



This series is not a recommended product.  
Not recommended for new design.

## Varistors (ZNR Surge Absorber)

D type

V series



For Varistor Voltages ranging from 200 to 1100V, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

### Features

- Large withstanding surge current capability in compact sizes
- Large "Energy Handling Capability" absorbing transient overvoltages in compact sizes
- Wide range of varistor voltages
- RoHS compliant

### Recommended applications

- Transistor, diode, IC, thyristor or triac semiconductor protection
- Surge protection in consumer electronic equipment
- Surge protection in communication, measuring or controller electronics
- Surge protection in electronic home appliances, gas or petroleum appliances

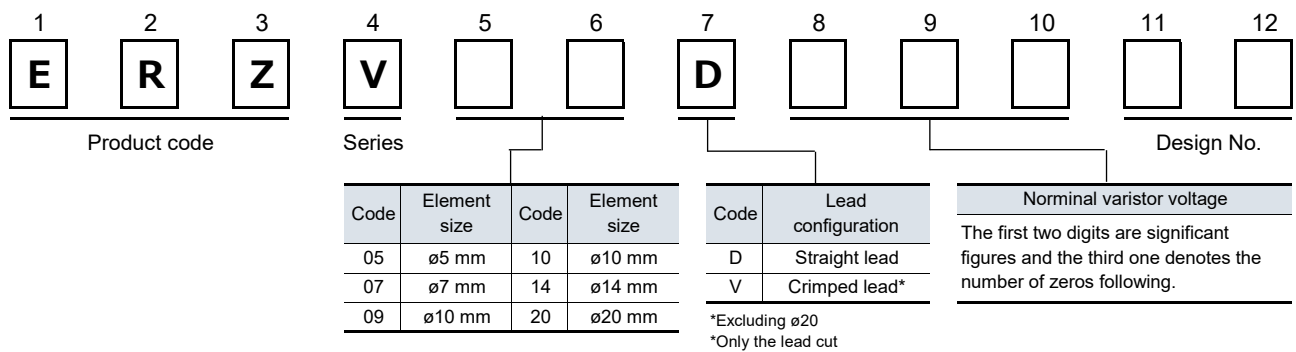
### Applicable standards

- UL1449 (VZCA2/UL, VZCA8/C-UL)
- VDE IEC61051-1, -2, -2-2, IEC60950-1 Annex.Q, IEC62368-1 G8.1
- CSA C22.2 N 269.5
- CQC (GB/T10193, GB/T10194, GB4943.1)

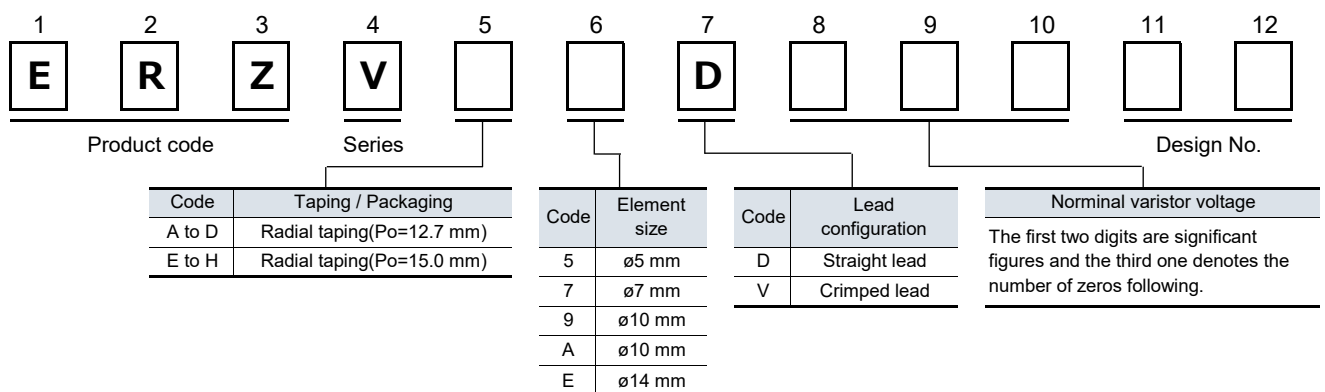
Refer to "Standard Products" , and "Application Note for Safety Standards" , for the details.

■ As for handling precautions and minimum quantity / Packing unit please see related information.

### Explanation of part numbers (Bulk)



### Explanation of part numbers (Taping)



## Reference guide to standard products

| Part No.   | Applicable standards |           | Varistor voltage* | Maximum allowable voltage |        | Clamping voltage 8/20 $\mu$ s |        | Maximum peak current at 8/20 $\mu$ s (A) |         |
|------------|----------------------|-----------|-------------------|---------------------------|--------|-------------------------------|--------|------------------------------------------|---------|
|            | Type name            | Approvals | (V)               | AC rms (V)                | DC (V) | max.(V)                       | Ip (A) | 1 time                                   | 2 times |
| ERZV05D180 | V180                 | ◇         | 18<br>(16 to 20)  | 11                        | 14     | 40                            | 1      | 250                                      | 125     |
| ERZV07D180 | V7180                | ◇         |                   |                           |        | 36                            | 2.5    | 500                                      | 250     |
| ERZV09D180 | V9180                | ◇         |                   |                           |        | 36                            | 5      | 1000                                     | 500     |
| ERZV10D180 | V10180               | ◇         |                   |                           |        | 36                            | 5      | 1000                                     | 500     |
| ERZV14D180 | V14180               | ◇         |                   |                           |        | 36                            | 10     | 2000                                     | 1000    |
| ERZV20D180 | V20180               | ◇         |                   |                           |        | 36                            | 20     | 3000                                     | 2000    |
| ERZV05D220 | V220                 | ◇         | 22<br>(20 to 24)  | 14                        | 18     | 48                            | 1      | 250                                      | 125     |
| ERZV07D220 | V7220                | ◇         |                   |                           |        | 43                            | 2.5    | 500                                      | 250     |
| ERZV09D220 | V9220                | ◇         |                   |                           |        | 43                            | 5      | 1000                                     | 500     |
| ERZV10D220 | V10220               | ◇         |                   |                           |        | 43                            | 5      | 1000                                     | 500     |
| ERZV14D220 | V14220               | ◇         |                   |                           |        | 43                            | 10     | 2000                                     | 1000    |
| ERZV20D220 | V20220               | ◇         |                   |                           |        | 43                            | 20     | 3000                                     | 2000    |
| ERZV05D270 | V270                 | ◇         | 27<br>(24 to 30)  | 17                        | 22     | 60                            | 1      | 250                                      | 125     |
| ERZV07D270 | V7270                | ◇         |                   |                           |        | 53                            | 2.5    | 500                                      | 250     |
| ERZV09D270 | V9270                | ◇         |                   |                           |        | 53                            | 5      | 1000                                     | 500     |
| ERZV10D270 | V10270               | ◇         |                   |                           |        | 53                            | 5      | 1000                                     | 500     |
| ERZV14D270 | V14270               | ◇         |                   |                           |        | 53                            | 10     | 2000                                     | 1000    |
| ERZV20D270 | V20270               | ◇         |                   |                           |        | 53                            | 20     | 3000                                     | 2000    |
| ERZV05D330 | V330                 | ◇         | 33<br>(30 to 36)  | 20                        | 26     | 73                            | 1      | 250                                      | 125     |
| ERZV07D330 | V7330                | ◇         |                   |                           |        | 65                            | 2.5    | 500                                      | 250     |
| ERZV09D330 | V9330                | ◇         |                   |                           |        | 65                            | 5      | 1000                                     | 500     |
| ERZV10D330 | V10330               | ◇         |                   |                           |        | 65                            | 5      | 1000                                     | 500     |
| ERZV14D330 | V14330               | ◇         |                   |                           |        | 65                            | 10     | 2000                                     | 1000    |
| ERZV20D330 | V20330               | ◇         |                   |                           |        | 65                            | 20     | 3000                                     | 2000    |
| ERZV05D390 | V390                 | ◇         | 39<br>(35 to 43)  | 25                        | 31     | 86                            | 1      | 250                                      | 125     |
| ERZV07D390 | V7390                | ◇         |                   |                           |        | 77                            | 2.5    | 500                                      | 250     |
| ERZV09D390 | V9390                | ◇         |                   |                           |        | 77                            | 5      | 1000                                     | 500     |
| ERZV10D390 | V10390               | ◇         |                   |                           |        | 77                            | 5      | 1000                                     | 500     |
| ERZV14D390 | V14390               | ◇         |                   |                           |        | 77                            | 10     | 2000                                     | 1000    |
| ERZV20D390 | V20390               | ◇         |                   |                           |        | 77                            | 20     | 3000                                     | 2000    |
| ERZV05D470 | V470                 | ◇         | 47<br>(42 to 52)  | 30                        | 38     | 104                           | 1      | 250                                      | 125     |
| ERZV07D470 | V7470                | ◇         |                   |                           |        | 93                            | 2.5    | 500                                      | 250     |
| ERZV09D470 | V9470                | ◇         |                   |                           |        | 93                            | 5      | 1000                                     | 500     |
| ERZV10D470 | V10470               | ◇         |                   |                           |        | 93                            | 5      | 1000                                     | 500     |
| ERZV14D470 | V14470               | ◇         |                   |                           |        | 93                            | 10     | 2000                                     | 1000    |
| ERZV20D470 | V20470               | ◇         |                   |                           |        | 93                            | 20     | 3000                                     | 2000    |
| ERZV05D560 | V560                 | ◇         | 56<br>(50 to 62)  | 35                        | 45     | 123                           | 1      | 250                                      | 125     |
| ERZV07D560 | V7560                | ◇         |                   |                           |        | 110                           | 2.5    | 500                                      | 250     |
| ERZV09D560 | V9560                | ◇         |                   |                           |        | 110                           | 5      | 1000                                     | 500     |
| ERZV10D560 | V10560               | ◇         |                   |                           |        | 110                           | 5      | 1000                                     | 500     |
| ERZV14D560 | V14560               | ◇         |                   |                           |        | 110                           | 10     | 2000                                     | 1000    |
| ERZV20D560 | V20560               | ◇         |                   |                           |        | 110                           | 20     | 3000                                     | 2000    |
| ERZV05D680 | V680                 | ◇         | 68<br>(61 to 75)  | 40                        | 56     | 150                           | 1      | 250                                      | 125     |
| ERZV07D680 | V7680                | ◇         |                   |                           |        | 135                           | 2.5    | 500                                      | 250     |
| ERZV09D680 | V9680                | ◇         |                   |                           |        | 135                           | 5      | 1000                                     | 500     |
| ERZV10D680 | V10680               | ◇         |                   |                           |        | 135                           | 5      | 1000                                     | 500     |
| ERZV14D680 | V14680               | ◇         |                   |                           |        | 135                           | 10     | 2000                                     | 1000    |
| ERZV20D680 | V20680               | ◇         |                   |                           |        | 135                           | 20     | 3000                                     | 2000    |

\* Measuring Current of Varistor Voltage 5 Series (ERZV05D □□□) : 0.1 mA, Others : 1 mA

○: UL1449 (VZCA2/UL, VZCA8/C-UL),

☆: VDE (IEC61051-1, -2, -2-2), ★: VDE (IEC60950-1 Annex.Q, IEC62368-1 G8.1), □: CSA C22.2 No.269.5

◇: CQC (GB/T10193, GB/T10194), ◆: CQC (GB4943.1)

※Approval number (File No.) of safety regulations are subject to revision without notice. Ask factory for a copy of the latest file No.

## Reference guide to standard products

| Part No.   | Applicable standards |           | Varistor voltage*   | Maximum allowable voltage |        | Clamping voltage 8/20 $\mu$ s |        | Maximum peak current at 8/20 $\mu$ s (A) |         |
|------------|----------------------|-----------|---------------------|---------------------------|--------|-------------------------------|--------|------------------------------------------|---------|
|            | Type name            | Approvals | (V)                 | AC rms (V)                | DC (V) | max.(V)                       | Ip (A) | 1 time                                   | 2 times |
| ERZV05D820 | V820U                | ○☆☆◇      | 82<br>(74 to 90)    | 50                        | 65     | 145                           | 5      | 800                                      | 600     |
| ERZV07D820 | V7820U               | ○☆☆◇      |                     |                           |        | 135                           | 10     | 1750                                     | 1250    |
| ERZV09D820 | V9820U               | ○☆☆◇      |                     |                           |        | 135                           | 25     | 3500                                     | 2500    |
| ERZV10D820 | V10820U              | ○☆☆◇      |                     |                           |        | 135                           | 25     | 3500                                     | 2500    |
| ERZV14D820 | V14820U              | ○☆☆◇      |                     |                           |        | 135                           | 50     | 6000                                     | 5000    |
| ERZV20D820 | V20820U              | ○☆☆◇      |                     |                           |        | 135                           | 100    | 10000                                    | 7000    |
| ERZV05D101 | V101U                | ○☆☆◇      | 100<br>(90 to 110)  | 60                        | 85     | 175                           | 5      | 800                                      | 600     |
| ERZV07D101 | V7101U               | ○☆☆◇      |                     |                           |        | 165                           | 10     | 1750                                     | 1250    |
| ERZV09D101 | V9101U               | ○☆☆◇      |                     |                           |        | 165                           | 25     | 3500                                     | 2500    |
| ERZV10D101 | V10101U              | ○☆☆◇      |                     |                           |        | 165                           | 25     | 3500                                     | 2500    |
| ERZV14D101 | V14101U              | ○☆☆◇      |                     |                           |        | 165                           | 50     | 6000                                     | 5000    |
| ERZV20D101 | V20101U              | ○☆☆◇      |                     |                           |        | 165                           | 100    | 10000                                    | 7000    |
| ERZV05D121 | V121U                | ○☆☆◇      | 120<br>(108 to 132) | 75                        | 100    | 210                           | 5      | 800                                      | 600     |
| ERZV07D121 | V7121U               | ○☆☆◇      |                     |                           |        | 200                           | 10     | 1750                                     | 1250    |
| ERZV09D121 | V9121U               | ○☆☆◇      |                     |                           |        | 200                           | 25     | 3500                                     | 2500    |
| ERZV10D121 | V10121U              | ○☆☆◇      |                     |                           |        | 200                           | 25     | 3500                                     | 2500    |
| ERZV14D121 | V14121U              | ○☆☆◇      |                     |                           |        | 200                           | 50     | 6000                                     | 5000    |
| ERZV20D121 | V20121U              | ○☆☆◇      |                     |                           |        | 200                           | 100    | 10000                                    | 7000    |
| ERZV05D151 | V151U                | ○☆☆◇      | 150<br>(135 to 165) | 95                        | 125    | 260                           | 5      | 800                                      | 600     |
| ERZV07D151 | V7151U               | ○☆☆◇      |                     |                           |        | 250                           | 10     | 1750                                     | 1250    |
| ERZV09D151 | V9151U               | ○☆☆◇      |                     |                           |        | 250                           | 25     | 3500                                     | 2500    |
| ERZV10D151 | V10151U              | ○☆☆◇      |                     |                           |        | 250                           | 25     | 3500                                     | 2500    |
| ERZV14D151 | V14151U              | ○☆☆◇      |                     |                           |        | 250                           | 50     | 6000                                     | 5000    |
| ERZV20D151 | V20151U              | ○☆☆◇      |                     |                           |        | 250                           | 100    | 10000                                    | 7000    |
| ERZV05D201 | V201U                | ○☆☆◇      | 200<br>(185 to 225) | 130                       | 170    | 355                           | 5      | 800                                      | 600     |
| ERZV07D201 | V7201U               | ○☆☆◇      |                     |                           |        | 340                           | 10     | 1750                                     | 1250    |
| ERZV09D201 | V9201U               | ○☆☆◇      |                     |                           |        | 340                           | 25     | 3500                                     | 2500    |
| ERZV10D201 | V10201U              | ○☆☆◇      |                     |                           |        | 340                           | 25     | 3500                                     | 2500    |
| ERZV14D201 | V14201U              | ○☆☆◇      |                     |                           |        | 340                           | 50     | 6000                                     | 5000    |
| ERZV20D201 | V20201U              | ○☆☆◇      |                     |                           |        | 340                           | 100    | 10000                                    | 7000    |
| ERZV05D221 | V221U                | ○☆☆◇      | 220<br>(198 to 242) | 140                       | 180    | 380                           | 5      | 800                                      | 600     |
| ERZV07D221 | V7221U               | ○☆☆◇      |                     |                           |        | 360                           | 10     | 1750                                     | 1250    |
| ERZV09D221 | V9221U               | ○☆☆◇      |                     |                           |        | 360                           | 25     | 3500                                     | 2500    |
| ERZV10D221 | V10221U              | ○☆☆◇      |                     |                           |        | 360                           | 25     | 3500                                     | 2500    |
| ERZV14D221 | V14221U              | ○☆☆◇      |                     |                           |        | 360                           | 50     | 6000                                     | 5000    |
| ERZV20D221 | V20221U              | ○☆☆◇      |                     |                           |        | 360                           | 100    | 10000                                    | 7000    |
| ERZV05D241 | V241U                | ○☆☆◇      | 240<br>(216 to 264) | 150                       | 200    | 415                           | 5      | 800                                      | 600     |
| ERZV07D241 | V7241U               | ○☆☆◇      |                     |                           |        | 395                           | 10     | 1750                                     | 1250    |
| ERZV09D241 | V9241U               | ○☆☆◇      |                     |                           |        | 395                           | 25     | 3500                                     | 2500    |
| ERZV10D241 | V10241U              | ○☆☆◇      |                     |                           |        | 395                           | 25     | 3500                                     | 2500    |
| ERZV14D241 | V14241U              | ○☆☆◇      |                     |                           |        | 395                           | 50     | 6000                                     | 5000    |
| ERZV20D241 | V20241U              | ○☆☆◇      |                     |                           |        | 395                           | 100    | 10000                                    | 7000    |
| ERZV05D271 | V271U                | ○☆☆◇      | 270<br>(247 to 303) | 175                       | 225    | 475                           | 5      | 800                                      | 600     |
| ERZV07D271 | V7271U               | ○☆☆◇      |                     |                           |        | 455                           | 10     | 1750                                     | 1250    |
| ERZV09D271 | V9271U               | ○☆☆◇      |                     |                           |        | 455                           | 25     | 3500                                     | 2500    |
| ERZV10D271 | V10271U              | ○☆☆◇      |                     |                           |        | 455                           | 25     | 3500                                     | 2500    |
| ERZV14D271 | V14271U              | ○☆☆◇      |                     |                           |        | 455                           | 50     | 6000                                     | 5000    |
| ERZV20D271 | V20271U              | ○☆☆◇      |                     |                           |        | 455                           | 100    | 10000                                    | 7000    |

\* Measuring Current of Varistor Voltage 5 Series (ERZV05D □□□) : 0.1 mA, Others : 1 mA

○: UL1449 (VZCA2/UL, VZCA8/C-UL),

☆: VDE (IEC61051-1, -2, -2-2), ★: VDE (IEC60950-1 Annex.Q, IEC62368-1 G8.1), □: CSA C22.2 No.269.5

◇: CQC (GB/T10193, GB/T10194), ◆: CQC (GB4943.1)

※Approval number (File No.) of safety regulations are subject to revision without notice. Ask factory for a copy of the latest file No.

## Reference guide to standard products

| Part No.   | Applicable standards |           | Varistor voltage*   | Maximum allowable voltage |        | Clamping voltage 8/20 $\mu$ s |        | Maximum peak current at 8/20 $\mu$ s (A) |         |
|------------|----------------------|-----------|---------------------|---------------------------|--------|-------------------------------|--------|------------------------------------------|---------|
|            | Type name            | Approvals | (V)                 | AC rms (V)                | DC (V) | max.(V)                       | Ip (A) | 1 time                                   | 2 times |
| ERZV05D331 | V331U                | ○☆□◇      | 330<br>(297 to 363) | 210                       | 270    | 570                           | 5      | 800                                      | 600     |
| ERZV07D331 | V7331U               | ○☆□◇      |                     |                           |        | 545                           | 10     | 1750                                     | 1250    |
| ERZV09D331 | V9331U               | ○☆□◇      |                     |                           |        | 545                           | 25     | 3500                                     | 2500    |
| ERZV10D331 | V10331U              | ○☆□◇      |                     |                           |        | 545                           | 25     | 3500                                     | 2500    |
| ERZV14D331 | V14331U              | ○☆★□◇◆    |                     |                           |        | 545                           | 50     | 6000                                     | 4500    |
| ERZV20D331 | V20331U              | ○☆★□◇◆    |                     |                           |        | 545                           | 100    | 10000                                    | 6500    |
| ERZV05D361 | V361U                | ○☆□◇      | 360<br>(324 to 396) | 230                       | 300    | 620                           | 5      | 800                                      | 600     |
| ERZV07D361 | V7361U               | ○☆□◇      |                     |                           |        | 595                           | 10     | 1750                                     | 1250    |
| ERZV09D361 | V9361U               | ○☆□◇      |                     |                           |        | 595                           | 25     | 3500                                     | 2500    |
| ERZV10D361 | V10361U              | ○☆□◇      |                     |                           |        | 595                           | 25     | 3500                                     | 2500    |
| ERZV14D361 | V14361U              | ○☆★□◇◆    |                     |                           |        | 595                           | 50     | 6000                                     | 4500    |
| ERZV20D361 | V20361U              | ○☆★□◇◆    |                     |                           |        | 595                           | 100    | 10000                                    | 6500    |
| ERZV05D391 | V391U                | ○☆□◇      | 390<br>(351 to 429) | 250                       | 320    | 675                           | 5      | 800                                      | 600     |
| ERZV07D391 | V7391U               | ○☆□◇      |                     |                           |        | 650                           | 10     | 1750                                     | 1250    |
| ERZV09D391 | V9391U               | ○☆□◇      |                     |                           |        | 650                           | 25     | 3500                                     | 2500    |
| ERZV10D391 | V10391U              | ○☆□◇      |                     |                           |        | 650                           | 25     | 3500                                     | 2500    |
| ERZV14D391 | V14391U              | ○☆★□◇◆    |                     |                           |        | 650                           | 50     | 6000                                     | 4500    |
| ERZV20D391 | V20391U              | ○☆★□◇◆    |                     |                           |        | 650                           | 100    | 10000                                    | 6500    |
| ERZV05D431 | V431U                | ○☆□◇      | 430<br>(387 to 473) | 275                       | 350    | 745                           | 5      | 800                                      | 600     |
| ERZV07D431 | V7431U               | ○☆□◇      |                     |                           |        | 710                           | 10     | 1750                                     | 1250    |
| ERZV09D431 | V9431U               | ○☆□◇      |                     |                           |        | 710                           | 25     | 3500                                     | 2500    |
| ERZV10D431 | V10431U              | ○☆□◇      |                     |                           |        | 710                           | 25     | 3500                                     | 2500    |
| ERZV14D431 | V14431U              | ○☆★□◇◆    |                     |                           |        | 710                           | 50     | 6000                                     | 4500    |
| ERZV20D431 | V20431U              | ○☆★□◇◆    |                     |                           |        | 710                           | 100    | 10000                                    | 6500    |
| ERZV05D471 | V471U                | ○☆□◇      | 470<br>(423 to 517) | 300                       | 385    | 810                           | 5      | 800                                      | 600     |
| ERZV07D471 | V7471U               | ○☆□◇      |                     |                           |        | 775                           | 10     | 1750                                     | 1250    |
| ERZV09D471 | V9471U               | ○☆□◇      |                     |                           |        | 775                           | 25     | 3500                                     | 2500    |
| ERZV10D471 | V10471U              | ○☆★□◇◆    |                     |                           |        | 775                           | 25     | 3500                                     | 2500    |
| ERZV14D471 | V14471U              | ○☆★□◇◆    |                     |                           |        | 775                           | 50     | 6000                                     | 4500    |
| ERZV20D471 | V20471U              | ○☆★□◇◆    |                     |                           |        | 775                           | 100    | 10000                                    | 6500    |
| ERZV07D511 | V7511U               | ○☆□◇      | 510<br>(459 to 561) | 320                       | 410    | 845                           | 10     | 1750                                     | 1250    |
| ERZV09D511 | V9511U               | ○☆□◇      |                     |                           |        | 845                           | 25     | 3500                                     | 2500    |
| ERZV10D511 | V10511U              | ○☆★□◇◆    |                     |                           |        | 845                           | 25     | 3500                                     | 2500    |
| ERZV14D511 | V14511U              | ○☆★□◇◆    |                     |                           |        | 845                           | 50     | 6000                                     | 4500    |
| ERZV20D511 | V20511U              | ○☆★□◇◆    |                     |                           |        | 845                           | 100    | 10000                                    | 6500    |
| ERZV10D561 | V10561U              | ○☆★□◇◆    | 560<br>(504 to 616) | 350                       | 450    | 930                           | 25     | 3500                                     | 2500    |
| ERZV14D561 | V14561U              | ○☆★□◇◆    |                     |                           |        | 930                           | 50     | 5000                                     | 4500    |
| ERZV20D561 | V20561U              | ○☆★□◇◆    |                     |                           |        | 930                           | 100    | 7500                                     | 6500    |
| ERZV10D621 | V10621U              | ○☆★□◇◆    | 620<br>(558 to 682) | 385                       | 505    | 1025                          | 25     | 3500                                     | 2500    |
| ERZV14D621 | V14621U              | ○☆★□◇◆    |                     |                           |        | 1025                          | 50     | 5000                                     | 4500    |
| ERZV20D621 | V20621U              | ○☆★□◇◆    |                     |                           |        | 1025                          | 100    | 7500                                     | 6500    |
| ERZV10D681 | V10681U              | ○☆★□◇◆    | 680<br>(612 to 748) | 420                       | 560    | 1120                          | 25     | 3500                                     | 2500    |
| ERZV14D681 | V14681U              | ○☆★□◇◆    |                     |                           |        | 1120                          | 50     | 5000                                     | 4500    |
| ERZV20D681 | V20681U              | ○☆★□◇◆    |                     |                           |        | 1120                          | 100    | 7500                                     | 6500    |

\* Measuring Current of Varistor Voltage 5 Series (ERZV05D □□□) : 0.1 mA, Others : 1 mA

○: UL1449 (VZCA2/UL, VZCA8/C-UL),

☆: VDE (IEC61051-1, -2, -2-2), ★: VDE (IEC60950-1 Annex.Q, IEC62368-1 G8.1), □: CSA C22.2 No.269.5

◇: CQC (GB/T10193, GB/T10194), ◆: CQC (GB4943.1)

※Approval number (File No.) of safety regulations are subject to revision without notice. Ask factory for a copy of the latest file No.

