



### 10D Disc Varistor

#### FEATURES

- \* Wide operating voltages ranging from 5Vrms to 1000Vrms (6Vdc to 1465Vdc).
- \* Fast response time of less than 25nS, instantly clamping the transient over voltage.
- \* High surge current handling capability.
- \* High energy absorption capability.
- \* Low clamping voltages, providing better surge protection
- \* Low capacitance values, providing digital switching circuitry protection.
- \* High insulation resistance, preventing electric arching to the adjacent devices or circuits.



#### 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.

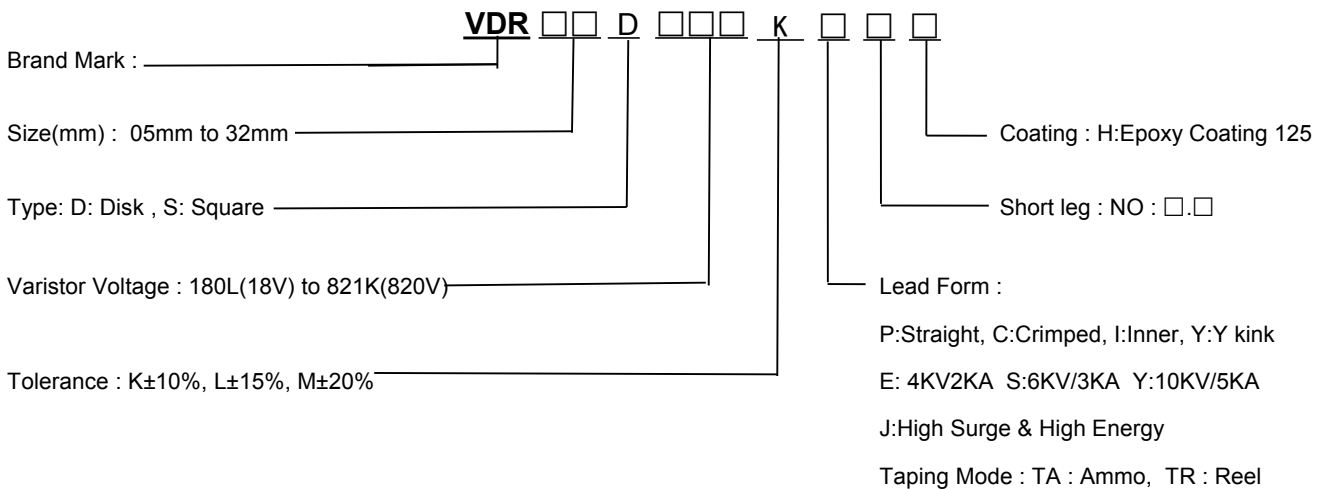
#### General Characteristics Definition

- \*Operating Temperature: -40 °C ~ +85 °C
- \*Storage Temperature: -40 °C ~ +125 °C
- \*Working Surface Temperature: +115 °C
- \*Insulation Resistance: > 100M Ω
- \*Coating (Epoxy Resin): Flame-Retardant to UL 94 V-0

#### Material

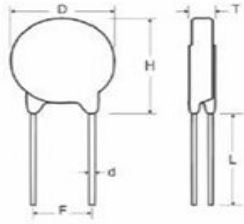
- \*Coating: Epoxy Resin
- \*Lead Wire: The Copper Wire
- \*Electrode: Silver Solder
- \*Disk: Zinc Oxide

#### Ordering Information

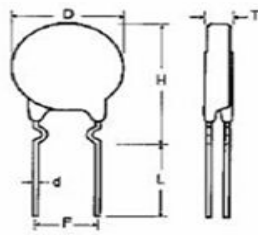


■ Dimensions

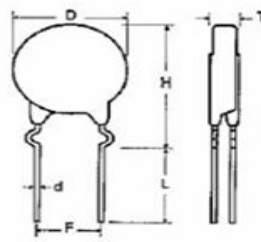
S Type(Straight Lead)



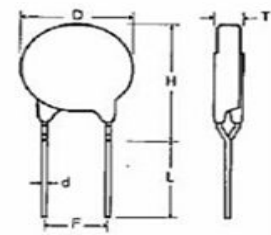
I Type(Inner Crimped Lead)



C Type(Out Crimped Lead)



Y Lead Type(Y Kink Lead)






