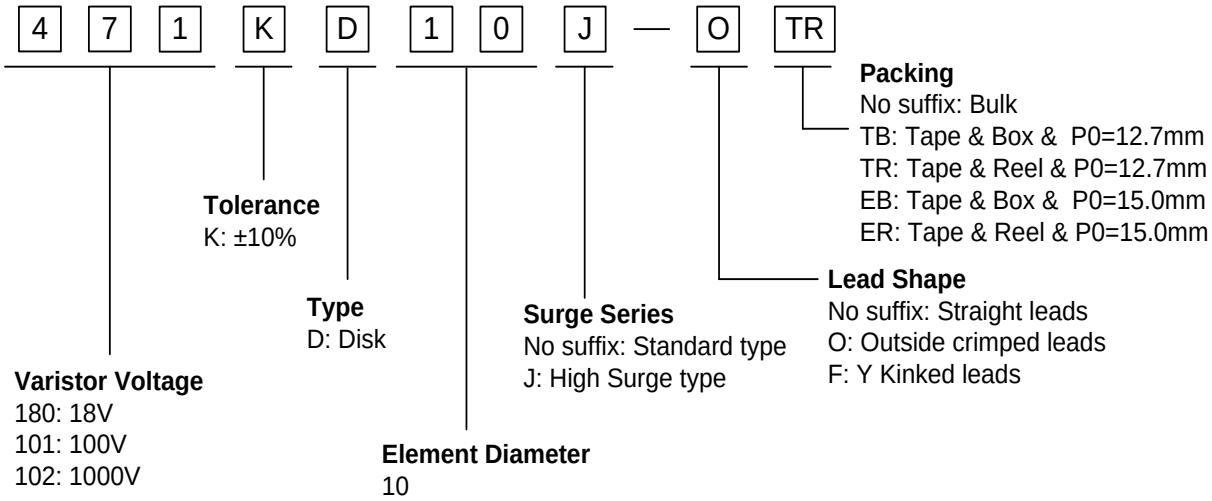
Features

- Wide operating voltage (V_{1mA}) range from 18V to 1100V
- Fast responding to transient over-voltage
- Large absorbing transient energy capability
- Low clamping ratio and no follow-on current
- Meets MSL level 1, per J-STD-020
- Operating Temperature：-40℃ ~ +105℃
- Storage Temperature：-40℃ ~ +125℃
- Safety certification：UL、CSA、VDE

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

Part Number Code



Dimensions

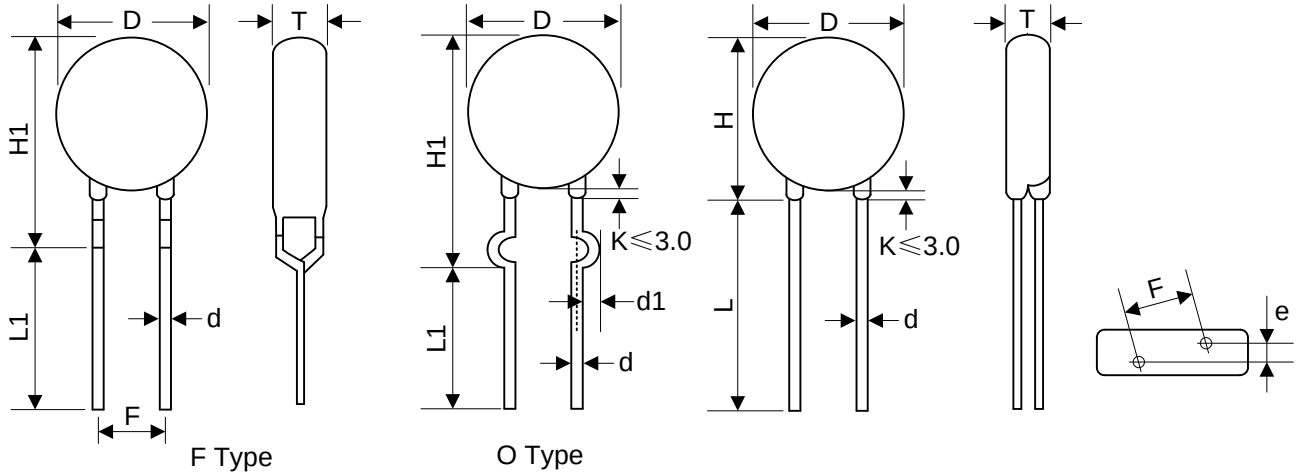


Table 1

Unit: mm

Symbol	Dimension
H	10.5~16.0
H1	13.0~17.5
L(min.)	20.0
L1(min.)	15.0
D	10.0~12.5
F(±0.8)	7.5
T	Table 2
e(±0.8)	Table 2
d(±0.05)	0.8
d1(±0.4)	1.4

Table 2

Unit: mm

Model	T	e	Model	T	e
180K	2.0~4.6	1.5	301K	2.7~5.5	2.5
220K	2.1~4.7	1.6	331K	2.7~5.8	2.5
270K	2.1~4.8	1.8	361K	2.9~6.0	2.7
330K	2.2~5.0	1.7	391K	3.0~6.2	2.8
390K	2.1~5.3	1.8	431K	3.2~6.5	3.0
470K	2.2~5.4	1.9	471K	3.3~6.7	3.2
560K	2.3~5.5	2.1	511K	3.4~6.8	3.4
680K	2.4~5.6	2.4	561K	3.6~7.0	3.6
820K	2.1~4.7	1.8	621K	3.8~7.3	3.9
101K	2.4~4.9	2.0	681K	4.0~7.6	4.2
121K	2.4~5.1	2.2	751K	4.3~8.0	4.3
151K	2.2~5.4	1.8	781K	4.4~8.1	4.4
181K	2.3~4.8	1.9	821K	4.6~8.3	4.6
201K	2.4~5.0	2.0	911K	4.8~8.8	5.0
221K	2.5~5.1	2.1	102K	5.4~9.3	5.0
241K	2.6~5.2	2.2	112K	5.8~9.9	5.4
271K	2.6~5.4	2.4			