## Reference guide to standard products

| Part No.     | Applicable standards |           | Varistor voltage*      | Maximum allowable voltage |        | Clamping voltage 8/20 $\mu$ s |                    | Maximum peak current at 8/20 $\mu$ s (A) |         |
|--------------|----------------------|-----------|------------------------|---------------------------|--------|-------------------------------|--------------------|------------------------------------------|---------|
|              | Type name            | Approvals | (V)                    | AC rms (V)                | DC (V) | max.(V)                       | I <sub>p</sub> (A) | 1 time                                   | 2 times |
| ERZV10D751   | V10751U              | ○☆★□◇◆    | 750<br>(675 to 825)    | 460                       | 615    | 1240                          | 25                 | 3500                                     | 2500    |
| ERZV14D751   | V14751U              | ○☆★□◇◆    |                        |                           |        | 1240                          | 50                 | 5000                                     | 4500    |
| ERZV20D751   | V20751U              | ○☆★□◇◆    |                        |                           |        | 1240                          | 100                | 7500                                     | 6500    |
| ERZV10D821   | V10821U              | ○☆★□◇◆    | 820<br>(738 to 902)    | 510                       | 670    | 1355                          | 25                 | 3500                                     | 2500    |
| ERZV14D821   | V14821U              | ○☆★□◇◆    |                        |                           |        | 1355                          | 50                 | 5000                                     | 4500    |
| ERZV20D821   | V20821U              | ○☆★□◇◆    |                        |                           |        | 1355                          | 100                | 7500                                     | 6500    |
| ERZV10D911   | V10911U              | ○☆★□◇◆    | 910<br>(819 to 1001)   | 550                       | 745    | 1500                          | 25                 | 3500                                     | 2500    |
| ERZV14D911   | V14911U              | ○☆★□◇◆    |                        |                           |        | 1500                          | 50                 | 5000                                     | 4500    |
| ERZV20D911   | V20911U              | ○☆★□◇◆    |                        |                           |        | 1500                          | 100                | 7500                                     | 6500    |
| ERZV10D102   | V10102U              | ○☆★□◇◆    | 1000<br>(900 to 1100)  | 625                       | 825    | 1650                          | 25                 | 3500                                     | 2500    |
| ERZV14D102   | V14102U              | ○☆★□◇◆    |                        |                           |        | 1650                          | 50                 | 5000                                     | 4500    |
| ERZV20D102   | V20102U              | ○☆★□◇◆    |                        |                           |        | 1650                          | 100                | 7500                                     | 6500    |
| ERZV10D112   | V10112U              | ○☆★□◇◆    | 1100<br>(990 to 1210)  | 680                       | 895    | 1815                          | 25                 | 3500                                     | 2500    |
| ERZV14D112   | V14112U              | ○☆★□◇◆    |                        |                           |        | 1815                          | 50                 | 5000                                     | 4500    |
| ERZV20D112   | V20112U              | ○☆★□◇◆    |                        |                           |        | 1815                          | 100                | 7500                                     | 6500    |
| ERZV10D182CS | V10182U              | ○☆★□◇◆    | 1800<br>(1700 to 1980) | 1000                      | 1465   | 2970                          | 25                 | 3500                                     | 2500    |
| ERZV14D182CS | V14182U              | ○☆★□◇◆    |                        |                           |        | 2970                          | 50                 | 5000                                     | 4500    |
| ERZV20D182   | V20182U              | ○☆★□◇◆    |                        |                           |        | 2970                          | 100                | 7500                                     | 6500    |

\* Measuring Current of Varistor Voltage 5 Series (ERZV05D □□□) : 0.1 mA, Others : 1 mA

○: UL1449 (VZCA2/UL, VZCA8/C-UL),

☆: VDE (IEC61051-1, -2, -2-2), ★: VDE (IEC60950-1 Annex.Q, IEC62368-1 G8.1), □: CSA C22.2 No.269.5

◇: CQC (GB/T10193, GB/T10194), ◆: CQC (GB4943.1)

※Approval number (File No.) of safety regulations are subject to revision without notice. Ask factory for a copy of the latest file No.

## Ratings and characteristics

● Operating temperature range : -40 to 85 °C

● Storage temperature range : -40 to 125 °C

| Part No.   | Varistor<br>voltage<br>at 0.1 m A | Maximum<br>allowable voltage |     | Clamping<br>voltage<br>(max.)<br>**I <sub>p</sub> | Rated<br>power | Maximum energy |        | Maximum<br>peak current<br>(8/20 μs) |      | Capacitance<br>(max.)<br>at 1 kHz |
|------------|-----------------------------------|------------------------------|-----|---------------------------------------------------|----------------|----------------|--------|--------------------------------------|------|-----------------------------------|
|            |                                   |                              |     |                                                   |                |                |        |                                      |      |                                   |
|            |                                   |                              |     |                                                   |                |                |        |                                      |      |                                   |
| (V)        | AC rms<br>(V)                     | DC<br>(V)                    | (V) | (W)                                               | (10/1000 μs)   | (2 ms)         | 1 time | 2 times                              | (pF) |                                   |
|            |                                   |                              |     |                                                   | (J)            | (J)            | (A)    | (A)                                  |      |                                   |
| ERZV05D180 | 18(16 to 20)                      | 11                           | 14  | 40                                                | 0.01           | 0.6            | 0.4    | 250                                  | 125  | 1600                              |
| ERZV05D220 | 22(20 to 24)                      | 14                           | 18  | 48                                                | 0.01           | 0.7            | 0.5    | 250                                  | 125  | 1500                              |
| ERZV05D270 | 27(24 to 30)                      | 17                           | 22  | 60                                                | 0.01           | 0.9            | 0.7    | 250                                  | 125  | 1450                              |
| ERZV05D330 | 33(30 to 36)                      | 20                           | 26  | 73                                                | 0.01           | 1.1            | 0.8    | 250                                  | 125  | 1400                              |
| ERZV05D390 | 39(35 to 43)                      | 25                           | 31  | 86                                                | 0.01           | 1.2            | 0.9    | 250                                  | 125  | 700                               |
| ERZV05D470 | 47(42 to 52)                      | 30                           | 38  | 104                                               | 0.01           | 1.5            | 1.1    | 250                                  | 125  | 650                               |
| ERZV05D560 | 56(50 to 62)                      | 35                           | 45  | 123                                               | 0.01           | 1.8            | 1.3    | 250                                  | 125  | 600                               |
| ERZV05D680 | 68(61 to 75)                      | 40                           | 56  | 150                                               | 0.01           | 2.2            | 1.6    | 250                                  | 125  | 580                               |
| ERZV05D820 | 82(74 to 90)                      | 50                           | 65  | 145                                               | 0.1            | 3.5            | 2.5    | 800                                  | 600  | 460                               |
| ERZV05D101 | 100(90 to 110)                    | 60                           | 85  | 175                                               | 0.1            | 4.0            | 3.0    | 800                                  | 600  | 400                               |
| ERZV05D121 | 120(108 to 132)                   | 75                           | 100 | 210                                               | 0.1            | 5.0            | 3.5    | 800                                  | 600  | 350                               |
| ERZV05D151 | 150(135 to 165)                   | 95                           | 125 | 260                                               | 0.1            | 6.5            | 4.5    | 800                                  | 600  | 300                               |

★ The following part numbers, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

|            |                 |     |     |     |     |      |      |     |     |     |
|------------|-----------------|-----|-----|-----|-----|------|------|-----|-----|-----|
| ERZV05D201 | 200(185 to 225) | 130 | 170 | 355 | 0.1 | 8.5  | 6.0  | 800 | 600 | 120 |
| ERZV05D221 | 220(198 to 242) | 140 | 180 | 380 | 0.1 | 9.0  | 6.5  | 800 | 600 | 110 |
| ERZV05D241 | 240(216 to 264) | 150 | 200 | 415 | 0.1 | 10.5 | 7.5  | 800 | 600 | 100 |
| ERZV05D271 | 270(247 to 303) | 175 | 225 | 475 | 0.1 | 11.0 | 8.0  | 800 | 600 | 90* |
| ERZV05D331 | 330(297 to 363) | 210 | 270 | 570 | 0.1 | 13.0 | 9.5  | 800 | 600 | 80* |
| ERZV05D361 | 360(324 to 396) | 230 | 300 | 620 | 0.1 | 16.0 | 11.0 | 800 | 600 | 80* |
| ERZV05D391 | 390(351 to 429) | 250 | 320 | 675 | 0.1 | 17.0 | 12.0 | 800 | 600 | 80* |
| ERZV05D431 | 430(387 to 473) | 275 | 350 | 745 | 0.1 | 20.0 | 13.5 | 800 | 600 | 70* |
| ERZV05D471 | 470(423 to 517) | 300 | 385 | 810 | 0.1 | 21.0 | 15.0 | 800 | 600 | 60* |

\*Measured at 1 MHz    \*Ip Measuring current of clamping voltage 180 to 680 : 1 A, 820 to 471 : 5 A

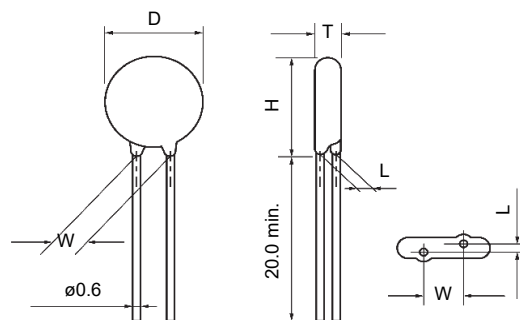
## Dimensions in mm (not to scale)

Unit : mm

| Part No.   | D max. | T max. | W±1.0 | H max. | L±1.0 |
|------------|--------|--------|-------|--------|-------|
| ERZV05D180 | 7.0    | 4.5    | 5.0   | 10.0   | 1.5   |
| ERZV05D220 | 7.0    | 4.5    | 5.0   | 10.0   | 1.5   |
| ERZV05D270 | 7.0    | 4.5    | 5.0   | 10.0   | 1.5   |
| ERZV05D330 | 7.0    | 4.5    | 5.0   | 10.0   | 1.5   |
| ERZV05D390 | 7.0    | 4.5    | 5.0   | 10.0   | 1.5   |
| ERZV05D470 | 7.0    | 4.5    | 5.0   | 10.0   | 1.5   |
| ERZV05D560 | 7.0    | 4.5    | 5.0   | 10.0   | 1.5   |
| ERZV05D680 | 7.0    | 4.5    | 5.0   | 10.0   | 1.5   |
| ERZV05D820 | 7.0    | 4.1    | 5.0   | 10.0   | 1.4   |
| ERZV05D101 | 7.0    | 4.3    | 5.0   | 10.0   | 1.6   |
| ERZV05D121 | 7.0    | 4.5    | 5.0   | 10.0   | 1.8   |
| ERZV05D151 | 7.0    | 4.8    | 5.0   | 10.0   | 2.1   |

★ The following part numbers, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

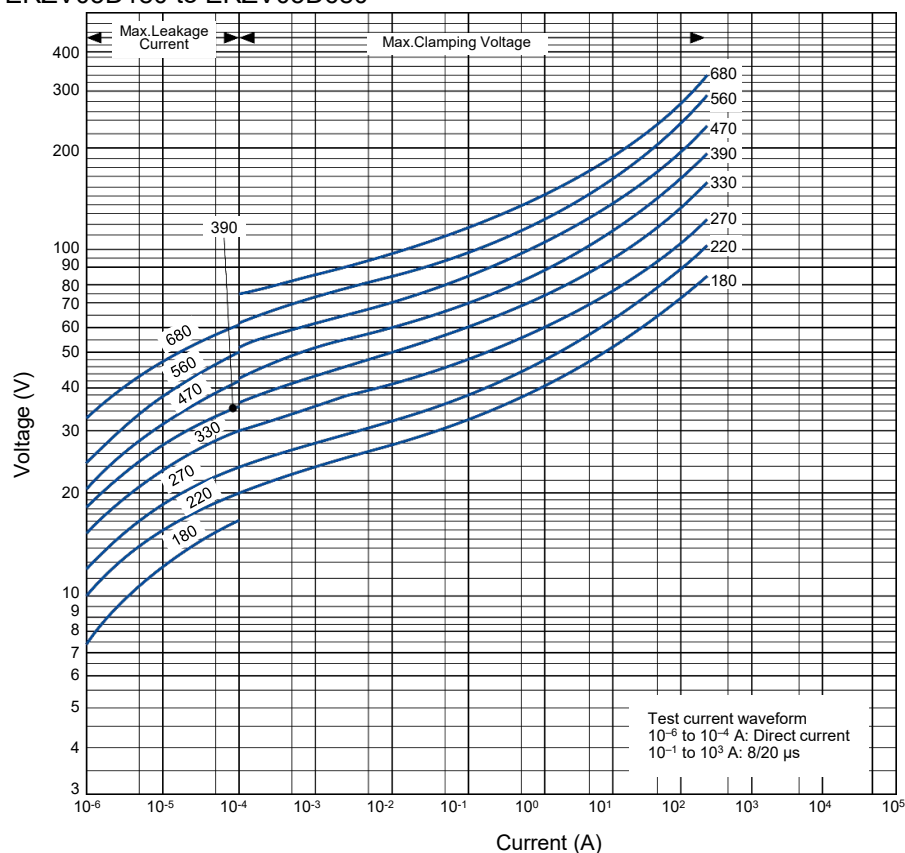
|            |     |     |     |      |     |
|------------|-----|-----|-----|------|-----|
| ERZV05D201 | 7.0 | 4.4 | 5.0 | 10.0 | 1.7 |
| ERZV05D221 | 7.0 | 4.5 | 5.0 | 10.0 | 1.8 |
| ERZV05D241 | 7.0 | 4.6 | 5.0 | 10.0 | 1.9 |
| ERZV05D271 | 7.0 | 4.8 | 5.0 | 10.0 | 2.1 |
| ERZV05D331 | 7.0 | 5.1 | 5.0 | 10.0 | 2.4 |
| ERZV05D361 | 7.0 | 5.3 | 5.0 | 10.0 | 2.5 |
| ERZV05D391 | 7.0 | 5.4 | 5.0 | 10.0 | 2.7 |
| ERZV05D431 | 7.0 | 5.6 | 5.0 | 10.0 | 2.9 |
| ERZV05D471 | 7.0 | 5.8 | 5.0 | 10.0 | 3.1 |



## Typical characteristics

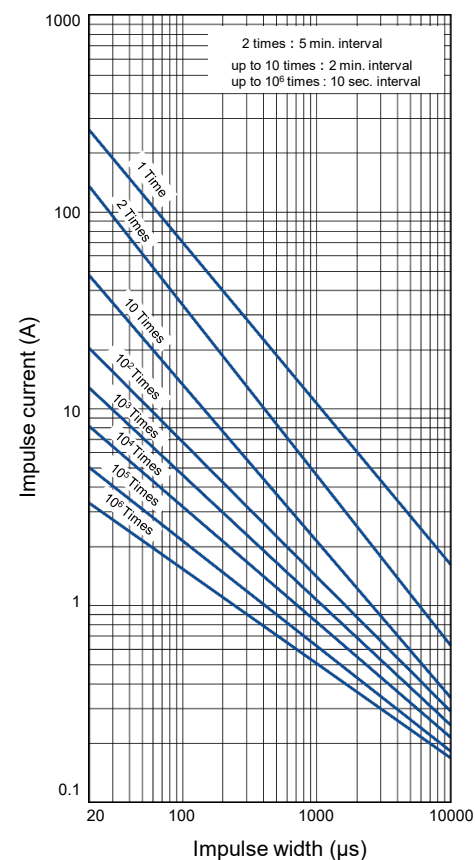
### Voltage vs. Current

ERZV05D180 to ERZV05D680

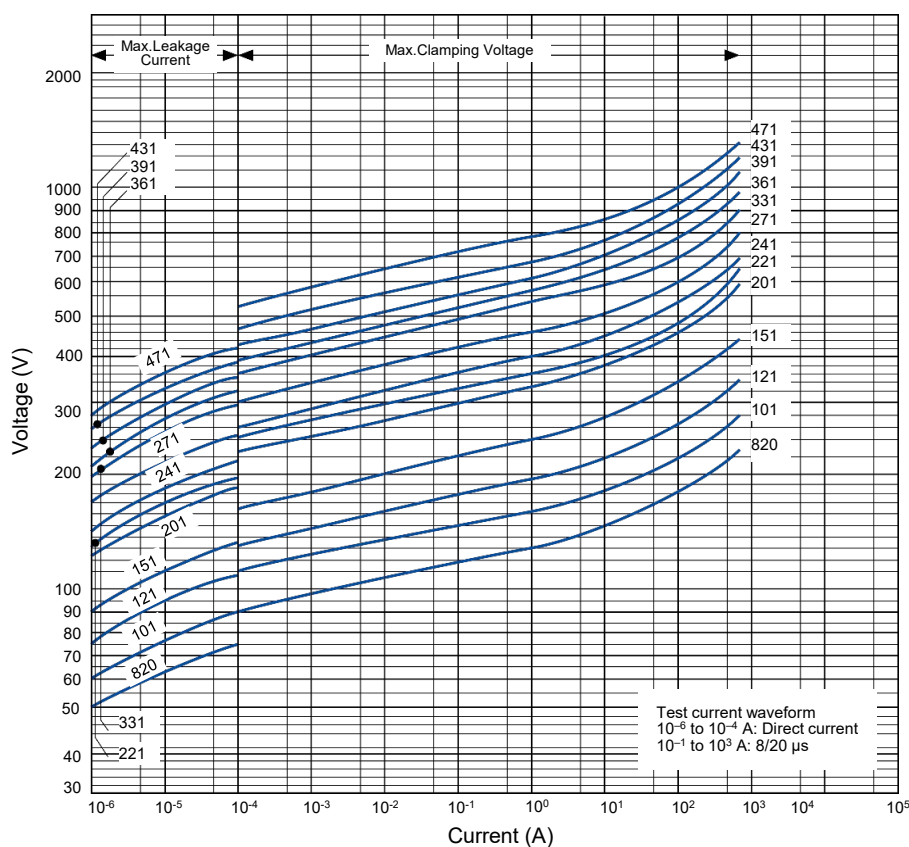


### Impulse Derating (Relation between impulse width and impulse current multiple)

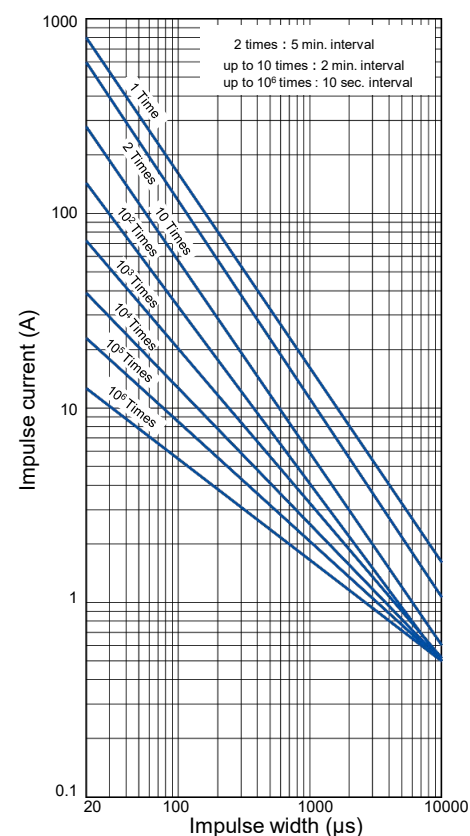
ERZV05D180 to ERZV05D680



ERZV05D820 to ERZV05D471



ERZV05D820 to ERZV05D471



## Ratings and characteristics

●Operating temperature range : -40 to 85 °C

●Storage temperature range : -40 to 125 °C

| Part No.   | Varistor voltage<br>at 1 mA | Maximum<br>allowable voltage |               | Clamping<br>voltage<br>(max.)<br>**Ip | Rated<br>power | Maximum energy |     | Maximum<br>peak current<br>(8/20 μs) |              | Capacitance<br>(max.)<br>at 1 kHz |        |        |         |
|------------|-----------------------------|------------------------------|---------------|---------------------------------------|----------------|----------------|-----|--------------------------------------|--------------|-----------------------------------|--------|--------|---------|
|            |                             | (V)                          | AC rms<br>(V) |                                       |                | DC<br>(V)      | (V) | (W)                                  | (10/1000 μs) |                                   | (2 ms) | 1 time | 2 times |
|            |                             |                              |               |                                       |                |                |     |                                      | (J)          |                                   | (J)    | (A)    | (A)     |
| ERZV07D180 | 18(16 to 20)                | 11                           | 14            | 36                                    | 0.02           | 1.1            | 0.9 | 500                                  | 250          | 3800                              |        |        |         |
| ERZV07D220 | 22(20 to 24)                | 14                           | 18            | 43                                    | 0.02           | 1.3            | 1.1 | 500                                  | 250          | 3600                              |        |        |         |
| ERZV07D270 | 27(24 to 30)                | 17                           | 22            | 53                                    | 0.02           | 1.6            | 1.3 | 500                                  | 250          | 3400                              |        |        |         |
| ERZV07D330 | 33(30 to 36)                | 20                           | 26            | 65                                    | 0.02           | 2.0            | 1.6 | 500                                  | 250          | 2900                              |        |        |         |
| ERZV07D390 | 39(35 to 43)                | 25                           | 31            | 77                                    | 0.02           | 2.4            | 1.9 | 500                                  | 250          | 1600                              |        |        |         |
| ERZV07D470 | 47(42 to 52)                | 30                           | 38            | 93                                    | 0.02           | 2.8            | 2.3 | 500                                  | 250          | 1550                              |        |        |         |
| ERZV07D560 | 56(50 to 62)                | 35                           | 45            | 110                                   | 0.02           | 3.4            | 2.7 | 500                                  | 250          | 1500                              |        |        |         |
| ERZV07D680 | 68(61 to 75)                | 40                           | 56            | 135                                   | 0.02           | 4.1            | 3.3 | 500                                  | 250          | 1200                              |        |        |         |
| ERZV07D820 | 82(74 to 90)                | 50                           | 65            | 135                                   | 0.25           | 7              | 5   | 1750                                 | 1250         | 810                               |        |        |         |
| ERZV07D101 | 100(90 to 110)              | 60                           | 85            | 165                                   | 0.25           | 8.5            | 6   | 1750                                 | 1250         | 700                               |        |        |         |
| ERZV07D121 | 120(108 to 132)             | 75                           | 100           | 200                                   | 0.25           | 10             | 7   | 1750                                 | 1250         | 590                               |        |        |         |
| ERZV07D151 | 150(135 to 165)             | 95                           | 125           | 250                                   | 0.25           | 13             | 9   | 1750                                 | 1250         | 500                               |        |        |         |

★The following part numbers, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

|            |                 |     |     |     |      |      |      |      |      |     |
|------------|-----------------|-----|-----|-----|------|------|------|------|------|-----|
| ERZV07D201 | 200(185 to 225) | 130 | 170 | 340 | 0.25 | 17.5 | 12.5 | 1750 | 1250 | 200 |
| ERZV07D221 | 220(198 to 242) | 140 | 180 | 360 | 0.25 | 19   | 13.5 | 1750 | 1250 | 190 |
| ERZV07D241 | 240(216 to 264) | 150 | 200 | 395 | 0.25 | 21   | 15   | 1750 | 1250 | 170 |
| ERZV07D271 | 270(247 to 303) | 175 | 225 | 455 | 0.25 | 24   | 17   | 1750 | 1250 | 150 |
| ERZV07D331 | 330(297 to 363) | 210 | 270 | 545 | 0.25 | 28   | 20   | 1750 | 1250 | 130 |
| ERZV07D361 | 360(324 to 396) | 230 | 300 | 595 | 0.25 | 32   | 23   | 1750 | 1250 | 130 |
| ERZV07D391 | 390(351 to 429) | 250 | 320 | 650 | 0.25 | 35   | 25   | 1750 | 1250 | 130 |
| ERZV07D431 | 430(387 to 473) | 275 | 350 | 710 | 0.25 | 40   | 27.5 | 1750 | 1250 | 120 |
| ERZV07D471 | 470(423 to 517) | 300 | 385 | 775 | 0.25 | 42   | 30   | 1750 | 1250 | 100 |
| ERZV07D511 | 510(459 to 561) | 320 | 410 | 845 | 0.25 | 45   | 32   | 1750 | 1250 | 90* |

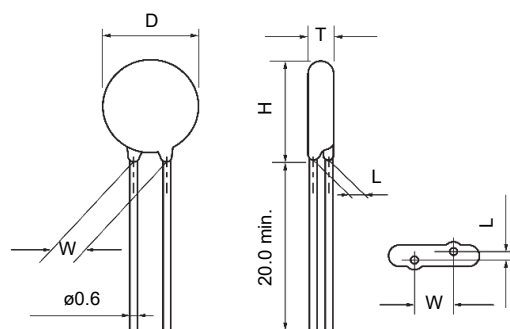
\*Measured at 1 MHz    \*\*Ip Measuring current of clamping voltage 180 to 680 : 2.5 A, 820 to 511 : 10 A

## Dimensions in mm (not to scale)

| Part No.   | Unit : mm |        |       |        |       |
|------------|-----------|--------|-------|--------|-------|
|            | D max.    | T max. | W±1.0 | H max. | L±1.0 |
| ERZV07D180 | 8.5       | 4.5    | 5.0   | 11.5   | 1.3   |
| ERZV07D220 | 8.5       | 4.6    | 5.0   | 11.5   | 1.4   |
| ERZV07D270 | 8.5       | 4.7    | 5.0   | 11.5   | 1.5   |
| ERZV07D330 | 8.5       | 4.9    | 5.0   | 11.5   | 1.7   |
| ERZV07D390 | 8.5       | 4.8    | 5.0   | 11.5   | 1.6   |
| ERZV07D470 | 8.5       | 4.9    | 5.0   | 11.5   | 1.7   |
| ERZV07D560 | 8.5       | 5.0    | 5.0   | 11.5   | 1.8   |
| ERZV07D680 | 8.5       | 5.2    | 5.0   | 11.5   | 2.0   |
| ERZV07D820 | 8.5       | 4.1    | 5.0   | 11.5   | 1.4   |
| ERZV07D101 | 8.5       | 4.3    | 5.0   | 11.5   | 1.6   |
| ERZV07D121 | 8.5       | 4.5    | 5.0   | 11.5   | 1.8   |
| ERZV07D151 | 8.5       | 4.8    | 5.0   | 11.5   | 2.1   |

★The following part numbers, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

