



嵩隆力上

SONGLONG LISHANG

VDR Varistor  
05D SERIES

## METAL OXIDE VARISTOR – 05D SERIES

### FEATURES

- \* Wide operating voltage (V0.1mA) range from 18V to 751V.
- \* 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
- \* Safety number : CUL- E317616      VDE- 40028836  
CQC-12001076477      ISO9001-2018



### 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.



### General Characteristics Definition

- \* Operating Temperature:  $(-40^{\circ}\text{C} \sim +85^{\circ}\text{C})$  &  $(-40^{\circ}\text{C} \sim +125^{\circ}\text{C})$
- \* Storage Temperature:  $(-40^{\circ}\text{C} \sim +125^{\circ}\text{C})$
- \* Working Surface Temperature:  $+115^{\circ}\text{C}$
- \* Insulation Resistance:  $> 100\text{M}\Omega$
- \* 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



### PART NUMBER CODE

**VDR**

Brand Mark

□□

Element Diameter

Type: D: Disk, S: Square

D

Varistor Voltage

□□□

Tolerance : K $\pm$ 10%, L $\pm$ 15%

K

□

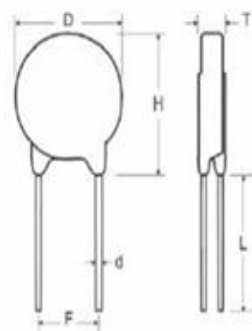
Sapce: Straight 85 $^{\circ}$ C  
H: 125 $^{\circ}$ C  
C: Crimped, Y: Y kink  
I: Inner, Tor G : Plaster

□□

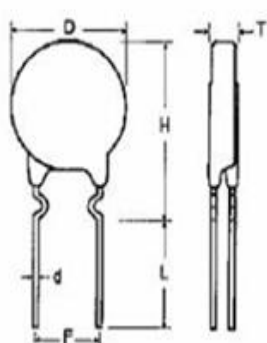
Lead Form :  
Short leg : NO : □.□  
E: 4KV2KA S: 6KV/3KA Y: 10KV/5KA  
□=ABCDEF Times  
J: High Surge & High Energy  
PH=Ultra Surge  
Taping : TA : Ammo, TR : Reel

## ■ Dimensions

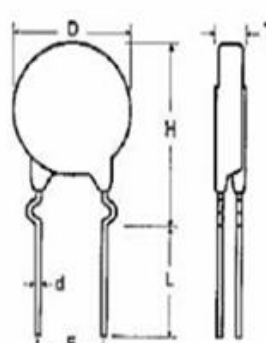
S Type(Straight Lead)



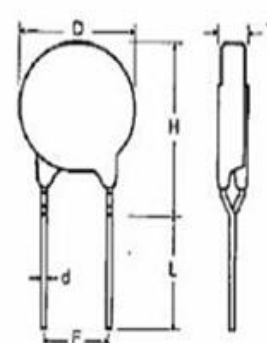
I Type(Inner Crimped Lead)



C Type(Out Crimped Lead)



Y Lead Type(Y Kink Lead)



