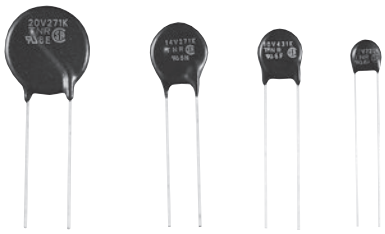
# V Series

RoHS2 Compliant

Scheduled for Discontinuation (March 2027)



## ◆FEATURES

- ●Excellent voltage non-linear coefficient.
  Low clamping voltage.
- ●Symmetrical V-I characteristics (No polarity).
- ●Fast response.
- ●Stable characteristics against repeated surges.
- ●Superior temperature characteristics.
- ●High reliability
- ●UL, CSA and VDE recognized components
  UL 1449 3rd File : E323623
  CSA File : LR97864
  VDE File : 118623
- ●Coating resin : UL94V-0

## ◆APPLICATIONS

- ●Protection for semiconductors from over voltage.
- ●Protection for electronic instruments from lightning surges.
- ●Absorption of on-off surges from motors and relays.

Operating Temperature Range: -40 to +85℃
Storage Temperature Range: -50 to +125℃

## ◆PART NUMBERING SYSTEM

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T | N | D | | | V | – | | | | K | B | | | | | | |

Design Code
Lead Forming / Taping
Packing Style⑦
Varistor Volt. Tolerance⑥
Varistor Voltage⑤
Series④
Element Diameter③
Product Form②
Category①

| ①Category | |
|---|---|
| T | Metal Oxide Varistors TNR |

| ②Product Form | |
|---|---|
| ND | Disk Type |

| ③Element Diameter | |
|---|---|
| 05 | φ 5 mm |
| 07 | φ 7 mm |
| 09 | φ 9 mm |
| 10 | φ10 mm |
| 12 | φ12 mm |
| 14 | φ14 mm |
| 20 | φ20 mm |

| ④Series | |
|---|---|
| V– | V Series |

| ⑤Varistor Voltage |
|---|
| The first two digits are significant figures and the third one denotes the number of following zeros. |

| ⑥Varistor Volt. Tolerance | |
|---|---|
| K | ±10% |

| ⑦Packing Style | |
|---|---|
| B | Bulk |
| T | Taping |

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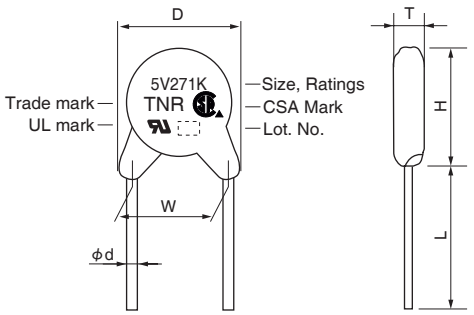
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# V Series

## ◆STANDARD RATINGS (Type 5V)

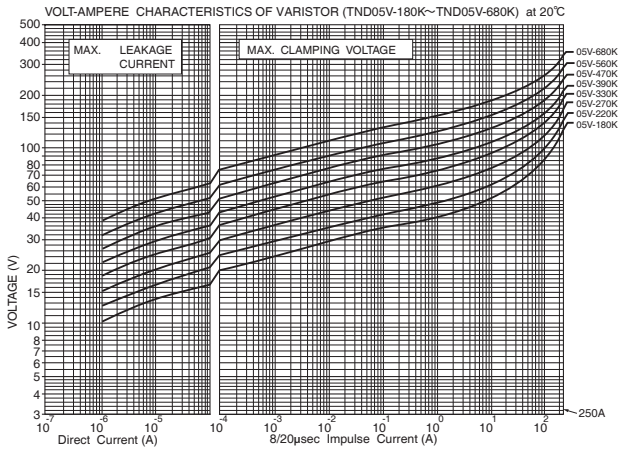
| Part Number | Previous Part Number (Just for your reference) | Maximum Ratings | | | | | Max. Clamping Voltage | | Capacitance Typical @1kHz | Varistor Voltage V0.1mA | T Max. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Max. Allowable Voltage | | Max. Peak Current | Max. Energy | Rated Wattage | | | | | |
| | | AC (Vrms) | DC (V) | 8/20μs(A) | 2ms(J) | (W) | (A) | (V) | (pF) | (V) | (mm) |
| TND05V-180KB00AAA0 | TNR5V180K | 11 | 14 | 250A/1 time<br>125A/2 times | 0.4 | 0.01 | 1 | 40 | 2540 | 18 ( 16～ 20) | 4.5 |
| TND05V-220KB00AAA0 | TNR5V220K | 14 | 18 | | 0.5 | | | 48 | 2090 | 22 ( 20～ 24) | |
| TND05V-270KB00AAA0 | TNR5V270K | 17 | 22 | | 0.7 | | | 60 | 1790 | 27 ( 24～ 30) | |
| TND05V-330KB00AAA0 | TNR5V330K | 20 | 26 | | 0.8 | | | 73 | 1480 | 33 ( 30～ 36) | |
| TND05V-390KB00AAA0 | TNR5V390K | 25 | 30 | | 0.9 | | | 86 | 1310 | 39 ( 35～ 43) | |
| TND05V-470KB00AAA0 | TNR5V470K | 30 | 37 | | 1.1 | | | 104 | 1140 | 47 ( 42～ 52) | |
| TND05V-560KB00AAA0 | TNR5V560K | 35 | 44 | | 1.3 | | | 123 | 1000 | 56 ( 50～ 62) | |
| TND05V-680KB00AAA0 | TNR5V680K | 40 | 55 | | 1.6 | | | 150 | 870 | 68 ( 61～ 75) | |
| TND05V-820KB00AAA0 | TNR5V820K | 50 | 65 | 800A/1 time<br>600A/2 times | 2.5 | 0.1 | 5 | 145 | 400 | 82 ( 74～ 90) | 4.1 |
| TND05V-101KB00AAA0 | TNR5V101K | 60 | 85 | | 3 | | | 175 | 350 | 100 ( 90～110) | 4.3 |
| TND05V-121KB00AAA0 | TNR5V121K | 75 | 100 | | 3.5 | | | 210 | 310 | 120 (108～132) | 4.5 |
| TND05V-151KB00AAA0 | TNR5V151K | 95 | 125 | | 4.5 | | | 260 | 270 | 150 (135～165) | 4.8 |
| TND05V-181KB00AAA0 | TNR5V181K | 110 | 145 | | 5 | | | 325 | 190 | 180 (162～198) | 4.3 |
| TND05V-201KB00AAA0 | TNR5V201K | 130 | 170 | | 6 | | | 355 | 110 | 200 (185～225) | 4.4 |
| TND05V-221KB00AAA0 | TNR5V221K | 140 | 180 | | 6.5 | | | 380 | 110 | 220 (198～242) | 4.5 |
| TND05V-241KB00AAA0 | TNR5V241K | 150 | 200 | | 7.5 | | | 415 | 100 | 240 (216～264) | 4.6 |
| TND05V-271KB00AAA0 | TNR5V271K | 175 | 225 | | 8 | | | 475 | 90 | 270 (247～303) | 4.8 |
| TND05V-331KB00AAA0 | TNR5V331K | 210 | 270 | | 9.5 | | | 570 | 80 | 330 (297～363) | 5.1 |
| TND05V-361KB00AAA0 | TNR5V361K | 230 | 300 | | 11 | | | 620 | 80 | 360 (324～396) | 5.3 |
| TND05V-391KB00AAA0 | TNR5V391K | 250 | 320 | | 12 | | | 675 | 70 | 390 (351～429) | 5.4 |
| TND05V-431KB00AAA0 | TNR5V431K | 275 | 350 | | 13.5 | | | 745 | 70 | 430 (387～473) | 5.6 |
| TND05V-471KB00AAA0 | TNR5V471K | 300 | 385 | | 15 | | | 810 | 60 | 470 (423～517) | 5.8 |

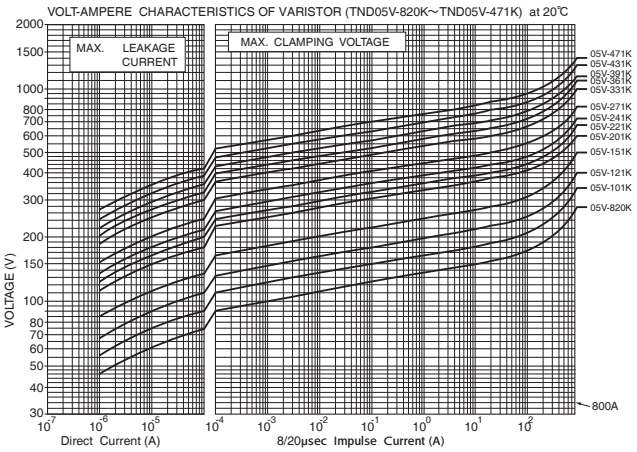
## ◆DIMENSIONS [mm]




| D Max. | H Max. | T Max. | L Min. | ϕd ±0.05 | W ±1.0 |
|---|---|---|---|---|---|
| 7.5 | 10.0 | Ref. to RATINGS | 20.0 | 0.6 | 5.0 |

## ◆V-I CURVE




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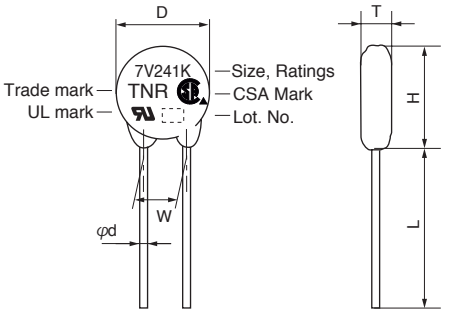
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# V Series

## ◆STANDARD RATINGS (Type 7V)

| Part Number | Previous Part Number (Just for your reference) | Maximum Ratings | | | | | Max. Clamping Voltage | | Capacitance Typical @1kHz | Varistor Voltage V CmA | T Max. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Max. Allowable Voltage | | Max. Peak Current | Max. Energy | Rated Wattage | | | | | |
| | | AC (Vrms) | DC (V) | 8/20μs(A) | 2ms(J) | (W) | (A) | (V) | (pF) | (V) | (mm) |
| TND07V-150KB00AAA0 | TNR7V150K | 8 | 12 | | 0.7 | | | 30 | 4600 | 15 ( 13～ 17) | 4.5 |
| TND07V-180KB00AAA0 | TNR7V180K | 11 | 14 | | 0.9 | | | 36 | 3800 | 18 ( 16～ 20) | 4.5 |
| TND07V-220KB00AAA0 | TNR7V220K | 14 | 18 | | 1.1 | | | 43 | 3200 | 22 ( 20～ 24) | 4.6 |
| TND07V-270KB00AAA0 | TNR7V270K | 17 | 22 | 500A/1 time | 1.3 | | | 53 | 2800 | 27 ( 24～ 30) | 4.7 |
| TND07V-330KB00AAA0 | TNR7V330K | 20 | 26 | | 1.6 | 0.02 | 2.5 | 65 | 2300 | 33 ( 30～ 36) | 4.9 |
| TND07V-390KB00AAA0 | TNR7V390K | 25 | 30 | 250A/2 times | 1.9 | | | 77 | 2100 | 39 ( 35～ 43) | 4.8 |
| TND07V-470KB00AAA0 | TNR7V470K | 30 | 37 | | 2.3 | | | 93 | 1900 | 47 ( 42～ 52) | 4.9 |
| TND07V-560KB00AAA0 | TNR7V560K | 35 | 44 | | 2.7 | | | 110 | 1700 | 56 ( 50～ 62) | 5.0 |
| TND07V-680KB00AAA0 | TNR7V680K | 40 | 55 | | 3.3 | | | 135 | 1500 | 68 ( 61～ 75) | 5.2 |
| TND07V-820KB00AAA0 | TNR7V820K | 50 | 65 | | 5 | | | 135 | 800 | 82 ( 74～ 90) | 4.1 |
| TND07V-101KB00AAA0 | TNR7V101K | 60 | 85 | | 6 | | | 165 | 700 | 100 ( 90～110) | 4.3 |
| TND07V-121KB00AAA0 | TNR7V121K | 75 | 100 | | 7 | | | 200 | 650 | 120 (108～132) | 4.5 |
| TND07V-151KB00AAA0 | TNR7V151K | 95 | 125 | | 9 | | | 250 | 600 | 150 (135～165) | 4.8 |
| TND07V-181KB00AAA0 | TNR7V181K | 110 | 145 | | 11 | | | 300 | 430 | 180 (162～198) | 4.3 |
| TND07V-201KB00AAA0 | TNR7V201K | 130 | 170 | | 12.5 | | | 340 | 250 | 200 (185～225) | 4.4 |
| TND07V-221KB00AAA0 | TNR7V221K | 140 | 180 | 1750A/1 time | 13.5 | | | 360 | 230 | 220 (198～242) | 4.5 |
| TND07V-241KB00AAA0 | TNR7V241K | 150 | 200 | | 15 | 0.25 | 10 | 395 | 210 | 240 (216～264) | 4.6 |
| TND07V-271KB00AAA0 | TNR7V271K | 175 | 225 | 1250A/2 times | 17 | | | 455 | 190 | 270 (247～303) | 4.8 |
| TND07V-331KB00AAA0 | TNR7V331K | 210 | 270 | | 20 | | | 545 | 160 | 330 (297～363) | 5.1 |
| TND07V-361KB00AAA0 | TNR7V361K | 230 | 300 | | 23 | | | 595 | 150 | 360 (324～396) | 5.3 |
| TND07V-391KB00AAA0 | TNR7V391K | 250 | 320 | | 25 | | | 650 | 140 | 390 (351～429) | 5.4 |
| TND07V-431KB00AAA0 | TNR7V431K | 275 | 350 | | 27.5 | | | 710 | 130 | 430 (387～473) | 5.6 |
| TND07V-471KB00AAA0 | TNR7V471K | 300 | 385 | | 30 | | | 775 | 120 | 470 (423～517) | 5.8 |
| TND07V-511KB00AAA0 | TNR7V511K | 320 | 410 | | 32 | | | 845 | 110 | 510 (459～561) | 6.0 |

## ◆DIMENSIONS [mm]




| D Max. | H Max. | T Max. | L Min. | φd ±0.05 | W ±1.0 |
|---|---|---|---|---|---|
| 8.5 | 11.5 | Ref. to RATINGS | 20.0 | 0.6 | 5.0 |