Unit: mm

Part No.	T Max.	D Max.	H Max.		L min.	F ±0.8	d ± 0.05
			SB	CB / IB / YB			
10D112K	7.8	12.5 6KV/3KA 14.5	14.0	17.0	20.0	7.5	0.8
10D102K	7.6						
10D911K	7.2						
10D821K	6.8						
10D751K	6.5						
10D681K	6.4						
10D621K	6.4						
10D561K	6.2						
10D511K	5.8						
10D471K	5.6						
10D431K	5.3						
10D391K	5.1						
10D361K	5.0						
10D331K	4.8						
10D301K	4.7						
10D271K	4.5						
10D241K	4.3						
10D221K	4.2						
10D201K	4.1						
10D181K	4.1						
10D151K	4.8						
10D121K	4.5						
10D101K	4.3						
10D820K	4.1						
10D680K	4.5						
10D560K	4.5						
10D470K	4.5						
10D390K	4.5						
10D330K	4.5						
10D270K	4.5						
10D220K	4.5						
10D180L	4.5						

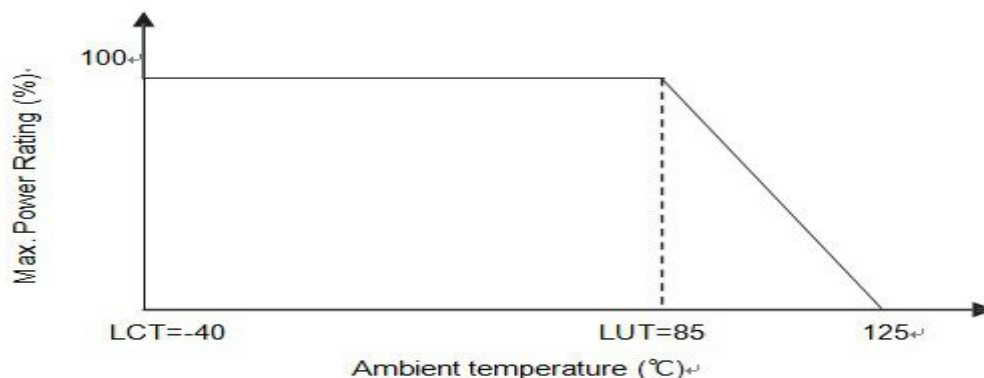
10D Standard & High Surge

Part No.	Maximum Allowable Voltage		Energy 10/1000 μS		Withstanding Surge Current 8/20 μS				Rated POWER (W)	Varistor Voltage	Max Clamping Voltage	Capacitance
	ACrms	DC	Standard	High Surge	Standard (A)		High Surge(A)					
	(V)	(V)	(J)	(J)	1 TIME	2 TIME	1 TIME	2 TIME				
10D180L	10	14	2.8	3.0	500	250	1000	500	0.05	18(15-21)	38	5600
10D220K	14	18	4.5	5.0	500	250	1000	500	0.05	22(20-24)	43	4500
10D270K	17	22	6.0	6.5	500	250	1000	500	0.05	27(24-30)	53	3700
10D330K	20	26	7.4	8.0	500	250	1000	500	0.05	33(30-36)	65	3000
10D390K	25	31	9.1	9.5	500	250	1000	500	0.05	39(35-43)	77	2600
10D470K	30	38	10.8	11	500	250	1000	500	0.05	47(42-52)	93	2100
10D560K	35	45	12.9	13	500	250	1000	500	0.05	56(50-62)	110	1800
10D680K	40	56	15.4	16	500	250	1000	500	0.05	68(61-75)	135	1500
Part No.	Maximum Allowable Voltage		Energy 10/1000 μS		Withstanding Surge Current 8/20 μS				Rated POWER (W)	Varistor Voltage	Max Clamping Voltage	Capacitance
	ACrms	DC	Standard	High Surge	Standard (A)		High Surge(A)					
	(V)	(V)	(J)	(J)	1 TIME	2 TIME	1 TIME	2 TIME				
10D820K	50	65	16.8	17.0	2500	1250	3500	2500	0.4	82(74-90)	135	1200
10D101K	60	85	18.2	18.5	2500	1250	3500	2500	0.4	100(90-110)	165	1000
10D121K	75	100	21.0	21.5	2500	1250	3500	2500	0.4	120(108-132)	200	830
10D151K	95	125	25.2	26.0	2500	1250	3500	2500	0.4	150(135-165)	250	670
10D181K	115	150	30.8	38.0	2500	1250	3500	2500	0.4	180(162-198)	300	560
10D201K	130	170	42.0	42.5	2500	1250	3500	2500	0.4	200(185-225)	330	500
10D221K	140	180	46.2	46.5	2500	1250	3500	2500	0.4	220(198-242)	360	450
10D241K	150	200	50.4	51.0	2500	1250	3500	2500	0.4	240(216-264)	395	420
10D271K	175	225	57.4	58.0	2500	1250	3500	2500	0.4	270(243-297)	455	370
10D301K	190	250	63.0	63.5	2500	1250	3500	2500	0.4	300(270-330)	505	330
10D331K	210	275	68.6	69.0	2500	1250	3500	2500	0.4	330(297-363)	550	300
10D361K	230	300	74.2	75.0	2500	1250	3500	2500	0.4	360(324-396)	595	280
10D391K	250	320	81.2	82.0	2500	1250	3500	2500	0.4	390(351-429)	650	260
10D431K	275	350	88.2	89.0	2500	1250	3500	2500	0.4	430(387-473)	710	230
10D471K	300	385	96	100	2500	1250	3500	2500	0.4	470(423-517)	775	210
10D511K	320	415	98	102	2500	1250	3500	2500	0.4	510(459-561)	845	200
10D561K	350	460	100	104	2500	1250	3500	2500	0.4	560(504-616)	920	180
10D621K	385	505	102	106	2500	1250	3500	2500	0.4	620(558-682)	1025	160
10D681K	420	560	104	108	2500	1250	3500	2500	0.4	680(612-748)	1120	150
10D751K	460	615	110	118	2500	1250	3500	2500	0.4	750(675-825)	1240	140
10D781K	485	640	118	120	2500	1250	3500	2500	0.4	780(702-858)	1290	130
10D821K	510	670	122	125	2500	1250	3500	2500	0.4	820(738-902)	1355	120
10D911K	550	745	128	134	2500	1250	3500	2500	0.4	910(819-1001)	1500	110
10D102K	625	825	131	140	2500	1250	3500	2500	0.4	1000(900-1100)	1650	100
10D112K	680	895	133	155	2500	1250	3500	2500	0.4	1100(990-1210)	1815	90

