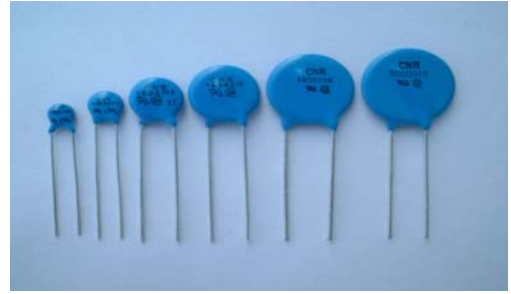


TYEE Varistor

Varistor are voltage dependent, nonlinear device which have an electrical behavior similar to back-to-back zener diodes.

TYEE series zinc oxide varistor are nonlinear resistors, consisting main of zinc oxide and several kinds of metal oxide additive.

They are bilateral and symmetrical V-I characteristics curve and unparalleled large peak current capability are used for absorption of transient voltage, suppression of pulse noise and circuit voltage stabilization.



Applications

- Surge Protection in consumer electronics
 - industrial electronics
 - telephone and telecommunication systems
 - automobile equipments
 - measuring and controller systems
 - electronic home appliances
 - gas and petroleum appliances
- Absorption of switching surge from various kinds of relays and electro-magnetic valves.
- Electrostatic discharge an spike noise suppression.
- Protection of various kinds of transistors, diodes, ICs, thyristors, triac semiconductors, and etc.
- Automobile control system such as transistorized ignition system and electronic fuel injection system, and etc.

Features

- Fast response
- Excellent voltage ratio
- High stabilization for circuit voltage
- Unparalleled absorption for transient voltage characteristics
- Bilateral and symmetrical V-I Characteristics curve

Related Standards

- UL1414, UL1449(2nd Edition), CSA, VDE

Explanation of Part Numbers

| | | | | | | |
|--------------|---------|------|---|---|---|---|
| 05 | [] | D | 2 | 2 | 0 | K |
| Element Dia. | | Type | Varistor Voltage | | | Tolerance |
| 05 | ψ5.0mm | D | Examples <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">2</div> <div style="border: 1px solid black; padding: 2px;">2</div> <div style="border: 1px solid black; padding: 2px;">0</div> </div> $22 \times 10^0 = 22V$ <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">2</div> <div style="border: 1px solid black; padding: 2px;">2</div> <div style="border: 1px solid black; padding: 2px;">1</div> </div> $22 \times 10^1 = 220V$ | | | K:±10% or customer special requirement |
| 07 | ψ7.0mm | | | | | |
| 10 | ψ10.0mm | | | | | |
| 14 | ψ14.0mm | | | | | |
| 18 | ψ18.0mm | | | | | |
| 20 | ψ20.0mm | | | | | |

Device Ratings and Characteristics

05D Series

| Part No. | Maximum Allowable Voltage | | Varistor Voltage (@0.1mA) | | | Clamping Voltage @ Test Current (8/20µs) | | Maximum Energy (J) | Maximum Peak Current (8/20µs) (A) | Rated Power (W) | Typical Capacitance (@1KHz) (pF) | Standards |
|----------------|---------------------------|-------|---------------------------|---------|------|--|-------|--------------------|-----------------------------------|-----------------|----------------------------------|-----------|
| | | | | | | Vc(V) | Ip(A) | | | | | |
| Device Marking | ACrms(V) | DC(V) | Min. | Vb(Vdc) | Max. | | | 10/1000µs | | | | |
| 05D180K | 11 | 14 | 14.4 | 18 | 21.6 | 44 | 1 | 0.4 | 100 | 0.01 | 1600 | ☆ |
| 05D220K | 14 | 18 | 18.7 | 22 | 26.0 | 51 | 1 | 0.5 | 100 | 0.01 | 1500 | ☆ |
| 05D270K | 17 | 22 | 23.0 | 27 | 31.1 | 60 | 1 | 0.6 | 100 | 0.01 | 1450 | ☆ |
| 05D330K | 20 | 26 | 29.5 | 33 | 36.5 | 73 | 1 | 0.8 | 100 | 0.01 | 1400 | ☆ |
| 05D390K | 25 | 31 | 35 | 39 | 46 | 86 | 1 | 0.9 | 100 | 0.01 | 700 | ☆ |
| 05D470K | 30 | 38 | 42 | 47 | 55 | 104 | 1 | 1.1 | 100 | 0.01 | 650 | ☆ |
| 05D560K | 35 | 45 | 50 | 56 | 66 | 123 | 1 | 1.3 | 100 | 0.01 | 600 | ☆ |
| 05D680K | 40 | 56 | 61 | 68 | 80 | 150 | 1 | 1.6 | 100 | 0.01 | 580 | ☆ |
| 05D820K | 50 | 65 | 74 | 82 | 90 | 145 | 5 | 2.5 | 400 | 0.10 | 310 | ☆ ◎ |
| 05D101K | 60 | 85 | 90 | 100 | 110 | 175 | 5 | 3.0 | 400 | 0.10 | 290 | ☆ ◎ |
| 05D121K | 75 | 100 | 108 | 120 | 132 | 210 | 5 | 4.0 | 400 | 0.10 | 270 | ☆ ◎ |
| 05D151K | 95 | 125 | 135 | 150 | 165 | 260 | 5 | 4.8 | 400 | 0.10 | 240 | ☆ ◎ |
| 05D181K | 115 | 150 | 162 | 180 | 198 | 325 | 5 | 5.9 | 400 | 0.10 | 140 | ☆ ◎ |
| 05D201K | 130 | 170 | 185 | 200 | 225 | 355 | 5 | 6.5 | 400 | 0.10 | 120 | ☆ △ ※ ◎ |
| 05D221K | 140 | 180 | 198 | 220 | 242 | 380 | 5 | 7.0 | 400 | 0.10 | 110 | ☆ △ ※ ◎ |
| 05D241K | 150 | 200 | 216 | 240 | 264 | 415 | 5 | 8.0 | 400 | 0.10 | 110 | ☆ △ ※ ◎ |
| 05D271K | 175 | 225 | 247 | 270 | 303 | 475 | 5 | 8.5 | 400 | 0.10 | 100 | ☆ △ ※ ◎ |
| 05D301K | 195 | 250 | 270 | 300 | 330 | 505 | 5 | 9.0 | 400 | 0.10 | 100 | ☆ △ ※ ◎ |
| 05D331K | 210 | 275 | 297 | 330 | 363 | 600 | 5 | 10.0 | 400 | 0.10 | 90 | ☆ △ ※ ◎ |
| 05D361K | 230 | 300 | 324 | 360 | 396 | 620 | 5 | 10.0 | 400 | 0.10 | 80 | ☆ △ ※ ◎ |
| 05D391K | 250 | 320 | 351 | 390 | 429 | 675 | 5 | 12.0 | 400 | 0.10 | 80 | ☆ △ ※ ◎ |
| 05D431K | 275 | 350 | 387 | 430 | 473 | 745 | 5 | 13.0 | 400 | 0.10 | 70 | ☆ △ ※ ◎ |
| 05D471K | 300 | 385 | 423 | 470 | 517 | 810 | 5 | 15.0 | 400 | 0.10 | 70 | ☆ △ ※ ◎ |
| 05D511K | 320 | 410 | 459 | 510 | 561 | 880 | 5 | 15.0 | 400 | 0.10 | 65 | ☆ △ ※ ◎ |
| 05D561K | 350 | 460 | 504 | 560 | 616 | 940 | 5 | 15.0 | 400 | 0.10 | 65 | ☆ △ ※ ◎ |
| 05D621K | 385 | 505 | 558 | 620 | 682 | 1050 | 5 | 15.0 | 400 | 0.10 | 65 | ☆ △ ※ ◎ |
| 05D681K | 420 | 560 | 612 | 680 | 748 | 1150 | 5 | 15.0 | 400 | 0.10 | 60 | ☆ △ ※ ◎ |
| 05D751K | 460 | 615 | 675 | 750 | 825 | 1290 | 5 | 15.0 | 400 | 0.10 | 60 | ☆ △ ※ ◎ |

Application Notes for UL Recognized Components

Related Standards

| Standard No. | UL 1414 | UL 1449(2nd Edition) | CSA | VDE |
|--------------|----------------------------|-------------------------------------|---|---|
| Title | Across-The-Line Components | Transient Voltage Surge Suppressors | Accessories and Parts for Electronic Products | Varistors for use in Electronic equipment |
| File No. | E165143 | E150709 | LR109736-1 | 21557-4790-001 |
| Symbols | △ | ☆ | ※ | ◎ |

Selection guide

1. Determine the necessary steady-state voltage (working voltage).
2. Establish the transient energy absorbed by the varistor
3. Calculate the peak transient current through the varistor
4. Determine power dissipation requirement.
5. Select a model to provide the required voltage-clamping characteristics

