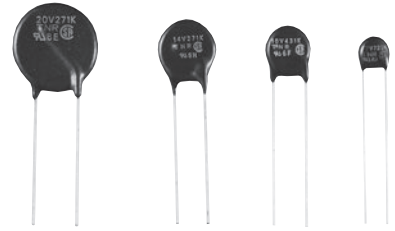


# V Series



## ◆FEATURES

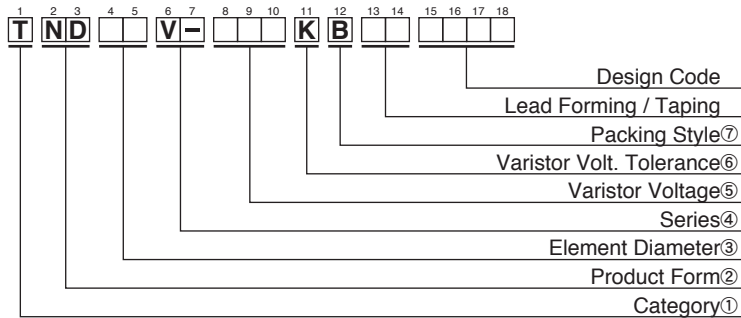
- Excellent voltage non-linear coefficient.  
Low clamping voltage.
- Symmetrical V-I characteristics (No polarity).
- Fast response.
- Stable characteristics against repeated surges.
- Superior temperature characteristics.
- High reliability
- UL, CSA and VDE recognized components  
UL 1449 3rd File : 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°C  
Storage Temperature Range: -50 to +125°C

## ◆PART NUMBERING SYSTEM



| 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                | φ 10 mm |
| 12                | φ 12 mm |
| 14                | φ 14 mm |
| 20                | φ 20 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 |

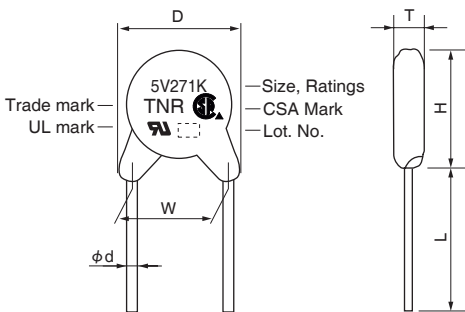


V Series

◆STANDARD RATINGS (Type 5V)

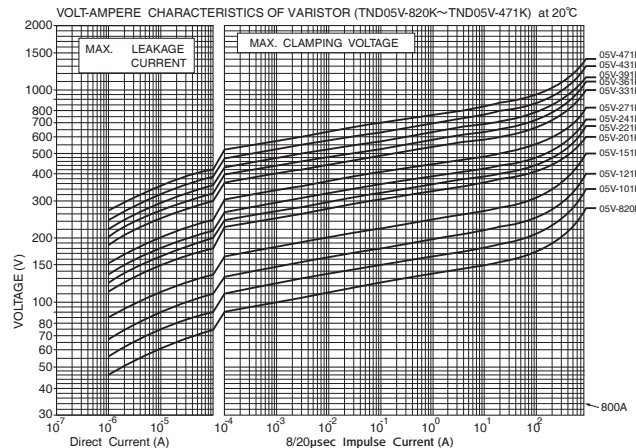
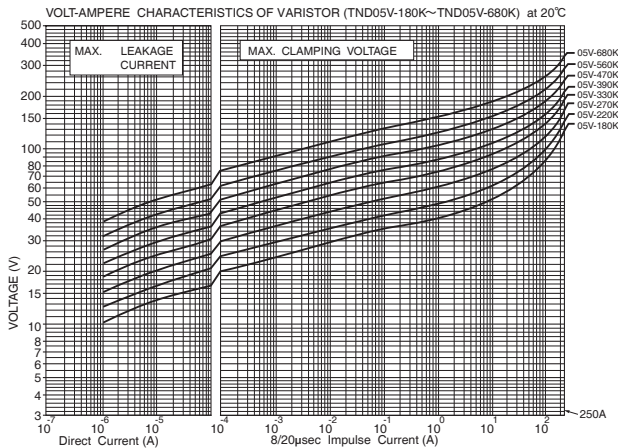
| Part Number        | Previous Part Number<br>(Just for your reference) | Maximum Ratings        |        |                             |             |               | Max. Clamping Voltage |     | Capacitance<br>Typical<br>@1kHz<br>(pF) | Varistor Voltage<br>V <sub>0.1mA</sub><br>(V) | T<br>Max.<br>(mm) |
|--------------------|---|------------------------|--------|-----------------------------|-------------|---------------|-----------------------|-----|---|---|-------------------|
|                    |   | Max. Allowable Voltage |        | Max. Peak Current           | Max. Energy | Rated Wattage | (A)                   | (V) |   |   |                   |
|                    |   | AC (Vrms)              | DC (V) | 8/20μs(A)                   | 2ms(J)      | (W)           |                       |     |   |   |                   |
| 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<br>Max. | H<br>Max. | T<br>Max.       | L<br>Min. | φd<br>±0.05 | W<br>±1.0 |
|-----------|-----------|-----------------|-----------|-------------|-----------|
| 7.5       | 10.0      | Ref. to RATINGS | 20.0      | 0.6         | 5.0       |

◆V-I CURVE

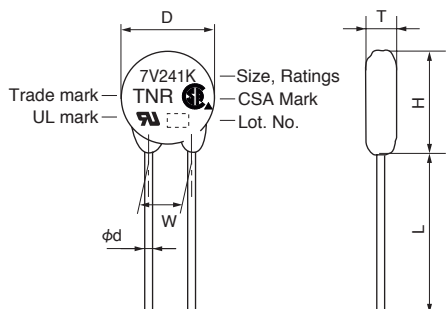


# V Series

## ◆STANDARD RATINGS (Type 7V)

| Part Number        | Previous Part Number<br>(Just for your reference) | Maximum Ratings        |        |                   |             |               | Max. Clamping Voltage |     | Capacitance<br>Typical<br>@1kHz<br>(pF) | Varistor Voltage<br>V <sub>1mA</sub><br>(V) | T<br>Max.<br>(mm) |
|--------------------|---|------------------------|--------|-------------------|-------------|---------------|-----------------------|-----|---|---|-------------------|
|                    |   | Max. Allowable Voltage |        | Max. Peak Current | Max. Energy | Rated Wattage | (A)                   | (V) |   |   |                   |
|                    |   | AC (Vrms)              | DC (V) | 8/20μs(A)         | 2ms(J)      |               |                       |     |   |   |                   |
| 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               |

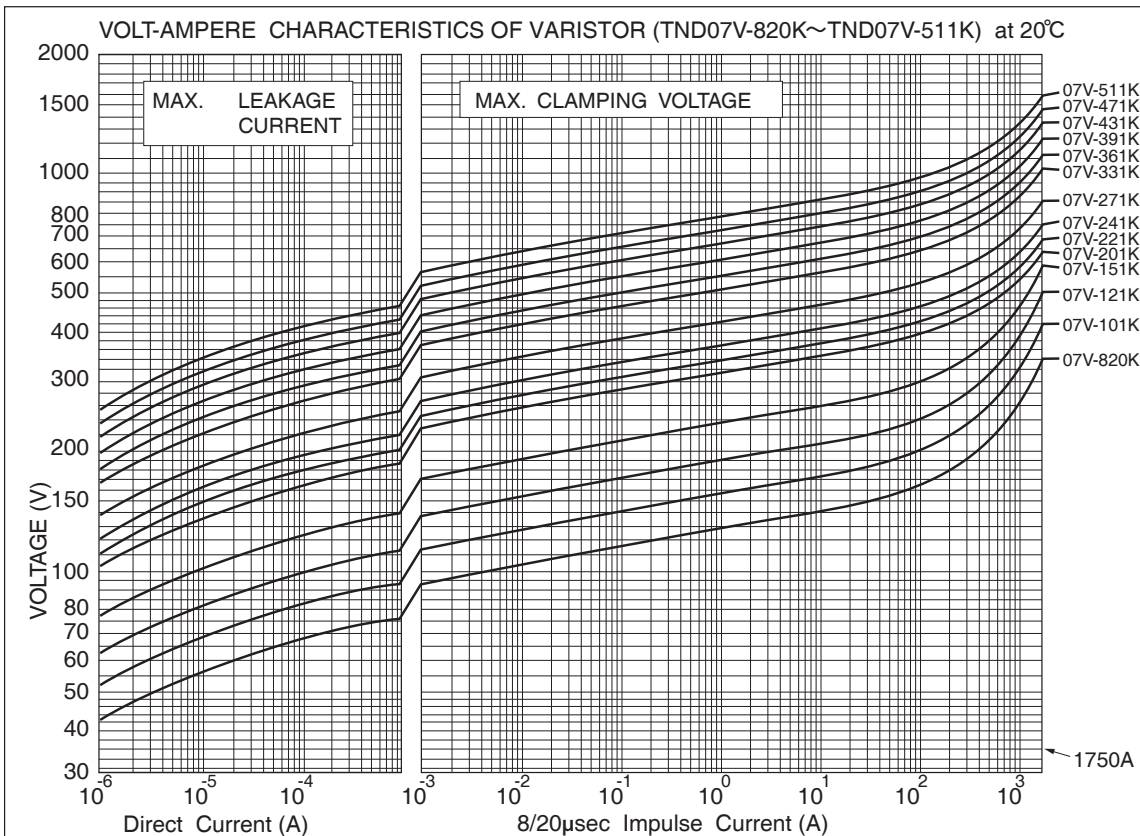
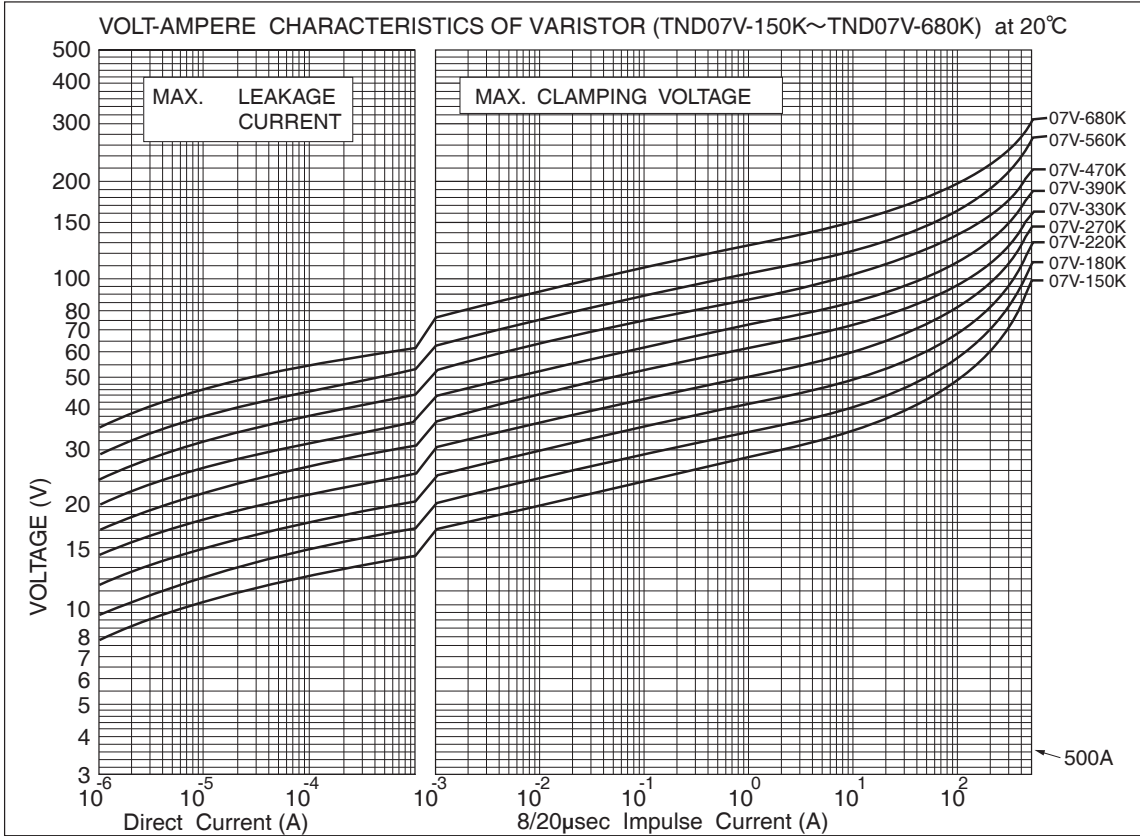
## ◆DIMENSIONS [mm]



