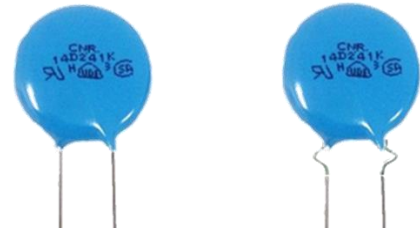






Description

CNR D/V/P/H series metal 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.











| Agency Approvals | | Certificate No. | Features |
|---|-------------------------------|--------------------------------|---|
| Agency | Agency Approval | Certificate No. | 1. RoHS compliant 2. Halogen-free series are available 3. Body size: $\varnothing 05 \sim \varnothing 20\text{mm}$ 4. CNR-10D181K~10D112K ,CNR-14D181K~14D112K, CNR-18D180K~18D112K ,CNR-20D181K~20D112K, meet IEC 60950-1:2013 Annex Q requirement. |
|  | UL 1449 4 th & cUL | VZCA2.E316325 VZCA8.E316325 | |
|  | IEC 61051-1:2007-04 | 40008220 | |
| | IEC 61051-2:2009-05 | | |
| | IEC 61051-2-2:1991-01 | | |
| IEC 60950-1:2013 for 10mm,14mm,18mm and 20mm only | | | |
|  | CLASS 2221 01 | 1081695 | |
|  | GB/T 10193-1997 | CQC14001119255 | Applications 1. Power supply 2. Home appliance 3. Industrial equipment 4. Telecommunication or telephone system 5. Smart meter 6. Lighting products 7. Photovoltaic industry |
| | GB/T 10194-1997 | CQC02001002471 | |
| | GB 4943.1-2011 | CQC08001023767 | |
| | GB 8898 -2011 | CQC08001023768 | |
| | | CQC08001023769 | |

| Max. Rating | | |
|---|-------------|--------------------|
| | D-Series | Units |
| AC Voltage Range (Vac) | 11 to 1000 | V |
| DC Voltage Range(Vdc) | 14 to 1465 | V |
| Peak Current for 8/20 μ S Current Wave | 100 to 6500 | A |
| Energy Range For 10/1000 μ S Current Wave | 0.4 to 620 | J |
| Operation Ambient Temperature Range | -40 to +105 | $^{\circ}\text{C}$ |
| Storage Temperature Range | -40 to +125 | $^{\circ}\text{C}$ |
| Varistor Voltage Range Vn(Vdc) | 18 to 1800 | V |
| Insulation Resistance | >1000 | M Ω |
| Typical Response Time | <25 | ns |








| Device Ratings and Characteristics | | | | | | | | | | | | | | |
|------------------------------------|----------------|---------------------------|-------|--------------------------|------|------|---|-------|-----------------------------|--------------------------------|-------------|-----------------------------|-------------------------|--------------------------|
| Part No. | Device Marking | Maximum Allowable Voltage | | Varistor Voltage (@ 1mA) | | | Clamping Voltage @ Test Current (@8/20µs) | | Maximum Energy (@10/1000µs) | Maximum Peak Current (@8/20µs) | Rated Power | Typical Capacitance (@1KHz) | UL 1449 4th ,In @8/20us | Related Standards Symbol |
| | | ACrms(V) | DC(V) | Vn(Vdc) | Min. | Max. | Vc(V) | Ip(A) | (J) | (A) | (W) | (pF) | (KA) | |
| CNR-05D180K | 05D180K | 11 | 14 | 18 | 16 | 20 | 40 | 1 | 0.4 | 100 | 0.01 | 1600 | 0.1 | ○ |
| CNR-05D220K | 05D220K | 14 | 18 | 22 | 20 | 24 | 48 | 1 | 0.5 | 100 | 0.01 | 1500 | | ○ |
| CNR-05D270K | 05D270K | 17 | 22 | 27 | 24 | 30 | 60 | 1 | 0.6 | 100 | 0.01 | 1450 | | ○ |
| CNR-05D330K | 05D330K | 20 | 26 | 33 | 30 | 36 | 73 | 1 | 0.8 | 100 | 0.01 | 1400 | | ○ |
| CNR-05D390K | 05D390K | 25 | 31 | 39 | 35 | 43 | 86 | 1 | 0.9 | 100 | 0.01 | 700 | | ○ |
| CNR-05D470K | 05D470K | 30 | 38 | 47 | 42 | 52 | 104 | 1 | 1.1 | 100 | 0.01 | 650 | | ○ |
| CNR-05D560K | 05D560K | 35 | 45 | 56 | 50 | 62 | 123 | 1 | 1.3 | 100 | 0.01 | 600 | | ○ |
| CNR-05D680K | 05D680K | 40 | 56 | 68 | 61 | 75 | 150 | 1 | 1.6 | 100 | 0.01 | 580 | | ○ |
| CNR-05D820K | 05D820K | 50 | 65 | 82 | 74 | 90 | 145 | 5 | 2.5 | 400 | 0.10 | 310 | 0.25 | □ |
| CNR-05D101K | 05D101K | 60 | 85 | 100 | 90 | 110 | 175 | 5 | 3.0 | 400 | 0.10 | 290 | | □ |
| CNR-05D121K | 05D121K | 75 | 100 | 120 | 108 | 132 | 210 | 5 | 4.0 | 400 | 0.10 | 270 | | □ |
| CNR-05D151K | 05D151K | 95 | 125 | 150 | 135 | 165 | 260 | 5 | 4.8 | 400 | 0.10 | 240 | | □ |
| CNR-05D181K | 05D181K | 115 | 150 | 180 | 162 | 198 | 315 | 5 | 5.9 | 400 | 0.10 | 140 | | □ |
| CNR-05D201K | 05D201K | 130 | 170 | 200 | 180 | 220 | 355 | 5 | 6.5 | 400 | 0.10 | 120 | | ◇ |
| CNR-05D221K | 05D221K | 140 | 180 | 220 | 198 | 242 | 380 | 5 | 7.0 | 400 | 0.10 | 110 | | ◇ |
| CNR-05D241K | 05D241K | 150 | 200 | 240 | 216 | 264 | 415 | 5 | 8.0 | 400 | 0.10 | 110 | | ◇ |
| CNR-05D271K | 05D271K | 175 | 225 | 270 | 243 | 297 | 475 | 5 | 8.5 | 400 | 0.10 | 100 | | ◇ |
| CNR-05D301K | 05D301K | 195 | 250 | 300 | 270 | 330 | 505 | 5 | 9.0 | 400 | 0.10 | 100 | | ◇ |
| CNR-05D331K | 05D331K | 215 | 275 | 330 | 297 | 363 | 585 | 5 | 10.0 | 400 | 0.10 | 90 | | ◇ |
| CNR-05D361K | 05D361K | 230 | 300 | 360 | 324 | 396 | 620 | 5 | 10.0 | 400 | 0.10 | 80 | | ◇ |
| CNR-05D391K | 05D391K | 250 | 320 | 390 | 351 | 429 | 675 | 5 | 12.0 | 400 | 0.10 | 80 | | ◇ |
| CNR-05D431K | 05D431K | 275 | 350 | 430 | 387 | 473 | 745 | 5 | 13.0 | 400 | 0.10 | 70 | | ◇ |
| CNR-05D471K | 05D471K | 300 | 385 | 470 | 423 | 517 | 810 | 5 | 15.0 | 400 | 0.10 | 70 | | ◇ |
| CNR-05D511K | 05D511K | 320 | 410 | 510 | 459 | 561 | 878 | 5 | 16.0 | 400 | 0.10 | 65 | | ◇ |
| CNR-05D561K | 05D561K | 350 | 460 | 560 | 504 | 616 | 940 | 5 | 18.0 | 400 | 0.10 | 65 | ◇ | |
| CNR-05D621K | 05D621K | 395 | 510 | 620 | 558 | 682 | 1050 | 5 | 18.0 | 400 | 0.10 | 65 | ◇ | |
| CNR-05D681K | 05D681K | 420 | 560 | 680 | 612 | 748 | 1120 | 5 | 18.0 | 400 | 0.10 | 60 | ◇ | |
| CNR-05D751K | 05D751K | 460 | 615 | 750 | 675 | 825 | 1240 | 5 | 18.0 | 400 | 0.10 | 60 | ◇ | |

Related Standards

| | | | | | | | | |
|----------|---|---|---|---|---|---|---|---|
| Symbols | ○ | □ | ◇ | | | | | |
| Approval |  |  |  |  |  |  |  |  |









| Device Ratings and Characteristics | | | | | | | | | | | | | | |
|------------------------------------|----------------|---------------------------|-------|--------------------------|------|------|---|-------|-----------------------------|--------------------------------|-------------|-----------------------------|-------------------------|--------------------------|
| Part No. | Device Marking | Maximum Allowable Voltage | | Varistor Voltage (@ 1mA) | | | Clamping Voltage @ Test Current (@8/20µs) | | Maximum Energy (@10/1000µs) | Maximum Peak Current (@8/20µs) | Rated Power | Typical Capacitance (@1KHz) | UL 1449 4th ,In @8/20us | Related Standards Symbol |
| | | ACrms(V) | DC(V) | Vn(Vdc) | Min. | Max. | Vc(V) | Ip(A) | (J) | (A) | (W) | (pF) | (KA) | |
| CNR-07D180K | 07D180K | 11 | 14 | 18 | 16 | 20 | 36 | 2.5 | 0.9 | 250 | 0.02 | 3800 | 0.15 | ○ |
| CNR-07D220K | 07D220K | 14 | 18 | 22 | 20 | 24 | 43 | 2.5 | 1.1 | 250 | 0.02 | 3600 | | ○ |
| CNR-07D270K | 07D270K | 17 | 22 | 27 | 24 | 30 | 53 | 2.5 | 1.4 | 250 | 0.02 | 3400 | | ○ |
| CNR-07D330K | 07D330K | 20 | 26 | 33 | 30 | 36 | 65 | 2.5 | 1.7 | 250 | 0.02 | 2900 | | ○ |
| CNR-07D390K | 07D390K | 25 | 31 | 39 | 35 | 43 | 77 | 2.5 | 2.1 | 250 | 0.02 | 1600 | | ○ |
| CNR-07D470K | 07D470K | 30 | 38 | 47 | 42 | 52 | 93 | 2.5 | 2.5 | 250 | 0.02 | 1550 | | ○ |
| CNR-07D560K | 07D560K | 35 | 45 | 56 | 50 | 62 | 110 | 2.5 | 3.1 | 250 | 0.02 | 1500 | | ○ |
| CNR-07D680K | 07D680K | 40 | 56 | 68 | 61 | 75 | 135 | 2.5 | 3.6 | 250 | 0.02 | 1200 | | ○ |
| CNR-07D820K | 07D820K | 50 | 65 | 82 | 74 | 90 | 135 | 10 | 5.5 | 1200 | 0.25 | 860 | 0.5 | □ |
| CNR-07D101K | 07D101K | 60 | 85 | 100 | 90 | 110 | 165 | 10 | 6.5 | 1200 | 0.25 | 750 | | □ |
| CNR-07D121K | 07D121K | 75 | 100 | 120 | 108 | 132 | 200 | 10 | 7.8 | 1200 | 0.25 | 530 | | □ |
| CNR-07D151K | 07D151K | 95 | 125 | 150 | 135 | 165 | 250 | 10 | 9.7 | 1200 | 0.25 | 410 | | □ |
| CNR-07D181K | 07D181K | 115 | 150 | 180 | 162 | 198 | 300 | 10 | 11.7 | 1200 | 0.25 | 300 | | □ |
| CNR-07D201K | 07D201K | 130 | 170 | 200 | 180 | 220 | 340 | 10 | 13 | 1200 | 0.25 | 250 | | ◇ |
| CNR-07D221K | 07D221K | 140 | 180 | 220 | 198 | 242 | 360 | 10 | 14 | 1200 | 0.25 | 250 | | ◇ |
| CNR-07D241K | 07D241K | 150 | 200 | 240 | 216 | 264 | 395 | 10 | 15 | 1200 | 0.25 | 240 | | ◇ |
| CNR-07D271K | 07D271K | 175 | 225 | 270 | 243 | 297 | 455 | 10 | 18 | 1200 | 0.25 | 220 | | ◇ |
| CNR-07D301K | 07D301K | 195 | 250 | 300 | 270 | 330 | 500 | 10 | 21 | 1200 | 0.25 | 190 | | ◇ |
| CNR-07D331K | 07D331K | 215 | 275 | 330 | 297 | 363 | 550 | 10 | 25 | 1200 | 0.25 | 180 | | ◇ |
| CNR-07D361K | 07D361K | 230 | 300 | 360 | 324 | 396 | 595 | 10 | 25 | 1200 | 0.25 | 170 | | ◇ |
| CNR-07D391K | 07D391K | 250 | 320 | 390 | 351 | 429 | 650 | 10 | 25 | 1200 | 0.25 | 160 | | ◇ |
| CNR-07D431K | 07D431K | 275 | 350 | 430 | 387 | 473 | 710 | 10 | 28 | 1200 | 0.25 | 150 | | ◇ |
| CNR-07D471K | 07D471K | 300 | 385 | 470 | 423 | 517 | 775 | 10 | 30 | 1200 | 0.25 | 130 | | ◇ |
| CNR-07D511K | 07D511K | 320 | 410 | 510 | 459 | 561 | 845 | 10 | 33 | 1200 | 0.25 | 120 | | ◇ |
| CNR-07D561K | 07D561K | 350 | 460 | 560 | 504 | 616 | 915 | 10 | 33 | 1200 | 0.25 | 120 | | ◇ |
| CNR-07D621K | 07D621K | 395 | 510 | 620 | 558 | 682 | 1020 | 10 | 35 | 1200 | 0.25 | 120 | | ◇ |
| CNR-07D681K | 07D681K | 420 | 560 | 680 | 612 | 748 | 1120 | 10 | 35 | 1200 | 0.25 | 110 | | ◇ |
| CNR-07D751K | 07D751K | 465 | 615 | 750 | 675 | 825 | 1235 | 10 | 38 | 1200 | 0.25 | 100 | | ◇ |
| CNR-07D781K | 07D781K | 485 | 640 | 780 | 702 | 858 | 1290 | 10 | 40 | 1200 | 0.25 | 90 | ◇ | |
| CNR-07D821K | 07D821K | 510 | 670 | 820 | 738 | 902 | 1355 | 10 | 42 | 1200 | 0.25 | 90 | ◇ | |

Related Standards

| | | | |
|----------|---|---|---|
| Symbols | ○ | □ | ◇ |
| Approval |  |    |    |








| Device Ratings and Characteristics | | | | | | | | | | | | | | |
|------------------------------------|----------------|---------------------------|-------|-------------------------|------|------|---|-------|-----------------------------|--------------------------------|-------------|-----------------------------|-------------------------|--------------------------|
| Part No. | Device Marking | Maximum Allowable Voltage | | Varistor Voltage (@1mA) | | | Clamping Voltage @ Test Current (@8/20µs) | | Maximum Energy (@10/1000µs) | Maximum Peak Current (@8/20µs) | Rated Power | Typical Capacitance (@1KHz) | UL 1449 4th ,In @8/20µs | Related Standards Symbol |
| | | ACrms(V) | DC(V) | Vn(Vdc) | Min. | Max. | Vc(V) | Ip(A) | (J) | (A) | (W) | (pF) | (KA) | |
| CNR-10D180K | 10D180K | 11 | 14 | 18 | 16 | 20 | 36 | 5 | 2.1 | 500 | 0.05 | 16000 | 0.5 | ○ |
| CNR-10D220K | 10D220K | 14 | 18 | 22 | 20 | 24 | 43 | 5 | 2.5 | 500 | 0.05 | 11000 | | ○ |
| CNR-10D270K | 10D270K | 17 | 22 | 27 | 24 | 30 | 53 | 5 | 3.0 | 500 | 0.05 | 8000 | | ○ |
| CNR-10D330K | 10D330K | 20 | 26 | 33 | 30 | 36 | 65 | 5 | 4.0 | 500 | 0.05 | 6300 | | ○ |
| CNR-10D390K | 10D390K | 25 | 31 | 39 | 35 | 43 | 77 | 5 | 4.6 | 500 | 0.05 | 5200 | | ○ |
| CNR-10D470K | 10D470K | 30 | 38 | 47 | 42 | 52 | 93 | 5 | 5.5 | 500 | 0.05 | 4600 | | ○ |
| CNR-10D560K | 10D560K | 35 | 45 | 56 | 50 | 62 | 110 | 5 | 7.0 | 500 | 0.05 | 3750 | | ○ |
| CNR-10D680K | 10D680K | 40 | 56 | 68 | 61 | 75 | 135 | 5 | 8.2 | 500 | 0.05 | 2800 | | ○ |
| CNR-10D820K | 10D820K | 50 | 65 | 82 | 74 | 90 | 135 | 25 | 12 | 2500 | 0.4 | 1920 | □ | |
| CNR-10D101K | 10D101K | 60 | 85 | 100 | 90 | 110 | 165 | 25 | 15 | 2500 | 0.4 | 1800 | □ | |
| CNR-10D121K | 10D121K | 75 | 100 | 120 | 108 | 132 | 200 | 25 | 18 | 2500 | 0.4 | 1500 | □ | |
| CNR-10D151K | 10D151K | 95 | 125 | 150 | 135 | 165 | 250 | 25 | 22 | 2500 | 0.4 | 1200 | □ | |
| CNR-10D181K | 10D181K | 115 | 150 | 180 | 162 | 198 | 300 | 25 | 27 | 2500 | 0.4 | 620 | □ | |
| CNR-10D201K | 10D201K | 130 | 170 | 200 | 180 | 220 | 340 | 25 | 30 | 2500 | 0.4 | 570 | ◇ | |
| CNR-10D221K | 10D221K | 140 | 180 | 220 | 198 | 242 | 360 | 25 | 32 | 2500 | 0.4 | 560 | ◇ | |
| CNR-10D241K | 10D241K | 150 | 200 | 240 | 216 | 264 | 395 | 25 | 35 | 2500 | 0.4 | 550 | ◇ | |
| CNR-10D271K | 10D271K | 175 | 225 | 270 | 243 | 297 | 455 | 25 | 40 | 2500 | 0.4 | 530 | ◇ | |
| CNR-10D301K | 10D301K | 195 | 250 | 300 | 270 | 330 | 500 | 25 | 42 | 2500 | 0.4 | 500 | ◇ | |
| CNR-10D331K | 10D331K | 215 | 275 | 330 | 297 | 363 | 550 | 25 | 47 | 2500 | 0.4 | 450 | ◇ | |
| CNR-10D361K | 10D361K | 230 | 300 | 360 | 324 | 396 | 595 | 25 | 47 | 2500 | 0.4 | 450 | ◇ | |
| CNR-10D391K | 10D391K | 250 | 320 | 390 | 351 | 429 | 650 | 25 | 60 | 2500 | 0.4 | 430 | ◇ | |
| CNR-10D431K | 10D431K | 275 | 350 | 430 | 387 | 473 | 710 | 25 | 65 | 2500 | 0.4 | 400 | ◇ | |
| CNR-10D471K | 10D471K | 300 | 385 | 470 | 423 | 517 | 775 | 25 | 70 | 2500 | 0.4 | 300 | ◇ | |
| CNR-10D511K | 10D511K | 320 | 410 | 510 | 459 | 561 | 845 | 25 | 70 | 2500 | 0.4 | 260 | ◇ | |
| CNR-10D561K | 10D561K | 350 | 460 | 560 | 504 | 616 | 915 | 25 | 70 | 2500 | 0.4 | 200 | ◇ | |
| CNR-10D621K | 10D621K | 395 | 510 | 620 | 558 | 682 | 1020 | 25 | 70 | 2500 | 0.4 | 170 | ◇ | |
| CNR-10D681K | 10D681K | 420 | 560 | 680 | 612 | 748 | 1120 | 25 | 70 | 2500 | 0.4 | 160 | ◇ | |
| CNR-10D751K | 10D751K | 465 | 615 | 750 | 675 | 825 | 1235 | 25 | 75 | 2500 | 0.4 | 150 | ◇ | |
| CNR-10D781K | 10D781K | 485 | 640 | 780 | 702 | 858 | 1290 | 25 | 80 | 2500 | 0.4 | 150 | ◇ | |
| CNR-10D821K | 10D821K | 510 | 670 | 820 | 738 | 902 | 1355 | 25 | 85 | 2500 | 0.4 | 150 | ◇ | |
| CNR-10D911K | 10D911K | 550 | 745 | 910 | 819 | 1001 | 1500 | 25 | 93 | 2500 | 0.4 | 140 | ◇ | |
| CNR-10D102K | 10D102K | 625 | 825 | 1000 | 900 | 1100 | 1650 | 25 | 102 | 2500 | 0.4 | 140 | ◇ | |
| CNR-10D112K | 10D112K | 680 | 895 | 1100 | 990 | 1210 | 1815 | 25 | 115 | 2500 | 0.4 | 130 | ◇ | |
| CNR-10D182K | 10D182K | 1000 | 1465 | 1800 | 1620 | 1980 | 2950 | 25 | 185 | 2500 | 0.4 | 75 | 1 | ○ |