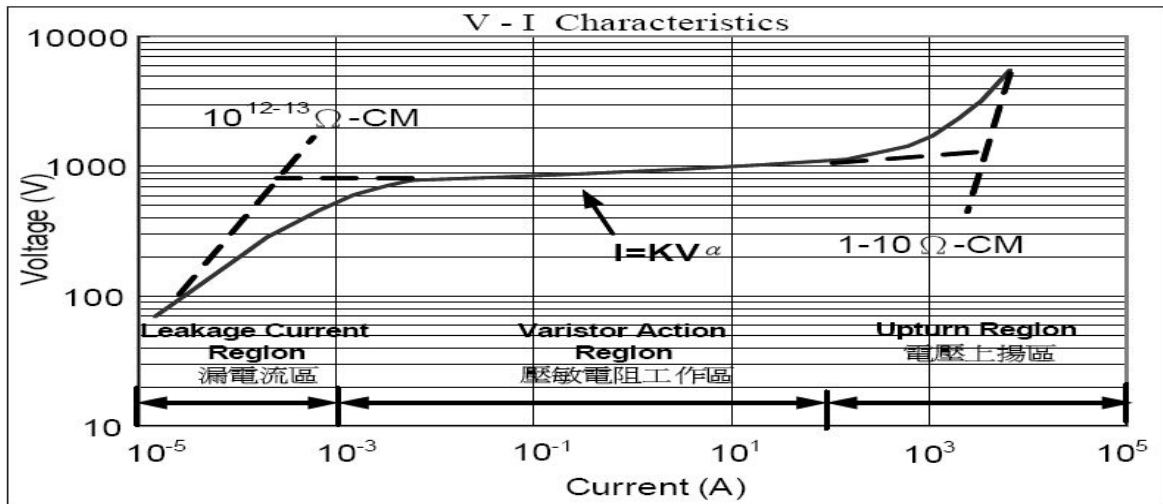
## Approval Standard And File Number

Certified Model No.	 E317616	 40028836	 12001076479	CSA & cUL E317616		
10D180L	YES	YES	YES	YES		
10D220K	YES	YES	YES	YES		
10D270K	YES	YES	YES	YES		
10D330K	YES	YES	YES	YES		
10D390K	YES	YES	YES	YES		
10D470K	YES	YES	YES	YES		
10D560K	YES	YES	YES	YES		
10D680K	YES	YES	YES	YES		
10D820K	YES	YES	YES	YES		
10D101K	YES	YES	YES	YES		
10D121K	YES	YES	YES	YES		
10D151K	YES	YES	YES	YES		
10D181K	YES	YES	3ka/6kv	YES		
10D201K	YES	YES	3ka/6kv	YES		
10D221K	YES	YES	3ka/6kv	YES		
10D241K	YES	YES	3ka/6kv	YES		
10D271K	YES	YES	3ka/6kv	YES		
10D301K	YES	YES	3ka/6kv	YES		
10D331K	YES	YES	3ka/6kv	YES		
10D361K	YES	YES	3ka/6kv	YES		
10D391K	YES	YES	3ka/6kv	YES		
10D431K	YES	YES	3ka/6kv	YES	3ka/6kv	
10D471K	YES	3ka/6kv	YES	3ka/6kv	YES	3ka/6kv
10D511K	YES	3ka/6kv	YES	3ka/6kv	YES	3ka/6kv
10D561K	YES	3ka/6kv	YES	3ka/6kv	YES	3ka/6kv
10D621K	YES	3ka/6kv	YES	3ka/6kv	YES	3ka/6kv
10D681K	YES	3ka/6kv	YES	3ka/6kv	YES	3ka/6kv
10D751K	YES	YES	3ka/6kv	YES	3ka/6kv	YES
10D821K	YES	YES	3ka/6kv	YES	3ka/6kv	YES
10D911K	YES	YES	3ka/6kv	YES	3ka/6kv	YES
10D102K	YES	YES	3ka/6kv	YES	3ka/6kv	YES
10D112K	YES	YES	3ka/6kv	YES	3ka/6kv	YES

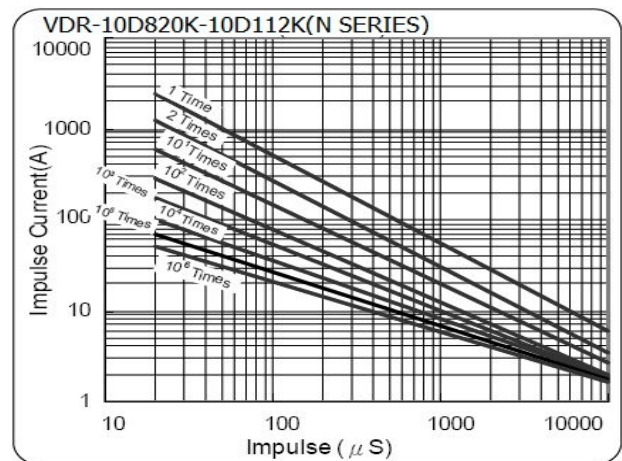
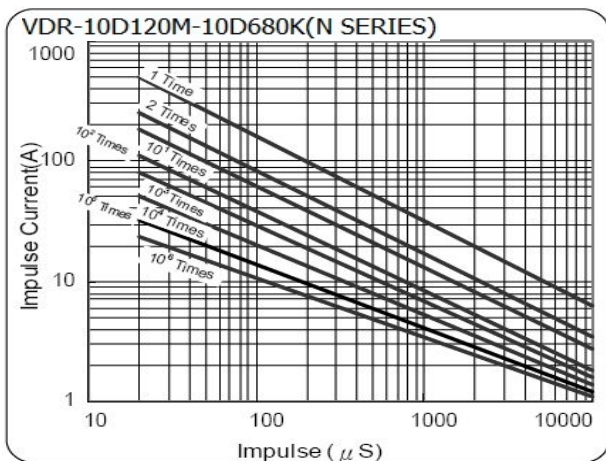
## Power Derating Curve