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

V Series

◆V-I CURVE (Type 7V)

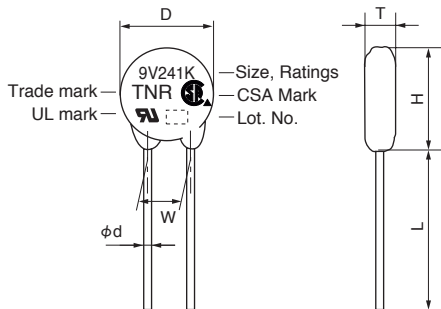


# V Series

## ◆ RATINGS (Type 9V)

| Part Number        | Previous Part Number<br>(Just for your reference) | Maximum Ratings        |        |                   |               |               | Max. Clamping Voltage |               | Capacitance<br>Typical<br>@1kHz<br>(pF) | Varistor Voltage<br>V <sub>1mA</sub><br>(V) | T<br>Max.<br>(mm) |     |
|--------------------|---|------------------------|--------|-------------------|---------------|---------------|-----------------------|---------------|---|---|-------------------|-----|
|                    |   | Max. Allowable Voltage |        | Max. Peak Current | Max. Energy   | Rated Wattage | (A)                   | (V)           |   |   |                   |     |
|                    |   | AC (Vrms)              | DC (V) | 8/20μs(A)         | 2ms(J)        |               |                       |               |   |   |                   | (W) |
| TND09V-150KB00AAA0 | TNR9V150K   | 8                      | 12     | 800A/1 time       | 2.0           | 0.02          | 5                     | 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     |                   | 3.2           |               |                       | 53            | 6000                                    | 27 ( 24~ 30)                                | 4.2               |     |
| TND09V-330KB00AAA0 | TNR9V330K   | 20                     | 26     | 400A/2 times      | 4.0           | 0.02          | 5                     | 65            | 5000                                    | 33 ( 30~ 36)                                | 4.5               |     |
| TND09V-390KB00AAA0 | TNR9V390K   | 25                     | 30     |                   | 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                | 170           | 2500          | 82 ( 74~ 90)          | 3.8           |   |   |                   |     |
| TND09V-101KB00AAA0 | TNR9V101K   | 60                     | 85     | 12                | 200           | 1600          | 100 ( 90~110)         | 3.9           |   |   |                   |     |
| TND09V-121KB00AAA0 | TNR9V121K   | 75                     | 100    | 14.5              | 250           | 1400          | 120 (108~132)         | 4.1           |   |   |                   |     |
| TND09V-151KB00AAA0 | TNR9V151K   | 95                     | 125    | 18                | 300           | 1300          | 150 (135~165)         | 4.4           |   |   |                   |     |
| TND09V-181KB00AAA0 | TNR9V181K   | 110                    | 145    | 22                | 340           | 900           | 180 (162~198)         | 4.0           |   |   |                   |     |
| TND09V-201KB00AAA0 | TNR9V201K   | 130                    | 170    | 25                | 360           | 500           | 200 (185~225)         | 4.1           |   |   |                   |     |
| TND09V-221KB00AAA0 | TNR9V221K   | 140                    | 180    | 3000A/1 time      | 27.5          | 0.25          | 25                    | 450           | 450                                     | 220 (198~242)                               | 4.2               |     |
| TND09V-241KB00AAA0 | TNR9V241K   | 150                    | 200    |                   | 30            |               |                       | 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           |   |   |                   |     |

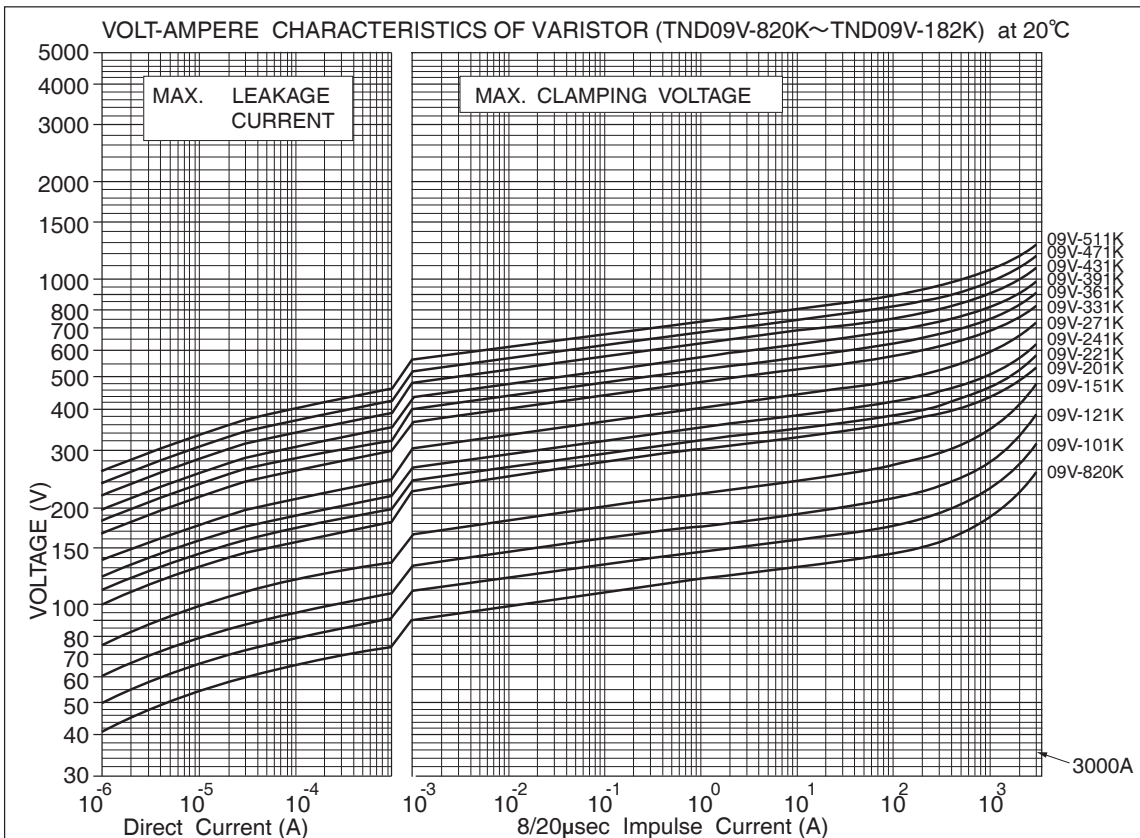
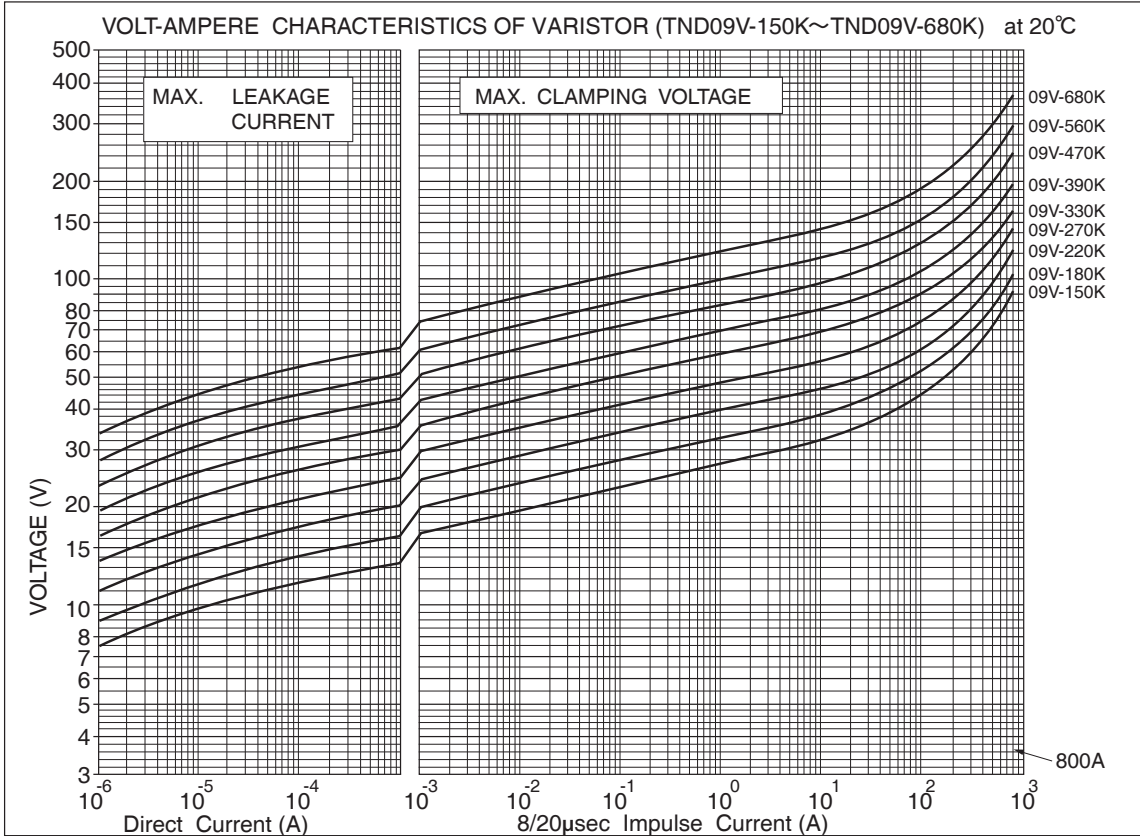
## ◆ DIMENSIONS [mm]