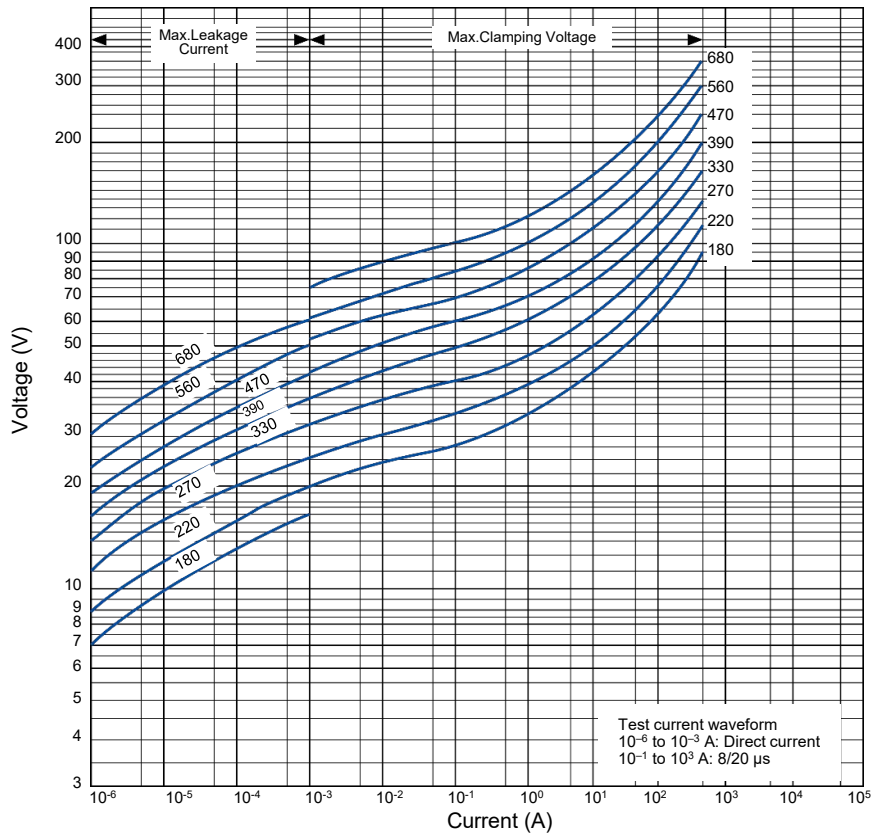
|            |     |     |     |      |     |
|------------|-----|-----|-----|------|-----|
| ERZV07D201 | 8.5 | 4.4 | 5.0 | 11.5 | 1.7 |
| ERZV07D221 | 8.5 | 4.5 | 5.0 | 11.5 | 1.8 |
| ERZV07D241 | 8.5 | 4.6 | 5.0 | 11.5 | 1.9 |
| ERZV07D271 | 8.5 | 4.8 | 5.0 | 11.5 | 2.1 |
| ERZV07D331 | 8.5 | 5.1 | 5.0 | 11.5 | 2.4 |
| ERZV07D361 | 8.5 | 5.3 | 5.0 | 11.5 | 2.5 |
| ERZV07D391 | 8.5 | 5.4 | 5.0 | 11.5 | 2.7 |
| ERZV07D431 | 8.5 | 5.6 | 5.0 | 11.5 | 2.9 |
| ERZV07D471 | 8.5 | 5.8 | 5.0 | 11.5 | 3.1 |
| ERZV07D511 | 8.5 | 6.0 | 5.0 | 11.5 | 3.3 |



## Typical characteristics

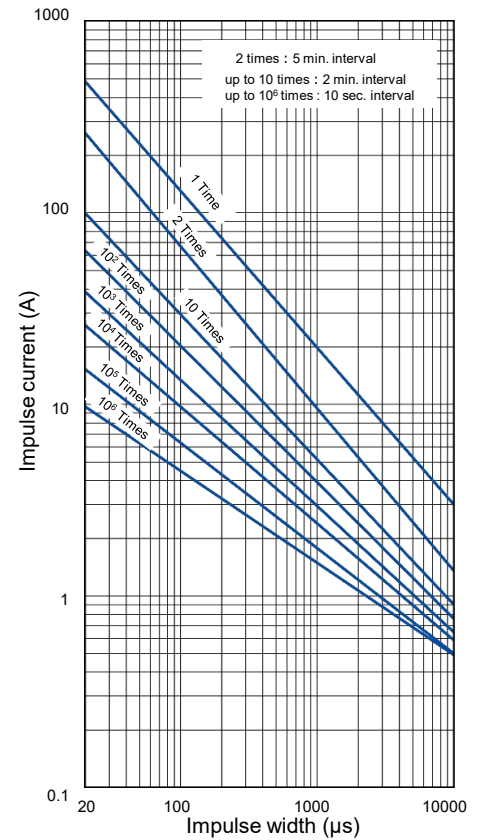
### Voltage vs. Current

ERZV07D180 to ERZV07D680

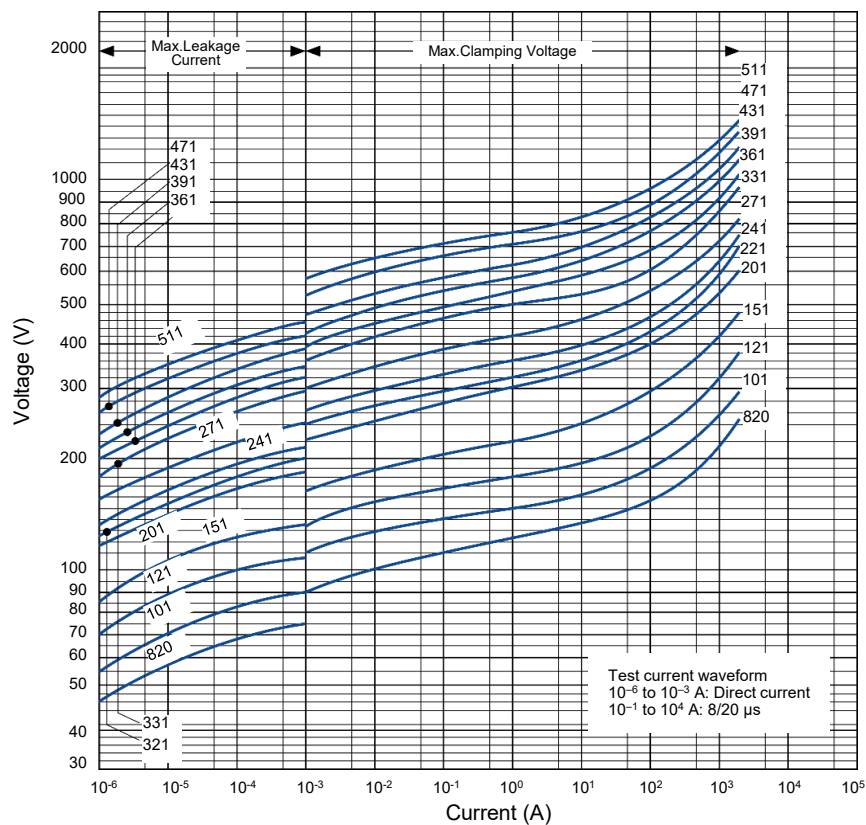


### Impulse Derating (Relation between impulse width and impulse current multiple)

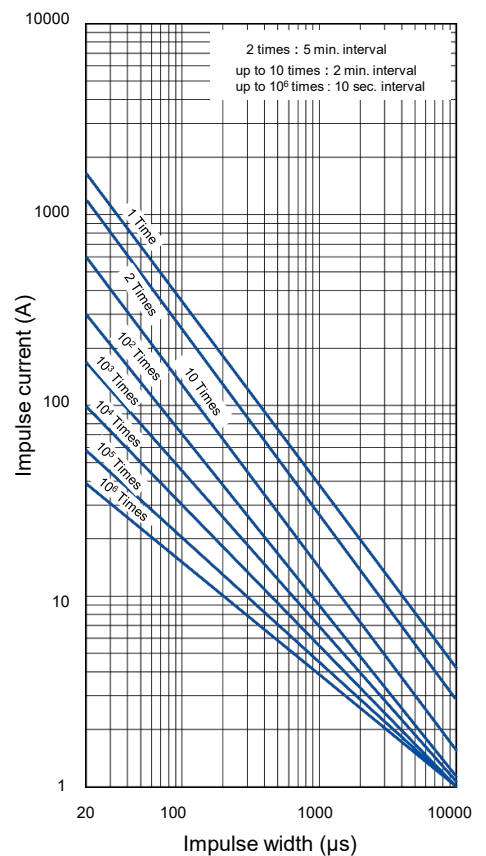
ERZV07D180 to ERZV07D680



ERZV07D820 to ERZV07D511



ERZV07D820 to ERZV07D511



## Ratings and characteristics

●Operating temperature range : -40 to 85 °C

●Storage temperature range : -40 to 125 °C

| Part No.   | Varistor voltage<br>at 1 mA | Maximum<br>allowable voltage |     | Clamping<br>voltage<br>(max.)<br>**Ip | Rated<br>power | Maximum energy |        | Maximum<br>peak current<br>(8/20 μs) |      | Capacitance<br>(max.)<br>at 1 kHz |
|------------|-----------------------------|------------------------------|-----|---------------------------------------|----------------|----------------|--------|--------------------------------------|------|-----------------------------------|
|            |                             |                              |     |                                       |                |                |        |                                      |      |                                   |
|            |                             |                              |     |                                       |                |                |        |                                      |      |                                   |
| (V)        | AC rms<br>(V)               | DC<br>(V)                    | (V) | (W)                                   | (10/1000 μs)   | (2 ms)         | 1 time | 2 times                              | (pF) |                                   |
|            |                             |                              |     |                                       | (J)            | (J)            | (A)    | (A)                                  |      |                                   |
| ERZV09D180 | 18(16 to 20)                | 11                           | 14  | 36                                    | 0.05           | 2.6            | 2.2    | 1000                                 | 500  | 16000                             |
| ERZV09D220 | 22(20 to 24)                | 14                           | 18  | 43                                    | 0.05           | 3.2            | 2.6    | 1000                                 | 500  | 11000                             |
| ERZV09D270 | 27(24 to 30)                | 17                           | 22  | 53                                    | 0.05           | 3.9            | 3.2    | 1000                                 | 500  | 8000                              |
| ERZV09D330 | 33(30 to 36)                | 20                           | 26  | 65                                    | 0.05           | 4.8            | 4.0    | 1000                                 | 500  | 6300                              |
| ERZV09D390 | 39(35 to 43)                | 25                           | 31  | 77                                    | 0.05           | 5.6            | 4.7    | 1000                                 | 500  | 5200                              |
| ERZV09D470 | 47(42 to 52)                | 30                           | 38  | 93                                    | 0.05           | 6.8            | 5.6    | 1000                                 | 500  | 4600                              |
| ERZV09D560 | 56(50 to 62)                | 35                           | 45  | 110                                   | 0.05           | 8.1            | 6.7    | 1000                                 | 500  | 3750                              |
| ERZV09D680 | 68(61 to 75)                | 40                           | 56  | 135                                   | 0.05           | 9.8            | 8.2    | 1000                                 | 500  | 2800                              |
| ERZV09D820 | 82(74 to 90)                | 50                           | 65  | 135                                   | 0.4            | 14.0           | 10     | 3500                                 | 2500 | 2000                              |
| ERZV09D101 | 100(90 to 110)              | 60                           | 85  | 165                                   | 0.4            | 17             | 12     | 3500                                 | 2500 | 1700                              |
| ERZV09D121 | 120(108 to 132)             | 75                           | 100 | 200                                   | 0.4            | 20             | 14.5   | 3500                                 | 2500 | 1400                              |
| ERZV09D151 | 150(135 to 165)             | 95                           | 125 | 250                                   | 0.4            | 25             | 18     | 3500                                 | 2500 | 1100                              |

★The following part numbers, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

|            |                 |     |     |     |     |    |      |      |      |     |
|------------|-----------------|-----|-----|-----|-----|----|------|------|------|-----|
| ERZV09D201 | 200(185 to 225) | 130 | 170 | 340 | 0.4 | 35 | 25   | 3500 | 2500 | 430 |
| ERZV09D221 | 220(198 to 242) | 140 | 180 | 360 | 0.4 | 39 | 27.5 | 3500 | 2500 | 410 |
| ERZV09D241 | 240(216 to 264) | 150 | 200 | 395 | 0.4 | 42 | 30   | 3500 | 2500 | 380 |
| ERZV09D271 | 270(247 to 303) | 175 | 225 | 455 | 0.4 | 49 | 35   | 3500 | 2500 | 350 |
| ERZV09D331 | 330(297 to 363) | 210 | 270 | 545 | 0.4 | 58 | 42   | 3500 | 2500 | 300 |
| ERZV09D361 | 360(324 to 396) | 230 | 300 | 595 | 0.4 | 65 | 45   | 3500 | 2500 | 300 |
| ERZV09D391 | 390(351 to 429) | 250 | 320 | 650 | 0.4 | 70 | 50   | 3500 | 2500 | 300 |
| ERZV09D431 | 430(387 to 473) | 275 | 350 | 710 | 0.4 | 80 | 55   | 3500 | 2500 | 270 |
| ERZV09D471 | 470(423 to 517) | 300 | 385 | 775 | 0.4 | 85 | 60   | 3500 | 2500 | 230 |
| ERZV09D511 | 510(459 to 561) | 320 | 410 | 845 | 0.4 | 92 | 67   | 3500 | 2500 | 210 |

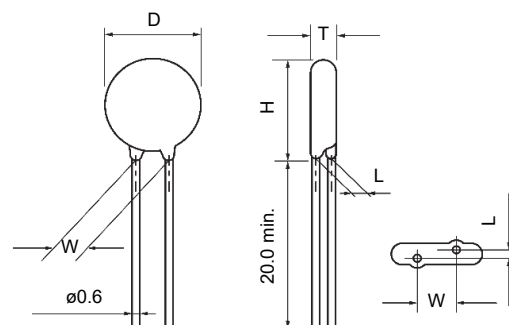
\*Ip Measuring current of clamping voltage 180 to 680 : 5 A, 820 to 511 : 25 A

## Dimensions in mm (not to scale)

| Part No.   | Unit : mm |        |       |        |       |
|------------|-----------|--------|-------|--------|-------|
|            | D max.    | T max. | W±1.0 | H max. | L±1.0 |
| ERZV09D180 | 11.5      | 3.8    | 5.0   | 14.0   | 1.3   |
| ERZV09D220 | 11.5      | 4.0    | 5.0   | 14.0   | 1.4   |
| ERZV09D270 | 11.5      | 4.2    | 5.0   | 14.0   | 1.5   |
| ERZV09D330 | 11.5      | 4.5    | 5.0   | 14.0   | 1.7   |
| ERZV09D390 | 11.5      | 4.0    | 5.0   | 14.0   | 1.7   |
| ERZV09D470 | 11.5      | 4.2    | 5.0   | 14.0   | 1.8   |
| ERZV09D560 | 11.5      | 4.4    | 5.0   | 14.0   | 1.9   |
| ERZV09D680 | 11.5      | 4.5    | 5.0   | 14.0   | 2.2   |
| ERZV09D820 | 11.5      | 3.8    | 5.0   | 14.0   | 1.6   |
| ERZV09D101 | 11.5      | 3.9    | 5.0   | 14.0   | 1.8   |
| ERZV09D121 | 11.5      | 4.1    | 5.0   | 14.0   | 2.0   |
| ERZV09D151 | 11.5      | 4.4    | 5.0   | 14.0   | 2.2   |

★The following part numbers, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

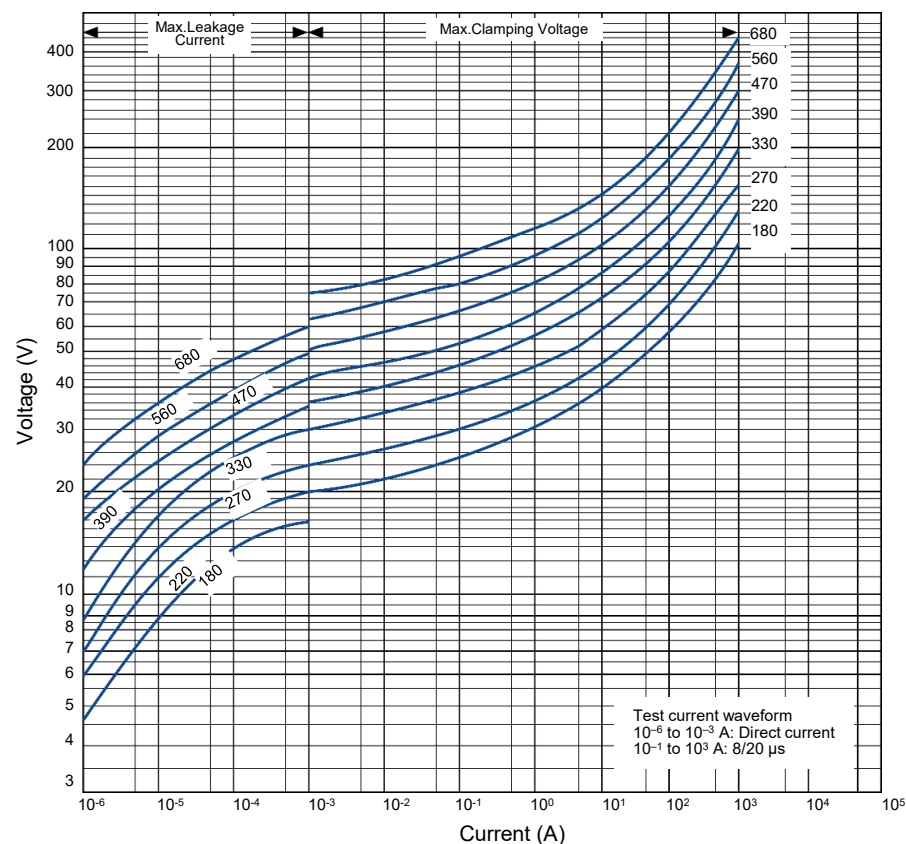
|            |      |     |     |      |     |
|------------|------|-----|-----|------|-----|
| ERZV09D201 | 11.5 | 4.1 | 5.0 | 14.0 | 1.7 |
| ERZV09D221 | 11.5 | 4.2 | 5.0 | 14.0 | 1.8 |
| ERZV09D241 | 11.5 | 4.3 | 5.0 | 14.0 | 1.9 |
| ERZV09D271 | 11.5 | 4.5 | 5.0 | 14.0 | 2.0 |
| ERZV09D331 | 11.5 | 4.8 | 5.0 | 14.0 | 2.3 |
| ERZV09D361 | 11.5 | 5.0 | 5.0 | 14.0 | 2.5 |
| ERZV09D391 | 11.5 | 5.1 | 5.0 | 14.0 | 2.6 |
| ERZV09D431 | 11.5 | 5.3 | 5.0 | 14.0 | 2.8 |
| ERZV09D471 | 11.5 | 5.6 | 5.0 | 14.0 | 3.1 |
| ERZV09D511 | 11.5 | 5.8 | 5.0 | 14.0 | 3.2 |



## Typical characteristics

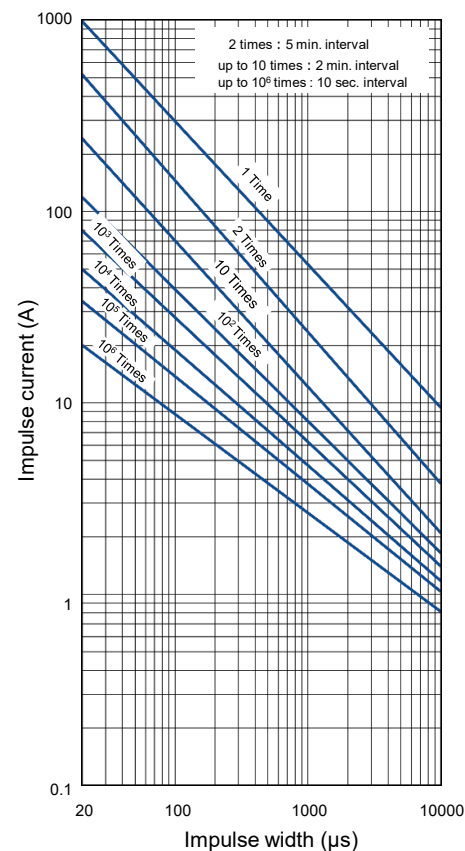
### Voltage vs. Current

ERZV09D180 to ERZV09D680

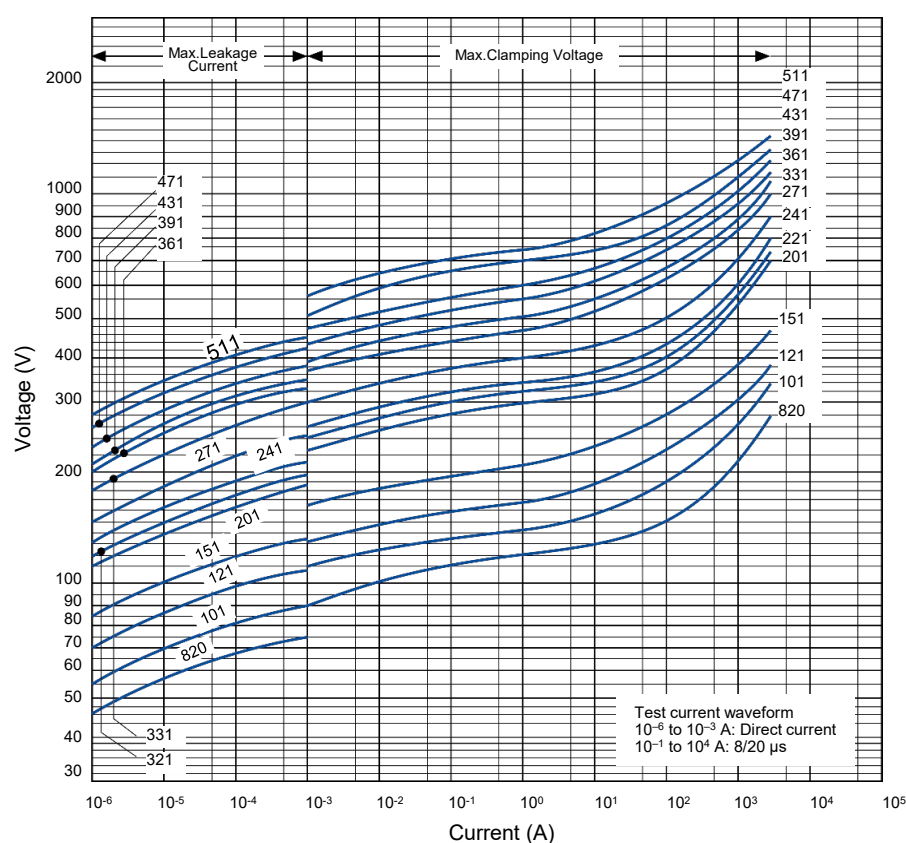


### Impulse Derating (Relation between impulse width and impulse current multiple)

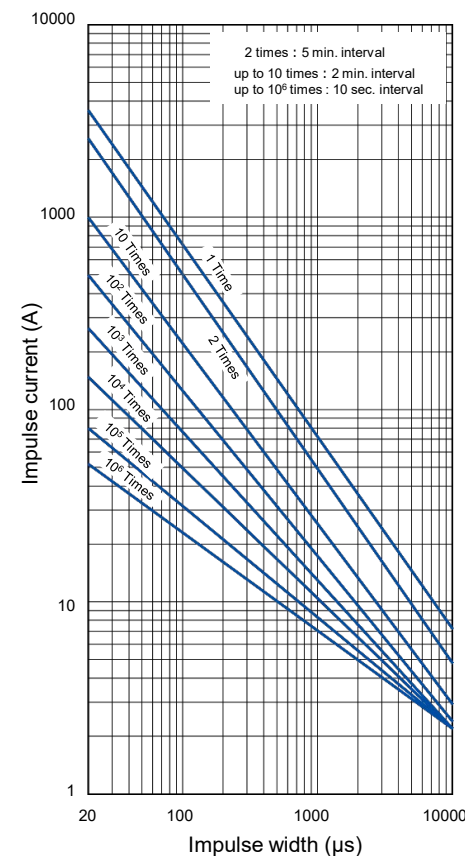
ERZV09D180 to ERZV09D680



ERZV09D820 to ERZV09D511



ERZV09D820 to ERZV09D511



## Ratings and characteristics

●Operating temperature range : -40 to 85 °C

●Storage temperature range : -40 to 125 °C

| Part No.   | Varistor voltage at 1 mA | Maximum allowable voltage |        | Clamping voltage (max.)<br>**Ip | Rated power | Maximum energy      |               | Maximum peak current (8/20 µs) |                | Capacitance (max.) at 1 kHz |
|------------|--------------------------|---------------------------|--------|---------------------------------|-------------|---------------------|---------------|--------------------------------|----------------|-----------------------------|
|            |                          |                           |        |                                 |             |                     |               |                                |                |                             |
|            |                          | AC rms (V)                | DC (V) |                                 |             | (10/1000 µs)<br>(J) | (2 ms)<br>(J) | 1 time<br>(A)                  | 2 times<br>(A) |                             |
| ERZV10D180 | 18(16 to 20)             | 11                        | 14     | 36                              | 0.05        | 2.6                 | 2.2           | 1000                           | 500            | 16000                       |
| ERZV10D220 | 22(20 to 24)             | 14                        | 18     | 43                              | 0.05        | 3.2                 | 2.6           | 1000                           | 500            | 11000                       |
| ERZV10D270 | 27(24 to 30)             | 17                        | 22     | 53                              | 0.05        | 3.9                 | 3.2           | 1000                           | 500            | 8000                        |
| ERZV10D330 | 33(30 to 36)             | 20                        | 26     | 65                              | 0.05        | 4.8                 | 4.0           | 1000                           | 500            | 6300                        |
| ERZV10D390 | 39(35 to 43)             | 25                        | 31     | 77                              | 0.05        | 5.6                 | 4.7           | 1000                           | 500            | 5200                        |
| ERZV10D470 | 47(42 to 52)             | 30                        | 38     | 93                              | 0.05        | 6.8                 | 5.6           | 1000                           | 500            | 4600                        |
| ERZV10D560 | 56(50 to 62)             | 35                        | 45     | 110                             | 0.05        | 8.1                 | 6.7           | 1000                           | 500            | 3750                        |
| ERZV10D680 | 68(61 to 75)             | 40                        | 56     | 135                             | 0.05        | 9.8                 | 8.2           | 1000                           | 500            | 2800                        |
| ERZV10D820 | 82(74 to 90)             | 50                        | 65     | 135                             | 0.4         | 14                  | 10            | 3500                           | 2500           | 2000                        |
| ERZV10D101 | 100(90 to 110)           | 60                        | 85     | 165                             | 0.4         | 17                  | 12            | 3500                           | 2500           | 1700                        |
| ERZV10D121 | 120(108 to 132)          | 75                        | 100    | 200                             | 0.4         | 20                  | 14.5          | 3500                           | 2500           | 1400                        |
| ERZV10D151 | 150(135 to 165)          | 95                        | 125    | 250                             | 0.4         | 25                  | 18            | 3500                           | 2500           | 1100                        |