Related Standards

| Symbols | ○ | □ | ◇ | | | | | |
|----------|---|---|---|---|---|---|---|---|
| Approval |  |  |  |  |  |  |  |  |








| Device Ratings and Characteristics | | | | | | | | | | | | | | |
|------------------------------------|----------------|---------------------------|-------|-------------------------|------|------|---|-------|-----------------------------|--------------------------------|-------------|-----------------------------|-------------------------|--------------------------|
| Part No. | Device Marking | Maximum Allowable Voltage | | Varistor Voltage (@1mA) | | | Clamping Voltage @ Test Current (@8/20µs) | | Maximum Energy (@10/1000µs) | Maximum Peak Current (@8/20µs) | Rated Power | Typical Capacitance (@1KHz) | UL 1449 4th ,In @8/20µs | Related Standards Symbol |
| | | ACrms(V) | DC(V) | Vn(Vdc) | Min. | Max. | Vc(V) | Ip(A) | (J) | (A) | (W) | (pF) | (KA) | |
| CNR-14D180K | 14D180K | 11 | 14 | 18 | 16 | 20 | 36 | 10 | 4 | 1000 | 0.1 | 25000 | 1 | ○ |
| CNR-14D220K | 14D220K | 14 | 18 | 22 | 20 | 24 | 43 | 10 | 5 | 1000 | 0.1 | 20000 | | ○ |
| CNR-14D270K | 14D270K | 17 | 22 | 27 | 24 | 30 | 53 | 10 | 6 | 1000 | 0.1 | 16000 | | ○ |
| CNR-14D330K | 14D330K | 20 | 26 | 33 | 30 | 36 | 65 | 10 | 7.5 | 1000 | 0.1 | 12200 | | ○ |
| CNR-14D390K | 14D390K | 25 | 31 | 39 | 35 | 43 | 77 | 10 | 8.6 | 1000 | 0.1 | 7000 | | ○ |
| CNR-14D470K | 14D470K | 30 | 38 | 47 | 42 | 52 | 93 | 10 | 10 | 1000 | 0.1 | 6750 | | ○ |
| CNR-14D560K | 14D560K | 35 | 45 | 56 | 50 | 62 | 110 | 10 | 11 | 1000 | 0.1 | 6500 | | ○ |
| CNR-14D680K | 14D680K | 40 | 56 | 68 | 61 | 75 | 135 | 10 | 14 | 1000 | 0.1 | 5500 | ○ | |
| CNR-14D820K | 14D820K | 50 | 65 | 82 | 74 | 90 | 135 | 50 | 22 | 4500 | 0.6 | 4300 | □ | |
| CNR-14D101K | 14D101K | 60 | 85 | 100 | 90 | 110 | 165 | 50 | 28 | 4500 | 0.6 | 3500 | □ | |
| CNR-14D121K | 14D121K | 75 | 100 | 120 | 108 | 132 | 200 | 50 | 32 | 4500 | 0.6 | 2500 | □ | |
| CNR-14D151K | 14D151K | 95 | 125 | 150 | 135 | 165 | 250 | 50 | 40 | 4500 | 0.6 | 2100 | □ | |
| CNR-14D181K | 14D181K | 115 | 150 | 180 | 162 | 198 | 300 | 50 | 52 | 4500 | 0.6 | 1250 | □ | |
| CNR-14D201K | 14D201K | 130 | 170 | 200 | 180 | 220 | 340 | 50 | 57 | 4500 | 0.6 | 1150 | ◇ | |
| CNR-14D221K | 14D221K | 140 | 180 | 220 | 198 | 242 | 360 | 50 | 60 | 4500 | 0.6 | 1100 | ◇ | |
| CNR-14D241K | 14D241K | 150 | 200 | 240 | 216 | 264 | 395 | 50 | 63 | 4500 | 0.6 | 1050 | ◇ | |
| CNR-14D271K | 14D271K | 175 | 225 | 270 | 243 | 297 | 455 | 50 | 70 | 4500 | 0.6 | 1000 | ◇ | |
| CNR-14D301K | 14D301K | 195 | 250 | 300 | 270 | 330 | 500 | 50 | 78 | 4500 | 0.6 | 900 | ◇ | |
| CNR-14D331K | 14D331K | 215 | 275 | 330 | 297 | 363 | 550 | 50 | 93 | 4500 | 0.6 | 850 | ◇ | |
| CNR-14D361K | 14D361K | 230 | 300 | 360 | 324 | 396 | 595 | 50 | 93 | 4500 | 0.6 | 800 | ◇ | |
| CNR-14D391K | 14D391K | 250 | 320 | 390 | 351 | 429 | 650 | 50 | 100 | 4500 | 0.6 | 800 | ◇ | |
| CNR-14D431K | 14D431K | 275 | 350 | 430 | 387 | 473 | 710 | 50 | 115 | 4500 | 0.6 | 650 | ◇ | |
| CNR-14D471K | 14D471K | 300 | 385 | 470 | 423 | 517 | 775 | 50 | 125 | 4500 | 0.6 | 550 | ◇ | |
| CNR-14D511K | 14D511K | 320 | 410 | 510 | 459 | 561 | 845 | 50 | 125 | 4500 | 0.6 | 450 | ◇ | |
| CNR-14D561K | 14D561K | 350 | 460 | 560 | 504 | 616 | 915 | 50 | 125 | 4500 | 0.6 | 400 | ◇ | |
| CNR-14D621K | 14D621K | 395 | 510 | 620 | 558 | 682 | 1020 | 50 | 125 | 4500 | 0.6 | 350 | ◇ | |
| CNR-14D681K | 14D681K | 420 | 560 | 680 | 612 | 748 | 1120 | 50 | 130 | 4500 | 0.6 | 350 | ◇ | |
| CNR-14D751K | 14D751K | 465 | 615 | 750 | 675 | 825 | 1235 | 50 | 143 | 4500 | 0.6 | 330 | ◇ | |
| CNR-14D781K | 14D781K | 485 | 640 | 780 | 702 | 858 | 1290 | 50 | 148 | 4500 | 0.6 | 330 | ◇ | |
| CNR-14D821K | 14D821K | 510 | 670 | 820 | 738 | 902 | 1355 | 50 | 157 | 4500 | 0.6 | 330 | ◇ | |
| CNR-14D911K | 14D911K | 550 | 745 | 910 | 819 | 1001 | 1500 | 50 | 175 | 4500 | 0.6 | 300 | ◇ | |
| CNR-14D102K | 14D102K | 625 | 825 | 1000 | 900 | 1100 | 1650 | 50 | 190 | 4500 | 0.6 | 300 | ◇ | |
| CNR-14D112K | 14D112K | 680 | 895 | 1100 | 990 | 1210 | 1815 | 50 | 213 | 4500 | 0.6 | 200 | ◇ | |
| CNR-14D182K | 14D182K | 1000 | 1465 | 1800 | 1620 | 1980 | 2950 | 50 | 354 | 4500 | 0.6 | 150 | 2 | ○ |

Related Standards

| Symbols | ○ | □ | ◇ |
|----------|---|---|---|
| Approval |  |    |     |







| Device Ratings and Characteristics | | | | | | | | | | | | | | |
|------------------------------------|----------------|---------------------------|-------|-------------------------|------|------|---|-------|-----------------------------|--------------------------------|-------------|-----------------------------|-------------------------|--------------------------|
| Part No. | Device Marking | Maximum Allowable Voltage | | Varistor Voltage (@1mA) | | | Clamping Voltage @ Test Current (@8/20µs) | | Maximum Energy (@10/1000µs) | Maximum Peak Current (@8/20µs) | Rated Power | Typical Capacitance (@1KHz) | UL 1449 4th ,In @8/20µs | Related Standards Symbol |
| | | ACrms(V) | DC(V) | Vn(Vdc) | Min. | Max. | Vc(V) | Ip(A) | (J) | (A) | (W) | (pF) | (KA) | |
| CNR-18D180K | 18D180K | 11 | 14 | 18 | 16 | 20 | 36 | 15 | 8.3 | 2000 | 0.15 | 36400 | 2 | ○ |
| CNR-18D220K | 18D220K | 14 | 18 | 22 | 20 | 24 | 43 | 15 | 10.4 | 2000 | 0.15 | 27300 | | ○ |
| CNR-18D270K | 18D270K | 17 | 22 | 27 | 24 | 30 | 53 | 15 | 12.5 | 2000 | 0.15 | 22290 | | ○ |
| CNR-18D330K | 18D330K | 20 | 26 | 33 | 30 | 36 | 65 | 15 | 15.6 | 2000 | 0.15 | 18200 | | ○ |
| CNR-18D390K | 18D390K | 25 | 31 | 39 | 35 | 43 | 77 | 15 | 17.9 | 2000 | 0.15 | 12250 | | ○ |
| CNR-18D470K | 18D470K | 30 | 38 | 47 | 42 | 52 | 93 | 15 | 20.8 | 2000 | 0.15 | 12280 | | ○ |
| CNR-18D560K | 18D560K | 35 | 45 | 56 | 50 | 62 | 110 | 15 | 22.8 | 2000 | 0.15 | 11100 | | ○ |
| CNR-18D680K | 18D680K | 40 | 56 | 68 | 61 | 75 | 135 | 15 | 29.1 | 2000 | 0.15 | 10460 | | ○ |
| CNR-18D820K | 18D820K | 50 | 65 | 82 | 74 | 90 | 135 | 75 | 30.6 | 5500 | 0.80 | 7460 | 5 | □ |
| CNR-18D101K | 18D101K | 60 | 85 | 100 | 90 | 110 | 165 | 75 | 38.9 | 5500 | 0.80 | 7280 | | □ |
| CNR-18D121K | 18D121K | 75 | 100 | 120 | 108 | 132 | 200 | 75 | 44.4 | 5500 | 0.80 | 5000 | | □ |
| CNR-18D151K | 18D151K | 95 | 125 | 150 | 135 | 165 | 250 | 75 | 55.6 | 5500 | 0.80 | 3820 | | □ |
| CNR-18D181K | 18D181K | 115 | 150 | 180 | 162 | 198 | 300 | 75 | 69.4 | 5500 | 0.80 | 2270 | | □ |
| CNR-18D201K | 18D201K | 130 | 170 | 200 | 180 | 220 | 340 | 75 | 79.2 | 6500 | 0.80 | 2100 | | ◇ |
| CNR-18D221K | 18D221K | 140 | 180 | 220 | 198 | 242 | 360 | 75 | 83.3 | 6500 | 0.80 | 2000 | | ◇ |
| CNR-18D241K | 18D241K | 150 | 200 | 240 | 216 | 264 | 395 | 75 | 87.5 | 6500 | 0.80 | 2000 | | ◇ |
| CNR-18D271K | 18D271K | 175 | 225 | 270 | 243 | 297 | 455 | 75 | 97.2 | 6500 | 0.80 | 1910 | | ◇ |
| CNR-18D301K | 18D301K | 195 | 250 | 300 | 270 | 330 | 500 | 75 | 101 | 6500 | 0.80 | 1630 | | ◇ |
| CNR-18D331K | 18D331K | 215 | 275 | 330 | 297 | 363 | 550 | 75 | 129 | 6500 | 0.80 | 1590 | | ◇ |
| CNR-18D361K | 18D361K | 230 | 300 | 360 | 324 | 396 | 595 | 75 | 129 | 6500 | 0.80 | 1540 | | ◇ |
| CNR-18D391K | 18D391K | 250 | 320 | 390 | 351 | 429 | 650 | 75 | 139 | 6500 | 0.80 | 1270 | | ◇ |
| CNR-18D431K | 18D431K | 275 | 350 | 430 | 387 | 473 | 710 | 75 | 160 | 6500 | 0.80 | 1220 | | ◇ |
| CNR-18D471K | 18D471K | 300 | 385 | 470 | 423 | 517 | 775 | 75 | 174 | 6500 | 0.80 | 1090 | | ◇ |
| CNR-18D511K | 18D511K | 320 | 410 | 510 | 459 | 561 | 845 | 75 | 175 | 6500 | 0.80 | 950 | | ◇ |
| CNR-18D561K | 18D561K | 350 | 460 | 560 | 504 | 616 | 915 | 75 | 178 | 6500 | 0.80 | 770 | | ◇ |
| CNR-18D621K | 18D621K | 395 | 510 | 620 | 558 | 682 | 1020 | 75 | 181 | 6500 | 0.80 | 510 | | ◇ |
| CNR-18D681K | 18D681K | 420 | 560 | 680 | 612 | 748 | 1120 | 75 | 182 | 6500 | 0.80 | 500 | | ◇ |
| CNR-18D751K | 18D751K | 465 | 615 | 750 | 675 | 825 | 1235 | 75 | 200 | 6500 | 0.80 | 480 | | ◇ |
| CNR-18D781K | 18D781K | 485 | 640 | 780 | 702 | 858 | 1290 | 75 | 207 | 6500 | 0.80 | 450 | | ◇ |
| CNR-18D821K | 18D821K | 510 | 670 | 820 | 738 | 902 | 1355 | 75 | 220 | 6500 | 0.80 | 450 | | ◇ |
| CNR-18D911K | 18D911K | 550 | 745 | 910 | 819 | 1001 | 1500 | 75 | 245 | 6500 | 0.80 | 430 | | ◇ |
| CNR-18D102K | 18D102K | 625 | 825 | 1000 | 900 | 1100 | 1650 | 75 | 266 | 6500 | 0.80 | 410 | | ◇ |
| CNR-18D112K | 18D112K | 680 | 895 | 1100 | 990 | 1210 | 1815 | 75 | 298 | 6500 | 0.80 | 360 | ◇ | |