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

V Series

◆V-I CURVE (Type 9V)



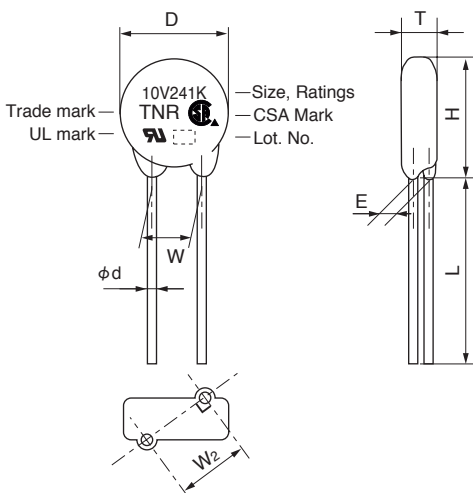
V Series

◆RATINGS (Type 10V)

| Part Number        | Previous Part Number<br>(Just for your reference) | Maximum Ratings        |        |                   |             |               | Max. Clamping Voltage | Capacitance Typical @1kHz | Varistor Voltage V <sub>1mA</sub> | 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]



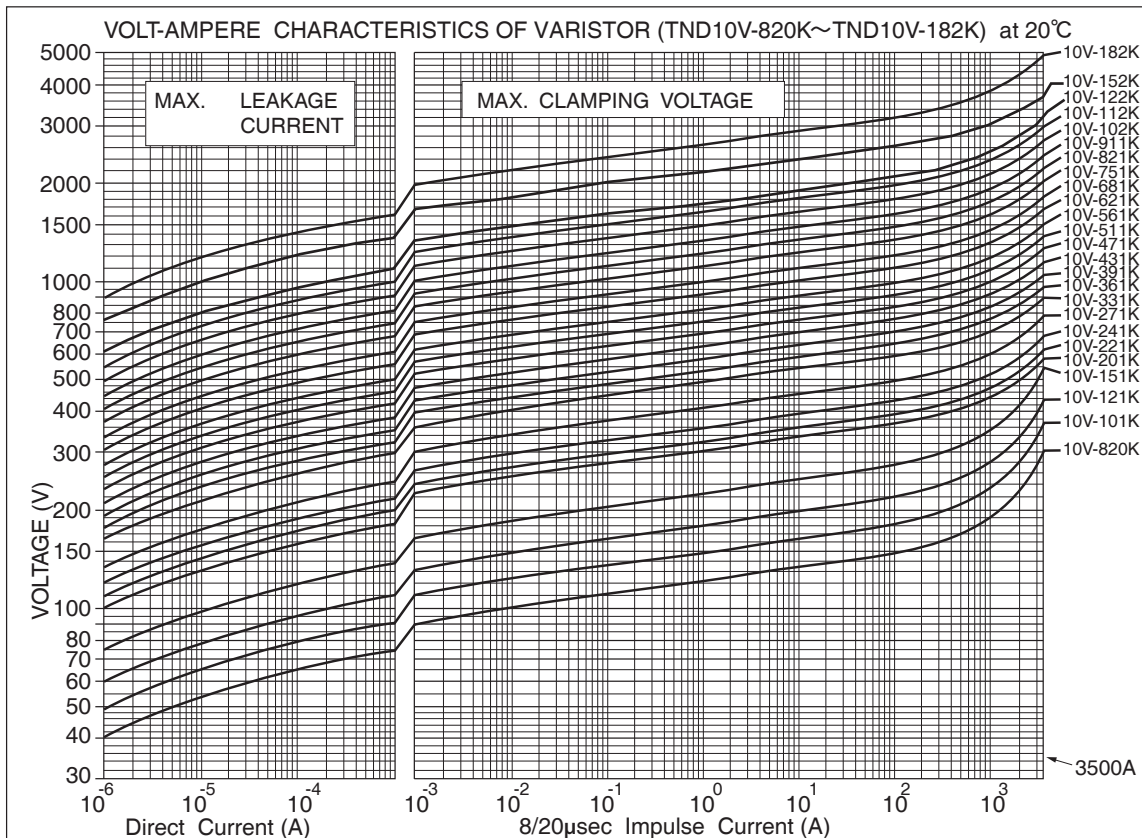
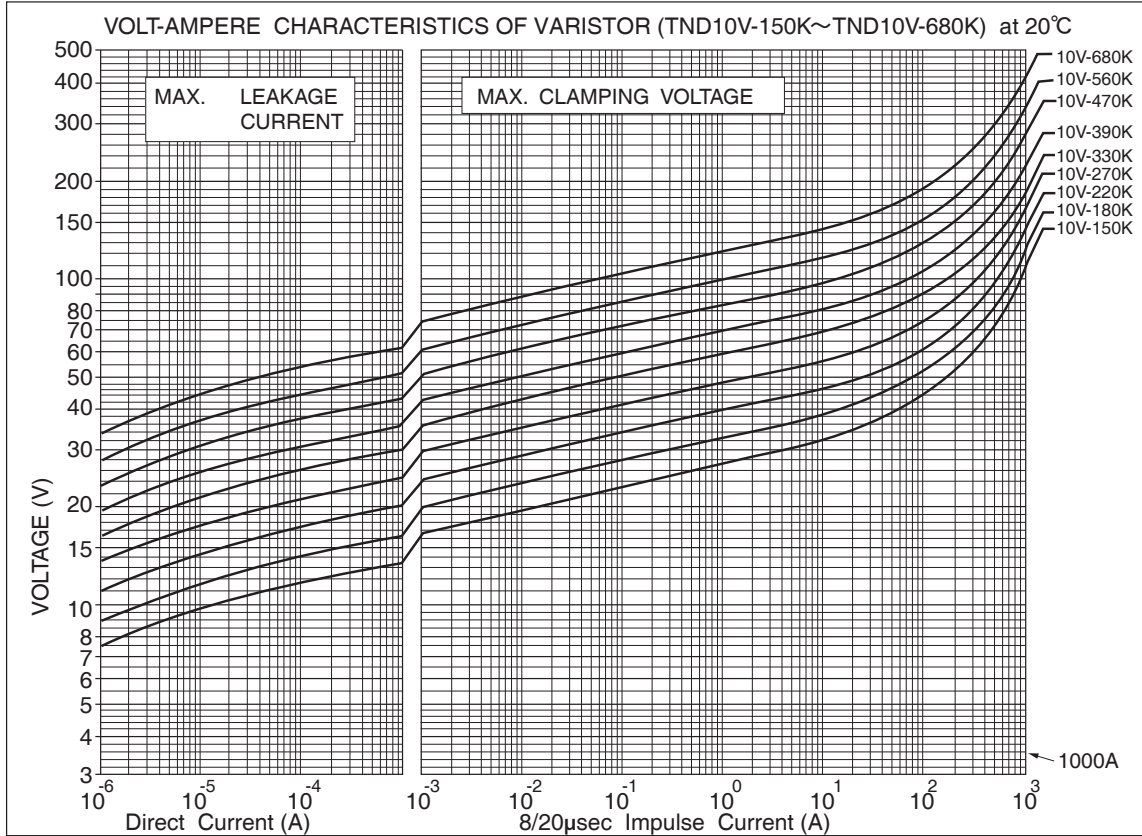
|  |   |     |
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|  | ◇ | □   |
| Standard                                       | A | N/A |
| φ 10 IEC 62368-1:2014 G.8.2 conforming product | S | S   |

| 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.

V Series

◆V-I CURVE (Type 10V)





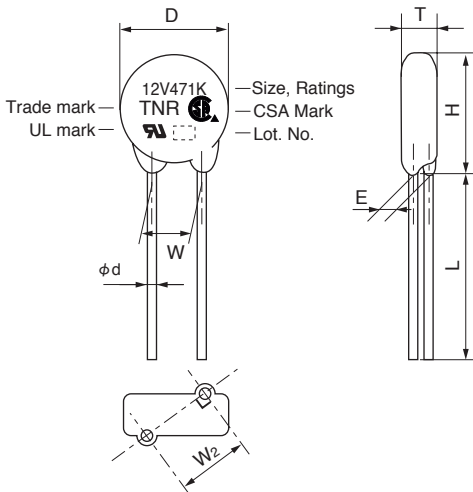
V Series

◆ RATINGS (Type 12V)

| Part Number        | Previous Part Number<br>(Just for your reference) | Maximum Ratings        |        |                   |             |               | Max. Clamping Voltage |      | Capacitance<br>Typical<br>@1kHz | Varistor Voltage<br>V <sub>1mA</sub> | T<br>Max. | E<br>±1.0 | W2<br>reference |
|--------------------|---|------------------------|--------|-------------------|-------------|---------------|-----------------------|------|---------------------------------|--------------------------------------|-----------|-----------|-----------------|
|                    |   | Max. Allowable Voltage |        | Max. Peak Current | Max. Energy | Rated Wattage | (A)                   | (V)  |                                 |                                      |           |           |                 |
|                    |   | AC (Vrms)              | DC (V) | 8/20μs(A)         | 2ms(J)      | (W)           |                       |      | (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]