★ The following part numbers, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

|              |                    |      |      |      |      |     |        |      |      |        |
|--------------|--------------------|------|------|------|------|-----|--------|------|------|--------|
| ERZV10D201   | 200(185 to 225)    | 130  | 170  | 340  | 0.4  | 35  | 25     | 3500 | 2500 | 430    |
| ERZV10D221   | 220(198 to 242)    | 140  | 180  | 360  | 0.4  | 39  | 27.5   | 3500 | 2500 | 410    |
| ERZV10D241   | 240(216 to 264)    | 150  | 200  | 395  | 0.4  | 42  | 30     | 3500 | 2500 | 380    |
| ERZV10D271   | 270(247 to 303)    | 175  | 225  | 455  | 0.4  | 49  | 35     | 3500 | 2500 | 350    |
| ERZV10D331   | 330(297 to 363)    | 210  | 270  | 545  | 0.4  | 58  | 42     | 3500 | 2500 | 300    |
| ERZV10D361   | 360(324 to 396)    | 230  | 300  | 595  | 0.4  | 65  | 45     | 3500 | 2500 | 300    |
| ERZV10D391   | 390(351 to 429)    | 250  | 320  | 650  | 0.4  | 70  | 50     | 3500 | 2500 | 300    |
| ERZV10D431   | 430(387 to 473)    | 275  | 350  | 710  | 0.4  | 80  | 55     | 3500 | 2500 | 270    |
| ERZV10D471   | 470(423 to 517)    | 300  | 385  | 775  | 0.4  | 85  | 60     | 3500 | 2500 | 230    |
| ERZV10D511   | 510(459 to 561)    | 320  | 410  | 845  | 0.4  | 92  | 67     | 3500 | 2500 | 210    |
| ERZV10D561   | 560(504 to 616)    | 350  | 450  | 930  | 0.4  | 92  | 67     | 3500 | 2500 | 200    |
| ERZV10D621   | 620(558 to 682)    | 385  | 505  | 1025 | 0.4  | 92  | 67     | 3500 | 2500 | 190    |
| ERZV10D681   | 680(612 to 748)    | 420  | 560  | 1120 | 0.4  | 92  | 67     | 3500 | 2500 | 170    |
| ERZV10D751   | 750(675 to 825)    | 460  | 615  | 1240 | 0.4  | 100 | 70     | 3500 | 2500 | 160    |
| ERZV10D821   | 820(738 to 902)    | 510  | 670  | 1355 | 0.4  | 110 | 80     | 3500 | 2500 | 140    |
| ERZV10D911   | 910(819 to 1001)   | 550  | 745  | 1500 | 0.4  | 130 | 90     | 3500 | 2500 | 120    |
| ERZV10D102   | 1000(900 to 1100)  | 625  | 825  | 1650 | 0.4  | 140 | 100    | 3500 | 2500 | 110    |
| ERZV10D112   | 1100(990 to 1210)  | 680  | 895  | 1815 | 0.4  | 155 | 110    | 3500 | 2500 | 110    |
| ERZV10D182CS | 1800(1700 to 1980) | 1000 | 1465 | 2970 | 0.4* | 247 | 183*** | 3500 | 2500 | ***70* |

\*Measured at 1 MHz    \*\*Ip Measuring current of clamping voltage 180 to 680 : 5 A, 820 to 182 : 25 A

## Dimensions in mm (not to scale)

Unit : mm

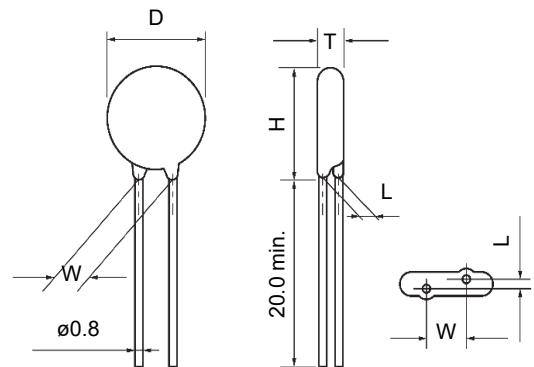
| Part No.   | D max. | T max. | W±1.0 | H max. | L±1.0 |
|------------|--------|--------|-------|--------|-------|
| ERZV10D180 | 11.5   | 4.6    | 7.5   | 14.5   | 1.3   |
| ERZV10D220 | 11.5   | 4.7    | 7.5   | 14.5   | 1.4   |
| ERZV10D270 | 11.5   | 4.8    | 7.5   | 14.5   | 1.5   |
| ERZV10D330 | 11.5   | 5.0    | 7.5   | 14.5   | 1.7   |
| ERZV10D390 | 11.5   | 4.9    | 7.5   | 14.5   | 1.6   |
| ERZV10D470 | 11.5   | 5.0    | 7.5   | 14.5   | 1.7   |
| ERZV10D560 | 11.5   | 5.1    | 7.5   | 14.5   | 1.8   |
| ERZV10D680 | 11.5   | 5.3    | 7.5   | 14.5   | 2.0   |
| ERZV10D820 | 11.5   | 4.5    | 7.5   | 14.5   | 1.6   |
| ERZV10D101 | 11.5   | 4.7    | 7.5   | 14.5   | 1.8   |
| ERZV10D121 | 11.5   | 4.9    | 7.5   | 14.5   | 2.0   |
| ERZV10D151 | 11.5   | 5.2    | 7.5   | 14.5   | 2.3   |

★ The following part numbers, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

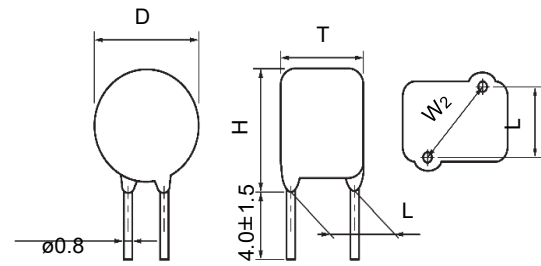
|            |      |     |     |      |     |
|------------|------|-----|-----|------|-----|
| ERZV10D201 | 11.5 | 4.8 | 7.5 | 14.5 | 1.9 |
| ERZV10D221 | 11.5 | 4.9 | 7.5 | 14.5 | 2.0 |
| ERZV10D241 | 11.5 | 5.0 | 7.5 | 14.5 | 2.1 |
| ERZV10D271 | 11.5 | 5.2 | 7.5 | 14.5 | 2.3 |
| ERZV10D331 | 11.5 | 5.5 | 7.5 | 14.5 | 2.6 |
| ERZV10D361 | 11.5 | 5.7 | 7.5 | 14.5 | 2.8 |
| ERZV10D391 | 11.5 | 5.8 | 7.5 | 14.5 | 2.9 |
| ERZV10D431 | 11.5 | 6.0 | 7.5 | 14.5 | 3.1 |
| ERZV10D471 | 11.5 | 6.2 | 7.5 | 14.5 | 3.3 |
| ERZV10D511 | 11.5 | 6.4 | 7.5 | 14.5 | 3.5 |
| ERZV10D561 | 12.5 | 6.7 | 7.5 | 15.5 | 3.8 |
| ERZV10D621 | 12.5 | 7.1 | 7.5 | 15.5 | 4.2 |
| ERZV10D681 | 12.5 | 7.4 | 7.5 | 15.5 | 4.5 |
| ERZV10D751 | 12.5 | 7.8 | 7.5 | 15.5 | 4.9 |
| ERZV10D821 | 12.5 | 8.1 | 7.5 | 15.5 | 5.2 |
| ERZV10D911 | 12.5 | 8.6 | 7.5 | 15.5 | 5.7 |
| ERZV10D102 | 12.5 | 9.1 | 7.5 | 15.5 | 6.2 |
| ERZV10D112 | 12.5 | 9.7 | 7.5 | 15.5 | 6.8 |

|              |      |      |       |      |             |
|--------------|------|------|-------|------|-------------|
| ERZV10D182CS | 13.5 | 14.4 | 11.0* | 16.5 | 10.0 (±1.5) |
|--------------|------|------|-------|------|-------------|

\* W<sub>2</sub>



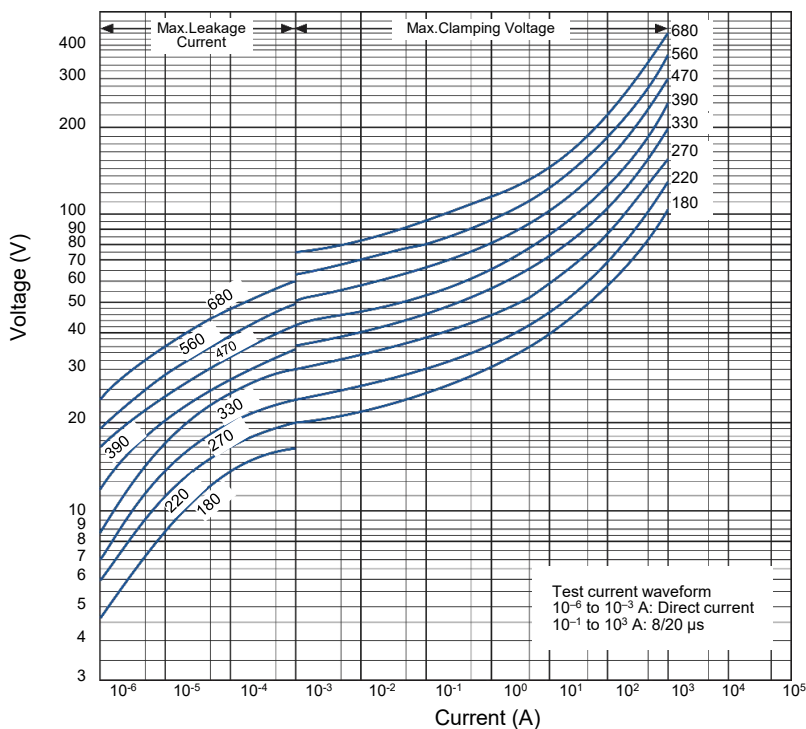
(ERZV10D182CS)



## Typical characteristics

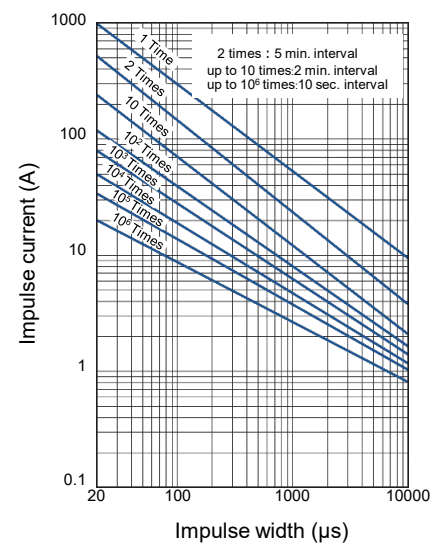
### Voltage vs. Current

ERZV10D180 to ERZV10D680



### Impulse Derating (Relation between impulse width and impulse current multiple)

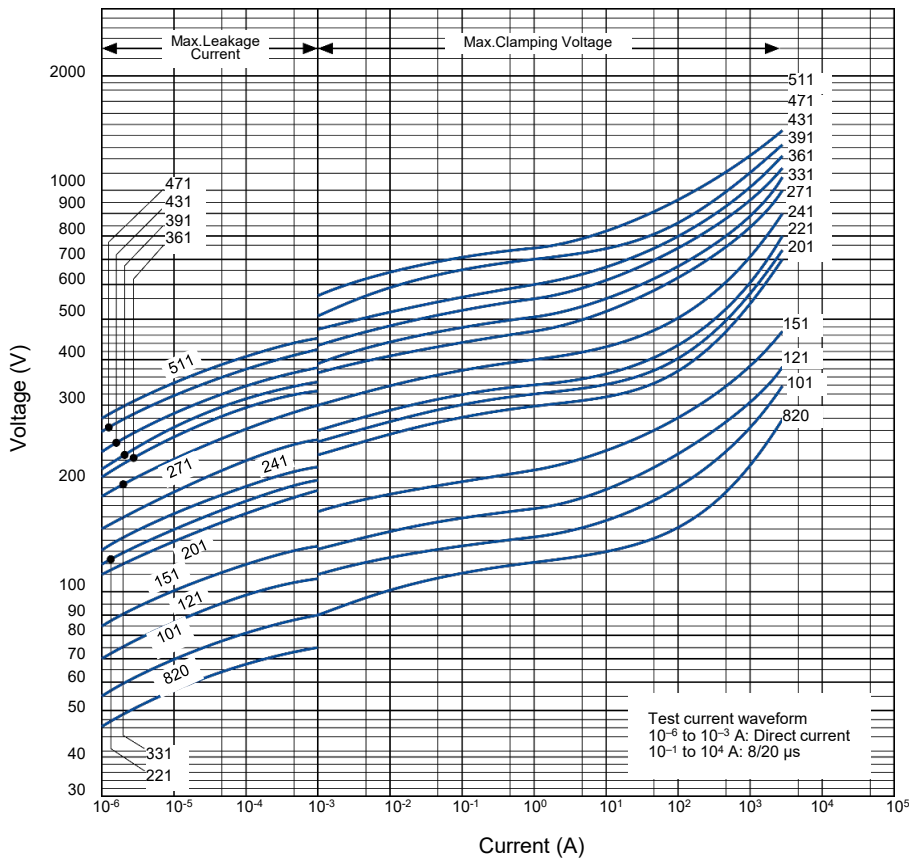
ERZV10D180 to ERZV10D680



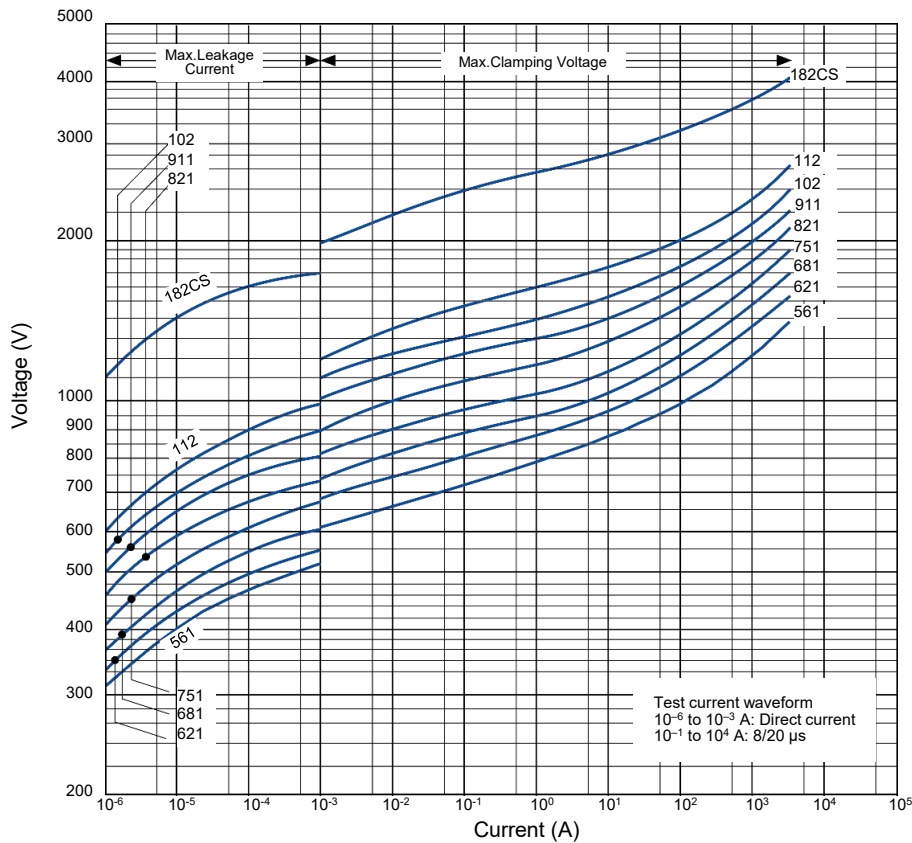
## Typical characteristics

### Voltage vs. Current

ERZV10D820 to ERZV10D511

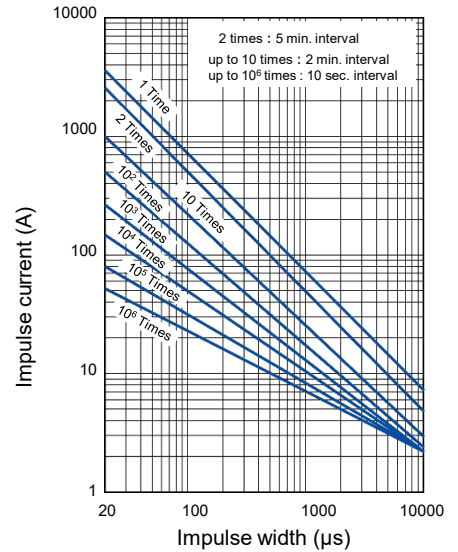


ERZV10D561 to ERZV10D182CS

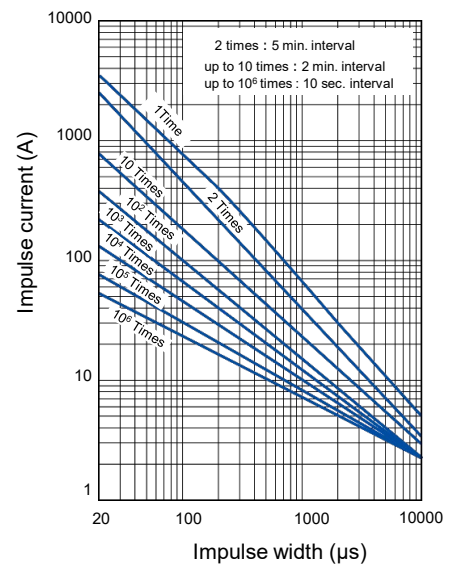


### Impulse Derating (Relation between impulse width and impulse current multiple)

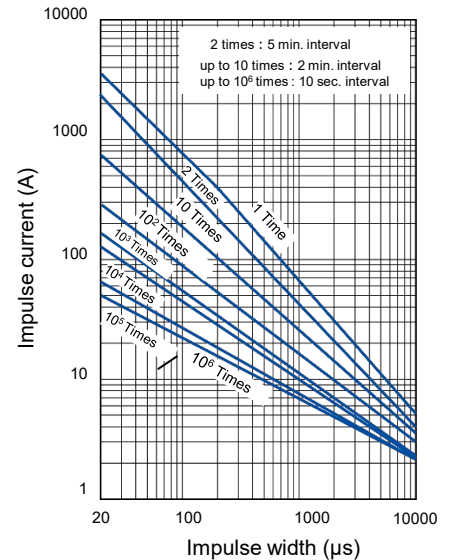
ERZV10D820 to ERZV10D511



ERZV10D561 to ERZV10D112



ERZV10D182CS



## Ratings and characteristics

●Operating temperature range : -40 to 85 °C

●Storage temperature range : -40 to 125 °C

| Part No.   | Varistor voltage<br>at 1 mA | Maximum<br>allowable voltage |           | Clamping<br>voltage<br>(max.)<br>**Ip | Rated<br>power | Maximum energy      |               | Maximum<br>peak current<br>(8/20 µs) |                | Capacitance<br>(max.)<br>at 1 kHz |
|------------|-----------------------------|------------------------------|-----------|---------------------------------------|----------------|---------------------|---------------|--------------------------------------|----------------|-----------------------------------|
|            |                             |                              |           |                                       |                |                     |               |                                      |                |                                   |
|            |                             | AC rms<br>(V)                | DC<br>(V) |                                       |                | (10/1000 µs)<br>(J) | (2 ms)<br>(J) | 1 time<br>(A)                        | 2 times<br>(A) |                                   |
| ERZV14D180 | 18(16 to 20)                | 11                           | 14        | 36                                    | 0.1            | 5.2                 | 4.3           | 2000                                 | 1000           | 25000                             |
| ERZV14D220 | 22(20 to 24)                | 14                           | 18        | 43                                    | 0.1            | 6.3                 | 5.3           | 2000                                 | 1000           | 20000                             |
| ERZV14D270 | 27(24 to 30)                | 17                           | 22        | 53                                    | 0.1            | 7.8                 | 6.5           | 2000                                 | 1000           | 16000                             |
| ERZV14D330 | 33(30 to 36)                | 20                           | 26        | 65                                    | 0.1            | 9.5                 | 7.9           | 2000                                 | 1000           | 12200                             |
| ERZV14D390 | 39(35 to 43)                | 25                           | 31        | 77                                    | 0.1            | 11                  | 9.4           | 2000                                 | 1000           | 7000                              |
| ERZV14D470 | 47(42 to 52)                | 30                           | 38        | 93                                    | 0.1            | 14                  | 11            | 2000                                 | 1000           | 6750                              |
| ERZV14D560 | 56(50 to 62)                | 35                           | 45        | 110                                   | 0.1            | 16                  | 13            | 2000                                 | 1000           | 6500                              |
| ERZV14D680 | 68(61 to 75)                | 40                           | 56        | 135                                   | 0.1            | 20                  | 16            | 2000                                 | 1000           | 5500                              |
| ERZV14D820 | 82(74 to 90)                | 50                           | 65        | 135                                   | 0.6            | 28                  | 20            | 6000                                 | 5000           | 3700                              |
| ERZV14D101 | 100(90 to 110)              | 60                           | 85        | 165                                   | 0.6            | 35                  | 25            | 6000                                 | 5000           | 3200                              |
| ERZV14D121 | 120(108 to 132)             | 75                           | 100       | 200                                   | 0.6            | 42                  | 30            | 6000                                 | 5000           | 2700                              |
| ERZV14D151 | 150(135 to 165)             | 95                           | 125       | 250                                   | 0.6            | 53                  | 37.5          | 6000                                 | 5000           | 2200                              |

★ The following part numbers, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

|              |                    |      |      |      |     |     |     |      |      |     |
|--------------|--------------------|------|------|------|-----|-----|-----|------|------|-----|
| ERZV14D201   | 200(185 to 225)    | 130  | 170  | 340  | 0.6 | 70  | 50  | 6000 | 5000 | 770 |
| ERZV14D221   | 220(198 to 242)    | 140  | 180  | 360  | 0.6 | 78  | 55  | 6000 | 5000 | 740 |
| ERZV14D241   | 240(216 to 264)    | 150  | 200  | 395  | 0.6 | 84  | 60  | 6000 | 5000 | 700 |
| ERZV14D271   | 270(247 to 303)    | 175  | 225  | 455  | 0.6 | 99  | 70  | 6000 | 5000 | 640 |
| ERZV14D331   | 330(297 to 363)    | 210  | 270  | 545  | 0.6 | 115 | 80  | 6000 | 4500 | 580 |
| ERZV14D361   | 360(324 to 396)    | 230  | 300  | 595  | 0.6 | 130 | 90  | 6000 | 4500 | 540 |
| ERZV14D391   | 390(351 to 429)    | 250  | 320  | 650  | 0.6 | 140 | 100 | 6000 | 4500 | 500 |
| ERZV14D431   | 430(387 to 473)    | 275  | 350  | 710  | 0.6 | 155 | 110 | 6000 | 4500 | 450 |
| ERZV14D471   | 470(423 to 517)    | 300  | 385  | 775  | 0.6 | 175 | 125 | 6000 | 4500 | 400 |
| ERZV14D511   | 510(459 to 561)    | 320  | 410  | 845  | 0.6 | 190 | 136 | 6000 | 4500 | 350 |
| ERZV14D561   | 560(504 to 616)    | 350  | 450  | 930  | 0.6 | 190 | 136 | 5000 | 4500 | 340 |
| ERZV14D621   | 620(558 to 682)    | 385  | 505  | 1025 | 0.6 | 190 | 136 | 5000 | 4500 | 330 |
| ERZV14D681   | 680(612 to 748)    | 420  | 560  | 1120 | 0.6 | 190 | 136 | 5000 | 4500 | 320 |
| ERZV14D751   | 750(675 to 825)    | 460  | 615  | 1240 | 0.6 | 210 | 150 | 5000 | 4500 | 310 |
| ERZV14D821   | 820(738 to 902)    | 510  | 670  | 1355 | 0.6 | 235 | 165 | 5000 | 4500 | 280 |
| ERZV14D911   | 910(819 to 1001)   | 550  | 745  | 1500 | 0.6 | 255 | 180 | 5000 | 4500 | 250 |
| ERZV14D102   | 1000(900 to 1100)  | 625  | 825  | 1650 | 0.6 | 280 | 200 | 5000 | 4500 | 230 |
| ERZV14D112   | 1100(990 to 1210)  | 680  | 895  | 1815 | 0.6 | 310 | 220 | 5000 | 4500 | 210 |
| ERZV14D182CS | 1800(1700 to 1980) | 1000 | 1465 | 2970 | 0.6 | 510 | 360 | 5000 | 4500 | 120 |

\*Ip Measuring current of clamping voltage 180 to 680 : 10 A, 820 to 182 : 50 A

## Dimensions in mm (not to scale)

Unit : mm

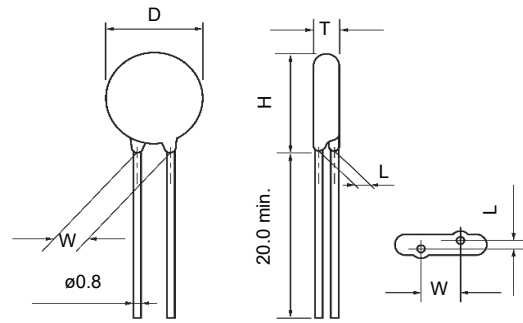
| Part No.   | D max. | T max. | W±1.0 | H max. | L±1.0 |
|------------|--------|--------|-------|--------|-------|
| ERZV14D180 | 15.5   | 4.6    | 7.5   | 18.5   | 1.3   |
| ERZV14D220 | 15.5   | 4.7    | 7.5   | 18.5   | 1.4   |
| ERZV14D270 | 15.5   | 4.8    | 7.5   | 18.5   | 1.5   |
| ERZV14D330 | 15.5   | 5.0    | 7.5   | 18.5   | 1.7   |
| ERZV14D390 | 15.5   | 4.9    | 7.5   | 18.5   | 1.6   |
| ERZV14D470 | 15.5   | 5.0    | 7.5   | 18.5   | 1.7   |
| ERZV14D560 | 15.5   | 5.1    | 7.5   | 18.5   | 1.8   |
| ERZV14D680 | 15.5   | 5.3    | 7.5   | 18.5   | 2.0   |
| ERZV14D820 | 15.5   | 4.5    | 7.5   | 18.5   | 1.6   |
| ERZV14D101 | 15.5   | 4.7    | 7.5   | 18.5   | 1.8   |
| ERZV14D121 | 15.5   | 4.9    | 7.5   | 18.5   | 2.0   |
| ERZV14D151 | 15.5   | 5.2    | 7.5   | 18.5   | 2.3   |

★ The following part numbers, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

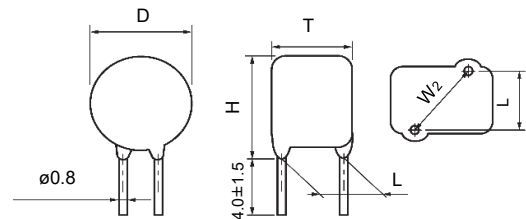
|            |      |     |     |      |     |
|------------|------|-----|-----|------|-----|
| ERZV14D201 | 15.5 | 4.8 | 7.5 | 18.5 | 1.9 |
| ERZV14D221 | 15.5 | 4.9 | 7.5 | 18.5 | 2.0 |
| ERZV14D241 | 15.5 | 5.0 | 7.5 | 18.5 | 2.1 |
| ERZV14D271 | 15.5 | 5.2 | 7.5 | 18.5 | 2.3 |
| ERZV14D331 | 15.5 | 5.5 | 7.5 | 18.5 | 2.6 |
| ERZV14D361 | 15.5 | 5.7 | 7.5 | 18.5 | 2.8 |
| ERZV14D391 | 15.5 | 5.8 | 7.5 | 18.5 | 2.9 |
| ERZV14D431 | 15.5 | 6.0 | 7.5 | 18.5 | 3.1 |
| ERZV14D471 | 15.5 | 6.2 | 7.5 | 18.5 | 3.3 |
| ERZV14D511 | 15.5 | 6.4 | 7.5 | 18.5 | 3.5 |
| ERZV14D561 | 16.0 | 6.7 | 7.5 | 19.0 | 3.8 |
| ERZV14D621 | 16.0 | 7.1 | 7.5 | 19.0 | 4.2 |
| ERZV14D681 | 16.0 | 7.4 | 7.5 | 19.0 | 4.5 |
| ERZV14D751 | 16.0 | 7.8 | 7.5 | 19.0 | 4.9 |
| ERZV14D821 | 16.0 | 8.1 | 7.5 | 19.0 | 5.2 |
| ERZV14D911 | 16.0 | 8.6 | 7.5 | 19.0 | 5.7 |
| ERZV14D102 | 16.0 | 9.1 | 7.5 | 19.0 | 6.2 |
| ERZV14D112 | 16.0 | 9.7 | 7.5 | 19.0 | 6.8 |

|              |      |       |       |      |             |
|--------------|------|-------|-------|------|-------------|
| ERZV14D182CS | 17.0 | 14.4* | 15.0* | 20.5 | 10.5 (±2.0) |
|--------------|------|-------|-------|------|-------------|