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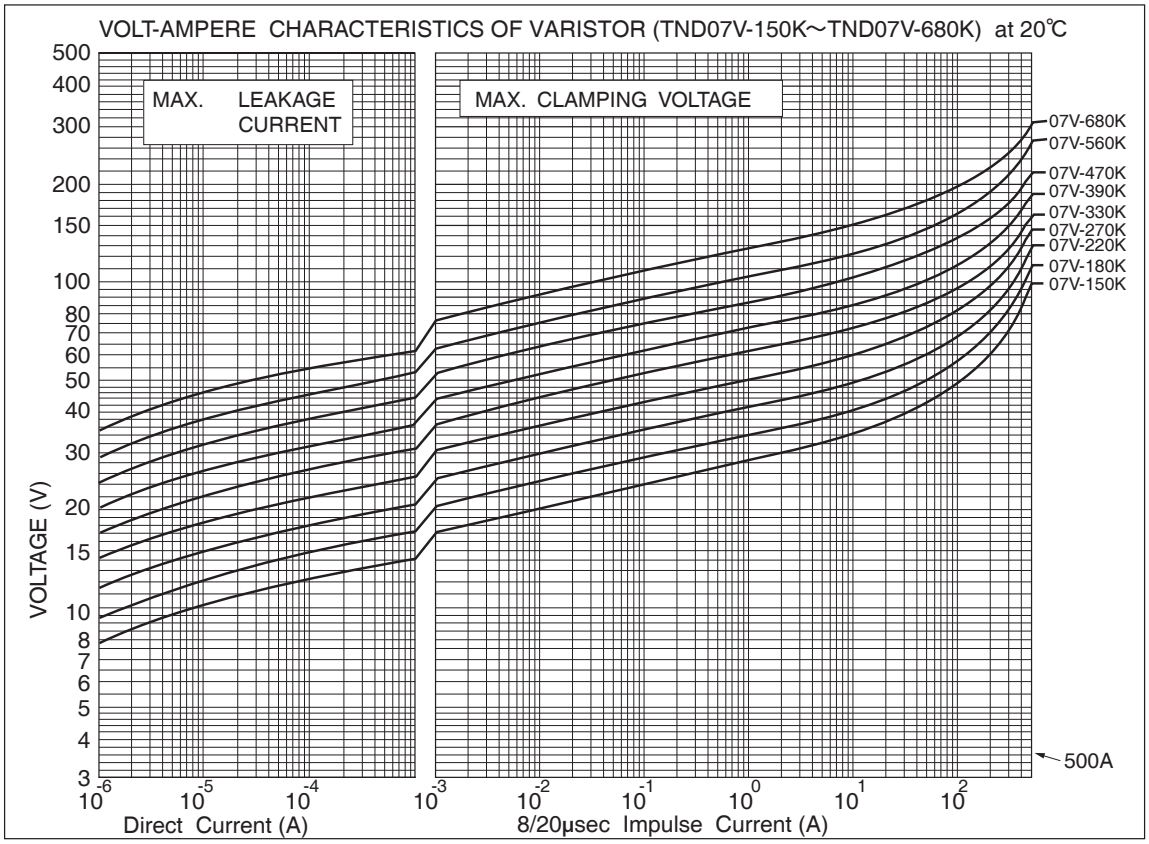
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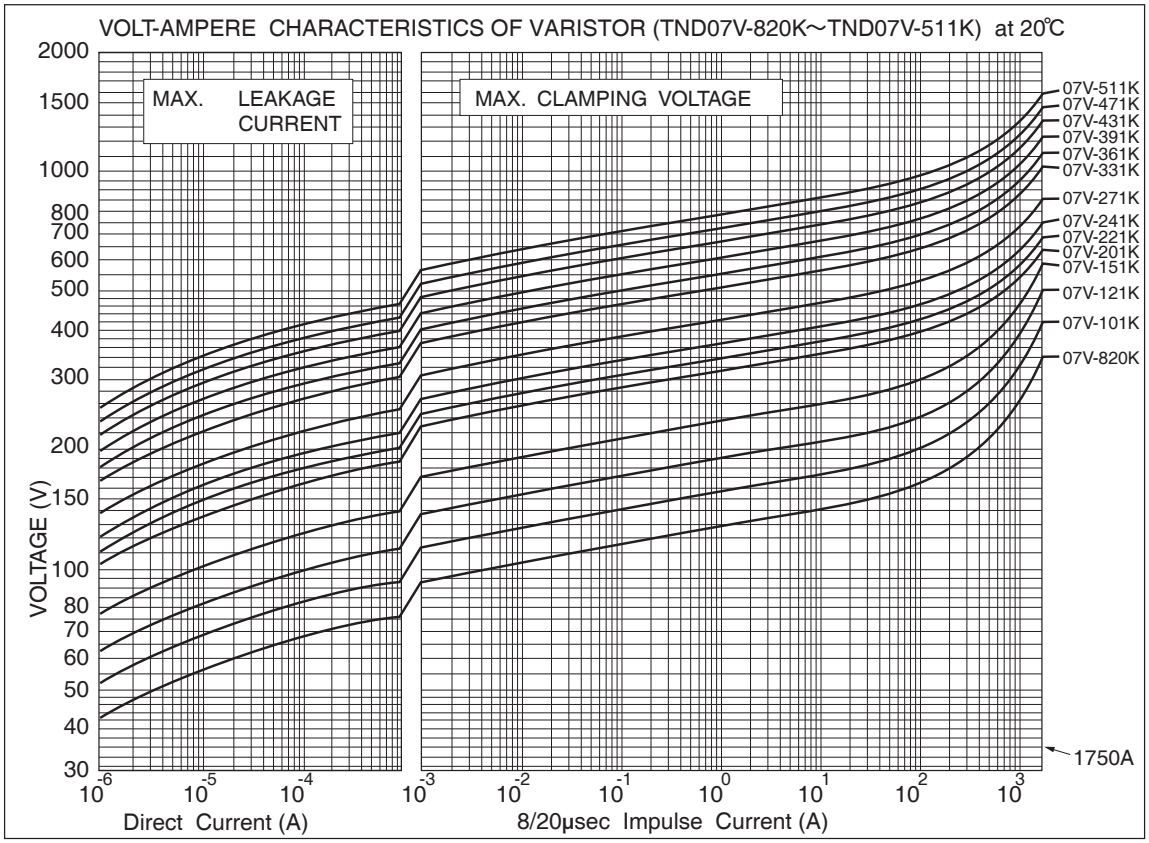


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# V Series

## ◆V-I CURVE (Type 7V)




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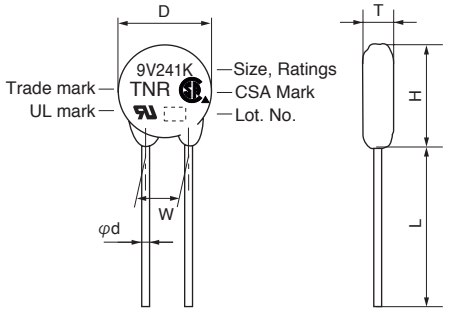
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# V Series

## ◆RATINGS (Type 9V)

| Part Number | Previous Part Number (Just for your reference) | Maximum Ratings | | | | | Max. Clamping Voltage | | Capacitance Typical @1kHz | Varistor Voltage V CmA | T Max. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Max. Allowable Voltage | | Max. Peak Current | Max. Energy | Rated Wattage | | | | | |
| | | AC (Vrms) | DC (V) | 8/20μs(A) | 2ms(J) | (W) | (A) | (V) | (pF) | (V) | (mm) |
| TND09V-150KB00AAA0 | TNR9V150K | 8 | 12 | | 2.0 | | | 30 | 9600 | 15 ( 13～ 17) | 3.8 |
| TND09V-180KB00AAA0 | TNR9V180K | 11 | 14 | | 2.2 | | | 36 | 8000 | 18 ( 16～ 20) | 3.8 |
| TND09V-220KB00AAA0 | TNR9V220K | 14 | 18 | | 2.6 | | | 43 | 7000 | 22 ( 20～ 24) | 4.0 |
| TND09V-270KB00AAA0 | TNR9V270K | 17 | 22 | 800A/1 time | 3.2 | | | 53 | 6000 | 27 ( 24～ 30) | 4.2 |
| TND09V-330KB00AAA0 | TNR9V330K | 20 | 26 | | 4.0 | 0.02 | 5 | 65 | 5000 | 33 ( 30～ 36) | 4.5 |
| TND09V-390KB00AAA0 | TNR9V390K | 25 | 30 | 400A/2 times | 4.7 | | | 77 | 4500 | 39 ( 35～ 43) | 4.0 |
| TND09V-470KB00AAA0 | TNR9V470K | 30 | 37 | | 5.6 | | | 93 | 4000 | 47 ( 42～ 52) | 4.2 |
| TND09V-560KB00AAA0 | TNR9V560K | 35 | 44 | | 6.7 | | | 110 | 3500 | 56 ( 50～ 62) | 4.4 |
| TND09V-680KB00AAA0 | TNR9V680K | 40 | 55 | | 8.2 | | | 135 | 3200 | 68 ( 61～ 75) | 4.5 |
| TND09V-820KB00AAA0 | TNR9V820K | 50 | 65 | | 10 | | | 135 | 1700 | 82 ( 74～ 90) | 3.8 |
| TND09V-101KB00AAA0 | TNR9V101K | 60 | 85 | | 12 | | | 165 | 1600 | 100 ( 90～110) | 3.9 |
| TND09V-121KB00AAA0 | TNR9V121K | 75 | 100 | | 14.5 | | | 200 | 1400 | 120 (108～132) | 4.1 |
| TND09V-151KB00AAA0 | TNR9V151K | 95 | 125 | | 18 | | | 250 | 1300 | 150 (135～165) | 4.4 |
| TND09V-181KB00AAA0 | TNR9V181K | 110 | 145 | | 22 | | | 300 | 900 | 180 (162～198) | 4.0 |
| TND09V-201KB00AAA0 | TNR9V201K | 130 | 170 | | 25 | | | 340 | 500 | 200 (185～225) | 4.1 |
| TND09V-221KB00AAA0 | TNR9V221K | 140 | 180 | 3000A/1 time | 27.5 | | | 360 | 450 | 220 (198～242) | 4.2 |
| TND09V-241KB00AAA0 | TNR9V241K | 150 | 200 | | 30 | 0.25 | 25 | 395 | 400 | 240 (216～264) | 4.3 |
| TND09V-271KB00AAA0 | TNR9V271K | 175 | 225 | 2000A/2 times | 35 | | | 455 | 350 | 270 (247～303) | 4.5 |
| TND09V-331KB00AAA0 | TNR9V331K | 210 | 270 | | 42 | | | 545 | 300 | 330 (297～363) | 4.8 |
| TND09V-361KB00AAA0 | TNR9V361K | 230 | 300 | | 45 | | | 595 | 280 | 360 (324～396) | 5.0 |
| TND09V-391KB00AAA0 | TNR9V391K | 250 | 320 | | 50 | | | 650 | 260 | 390 (351～429) | 5.1 |
| TND09V-431KB00AAA0 | TNR9V431K | 275 | 350 | | 55 | | | 710 | 240 | 430 (387～473) | 5.3 |
| TND09V-471KB00AAA0 | TNR9V471K | 300 | 385 | | 60 | | | 775 | 220 | 470 (423～517) | 5.6 |
| TND09V-511KB00AAA0 | TNR9V511K | 320 | 410 | | 67 | | | 845 | 210 | 510 (459～561) | 5.8 |

## ◆DIMENSIONS [mm]




| D Max. | H Max. | T Max. | L Min. | φd ±0.05 | W ±1.0 |
|---|---|---|---|---|---|
| 11.5 | 14.5 | Ref. to RATINGS | 20.0 | 0.6 | 5.0 |

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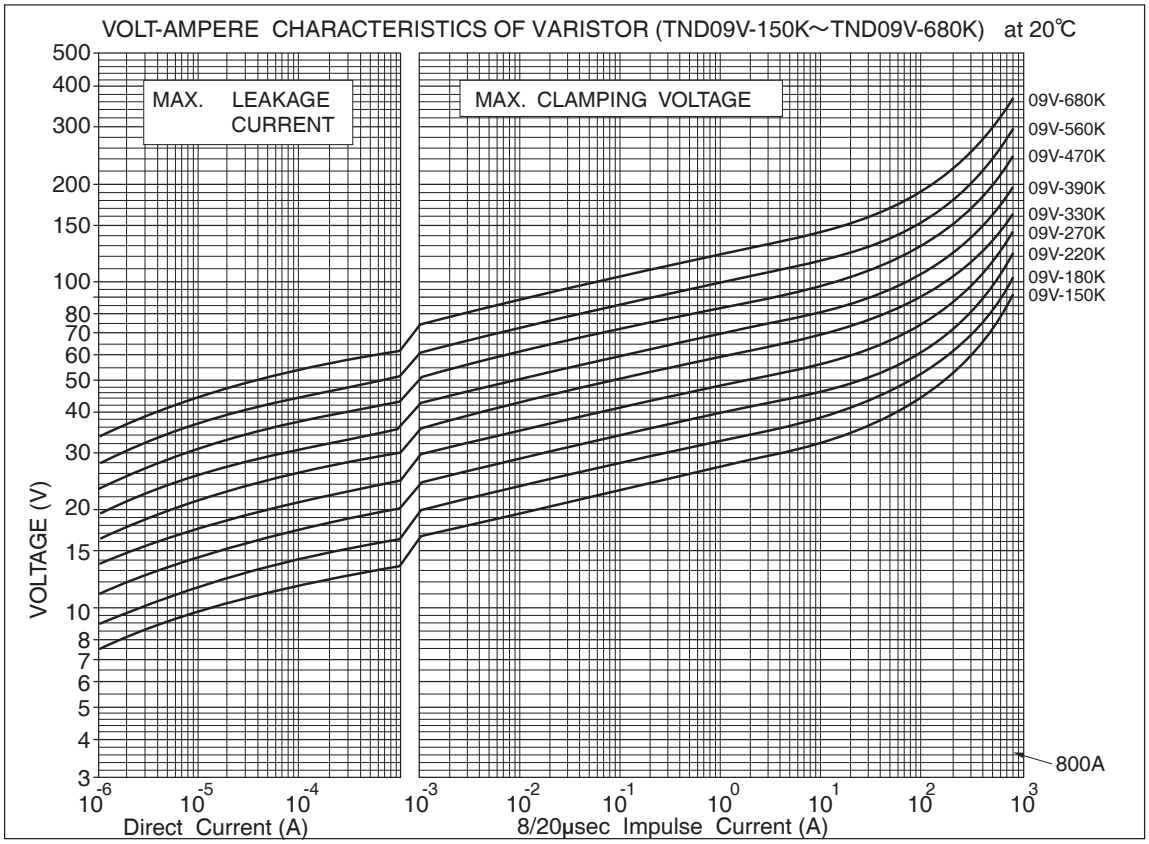
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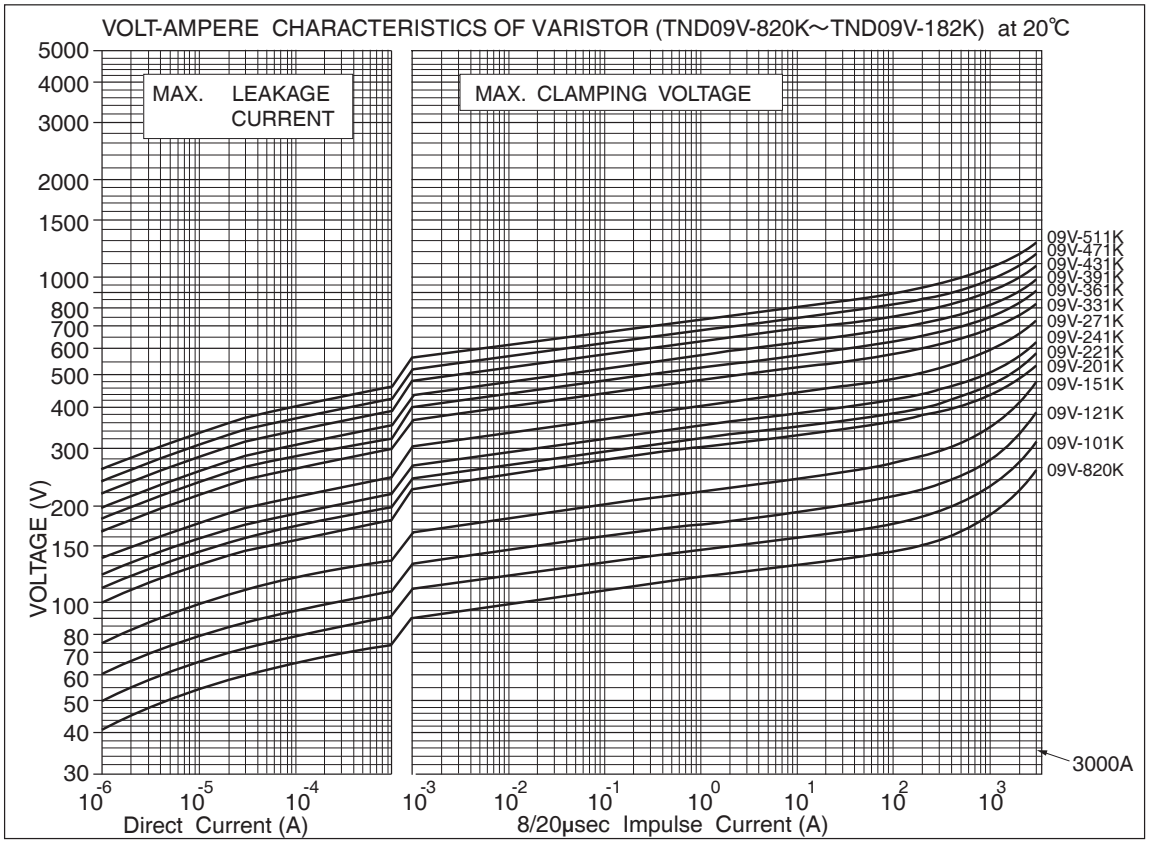