Electrical Characteristics

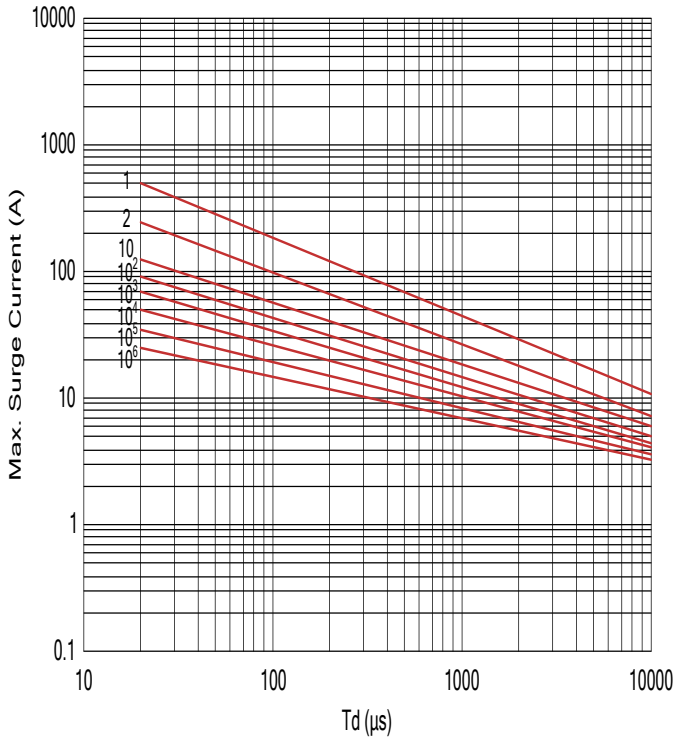
Part Number		Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Withstanding Surge Current		Maximum Energy (10/1000μs)		Rated Power	Typical Capacitance (Reference)
Standard	High Surge	V_{AC}(V)	V_{DC}(V)	V_{1mA}(V)	I_P(A)	V_C(V)	I (A) Standard	I (A) High Surge	(J) Standard	(J) High Surge	(W)	@1KHz (pf)
180KD10	180KD10J	11	14	18(15~21.6)	5	36	500	1000	2.1	3.0	0.05	5600
220KD10	220KD10J	14	18	22(19.5~26)	5	43	500	1000	2.5	5.0	0.05	4500
270KD10	270KD10J	17	22	27(25~31)	5	53	500	1000	3.0	6.0	0.05	3700
330KD10	330KD10J	20	26	33(29.5~36.5)	5	65	500	1000	4.0	7.0	0.05	3000
390KD10	390KD10J	25	31	39(35~43)	5	77	500	1000	4.6	9.0	0.05	2400
470KD10	470KD10J	30	38	47(42~52)	5	93	500	1000	5.5	11.0	0.05	2100
560KD10	560KD10J	35	45	56(50~62)	5	110	500	1000	7.0	13.0	0.05	1800
680KD10	680KD10J	40	56	68(61~75)	5	135	500	1000	8.2	15.0	0.05	1500
820KD10	820KD10J	50	65	82(74~90)	25	135	2500	3500	12.0	17.0	0.4	1200
101KD10	101KD10J	60	85	100(90~110)	25	165	2500	3500	15.0	18.0	0.4	1000
121KD10	121KD10J	75	100	120(108~132)	25	200	2500	3500	18.0	21.0	0.4	830
151KD10	151KD10J	95	125	150(135~165)	25	250	2500	3500	22.0	25.0	0.4	670
181KD10	181KD10J	115	150	180(162~198)	25	300	2500	3500	27.0	30.0	0.4	560
201KD10	201KD10J	130	170	200(180~220)	25	340	2500	3500	30.0	35.0	0.4	500
221KD10	221KD10J	140	180	220(198~242)	25	360	2500	3500	32.0	39.0	0.4	450
241KD10	241KD10J	150	200	240(216~264)	25	395	2500	3500	35.0	42.0	0.4	420
271KD10	271KD10J	175	225	270(243~297)	25	455	2500	3500	37.0	49.0	0.4	370
301KD10	301KD10J	190	250	300(270~330)	25	500	2500	3500	40.0	54.0	0.4	330
331KD10	331KD10J	210	275	330(297~363)	25	550	2500	3500	43.0	58.0	0.4	300
361KD10	361KD10J	230	300	360(324~396)	25	595	2500	3500	47.0	65.0	0.4	280
391KD10	391KD10J	250	320	390(351~429)	25	650	2500	3500	60.0	70.0	0.4	260
431KD10	431KD10J	275	350	430(387~473)	25	710	2500	3500	65.0	80.0	0.4	230
471KD10	471KD10J	300	385	470(423~517)	25	775	2500	3500	67.0	85.0	0.4	210
511KD10	511KD10J	320	415	510(459~561)	25	845	2500	3500	69.0	90.0	0.4	200
561KD10	561KD10J	350	460	560(504~616)	25	925	2500	3500	70.0	92.0	0.4	180
621KD10	621KD10J	385	505	620(558~682)	25	1025	2500	3500	72.0	95.0	0.4	160
681KD10	681KD10J	420	560	680(612~748)	25	1120	2500	3500	75.0	98.0	0.4	150
751KD10	751KD10J	460	615	750(675~825)	25	1240	2500	3500	77.0	100.0	0.4	130
781KD10	781KD10J	485	640	780(702~858)	25	1290	2500	3500	80.0	105.0	0.4	125
821KD10	821KD10J	510	670	820(738~902)	25	1355	2500	3500	85.0	110.0	0.4	120
911KD10	911KD10J	550	745	910(819~1001)	25	1500	2500	3500	93.0	130.0	0.4	110
102KD10	102KD10J	625	825	1000(900~1100)	25	1650	2500	3500	102.0	140.0	0.4	100
112KD10	112KD10J	680	895	1100(990~1210)	25	1815	2500	3500	115.0	155.0	0.4	90

Notes: 1. The tolerance of varistor voltage between 18V and 27V is more than 10%.

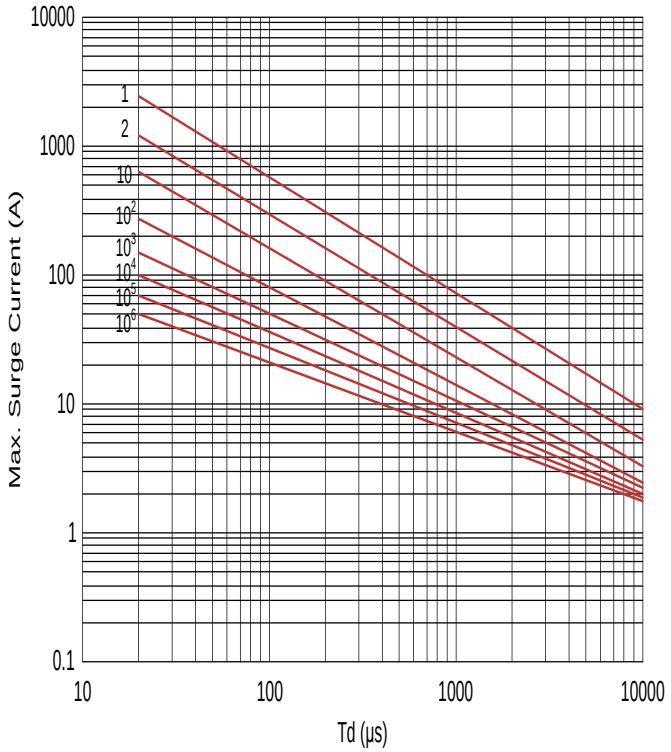
2. Leakage Current (@83% of V_{1mA})：IR≤50μA (180K~680K)　IR≤25μA (820K~112K)

