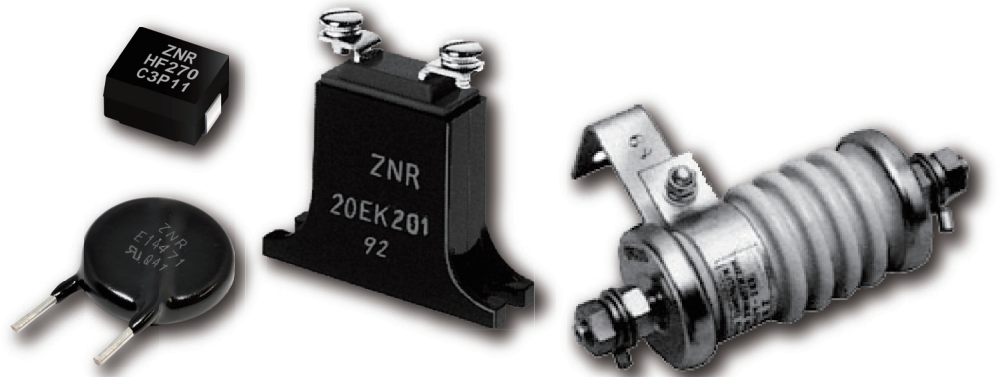


Products Catalog

Varistors (ZNR Surge Absorber)



**IN Your
Future**



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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.

“ZNR” Transient / Surge absorbers

ZNRs are zinc-oxide nonlinear resistors whose resistance changes as a function of the applied voltage. These basic characteristics of ZNR express by varistor voltage and clamping voltage (or voltage ratio). The ZNR utilizes a ceramic element composed of zinc oxide and several kinds of metal oxide additives that have been sintered at relatively high temperature. The ZNR has a bilateral and symmetrical V-I characteristics similar to back-to-back zener diode and unparalleled large peak current capability so it can be used for absorption of transient voltage, suppression of pulse noise and as an arrester element and circuit voltage stabilization.

Explanation of technical terms

1. Voltage-current characteristics

Figure 1 shows voltage-current characteristics of ZNR. The axis of abscissas is logarithm of current and the axis of ordinates is logarithm of voltage. Characteristics, voltage value at 1mA(principle) is used, calling varistor voltage. In case of surge absorber which utilizes at large current region because of voltage at specified current is used, calling clamping voltage.

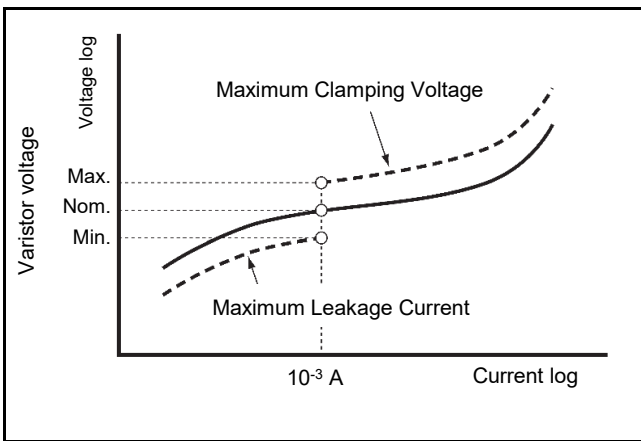


Fig.1. Example of V-I Characteristic of ZNR

2. Maximum peak current

Specification which specified how much surge current surge absorber can endure is maximum peak current.

This characteristic expresses a current value having standard wave form shown in figure 2. In case of different waveform from the standard one, the specifications shall be determined by referring to impulse life ratings.

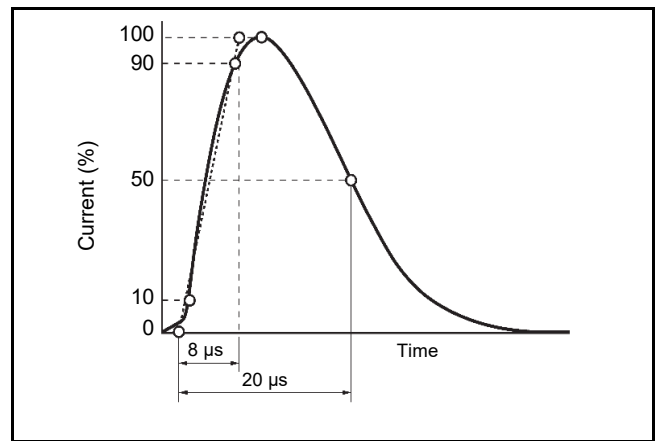


Fig.2. Standard Impulse Current Waveform (8/20 μs)

Note: *ZNR “Zinc Oxide Nonlinear Resistor” is a trade mark of voltage dependent resistor elements by Panasonic. ZNR is in some cases named Metal Oxide Varistor “MOV”

3. Clamping voltage

Varistors have an ability to limit a high voltage surge like lightning. We call this limited voltage as “Clamping Voltage”. “Clamping Voltage” is measured by voltage between two terminals using standard impulse current waveform (8/20 μs) shown in fig.2. To avoid an exothermic influence.

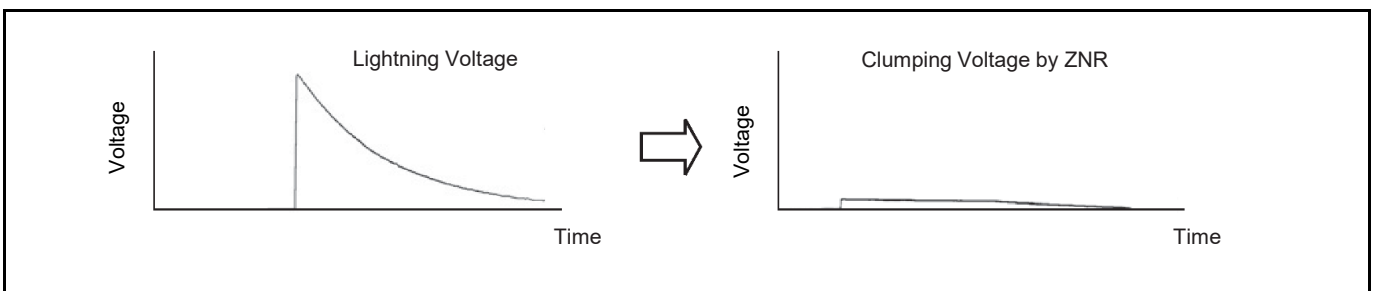
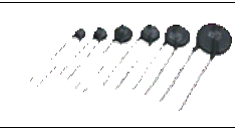






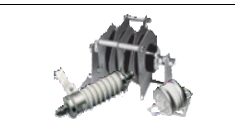

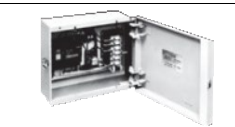
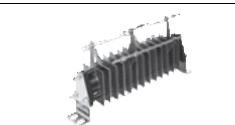


Fig. 3 Example of impressing pulse and clamping Voltage

Products system

| | | | | |
|-----------------------------------|-------------------------------|---|--|--|
| Varistors (ZNR Surge Absorber) | D type E/E-S1 series |  | Large surge current and energy handling capability for absorbing transient overvoltage | <ul style="list-style-type: none"> ● Varistor voltage : 200 to 1100 V ● Maximum peak current : 600 to 7000 A (at 8/20 μs) |
| | D type V series |  | Standard type with radial leads for general surge protect applications | <ul style="list-style-type: none"> ● Varistor voltage : 18 to 1800 V ● Maximum peak current : 125 to 7000 A (at 8/20 μs) |
| | SMD type HF series |  | For Automotive (DC12 V) Meet for Load Dump Surge Compact size SMD High Reliability | <ul style="list-style-type: none"> ● Varistor voltage : 20 to 23.2 V 27 V±20 % ● Maximum surge : JASO A-1 70 V 1 time |
| | SMD type VF series |  | Surface mount type with protective coating so as to high level reliability | <ul style="list-style-type: none"> ● Varistor voltage : 22 to 470 V ● Maximum peak current : 125 to 600 A (at 8/20 μs) |
| | SC type |  | For incorporation in a surge protective device corresponding to the JIS C 5381-1 | <ul style="list-style-type: none"> ● Varistor voltage : 200 to 950 V ● Maximum peak current : In 20 kA, I_{max} 40 kA (at 8/20 μs) |
| | E type CK type |  | For an application in industrial electric or electronic equipment under heavy duty | <ul style="list-style-type: none"> ● Varistor voltage : 200 to 1100 V ● Maximum peak current : 5 to 25 kA (at 8/20 μs) |
| | P type |  | Plug-in type with deterioration indicator. For application to industrial equipment | <ul style="list-style-type: none"> ● Varistor voltage : 250 to 1000 V ● Maximum peak current : 5000 A (at 8/20 μs) |
| | J type |  | Stack-type for heavy surge energy application (High power induced load and so on) | <ul style="list-style-type: none"> ● Varistor voltage : 560 to 1250 V ● Maximum peak current : 80 to 320 kA (at 4/10 μs) ● Energy : 5000 to 40000 J |
| | G type |  | For protection to switching surge of high voltage (3.3, 6.6 kV) equipment | <ul style="list-style-type: none"> ● Varistor voltage : 5 to 17 kV ● Maximum peak current : 5 to 10 kA (at 8/20 μs) ● Energy : 1300 to 2600 J |
| | Surge absorber units |  | Surge absorber with connected ZNRs and circuit breaker in box | <ul style="list-style-type: none"> ● Varistor voltage : 12 to 100 V ● Maximum peak current : 5000 A |
| | Surge absorbers for thyristor |  | Thyristor protection against switching surge of transformer | <ul style="list-style-type: none"> ● Varistor voltage : 510 to 2500 V ● Impulse life : 40 to 210 A (2 ms, 104 times) |

Matters to Be Observed When Using This Product

(D-type : E series)

Safety measures

An abnormal state of the D-type / E series varistor (ZNR surge absorber, 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.

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.

■ 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.

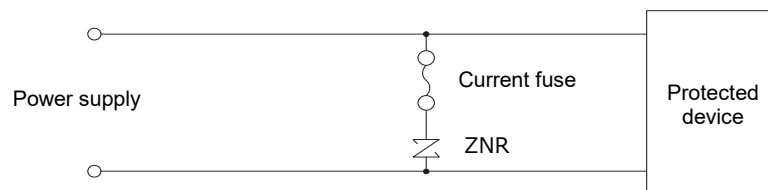
Confirm that no secondary accident arises when the surge absorber in an actual circuit breaks. Selected rated currents of current fuses shown in the following table are exemplary one and may vary depending on circuit conditions used. Confirm the rated current by a test, etc., before using the current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

<Rated currents of current fuses for the D-type / E/E-S1 series surge absorbers>

| Standard product number | ERZE05A□□□□ | ERZE07A□□□□ | ERZE08A□□□□ | ERZE10A□□□□ | ERZE11A□□□□ | ERZE14A□□□□ |
|-------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Rating Current | 5 A max. | 7 A max. | 7 A max. | 10 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.

(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 | <p>DC Single-phase AC</p> | <p>DC Single-phase AC</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <p>Three-phase AC</p> | <p>Three-phase AC</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Varistor voltage selection | <table border="1"> <thead> <tr> <th>ZNR</th> <th>Power supply voltage [AC]</th> <th>Nominal varistor voltage</th> </tr> </thead> <tbody> <tr> <td rowspan="6">ZNR 1 ZNR 3</td> <td>100 V</td> <td>201 to 361*</td> </tr> <tr> <td>120 V</td> <td>241 to 431*</td> </tr> <tr> <td>200 V</td> <td>471 to 621*</td> </tr> <tr> <td>220 V</td> <td>471 to 621*</td> </tr> <tr> <td>240 V</td> <td>511, 621*</td> </tr> <tr> <td>380 V</td> <td>751, 821*</td> </tr> </tbody> </table> | ZNR | Power supply voltage [AC] | Nominal varistor voltage | ZNR 1 ZNR 3 | 100 V | 201 to 361* | 120 V | 241 to 431* | 200 V | 471 to 621* | 220 V | 471 to 621* | 240 V | 511, 621* | 380 V | 751, 821* | <table border="1"> <thead> <tr> <th>ZNR</th> <th>Power supply voltage [AC]</th> <th>Nominal varistor voltage</th> </tr> </thead> <tbody> <tr> <td rowspan="6">ZNR 2 ZNR 4</td> <td rowspan="3">100 V 220 V</td> <td>471</td> </tr> <tr> <td>511</td> </tr> <tr> <td>621</td> </tr> <tr> <td rowspan="3">230 V 240 V</td> <td>821 or higher**</td> </tr> <tr> <td>511</td> </tr> <tr> <td>621*</td> </tr> <tr> <td>380 V</td> <td>821 or higher**</td> </tr> <tr> <td></td> <td></td> <td>112**</td> </tr> </tbody> </table> | ZNR | Power supply voltage [AC] | Nominal varistor voltage | ZNR 2 ZNR 4 | 100 V 220 V | 471 | 511 | 621 | 230 V 240 V | 821 or higher** | 511 | 621* | 380 V | 821 or higher** | | | 112** |
| | ZNR | Power supply voltage [AC] | Nominal varistor voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZNR 1 ZNR 3 | 100 V | 201 to 361* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 120 V | 241 to 431* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 200 V | 471 to 621* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 220 V | 471 to 621* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 240 V | 511, 621* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 380 V | 751, 821* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZNR | Power supply voltage [AC] | Nominal varistor voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZNR 2 ZNR 4 | 100 V 220 V | 471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 511 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 621 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 230 V 240 V | 821 or higher** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 511 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 621* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 380 V | 821 or higher** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 112** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <p>* Choose the element size while taking surge conditions into consideration.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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 (solder bath immersion method) | 260 °C, 10 seconds or less | A D-type surge absorber should not be soldered by reflow soldering. |

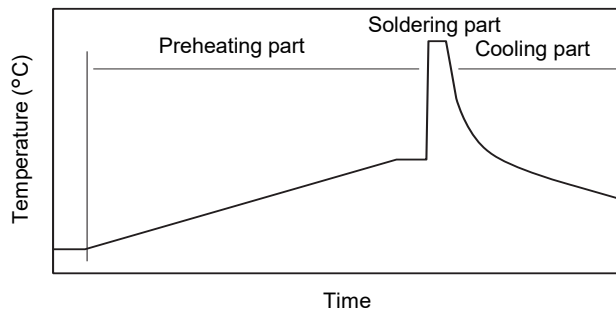
Note 1: Soldering the surge absorber under soldering conditions different from the recommended soldering conditions requires extra checking to ensure it won't cause any problems.
Additional soldering is allowed only once. It must be done within 5 seconds, with the soldering iron temperature kept at 400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

Flow soldering (solder bath immersion method)



| | | |
|-----------------|--|---------------------|
| 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 (cooling under the normal temperature) | |

- 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.

Varistors (ZNR Surge Absorber)

D type

E series



Varistors (ZNR Surge Absorber), Series E, Type D features large surge current and energy handling capability for absorbing transient overvoltage in a compact size.

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

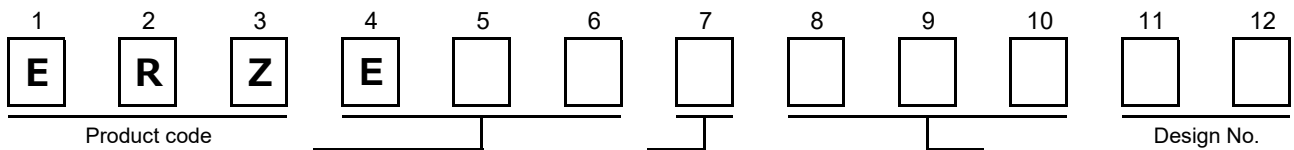
Applicable standards

- UL1449 (VZCA2/UL, VZCA8/C-UL)
 - VDE IEC61051-1, -2, -2-2, IEC60950-1 Annex.Q, IEC62368-1 G8.1
 - CQC (GB/T10193, GB/T10194, GB4943.1)
- Refer to "Standard Products" , and "Application Note for Safety Standards" , for the details.

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



| Code | Series | Lead configuration | | |
|------|---------------|--------------------|---------------|-------|
| Code | Configuration | Packaging | | |
| E05 | E 5 | | | |
| E07 | E7 | A | Straight lead | Bulk |
| E08 | E8 | B ^{*1} | Crimped lead | Bulk |
| E10 | E10 | E ^{*2} | Straight lead | Taped |
| E11 | E11 | F ^{*2} | Crimped lead | Taped |
| E14 | E14 | | | |

*1: Excluding E14, only the lead cut
*2: Excluding E14

Normal varistor voltage

The first two digits are significant figures and the third one denotes the number of zeros following.

Reference guide to standard products

| Part No. | Applicable standards | | Varistor voltage at 1 mA (V) | Maximum allowable voltage | | Clamping voltage at 8/20 μs | | Maximum peak current at 8/20 μs (A) | |
|------------|----------------------|-----------|------------------------------|---------------------------|--------|-----------------------------|--------|-------------------------------------|---------|
| | Type name | Approvals | | Acrms (V) | DC (V) | max.(V) | Ip (A) | 1 time | 2 times |
| ERZE05A201 | E201 | ○☆◇ | 200 (185 to 225) | 130 | 170 | 340 | 10 | 1200 | 600 |
| ERZE07A201 | E7201 | ○☆◇ | | | | 340 | 25 | 2500 | 1250 |
| ERZE08A201 | E8201 | ○☆◇ | | | | 340 | 25 | 3500 | 2500 |
| ERZE10A201 | E10201 | ○☆◇ | | | | 340 | 50 | 4500 | 3000 |
| ERZE11A201 | E11201 | ○☆★◇◆ | | | | 340 | 50 | 6000 | 5000 |
| ERZE14A201 | E14201 | ○☆★◇◆ | | | | 340 | 100 | 10000 | 7000 |
| ERZE05A221 | E221 | ○☆◇ | 220 (198 to 242) | 140 | 180 | 360 | 10 | 1200 | 600 |
| ERZE07A221 | E7221 | ○☆◇ | | | | 360 | 25 | 2500 | 1250 |
| ERZE08A221 | E8221 | ○☆◇ | | | | 360 | 25 | 3500 | 2500 |
| ERZE10A221 | E10221 | ○☆◇ | | | | 360 | 50 | 4500 | 3000 |
| ERZE11A221 | E11221 | ○☆★◇◆ | | | | 360 | 50 | 6000 | 5000 |
| ERZE14A221 | E14221 | ○☆★◇◆ | | | | 360 | 100 | 10000 | 7000 |
| ERZE05A241 | E241 | ○☆◇ | 240 (216 to 264) | 150 | 200 | 395 | 10 | 1200 | 600 |
| ERZE07A241 | E7241 | ○☆◇ | | | | 395 | 25 | 2500 | 1250 |
| ERZE08A241 | E8241 | ○☆◇ | | | | 395 | 25 | 3500 | 2500 |
| ERZE10A241 | E10241 | ○☆◇ | | | | 395 | 50 | 4500 | 3000 |
| ERZE11A241 | E11241 | ○☆★◇◆ | | | | 395 | 50 | 6000 | 5000 |
| ERZE14A241 | E14241 | ○☆★◇◆ | | | | 395 | 100 | 10000 | 7000 |
| ERZE05A271 | E271 | ○☆◇ | 270 (247 to 303) | 175 | 225 | 455 | 10 | 1200 | 600 |
| ERZE07A271 | E7271 | ○☆◇ | | | | 455 | 25 | 2500 | 1250 |
| ERZE08A271 | E8271 | ○☆◇ | | | | 455 | 25 | 3500 | 2500 |
| ERZE10A271 | E10271 | ○☆◇ | | | | 455 | 50 | 4500 | 3000 |
| ERZE11A271 | E11271 | ○☆★◇◆ | | | | 455 | 50 | 6000 | 5000 |
| ERZE14A271 | E14271 | ○☆★◇◆ | | | | 455 | 100 | 10000 | 7000 |
| ERZE05A331 | E331 | ○☆◇ | 330 (297 to 363) | 210 | 270 | 545 | 10 | 1200 | 600 |
| ERZE07A331 | E7331 | ○☆◇ | | | | 545 | 25 | 2500 | 1250 |
| ERZE08A331 | E8331 | ○☆◇ | | | | 545 | 25 | 3500 | 2500 |
| ERZE10A331 | E10331 | ○☆◇ | | | | 545 | 50 | 4500 | 3000 |
| ERZE11A331 | E11331 | ○☆★◇◆ | | | | 545 | 50 | 6000 | 4500 |
| ERZE14A331 | E14331 | ○☆★◇◆ | | | | 545 | 100 | 10000 | 6500 |
| ERZE05A361 | E361 | ○☆◇ | 360 (324 to 396) | 230 | 300 | 595 | 10 | 1200 | 600 |
| ERZE07A361 | E7361 | ○☆◇ | | | | 595 | 25 | 2500 | 1250 |
| ERZE08A361 | E8361 | ○☆◇ | | | | 595 | 25 | 3500 | 2500 |
| ERZE10A361 | E10361 | ○☆◇ | | | | 595 | 50 | 4500 | 3000 |
| ERZE11A361 | E11361 | ○☆★◇◆ | | | | 595 | 50 | 6000 | 4500 |
| ERZE14A361 | E14361 | ○☆★◇◆ | | | | 595 | 100 | 10000 | 6500 |
| ERZE05A391 | E391 | ○☆◇ | 390 (351 to 429) | 250 | 320 | 650 | 10 | 1200 | 600 |
| ERZE07A391 | E7391 | ○☆◇ | | | | 650 | 25 | 2500 | 1250 |
| ERZE08A391 | E8391 | ○☆◇ | | | | 650 | 25 | 3500 | 2500 |
| ERZE10A391 | E10391 | ○☆◇ | | | | 650 | 50 | 4500 | 3000 |
| ERZE11A391 | E11391 | ○☆★◇◆ | | | | 650 | 50 | 6000 | 4500 |
| ERZE14A391 | E14391 | ○☆★◇◆ | | | | 650 | 100 | 10000 | 6500 |
| ERZE05A431 | E431 | ○☆◇ | 430 (387 to 473) | 275 | 350 | 710 | 10 | 1200 | 600 |
| ERZE07A431 | E7431 | ○☆◇ | | | | 710 | 25 | 2500 | 1250 |
| ERZE08A431 | E8431 | ○☆◇ | | | | 710 | 25 | 3500 | 2500 |
| ERZE10A431 | E10431 | ○☆◇ | | | | 710 | 50 | 4500 | 3000 |
| ERZE11A431 | E11431 | ○☆★◇◆ | | | | 710 | 50 | 6000 | 4500 |
| ERZE14A431 | E14431 | ○☆★◇◆ | | | | 710 | 100 | 10000 | 6500 |

○: UL1449 (VZCA2/UL, VZCA8/C-UL), ☆: VDE (IEC61051-1, -2, -2-2) ★: VDE (IEC60950-1 Annex.Q, IEC62368-1 G8.1),

◇: 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 at 1 mA (V) | Maximum allowable voltage | | Clamping voltage at 8/20 μs | | Maximum peak current at 8/20 μs (A) | |
|------------|----------------------|-----------|---------------------------------|---------------------------|--------|-----------------------------|--------|-------------------------------------|---------|
| | Type name | Approvals | | Acrms (V) | DC (V) | max.(V) | Ip (A) | 1 time | 2 times |
| ERZE05A471 | E471 | ○☆◇ | 470 (423 to 517) | 300 | 385 | 775 | 10 | 1200 | 600 |
| ERZE07A471 | E7471 | ○☆◇ | | | | 775 | 25 | 2500 | 1250 |
| ERZE08A471 | E8471 | ○☆★◇◆ | | | | 775 | 25 | 3500 | 2500 |
| ERZE10A471 | E10471 | ○☆★◇◆ | | | | 775 | 50 | 4500 | 3000 |
| ERZE11A471 | E11471 | ○☆★◇◆ | | | | 775 | 50 | 6000 | 4500 |
| ERZE14A471 | E14471 | ○☆★◇◆ | | | | 775 | 100 | 10000 | 6500 |
| ERZE07A511 | E7511 | ○☆◇ | 510 (459 to 561) | 320 | 410 | 845 | 25 | 2500 | 1250 |
| ERZE08A511 | E8511 | ○☆★◇◆ | | | | 845 | 25 | 3500 | 2500 |
| ERZE10A511 | E10511 | ○☆★◇◆ | | | | 845 | 50 | 4500 | 3000 |
| ERZE11A511 | E11511 | ○☆★◇◆ | | | | 845 | 50 | 6000 | 4500 |
| ERZE14A511 | E14511 | ○☆★◇◆ | | | | 845 | 100 | 10000 | 6500 |
| ERZE07A561 | E7561 | ○☆◇ | 560 (504 to 616) | 350 | 450 | 930 | 25 | 2500 | 1250 |
| ERZE08A561 | E8561 | ○☆★◇◆ | | | | 930 | 25 | 3500 | 2500 |
| ERZE10A561 | E10561 | ○☆★◇◆ | | | | 930 | 50 | 4500 | 3000 |
| ERZE11A561 | E11561 | ○☆★◇◆ | | | | 930 | 50 | 6000 | 4500 |
| ERZE14A561 | E14561 | ○☆★◇◆ | | | | 930 | 100 | 10000 | 6500 |
| ERZE07A621 | E7621 | ○☆◇ | 620 (558 to 682) | 385 | 505 | 1025 | 25 | 2500 | 1250 |
| ERZE08A621 | E8621 | ○☆★◇◆ | | | | 1025 | 25 | 3500 | 2500 |
| ERZE10A621 | E10621 | ○☆★◇◆ | | | | 1025 | 50 | 4500 | 3000 |
| ERZE11A621 | E11621 | ○☆★◇◆ | | | | 1025 | 50 | 5000 | 4500 |
| ERZE14A621 | E14621 | ○☆★◇◆ | | | | 1025 | 100 | 7500 | 6500 |
| ERZE08A681 | E8681 | ○☆★◇◆ | 680 (612 to 748) | 420 | 560 | 1120 | 25 | 3500 | 2500 |
| ERZE10A681 | E10681 | ○☆★◇◆ | | | | 1120 | 50 | 4500 | 3000 |
| ERZE11A681 | E11681 | ○☆★◇◆ | | | | 1120 | 50 | 5000 | 4500 |
| ERZE14A681 | E14681 | ○☆★◇◆ | | | | 1120 | 100 | 7500 | 6500 |
| ERZE08A751 | E8751 | ○☆★◇◆ | 750 (675 to 825) | 460 | 615 | 1240 | 25 | 3500 | 2500 |
| ERZE10A751 | E10751 | ○☆★◇◆ | | | | 1240 | 50 | 4500 | 3000 |
| ERZE11A751 | E11751 | ○☆★◇◆ | | | | 1240 | 50 | 5000 | 4500 |
| ERZE14A751 | E14751 | ○☆★◇◆ | | | | 1240 | 100 | 7500 | 6500 |
| ERZE10A821 | E10821 | ○☆★◇◆ | 820 (738 to 902) | 510 | 670 | 1355 | 50 | 4500 | 3000 |
| ERZE11A821 | E11821 | ○☆★◇◆ | | | | 1355 | 50 | 5000 | 4500 |
| ERZE14A821 | E14821 | ○☆★◇◆ | | | | 1355 | 100 | 7500 | 6500 |
| ERZE10A911 | E10911 | ○☆★◇◆ | 910 (819 to 1001) | 550 | 745 | 1500 | 50 | 4500 | 3000 |
| ERZE11A911 | E11911 | ○☆★◇◆ | | | | 1500 | 50 | 5000 | 4500 |
| ERZE14A911 | E14911 | ○☆★◇◆ | | | | 1500 | 100 | 7500 | 6500 |
| ERZE10A102 | E10102 | ○☆★◇◆ | 1000 (900 to 1100) | 625 | 825 | 1650 | 50 | 4500 | 3000 |
| ERZE11A102 | E11102 | ○☆★◇◆ | | | | 1650 | 50 | 5000 | 4500 |
| ERZE14A102 | E14102 | ○☆★◇◆ | | | | 1650 | 100 | 7500 | 6500 |
| ERZE10A112 | E10112 | ○☆★◇◆ | 1100 (990 to 1210) | 680 | 895 | 1815 | 50 | 4500 | 3000 |
| ERZE11A112 | E11112 | ○☆★◇◆ | | | | 1815 | 50 | 5000 | 4500 |
| ERZE14A112 | E14112 | ○☆★◇◆ | | | | 1815 | 100 | 7500 | 6500 |

○: UL1449 (VZCA2/UL, VZCA8/C-UL), ☆: VDE (IEC61051-1, -2, -2-2) ★: VDE (IEC60950-1 Annex.Q, IEC62368-1 G8.1),

◇: 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

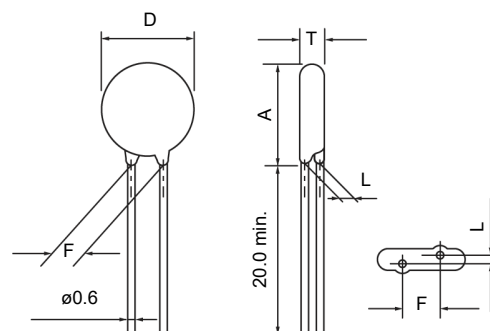
| Part No. | Varistor voltage at 1 mA | Maximum allowable voltage | | Clamping voltage (max.) **Ip | Rated power | Maximum energy | | Maximum peak current (8/20 μ s) | | Capacitance (max.) at 1 kHz |
|------------|--------------------------|---------------------------|--------|------------------------------|-------------|-------------------|--------|-------------------------------------|-------------|-----------------------------|
| | | ACrms (V) | DC (V) | | | (10/1000 μ s) | (2 ms) | 1 time (A) | 2 times (A) | |
| | (V) | (V) | (V) | (W) | (J) | (J) | (A) | (A) | (pF) | |
| ERZE05A201 | 200(185 to 225) | 130 | 170 | 340 | 0.25 | 13 | 9.5 | 1200 | 600 | 200 |
| ERZE05A221 | 220(198 to 242) | 140 | 180 | 360 | 0.25 | 14 | 10 | 1200 | 600 | 190 |
| ERZE05A241 | 240(216 to 264) | 150 | 200 | 395 | 0.25 | 15 | 11 | 1200 | 600 | 170 |
| ERZE05A271 | 270(247 to 303) | 175 | 225 | 455 | 0.25 | 18 | 13 | 1200 | 600 | 150 |
| ERZE05A331 | 330(297 to 363) | 210 | 270 | 545 | 0.25 | 21 | 15 | 1200 | 600 | 130 |
| ERZE05A361 | 360(324 to 396) | 230 | 300 | 595 | 0.25 | 23 | 17 | 1200 | 600 | 130 |
| ERZE05A391 | 390(351 to 429) | 250 | 320 | 650 | 0.25 | 26 | 19 | 1200 | 600 | 130 |
| ERZE05A431 | 430(387 to 473) | 275 | 350 | 710 | 0.25 | 29 | 21 | 1200 | 600 | 120 |
| ERZE05A471 | 470(423 to 517) | 300 | 385 | 775 | 0.25 | 32 | 23 | 1200 | 600 | 100 |

*Ip Measuring current of clamping voltage : 10 A

Dimensions in mm (not to scale)

Unit : mm

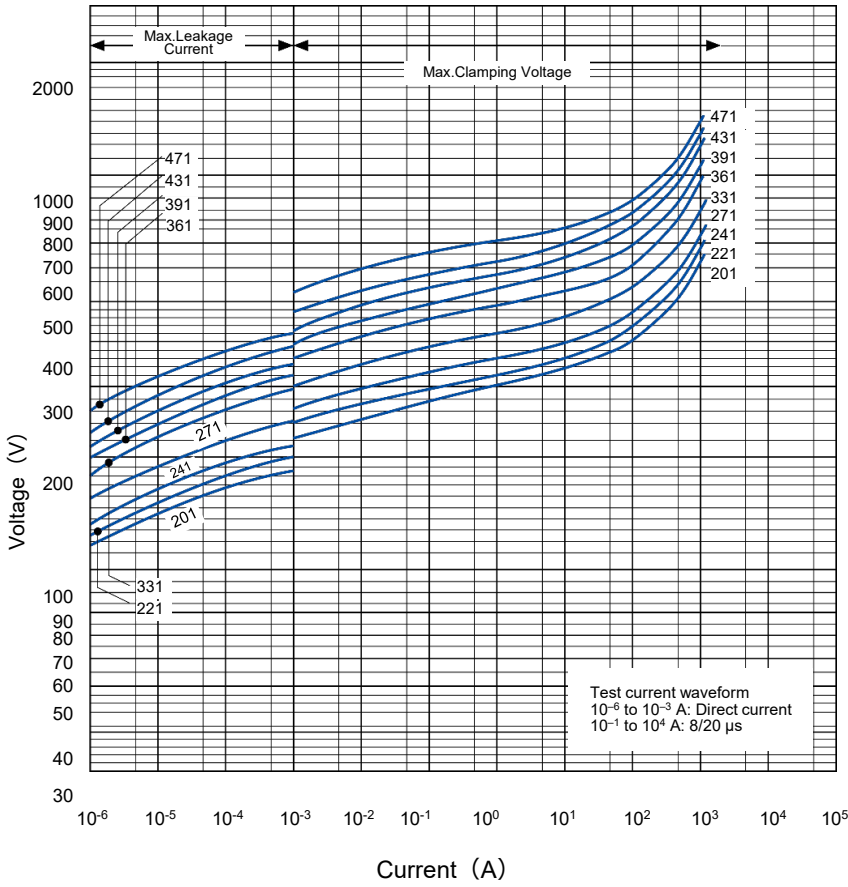
| Part No. | D max. | T max. | F \pm 1.0 | A max. | L \pm 1.0 |
|------------|--------|--------|-------------|--------|-------------|
| ERZE05A201 | 7.0 | 4.8 | 5.0 | 10.0 | 2.1 |
| ERZE05A221 | 7.0 | 4.9 | 5.0 | 10.0 | 2.3 |
| ERZE05A241 | 7.0 | 5.0 | 5.0 | 10.0 | 2.4 |
| ERZE05A271 | 7.0 | 5.2 | 5.0 | 10.0 | 2.5 |
| ERZE05A331 | 7.0 | 5.5 | 5.0 | 10.0 | 2.9 |
| ERZE05A361 | 7.0 | 5.8 | 5.0 | 10.0 | 3.1 |
| ERZE05A391 | 7.0 | 5.9 | 5.0 | 10.0 | 3.2 |
| ERZE05A431 | 7.0 | 6.1 | 5.0 | 10.0 | 3.3 |
| ERZE05A471 | 7.0 | 6.3 | 5.0 | 10.0 | 3.5 |