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# V Series

## ◆V-I CURVE (Type 9V)




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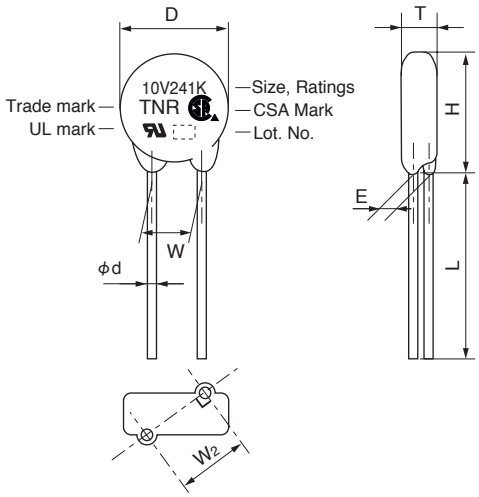
# V Series

## ◆RATINGS (Type 10V)

| Part Number | Previous Part Number (Just for your reference) | Maximum Ratings | | | | | Max. Clamping Voltage | | Capacitance Typical @1kHz | Varistor Voltage V CmA | T Max. | E ±1.0 | W2 reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Max. Allowable Voltage | | Max. Peak Current | Max. Energy | Rated Wattage | | | | | | | |
| | | AC (Vrms) | DC (V) | 8/20μs(A) | 2ms(J) | (W) | (A) | (V) | (pF) | (V) | (mm) | (mm) | (mm) |
| TND10V-150KB00AAA0 | TNR10V150K | 8 | 12 | | 2.0 | | | 30 | 9600 | 15 ( 13～ 17) | 4.5 | 1.0 | 7.6 |
| TND10V-180KB00AAA0 | TNR10V180K | 11 | 14 | | 2.2 | | | 36 | 8000 | 18 ( 16～ 20) | 4.6 | 1.1 | 7.6 |
| TND10V-220KB00AAA0 | TNR10V220K | 14 | 18 | | 2.6 | | | 43 | 7000 | 22 ( 20～ 24) | 4.7 | 1.2 | 7.6 |
| TND10V-270KB00AAA0 | TNR10V270K | 17 | 22 | 1000A/1 time | 3.2 | | | 53 | 6000 | 27 ( 24～ 30) | 4.8 | 1.3 | 7.6 |
| TND10V-330KB00AAA0 | TNR10V330K | 20 | 26 | | 4.0 | 0.05 | 5 | 65 | 5000 | 33 ( 30～ 36) | 5.0 | 1.5 | 7.6 |
| TND10V-390KB00AAA0 | TNR10V390K | 25 | 30 | 500A/2 times | 4.7 | | | 77 | 4500 | 39 ( 35～ 43) | 4.9 | 1.3 | 7.6 |
| TND10V-470KB00AAA0 | TNR10V470K | 30 | 37 | | 5.6 | | | 93 | 4000 | 47 ( 42～ 52) | 5.0 | 1.4 | 7.6 |
| TND10V-560KB00AAA0 | TNR10V560K | 35 | 44 | | 6.7 | | | 110 | 3500 | 56 ( 50～ 62) | 5.1 | 1.6 | 7.7 |
| TND10V-680KB00AAA0 | TNR10V680K | 40 | 55 | | 8.2 | | | 135 | 3200 | 68 ( 61～ 75) | 5.3 | 1.8 | 7.7 |
| TND10V-820KB00AAA0 | TNR10V820K | 50 | 65 | | 10 | | | 135 | 1700 | 82 ( 74～ 90) | 4.5 | 1.1 | 7.6 |
| TND10V-101KB00AAA0 | TNR10V101K | 60 | 85 | | 12 | | | 165 | 1600 | 100 ( 90～ 110) | 4.7 | 1.3 | 7.6 |
| TND10V-121KB00AAA0 | TNR10V121K | 75 | 100 | | 14.5 | | | 200 | 1400 | 120 ( 108～ 132) | 4.9 | 1.4 | 7.6 |
| TND10V-151KB00AAA0 | TNR10V151K | 95 | 125 | | 18 | | | 250 | 1300 | 150 ( 135～ 165) | 5.2 | 1.7 | 7.7 |
| TND10V-181KB00AAA0 | TNR10V181K | 110 | 145 | | 22 | | | 300 | 900 | 180 ( 162～ 198) | 4.7 | 1.1 | 7.6 |
| TND10V-201KB00AAA0 | TNR10V201K | 130 | 170 | | 25 | | | 340 | 500 | 200 ( 185～ 225) | 4.8 | 1.2 | 7.6 |
| TND10V-221KB00AAA0 | TNR10V221K | 140 | 180 | | 27.5 | | | 360 | 450 | 220 ( 198～ 242) | 4.9 | 1.3 | 7.6 |
| TND10V-241KB00AAA0 | TNR10V241K | 150 | 200 | | 30 | | | 395 | 400 | 240 ( 216～ 264) | 5.0 | 1.3 | 7.6 |
| TND10V-271KB00AAA0 | TNR10V271K | 175 | 225 | | 35 | | | 455 | 350 | 270 ( 247～ 303) | 5.2 | 1.4 | 7.6 |
| TND10V-331KB00AAA0 | TNR10V331K | 210 | 270 | | 42 | | | 545 | 300 | 330 ( 297～ 363) | 5.5 | 1.6 | 7.7 |
| TND10V-361KB00AAA0 | TNR10V361K | 230 | 300 | | 45 | | | 595 | 280 | 360 ( 324～ 396) | 5.7 | 1.8 | 7.7 |
| TND10V-391KB00AAA0 | TNR10V391K | 250 | 320 | 3500A/1 time | 50 | | | 650 | 260 | 390 ( 351～ 429) | 5.8 | 1.9 | 7.7 |
| TND10V-431KB00AAA0 | TNR10V431K | 275 | 350 | | 55 | 0.4 | 25 | 710 | 240 | 430 ( 387～ 473) | 6.0 | 2.0 | 7.8 |
| TND10V-471KB00A◇A0 | TNR10V471K□ | 300 | 385 | 2500A/2 times | 60 | | | 775 | 220 | 470 ( 423～ 517) | 6.2 | 2.1 | 7.8 |
| TND10V-511KB00A◇A0 | TNR10V511K□ | 320 | 410 | | 67 | | | 845 | 210 | 510 ( 459～ 561) | 6.4 | 2.3 | 7.8 |
| TND10V-561KB00A◇A0 | TNR10V561K□ | 350 | 460 | | 67 | | | 922 | 195 | 560 ( 504～ 616) | 6.7 | 2.5 | 7.9 |
| TND10V-621KB00A◇A0 | TNR10V621K□ | 385 | 505 | | 67 | | | 1025 | 180 | 620 ( 558～ 682) | 7.1 | 2.7 | 8.0 |
| TND10V-681KB00A◇A0 | TNR10V681K□ | 420 | 560 | | 67 | | | 1120 | 165 | 680 ( 612～ 748) | 7.4 | 2.9 | 8.0 |
| TND10V-751KB00A◇A0 | TNR10V751K□ | 460 | 615 | | 70 | | | 1240 | 150 | 750 ( 675～ 825) | 7.8 | 3.1 | 8.1 |
| TND10V-821KB00A◇A0 | TNR10V821K□ | 510 | 670 | | 80 | | | 1355 | 140 | 820 ( 738～ 902) | 8.1 | 3.4 | 8.2 |
| TND10V-911KB00A◇A0 | TNR10V911K□ | 550 | 745 | | 90 | | | 1500 | 125 | 910 ( 819～1001) | 8.6 | 3.7 | 8.4 |
| TND10V-102KB00A◇A0 | TNR10V102K□ | 625 | 825 | | 100 | | | 1650 | 115 | 1000 ( 900～1100) | 9.1 | 4.0 | 8.5 |
| TND10V-112KB00A◇A0 | TNR10V112K□ | 680 | 895 | | 110 | | | 1815 | 105 | 1100 ( 990～1210) | 9.7 | 4.4 | 8.7 |
| TND10V-122KB00A◇A0 | TNR10V122K□ | 720 | 980 | | 120 | | | 1950 | 95 | 1200 (1080～1320) | 10.5 | 4.7* | 8.9** |
| TND10V-152KB00A◇A0 | TNR10V152K□ | 860 | 1220 | | 150 | | | 2440 | 85 | 1500 (1350～1650) | 12.4 | 5.8* | 9.5** |
| TND10V-182KB00A◇A0 | TNR10V182K□ | 1000 | 1465 | | 183 | | | 2970 | 70 | 1800 (1700～1980) | 14.4 | 6.9* | 10.2** |

*E±2 **W2±2

## ◆DIMENSIONS [mm]




| | ◇ | □ |
|---|---|---|
| Standard | A | N/A |
| ϕ10 IEC 62368-1:2014 G.8.2 conforming product | S | S |

| Part Number | D Max. | H Max. | T Max. | L Min. | ϕd ±0.05 | W ±1.0 |
|---|---|---|---|---|---|---|
| TND10V-150K to TND10V-511K | 11.5 | 14.5 | Ref. to RATINGS | 20.0 | 0.8 | 7.5 |
| TND10V-561K to TND10V-112K | 12.5 | 15.5 | | | | |
| TND10V-122K to TND10V-182K | 13.5 | 16.5 | | | | |

●Common to standard product and IEC 62368-1:2014 G.8.2 conforming product

●The product with less than 620V of varistor voltage, taping is possible.
Please refer to taping and forming specifications.
The lead type parallel to a straight prepares, too.