Unit: mm

| Part No.    | Part No.     | T Max. | D Max. | H Max. |           | L min. | F ±0.8 | d ± 0.05 |
|-------------|--------------|--------|--------|--------|-----------|--------|--------|----------|
|             |              |        |        | S      | I / C / Y |        |        |          |
| VDR-05D180L | VDR-05D180LJ | 4.5    | 7.5    | 10.5   | 13.0      | 20.0   | 5.0    | 0.6      |
| VDR-05D220K | VDR-05D220KJ | 4.6    |        |        |           |        |        |          |
| VDR-05D270K | VDR-05D270KJ | 4.7    |        |        |           |        |        |          |
| VDR-05D330K | VDR-05D330KJ | 4.9    |        |        |           |        |        |          |
| VDR-05D390K | VDR-05D390KJ | 4.8    |        |        |           |        |        |          |
| VDR-05D470K | VDR-05D470KJ | 4.9    |        |        |           |        |        |          |
| VDR-05D560K | VDR-05D560KJ | 5.0    |        |        |           |        |        |          |
| VDR-05D680K | VDR-05D680KJ | 5.2    |        |        |           |        |        |          |
| VDR-05D820K | VDR-05D820KJ | 4.1    |        |        |           |        |        |          |
| VDR-05D101K | VDR-05D101KJ | 4.3    |        |        |           |        |        |          |
| VDR-05D121K | VDR-05D121KJ | 4.5    |        |        |           |        |        |          |
| VDR-05D151K | VDR-05D151KJ | 4.8    |        |        |           |        |        |          |
| VDR-05D181K | VDR-05D181KJ | 4.3    |        |        |           |        |        |          |
| VDR-05D201K | VDR-05D201KJ | 4.4    |        |        |           |        |        |          |
| VDR-05D221K | VDR-05D221KJ | 4.5    |        |        |           |        |        |          |
| VDR-05D241K | VDR-05D241KJ | 4.6    |        |        |           |        |        |          |
| VDR-05D271K | VDR-05D271KJ | 4.9    |        |        |           |        |        |          |
| VDR-05D301K | VDR-05D301KJ | 5.0    |        |        |           |        |        |          |
| VDR-05D331K | VDR-05D331KJ | 5.1    |        |        |           |        |        |          |
| VDR-05D361K | VDR-05D361KJ | 5.2    |        |        |           |        |        |          |
| VDR-05D391K | VDR-05D391KJ | 5.4    |        |        |           |        |        |          |
| VDR-05D431K | VDR-05D431KJ | 5.7    |        |        |           |        |        |          |
| VDR-05D471K | VDR-05D471KJ | 6.0    |        |        |           |        |        |          |
| VDR-05D511K | VDR-05D511KJ | 6.2    |        |        |           |        |        |          |
| VDR-05D561K | VDR-05D561KJ | 6.5    |        |        |           |        |        |          |
| VDR-05D621K | VDR-05D621KJ | 6.5    |        |        |           |        |        |          |
| VDR-05D681K | VDR-05D681KJ | 6.8    |        |        |           |        |        |          |
| VDR-05D751K | VDR-05D751KJ | 6.9    |        |        |           |        |        |          |