Maximum Surge Current Derating Curve

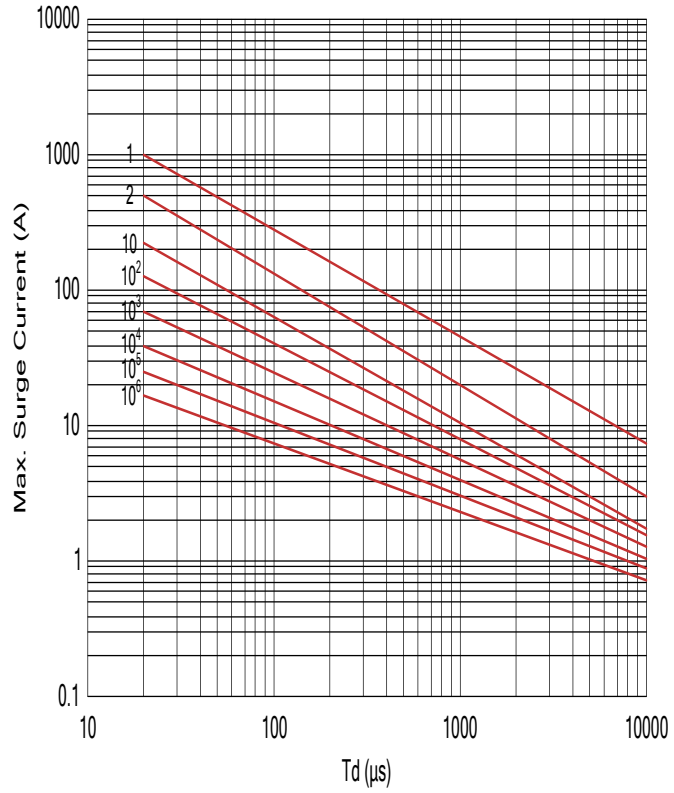
180KD10 to 680KD10



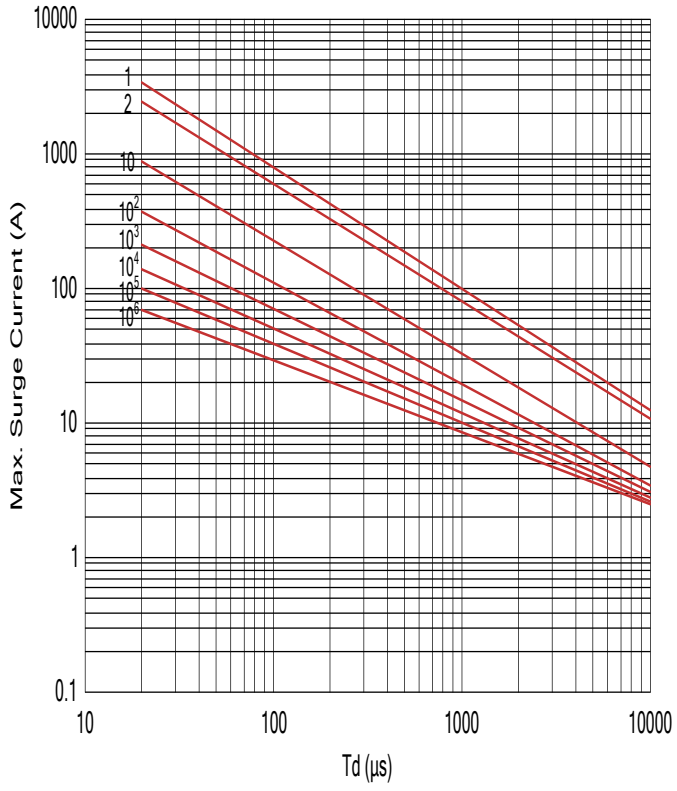
820KD10 to 112KD10



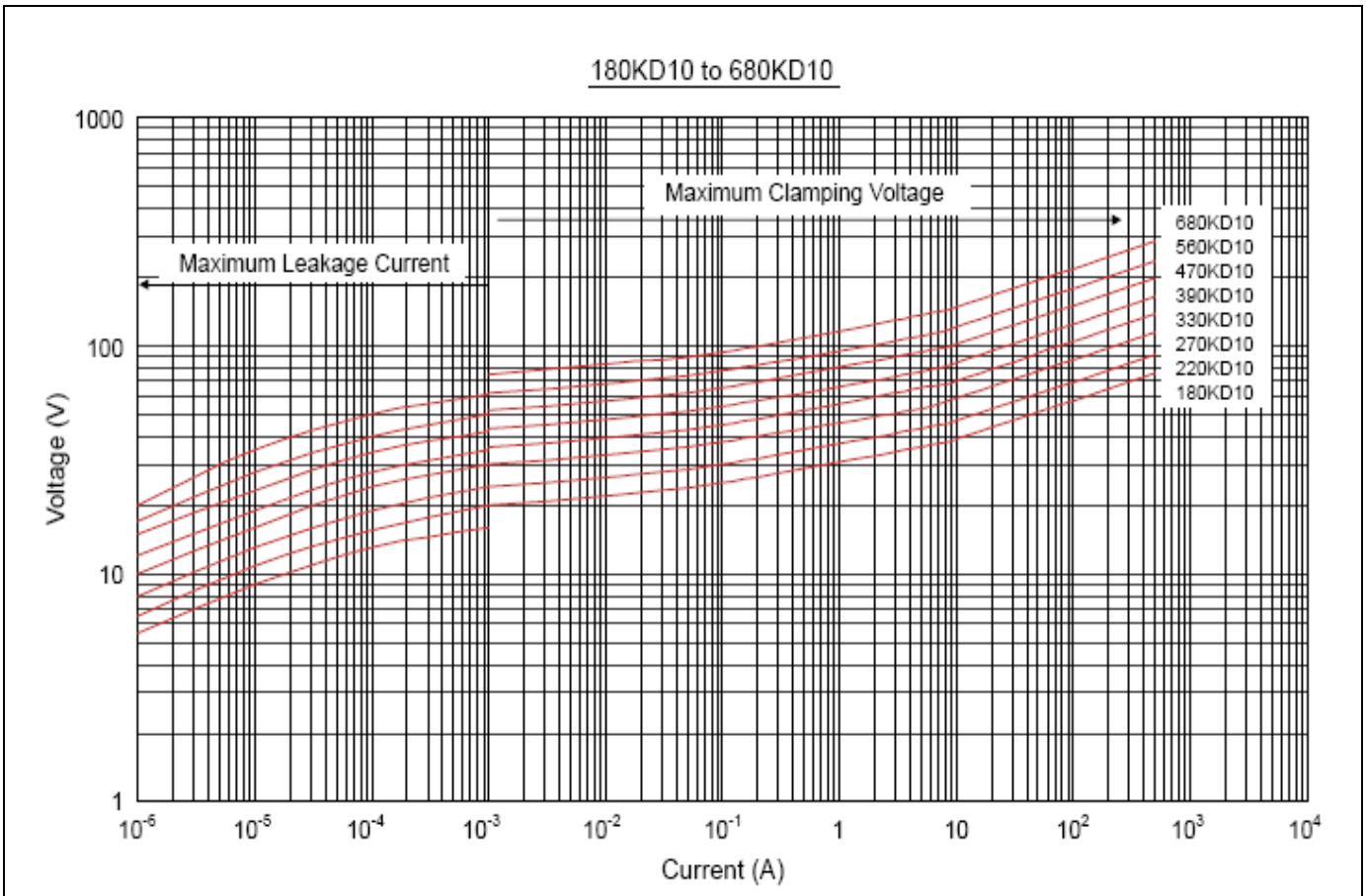
