

FEATURES

- | High surge current handling capability
- | High energy absorption capability
- | Wide operating voltages ranging from 10Vrms to 1000Vrms
- | Fast response time of less than 25ns, instantly clamping the transient over voltage
- | Low clamping voltages, providing better surge protection
- | Low capacitance values, providing digital switching circuitry protection
- | High insulation resistance, preventing electric arcing to the adjacent devices or circuits



14D

APPLICATIONS

- | Surge protection of consumer equipment
- | Surge protection of communication, measuring and controller instrument
- | Surge protection in electronic home appliances, gas and petroleum appliances
- | Relay and electromagnetic valve surge absorption
- | Transistor, Diode, IC, Thyristor or Triac semiconductor protection

APPROVALS

| | |
|-------------|------------------------------------|
| RoHS | Compliance with 2011/65/EU |
| HF | Compliance with IEC61249-2-21:2003 |

GENERAL CHARACTERISTICS DEFINITION

- | Operating Temperature Range : -40°C ~ +85°C
- | Storage Temperature Range : -40°C ~ +125°C
- | Working Surface Temperature : +115°C
- | Insulation Resistance : >100MΩ

MATERIAL

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

ELECTRICAL CHARACTERISTICS

| Symbol | | Mximum Allowable Voltage | | Varistor Voltage @1mA | Mximum Clamping Voltage | | Withstanding Surge Current (8/20μs) | | Maximum Energy (10/1000μs) | | Rated Power | Typical Capacitance (Reference) |
|----------|------------|--------------------------|---------------------|-----------------------|-------------------------|--------------------|-------------------------------------|-----------------|----------------------------|----------------|-------------|---------------------------------|
| Standard | High Surge | V _{AC} (V) | V _{DC} (V) | (V) | V _C (V) | I _P (A) | I(A) Standard | I(A) High Surge | (J) Standard | (J) High Surge | (W) | @1KHz (pF) |
| 14D180L | 14D180LJ | 10 | 14 | 18(15-21) | 38 | 10 | 1000 | 2000 | 6.6 | 7.0 | 0.1 | 11100 |
| 14D220K | 14D220KJ | 14 | 18 | 22(20-24) | 43 | 10 | 1000 | 2000 | 7.6 | 8.0 | 0.1 | 9100 |
| 14D270K | 14D270KJ | 17 | 22 | 27(24-30) | 53 | 10 | 1000 | 2000 | 9.7 | 10.0 | 0.1 | 7400 |
| 14D330K | 14D330KJ | 20 | 26 | 33(30-36) | 65 | 10 | 1000 | 2000 | 12.3 | 12.5 | 0.1 | 6100 |
| 14D390K | 14D390KJ | 25 | 31 | 39(35-43) | 77 | 10 | 1000 | 2000 | 13.2 | 13.0 | 0.1 | 5100 |
| 14D470K | 14D470KJ | 30 | 38 | 47(42-52) | 93 | 10 | 1000 | 2000 | 16.8 | 17.0 | 0.1 | 4300 |
| 14D560K | 14D560KJ | 35 | 45 | 56(50-62) | 110 | 10 | 1000 | 2000 | 19.6 | 20.0 | 0.1 | 3600 |
| 14D680K | 14D680KJ | 40 | 56 | 68(61-75) | 135 | 10 | 1000 | 2000 | 23.8 | 24.0 | 0.1 | 2900 |
| 14D820K | 14D820KJ | 50 | 65 | 82(74-90) | 135 | 50 | 4500 | 6000 | 29.4 | 30.0 | 0.6 | 2400 |
| 14D101K | 14D101KJ | 60 | 85 | 100(90-110) | 165 | 50 | 4500 | 6000 | 33.6 | 35.0 | 0.6 | 2000 |
| 14D121K | 14D121KJ | 75 | 100 | 120(108-132) | 200 | 50 | 4500 | 6000 | 40.6 | 42.0 | 0.6 | 1700 |
| 14D151K | 14D151KJ | 95 | 125 | 150(135-165) | 250 | 50 | 4500 | 6000 | 51.8 | 53.0 | 0.6 | 1300 |
| 14D181K | 14D181KJ | 115 | 150 | 180(162-198) | 300 | 50 | 4500 | 6000 | 58.8 | 74.0 | 0.6 | 1100 |
| 14D201K | 14D201KJ | 130 | 170 | 200(185-225) | 330 | 50 | 4500 | 6000 | 75.2 | 78.6 | 0.6 | 1000 |
| 14D221K | 14D221KJ | 140 | 180 | 220(198-242) | 360 | 50 | 4500 | 6000 | 79.8 | 80.5 | 0.6 | 900 |
| 14D241K | 14D241KJ | 150 | 200 | 240(216-262) | 395 | 50 | 4500 | 6000 | 82.6 | 86.0 | 0.6 | 830 |
| 14D271K | 14D271KJ | 175 | 225 | 270(243-297) | 455 | 50 | 4500 | 6000 | 84.0 | 94.0 | 0.6 | 740 |
| 14D301K | 14D301KJ | 190 | 250 | 300(270-330) | 505 | 50 | 4500 | 6000 | 103 | 105 | 0.6 | 670 |
| 14D331K | 14D331KJ | 210 | 275 | 330(297-363) | 550 | 50 | 4500 | 6000 | 112 | 115 | 0.6 | 610 |
| 14D361K | 14D361KJ | 230 | 300 | 360(324-396) | 595 | 50 | 4500 | 6000 | 123 | 130 | 0.6 | 560 |
| 14D391K | 14D391KJ | 250 | 320 | 390(351-429) | 650 | 50 | 4500 | 6000 | 135 | 140 | 0.6 | 510 |
| 14D431K | 14D431KJ | 275 | 350 | 430(387-473) | 710 | 50 | 4500 | 6000 | 145 | 155 | 0.6 | 460 |
| 14D471K | 14D471KJ | 300 | 385 | 470(423-517) | 775 | 50 | 4500 | 6000 | 147 | 175 | 0.6 | 430 |
| 14D511K | 14D511KJ | 320 | 415 | 510(459-561) | 845 | 50 | 4500 | 6000 | 148 | 180 | 0.6 | 390 |
| 14D561K | 14D561KJ | 350 | 460 | 560(504-616) | 920 | 50 | 4500 | 6000 | 150 | 186 | 0.6 | 360 |
| 14D621K | 14D621KJ | 385 | 505 | 620(558-682) | 1025 | 50 | 4500 | 6000 | 155 | 188 | 0.6 | 320 |
| 14D681K | 14D681KJ | 420 | 560 | 680(612-748) | 1120 | 50 | 4500 | 6000 | 160 | 190 | 0.6 | 290 |
| 14D751K | 14D751KJ | 460 | 615 | 750(675-825) | 1240 | 50 | 4500 | 6000 | 180 | 210 | 0.6 | 270 |