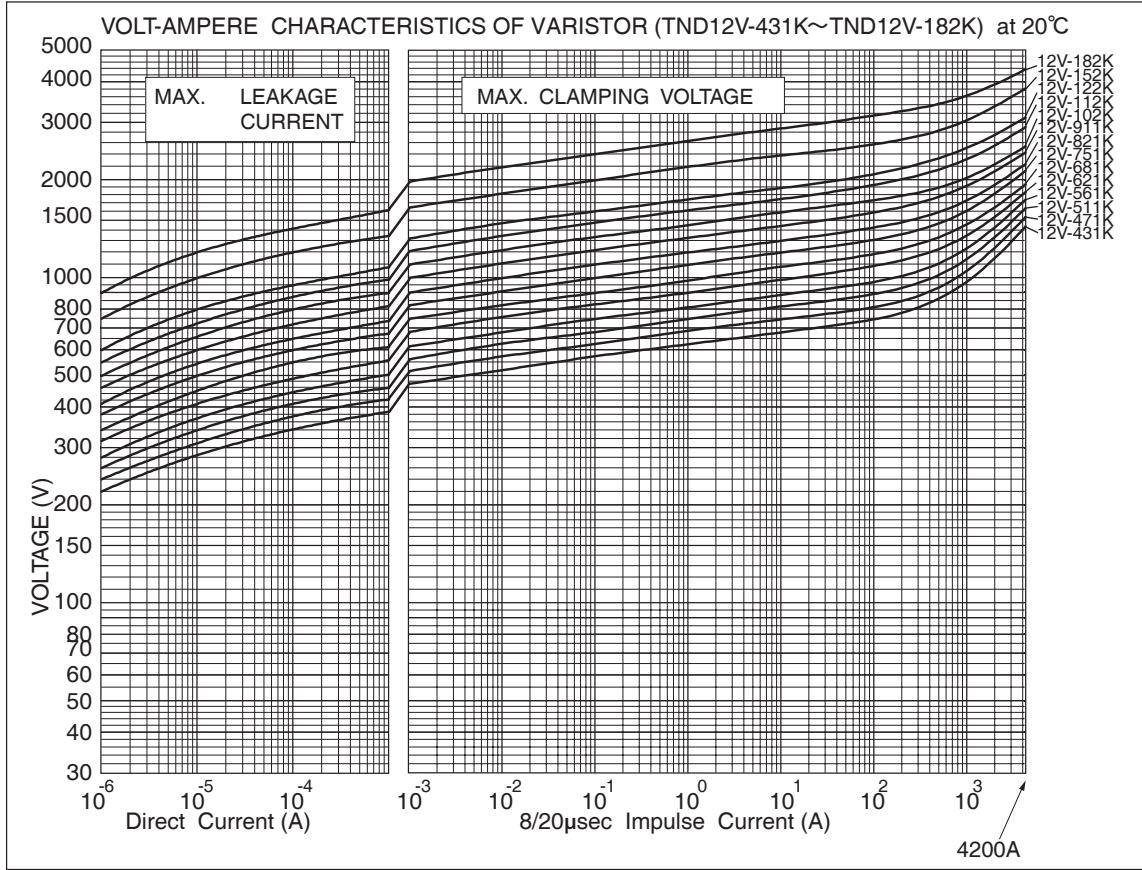


| Part Number                | D<br>Max. | H<br>Max. | T<br>Max.          | L<br>Min. | φd<br>±0.05 | W<br>±1.0 |
|----------------------------|-----------|-----------|--------------------|-----------|-------------|-----------|
| TND12V-431K to TND12V-102K | 14.0      | 17.0      | Ref. to<br>RATINGS | 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.

V Series

◆V-I CURVE (Type 12V)



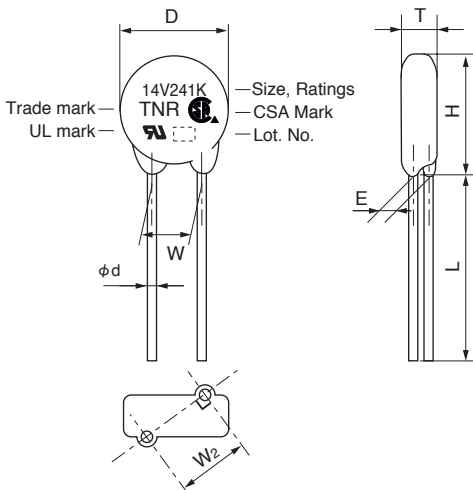
V Series

◆ RATINGS (Type 14V)

| Part Number        | Previous Part Number<br>(Just for your reference) | Maximum Ratings        |        |                   |             |               | Max. Clamping Voltage | Capacitance Typical @1kHz | Varistor Voltage V1mA | 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)           |                       |                           |                       |        |        |              |
| 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           | 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         | 0.6           | 710                   | 460                       | 430 ( 387~ 473)       | 6.0    | 2.1    | 7.8          |
| TND14V-471KB00AAA0 | TNR14V471K  | 300                    | 385    |                   | 125         |               | 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]

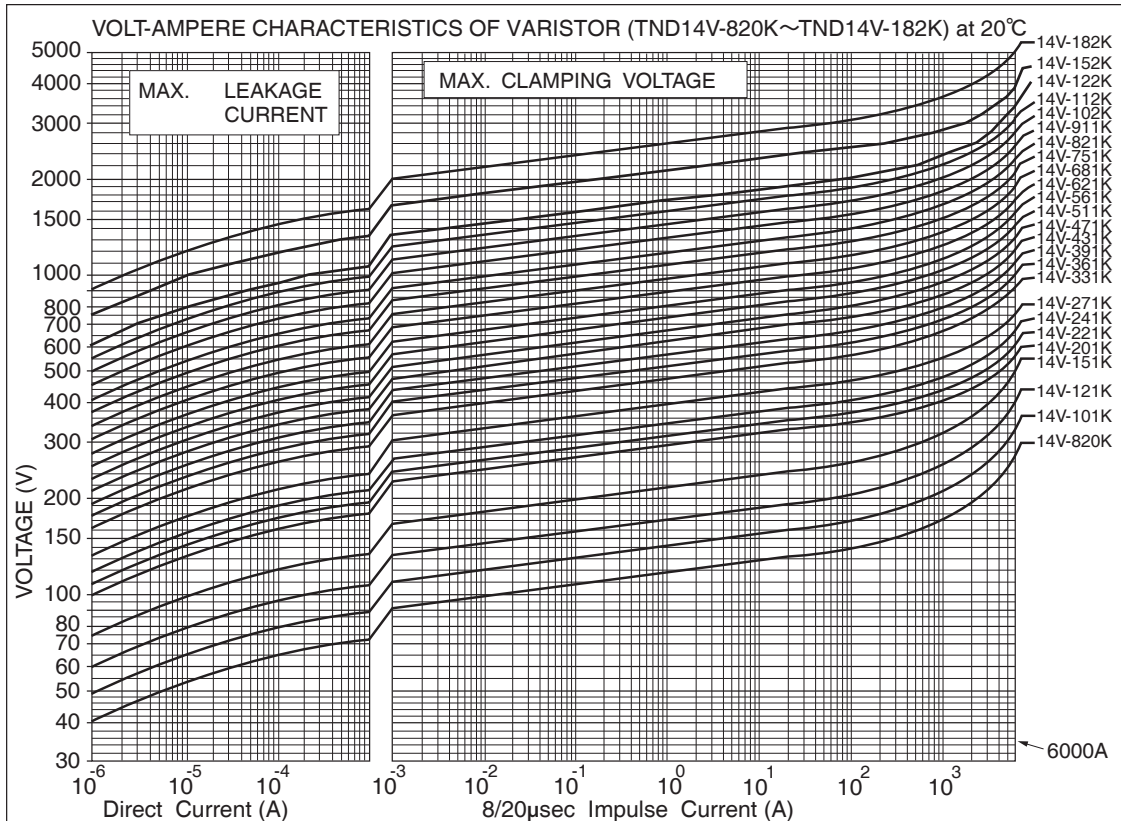
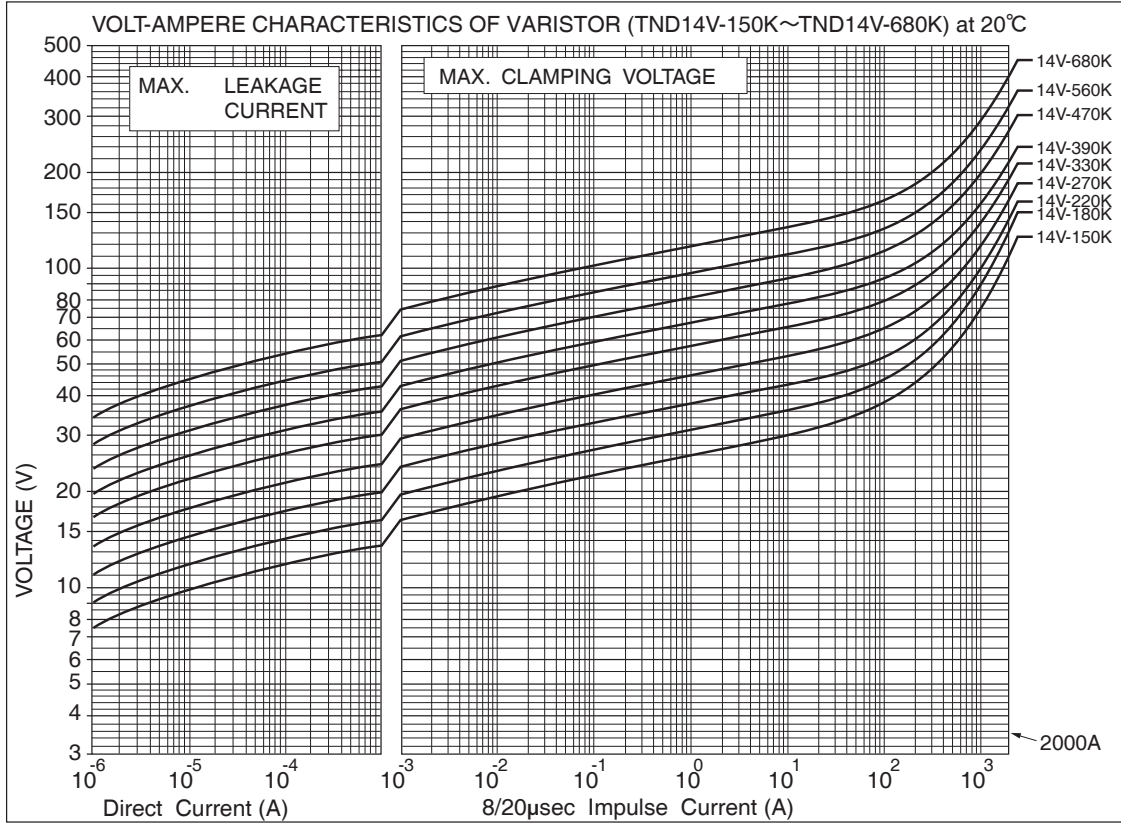


| Part Number                | D Max. | H Max. | T Max.          | L Min. | φd ±0.05 | W ±1.0 |
|----------------------------|--------|--------|-----------------|--------|----------|--------|
| TND14V-150K to TND14V-511K | 15.5   | 18.5   | Ref. to RATINGS | 20     | 0.8      | 7.5    |
| TND14V-561K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

V Series

◆V-I CURVE (Type 14V)