180KD10J to 680KD10J

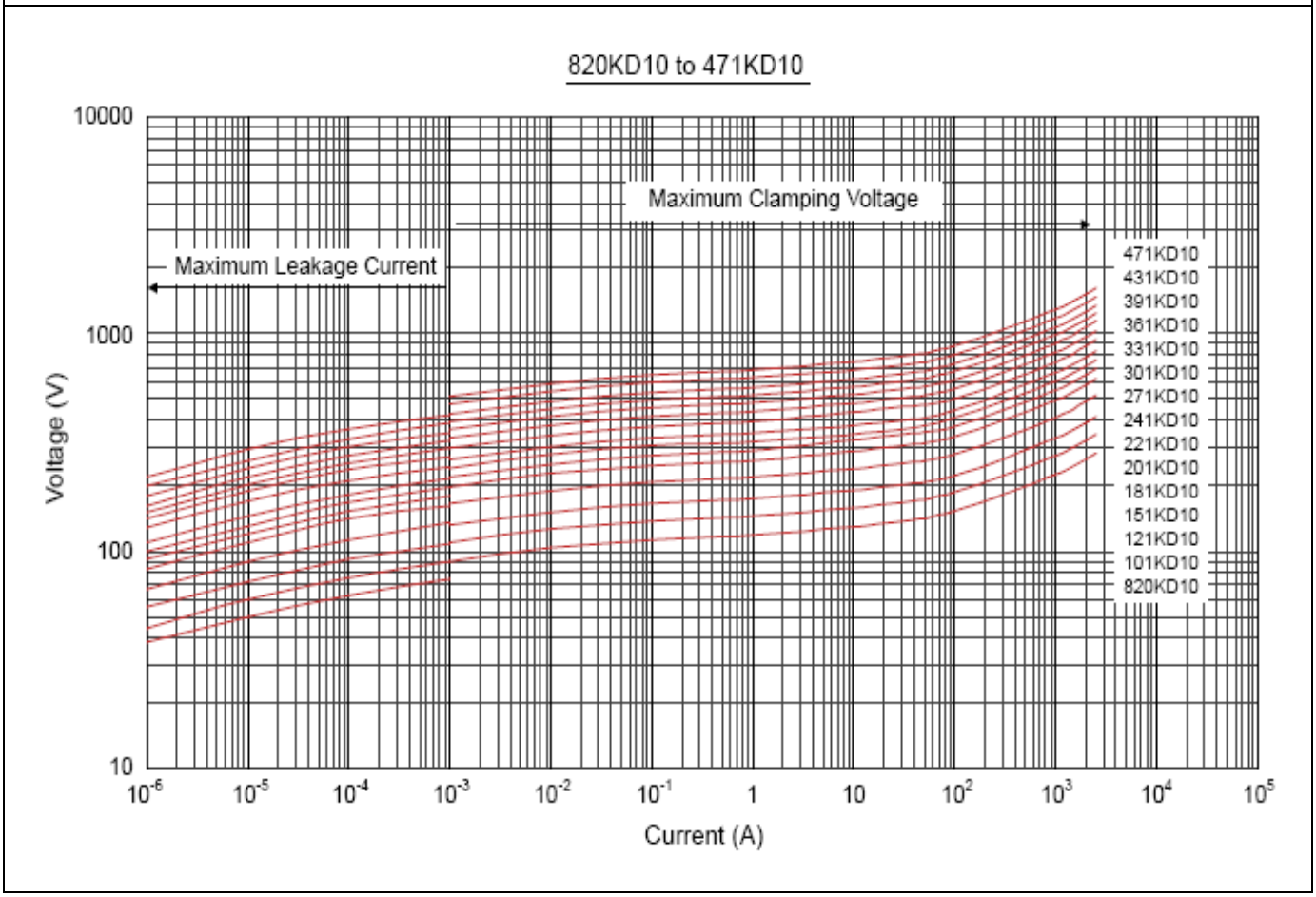


820KD10J to 112KD10J



Maximum Leakage Current and Maximum Clamping Voltage Curve