07D Series

| Part No. Device Marking | Maximum Allowable Voltage | | Varistor Voltage (@1mA) | | | Clamping Voltage @ Test Current (8/20µs) | | Maximum Energy (J) | Maximum Peak Current (8/20µs) | Rated Power (W) | Typical Capacitance (@1KHz) (pF) | Standards |
|-------------------------------|---------------------------|-------|-------------------------|---------|------|--|-------|--------------------|-------------------------------|-----------------|----------------------------------|-----------|
| | ACrms(V) | DC(V) | Min. | Vb(Vdc) | Max. | Vc(V) | Ip(A) | 10/1000µs | (A) | (W) | (pF) | |
| 07D180K | 11 | 14 | 14.4 | 18 | 21.6 | 42 | 2.5 | 0.9 | 250 | 0.02 | 3800 | ☆ |
| 07D220K | 14 | 18 | 18.7 | 22 | 26.0 | 47 | 2.5 | 1.1 | 250 | 0.02 | 3600 | ☆ |
| 07D270K | 17 | 22 | 23.0 | 27 | 31.1 | 53 | 2.5 | 1.4 | 250 | 0.02 | 3400 | ☆ |
| 07D330K | 20 | 26 | 29.5 | 33 | 36.5 | 65 | 2.5 | 1.7 | 250 | 0.02 | 2900 | ☆ |
| 07D390K | 25 | 31 | 35 | 39 | 43 | 77 | 2.5 | 2.1 | 250 | 0.02 | 1600 | ☆ |
| 07D470K | 30 | 38 | 42 | 47 | 52 | 93 | 2.5 | 2.5 | 250 | 0.02 | 1550 | ☆ |
| 07D560K | 35 | 45 | 50 | 56 | 62 | 110 | 2.5 | 3.1 | 250 | 0.02 | 1500 | ☆ |
| 07D680K | 40 | 56 | 61 | 68 | 75 | 135 | 2.5 | 3.6 | 250 | 0.02 | 1200 | ☆ |
| 07D820K | 50 | 65 | 74 | 82 | 90 | 135 | 10 | 5.5 | 1200 | 0.25 | 860 | ☆ ◎ |
| 07D101K | 60 | 85 | 90 | 100 | 110 | 165 | 10 | 6.5 | 1200 | 0.25 | 750 | ☆ ◎ |
| 07D121K | 75 | 100 | 108 | 120 | 132 | 200 | 10 | 7.8 | 1200 | 0.25 | 530 | ☆ ◎ |
| 07D151K | 95 | 125 | 135 | 150 | 165 | 250 | 10 | 9.7 | 1200 | 0.25 | 410 | ☆ ◎ |
| 07D181K | 115 | 150 | 162 | 180 | 198 | 300 | 10 | 11.7 | 1200 | 0.25 | 300 | ☆ ◎ |
| 07D201K | 130 | 170 | 185 | 200 | 225 | 340 | 10 | 13.0 | 1200 | 0.25 | 250 | ☆ △ ※ ◎ |
| 07D221K | 140 | 180 | 198 | 220 | 242 | 360 | 10 | 14.0 | 1200 | 0.25 | 250 | ☆ △ ※ ◎ |
| 07D241K | 150 | 200 | 216 | 240 | 264 | 395 | 10 | 15.0 | 1200 | 0.25 | 240 | ☆ △ ※ ◎ |
| 07D271K | 175 | 225 | 247 | 270 | 303 | 455 | 10 | 18.0 | 1200 | 0.25 | 220 | ☆ △ ※ ◎ |
| 07D301K | 195 | 250 | 270 | 300 | 330 | 500 | 10 | 20.0 | 1200 | 0.25 | 190 | ☆ △ ※ ◎ |
| 07D331K | 210 | 275 | 297 | 330 | 363 | 550 | 10 | 25.0 | 1200 | 0.25 | 180 | ☆ △ ※ ◎ |
| 07D361K | 230 | 300 | 324 | 360 | 396 | 595 | 10 | 25.0 | 1200 | 0.25 | 170 | ☆ △ ※ ◎ |
| 07D391K | 250 | 320 | 351 | 390 | 429 | 650 | 10 | 25.0 | 1200 | 0.25 | 160 | ☆ △ ※ ◎ |
| 07D431K | 275 | 350 | 387 | 430 | 473 | 710 | 10 | 28.0 | 1200 | 0.25 | 150 | ☆ △ ※ ◎ |
| 07D471K | 300 | 385 | 423 | 470 | 517 | 775 | 10 | 30.0 | 1200 | 0.25 | 130 | ☆ △ ※ ◎ |
| 07D511K | 320 | 410 | 459 | 510 | 561 | 845 | 10 | 30.0 | 1200 | 0.25 | 120 | ☆ △ ※ ◎ |
| 07D561K | 350 | 460 | 504 | 560 | 616 | 915 | 10 | 30.0 | 1200 | 0.25 | 120 | ☆ △ ※ ◎ |
| 07D621K | 385 | 505 | 558 | 620 | 682 | 1025 | 10 | 30.0 | 1200 | 0.25 | 120 | ☆ △ ※ ◎ |
| 07D681K | 420 | 560 | 612 | 680 | 748 | 1120 | 10 | 30.0 | 1200 | 0.25 | 110 | ☆ △ ※ ◎ |
| 07D751K | 460 | 615 | 675 | 750 | 825 | 1240 | 10 | 33.0 | 1200 | 0.25 | 100 | ☆ △ ※ ◎ |
| 07D781K | 485 | 640 | 702 | 780 | 858 | 1290 | 10 | 37.0 | 1200 | 0.25 | 90 | ☆ △ ※ ◎ |
| 07D821K | 510 | 670 | 738 | 820 | 902 | 1355 | 10 | 40.0 | 1200 | 0.25 | 90 | ☆ △ ※ ◎ |

Related Standards

| Standard No. | UL 1414 | UL 1449(2nd Edition) | CSA | VDE |
|--------------|----------------------------|-------------------------------------|---|---|
| Title | Across-The-Line Components | Transient Voltage Surge Suppressors | Accessories and Parts for Electronic Products | Varistors for use in Electronic equipment |
| File No. | E165143 | E150709 | LR109736-1 | 21557-4790-001 |
| Symbols | △ | ☆ | ※ | ◎ |

10D Series

| Part No. Device Marking | Maximum Allowable Voltage | | Varistor Voltage (@1mA) | | | Clamping Voltage @ Test Current (8/20µs) | | Maximum Energy (J) | Maximum Peak Current (8/20µs) | Rated Power (W) | Typical Capacitance (@1KHz) | Standards |
|-------------------------------|---------------------------|-------|-------------------------|---------|------|--|-------|--------------------|-------------------------------|-----------------|-----------------------------|-----------|
| | ACrms(V) | DC(V) | Min. | Vb(Vdc) | Max. | Vc(V) | Ip(A) | 10/1000µs | (A) | (pF) | | |
| 10D180K | 11 | 14 | 14.4 | 18 | 21.6 | 39 | 5 | 2.1 | 500 | 0.05 | 16000 | ☆ |
| 10D220K | 14 | 18 | 18.7 | 22 | 26.0 | 43 | 5 | 2.5 | 500 | 0.05 | 11000 | ☆ |
| 10D270K | 17 | 22 | 23.0 | 27 | 31.1 | 53 | 5 | 3.0 | 500 | 0.05 | 8000 | ☆ |
| 10D330K | 20 | 26 | 29.5 | 33 | 36.5 | 65 | 5 | 4.0 | 500 | 0.05 | 6300 | ☆ |
| 10D390K | 25 | 31 | 35 | 39 | 43 | 77 | 5 | 4.6 | 500 | 0.05 | 5200 | ☆ |
| 10D470K | 30 | 38 | 42 | 47 | 52 | 93 | 5 | 5.5 | 500 | 0.05 | 4600 | ☆ |
| 10D560K | 35 | 45 | 50 | 56 | 62 | 110 | 5 | 7.0 | 500 | 0.05 | 3750 | ☆ |
| 10D680K | 40 | 56 | 61 | 68 | 75 | 135 | 5 | 8.2 | 500 | 0.05 | 2800 | ☆ |
| 10D820K | 50 | 65 | 74 | 82 | 90 | 135 | 25 | 12.0 | 2500 | 0.40 | 1920 | ☆ ◎ |
| 10D101K | 60 | 85 | 90 | 100 | 110 | 165 | 25 | 15.0 | 2500 | 0.40 | 1800 | ☆ ◎ |
| 10D121K | 75 | 100 | 108 | 120 | 132 | 200 | 25 | 18.0 | 2500 | 0.40 | 1500 | ☆ ◎ |
| 10D151K | 95 | 125 | 135 | 150 | 165 | 250 | 25 | 22.0 | 2500 | 0.40 | 1200 | ☆ ◎ |
| 10D181K | 115 | 150 | 162 | 180 | 198 | 300 | 25 | 27.0 | 2500 | 0.40 | 620 | ☆ ◎ |
| 10D201K | 130 | 170 | 185 | 200 | 225 | 340 | 25 | 30.0 | 2500 | 0.40 | 570 | ☆ △ ※ ◎ |
| 10D221K | 140 | 180 | 198 | 220 | 242 | 360 | 25 | 32.0 | 2500 | 0.40 | 560 | ☆ △ ※ ◎ |
| 10D241K | 150 | 200 | 216 | 240 | 264 | 395 | 25 | 35.0 | 2500 | 0.40 | 550 | ☆ △ ※ ◎ |
| 10D271K | 175 | 225 | 247 | 270 | 303 | 455 | 25 | 40.0 | 2500 | 0.40 | 530 | ☆ △ ※ ◎ |
| 10D301K | 195 | 250 | 270 | 300 | 330 | 500 | 25 | 42.0 | 2500 | 0.40 | 500 | ☆ △ ※ ◎ |
| 10D331K | 210 | 275 | 297 | 330 | 363 | 550 | 25 | 47.0 | 2500 | 0.40 | 450 | ☆ △ ※ ◎ |
| 10D361K | 230 | 300 | 324 | 360 | 396 | 595 | 25 | 47.0 | 2500 | 0.40 | 450 | ☆ △ ※ ◎ |
| 10D391K | 250 | 320 | 351 | 390 | 429 | 650 | 25 | 60.0 | 2500 | 0.40 | 430 | ☆ △ ※ ◎ |
| 10D431K | 275 | 350 | 387 | 430 | 473 | 710 | 25 | 65.0 | 2500 | 0.40 | 400 | ☆ △ ※ ◎ |
| 10D471K | 300 | 385 | 423 | 470 | 517 | 775 | 25 | 70.0 | 2500 | 0.40 | 300 | ☆ △ ※ ◎ |
| 10D511K | 320 | 410 | 459 | 510 | 561 | 845 | 25 | 70.0 | 2500 | 0.40 | 260 | ☆ △ ※ ◎ |
| 10D561K | 350 | 460 | 504 | 560 | 616 | 915 | 25 | 70.0 | 2500 | 0.40 | 200 | ☆ △ ※ ◎ |
| 10D621K | 385 | 505 | 558 | 620 | 682 | 1025 | 25 | 70.0 | 2500 | 0.40 | 170 | ☆ △ ※ ◎ |
| 10D681K | 420 | 560 | 612 | 680 | 748 | 1120 | 25 | 70.0 | 2500 | 0.40 | 160 | ☆ △ ※ ◎ |
| 10D751K | 460 | 615 | 675 | 750 | 825 | 1240 | 25 | 75.0 | 2500 | 0.40 | 150 | ☆ △ ※ ◎ |
| 10D781K | 485 | 640 | 702 | 780 | 858 | 1290 | 25 | 80.0 | 2500 | 0.40 | 150 | ☆ △ ※ ◎ |
| 10D821K | 510 | 670 | 738 | 820 | 902 | 1355 | 25 | 85.0 | 2500 | 0.40 | 150 | ☆ △ ※ ◎ |
| 10D911K | 550 | 745 | 819 | 910 | 1001 | 1500 | 25 | 93.0 | 2500 | 0.40 | 140 | ☆ △ ※ ◎ |
| 10D102K | 625 | 825 | 900 | 1000 | 1100 | 1650 | 25 | 102.0 | 2500 | 0.40 | 140 | ☆ △ ※ ◎ |
| 10D112K | 680 | 895 | 990 | 1100 | 1210 | 1815 | 25 | 115.0 | 2500 | 0.40 | 130 | ☆ ※ ◎ |