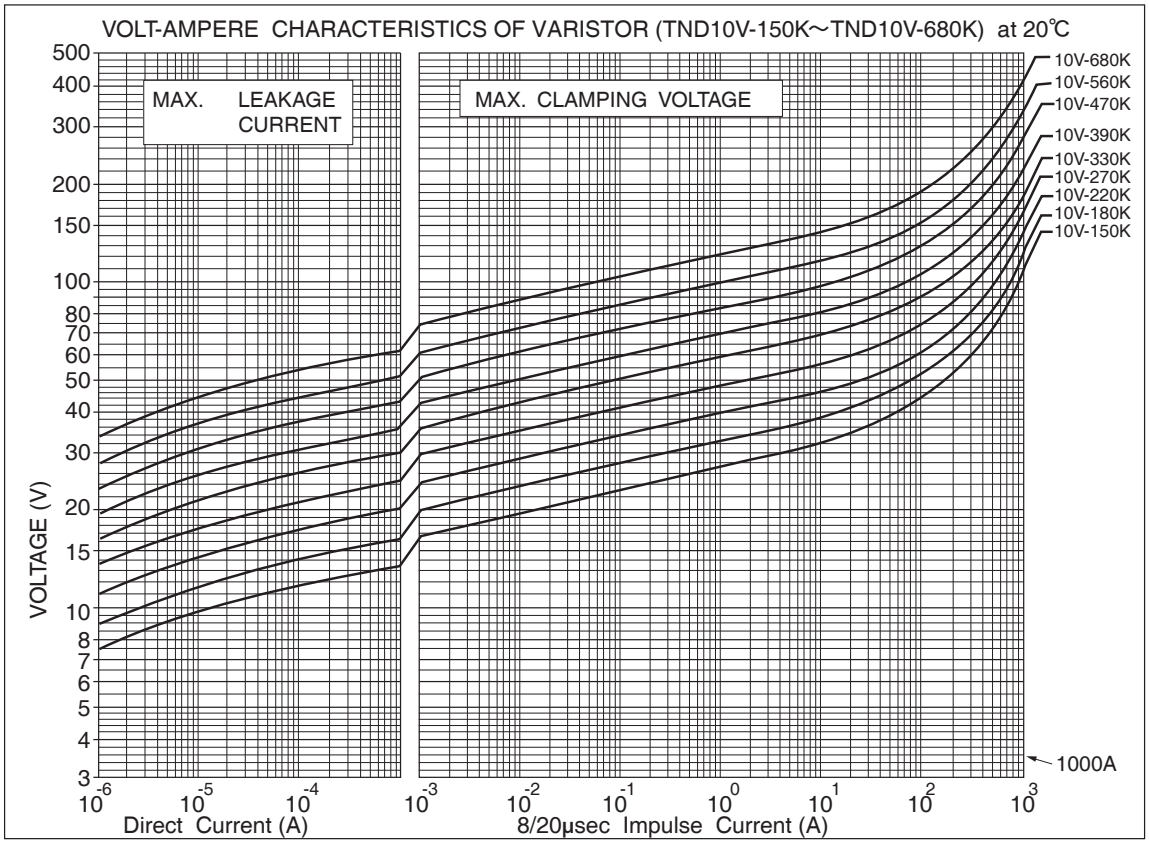
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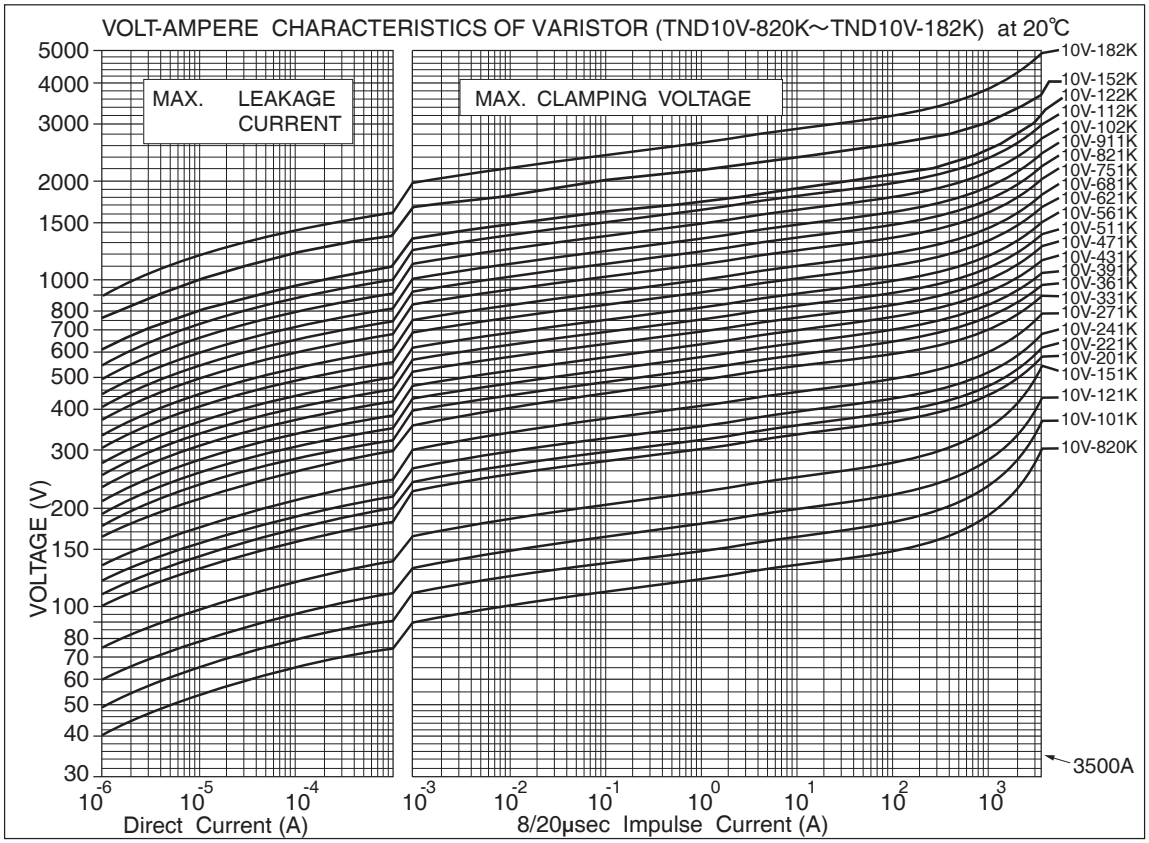


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# V Series

## ◆V-I CURVE (Type 10V)




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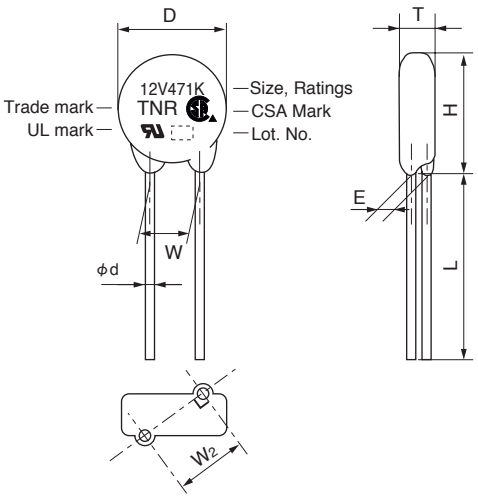
# V Series

## ◆RATINGS (Type 12V)

| Part Number | Previous Part Number (Just for your reference) | Maximum Ratings | | | | | Max. Clamping Voltage | | Capacitance Typical @1kHz | Varistor Voltage V CmA | T Max. | E ±1.0 | W2 reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Max. Allowable Voltage | | Max. Peak Current | Max. Energy | Rated Wattage | | | | | | | |
| | | AC (Vrms) | DC (V) | 8/20μs(A) | 2ms(J) | (W) | (A) | (V) | (pF) | (V) | (mm) | (mm) | (mm) |
| TND12V-431KB00AAA0 | TNR12V431K | 275 | 350 | | 55 | | | 710 | 375 | 430 ( 387～ 473) | 6.0 | 2.0 | 7.8 |
| TND12V-471KB00AAA0 | TNR12V471K | 300 | 385 | | 60 | | | 775 | 345 | 470 ( 423～ 517) | 6.2 | 2.1 | 7.8 |
| TND12V-511KB00AAA0 | TNR12V511K | 320 | 410 | | 67 | | | 845 | 330 | 510 ( 459～ 561) | 6.4 | 2.3 | 7.8 |
| TND12V-561KB00AAA0 | TNR12V561K | 350 | 460 | | 67 | | | 922 | 305 | 560 ( 504～ 616) | 6.7 | 2.5 | 7.9 |
| TND12V-621KB00AAA0 | TNR12V621K | 385 | 505 | | 67 | | | 1025 | 280 | 620 ( 558～ 682) | 7.1 | 2.7 | 8.0 |
| TND12V-681KB00AAA0 | TNR12V681K | 420 | 560 | 4,200A/1 time | 67 | | | 1120 | 260 | 680 ( 612～ 748) | 7.4 | 2.9 | 8.0 |
| TND12V-751KB00AAA0 | TNR12V751K | 460 | 615 | | 70 | 0.4 | 25 | 1240 | 235 | 750 ( 675～ 825) | 7.8 | 3.1 | 8.1 |
| TND12V-821KB00AAA0 | TNR12V821K | 510 | 670 | 3,000A/2 times | 80 | | | 1355 | 220 | 820 ( 738～ 902) | 8.1 | 3.4 | 8.2 |
| TND12V-911KB00AAA0 | TNR12V911K | 550 | 745 | | 90 | | | 1500 | 195 | 910 ( 819～1001) | 8.6 | 3.7 | 8.4 |
| TND12V-102KB00AAA0 | TNR12V102K | 625 | 825 | | 100 | | | 1650 | 180 | 1000 ( 900～1100) | 9.1 | 4.0 | 8.5 |
| TND12V-112KB00AAA0 | TNR12V112K | 680 | 895 | | 110 | | | 1815 | 165 | 1100 ( 990～1210) | 9.7 | 4.4 | 8.7 |
| TND12V-122KB00AAA0 | TNR12V122K | 720 | 980 | | 120 | | | 1950 | 150 | 1200 (1080～1320) | 10.5 | 4.7* | 8.9** |
| TND12V-152KB00AAA0 | TNR12V152K | 860 | 1220 | | 150 | | | 2440 | 135 | 1500 (1350～1650) | 12.4 | 5.8* | 9.5** |
| TND12V-182KB00AAA0 | TNR12V182K | 1000 | 1465 | | 183 | | | 2970 | 110 | 1800 (1700～1980) | 14.4 | 6.9* | 10.2** |

*E±2 **W2±2

## ◆DIMENSIONS [mm]




| Part Number | D Max. | H Max. | T Max. | L Min. | ϕd ±0.05 | W ±1.0 |
|---|---|---|---|---|---|---|
| TND12V-431K to TND12V-102K | 14.0 | 17.0 | Ref. to RATINGS | 20 | 0.8 | 7.5 |
| TND12V-112K | 15.0 | 18.0 | | | | |
| TND12V-122K | | | | | | |
| TND12V-152K to TND12V-182K | 16.0 | 19.0 | | | | |

●The product with less than 620V of varistor voltage, taping is possible.
Please refer to taping and forming specifications.
The lead type parallel to a straight prepares, too.

Please be advised that production of all products listed in this publication will be discontinued, with final orders accepted through the end of March 2027.

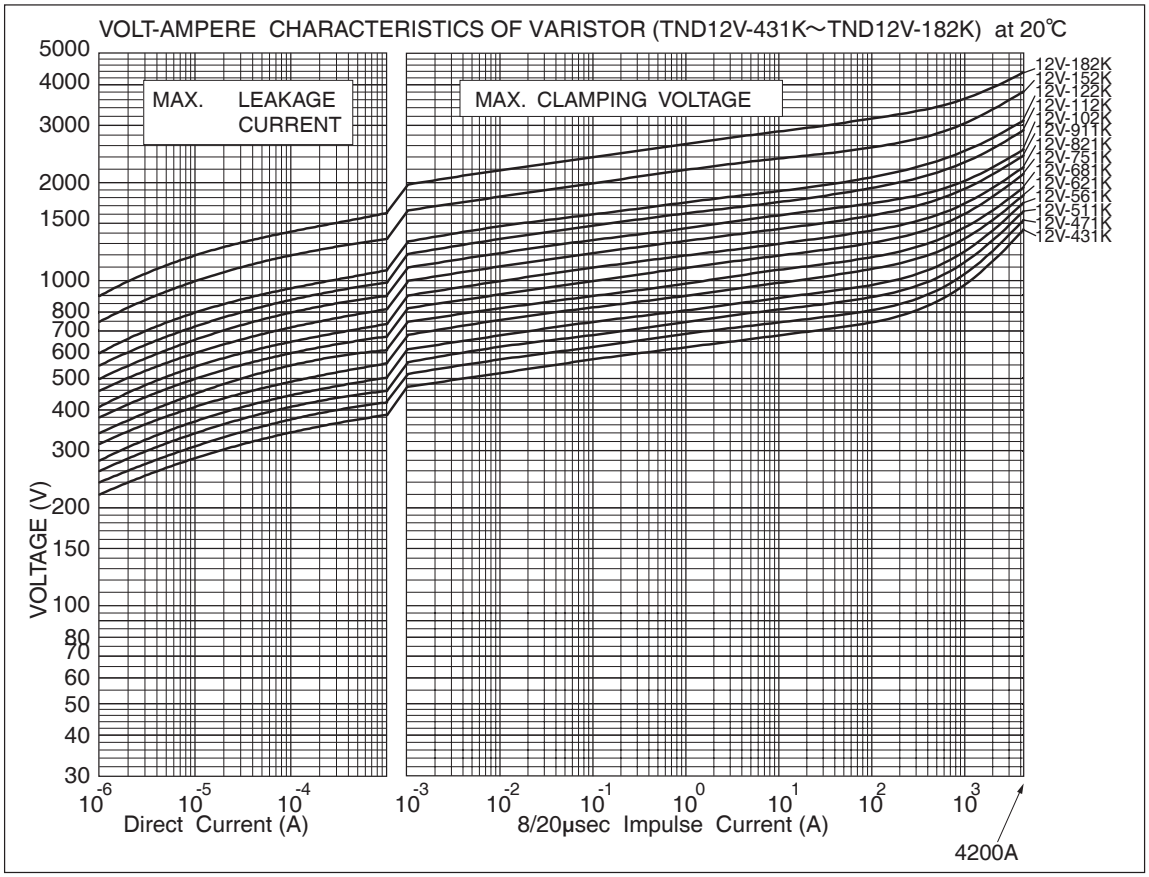
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# V Series

## ◆V-I CURVE (Type 12V)




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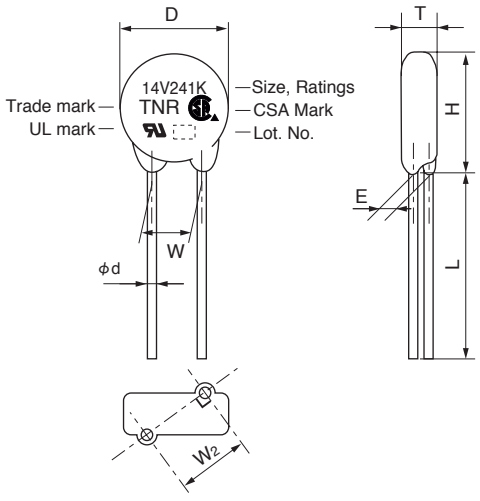
# V Series