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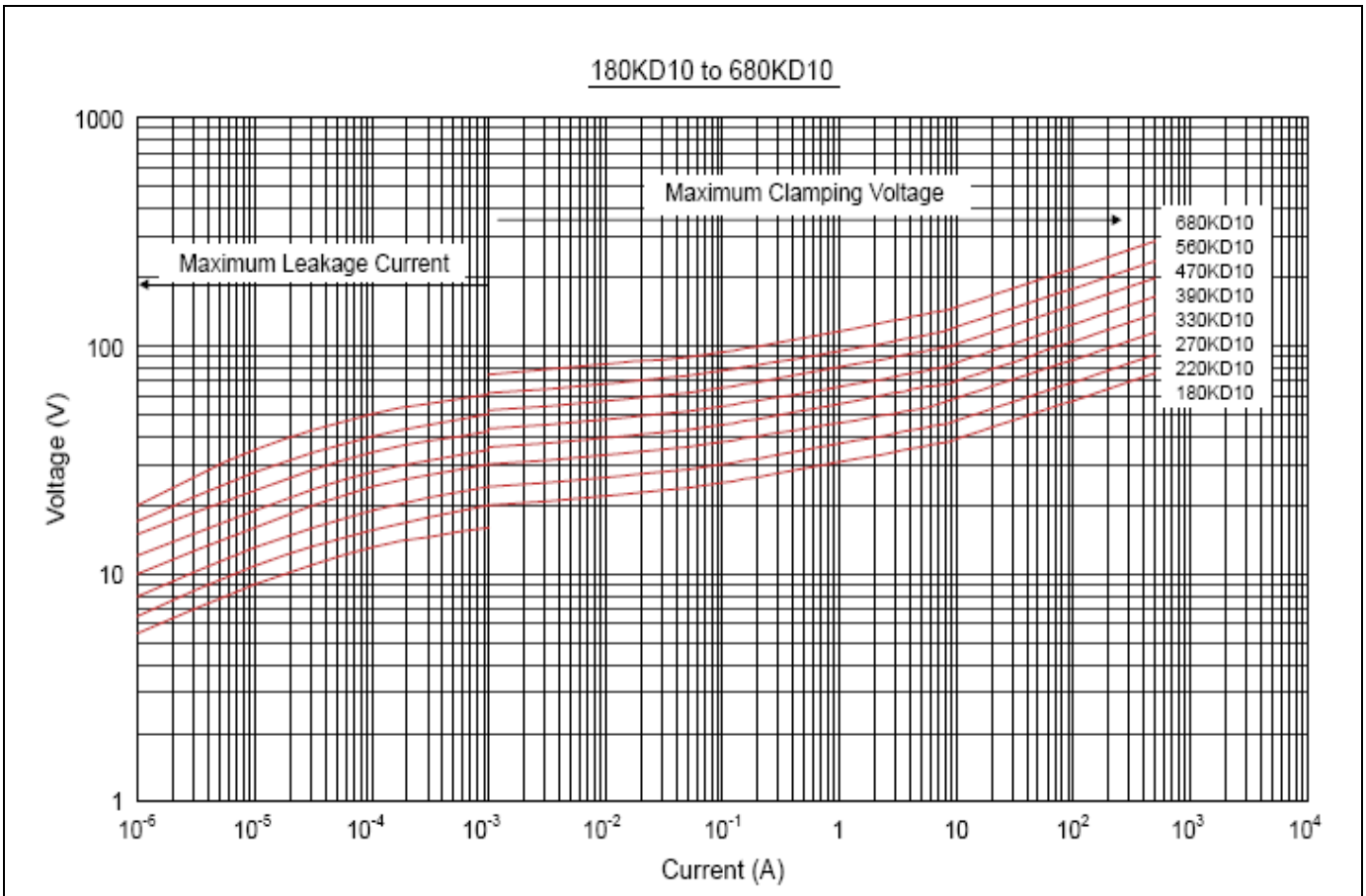
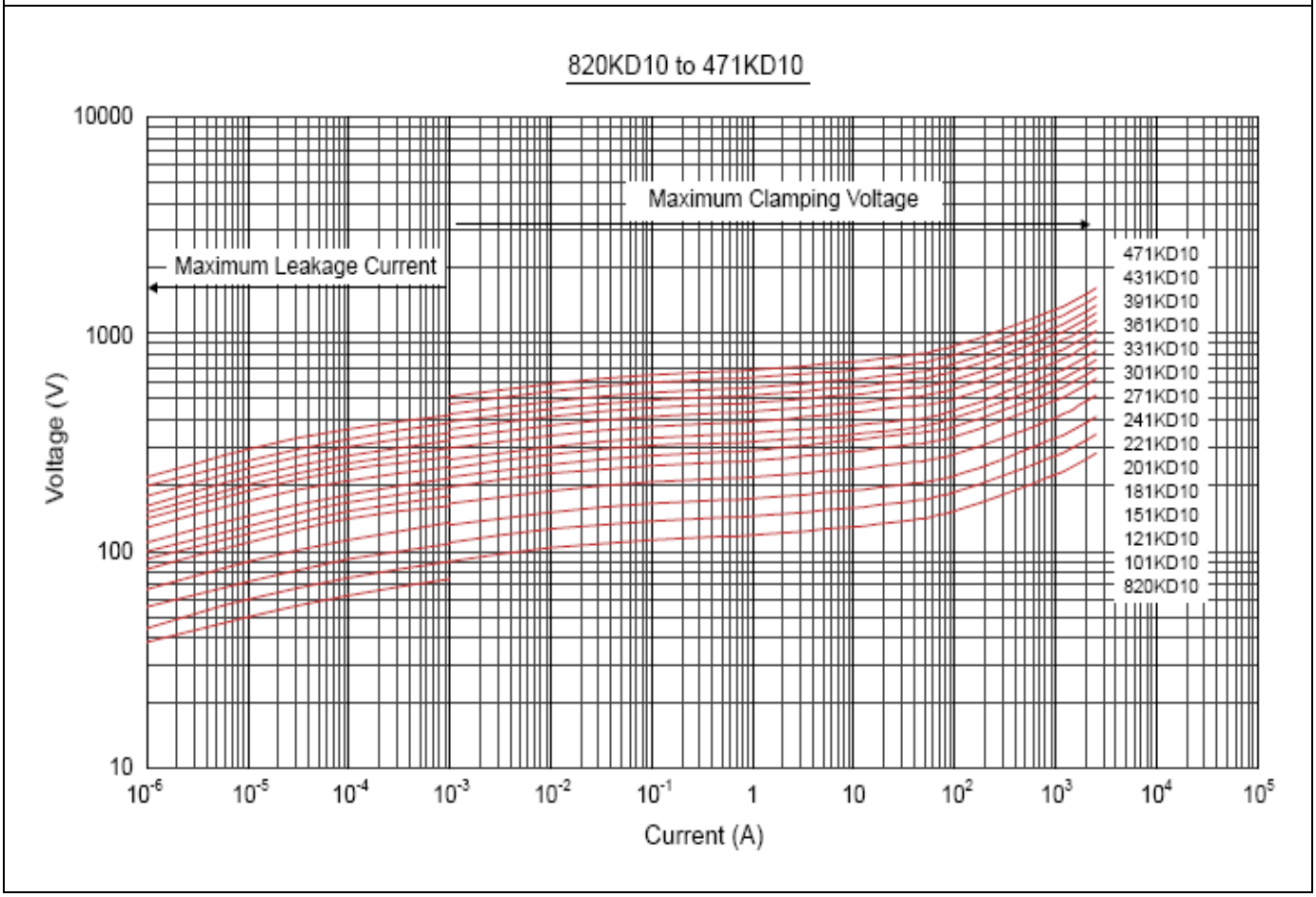
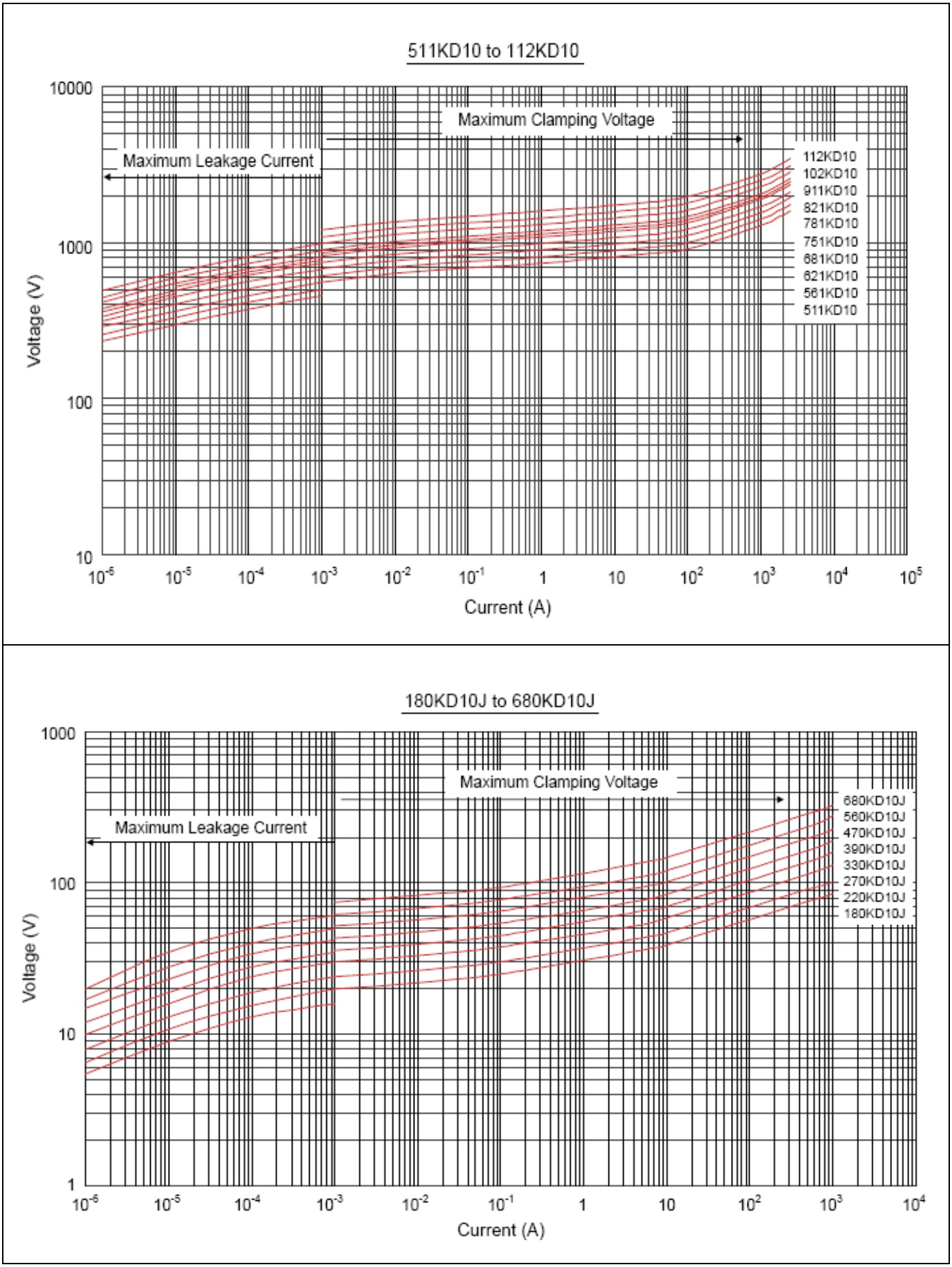
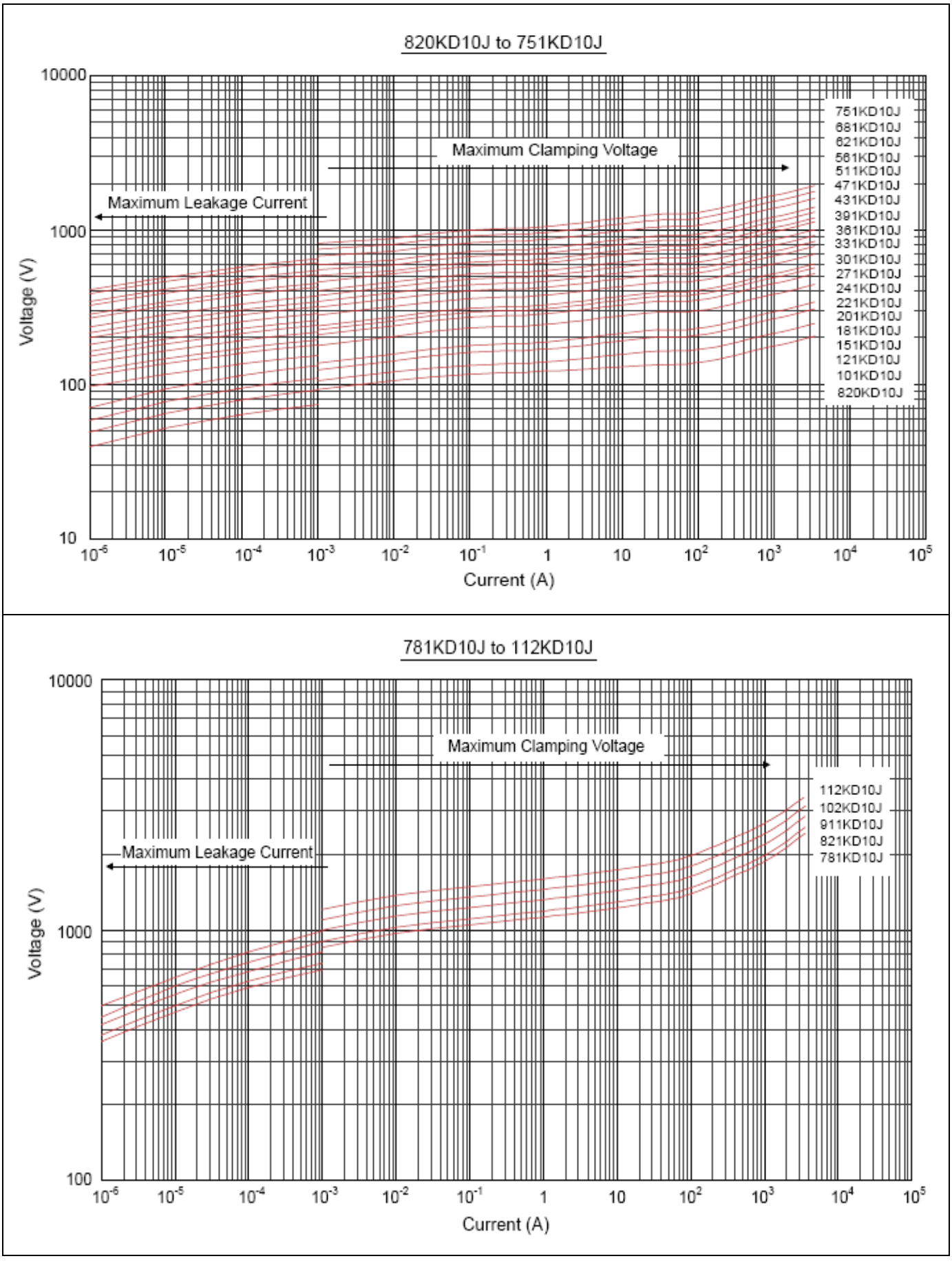