Related Standards

| Standard No. | UL 1414 | UL 1449(2nd Edition) | CSA | VDE |
|--------------|----------------------------|-------------------------------------|---|---|
| Title | Across-The-Line Components | Transient Voltage Surge Suppressors | Accessories and Parts for Electronic Products | Varistors for use in Electronic equipment |
| File No. | E165143 | E150709 | LR109736-1 | 21557-4790-001 |
| Symbols | △ | ☆ | ※ | ◎ |

14D Series

| Part No. Device Marking | Maximum Allowable Voltage | | Varistor Voltage (@1mA) | | | Clamping Voltage @ Test Current (8/20μs) | | Maximum Energy (J) | Maximum Peak Current (8/20μs) (A) | Rated Power (W) | Typical Capacitance (@1KHz) (pF) | Standards |
|-------------------------------|---------------------------|-------|-------------------------|---------|------|--|-------|--------------------|-----------------------------------|-----------------|----------------------------------|-----------|
| | ACrms(V) | DC(V) | Min. | Vb(Vdc) | Max. | Vc(V) | Ip(A) | 10/1000μs | | | | |
| 14D180K | 11 | 14 | 14.4 | 18 | 21.6 | 39 | 10 | 4.0 | 1000 | 0.1 | 25000 | ☆ |
| 14D220K | 14 | 18 | 18.7 | 22 | 26.0 | 43 | 10 | 5.0 | 1000 | 0.1 | 20000 | ☆ |
| 14D270K | 17 | 22 | 23.0 | 27 | 31.1 | 53 | 10 | 6.0 | 1000 | 0.1 | 16000 | ☆ |
| 14D330K | 20 | 26 | 29.5 | 33 | 36.5 | 65 | 10 | 7.5 | 1000 | 0.1 | 12200 | ☆ |
| 14D390K | 25 | 31 | 35 | 39 | 43 | 77 | 10 | 8.6 | 1000 | 0.1 | 7000 | ☆ |
| 14D470K | 30 | 38 | 42 | 47 | 52 | 93 | 10 | 10.0 | 1000 | 0.1 | 6750 | ☆ |
| 14D560K | 35 | 45 | 50 | 56 | 62 | 110 | 10 | 11.0 | 1000 | 0.1 | 6500 | ☆ |
| 14D680K | 40 | 56 | 61 | 68 | 75 | 135 | 10 | 14.0 | 1000 | 0.1 | 5500 | ☆ |
| 14D820K | 50 | 65 | 74 | 82 | 90 | 135 | 50 | 22.0 | 4500 | 0.6 | 4300 | ☆ ◎ |
| 14D101K | 60 | 85 | 90 | 100 | 110 | 165 | 50 | 28.0 | 4500 | 0.6 | 3500 | ☆ ◎ |
| 14D121K | 75 | 100 | 108 | 120 | 132 | 200 | 50 | 32.0 | 4500 | 0.6 | 2500 | ☆ ◎ |
| 14D151K | 95 | 125 | 135 | 150 | 165 | 250 | 50 | 40.0 | 4500 | 0.6 | 2100 | ☆ ◎ |
| 14D181K | 115 | 150 | 162 | 180 | 198 | 300 | 50 | 50.0 | 4500 | 0.6 | 1250 | ☆ ◎ |
| 14D201K | 130 | 170 | 185 | 200 | 225 | 340 | 50 | 57.0 | 4500 | 0.6 | 1150 | ☆ △ ※ ◎ |
| 14D221K | 140 | 180 | 198 | 220 | 242 | 360 | 50 | 60.0 | 4500 | 0.6 | 1100 | ☆ △ ※ ◎ |
| 14D241K | 150 | 200 | 216 | 240 | 264 | 395 | 50 | 63.0 | 4500 | 0.6 | 1050 | ☆ △ ※ ◎ |
| 14D271K | 175 | 225 | 247 | 270 | 303 | 455 | 50 | 70.0 | 4500 | 0.6 | 1000 | ☆ △ ※ ◎ |
| 14D301K | 195 | 250 | 270 | 300 | 330 | 500 | 50 | 73.0 | 4500 | 0.6 | 900 | ☆ △ ※ ◎ |
| 14D331K | 210 | 275 | 297 | 330 | 363 | 550 | 50 | 93.0 | 4500 | 0.6 | 850 | ☆ △ ※ ◎ |
| 14D361K | 230 | 300 | 324 | 360 | 396 | 595 | 50 | 93.0 | 4500 | 0.6 | 800 | ☆ △ ※ ◎ |
| 14D391K | 250 | 320 | 351 | 390 | 429 | 650 | 50 | 100.0 | 4500 | 0.6 | 800 | ☆ △ ※ ◎ |
| 14D431K | 275 | 350 | 387 | 430 | 473 | 710 | 50 | 115.0 | 4500 | 0.6 | 650 | ☆ △ ※ ◎ |
| 14D471K | 300 | 385 | 423 | 470 | 517 | 775 | 50 | 125.0 | 4500 | 0.6 | 550 | ☆ △ ※ ◎ |
| 14D511K | 320 | 410 | 459 | 510 | 561 | 845 | 50 | 125.0 | 4500 | 0.6 | 450 | ☆ △ ※ ◎ |
| 14D561K | 350 | 460 | 504 | 560 | 616 | 915 | 50 | 125.0 | 4500 | 0.6 | 400 | ☆ △ ※ ◎ |
| 14D621K | 385 | 505 | 558 | 620 | 682 | 1025 | 50 | 125.0 | 4500 | 0.6 | 350 | ☆ △ ※ ◎ |
| 14D681K | 420 | 560 | 612 | 680 | 748 | 1120 | 50 | 130.0 | 4500 | 0.6 | 350 | ☆ △ ※ ◎ |
| 14D751K | 460 | 615 | 675 | 750 | 825 | 1240 | 50 | 143.0 | 4500 | 0.6 | 330 | ☆ △ ※ ◎ |
| 14D781K | 485 | 640 | 702 | 780 | 858 | 1290 | 50 | 148.0 | 4500 | 0.6 | 330 | ☆ △ ※ ◎ |
| 14D821K | 510 | 670 | 738 | 820 | 902 | 1355 | 50 | 157.0 | 4500 | 0.6 | 330 | ☆ △ ※ ◎ |
| 14D911K | 550 | 745 | 819 | 910 | 1001 | 1500 | 50 | 175.0 | 4500 | 0.6 | 300 | ☆ △ ※ ◎ |
| 14D102K | 625 | 825 | 900 | 1000 | 1100 | 1650 | 50 | 190.0 | 4500 | 0.6 | 300 | ☆ △ ※ ◎ |
| 14D112K | 680 | 895 | 990 | 1100 | 1210 | 1815 | 50 | 213.0 | 4500 | 0.6 | 200 | ☆ ※ ◎ |
| 14D182K | 1000 | 1465 | 1620 | 1800 | 1980 | 2970 | 50 | 337.0 | 4500 | 0.6 | 150 | ☆ |

Related Standards

| Standard No. | UL 1414 | UL 1449(2nd Edition) | CSA | VDE |
|--------------|----------------------------|-------------------------------------|---|---|
| Title | Across-The-Line Components | Transient Voltage Surge Suppressors | Accessories and Parts for Electronic Products | Varistors for use in Electronic equipment |
| File No. | E165143 | E150709 | LR109736-1 | 21557-4790-001 |
| Symbols | △ | ☆ | ※ | ◎ |