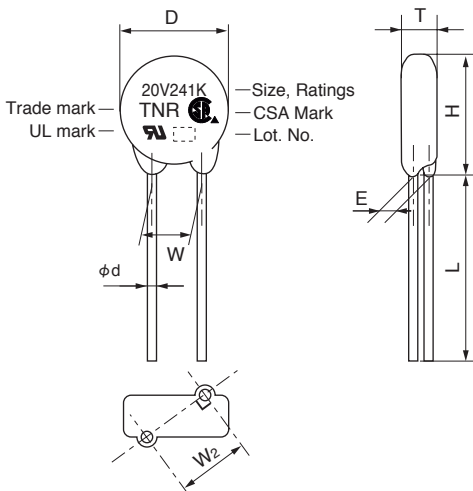
V Series

◆ RATINGS (Type 20V)

| Part Number        | Previous Part Number<br>(Just for your reference) | Maximum Ratings        |        |                   |             |               | Max. Clamping Voltage | Capacitance Typical @1kHz | Varistor Voltage V <sub>1mA</sub> | 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     | 3000A/1 time      | 12          | 0.2           | 20                    | 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     |                   | 17          |               |                       | 53                        | 28000                             | 27 ( 24~ 30) | 5.3    | 1.4          | 10.1 |
| TND20V-330KB00AAA0 | TNR20V330K  | 20                     | 26     | 2000A/2 times     | 21          | 1.0           | 100                   | 65                        | 24000                             | 33 ( 30~ 36) | 5.5    | 1.6          | 10.1 |
| TND20V-390KB00AAA0 | TNR20V390K  | 25                     | 30     |                   | 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     | 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     | 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               | 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      | 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     | 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

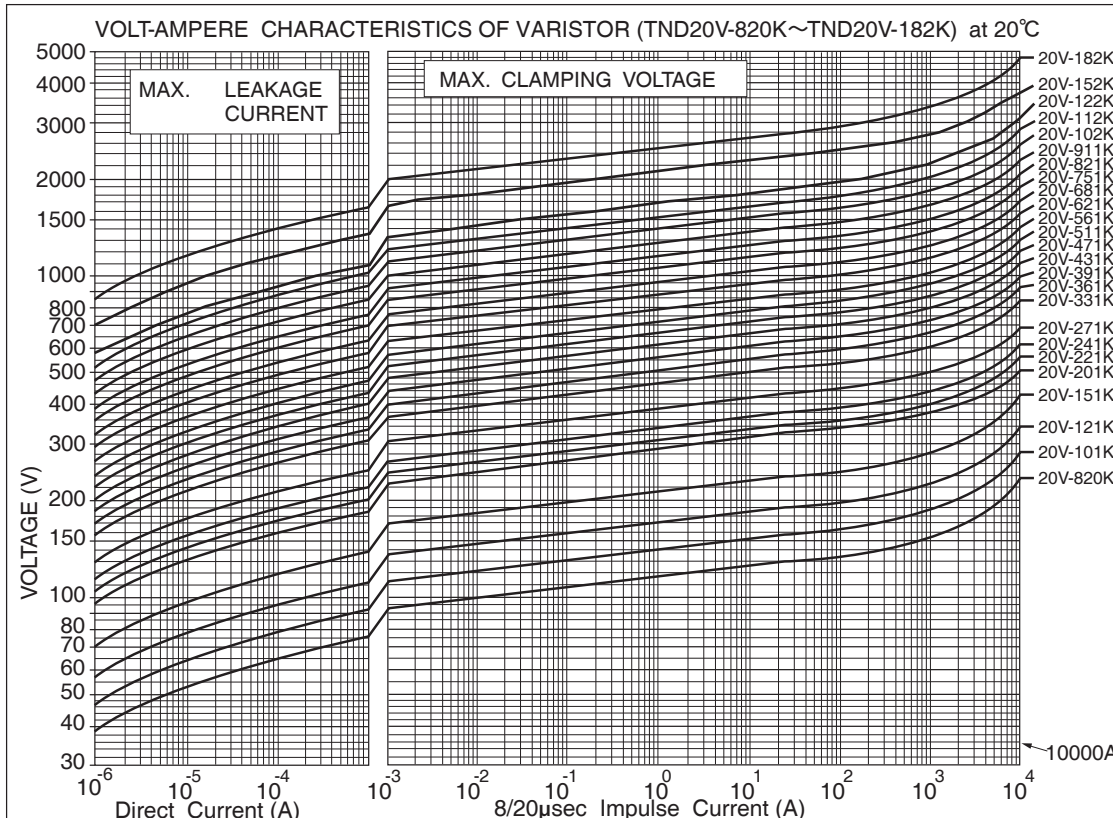
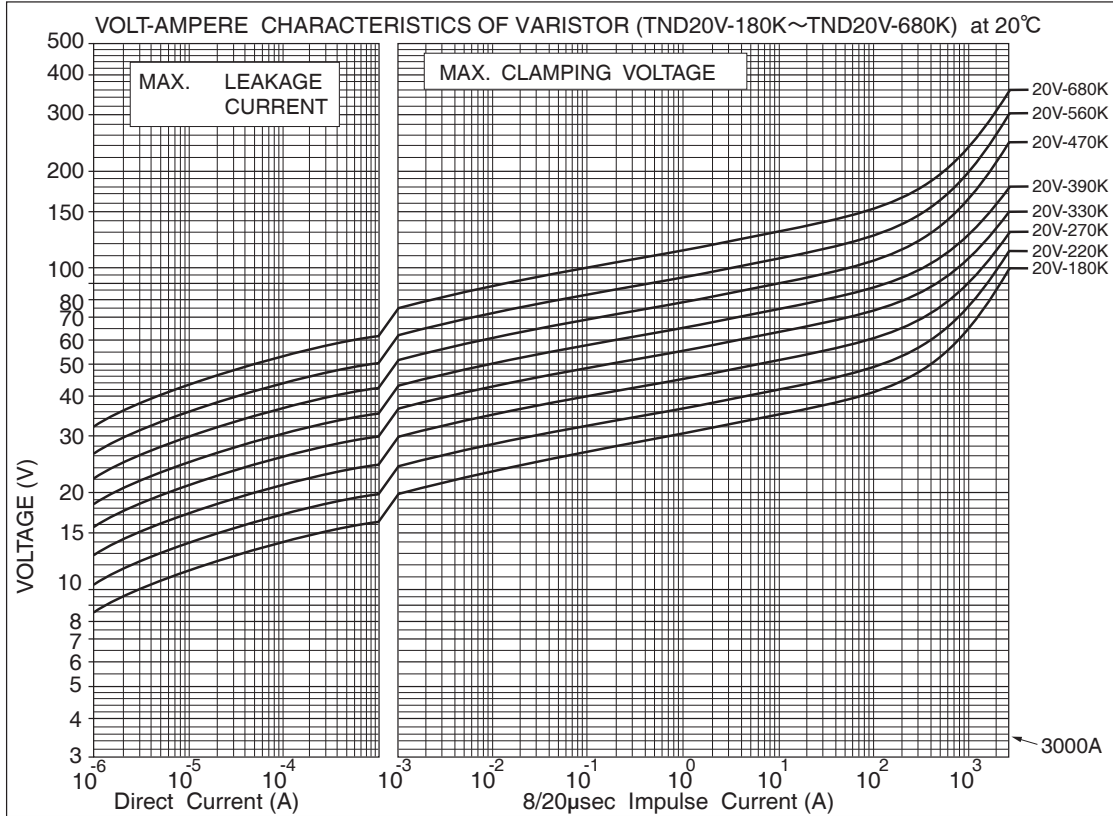
◆ DIMENSIONS [mm]



| 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   |                 |        |          |        |

V Series

◆V-I CURVE (Type 20V)





## V Series

### ◆GENERAL SPECIFICATIONS

| Item                            | Test Conditions  | Specifications                                    |             |             |    |     |                            |     |
|---------------------------------|--|---|-------------|-------------|----|-----|----------------------------|-----|
| Standard Test Condition         | 20±15°C, 85%RH Max.  |   |             |             |    |     |                            |     |
| Varistor Voltage                | Voltage across varistor at specified current.  | Satisfy the specification                         |             |             |    |     |                            |     |
|                                 | <table border="1"> <thead> <tr> <th>Type</th> <th>Current CmA</th> </tr> </thead> <tbody> <tr> <td>5V</td> <td>0.1</td> </tr> <tr> <td>7V, 9V, 10V, 12V, 14V, 20V</td> <td>1.0</td> </tr> </tbody> </table>  |   | Type        | Current CmA | 5V | 0.1 | 7V, 9V, 10V, 12V, 14V, 20V | 1.0 |
|                                 | Type   |   | Current CmA |             |    |     |                            |     |
| 5V                              | 0.1  |   |             |             |    |     |                            |     |
| 7V, 9V, 10V, 12V, 14V, 20V      | 1.0  |   |             |             |    |     |                            |     |
|                                 |  |   |             |             |    |     |                            |     |
| 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°C) 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 | $\frac{V_{cmA} \text{ at } 85^{\circ}\text{C} - V_{cmA} \text{ at } 25^{\circ}\text{C}}{V_{cmA} \text{ at } 25^{\circ}\text{C}} \times \frac{1}{60} \times 100 (\%/^{\circ}\text{C})$ <p style="text-align: right;">VcmA : Actual varistor voltage</p> | Within ±0.05%/°C                                  |             |             |    |     |                            |     |
| 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°C for 1000±12 hours without load.                                      | $\Delta V_{cmA}/V_{cmA} \leq \pm 5\%$<br>However, on varistors have nominal varistor voltages from 15V to 68V, the varistor voltage change shall be $\Delta V_{cmA}/V_{cmA} \leq \pm 10\%$ |
| Low Temperature Storage             | The specimen shall be subjected -40±2°C for 1000±12 hours without load.                                      | $\Delta V_{cmA}/V_{cmA} \leq \pm 5\%$  |
| Damp heat (Humidity)                | The specimen shall be subjected to 40±2°C, 90 to 95%RH for 1000±12 hours without load.                       | $\Delta V_{cmA}/V_{cmA} \leq \pm 5\%$  |
| Temperature Cycle                   | The temperature cycle shown below shall be repeated 5 cycles.<br>-40±3°C, 30 minutes ⇔ +85±2°C, 30 minutes   | $\Delta V_{cmA}/V_{cmA} \leq \pm 5\%$<br>No remarkable damage  |
| High Temperature Operating          | The specimen shall be subjected to 85±2°C with the maximum allowable voltage for 1000±12 hours.              | $\Delta V_{cmA}/V_{cmA} \leq \pm 10\%$   |
| Damp heat Operating                 | The specimen shall be subjected to 40±2°C, 90 to 95%RH with the maximum allowable voltage for 1000±12 hours. | $\Delta V_{cmA}/V_{cmA} \leq \pm 10\%$   |

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.