Maximum Leakage Current and Maximum Clamping Voltage Curve



Maximum Leakage Current and Maximum Clamping Voltage Curve

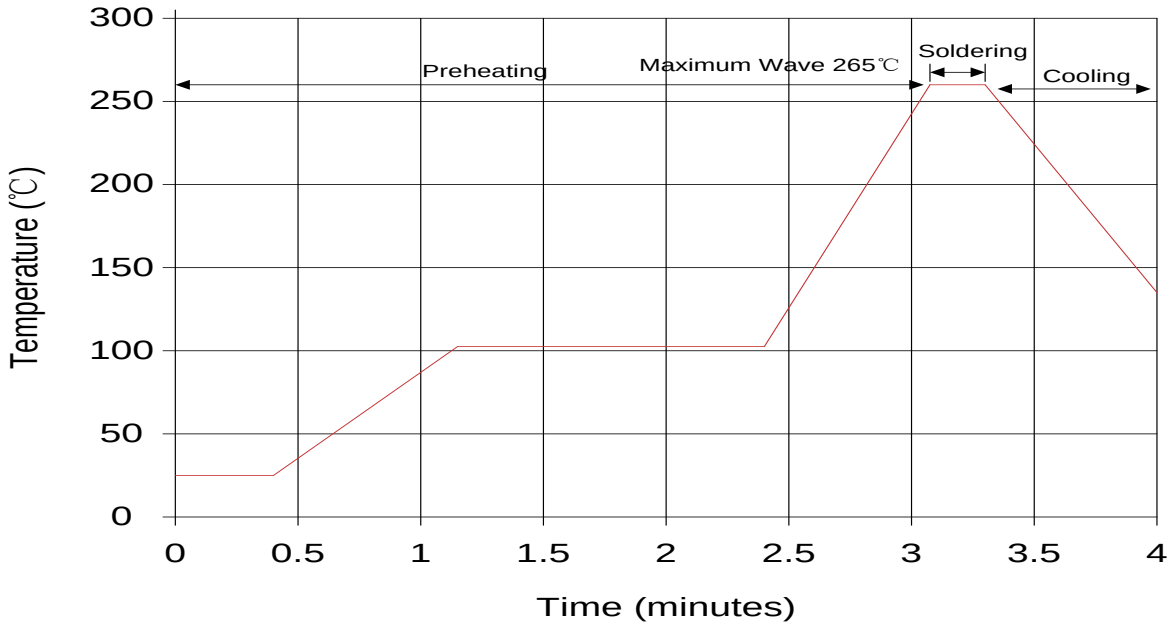


Reliability

Items	Standard	Test conditions / Methods	Specifications
Tensile Strength of Terminals	IEC60068-2-21	Gradually applying the force specified and keeping the unit fixed for 10±1 sec. Terminal diameter (mm) / Force (kg) 0.5＜d≤0.8 / 1.0 0.8＜d≤1.25 / 2.0 1.25＜d / 4.0	No visible damage $\|\Delta V_{1mA}/V_{1mA}\| \leq 5\%$
Bending Strength of Terminals	IEC60068-2-21	Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, then return to the original position. Repeat the procedure in the opposite direction. Terminal diameter (mm) / Force (kg) 0.5＜d≤0.8 / 0.5 0.8＜d≤1.25 / 1.0 1.25＜d / 2.0	No visible damage $\|\Delta V_{1mA}/V_{1mA}\| \leq 5\%$
Vibration	IEC60068-2-6	Frequency range: 10~55 Hz Amplitude: 0.75mm or 98m/s^2 Direction: 3 mutually perpendicular directions, 2hrs each.	No visible damage $\|\Delta V_{1mA}/V_{1mA}\| \leq 5\%$
Solderability	IEC60068-2-20	Solder Temp: 245±5℃ Dipping Time: 2±0.5 sec	At least 95% of terminal electrode is covered by new solder
Resistance to Soldering Heat	IEC60068-2-20	Solder Temp: 260±5℃ Dipping Time: 10±1 sec	No visible damage $\|\Delta V_{1mA}/V_{1mA}\| \leq 5\%$
High Temperature Storage	IEC60068-2-2	Ambient Temp: 125±2℃ Duration: 1000±24hrs	No visible damage $\|\Delta V_{1mA}/V_{1mA}\| \leq 5\%$
Low Temperature Storage	IEC60068-2-1	Ambient Temp: -40±2℃ Duration: 1000±24hrs	No visible damage $\|\Delta V_{1mA}/V_{1mA}\| \leq 5\%$
Damp Heat, Steady State	IEC60068-2-78	The test is divided into two groups . a. 40±2℃ , 90~95% RH for 1344±24hrs b. 40±2℃ , 90~95% RH,at 10%VDC ,1344±24 hrs	No visible damage $\|\Delta V_{1mA}/V_{1mA}\| \leq 10\%$ Insulation Resistance≧100MΩ
High Temperature Load	MIL-STD-202 Method 108	Ambient Temp: 105±2℃ Duration: 1000±24hrs Load: Max. Allowable Voltage In AC.	$\|\Delta V_{1mA}/V_{1mA}\| \leq 10\%$
Temperature Cycle	IEC60068-2-14	The conditions shown below shall be repeated 5 cycles Step / Temperature (℃) / Period (minutes) 1 / -40±3 / 30±3 2 / Room temperature / 5±3 3 / 125±3 / 30±3 4 / Room temperature / 5±3	No visible damage $\|\Delta V_{1mA}/V_{1mA}\| \leq 5\%$
8/20uS Surge Life	IEC61051-1	8/20μS waveform,10 surge currents, unipolar, interval 30secs,amplitude corresponding to max. surge current derating curves for 20μS.	No visible damage △Vb(1mA)≦±10%
10/1000μS Surge Life	IEC61051-1	10/1000μS waveform,10 surge currents, unipolar, interval 2mins,amplitude corresponding to max. surge current derating curves for 1000μS.	No visible damage $\|\Delta V_{1mA}/V_{1mA}\| \leq 10\%$
Voltage Proof	IEC61051-1	Metal balls method, 2500Vac 1 min.	No visible damage

Soldering Recommendation

Lead-free Wave Soldering Recommendation

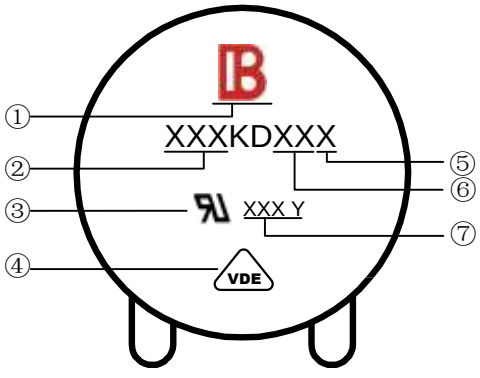


Item	Conditions
Peak Temperature	265℃
Dipping Time	10 seconds (max.)
Soldering	1 time

Recommendation Reworking Conditions with Soldering Iron

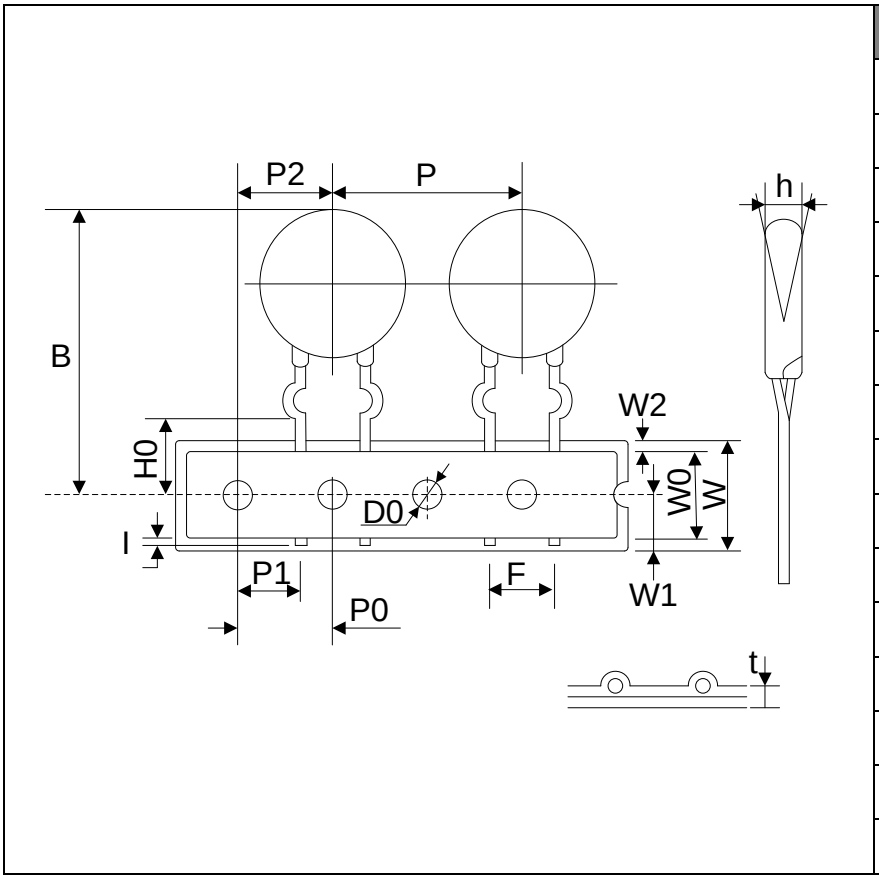
Item	Conditions
Temperature of Soldering Iron-tip	360℃ (max.)
Soldering Time	3 seconds (max.)
Distance from Varistor	2mm (min.)

