

Features

- I Wide operating voltage (V1mA) range from 18V to 750V
- I Fast responding to transient over-voltage.
- I Large absorbing transient energy capability.
- I Low clamping ratio and no following-on current.

General Information

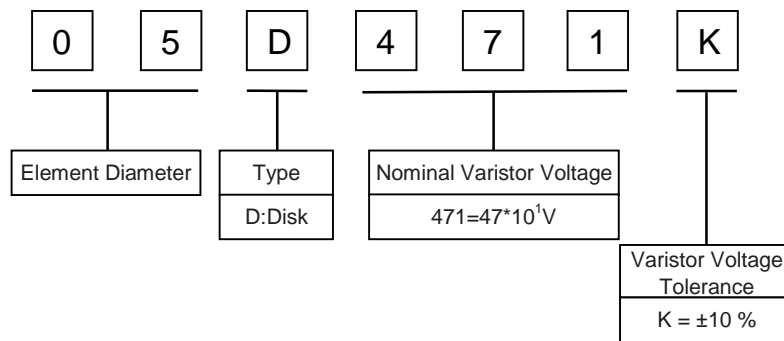
- I Surge protection in consumer electronics
- I Surge protection in industrial electronics
- I Relay and electromagnetic valve surge absorption
- I Transistor, diode, IC, thyristor or triac semiconductor protection
- I Surge protection in electronic home appliances, gas and petroleum appliances



General Characteristics

- I Body: Nickel Plated
- I Devices with No Leads: Nickel Plated
- I Operating Temperature: -40°C to +85°C
- I Storage Temperature: -40 °C to +125°C
- I Axial Devices: Tin Plated

Part Number Code



Electrical Characteristics

| Type Number | Varistor Voltage | Max. Allowable Voltage | | Max. Energy (2ms) (J) | Max. Clamping Voltage (8/20µs) | | Withstanding Surge Current (8/20µs) (A) | Rated Power (W) | Typical Capacitance (Reference) @1KHz(pf) |
|-------------|------------------|------------------------|---------------------|--------------------------|--------------------------------|--------------------|--|--------------------|--|
| | | V _{AC} (V) | V _{DC} (V) | | I _P (A) | V _C (V) | | | |
| 05D180K | 16~20 | 11 | 14 | 0.3 | 1 | 40 | 100 | 0.01 | 2400 |
| 05D220K | 20~24 | 14 | 18 | 0.4 | 1 | 48 | 100 | 0.01 | 1800 |
| 05D270K | 24~30 | 17 | 22 | 0.5 | 1 | 60 | 100 | 0.01 | 1500 |
| 05D330K | 30~36 | 20 | 26 | 0.6 | 1 | 73 | 100 | 0.01 | 1200 |
| 05D390K | 35~43 | 25 | 31 | 0.7 | 1 | 86 | 100 | 0.01 | 1000 |
| 05D470K | 42~52 | 30 | 38 | 0.8 | 1 | 104 | 100 | 0.01 | 850 |
| 05D560K | 50~62 | 35 | 45 | 1.0 | 1 | 123 | 100 | 0.01 | 700 |
| 05D680K | 61~75 | 40 | 56 | 1.2 | 1 | 145 | 100 | 0.01 | 560 |
| 05D820K | 74~90 | 50 | 65 | 1.5 | 5 | 150 | 400 | 0.1 | 480 |
| 05D101K | 90~110 | 60 | 85 | 1.8 | 5 | 175 | 400 | 0.1 | 420 |
| 05D121K | 108~132 | 75 | 100 | 2.2 | 5 | 210 | 400 | 0.1 | 360 |
| 05D151K | 135~165 | 95 | 125 | 2.7 | 5 | 260 | 400 | 0.1 | 280 |
| 05D181K | 162~198 | 115 | 150 | 3.2 | 5 | 320 | 400 | 0.1 | 200 |
| 05D201K | 180~220 | 130 | 170 | 3.6 | 5 | 355 | 400 | 0.1 | 160 |
| 05D221K | 198~242 | 140 | 180 | 4.0 | 5 | 380 | 400 | 0.1 | 110 |
| 05D241K | 216~264 | 150 | 200 | 4.3 | 5 | 415 | 400 | 0.1 | 85 |
| 05D271K | 243~297 | 175 | 225 | 4.9 | 5 | 475 | 400 | 0.1 | 75 |
| 05D301K | 270~330 | 195 | 250 | 5.4 | 5 | 525 | 400 | 0.1 | 75 |
| 05D331K | 297~363 | 210 | 275 | 5.9 | 5 | 575 | 400 | 0.1 | 75 |
| 05D361K | 324~396 | 230 | 300 | 6.5 | 5 | 620 | 400 | 0.1 | 70 |
| 05D391K | 351~429 | 250 | 320 | 7.0 | 5 | 675 | 400 | 0.1 | 70 |
| 05D431K | 387~473 | 275 | 350 | 7.7 | 5 | 745 | 400 | 0.1 | 65 |
| 05D471K | 423~517 | 300 | 385 | 8.5 | 5 | 810 | 400 | 0.1 | 55 |
| 05D511K | 459~561 | 320 | 418 | 9.2 | 5 | 882 | 400 | 0.1 | 55 |
| 05D561K | 504~616 | 350 | 460 | 10.1 | 5 | 968 | 400 | 0.1 | 50 |
| 05D621K | 558~682 | 385 | 505 | 11.2 | 5 | 1072 | 400 | 0.1 | 45 |
| 05D681K | 612~748 | 420 | 560 | 12.2 | 5 | 1176 | 400 | 0.1 | 40 |
| 05D751K | 675~825 | 460 | 615 | 13.5 | 5 | 1300 | 400 | 0.1 | 35 |