Related Standards

| | | | | | | | |
|----------|---|---|---|---|---|---|---|
| Symbols | ○ | □ | ◇ | | | | |
| Approval |  |  |  |  |  |  |  |

| Device Ratings and Characteristics | | | | | | | | | | | | | | |
|------------------------------------|----------------|---------------------------|-------|-------------------------|------|------|---|-------|-----------------------------|--------------------------------|-------------|-----------------------------|-------------------------|--------------------------|
| Part No. | Device Marking | Maximum Allowable Voltage | | Varistor Voltage (@1mA) | | | Clamping Voltage @ Test Current (@8/20µs) | | Maximum Energy (@10/1000µs) | Maximum Peak Current (@8/20µs) | Rated Power | Typical Capacitance (@1KHz) | UL 1449 4th ,In @8/20us | Related Standards Symbol |
| | | ACrms(V) | DC(V) | Vn(Vdc) | Min. | Max. | Vc(V) | Ip(A) | (J) | (A) | (W) | (pF) | (KA) | |
| CNR-20D180K | 20D180K | 11 | 14 | 18 | 16 | 20 | 36 | 20 | 11 | 2000 | 0.2 | 40000 | 2 | ○ |
| CNR-20D220K | 20D220K | 14 | 18 | 22 | 20 | 24 | 43 | 20 | 14 | 2000 | 0.2 | 30000 | | ○ |
| CNR-20D270K | 20D270K | 17 | 22 | 27 | 24 | 30 | 53 | 20 | 18 | 2000 | 0.2 | 24500 | | ○ |
| CNR-20D330K | 20D330K | 20 | 26 | 33 | 30 | 36 | 65 | 20 | 23 | 2000 | 0.2 | 20000 | | ○ |
| CNR-20D390K | 20D390K | 25 | 31 | 39 | 35 | 43 | 77 | 20 | 26 | 2000 | 0.2 | 13800 | | ○ |
| CNR-20D470K | 20D470K | 30 | 38 | 47 | 42 | 52 | 93 | 20 | 33 | 2000 | 0.2 | 13500 | | ○ |
| CNR-20D560K | 20D560K | 35 | 45 | 56 | 50 | 62 | 110 | 20 | 41 | 2000 | 0.2 | 12200 | | ○ |
| CNR-20D680K | 20D680K | 40 | 56 | 68 | 61 | 75 | 135 | 20 | 46 | 2000 | 0.2 | 11500 | | ○ |
| CNR-20D820K | 20D820K | 50 | 65 | 82 | 74 | 90 | 135 | 100 | 48 | 6500 | 1 | 8200 | □ | |
| CNR-20D101K | 20D101K | 60 | 85 | 100 | 90 | 110 | 165 | 100 | 51 | 6500 | 1 | 8000 | □ | |
| CNR-20D121K | 20D121K | 75 | 100 | 120 | 108 | 132 | 200 | 100 | 55 | 6500 | 1 | 5500 | □ | |
| CNR-20D151K | 20D151K | 95 | 125 | 150 | 135 | 165 | 250 | 100 | 70 | 6500 | 1 | 4200 | □ | |
| CNR-20D181K | 20D181K | 115 | 150 | 180 | 162 | 198 | 300 | 100 | 85 | 6500 | 1 | 2500 | □ | |
| CNR-20D201K | 20D201K | 130 | 170 | 200 | 180 | 220 | 340 | 100 | 95 | 6500 | 1 | 2300 | ◇ | |
| CNR-20D221K | 20D221K | 140 | 180 | 220 | 198 | 242 | 360 | 100 | 100 | 6500 | 1 | 2200 | ◇ | |
| CNR-20D241K | 20D241K | 150 | 200 | 240 | 216 | 264 | 395 | 100 | 108 | 6500 | 1 | 2200 | ◇ | |
| CNR-20D271K | 20D271K | 175 | 225 | 270 | 243 | 297 | 455 | 100 | 127 | 6500 | 1 | 2100 | ◇ | |
| CNR-20D301K | 20D301K | 195 | 250 | 300 | 270 | 330 | 500 | 100 | 150 | 6500 | 1 | 1800 | ◇ | |
| CNR-20D331K | 20D331K | 215 | 275 | 330 | 297 | 363 | 550 | 100 | 163 | 6500 | 1 | 1750 | ◇ | |
| CNR-20D361K | 20D361K | 230 | 300 | 360 | 324 | 396 | 595 | 100 | 163 | 6500 | 1 | 1700 | ◇ | |
| CNR-20D391K | 20D391K | 250 | 320 | 390 | 351 | 429 | 650 | 100 | 180 | 6500 | 1 | 1400 | ◇ | |
| CNR-20D431K | 20D431K | 275 | 350 | 430 | 387 | 473 | 710 | 100 | 190 | 6500 | 1 | 1350 | ◇ | |
| CNR-20D471K | 20D471K | 300 | 385 | 470 | 423 | 517 | 775 | 100 | 220 | 6500 | 1 | 1200 | ◇ | |
| CNR-20D511K | 20D511K | 320 | 410 | 510 | 459 | 561 | 845 | 100 | 220 | 6500 | 1 | 1050 | ◇ | |
| CNR-20D561K | 20D561K | 350 | 460 | 560 | 504 | 616 | 915 | 100 | 220 | 6500 | 1 | 850 | ◇ | |
| CNR-20D621K | 20D621K | 395 | 510 | 620 | 558 | 682 | 1020 | 100 | 220 | 6500 | 1 | 570 | ◇ | |
| CNR-20D681K | 20D681K | 420 | 560 | 680 | 612 | 748 | 1120 | 100 | 230 | 6500 | 1 | 550 | ◇ | |
| CNR-20D751K | 20D751K | 465 | 615 | 750 | 675 | 825 | 1235 | 100 | 255 | 6500 | 1 | 530 | ◇ | |
| CNR-20D781K | 20D781K | 485 | 640 | 780 | 702 | 858 | 1290 | 100 | 265 | 6500 | 1 | 500 | ◇ | |
| CNR-20D821K | 20D821K | 510 | 670 | 820 | 738 | 902 | 1355 | 100 | 282 | 6500 | 1 | 500 | ◇ | |
| CNR-20D911K | 20D911K | 550 | 745 | 910 | 819 | 1001 | 1500 | 100 | 310 | 6500 | 1 | 480 | ◇ | |
| CNR-20D102K | 20D102K | 625 | 825 | 1000 | 900 | 1100 | 1650 | 100 | 342 | 6500 | 1 | 460 | ◇ | |
| CNR-20D112K | 20D112K | 680 | 895 | 1100 | 990 | 1210 | 1815 | 100 | 383 | 6500 | 1 | 400 | ◇ | |
| CNR-20D182K | 20D182K | 1000 | 1465 | 1800 | 1620 | 1980 | 2950 | 100 | 620 | 6500 | 1 | 300 | 3 | ○ |

Related Standards

| | | | |
|----------|---|---|---|
| Symbols | ○ | □ | ◇ |
| Approval |  |    |    |

Reliability

| Characteristics | Standard | Test Conditions | Specifications |
|---|--|--|--|
| Robustness of terminations | IEC 60068-2-21 Test Ua1 | F = 10 N (d ≤ 0.8 mm) , F = 20 N (d = 1 mm) | $\Delta V/V \leq \pm 10\%$ No visible damage |
| Solderability | IEC 60068-2-20 Test Ta (Method 1) | T = 235±5°C, d = 2±0.5s | Approximately ≥ 95% |
| Resistance to soldering heat | IEC 60068-2-20 Test Tb (Method 1A) | T = 260±5°C, d = 10±1s | $\Delta V/V \leq \pm 10\%$ No visible damage |
| Shock | IEC 60068-2-27 Test Ea | Pulse shape: half-sine. a = 490 m/s ² , d = 11ms. N = 6 x 3 shocks | $\Delta V/V \leq \pm 10\%$ No visible damage |
| Vibration | IEC 60068-2-6 Test Fc Method B4 | Frequency range: 10 Hz to 55 Hz ,a = 0.75 mm or 98 m/s ² (whichever is the less), d = 3x2 h | $\Delta V/V \leq \pm 10\%$ No visible damage |
| Needle flame test | IEC 60695-11-5 | Severity: Vertical 10 s | Duration of burning: 5 s max. |
| Voltage under pulse condition | IEC 61051-2 | At class current | As specified in specification |
| Voltage proof | IEC 61051-2 | Metal balls method (4.8.1.2) 2500 V, 60 s | As specified in specification |
| Pulse current - 8/20 μs | IEC 61051-2 | 8/20 μs, 10 times, I peak=0.25*Imax | $\Delta V/V \leq \pm 10\%$ No visible damage |
| Pulse current - 10/1000 μs | IEC 61051-2 | 10/1000 μs, 10 times, Ipeak = 0.0075* Imax | $\Delta V/V \leq \pm 10\%$ No visible damage |
| Combination pulse | IEC 60950-1:2013 Annex Q | Additional test: 10 pulses (combination pulse 6KV/3KA), in one direction, 1 per min | $\Delta V/V \leq \pm 10\%$ No visible damage U ≤ 1.1 Uinitial Voltage proof:No breakdown or flashover |
| Rapid change of temperature | IEC 60068-2-14 Test Na | N = 5 cycles, d = 30 min , θA = -40±3°C, θB = 85±2°C | $\Delta V/V \leq \pm 10\%$ No visible damage |
| Climatic sequence | IEC 60068-2-2 Test Ba IEC 60068-2-30 Test Db IEC 60068-2-1 Test Aa IEC 60068-2-30 Test Db | Dry heat, Test Ba:16±2h, T = 85±2°C Damp heat, Test Db first cycle :24h, T = 55±2°C Cold, Test Aa :2h, T = -40±3°C Damp heat Test Ba remaining cycles:5 cycle | $\Delta V/V \leq \pm 10\%$ No visible damage RISO ≥ 100MΩ Voltage proof:No breakdown or flashover |
| Endurance at upper category temperature | IEC 61051-1 (4.21) | T:max temperature as specified , Duration: 1000 h, Voltage: max. a.c. voltage | $\Delta V/V \leq \pm 10\%$ No visible damage R ≥ 1000MΩ U ≤ 1,1 Uinitial |



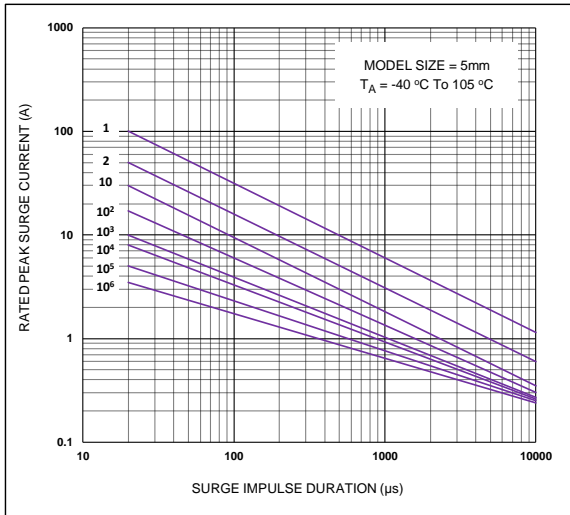
Reliability

| Characteristics | Standard | Test Conditions | Specifications |
|------------------------------------|---------------------------|--|--|
| Damp heat (Steady state) | IEC 60068-2-78 Test Ca | T = 40±2°C, RH = 93(+2/-3)%, 56d , 4 specimens:No voltage applied , Other 4 specimens:Applied voltage: 10% of the max. d.c. voltage | $\Delta V/V \leq \pm 10\%$ RISO $\geq 100M\Omega$ |
| Maximum Peak Current | Specification Standard | $I_{max}, 8/20 \mu s, 1 \text{ time } \frac{V_{1mA \text{ at } 85^\circ C} - V_{1mA \text{ at } 25^\circ C}}{V_{1mA \text{ at } 25^\circ C}} \times \frac{1}{60} \times 100(\%/C)$ | $-0.05 \leq TC \leq 0.05(\%/^\circ C)$ |
| Nominal Discharge Current Test | UL1449 4th | Nominal Discharge Current (In), 8/20 μs , 15 times | $\Delta V/V \leq \pm 10\%$ No visible damage |
| Varistor Voltage Temp. Coefficient | Specification Standard | V1mA at -40°C, 85°C, 25°C | $\Delta V/V \leq \pm 10\%$ No visible damage |
| High Temperature Storage | IEC60068-2-2 | 1000h, T = 85±2°C | $\Delta V/V \leq \pm 10\%$ No visible damage |
| Max. Energy | Specification Standard | 10/1000 μs , 1 tmes, Max. Energy | $\Delta V/V \leq \pm 10\%$ No visible damage |
| Operating duty cycle test * | UL 1449 | 6 kV/3 kA combination wave surges, phase angle of 90 (+0, -15) degrees, npositive polarity 8 times, negative polarity 7 times, interval of 60s. | $\Delta V/V \leq \pm 10\%$ No visible damage |
| Surge Immunity Test * | IEC 61000-4-5 | 4kV/2kA combination wave surges, phase angle of 90 (+0, -15) degrees, npositive polarity 20times, negative polarity 20times, interval of 60s. | $\Delta V/V \leq \pm 10\%$ No visible damage |

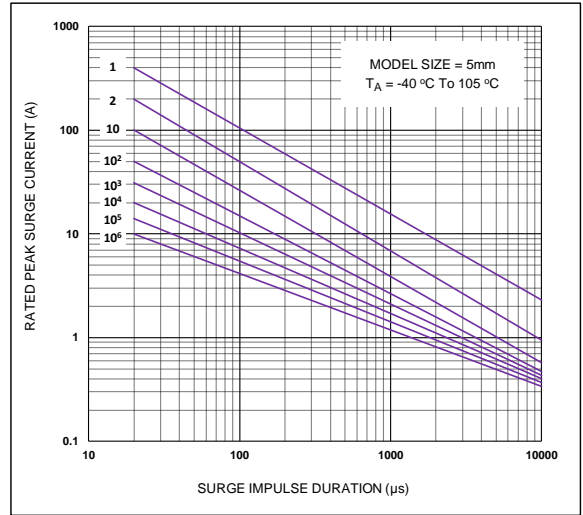
* (According to customer requirements to meet the test items)