Marking Code

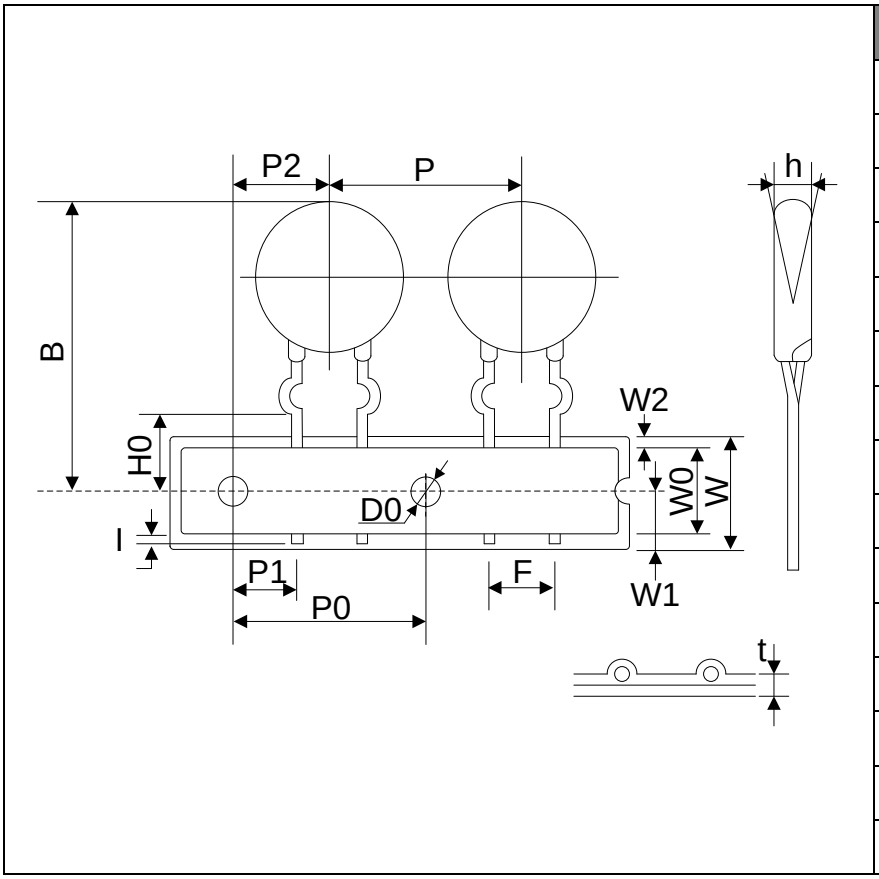


① Brightking Logo
② Varistor Voltage
③ UL Accreditation Logo
④ VDE Accreditation Logo
⑤ "J" is High Surge Code, no "J" is Standard Surge
⑥ Disk Size
⑦ Internal control code

Taping Dimensions



Symbol	Dimension (mm)
P	25.4±1.0
P0	12.7±1.0
P1	8.95±0.7
P2	12.7±1.3
F	7.5±0.8
h	0±2
W	18.0±1.0
W0	12.0±1.0
W1	9.0±0.5
W2	3.0max
H0	16.0±1.0
I	2.0max
D0	4.0±0.2
t	0.6±0.3
B	36max



Symbol	Dimension (mm)
P	15.0±1.0
P0	15.0±1.0
P1	3.85±0.7
P2	7.5±1.3
F	7.5±0.8
h	0±2
W	18.0±1.0
W0	12.0±1.0
W1	9.0±0.5
W2	3.0max
H0	16.0±1.0
I	2.0max
D0	4.0±0.2
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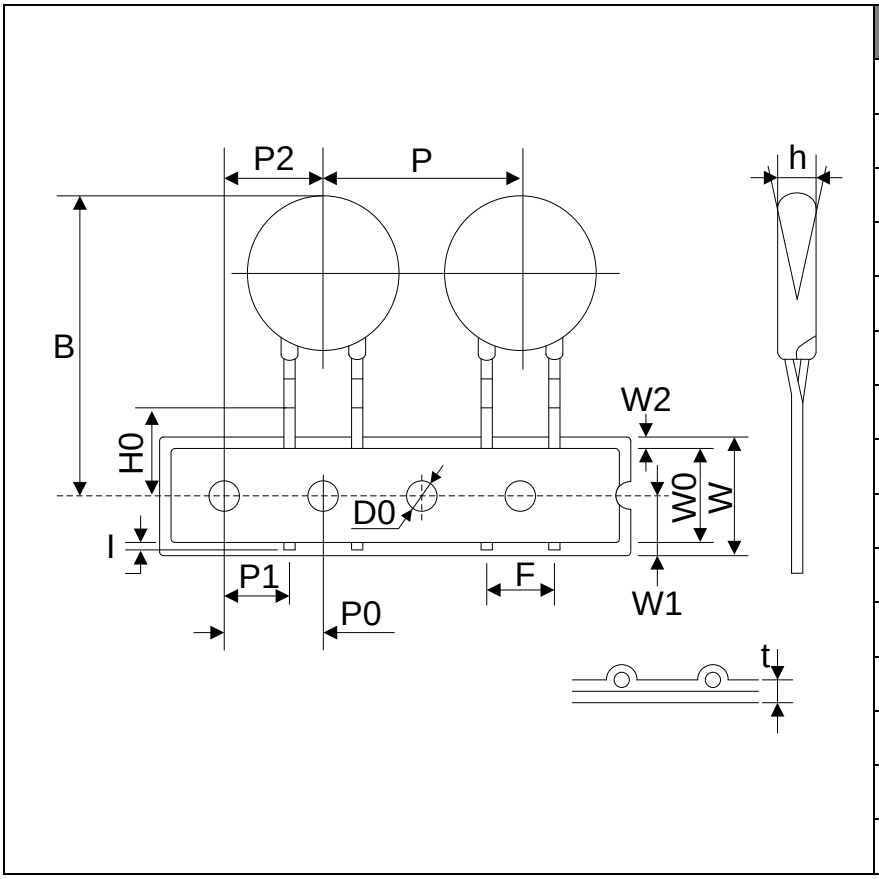
Taping Dimensions



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W2	3.0max
H0	16.0±1.0
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D0	4.0±0.2
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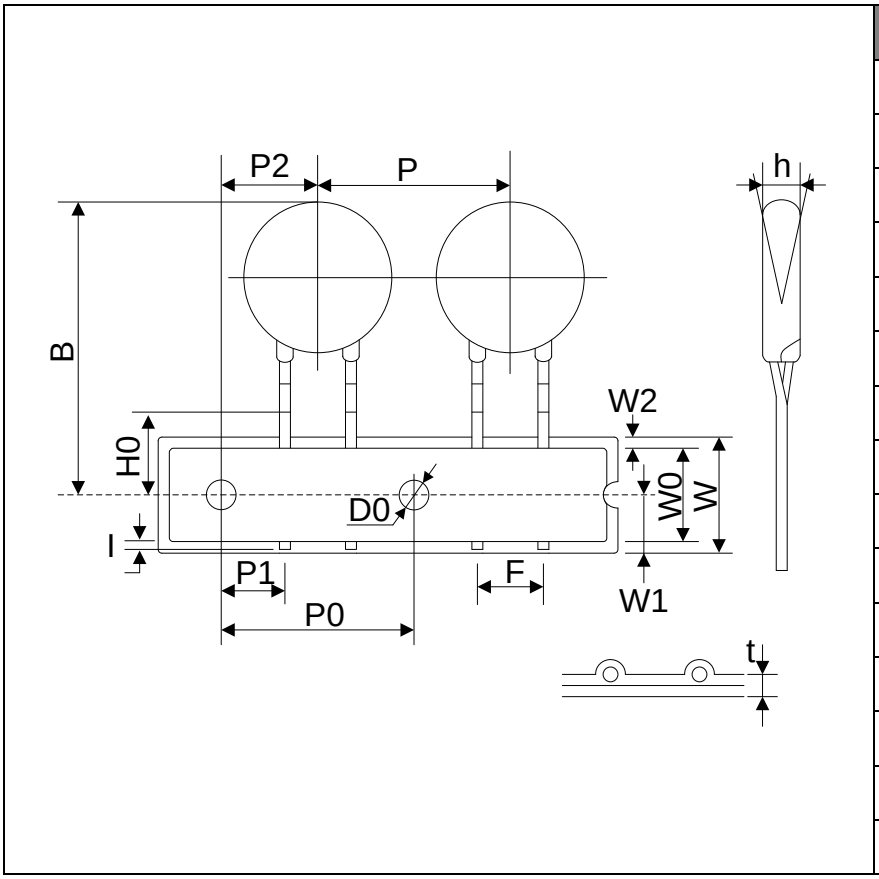

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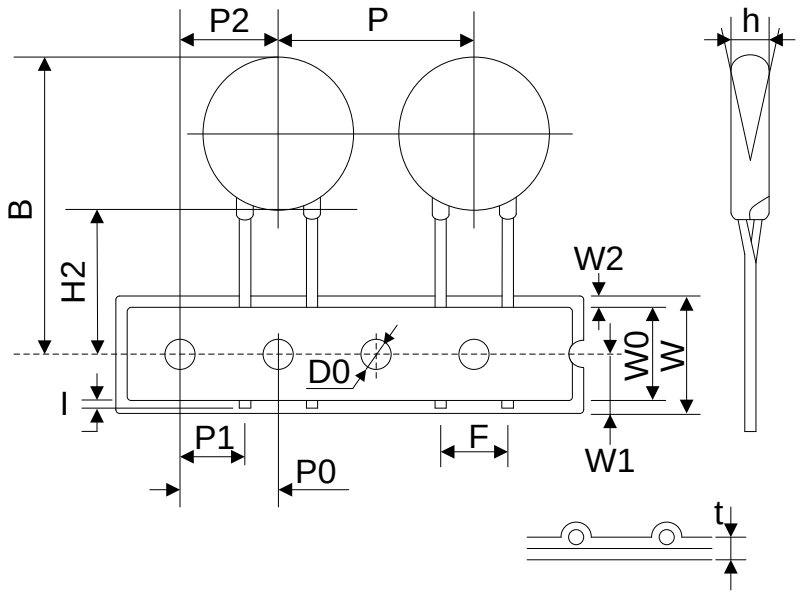