Typical characteristics

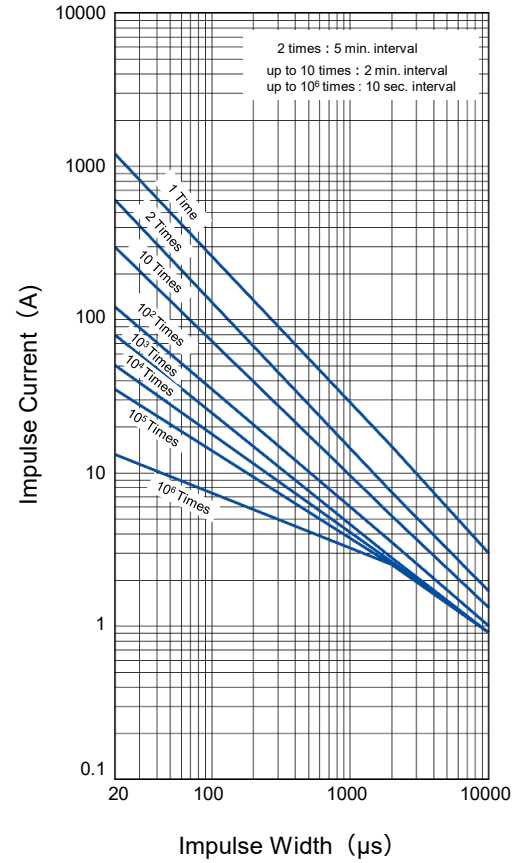
Voltage vs. Current

ERZE05A201 to ERZE05A471



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

ERZE05A201 to ERZE05A471



Ratings and characteristics

●Operating temperature range : -40 to 85 °C

●Storage temperature range : -40 to 125 °C

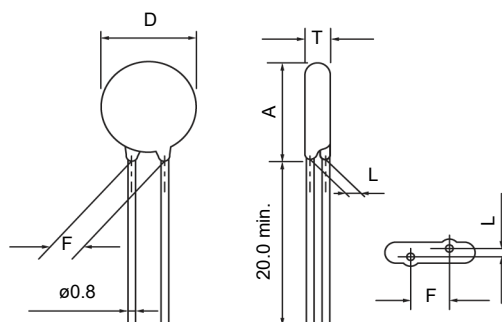
| Part No. | Varistor voltage at 1 mA | Maximum allowable voltage | | Clamping voltage (max.) **Ip | Rated power | Maximum energy | | Maximum peak current (8/20 μs) | | Capacitance (max.) at 1 kHz |
|------------|--------------------------|---------------------------|--------|------------------------------|-------------|----------------|--------|--------------------------------|---------|-----------------------------|
| | | ACrms (V) | DC (V) | | | (10/1000 μs) | (2 ms) | 1 time | 2 times | |
| | | | | | | (J) | (J) | (A) | (A) | |
| (V) | (V) | (V) | (W) | (J) | (J) | (A) | (A) | (pF) | | |
| ERZE07A201 | 200(185 to 225) | 130 | 170 | 340 | 0.3 | 26 | 19 | 2500 | 1250 | 360 |
| ERZE07A221 | 220(198 to 242) | 140 | 180 | 360 | 0.3 | 30 | 22 | 2500 | 1250 | 350 |
| ERZE07A241 | 240(216 to 264) | 150 | 200 | 395 | 0.3 | 33 | 24 | 2500 | 1250 | 340 |
| ERZE07A271 | 270(247 to 303) | 175 | 225 | 455 | 0.3 | 39 | 28 | 2500 | 1250 | 310 |
| ERZE07A331 | 330(297 to 363) | 210 | 270 | 545 | 0.3 | 44 | 32 | 2500 | 1250 | 280 |
| ERZE07A361 | 360(324 to 396) | 230 | 300 | 595 | 0.3 | 50 | 36 | 2500 | 1250 | 260 |
| ERZE07A391 | 390(351 to 429) | 250 | 320 | 650 | 0.3 | 53 | 38 | 2500 | 1250 | 240 |
| ERZE07A431 | 430(387 to 473) | 275 | 350 | 710 | 0.3 | 60 | 43 | 2500 | 1250 | 210 |
| ERZE07A471 | 470(423 to 517) | 300 | 385 | 775 | 0.3 | 65 | 47 | 2500 | 1250 | 170 |
| ERZE07A511 | 510(459 to 561) | 320 | 410 | 845 | 0.3 | 70 | 50 | 2500 | 1250 | 140 |
| ERZE07A561 | 560(504 to 616) | 350 | 450 | 930 | 0.3 | 75 | 55 | 2500 | 1250 | 140 |
| ERZE07A621 | 620(558 to 682) | 385 | 505 | 1025 | 0.3 | 80 | 60 | 2500 | 1250 | 135 |

*Ip Measuring current of clamping voltage : 25 A

Dimensions in mm (not to scale)

Unit : mm

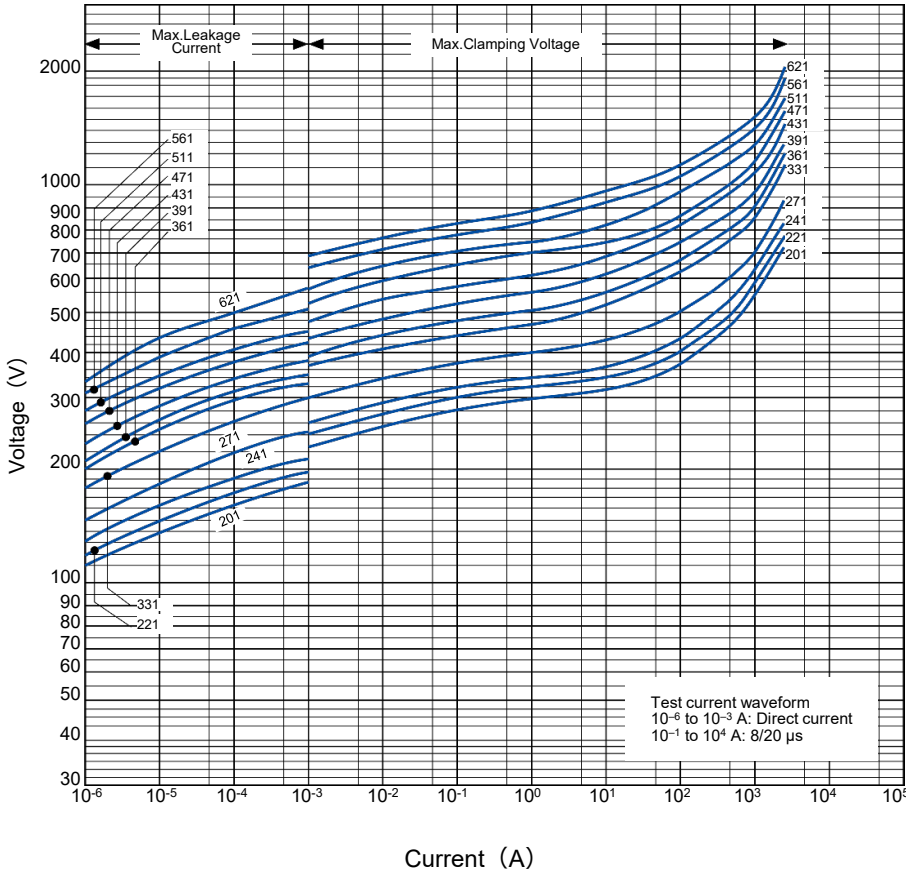
| Part No. | D max. | T max. | F±1.0 | A max. | L±1.0 |
|------------|--------|--------|-------|--------|-------|
| ERZE07A201 | 9.0 | 5.3 | 7.5 | 12.5 | 2.1 |
| ERZE07A221 | 9.0 | 5.4 | 7.5 | 12.5 | 2.3 |
| ERZE07A241 | 9.0 | 5.5 | 7.5 | 12.5 | 2.4 |
| ERZE07A271 | 9.0 | 5.7 | 7.5 | 12.5 | 2.5 |
| ERZE07A331 | 9.0 | 6.0 | 7.5 | 12.5 | 2.8 |
| ERZE07A361 | 9.0 | 6.2 | 7.5 | 12.5 | 2.9 |
| ERZE07A391 | 9.0 | 6.3 | 7.5 | 12.5 | 3.0 |
| ERZE07A431 | 9.0 | 6.5 | 7.5 | 12.5 | 3.1 |
| ERZE07A471 | 9.0 | 6.8 | 7.5 | 12.5 | 3.3 |
| ERZE07A511 | 9.0 | 7.0 | 7.5 | 12.5 | 3.5 |
| ERZE07A561 | 9.0 | 7.4 | 7.5 | 13.5 | 3.8 |
| ERZE07A621 | 10.0 | 7.8 | 7.5 | 13.5 | 4.0 |



Typical characteristics

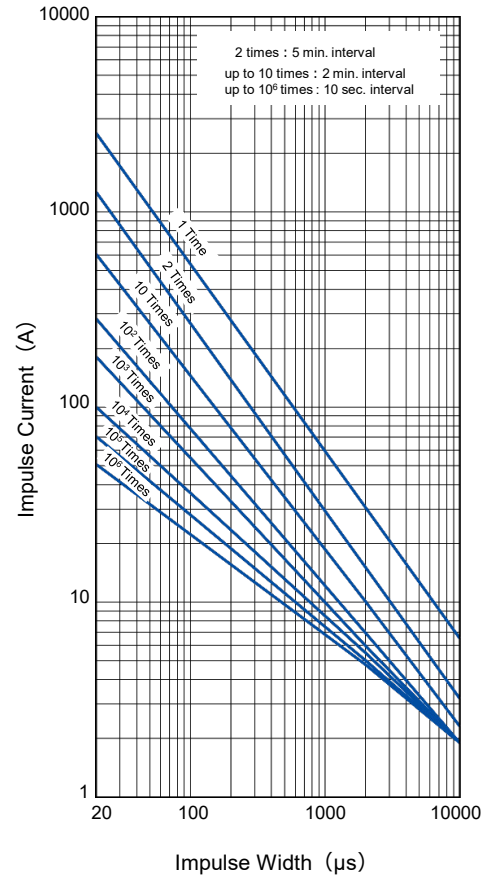
Voltage vs. Current

ERZE07A201 to ERZE07A621



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

ERZE07A201 to ERZE07A621



Ratings and characteristics

● Operating temperature range : -40 to 85 °C ● Storage temperature range : -40 to 125 °C

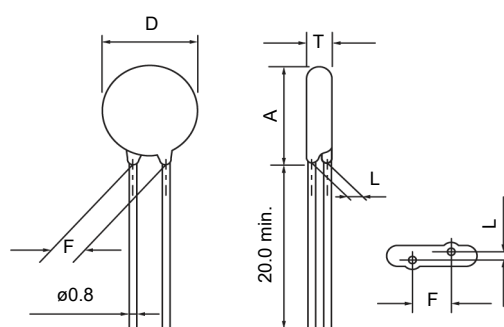
| Part No. | Varistor voltage at 1 mA | Maximum allowable voltage | | Clamping voltage (max.) **Ip | Rated power | Maximum energy | | Maximum peak current (8/20 μs) | | Capacitance (max.) at 1 kHz |
|------------|--------------------------|---------------------------|--------|------------------------------|-------------|----------------|--------|--------------------------------|---------|-----------------------------|
| | | ACrms (V) | DC (V) | | | (10/1000 μs) | (2 ms) | 1 time | 2 times | |
| | (V) | (V) | (V) | (W) | (J) | (J) | (A) | (A) | (pF) | |
| ERZE08A201 | 200(185 to 225) | 130 | 170 | 340 | 0.4 | 35 | 25 | 3500 | 2500 | 390 |
| ERZE08A221 | 220(198 to 242) | 140 | 180 | 360 | 0.4 | 39 | 27.5 | 3500 | 2500 | 380 |
| ERZE08A241 | 240(216 to 264) | 150 | 200 | 395 | 0.4 | 42 | 30 | 3500 | 2500 | 360 |
| ERZE08A271 | 270(247 to 303) | 175 | 225 | 455 | 0.4 | 49 | 35 | 3500 | 2500 | 330 |
| ERZE08A331 | 330(297 to 363) | 210 | 270 | 545 | 0.4 | 58 | 42 | 3500 | 2500 | 300 |
| ERZE08A361 | 360(324 to 396) | 230 | 300 | 595 | 0.4 | 65 | 45 | 3500 | 2500 | 280 |
| ERZE08A391 | 390(351 to 429) | 250 | 320 | 650 | 0.4 | 70 | 50 | 3500 | 2500 | 260 |
| ERZE08A431 | 430(387 to 473) | 275 | 350 | 710 | 0.4 | 80 | 55 | 3500 | 2500 | 230 |
| ERZE08A471 | 470(423 to 517) | 300 | 385 | 775 | 0.4 | 85 | 60 | 3500 | 2500 | 180 |
| ERZE08A511 | 510(459 to 561) | 320 | 410 | 845 | 0.4 | 92 | 67 | 3500 | 2500 | 150 |
| ERZE08A561 | 560(504 to 616) | 350 | 450 | 930 | 0.4 | 92 | 67 | 3500 | 2500 | 150 |
| ERZE08A621 | 620(558 to 682) | 385 | 505 | 1025 | 0.4 | 92 | 67 | 3500 | 2500 | 140 |
| ERZE08A681 | 680(612 to 748) | 420 | 560 | 1120 | 0.4 | 92 | 67 | 3500 | 2500 | 130 |
| ERZE08A751 | 750(675 to 825) | 460 | 615 | 1240 | 0.4 | 100 | 70 | 3500 | 2500 | 130 |

*Ip Measuring current of clamping voltage : 25 A

Dimensions in mm (not to scale)

Unit : mm

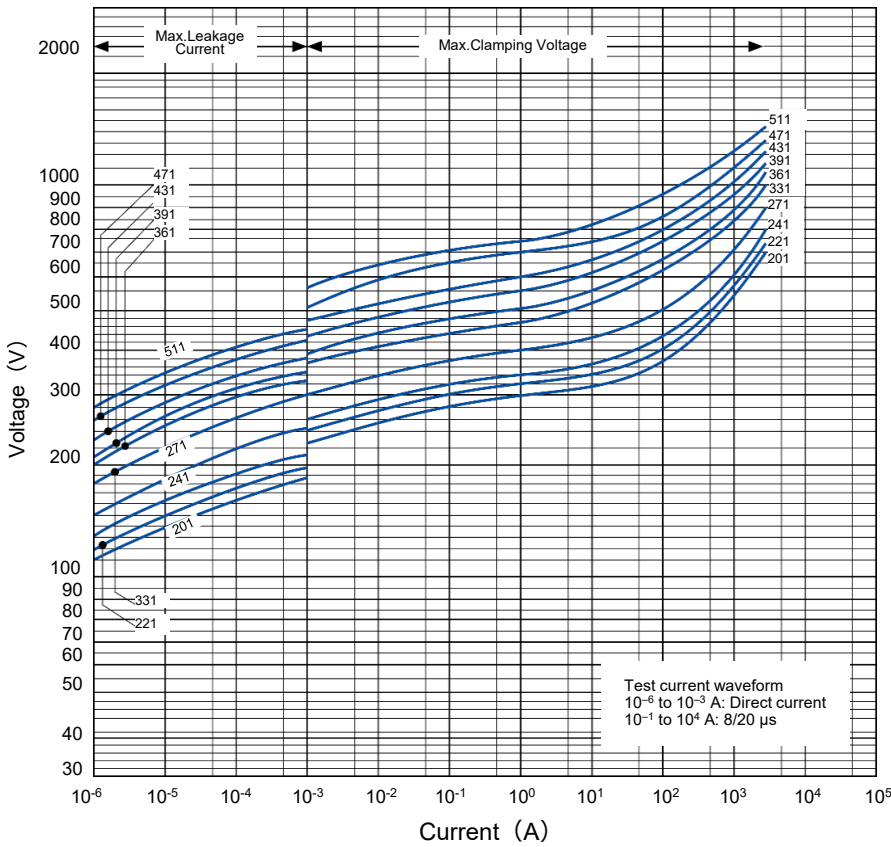
| Part No. | D max. | T max. | F±1.0 | A max. | L±1.0 |
|------------|--------|--------|-------|--------|-------|
| ERZE08A201 | 10.5 | 5.1 | 7.5 | 13.5 | 1.9 |
| ERZE08A221 | 10.5 | 5.2 | 7.5 | 13.5 | 2.0 |
| ERZE08A241 | 10.5 | 5.3 | 7.5 | 13.5 | 2.1 |
| ERZE08A271 | 10.5 | 5.5 | 7.5 | 13.5 | 2.3 |
| ERZE08A331 | 10.5 | 5.9 | 7.5 | 13.5 | 2.6 |
| ERZE08A361 | 10.5 | 6.1 | 7.5 | 13.5 | 2.8 |
| ERZE08A391 | 10.5 | 6.3 | 7.5 | 13.5 | 2.9 |
| ERZE08A431 | 10.5 | 6.5 | 7.5 | 13.5 | 3.1 |
| ERZE08A471 | 10.5 | 7.3 | 7.5 | 13.5 | 3.6 |
| ERZE08A511 | 10.5 | 7.8 | 7.5 | 13.5 | 4.0 |
| ERZE08A561 | 10.5 | 8.1 | 7.5 | 13.5 | 4.3 |
| ERZE08A621 | 11.5 | 8.7 | 7.5 | 14.5 | 4.7 |
| ERZE08A681 | 11.5 | 9.0 | 7.5 | 14.5 | 5.0 |
| ERZE08A751 | 11.5 | 9.7 | 7.5 | 14.5 | 5.6 |



Typical characteristics

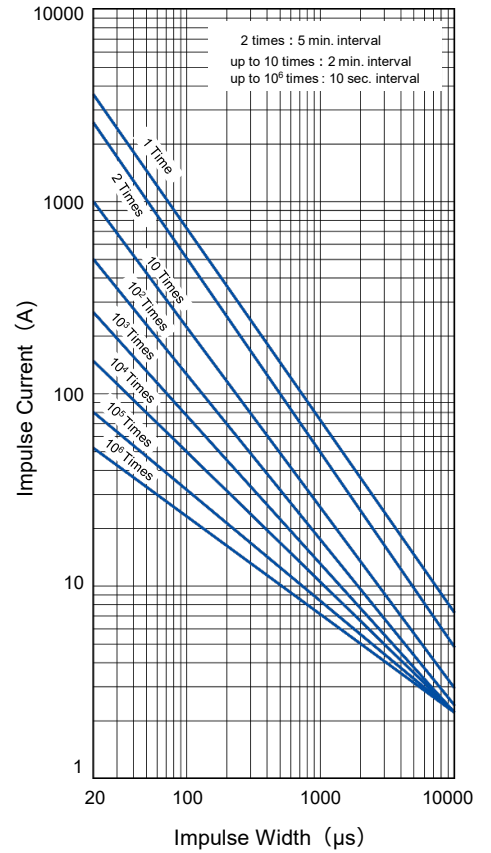
Voltage vs. Current

ERZE08A201 to ERZE08A511

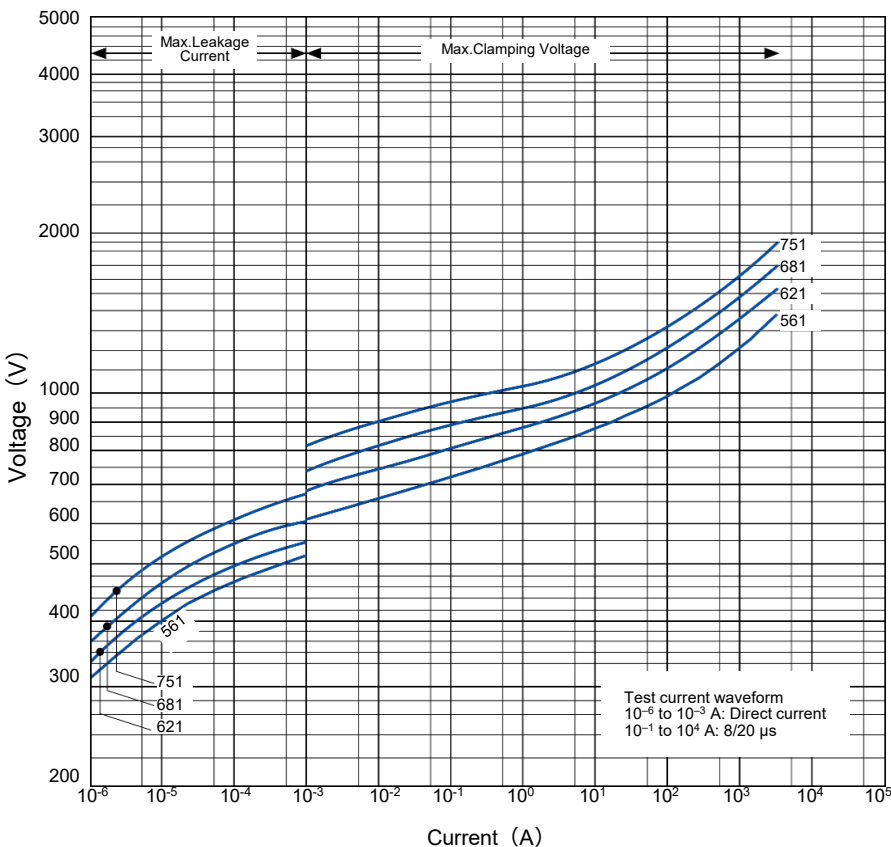


Impulse Derating (Relation between impulse width and impulse current multiple)

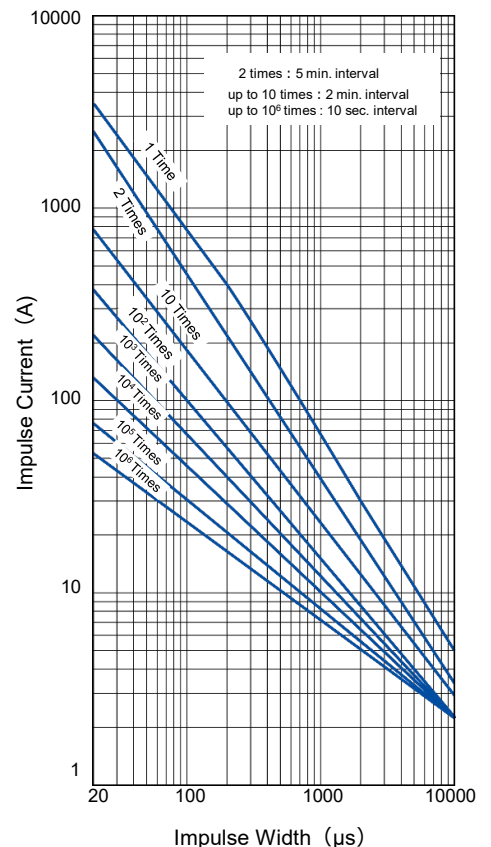
ERZE08A201 to ERZE08A511



ERZE08A561 to ERZE08A751



ERZE08A561 to ERZE08A751



Ratings and characteristics

●Operating temperature range : -40 to 85 °C

●Storage temperature range : -40 to 125 °C

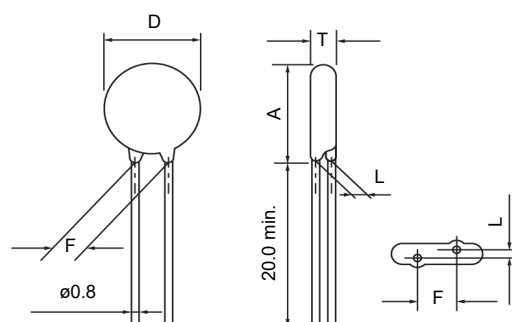
| Part No. | Varistor voltage at 1 mA | Maximum allowable voltage | | Clamping voltage (max.) **Ip | Rated power | Maximum energy | | Maximum peak current (8/20 μs) | | Capacitance (max.) at 1 kHz |
|------------|-----------------------------|------------------------------|-----------|------------------------------------|----------------|----------------|--------|--------------------------------------|---------|-----------------------------------|
| | | ACrms (V) | DC (V) | | | (10/1000 μs) | (2 ms) | 1 time | 2 times | |
| | (V) | (V) | (V) | (W) | (J) | (J) | (A) | (A) | (pF) | |
| ERZE10A201 | 200(185 to 225) | 130 | 170 | 340 | 0.5 | 47 | 34 | 4500 | 3000 | 630 |
| ERZE10A221 | 220(198 to 242) | 140 | 180 | 360 | 0.5 | 50 | 36 | 4500 | 3000 | 600 |
| ERZE10A241 | 240(216 to 264) | 150 | 200 | 395 | 0.5 | 56 | 40 | 4500 | 3000 | 570 |
| ERZE10A271 | 270(247 to 303) | 175 | 225 | 455 | 0.5 | 64 | 46 | 4500 | 3000 | 530 |
| ERZE10A331 | 330(297 to 363) | 210 | 270 | 545 | 0.5 | 72 | 52 | 4500 | 3000 | 470 |
| ERZE10A361 | 360(324 to 396) | 230 | 300 | 595 | 0.5 | 84 | 60 | 4500 | 3000 | 430 |
| ERZE10A391 | 390(351 to 429) | 250 | 320 | 650 | 0.5 | 91 | 65 | 4500 | 3000 | 400 |
| ERZE10A431 | 430(387 to 473) | 275 | 350 | 710 | 0.5 | 99 | 71 | 4500 | 3000 | 350 |
| ERZE10A471 | 470(423 to 517) | 300 | 385 | 775 | 0.5 | 106 | 76 | 4500 | 3000 | 320 |
| ERZE10A511 | 510(459 to 561) | 320 | 410 | 845 | 0.5 | 117 | 84 | 4500 | 3000 | 300 |
| ERZE10A561 | 560(504 to 616) | 350 | 450 | 930 | 0.5 | 120 | 86 | 4500 | 3000 | 290 |
| ERZE10A621 | 620(558 to 682) | 385 | 505 | 1025 | 0.5 | 126 | 88 | 4500 | 3000 | 280 |
| ERZE10A681 | 680(612 to 748) | 420 | 560 | 1120 | 0.5 | 133 | 95 | 4500 | 3000 | 260 |
| ERZE10A751 | 750(675 to 825) | 460 | 615 | 1240 | 0.5 | 140 | 100 | 4500 | 3000 | 250 |
| ERZE10A821 | 820(738 to 902) | 510 | 670 | 1355 | 0.5 | 154 | 110 | 4500 | 3000 | 230 |
| ERZE10A911 | 910(819 to 1001) | 550 | 745 | 1500 | 0.5 | 168 | 112 | 4500 | 3000 | 220 |
| ERZE10A102 | 1000(900 to 1100) | 625 | 825 | 1650 | 0.5 | 182 | 130 | 4500 | 3000 | 200 |
| ERZE10A112 | 1100(990 to 1210) | 680 | 895 | 1815 | 0.5 | 196 | 140 | 4500 | 3000 | 180 |

*Ip Measuring current of clamping voltage : 50 A

Dimensions in mm (not to scale)

Unit : mm

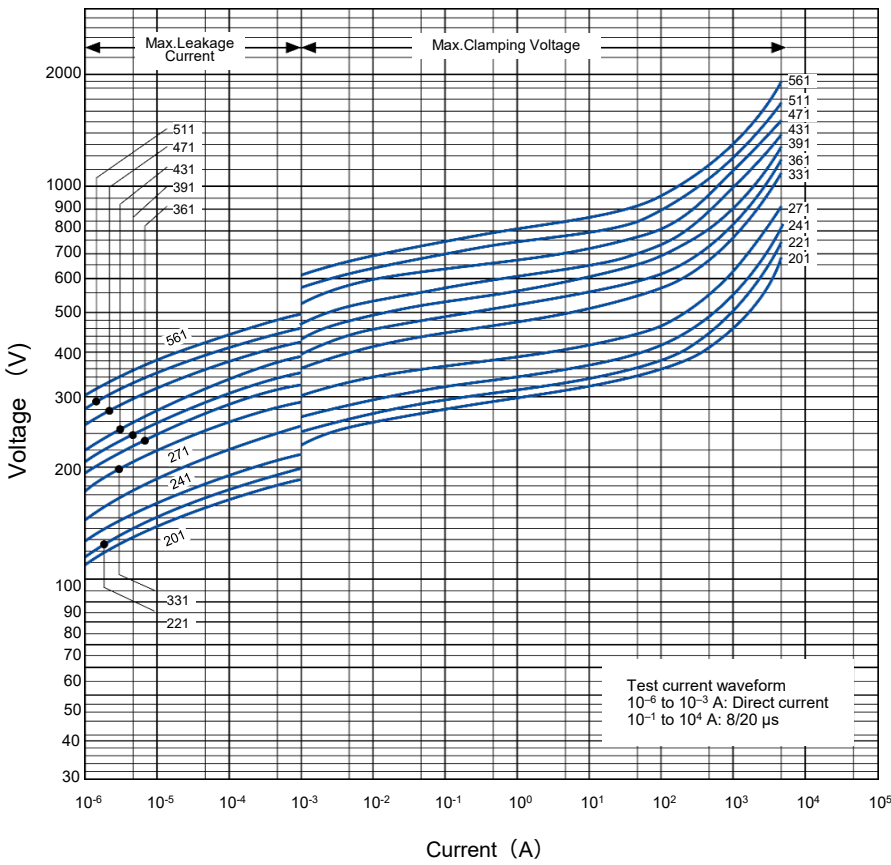
| Part No. | D max. | T max. | F±1.0 | A max. | L±1.0 |
|------------|--------|--------|-------|--------|-------|
| ERZE10A201 | 11.5 | 5.3 | 7.5 | 15.0 | 2.1 |
| ERZE10A221 | 11.5 | 5.4 | 7.5 | 15.0 | 2.3 |
| ERZE10A241 | 11.5 | 5.5 | 7.5 | 15.0 | 2.4 |
| ERZE10A271 | 11.5 | 5.7 | 7.5 | 15.0 | 2.5 |
| ERZE10A331 | 11.5 | 6.0 | 7.5 | 15.0 | 2.8 |
| ERZE10A361 | 11.5 | 6.2 | 7.5 | 15.0 | 2.9 |
| ERZE10A391 | 11.5 | 6.3 | 7.5 | 15.0 | 3.0 |
| ERZE10A431 | 11.5 | 6.5 | 7.5 | 15.0 | 3.1 |
| ERZE10A471 | 11.5 | 6.8 | 7.5 | 15.0 | 3.3 |
| ERZE10A511 | 11.5 | 7.0 | 7.5 | 15.0 | 3.5 |
| ERZE10A561 | 11.5 | 7.4 | 7.5 | 15.0 | 3.8 |
| ERZE10A621 | 12.5 | 7.8 | 7.5 | 16.0 | 4.0 |
| ERZE10A681 | 12.5 | 8.1 | 7.5 | 16.0 | 4.2 |
| ERZE10A751 | 12.5 | 8.6 | 7.5 | 16.0 | 4.6 |
| ERZE10A821 | 12.5 | 8.9 | 7.5 | 16.0 | 5.0 |
| ERZE10A911 | 12.5 | 9.5 | 7.5 | 16.0 | 5.7 |
| ERZE10A102 | 12.5 | 10.0 | 7.5 | 16.0 | 6.2 |
| ERZE10A112 | 12.5 | 10.6 | 7.5 | 16.0 | 6.8 |