Impulse Life Time Rating Curves

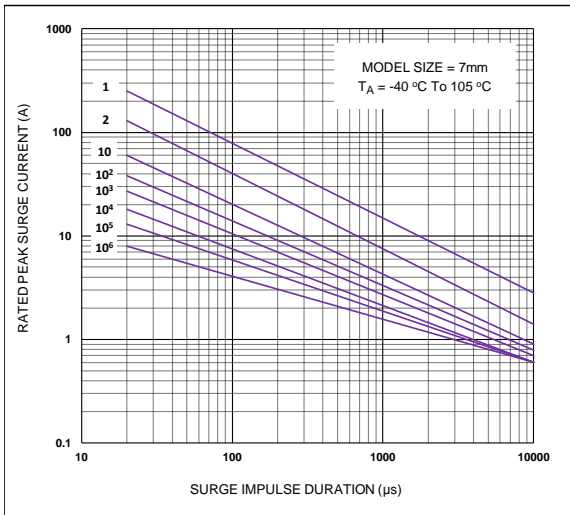
CNR-05D180K to CNR-05D680K



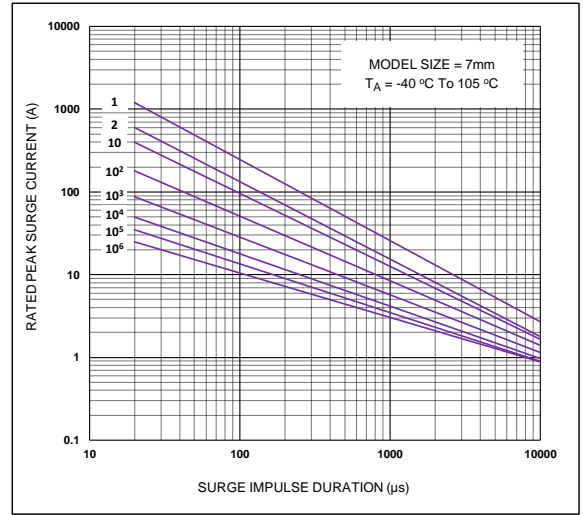
CNR-05D820K to CNR-05D751K



CNR-07D180K to CNR-07D680K

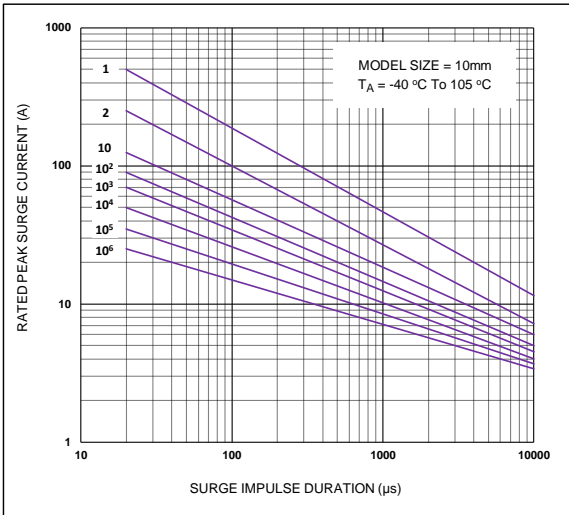


CNR-07D820K to CNR-07D821K

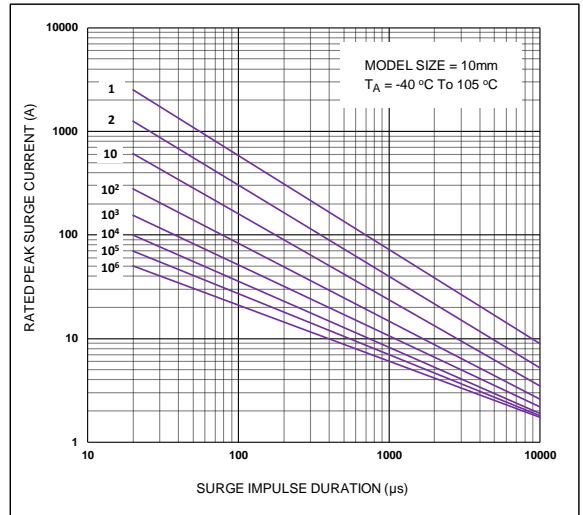


Impulse Life Time Rating Curves

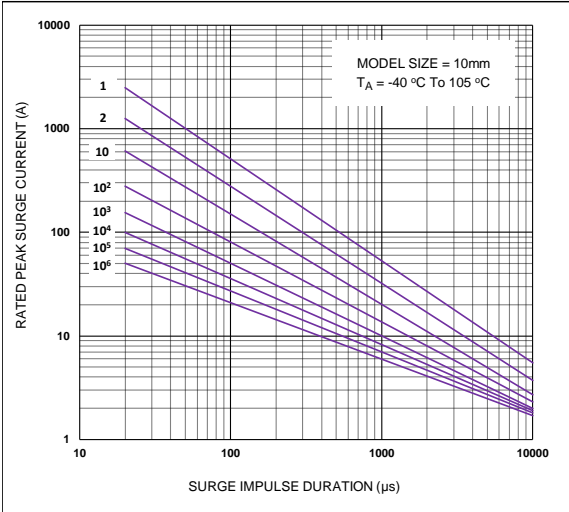
CNR-10D180K to CNR-10D680K



CNR-10D820K to CNR-10D751K

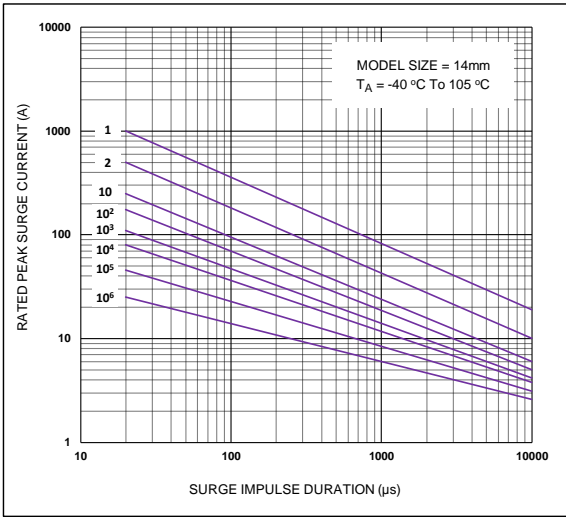


CNR-10D781K to CNR-10D182K

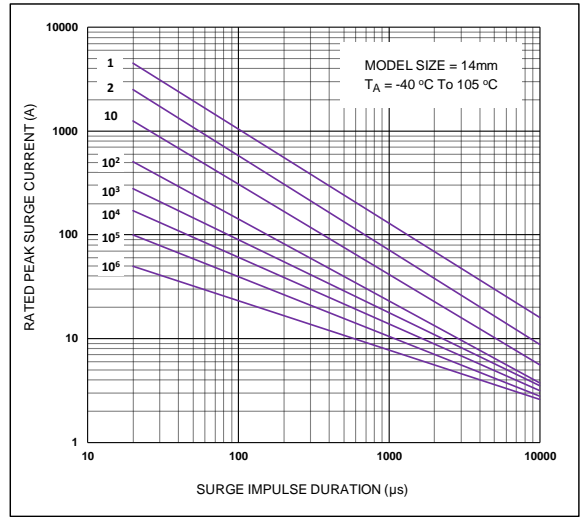


Impulse Life Time Rating Curves

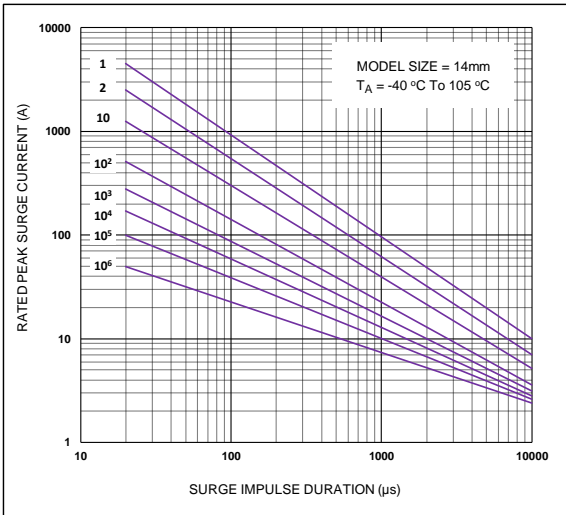
CNR-14D180K to CNR-14D680K



CNR-14D820K to CNR-14D751K

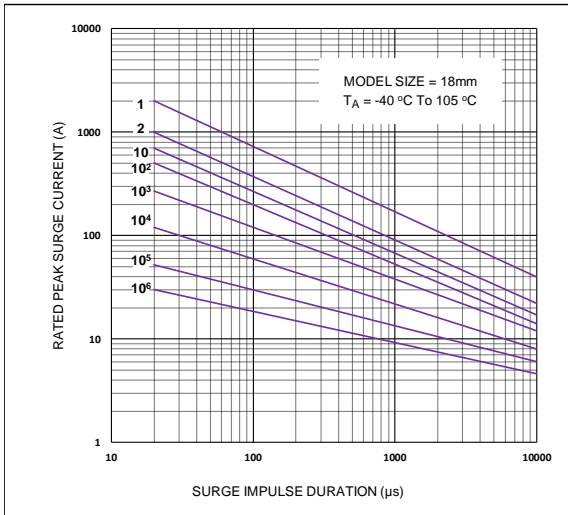


CNR-14D781K to CNR-14D182K

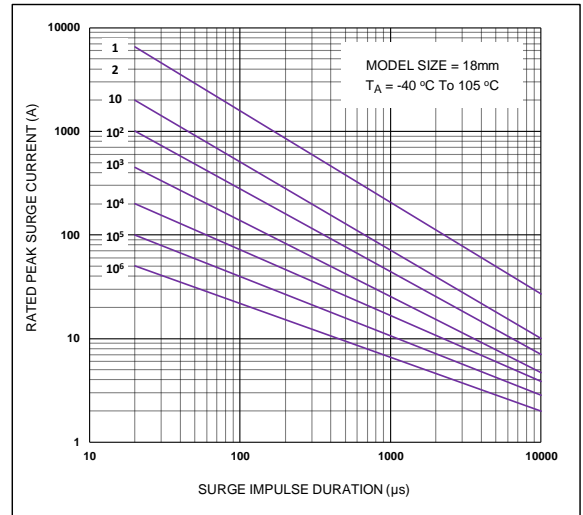


Impulse Life Time Rating Curves

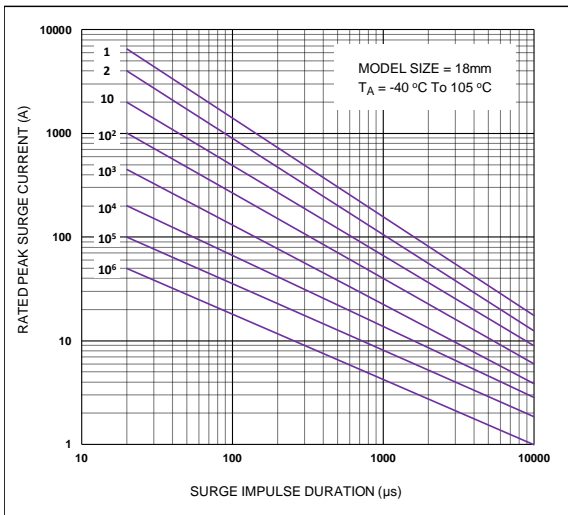
CNR-18D180K to CNR-18D680K



CNR-18D820K to CNR-18D751K

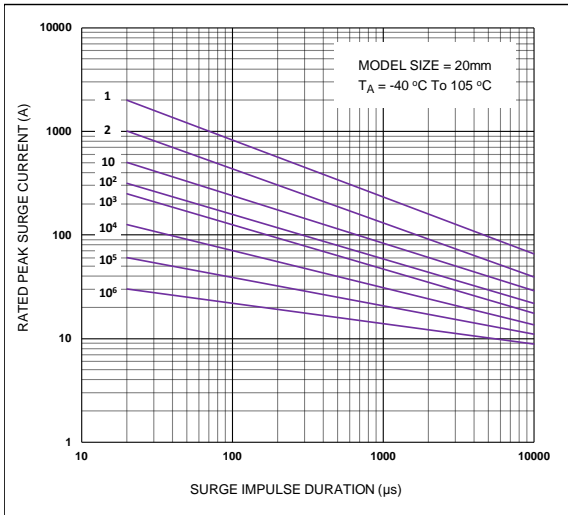


CNR-18D781K to CNR-18D112K

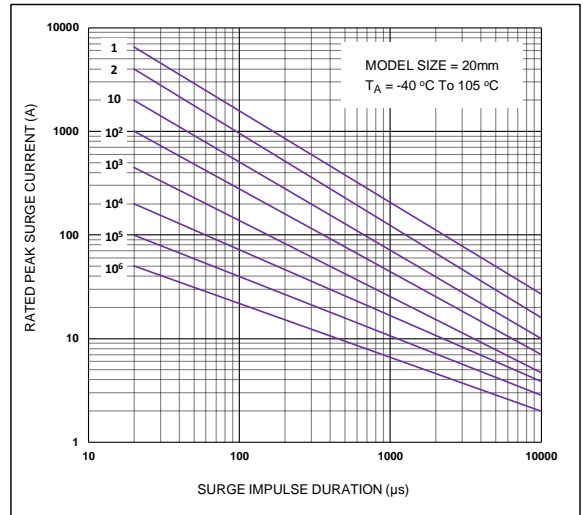


Impulse Life Time Rating Curves

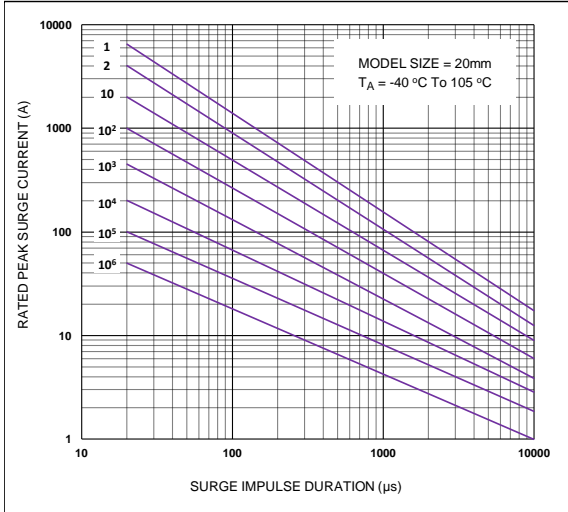
CNR-20D180K to CNR-20D680K



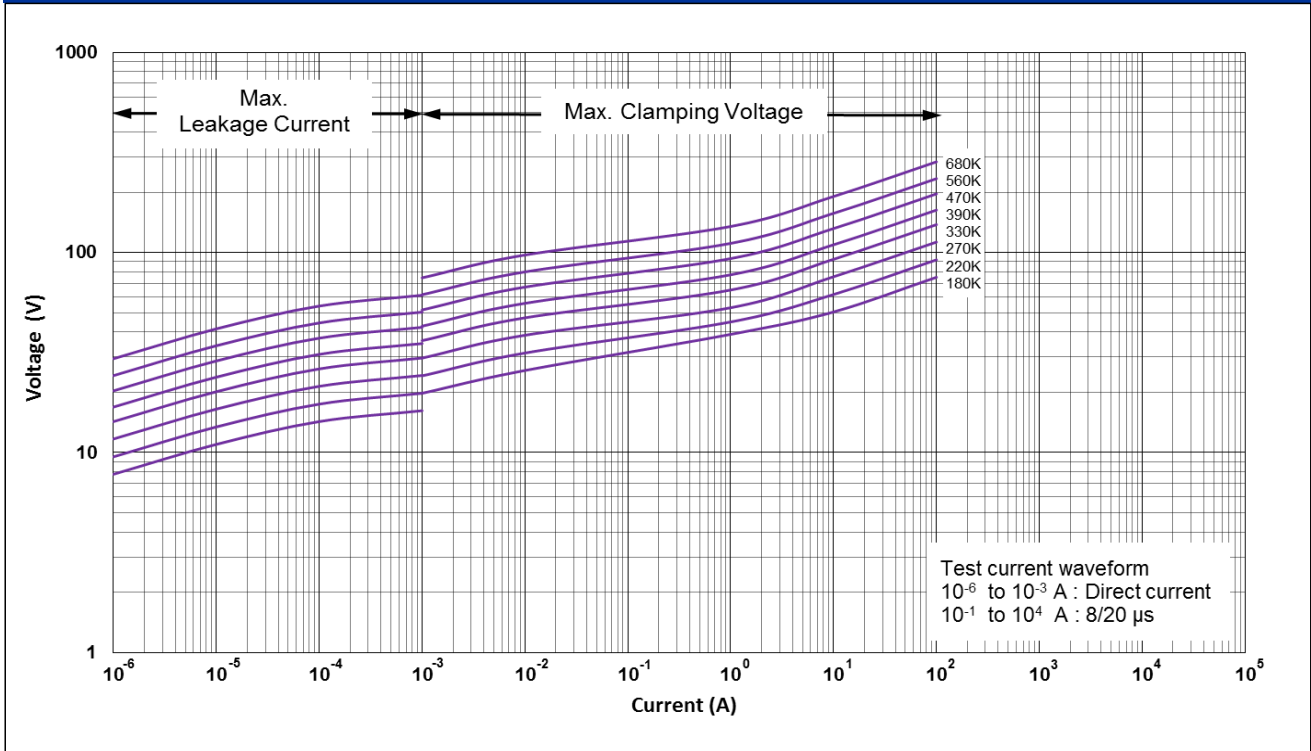
CNR-20D820K to CNR-20D751K



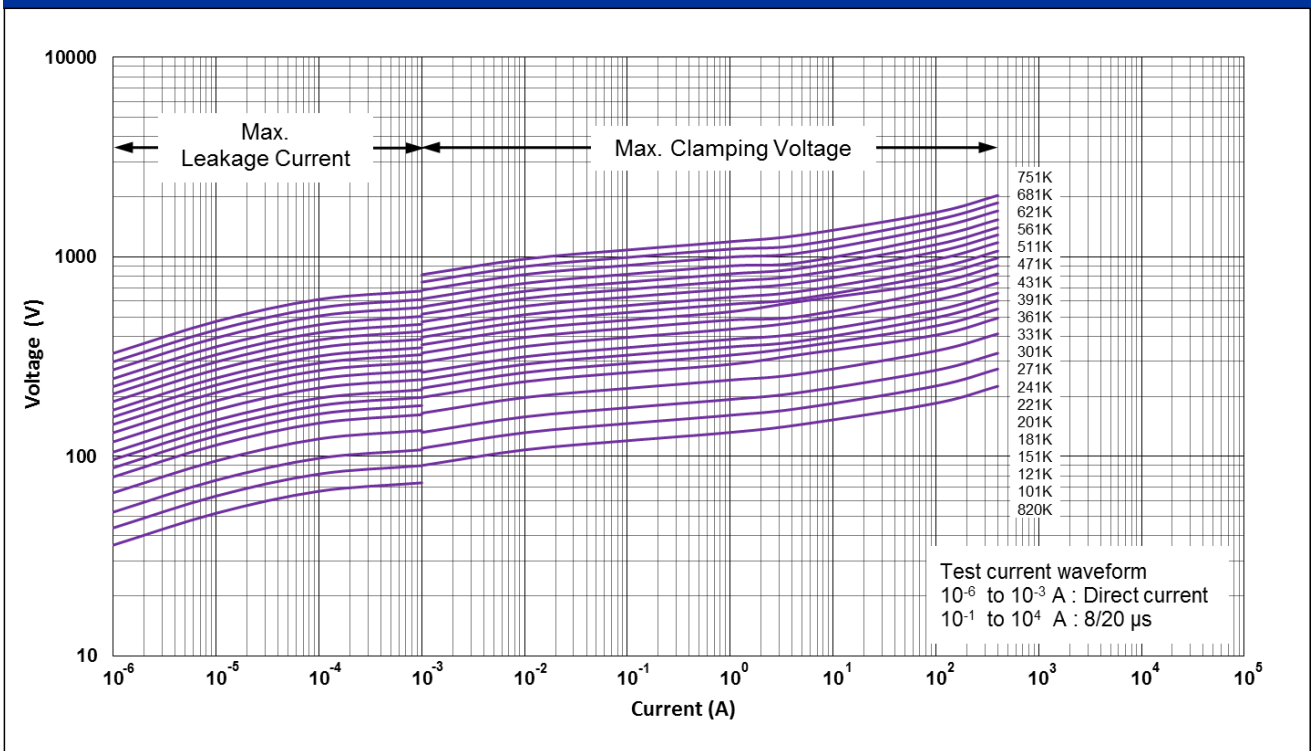
CNR-20D781K to CNR-20D182K



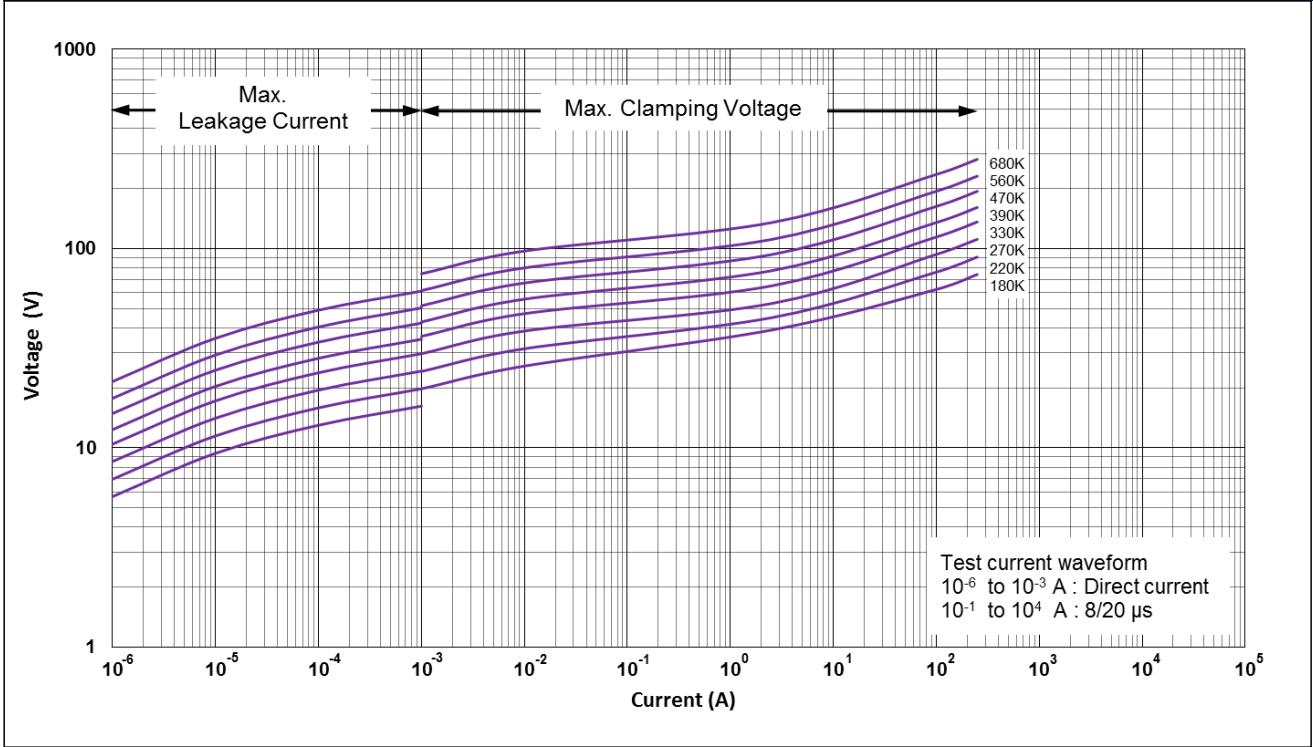
CNR-05D180K to CNR-05D680K V-I Curves



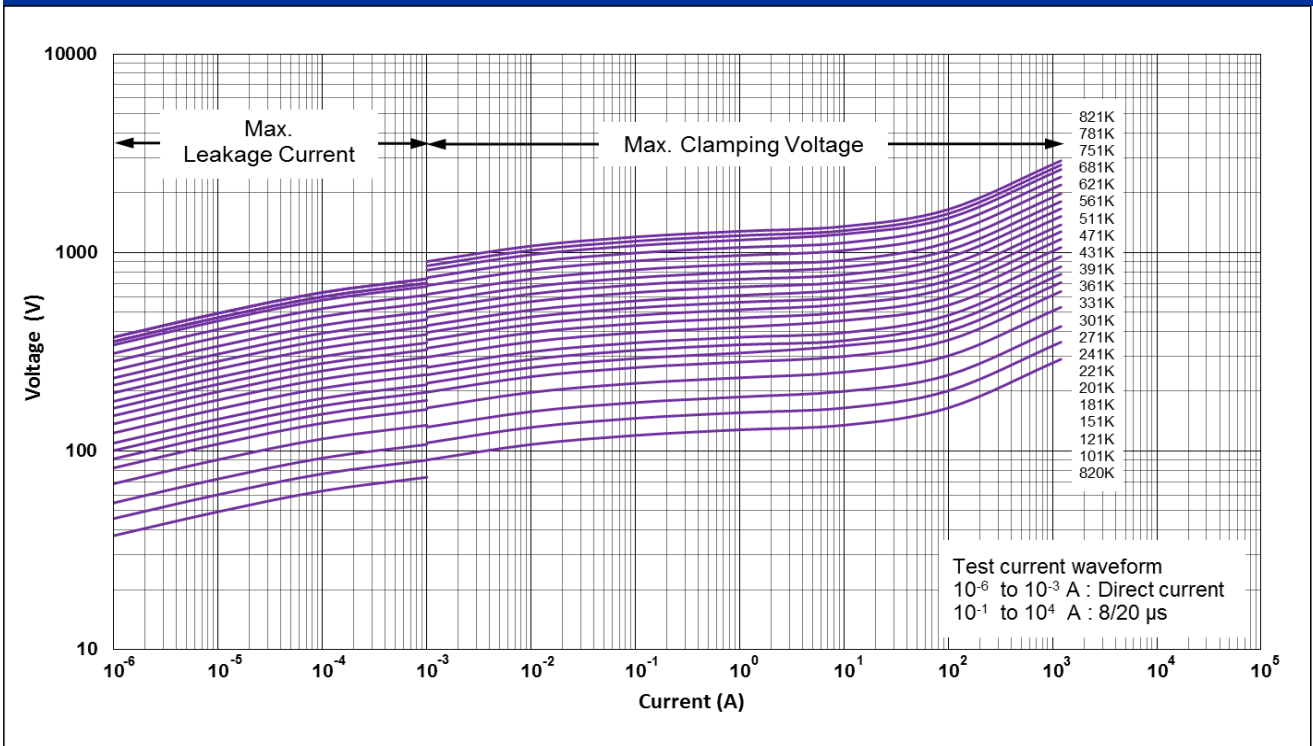
CNR-05D820K to CNR-05D751K V-I Curves



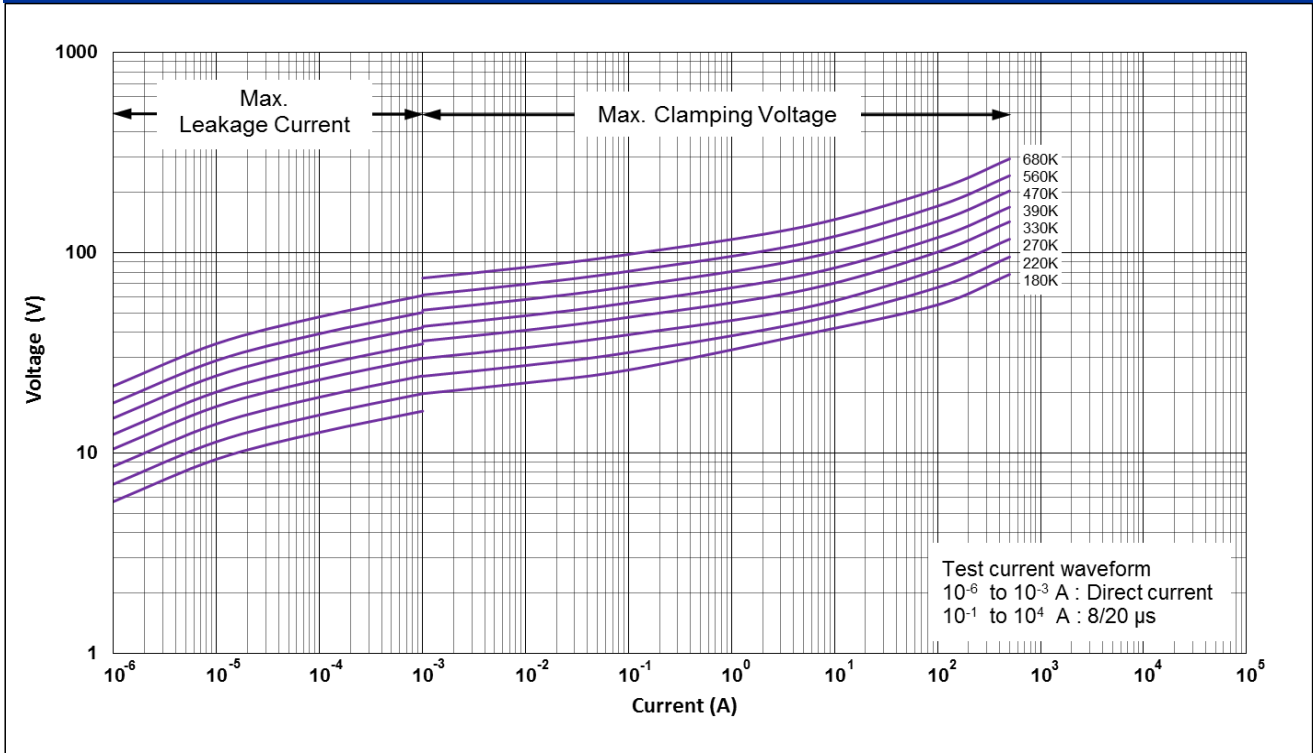
CNR-07D180K to CNR-07D680K V-I Curves



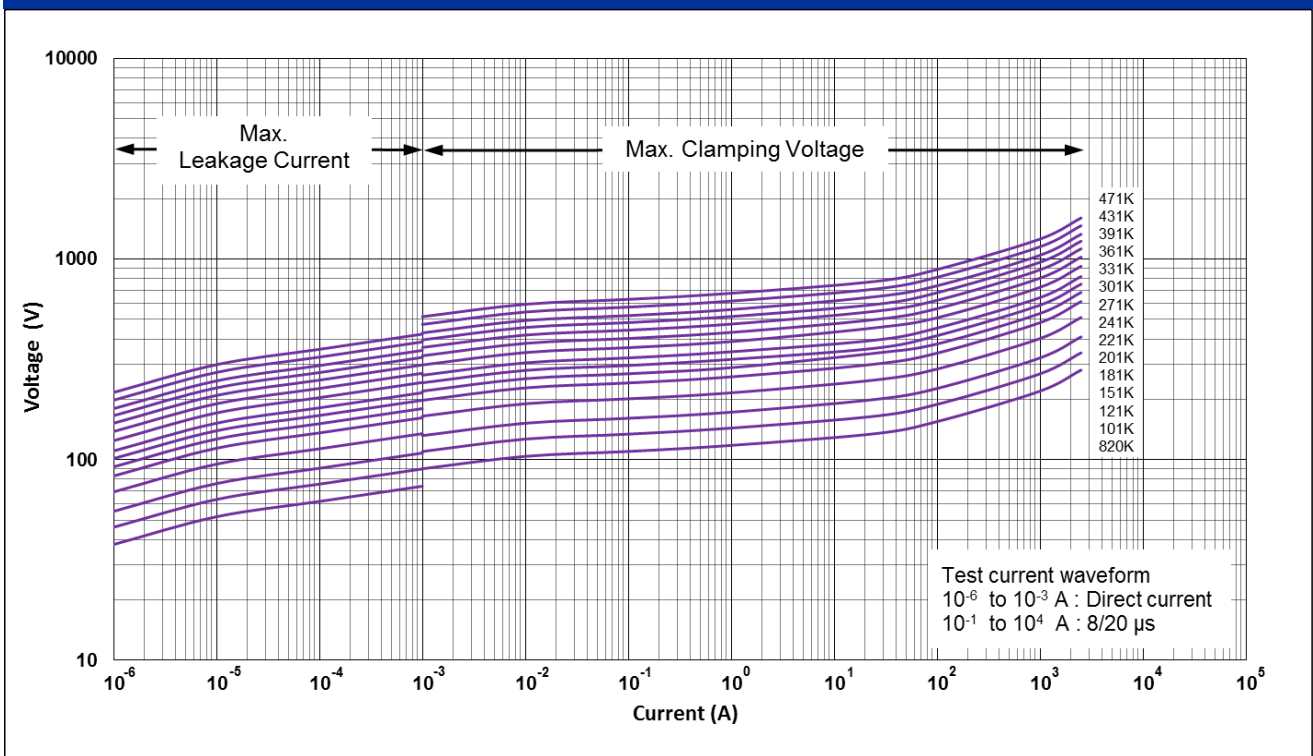
CNR-07D820K to CNR-07D821K V-I Curves



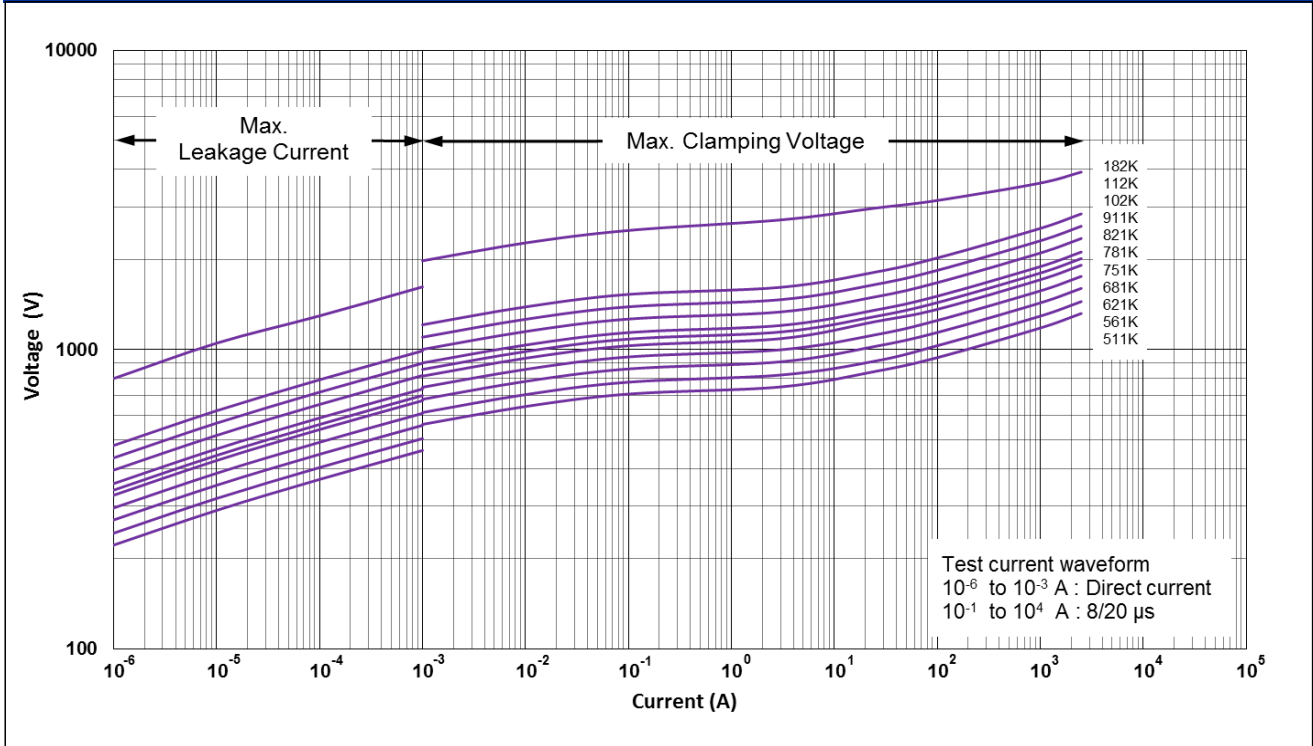
CNR-10D180K to CNR-10D680K V-I Curves



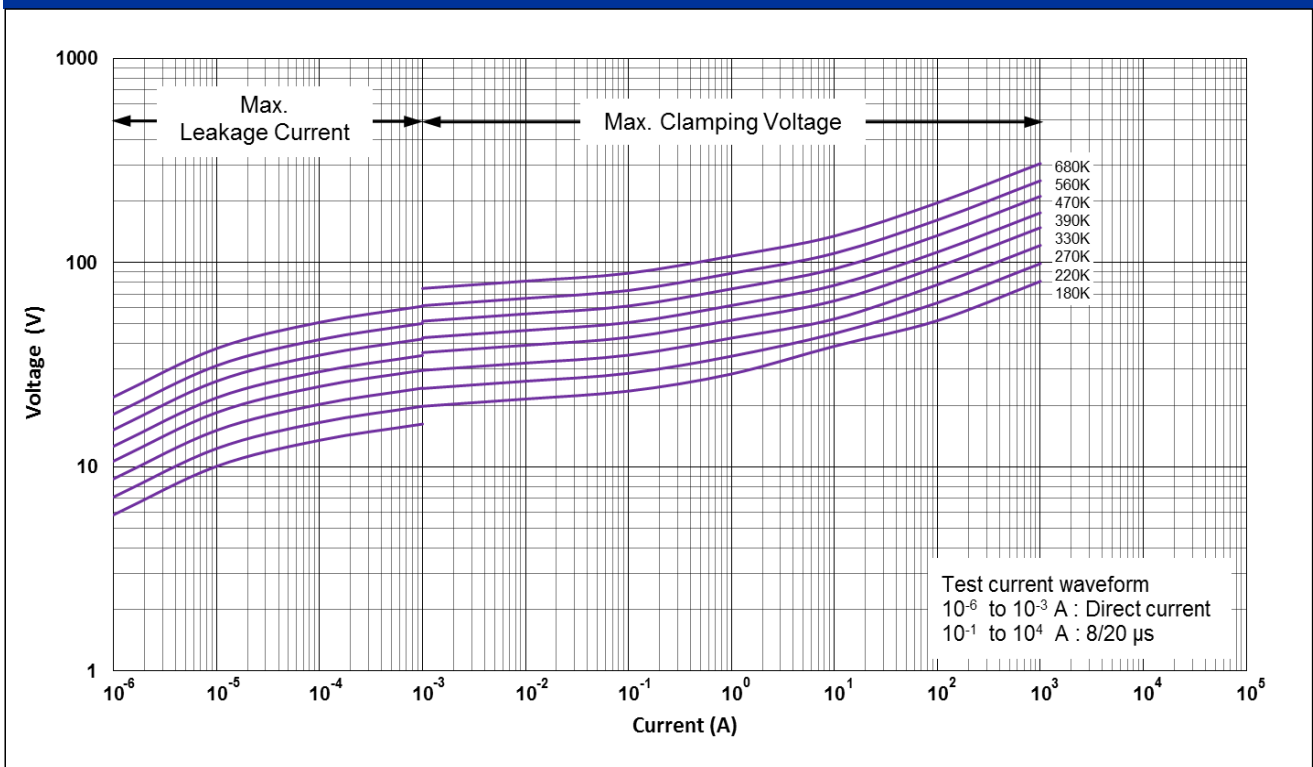