\* : W<sub>2</sub>



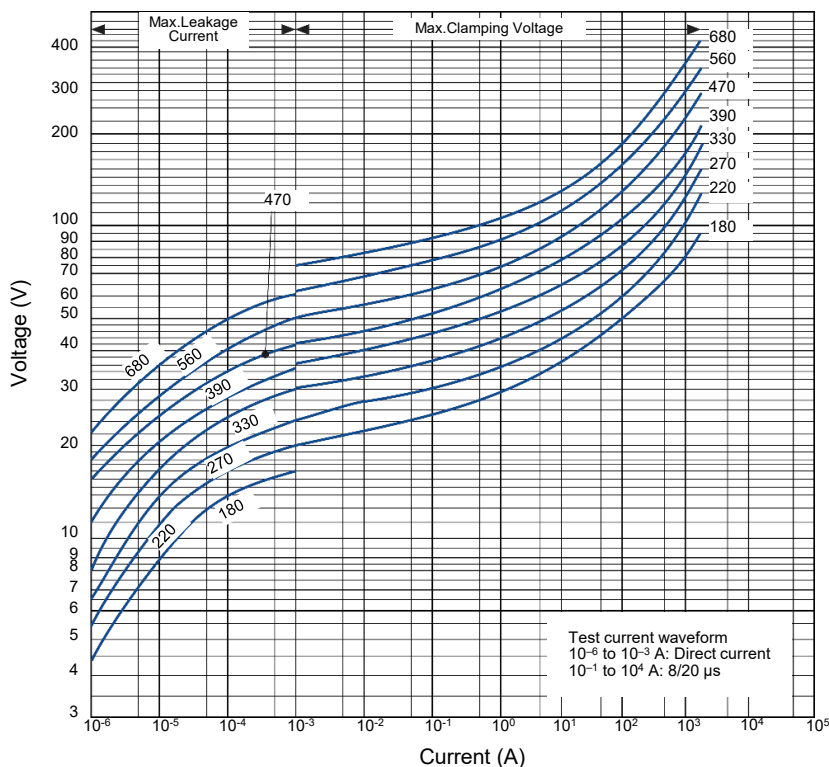
(ERZV14D182CS)



## Typical characteristics

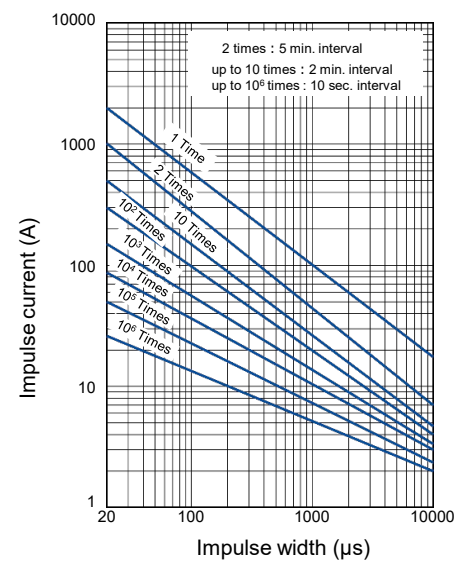
## Voltage vs. Current

ERZV14D180 to ERZV14D680



## Impulse Derating (Relation between impulse width and impulse current multiple)

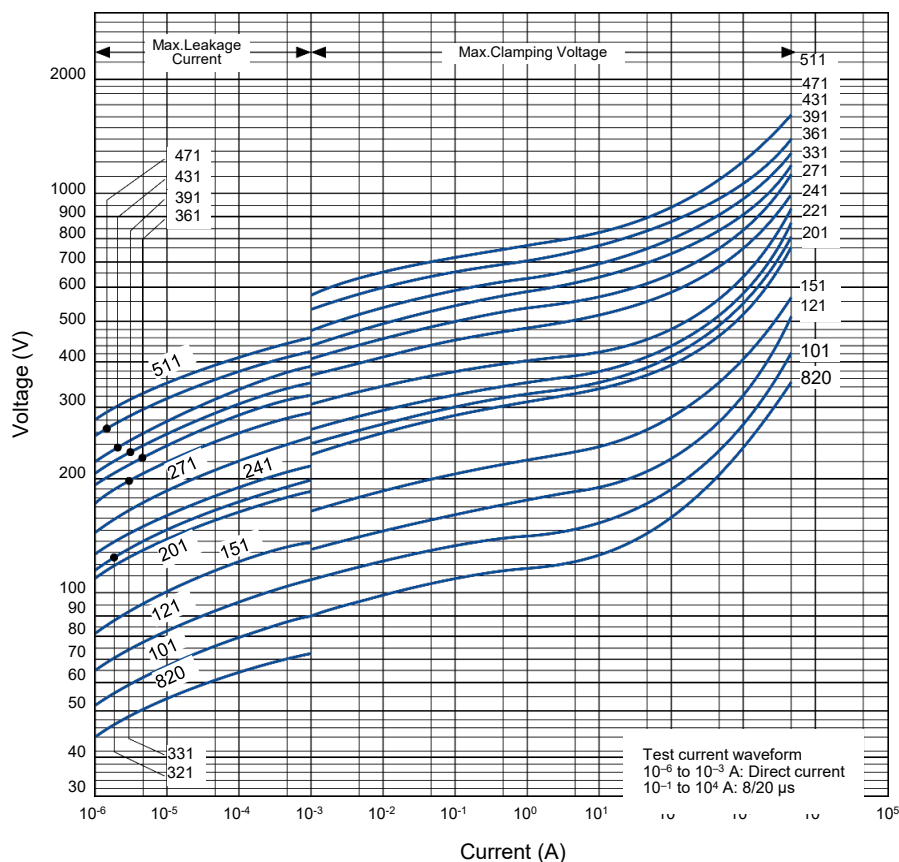
ERZV14D180 to ERZV14D680



## Typical characteristics

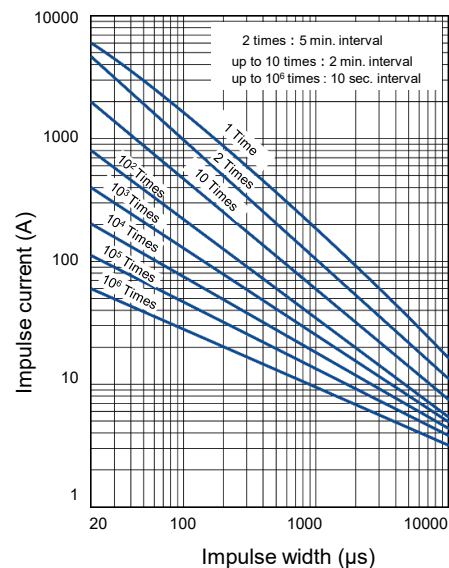
### Voltage vs. Current

#### ERZV14D820 to ERZV14D511

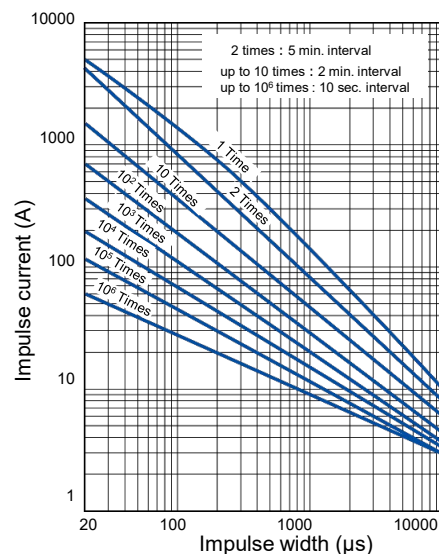


### Impulse Derating (Relation between impulse width and impulse current multiple)

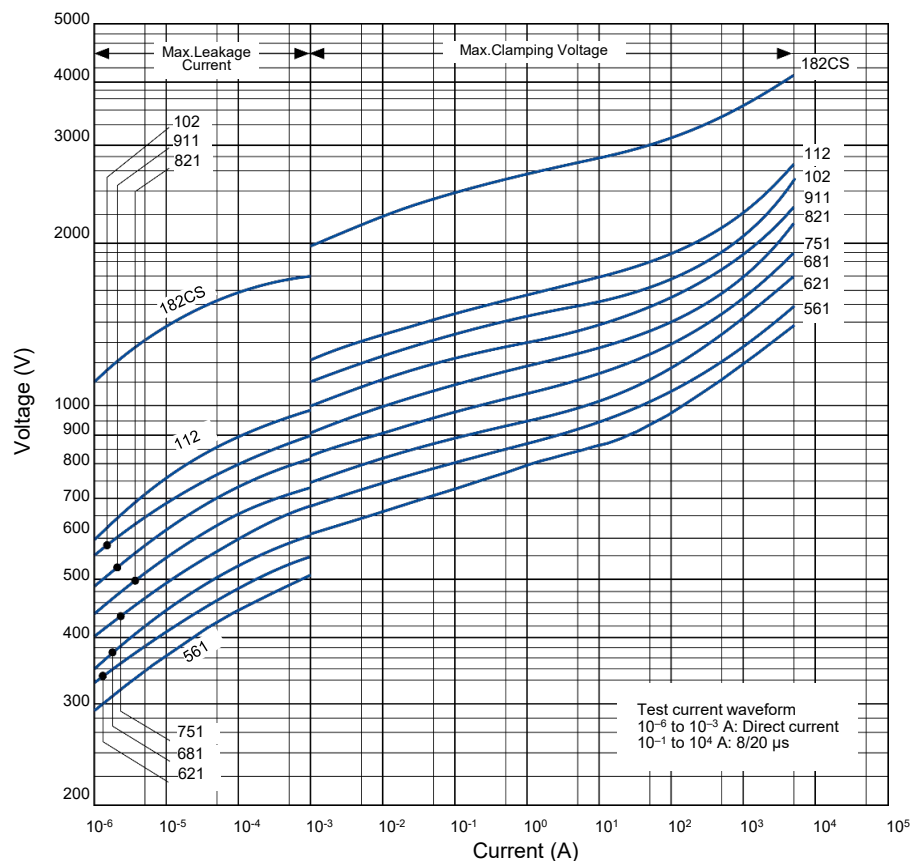
#### ERZV14D820 to ERZV14D511



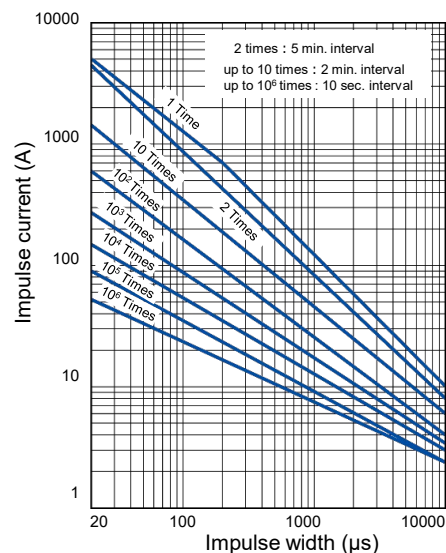
#### ERZV14D561 to ERZV14D112



#### ERZV14D561 to ERZV14D182CS



#### ERZV14D182CS



## Ratings and characteristics

●Operating temperature range : -40 to 85 °C

●Storage temperature range : -40 to 125 °C

| Part No.   | Varistor voltage<br>at 1 mA | Maximum<br>allowable voltage |           | Clamping<br>voltage<br>(max.)<br>**I <sub>p</sub> | Rated<br>power | Maximum energy |     | Maximum<br>peak current<br>(8/20 μs) |        | Capacitance<br>(max.)<br>at 1 kHz |        |         |
|------------|-----------------------------|------------------------------|-----------|---------------------------------------------------|----------------|----------------|-----|--------------------------------------|--------|-----------------------------------|--------|---------|
|            |                             | AC rms<br>(V)                | DC<br>(V) |                                                   |                | (V)            | (W) | (10/1000 μs)                         | (2 ms) |                                   | 1 time | 2 times |
|            |                             |                              |           |                                                   |                |                |     | (J)                                  | (J)    |                                   | (A)    | (A)     |
| ERZV20D180 | 18(16 to 20)                | 11                           | 14        | 36                                                | 0.2            | 13             | 12  | 3000                                 | 2000   | 40000                             |        |         |
| ERZV20D220 | 22(20 to 24)                | 14                           | 18        | 43                                                | 0.2            | 16             | 14  | 3000                                 | 2000   | 30000                             |        |         |
| ERZV20D270 | 27(24 to 30)                | 17                           | 22        | 53                                                | 0.2            | 19             | 17  | 3000                                 | 2000   | 24500                             |        |         |
| ERZV20D330 | 33(30 to 36)                | 20                           | 26        | 65                                                | 0.2            | 24             | 21  | 3000                                 | 2000   | 20000                             |        |         |
| ERZV20D390 | 39(35 to 43)                | 25                           | 31        | 77                                                | 0.2            | 28             | 25  | 3000                                 | 2000   | 13800                             |        |         |
| ERZV20D470 | 47(42 to 52)                | 30                           | 38        | 93                                                | 0.2            | 34             | 30  | 3000                                 | 2000   | 13500                             |        |         |
| ERZV20D560 | 56(50 to 62)                | 35                           | 45        | 110                                               | 0.2            | 41             | 36  | 3000                                 | 2000   | 12200                             |        |         |
| ERZV20D680 | 68(61 to 75)                | 40                           | 56        | 135                                               | 0.2            | 49             | 44  | 3000                                 | 2000   | 11500                             |        |         |
| ERZV20D820 | 82(74 to 90)                | 50                           | 65        | 135                                               | 1.0            | 56             | 40  | 10000                                | 7000   | 7500                              |        |         |
| ERZV20D101 | 100(90 to 110)              | 60                           | 85        | 165                                               | 1.0            | 70             | 50  | 10000                                | 7000   | 6500                              |        |         |
| ERZV20D121 | 120(108 to 132)             | 75                           | 100       | 200                                               | 1.0            | 85             | 60  | 10000                                | 7000   | 5500                              |        |         |
| ERZV20D151 | 150(135 to 165)             | 95                           | 125       | 250                                               | 1.0            | 106            | 75  | 10000                                | 7000   | 4500                              |        |         |

★The following part numbers, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

|            |                    |      |      |      |     |      |     |       |      |      |
|------------|--------------------|------|------|------|-----|------|-----|-------|------|------|
| ERZV20D201 | 200(185 to 225)    | 130  | 170  | 340  | 1.0 | 140  | 100 | 10000 | 7000 | 1700 |
| ERZV20D221 | 220(198 to 242)    | 140  | 180  | 360  | 1.0 | 155  | 110 | 10000 | 7000 | 1600 |
| ERZV20D241 | 240(216 to 264)    | 150  | 200  | 395  | 1.0 | 168  | 120 | 10000 | 7000 | 1500 |
| ERZV20D271 | 270(247 to 303)    | 175  | 225  | 455  | 1.0 | 190  | 135 | 10000 | 7000 | 1300 |
| ERZV20D331 | 330(297 to 363)    | 210  | 270  | 545  | 1.0 | 228  | 160 | 10000 | 6500 | 1100 |
| ERZV20D361 | 360(324 to 396)    | 230  | 300  | 595  | 1.0 | 255  | 180 | 10000 | 6500 | 1100 |
| ERZV20D391 | 390(351 to 429)    | 250  | 320  | 650  | 1.0 | 275  | 195 | 10000 | 6500 | 1100 |
| ERZV20D431 | 430(387 to 473)    | 275  | 350  | 710  | 1.0 | 303  | 215 | 10000 | 6500 | 1000 |
| ERZV20D471 | 470(423 to 517)    | 300  | 385  | 775  | 1.0 | 350  | 250 | 10000 | 6500 | 900  |
| ERZV20D511 | 510(459 to 561)    | 320  | 410  | 845  | 1.0 | 382  | 273 | 10000 | 6500 | 800  |
| ERZV20D561 | 560(504 to 616)    | 350  | 450  | 930  | 1.0 | 382  | 273 | 7500  | 6500 | 750  |
| ERZV20D621 | 620(558 to 682)    | 385  | 505  | 1025 | 1.0 | 382  | 273 | 7500  | 6500 | 700  |
| ERZV20D681 | 680(612 to 748)    | 420  | 560  | 1120 | 1.0 | 382  | 273 | 7500  | 6500 | 650  |
| ERZV20D751 | 750(675 to 825)    | 460  | 615  | 1240 | 1.0 | 420  | 300 | 7500  | 6500 | 600  |
| ERZV20D821 | 820(738 to 902)    | 510  | 670  | 1355 | 1.0 | 460  | 325 | 7500  | 6500 | 530  |
| ERZV20D911 | 910(819 to 1001)   | 550  | 745  | 1500 | 1.0 | 510  | 360 | 7500  | 6500 | 500  |
| ERZV20D102 | 1000(900 to 1100)  | 625  | 825  | 1650 | 1.0 | 565  | 400 | 7500  | 6500 | 450  |
| ERZV20D112 | 1100(990 to 1210)  | 680  | 895  | 1815 | 1.0 | 620  | 440 | 7500  | 6500 | 400  |
| ERZV20D182 | 1800(1700 to 1980) | 1000 | 1465 | 2970 | 1.0 | 1020 | 720 | 7500  | 6500 | 250  |

\*Ip Measuring current of clamping voltage 180 to 680 : 20 A, 820 to 182 : 100 A

## Dimensions in mm (not to scale)

Unit : mm

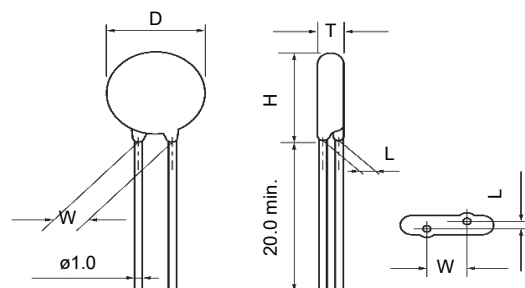
| Part No.   | D max. | T max. | W±1.0 | H max. | L±1.0 |
|------------|--------|--------|-------|--------|-------|
| ERZV20D180 | 21.5   | 5.1    | 10.0  | 24.5   | 1.5   |
| ERZV20D220 | 21.5   | 5.2    | 10.0  | 24.5   | 1.6   |
| ERZV20D270 | 21.5   | 5.3    | 10.0  | 24.5   | 1.7   |
| ERZV20D330 | 21.5   | 5.5    | 10.0  | 24.5   | 1.9   |
| ERZV20D390 | 21.5   | 5.5    | 10.0  | 24.5   | 1.9   |
| ERZV20D470 | 21.5   | 5.6    | 10.0  | 24.5   | 2.0   |
| ERZV20D560 | 21.5   | 5.7    | 10.0  | 24.5   | 2.1   |
| ERZV20D680 | 21.5   | 5.8    | 10.0  | 24.5   | 2.2   |
| ERZV20D820 | 21.5   | 4.9    | 10.0  | 24.5   | 1.8   |
| ERZV20D101 | 21.5   | 5.1    | 10.0  | 24.5   | 2.0   |
| ERZV20D121 | 21.5   | 5.3    | 10.0  | 24.5   | 2.2   |
| ERZV20D151 | 21.5   | 5.6    | 10.0  | 24.5   | 2.5   |

★ The following part numbers, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

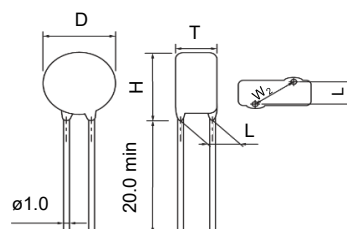
|            |      |      |      |      |     |
|------------|------|------|------|------|-----|
| ERZV20D201 | 21.5 | 5.2  | 10.0 | 24.5 | 2.1 |
| ERZV20D221 | 21.5 | 5.3  | 10.0 | 24.5 | 2.2 |
| ERZV20D241 | 21.5 | 5.4  | 10.0 | 24.5 | 2.3 |
| ERZV20D271 | 21.5 | 5.6  | 10.0 | 24.5 | 2.5 |
| ERZV20D331 | 21.5 | 5.9  | 10.0 | 24.5 | 2.8 |
| ERZV20D361 | 21.5 | 6.1  | 10.0 | 24.5 | 3.0 |
| ERZV20D391 | 21.5 | 6.2  | 10.0 | 24.5 | 3.1 |
| ERZV20D431 | 21.5 | 6.4  | 10.0 | 24.5 | 3.3 |
| ERZV20D471 | 21.5 | 6.6  | 10.0 | 24.5 | 3.5 |
| ERZV20D511 | 21.5 | 6.8  | 10.0 | 24.5 | 3.7 |
| ERZV20D561 | 22.5 | 7.1  | 10.0 | 25.5 | 4.2 |
| ERZV20D621 | 22.5 | 7.5  | 10.0 | 25.5 | 4.4 |
| ERZV20D681 | 22.5 | 7.8  | 10.0 | 25.5 | 4.7 |
| ERZV20D751 | 22.5 | 8.2  | 10.0 | 25.5 | 5.1 |
| ERZV20D821 | 22.5 | 8.5  | 10.0 | 25.5 | 5.4 |
| ERZV20D911 | 22.5 | 9.0  | 10.0 | 25.5 | 5.9 |
| ERZV20D102 | 22.5 | 9.5  | 10.0 | 25.5 | 6.4 |
| ERZV20D112 | 22.5 | 10.1 | 10.0 | 25.5 | 7.0 |

|            |      |      |       |      |             |
|------------|------|------|-------|------|-------------|
| ERZV20D182 | 23.5 | 14.8 | 15.0* | 28.0 | 10.7 (±2.0) |
|------------|------|------|-------|------|-------------|

\*: W<sub>2</sub>



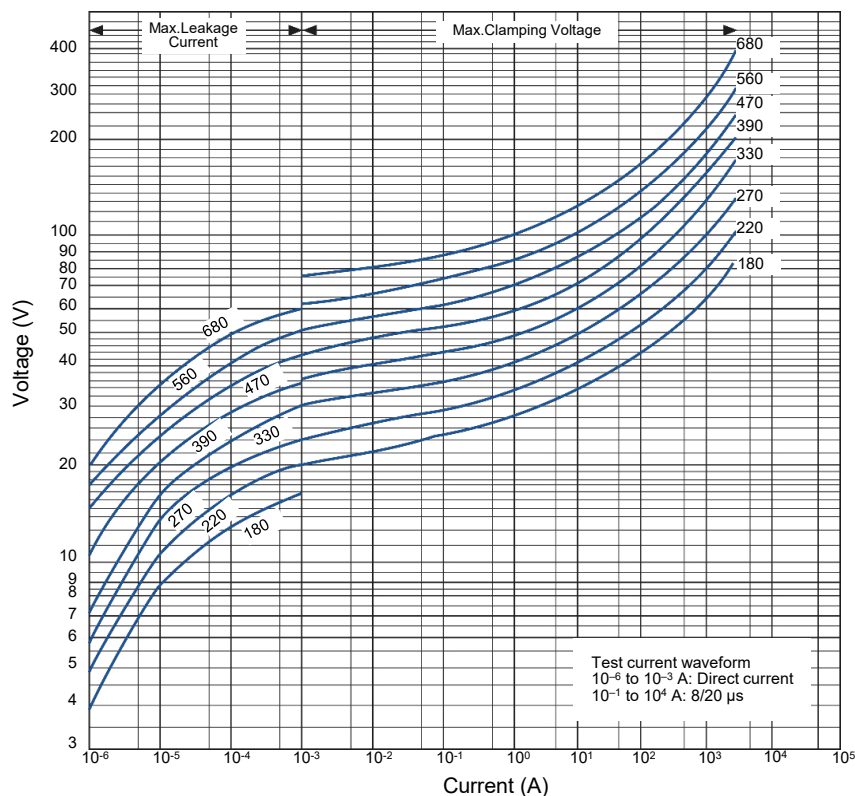
(ERZV20D182)



## Typical characteristics

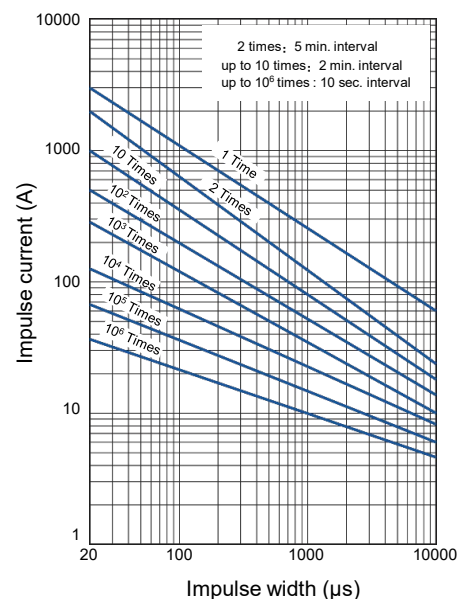
## Voltage vs. Current+B47:AZ78+B47:AX74