## ◆RATINGS (Type 14V)

| Part Number | Previous Part Number (Just for your reference) | Maximum Ratings | | | | | Max. Clamping Voltage | | Capacitance Typical @1kHz | Varistor Voltage V CmA | T Max. | E ±1.0 | W2 Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Max. Allowable Voltage | | Max. Peak Current | Max. Energy | Rated Wattage | | | | | | | |
| | | AC (Vrms) | DC (V) | 8/20μs(A) | 2ms(J) | (W) | (A) | (V) | (pF) | (V) | (mm) | (mm) | (mm) |
| TND14V-150KB00AAA0 | TNR14V150K | 8 | 12 | | 3.6 | | | 30 | 19500 | 15 ( 13～ 17) | 4.5 | 1.0 | 7.6 |
| TND14V-180KB00AAA0 | TNR14V180K | 11 | 14 | | 4.3 | | | 36 | 16500 | 18 ( 16～ 20) | 4.6 | 1.1 | 7.6 |
| TND14V-220KB00AAA0 | TNR14V220K | 14 | 18 | | 5.3 | | | 43 | 13500 | 22 ( 20～ 24) | 4.7 | 1.2 | 7.6 |
| TND14V-270KB00AAA0 | TNR14V270K | 17 | 22 | 2000A/1 time | 6.5 | | | 53 | 12000 | 27 ( 24～ 30) | 4.8 | 1.4 | 7.6 |
| TND14V-330KB00AAA0 | TNR14V330K | 20 | 26 | | 7.9 | 0.1 | 10 | 65 | 10000 | 33 ( 30～ 36) | 5.0 | 1.6 | 7.7 |
| TND14V-390KB00AAA0 | TNR14V390K | 25 | 30 | 1000A/2 times | 9.4 | | | 77 | 9000 | 39 ( 35～ 43) | 4.9 | 1.3 | 7.6 |
| TND14V-470KB00AAA0 | TNR14V470K | 30 | 37 | | 11 | | | 93 | 8000 | 47 ( 42～ 52) | 5.0 | 1.5 | 7.6 |
| TND14V-560KB00AAA0 | TNR14V560K | 35 | 44 | | 13 | | | 110 | 7500 | 56 ( 50～ 62) | 5.1 | 1.7 | 7.7 |
| TND14V-680KB00AAA0 | TNR14V680K | 40 | 55 | | 16 | | | 135 | 6500 | 68 ( 61～ 75) | 5.3 | 2.0 | 7.8 |
| TND14V-820KB00AAA0 | TNR14V820K | 50 | 65 | | 20 | | | 135 | 3000 | 82 ( 74～ 90) | 4.5 | 1.1 | 7.6 |
| TND14V-101KB00AAA0 | TNR14V101K | 60 | 85 | | 25 | | | 165 | 2700 | 100 ( 90～ 110) | 4.7 | 1.3 | 7.6 |
| TND14V-121KB00AAA0 | TNR14V121K | 75 | 100 | | 30 | | | 200 | 2500 | 120 ( 108～ 132) | 4.9 | 1.4 | 7.6 |
| TND14V-151KB00AAA0 | TNR14V151K | 95 | 125 | | 37 | | | 250 | 2300 | 150 ( 135～ 165) | 5.2 | 1.7 | 7.7 |
| TND14V-181KB00AAA0 | TNR14V181K | 110 | 145 | | 45 | | | 300 | 1650 | 180 ( 162～ 198) | 4.7 | 1.1 | 7.6 |
| TND14V-201KB00AAA0 | TNR14V201K | 130 | 170 | | 50 | | | 340 | 950 | 200 ( 185～ 225) | 4.8 | 1.2 | 7.6 |
| TND14V-221KB00AAA0 | TNR14V221K | 140 | 180 | 6000A/1 time | 55 | | | 360 | 850 | 220 ( 198～ 242) | 4.9 | 1.3 | 7.6 |
| TND14V-241KB00AAA0 | TNR14V241K | 150 | 200 | | 60 | | | 395 | 800 | 240 ( 216～ 264) | 5.0 | 1.4 | 7.6 |
| TND14V-271KB00AAA0 | TNR14V271K | 175 | 225 | 5000A/2 times | 70 | | | 455 | 700 | 270 ( 247～ 303) | 5.2 | 1.5 | 7.6 |
| TND14V-331KB00AAA0 | TNR14V331K | 210 | 270 | | 80 | | | 545 | 600 | 330 ( 297～ 363) | 5.5 | 1.7 | 7.7 |
| TND14V-361KB00AAA0 | TNR14V361K | 230 | 300 | | 90 | | | 595 | 550 | 360 ( 324～ 396) | 5.7 | 1.8 | 7.7 |
| TND14V-391KB00AAA0 | TNR14V391K | 250 | 320 | | 100 | | | 650 | 500 | 390 ( 351～ 429) | 5.8 | 1.9 | 7.7 |
| TND14V-431KB00AAA0 | TNR14V431K | 275 | 350 | | 110 | | | 710 | 460 | 430 ( 387～ 473) | 6.0 | 2.1 | 7.8 |
| TND14V-471KB00AAA0 | TNR14V471K | 300 | 385 | | 125 | 0.6 | 50 | 775 | 420 | 470 ( 423～ 517) | 6.2 | 2.2 | 7.8 |
| TND14V-511KB00AAA0 | TNR14V511K | 320 | 410 | | 136 | | | 845 | 390 | 510 ( 459～ 561) | 6.4 | 2.4 | 7.9 |
| TND14V-561KB00AAA0 | TNR14V561K | 350 | 460 | | 136 | | | 922 | 360 | 560 ( 504～ 616) | 6.7 | 2.6 | 7.9 |
| TND14V-621KB00AAA0 | TNR14V621K | 385 | 505 | | 136 | | | 1025 | 330 | 620 ( 558～ 682) | 7.1 | 2.8 | 8.0 |
| TND14V-681KB00AAA0 | TNR14V681K | 420 | 560 | | 136 | | | 1120 | 310 | 680 ( 612～ 748) | 7.4 | 3.0 | 8.1 |
| TND14V-751KB00AAA0 | TNR14V751K | 460 | 615 | | 150 | | | 1240 | 280 | 750 ( 675～ 825) | 7.8 | 3.3 | 8.2 |
| TND14V-821KB00AAA0 | TNR14V821K | 510 | 670 | 5000A/1 time | 165 | | | 1355 | 250 | 820 ( 738～ 902) | 8.1 | 3.5 | 8.3 |
| TND14V-911KB00AAA0 | TNR14V911K | 550 | 745 | | 180 | | | 1500 | 230 | 910 ( 819～1001) | 8.6 | 3.9 | 8.5 |
| TND14V-102KB00AAA0 | TNR14V102K | 625 | 825 | 4500A/2 times | 200 | | | 1650 | 210 | 1000 ( 900～1100) | 9.1 | 4.2 | 8.6 |
| TND14V-112KB00AAA0 | TNR14V112K | 680 | 895 | | 220 | | | 1815 | 190 | 1100 ( 990～1210) | 9.7 | 4.6 | 8.8 |
| TND14V-122KB00AAA0 | TNR14V122K | 720 | 980 | | 240 | | | 1950 | 170 | 1200 (1080～1320) | 10.5 | 4.9* | 9.0** |
| TND14V-152KB00AAA0 | TNR14V152K | 860 | 1220 | | 300 | | | 2440 | 150 | 1500 (1350～1650) | 12.4 | 6.0* | 9.6** |
| TND14V-182KB00AAA0 | TNR14V182K | 1000 | 1465 | | 360 | | | 2970 | 120 | 1800 (1700～1980) | 14.4 | 7.1* | 10.3** |

*E±2 **W2±2

## ◆DIMENSIONS [mm]




| Part Number | D Max. | H Max. | T Max. | L Min. | ϕd ±0.05 | W ±1.0 |
|---|---|---|---|---|---|---|
| TND14V-150K to TND14V-511K | 15.5 | 18.5 | Ref. to RATINGS | 20 | 0.8 | 7.5 |
| TND14V-561K to TND14V-112K | 16.0 | 19.0 | | | | |
| TND14V-122K to TND14V-182K | 17.0 | 20.5 | | | | |

●The product with less than 620V of varistor voltage, taping is possible.
Please refer to taping and forming specifications.
The lead type parallel to a straight prepares, too.

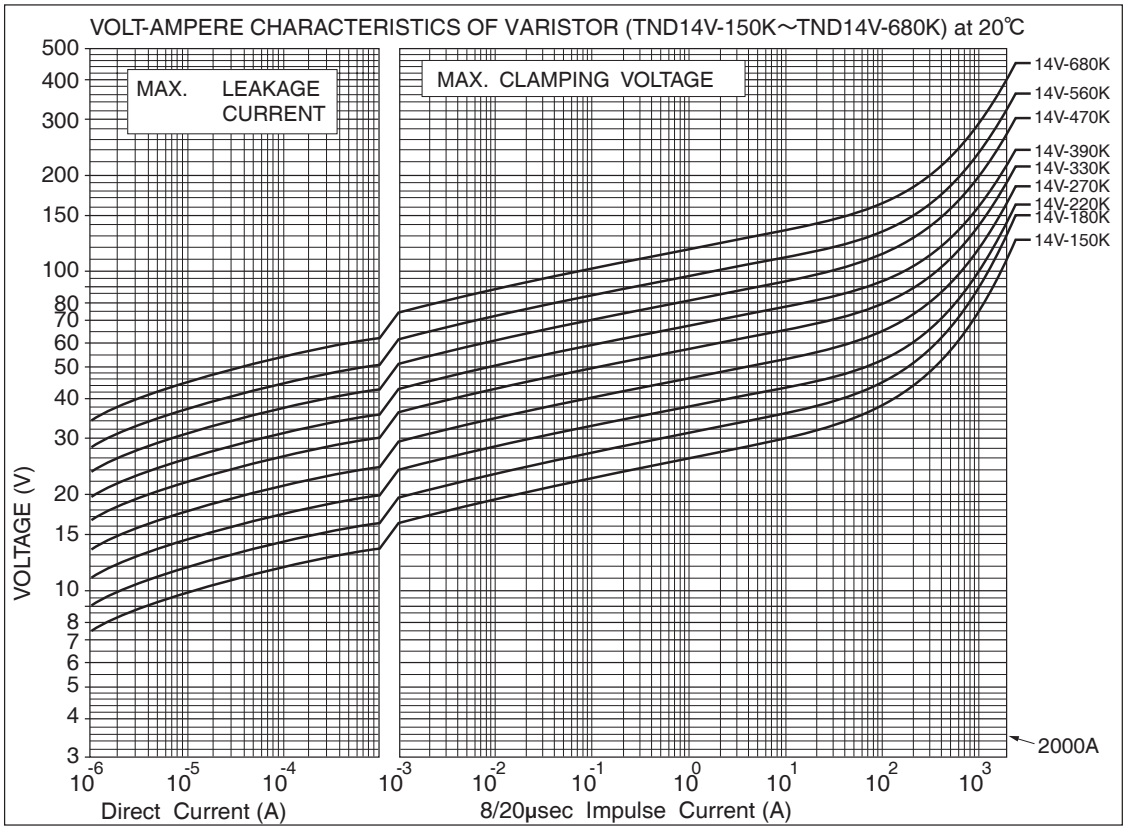
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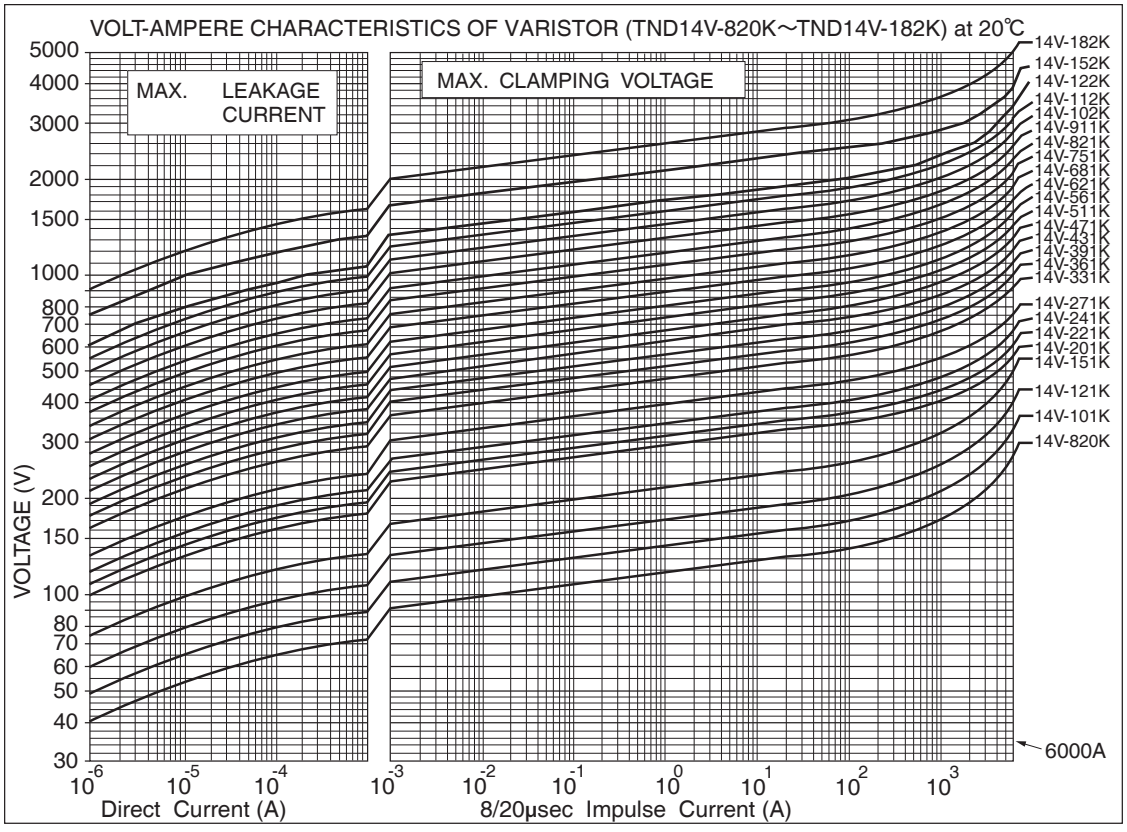


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# V Series

## ◆V-I CURVE (Type 14V)




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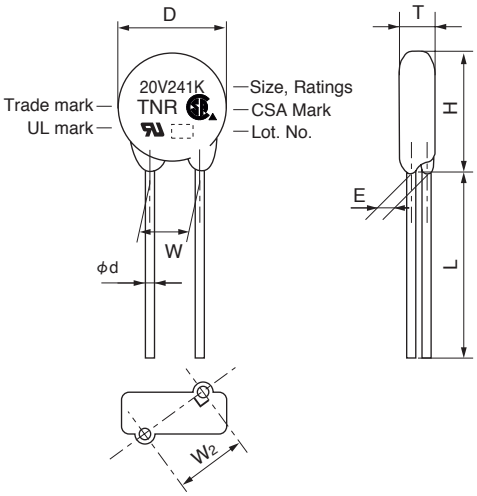
# V Series