## ELECTRICAL CHARACTERISTIC

| Part Number |            | Maximum Allowable Voltage |        | Varistor Voltage  | Maximum Voltage |       | Withstanding Surge Current |                 | Energy 10/1000μS |                 | Rated Power | Typical Capacitance (Reference) |
|-------------|------------|---------------------------|--------|-------------------|-----------------|-------|----------------------------|-----------------|------------------|-----------------|-------------|---------------------------------|
| Standard    | High Surge | AC (V)                    | DC (V) | V1mA(V)           | IP(A)           | VC(V) | I(A) Standard              | I(A) High Surge | I(A) Standard    | I(A) High Surge | (W)         | @1KHzPF                         |
| 05D180L     | 05D180LJ   | 11                        | 14     | 18<br>(15.0~21.6) | 1               | 40    | 100                        | 250             | 0.4              | 0.6             | 0.01        | 1400                            |
| 05D220K     | 05D220KJ   | 14                        | 18     | 22<br>(18.5~26.0) | 1               | 48    | 100                        | 250             | 0.5              | 0.7             | 0.01        | 1150                            |
| 05D270K     | 05D270KJ   | 17                        | 22     | 27(24~31)         | 1               | 60    | 100                        | 250             | 0.6              | 0.9             | 0.01        | 930                             |
| 05D330K     | 05D330KJ   | 20                        | 26     | 33<br>(28.5~36.5) | 1               | 73    | 100                        | 250             | 0.8              | 1.1             | 0.01        | 760                             |
| 05D390K     | 05D390KJ   | 25                        | 31     | 39(35~43)         | 1               | 80    | 100                        | 250             | 0.9              | 1.2             | 0.01        | 640                             |
| 05D470K     | 05D470KJ   | 30                        | 38     | 47(42~52)         | 1               | 104   | 100                        | 250             | 1.1              | 1.5             | 0.01        | 530                             |
| 05D560K     | 05D560KJ   | 35                        | 45     | 56(50~62)         | 1               | 123   | 100                        | 250             | 1.3              | 1.8             | 0.01        | 450                             |
| 05D680K     | 05D680KJ   | 40                        | 56     | 68(61~75)         | 1               | 145   | 100                        | 250             | 1.6              | 2.2             | 0.01        | 370                             |
| 05D820K     | 05D820KJ   | 50                        | 65     | 82(74~90)         | 5               | 150   | 400                        | 800             | 2.5              | 4.0             | 0.1         | 300                             |
| 05D101K     | 05D101KJ   | 60                        | 85     | 100(90~110)       | 5               | 177   | 400                        | 800             | 3.0              | 4.1             | 0.1         | 250                             |
| 05D121K     | 05D121KJ   | 75                        | 100    | 120(108~132)      | 5               | 210   | 400                        | 800             | 4.0              | 4.9             | 0.1         | 210                             |
| 05D151K     | 05D151KJ   | 95                        | 125    | 150(135~165)      | 5               | 260   | 400                        | 800             | 4.1              | 6.5             | 0.1         | 165                             |
| 05D181K     | 05D181KJ   | 115                       | 150    | 180(162~198)      | 5               | 320   | 400                        | 800             | 4.9              | 7.5             | 0.1         | 140                             |
| 05D201K     | 05D201KJ   | 130                       | 170    | 200(185~225)      | 5               | 355   | 400                        | 800             | 6.5              | 8.5             | 0.1         | 125                             |
| 05D221K     | 05D221KJ   | 140                       | 180    | 220(198~242)      | 5               | 380   | 400                        | 800             | 7.5              | 9.0             | 0.1         | 110                             |
| 05D241K     | 05D241KJ   | 150                       | 200    | 240(216~264)      | 5               | 415   | 400                        | 800             | 8.0              | 10.5            | 0.1         | 100                             |
| 05D271K     | 05D271KJ   | 175                       | 225    | 270(243~297)      | 5               | 475   | 400                        | 800             | 8.5              | 11.0            | 0.1         | 95                              |
| 05D301K     | 05D301KJ   | 190                       | 250    | 300(270~330)      | 5               | 520   | 400                        | 800             | 9.0              | 12.0            | 0.1         | 85                              |
| 05D331K     | 05D331KJ   | 210                       | 275    | 330(297~363)      | 5               | 570   | 400                        | 800             | 9.5              | 13.0            | 0.1         | 75                              |
| 05D361K     | 05D361KJ   | 230                       | 300    | 360(324~396)      | 5               | 620   | 400                        | 800             | 10.0             | 16.0            | 0.1         | 70                              |
| 05D391K     | 05D391KJ   | 250                       | 320    | 390(351~429)      | 5               | 675   | 400                        | 800             | 12.0             | 17.0            | 0.1         | 65                              |
| 05D431K     | 05D431KJ   | 275                       | 350    | 430(387~473)      | 5               | 745   | 400                        | 800             | 13.0             | 20.0            | 0.1         | 60                              |
| 05D471K     | 05D471KJ   | 300                       | 385    | 470(423~517)      | 5               | 810   | 400                        | 800             | 15.0             | 21.0            | 0.1         | 50                              |
| 05D511K     | 05D511KJ   | 320                       | 415    | 510(459~561)      | 5               | 845   | 400                        | 800             | 16.0             | 22.5            | 0.1         | 100                             |
| 05D561K     | 05D561KJ   | 350                       | 460    | 560(504~616)      | 5               | 920   | 400                        | 800             | 16.5             | 24.0            | 0.1         | 45                              |
| 05D621K     | 05D621KJ   | 385                       | 505    | 620(558~682)      | 5               | 1025  | 400                        | 800             | 21.0             | 25.0            | 0.1         | 40                              |
| 05D681K     | 05D681KJ   | 420                       | 560    | 680(612~748)      | 5               | 1120  | 400                        | 800             | 22.0             | 29.0            | 0.1         | 35                              |
| 05D751K     | 05D751KJ   | 460                       | 615    | 750(675~825)      | 5               | 1240  | 400                        | 800             | 22.4             | 32.0            | 0.1         | 30                              |