CNR-10D820K to CNR-10D471K V-I Curves



CNR-10D511K to CNR-10D182K V-I Curves

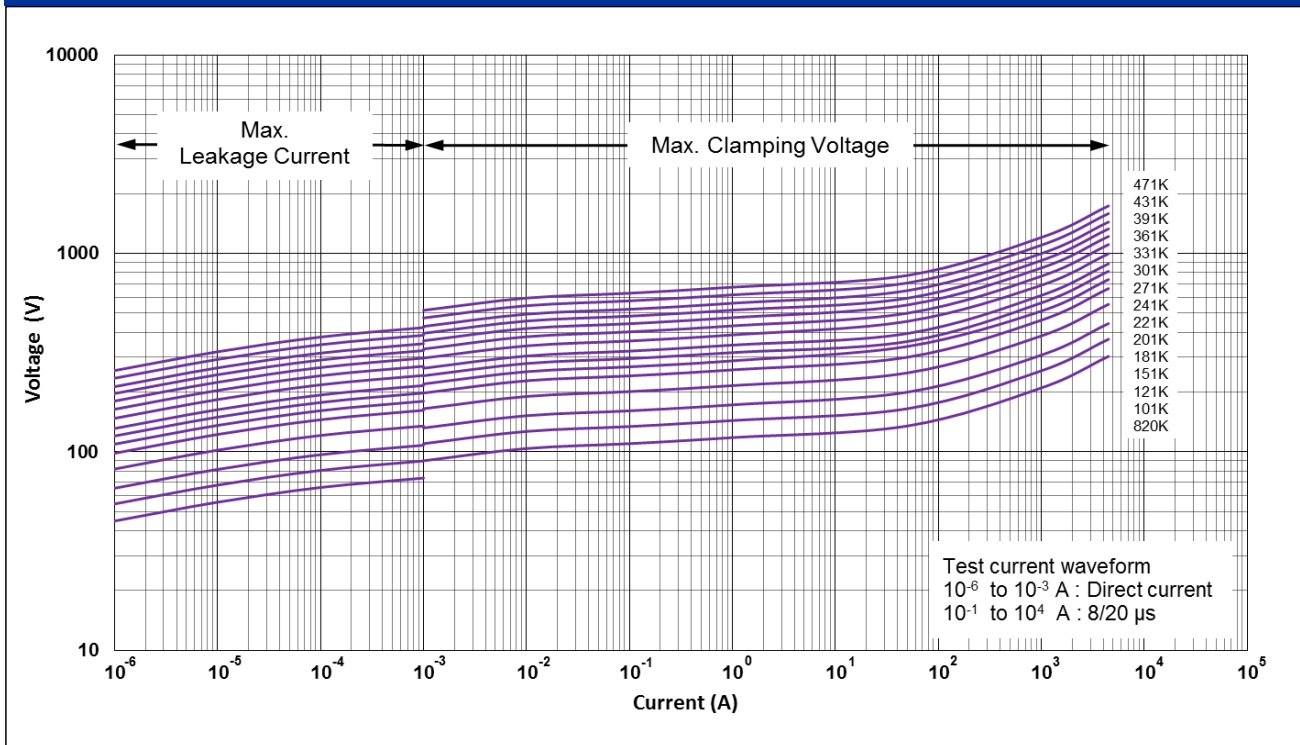


CNR-14D180K to CNR-14D680K V-I Curves

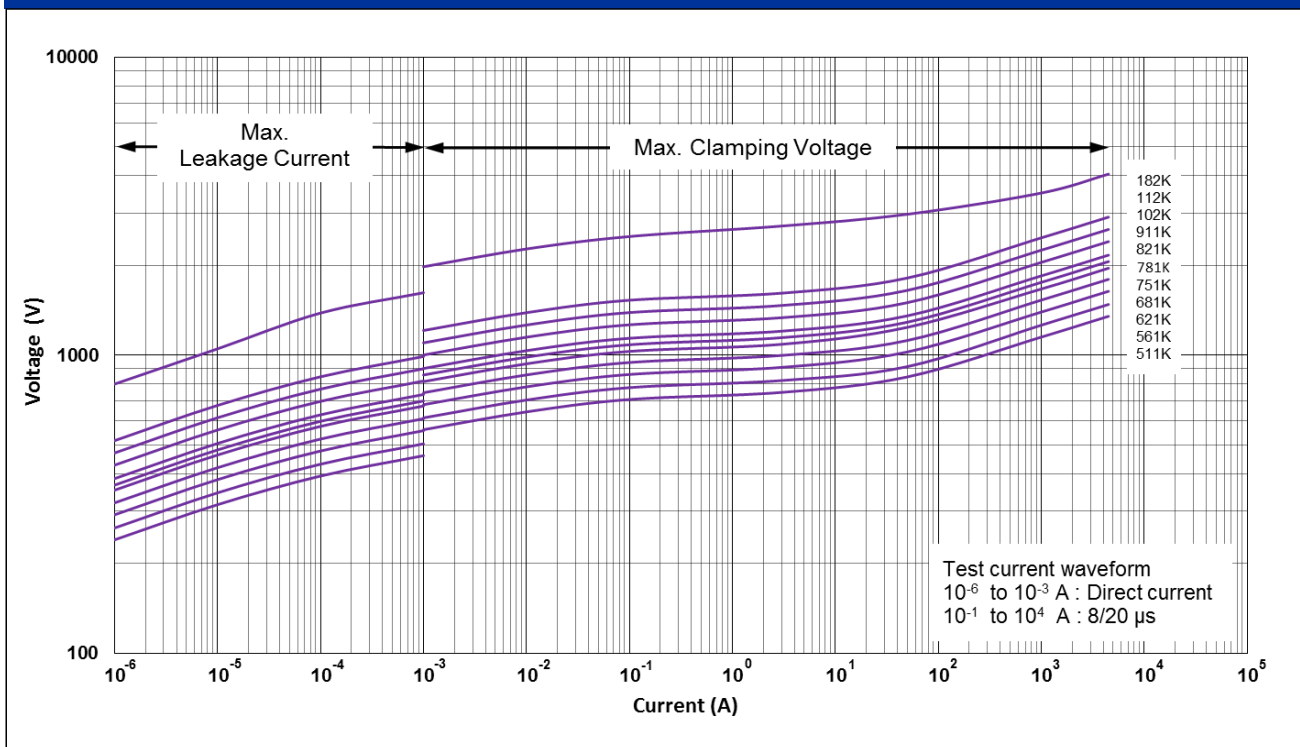




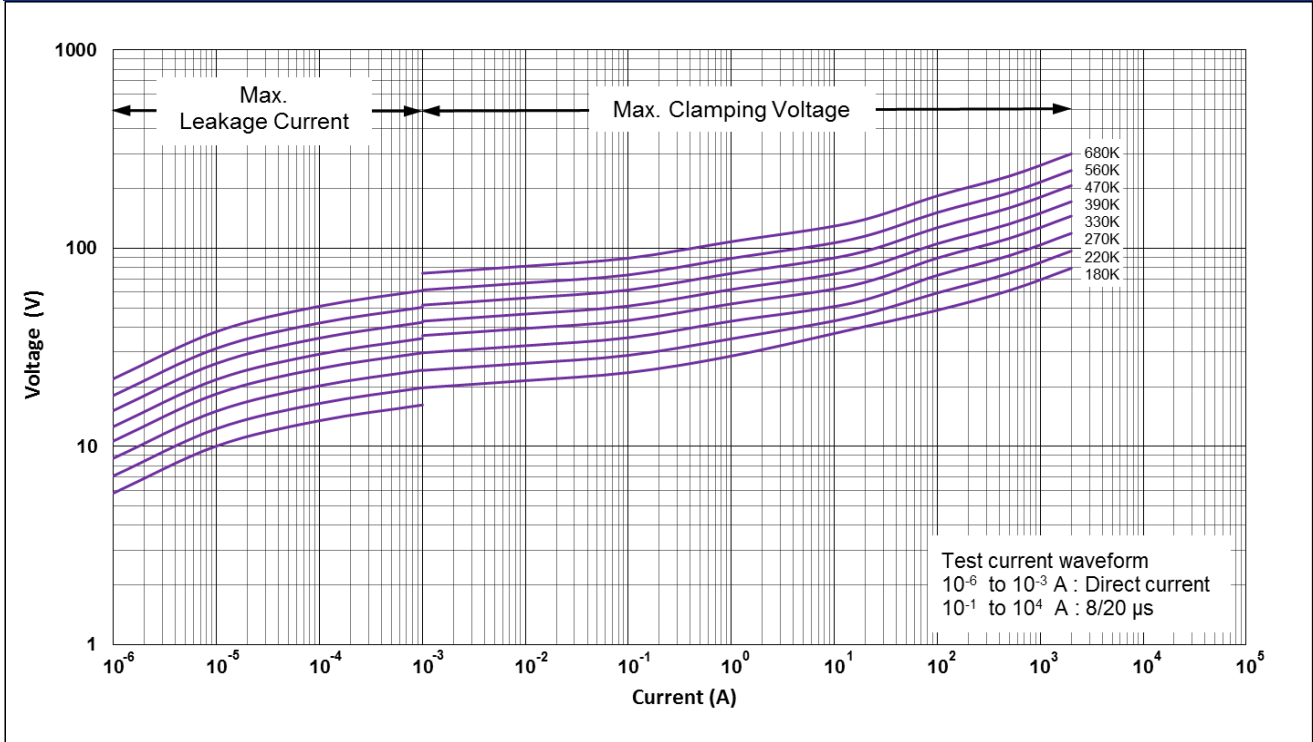
CNR-14D820K to CNR-14D471K V-I Curves



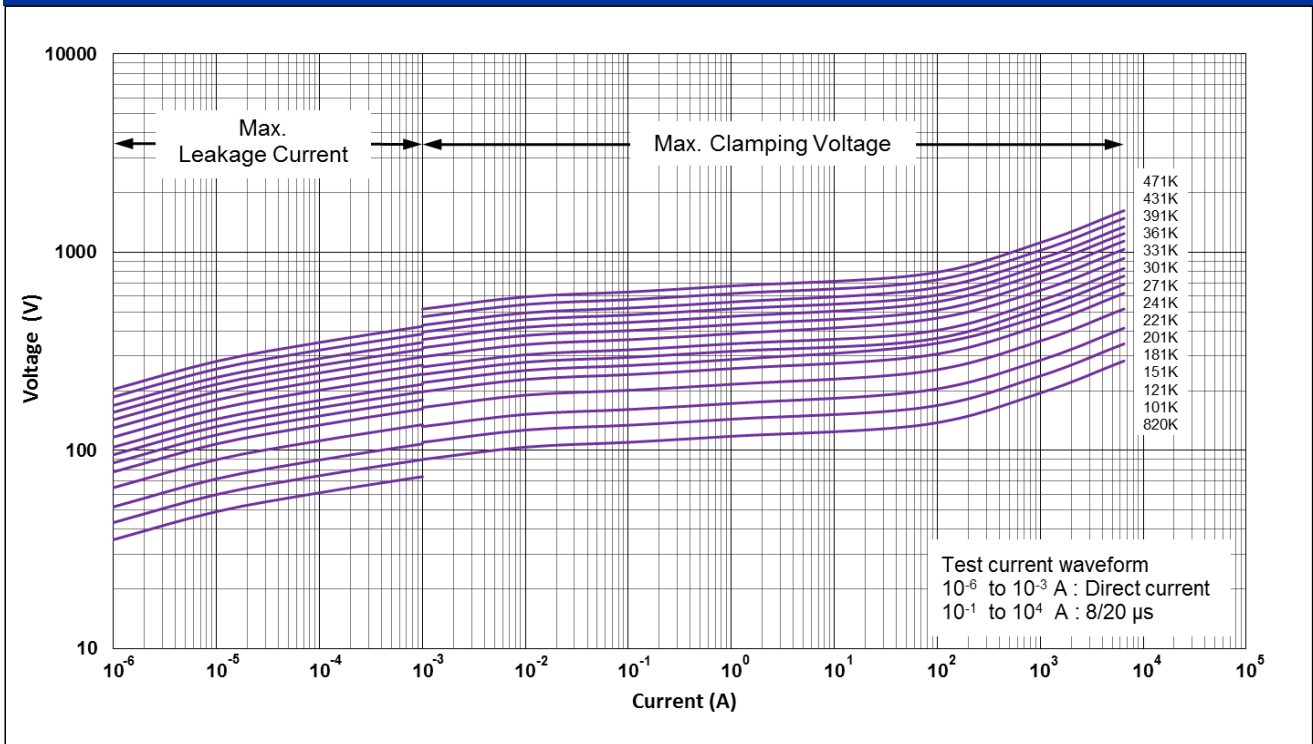
CNR-14D511K to CNR-14D182K V-I Curves



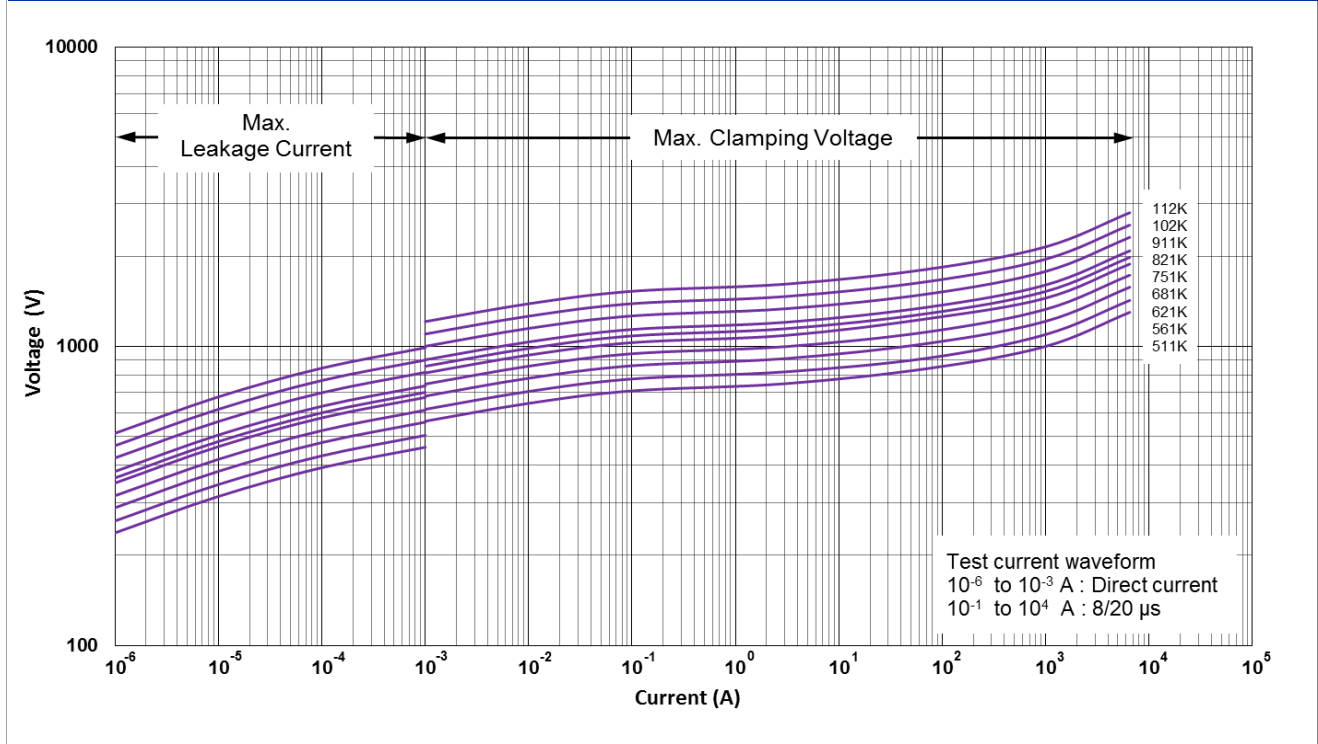
CNR-18D180K to CNR-18D680K V-I Curves



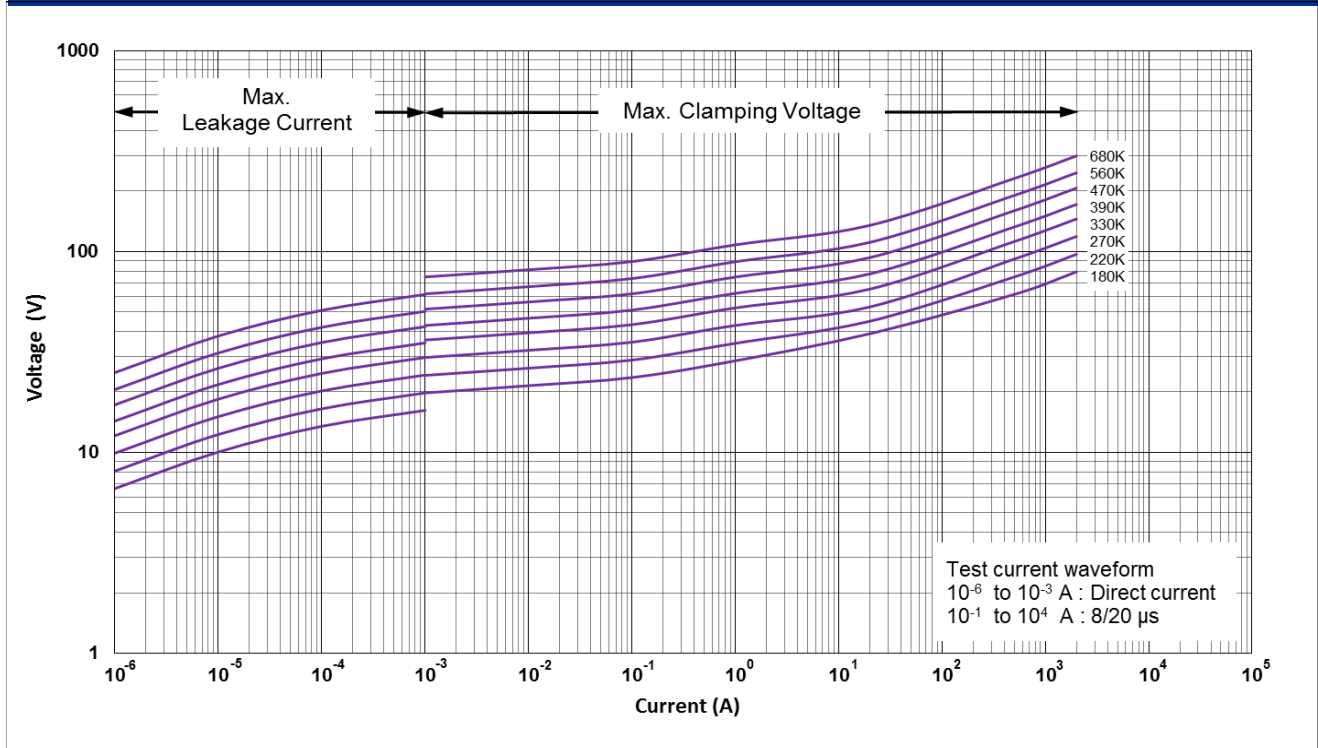
CNR-18D820K to CNR-18D471K V-I Curves



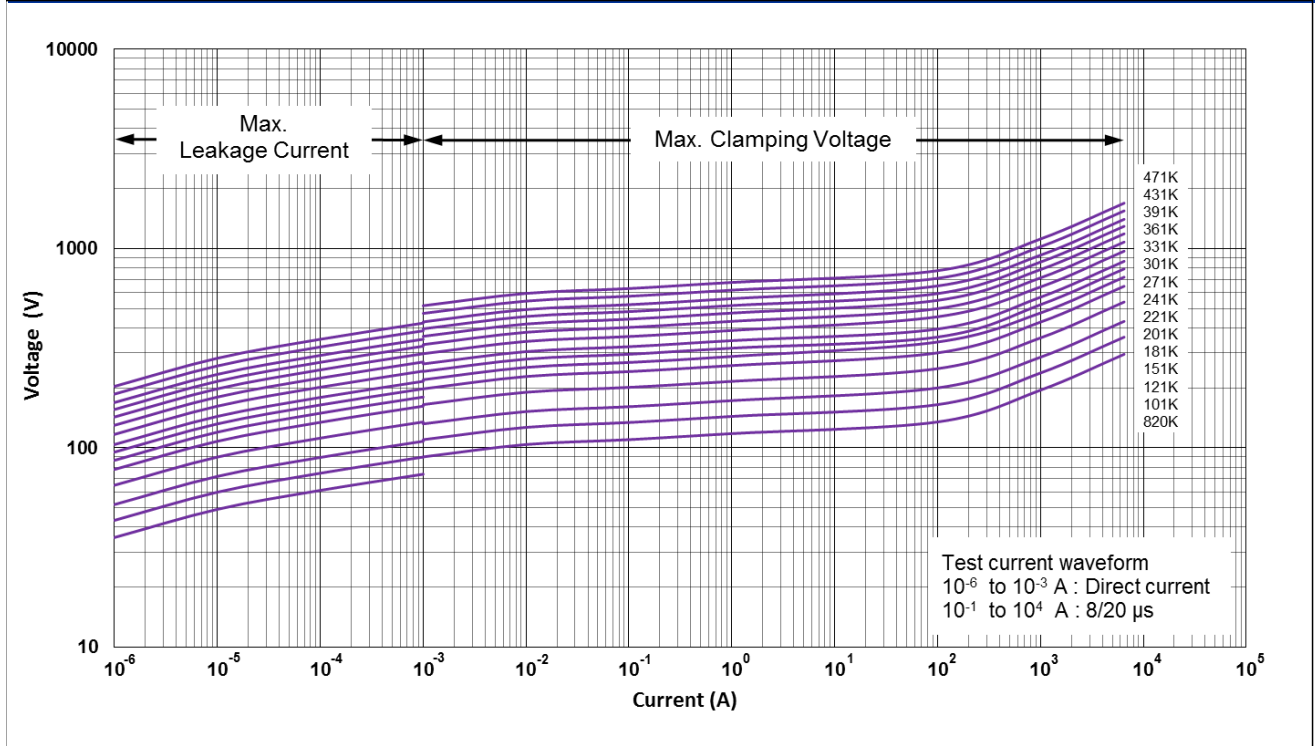
CNR-18D511K to CNR-18D112K V-I Curves



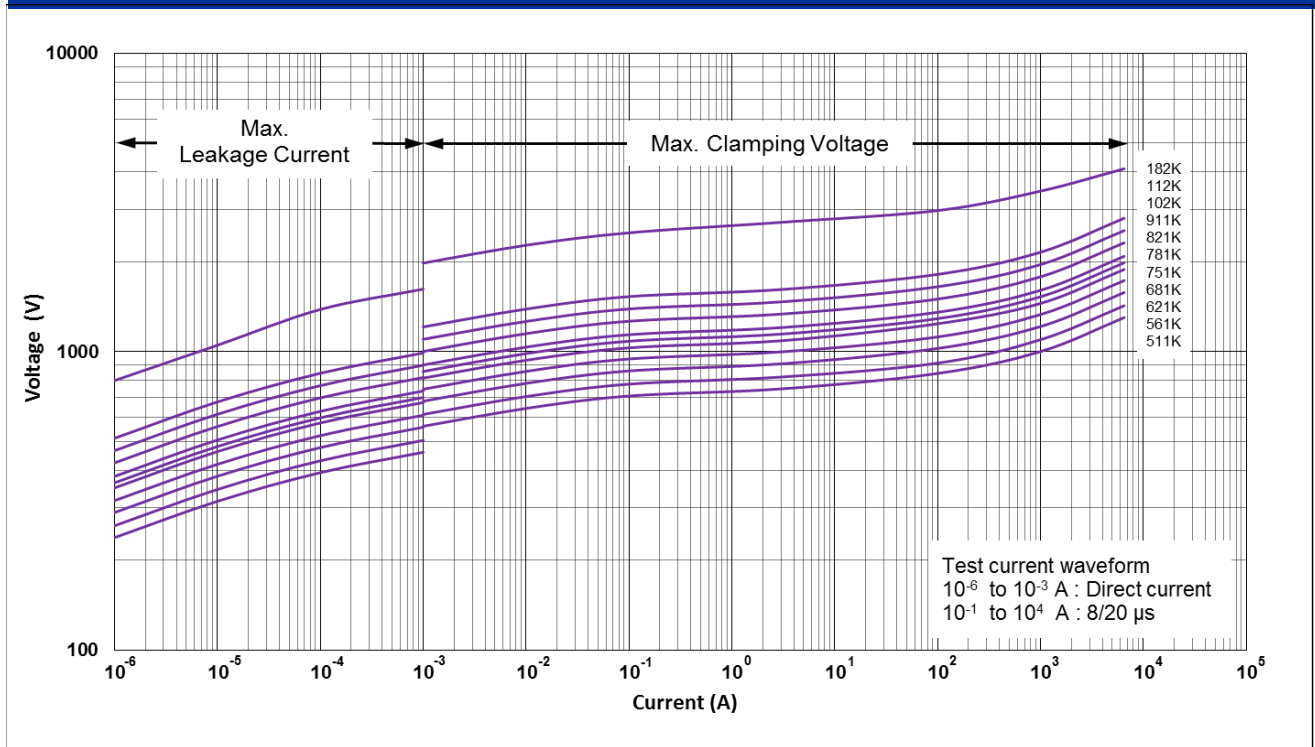
CNR-20D180K to CNR-20D680K V-I Curves



CNR-20D820K to CNR-20D471K V-I Curves

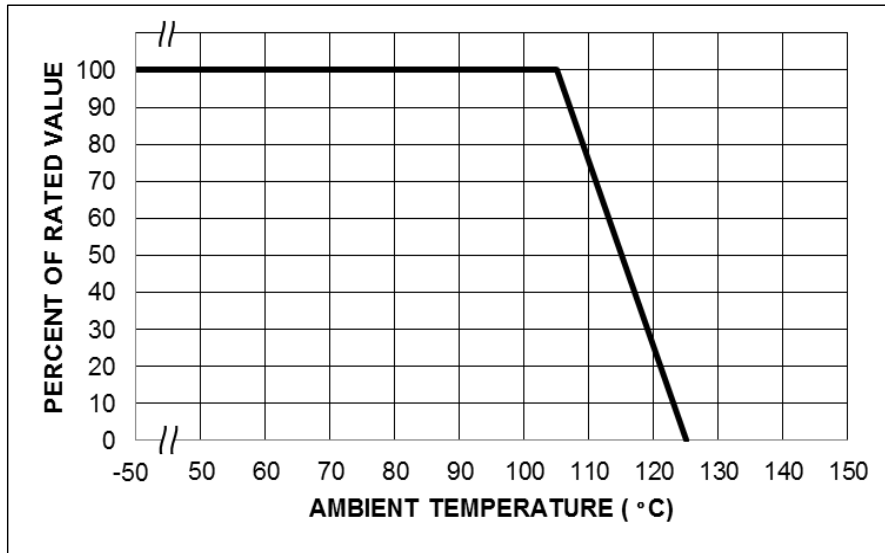


CNR-20D511K to CNR-20D182K V-I Curves

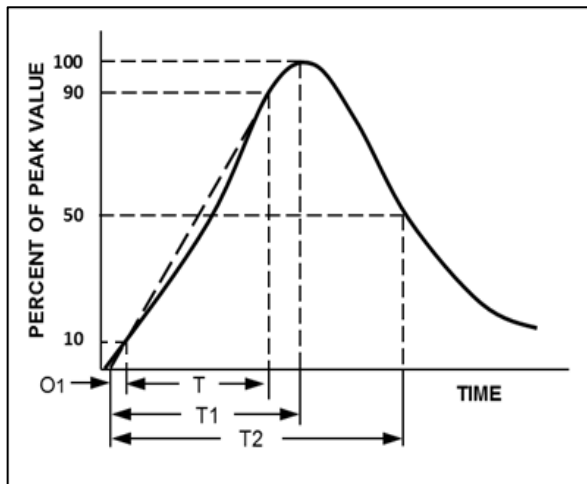


Power Derating Curve

Should transients occur in rapid succession, the average power dissipation is the energy (watt-seconds) per pulse times the number of pulses per second. The power so developed must be with the specifications shown on the Device Ratings and Specifications Table for the specific device. The operating values of a MOV need to be derated at high temperatures as shown above. Because varistors only dissipate a relatively small amount of average power they are not suitable for repetitive applications that involve substantial amounts of average power dissipation.



Surge Current Standard Waveform



O1 = Virtual Origin of Wave
 T = Time from 10% to 90% of Peak
 T1 = Rise Time = 1.25 x T
 T2 = Decay Time
 Example - For an 8/20 μs Current Waveform:
 8μs = T1 = Rise Time
 20μs = T2 = Decay Time

Product Dimensions

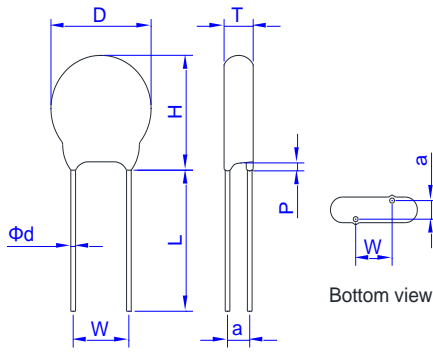