ERZV20D180 to ERZV20D680



## Impulse Derating (Relation between impulse width and impulse current multiple)

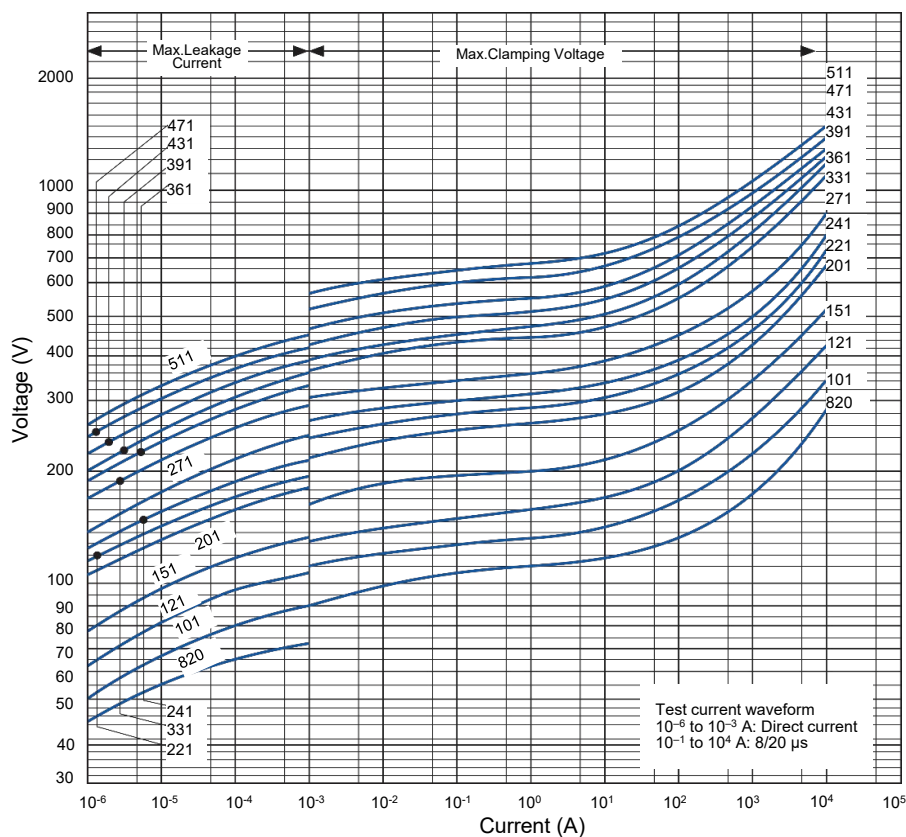
ERZV20D180 to ERZV20D680



## Typical characteristics

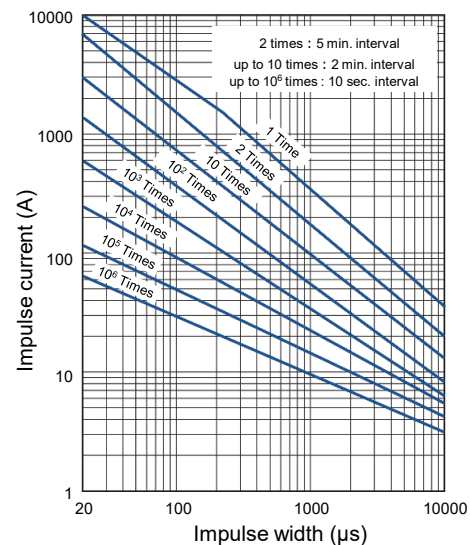
### Voltage vs. Current

ERZV20D820 to ERZV20D511

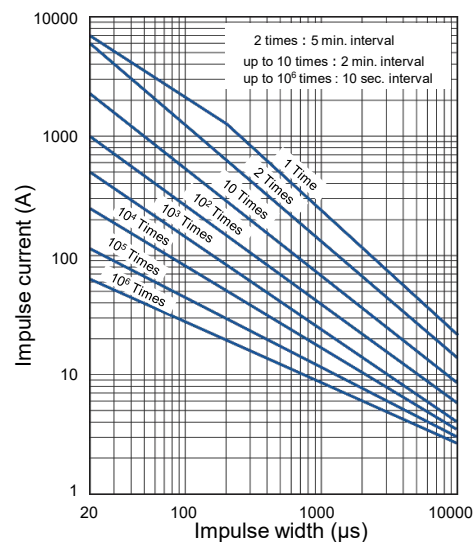


### Impulse Derating (Relation between impulse width and impulse current multiple)

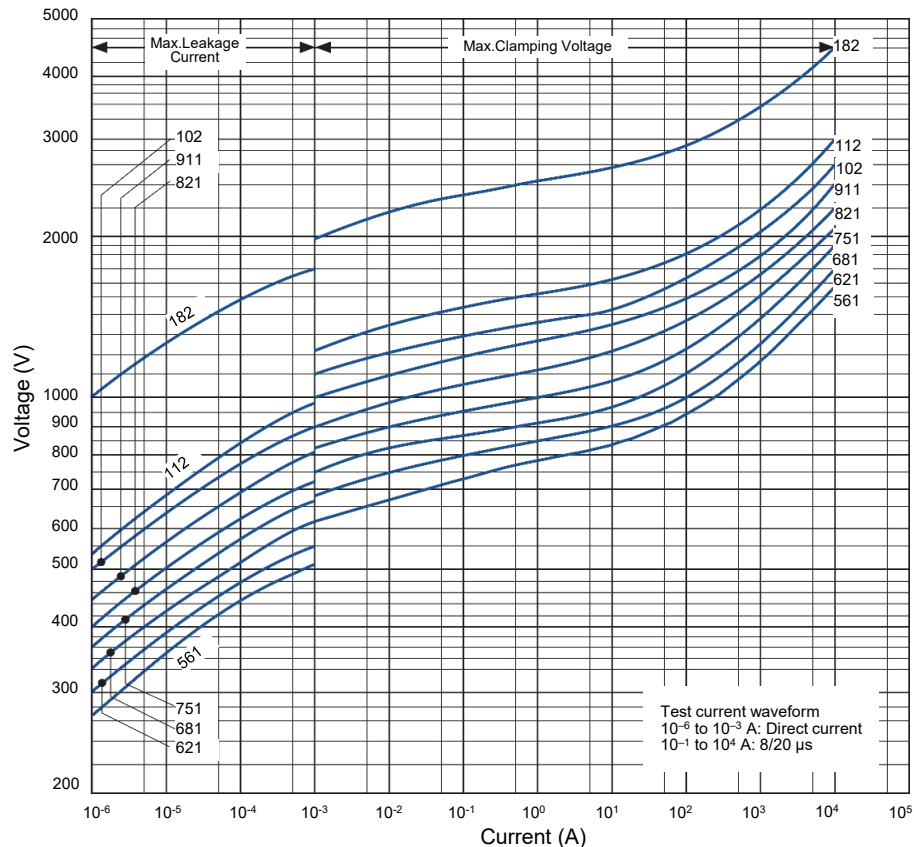
ERZV20D820 to ERZV20D511



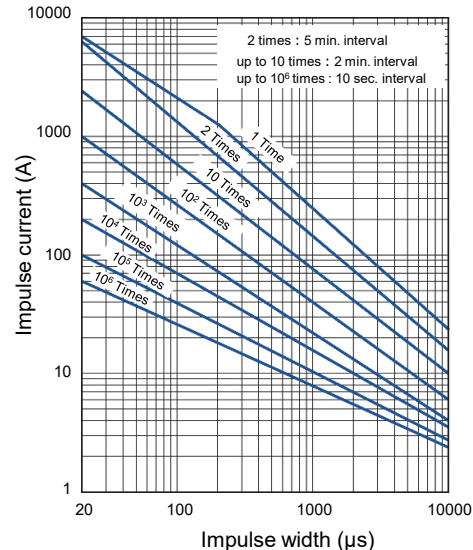
ERZV20D561 to ERZV20D112



ERZV20D561 to ERZV20D182

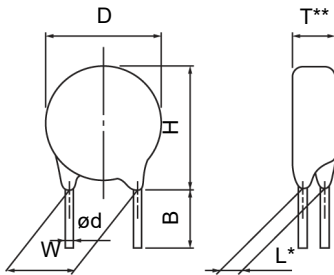


ERZV20D182



**Straight leads cut type (Bulk type)**

※ Ratings and characteristics is refer to bulk standard type.

**Dimensions in mm (not to scale)**

notes \* Dimension "L": Conforms to each individual specification.

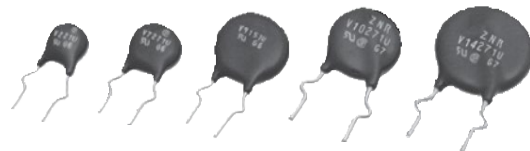
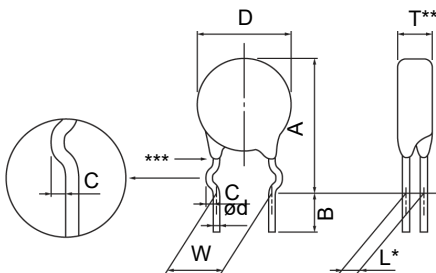
\*\* Dimension "T": Conforms to each individual specification.

Unit : mm

| Series                     | 5                                      | 7                                      | 9                                      | 10                                     |                                        |                                        | 14                                     |                                        |                                        |
|----------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| Varistor voltage           | 180 to 471                             | 180 to 511                             | 180 to 511                             | 180 to 511                             | 561 to 751                             | 821 to 112                             | 180 to 511                             | 561 to 751                             | 821 to 112                             |
| Symbol                     |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |
| D                          | 7.0 max.                               | 8.5 max.                               | 11.5max.                               | 11.5max.                               | 12.5max.                               | 12.5max.                               | 15.5 max.                              | 16.0max.                               | 16.0max.                               |
| H                          | 10.0 max.                              | 11.5 max.                              | 14.0max.                               | 14.5max.                               | 15.5max.                               | 15.5max.                               | 18.5 max.                              | 19.0max.                               | 19.0max.                               |
| W                          | 5.0±1.0                                | 5.0±1.0                                | 5.0±1.0                                | 7.5±1.0                                | 7.5±1.0                                | 7.5±1.0                                | 7.5±1.0                                | 7.5±1.0                                | 7.5±1.0                                |
| ø d                        | 0.60 <sup>+0.06</sup> <sub>-0.05</sub> | 0.60 <sup>+0.06</sup> <sub>-0.05</sub> | 0.60 <sup>+0.06</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> |
| B                          | 4.0±1.0                                | 4.0±1.0                                | 4.0±1.0                                | 4.0±1.0                                | 4.0±1.0                                | 4.0±1.5                                | 4.0±1.0                                | 4.0±1.0                                | 4.0±1.5                                |
| Standard products part No. | ERZV05D□□□CS                           | ERZV07D□□□CS                           | ERZV09D□□□CS                           | ERZV10D□□□CS                           | ERZV10D□□□CS                           | ERZV10D□□□C1                           | ERZV14D□□□CS                           | ERZV14D□□□CS                           | ERZV14D□□□C1                           |

**Crimped leads cut type (Bulk Type)**

※ Ratings and characteristics is refer to bulk standard type.

**Dimensions in mm (not to scale)**

notes \* Dimension "L": Conforms to each individual specification.

\*\* Dimension "T": Conforms to each individual specification.

\*\*\* Resin extenysions : No resin below the center of the hook.

Unit : mm

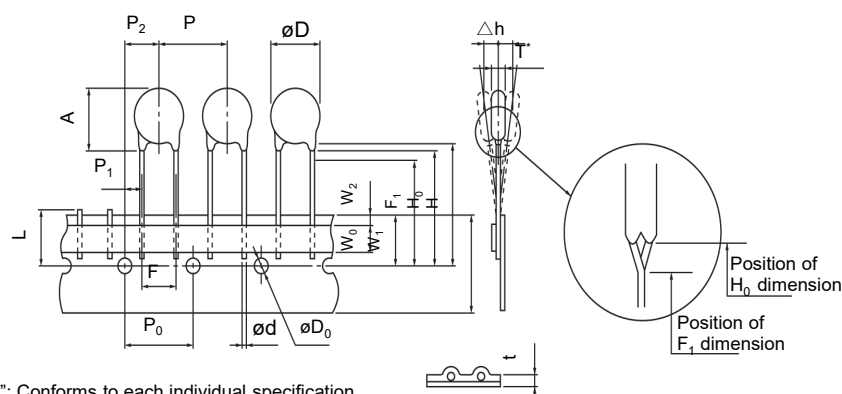
| Series                     | 5                                      | 7                                      | 9                                      | 10                                     |                                        |                                        | 14                                     |                                        |                                        |
|----------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| Varistor voltage           | 180 to 471                             | 180 to 511                             | 180 to 511                             | 180 to 511                             | 561 to 751                             | 821 to 112                             | 180 to 511                             | 561 to 751                             | 821 to 112                             |
| Symbol                     |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |                                        |
| A                          | 13.0 max.                              | 14.5 max.                              | 17.5 max.                              | 17.5 max.                              | 19.0 max.                              | 20.0 max.                              | 21.0 max.                              | 22.0 max.                              | 23.5 max.                              |
| D                          | 7.0 max.                               | 8.5 max.                               | 11.5max.                               | 11.5max.                               | 12.5max.                               | 12.5max.                               | 15.5 max.                              | 16.0max.                               | 16.0max.                               |
| C                          | 1.2±0.4                                | 1.2±0.4                                | 1.2±0.4                                | 1.4±0.4                                | 1.4±0.4                                | 1.4±0.4                                | 1.4±0.4                                | 1.4±0.4                                | 1.4±0.4                                |
| W                          | 5.0±1.0                                | 5.0±1.0                                | 5.0±1.0                                | 7.5±1.0                                | 7.5±1.0                                | 7.5±1.0                                | 7.5±1.0                                | 7.5±1.0                                | 7.5±1.0                                |
| ø d                        | 0.60 <sup>+0.06</sup> <sub>-0.05</sub> | 0.60 <sup>+0.06</sup> <sub>-0.05</sub> | 0.60 <sup>+0.06</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> |
| B                          | 4.0±1.0                                | 4.0±1.0                                | 4.0±1.0                                | 4.0±1.0                                | 4.0±1.0                                | 4.0±1.5                                | 4.0±1.0                                | 4.0±1.0                                | 4.0±1.5                                |
| Standard products part No. | ERZV05V□□□CS                           | ERZV07V□□□CS                           | ERZV09V□□□CS                           | ERZV10V□□□CS                           | ERZV10V□□□CS                           | ERZV10V□□□C1                           | ERZV14V□□□CS                           | ERZV14V□□□CS                           | ERZV14V□□□C1                           |

# Taping specifications for automated assembly (Straight leads and taping)

※ Ratings and characteristics is refer to bulk standard type.

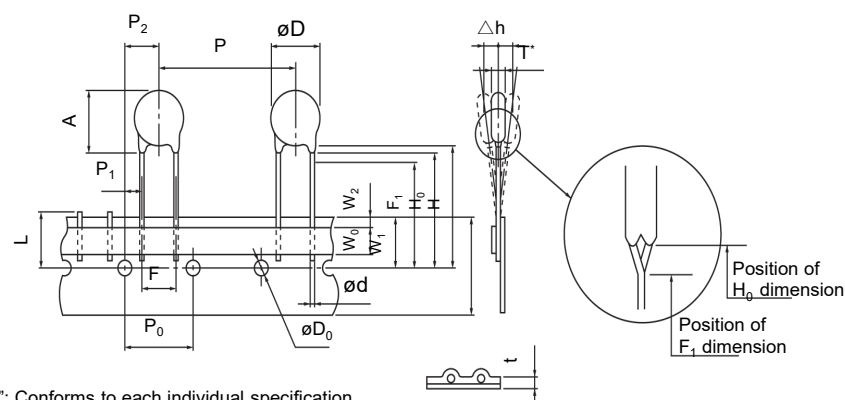
## Dimensions in mm (not to scale)

Type I・II



\* Dimension "T": Conforms to each individual specification.

Type III・IV



\* Dimension "T": Conforms to each individual specification.

Unit : mm

| Series                     | 5                                      | 7                                      | 9                                      | 10                                     |                                        |                                        | 14                                     |                                        |                                        |
|----------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| Varistor Voltage           | 180 to 471                             | 180 to 511                             | 180 to 511                             | 180 to 331                             | 361 to 511                             | 561 to 112                             | 180 to 331                             | 361 to 511                             | 561 to 112                             |
| 記号<br>Type                 | Type I                                 | Type I                                 | Type I                                 | Type I                                 | Type II                                | Type II                                | type III                               | Type IV                                | Type IV                                |
| P                          | 12.7±1.0                               | 12.7±1.0                               | 12.7±1.0                               | 15.0±1.0                               | 15.0±1.0                               | 15.0±1.0                               | 30.0±1.0                               | 30.0±1.0                               | 30.0±1.0                               |
| P <sub>0</sub>             | 12.7±0.3                               | 12.7±0.3                               | 12.7±0.3                               | 15.0±0.3                               | 15.0±0.3                               | 15.0±0.3                               | 15.0±0.3                               | 15.0±0.3                               | 15.0±0.3                               |
| P <sub>1</sub>             | 3.85±0.70                              | 3.85±0.70                              | 3.85±0.70                              | 3.75±0.70                              | 3.75±0.70                              | 3.75±0.70                              | 3.75±0.70                              | 3.75±0.70                              | 3.75±0.70                              |
| P <sub>2</sub>             | 6.35±1.30                              | 6.35±1.30                              | 6.35±1.30                              | 7.5±1.3                                | 7.5±1.3                                | 7.5±1.3                                | 7.5±1.3                                | 7.5±1.3                                | 7.5±1.3                                |
| ø d                        | 0.60 <sup>+0.06</sup> <sub>-0.05</sub> | 0.60 <sup>+0.06</sup> <sub>-0.05</sub> | 0.60 <sup>+0.06</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> <sub>-0.05</sub> |
| F                          | 5.0±0.5                                | 5.0±0.5                                | 5.0±0.5                                | 7.5±0.5                                | 7.5±0.5                                | 7.5±0.5                                | 7.5±0.5                                | 7.5±0.5                                | 7.5±0.5                                |
| △ h                        | 0±2                                    | 0±2                                    | 0±2                                    | 0±2                                    | 0±2                                    | 0±2                                    | 0±2                                    | 0±2                                    | 0±2                                    |
| W                          | 18.0 <sup>+1.0</sup> <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> <sub>-0.5</sub>   |
| W <sub>0</sub>             | 5.0 min.                               | 5.0 min.                               | 5.0 min.                               | 5.0 min.                               | 5.0 min.                               | 5.0 min.                               | 5.0 min.                               | 5.0 min.                               | 5.0 min.                               |
| W <sub>1</sub>             | 9.0±0.5                                | 9.0±0.5                                | 9.0±0.5                                | 9.0±0.5                                | 9.0±0.5                                | 9.0±0.5                                | 9.0±0.5                                | 9.0±0.5                                | 9.0±0.5                                |
| W <sub>2</sub>             | 3 max.                                 | 3 max.                                 | 3 max.                                 | 3 max.                                 | 3 max.                                 | 3 max.                                 | 3 max.                                 | 3 max.                                 | 3 max.                                 |
| H                          | Approx. 20                             | Approx. 20                             | Approx. 20                             | Approx. 22                             | Approx. 22                             | Approx. 22                             | Approx. 22                             | Approx. 22                             | Approx. 22                             |
| H <sub>0</sub>             | 17.0±0.5                               | 17.0±0.5                               | 17.0±0.5                               | 18.0 <sup>+2.0</sup> <sub>0</sub>      | —                                      | —                                      | 18.0 <sup>+2.0</sup> <sub>0</sub>      | —                                      | —                                      |
| F <sub>1</sub>             | —                                      | —                                      | —                                      | —                                      | 16.00 <sup>+0.75</sup> <sub>-0.5</sub> | 16.00 <sup>+0.75</sup> <sub>-0.5</sub> | —                                      | 16.00 <sup>+0.75</sup> <sub>-0.5</sub> | 16.00 <sup>+0.75</sup> <sub>-0.5</sub> |
| øD <sub>0</sub>            | ø4.0±0.2                               | ø4.0±0.2                               | ø4.0±0.2                               | ø4.0±0.2                               | ø4.0±0.2                               | ø4.0±0.2                               | ø4.0±0.2                               | ø4.0±0.2                               | ø4.0±0.2                               |
| t                          | 0.6±0.3                                | 0.6±0.3                                | 0.6±0.3                                | 0.6±0.3                                | 0.6±0.3                                | 0.6±0.3                                | 0.6±0.3                                | 0.6±0.3                                | 0.6±0.3                                |
| L                          | 11 max.                                | 11 max.                                | 11 max.                                | 11 max.                                | 11 max.                                | 11 max.                                | 11 max.                                | 11 max.                                | 11 max.                                |
| øD                         | 7.0 max.                               | 8.5 max.                               | 11.5 max.                              | 11.5 max.                              | 11.5 max.                              | 12.5 max.                              | 15.5 max.                              | 15.5 max.                              | 16.0 max.                              |
| A                          | 10.0 max.                              | 11.5 max.                              | 14.0 max.                              | 14.5 max.                              | 14.5 max.                              | 15.5 max.                              | 18.5 max.                              | 18.5 max.                              | 19.0 max.                              |
| Standard Products Part No. | ERZVA5D□□□                             | ERZVA7D□□□                             | ERZVA9D□□□                             | ERZVGAD□□□                             | ERZVGAD□□□                             | ERZVGAD□□□                             | ERZVGED□□□                             | ERZVGED□□□                             | ERZVGED□□□                             |

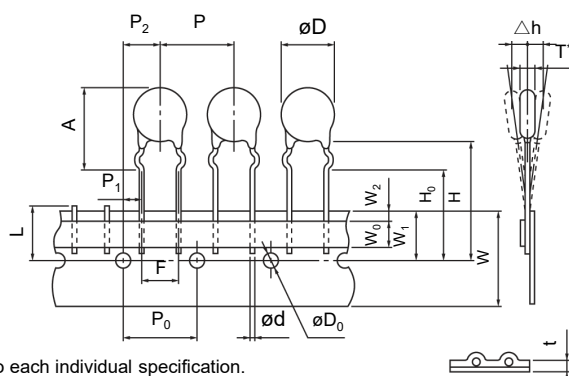
## D type / V series (Taping specifications)

### Taping specifications for automated assembly (Crimped leads and taping)

※ Ratings and characteristics is refer to bulk standard type.

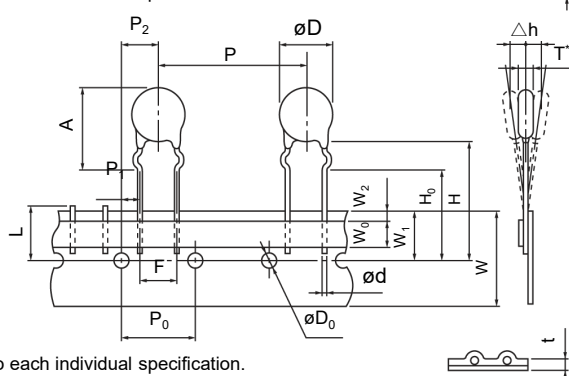
### Dimensions in mm (not to scale)

Type I



\* Dimension "T": Conforms to each individual specification.

Type II



\* Dimension "T": Conforms to each individual specification.

Unit : mm

| Series                     | 5                                        | 7                                        | 9                                        | 10                                       |                                          |                                          | 14                                       |                                          |                                          |
|----------------------------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|
| Varister Voltage           | 180 to 471                               | 180 to 511                               | 180 to 511                               | 180 to 331                               | 361 to 511                               | 561 to 112                               | 180 to 331                               | 361 to 511                               | 561 to 112                               |
| Type                       | Type I                                   | Type I                                   | Type I                                   | Type I                                   | Type I                                   | Type I                                   | Type II                                  | Type II                                  | Type II                                  |
| P                          | 12.7±1.0                                 | 12.7±1.0                                 | 12.7±1.0                                 | 15.0±1.0                                 | 15.0±1.0                                 | 15.0±1.0                                 | 30.0±1.0                                 | 30.0±1.0                                 | 30.0±1.0                                 |
| P <sub>0</sub>             | 12.7±0.3                                 | 12.7±0.3                                 | 12.7±0.3                                 | 15.0±0.3                                 | 15.0±0.3                                 | 15.0±0.3                                 | 15.0±0.3                                 | 15.0±0.3                                 | 15.0±0.3                                 |
| P <sub>1</sub>             | 3.85±0.70                                | 3.85±0.70                                | 3.85±0.70                                | 3.75±0.70                                | 3.75±0.70                                | 3.75±0.70                                | 3.75±0.70                                | 3.75±0.70                                | 3.75±0.70                                |
| P <sub>2</sub>             | 6.35±1.30                                | 6.35±1.30                                | 6.35±1.30                                | 7.5±1.3                                  | 7.5±1.3                                  | 7.5±1.3                                  | 7.5±1.3                                  | 7.5±1.3                                  | 7.5±1.3                                  |
| ø d                        | 0.60 <sup>+0.06</sup> / <sub>-0.05</sub> | 0.60 <sup>+0.06</sup> / <sub>-0.05</sub> | 0.60 <sup>+0.06</sup> / <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> / <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> / <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> / <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> / <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> / <sub>-0.05</sub> | 0.80 <sup>+0.08</sup> / <sub>-0.05</sub> |
| F                          | 5.0±0.5                                  | 5.0±0.5                                  | 5.0±0.5                                  | 7.5±0.5                                  | 7.5±0.5                                  | 7.5±0.5                                  | 7.5±0.5                                  | 7.5±0.5                                  | 7.5±0.5                                  |
| Δ h                        | 0±2                                      | 0±2                                      | 0±2                                      | 0±2                                      | 0±2                                      | 0±2                                      | 0±2                                      | 0±2                                      | 0±2                                      |
| W                          | 18.0 <sup>+1.0</sup> / <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> / <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> / <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> / <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> / <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> / <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> / <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> / <sub>-0.5</sub>   | 18.0 <sup>+1.0</sup> / <sub>-0.5</sub>   |
| W <sub>0</sub>             | 5.0 min.                                 | 5.0 min.                                 | 5.0 min.                                 | 5.0 min.                                 | 5.0 min.                                 | 5.0 min.                                 | 5.0 min.                                 | 5.0 min.                                 | 5.0 min.                                 |
| W <sub>1</sub>             | 9.0±0.5                                  | 9.0±0.5                                  | 9.0±0.5                                  | 9.0±0.5                                  | 9.0±0.5                                  | 9.0±0.5                                  | 9.0±0.5                                  | 9.0±0.5                                  | 9.0±0.5                                  |
| W <sub>2</sub>             | 3 max.                                   | 3 max.                                   | 3 max.                                   | 3 max.                                   | 3 max.                                   | 3 max.                                   | 3 max.                                   | 3 max.                                   | 3 max.                                   |
| H                          | Approx. 22                               | Approx. 22                               | Approx. 22                               | Approx. 22                               | Approx. 22                               | Approx. 22                               | Approx. 22                               | Approx. 22                               | Approx. 22                               |
| H <sub>0</sub>             | 17.0±0.5                                 | 17.0±0.5                                 | 17.0±0.5                                 | 16.0±0.5                                 | 16.0±0.5                                 | 16.0±0.5                                 | 16.0±0.5                                 | 16.0±0.5                                 | 16.0±0.5                                 |
| øD <sub>0</sub>            | ø4.0±0.2                                 | ø4.0±0.2                                 | ø4.0±0.2                                 | ø4.0±0.2                                 | ø4.0±0.2                                 | ø4.0±0.2                                 | ø4.0±0.2                                 | ø4.0±0.2                                 | ø4.0±0.2                                 |
| t                          | 0.6±0.3                                  | 0.6±0.3                                  | 0.6±0.3                                  | 0.6±0.3                                  | 0.6±0.3                                  | 0.6±0.3                                  | 0.6±0.3                                  | 0.6±0.3                                  | 0.6±0.3                                  |
| L                          | 11 max.                                  | 11 max.                                  | 11 max.                                  | 11 max.                                  | 11 max.                                  | 11 max.                                  | 11 max.                                  | 11 max.                                  | 11 max.                                  |
| øD                         | 7.0 max.                                 | 8.5 max.                                 | 11.5 max.                                | 11.5 max.                                | 11.5 max.                                | 12.5 max.                                | 15.5 max.                                | 15.5 max.                                | 16.0 max.                                |
| A                          | 13.0 max.                                | 14.5 max.                                | 17.5 max.                                | 17.5 max.                                | 17.5 max.                                | *(refer)                                 | 21.0 max.                                | 21.0 max.                                | *(refer)                                 |
| Standard Products Part No. | ERZVA5V□□□                               | ERZVA7V□□□                               | ERZVA9V□□□                               | ERZVEAV□□□                               | ERZVEAV□□□                               | ERZVEAV□□□                               | ERZVEEV□□□                               | ERZVEEV□□□                               | ERZVEEV□□□                               |

#### \*Dimension "A"

| Part No.   | 10 Series | 14 Series |
|------------|-----------|-----------|
| ERZV□□V561 | 19.0 max. | 22.0 max. |
| ERZV□□V621 | 19.0 max. | 22.0 max. |
| ERZV□□V681 | 19.0 max. | 22.0 max. |
| ERZV□□V751 | 19.0 max. | 22.0 max. |

| Part No.   | 10 Series | 14 Series |
|------------|-----------|-----------|
| ERZV□□V821 | 20.0 max. | 23.5 max. |
| ERZV□□V911 | 20.0 max. | 23.5 max. |
| ERZV□□V102 | 20.0 max. | 23.5 max. |
| ERZV□□V112 | 20.0 max. | 23.5 max. |

## Application note for safety standards

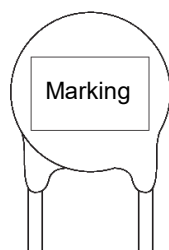
- Approvals products lists in "Reference Guide to Standard Products."
- UL and VDE : Registered in "Type name", it isn't registered in "Panasonic Part No."
- CQC : Registered in "Panasonic Part No."
- "Rated Voltages" are specified for UL recognized components in list shown below.