Typical characteristics

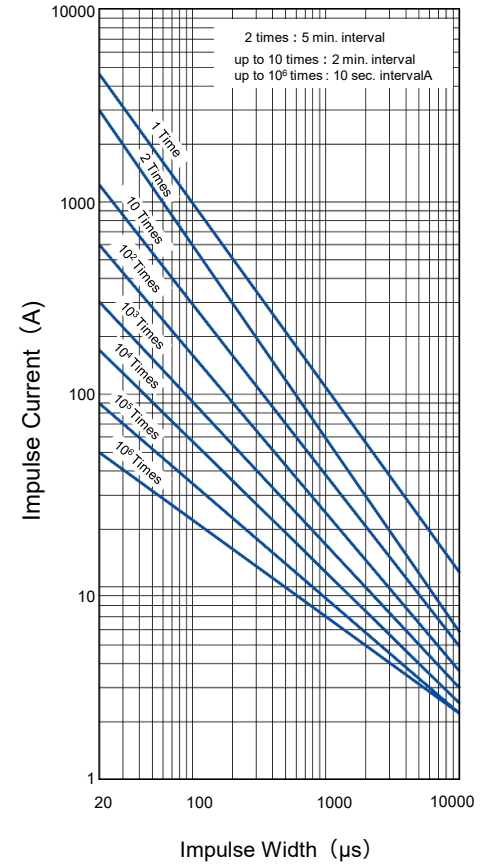
Voltage vs. Current

ERZE10A201 to ERZE10A561

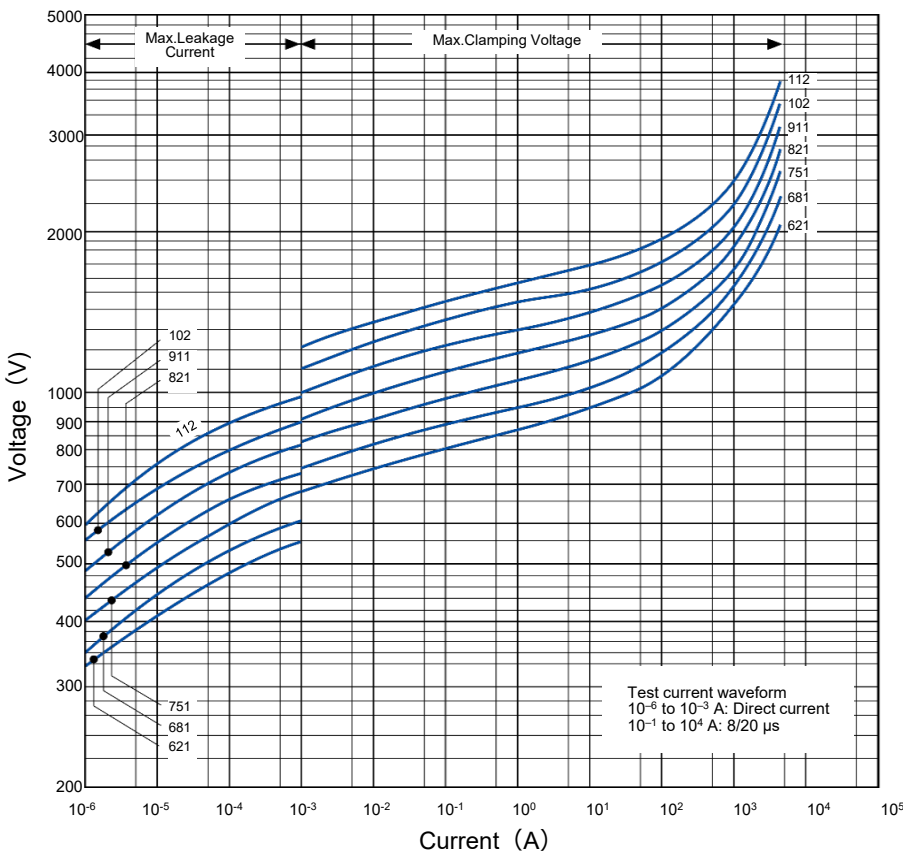


Impulse Derating (Relation between impulse width and impulse current multiple)

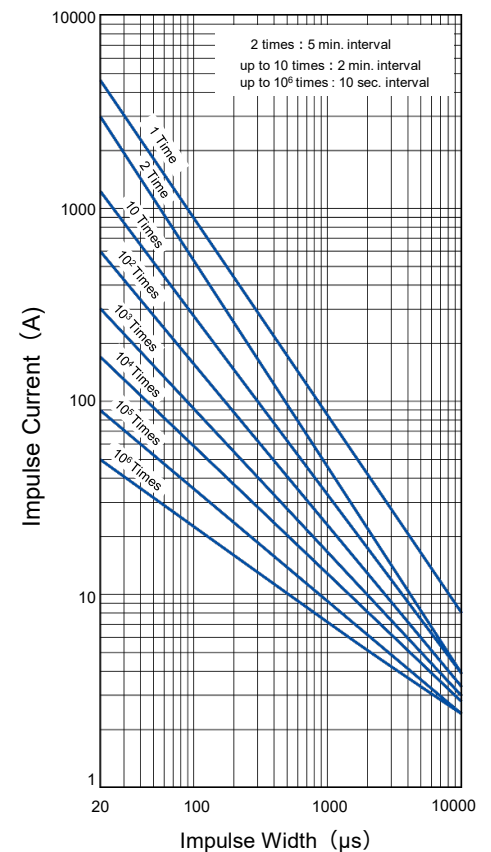
ERZE10A201 to ERZE10A561



ERZE10A621 to ERZE10A112



ERZE10A621 to ERZE10A112



Ratings and characteristics

●Operating temperature range : -40 to 85 °C

●Storage temperature range : -40 to 125 °C

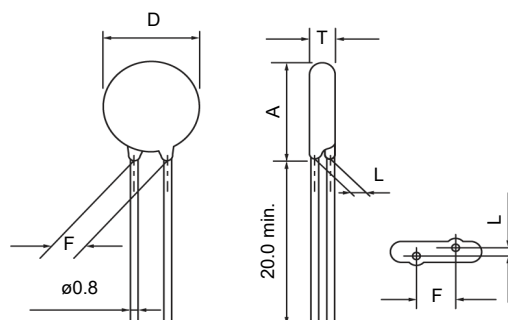
| Part No. | Varistor voltage at 1 mA | Maximum allowable voltage | | Clamping voltage (max.) **Ip | Rated power | Maximum energy | | Maximum peak current (8/20 μ s) | | Capacitance (max.) at 1 kHz |
|------------|-----------------------------|------------------------------|-----------|------------------------------------|----------------|-------------------|--------|---|---------|-----------------------------------|
| | | ACrms (V) | DC (V) | | | (10/1000 μ s) | (2 ms) | 1 time | 2 times | |
| | (V) | (V) | (V) | (W) | (J) | (J) | (A) | (A) | (pF) | |
| ERZE11A201 | 200(185 to 225) | 130 | 170 | 340 | 0.6 | 70 | 50 | 6000 | 5000 | 690 |
| ERZE11A221 | 220(198 to 242) | 140 | 180 | 360 | 0.6 | 78 | 55 | 6000 | 5000 | 660 |
| ERZE11A241 | 240(216 to 264) | 150 | 200 | 395 | 0.6 | 84 | 60 | 6000 | 5000 | 620 |
| ERZE11A271 | 270(247 to 303) | 175 | 225 | 455 | 0.6 | 99 | 70 | 6000 | 5000 | 580 |
| ERZE11A331 | 330(297 to 363) | 210 | 270 | 545 | 0.6 | 115 | 80 | 6000 | 4500 | 520 |
| ERZE11A361 | 360(324 to 396) | 230 | 300 | 595 | 0.6 | 130 | 90 | 6000 | 4500 | 480 |
| ERZE11A391 | 390(351 to 429) | 250 | 320 | 650 | 0.6 | 140 | 100 | 6000 | 4500 | 450 |
| ERZE11A431 | 430(387 to 473) | 275 | 350 | 710 | 0.6 | 155 | 110 | 6000 | 4500 | 400 |
| ERZE11A471 | 470(423 to 517) | 300 | 385 | 775 | 0.6 | 175 | 125 | 6000 | 4500 | 360 |
| ERZE11A511 | 510(459 to 561) | 320 | 410 | 845 | 0.6 | 190 | 136 | 6000 | 4500 | 310 |
| ERZE11A561 | 560(504 to 616) | 350 | 450 | 930 | 0.6 | 190 | 136 | 6000 | 4500 | 310 |
| ERZE11A621 | 620(558 to 682) | 385 | 505 | 1025 | 0.6 | 190 | 136 | 5000 | 4500 | 300 |
| ERZE11A681 | 680(612 to 748) | 420 | 560 | 1120 | 0.6 | 190 | 136 | 5000 | 4500 | 290 |
| ERZE11A751 | 750(675 to 825) | 460 | 615 | 1240 | 0.6 | 210 | 150 | 5000 | 4500 | 280 |
| ERZE11A821 | 820(738 to 902) | 510 | 670 | 1355 | 0.6 | 235 | 165 | 5000 | 4500 | 260 |
| ERZE11A911 | 910(819 to 1001) | 550 | 745 | 1500 | 0.6 | 255 | 180 | 5000 | 4500 | 240 |
| ERZE11A102 | 1000(900 to 1100) | 625 | 825 | 1650 | 0.6 | 280 | 200 | 5000 | 4500 | 220 |
| ERZE11A112 | 1100(990 to 1210) | 680 | 895 | 1815 | 0.6 | 310 | 220 | 5000 | 4500 | 200 |

*Ip Measuring current of clamping voltage : 50 A

Dimensions in mm (not to scale)

Unit : mm

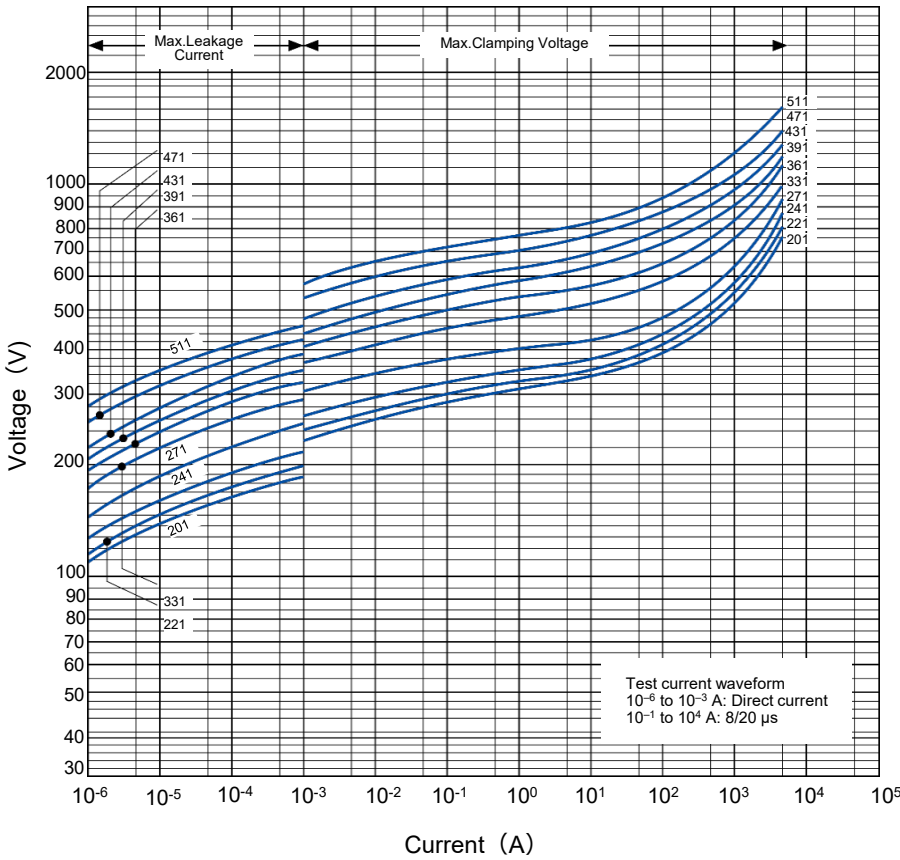
| Part No. | D max. | T max. | F \pm 1.0 | A max. | L \pm 1.0 |
|------------|--------|--------|-------------|--------|-------------|
| ERZE11A201 | 13.0 | 5.2 | 7.5 | 17.0 | 1.9 |
| ERZE11A221 | 13.0 | 5.3 | 7.5 | 17.0 | 2.0 |
| ERZE11A241 | 13.0 | 5.4 | 7.5 | 17.0 | 2.1 |
| ERZE11A271 | 13.0 | 5.6 | 7.5 | 17.0 | 2.3 |
| ERZE11A331 | 13.0 | 5.9 | 7.5 | 17.0 | 2.6 |
| ERZE11A361 | 13.0 | 6.1 | 7.5 | 17.0 | 2.8 |
| ERZE11A391 | 13.0 | 6.2 | 7.5 | 17.0 | 2.9 |
| ERZE11A431 | 13.0 | 6.4 | 7.5 | 17.0 | 3.1 |
| ERZE11A471 | 13.0 | 6.6 | 7.5 | 17.0 | 3.3 |
| ERZE11A511 | 13.0 | 6.8 | 7.5 | 17.0 | 3.5 |
| ERZE11A561 | 13.0 | 7.2 | 7.5 | 17.0 | 3.8 |
| ERZE11A621 | 14.0 | 7.5 | 7.5 | 18.0 | 4.2 |
| ERZE11A681 | 14.0 | 7.8 | 7.5 | 18.0 | 4.5 |
| ERZE11A751 | 14.0 | 8.2 | 7.5 | 18.0 | 4.9 |
| ERZE11A821 | 14.0 | 8.5 | 7.5 | 18.0 | 5.2 |
| ERZE11A911 | 14.0 | 9.0 | 7.5 | 18.0 | 5.7 |
| ERZE11A102 | 14.0 | 9.5 | 7.5 | 18.0 | 6.2 |
| ERZE11A112 | 14.0 | 10.1 | 7.5 | 18.0 | 6.8 |



Typical characteristics

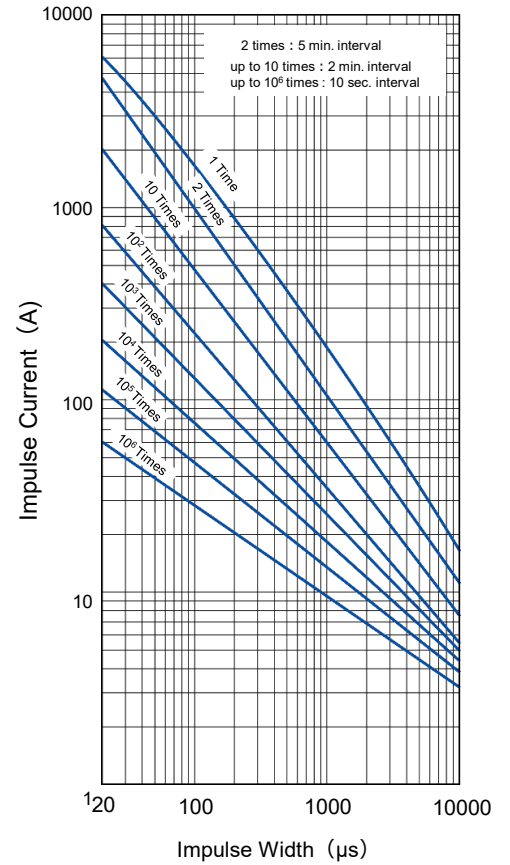
Voltage vs. Current

ERZE11A201 to ERZE11A511

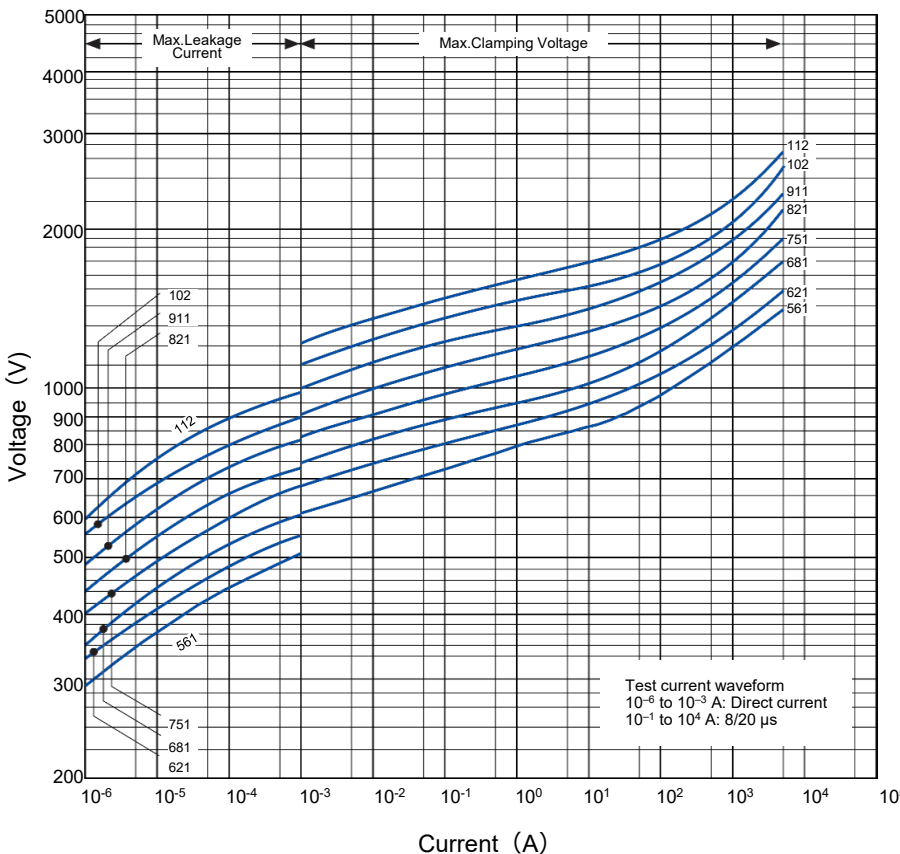


Impulse Derating (Relation between impulse width and impulse current multiple)

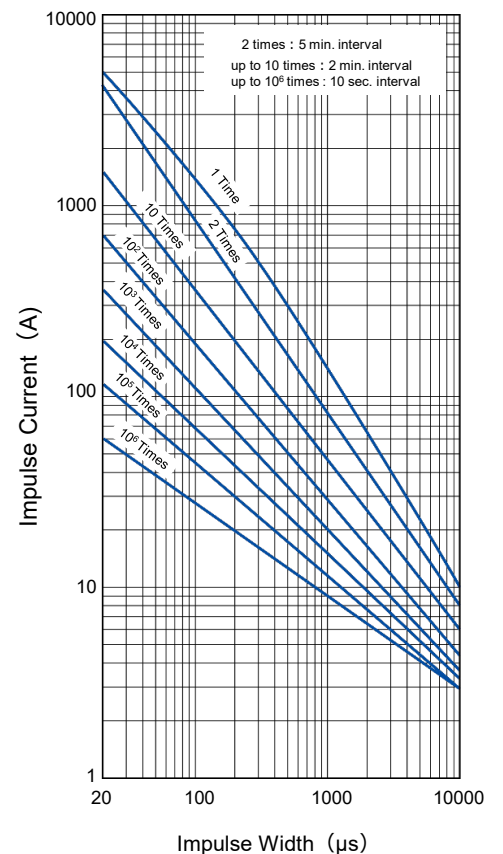
ERZE11A201 to ERZE11A511



ERZE11A561 to ERZE11A112



ERZE11A561 to ERZE11A112



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.

Ratings and characteristics

●Operating temperature range : -40 to 85 °C

●Storage temperature range : -40 to 125 °C

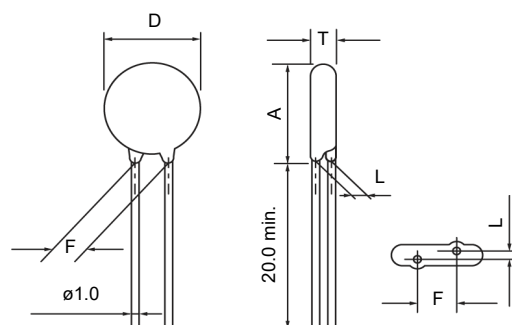
| Part No. | Varistor voltage at 1 mA | Maximum allowable voltage | | Clamping voltage (max.) **Ip | Rated power | Maximum energy | | Maximum peak current (8/20 μs) | | Capacitance (max.) at 1 kHz |
|------------|-----------------------------|------------------------------|-----------|------------------------------------|----------------|----------------|--------|--------------------------------------|---------|-----------------------------------|
| | | ACrms (V) | DC (V) | | | (10/1000 μs) | (2 ms) | 1 time | 2 times | |
| | (V) | (V) | (V) | (W) | (J) | (J) | (A) | (A) | (pF) | |
| ERZE14A201 | 200(185 to 225) | 130 | 170 | 340 | 1.0 | 140 | 100 | 10000 | 7000 | 1300 |
| ERZE14A221 | 220(198 to 242) | 140 | 180 | 360 | 1.0 | 155 | 110 | 10000 | 7000 | 1200 |
| ERZE14A241 | 240(216 to 264) | 150 | 200 | 395 | 1.0 | 168 | 120 | 10000 | 7000 | 1100 |
| ERZE14A271 | 270(247 to 303) | 175 | 225 | 455 | 1.0 | 190 | 135 | 10000 | 7000 | 1000 |
| ERZE14A331 | 330(297 to 363) | 210 | 270 | 545 | 1.0 | 228 | 160 | 10000 | 6500 | 900 |
| ERZE14A361 | 360(324 to 396) | 230 | 300 | 595 | 1.0 | 255 | 180 | 10000 | 6500 | 900 |
| ERZE14A391 | 390(351 to 429) | 250 | 320 | 650 | 1.0 | 275 | 195 | 10000 | 6500 | 800 |
| ERZE14A431 | 430(387 to 473) | 275 | 350 | 710 | 1.0 | 303 | 215 | 10000 | 6500 | 800 |
| ERZE14A471 | 470(423 to 517) | 300 | 385 | 775 | 1.0 | 350 | 250 | 10000 | 6500 | 750 |
| ERZE14A511 | 510(459 to 561) | 320 | 410 | 845 | 1.0 | 382 | 273 | 10000 | 6500 | 700 |
| ERZE14A561 | 560(504 to 616) | 350 | 450 | 930 | 1.0 | 382 | 273 | 10000 | 6500 | 700 |
| ERZE14A621 | 620(558 to 682) | 385 | 505 | 1025 | 1.0 | 382 | 273 | 7500 | 6500 | 650 |
| ERZE14A681 | 680(612 to 748) | 420 | 560 | 1120 | 1.0 | 382 | 273 | 7500 | 6500 | 600 |
| ERZE14A751 | 750(675 to 825) | 460 | 615 | 1240 | 1.0 | 420 | 300 | 7500 | 6500 | 530 |
| ERZE14A821 | 820(738 to 902) | 510 | 670 | 1355 | 1.0 | 460 | 325 | 7500 | 6500 | 500 |
| ERZE14A911 | 910(819 to 1001) | 550 | 745 | 1500 | 1.0 | 510 | 360 | 7500 | 6500 | 400 |
| ERZE14A102 | 1000(900 to 1100) | 625 | 825 | 1650 | 1.0 | 565 | 400 | 7500 | 6500 | 400 |
| ERZE14A112 | 1100(990 to 1210) | 680 | 895 | 1815 | 1.0 | 620 | 440 | 7500 | 6500 | 350 |

*Ip Measuring current of clamping voltage : 100 A

Dimensions in mm (not to scale)

Unit : mm

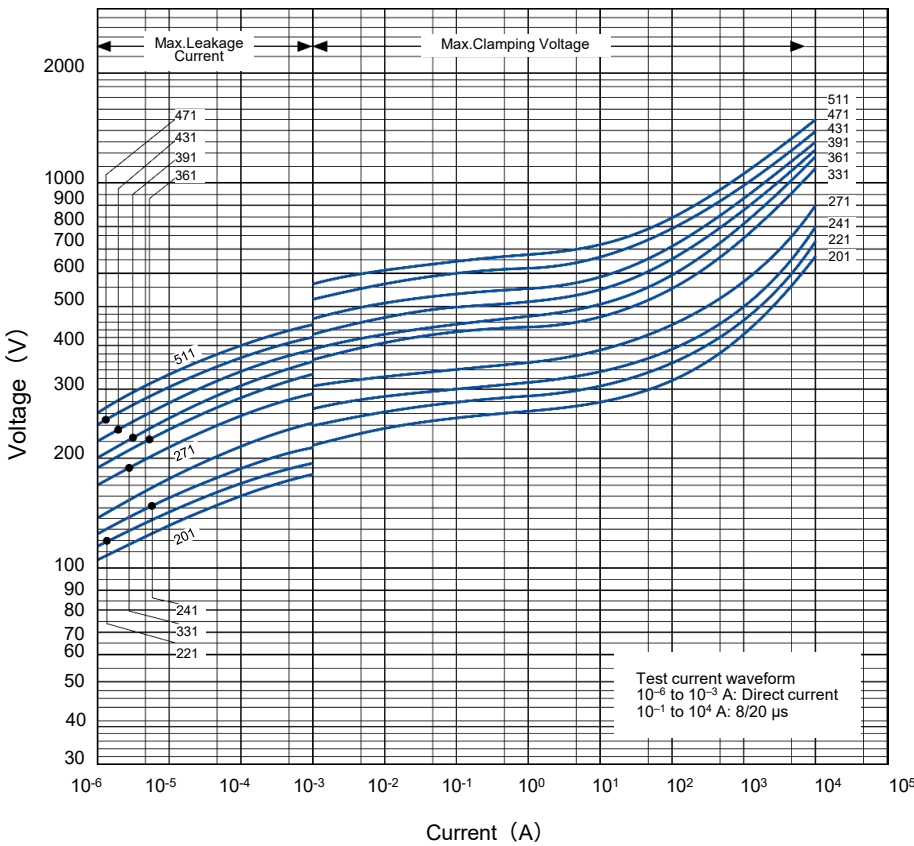
| Part No. | D max. | T max. | F±1.0 | A max. | L±1.0 |
|------------|--------|--------|-------|--------|-------|
| ERZE14A201 | 16.5 | 5.2 | 10.0 | 20.0 | 2.1 |
| ERZE14A221 | 16.5 | 5.3 | 10.0 | 20.0 | 2.2 |
| ERZE14A241 | 16.5 | 5.4 | 10.0 | 20.0 | 2.3 |
| ERZE14A271 | 16.5 | 5.6 | 10.0 | 20.0 | 2.5 |
| ERZE14A331 | 16.5 | 5.9 | 10.0 | 20.0 | 2.8 |
| ERZE14A361 | 16.5 | 6.1 | 10.0 | 20.0 | 3.0 |
| ERZE14A391 | 16.5 | 6.2 | 10.0 | 20.0 | 3.1 |
| ERZE14A431 | 16.5 | 6.4 | 10.0 | 20.0 | 3.3 |
| ERZE14A471 | 16.5 | 6.6 | 10.0 | 20.0 | 3.5 |
| ERZE14A511 | 16.5 | 6.8 | 10.0 | 20.0 | 3.7 |
| ERZE14A561 | 16.5 | 7.2 | 10.0 | 20.0 | 4.0 |
| ERZE14A621 | 17.5 | 7.5 | 10.0 | 20.5 | 4.4 |
| ERZE14A681 | 17.5 | 7.8 | 10.0 | 20.5 | 4.7 |
| ERZE14A751 | 17.5 | 8.2 | 10.0 | 20.5 | 5.1 |
| ERZE14A821 | 17.5 | 8.5 | 10.0 | 20.5 | 5.4 |
| ERZE14A911 | 17.5 | 9.0 | 10.0 | 20.5 | 5.9 |
| ERZE14A102 | 17.5 | 9.5 | 10.0 | 20.5 | 6.4 |
| ERZE14A112 | 17.5 | 10.1 | 10.0 | 20.5 | 7.2 |



Typical characteristics

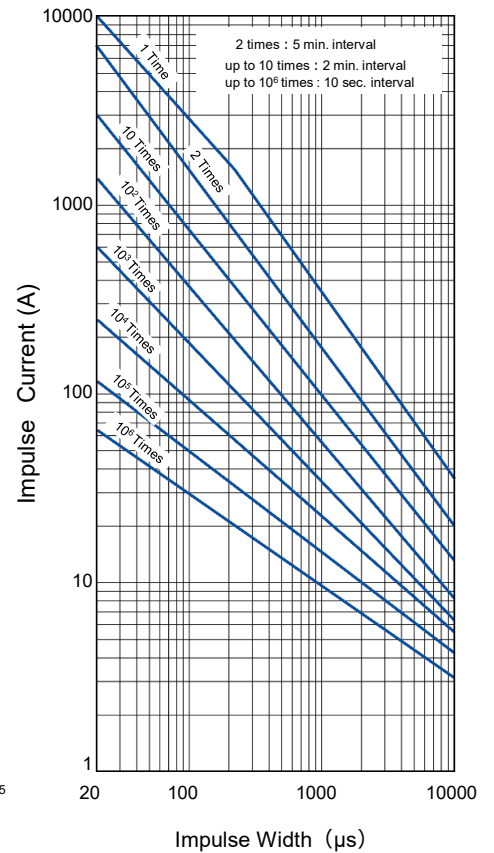
Voltage vs. Current

ERZE14A201 to ERZE14A511

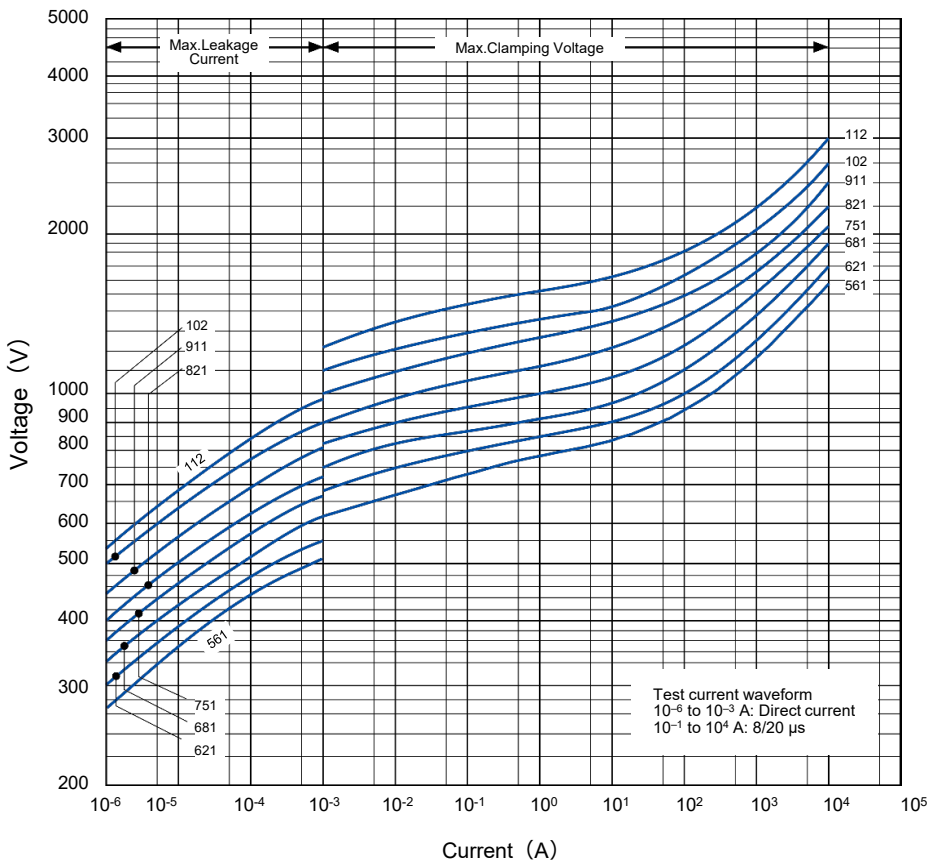


Impulse Derating (Relation between impulse width and impulse current multiple)

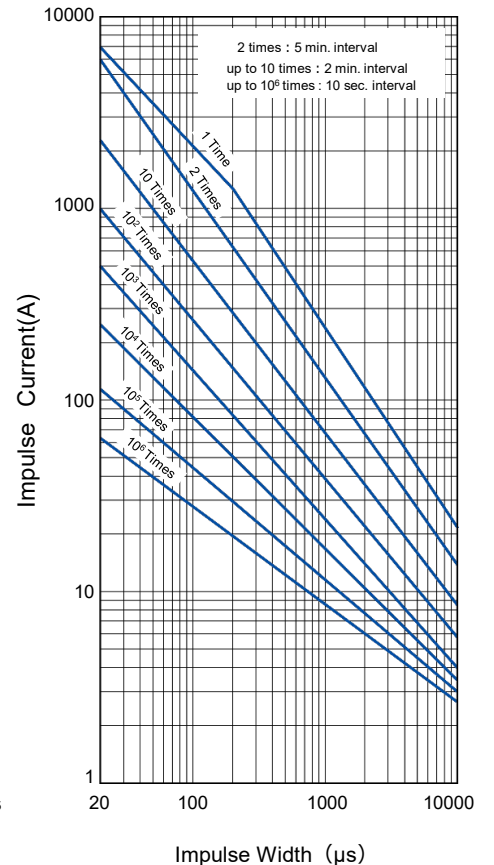
ERZE14A201 to ERZE14A511



ERZE14A561 to ERZE14A112



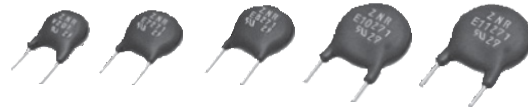
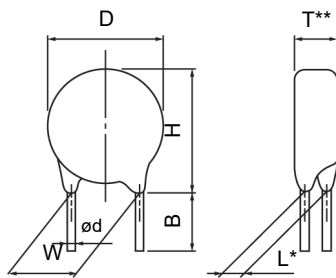
ERZE14A561 to ERZE14A112



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.