VARISTOR V - I CHARACTERISTICS



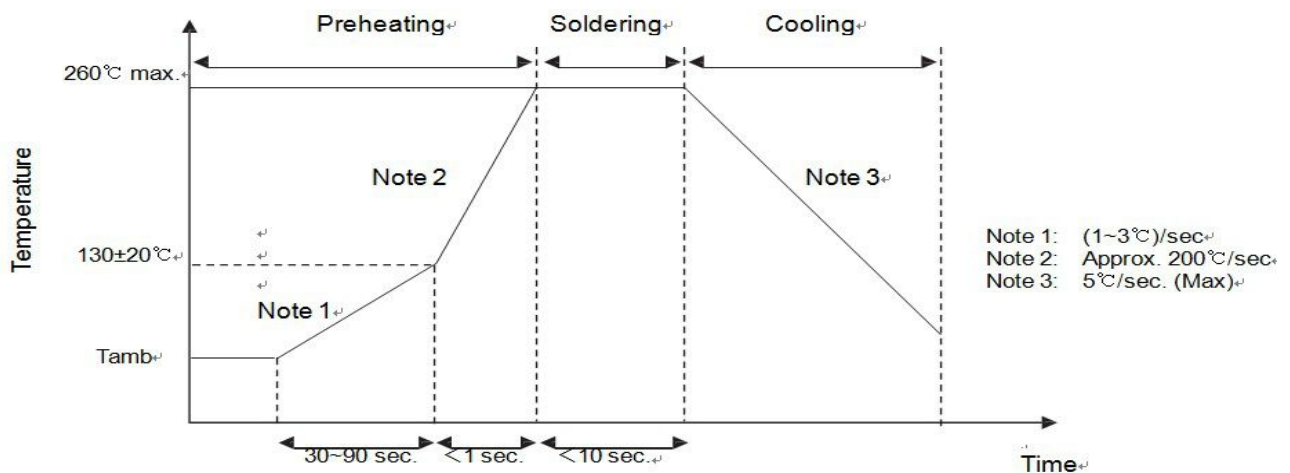
Surge Life Time Ratings N (Standard) / K (Low Capacitance) Series



Current (A)