**V Series**

**◆MECHANICAL CHARACTERISTICS**

| Item                                | Test Conditions  | Specifications   |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
|-------------------------------------|--|--|--------------------------|--------------------------|------------------|--------------|---------|---------|--------------------|-----------|-----|---------------|------------------------------|--|
| <b>Resistance to Soldering Heat</b> | Each lead shall be dipped into a solder bath having a temperature of 350±10°C to a point 2.0 to 2.5 mm from the body of the unit, be held there for 3 <sup>+1</sup> <sub>0</sub> sec and then be stored at room temperature for 1 to 2 hours. The ΔVcmA and mechanical damage shall be examined.<br>or<br>Each lead shall be dipped into a solder bath having a temperature of 260±10°C to a point 2.0 to 2.5 mm from the body of the unit, be held there for 10±1 sec and then be stored at room temperature for 1 to 2 hours. The ΔVcmA and mechanical damage shall be examined. | ΔVcmA/VcmA ≤±5%<br>No remarkable damage                            |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
| <b>Solderability</b>                | Each lead shall be dipped into a methanol solution (about 25%) of rosin for 5 to 10 sec. Then each lead shall be dipped into a solder.   | At least, 95% of the leads shall be covered with solder uniformly. |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
|                                     | <table border="1"> <tr> <td>Solder</td> <td>Pb free (Sn-3.0Ag-0.5Cu)</td> <td>Eutectic (Sn/Pb)</td> </tr> <tr> <td>Solder Temp.</td> <td>245±5°C</td> <td>235±5°C</td> </tr> <tr> <td>Dipping Time</td> <td colspan="2">2±0.5sec.</td> </tr> <tr> <td>Dipping Depth</td> <td colspan="2">1.5 to 2.0mm (from the body)</td> </tr> </table>  |  | Solder                   | Pb free (Sn-3.0Ag-0.5Cu) | Eutectic (Sn/Pb) | Solder Temp. | 245±5°C | 235±5°C | Dipping Time       | 2±0.5sec. |     | Dipping Depth | 1.5 to 2.0mm (from the body) |  |
|                                     | Solder   |  | Pb free (Sn-3.0Ag-0.5Cu) | Eutectic (Sn/Pb)         |                  |              |         |         |                    |           |     |               |                              |  |
|                                     | Solder Temp.   |  | 245±5°C                  | 235±5°C                  |                  |              |         |         |                    |           |     |               |                              |  |
| Dipping Time                        | 2±0.5sec.  |  |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
| Dipping Depth                       | 1.5 to 2.0mm (from the body)   |  |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
|                                     |  |  |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
|                                     |  |  |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
| <b>Lead Pull Strength</b>           | Fix varistor body, and suspend specified weight toward direction of lead axis.   | No abnormality such as disconnection.<br><br>ΔVcmA/VcmA ≤±5%       |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
|                                     | <table border="1"> <tr> <td>Type</td> <td>Lead Diameter</td> <td>Weight</td> </tr> <tr> <td>5V, 7V, 9V</td> <td>0.6mm</td> <td>10N</td> </tr> <tr> <td>10V, 12V, 14V, 20V</td> <td>0.8mm</td> <td>10N</td> </tr> </table>  |  | Type                     | Lead Diameter            | Weight           | 5V, 7V, 9V   | 0.6mm   | 10N     | 10V, 12V, 14V, 20V | 0.8mm     | 10N |               |                              |  |
|                                     | Type   |  | Lead Diameter            | Weight                   |                  |              |         |         |                    |           |     |               |                              |  |
|                                     | 5V, 7V, 9V   |  | 0.6mm                    | 10N                      |                  |              |         |         |                    |           |     |               |                              |  |
| 10V, 12V, 14V, 20V                  | 0.8mm  | 10N  |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
|                                     |  |  |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
|                                     |  |  |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
| <b>Lead Bend Strength</b>           | 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.   | The leads shall not disconnect, slacken and peel off.              |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
|                                     | <table border="1"> <tr> <td>Type</td> <td>Lead Diameter</td> <td>Weight</td> </tr> <tr> <td>5V, 7V, 9V</td> <td>0.6mm</td> <td>5N</td> </tr> <tr> <td>10V, 12V, 14V, 20V</td> <td>0.8mm</td> <td>5N</td> </tr> </table>  |  | Type                     | Lead Diameter            | Weight           | 5V, 7V, 9V   | 0.6mm   | 5N      | 10V, 12V, 14V, 20V | 0.8mm     | 5N  |               |                              |  |
|                                     | Type   |  | Lead Diameter            | Weight                   |                  |              |         |         |                    |           |     |               |                              |  |
|                                     | 5V, 7V, 9V   |  | 0.6mm                    | 5N                       |                  |              |         |         |                    |           |     |               |                              |  |
| 10V, 12V, 14V, 20V                  | 0.8mm  | 5N   |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
|                                     |  |  |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
|                                     |  |  |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
| <b>Vibration</b>                    | Mount varistor body on vibrator, and conduct the following 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><br>ΔVcmA/VcmA ≤±5%       |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |
|                                     |  |  |                          |                          |                  |              |         |         |                    |           |     |               |                              |  |

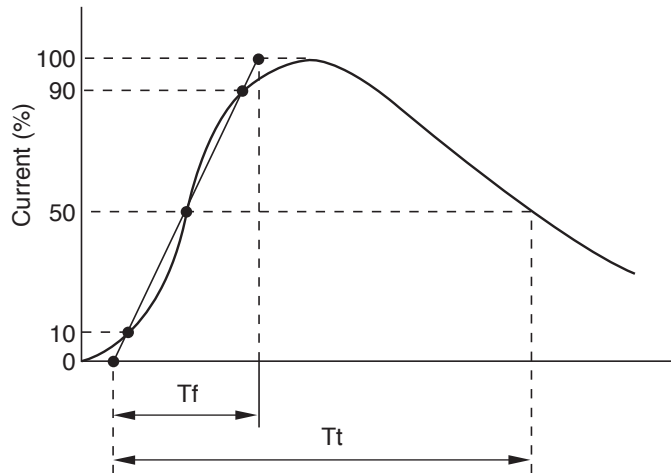


## PULSE LIFE TIME RATINGS

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)

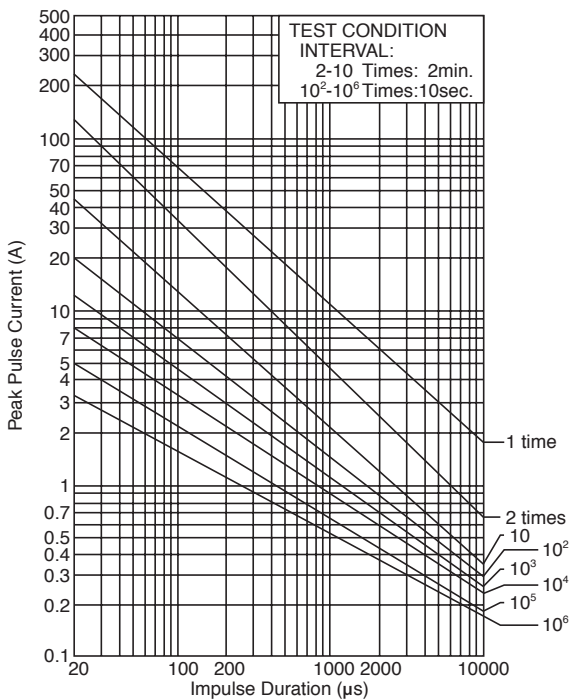


Tf : (Rise Time)

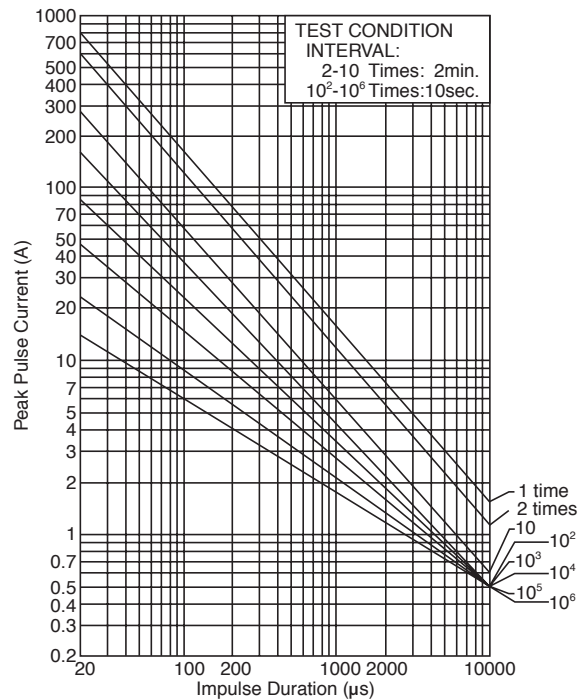
Tt : (Impulse Duration)