## ◆RATINGS (Type 20V)

| Part Number | Previous Part Number (Just for your reference) | Maximum Ratings | | | | | Max. Clamping Voltage | | Capacitance Typical @1kHz | Varistor Voltage V CmA | T Max. | E ±1.0 | W2 Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Max. Allowable Voltage | | Max. Peak Current | Max. Energy | Rated Wattage | | | | | | | |
| | | AC (Vrms) | DC (V) | 8/20μs(A) | 2ms(J) | (W) | (A) | (V) | (pF) | (V) | (mm) | (mm) | (mm) |
| TND20V-180KB00AAA0 | TNR20V180K | 11 | 14 | | 12 | | | 36 | 39000 | 18 ( 16～ 20) | 5.1 | 1.1 | 10.1 |
| TND20V-220KB00AAA0 | TNR20V220K | 14 | 18 | | 14 | | | 43 | 33000 | 22 ( 20～ 24) | 5.2 | 1.2 | 10.1 |
| TND20V-270KB00AAA0 | TNR20V270K | 17 | 22 | 3000A/1 time | 17 | | | 53 | 28000 | 27 ( 24～ 30) | 5.3 | 1.4 | 10.1 |
| TND20V-330KB00AAA0 | TNR20V330K | 20 | 26 | | 21 | 0.2 | 20 | 65 | 24000 | 33 ( 30～ 36) | 5.5 | 1.6 | 10.1 |
| TND20V-390KB00AAA0 | TNR20V390K | 25 | 30 | 2000A/2 times | 25 | | | 77 | 21000 | 39 ( 35～ 43) | 5.5 | 1.3 | 10.1 |
| TND20V-470KB00AAA0 | TNR20V470K | 30 | 37 | | 30 | | | 93 | 19000 | 47 ( 42～ 52) | 5.6 | 1.5 | 10.1 |
| TND20V-560KB00AAA0 | TNR20V560K | 35 | 44 | | 36 | | | 110 | 17000 | 56 ( 50～ 62) | 5.7 | 1.7 | 10.1 |
| TND20V-680KB00AAA0 | TNR20V680K | 40 | 55 | | 44 | | | 135 | 15000 | 68 ( 61～ 75) | 5.8 | 2.0 | 10.2 |
| TND20V-820KB00AAA0 | TNR20V820K | 50 | 65 | | 40 | | | 135 | 6700 | 82 ( 74～ 90) | 4.9 | 1.2 | 10.1 |
| TND20V-101KB00AAA0 | TNR20V101K | 60 | 85 | | 50 | | | 165 | 6100 | 100 ( 90～ 110) | 5.1 | 1.4 | 10.1 |
| TND20V-121KB00AAA0 | TNR20V121K | 75 | 100 | | 60 | | | 200 | 5600 | 120 ( 108～ 132) | 5.3 | 1.5 | 10.1 |
| TND20V-151KB00AAA0 | TNR20V151K | 95 | 125 | | 75 | | | 250 | 5100 | 150 ( 135～ 165) | 5.6 | 1.8 | 10.2 |
| TND20V-181KB00AAA0 | TNR20V181K | 110 | 145 | | 85 | | | 300 | 3900 | 180 ( 162～ 198) | 5.1 | 1.2 | 10.1 |
| TND20V-201KB00AAA0 | TNR20V201K | 130 | 170 | | 100 | | | 340 | 2700 | 200 ( 185～ 225) | 5.2 | 1.2 | 10.1 |
| TND20V-221KB00AAA0 | TNR20V221K | 140 | 180 | 10000A/1 time | 110 | | | 360 | 2500 | 220 ( 198～ 242) | 5.3 | 1.3 | 10.1 |
| TND20V-241KB00AAA0 | TNR20V241K | 150 | 200 | | 120 | | | 395 | 2300 | 240 ( 216～ 264) | 5.4 | 1.4 | 10.1 |
| TND20V-271KB00AAA0 | TNR20V271K | 175 | 225 | 7000A/2 times | 135 | | | 455 | 2000 | 270 ( 247～ 303) | 5.6 | 1.5 | 10.1 |
| TND20V-331KB00AAA0 | TNR20V331K | 210 | 270 | | 160 | | | 545 | 1700 | 330 ( 297～ 363) | 5.9 | 1.7 | 10.1 |
| TND20V-361KB00AAA0 | TNR20V361K | 230 | 300 | | 180 | | | 595 | 1500 | 360 ( 324～ 396) | 6.1 | 1.9 | 10.2 |
| TND20V-391KB00AAA0 | TNR20V391K | 250 | 320 | | 195 | | | 650 | 1400 | 390 ( 351～ 429) | 6.2 | 2.0 | 10.2 |
| TND20V-431KB00AAA0 | TNR20V431K | 275 | 350 | | 215 | | | 710 | 1300 | 430 ( 387～ 473) | 6.4 | 2.1 | 10.2 |
| TND20V-471KB00AAA0 | TNR20V471K | 300 | 385 | | 250 | 1.0 | 100 | 775 | 1200 | 470 ( 423～ 517) | 6.6 | 2.3 | 10.3 |
| TND20V-511KB00AAA0 | TNR20V511K | 320 | 410 | | 273 | | | 845 | 1100 | 510 ( 459～ 561) | 6.8 | 2.4 | 10.3 |
| TND20V-561KB00AAA0 | TNR20V561K | 350 | 460 | | 273 | | | 922 | 1000 | 560 ( 504～ 616) | 7.1 | 2.6 | 10.3 |
| TND20V-621KB00AAA0 | TNR20V621K | 385 | 505 | | 273 | | | 1025 | 900 | 620 ( 558～ 682) | 7.5 | 2.9 | 10.4 |
| TND20V-681KB00AAA0 | TNR20V681K | 420 | 560 | | 273 | | | 1120 | 830 | 680 ( 612～ 748) | 7.8 | 3.1 | 10.5 |
| TND20V-751KB00AAA0 | TNR20V751K | 460 | 615 | | 300 | | | 1240 | 750 | 750 ( 675～ 825) | 8.2 | 3.4 | 10.6 |
| TND20V-821KB00AAA0 | TNR20V821K | 510 | 670 | 7500A/1 time | 325 | | | 1355 | 700 | 820 ( 738～ 902) | 8.5 | 3.6 | 10.6 |
| TND20V-911KB00AAA0 | TNR20V911K | 550 | 745 | | 360 | | | 1500 | 620 | 910 ( 819～1001) | 9.0 | 4.0 | 10.8 |
| TND20V-102KB00AAA0 | TNR20V102K | 625 | 825 | 6500A/2 times | 400 | | | 1650 | 560 | 1000 ( 900～1100) | 9.5 | 4.3 | 10.9 |
| TND20V-112KB00AAA0 | TNR20V112K | 680 | 895 | | 440 | | | 1815 | 510 | 1100 ( 990～1210) | 10.1 | 4.7 | 11.0 |
| TND20V-122KB00AAA0 | TNR20V122K | 720 | 980 | | 480 | | | 1950 | 450 | 1200 (1080～1320) | 10.8 | 5.1* | 11.2** |
| TND20V-152KB00AAA0 | TNR20V152K | 860 | 1220 | | 600 | | | 2440 | 390 | 1500 (1350～1650) | 12.8 | 6.2* | 11.8** |
| TND20V-182KB00AAA0 | TNR20V182K | 1000 | 1465 | | 720 | | | 2970 | 340 | 1800 (1700～1980) | 14.8 | 7.4* | 12.4** |

*E±2 **W2±2

## ◆DIMENSIONS [mm]




| Part Number | D Max. | H Max. | T Max. | L Min. | ϕd ±0.05 | W ±1.0 |
|---|---|---|---|---|---|---|
| TND20V-180K to TND20V-511K | 21.5 | 24.5 | Ref. to Ratings | 20 | 0.8 | 10.0 |
| TND20V-561K to TND20V-112K | 22.5 | 25.5 | | | | |
| TND20V-122K to TND20V-182K | 23.5 | 28.0 | | | | |

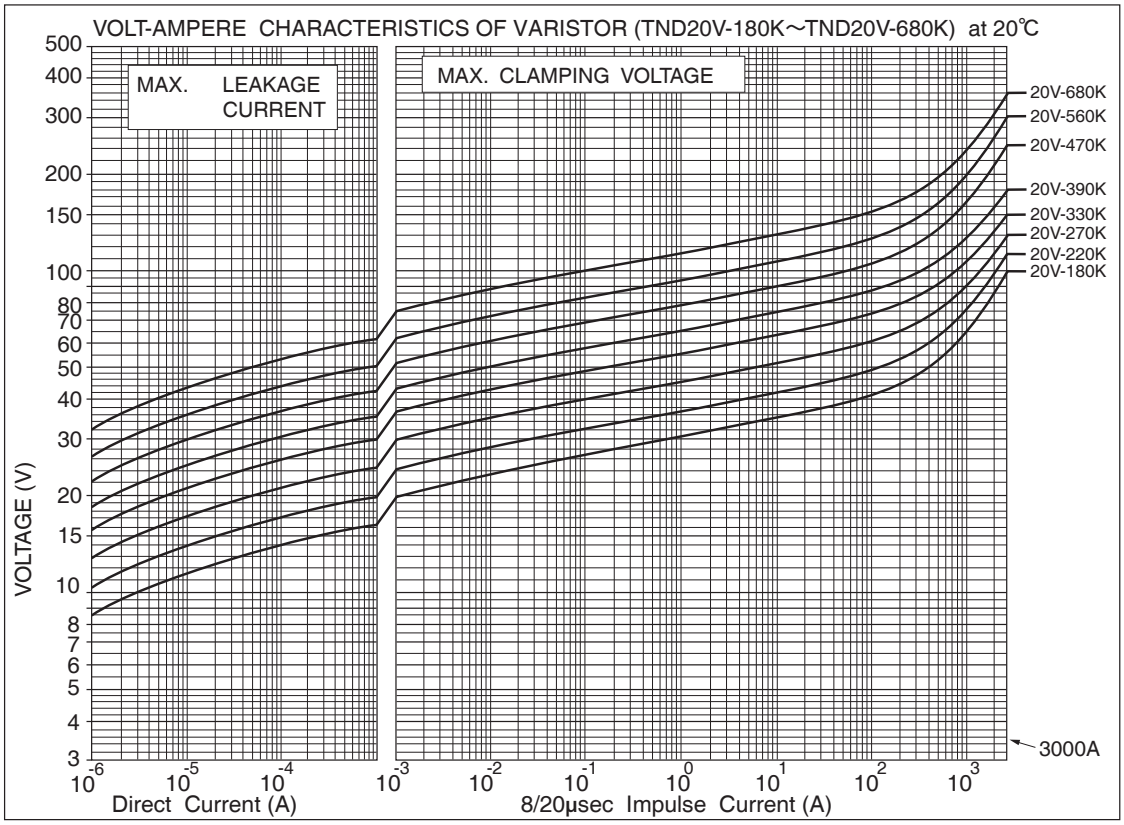
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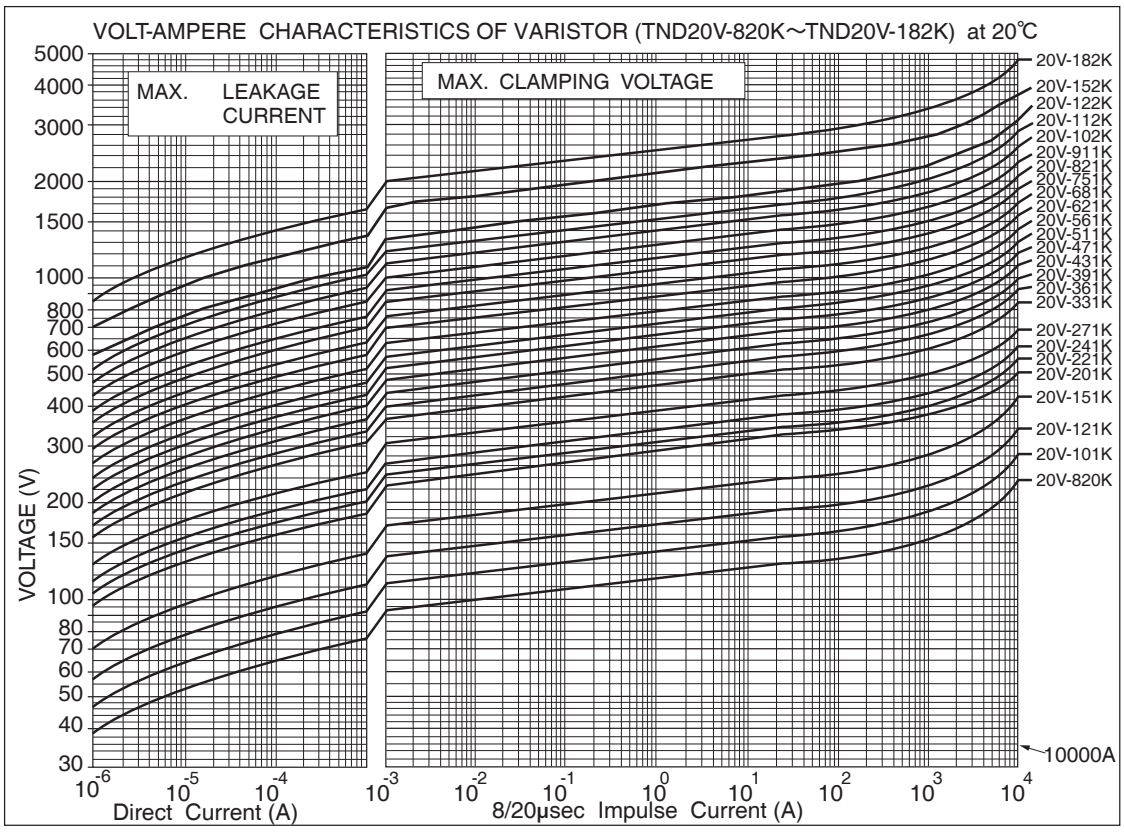


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# V Series

## ◆V-I CURVE (Type 20V)




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# V Series

## ◆GENERAL SPECIFICATIONS

| Item | Test Conditions | Specifications |
|---|---|---|
| **Standard Test Condition** | 20±15℃, 85%RH Max. | |
| **Varistor Voltage** | Voltage across varistor at specified current.<br>Type: 5V — Current CmA: 0.1<br>Type: 7V, 9V, 10V, 12V, 14V, 20V — Current CmA: 1.0 | Satisfy the specification |
| **Maximum Allowable Voltage** | Maximum continuous AC voltage (50 to 60Hz AC) and maximum DC voltage which can be applied. | Satisfy the specification |
| **Maximum Peak Surge Current** | Maximum surge current (8/20μs pulse wave to be applied once, or twice, 5 minutes apart) for varistor voltage change within±10% of the initial value. | Satisfy the specification |
| **Energy Rating** | Maximum energy (2 ms. square wave to be applied once) for varistor voltage change within ±10% of the initial value. | Satisfy the specification |
| **Rated Wattage** | Maximum power (50 to 60Hz AC power to be applied for 1000 hours at 85±2℃) for varistor voltage change within ±10% of the initial value. | Satisfy the specification |
| **Maximum Clamping Voltage** | Maximum voltage across varistor when 8/20μs rated current surge is applied. | Satisfy the specification |
| **Capacitance** | Varistor's capacitance at 1kHz, standard test condition. | For reference only. |
| **Voltage Temperature Coefficient** | $\frac{\text{V CmA at 85℃} - \text{V CmA at 25℃}}{\text{V CmA at 25℃}} \times \frac{1}{60} \times 100\ (\%/℃)$<br>V CmA : Actual varistor voltage | Within ±0.05%/℃ |
| **Insulation** | Short circuit the two leads of varistor, and put the varistor body into metal balls (1.6mm diameter) leaving 2mm epoxy coating outside. Then, apply 2.5kVrms between the leads and the metal balls for 60±5 sec.. | The varistor shall withstand with no abnormality. |

## ◆ENVIRONMENTAL CHARACTERISTICS

| Item | Test Conditions | Specifications |
|---|---|---|
| **High Temperature Storage (Dry heat)** | The specimen shall be subjected 125±2℃ for 1000±12 hours without load. | ΔV CmA/V CmA≦±5%<br>However, on varistors have nominal varistor voltages from 15V to 68V, the varistor voltage change shall be<br>ΔV CmA/V CmA≦±10% |
| **Low Temperature Storage** | The specimen shall be subjected -40±2℃ for 1000±12 hours without load. | ΔV CmA/V CmA≦±5% |
| **Damp heat (Humidity)** | The specimen shall be subjected to 40±2℃, 90 to 95%RH for 1000±12 hours without load. | ΔV CmA/V CmA≦±5% |
| **Temperature Cycle** | The temperature cycle shown below shall be repeated 5 cycles.<br>-40±3℃, 30 minutes ⇔ +85±2℃, 30 minutes | ΔV CmA/V CmA≦±5%<br>No remarkable damage |
| **High Temperature Operating** | The specimen shall be subjected to 85±2℃ with the maximum allowable voltage for 1000±12 hours. | ΔV CmA/V CmA≦±10% |
| **Damp heat Operating** | The specimen shall be subjected to 40±2℃, 90 to 95%RH with the maximum allowable voltage for 1000±12 hours. | ΔV CmA/V CmA≦±10% |

Varistor voltage change of forward direction shall be measured in the test of unipolar surge life and DC load life.
Varistor voltage change is measured after stored at Standard Test Conditions for 1 to 2 hours.
Note : For 42V battery line, please contact our sales office.

