



**Cerglass MFG Inc**  
HangZhou DongWo Electronic Technology Co., Ltd.

**VDR Varistor**

**05D COVER**

**Product Specification For Approval**

**CUSTOMER**

**Approved Item**

**Customer P/N**

**Lead form**

Straight  Crimped (    mm)  Y Kink  Inner Crimped

**Packing**

Bulk  Ammo  Reel

**Approval Standard**

**40028836**

**E317616**

**12001076477**

**And File Number**



**STANDARD**

IEC60950-1 Annex Q / UL 3&4 Rd / GB8898 GB4943.1

GB/T10193-1997GB/T10194-1997 3KA/6KV

**ISSUE DATE / REV**

**2015/1/27**

**A1**

**Special description**

**SONGLONG LISHANG ELECTRONICS**

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# Metal Oxide Varistor : VDR Series Disc Type Varistor for Surge Protection

## 05D 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.

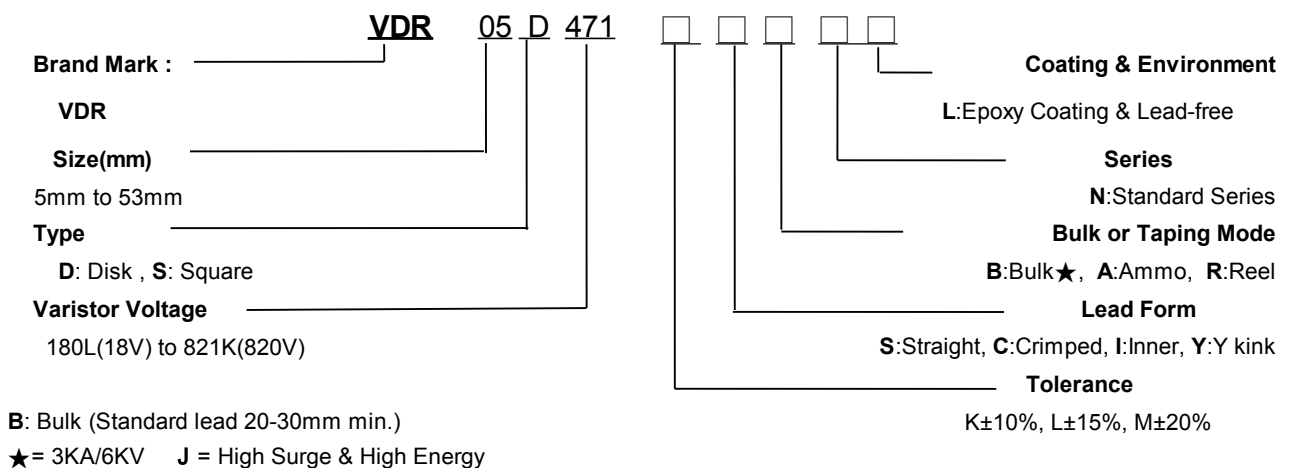
### General Characteristics Definition

- \*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

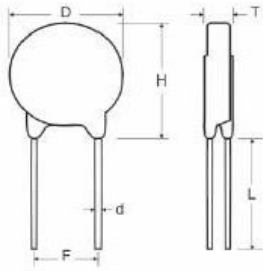




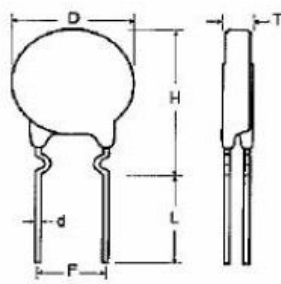
## Metal Oxide Varistor : VDR Series Disc Type Varistor for Surge Protection

### ■ Dimensions

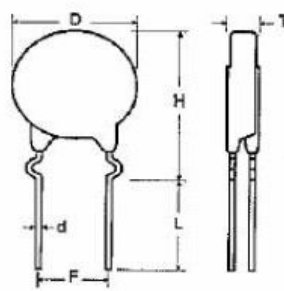
S Type(Straight Lead)