The tolerance of varistor voltage between 18V and 68V is more than 10%.

05D511K to 05D751K does not have VDE certification



## Reliability Test

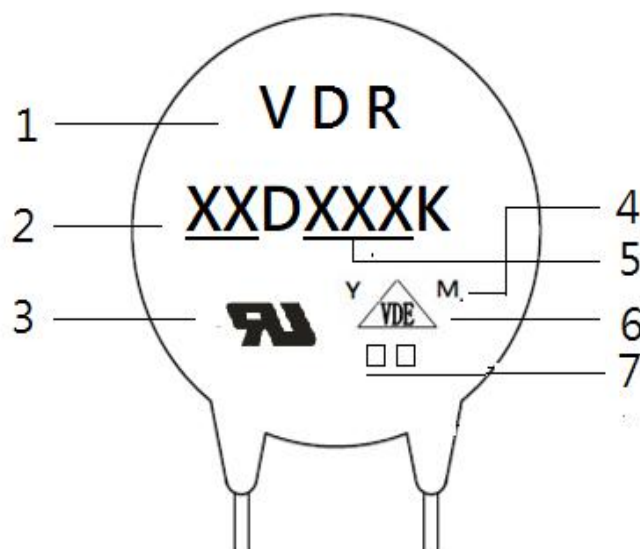
### Mechanical Ratings

| 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<br>$\Delta VB/VB\% \leq \pm 5\%$ |
| 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<br>$\Delta VB/VB\% \leq \pm 5\%$ |

### 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.<br>Ambient temp : 125±2°C ; Period : 1000±24hours.                     |      |           | $\Delta VB/VB\% \leq \pm 10\%$                      |
| High Temperature Storage | In a drying oven without load.<br>Ambient temp : 125±2°C ; period : 1000±24hours                                                                                                                                                                                                                                                             |      |           | $\Delta VB/VB\% \leq \pm 5\%$                       |
| 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.<br>Ambient condition : 40±2°C , 90 to 95%R.H. ; period : 1000±24 hours |      |           | $\Delta VB/VB\% \leq \pm 10\%$                      |
| 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                                              |
|                          |                                                                                                                                                                                                                                                                                                                                              | 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<br>$\Delta VB/VB\% \leq \pm 10\%$ |
| Voltage Proof            | Voltage : 2500VAC Leakage Current ≤ 0.5mA Time : 60 Seconds                                                                                                                                                                                                                                                                                  |      |           | No Breakdown                                        |

## MARKING CODE



- 1 SongLong Lishang Logo
- 2 Disk Size
- 3 CUL Accreditation Logo
- 4 "Y" & "M" Product Line Code
- 5 Varistor Voltage
- 6 VDE Accreditation Logo
- 7 Energy and frequency of combined wave
  - "J" is High Surge Code,not "J" is Standard Surge
  - "H" is High temperature range ,not "H" is Standard

## Packaging specification / bulk packaging quantity

Unit:Pcs

| Dimension       | Part No.     | Bag   | Small Carton | Carton |
|-----------------|--------------|-------|--------------|--------|
| 05D             | 180L to 821K | 1,000 | 10,000       | 20,000 |
| 05D (Short leg) | 180L to 821K | 1,000 | 15,000       | 30,000 |