| Symbol | | Mximum Allowable Voltage | | Varistor Voltage @1mA | Mximum Clamping Voltage | | Withstanding Surge Current (8/20μs) | | Maximum Energy (10/1000μs) | | Rated Power | Typical Capacitance (Reference) |
|----------|------------|--------------------------|---------------------|-----------------------|-------------------------|--------------------|-------------------------------------|-----------------|----------------------------|----------------|-------------|---------------------------------|
| Standard | High Surge | V _{AC} (V) | V _{DC} (V) | (V) | V _c (V) | I _p (A) | I(A) Standard | I(A) High Surge | (J) Standard | (J) High Surge | (W) | @1KHz (pF) |
| 14D781K | 14D781KJ | 485 | 640 | 780(702-858) | 1290 | 50 | 4500 | 6000 | 190 | 211 | 0.6 | 260 |
| 14D821K | 14D821KJ | 510 | 670 | 820(738-902) | 1355 | 50 | 4500 | 6000 | 203 | 235 | 0.6 | 230 |
| 14D911K | 14D911KJ | 550 | 745 | 910(819-1001) | 1500 | 50 | 4500 | 6000 | 208 | 255 | 0.6 | 220 |
| 14D102K | 14D102KJ | 625 | 825 | 1000(900-1100) | 1650 | 50 | 4500 | 6000 | 212 | 280 | 0.6 | 200 |
| 14D112K | 14D112KJ | 680 | 895 | 1100(990-1210) | 1815 | 50 | 4500 | 6000 | 217 | 310 | 0.6 | 180 |
| 14D152K | 14D152KJ | 900 | 1200 | 1500(1350-1650) | 2475 | 50 | 4500 | 6000 | 266 | 420 | 0.6 | 130 |
| 14D182K | 14D182KJ | 1000 | 1465 | 1800(1620-1980) | 2970 | 50 | 4500 | 6000 | 336 | 510 | 0.6 | 110 |