Fig 1. Straight Lead

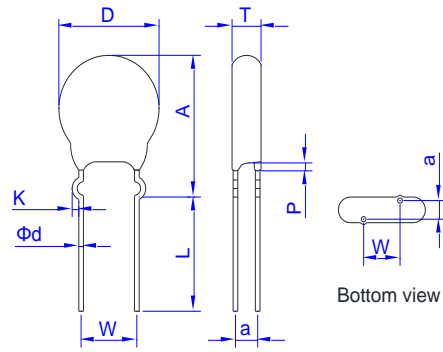


Fig 2. Outside Kink Lead

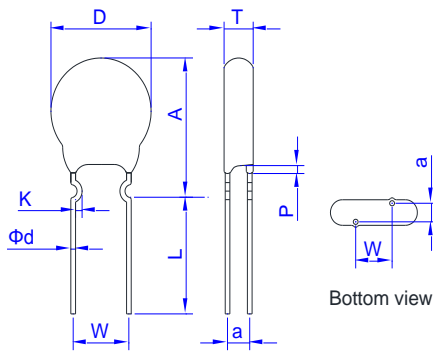


Fig 3. Inside Kink Lead

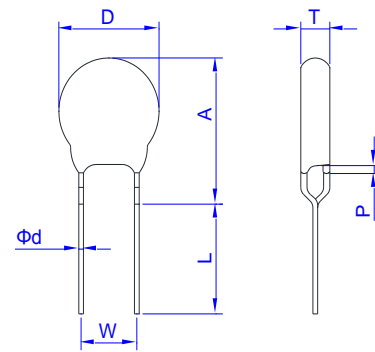


Fig 4. In Line Kink Lead

Dimension Table

Unit:mm

| Symbol | Model size | 05D | | 07D | | 10D | | 14D | | 18D | | 20D | |
|--------------|------------|----------------|------|------|------|------|------|------|------|------|------|------|------|
| | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| D | | 5.5 | 7.5 | 7.5 | 9.0 | 10.5 | 14.0 | 13.5 | 17.5 | 18.5 | 23.0 | 19.5 | 25.0 |
| H | | - | 10.0 | - | 12.0 | - | 17.0 | - | 20.5 | - | 26.0 | - | 28.0 |
| W | | 4.0 | 6.0 | 4.0 | 6.0 | 6.5 | 8.5 | 6.5 | 8.5 | 6.5 | 8.5 | 9.0 | 11.0 |
| Φd | | 0.55 | 0.65 | 0.55 | 0.65 | 0.75 | 0.85 | 0.75 | 0.85 | 0.75 | 0.85 | 0.95 | 1.05 |
| P(max.) | | 3.0 | | | | | | | | | | | |
| L(min) | | 25.0 | | | | | | | | | | | |
| K(Kink Lead) | | 0.8 | 1.6 | 0.8 | 1.6 | 1.0 | 1.8 | 1.0 | 1.8 | 1.0 | 1.8 | 1.0 | 1.8 |
| A(max.) | 180K-271K | - | 13.0 | - | 15.0 | - | 19.5 | - | 22.5 | - | 26.5 | - | 30.0 |
| | >271K | - | 13.0 | - | 15.0 | - | 20.5 | - | 23.5 | - | 27.0 | - | 31.0 |
| T | | See Tmax table | | | | | | | | | | | |

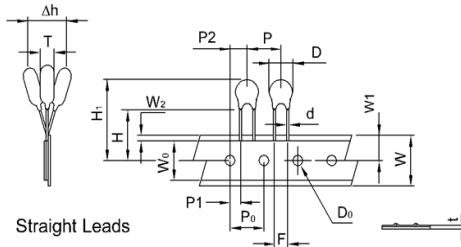
* Short Cut Lead type TTX the lead length (L) can 3.0~15mm (expect 20D dia <10mm), see Ordering Note.

** a value see T max. table

| T max. Table | | | | | | | | Unit:mm | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|---------|---------|-----|-----|------|------|-----|------|---------|
| Model | 05D | 07D | 10D | 14D | 18D | 20D | a(±1.0) | Model | 05D | 07D | 10D | 14D | 18D | 20D | a(±1.0) |
| 180K | 3.3 | 3.5 | 3.9 | 4.0 | 4.2 | 4.3 | 1.5 | 301K | 3.9 | 4.1 | 4.3 | 4.4 | 4.6 | 4.7 | 1.9 |