18D Series

| Part No. | Maximum Allowable Voltage | | Varistor Voltage (@ 1mA) | | | Clamping Voltage @ Test Current (8/20µs) | | Maximum Energy (J) | Maximum Peak Current (8/20µs) | Rated Power (W) | Typical Capacitance (@ 1KHz) | Standards |
|----------|---------------------------|-------|--------------------------|---------|------|--|-------|--------------------|-------------------------------|-----------------|------------------------------|-----------|
| | ACrms(V) | DC(V) | Min. | Vb(Vdc) | Max. | Vc(V) | Ip(A) | 10/1000µs | (A) | (pF) | | |
| 18D180K | 11 | 14 | 14.4 | 18 | 21.6 | 39 | 15 | 8.3 | 2000 | 0.15 | 36400 | ☆ |
| 18D220K | 14 | 18 | 18.7 | 22 | 26.0 | 43 | 15 | 10.4 | 2000 | 0.15 | 27300 | ☆ |
| 18D270K | 17 | 22 | 23.0 | 27 | 31.1 | 53 | 15 | 12.5 | 2000 | 0.15 | 22290 | ☆ |
| 18D330K | 20 | 26 | 29.5 | 33 | 36.5 | 65 | 15 | 15.6 | 2000 | 0.15 | 18200 | ☆ |
| 18D390K | 25 | 31 | 35 | 39 | 43 | 77 | 15 | 17.9 | 2000 | 0.15 | 12250 | ☆ |
| 18D470K | 30 | 38 | 42 | 47 | 52 | 93 | 15 | 20.8 | 2000 | 0.15 | 12280 | ☆ |
| 18D560K | 35 | 45 | 50 | 56 | 62 | 110 | 15 | 22.8 | 2000 | 0.15 | 11100 | ☆ |
| 18D680K | 40 | 56 | 61 | 68 | 75 | 135 | 15 | 29.1 | 2000 | 0.15 | 10460 | ☆ |
| 18D820K | 50 | 65 | 74 | 82 | 90 | 135 | 75 | 30.6 | 5500 | 0.8 | 7460 | ☆ ◎ |
| 18D101K | 60 | 85 | 90 | 100 | 110 | 165 | 75 | 38.9 | 5500 | 0.8 | 7280 | ☆ ◎ |
| 18D121K | 75 | 100 | 108 | 120 | 132 | 200 | 75 | 44.4 | 6500 | 0.8 | 5000 | ☆ ◎ |
| 18D151K | 95 | 125 | 135 | 150 | 165 | 250 | 75 | 55.6 | 6500 | 0.8 | 3820 | ☆ ◎ |
| 18D181K | 115 | 150 | 162 | 180 | 198 | 300 | 75 | 69.4 | 6500 | 0.8 | 2270 | ☆ ◎ |
| 18D201K | 130 | 170 | 185 | 200 | 225 | 330 | 75 | 79.2 | 6500 | 0.8 | 2100 | ☆ △ ※ ◎ |
| 18D221K | 140 | 180 | 198 | 220 | 242 | 360 | 75 | 83.3 | 6500 | 0.8 | 2000 | ☆ △ ※ ◎ |
| 18D241K | 150 | 200 | 216 | 240 | 264 | 395 | 75 | 87.5 | 6500 | 0.8 | 2000 | ☆ △ ※ ◎ |
| 18D271K | 175 | 225 | 247 | 270 | 303 | 455 | 75 | 97.2 | 6500 | 0.8 | 1910 | ☆ △ ※ ◎ |
| 18D301K | 195 | 250 | 270 | 300 | 330 | 500 | 75 | 101.4 | 6500 | 0.8 | 1630 | ☆ △ ※ ◎ |
| 18D331K | 210 | 275 | 297 | 330 | 363 | 550 | 75 | 129.2 | 6500 | 0.8 | 1590 | ☆ △ ※ ◎ |
| 18D361K | 230 | 300 | 324 | 360 | 396 | 595 | 75 | 129.2 | 6500 | 0.8 | 1540 | ☆ △ ※ ◎ |
| 18D391K | 250 | 320 | 351 | 390 | 429 | 650 | 75 | 138.9 | 6500 | 0.8 | 1270 | ☆ △ ※ ◎ |
| 18D431K | 275 | 350 | 387 | 430 | 473 | 710 | 75 | 159.7 | 6500 | 0.8 | 1220 | ☆ △ ※ ◎ |
| 18D471K | 300 | 385 | 423 | 470 | 517 | 775 | 75 | 173.6 | 6500 | 0.8 | 1090 | ☆ △ ※ ◎ |
| 18D511K | 320 | 410 | 459 | 510 | 561 | 845 | 75 | 175.0 | 6500 | 0.8 | 950 | ☆ △ ※ ◎ |
| 18D561K | 350 | 460 | 504 | 560 | 616 | 915 | 75 | 177.8 | 6500 | 0.8 | 770 | ☆ △ ※ ◎ |
| 18D621K | 385 | 505 | 558 | 620 | 682 | 1025 | 75 | 180.6 | 6500 | 0.8 | 510 | ☆ △ ※ ◎ |
| 18D681K | 420 | 560 | 612 | 680 | 748 | 1120 | 75 | 182.0 | 6500 | 0.8 | 500 | ☆ △ ※ ◎ |
| 18D751K | 460 | 615 | 675 | 750 | 825 | 1240 | 75 | 200.2 | 6500 | 0.8 | 480 | ☆ △ ※ ◎ |
| 18D781K | 485 | 640 | 702 | 780 | 858 | 1290 | 75 | 207.2 | 6500 | 0.8 | 450 | ☆ △ ※ ◎ |
| 18D821K | 510 | 675 | 738 | 820 | 902 | 1355 | 75 | 219.8 | 6500 | 0.8 | 450 | ☆ △ ※ ◎ |
| 18D911K | 550 | 745 | 819 | 910 | 1001 | 1500 | 75 | 245.0 | 6500 | 0.8 | 430 | ☆ △ ※ ◎ |
| 18D102K | 625 | 825 | 900 | 1000 | 1100 | 1650 | 75 | 266.0 | 6500 | 0.8 | 410 | ☆ △ ※ ◎ |
| 18D112K | 680 | 895 | 990 | 1100 | 1210 | 1815 | 75 | 298.2 | 6500 | 0.8 | 360 | ☆ ※ ◎ |
| 18D182K | 1000 | 1465 | 1620 | 1800 | 1980 | 2970 | 75 | 478.0 | 6500 | 0.8 | 260 | |

Related Standards

| Standard No. | UL 1414 | UL 1449(2nd Edition) | CSA | VDE |
|--------------|----------------------------|-------------------------------------|---|---|
| Title | Across-The-Line Components | Transient Voltage Surge Suppressors | Accessories and Parts for Electronic Products | Varistors for use in Electronic equipment |
| File No. | E165143 | E150709 | LR109736-1 | 21557-4790-001 |
| Symbols | △ | ☆ | ※ | ◎ |