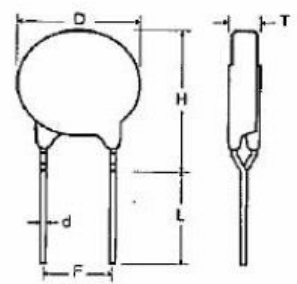
I Type(Inner Crimped Lead)



C Type(Out Crimped Lead)



Y Lead Type(Y Kink Lead)



Unit: mm

Part No.	D Max.	H Max.		L min.	F ±0.8	d ± 0.05	T Max.
		SB	CB / IB / YB				
05D751K	7.0	9.0	12.0	20.0	5.0	0.6	6.5
05D681K	7.0	9.0	12.0	20.0	5.0	0.6	6.4
05D621K	7.0	9.0	12.0	20.0	5.0	0.6	6.4
05D561K	7.0	9.0	12.0	20.0	5.0	0.6	6.2
05D511K	7.0	9.0	12.0	20.0	5.0	0.6	5.8
05D471K	7.0	9.0	12.0	20.0	5.0	0.6	5.6
05D431K	7.0	9.0	12.0	20.0	5.0	0.6	5.3
05D391K	7.0	9.0	12.0	20.0	5.0	0.6	5.1
05D361K	7.0	9.0	12.0	20.0	5.0	0.6	5.0
05D331K	7.0	9.0	12.0	20.0	5.0	0.6	4.8
05D301K	7.0	9.0	12.0	20.0	5.0	0.6	4.7
05D271K	7.0	9.0	12.0	20.0	5.0	0.6	4.5
05D241K	7.0	9.0	12.0	20.0	5.0	0.6	4.3
05D221K	7.0	9.0	12.0	20.0	5.0	0.6	4.2
05D201K	7.0	9.0	12.0	20.0	5.0	0.6	4.1
05D181K	7.0	9.0	12.0	20.0	5.0	0.6	4.1
05D151K	7.0	9.0	12.0	20.0	5.0	0.6	4.8
05D121K	7.0	9.0	12.0	20.0	5.0	0.6	4.5
05D101K	7.0	9.0	12.0	20.0	5.0	0.6	4.3
05D820K	7.0	9.0	12.0	20.0	5.0	0.6	4.1
05D680K	7.0	9.0	12.0	20.0	5.0	0.6	4.5
05D560K	7.0	9.0	12.0	20.0	5.0	0.6	4.5
05D470K	7.0	9.0	12.0	20.0	5.0	0.6	4.1
05D390K	7.0	9.0	12.0	20.0	5.0	0.6	4.1
05D330K	7.0	9.0	12.0	20.0	5.0	0.6	3.9
05D270K	7.0	9.0	12.0	20.0	5.0	0.6	3.9
05D220K	7.0	9.0	12.0	20.0	5.0	0.6	3.8
05D180L	7.0	9.0	12.0	20.0	5.0	0.6	3.8