| 220K | 3.6 | 3.8 | 4.2 | 4.3 | 4.5 | 4.6 | 1.6 | 331K | 4.0 | 4.2 | 4.5 | 4.6 | 4.8 | 4.9 | 2.0 |
| 270K | 3.8 | 4.0 | 4.4 | 4.5 | 4.7 | 4.8 | 1.7 | 361K | 4.1 | 4.3 | 4.7 | 4.8 | 5.0 | 5.1 | 1.7 |
| 330K | 3.3 | 3.5 | 3.9 | 4.0 | 4.2 | 4.3 | 1.6 | 391K | 4.2 | 4.4 | 4.8 | 4.9 | 5.1 | 5.2 | 1.8 |
| 390K | 3.5 | 3.7 | 4.1 | 4.2 | 4.4 | 4.5 | 1.8 | 431K | 4.4 | 4.6 | 5.0 | 5.1 | 5.3 | 5.4 | 1.9 |
| 470K | 3.7 | 3.9 | 4.3 | 4.4 | 4.6 | 4.7 | 1.9 | 471K | 4.6 | 4.8 | 5.2 | 5.3 | 5.5 | 5.6 | 2.0 |
| 560K | 4.0 | 4.2 | 4.6 | 4.7 | 4.9 | 5.0 | 2.0 | 511K | 4.8 | 5.0 | 5.3 | 5.4 | 5.6 | 5.7 | 2.2 |
| 680K | 4.3 | 4.5 | 4.9 | 5.0 | 5.2 | 5.3 | 2.2 | 561K | 5.0 | 5.2 | 5.5 | 5.6 | 5.8 | 5.9 | 2.3 |
| 820K | 3.3 | 3.5 | 3.9 | 4.0 | 4.2 | 4.3 | 1.5 | 621K | 5.3 | 5.5 | 5.7 | 5.8 | 6.0 | 6.1 | 2.5 |
| 101K | 3.6 | 3.8 | 4.2 | 4.3 | 4.5 | 4.6 | 1.5 | 681K | 5.4 | 5.6 | 5.8 | 5.9 | 6.1 | 6.2 | 2.7 |
| 121K | 3.8 | 4.0 | 4.4 | 4.5 | 4.7 | 4.8 | 1.6 | 751K | 5.6 | 5.8 | 6.0 | 6.1 | 6.3 | 6.4 | 2.9 |
| 151K | 4.1 | 4.3 | 4.7 | 4.8 | 5.0 | 5.1 | 1.8 | 781K | - | 6.0 | 6.3 | 6.4 | 6.6 | 6.7 | 3.0 |
| 181K | 3.2 | 3.4 | 3.8 | 3.9 | 4.1 | 4.2 | 1.5 | 821K | - | 6.3 | 6.5 | 6.6 | 6.8 | 6.9 | 3.1 |
| 201K | 3.3 | 3.5 | 3.9 | 4.0 | 4.2 | 4.3 | 1.5 | 911K | - | - | 6.6 | 6.7 | 6.9 | 7.0 | 3.5 |
| 221K | 3.4 | 3.6 | 4.0 | 4.1 | 4.3 | 4.4 | 1.6 | 102K | - | - | 7.0 | 7.1 | 7.3 | 7.4 | 3.8 |
| 241K | 3.5 | 3.7 | 4.1 | 4.2 | 4.4 | 4.5 | 1.7 | 112K | - | - | 7.4 | 7.5 | 7.7 | 7.9 | 4.1 |
| 271K | 3.7 | 3.9 | 4.2 | 4.3 | 4.5 | 4.6 | 1.8 | 182K | - | - | 11.3 | 11.5 | - | 11.9 | 6.0 |

Tape and Reel Specifications

● Radial devices on tape are supplied with straight leads or inline kink leads.