Soldering Recommendation

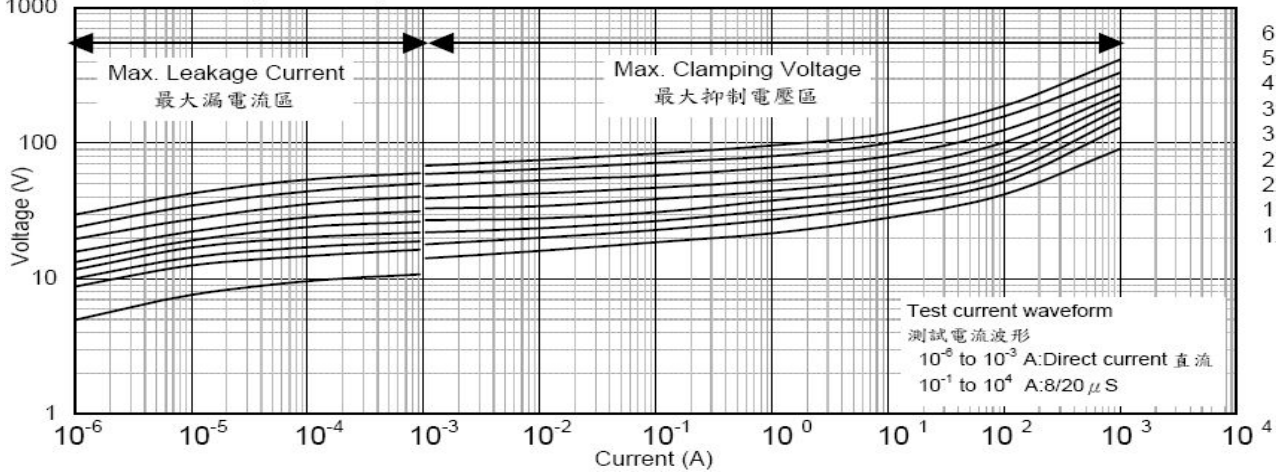
Wave Soldering Profile



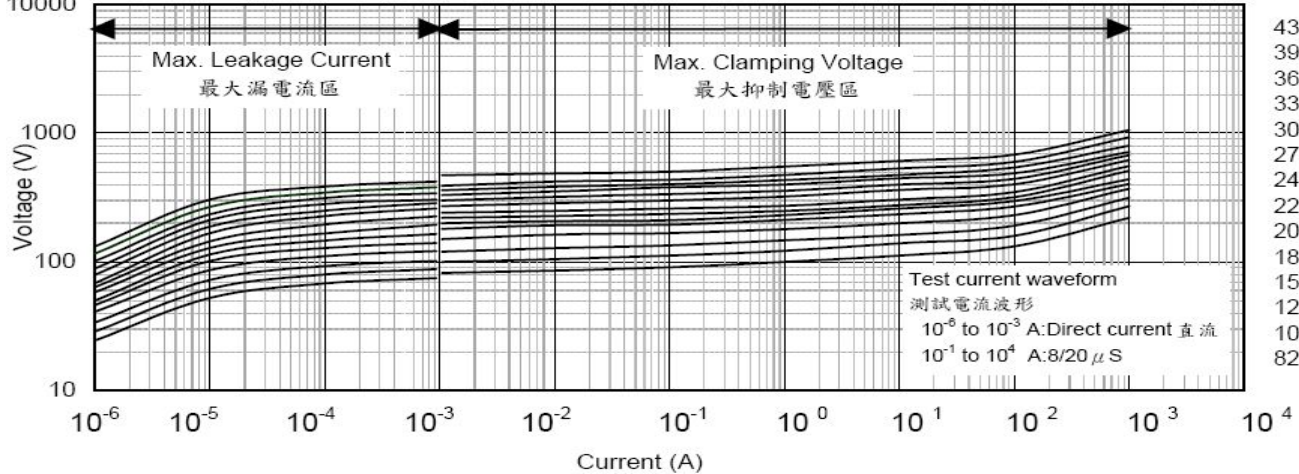


V-I CURVE

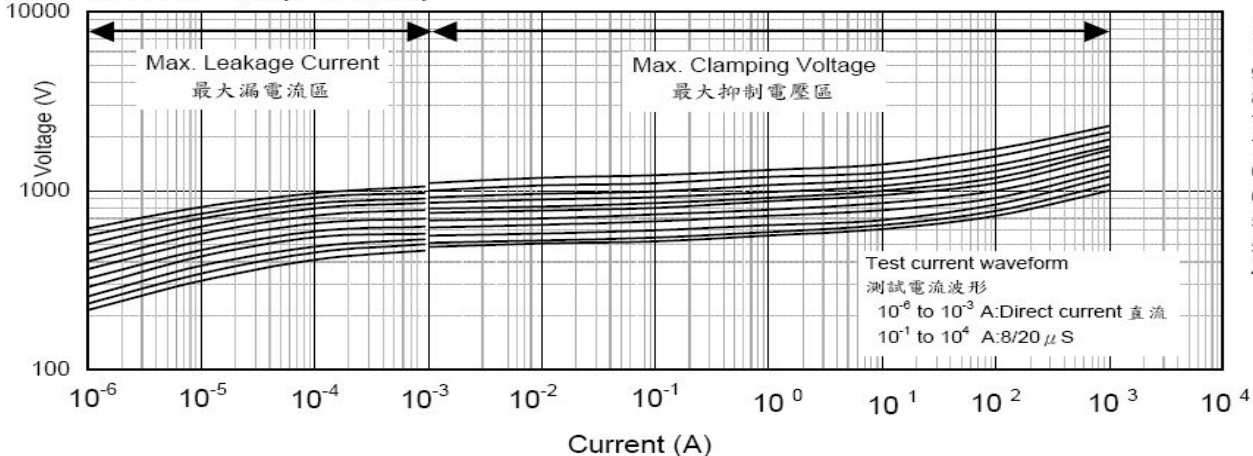
VDR-10D120M-10D680K(N/J SERIES)