20D Series

| Part No. | Maximum Allowable Voltage | | Varistor Voltage (@1mA) | | | Clamping Voltage @ Test Current (8/20 μ s) | | Maximum Energy (J) | Maximum Peak Current (8/20 μ s) (A) | Rated Power (W) | Typical Capacitance (@1KHz) (pF) | Standards |
|----------------|---------------------------|-------|-------------------------|---------|------|--|-------|--------------------|---|-----------------|----------------------------------|-----------|
| | | | | | | Vc(V) | Ip(A) | | | | | |
| Device Marking | ACrms(V) | DC(V) | Min. | Vb(Vdc) | Max. | Vc(V) | Ip(A) | 10/1000 μ s | (A) | (W) | (pF) | |
| 20D180K | 11 | 14 | 14.4 | 18 | 21.6 | 39 | 20 | 11.0 | 2000 | 0.2 | 40000 | ☆ |
| 20D220K | 14 | 18 | 18.7 | 22 | 26.0 | 43 | 20 | 14.0 | 2000 | 0.2 | 30000 | ☆ |
| 20D270K | 17 | 22 | 23.0 | 27 | 31.1 | 53 | 20 | 18.0 | 2000 | 0.2 | 24500 | ☆ |
| 20D330K | 20 | 26 | 29.5 | 33 | 36.5 | 65 | 20 | 23.0 | 2000 | 0.2 | 20000 | ☆ |
| 20D390K | 25 | 31 | 35 | 39 | 43 | 77 | 20 | 26.0 | 2000 | 0.2 | 13800 | ☆ |
| 20D470K | 30 | 38 | 42 | 47 | 52 | 93 | 20 | 33.0 | 2000 | 0.2 | 13500 | ☆ |
| 20D560K | 35 | 45 | 50 | 56 | 62 | 110 | 20 | 41.0 | 2000 | 0.2 | 12200 | ☆ |
| 20D680K | 40 | 56 | 61 | 68 | 75 | 135 | 20 | 46.0 | 2000 | 0.2 | 11500 | ☆ |
| 20D820K | 50 | 65 | 74 | 82 | 90 | 135 | 100 | 38.0 | 6500 | 1.0 | 8200 | ☆ ◎ |
| 20D101K | 60 | 85 | 90 | 100 | 110 | 165 | 100 | 45.0 | 6500 | 1.0 | 8000 | ☆ ◎ |
| 20D121K | 75 | 100 | 108 | 120 | 132 | 200 | 100 | 55.0 | 6500 | 1.0 | 5500 | ☆ ◎ |
| 20D151K | 95 | 125 | 135 | 150 | 165 | 250 | 100 | 70.0 | 6500 | 1.0 | 4200 | ☆ ◎ |
| 20D181K | 115 | 150 | 162 | 180 | 198 | 300 | 100 | 85.0 | 6500 | 1.0 | 2500 | ☆ ◎ |
| 20D201K | 130 | 170 | 185 | 200 | 225 | 340 | 100 | 95.0 | 6500 | 1.0 | 2300 | ☆ △ ※ ◎ |
| 20D221K | 140 | 180 | 198 | 220 | 242 | 360 | 100 | 100.0 | 6500 | 1.0 | 2200 | ☆ △ ※ ◎ |
| 20D241K | 150 | 200 | 216 | 240 | 264 | 395 | 100 | 108.0 | 6500 | 1.0 | 2200 | ☆ △ ※ ◎ |
| 20D271K | 175 | 225 | 247 | 270 | 303 | 455 | 100 | 127.0 | 6500 | 1.0 | 2100 | ☆ △ ※ ◎ |
| 20D301K | 195 | 250 | 270 | 300 | 330 | 500 | 100 | 150.0 | 6500 | 1.0 | 1800 | ☆ △ ※ ◎ |
| 20D331K | 210 | 275 | 297 | 330 | 363 | 550 | 100 | 163.0 | 6500 | 1.0 | 1750 | ☆ △ ※ ◎ |
| 20D361K | 230 | 300 | 324 | 360 | 396 | 595 | 100 | 163.0 | 6500 | 1.0 | 1700 | ☆ △ ※ ◎ |
| 20D391K | 250 | 320 | 351 | 390 | 429 | 650 | 100 | 180.0 | 6500 | 1.0 | 1400 | ☆ △ ※ ◎ |
| 20D431K | 275 | 350 | 387 | 430 | 473 | 710 | 100 | 190.0 | 6500 | 1.0 | 1350 | ☆ △ ※ ◎ |
| 20D471K | 300 | 385 | 423 | 470 | 517 | 775 | 100 | 220.0 | 6500 | 1.0 | 1200 | ☆ △ ※ ◎ |
| 20D511K | 320 | 410 | 459 | 510 | 561 | 845 | 100 | 220.0 | 6500 | 1.0 | 1050 | ☆ △ ※ ◎ |
| 20D561K | 350 | 460 | 504 | 560 | 616 | 915 | 100 | 220.0 | 6500 | 1.0 | 850 | ☆ △ ※ ◎ |
| 20D621K | 385 | 505 | 558 | 620 | 682 | 1025 | 100 | 220.0 | 6500 | 1.0 | 570 | ☆ △ ※ ◎ |
| 20D681K | 420 | 560 | 612 | 680 | 748 | 1120 | 100 | 230.0 | 6500 | 1.0 | 550 | ☆ △ ※ ◎ |
| 20D751K | 460 | 615 | 675 | 750 | 825 | 1240 | 100 | 255.0 | 6500 | 1.0 | 530 | ☆ △ ※ ◎ |
| 20D781K | 485 | 640 | 702 | 780 | 858 | 1290 | 100 | 265.0 | 6500 | 1.0 | 500 | ☆ △ ※ ◎ |
| 20D821K | 510 | 675 | 738 | 820 | 902 | 1355 | 100 | 282.0 | 6500 | 1.0 | 500 | ☆ △ ※ ◎ |
| 20D911K | 550 | 745 | 819 | 910 | 1001 | 1500 | 100 | 310.0 | 6500 | 1.0 | 480 | ☆ △ ※ ◎ |
| 20D102K | 625 | 825 | 900 | 1000 | 1100 | 1650 | 100 | 342.0 | 6500 | 1.0 | 460 | ☆ △ ※ ◎ |
| 20D112K | 680 | 895 | 990 | 1100 | 1210 | 1815 | 100 | 383.0 | 6500 | 1.0 | 400 | ☆ ※ ◎ |
| 20D182K | 1000 | 1465 | 1620 | 1800 | 1980 | 2970 | 100 | 625.0 | 6500 | 1.0 | 250 | |

Related Standards

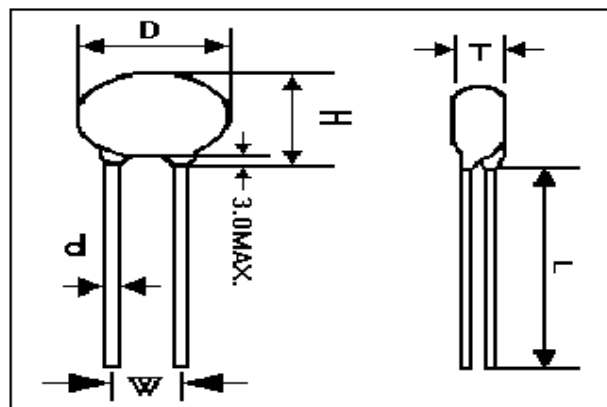
| Standard No. | UL 1414 | UL 1449(2nd Edition) | CSA | VDE |
|--------------|----------------------------|-------------------------------------|---|---|
| Title | Across-The-Line Components | Transient Voltage Surge Suppressors | Accessories and Parts for Electronic Products | Varistors for use in Electronic equipment |
| File No. | E165143 | E150709 | LR109736-1 | 21557-4790-001 |
| Symbols | △ | ☆ | ※ | ◎ |

Dimension of Standard Products

Dimension Table

Unit:mm

| Model Symbol | 05D | 07D | 10D | 14D | 18D | 20D |
|-----------------|------|------|------|------|------|------|
| D(max.) | 7.5 | 9.0 | 14.0 | 17.5 | 23.0 | 25.0 |
| H(max.) | 10.0 | 12.0 | 17.0 | 20.5 | 26.0 | 28.0 |
| W(±1.0) | 5.0 | 5.0 | 7.5 | 7.5 | 7.5 | 10.0 |
| L(min.) | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 |
| d(±0.02) | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 1.0 |



T(max). Table

Unit:mm

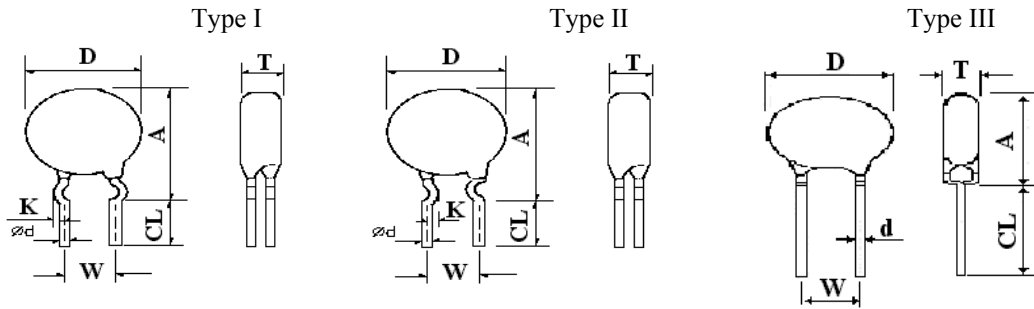
| Part No | 05D | 07D | 10D | 14D | 18D | 20D |
|---------|-----|-----|-----|-----|-----|-----|
| 180K | 3.3 | 3.5 | 3.9 | 4.0 | 4.2 | 4.3 |
| 220K | 3.6 | 3.8 | 4.2 | 4.3 | 4.5 | 4.6 |
| 270K | 3.8 | 4.0 | 4.4 | 4.5 | 4.7 | 4.8 |
| 330K | 3.3 | 3.5 | 3.9 | 4.0 | 4.2 | 4.3 |
| 390K | 3.5 | 3.7 | 4.1 | 4.2 | 4.4 | 4.5 |
| 470K | 3.7 | 3.9 | 4.3 | 4.4 | 4.6 | 4.7 |
| 560K | 4.0 | 4.2 | 4.6 | 4.7 | 4.9 | 5.0 |
| 680K | 4.3 | 4.5 | 4.9 | 5.0 | 5.2 | 5.3 |
| 820K | 3.3 | 3.5 | 3.9 | 4.0 | 4.2 | 4.3 |
| 101K | 3.6 | 3.8 | 4.2 | 4.3 | 4.5 | 4.6 |
| 121K | 3.8 | 4.0 | 4.4 | 4.5 | 4.7 | 4.8 |
| 151K | 4.1 | 4.3 | 4.7 | 4.8 | 5.0 | 5.1 |
| 181K | 3.2 | 3.4 | 3.8 | 3.9 | 4.1 | 4.2 |
| 201K | 3.3 | 3.5 | 3.9 | 4.0 | 4.2 | 4.3 |
| 221K | 3.4 | 3.6 | 4.0 | 4.1 | 4.3 | 4.4 |
| 241K | 3.5 | 3.7 | 4.1 | 4.2 | 4.4 | 4.5 |
| 271K | 3.7 | 3.9 | 4.2 | 4.3 | 4.5 | 4.6 |

| Part No | 05D | 07D | 10D | 14D | 18D | 20D |
|---------|-----|-----|-----|------|------|------|
| 301K | 3.9 | 4.1 | 4.3 | 4.4 | 4.6 | 4.7 |
| 331K | 4.0 | 4.2 | 4.5 | 4.6 | 4.8 | 4.9 |
| 361K | 4.1 | 4.3 | 4.7 | 4.8 | 5.0 | 5.1 |
| 391K | 4.2 | 4.4 | 4.8 | 4.9 | 5.1 | 5.2 |
| 431K | 4.4 | 4.6 | 5.0 | 5.1 | 5.3 | 5.4 |
| 471K | 4.6 | 4.8 | 5.2 | 5.3 | 5.5 | 5.6 |
| 511K | 4.8 | 5.0 | 5.3 | 5.4 | 5.6 | 5.7 |
| 561K | 5.0 | 5.2 | 5.5 | 5.6 | 5.7 | 5.9 |
| 621K | 5.3 | 5.5 | 5.7 | 5.8 | 6.0 | 6.1 |
| 681K | 5.4 | 5.6 | 5.8 | 5.9 | 6.1 | 6.2 |
| 751K | 5.6 | 5.8 | 6.0 | 6.1 | 6.3 | 6.4 |
| 781K | 5.8 | 6.0 | 6.3 | 6.4 | 6.6 | 6.7 |
| 821K | x | 6.3 | 6.5 | 6.6 | 6.8 | 6.9 |
| 911K | x | x | 6.6 | 6.7 | 6.9 | 7.0 |
| 102K | x | x | 7.0 | 7.1 | 7.3 | 7.4 |
| 112K | x | x | 7.4 | 7.5 | 7.7 | 7.9 |
| 182K | x | x | x | 11.5 | 11.7 | 11.9 |