● V series

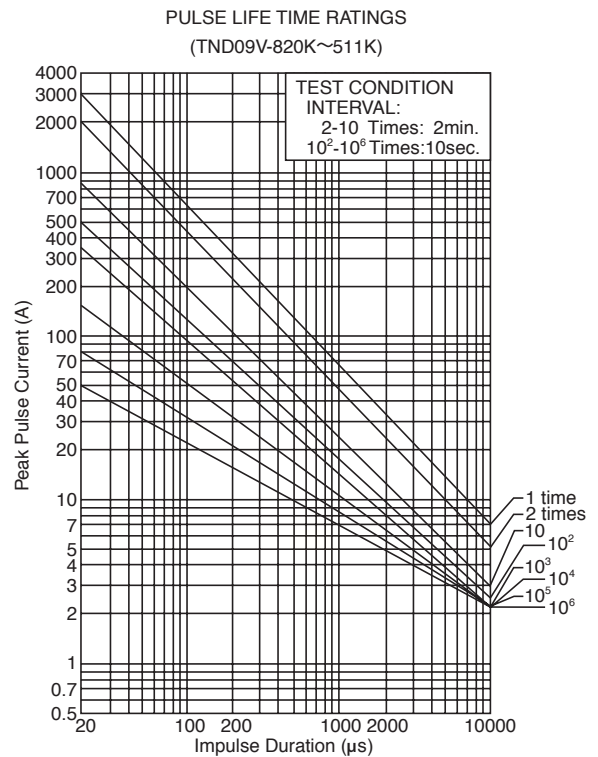
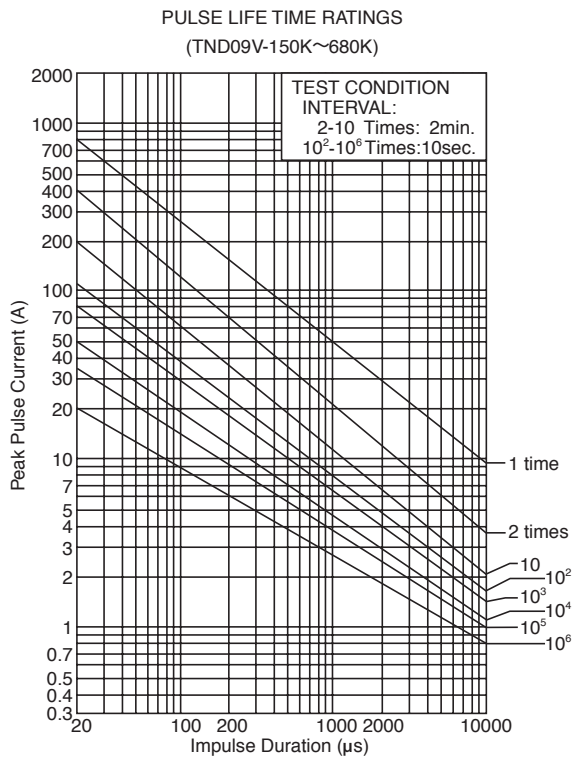
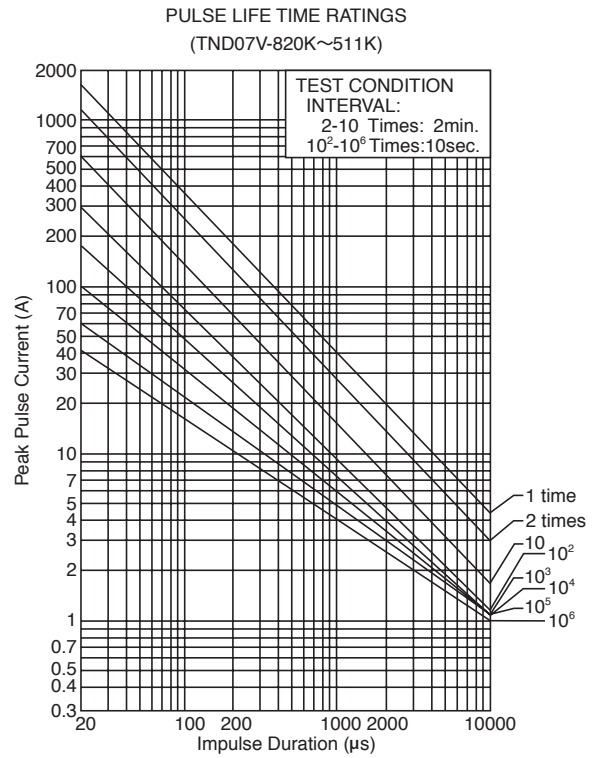
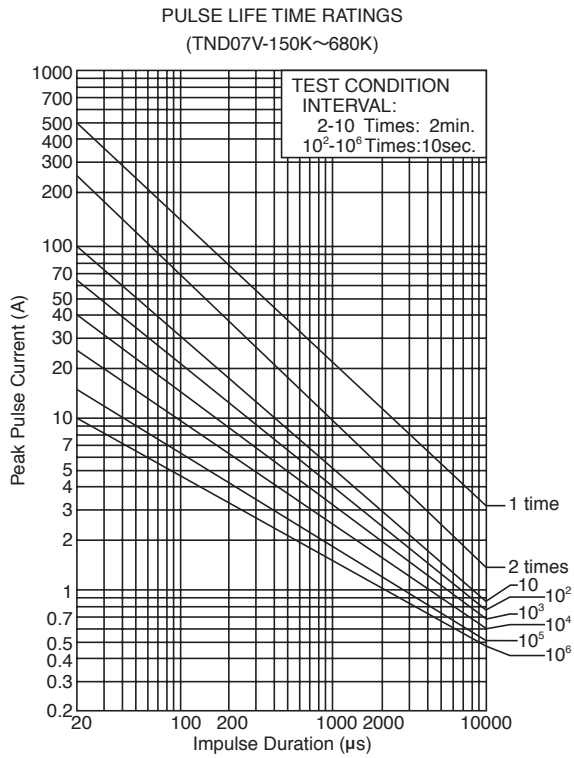
PULSE LIFE TIME RATINGS  
(TND05V-180K~680K)



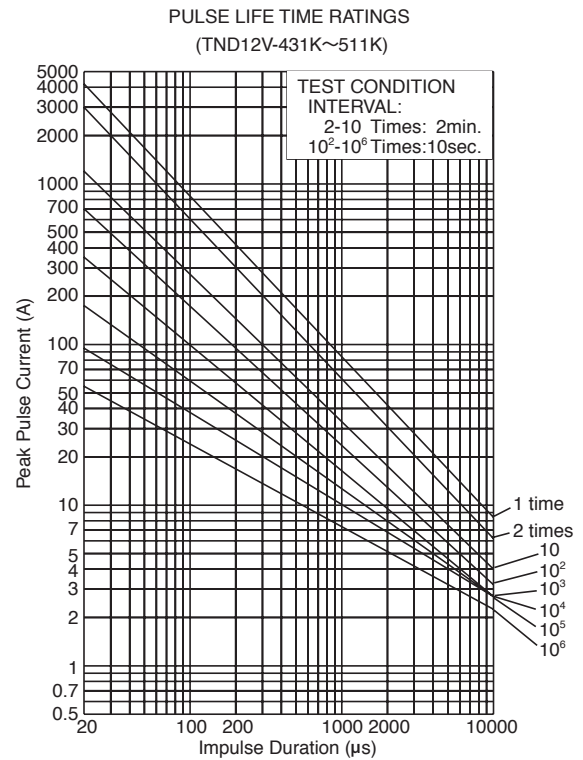
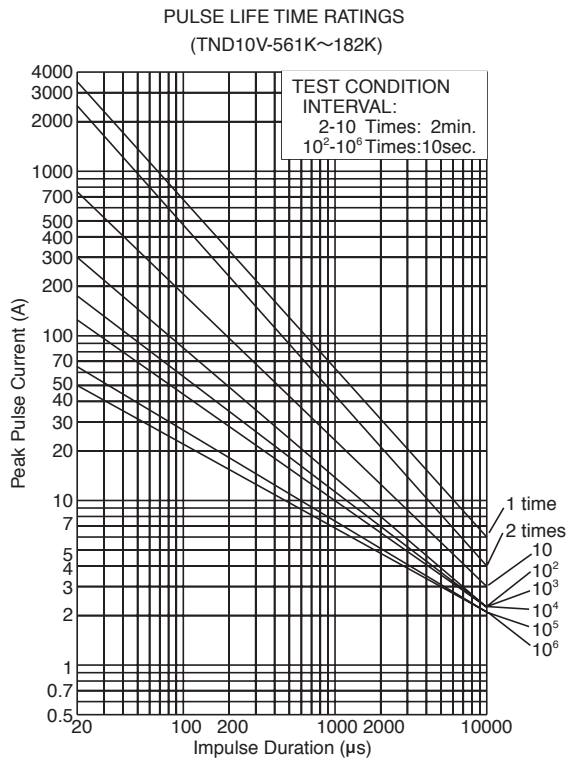
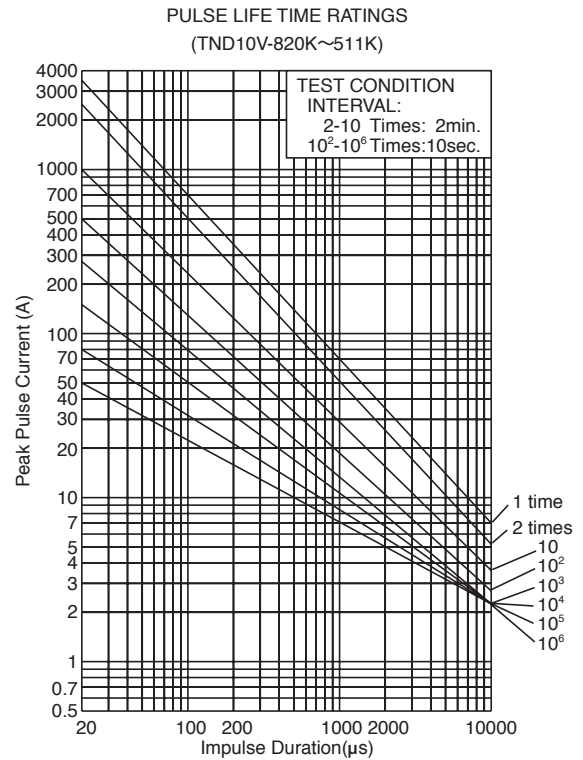
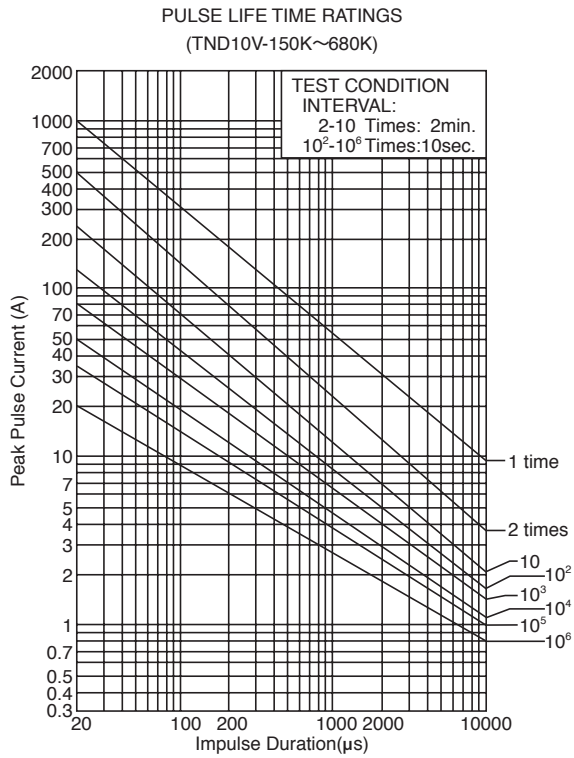
PULSE LIFE TIME RATINGS  
(TND05V-820K~471K)