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# V Series

## ◆MECHANICAL CHARACTERISTICS

| Item | Test Conditions | Specifications |
|---|---|---|
| **Resistance to Soldering Heat** | After V CmA is measured at room temperature, each lead shall be dipped into a solder bath at a temperature of 350±10°C to a point 2.0 to 2.5 mm from the root of the lead, and be held there for $3^{+1}_{-0}$ seconds, and then be stored at room temperature for 1 to 2 hours. Then, V CmA shall be examined. (Conform to JIS C 5102)<br>or<br>After V CmA is measured at room temperature, each lead shall be dipped into a solder bath at a temperature of 260±10°C to a point 2.0 to 2.5 mm from the root of the lead, be held there for 10±1 seconds, and then be stored at room temperature for 1 to 2 hours. Then, V CmA shall be examined. | ΔV CmA/V CmA≦±5%<br>No remarkable damage |
| **Solderability** | Each lead shall be dipped into a ethanol solution (about 25%) of rosin for 5 to 10 sec.<br>Then each lead shall be dipped into a solder.<br>Solder: Pb free (Sn-3.0Ag-0.5Cu) / Eutectic (Sn/Pb)<br>Solder Temp.: 245±5℃ / 235±5℃<br>Dipping Time: 2±0.5sec.<br>Dipping Depth: 1.5 to 2.0mm (from the body) | At least, 95% of the leads shall be covered with solder uniformly. |
| **Lead Pull Strength** | Fix varistor body, and suspend specified weight toward direction of lead axis.<br>Type / Lead Diameter / Weight<br>5V, 7V, 9V / 0.6mm / 10N<br>10V, 12V, 14V, 20V / 0.8mm / 10N | No abnormality such as disconnection.<br>ΔV CmA/V CmA≦±5% |
| **Lead Bend Strength** | Fix varistor body vertically. Then suspend specified weight and bent the varistor body by 90°, and return it to the original position. Carry out the operation in the opposite direction and return the body to the original position.<br>Type / Lead Diameter / Weight<br>5V, 7V, 9V / 0.6mm / 5N<br>10V, 12V, 14V, 20V / 0.8mm / 5N | The leads shall not disconnect, slacken and peel off. |
| **Vibration** | Mount varistor body on vibrator, and conduct the follwing vibration test.<br>Peak-to-Peak amplitude : 1.5mm<br>Vibration frequency range : 10Hz to 55Hz<br>Sweeping time:<br>Approximately one minute for 10Hz →55Hz →10Hz<br>Direction and duration of vibration :<br>Three directions of X, Y and Z. Two hours each.<br>Six hours total. | No remarkable appearance abnormality.<br>ΔV CmA/V CmA≦±5% |

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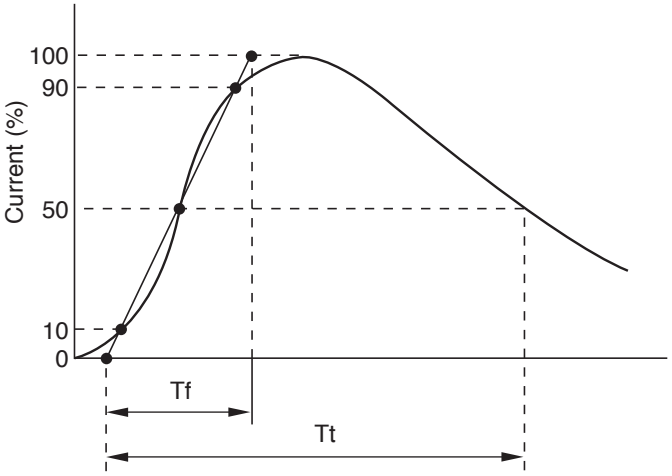
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# PULSE LIFE TIME RATINGS

When the following factors are different from the specified conditions,
the peak pulse current should be revised based on the PULSE LIFE TIME RATINGS.

- Impulse duration time
- Number of impulse

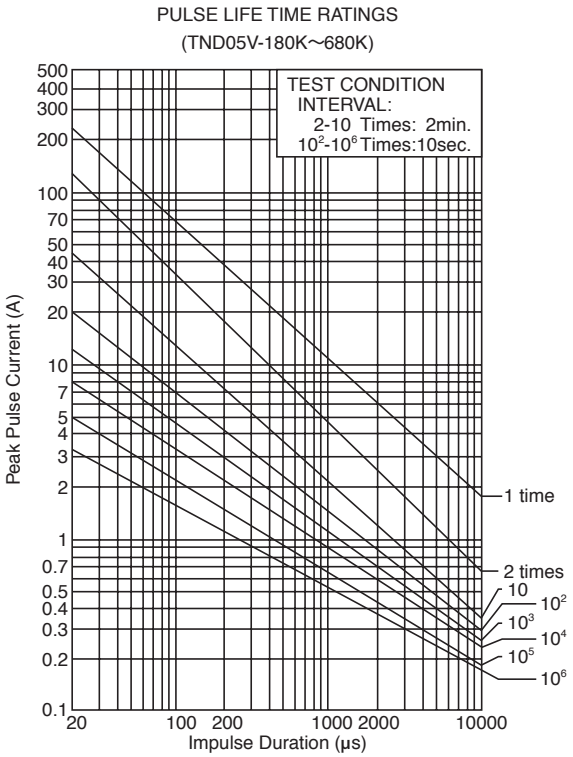
(Impulse Current Wave Form)

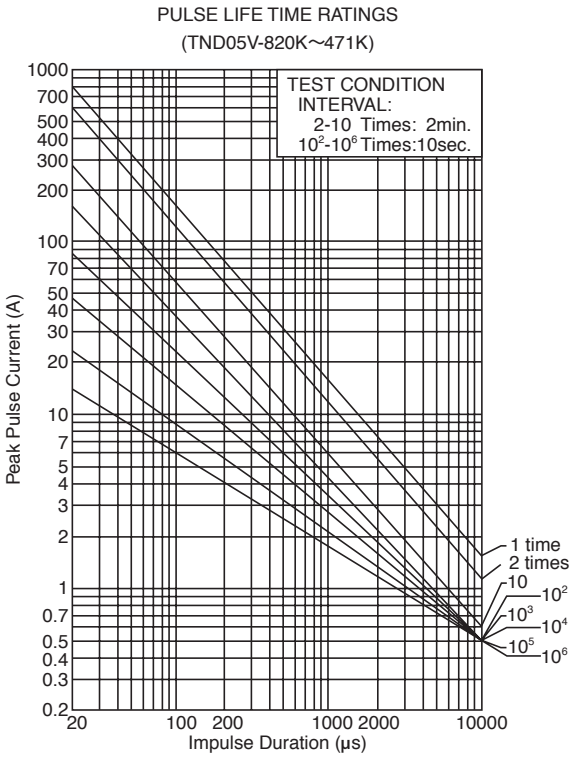



Tf : (Rise Time)

Tt : (Impulse Duration)

●V series




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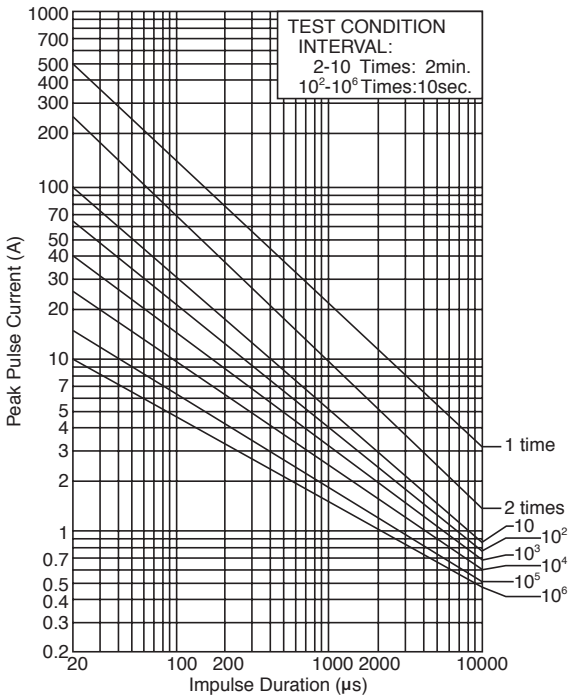
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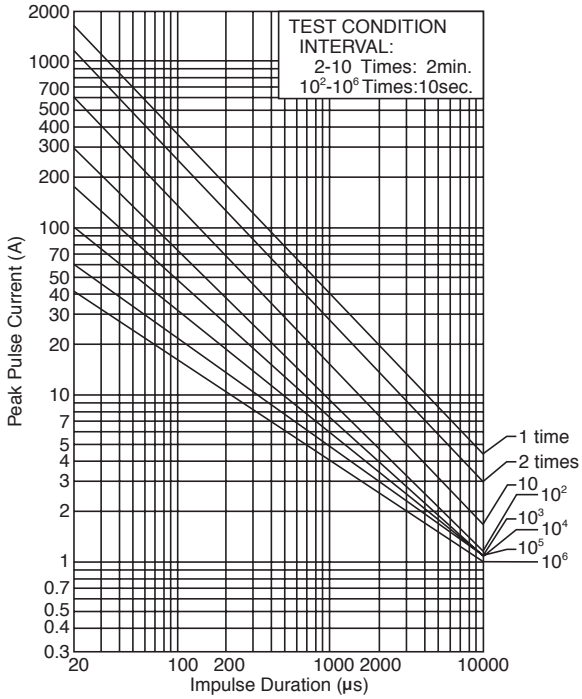
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●V series

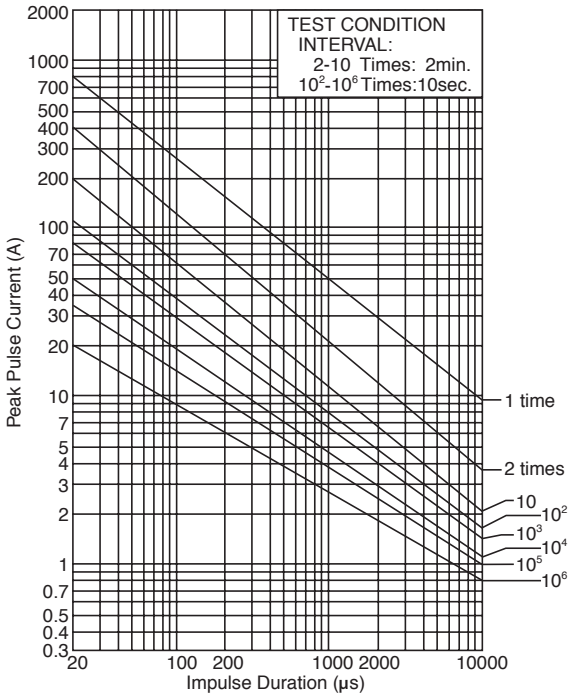
PULSE LIFE TIME RATINGS
(TND07V-150K～680K)



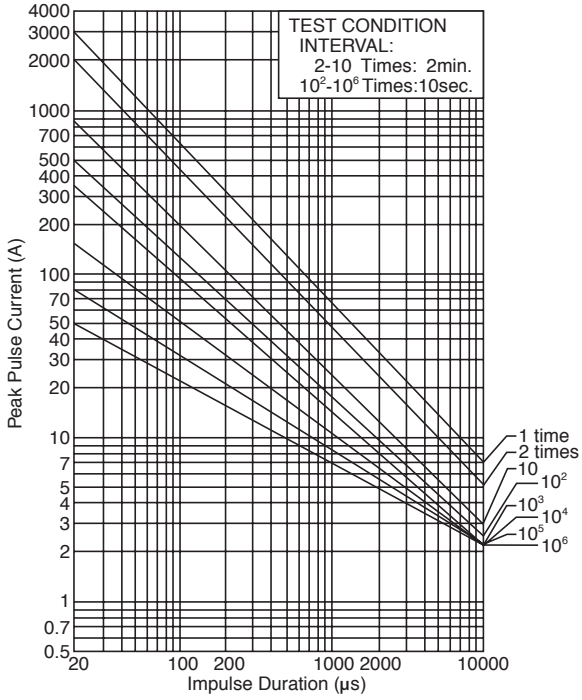

PULSE LIFE TIME RATINGS
(TND07V-820K～511K)




PULSE LIFE TIME RATINGS
(TND09V-150K～680K)




PULSE LIFE TIME RATINGS
(TND09V-820K～511K)




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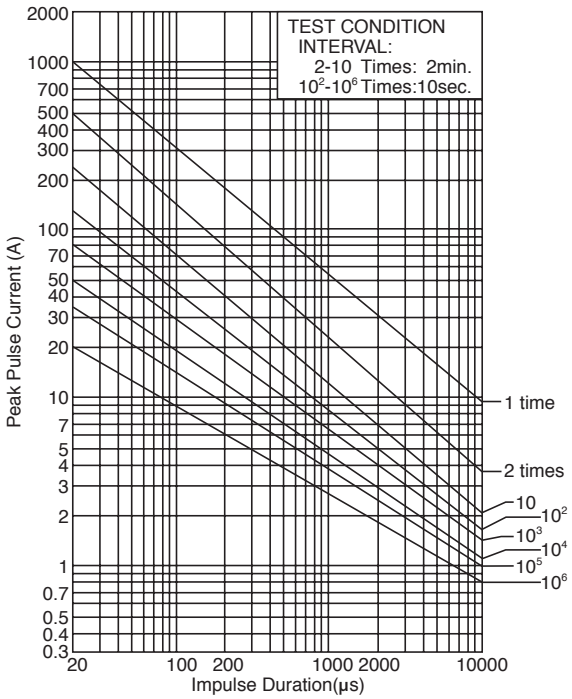
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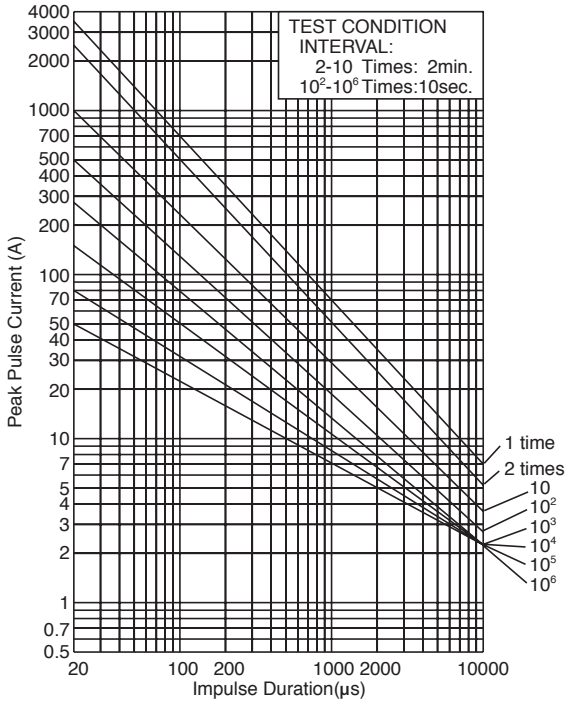
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●V series