VDR-10D820K-10D431K(N/J SERIES)

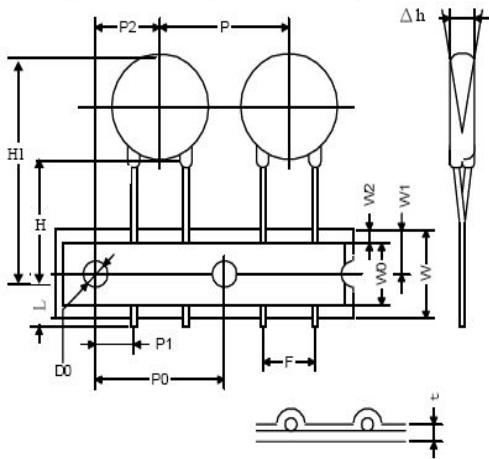


VDR-10D471K~112K(N/J Series)

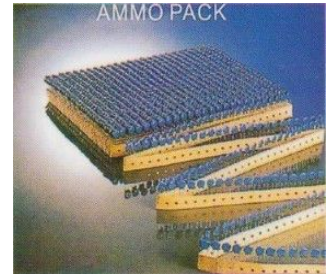
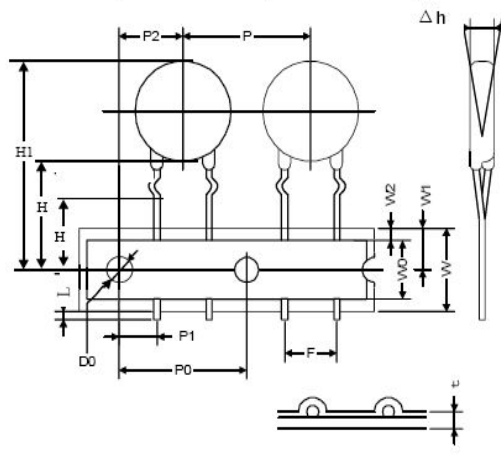