## The AC rated voltage and maximum allowable voltage

| Type name | Maximum allowable voltage |        | Rated voltage (Vrms) |                    |
|-----------|---------------------------|--------|----------------------|--------------------|
|           | ACrms (V)                 | DC (V) | UL1449               | CSA C22.2 No.269.5 |
| V*820U    | 50                        | 65     | 45                   | N/A                |
| V*101U    | 60                        | 85     | 55                   | N/A                |
| V*121U    | 75                        | 100    | 68                   | N/A                |
| V*151U    | 95                        | 125    | 86                   | N/A                |
| V*201U    | 130                       | 170    | 118                  | 118                |
| V*221U    | 140                       | 180    | 127                  | 127                |
| V*241U    | 150                       | 200    | 136                  | 136                |
| V*271U    | 175                       | 225    | 159                  | 159                |
| V*331U    | 210                       | 270    | 189                  | 189                |
| V*361U    | 230                       | 300    | 209                  | 209                |
| V*391U    | 250                       | 320    | 227                  | 227                |
| V*431U    | 275                       | 350    | 250                  | 250                |
| V*471U    | 300                       | 385    | 272                  | 272                |
| V*511U    | 320                       | 410    | 291                  | 291                |
| V*561U    | 350                       | 450    | 320                  | 320                |
| V*621U    | 385                       | 505    | 350                  | 350                |
| V*681U    | 420                       | 560    | 381                  | 381                |
| V*751U    | 460                       | 615    | 418                  | 418                |
| V*821U    | 510                       | 670    | 463                  | 463                |
| V*911U    | 550                       | 745    | 500                  | 500                |
| V*102U    | 625                       | 825    | 568                  | 568                |
| V*112U    | 680                       | 895    | 600                  | 618                |
| V*182U    | 1000                      | 1465   | 600                  | 909                |

\* : 5 Series is blank, 7 series is 7, 9 series is 9, 10 series is 10, 14 series is 14, 20 series is 20

## Explanation of the contents



| Mark            | Explanation of the content              |                                                              |
|-----------------|-----------------------------------------|--------------------------------------------------------------|
| V*□□□           | Abbreviation of Part No.<br>(Type name) | [ □□□<br>Nominal varistor volage ]                           |
| V*□□□U          |                                         |                                                              |
| ○               | Factory identification mark             | None : Japan<br>Q : Indonesia                                |
| ◆ <sup>*1</sup> | Year code                               | 2019 : 9, 2020 : K, 2021 : A<br>2022 : B, 2023 : C, 2024 : D |
| ◇               | Monthly code                            | Jan : 1 to Sep : 9,<br>Oct. : 0, Nov. : N, Dec. : D          |
|                 | UL recognized components mark           |                                                              |
|                 | CSA monogram                            |                                                              |

\* : 5 series is blank, 7 series is 7, 9 series is 9, 10 series is 10, 14 series is 14, 20 series is 20

\*1: If the 10's digit of a Christian year is an even year, as an end abbreviation, an alphabetic character is used.

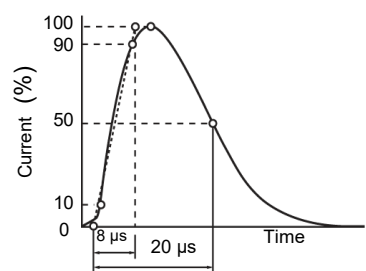
1 : A, 2 : B, 3 : C, 4 : D, 5 : E, 6 : F, 7 : G, 8 : H, 9 : J, 0 : K

If the 10's digit of a Christian year is an odd year, as an end abbreviation, a number is used.

## Marking contents

| Series (Example)<br>Varistor voltage | 5<br>(ERZV05D□□□) | 7<br>(ERZV07D□□□) | 9<br>(ERZV09D□□□) | 10<br>(ERZV10D□□□)    | 14<br>(ERZV14D□□□)    | 20<br>(ERZV20D□□□)    |
|--------------------------------------|-------------------|-------------------|-------------------|-----------------------|-----------------------|-----------------------|
| 180 to 680                           | V□□□<br>○◆◇       | V7□□□<br>○◆◇      | V9□□□<br>○◆◇      | ZNR<br>V10□□□<br>○◆◇  | ZNR<br>V14□□□<br>○◆◇  | ZNR<br>V20□□□<br>○◆◇  |
| 820 to 151                           | V□□□U<br>○◆◇      | V7□□□U<br>○◆◇     | V9□□□U<br>○◆◇     | ZNR<br>V10□□□U<br>○◆◇ | ZNR<br>V14□□□U<br>○◆◇ | ZNR<br>V20□□□U<br>○◆◇ |
| 201 or more                          | <br>V□□□U<br>○◆◇  | <br>V7□□□U<br>○◆◇ | <br>V9□□□U<br>○◆◇ | ZNR<br>V10□□□U<br>○◆◇ | ZNR<br>V14□□□U<br>○◆◇ | ZNR<br>V20□□□U<br>○◆◇ |

## Performance characteristics

| Characteristics                                 |                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Test methods / description                                                                                                                                                                                               | Specifications               |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
|-------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------|--------------------|-------------------------------------------------|------------------------|------------------------|---------|-----------------|--|--------------------------|---------------|---------------|--|--------------------------|----------------|----------------|--|--------------------------|----------------|----------------|--|--------------------------|----------------|----------------|--|--------------------------|----------------|----------------|--|--------------------------|-----------------|----------------|--|--------------------------|----------------|----------------|--|--------------------------|-----------------|----------------|--|--------------------------|-----------------|----------------|--|--------------------------|-----------------|----------------|--|--------------|-----------------|----------------|--|--------------------------|-----------------|-----------------|--|--------------|-----------------|----------------|--|--------------------------|-----------------|-----------------|--|------------|-----------------|-----------------|--|------------------------------------------|
| Standard test condition                         |                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Electrical measurements (initial/after tests) shall be conducted at temperature of 5 to 35 °C, relative humidity of maximum 85 %.                                                                                        | —                            |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| Electrical                                      | Varistor voltage                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The voltage between two terminals with the specified measuring current C <sub>mA</sub> DC applied is called VC or V <sub>CmA</sub> . The measurement shall be made as fast as possible to avoid heat affection.          | To meet the specified value. |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
|                                                 | Maximum allowable voltage                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The maximum sinusoidal RMS voltage or maximum DC voltage that can be applied continuously.                                                                                                                               |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
|                                                 | Clamping voltage                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The maximum voltage between two terminals with the specified standard impulse current (8/20 μs) illustrated below applied. <div></div> |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
|                                                 | Rated power                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The power that can be applied in the specified ambient temperature.                                                                                                                                                      |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
|                                                 | Maximum energy                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The maximum energy within the varistor voltage change of ±10 % when a single impulse current of 2 ms or 10/1000 μs is applied.                                                                                           |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
|                                                 | Maximum peak current (Withstanding Surge Current) | 2 times                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The maximum current within the varistor voltage change of ±10 % when a standard impulse current of 8/20 μs is applied two times with an interval of 5 minutes.                                                           |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
|                                                 |                                                   | 1 time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | The maximum current within the varistor voltage change of ±10 % with a single standard impulse current of 8/20 μs is applied.                                                                                            |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
|                                                 | Temperature coefficient of varistor voltage       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | $\frac{V_{CmA} \text{ at } 85\text{ °C} - V_{CmA} \text{ at } 25\text{ °C}}{V_{CmA} \text{ at } 25\text{ °C}} \times \frac{1}{60} 100(\%/^{\circ}\text{C})$                                                              | 0 to -0.05 %/ °C max.        |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
|                                                 | Capacitance                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Capacitance shall be measured at 1 kHz ±10 %, 1 Vrms max. (1 MHz ±10 % below 100 pF), 0 V bias and 20±2 °C.                                                                                                              | To meet the specified value. |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| Withstanding voltage (Body Insulation)          |                                                   | The specified voltage shall be applied between both terminals of the specimen connected together and metal foil closely wrapped round its body for 1 minute. <table><tr><th>Classification (Nominal varistor voltage)</th><th>Test Voltage (AC)</th></tr><tr><td>V<sub>0.1 mA</sub>, V<sub>1 mA</sub> ≤ 330 V</td><td>1000 Vrms</td></tr><tr><td>V<sub>0.1 mA</sub>, V<sub>1 mA</sub> &gt; 330 V</td><td>1500 Vrms</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Classification (Nominal varistor voltage)                                                                                                                                                                                | Test Voltage (AC)            | V <sub>0.1 mA</sub> , V <sub>1 mA</sub> ≤ 330 V | 1000 Vrms          | V <sub>0.1 mA</sub> , V <sub>1 mA</sub> > 330 V | 1500 Vrms              | No breakdown           |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| Classification (Nominal varistor voltage)       | Test Voltage (AC)                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| V <sub>0.1 mA</sub> , V <sub>1 mA</sub> ≤ 330 V | 1000 Vrms                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| V <sub>0.1 mA</sub> , V <sub>1 mA</sub> > 330 V | 1500 Vrms                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| Impulse life                                    |                                                   | The change of VC shall be measured after the impulse current listed below is applied 10000 or 100000 times continuously with the interval of 10 seconds at room temperature. <table><tr><th rowspan="3">Part No.</th><th>Item</th><th>Impulse Life( I )</th><th>Impulse Life( II )</th></tr><tr><th>Times</th><th>×10<sup>4</sup> Times</th><th>×10<sup>5</sup> Times</th></tr><tr><th>Current</th><th colspan="2">Impulse Current</th></tr><tr><td>ERZV05D180 to ERZV05D680</td><td>8 A (8/20 μs)</td><td>5 A (8/20 μs)</td><td></td></tr><tr><td>ERZV07D180 to ERZV07D680</td><td>25 A (8/20 μs)</td><td>15 A (8/20 μs)</td><td></td></tr><tr><td>ERZV09D180 to ERZV09D680</td><td>50 A (8/20 μs)</td><td>35 A (8/20 μs)</td><td></td></tr><tr><td>ERZV10D180 to ERZV10D680</td><td>50 A (8/20 μs)</td><td>35 A (8/20 μs)</td><td></td></tr><tr><td>ERZV14D180 to ERZV14D680</td><td>90 A (8/20 μs)</td><td>50 A (8/20 μs)</td><td></td></tr><tr><td>ERZV20D180 to ERZV20D680</td><td>130 A (8/20 μs)</td><td>65 A (8/20 μs)</td><td></td></tr><tr><td>ERZV05D820 to ERZV05D471</td><td>40 A (8/20 μs)</td><td>25 A (8/20 μs)</td><td></td></tr><tr><td>ERZV07D820 to ERZV07D511</td><td>100 A (8/20 μs)</td><td>60 A (8/20 μs)</td><td></td></tr><tr><td>ERZV09D820 to ERZV09D511</td><td>150 A (8/20 μs)</td><td>85 A (8/20 μs)</td><td></td></tr><tr><td>ERZV10D820 to ERZV10D112</td><td>150 A (8/20 μs)</td><td>85 A (8/20 μs)</td><td></td></tr><tr><td>ERZV10D182CS</td><td>120 A (8/20 μs)</td><td>75 A (8/20 μs)</td><td></td></tr><tr><td>ERZV14D820 to ERZV14D112</td><td>200 A (8/20 μs)</td><td>110 A (8/20 μs)</td><td></td></tr><tr><td>ERZV14D182CS</td><td>150 A (8/20 μs)</td><td>90 A (8/20 μs)</td><td></td></tr><tr><td>ERZV20D820 to ERZV20D112</td><td>250 A (8/20 μs)</td><td>120 A (8/20 μs)</td><td></td></tr><tr><td>ERZV20D182</td><td>200 A (8/20 μs)</td><td>100 A (8/20 μs)</td><td></td></tr></table> | Part No.                                                                                                                                                                                                                 | Item                         | Impulse Life( I )                               | Impulse Life( II ) | Times                                           | ×10 <sup>4</sup> Times | ×10 <sup>5</sup> Times | Current | Impulse Current |  | ERZV05D180 to ERZV05D680 | 8 A (8/20 μs) | 5 A (8/20 μs) |  | ERZV07D180 to ERZV07D680 | 25 A (8/20 μs) | 15 A (8/20 μs) |  | ERZV09D180 to ERZV09D680 | 50 A (8/20 μs) | 35 A (8/20 μs) |  | ERZV10D180 to ERZV10D680 | 50 A (8/20 μs) | 35 A (8/20 μs) |  | ERZV14D180 to ERZV14D680 | 90 A (8/20 μs) | 50 A (8/20 μs) |  | ERZV20D180 to ERZV20D680 | 130 A (8/20 μs) | 65 A (8/20 μs) |  | ERZV05D820 to ERZV05D471 | 40 A (8/20 μs) | 25 A (8/20 μs) |  | ERZV07D820 to ERZV07D511 | 100 A (8/20 μs) | 60 A (8/20 μs) |  | ERZV09D820 to ERZV09D511 | 150 A (8/20 μs) | 85 A (8/20 μs) |  | ERZV10D820 to ERZV10D112 | 150 A (8/20 μs) | 85 A (8/20 μs) |  | ERZV10D182CS | 120 A (8/20 μs) | 75 A (8/20 μs) |  | ERZV14D820 to ERZV14D112 | 200 A (8/20 μs) | 110 A (8/20 μs) |  | ERZV14D182CS | 150 A (8/20 μs) | 90 A (8/20 μs) |  | ERZV20D820 to ERZV20D112 | 250 A (8/20 μs) | 120 A (8/20 μs) |  | ERZV20D182 | 200 A (8/20 μs) | 100 A (8/20 μs) |  | $\Delta V_{CmA} / V_{CmA} \leq \pm 10\%$ |
| Part No.                                        | Item                                              | Impulse Life( I )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                          | Impulse Life( II )           |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
|                                                 | Times                                             | ×10 <sup>4</sup> Times                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                          | ×10 <sup>5</sup> Times       |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
|                                                 | Current                                           | Impulse Current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV05D180 to ERZV05D680                        | 8 A (8/20 μs)                                     | 5 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV07D180 to ERZV07D680                        | 25 A (8/20 μs)                                    | 15 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV09D180 to ERZV09D680                        | 50 A (8/20 μs)                                    | 35 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV10D180 to ERZV10D680                        | 50 A (8/20 μs)                                    | 35 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV14D180 to ERZV14D680                        | 90 A (8/20 μs)                                    | 50 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV20D180 to ERZV20D680                        | 130 A (8/20 μs)                                   | 65 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV05D820 to ERZV05D471                        | 40 A (8/20 μs)                                    | 25 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV07D820 to ERZV07D511                        | 100 A (8/20 μs)                                   | 60 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV09D820 to ERZV09D511                        | 150 A (8/20 μs)                                   | 85 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV10D820 to ERZV10D112                        | 150 A (8/20 μs)                                   | 85 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV10D182CS                                    | 120 A (8/20 μs)                                   | 75 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV14D820 to ERZV14D112                        | 200 A (8/20 μs)                                   | 110 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV14D182CS                                    | 150 A (8/20 μs)                                   | 90 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV20D820 to ERZV20D112                        | 250 A (8/20 μs)                                   | 120 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |
| ERZV20D182                                      | 200 A (8/20 μs)                                   | 100 A (8/20 μs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                          |                              |                                                 |                    |                                                 |                        |                        |         |                 |  |                          |               |               |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                |                |  |                          |                 |                |  |                          |                |                |  |                          |                 |                |  |                          |                 |                |  |                          |                 |                |  |              |                 |                |  |                          |                 |                 |  |              |                 |                |  |                          |                 |                 |  |            |                 |                 |  |                                          |

## Performance characteristics

| Characteristics                     |                                                                                                                                                                                                                                                                                                                                                            | Test methods / description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                 | Specifications                         |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------|------------------|------------------|-------|---------|--------|---------------------------------|------------------|------|---|-------|------|---|------------------|------|---------------------------------|
| Mechanical                          | Robustness of terminations (Tensile)                                                                                                                                                                                                                                                                                                                       | After gradually applying the force specified below and keeping the unit fixed for 10 seconds, the terminal shall be visually examined for any damage.<br><br><table><tr><td>Terminal diameter</td><td>Force</td></tr><tr><td>ø0.6 mm, ø0.8 mm</td><td>9.8 N</td></tr><tr><td>ø1.0 mm</td><td>19.6 N</td></tr></table>                                                                                                                                                                                                        |                                                                                 | Terminal diameter                      | Force            | ø0.6 mm, ø0.8 mm | 9.8 N | ø1.0 mm | 19.6 N | No remarkable mechanical damage |                  |      |   |       |      |   |                  |      |                                 |
|                                     | Terminal diameter                                                                                                                                                                                                                                                                                                                                          | Force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                 |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
|                                     | ø0.6 mm, ø0.8 mm                                                                                                                                                                                                                                                                                                                                           | 9.8 N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                 |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
|                                     | ø1.0 mm                                                                                                                                                                                                                                                                                                                                                    | 19.6 N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                 |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
|                                     | Robustness of terminations (Bending)                                                                                                                                                                                                                                                                                                                       | The unit shall be secured with its terminal kept vertical and the force specified below shall be applied in the axial direction.<br>The terminal shall gradually be bent by 90 ° in one direction, then 90 ° in the opposite direction, and again back to the original position.<br>The damage of the terminal shall be visually examined.<br><br><table><tr><td>Terminal diameter</td><td>Force</td></tr><tr><td>ø0.6 mm, ø0.8 mm</td><td>4.9 N</td></tr><tr><td>ø1.0 mm</td><td>9.8 N</td></tr></table>                    |                                                                                 | Terminal diameter                      | Force            | ø0.6 mm, ø0.8 mm | 4.9 N | ø1.0 mm | 9.8 N  |                                 |                  |      |   |       |      |   |                  |      |                                 |
| Terminal diameter                   | Force                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                 |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
| ø0.6 mm, ø0.8 mm                    | 4.9 N                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                 |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
| ø1.0 mm                             | 9.8 N                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                 |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
| Vibration                           | After repeatedly applying a single harmonic vibration (amplitude: 0.75 mm, double amplitude: 1.5 mm) with 1 minute vibration frequency cycles (10 Hz to 55 Hz to 10 Hz) to each of three perpendicular directions for 2 hours. Thereafter, the unit shall be visually examined.                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                 |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
| Solderability                       | After dipping the terminals to a depth of approximately 3 mm from the body in a soldering bath of 235±5 °C for 2±0.5 seconds, the terminal shall be visually examined.                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Approximately 95 % of the terminals shall be covered with new solder uniformly. |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
| Resistance to soldering heat        | After each lead shall be dipped into a solder bath having a temperature of 260±5 °C to a point 2.0 to 2.5 mm from the body of the unit, using shielding board (t=1.5 mm), be held there for 10±1 s and then be stored at room temperature and normal humidity for 1 hour or over. The change of V <sub>CmA</sub> and mechanical damages shall be examined. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $\Delta V_{CmA}/V_{CmA} \leq \pm 5 \%$                                          |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
| Environmental                       | High temperature storage/Dry heat                                                                                                                                                                                                                                                                                                                          | The specimen shall be subjected to 125±2 °C for 1000 hours in a thermostatic bath without load and then stored at room temperature and normal humidity for 1 hour or over. Thereafter, the change of V <sub>CmA</sub> shall be measured.                                                                                                                                                                                                                                                                                     |                                                                                 | $\Delta V_{CmA}/V_{CmA} \leq \pm 5 \%$ |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
|                                     | Humidity                                                                                                                                                                                                                                                                                                                                                   | The specimen shall be subjected to 40±2 °C, 90 to 95 % RH for 1000 hours without load and then stored at room temperature and normal humidity for 1 hour or over. Thereafter, the change of V <sub>CmA</sub> shall be measured.                                                                                                                                                                                                                                                                                              |                                                                                 |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
|                                     | Temperature cycle                                                                                                                                                                                                                                                                                                                                          | The temperature cycle shown below shall be repeated five cycles and then stored at room temperature and normal humidity for 1 hour or over. The change of V <sub>CmA</sub> and mechanical damage shall be examined.<br><table><tr><td>Step</td><td>Temperature (°C)</td><td>Period (minutes)</td></tr><tr><td>1</td><td>−40±3</td><td>30±3</td></tr><tr><td>2</td><td>Room temperature</td><td>15±3</td></tr><tr><td>3</td><td>125±2</td><td>30±3</td></tr><tr><td>4</td><td>Room temperature</td><td>15±3</td></tr></table> |                                                                                 | Step                                   | Temperature (°C) | Period (minutes) | 1     | −40±3   | 30±3   | 2                               | Room temperature | 15±3 | 3 | 125±2 | 30±3 | 4 | Room temperature | 15±3 | No remarkable mechanical damage |
|                                     | Step                                                                                                                                                                                                                                                                                                                                                       | Temperature (°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Period (minutes)                                                                |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
|                                     | 1                                                                                                                                                                                                                                                                                                                                                          | −40±3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 30±3                                                                            |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
|                                     | 2                                                                                                                                                                                                                                                                                                                                                          | Room temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 15±3                                                                            |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
| 3                                   | 125±2                                                                                                                                                                                                                                                                                                                                                      | 30±3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                 |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
| 4                                   | Room temperature                                                                                                                                                                                                                                                                                                                                           | 15±3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                 |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
| High temperature load/Dry heat load | After being continuously applied the Maximum Allowable Voltage at 85±2 °C for 1000 hours, the specimen shall be stored at room temperature and normal humidity for 1 hour or over. Thereafter, the change of V <sub>CmA</sub> shall be measured.                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                 |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
| Damp heat load/ Humidity load       | The specimen shall be subjected to 40±2 °C, 90 to 95 % RH and the Maximum Allowable Voltage for 1000 hours and then stored at room temperature and normal humidity for 1 hour or over. Thereafter, the change of V <sub>CmA</sub> shall be measured.                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $\Delta V_{CmA}/V_{CmA} \leq \pm 10 \%$                                         |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |
| Low temperature storage/Cold        | The specimen shall be subjected to −40±2 °C without load for 1000 hours and then stored at room temperature and normal humidity for 1 hour or over. Thereafter, the change of V <sub>CmA</sub> shall be measured.                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $\Delta V_{CmA}/V_{CmA} \leq \pm 5 \%$                                          |                                        |                  |                  |       |         |        |                                 |                  |      |   |       |      |   |                  |      |                                 |

## Minimum quantity / Packing unit

| Product                                   | Series / Type      |                             | Part number              | Minimum quantity / Packing unit | Packing quantity in carton | Carton (about) L×W×H (mm) |
|-------------------------------------------|--------------------|-----------------------------|--------------------------|---------------------------------|----------------------------|---------------------------|
| “ZNR”<br>Transient/<br>surge<br>absorbers | D type<br>V series | Straight leads<br><Bulk>    | ERZV05D180 to 271        | 100                             | 10000                      | 210×340×160               |
|                                           |                    |                             | ERZV05D331 to 471        | 100                             | 10000                      | 210×340×180               |
|                                           |                    |                             | ERZV07D180 to 470        | 100                             | 10000                      | 210×340×160               |
|                                           |                    |                             | ERZV07D560 to 680        | 100                             | 10000                      | 210×340×180               |
|                                           |                    |                             | ERZV07D820 to 121        | 100                             | 10000                      | 210×340×160               |
|                                           |                    |                             | ERZV07D151 to 271        | 100                             | 10000                      | 210×340×180               |
|                                           |                    |                             | ERZV07D331 to 511        | 100                             | 5000                       | 210×340×110               |
|                                           |                    |                             | ERZV09D180 to 121        | 100                             | 5000                       | 210×340×160               |
|                                           |                    |                             | ERZV09D151 to 271        | 100                             | 4000                       | 210×340×130               |
|                                           |                    |                             | ERZV09D331 to 511        | 100                             | 4000                       | 210×340×160               |
|                                           |                    |                             | ERZV10D180 to 121        | 50                              | 5000                       | 210×340×160               |
|                                           |                    |                             | ERZV10D151 to 271        | 50                              | 4000                       | 210×340×130               |
|                                           |                    |                             | ERZV10D331 to 621        | 50                              | 4000                       | 210×340×160               |
|                                           |                    |                             | ERZV10D681 to 821        | 50                              | 2000                       | 210×340×110               |
|                                           |                    |                             | ERZV10D911 to 112        | 50                              | 2000                       | 210×340×110               |
|                                           |                    |                             | ERZV10D182CS             | 50                              | 1000                       | 210×340×*80               |
|                                           |                    |                             | ERZV14D180 to 121        | 50                              | 3000                       | 210×340×130               |
|                                           |                    |                             | ERZV14D151 to 271        | 50                              | 3000                       | 210×340×130               |
|                                           |                    |                             | ERZV14D331 to 621        | 50                              | 2000                       | 210×340×130               |
|                                           |                    |                             | ERZV14D681 to 821        | 50                              | 2000                       | 210×340×130               |
|                                           |                    |                             | ERZV14D911 to 112        | 50                              | 1000                       | 210×340×110               |
|                                           |                    |                             | ERZV14D182CS             | 50                              | 1000                       | 210×340×110               |
|                                           |                    |                             | ERZV20D180 to 271        | 50                              | 2000                       | 210×340×160               |
|                                           |                    |                             | ERZV20D331 to 511        | 50                              | 1000                       | 210×340×110               |
|                                           |                    |                             | ERZV20D561 to 821        | 50                              | 1000                       | 210×340×130               |
|                                           |                    |                             | ERZV20D911 to 112        | 50                              | 1000                       | 210×340×130               |
|                                           |                    |                             | ERZV20D182               | 25                              | 500                        | 210×340×130               |
|                                           |                    | Leads cut type<br><Bulk>    | ERZV05D(V)180CS to 271CS | 100                             | 10000                      | 210×340×*80               |
|                                           |                    |                             | ERZV05D(V)331CS to 471CS | 100                             | 10000                      | 210×340×110               |
|                                           |                    |                             | ERZV07D(V)180CS to 271CS | 100                             | 10000                      | 210×340×*80               |
|                                           |                    |                             | ERZV07D(V)331CS to 511CS | 100                             | 10000                      | 210×340×110               |
|                                           |                    |                             | ERZV09D(V)180CS to 121CS | 100                             | 5000                       | 210×340×110               |
|                                           |                    |                             | ERZV09D(V)151CS to 511CS | 100                             | 4000                       | 210×340×*80               |
|                                           |                    |                             | ERZV10D(V)180CS to 121CS | 100                             | 5000                       | 210×340×110               |
|                                           |                    |                             | ERZV10D(V)151CS to 621CS | 100                             | 4000                       | 210×340×*80               |
|                                           |                    |                             | ERZV10D(V)681CS to 751CS | 100                             | 2000                       | 210×340×*80               |
|                                           |                    |                             | ERZV10D(V)821C1 to 112C1 | 100                             | 2000                       | 210×340×*80               |
|                                           |                    |                             | ERZV14D(V)180CS to 271CS | 100                             | 3000                       | 210×340×*80               |
|                                           |                    |                             | ERZV14D(V)331CS to 821C1 | 100                             | 2000                       | 210×340×*80               |
|                                           |                    |                             | ERZV14D(V)911C1 to 112C1 | 100                             | 1000                       | 210×340×*80               |
|                                           | D type<br>V series | Straight leads<br>and taped | ERZVA5D180 to 271        | 1000                            | 10000                      | 360×320×260               |
|                                           |                    |                             | ERZVA5D331 to 471        | 1000                            | 10000                      | 400×360×260               |
|                                           |                    |                             | ERZVA7D180 to 271        | 1000                            | 10000                      | 400×360×260               |
|                                           |                    |                             | ERZVA7D331 to 511        | 1000                            | 10000                      | 470×360×260               |
|                                           |                    |                             | ERZVA9D180 to 271        | 1000                            | 10000                      | 400×360×260               |
|                                           |                    |                             | ERZVA9D331 to 511        | 1000                            | 10000                      | 470×360×260               |
|                                           |                    |                             | ERZVGAD180 to 621        | 1000                            | 5000                       | 360×310×320               |
|                                           |                    |                             | ERZVGAD681 to 112        | 500                             | 2500                       | 360×270×320               |
|                                           |                    |                             | ERZVGED180 to 511        | 500                             | 2500                       | 360×310×320               |
|                                           |                    |                             | ERZVGED561 to 112        | 250                             | 1250                       | 360×270×320               |
|                                           |                    | Crimped lead<br>and taped   | ERZVA5V180 to 271        | 1000                            | 10000                      | 360×320×260               |
|                                           |                    |                             | ERZVA5V331 to 471        | 1000                            | 10000                      | 400×360×260               |
|                                           |                    |                             | ERZVA7V180 to 271        | 1000                            | 10000                      | 400×360×260               |
|                                           |                    |                             | ERZVA7V331 to 511        | 1000                            | 10000                      | 470×360×260               |
|                                           |                    |                             | ERZVA9V180 to 271        | 1000                            | 10000                      | 400×360×300               |
|                                           |                    |                             | ERZVA9V331 to 511        | 1000                            | 10000                      | 470×360×300               |
|                                           |                    |                             | ERZVEAV180 to 621        | 1000                            | 5000                       | 360×310×320               |
|                                           |                    |                             | ERZVEAV681 to 112        | 500                             | 2500                       | 360×270×320               |
|                                           |                    |                             | ERZVEEV180 to 511        | 500                             | 2500                       | 360×310×320               |
|                                           |                    |                             | ERZVEEV561 to 112        | 250                             | 1250                       | 360×270×320               |

Part No., quantity and country of origin are designated on outer packages in English.