**Metal Oxide Varistor : VDR Series**  
**Disc Type Varistor for Surge Protection**


**05D Standard & High Surge**

Part No.	Maximum Allowable Voltage		Energy 10/1000 $\mu$ S		Withstanding Surge Current 8/20 $\mu$ S				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				
05D180L	10	14	0.4	0.6	100	50	250	125	0.01	18(15-21)	38	1400
05D220K	14	18	0.6	0.7	100	50	250	125	0.01	22(20-24)	43	1150
05D270K	17	22	0.7	0.9	100	50	250	125	0.01	27(24-30)	53	930
05D330K	20	26	0.8	1.1	100	50	250	125	0.01	33(30-36)	65	760
05D390K	25	31	1.1	1.2	100	50	250	125	0.01	39(35-43)	77	640
05D470K	30	38	1.4	1.5	100	50	250	125	0.01	47(42-52)	93	530
05D560K	35	45	1.5	1.8	100	50	250	125	0.01	56(50-62)	110	450
05D680K	40	56	1.8	2.2	100	50	250	125	0.01	68(61-75)	135	370
Part No.	Maximum Allowable Voltage		Energy 10/1000 $\mu$ S		Withstanding Surge Current 8/20 $\mu$ S				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				
05D820K	50	65	2.6	3.8	400	200	800	600	0.1	82(74-90)	135	300
05D101K	60	85	2.8	4.0	400	200	800	600	0.1	100(90-110)	165	250
05D121K	75	100	4.2	5.0	400	200	800	600	0.1	120(108-132)	200	210
05D151K	95	125	4.2	7.0	400	200	800	600	0.1	150(135-165)	250	165
05D181K	115	150	5.6	8.0	400	200	800	600	0.1	180(162-198)	300	140
05D201K	130	170	7.7	8.7	400	200	800	600	0.1	200(185-225)	330	125
05D221K	140	180	8.8	9.0	400	200	800	600	0.1	220(198-242)	360	110
05D241K	150	200	9.8	11.0	400	200	800	600	0.1	240(216-264)	395	110
05D271K	175	225	10.5	13.0	400	200	800	600	0.1	270(243-297)	455	95
05D301K	190	250	11.8	14.0	400	200	800	600	0.1	300(270-330)	505	85
05D331K	210	275	14.0	14.5	400	200	800	600	0.1	330(297-363)	550	75
05D361K	230	300	14.0	16.0	400	200	800	600	0.1	360(324-396)	595	70
05D391K	250	320	15.4	17.0	400	200	800	600	0.1	390(351-429)	650	65
05D431K	275	350	16.8	20.0	400	200	800	600	0.1	430(387-473)	710	60
05D471K	300	385	18.2	20.8	400	200	800	600	0.1	470(423-517)	775	55
05D511K	320	415	19.6	21.0	400	200	800	600	0.1	510(459-561)	845	50
05D561K	350	460	19.6	23.0	400	200	800	600	0.1	560(504-616)	920	45
05D621K	385	505	21.0	25.0	400	200	800	600	0.1	620(558-682)	1025	40
05D681K	420	560	21.0	29.0	400	200	800	600	0.1	680(612-748)	1120	35
05D751K	460	615	22.4	32.0	400	200	800	600	0.1	750(675-825)	1240	30



Metal Oxide Varistor : **VDR** Series  
Disc Type Varistor for Surge Protection

**Approval Standard And File Number**

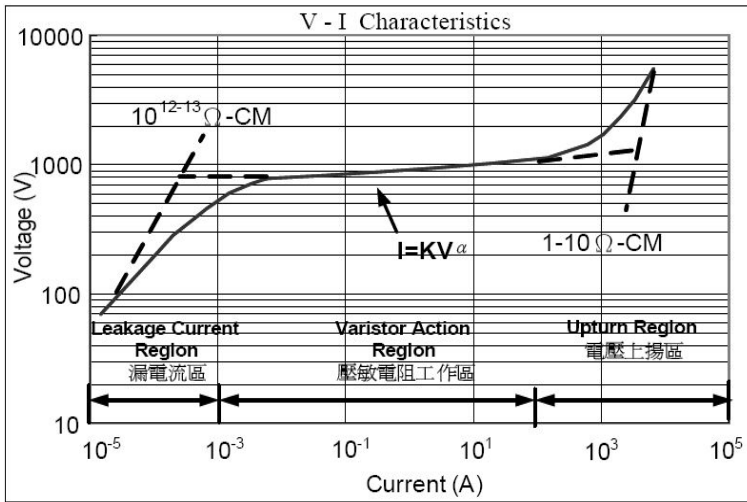
Certified Model No.	 UL1449 3rd & cUL E317616	 40028836	 12001076477
05D120M			
05D180L	YES	YES	YES
05D220K	YES	YES	YES
05D270K	YES	YES	YES
05D330K	YES	YES	YES
05D390K	YES	YES	YES
05D470K	YES	YES	YES
05D560K	YES	YES	YES
05D680K	YES	YES	YES
05D820K	YES	YES	YES
05D101K	YES	YES	YES
05D121K	YES	YES	YES
05D151K	YES	YES	YES
05D181K	YES	YES	YES
05D201K	YES	YES	YES
05D221K	YES	YES	YES
05D241K	YES	YES	YES
05D271K	YES	YES	YES
05D301K	YES	YES	YES
05D331K	YES	YES	YES
05D361K	YES	YES	YES
05D391K	YES	YES	YES
05D431K	YES	YES	YES
05D471K	YES	YES	YES
05D511K	YES		YES
05D561K	YES		YES
05D621K	YES		YES
05D681K	YES		YES
05D751K			YES