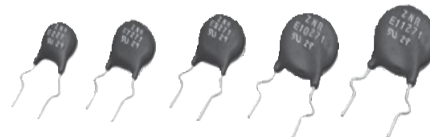
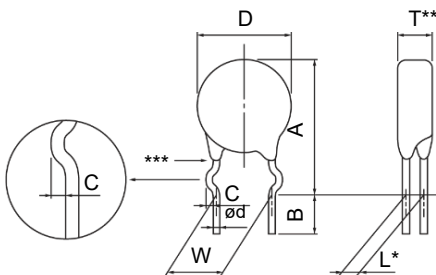
Unit : mm

| Series | E5 | | E7 | | E8 | | E10 | | E11 | |
|----------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Varister Voltage | 201 to 471 | 201 to 511 | 561 | 621 | 201 to 561 | 621 to 751 | 201 to 561 | 621 to 112 | 201 to 561 | 621 to 112 |
| D | 7.0 max. | 9.0 max. | 9.0 max. | 10.0 max. | 10.5 max. | 11.5 max. | 11.5 max. | 12.5 max. | 13.0 max. | 14.0 max. |
| H | 10.0 max. | 12.5 max. | 13.5 max. | 13.5 max. | 13.5 max. | 14.5 max. | 15.0 max. | 16.0 max. | 17.0 max. | 18.0 max. |
| W | 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 | 7.5±1.0 | 7.5±1.0 | 7.5±1.0 |
| ød | 0.60 +0.06 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 |
| B | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 |
| Standard products part No. | ERZE05A□□□CS | ERZE07A□□□CS | | ERZE08A□□□CS | | ERZE10A□□□CS | | ERZE11A□□□CS | | |

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

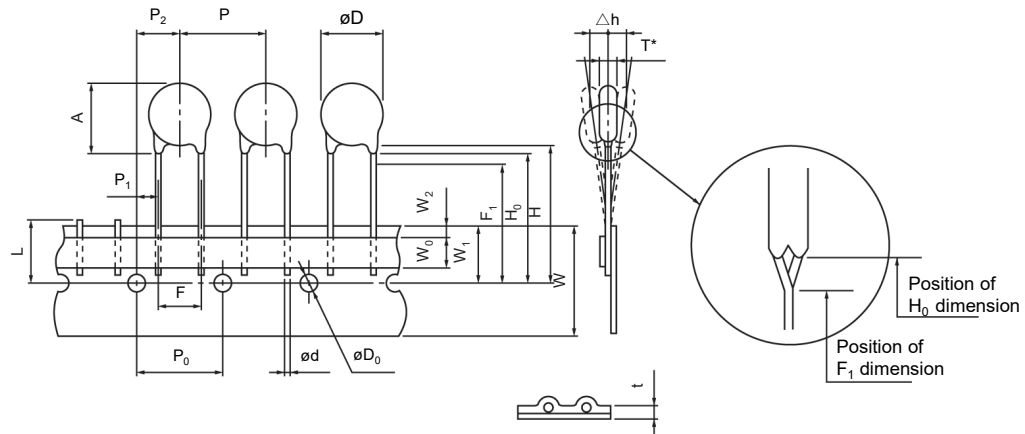
| Series | E5 | | E7 | | E8 | | E10 | | | E11 | |
|----------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Varister Voltage | 201 to 471 | 201 to 511 | 561 | 621 | 201 to 561 | 621 to 751 | 201 to 561 | 621 to 681 | 751 to 112 | 201 to 561 | 621 to 112 |
| D | 7.0 max. | 9.0 max. | 9.0 max. | 10.0 max. | 10.5 max. | 11.5 max. | 11.5 max. | 12.5 max. | 12.5 max. | 13.0 max. | 14.0 max. |
| A | 13.0 max. | 15.5 max. | 16.5 max. | 16.5 max. | 17.0 max. | 18.0 max. | 18.0 max. | 19.5 max.. | 20.5 max. | 20.5 max. | 21.5 max. |
| C | 1.2±1.4 | 1.4±1.4 | 1.4±1.4 | 1.4±1.4 | 1.4±1.4 | 1.4±1.4 | 1.4±1.4 | 1.4±1.4 | 1.4±1.4 | 1.4±1.4 | 1.4±1.4 |
| W | 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 | 7.5±1.0 | 7.5±1.0 | 7.5±1.0 | 7.5±1.0 |
| ød | 0.60 +0.06 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 | 0.80 +0.08 -0.05 |
| B | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 |
| Standard products part No. | ERZE05B□□□CS | ERZE07B□□□CS | | ERZE08B□□□CS | | ERZE10B□□□CS | | | ERZE11B□□□CS | | |

D type / E series (Taping specifications)

Taping specifications for automated assembly (Straight leads and taping)

※ Ratings and characteristics is refer to bulk standard type.

Dimensions in mm (not to scale)



※ Dimension "T": Conforms to each individual specification.

Unit : mm

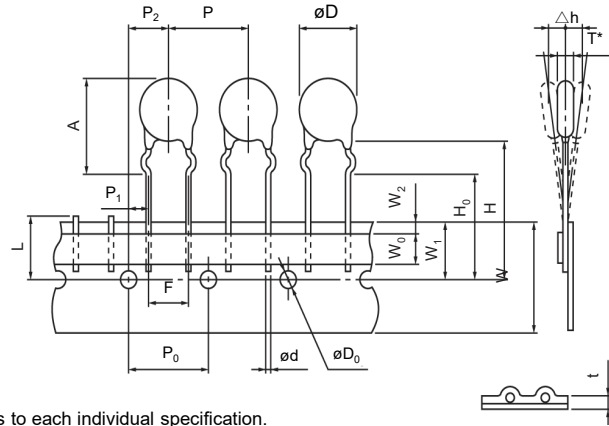
| Series | E5 | | | | | E7 | | | | | E8 | | | E10 | | | E11 | | |
|------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Symbol | 201 to 471 | 201 to 271 | 331 to 551 | 561 | 621 | 201 to 221 | 241 to 561 | 621 to 751 | 201 to 221 | 241 to 561 | 621 to 112 | 201 to 221 | 241 to 561 | 621 to 112 | 201 to 221 | 241 to 561 | 621 to 112 | | |
| P | 12.7±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | | |
| P ₀ | 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 | 15.0±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 | 15.0±0.3 | 15.0±0.3 | 15.0±0.3 | | |
| P ₁ | 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 | 3.75±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 | 3.75±0.70 | 3.75±0.70 | 3.75±0.70 | | |
| P ₂ | 6.36±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 | 7.5±1.3 | 7.5±1.3 | 7.5±1.3 | 7.5±1.3 | 7.5±1.3 | 7.5±1.3 | 7.5±1.3 | 7.5±1.3 | 7.5±1.3 | 7.5±1.3 | | |
| ød | 0.60 ^{+0.06} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | | |
| F | 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 | 7.5±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 | 7.5±0.5 | 7.5±0.5 | 7.5±0.5 | | |
| Δh | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 | | |
| W | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | | |
| W ₀ | 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. | 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 ₁ | 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 | 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 ₂ | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | | |
| H | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | | |
| H ₀ | 17.0±0.5 | 18.0 ^{+2.0} / ₀ | --- | --- | --- | 18.0 ^{+2.0} / ₀ | --- | --- | 18.0 ^{+2.0} / ₀ | --- | --- | 18.0 ^{+2.0} / ₀ | --- | --- | 18.0 ^{+2.0} / ₀ | --- | --- | | |
| F ₁ | --- | --- | 16.0 ^{+0.75} / _{-0.50} | 16.0 ^{+0.75} / _{-0.50} | 16.0 ^{+0.75} / _{-0.50} | --- | 16.0 ^{+0.75} / _{-0.50} | 16.0 ^{+0.75} / _{-0.50} | --- | 16.0 ^{+0.75} / _{-0.50} | 16.0 ^{+0.75} / _{-0.50} | --- | 16.0 ^{+0.75} / _{-0.50} | 16.0 ^{+0.75} / _{-0.50} | --- | 16.0 ^{+0.75} / _{-0.50} | 16.0 ^{+0.75} / _{-0.50} | | |
| øD ₀ | 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 | 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 | 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 | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | | |
| øD | 7.0 max. | 9.0 max. | 9.0 max. | 9.0 max. | 10.0 max. | 10.5 max. | 10.5 max. | 11.5 max. | 11.5 max. | 11.5 max. | 12.5 max. | 13.0 max. | 13.0 max. | 14.0 max. | 13.0 max. | 13.0 max. | 14.0 max. | | |
| A | 10.0 max. | 12.5 max. | 12.5 max. | 13.5 max. | 13.5 max. | 13.5 max. | 13.5 max. | 14.5 max. | 15.0 max. | 15.0 max. | 16.0 max. | 17.0 max. | 17.0 max. | 18.0 max. | 17.0 max. | 17.0 max. | 18.0 max. | | |
| Standard products part | ERZE05E □□ | ERZE07E □□□□ | | | | | ERZE08E □□□□ | | | ERZE10E □□□□ | | | ERZE11E □□□□ | | | | | | |

D type / E 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)



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

Unit : mm

| Series Symbol | E5 | | E7 | | E8 | | | E10 | | | E11 | | | |
|------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | Varistor Voltage | 201 to 471 | 201 to 551 | 561 | 621 | 201 to 221 | 241 to 561 | 621 to 751 | 201 to 561 | 621 to 681 | 751 to 112 | 201 to 221 | 241 to 561 | 621 to 112 |
| P | 12.7±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 | 15.0±1.0 |
| P ₀ | 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 | 15.0±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 ₁ | 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 | 3.75±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 ₂ | 6.36±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 | 7.5±1.3 | 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 ^{+0.06} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} |
| F | 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 | 7.5±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 | 0±2 | 0±2 | 0±2 | 0±2 | 0±2 |
| W | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} | 18.0 ^{+1.0} / _{-0.5} |
| W ₀ | 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. | 5.0 min. | 5.0 min. | 5.0 min. | 5.0 min. | 5.0 min. |
| W ₁ | 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 | 9.0±0.5 | 9.0±0.5 | 9.0±0.5 | 9.0±0.5 | 9.0±0.5 |
| W ₂ | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. | 3.0 max. |
| H | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 | Approx. 22 |
| H ₀ | 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 | 16.0±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 |
| ø D ₀ | 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 | 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 | 0.6±0.3 | 0.6±0.3 | 0.6±0.3 | 0.6±0.3 | 0.6±0.3 |
| L | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. | 11.0 max. |
| ø D | 7.0 max. | 9.0 max. | 9.0 max. | 10.0 max. | 10.5 max. | 10.5 max. | 11.5 max. | 11.5 max. | 12.5 max. | 12.5 max. | 13.0 max. | 13.0 max. | 14.0 max. | |
| A | 13.0 max. | 15.5 max. | 16.5 max. | 16.5 max. | 17.0 max. | 17.0 max. | 18.0 max. | 18.0 max. | 19.5 max. | 20.5 max. | 20.5 max. | 20.5 max. | 21.5 max. | |
| Standard products part | ERZE05F□□□ | ERZE07F□□□ | | ERZE08F□□□ | | | ERZE10F□□□ | | | ERZE11F□□□ | | | | |

Application note for safety standards

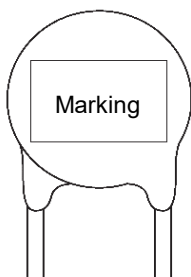
- Approvals products lists in "Reference Guide to Standard Products."
- UL and VDE : Registered in "Type name", it isn't registered in "Panasonic Part No."
- CQC : Registered in "Panasonic Part No."
- "Rated Voltages" are specified for UL recognized components in list shown below.

The AC rated voltage and maximum allowable voltage

| Type name | Maximum allowable voltage | | Rated voltage (Vrms) |
|-----------|---------------------------|--------|----------------------|
| | ACrms (V) | DC (V) | UL1449 |
| E*201 | 130 | 170 | 118 |
| E*221 | 140 | 180 | 127 |
| E*241 | 150 | 200 | 136 |
| E*271 | 175 | 225 | 159 |
| E*331 | 210 | 270 | 189 |
| E*361 | 230 | 300 | 209 |
| E*391 | 250 | 320 | 227 |
| E*431 | 275 | 350 | 250 |
| E*471 | 300 | 385 | 272 |
| E*511 | 320 | 410 | 291 |
| E*561 | 350 | 450 | 320 |
| E*621 | 385 | 505 | 350 |
| E*681 | 420 | 560 | 381 |
| E*751 | 460 | 615 | 418 |
| E*821 | 510 | 670 | 463 |
| E*911 | 550 | 745 | 500 |
| E*102 | 625 | 825 | 568 |
| E*112 | 680 | 895 | 600 |

* : 5 Series is blank, 7 series is 7, 8 series is 8, 10 series is 10, 11 series is 11, 14 series is 14

Explanation of the contents



| Mark | Explanation of the content | |
|-----------------|--------------------------------------|--|
| E*□□□ | Abbreviation of part No. (Type Name) | [□□□ Nominal varistor volage] |
| ○ | Factory identification mark | None : Japan Q : Indonesia |
| ◆ ^{*1} | Year code | 2019 : 9, 2020 : K, 2021 : A 2022 : B, 2023 : C, 2024 : D |
| ◇ | Monthly code | Jan : 1 to Sep : 9, Oct. : 0, Nov. : N, Dec. : D |
| UL | UL Recognized components mark | |

* : 5 series is blank, 7 series is 7, 8 series is 8, 10 series is 10, 11 series is 11, 14 series is 14

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

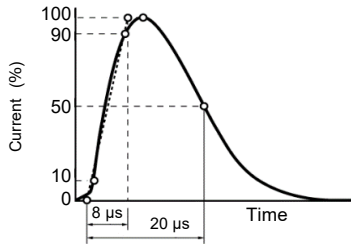
1 : A, 2 : B, 3 : C, 4 : D, 5 : E, 6 : F, 7 : G, 8 : H, 9 : J, 0 : K

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) Varistor voltage | 5 (ERZE05A□□□) | 7 (ERZE07A□□□) | 8 (ERZE08A□□□) | 10 (ERZE10A□□□) | 11 (ERZE11A□□□) | 14 (ERZE14A□□□) |
|--------------------------------------|-------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|
| 201 or more | ZNR E□□□ UL ○ ◆ ◆ | ZNR E7□□□ UL ○ ◆ ◆ | ZNR E8□□□ UL ○ ◆ ◆ | ZNR E10□□□ UL ○ ◆ ◆ | ZNR E11□□□ UL ○ ◆ ◆ | ZNR E14□□□ UL ○ ◆ ◆ |

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 1mA DC applied is called V_1 or V_{1mA} . 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 μ s) illustrated below applied.  | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Rated power | The power that can be applied in the specified ambient temperature. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Maximum energy | The maximum energy within the varistor voltage change of ± 10 % when a single impulse current of 2 ms or 10/1000 μ s is applied. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Maximum peak current (Withstanding surge current) | 2 times | | The maximum current within the varistor voltage change of ± 10 % when a standard impulse current of 8/20 μ s 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 μ s is applied. | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Temperature coefficient of varistor voltage | $\frac{V_{1mA} \text{ at } 85^\circ\text{C} - V_{1mA} \text{ at } 25^\circ\text{C}}{V_{1mA} \text{ at } 25^\circ\text{C}} \times \frac{1}{60} 100(\%/^\circ\text{C})$ | | 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) | AC 1500 Vrms shall be applied between both terminals of the specimen connected together and metal foil closely wrapped round its body for 1 minute. | | No breakdown | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 border="1" data-bbox="411 1662 1197 2060"> <thead> <tr> <th>Item</th> <th>Impulse Life(I)</th> <th>Impulse Life(II)</th> </tr> <tr> <th>Times</th> <td>$\times 10^4$ Times</td> <td>$\times 10^5$ Times</td> </tr> <tr> <th>Part No.</th> <th colspan="2">Impulse Current</th> </tr> </thead> <tbody> <tr> <td>ERZE05A201 to ERZE05A471</td> <td>50 A (8/20 μs)</td> <td>35 A (8/20 μs)</td> </tr> <tr> <td>ERZE07A201 to ERZE07A471</td> <td>100 A (8/20 μs)</td> <td>70 A (8/20 μs)</td> </tr> <tr> <td>ERZE08A201 to ERZE08A751</td> <td>150 A (8/20 μs)</td> <td>85 A (8/20 μs)</td> </tr> <tr> <td>ERZE10A201 to ERZE10A112</td> <td>170 A (8/20 μs)</td> <td>90 A (8/20 μs)</td> </tr> <tr> <td>ERZE11A201 to ERZE11A112</td> <td>200 A (8/20 μs)</td> <td>110 A (8/20 μs)</td> </tr> <tr> <td>ERZE14A201 to ERZE14A112</td> <td>250 A (8/20 μs)</td> <td>120 A (8/20 μs)</td> </tr> </tbody> </table> | Item | Impulse Life(I) | Impulse Life(II) | Times | $\times 10^4$ Times | $\times 10^5$ Times | Part No. | Impulse Current | | ERZE05A201 to ERZE05A471 | 50 A (8/20 μ s) | 35 A (8/20 μ s) | ERZE07A201 to ERZE07A471 | 100 A (8/20 μ s) | 70 A (8/20 μ s) | ERZE08A201 to ERZE08A751 | 150 A (8/20 μ s) | 85 A (8/20 μ s) | ERZE10A201 to ERZE10A112 | 170 A (8/20 μ s) | 90 A (8/20 μ s) | ERZE11A201 to ERZE11A112 | 200 A (8/20 μ s) | 110 A (8/20 μ s) | ERZE14A201 to ERZE14A112 | 250 A (8/20 μ s) | 120 A (8/20 μ s) | $\Delta V_{1mA}/V_{1mA} \leq 0$ to +20% |
| Item | Impulse Life(I) | Impulse Life(II) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Times | $\times 10^4$ Times | $\times 10^5$ Times | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Part No. | Impulse Current | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZE05A201 to ERZE05A471 | 50 A (8/20 μ s) | 35 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZE07A201 to ERZE07A471 | 100 A (8/20 μ s) | 70 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZE08A201 to ERZE08A751 | 150 A (8/20 μ s) | 85 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZE10A201 to ERZE10A112 | 170 A (8/20 μ s) | 90 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZE11A201 to ERZE11A112 | 200 A (8/20 μ s) | 110 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZE14A201 to ERZE14A112 | 250 A (8/20 μ s) | 120 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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. | | No remarkable mechanical damage | | | | | | | | | | | | | |
| | | <u>Terminal diameter</u> ø0.6 mm, ø0.8 mm ø1.0 mm | <u>Force</u> 9.8 N 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. The terminal shall gradually be bent by 90 ° in one direction, then 90 ° in the opposite direction, and again back to the original position. The damage of the terminal shall be visually examined. | | | | | | | | | | | | | | | |
| | | <u>Terminal diameter</u> ø0.6 mm, ø0.8 mm ø1.0 mm | <u>Force</u> 4.9 N 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 to 2 hours. The change of VCmA and mechanical damages shall be examined. | | $\Delta V_{1mA}/V_{1mA} \leq \pm 5 \%$ | | | | | | | | | | | | | | |
| 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 to 2 hours. Thereafter, the change of VCmA shall be measured. | | $\Delta V_{1mA}/V_{1mA} \leq \pm 5 \%$ | | | | | | | | | | | | | |
| | 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 to 2 hours. Thereafter, the change of VCmA shall be measured. | | $\Delta V_{1mA}/V_{1mA} \leq \pm 5 \%$ | | | | | | | | | | | | | |
| | Temperature cycle | The temperature cycle shown below shall be repeated five cycles and then stored at room temperature and normal humidity for 1 to 2 hours. The change of VCmA and mechanical damage shall be examined. | | $\Delta V_{1mA}/V_{1mA} \leq \pm 5 \%$ No remarkable mechanical damage | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>15±3</td> </tr> <tr> <td>3</td> <td>125±2</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>15±3</td> </tr> </tbody> </table> | Step | | Temperature (°C) | Period (minutes) | 1 | -40±3 | 30±3 | 2 | Room temperature | 15±3 | 3 | 125±2 | 30±3 | 4 | Room temperature |
| | 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 to 2 hours. Thereafter, the change of VCmA shall be measured. | | $\Delta V_{1mA}/V_{1mA} \leq \pm 10 \%$ | | | | | | | | | | | | | | |
| Damp heat load/Humidity load | The specimen shall be subjected to 40±2°C, 90 to 95 % RH and the Maximum Allowable Voltage for 1000 hours and then stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of VCmA shall be measured. | | | | | | | | | | | | | | | | |
| 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 to 2 hours. Thereafter, the change of VCmA shall be measured. | | $\Delta V_{1mA}/V_{1mA} \leq \pm 5 \%$ | | | | | | | | | | | | | | |

Minimum quantity / Packing unit

| Product | Series / Type | Part number | Minimum quantity / Packing unit | Packing quantity in carton | Carton (about) L×W×H (mm) |
|-----------------------------------|--------------------|--------------------------|---------------------------------|----------------------------|---------------------------|
| Varistors (ZNR Surge Absorber) | D type E series | ERZE05A201 to 471 | 100 | 10000 | 210×340×180 |
| | | ERZE07A201 to 391 | 50 | 3000 | 210×340×130 |
| | | ERZE07A431 to 621 | 50 | 3000 | 210×340×150 |
| | | ERZE08A201 to 331 | 50 | 3000 | 210×340×110 |
| | | ERZE08A361 to 511 | 50 | 3000 | 210×340×110 |
| | | ERZE08A561 to 751 | 50 | 2000 | 210×340×110 |
| | | ERZE10A201 to 241 | 50 | 3000 | 210×340×110 |
| | | ERZE10A271 to 431 | 50 | 3000 | 210×340×110 |
| | | ERZE10A471 to 112 | 50 | 2000 | 210×340×110 |
| | | ERZE11A201 to 361 | 50 | 3000 | 210×340×110 |
| | | ERZE11A391 to 561 | 50 | 2000 | 210×340×110 |
| | | ERZE11A621 to 112 | 50 | 1000 | 210×340×110 |
| | | ERZE14A201 to 221 | 50 | 2000 | 210×340×110 |
| | | ERZE14A241 to 431 | 50 | 2000 | 210×340×110 |
| | | ERZE14A471 to 112 | 50 | 1000 | 210×340×110 |
| | | ERZE05A(B)201CS to 471CS | 100 | 10000 | 210×340×180 |
| | | ERZE07A(B)201CS to 391CS | 100 | 4000 | 210×340×110 |
| | | ERZE07A(B)431CS to 621CS | 50 | 4000 | 210×340×110 |
| | | ERZE08A(B)201CS to 331CS | 100 | 4000 | 210×340×110 |
| | | ERZE08A(B)361CS to 511CS | 50 | 4000 | 210×340×110 |
| | | ERZE08A(B)561CS to 751CS | 50 | 3000 | 210×340×110 |
| | | ERZE10A(B)201CS to 241CS | 100 | 4000 | 210×340×110 |
| | | ERZE10A(B)271CS to 431CS | 50 | 4000 | 210×340×110 |
| | | ERZE10A(B)471CS to 112CS | 50 | 3000 | 210×340×110 |
| | | ERZE11A(B)201CS to 361CS | 50 | 3000 | 210×340×110 |
| | | ERZE11A(B)391CS to 561CS | 50 | 2000 | 210×340×110 |
| | | ERZE11A(B)621CS to 112CS | 50 | 2000 | 210×340×110 |
| | | ERZE05E201 to 471 | 1000 | 10000 | 400×360×260 |
| | | ERZE07E201 to 271 | 1000 | 10000 | 400×360×260 |
| | | ERZE07E331 to 471 | 1000 | 10000 | 470×360×260 |
| | | ERZE07E511 to 621 | 500 | 5000 | 400×360×260 |
| | | ERZE08E201 to 271 | 1000 | 5000 | 360×310×320 |
| | | ERZE08E331 to 431 | 1000 | 5000 | 360×310×320 |
| | | ERZE08E471 to 511 | 1000 | 5000 | 360×310×320 |
| | | ERZE08E561 to 751 | 500 | 2500 | 360×270×320 |
| | | ERZE10E201 to 241 | 1000 | 5000 | 360×310×320 |
| | | ERZE10E271 to 471 | 1000 | 5000 | 360×310×320 |
| | | ERZE10E511 to 561 | 1000 | 5000 | 360×310×320 |
| | | ERZE10E621 to 112 | 500 | 2500 | 360×270×320 |
| | | ERZE11E201 to 271 | 1000 | 5000 | 360×310×320 |
| | | ERZE11E331 to 511 | 1000 | 5000 | 360×310×320 |
| | | ERZE11E561 to 112 | 500 | 2500 | 360×270×320 |
| | | ERZE05F201 to 471 | 1000 | 10000 | 400×360×260 |
| | | ERZE07F201 to 271 | 1000 | 10000 | 400×360×260 |
| | | ERZE07F331 to 471 | 1000 | 10000 | 470×360×260 |
| | | ERZE07F511 to 621 | 500 | 5000 | 400×360×260 |
| | | ERZE08F201 to 271 | 1000 | 5000 | 360×310×320 |
| | | ERZE08F331 to 431 | 1000 | 5000 | 360×310×320 |
| | | ERZE08F471 to 511 | 1000 | 5000 | 360×310×320 |
| | | ERZE08F561 to 751 | 500 | 2500 | 360×270×320 |
| ERZE10F201 to 241 | 1000 | 5000 | 360×310×320 | | |
| ERZE10F271 to 471 | 1000 | 5000 | 360×310×320 | | |
| ERZE10F511 to 561 | 1000 | 5000 | 360×310×320 | | |
| ERZE10F621 to 112 | 500 | 2500 | 360×270×320 | | |
| ERZE11F201 to 271 | 1000 | 5000 | 360×310×320 | | |
| ERZE11F331 to 511 | 1000 | 5000 | 360×310×320 | | |
| ERZE11F561 to 112 | 500 | 2500 | 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.

Varistors (ZNR Surge Absorber)

D type

E-S1 series



Varistors (ZNR Surge Absorber), Series E-S1, improves E series products with high capability for absorbing transient overvoltage in a compact size, suitable for surge protection at high temperature.

Features

- Large withstanding surge current capability in compact sizes
- Withstanding surge current at max. 125 °C
- 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

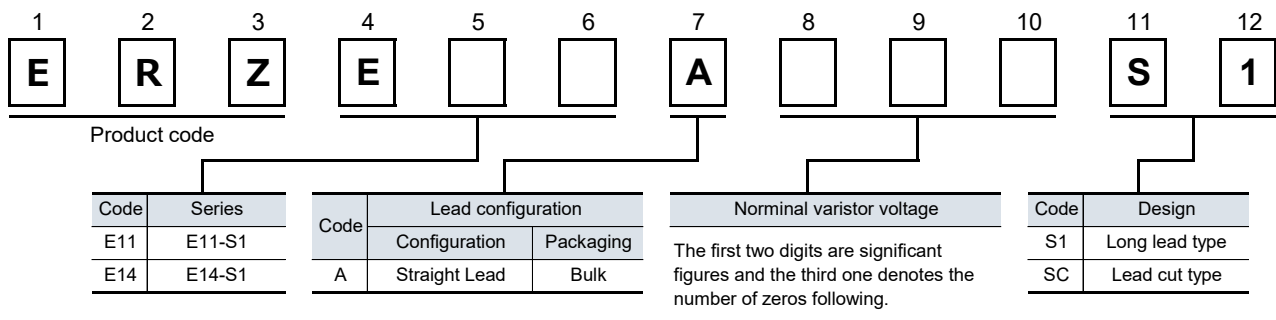
Applicable standards

- UL1449 (VZCA2/UL, VZCA8/C-UL)
- VDE IEC61051-1, -2, -2-2, IEC60950-1 Annex.Q, IEC62368-1 G8.1
- 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



Reference guide to standard products

| Part No. | Applicable Standards | | Varistor Voltage at 1 mA (V) | Maximum Allowable Voltage | | Clamping Voltage at 8/20 μ s | | Maximum Peak Current at 8/20 μ s (A) | | |
|--------------|----------------------|-----------|---------------------------------|---------------------------|--------|----------------------------------|--------------------|--|--------------|---------------|
| | Type name | Approvals | | ACrms (V) | DC (V) | max. (V) | I _p (A) | 85°C 1 time | 125°C 1 time | 125°C 2 times |
| ERZE11A201S1 | E11201 | ○☆★◇◆ | 200 (185 to 225) | 130 | 170 | 340 | 50 | 6000 | 5000 | 4500 |
| ERZE11A221S1 | E11221 | ○☆★◇◆ | 220 (198 to 242) | 140 | 180 | 360 | 50 | 6000 | 5000 | 4500 |
| ERZE11A241S1 | E11241 | ○☆★◇◆ | 240 (216 to 264) | 150 | 200 | 395 | 50 | 6000 | 5000 | 4500 |
| ERZE11A271S1 | E11271 | ○☆★◇◆ | 270 (247 to 303) | 175 | 225 | 455 | 50 | 6000 | 5000 | 4500 |
| ERZE11A331S1 | E11331 | ○☆★◇◆ | 330 (297 to 363) | 210 | 270 | 545 | 50 | 6000 | 5000 | 4500 |
| ERZE11A361S1 | E11361 | ○☆★◇◆ | 360 (324 to 396) | 230 | 300 | 595 | 50 | 6000 | 5000 | 4500 |
| ERZE11A391S1 | E11391 | ○☆★◇◆ | 390 (351 to 429) | 250 | 320 | 650 | 50 | 6000 | 5000 | 4500 |
| ERZE11A431S1 | E11431 | ○☆★◇◆ | 430 (387 to 473) | 275 | 350 | 710 | 50 | 6000 | 5000 | 4500 |
| ERZE11A471S1 | E11471 | ○☆★◇◆ | 470 (423 to 517) | 300 | 385 | 775 | 50 | 6000 | 5000 | 4500 |
| ERZE11A511S1 | E11511 | ○☆★◇◆ | 510 (459 to 561) | 320 | 410 | 845 | 50 | 6000 | 5000 | 4500 |
| ERZE11A561S1 | E11561 | ○☆★◇◆ | 560 (504 to 616) | 350 | 450 | 930 | 50 | 6000 | 5000 | 4500 |
| ERZE11A621S1 | E11621 | ○☆★◇◆ | 620 (558 to 682) | 385 | 505 | 1025 | 50 | 5000 | 5000 | 4500 |
| ERZE11A681S1 | E11681 | ○☆★◇◆ | 680 (612 to 748) | 420 | 560 | 1120 | 50 | 5000 | 5000 | 4500 |
| ERZE11A751S1 | E11751 | ○☆★◇◆ | 750 (675 to 825) | 460 | 615 | 1240 | 50 | 5000 | 5000 | 4500 |
| ERZE11A821S1 | E11821 | ○☆★◇◆ | 820 (738 to 902) | 510 | 670 | 1355 | 50 | 5000 | 5000 | 4500 |
| ERZE11A911S1 | E11911 | ○☆★◇◆ | 910 (819 to 1001) | 550 | 745 | 1500 | 50 | 5000 | 5000 | 4500 |
| ERZE11A102S1 | E11102 | ○☆★◇◆ | 1000 (900 to 1100) | 625 | 825 | 1650 | 50 | 5000 | 5000 | 4500 |
| ERZE11A112S1 | E11112 | ○☆★◇◆ | 1100 (990 to 1210) | 680 | 895 | 1815 | 50 | 5000 | 5000 | 4500 |