Packing Quantity

| Part No. | Min. Q'ty(pcs) / Bags | Min. Q'ty(pcs) /Inner Box | Min. Q'ty(pcs) /Carton |
|----------|--------------------------|------------------------------|---------------------------|
| 05DXXXXK | 1000 | 10000 | 20000 |
| 07DXXXXK | 1000 | 5000 | 10000 |
| 10DXXXXK | 500 | 3000 | 6000 |
| 14DXXXXK | 500 | 2000 | 4000 |
| 18DXXXXK | 250 | 1000 | 2000 |
| 20DXXXXK | 250 | 1000 | 2000 |

Crimped Lead Type



Unit:mm

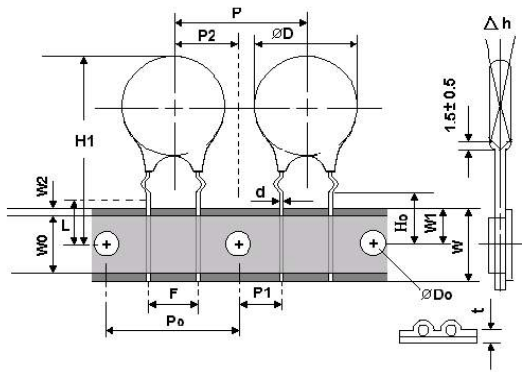
| Symbol | | Series | 05D Series | 07D Series | 10D Series | 14D Series | 20D Series |
|--------|---------|---------------|------------------|-------------|------------|------------|------------|
| | | A max. | Varistor Voltage | 18V to 330V | 13.0 | 15.0 | 19.5 |
| | V1mA(V) | 360V to 1800V | 13.0 | 15.0 | 20.5 | 23.5 | 32.0 |
| Dmax. | | | 7.5 | 9.0 | 14.0 | 17.5 | 25.0 |
| K | | | 1.2±0.4 | 1.2±0.4 | 1.4±0.4 | 1.4±0.4 | 1.6±0.4 |
| W | | | 5.0±1.0 | 5.0±1.0 | 7.5±1.0 | 7.5±1.0 | 10.0±1.0 |
| CL | | | 5.0±0.5 | 5.0±0.5 | 5.0±0.5 | 5.0±0.5 | 5.0±0.5 |
| φd | | | 0.6 | 0.6 | 0.8 | 0.8 | 1.0 |

Symbol T : Product thickness please refer to dimension of standard products

Packing Quantity

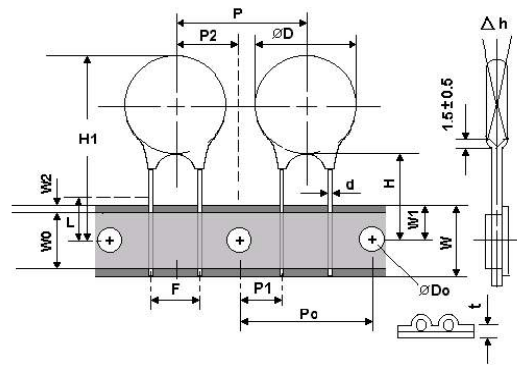
| Cut-off Straight Lead | Cut-off Type I Lead | Cut-off Type II Lead | Cut-off Type III Lead | Min. Q'ty (pcs)/Bags | Min. Q'ty (pcs)/Inner Box | Min. Q'ty (pcs)/Carton |
|-----------------------|---------------------|----------------------|-----------------------|----------------------|---------------------------|------------------------|
| 05DXXXK-TTS | -TTK | -TTI | -TTH | 1000 | 15000 | 30000 |
| 07DXXXK-TTS | -TTK | -TTI | -TTH | 1000 | 15000 | 30000 |
| 10DXXXK-TTS | -TTK | -TTI | -TTH | 500 | 5000 | 10000 |
| 14DXXXK-TTS | -TTK | -TTI | -TTH | 500 | 3000 | 6000 |
| 18DXXXK-TTS | N/A | N/A | N/A | 250 | 1500 | 3000 |
| 20DXXXK-TTS | N/A | N/A | N/A | 250 | 1500 | 3000 |

Tape and Reel Fig.



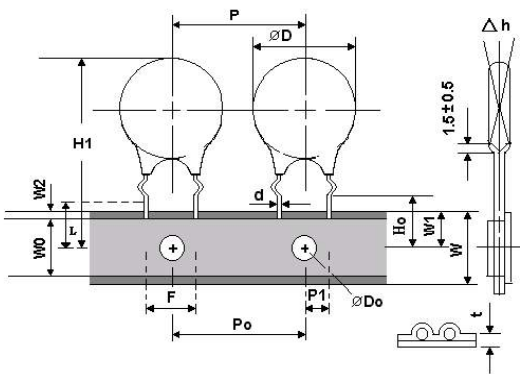
05D、07D Type I Lead

FIG 1



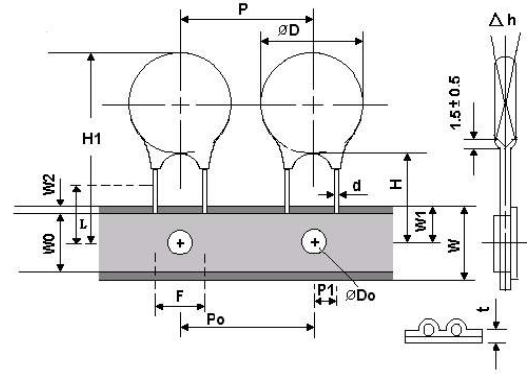
05D、07D Straight Lead

FIG 2



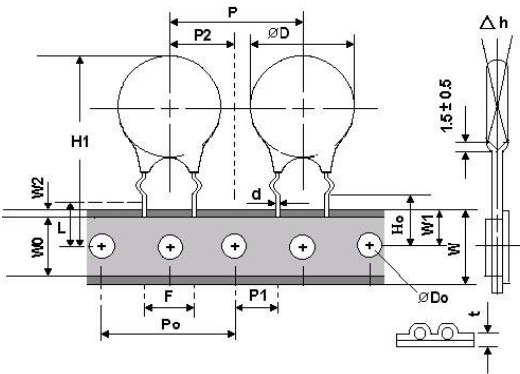
10D Type I Lead

FIG 3



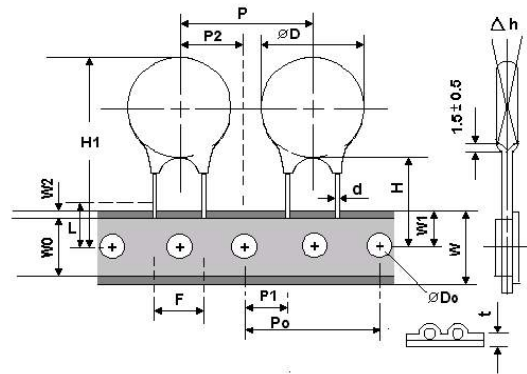
10D Straight Lead

FIG 4



14D Type I Lead

FIG 5



14D Straight Lead

FIG 6

Taping product ordering Information

| Tape & Reel | | | | Flax Box | | | |
|---------------|-------------|--------------|---------------|---------------|-------------|--------------|---------------|
| Straight Lead | Type I Lead | Type II Lead | Type III Lead | Straight Lead | Type I Lead | Type II Lead | Type III Lead |
| 05DXXXK-TRS | -TRK | -TRI | -TRH | 05DXXXK-BTS | -BTK | -BTI | -BTH |
| 07DXXXK-TRS | -TRK | -TRI | -TRH | 07DXXXK-BTS | -BTK | -BTI | -BTH |
| 10DXXXK-TRS | -TRK | -TRI | -TRH | 10DXXXK-BTS | -BTK | -BTI | -BTH |
| 14DXXXK-TRS | -TRK | -TRI | -TRH | | OUTSIDE | INSIDE | CRIMPED |
| | OUTSIDE | INSIDE | CRIMPED | | KINK | KINK | |
| | KINK | KINK | | | | | |