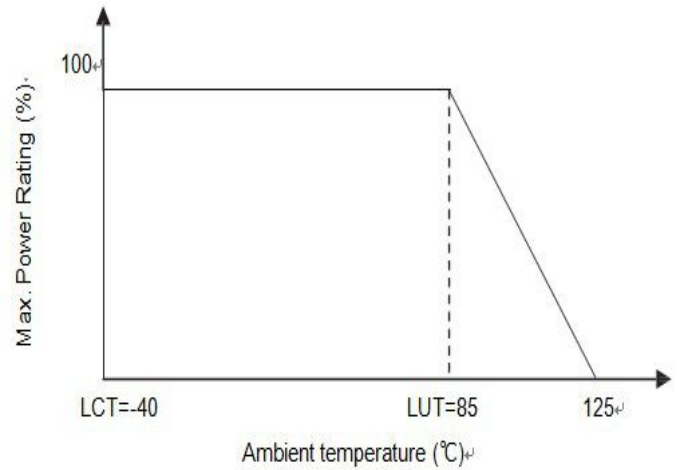
# Metal Oxide Varistor : VDR Series

## Disc Type Varistor for Surge Protection

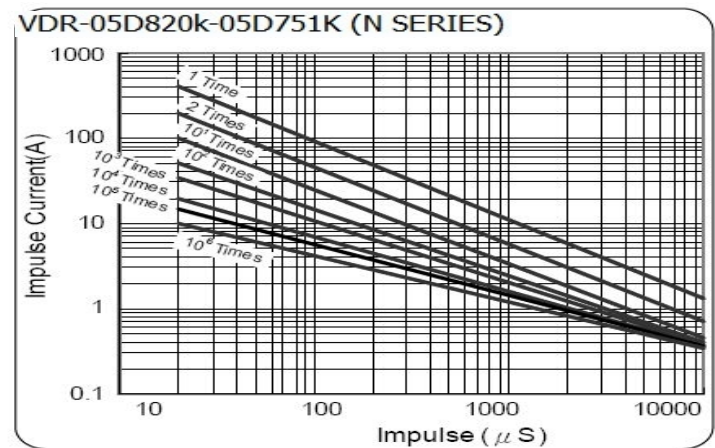
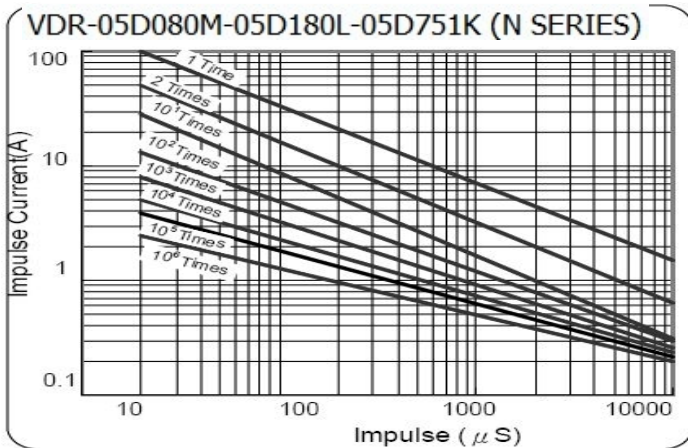
### VARISTOR V - I CHARACTERISTICS