## Dimension - TA / TR / CA / CR Ammo & Reel Series

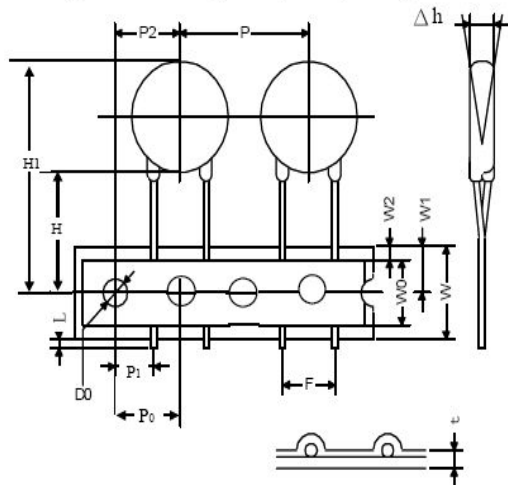
Straight Leads (5D,7D,10D)



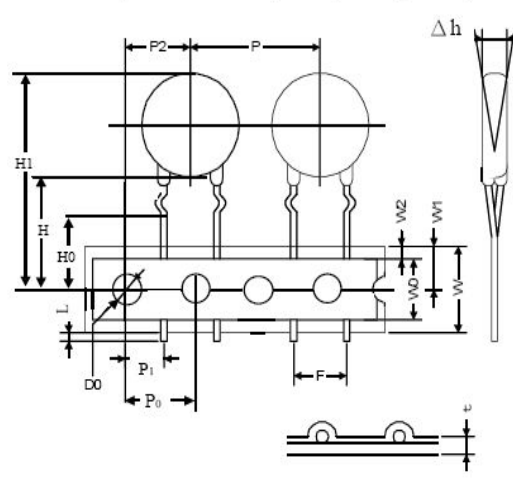
Crimped Leads (5D,7D,10D)



Straight Leads (10D,14D,20D)



Crimped Leads (10D,14D,20D)



Unit: pcs

Packing	Dimensions	Symbol	Dimensions		
			5D	7D	9/10D 14D 18/20D
AMMO		LP	330mm	335mm	345mm
		WP	310mm	243mm	345mm
		HP	50mm	50mm	65mm
		Carton	350x270x330	355x260x537	360x360x480
REEL		RD	360mm	340mm	
		RD1	30±0.5mm	30±0.5mm	
		RW	45mm	51mm	53mm
		RW1	50mm	56mm	58mm
		LP	365mm	345mm	
		WP	365mm	345mm	
		HP	57mm	65mm	
		Carton	380x380x480	360x360x480	

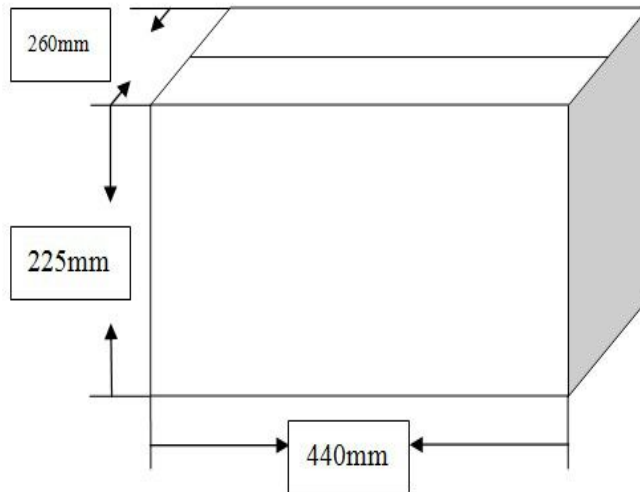
Reel		Ammo	
Box	Carton	Box	Carton
2000	16000	2000	10000
		1500	7500
2000	16000	2000	10000
		1500	7500
500	3500	500	5000
500	3500	500	5000
400	2800	500	5000
400	2800	400	2800
300	2100	300	2100