Maximum Allowable Voltage and Maximum Peak Current at 8/20 μ s(A) at 125 °C

○ : UL1449 (VZCA2/UL, VZC A8/C-UL), ☆ : VDE (IEC61051-1, -2, -2-2), ★ : VDE (IEC60950-1 Annex.Q, IEC62368-1 G8.1),

◇ : 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 125 °C

● Storage temperature range : -40 to 125 °C

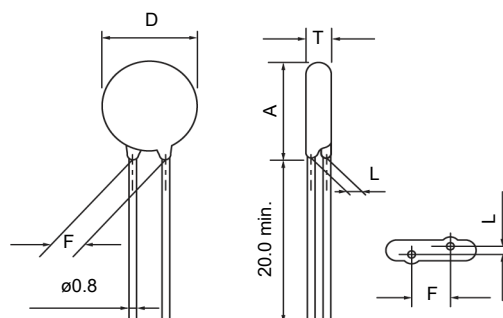
| Part No. | Varistor Voltage at 1 mA | Maximum allowable voltage | | Clamping voltage (max.) *Ip | Rated power | Maximum energy | | Maximum peak current at 8/20 μs | | | Capacitance (max.) at 1 kHz |
|--------------|--------------------------|---------------------------|--------|-----------------------------|-------------|----------------|------|---------------------------------|---------------|----------------|-----------------------------|
| | | ACrms (V) | DC (V) | | | 10/1000 μs | 2 ms | 85 °C 1 time | 125 °C 1 time | 125 °C 2 times | |
| | (V) | (V) | (V) | (W) | (J) | (J) | (A) | (A) | (A) | (pF) | |
| ERZE11A201S1 | 200(185 to 225) | 130 | 170 | 340 | 0.6 | 70 | 50 | 6000 | 5000 | 4500 | 690 |
| ERZE11A221S1 | 220(198 to 242) | 140 | 180 | 360 | 0.6 | 78 | 55 | 6000 | 5000 | 4500 | 660 |
| ERZE11A241S1 | 240(216 to 264) | 150 | 200 | 395 | 0.6 | 84 | 60 | 6000 | 5000 | 4500 | 620 |
| ERZE11A271S1 | 270(247 to 303) | 175 | 225 | 455 | 0.6 | 99 | 70 | 6000 | 5000 | 4500 | 580 |
| ERZE11A331S1 | 330(297 to 363) | 210 | 270 | 545 | 0.6 | 115 | 80 | 6000 | 5000 | 4500 | 520 |
| ERZE11A361S1 | 360(324 to 396) | 230 | 300 | 595 | 0.6 | 130 | 90 | 6000 | 5000 | 4500 | 480 |
| ERZE11A391S1 | 390(351 to 429) | 250 | 320 | 650 | 0.6 | 140 | 100 | 6000 | 5000 | 4500 | 450 |
| ERZE11A431S1 | 430(387 to 473) | 275 | 350 | 710 | 0.6 | 155 | 110 | 6000 | 5000 | 4500 | 400 |
| ERZE11A471S1 | 470(423 to 517) | 300 | 385 | 775 | 0.6 | 175 | 125 | 6000 | 5000 | 4500 | 360 |
| ERZE11A511S1 | 510(459 to 561) | 320 | 410 | 845 | 0.6 | 190 | 136 | 6000 | 5000 | 4500 | 310 |
| ERZE11A561S1 | 560(504 to 616) | 350 | 450 | 930 | 0.6 | 190 | 136 | 6000 | 5000 | 4500 | 310 |
| ERZE11A621S1 | 620(558 to 682) | 385 | 505 | 1025 | 0.6 | 190 | 136 | 5000 | 5000 | 4500 | 300 |
| ERZE11A681S1 | 680(612 to 748) | 420 | 560 | 1120 | 0.6 | 190 | 136 | 5000 | 5000 | 4500 | 290 |
| ERZE11A751S1 | 750(675 to 825) | 460 | 615 | 1240 | 0.6 | 210 | 150 | 5000 | 5000 | 4500 | 280 |
| ERZE11A821S1 | 820(738 to 902) | 510 | 670 | 1355 | 0.6 | 235 | 165 | 5000 | 5000 | 4500 | 260 |
| ERZE11A911S1 | 910(819 to 1001) | 550 | 745 | 1500 | 0.6 | 255 | 180 | 5000 | 5000 | 4500 | 240 |
| ERZE11A102S1 | 1000(900 to 1100) | 625 | 825 | 1650 | 0.6 | 280 | 200 | 5000 | 5000 | 4500 | 220 |
| ERZE11A112S1 | 1100(990 to 1210) | 680 | 895 | 1815 | 0.6 | 310 | 220 | 5000 | 5000 | 4500 | 200 |

*Ip Measuring current of clamping voltage : 50 A

Dimensions in mm (not to scale)

Unit : mm

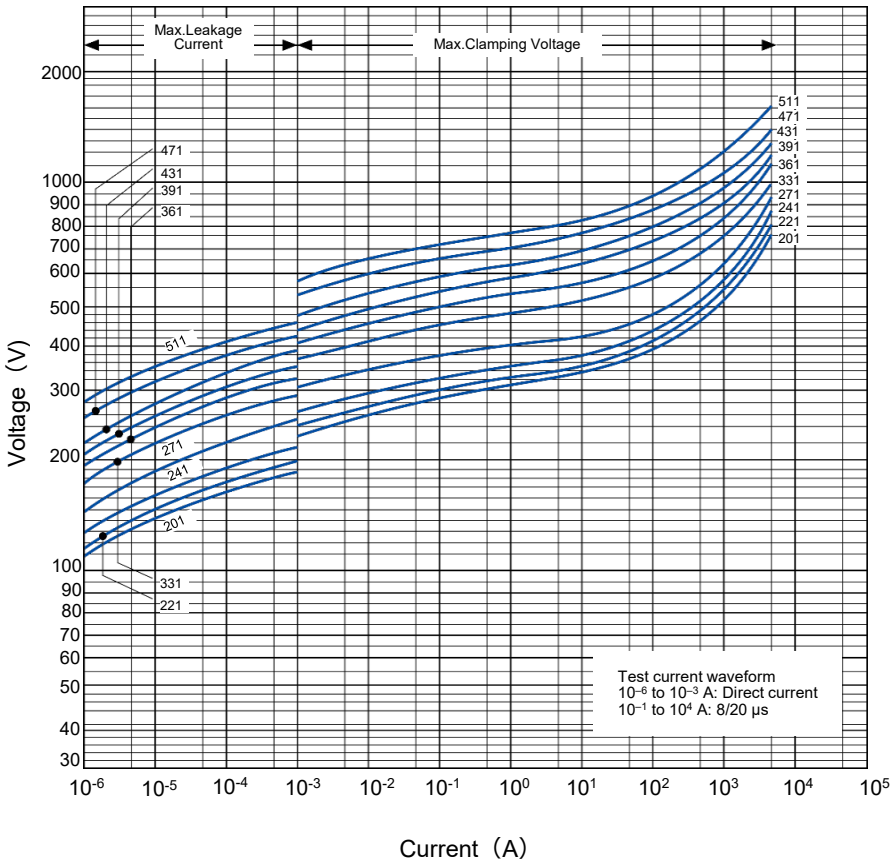
| Part No. | D max. | T max. | F±1.0 | A max. | L±1.0 |
|--------------|--------|--------|-------|--------|-------|
| ERZE11A201S1 | 13.0 | 5.2 | 7.5 | 17.0 | 1.9 |
| ERZE11A221S1 | 13.0 | 5.3 | 7.5 | 17.0 | 2.0 |
| ERZE11A241S1 | 13.0 | 5.4 | 7.5 | 17.0 | 2.1 |
| ERZE11A271S1 | 13.0 | 5.6 | 7.5 | 17.0 | 2.3 |
| ERZE11A331S1 | 13.0 | 5.9 | 7.5 | 17.0 | 2.6 |
| ERZE11A361S1 | 13.0 | 6.1 | 7.5 | 17.0 | 2.8 |
| ERZE11A391S1 | 13.0 | 6.2 | 7.5 | 17.0 | 2.9 |
| ERZE11A431S1 | 13.0 | 6.4 | 7.5 | 17.0 | 3.1 |
| ERZE11A471S1 | 13.0 | 6.6 | 7.5 | 17.0 | 3.3 |
| ERZE11A511S1 | 13.0 | 6.8 | 7.5 | 17.0 | 3.5 |
| ERZE11A561S1 | 13.0 | 7.2 | 7.5 | 17.0 | 3.8 |
| ERZE11A621S1 | 14.0 | 7.5 | 7.5 | 18.0 | 4.2 |
| ERZE11A681S1 | 14.0 | 7.8 | 7.5 | 18.0 | 4.5 |
| ERZE11A751S1 | 14.0 | 8.2 | 7.5 | 18.0 | 4.9 |
| ERZE11A821S1 | 14.0 | 8.5 | 7.5 | 18.0 | 5.2 |
| ERZE11A911S1 | 14.0 | 9.0 | 7.5 | 18.0 | 5.7 |
| ERZE11A102S1 | 14.0 | 9.5 | 7.5 | 18.0 | 6.2 |
| ERZE11A112S1 | 14.0 | 10.1 | 7.5 | 18.0 | 6.8 |



Typical characteristics

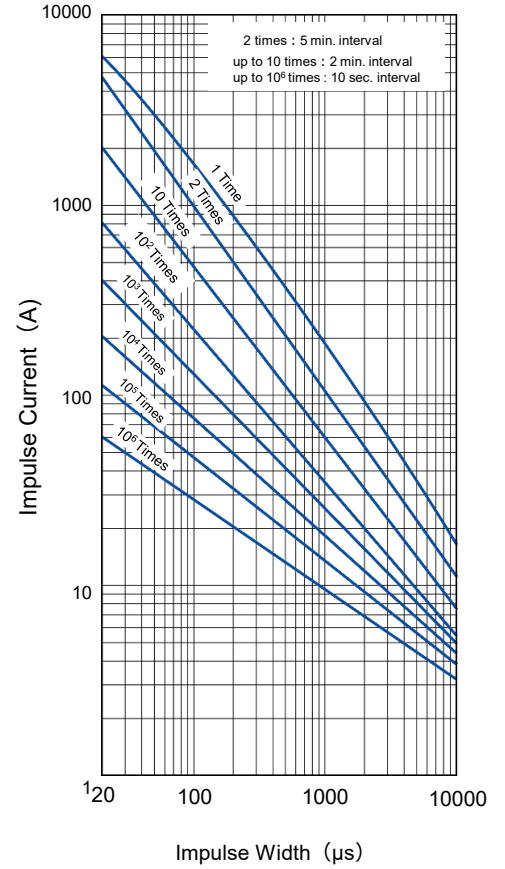
Voltage vs. Current

ERZE11A201S1 to ERZE11A511S1

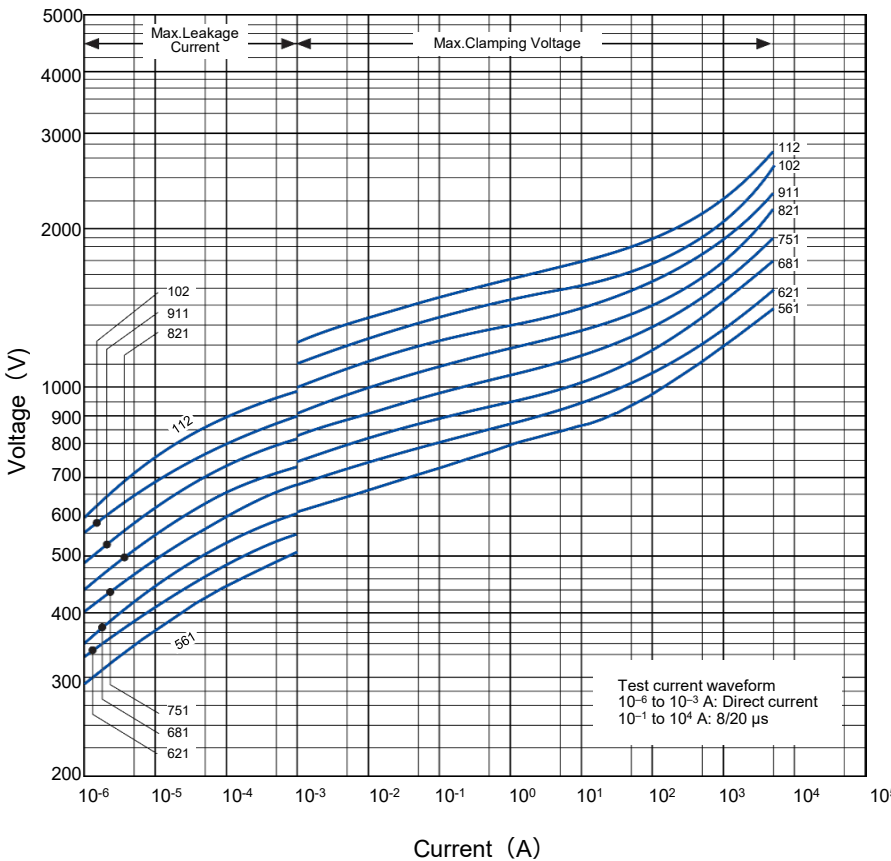


Impulse Derating (Relation between impulse width and impulse current multiple)

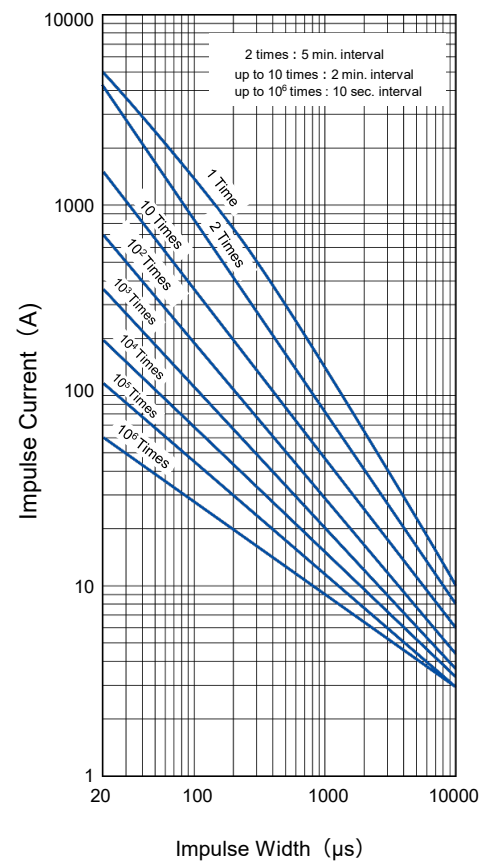
ERZE11A201S1 to ERZE11A511S1



ERZE11A561S1 to ERZE11A112S1



ERZE11A561S1 to ERZE11A112S1



Reference guide to standard products

| Part No. | Applicable standards | | Varistor voltage at 1 mA (V) | Maximum allowable voltage | | Clamping voltage at 8/20 μ s | | Maximum peak current at 8/20 μ s (A) | | |
|--------------|----------------------|-----------|---------------------------------|---------------------------|--------|----------------------------------|--------|--|--------------|---------------|
| | Type name | Approvals | | ACrms (V) | DC (V) | max. (V) | Ip (A) | 85°C 1 time | 125°C 1 time | 125°C 2 times |
| ERZE14A201S1 | E14201 | ○☆★◇◆ | 200 (185 to 225) | 130 | 170 | 340 | 100 | 10000 | 7500 | 6500 |
| ERZE14A221S1 | E14221 | ○☆★◇◆ | 220 (198 to 242) | 140 | 180 | 360 | 100 | 10000 | 7500 | 6500 |
| ERZE14A241S1 | E14241 | ○☆★◇◆ | 240 (216 to 264) | 150 | 200 | 395 | 100 | 10000 | 7500 | 6500 |
| ERZE14A271S1 | E14271 | ○☆★◇◆ | 270 (247 to 303) | 175 | 225 | 455 | 100 | 10000 | 7500 | 6500 |
| ERZE14A331S1 | E14331 | ○☆★◇◆ | 330 (297 to 363) | 210 | 270 | 545 | 100 | 10000 | 7500 | 6500 |
| ERZE14A361S1 | E14361 | ○☆★◇◆ | 360 (324 to 396) | 230 | 300 | 595 | 100 | 10000 | 7500 | 6500 |
| ERZE14A391S1 | E14391 | ○☆★◇◆ | 390 (351 to 429) | 250 | 320 | 650 | 100 | 10000 | 7500 | 6500 |
| ERZE14A431S1 | E14431 | ○☆★◇◆ | 430 (387 to 473) | 275 | 350 | 710 | 100 | 10000 | 7500 | 6500 |
| ERZE14A471S1 | E14471 | ○☆★◇◆ | 470 (423 to 517) | 300 | 385 | 775 | 100 | 10000 | 7500 | 6500 |
| ERZE14A511S1 | E14511 | ○☆★◇◆ | 510 (459 to 561) | 320 | 410 | 845 | 100 | 10000 | 7500 | 6500 |
| ERZE14A561S1 | E14561 | ○☆★◇◆ | 560 (504 to 616) | 350 | 450 | 930 | 100 | 10000 | 7500 | 6500 |
| ERZE14A621S1 | E14621 | ○☆★◇◆ | 620 (558 to 682) | 385 | 505 | 1025 | 100 | 7500 | 7500 | 6500 |
| ERZE14A681S1 | E14681 | ○☆★◇◆ | 680 (612 to 748) | 420 | 560 | 1120 | 100 | 7500 | 7500 | 6500 |
| ERZE14A751S1 | E14751 | ○☆★◇◆ | 750 (675 to 825) | 460 | 615 | 1240 | 100 | 7500 | 7500 | 6500 |
| ERZE14A821S1 | E14821 | ○☆★◇◆ | 820 (738 to 902) | 510 | 670 | 1355 | 100 | 7500 | 7500 | 6500 |
| ERZE14A911S1 | E14911 | ○☆★◇◆ | 910 (819 to 1001) | 550 | 745 | 1500 | 100 | 7500 | 7500 | 6500 |
| ERZE14A102S1 | E14102 | ○☆★◇◆ | 1000 (900 to 1100) | 625 | 825 | 1650 | 100 | 7500 | 7500 | 6500 |
| ERZE14A112S1 | E14112 | ○☆★◇◆ | 1100 (990 to 1210) | 680 | 895 | 1815 | 100 | 7500 | 7500 | 6500 |

Maximum Allowable Voltage and Maximum Peak Current at 8/20 μ s(A) at 125 °C

○ : UL1449 (VZCA2/UL, VZC A8/C-UL), ☆ : VDE (IEC61051-1, -2, -2-2), ★ : VDE (IEC60950-1 Annex.Q, IEC62368-1 G8.1),

◇ : 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 125 °C

● Storage temperature range : -40 to 125 °C

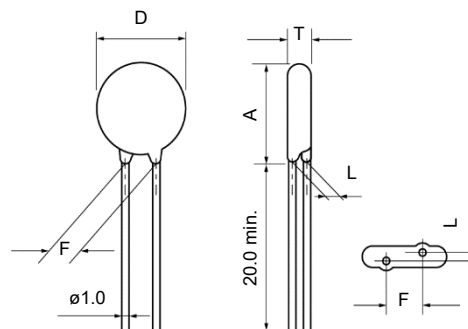
| Part No. | Varistor voltage at 1 mA | Maximum allowable voltage | | Clamping voltage (max.) *Ip | Rated power | Maximum energy | | Maximum peak current at 8/20 μ s | | | Capacitance (max.) at 1 kHz |
|--------------|-----------------------------|------------------------------|-----------|--------------------------------------|----------------|--------------------|------|---|------------------|-------------------|-----------------------------------|
| | | ACrms (V) | DC (V) | | | 10/1000 μ s | 2 ms | 85 °C 1 time | 125 °C 1 time | 125 °C 2 times | |
| | (V) | (V) | (V) | (W) | (J) | (J) | (A) | (A) | (A) | (pF) | |
| ERZE14A201S1 | 200(185 to 225) | 130 | 170 | 340 | 1.0 | 140 | 100 | 10000 | 7500 | 6500 | 1300 |
| ERZE14A221S1 | 220(198 to 242) | 140 | 180 | 360 | 1.0 | 155 | 110 | 10000 | 7500 | 6500 | 1200 |
| ERZE14A241S1 | 240(216 to 264) | 150 | 200 | 395 | 1.0 | 168 | 120 | 10000 | 7500 | 6500 | 1100 |
| ERZE14A271S1 | 270(247 to 303) | 175 | 225 | 455 | 1.0 | 190 | 135 | 10000 | 7500 | 6500 | 1000 |
| ERZE14A331S1 | 330(297 to 363) | 210 | 270 | 545 | 1.0 | 228 | 160 | 10000 | 7500 | 6500 | 900 |
| ERZE14A361S1 | 360(324 to 396) | 230 | 300 | 595 | 1.0 | 255 | 180 | 10000 | 7500 | 6500 | 900 |
| ERZE14A391S1 | 390(351 to 429) | 250 | 320 | 650 | 1.0 | 275 | 195 | 10000 | 7500 | 6500 | 800 |
| ERZE14A431S1 | 430(387 to 473) | 275 | 350 | 710 | 1.0 | 303 | 215 | 10000 | 7500 | 6500 | 800 |
| ERZE14A471S1 | 470(423 to 517) | 300 | 385 | 775 | 1.0 | 350 | 250 | 10000 | 7500 | 6500 | 750 |
| ERZE14A511S1 | 510(459 to 561) | 320 | 410 | 845 | 1.0 | 382 | 273 | 10000 | 7500 | 6500 | 700 |
| ERZE14A561S1 | 560(504 to 616) | 350 | 450 | 930 | 1.0 | 382 | 273 | 10000 | 7500 | 6500 | 700 |
| ERZE14A621S1 | 620(558 to 682) | 385 | 505 | 1025 | 1.0 | 382 | 273 | 7500 | 7500 | 6500 | 650 |
| ERZE14A681S1 | 680(612 to 748) | 420 | 560 | 1120 | 1.0 | 382 | 273 | 7500 | 7500 | 6500 | 600 |
| ERZE14A751S1 | 750(675 to 825) | 460 | 615 | 1240 | 1.0 | 420 | 300 | 7500 | 7500 | 6500 | 530 |
| ERZE14A821S1 | 820(738 to 902) | 510 | 670 | 1355 | 1.0 | 460 | 325 | 7500 | 7500 | 6500 | 500 |
| ERZE14A911S1 | 910(819 to 1001) | 550 | 745 | 1500 | 1.0 | 510 | 360 | 7500 | 7500 | 6500 | 400 |
| ERZE14A102S1 | 1000(900 to 1100) | 625 | 825 | 1650 | 1.0 | 565 | 400 | 7500 | 7500 | 6500 | 400 |
| ERZE14A112S1 | 1100(990 to 1210) | 680 | 895 | 1815 | 1.0 | 620 | 440 | 7500 | 7500 | 6500 | 350 |

*Ip Measuring current of clamping voltage : 100 A

Dimensions in mm (not to scale)

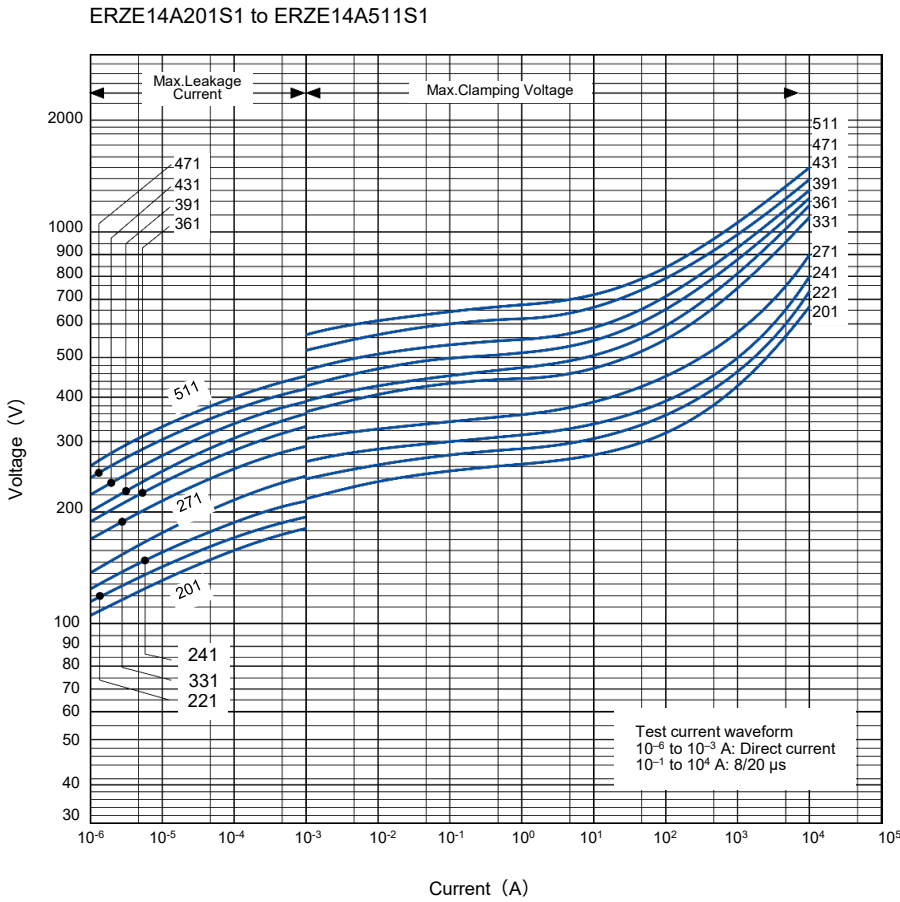
Unit : mm

| Part No. | D max. | T max. | F \pm 1.0 | A max. | L \pm 1.0 |
|--------------|--------|--------|-------------|--------|-------------|
| ERZE14A201S1 | 16.5 | 5.2 | 10.0 | 20.0 | 2.1 |
| ERZE14A221S1 | 16.5 | 5.3 | 10.0 | 20.0 | 2.2 |
| ERZE14A241S1 | 16.5 | 5.4 | 10.0 | 20.0 | 2.3 |
| ERZE14A271S1 | 16.5 | 5.6 | 10.0 | 20.0 | 2.5 |
| ERZE14A331S1 | 16.5 | 5.9 | 10.0 | 20.0 | 2.8 |
| ERZE14A361S1 | 16.5 | 6.1 | 10.0 | 20.0 | 3.0 |
| ERZE14A391S1 | 16.5 | 6.2 | 10.0 | 20.0 | 3.1 |
| ERZE14A431S1 | 16.5 | 6.4 | 10.0 | 20.0 | 3.3 |
| ERZE14A471S1 | 16.5 | 6.6 | 10.0 | 20.0 | 3.5 |
| ERZE14A511S1 | 16.5 | 6.8 | 10.0 | 20.0 | 3.7 |
| ERZE14A561S1 | 16.5 | 7.2 | 10.0 | 20.0 | 4.0 |
| ERZE14A621S1 | 17.5 | 7.5 | 10.0 | 20.5 | 4.4 |
| ERZE14A681S1 | 17.5 | 7.8 | 10.0 | 20.5 | 4.7 |
| ERZE14A751S1 | 17.5 | 8.2 | 10.0 | 20.5 | 5.1 |
| ERZE14A821S1 | 17.5 | 8.5 | 10.0 | 20.5 | 5.4 |
| ERZE14A911S1 | 17.5 | 9.0 | 10.0 | 20.5 | 5.9 |
| ERZE14A102S1 | 17.5 | 9.5 | 10.0 | 20.5 | 6.4 |
| ERZE14A112S1 | 17.5 | 10.1 | 10.0 | 20.5 | 7.2 |

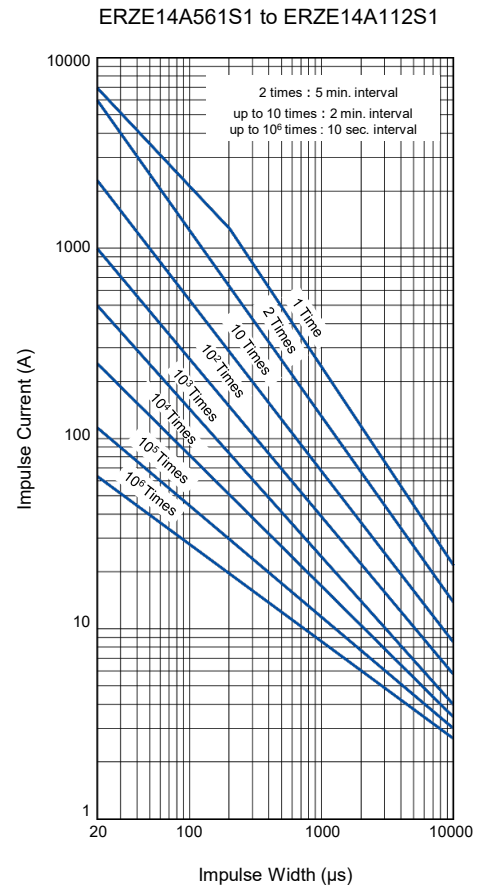
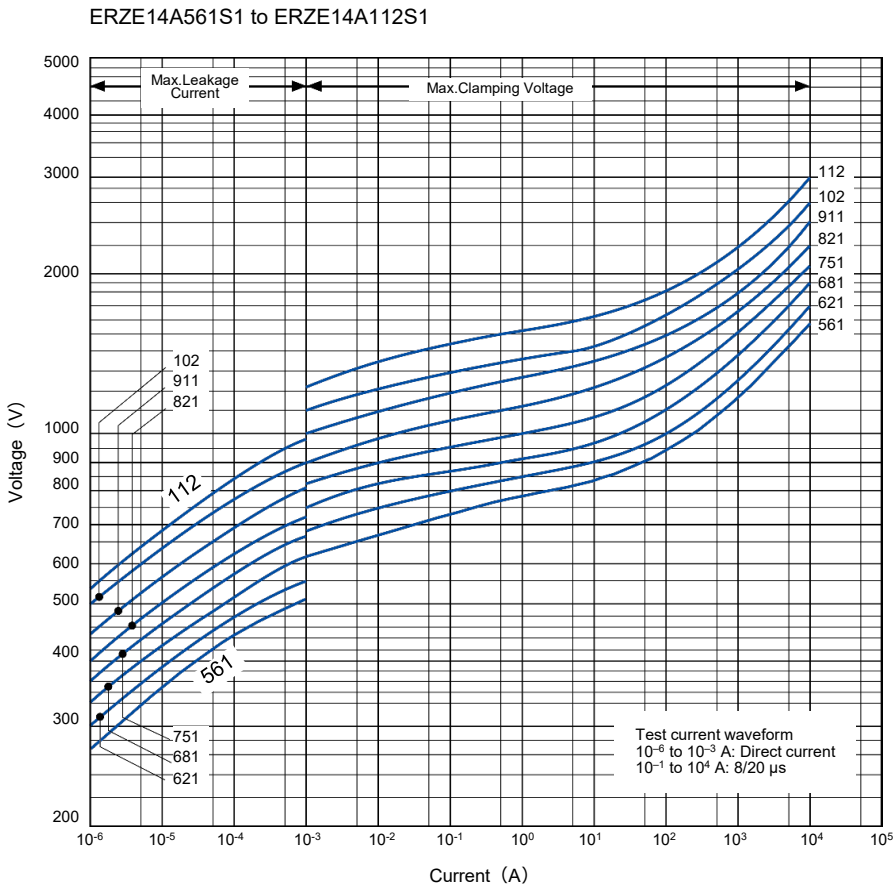
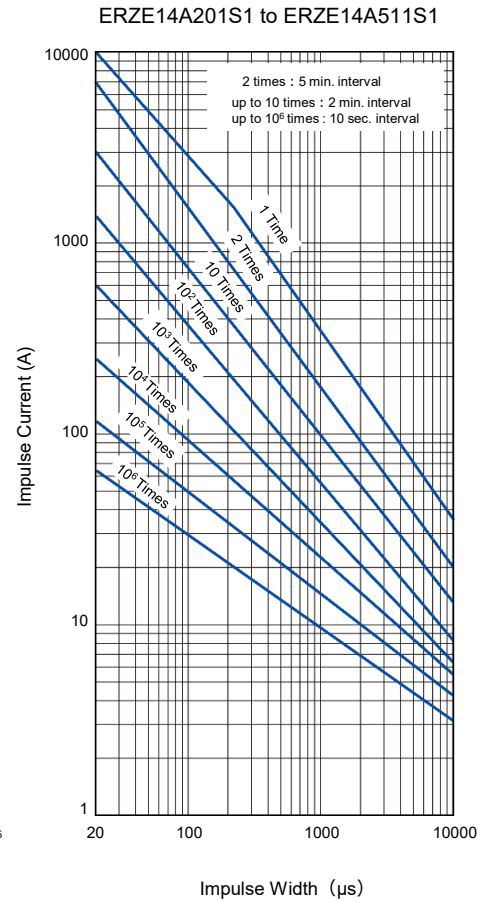


Typical characteristics

Voltage vs. Current



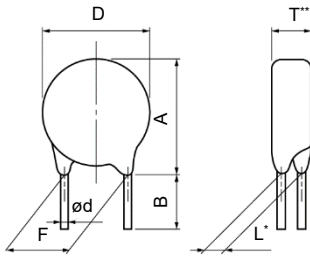
Impulse Derating (Relation between impulse width and impulse current multiple)



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 Symbol | Varister Voltage | E11-S1 | | E14-S1 | |
|----------------------------|------------------|--|--|---------------------------------------|---------------------------------------|
| | | 201 to 561 | 621 to 112 | 201 to 561 | 621 to 112 |
| D | | 13.0 max | 14.0 max | 16.5 max | 17.5 max |
| A | | 17.0 max | 18.0 max | 20.0 max | 20.5 max |
| F | | 7.5±1.0 | 7.5±1.0 | 10.0±1.0 | 10.0±1.0 |
| ø d | | 0.80 ^{+0.08} _{-0.05} | 0.80 ^{+0.08} _{-0.05} | 1.00 ^{+0.1} _{-0.05} | 1.00 ^{+0.1} _{-0.05} |
| B | | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 | 4.0±1.0 |
| Standard Products Part No. | | ERZE11A□□□SC | | ERZE14A□□□SC | |

Application Note for Safety Standards (For Series E-S1)

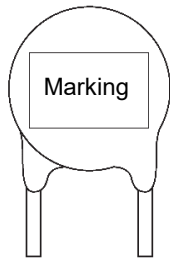
- Approvals products lists in "Reference Guide to Standard Products."
- UL and VDE : Registered in "Type name", it isn't registered in "Panasonic Part No."
- CQC : Registered in "Panasonic Part No."
- "Rated Voltages" are specified for UL recognized components in list shown below.