DIMENSION OF TAPING PRODUCT

| Symbol | PARAMETER | Model Size | | | | |
|----------------|---|----------------------|----------------------|----------------------|----------------------|----------------------|
| | | 05D series | 07D series | 10D series | | 14D series |
| P | Pitch of Component | 12.7±1.0 | 12.7±1.0 | 12.7±1.0 | 15.0±1.0 | 25.4±1.0 |
| P ₀ | Feed Hole Pitch | 12.7±0.2 | 12.7±0.2 | 12.7±0.2 | 15.0±0.2 | 25.4±0.2 |
| P ₁ | Feed Hole Center to Lead | 3.85±0.7 | 3.85±0.7 | 3.75±0.7 | 3.85±0.7 | 8.95±0.7 |
| P ₂ | Hole Center to Component Center | 6.35±0.7 | 6.35±0.7 | - | 7.5±1.3 | 12.7±0.7 |
| F | Lead to Lead Distance | 5.0±0.8 | 5.0±0.8 | 7.5±0.8 | 7.5±0.8 | 7.5±0.8 |
| △ h | Component Alignment | 2.0 Max | 2.0 Max | 2.0 Max | 2.0 Max | 2.0 Max |
| W | Tape Width | 18.0+1.0 18.0-0.5 | 18.0+1.0 18.0-0.5 | 18.0+1.0 18.0-0.5 | 18.0+1.0 18.0-0.5 | 18.0+1.0 18.0-0.5 |
| W ₀ | Hold Down Tape Width | 5.0MIN. | 5.0MIN. | 5.0MIN. | 5.0MIN. | 5.0MIN. |
| W ₁ | Hole Position | 9.0+0.75 9.0-0.50 | 9.0+0.75 9.0-0.50 | 9.0+0.75 9.0-0.50 | 9.0+0.75 9.0-0.50 | 9.0+0.75 9.0-0.50 |
| W ₂ | Hold Down Tape Position | 3.0Max | 3.0Max | 3.0Max | 3.0Max | 3.0Max |
| H | Height from Tape Center to Component Base | 18.0+2.0 18.0-0.0 | 18.0+2.0 18.0-0.0 | 18.0+2.0 18.0-0.0 | 18.0+2.0 18.0-0.0 | 18.0+2.0 18.0-0.0 |
| H ₀ | Seating Plane Height | 16.0±0.5 | 16.0±0.5 | 16.0±0.5 | 16.0±0.5 | 16.0±0.5 |
| H ₁ | Component Height | 29.0Max | 32.0Max | 36.0Max | 36.0Max | 40.0Max |
| D ₀ | Feed Hole Diameter | 4.0±0.2 | 4.0±0.2 | 4.0±0.2 | 4.0±0.2 | 4.0±0.2 |
| t | Total Tape Thickness | 0.7±0.2 | 0.7±0.2 | 0.7±0.2 | 0.7±0.2 | 0.7±0.2 |
| L | Length of Clipped Lead | 11.0 Max | 11.0 Max | 11.0 Max | 11.0 Max | 11.0 Max |

Note: Dimensions are in mm

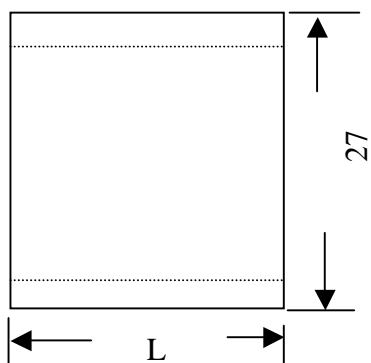
Packing Q'ty

| Tape & Reel (TRK/TRI/TRH Type) | | | | Flat Box (BTK/BTI/BTH TYPE) | | | | |
|--------------------------------|----------------------|--------------------------|-------------------------|-----------------------------|----------------------|---------------------------|-------|-------|
| Model No. | Min.Q'ty (pcs) /Reel | Min.Q'ty(pcs) /Inner Box | Min. Q'ty (pcs) /Carton | Model No. | Min.Q'ty (pcs) /Reel | Min.Q'ty (pcs) /Inner Box | FIG | |
| 05D | 180K~391K | 2000 | 4000 | 16000 | 180K~621K | 1000 | 10000 | 1 & 2 |
| | 431K~821K | 1500 | 3000 | 12000 | 681K~821K | 800 | 8000 | 1 & 2 |
| 07D | 180K~391K | 2000 | 4000 | 16000 | 180K~621K | 1000 | 10000 | 1 & 2 |
| | 431K~821K | 1500 | 3000 | 12000 | 681K~821K | 800 | 8000 | 1 & 2 |
| 10D P12.7mm | 180K~621K | 1000 | 2000 | 8000 | 180K~621K | 1000 | 8000 | 3 & 4 |
| | 681K~112K | 800 | 1600 | 6400 | 681K~112K | 800 | 6400 | 3 & 4 |
| 10D P15.0mm | 180K~621K | 1000 | 2000 | 8000 | 180K~621K | 800 | 6400 | 1 & 2 |
| | 681K~112K | 800 | 1600 | 6400 | 681K~112K | 600 | 4800 | 1 & 2 |
| 14D | 180K~391K | 800 | 1600 | 6400 | | | | 5 & 6 |
| | 431K~621K | 700 | 1400 | 5600 | | | | 5 & 6 |
| | 681K~112K | 600 | 1200 | 4800 | | | | 5 & 6 |

Packing Information

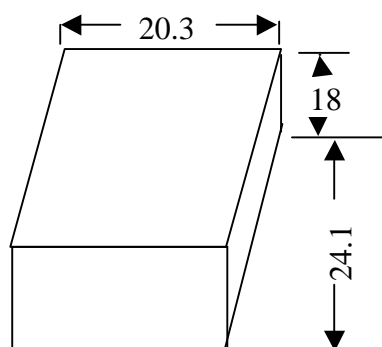
1. Standard

Packing Bag unit:cm



| | | |
|---|-------------------|------|
| L | 05D to 10D Series | 10.5 |
| | 14D to 20D Series | 19.5 |

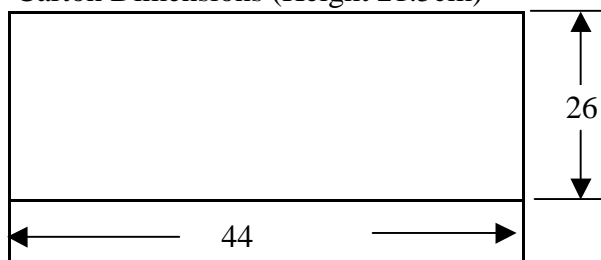
Inner box dimension



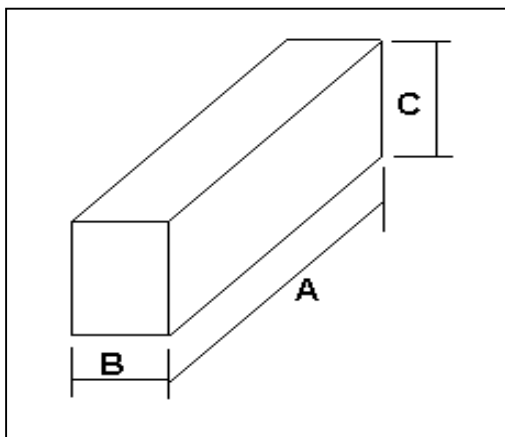
Label

| | | |
|----------|--|--------------|
| | | |
| Part No. | | Inspected by |
| Quantity | | |
| Lot No. | | |

Carton Dimensions (Height 21.5cm)



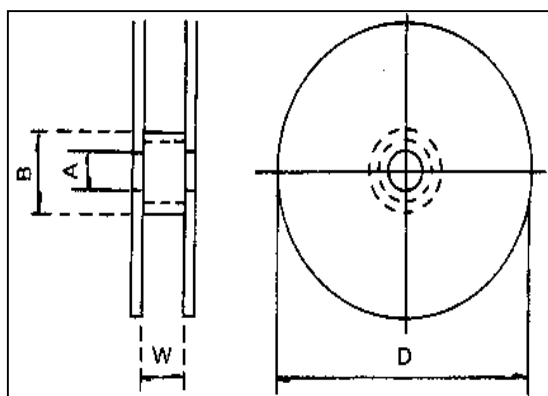
2. Flat box



| | |
|--------|---------|
| Symbol | 05D~10D |
| A | 340 max |
| B | 55max |
| C | 330max |

unit:mm

3. Tape & Reel



| | | |
|--------|-----------|---------|
| Symbol | 05D~07D | 10D~14D |
| W | 45 | 55 |
| D | 350max | |
| A | ϕ 30 | |
| B | ϕ 90 | |

unit:mm

Performance Characteristics (Electrical)