Straight Leads

Figure: A

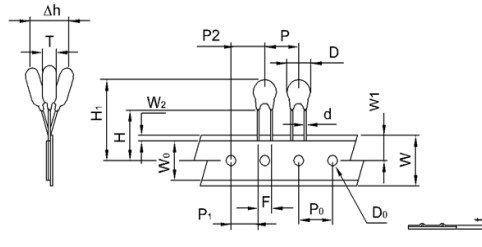


Figure: B

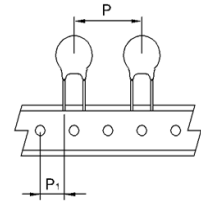
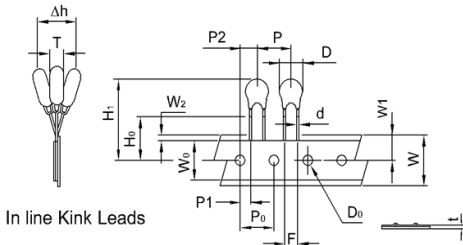


Figure: C



In line Kink Leads

Figure: D

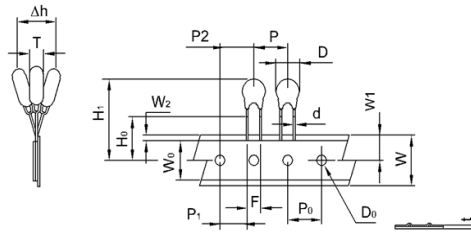


Figure: E

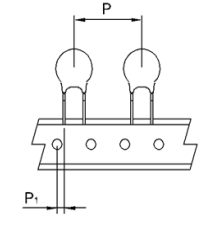


Figure: F

| Symbol | Description | Model | | | | | |
|----------------|---|-----------|-----------|-----------|-----------|-----------|-----------|
| | | 05D | 07D | 10D | 10D | 14D | 14D |
| P | Pitch of Component | 12.7±1.0 | 12.7±1.0 | 12.7±1.0 | 15.0±1.0 | 25.4±1.0 | 30.0±1.0 |
| P ₀ | Feed Hole Pitch | 12.7±0.2 | 12.7±0.2 | 12.7±0.2 | 15.0±0.2 | 12.7±0.2 | 15.0±0.2 |
| P ₁ | Feed Hole Center to Pitch | 3.85±0.7 | 3.85±0.7 | 3.85±0.7 | 3.75±0.7 | 8.95±0.7 | 3.75±0.7 |
| P ₂ | Hole Center to Component Center | 6.35±0.7 | 6.35±0.7 | 6.35±0.7 | 7.5±0.7 | 12.7±0.7 | 7.5±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 | 7.5±0.8 |
| Δh | Component Alignment | 2.0max | 2.0max | 2.0max | 2.0max | 2.0max | 2.0max |
| W | Tape Width | 18.0+1.0 | 18.0+1.0 | 18.0+1.0 | 18.0+1.0 | 18.0+1.0 | 18.0+1.0 |
| | | 18.0-0.5 | 18.0-0.5 | 18.0-0.5 | 18.0-0.5 | 18.0-0.5 | 18.0-0.5 |
| W ₀ | Hold Down Tape Width | 5.0 Min. | 5.0 Min. | 5.0 Min. | 5.0 Min. | 5.0 Min. | 5.0 Min. |
| W ₁ | Hole Position | 9.0+0.75 | 9.0+0.75 | 9.0+0.75 | 9.0+0.75 | 9.0+0.75 | 9.0+0.75 |
| | | 9.0-0.5 | 9.0-0.5 | 9.0-0.5 | 9.0-0.5 | 9.0-0.5 | 9.0-0.5 |
| W ₂ | Hold Down Tape Position | 3.0 Max | 3.0 Max | 3.0 Max | 3.0 Max | 3.0 Max | 3.0 Max |
| H | Height from Tape Center to Component Base | 18.0+2.0 | 18.0+2.0 | 18.0+2.0 | 18.0+2.0 | 18.0+2.0 | 18.0+2.0 |
| | | 18.0-0.0 | 18.0-0.0 | 18.0-0.0 | 18.0-0.0 | 18.0-0.0 | 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 | 16.0±0.5 |
| H ₁ | Component Height | 29.0 Max. | 32.0 Max. | 36.0 Max. | 36.0 Max. | 40.0 Max. | 40.0 Max. |
| 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 | 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 | 0.7±0.2 |
| L | Leagth Clipped Lead | 11.0 Max | 11.0 Max | 11.0 Max | 11.0 Max | 11.0 Max | 11.0 Max |
| Figure | | A, D | A, D | B, E | A, D | C | F |

Tape and Reel Specifications

● Radial devices on tape are supplied with inside kink leads or outside kink leads.

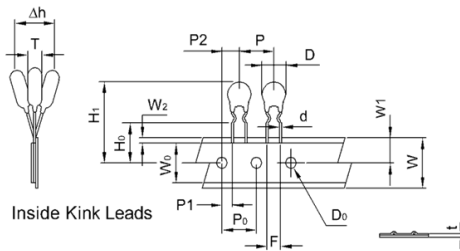


Figure: A

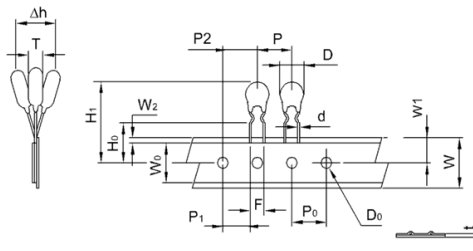


Figure: B

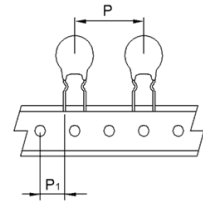


Figure: C

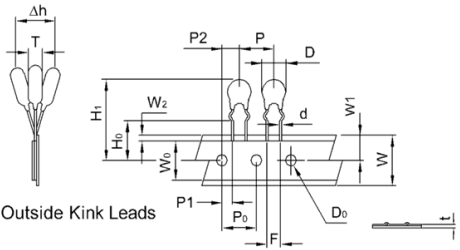


Figure: D

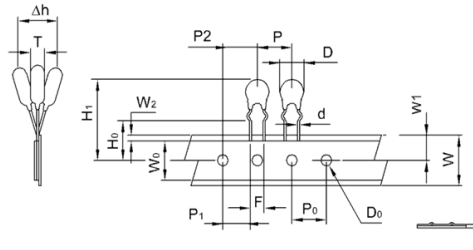


Figure: E

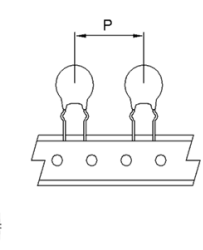


Figure: F

| Symbol | Description | Model | | | | | |
|----------------|---|-----------|-----------|-----------|-----------|-----------|-----------|
| | | 05D | 07D | 10D | 10D | 14D | 14D |
| P | Pitch of Component | 12.7±1.0 | 12.7±1.0 | 12.7±1.0 | 15.0±1.0 | 25.4±1.0 | 30.0±1.0 |
| P ₀ | Feed Hole Pitch | 12.7±0.2 | 12.7±0.2 | 12.7±0.2 | 15.0±0.2 | 12.7±0.2 | 15.0±0.2 |
| P ₁ | Feed Hole Center to Pitch | 3.85±0.7 | 3.85±0.7 | 3.85±0.7 | 3.75±0.7 | 8.95±0.7 | 3.75±0.7 |
| P ₂ | Hole Center to Component Center | 6.35±0.7 | 6.35±0.7 | 6.35±0.7 | 7.5±0.7 | 12.7±0.7 | 7.5±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 | 7.5±0.8 |
| Δh | Component Alignment | 2.0max | 2.0max | 2.0max | 2.0max | 2.0max | 2.0max |
| W | Tape Width | 18.0+1.0 | 18.0+1.0 | 18.0+1.0 | 18.0+1.0 | 18.0+1.0 | 18.0+1.0 |
| | | 18.0-0.5 | 18.0-0.5 | 18.0-0.5 | 18.0-0.5 | 18.0-0.5 | 18.0-0.5 |
| W ₀ | Hold Down Tape Width | 5.0 Min. | 5.0 Min. | 5.0 Min. | 5.0 Min. | 5.0 Min. | 5.0 Min. |
| W ₁ | Hole Position | 9.0+0.75 | 9.0+0.75 | 9.0+0.75 | 9.0+0.75 | 9.0+0.75 | 9.0+0.75 |
| | | 9.0-0.5 | 9.0-0.5 | 9.0-0.5 | 9.0-0.5 | 9.0-0.5 | 9.0-0.5 |
| W ₂ | Hold Down Tape Position | 3.0 Max | 3.0 Max | 3.0 Max | 3.0 Max | 3.0 Max | 3.0 Max |
| H | Height from Tape Center to Component Base | 18.0+2.0 | 18.0+2.0 | 18.0+2.0 | 18.0+2.0 | 18.0+2.0 | 18.0+2.0 |
| | | 18.0-0.0 | 18.0-0.0 | 18.0-0.0 | 18.0-0.0 | 18.0-0.0 | 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 | 16.0±0.5 |
| H ₁ | Component Height | 29.0 Max. | 32.0 Max. | 36.0 Max. | 36.0 Max. | 40.0 Max. | 40.0 Max. |
| 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 | 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 | 0.7±0.2 |
| L | Leagth Clipped Lead | 11.0 Max | 11.0 Max | 11.0 Max | 11.0 Max | 11.0 Max | 11.0 Max |
| Figure | | A, D | A, D | B, E | A, D | C | F |

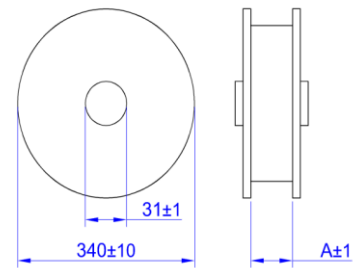
Packing information

Bulk packing

| Series | Straight Lead Type Quantity(pcs/bag) | Cut Lead Type Quantity(pcs/bag) | Kink Type Quantity(pcs/bag) |
|---------|---|------------------------------------|--------------------------------|
| CNR-05D | 1000 | 1000 | 1000 |
| CNR-07D | 1000 | 1000 | 1000 |
| CNR-10D | 500 | 500 | 500 |
| CNR-14D | 500 | 500 | 500 |
| CNR-18D | 500 | 500 | 500 |
| CNR-20D | 250 | 250 | 250 |

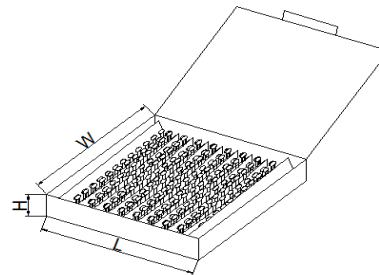
Tape & Reel product packing

| Series | A (mm) | Quantity (pcs/reel) |
|-------------------------|--------|---------------------|
| CNR-05D(180K~391K)-TRXX | 43 | 2000 |
| CNR-05D(431K~751K)-TRXX | | 1500 |
| CNR-07D(180K~391K)-TRXX | | 2000 |
| CNR-07D(431K~821K)-TRXX | | 1500 |
| CNR-10D(180K~621K)-TRXX | | 1000 |
| CNR-10D(681K~112K)-TRXX | | 800 |
| CNR-14D(180K~391K)-TRXX | 56 | 800 |
| CNR-14(D431K~621K)-TRXX | | 700 |
| CNR-14D(681K~112K)-TRXX | | 600 |

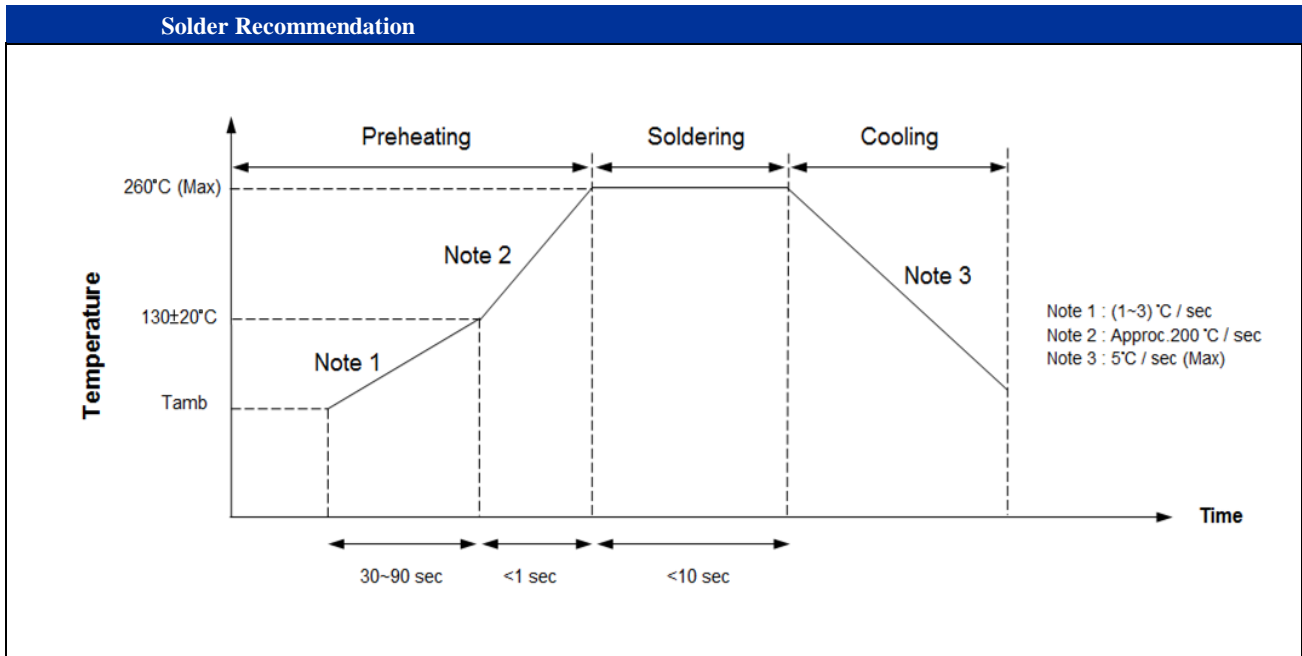


Box product packing

| Series | Quantity (pcs/box) |
|-------------------------|--------------------|
| CNR-05D(180K~621K)-BTXX | 1000 |
| CNR-05D(681K~751K)-BTXX | 800 |
| CNR-07D(180K~621K)-BTXX | 1000 |
| CNR-07D(681K~821K)-BTXX | 800 |
| CNR-10D(180K~621K)-BTXX | 1000 |
| CNR-10D(681K~112K)-BTXX | 800 |
| CNR-14D(180K~621K)-BTXX | 500 |
| CNR-14D(681K~112K)-BTXX | 400 |



| Series | L±5 | W±5 | H±5 |
|------------|-----|-----|-----|
| CNR-05~07D | 340 | 245 | 45 |
| CNR-10~14D | 340 | 245 | 50 |



| Recommendation Reworking Conditions with Soldering Iron | |
|---|-------------|
| Item | Conditions |
| Temperature of soldering Iron-tip | 360°C (Max) |
| Soldering Time | 3 sec(Max) |
| Distance from Varistor | 2mm(Min) |

RoHS Compliant Declaration

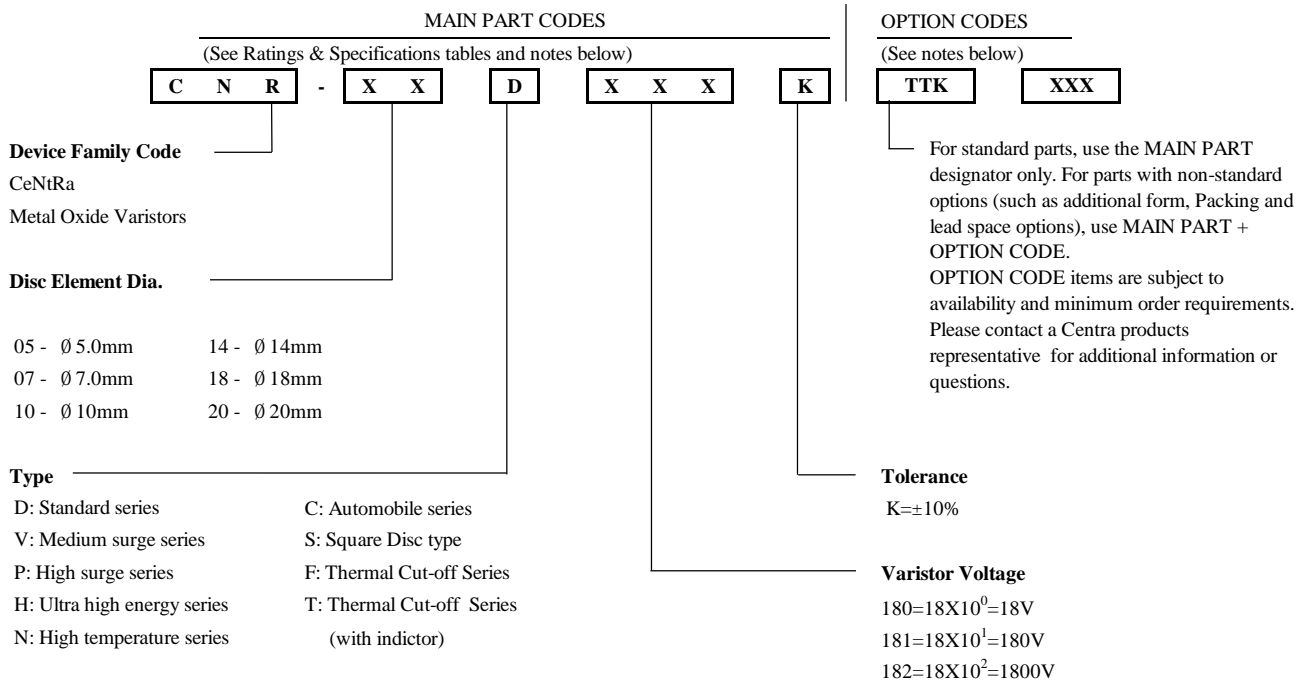
We hereby declare that the components delivered to your company are compliant with RoHS Directive 2002/95/EC

Storage Conditions of Products

- (I) Storage Conditions:
- 1.Storage Temperature: -10°C ~+40°C
 - 2.Relative Humidity: ≤ 75% RH
 - 3.Keep away from corrosive atmosphere and sunlight
 - 4.Solvent Resistance: MIL-STD-202, Method 215F
 - 5.Moisture Sensitivity: Level 1, J-STD-020

(II) Period of Storage: 1 year

Explanation of Part Numbers



Ordering Notes:

MAIN PART CODES

Series + /Packaging/ Lead Style / Designators:

Ordering examples:

| | | | |
|--|---|--|---|
| Straight Lead Bulk Pack (Standard) CNR-10D471K | Straight Lead (Short Cut) Bulk Pack CNR-10D471KTTSXXX | Straight Lead Tape & Reel Pack CNR-10D471KTRSX | Straight Lead Flat Box Pack CNR-10D471KBTSX |
| Outside Kink Lead Bulk Pack CNR-10D471SOK | Outside Kink Lead (Short Cut) Bulk Pack CNR-10D471KTTKXXX | Outside Kink Lead Tape & Reel Pack CNR-10D471KTRKX | Outside Kink Lead Flat Box Pack CNR-10D471KBTkX |
| Inside Kink Lead Bulk Pack CNR-10D471KSIK | Inside Kink Lead (Short Cut) Bulk Pack CNR-10D471KTtIXXX | Inside Kink Lead Tape & Reel Pack CNR-10D471KTRIX | Inside Kink Lead Flat Box Pack CNR-10D471KBTIX |
| In Line Kink Lead Bulk Pack CNR-10D471KSHK | In Line Kink Lead (Short Cut) Bulk Pack CNR-10D471KTTHXXX | In Line Kink Lead Tape & Reel Pack CNR-10D471KTRHX | In Line Kink Lead Flat Box Pack CNR-10D471KBTHX |

Option Code

+ XXX

| |
|---|
| Short Cut Lead Length 10mm±1.0mm CNR-10D471KTTS10 |
| Tape & Reel Pack Feed Hole Pitch CNR-10D471KTRSA CNR-10D471KTRSB |

A: P₀ → 12.7mm±0.2mm
B: P₀ → 15.0mm±0.2mm

CeNtRa D Series varistors are shipped standard in bulk pack with straight leads or Kink lead and lead spacing outlined in the Package Dimensions section of this data sheet. Contact your CeNtRa sales representative to discuss non-standard options.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

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