The AC rated voltage and maximum allowable voltage

| Type name | Maximum Allowable Voltage | | Rated Voltage (Vrms) |
|-----------|---------------------------|--------|----------------------|
| | ACrms (V) | DC (V) | UL1449 |
| E*201 | 130 | 170 | 118 |
| E*221 | 140 | 180 | 127 |
| E*241 | 150 | 200 | 136 |
| E*271 | 175 | 225 | 159 |
| E*331 | 210 | 270 | 189 |
| E*361 | 230 | 300 | 209 |
| E*391 | 250 | 320 | 227 |
| E*431 | 275 | 350 | 250 |
| E*471 | 300 | 385 | 272 |
| E*511 | 320 | 410 | 291 |
| E*561 | 350 | 450 | 320 |
| E*621 | 385 | 505 | 350 |
| E*681 | 420 | 560 | 381 |
| E*751 | 460 | 615 | 418 |
| E*821 | 510 | 670 | 463 |
| E*911 | 550 | 745 | 500 |
| E*102 | 625 | 825 | 568 |
| E*112 | 680 | 895 | 600 |

* : 11 series is 11, 14 series is 14

Explanation of the contents



| Mark | Explanation of the content | |
|------------------|--------------------------------------|--|
| E11□□□ E14□□□ | Abbreviation of Part No. (Type name) | [□□□ Nominal varistor volage] |
| ○ | Factory identification mark | None:Japan Q:Indonesia |
| ◆*1 | Year code | 2019 : 9, 2020 : K, 2021 : A 2022 : B, 2023 : C, 2024 : D |
| ◇ | Monthly code | Jan : 1 to Sep : 9, Oct. : 0, Nov. : N, Dec. : D |
| H | Identification Code | |
| | UL Recognized Components Mark | |

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

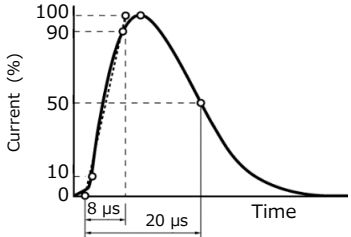
1 : A, 2 : B, 3 : C, 4 : D, 5 : E, 6 : F, 7 : G, 8 : H, 9 : J, 0 : K

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) Varister voltage | 11 (ERZE11A□□□S1) | 14 (ERZE14A□□□S1) |
|--------------------------------------|--------------------------|--------------------------|
| 201 or more | ZNR E11□□□ ○ ◆ ◇ H | ZNR E14□□□ ○ ◆ ◇ H |

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 1mA DC applied is called V_1 or V_{1mA} . 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. (max. 125 °C) | | | | | | | | | | | | | | | |
| | Clamping voltage | The maximum voltage between two terminals with the specified standard impulse current (8/20 μ s) illustrated below applied.  | | | | | | | | | | | | | | | |
| | Rated power | The power that can be applied in the specified ambient temperature. | | | | | | | | | | | | | | | |
| | Maximum energy | The maximum energy within the varistor voltage change of ± 10 % when a single impulse current of 2 ms or 10/1000 μ s is applied. | | | | | | | | | | | | | | | |
| | Maximum peak current (Withstanding surge current) | 2 times | | The maximum current within the varistor voltage change of ± 10 % when a standard impulse current of 8/20 μ s is applied two times with an interval of 5 minutes. (at max. 125 °C) | | | | | | | | | | | | | |
| | | 1 time | | The maximum current within the varistor voltage change of ± 10 % with a single standard impulse current of 8/20 μ s is applied. (at max. 125 °C) | | | | | | | | | | | | | |
| | Temperature coefficient of varistor voltage | $\frac{V_{1mA} \text{ at } 125\text{ }^\circ\text{C} - V_{1mA} \text{ at } 25\text{ }^\circ\text{C}}{V_{1mA} \text{ at } 25\text{ }^\circ\text{C}} \times \frac{1}{100} 100(\%/^\circ\text{C})$ | | 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) | AC 1500 Vrms shall be applied between both terminals of the specimen connected together and metal foil closely wrapped round its body for 1 minute. | | No breakdown | | | | | | | | | | | | | |
| 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 border="1" data-bbox="406 1697 1184 1921"> <thead> <tr> <th>Item</th> <th>Impulse Life(I)</th> <th>Impulse Life(II)</th> </tr> </thead> <tbody> <tr> <td>Times</td> <td>$\times 10^4$ Times</td> <td>$\times 10^5$ Times</td> </tr> <tr> <th>Part No.</th> <th colspan="2">Impulse Current</th> </tr> <tr> <td>ERZE11A201S1 to ERZE11A112S1</td> <td>200 A (8/20 μs)</td> <td>110 A (8/20 μs)</td> </tr> <tr> <td>ERZE14A201S1 to ERZE14A112S1</td> <td>250 A (8/20 μs)</td> <td>120 A (8/20 μs)</td> </tr> </tbody> </table> | Item | Impulse Life(I) | Impulse Life(II) | Times | $\times 10^4$ Times | $\times 10^5$ Times | Part No. | Impulse Current | | ERZE11A201S1 to ERZE11A112S1 | 200 A (8/20 μ s) | 110 A (8/20 μ s) | ERZE14A201S1 to ERZE14A112S1 | 250 A (8/20 μ s) | 120 A (8/20 μ s) | $\Delta V_{1mA}/V_{1mA} \leq 0 \text{ to } +20\%$ |
| Item | Impulse Life(I) | Impulse Life(II) | | | | | | | | | | | | | | | |
| Times | $\times 10^4$ Times | $\times 10^5$ Times | | | | | | | | | | | | | | | |
| Part No. | Impulse Current | | | | | | | | | | | | | | | | |
| ERZE11A201S1 to ERZE11A112S1 | 200 A (8/20 μ s) | 110 A (8/20 μ s) | | | | | | | | | | | | | | | |
| ERZE14A201S1 to ERZE14A112S1 | 250 A (8/20 μ s) | 120 A (8/20 μ s) | | | | | | | | | | | | | | | |

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. | | No remarkable mechanical damage | | | | | | | | | | | | | | |
| | | <u>Terminal diameter</u> | <u>Force</u> | | | | | | | | | | | | | | | |
| | | 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. The terminal shall gradually be bent by 90 ° in one direction, then 90 ° in the opposite direction, and again back to the original position. The damage of the terminal shall be visually examined. | | | | | | | | | | | | | | | | |
| | <u>Terminal diameter</u> | <u>Force</u> | | | | | | | | | | | | | | | | |
| | 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 to 2 hours. The change of VCmA and mechanical damages shall be examined. | | $\Delta V_{1\text{ mA}}/V_{1\text{ mA}} \leq \pm 5\%$ | | | | | | | | | | | | | | | |
| 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 to 2 hours. Thereafter, the change of VCmA shall be measured. | | $\Delta V_{1\text{ mA}}/V_{1\text{ mA}} \leq \pm 5\%$ | | | | | | | | | | | | | | |
| | 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 to 2 hours. Thereafter, the change of VCmA shall be measured. | | $\Delta V_{1\text{ mA}}/V_{1\text{ mA}} \leq \pm 5\%$ | | | | | | | | | | | | | | |
| | Temperature cycle | The temperature cycle shown below shall be repeated five cycles and then stored at room temperature and normal humidity for 1 to 2 hours. The change of VCmA and mechanical damage shall be examined. | | $\Delta V_{1\text{ mA}}/V_{1\text{ mA}} \leq \pm 5\%$ No remarkable mechanical damage | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>15±3</td> </tr> <tr> <td>3</td> <td>125±2</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>15±3</td> </tr> </tbody> </table> | Step | Temperature (°C) | Period (minutes) | 1 | -40±3 | 30±3 | 2 | Room temperature | 15±3 | 3 | 125±2 | 30±3 | 4 | Room temperature | 15±3 | |
| | 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 125±2 °C for 1000 hours, the specimen shall be stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of VCmA shall be measured. | | $\Delta V_{1\text{ mA}}/V_{1\text{ mA}} \leq \pm 10\%$ | | | | | | | | | | | | | | | |
| Damp heat load/humidity load | The specimen shall be subjected to 40±2 °C, 90 to 95 % RH and the Maximum Allowable Voltage for 1000 hours and then stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of VCmA shall be measured. | | | | | | | | | | | | | | | | | |
| 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 to 2 hours. Thereafter, the change of VCmA shall be measured. | | $\Delta V_{1\text{ mA}}/V_{1\text{ mA}} \leq \pm 5\%$ | | | | | | | | | | | | | | | |

Minimum quantity / Packing unit

| Product | Series / Type | | Part number | Minimum quantity / Packing unit | Packing quantity in carton | Carton (about) L×W×H (mm) |
|-----------------------------------|--------------------------|--------------------------|-----------------------|---------------------------------|----------------------------|---------------------------|
| Varistors (ZNR Surge Absorber) | D type E-S1 series | Straight leads <Bulk> | ERZE11A201S1 to 361S1 | 50 | 3000 | 210×340×110 |
| | | | ERZE11A391S1 to 561S1 | 50 | 2000 | 210×340×110 |
| | | | ERZE11A621S1 to 112S1 | 50 | 1000 | 210×340×110 |
| | | | ERZE14A201S1 to 221S1 | 50 | 2000 | 210×340×110 |
| | | | ERZE14A241S1 to 431S1 | 50 | 2000 | 210×340×110 |
| | | | ERZE14A471S1 to 112S1 | 50 | 1000 | 210×340×110 |
| | | Leads cut type <Bulk> | ERZE11A201SC to 361SC | 50 | 3000 | 210×340×110 |
| | | | ERZE11A391SC to 561SC | 50 | 2000 | 210×340×110 |
| | | | ERZE11A621SC to 112SC | 50 | 2000 | 210×340×110 |
| | | | ERZE14A201SC to 361SC | 50 | 2000 | 210×340×110 |
| | | | ERZE14A391SC to 561SC | 50 | 2000 | 210×340×110 |
| | | | ERZE14A621SC to 112SC | 50 | 1000 | 210×340×110 |

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

※Please contact local sales office about packing specifications.

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

To know the detailed specifications of individual products or specific evaluation test scores, please contact us. We issue a delivery specification sheet for each product ordered. Please confirm with the 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.

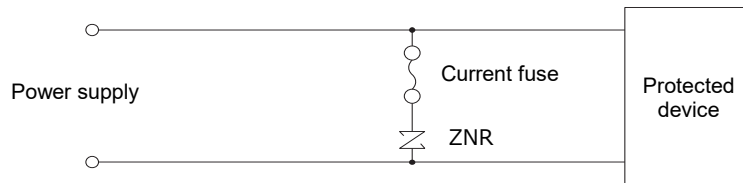
<Rated current of a current fuse for the SMD-type / VF series surge absorber>

| | |
|-------------------------|------------|
| 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)

| Connection | Surge absorber placed between lines | Surge absorber placed between a line and the ground | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------|--|---|-------------------------------|---------------------------|--------------------------|--------|----------|----------------|-------|-------------|-------------|-------|-------------|-------------|-------|-------------|-----|-------|-------------|-----|-------|-----------|---|-------|-----------|---|--|-----|---------------------------|--------------------------|--|--------|----------|----------------|----------------|-----|-----|-----|---|------|---|-----------------|---|--------|---|---|---|-------|-----|---|------|---|-----------------|---|-------|---|-------|-------|---|--------|---|
| | | <p>DC Single-phase AC</p> | <p>DC Single-phase AC</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <p>Three-phase AC</p> | <p>Three-phase AC</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Varistor voltage selection | <table border="1"> <thead> <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> </thead> <tbody> <tr> <td rowspan="6">ZNR 1 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> </tbody> </table> | ZNR | Power supply voltage [AC] | Nominal varistor voltage | | D-type | SMD-type | ZNR 1 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 border="1"> <thead> <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> </thead> <tbody> <tr> <td rowspan="12">ZNR 2 ZNR 4</td> <td rowspan="6">100 V 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>-</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="2">380 V</td> <td>112**</td> <td>-</td> </tr> <tr> <td>182***</td> <td>-</td> </tr> </tbody> </table> | ZNR | Power supply voltage [AC] | Nominal varistor voltage | | D-type | SMD-type | ZNR 2 ZNR 4 | 100 V 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 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 ZNR 4 | 100 V 220 V | 471 | 471 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 511 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 621* | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 821 or higher** | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 182*** | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 230 V | 511 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 621* | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 821 or higher** | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 182** | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 380 V | 112** | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 182*** | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <p>* Choose the element size while taking surge conditions into consideration.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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.

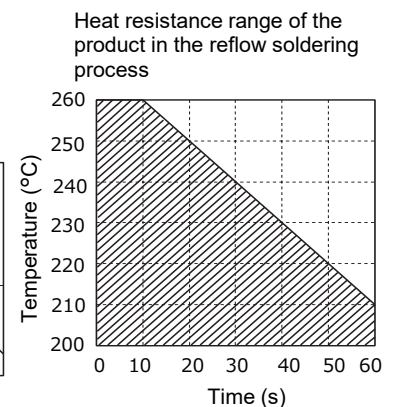
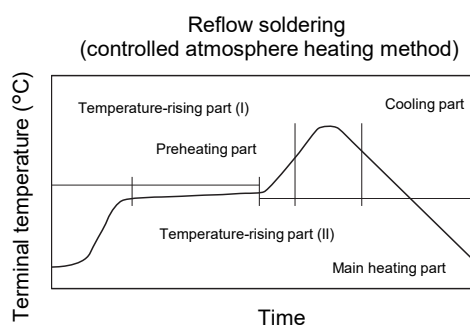
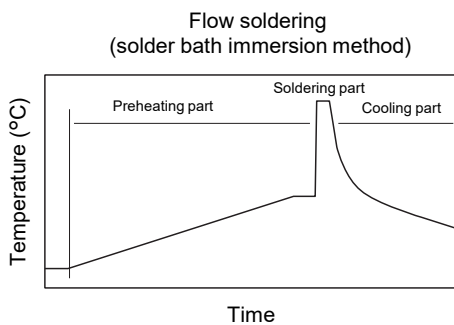
Mounting and storage conditions

- 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 (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 (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 (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 (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.

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

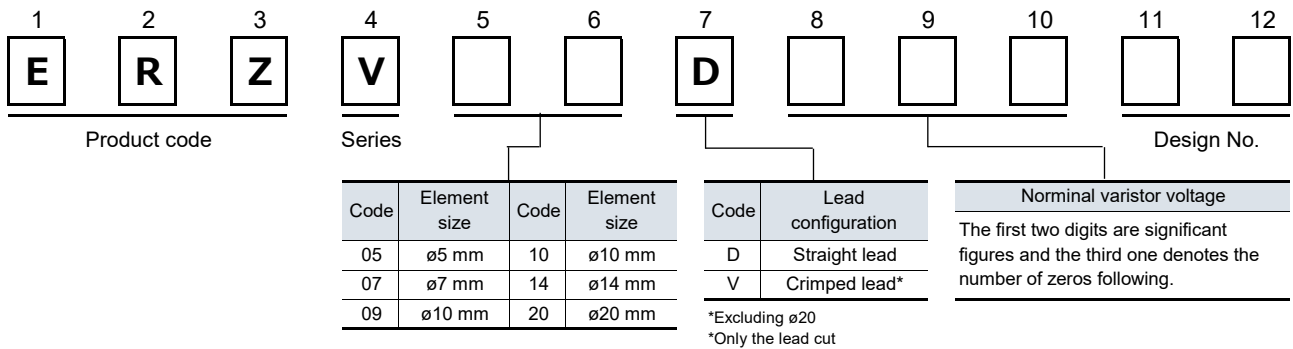
Applicable standards

- 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)

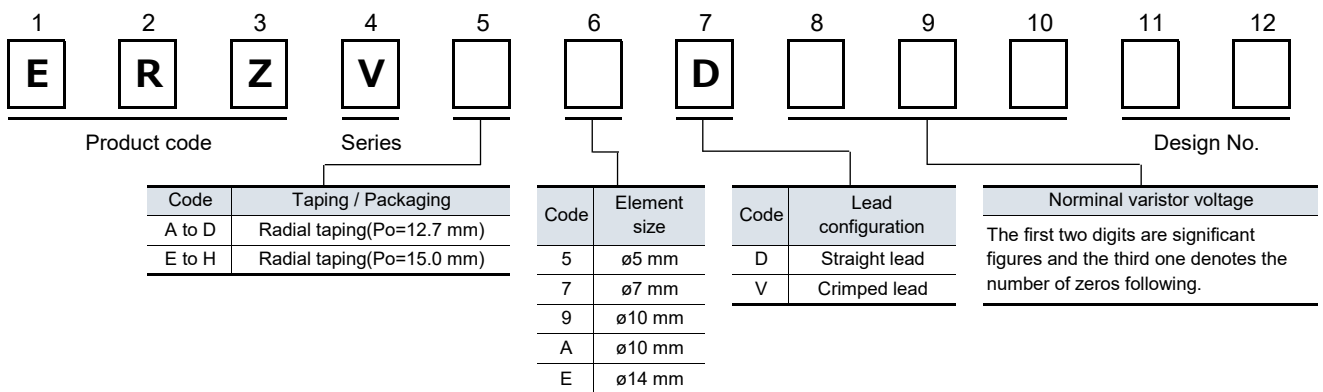
Refer to "Standard Products" , and "Application Note for Safety Standards" , for the details.

■ 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* (V) | Maximum allowable voltage | | Clamping voltage 8/20 μs | | Maximum peak current at 8/20 μs (A) | |
|------------|----------------------|-----------|--------------------------|---------------------------|--------|--------------------------|--------|-------------------------------------|---------|
| | Type name | Approvals | | AC rms (V) | DC (V) | max.(V) | Ip (A) | 1 time | 2 times |
| ERZV05D180 | V180 | ◇ | 18 (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 (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 (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 (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 (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 (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 (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 (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* (V) | Maximum allowable voltage | | Clamping voltage 8/20 μs | | Maximum peak current at 8/20 μs (A) | |
|------------|----------------------|-----------|--------------------------|---------------------------|--------|--------------------------|--------|-------------------------------------|---------|
| | Type name | Approvals | | AC rms (V) | DC (V) | max.(V) | Ip (A) | 1 time | 2 times |
| ERZV05D820 | V820U | ○☆◇ | 82 (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 (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 (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 (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 (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 (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 (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 (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.

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.

7-Aug-24

Reference guide to standard products

| Part No. | Applicable standards | | Varistor voltage* (V) | Maximum allowable voltage | | Clamping voltage 8/20 μ s | | Maximum peak current at 8/20 μ s (A) | |
|------------|----------------------|-----------|--------------------------|---------------------------|--------|-------------------------------|--------|--|---------|
| | Type name | Approvals | | AC rms (V) | DC (V) | max.(V) | Ip (A) | 1 time | 2 times |
| ERZV05D331 | V331U | ○☆□◇ | 330 (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 (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 (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 (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 (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 (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 (504 to 616) | 350 | 450 | 930 |
| ERZV14D561 | V14561U | ○☆★□◇◆ | 930 | 50 | 5000 | | | | 4500 |
| ERZV20D561 | V20561U | ○☆★□◇◆ | 930 | 100 | 7500 | | | | 6500 |
| ERZV10D621 | V10621U | ○☆★□◇◆ | 620 (558 to 682) | 385 | 505 | 1025 | 25 | 3500 | 2500 |
| ERZV14D621 | V14621U | ○☆★□◇◆ | | | | 1025 | 50 | 5000 | 4500 |
| ERZV20D621 | V20621U | ○☆★□◇◆ | | | | 1025 | 100 | 7500 | 6500 |
| ERZV10D681 | V10681U | ○☆★□◇◆ | 680 (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* (V) | Maximum allowable voltage | | Clamping voltage 8/20 μ s | | Maximum peak current at 8/20 μ s (A) | |
|--------------|----------------------|-----------|--------------------------|---------------------------|--------|-------------------------------|--------|--|---------|
| | Type name | Approvals | | AC rms (V) | DC (V) | max.(V) | Ip (A) | 1 time | 2 times |
| ERZV10D751 | V10751U | ○☆★□◇◆ | 750 (675 to 825) | 460 | 615 | 1240 | 25 | 3500 | 2500 |
| ERZV14D751 | V14751U | ○☆★□◇◆ | | | | 1240 | 50 | 5000 | 4500 |
| ERZV20D751 | V20751U | ○☆★□◇◆ | | | | 1240 | 100 | 7500 | 6500 |
| ERZV10D821 | V10821U | ○☆★□◇◆ | 820 (738 to 902) | 510 | 670 | 1355 | 25 | 3500 | 2500 |
| ERZV14D821 | V14821U | ○☆★□◇◆ | | | | 1355 | 50 | 5000 | 4500 |
| ERZV20D821 | V20821U | ○☆★□◇◆ | | | | 1355 | 100 | 7500 | 6500 |
| ERZV10D911 | V10911U | ○☆★□◇◆ | 910 (819 to 1001) | 550 | 745 | 1500 | 25 | 3500 | 2500 |
| ERZV14D911 | V14911U | ○☆★□◇◆ | | | | 1500 | 50 | 5000 | 4500 |
| ERZV20D911 | V20911U | ○☆★□◇◆ | | | | 1500 | 100 | 7500 | 6500 |
| ERZV10D102 | V10102U | ○☆★□◇◆ | 1000 (900 to 1100) | 625 | 825 | 1650 | 25 | 3500 | 2500 |
| ERZV14D102 | V14102U | ○☆★□◇◆ | | | | 1650 | 50 | 5000 | 4500 |
| ERZV20D102 | V20102U | ○☆★□◇◆ | | | | 1650 | 100 | 7500 | 6500 |
| ERZV10D112 | V10112U | ○☆★□◇◆ | 1100 (990 to 1210) | 680 | 895 | 1815 | 25 | 3500 | 2500 |
| ERZV14D112 | V14112U | ○☆★□◇◆ | | | | 1815 | 50 | 5000 | 4500 |
| ERZV20D112 | V20112U | ○☆★□◇◆ | | | | 1815 | 100 | 7500 | 6500 |
| ERZV10D182CS | V10182U | ○☆★□◇◆ | 1800 (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 voltage at 0.1 mA | Maximum allowable voltage | | Clamping voltage (max.) **Ip | Rated power | Maximum energy | | Maximum peak current (8/20 μs) | | Capacitance (max.) at 1 kHz |
|------------|-------------------------------|------------------------------|---------------|---------------------------------------|----------------|----------------|-----|--------------------------------------|---------------------|-----------------------------------|
| | | (V) | AC rms (V) | | | DC (V) | (V) | (W) | (10/1000 μs) (J) | |
| | ERZV05D180 | 18(16 to 20) | 11 | 14 | 40 | 0.01 | 0.6 | 0.4 | 250 | 125 |
| 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

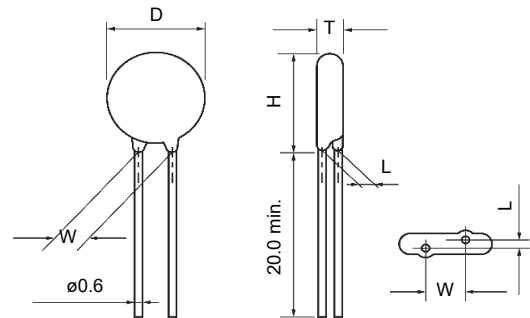
Dimensions in mm (not to scale)

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 |



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

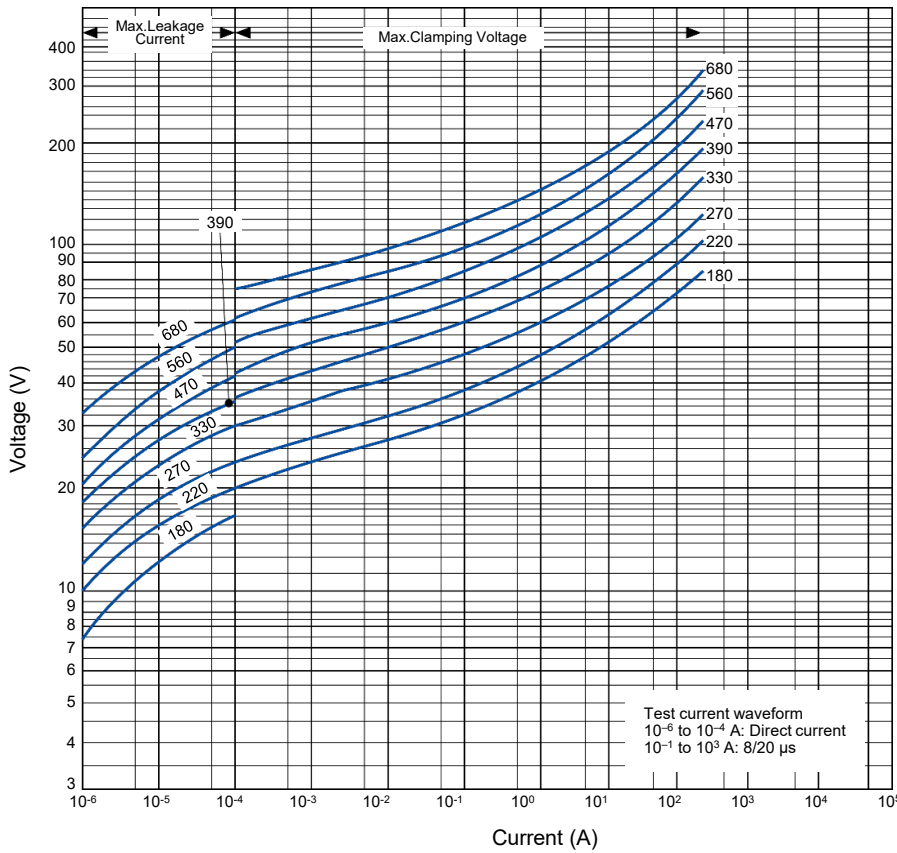
Should a safety concern arise regarding this product, please be sure to contact us immediately.

7-Aug-24

Typical characteristics

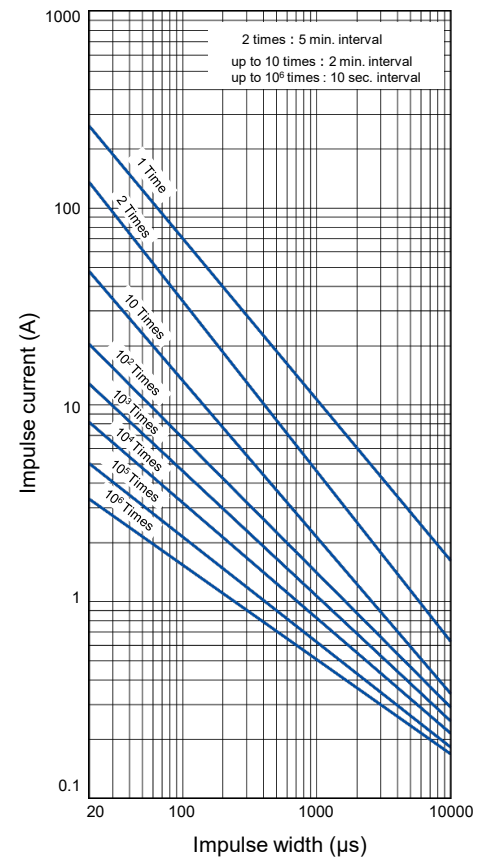
Voltage vs. Current

ERZV05D180 to ERZV05D680

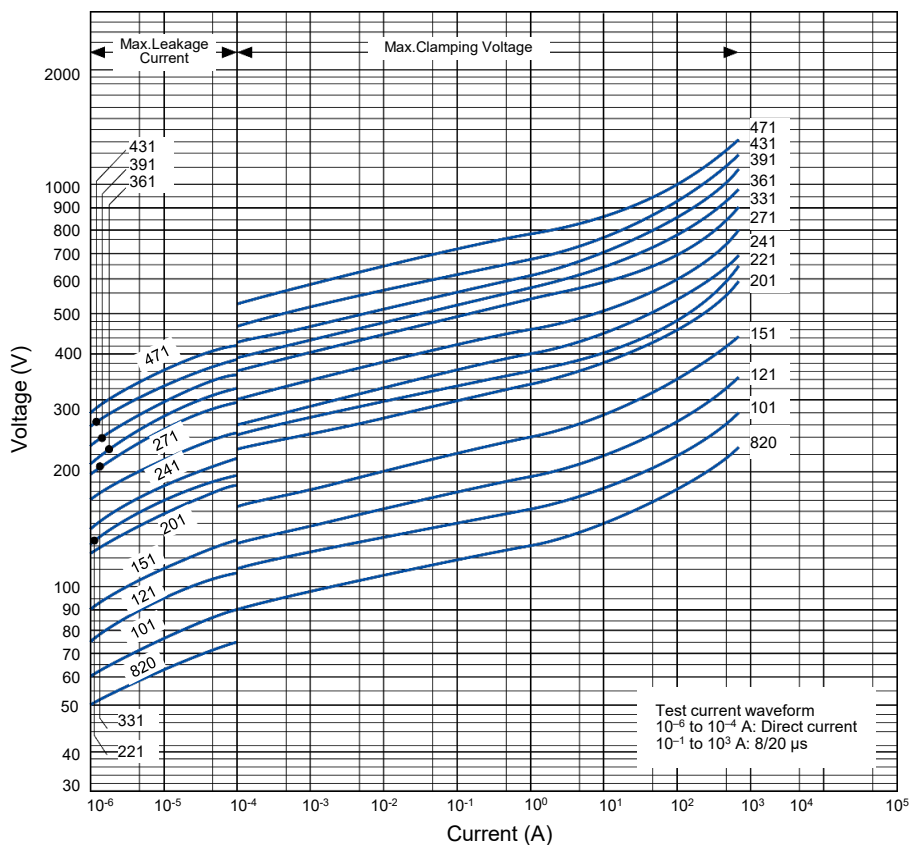


Impulse Derating (Relation between impulse width and impulse current multiple)

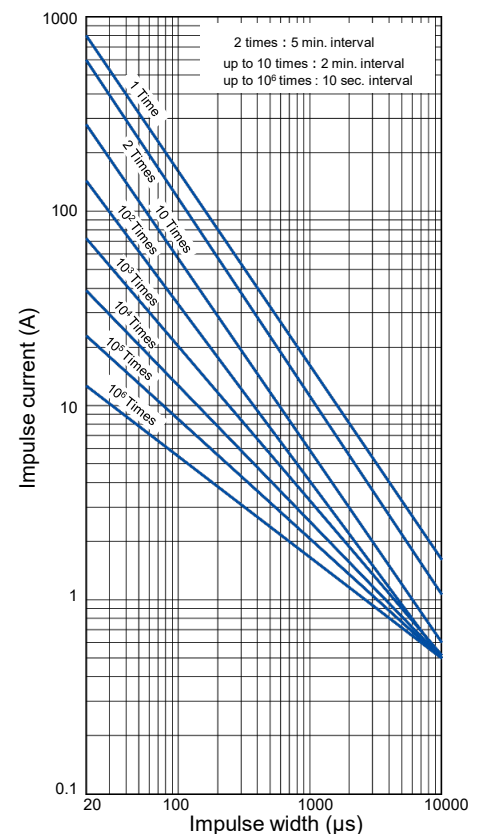
ERZV05D180 to ERZV05D680



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 at 1 mA (V) | Maximum allowable voltage | | Clamping voltage (max.) **Ip (V) | Rated power (W) | Maximum energy | | Maximum peak current (8/20 µs) | | Capacitance (max.) at 1 kHz (pF) |
|------------|---------------------------------|---------------------------|-----------|--|--------------------|---------------------|---------------|-----------------------------------|----------------|--|
| | | AC rms (V) | DC (V) | | | (10/1000 µs) (J) | (2 ms) (J) | 1 time (A) | 2 times (A) | |
| | ERZV07D180 | 18(16 to 20) | 11 | 14 | 36 | 0.02 | 1.1 | 0.9 | 500 | 250 |
| 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](#)

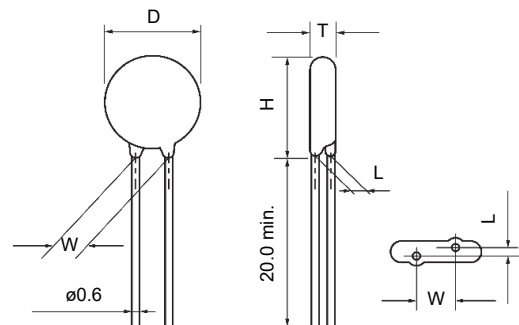
| | | | | | | | | | | |
|------------|-----------------|-----|-----|-----|------|------|------|------|------|-----|
| ERZV07D201 | 200(185 to 225) | 130 | 170 | 340 | 0.25 | 17.5 | 12.5 | 1750 | 1250 | 200 |
| ERZV07D221 | 220(198 to 242) | 140 | 180 | 360 | 0.25 | 19 | 13.5 | 1750 | 1250 | 190 |
| ERZV07D241 | 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)