### Power Derating Curve

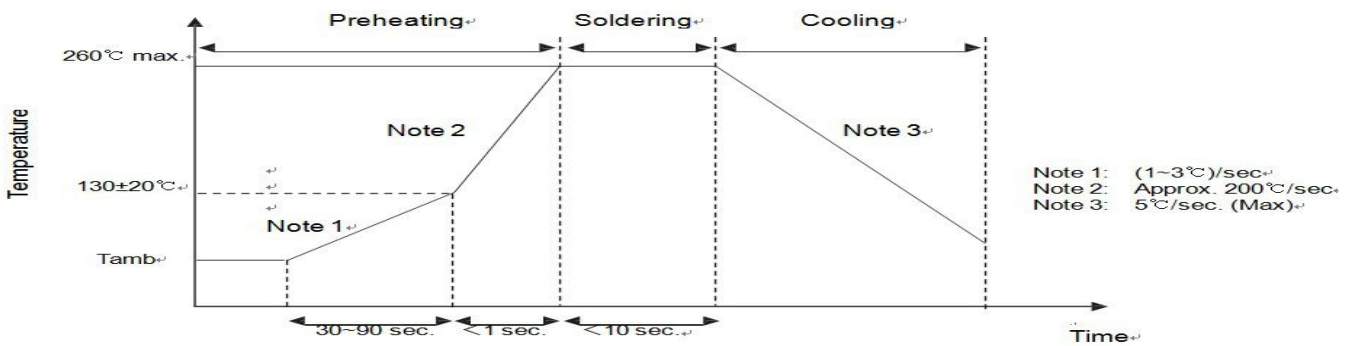


Surge Life Time Ratings N (Standard) / K (Low Capacitance) Series



### Soldering Recommendation

#### Wave Soldering Profile

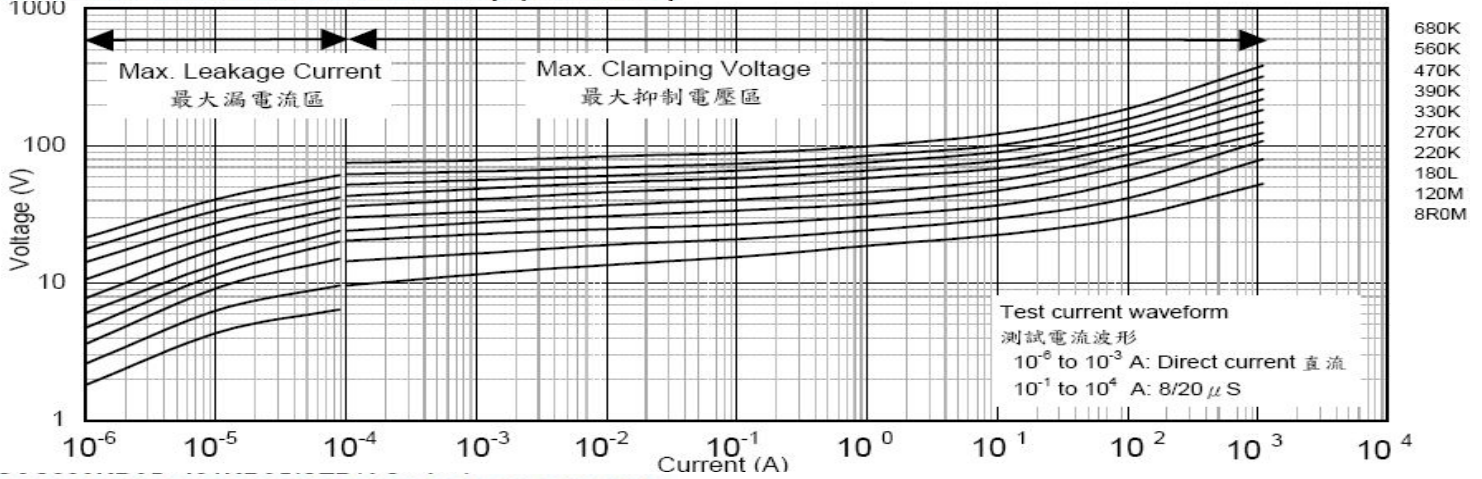