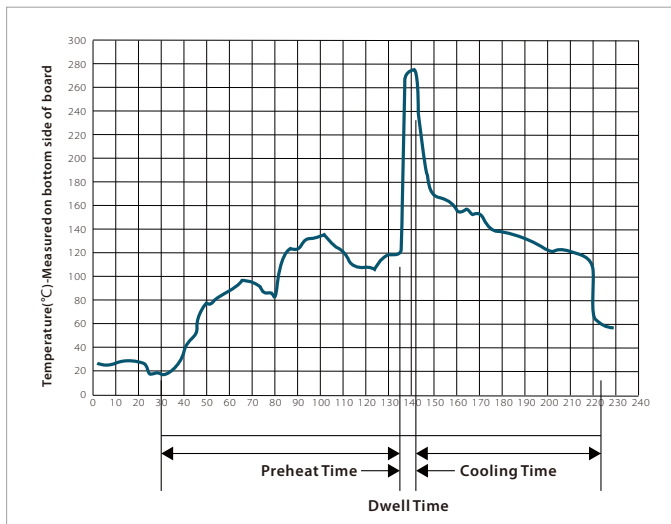
CHARACTERISTIC CURVES

| Items | Test condition/Description | | | | | |
|--|--|--------------|--------------|-------------|--------------|--------------|
| Varistor Voltage | The voltage across the varistor measured at 1mA DC,can be called Vb | | | | | |
| Maximum Allowable Voltage | Maximum continuous sine wave(RMS) or DC voltage which may be applied | | | | | |
| Maximum Clamping Voltage | Peak voltage across the varistor with a specified peak impulse current of 8/20μs waveform | | | | | |
| Rated Power | The maximum average power that can be applied within the specified ambient temperature | | | | | |
| Withstanding Surge Current | The maximum current within the varistor voltage change of less than ±10% when one impulse current(8/20μs)applied | | | | | |
| Energy | The max.energy absorbed with a varistor voltage change of less than ± 10% when one impulse (10/1000μs) is applied | | | | | |
| Varistor Voltage Temperature Coefficient | $\left \frac{Vb@85^{\circ}C - Vb@25^{\circ}C}{Vb@25^{\circ}C} \times \frac{1}{60} \times 100\% (\%/^{\circ}C) \right \leq 0.05\% / ^{\circ}C$ $\left \frac{Vb@-40^{\circ}C - Vb@25^{\circ}C}{Vb@25^{\circ}C} \times \frac{1}{65} \times 100\% (\%/^{\circ}C) \right \leq 0.05\% / ^{\circ}C$ | | | | | |
| Surge Life | The max.current with a varistor voltage change of less than ±10% when 10,000 times impulse current (8/20μs) are applied at intervals of 20 seconds at room temperature <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td rowspan="2">14D Series</td> <td>180L to 680K</td> <td>75A(8/20μs)</td> </tr> <tr> <td>820K to 182K</td> <td>150A(8/20μs)</td> </tr> </table> | 14D Series | 180L to 680K | 75A(8/20μs) | 820K to 182K | 150A(8/20μs) |
| 14D Series | 180L to 680K | | 75A(8/20μs) | | | |
| | 820K to 182K | 150A(8/20μs) | | | | |