Unit : mm

| Part No. | 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 |



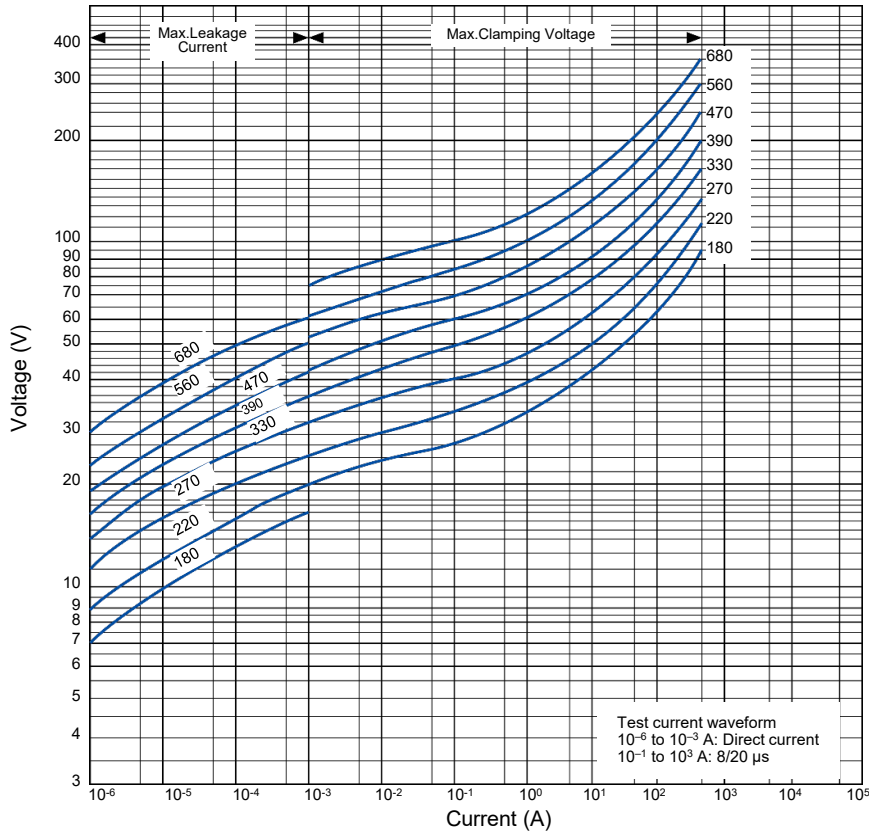
★ The following part numbers, kindly also consider corresponding, smaller E Series devices with better performance for their size. → [Please click here](#)

| | | | | | |
|------------|-----|-----|-----|------|-----|
| 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

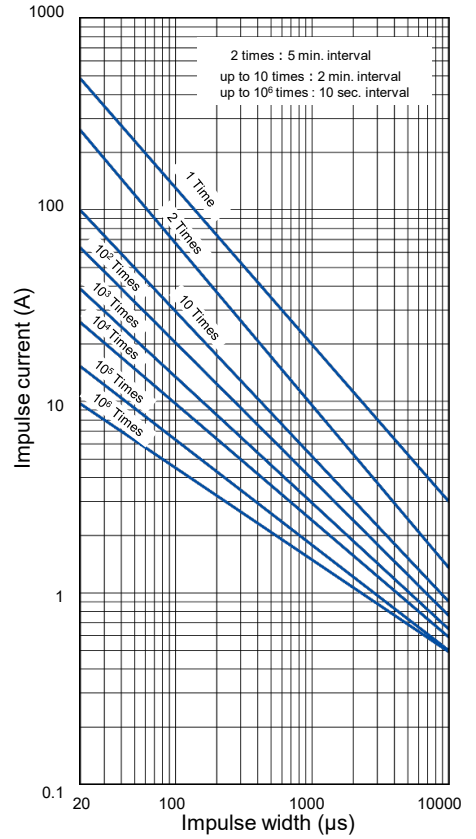
Voltage vs. Current

ERZV07D180 to ERZV07D680

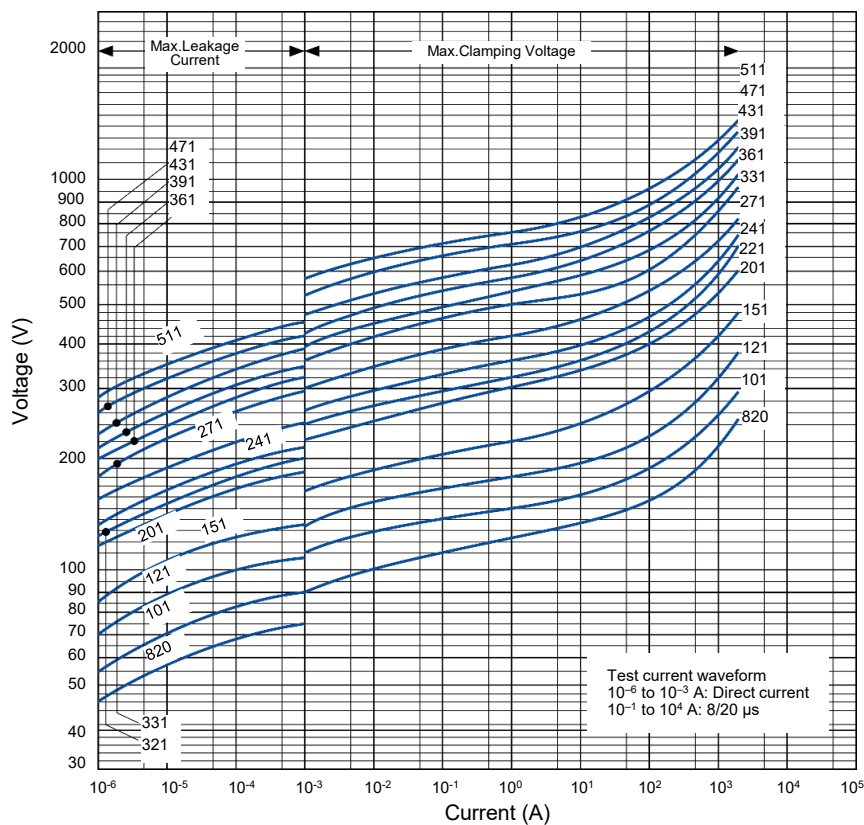


Impulse Derating (Relation between impulse width and impulse current multiple)

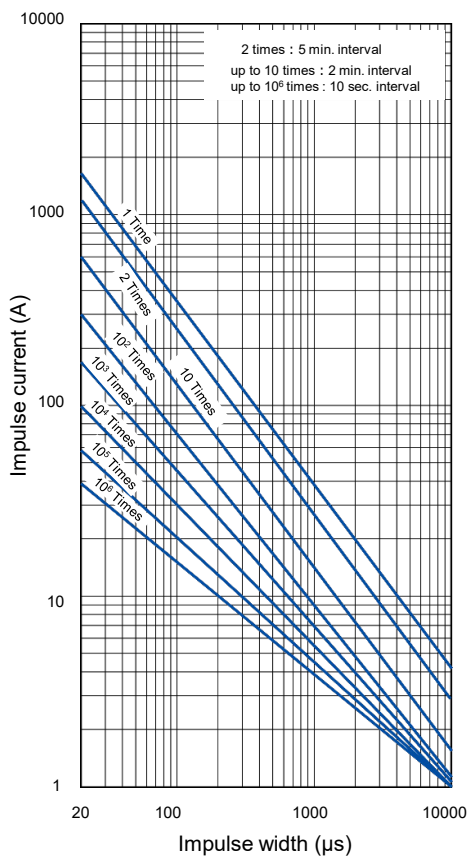
ERZV07D180 to ERZV07D680



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 at 1 mA (V) | Maximum allowable voltage | | Clamping voltage (max.) **Ip (V) | Rated power (W) | Maximum energy | | Maximum peak current (8/20 μs) | | Capacitance (max.) at 1 kHz (pF) |
|------------|---------------------------------|---------------------------|-----------|--|--------------------|---------------------|---------------|-----------------------------------|----------------|---|
| | | AC rms (V) | DC (V) | | | (10/1000 μs) (J) | (2 ms) (J) | 1 time (A) | 2 times (A) | |
| | ERZV09D180 | 18(16 to 20) | 11 | 14 | 36 | 0.05 | 2.6 | 2.2 | 1000 | 500 |
| 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 |

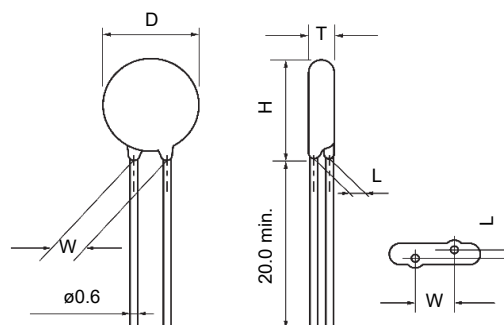
*Ip Measuring current of clamping voltage 180 to 680 : 5 A, 820 to 511 : 25 A

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](#)

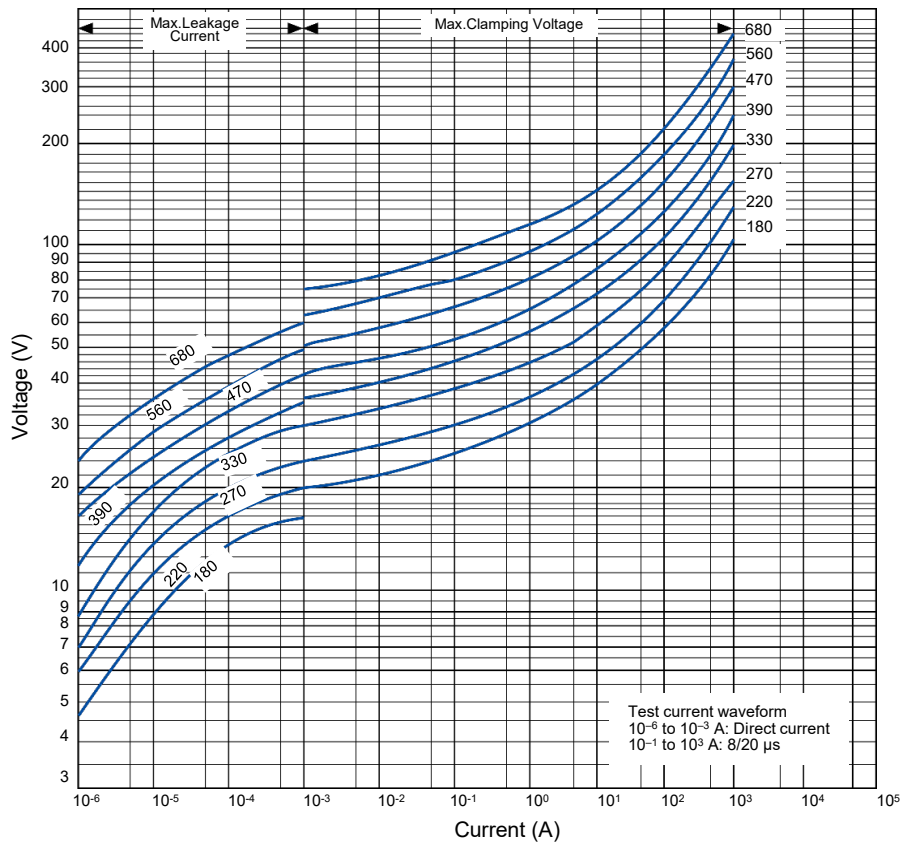
| | | | | | |
|------------|------|-----|-----|------|-----|
| ERZV09D201 | 11.5 | 4.1 | 5.0 | 14.0 | 1.7 |
| ERZV09D221 | 11.5 | 4.2 | 5.0 | 14.0 | 1.8 |
| ERZV09D241 | 11.5 | 4.3 | 5.0 | 14.0 | 1.9 |
| ERZV09D271 | 11.5 | 4.5 | 5.0 | 14.0 | 2.0 |
| ERZV09D331 | 11.5 | 4.8 | 5.0 | 14.0 | 2.3 |
| ERZV09D361 | 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

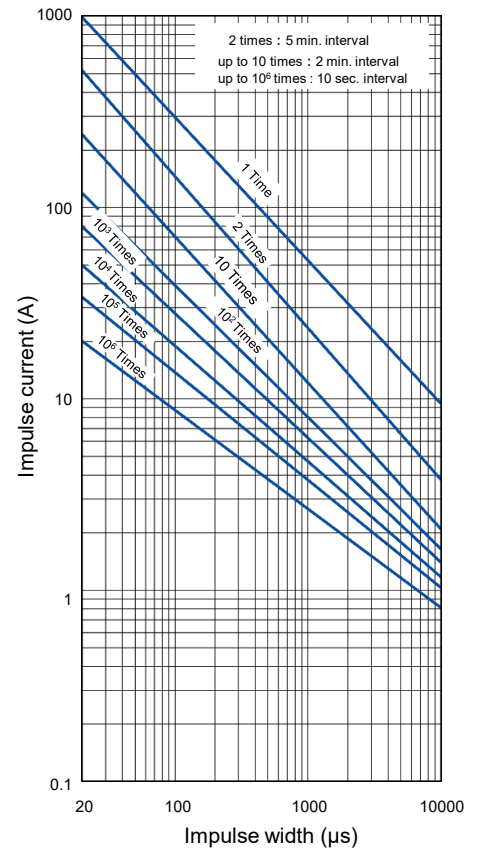
Voltage vs. Current

ERZV09D180 to ERZV09D680

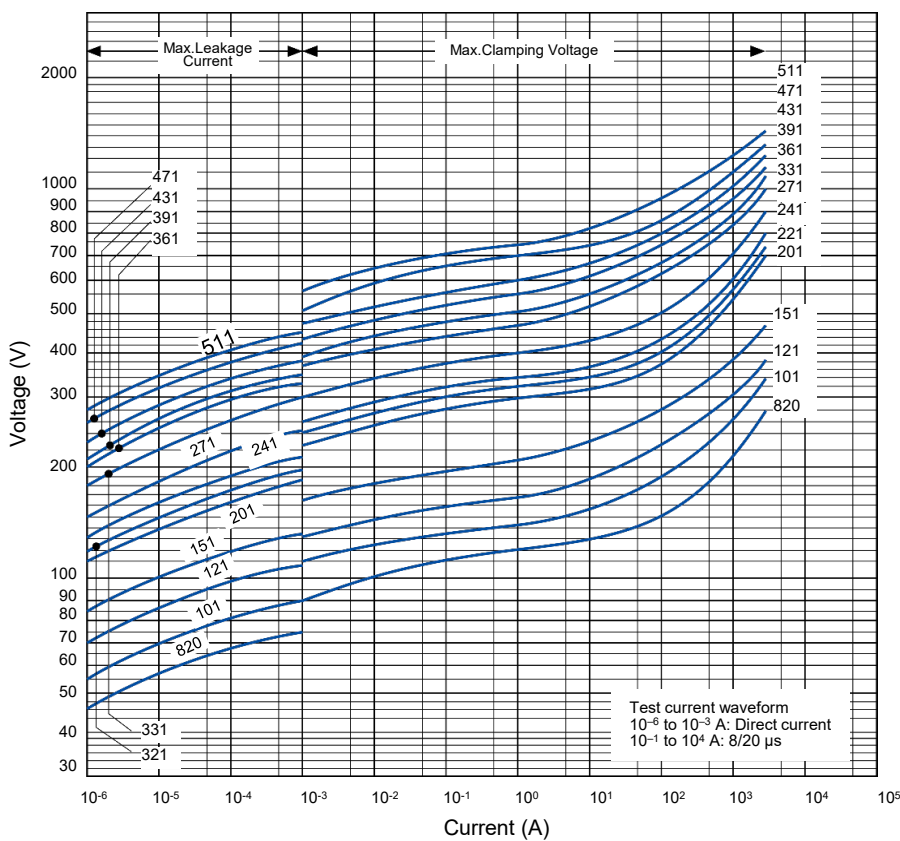


Impulse Derating (Relation between impulse width and impulse current multiple)

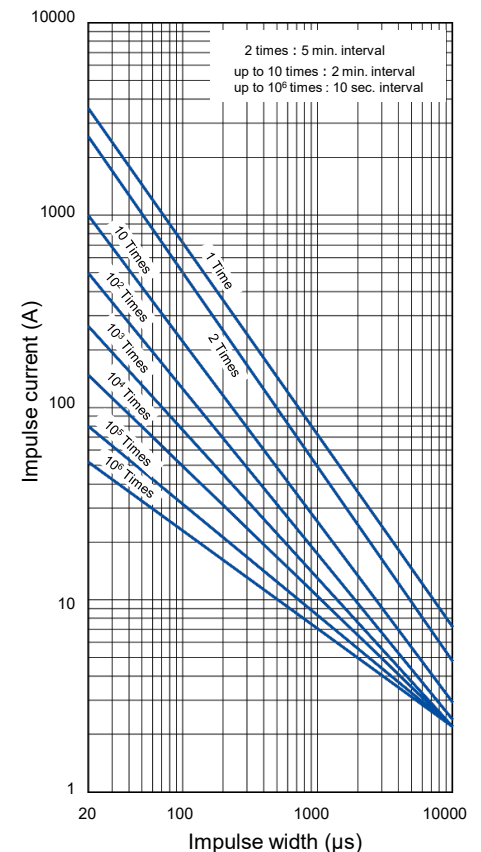
ERZV09D180 to ERZV09D680



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 (V) | Maximum allowable voltage | | Clamping voltage (max.) **Ip (V) | Rated power (W) | Maximum energy | | Maximum peak current (8/20 μs) | | Capacitance (max.) at 1 kHz (pF) |
|------------|---------------------------------|---------------------------|-----------|--|--------------------|---------------------|---------------|-----------------------------------|----------------|--|
| | | AC rms (V) | DC (V) | | | (10/1000 μs) (J) | (2 ms) (J) | 1 time (A) | 2 times (A) | |
| | ERZV10D180 | 18(16 to 20) | 11 | 14 | 36 | 0.05 | 2.6 | 2.2 | 1000 | 500 |
| 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

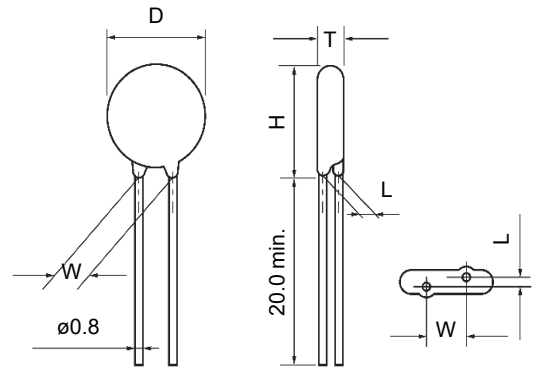
| Part No. | D max. | T max. | W±1.0 | H max. | L±1.0 |
|------------|--------|--------|-------|--------|-------|
| ERZV10D180 | 11.5 | 4.6 | 7.5 | 14.5 | 1.3 |
| ERZV10D220 | 11.5 | 4.7 | 7.5 | 14.5 | 1.4 |
| ERZV10D270 | 11.5 | 4.8 | 7.5 | 14.5 | 1.5 |
| ERZV10D330 | 11.5 | 5.0 | 7.5 | 14.5 | 1.7 |
| 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](#)

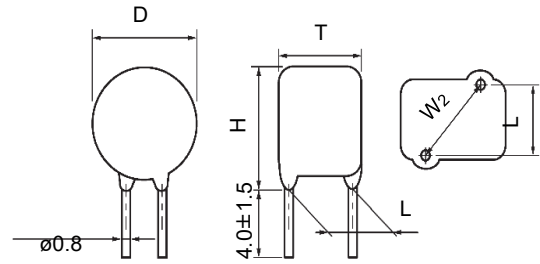
| | | | | | |
|------------|------|-----|-----|------|-----|
| ERZV10D201 | 11.5 | 4.8 | 7.5 | 14.5 | 1.9 |
| ERZV10D221 | 11.5 | 4.9 | 7.5 | 14.5 | 2.0 |
| ERZV10D241 | 11.5 | 5.0 | 7.5 | 14.5 | 2.1 |
| ERZV10D271 | 11.5 | 5.2 | 7.5 | 14.5 | 2.3 |
| ERZV10D331 | 11.5 | 5.5 | 7.5 | 14.5 | 2.6 |
| ERZV10D361 | 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) |
|--------------|------|------|-------|------|-------------|

* W₂



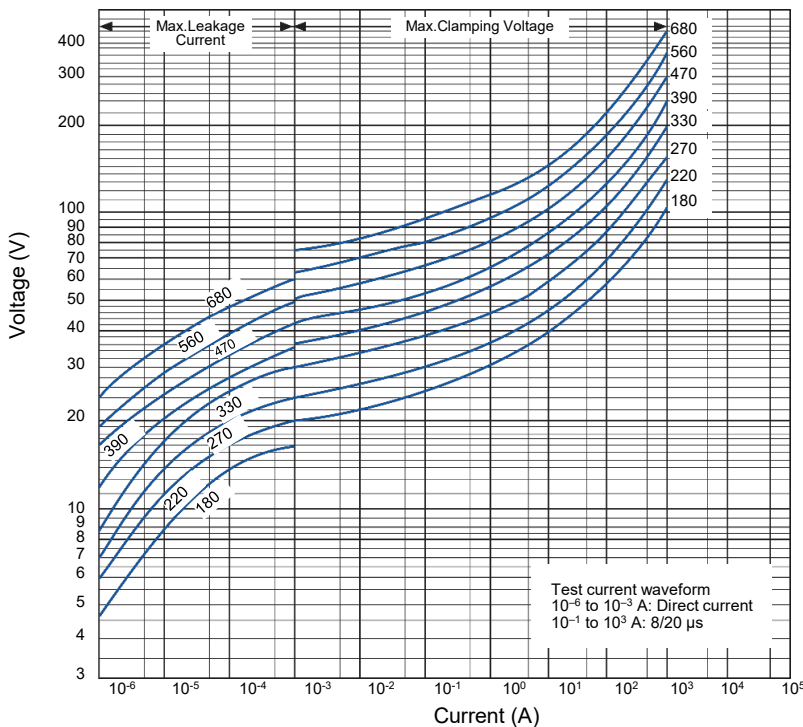
(ERZV10D182CS)



Typical characteristics

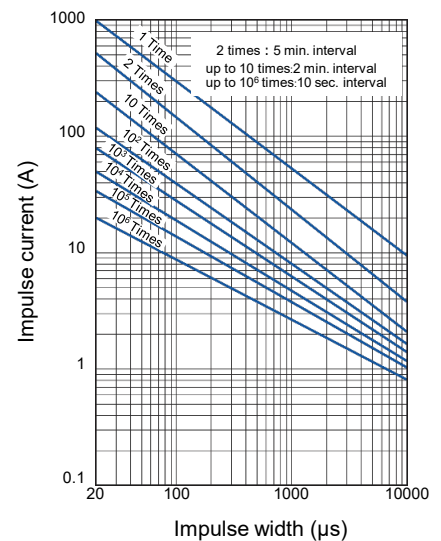
Voltage vs. Current

ERZV10D180 to ERZV10D680



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

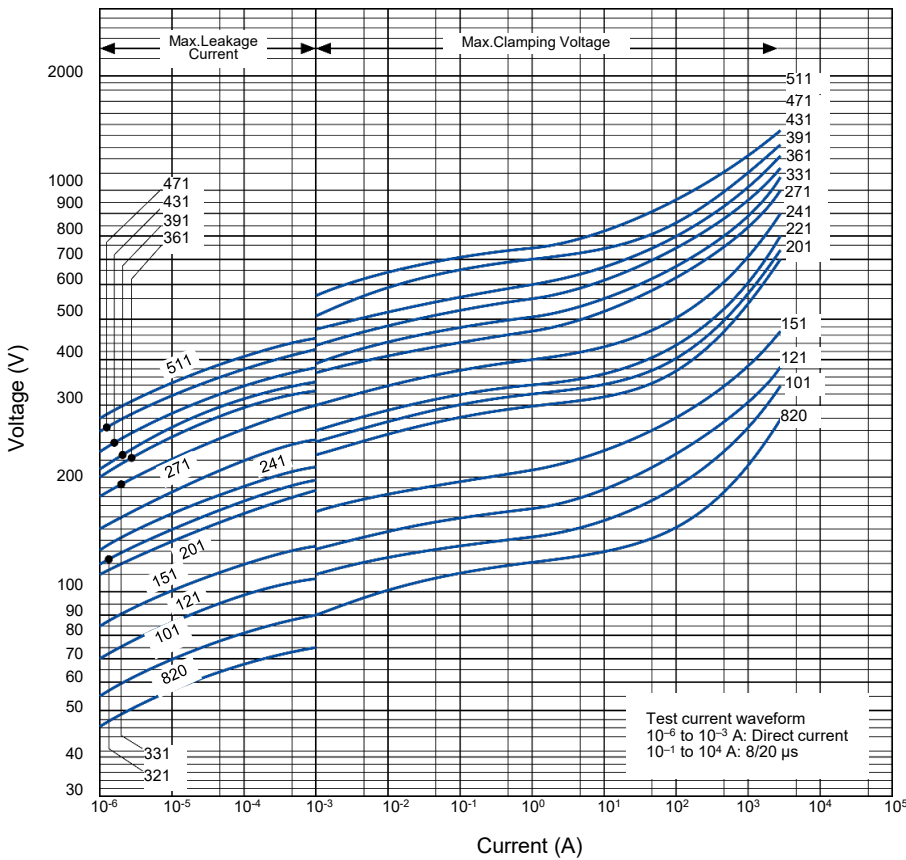
ERZV10D180 to ERZV10D680



Typical characteristics

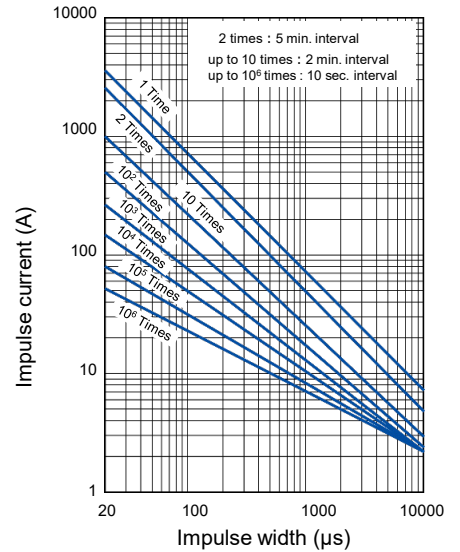
Voltage vs. Current

ERZV10D820 to ERZV10D511

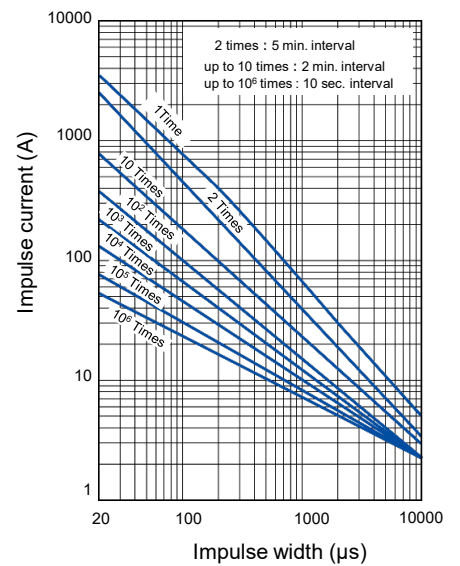


Impulse Derating (Relation between impulse width and impulse current multiple)

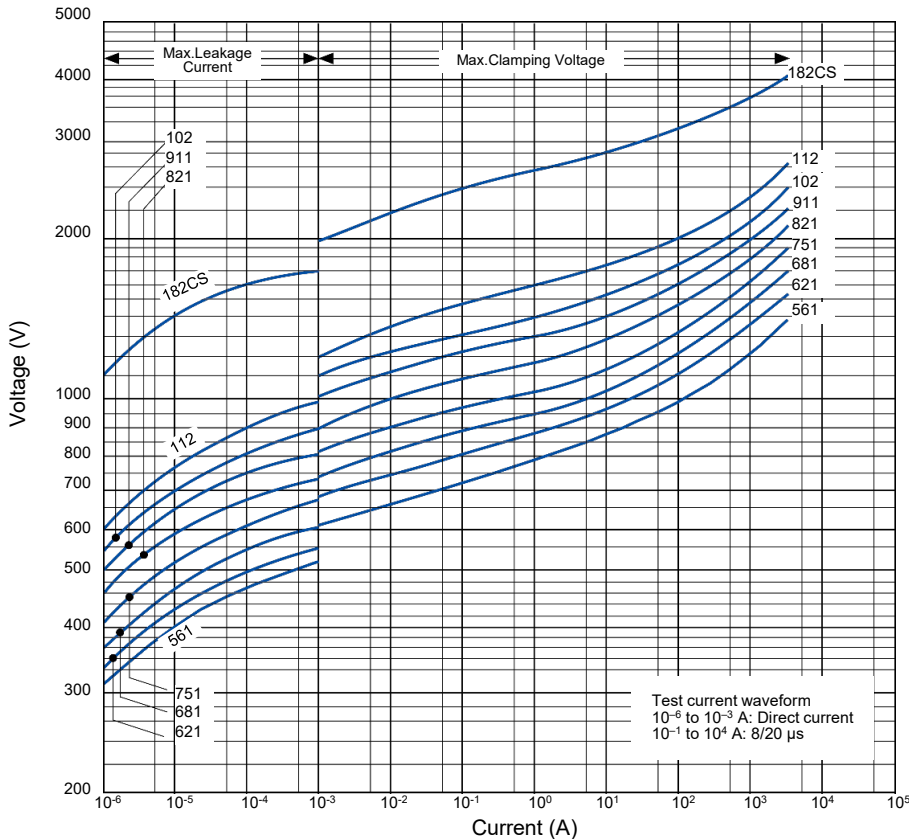
ERZV10D820 to ERZV10D511



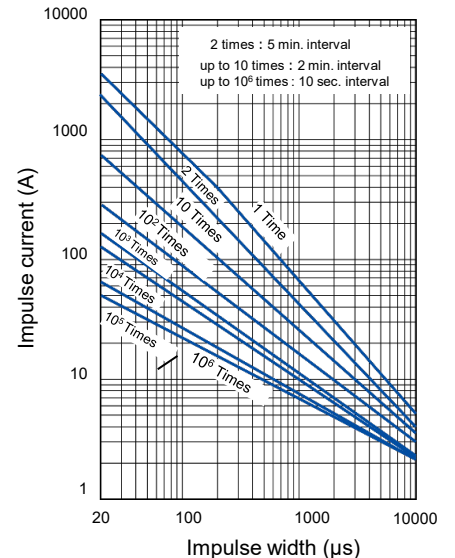
ERZV10D561 to ERZV10D112



ERZV10D561 to ERZV10D182CS



ERZV10D182CS



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.) **Ip | Rated power | Maximum energy | | Maximum peak current (8/20 μs) | | Capacitance (max.) at 1 kHz |
|------------|--------------------------|---------------------------|--------|---------------------------------|-------------|----------------|--------|--------------------------------|---------|-----------------------------|
| | | AC rms (V) | DC (V) | | | (10/1000 μs) | (2 ms) | 1 time | 2 times | |
| | (V) | (V) | (V) | (W) | (J) | (J) | (A) | (A) | (pF) | |
| 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

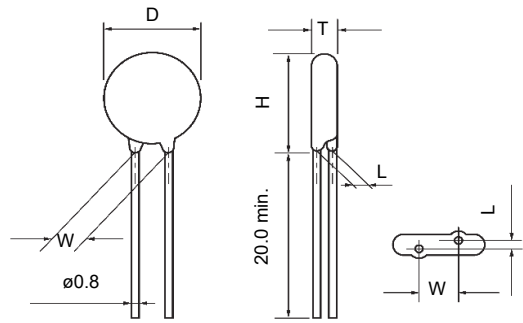
| Part No. | D max. | T max. | W±1.0 | H max. | L±1.0 |
|------------|--------|--------|-------|--------|-------|
| ERZV14D180 | 15.5 | 4.6 | 7.5 | 18.5 | 1.3 |
| ERZV14D220 | 15.5 | 4.7 | 7.5 | 18.5 | 1.4 |
| ERZV14D270 | 15.5 | 4.8 | 7.5 | 18.5 | 1.5 |
| ERZV14D330 | 15.5 | 5.0 | 7.5 | 18.5 | 1.7 |
| 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](#)

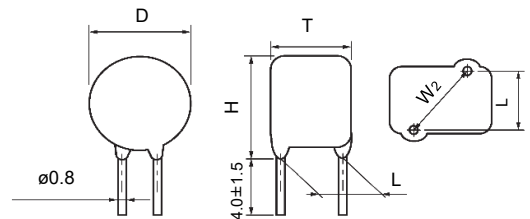
| | | | | | |
|------------|------|-----|-----|------|-----|
| ERZV14D201 | 15.5 | 4.8 | 7.5 | 18.5 | 1.9 |
| ERZV14D221 | 15.5 | 4.9 | 7.5 | 18.5 | 2.0 |
| ERZV14D241 | 15.5 | 5.0 | 7.5 | 18.5 | 2.1 |
| ERZV14D271 | 15.5 | 5.2 | 7.5 | 18.5 | 2.3 |
| ERZV14D331 | 15.5 | 5.5 | 7.5 | 18.5 | 2.6 |
| ERZV14D361 | 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) |
|--------------|------|-------|-------|------|-------------|