※ Please contact local sales office about packing specifications.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.

Should a safety concern arise regarding this product, please be sure to contact us immediately.

20-May-25

## Safety and Legal Matters to Be Observed

### Product specifications and applications

- Please be advised that this product and product specifications are subject to change without notice for improvement purposes. Therefore, please request and confirm the latest delivery specifications that explain the specifications in detail before the final design, or purchase or use of the product, regardless of the application. In addition, do not use this product in any way that deviates from the contents of the company's delivery specifications.
- Unless otherwise specified in this catalog or the product specifications, this product is intended for use in general electronic equipment (AV products, home appliances, commercial equipment, office equipment, information and communication equipment, etc.).  
When this product is used for the following special cases, the specification document suited to each application shall be signed/sealed (with Panasonic Industry and the user) in advance..These include applications requiring special quality and reliability, wherein their failures or malfunctions may directly threaten human life or cause harm to the human body (e.g.: space/aircraft equipment, transportation/traffic equipment, combustion equipment, medical equipment, disaster prevention/crime prevention equipment, safety equipment, etc.).

### Safety design and product evaluation

- Please ensure safety through protection circuits, redundant circuits, etc., in the customer's system design so that a defect in our company's product will not endanger human life or cause other serious damage.
- This catalog shows the quality and performance of individual parts. The durability of parts varies depending on the usage environment and conditions. Therefore, please ensure to evaluate and confirm the state of each part after it has been mounted in your product in the actual operating environment before use.  
If you have any doubts about the safety of this product, then please notify us immediately, and be sure to conduct a technical review including the above protection circuits and redundant circuits at your company.

### Laws / Regulations / Intellectual property

- The transportation of dangerous goods as designated by UN numbers, UN classifications, etc., does not apply to this product. In addition, when exporting products, product specifications, and technical information described in this catalog, please comply with the laws and regulations of the countries to which the products are exported, especially those concerning security export control.
- Each model of this product complies with the RoHS Directive (Restriction of the use of hazardous substances in electrical and electronic equipment) (2011/65/EU and (EU) 2015/863). The date of compliance with the RoHS Directive and REACH Regulation varies depending on the product model.  
Further, if you are using product models in stock and are not sure whether or not they comply with the RoHS Directive or REACH Regulation, please contact us by selecting "Sales Inquiry" from the inquiry form.
- During the manufacturing process of this product and any of its components and materials to be used, Panasonic Industry does not intentionally use ozone-depleting substances stipulated in the Montreal Protocol and specific bromine-based flame retardants such as PBBs (Poly-Brominated Biphenyls) / PBDEs (Poly-Brominated Diphenyl Ethers). In addition, the materials used in this product are all listed as existing chemical substances based on the Act on the Regulation of Manufacture and Evaluation of Chemical Substances.
- With regard to the disposal of this product, please confirm the disposal method in each country and region where it is incorporated into your company's product and used.
- The technical information contained in this catalog is intended to show only typical operation and application circuit examples of this product. This catalog does not guarantee that such information does not infringe upon the intellectual property rights of Panasonic Industry or any third party, nor imply that the license of such rights has been granted.
- Design, materials, or process related to technical owned by Panasonic Industry are subject to change without notice.

**Panasonic Industry will assume no liability whatsoever if the use of our company's products deviates from the contents of this catalog or does not comply with the precautions. Please be advised of these restrictions.**

## Matters to Be Observed When Using This Product

(D-type : V series / SMD-type : HF·VF series)

### Safety measures

An abnormal state for varistors (ZNR surge absorbers) of the D type/V series and SMD-Type/HF, VF Series (hereinafter the product or "the surge absorber") that results from a problem with service conditions (materials used, the surrounding environment, power conditions, circuit conditions, etc.) may cause a fire accident, electric shock accident, burn accident, or product failure. Matters to note when handling this product will hereinafter be described. What is described below should be checked sufficiently before the product is used.

#### ■ Confirming rated capabilities

Use the surge absorber within the range of its rated capabilities. Each type of surge absorber has specified rated capabilities including a maximum allowable circuit voltage, a surge current tolerance, an energy tolerance, an impulse lifespan (surge lifespan), average pulse power, and a service temperature. Using the surge absorber under severe service conditions that are beyond the rated capabilities causes degraded performance of the surge absorber or destruction of a circuit element, which may lead to smoke generation, ignition, etc.

#### ■ Take the following measures in order to avoid an accident caused by expected phenomenon.

(1) Destruction of the surge absorber may scatter its fractured pieces around. To protect other elements from these pieces, set product in a case or shield it with a cover.

(2) Do not place the surge absorber near combustible materials (vinyl cable, resin mold, etc.). If avoiding the vicinity of combustible materials is difficult, protect the combustible material with an incombustible cover.

(3) Surge absorber placed between lines

When the surge absorber is placed between lines, connect a normal type current fuse in series with the surge absorber.

\* See "Current fuse" in the "Circuit design and circuit board design" section.

(4) Surge absorber placed between a line and the ground

① When the surge absorber is placed between a line and the ground, even if the surge absorber short-circuits, ground resistance will remain in the section between the line and the ground, leaving a possibility that the current fuse won't blow, in which case the outer sheath resin of the surge absorber may generate smoke or ignite due to current flow. To prevent such a case, place an earth leakage breaker in a location closer to the power supply than the surge absorber. When not using an earth leakage breaker, use a current fuse and temperature fuse in series with each other.

\* See Table 1 in the "Circuit design and circuit board design" section.

② When the surge absorber is placed between a live part and a metal case, it may cause electric shock if the surge absorber short-circuits. To avoid this, ground the metal case or shield it to prevent direct contact with the metal case.

#### ■ In case the surge absorber should short-circuit and generate smoke or ignite, immediately cut off current flow to the surge absorber.

#### ■ Rated voltage for UL certification, etc.

To allow the surge absorber to meet leak current requirements, etc., a maximum allowable circuit voltage and rated voltage are specified for the surge absorber.

When applying for UL certification, etc. of a device equipped with a surge absorber, ensure the working voltage of the device does not exceed the rated voltage of the surge absorber.

#### ■ An unexpected sharp rise in the working voltage, an incoming excessive surge, etc., may cause the surge absorber to generate smoke or ignite.

In such a case, fire spreading through the device should be prevented to avoid expanded damage. To achieve this, take a multi-protection measure, such as adopting fire-resistant materials that make up the outer shell components and structural materials.

## Use environments and cleaning conditions

- Do not use the surge absorber in an outdoor environment where the surge absorber is exposed to sunlight.
- Do not use the surge absorber in which direct sunlight hits the surge absorber or near a heating element where the temperature of the surge absorber would rise above its working temperature.
- Do not use the surge absorber in a place where the surge absorber is exposed to wind or rain or a highly humid place where steam is emitted or dew concentrates.
- Do not use the surge absorber in a place filled with dust or salt, in an atmosphere contaminated with a corrosive gas, etc., or in liquids such as water, oil, chemical, or organic solvents.
- Do not wash the surge absorber with a solvent (thinner, acetone, etc.) that damages the outer sheath resin.

## Response to anomalies and handling conditions

Be careful not to drop the surge absorber on the floor, etc. The product is likely to suffer mechanical or electrical damage when dropped on the floor. Avoid using such a product.

## Reliability

A capacitor conforming to "AEC-Q200" refers to a capacitor having passed some or all of evaluation test items defined in AEC-Q200.

To know the detailed specifications of each capacitor or specific evaluation test scores, please contact us.

We issue a delivery specification sheet for each product ordered. Please confirm the delivery specification sheet when you place an order with us.

## Circuit design and circuit board design

Meet the following requirements. Not following the requirements can result in a shorter lifespan of the surge absorber or its failure.

- Choose a surge absorber whose maximum allowable circuit voltage has a margin relative to the maximum voltage range including source voltage fluctuations.

\* See Table 1 in the "Circuit design and circuit board design" section.

- When surges are applied intermittently to the surge absorber at short intervals (when pulses of voltages are applied in a noise simulator test, etc.), make sure that the surge power does not exceed the maximum average pulse power of the surge absorber.
- The product numbers of recommended surge absorbers to choose are shown in Table 1.

(1) The case of placing the surge absorber between lines

When the source voltage is expected to rise temporarily due to unbalanced single-wire loads in a three-phase three-wire connection configuration, a short circuit between a voltage line and a neutral line, loss of the neutral line, or resonance of a capacitive load caused by switching on/off, use a surge absorber (varistor) indicated by "\*" in Table 1.

(2) The case of placing the surge absorber between a line and the ground

Line-to-ground voltage may rise with a single-wire ground fault, etc. Use a recommended surge absorber in Table 1 that is different from the surge absorber placed between lines. When the device is subjected to an insulation resistance test (500 V DC), use a D-type surge absorber indicated by "\*" in Table 1.

According to "Electrical Appliance Technical Standards" based on the Electrical Appliance and Material Safety Act, when using a varistor voltage which would fail the insulation performance test, the surge absorber may be removed from the device when being subjected to the test, depending on circuit test conditions.

\* See attached table 4, appendix 4, "Electrical Appliance Technical Standards" based on the Electrical Appliance and Material Safety Act.

When conducting a withstand voltage test (1000 V AC or 1200 V AC) of the device, use the recommended D type / V series surge absorber indicated by "\*\*\*\*" in Table 1.

■ Current fuse

- (1) Select a surge absorber and the rated current for a current fuse to be used in a manner shown in the following table. Confirm that no secondary accident arises when the surge absorber in an actual circuit breaks. Selected rated currents of current fuses shown in the following table are exemplary one and may vary depending on circuit conditions used. Confirm the rated current by a test, etc., before using the current fuse.

<Rated currents of current fuses for the D-type / V series surge absorber>

|                         |            |            |            |            |            |            |
|-------------------------|------------|------------|------------|------------|------------|------------|
| Standard product number | ERZV05D□□□ | ERZV07D□□□ | ERZV09D□□□ | ERZV10D□□□ | ERZV14D□□□ | ERZV20D□□□ |
| Rating current          | 3 A max.   | 5 A max.   | 7 A max.   | 7 A max.   | 10 A max.  | 10 A max.  |

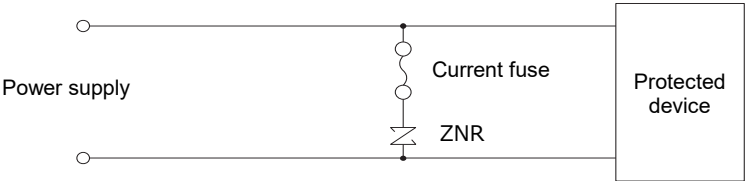
\* Use the rated voltage of the current fuse that corresponds to the circuit voltage of a circuit including the current fuse.

<Rated current of a current fuse for the SMD-type / VF series surge absorber>

|                         |            |
|-------------------------|------------|
| Standard product number | ERZVF□M□□□ |
| Rating current          | 5 A max.   |

- \* Use the rated voltage of the current fuse that corresponds to the circuit voltage of a circuit including the current fuse.
- \* For the HF series surge absorber, select the rated current of the fuse after confirming the way the fuse handles a load dump surge and the protective coordination action it makes when the surge absorber is destroyed.

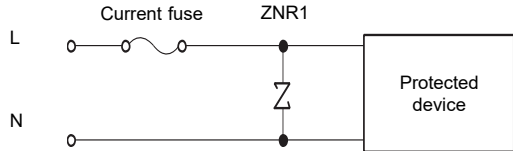
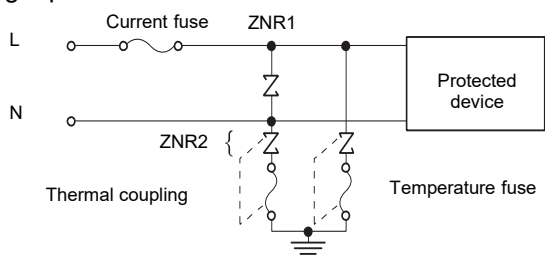
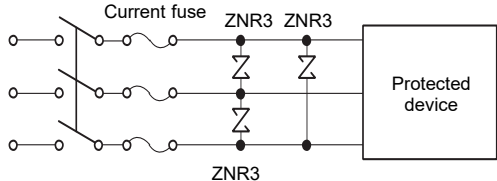
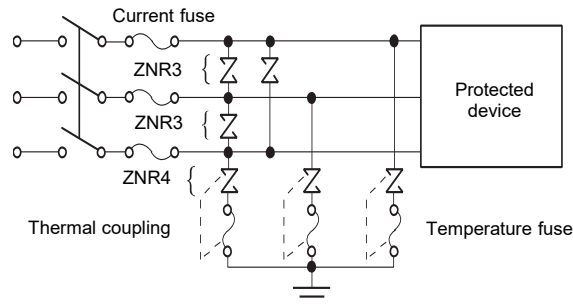
- (2) Recommended parts where fuses are connected are shown in Table 1. When a load current to a protected device is so large as to exceed the rated current of the fuse, however, connect the fuse in a location shown in the following diagram.



■ Temperature fuse

When connecting the surge absorber to a temperature fuse, choose a connection method and a temperature fuse that allow fine thermal coupling between the surge absorber and the temperature fuse.

Table 1 Application example of the product (ordinary application example)

|                | Surge absorber placed between lines                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                                                             | Surge absorber placed between a line and the ground                                                         |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------|--|--------|----------|----------------|-------|-------------|-------------|-------|-------------|-------------|-------|-------------|-----|-------|-------------|-----|-------|----------|---|-------|----------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|-----|---------------------------|--------------------------|--|--------|----------|----------------|----------------|-----|-----|-----|---|------|---|-----------------|---|--------|---|-------|-----|---|------|---|-----------------|---|-------|---|-------|-------|---|--------|---|---|
|                | Connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |                                                                             | Connection                                                                                                  |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                | DC<br>Single-phase AC<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |                                                                             | DC<br>Single-phase AC<br> |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                | Three-phase AC<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                                                             | Three-phase AC<br>        |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                | Varistor voltage selection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |                                                                             | Varistor voltage selection                                                                                  |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                | <table> <tr> <th rowspan="2">ZNR</th><th rowspan="2">Power supply voltage [AC]</th><th colspan="2">Nominal varistor voltage</th></tr> <tr> <th>D-type</th><th>SMD-type</th></tr> <tr> <td rowspan="6">ZNR 1<br/>ZNR 3</td><td>100 V</td><td>201 to 361*</td><td>201 to 361*</td></tr> <tr> <td>120 V</td><td>241 to 431*</td><td>241 to 431*</td></tr> <tr> <td>200 V</td><td>471 to 621*</td><td>471</td></tr> <tr> <td>220 V</td><td>471 to 621*</td><td>471</td></tr> <tr> <td>240 V</td><td>511、621*</td><td>-</td></tr> <tr> <td>380 V</td><td>751、821*</td><td>-</td></tr> </table> |                          |                                                                             | ZNR                                                                                                         | Power supply voltage [AC] | Nominal varistor voltage |  | D-type | SMD-type | ZNR 1<br>ZNR 3 | 100 V | 201 to 361* | 201 to 361* | 120 V | 241 to 431* | 241 to 431* | 200 V | 471 to 621* | 471 | 220 V | 471 to 621* | 471 | 240 V | 511、621* | - | 380 V | 751、821* | - | <table> <tr> <th rowspan="2">ZNR</th><th rowspan="2">Power supply voltage [AC]</th><th colspan="2">Nominal varistor voltage</th></tr> <tr> <th>D-type</th><th>SMD-type</th></tr> <tr> <td rowspan="12">ZNR 2<br/>ZNR 4</td><td rowspan="5">100 V<br/>220 V</td><td>471</td><td>471</td></tr> <tr> <td>511</td><td>-</td></tr> <tr> <td>621*</td><td>-</td></tr> <tr> <td>821 or higher**</td><td>-</td></tr> <tr> <td>182***</td><td>-</td></tr> <tr> <td rowspan="4">230 V</td><td>511</td><td>-</td></tr> <tr> <td>621*</td><td>-</td></tr> <tr> <td>821 or higher**</td><td>-</td></tr> <tr> <td>182**</td><td>-</td></tr> <tr> <td rowspan="4">380 V</td><td>112**</td><td>-</td></tr> <tr> <td>182***</td><td>-</td></tr> <tr> <td>-</td><td>-</td></tr> </table> |  |  | ZNR | Power supply voltage [AC] | Nominal varistor voltage |  | D-type | SMD-type | ZNR 2<br>ZNR 4 | 100 V<br>220 V | 471 | 471 | 511 | - | 621* | - | 821 or higher** | - | 182*** | - | 230 V | 511 | - | 621* | - | 821 or higher** | - | 182** | - | 380 V | 112** | - | 182*** | - | - |
| ZNR            | Power supply voltage [AC]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Nominal varistor voltage |                                                                             |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | D-type                   | SMD-type                                                                    |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
| ZNR 1<br>ZNR 3 | 100 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 201 to 361*              | 201 to 361*                                                                 |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                | 120 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 241 to 431*              | 241 to 431*                                                                 |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                | 200 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 471 to 621*              | 471                                                                         |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                | 220 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 471 to 621*              | 471                                                                         |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                | 240 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 511、621*                 | -                                                                           |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                | 380 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 751、821*                 | -                                                                           |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
| ZNR            | Power supply voltage [AC]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Nominal varistor voltage |                                                                             |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | D-type                   | SMD-type                                                                    |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
| ZNR 2<br>ZNR 4 | 100 V<br>220 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 471                      | 471                                                                         |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 511                      | -                                                                           |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 621*                     | -                                                                           |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 821 or higher**          | -                                                                           |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 182***                   | -                                                                           |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                | 230 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 511                      | -                                                                           |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 621*                     | -                                                                           |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 821 or higher**          | -                                                                           |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 182**                    | -                                                                           |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                | 380 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 112**                    | -                                                                           |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 182***                   | -                                                                           |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | -                        | -                                                                           |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                          | * Choose the element size while taking surge conditions into consideration. |                                                                                                             |                           |                          |  |        |          |                |       |             |             |       |             |             |       |             |     |       |             |     |       |          |   |       |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |     |                           |                          |  |        |          |                |                |     |     |     |   |      |   |                 |   |        |   |       |     |   |      |   |                 |   |       |   |       |       |   |        |   |   |

Processing conditions

- Do not apply vibration, impact (drop impact, etc.), or pressure strong enough to crack the outer sheath resin or absorber body of the surge absorber.
- When coating the surge absorber with a resin or embedding it in a resin mold, avoid using a resin that degrades the surge absorber.
- Do not bend or apply a force to the lead of a D-type surge absorber close to the outer sheath resin.

## Mounting and storage conditions

- When soldering the surge absorber, follow recommended soldering conditions shown in the following table so that solder or the insulation material making up the surge absorber is not melted.
- When making holes for mounting the surge absorber on the board, check the dimensions of the holes on the board, referencing the central point of the interval between the leads.  
Because the overall dimensional tolerance is large, forming the holes with high precision requires careful processing.

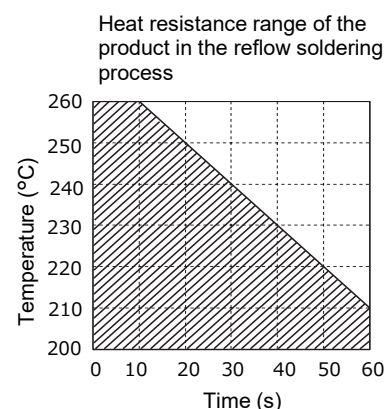
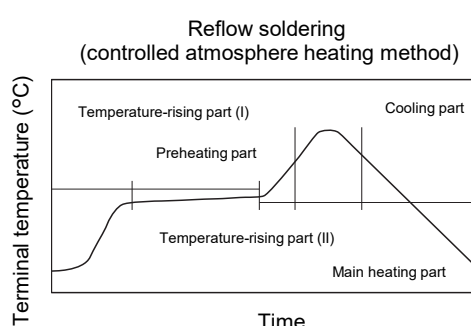
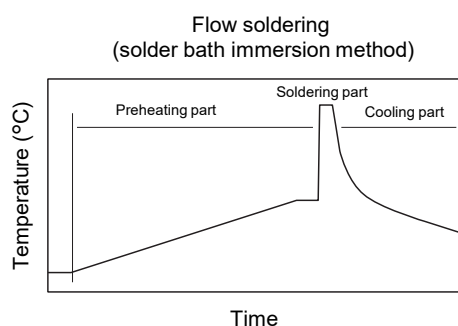
|          | Soldering method                                           | Recommended conditions                                  | Mater to note                                                                                                                       |
|----------|------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| D-type   | Flow soldering<br>(solder bath immersion method)           | 260 °C, 10 seconds or less                              | The D-type surge absorber should not be soldered by reflow soldering.                                                               |
| SMD-type | Flow soldering<br>(solder bath immersion method)           | 260 °C, 10 seconds or less                              | A high component mounting density may lead to poor solderability. In such a case, consider vent hole formation.                     |
|          | Reflow soldering<br>(controlled atmosphere heating method) | Refer to the recommended soldering temperature profile. | When a land is excessively larger than the terminal surface of a component, the component may shift position when solder is melted. |

Note 1: Soldering the surge absorber under soldering conditions different from the recommended soldering conditions requires extra checking to ensure it won't cause any problems.  
Additional soldering is allowed only once. It must be done within 5 seconds, with the soldering iron temperature kept at 400 °C or lower.

Note 2: A temperature profile may include a large error, depending on the measurement method used.  
Be careful in such cases.

Note 3: Board temperatures vary depending on the sizes of boards and mounting densities. Confirm the temperature for each type of board.

### <Recommended soldering temperature profile>



|                 |                                                           |                     |
|-----------------|-----------------------------------------------------------|---------------------|
| Preheating part | Normal temperature to 130 °C                              | 120 seconds or less |
| Soldering part  | 260 °C or less                                            | 10 seconds or less  |
| Cooling part    | Gradual cooling<br>(cooling under the normal temperature) |                     |

|                            |                                                                                    |                      |
|----------------------------|------------------------------------------------------------------------------------|----------------------|
| Temperature-rising part I  | Normal temperature to preheating temperature                                       | 30 to 60 seconds     |
| Preheating part            | 150 °C to 180 °C                                                                   | 60 to 120 seconds    |
| Temperature-rising part II | Preheating temperature to 200 °C                                                   | 2 to 6 °C per second |
| Main heating part          | Refer to the heat resistance range of the product in the reflow soldering process. |                      |
| Cooling part               | 200 °C to 100 °C                                                                   | 1 to 4 °C per second |

\* Do not perform reflow soldering more than two times.

- Mounting the surge absorber (SMD-type)  
When mounting the surge absorber on the board, make sure that no excessive impact or load, such as pressure from a suction nozzle for mounting the absorber, positional shift, or mechanical impact/stress caused by a positioning of the absorber, is applied to the surge absorber. There are cases where the surge absorber shifts from its intended position when mounted on the board. In such cases, consider a method of bonding the board and the outer sheath resin together.
- Do not keep the product in a high-temperature or high-humidity condition. Keep the surge absorber in a room with a temperature of 40 °C or lower and a relative humidity of 75% or lower and use the surge absorber within two years of storage. Check the solderability of a surge absorber stored for a long period (two years or more) before using the surge absorber.
- Keep the surge absorber in a place where no corrosive gas atmosphere (hydrogen sulfide, sulfurous acid, chlorine, ammonia, etc.) is present.
- Keep the surge absorber in a place where the surge absorber is protected from direct sunlight, dew concentration, etc.