| Characteristics | Test Methods/Description | | Specifications | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--|--|----------------------|--------------------------------|--------------------|-----------------------------|-----------|--------------------|--------------------|--------------------|--------------------|-----------|--------------------|--------------------|--------------------|---------------------|-----------|--------------------|--------------------|--------------------|---------------------|-----------|--------------------|---------------------|--------------------|---------------------|--|
| Standard Test Condition | Environmental conditions under which every measuring is done without doubt on the measuring results. Unless specially specified, temperature, relative humidity are 5 to 35 °C, 45 to 85 % RH. | | — | | | | | | | | | | | | | | | | | | | | | | | | | |
| Varistor Voltage | The voltage between two terminals with the specified measuring current I_{mA} DC applied is called V_c or V_{cmA} . The measurement shall be made as fast as possible to avoid heat affection. | | To meet the specified value | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Allowable Voltage | The maximum sinusoidal RMS voltage or maximum DC voltage that can be applied continuously in the specified environmental temperature range. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clamping Voltage | The maximum voltage between two terminals with the specified standard impulse current (8/20 μ s) illustrated below applied. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated Power | The power that can be applied in the specified ambient temperature. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Energy | The maximum energy within the varistor voltage change of $\pm 10\%$ when one impulse of 2 ms or 10/1000 μ s is applied. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum peak Current (Withstanding Surge Current) | 2 times | The maximum current within the varistor voltage change of $\pm 10\%$ with the standard impulse current (8/20 μ s) applied two times with an interval of 5 minutes. | To meet the specified value | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 times | The maximum current within the varistor voltage change of $\pm 10\%$ with the standard impulse current (8/20 μ s) applied one times. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Temperature Coefficient of Varistor Voltage | $\frac{V_c \text{ at } 85^\circ\text{C} - V_c \text{ at } 25^\circ\text{C}}{V_c \text{ at } 25^\circ\text{C}} \times \frac{1}{60} \times 100 (\% / ^\circ\text{C})$ | | - 0.05 %/°C max | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance | Capacitance shall be measured at 1 KHz $\pm 10\%$, 1Vrms max . 0V bias and 20 \pm 2°C | | To meet the specified value | | | | | | | | | | | | | | | | | | | | | | | | | |
| Withstanding Voltage (Body Insulation) | <p>The specified voltage shall be applied both terminals of the specimen connected together and metal foil closely wrapped round its body for 1 minute. Electrical breakdown shall be examined.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Classification (Nominal varistor voltage)</th> <th>Test Voltage (AC)</th> </tr> </thead> <tbody> <tr> <td>$V_{0.1mA}, V_{1mA} \leq 330V$</td> <td>1000 Vrms</td> </tr> <tr> <td>$V_{0.1mA}, V_{1mA} > 330V$</td> <td>1500 Vrms</td> </tr> </tbody> </table> | | Classification (Nominal varistor voltage) | Test Voltage (AC) | $V_{0.1mA}, V_{1mA} \leq 330V$ | 1000 Vrms | $V_{0.1mA}, V_{1mA} > 330V$ | 1500 Vrms | No breakdown | | | | | | | | | | | | | | | | | | | |
| Classification (Nominal varistor voltage) | Test Voltage (AC) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $V_{0.1mA}, V_{1mA} \leq 330V$ | 1000 Vrms | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $V_{0.1mA}, V_{1mA} > 330V$ | 1500 Vrms | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Impulse Life (I) | <p>The change of V_c shall be measured after the impulse listed below is applied 10000 times continuously with the interval of ten seconds at room temperature .</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td rowspan="2">5 Series</td> <td>05D180K to 05D680K</td> <td>0.5A (2 ms)</td> </tr> <tr> <td>05D820K to 05D471K</td> <td>20A (8/20 μs)</td> </tr> <tr> <td rowspan="2">7 Series</td> <td>07D180K to 07D680K</td> <td>18A (8/20 μs)</td> </tr> <tr> <td>07D820K to 07D471K</td> <td>50A (8/20 μs)</td> </tr> <tr> <td rowspan="2">10 Series</td> <td>10D180K to 10D680K</td> <td>50A (8/20 μs)</td> </tr> <tr> <td>10D820K to 10D112K</td> <td>100A (8/20 μs)</td> </tr> <tr> <td rowspan="2">14 Series</td> <td>14D180K to 14D680K</td> <td>75A (8/20 μs)</td> </tr> <tr> <td>14D820K to 14D182K</td> <td>150A (8/20 μs)</td> </tr> <tr> <td rowspan="2">20 Series</td> <td>20D180K to 20D680K</td> <td>120A (8/20 μs)</td> </tr> <tr> <td>20D820K to 20D182K</td> <td>200A (8/20 μs)</td> </tr> </tbody> </table> | | 5 Series | 05D180K to 05D680K | 0.5A (2 ms) | 05D820K to 05D471K | 20A (8/20 μ s) | 7 Series | 07D180K to 07D680K | 18A (8/20 μ s) | 07D820K to 07D471K | 50A (8/20 μ s) | 10 Series | 10D180K to 10D680K | 50A (8/20 μ s) | 10D820K to 10D112K | 100A (8/20 μ s) | 14 Series | 14D180K to 14D680K | 75A (8/20 μ s) | 14D820K to 14D182K | 150A (8/20 μ s) | 20 Series | 20D180K to 20D680K | 120A (8/20 μ s) | 20D820K to 20D182K | 200A (8/20 μ s) | $\Delta V_{cmA} / V_{cmA} \leq \pm 10\%$ |
| 5 Series | 05D180K to 05D680K | 0.5A (2 ms) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 05D820K to 05D471K | 20A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 Series | 07D180K to 07D680K | 18A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 07D820K to 07D471K | 50A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 Series | 10D180K to 10D680K | 50A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 10D820K to 10D112K | 100A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 Series | 14D180K to 14D680K | 75A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 14D820K to 14D182K | 150A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 Series | 20D180K to 20D680K | 120A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 20D820K to 20D182K | 200A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | |

Note: Varistor voltage change of forward direction shall be measured in the test of uni-pole surge life and DC load life

(Electrical)

| Characteristics | Test Methods | | Specifications | |
|--------------------|---|---------------------|--|--------------------|
| Impulse Life (II) | The change of Vc shall be measured after the impulse listed below is applied 100000 times continuously with the interval of ten seconds at room temperature . | | $\Delta V_{cmA}/V_{cmA} \leq \pm 10\%$ | |
| | 5 Series | 05D180K to 05D680K | | 0.45A (2 ms) |
| | | 05D820K to 05D471K | | 14A (8/20 μ s) |
| | 7 Series | 07D180K to 07D680K | | 12A (8/20 μ s) |
| | | 07D820K to 07D471K | | 35A (8/20 μ s) |
| | 10 Series | 10D180K to 10D680K | | 35A (8/20 μ s) |
| | | 10D820K to 10D471K | | 70A (8/20 μ s) |
| | 14 Series | 14D180K to 14D680K | | 45A (8/20 μ s) |
| | | 14D820K to 14D471K | | 90A (8/20 μ s) |
| | 20 Series | 20D180K to 20D680K | | 55A (8/20 μ s) |
| 20D820K to 20D471K | | 100A (8/20 μ s) | | |

Note: Varistor voltage change of forward direction shall be measured in the test of uni-pole surge life and DC load life

(Mechanical)

| Characteristics | Test Methods | | Specifications |
|--------------------------------------|--|----------------|--|
| Robustness of Terminations (Tensile) | After gradually applying the force specified below and keeping the unit fixed for the seconds, the terminal shall be visually examined for any damage. | | |
| | <u>Terminal diameter</u> | <u>Force</u> | |
| | Ø 0.6 mm | 9.8 N (1.0Kgf) | |
| | Ø 0.8 mm | 9.8 N (1.0Kgf) | |
| Robustness of Terminations (Bending) | The unit shall be secured with its terminal kept vertical and the force specified below be applied in the axial direction. | | No outstanding damage |
| | 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. | | |
| | <u>Terminal diameter</u> | <u>Force</u> | |
| Vibration | After repeatedly applying a single harmonic vibration (amplitude: 0.75 mm) double amplitude: 1.5mm with 1 minute vibration frequency cycles (10 Hz to 55 Hz to 10 Hz) to each of three perpendicular directions for 2 hours. Thereafter, the unit shall be visually examined. | | |
| | | | |
| | | | |
| | | | |
| Solderadilty | After dipping the terminals to a depth of approximately 3mm from the body in a soldering bath of 235±5°C for 2±0.5 seconds, the terminal shall be visually examined. | | Approximately 95% of the terminals shall be covered with solder uni-formly |
| | | | |
| Resistance to Soldering Heat | After each lead shall be dipped into a solder bath having a temperature 260±5°C (3 series: 250±5°C) to a point 2.0 to 2.5 mm from the body of the unit, using shieldig board (t=1.5mm), be held there for specified time (3series: 3±1 s, 5 series: 5±1 s and others: 10±1 s), and then be stored at room temperature and humidity for 1 to 2 hours. The change of Vc and mechanical damages are examined. | | $\Delta V_{cmA}/V_{cmA} \leq \pm 5\%$ No outstanding damage |
| | | | |

(Environmental)

| Characteristics | Test Methods | Specifications | | | | | | | | | | | | | | | |
|--|--|--|-----------------|------------------|---|-------------|------------|---|------------------|------------|---|-------------|------------|---|------------------|------------|---------------------------------------|
| High Temperature Storage/ Dry Heat | The specimen shall be subjected to 125 ± 2 °C for 1000 hours in a thermostatic bath without load and then stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured. | | | | | | | | | | | | | | | | |
| Damp Heat/ Humidity (Steady State) | The specimen shall be subjected to 40 ± 2 °C, 90 to 95 %RH for 1000 hours without load and then stored at room temperature and humidity for one to two hours. Thereafter, the change of Vc shall be measured. | | | | | | | | | | | | | | | | |
| Temperature Cycle | <p>The temperature cycle shown below shall be repeated five times and then stored at room temperature and humidity for one to two hours. The change of Vc and mechanical damage shall be examined.</p> <table border="1"> <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 ± 2</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 ± 2 | 30 ± 3 | 4 | Room temperature | 15 ± 3 | $\Delta V_{cmA}/V_{cmA} \leq \pm 5\%$ |
| Step | Temperature(°C) | Period (minutes) | | | | | | | | | | | | | | | |
| 1 | -40 ± 3 | 30 ± 3 | | | | | | | | | | | | | | | |
| 2 | Room temperature | 15 ± 3 | | | | | | | | | | | | | | | |
| 3 | 125 ± 2 | 30 ± 3 | | | | | | | | | | | | | | | |
| 4 | Room temperature | 15 ± 3 | | | | | | | | | | | | | | | |
| High Temperature Load/ Dry Heat Load | After being continuously applied the Maximum Allowable Voltage at 85 ± 2 °C for 1000 hours. The specimen shall be stored at room temperature and humidity for one to two hours. Thereafter, the change of Vc shall be measured. | $\Delta V_{cmA}/V_{cmA} \leq \pm 10\%$ | | | | | | | | | | | | | | | |
| Damp Heat Load/ Humidity Load | The specimen shall be subjected to 40 ± 2 °C, 90 to 95 %RH and the Maximum Allowable Voltage for 1000 hours and then stored at room temperature and humidity for one to two hours. Thereafter, the change of Vc shall be measured. | $\Delta V_{cmA}/V_{cmA} \leq \pm 10\%$ | | | | | | | | | | | | | | | |
| Low Temperature Storage/Cold | The specimen shall be subjected to -40 ± 2 °C without load for 1000 hours and then stored at room temperature for one to two hours. Thereafter, the change of Vc shall be measured. | $\Delta V_{cmA}/V_{cmA} \leq \pm 5\%$ | | | | | | | | | | | | | | | |