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F	7.5±0.8
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W0	12.0±1.0
W1	9.0±0.5
W2	3.0max
H2	20.0±2.0
I	2.0max
D0	4.0±0.2
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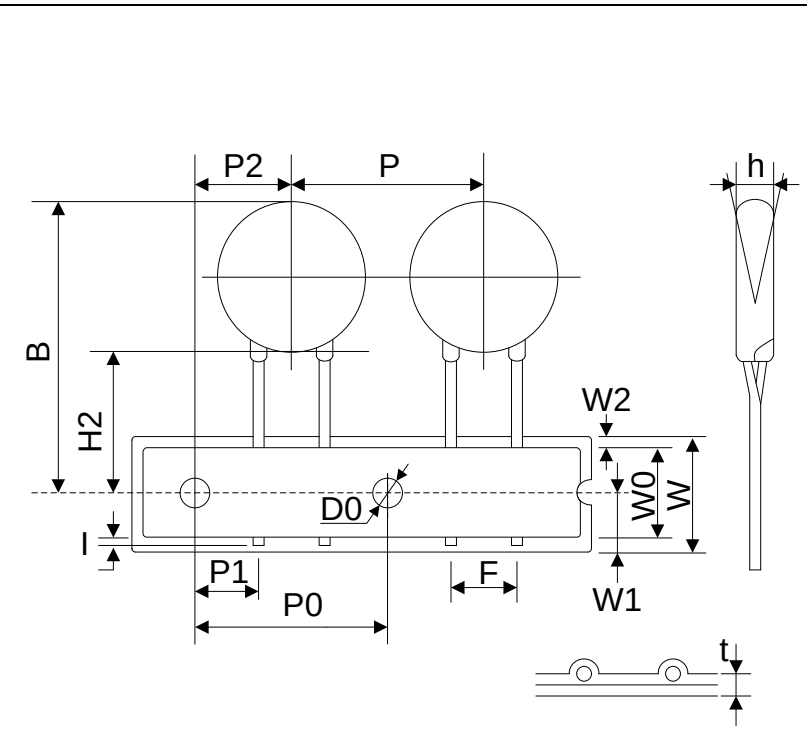

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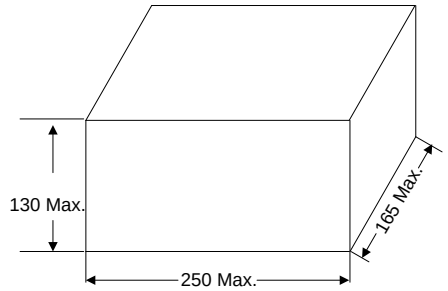
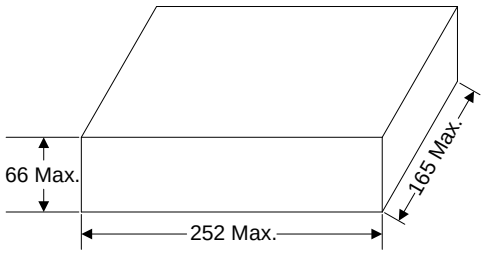
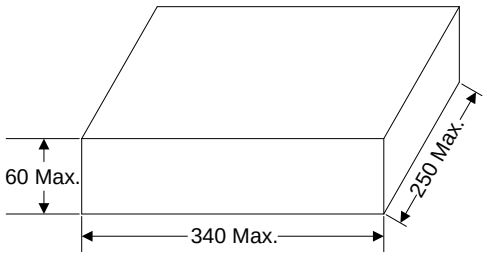
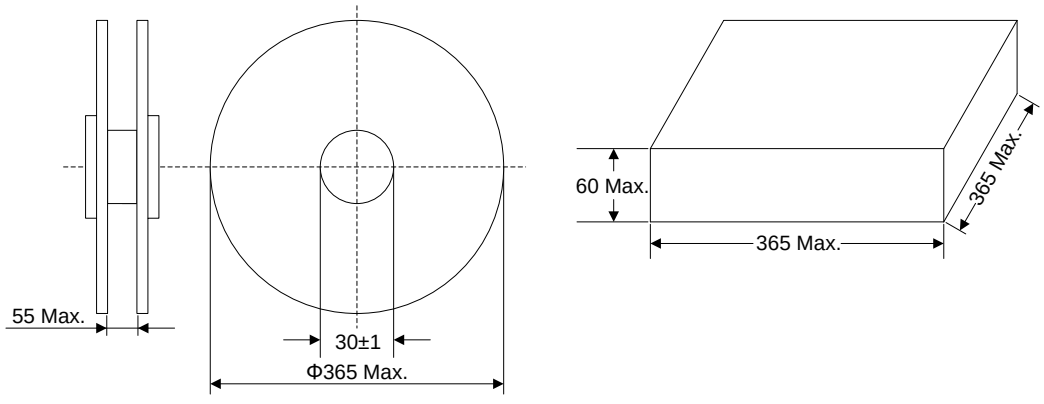
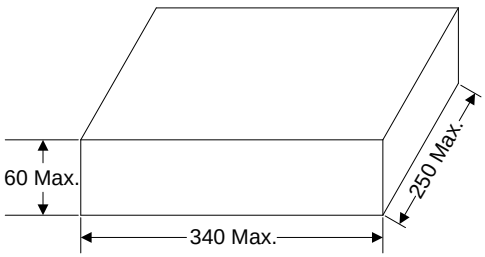
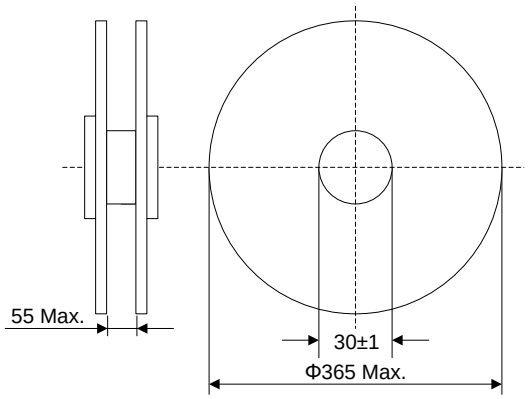
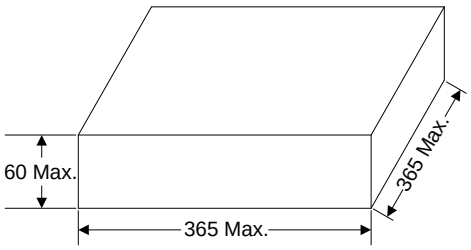
W2	3.0max
H2	20.0±2.0
I	2.0max
D0	4.0±0.2
t	0.6±0.3
B	36max

Quantity

Packaging Dimensions (Unit: mm)	Quantity
In bulk for Terminals Untrimmed Products 	500pcs/bag 4bags/box (180K~621K)
	400pcs/bag 4bags/box (681K~112K)
	300pcs/bag 4bags/box (122K~182K)
In bulk for Terminals Trimmed Products 	500pcs/bag 4bags/box (180K~621K)
	400pcs/bag 4bags/box (681K~112K)
	300pcs/bag 4bags/box (122K~182K)
Packaging Dimensions (Unit: mm)	**Quantity**
Tape & Box & P0=12.7mm 	750pcs/box (180K~241K)
	600pcs/box (271K~391K)
	500pcs/box (431K~621K)
	300pcs/box (681K~112K)
Tape & Reel & P0=12.7mm 	1000pcs/reel (180K~391K)
	750pcs/reel (431K~621K)
	500pcs/reel (681K~112K)

Quantity

Packaging Dimensions (Unit: mm)	Quantity
Tape & Box & P0=15.0mm  	1000pcs/box (180K~391K)
	750pcs/box (431K~621K)
	600pcs/box (681K~751K)
	500pcs/box (781K~112K)
Tape & Reel & P0=15.0mm   	1000pcs/reel (180K~391K)
	750pcs/reel (431K~751K)
	500pcs/reel (781K~112K)

Storage Condition of Products

(I) Storage Conditions :

1.Storage Temperature : -10℃ ~ +40℃

2.Relative Humidity : ≦80%RH

3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year

Mouser Electronics

Authorized Distributor

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