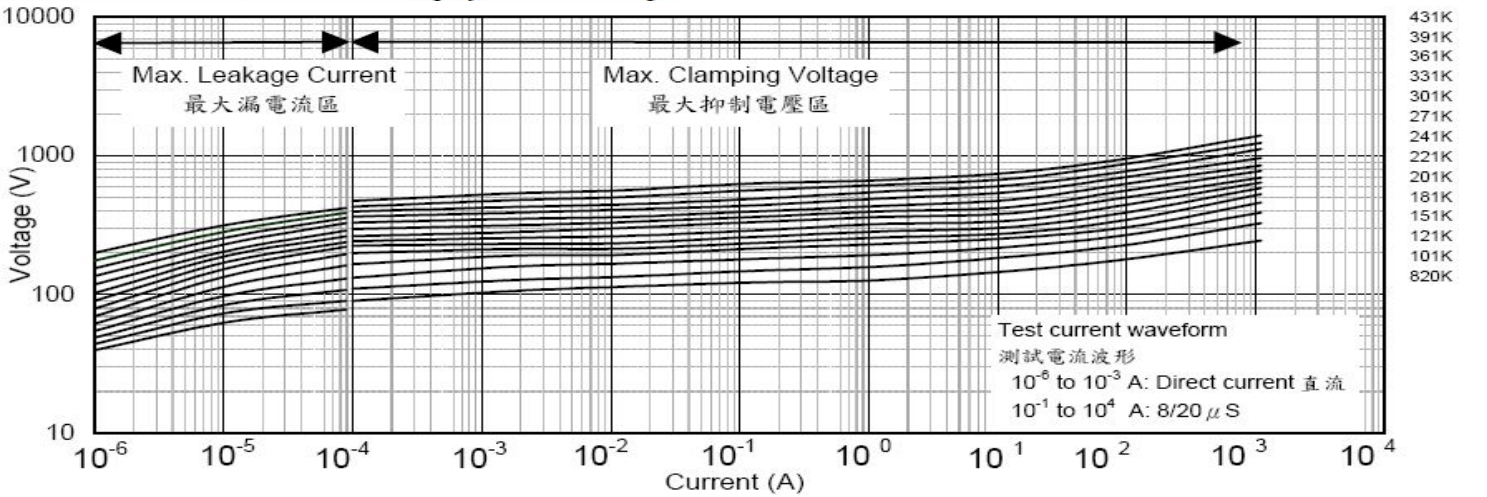
# Metal Oxide Varistor : VDR Series Disc Type Varistor for Surge Protection

## V-I CURVE

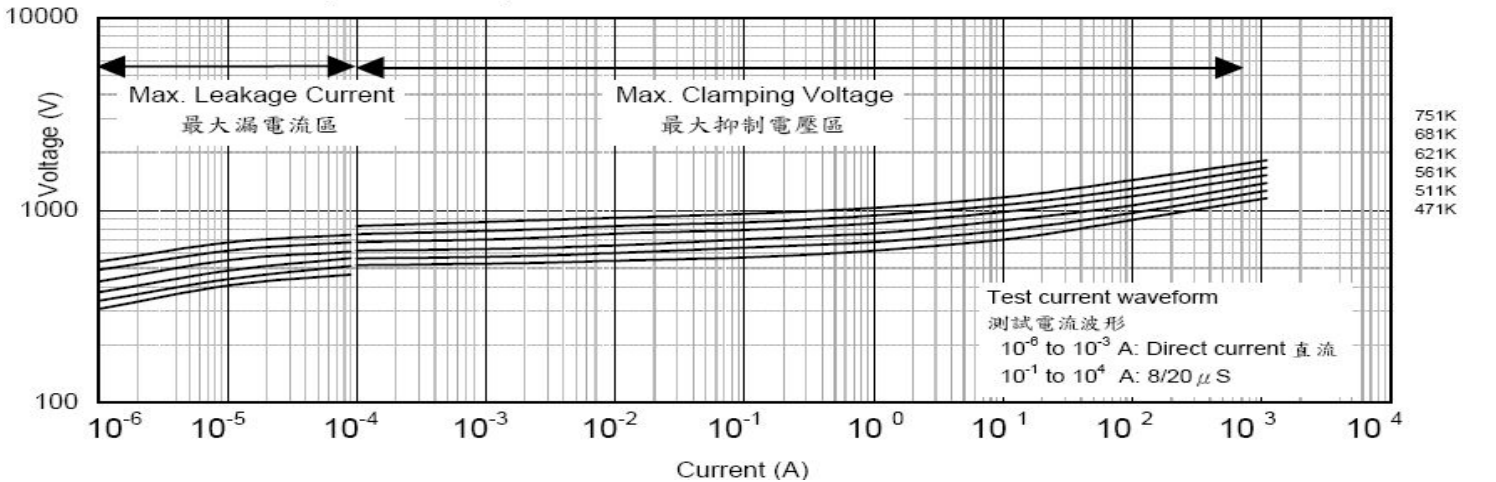
### VDR-05D080M-05D180L-05D680K (N/J SERIES)