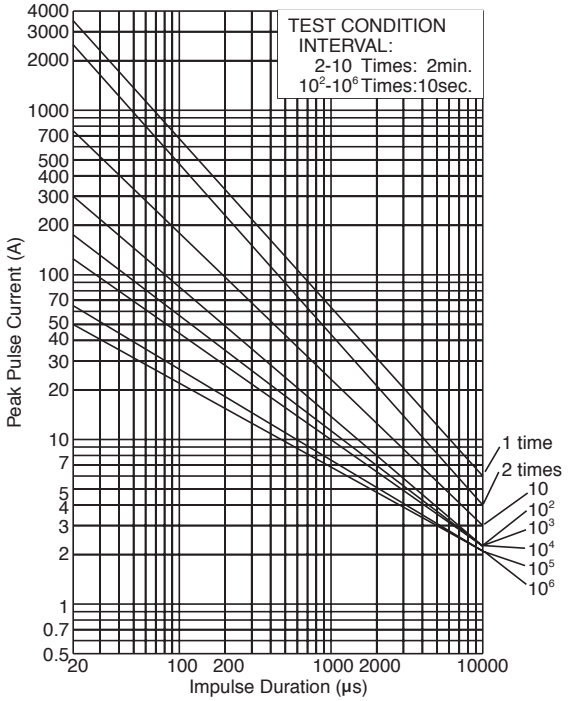
PULSE LIFE TIME RATINGS
(TND10V-150K～680K)



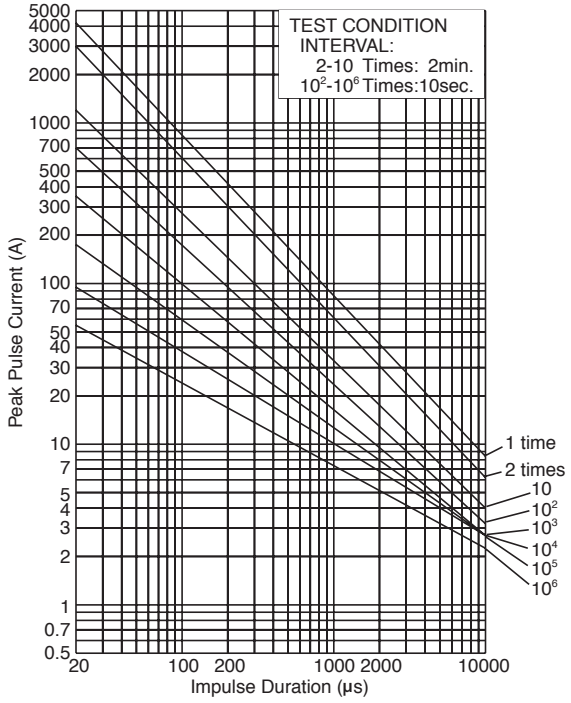

PULSE LIFE TIME RATINGS
(TND10V-820K～511K)




PULSE LIFE TIME RATINGS
(TND10V-561K～182K)




PULSE LIFE TIME RATINGS
(TND12V-431K～511K)




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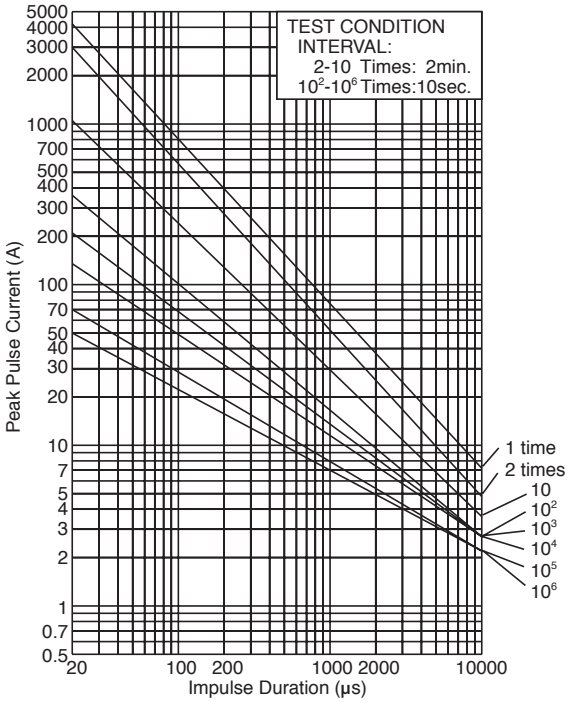
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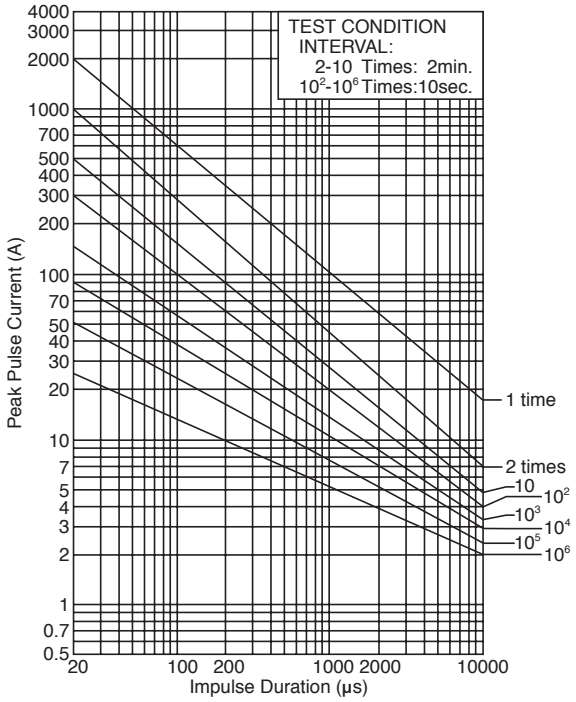
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●V series

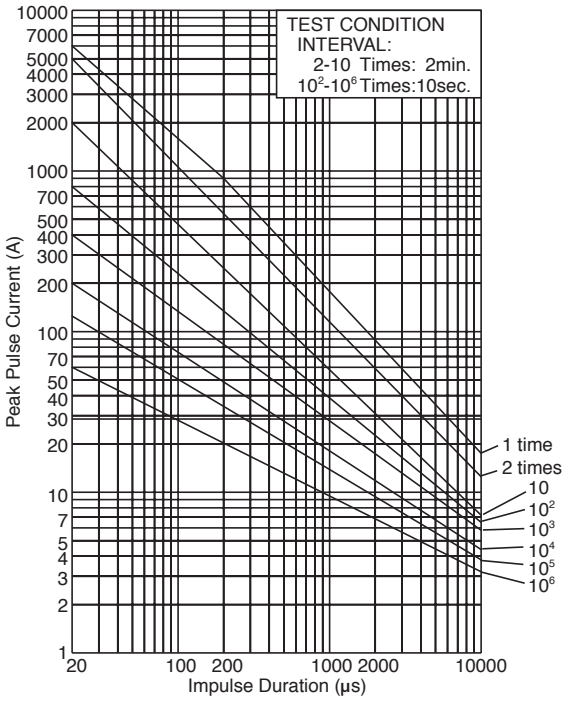
PULSE LIFE TIME RATINGS
(TND12V-561K～182K)



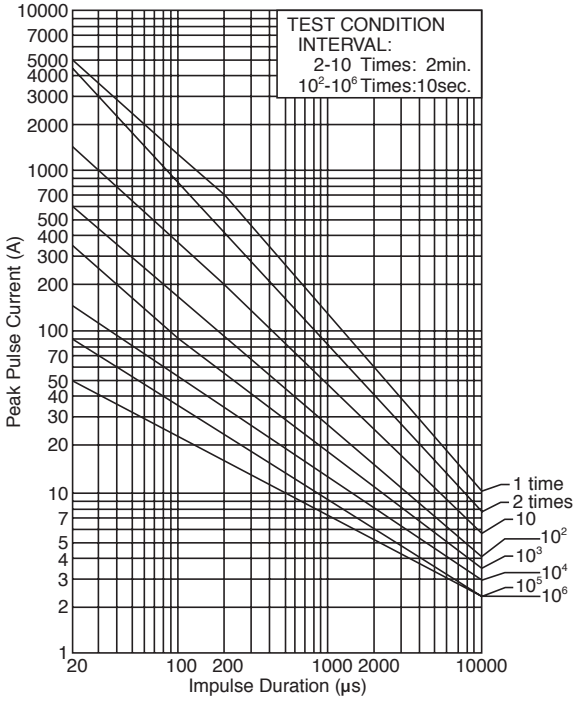

PULSE LIFE TIME RATINGS
(TND14V-150K～680K)




PULSE LIFE TIME RATINGS
(TND14V-820K～511K)




PULSE LIFE TIME RATINGS
(TND14V-561K～182K)




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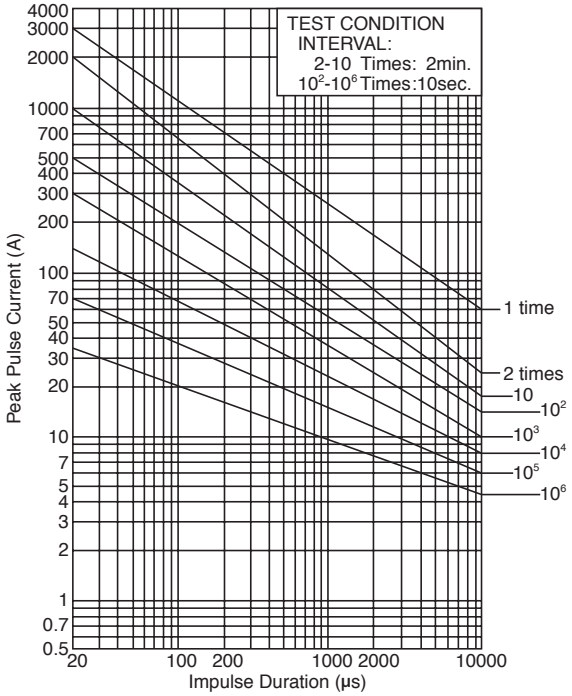
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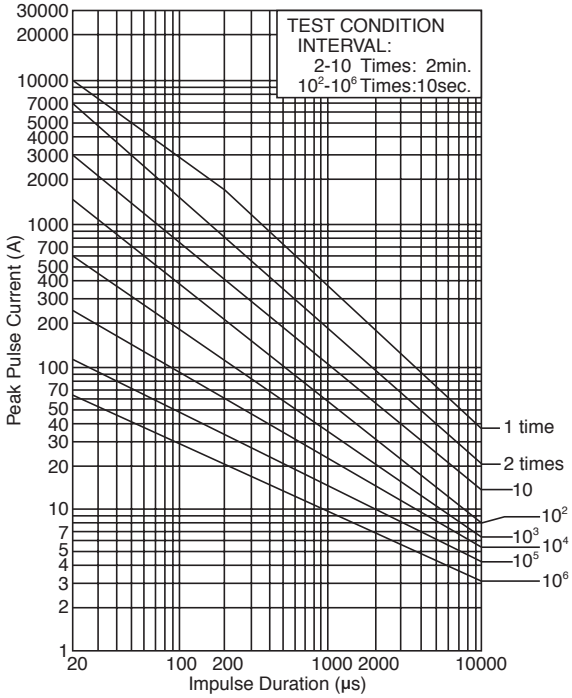
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●V series

PULSE LIFE TIME RATINGS
(TND20V-180K～680K)

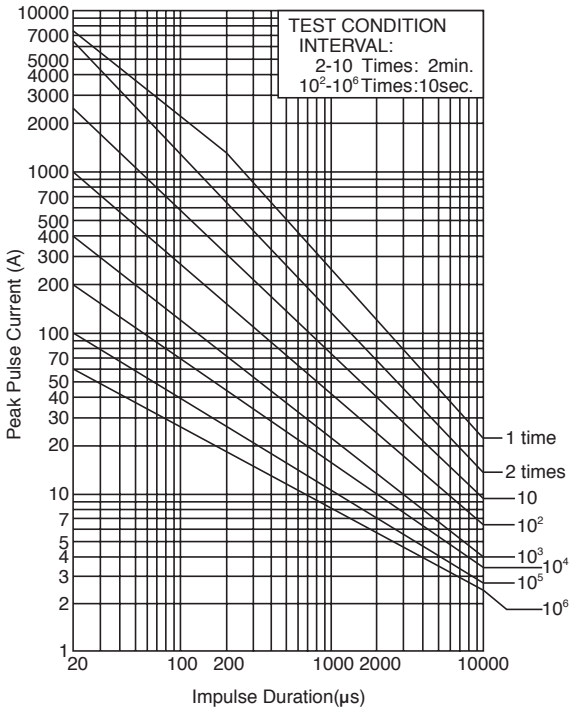



PULSE LIFE TIME RATINGS
(TND20V-820K～511K)




●V series

PULSE LIFE TIME RATINGS
(TND20V-561K～182K)




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■ Always read "Notes on Use" before using the product in order to enable you to use the product correctly and prevent any faults and accidents from occurring.

■ Request the Product Specification on the product of NIPPON CHEMI-CON CORPORATION to refer to it as well as this brochure prior to the order of the products. Some specific notes on use of the ordered product may be described in the specifications.

■ The products listed in this catalog are designed and manufactured for general electronics equipment use and are not intended for use in applications that can adversely affect human life; where the malfunction of equipment may cause damage to life or property. In addition, our products are not intended to be used in specific applications that may cause a major social impact. Please consult with us in advance of usage of our products in the following listed applications. ① Aerospace equipment ② Power generation equipment such as thermal power, nuclear power etc. ③ Medical equipment ④ Transport equipment (automobiles, trains, ships, etc.) ⑤ Transportation control equipment ⑥ Disaster prevention / crime prevention equipment ⑦ Highly publicized information processing equipment ⑧ Submarine equipment ⑨ Other applications that are not considered general-purpose applications.

■ The circuits described as examples in this catalog and the "delivery specifications" are featured in order to show the operations and usage of our products, however, this fact does not guarantee that the circuits are available to function in your equipment systems. We are not in any case responsible for any failures or damage caused by the use of information contained herein. You should examine our products, of which the characteristics are described in the "delivery specifications" and other documents, and determine whether or not our products suit your requirements according to the specifications of your equipment systems. Therefore, you bear final responsibility regarding the use of our products.
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In addition, we have an established system with enhanced traceability, therefore we will limit the applicable lot items for any potential compensation.

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Taping
Technical Terms on Varistors
Packaging・Minimum Order Quantity
Safety Standard
Technical Notes

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