Note: The energy (10/1000µs) is about 1.4 times of energy(2ms)



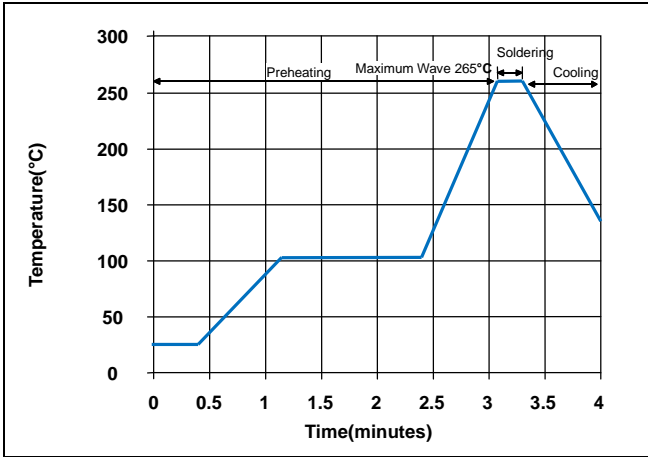
Electrical Ratings

| Items | Test Condition/Description | Requirement | | | | | |
|----------------------------|--|--------------|-----------------------------|--------------|-------------|--------------|--------------|
| Varistor Voltage | The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb. | | | | | | |
| Maximum Allowable Voltage | The recommended maximum sine wave voltage (RMS) or the Maximum DC voltage can be applied continuously. | | | | | | |
| Maximum Clamping Voltage | <p>The maximum voltage between two terminals with the specification standard impulse current. Applied waveform: 8/20μs</p> <p style="text-align: center;"> $T_1 = 1.25 \cdot T = 8\mu s \pm 20\%$ $T_2 = 20\mu s \pm 20\%$ </p> | | To meet the Specified value | | | | |
| Rated Wattage | The maximum average power that can be applied within the specified ambient temperature. | | | | | | |
| Energy | The maximum energy within the varistor voltage change of $\pm 10\%$ when one impulse of 10/1000μs or 2ms is applied. | | | | | | |
| Withstanding Surge Current | The maximum current within the varistor voltage change of $\pm 10\%$ with the standard impulse current (8/20μs) applied one time. | | | | | | |
| Surge Life | <p>The change of Vb shall be measured after the impulse listed below which is applied 10,000 times continuously with the interval of ten seconds at room temperature.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td rowspan="2" style="text-align: center;">5Φ series</td> <td style="text-align: center;">180K to 680K</td> <td style="text-align: center;">5A (8/20μs)</td> </tr> <tr> <td style="text-align: center;">820K to 751K</td> <td style="text-align: center;">20A (8/20μs)</td> </tr> </table> | | 5Φ series | 180K to 680K | 5A (8/20μs) | 820K to 751K | 20A (8/20μs) |
| 5Φ series | 180K to 680K | 5A (8/20μs) | | | | | |
| | 820K to 751K | 20A (8/20μs) | | | | | |



Soldering Recommendation

Wave Lead Free Soldering Recommendation

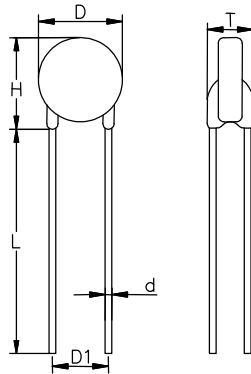


| Item | Conditions |
|------------------|-------------------|
| Peak Temperature | 265°C |
| Dipping Time | 10 seconds (max.) |
| Soldering | 1 time |

Recommendation Reworking Conditions with Soldering Iron

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

Dimensions



| Symbol | Millimeters | Inches |
|----------|-------------|--------|
| H(max) | 10.0 | 0.394 |
| L(min.) | 15.0 | 0.591 |
| D(max) | 7.0 | 0.276 |
| D1(±1.0) | 5.0 | 0.197 |
| T(max.) | TABLE 2 | |
| d(±0.1) | 0.6 | 0.024 |

Packaging Quantity: 1000pcs/bag

TABLE 2---T(max.)

| Model | Millimeters | Inches | Model | Millimeters | Inches |
|-----------|-------------|--------|-----------|-------------|--------|
| 180K~390K | 4.0 | 0.157 | 331K~391K | 6.0 | 0.236 |
| 470K~680K | 4.5 | 0.177 | 431K~561K | 6.5 | 0.256 |
| 820K~151K | 5.0 | 0.197 | 621K~751K | 7.0 | 0.276 |
| 181K~271K | 5.5 | 0.217 | | | |



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