### VDR-05D820k-05D431K (N/J SERIES)



### VDR-05D471k-05D751K (N/J SERIES)



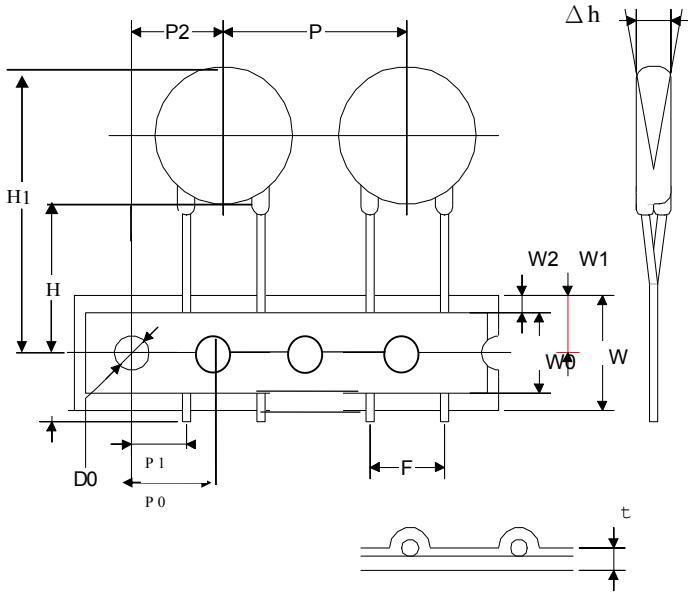


# Metal Oxide Varistor : VDR Series

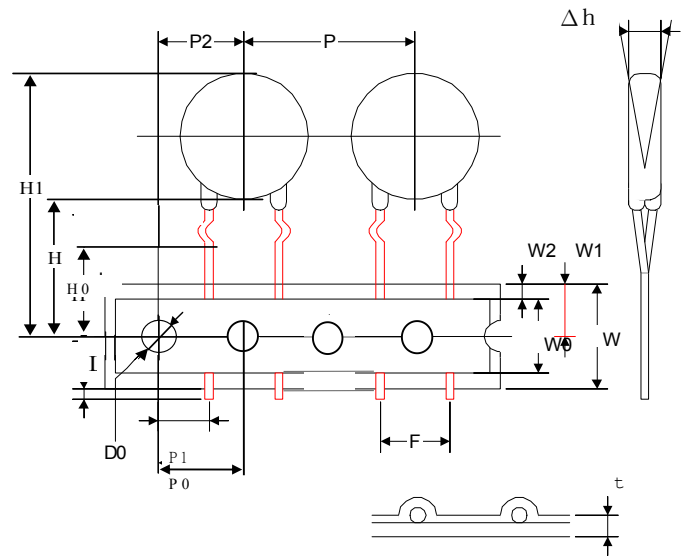
## Disc Type Varistor for Surge Protection

### Dimension - PA / PR / CA / CR Ammo & Reel Series

#### PA / PR



#### CA / CR Series

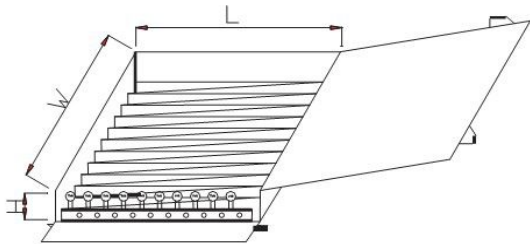


Unit: mm

Symbol	P	P0	P1	P2	F	W	W0	W1
05D	12.7±1.0	12.7±0.3	3.85±0.7	6.35±1.3	5.0±0.8	18.0±1.0	12.5max.	9.0±0.5
Symbol	W2	H	H0	H1	Δh	L	D0	t
05D	3.0max.	20.0±2.0	16.0±1.0	29.0max.	0±0.2	1.0max.	4.0±0.2	0.6±0.3