## Quality Per Packing Method

Unit:Pcs

Dimension	Part No.	Ammo		Reel	
		Box	Carton	Box	Carton
10D	180L to 471K	1,000	10,000	1,500	6,000
10D	511k to 821K	800	8,000	1,300	5,200

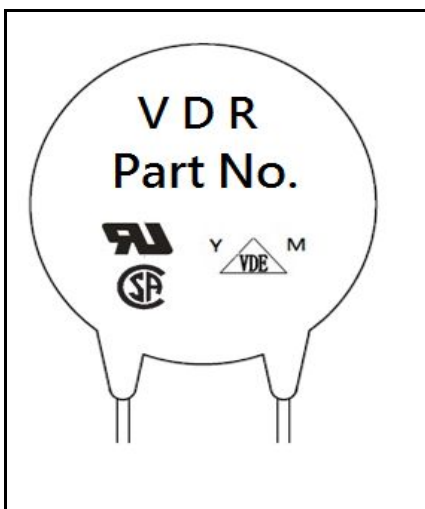
## Packing Specifications /Bulk Packing Dimension /Quantity per Packing Method



Unit:Pcs

Dimension	Part No.	Bag	Small Carton	Carton
10D	180L to 112K	500	5,000	10,000
10D (Short leg)	180L to 112K	500	7,500	15,000

## Marking



Marking	
Trademark	VDR
Part No.	10D180L-121K
Standard for Safety	UL / VDE / CQC
Date Code:	Y : Year M : Month
J	High Surge
E* / S* / Y*	4KV/2KA /6KV/3KA /10KV/5KA



**Reliability Test**

**Mechanical Ratings**

Test Parameter	Test Condition / Description			Performance Requirements
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.	Diameter	Loading	No visible damage
		0.6mm	1.0 Kg	
		0.8mm	1.0 Kg	
		1.0mm	2.0 Kg	
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.	Diameter	Loading	No visible damage
		0.6mm	0.5 Kg	
		0.8mm	0.5 Kg	
		1.0mm	1.0 Kg	
Vibration	The Specimen shall be vibrated by its lead wires with a total amplitude of 1.5mm and a varying frequency of 10~55~10HZ(each minutes) for a period of 2 hours respectively in each X,Y and Z directions.			No visible damage VB/VB% ≤ ±5%     △
Soldering-solderability	After dipping the terminal to depth of approximately 3mm from the specimen in a soldering bath of 260°C for 10±1(D5: 5±1) seconds. Thereafter the terminal shall be visually examined.			Terminations shall be uniformly tinned
Soldering- Resistance to Solder Heat	After preheating the specimen, the specimen shall be completely immersed into a soldering bath having a temperature of 260±5°C for 10±1 (D5: 5±1) seconds or iron of 400±5°C for 3±0.5 seconds. There after the change of Vb and mechanical damage shall be examined.			No visible damage VB/VB% ≤ ±5%     △

**ENVIRONMENTAL RATINGS**

Dry Heat Loading	The specimen shall be applied continuously the maximum allowable voltage at the specified conditions for specified period and then stored at room temperature and normal humidity over 2 hours. Thereafter, the change of Vb and mechanical damage shall be examined. Ambient temp : 125±2°C ; Period : 1000±24hours.			△VB/VB% ≤ ±10%	
High Temperature Storage	In a drying oven without load. Ambient temp : 125±2°C ; period : 1000±24hours			△VB/VB% ≤ ±5%	
Damp Heat Loading	The specimen shall be applied continuously the maximum allowable voltage at the specified conditions for specified period and then stored at room temperature and normal humidity over 2 hours. Thereafter, the change of Vb and mechanical damage shall be examined. Ambient condition : 40±2°C , 90 to 95%R.H. ; period : 1000±24 hours			△VB/VB% ≤ ±10%	
Temperature Cycle	Condition the specimen to each temperature form step 1 to step 4 in this order for the period shown in the table of specifications. The change of Vb and mechanical damage shall be examined after 2 hours.	Step	Temp°C	Period	No visible damage △VB/VB% ≤ ±10%
		1	-40±3°C	30 min.	
		2	Room Temp	15 min.	
		3	85±2°C	30 min.	
		4	Room Temp	15 min.	
Surge Lifetime Rating	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.			No visible damage △VB/VB% ≤ ±10%	
Voltage Proof	Voltage : 2500VAC Leakage Current ≤ 0.5mA Time : 60 Seconds			No Breakdown	