CHARACTERISTIC CURVES

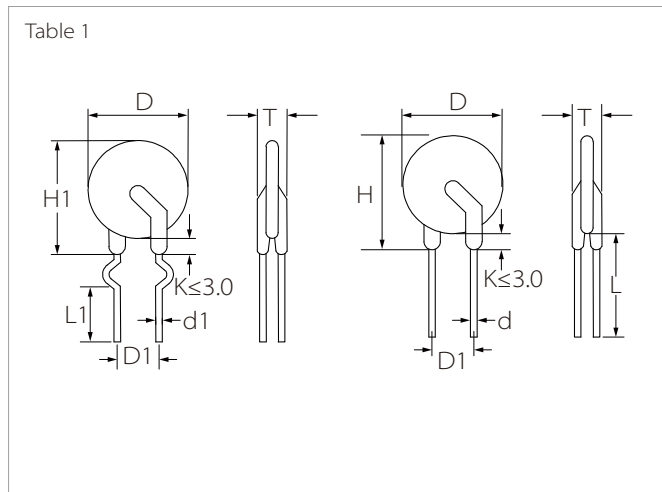
| Items | Test condition/Description | Specifications | | | | | | | | | | | | | | | |
|--------------------------|--|---|-----------------|-----------------|---|-------|------|---|------------------|------|---|-------|------|---|------------------|------|--|
| High Temperature Storage | Ambient Temp:125±2°C Duration:1000 hrs | $ \Delta V_{1_{mA}}/V_{1_{mA}} \leq 5\%$ | | | | | | | | | | | | | | | |
| Low Temperature Storage | Ambient Temp:-40±2°C Duration:1000 hrs | $ \Delta V_{1_{mA}}/V_{1_{mA}} \leq 5\%$ | | | | | | | | | | | | | | | |
| Humidity | Ambient Temp:40±2°C,90~95% R.H. Duration:1000 hrs | $ \Delta V_{1_{mA}}/V_{1_{mA}} \leq 5\%$ | | | | | | | | | | | | | | | |
| Temperature Cycle | The conditions shown below shall be repeated 5 cycles <table border="1" data-bbox="582 582 1141 761"> <thead> <tr> <th>Step</th> <th>Temperature(°C)</th> <th>Period(minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>15±3</td> </tr> <tr> <td>3</td> <td>125±3</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>15±3</td> </tr> </tbody> </table> | Step | Temperature(°C) | Period(minutes) | 1 | -40±3 | 30±3 | 2 | Room temperature | 15±3 | 3 | 125±3 | 30±3 | 4 | Room temperature | 15±3 | No visible damage $ \Delta V_{1_{mA}}/V_{1_{mA}} \leq 5\%$ |
| Step | Temperature(°C) | Period(minutes) | | | | | | | | | | | | | | | |
| 1 | -40±3 | 30±3 | | | | | | | | | | | | | | | |
| 2 | Room temperature | 15±3 | | | | | | | | | | | | | | | |
| 3 | 125±3 | 30±3 | | | | | | | | | | | | | | | |
| 4 | Room temperature | 15±3 | | | | | | | | | | | | | | | |
| High Temperature Load | Ambient Temp:85±2°C ,Duration:1000 hrs Load:Max.Allowable Voltage in AC eara | $ \Delta V_{1_{mA}}/V_{1_{mA}} \leq 10\%$ | | | | | | | | | | | | | | | |
| Damp Heat Load | Ambient Temp:40±2°C ,90~95% R.H. Duration:1000 hrs Load:Max.Allowable Voltage | No visible damage $ \Delta V_{1_{mA}}/V_{1_{mA}} \leq 10\%$ | | | | | | | | | | | | | | | |
| Voltage Proof | Metal balls method,2500Vac 1 min | No visible damage | | | | | | | | | | | | | | | |

WAVE SOLDERING



| Wave Parameter | | Lead-free assembly |
|------------------------|------------------|--------------------|
| Pre Heat | Temperature Min | 100°C |
| | Temperature Max | 150°C |
| | Time(min to max) | 60 – 180 secs |
| Solder pot Temperature | | 280°C Max |
| Solder Dwell Time | | 2-5 seconds |

PACKAGE INFORMATION



| Symbol | Dimension(mm) |
|----------|---------------|
| H(max) | 20.0 |
| H1(max) | 21.0 |
| L(min) | 20.0 |
| L1(min) | 15.0 |
| D(max) | 17.0 |
| D1(±0.8) | 7.5 |
| T(max) | Table2 |
| d(±0.05) | 0.8 |
| d1(±0.4) | 1.4 |

| Table 2 | | Tmax(mm) | | | | | |
|---------|-----|----------|-----|---------|-----|---------|------|
| 14D180L | 4.0 | 14D101K | 4.3 | 14D331K | 4.8 | 14D751K | 6.5 |
| 14D220K | 4.0 | 14D121K | 4.5 | 14D361K | 5.0 | 14D781K | 6.6 |
| 14D270K | 4.0 | 14D151K | 4.8 | 14D391K | 5.1 | 14D821K | 7.2 |
| 14D330K | 4.2 | 14D181K | 4.1 | 14D431K | 5.3 | 14D911K | 7.6 |
| 14D390K | 4.5 | 14D201K | 4.1 | 14D471K | 5.6 | 14D102K | 7.8 |
| 14D470K | 4.5 | 14D221K | 4.2 | 14D511K | 5.8 | 14D112K | 9.9 |
| 14D560K | 4.1 | 14D241K | 4.3 | 14D561K | 6.2 | 14D152K | 11.0 |
| 14D680K | 4.1 | 14D271K | 4.5 | 14D621K | 6.4 | 14D182K | 12.5 |
| 14D820K | 4.1 | 14D301K | 4.7 | 14D681K | 6.4 | | |

ORDERING INFORMATION

| Part Number | Component Package | Package |
|-------------|-------------------|---------|
| 14D SERIES | 14D | 500PCS |

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