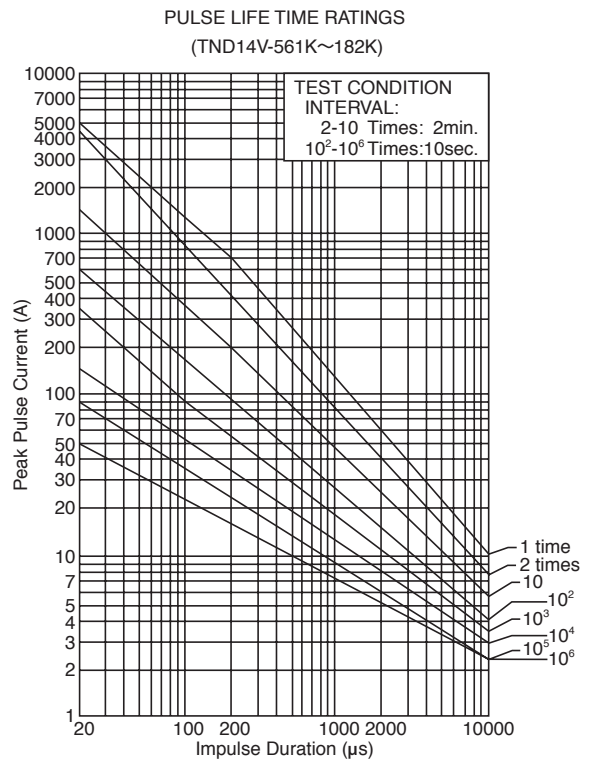
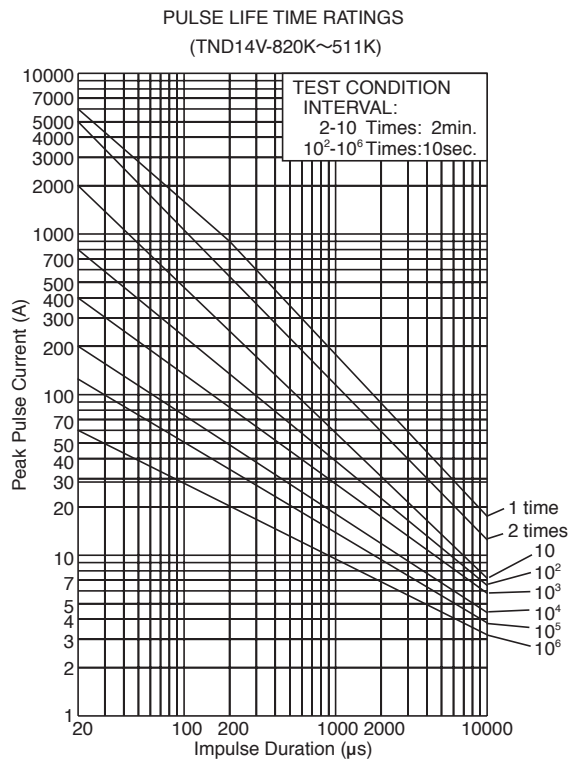
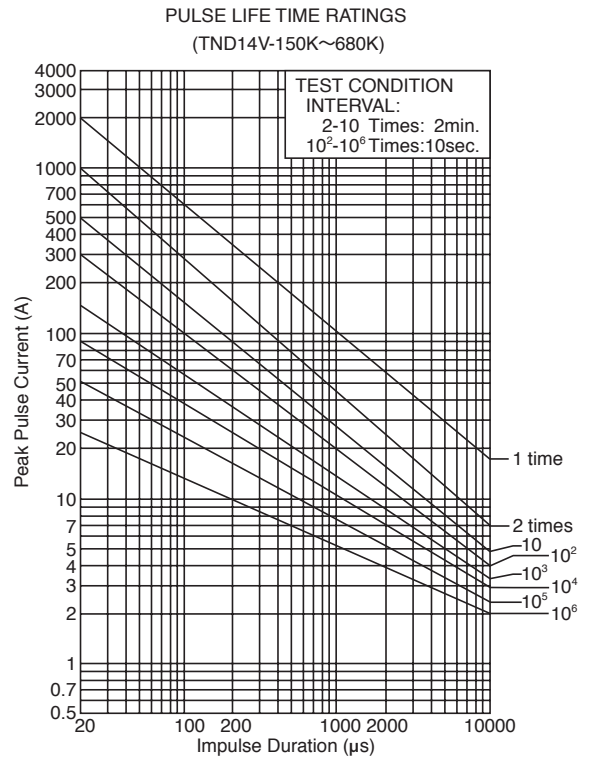
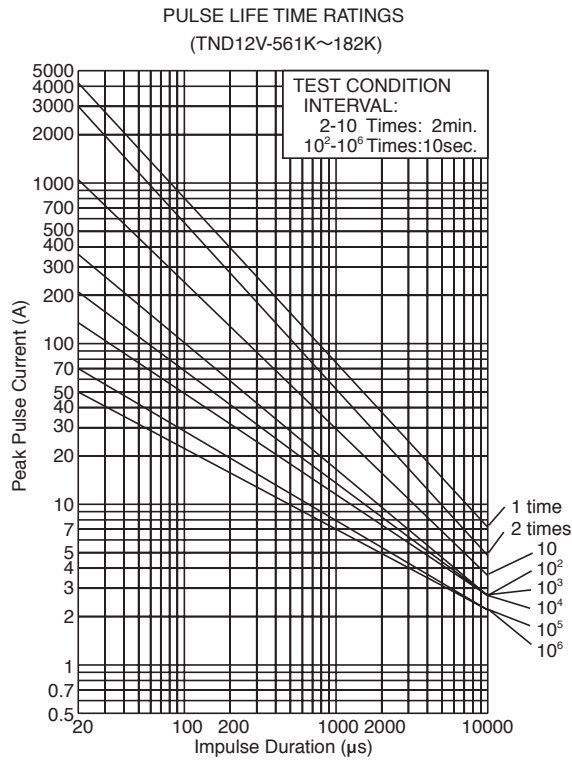
●V series



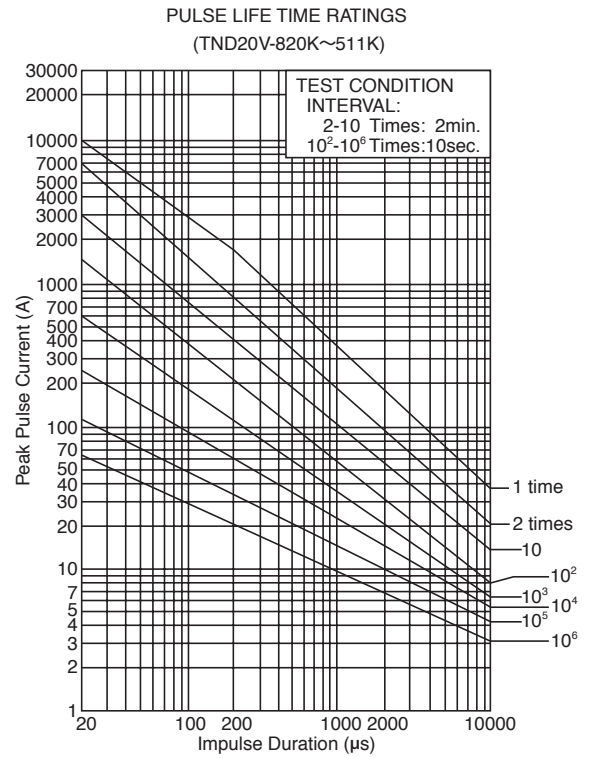
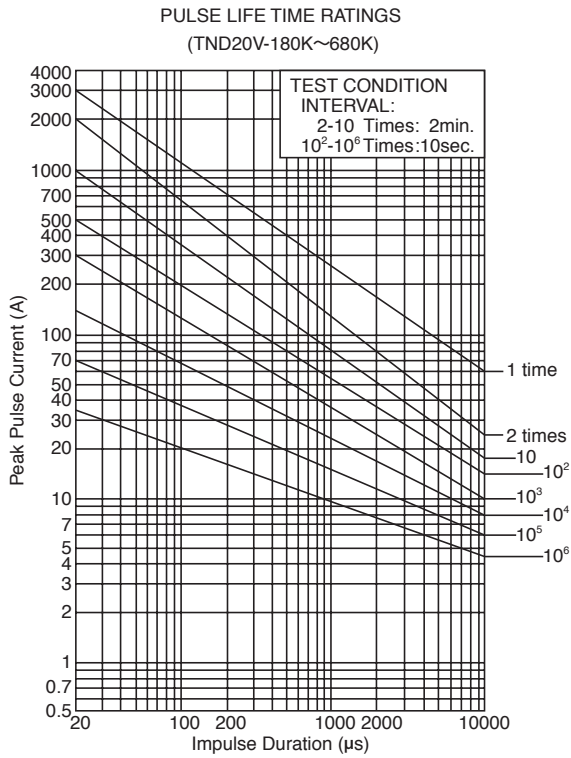
● V series



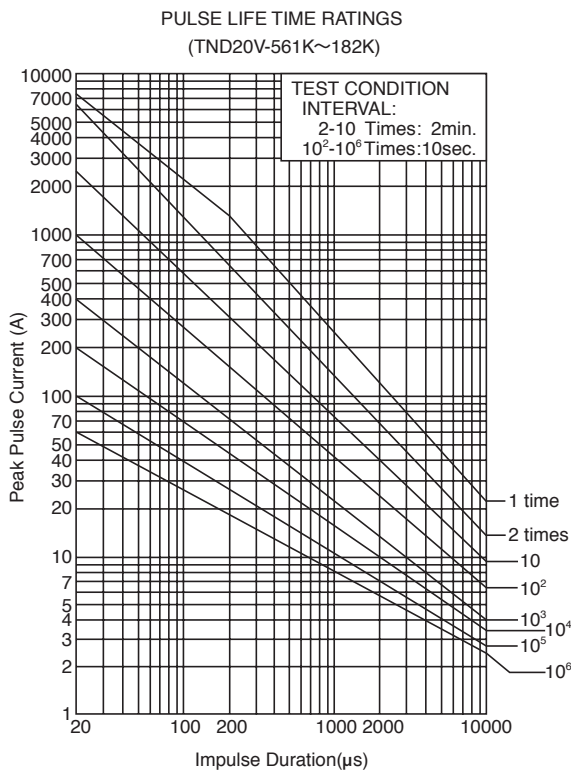
●V series



●V series



●V series





- 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.  
Please make sure that you take appropriate safety measures such as use of redundant design and malfunction prevention measures in order to prevent fatal accidents and/or fires in the event any of our products malfunction.
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- We reserve the right to discontinue production and delivery of products. We do not guarantee that all the products included in this catalog will be available in the future.  
The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific 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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[Precautions and Guidelines](#)

[Taping](#)

[Technical Terms on Varistors](#)

[Packaging • Minimum Order Quantity](#)

[Safety Standard](#)

[Technical Notes](#)