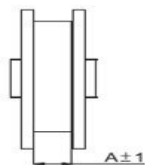
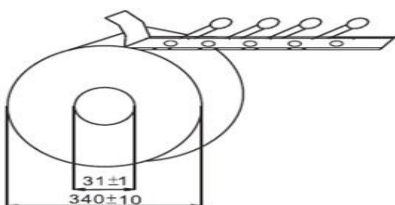
### Packing Specifications Ammo & Reel Packing Dimension

#### Ammo & Reel Box



#### Symbol Ammo

Series	W±5	L±5	H±5
VDR05D	348	185	60
~ VDR20D	348	275	60



(Unit: mm)

#### Symbol Reel

	05D	07D	10D	14D	20D
A	46	46	46	46	55



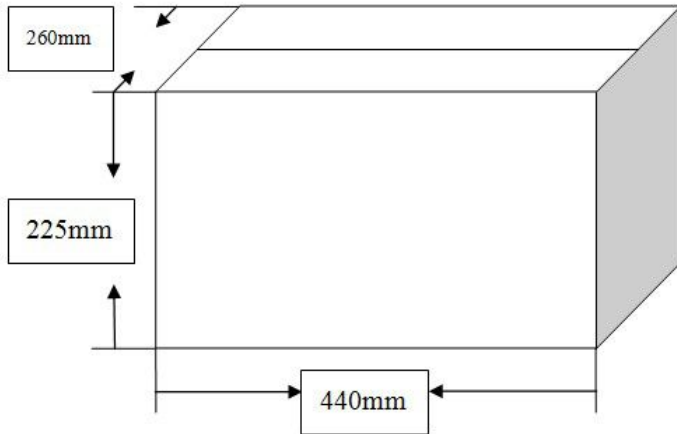


Metal Oxide Varistor : **VDR** Series  
Disc Type Varistor for Surge Protection

Unit:Pcs

Dimension	Part No.	Ammo		Reel	
		Box	Carton	Box	Carton
05D	180L to 561K	1,500	15,000	2,000	20,000
05D	621k to 821K	1,300	13,000	1,500	15,000

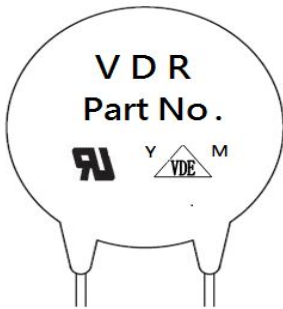
**Packing Specifications /Bulk Packing Dimension /Quantity per Packing Method**



Unit:Pcs

Dimension	Part No.	Bag	Small Carton	Carton
05D	180L to 751K	1,000	10,000	20,000
<b>05D (Short leg)</b>	180L to 751K	1,000	15,000	30,000

**Marking & DIMENSIONS**



<b>Trademark :</b>	<b>VDR</b>
<b>Part No. :</b>	<b>05D180L-821K</b> <b>511K-821K No VDE</b> <b>05D180L-821K No Csa</b>
<b>Standard for Safety:</b>	<b>UL / VDE</b>
<b>Date Code:</b>	<b>Y : Year M : Month</b>



## Metal Oxide Varistor : VDR Series

### Disc Type Varistor for Surge Protection

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,Yand 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%     △
<b>ENVIRONMENTAL RATINGS</b>						
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 ±10%     △VB/VB% ≤
Voltage Proof	Voltage : 2500VAC Leakage Current ≤ 0.5mA Time : 60 Seconds					No Breakdown

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[TND10V-271KB00AAA0](#) [NTE1V030](#) [NTE1V275](#) [NTE2V015](#) [NTE2V035](#)