* : W₂



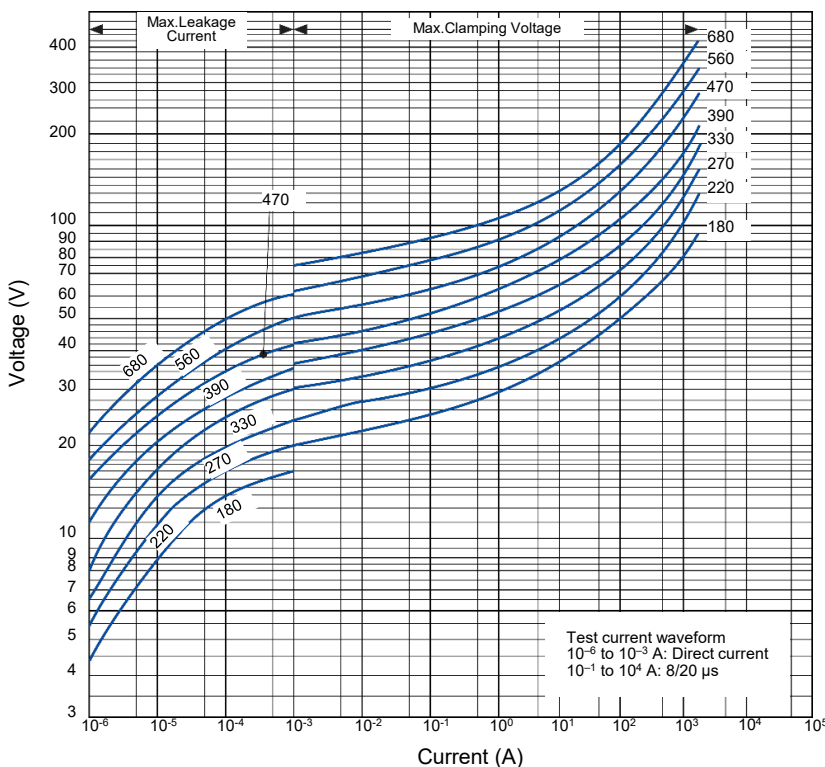
(ERZV14D182CS)



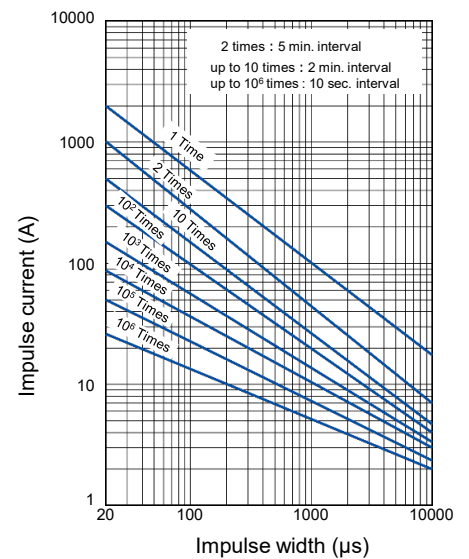
Typical characteristics

Voltage vs. Current

ERZV14D180 to ERZV14D680



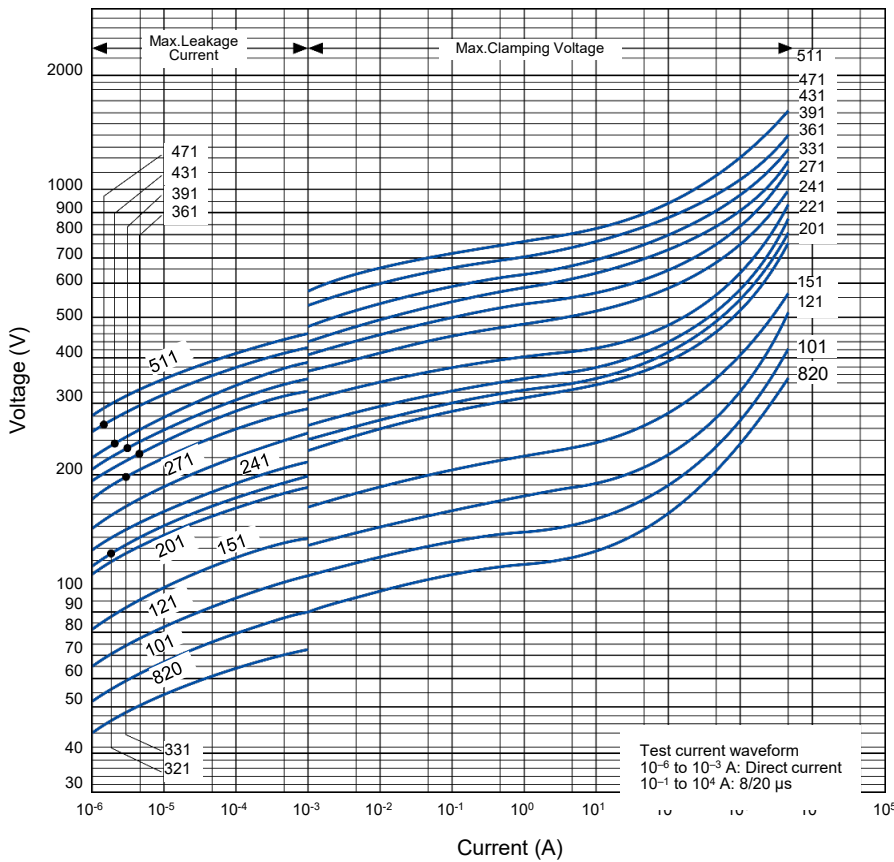
Impulse Derating (Relation between impulse width and impulse current multiple)
ERZV14D180 to ERZV14D680



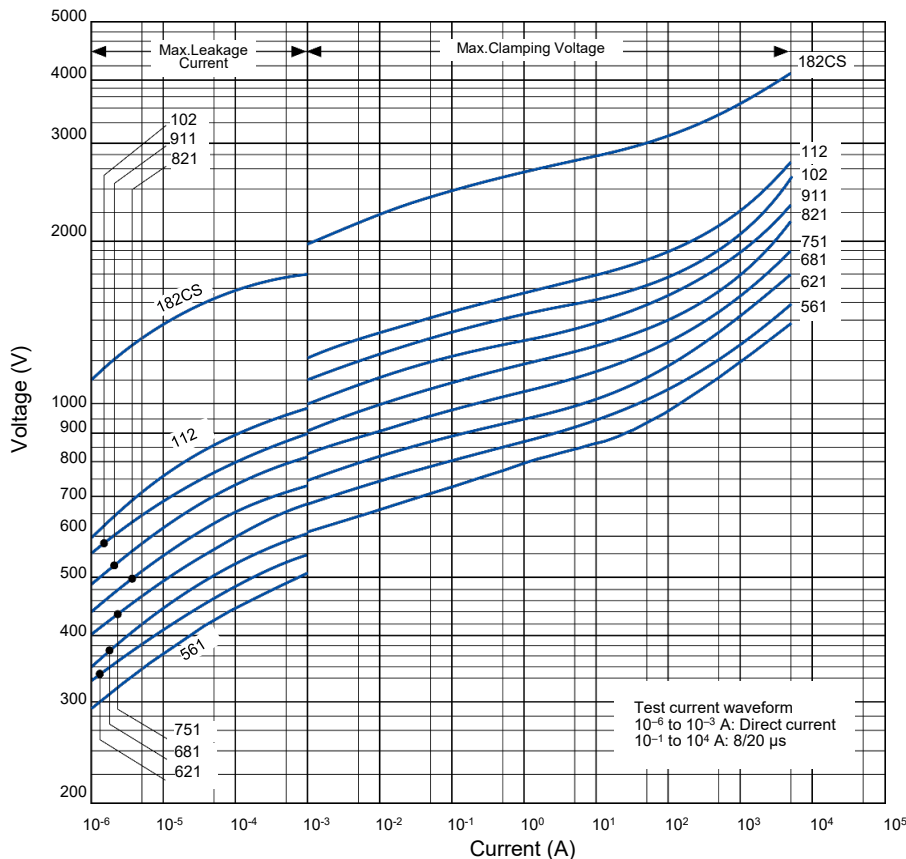
Typical characteristics

Voltage vs. Current

ERZV14D820 to ERZV14D511

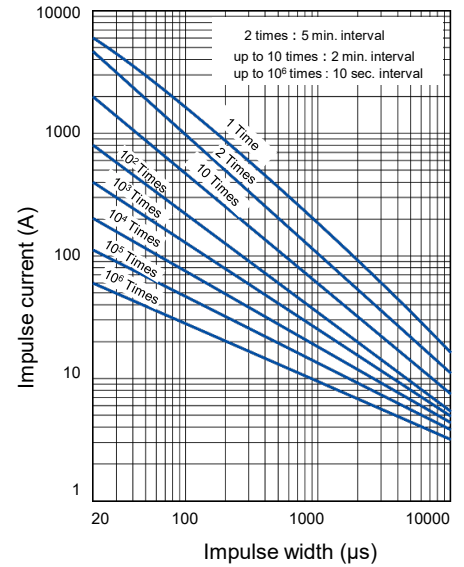


ERZV14D561 to ERZV14D182CS

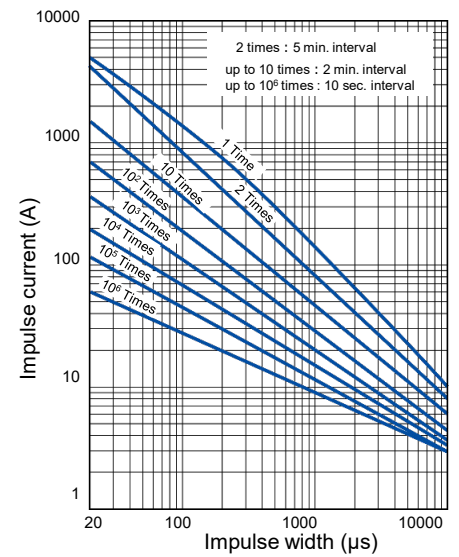


Impulse Derating (Relation between impulse width and impulse current multiple)

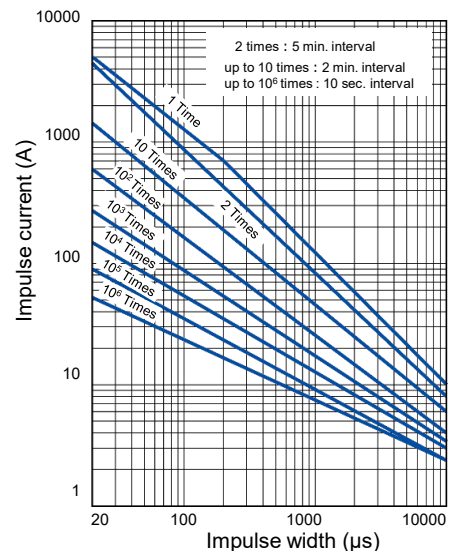
ERZV14D820 to ERZV14D511



ERZV14D561 to ERZV14D112



ERZV14D182CS



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.) **Ip | Rated power | Maximum energy | | Maximum peak current (8/20 μs) | | Capacitance (max.) at 1 kHz |
|------------|--------------------------|---------------------------|--------|---------------------------------|-------------|----------------|--------|--------------------------------|---------|-----------------------------|
| | | AC rms (V) | DC (V) | | | (10/1000 μs) | (2 ms) | 1 time | 2 times | |
| | (V) | (V) | (V) | (W) | (J) | (J) | (A) | (A) | (pF) | |
| 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)

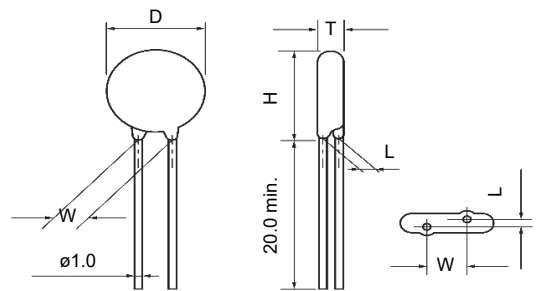
| Part No. | D max. | T max. | W±1.0 | H max. | L±1.0 |
|------------|--------|--------|-------|--------|-------|
| ERZV20D180 | 21.5 | 5.1 | 10.0 | 24.5 | 1.5 |
| ERZV20D220 | 21.5 | 5.2 | 10.0 | 24.5 | 1.6 |
| ERZV20D270 | 21.5 | 5.3 | 10.0 | 24.5 | 1.7 |
| ERZV20D330 | 21.5 | 5.5 | 10.0 | 24.5 | 1.9 |
| 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](#)

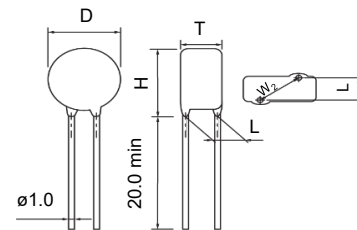
| | | | | | |
|------------|------|------|------|------|-----|
| ERZV20D201 | 21.5 | 5.2 | 10.0 | 24.5 | 2.1 |
| ERZV20D221 | 21.5 | 5.3 | 10.0 | 24.5 | 2.2 |
| ERZV20D241 | 21.5 | 5.4 | 10.0 | 24.5 | 2.3 |
| ERZV20D271 | 21.5 | 5.6 | 10.0 | 24.5 | 2.5 |
| ERZV20D331 | 21.5 | 5.9 | 10.0 | 24.5 | 2.8 |
| 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) |
|------------|------|------|-------|------|-------------|

*: W₂



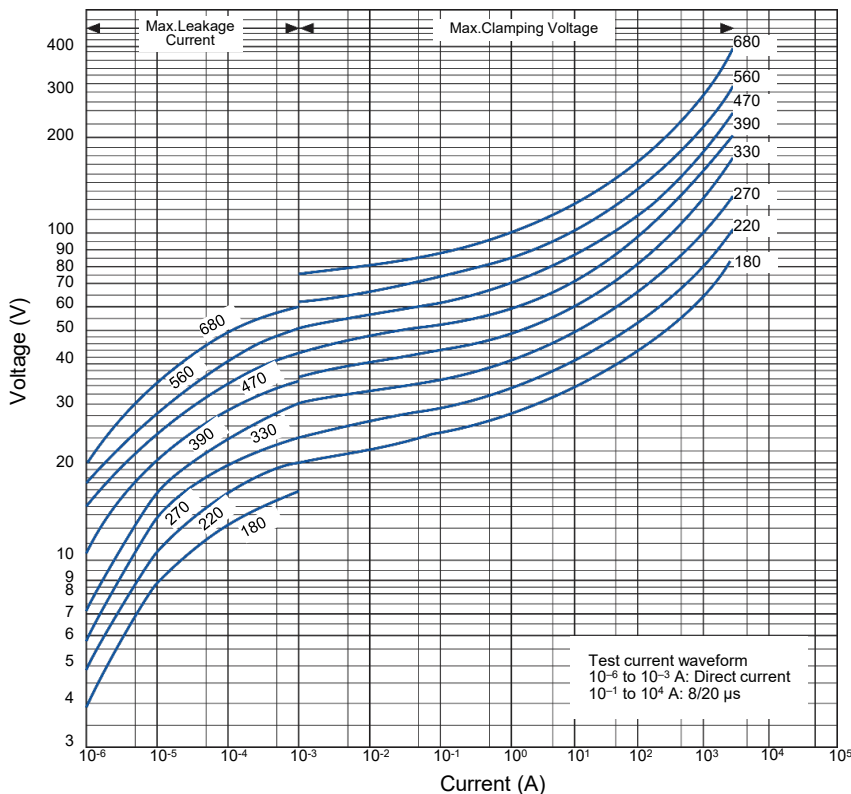
(ERZV20D182)



Typical characteristics

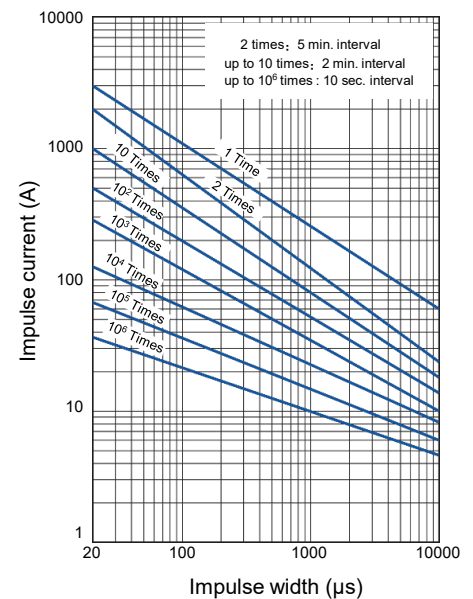
Voltage vs. Current+B47:AZ78+B47:AX74

ERZV20D180 to ERZV20D680



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

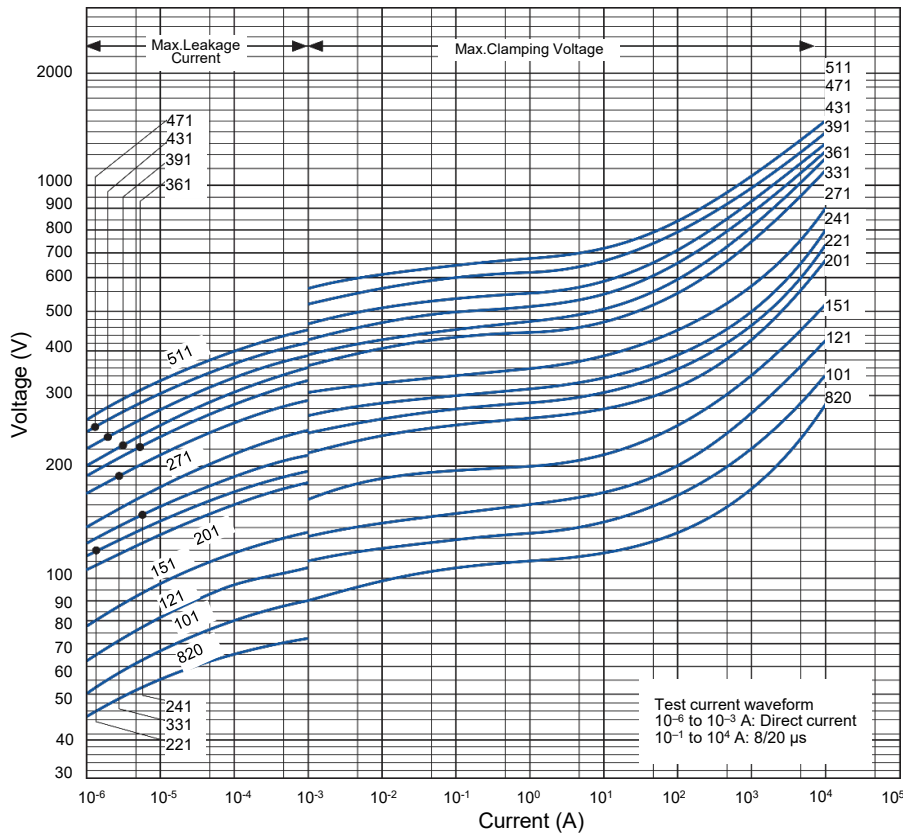
ERZV20D180 to ERZV20D680



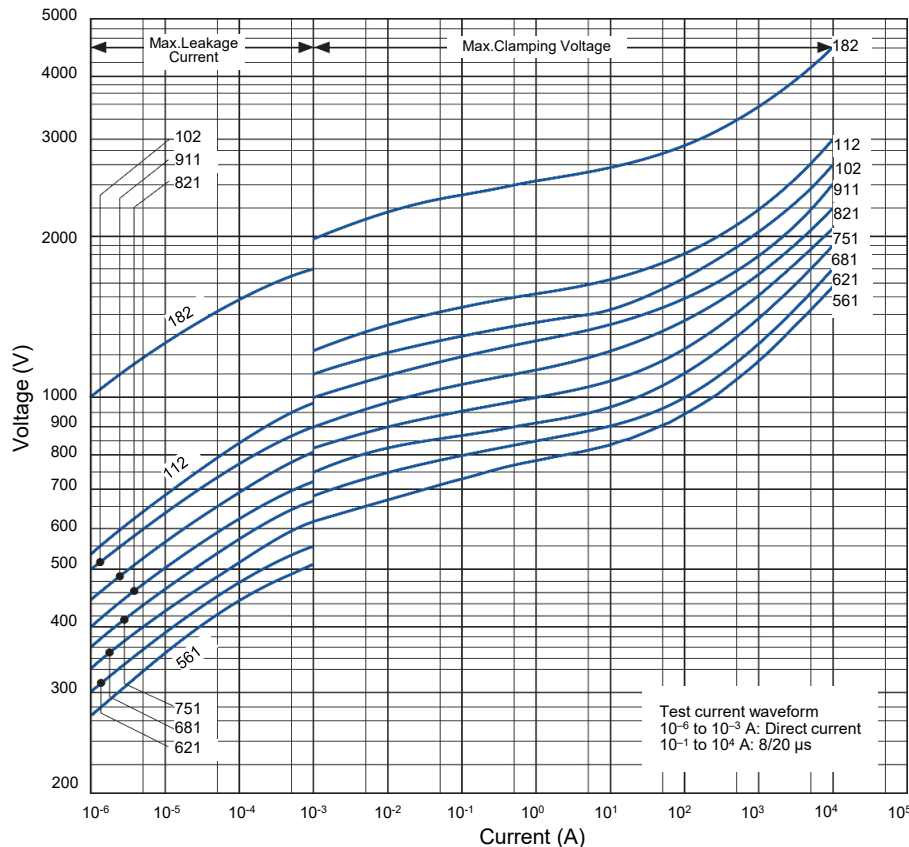
Typical characteristics

Voltage vs. Current

ERZV20D820 to ERZV20D511

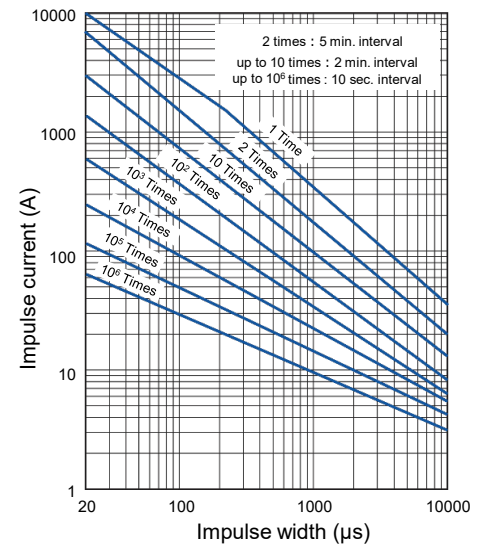


ERZV20D561 to ERZV20D182

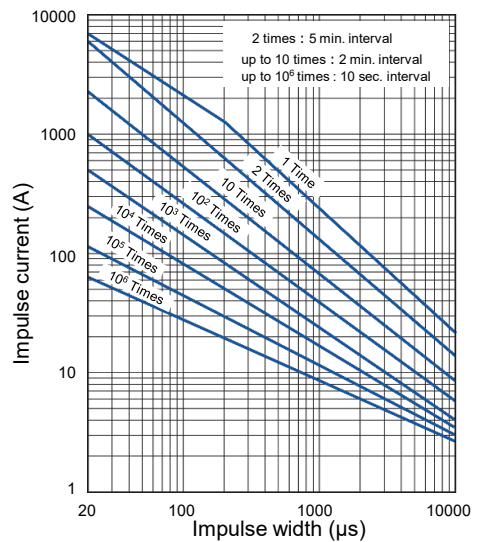


Impulse Derating (Relation between impulse width and impulse current multiple)

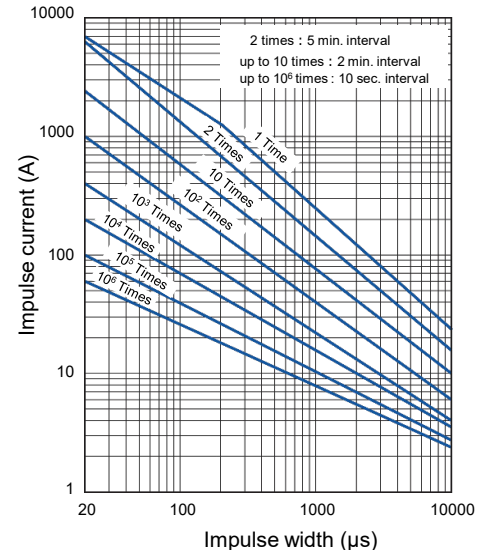
ERZV20D820 to ERZV20D511



ERZV20D561 to ERZV20D112



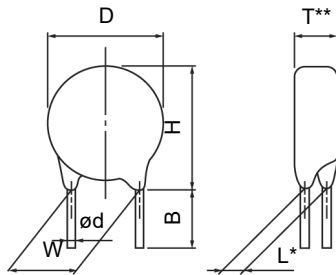
ERZV20D182



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.

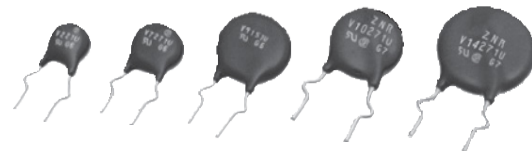
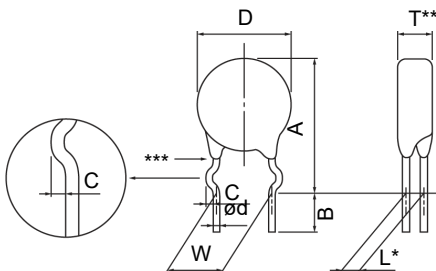
Unit : mm

| Series | 5 | 7 | 9 | 10 | | | 14 | | |
|----------------------------|--|--|--|--|--|--|--|--|--|
| Varistor voltage Symbol | 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 |
| 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 ^{+0.06} / _{-0.05} | 0.60 ^{+0.06} / _{-0.05} | 0.60 ^{+0.06} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} |
| 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 extenyions : No resin below the center of the hook.

Unit : mm

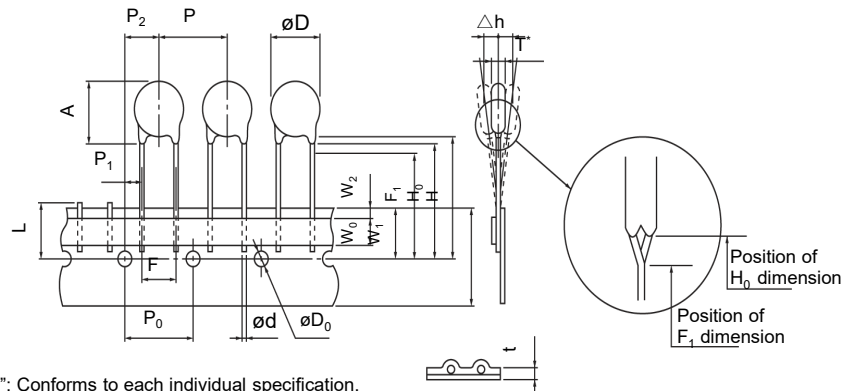
| Series | 5 | 7 | 9 | 10 | | | 14 | | |
|----------------------------|--|--|--|--|--|--|--|--|--|
| Varistor voltage Symbol | 180 to 471 | 180 to 511 | 180 to 511 | 180 to 511 | 561 to 751 | 821 to 112 | 180 to 511 | 561 to 751 | 821 to 112 |
| A | 13.0 max. | 14.5 max. | 17.5 max. | 17.5 max. | 19.0 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 ^{+0.06} / _{-0.05} | 0.60 ^{+0.06} / _{-0.05} | 0.60 ^{+0.06} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} | 0.80 ^{+0.08} / _{-0.05} |
| 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.

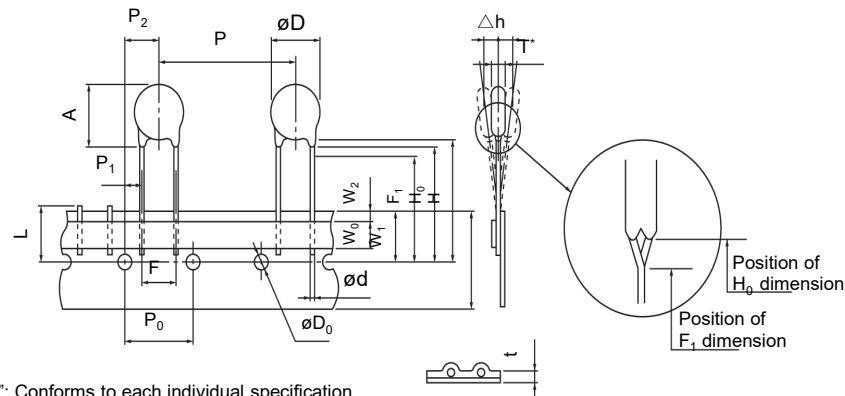
Dimensions in mm (not to scale)

Type I · II



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

Type III · IV



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

Unit : mm

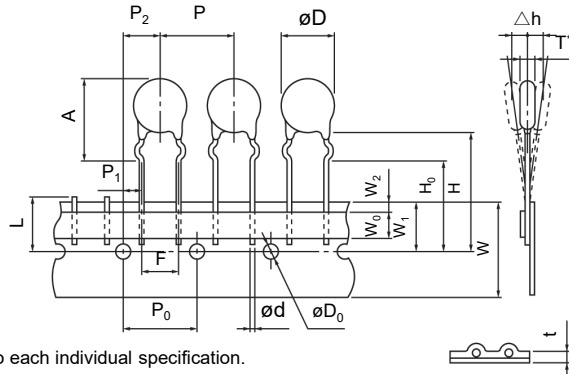
| Series | 5 | 7 | 9 | 10 | | | 14 | | |
|----------------------------|--|--|--|--|--|--|--|--|--|
| Varistor Voltage | 180 to 471 | 180 to 511 | 180 to 511 | 180 to 331 | 361 to 511 | 561 to 112 | 180 to 331 | 361 to 511 | 561 to 112 |
| 記号 Type | Type I | Type I | Type I | Type I | Type II | Type II | 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 ₀ | 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 ₁ | 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 ₂ | 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 ^{+0.06} _{-0.05} | 0.60 ^{+0.06} _{-0.05} | 0.60 ^{+0.06} _{-0.05} | 0.80 ^{+0.08} _{-0.05} | 0.80 ^{+0.08} _{-0.05} | 0.80 ^{+0.08} _{-0.05} | 0.80 ^{+0.08} _{-0.05} | 0.80 ^{+0.08} _{-0.05} | 0.80 ^{+0.08} _{-0.05} |
| 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 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} |
| W ₀ | 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 ₁ | 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 ₂ | 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 ₀ | 17.0±0.5 | 17.0±0.5 | 17.0±0.5 | 18.0 ^{+2.0} ₀ | --- | --- | 18.0 ^{+2.0} ₀ | --- | --- |
| F ₁ | --- | --- | --- | --- | 16.00 ^{+0.75} _{-0.5} | 16.00 ^{+0.75} _{-0.5} | --- | 16.00 ^{+0.75} _{-0.5} | 16.00 ^{+0.75} _{-0.5} |
| øD ₀ | 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□□□ |

Taping specifications for automated assembly (Crimped leads and taping)

※ Ratings and characteristics is refer to bulk standard type.

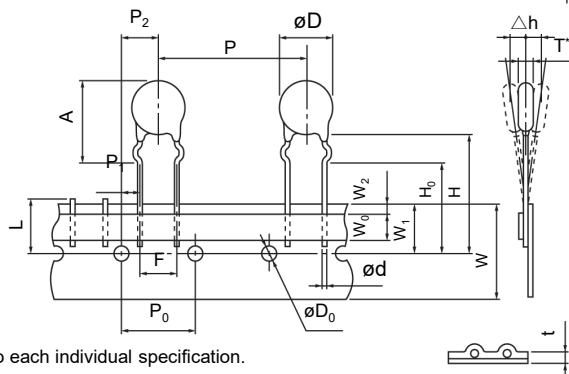
Dimensions in mm (not to scale)

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 | | |
|----------------------------|--|--|--|--|--|--|--|--|--|
| 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 |
| 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 ₀ | 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 ₁ | 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 ₂ | 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 ^{+0.06} _{-0.05} | 0.60 ^{+0.06} _{-0.05} | 0.60 ^{+0.06} _{-0.05} | 0.80 ^{+0.08} _{-0.05} | 0.80 ^{+0.08} _{-0.05} | 0.80 ^{+0.08} _{-0.05} | 0.80 ^{+0.08} _{-0.05} | 0.80 ^{+0.08} _{-0.05} | 0.80 ^{+0.08} _{-0.05} |
| 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 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} | 18.0 ^{+1.0} _{-0.5} |
| W ₀ | 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 ₁ | 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 ₂ | 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 ₀ | 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 ₀ | 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

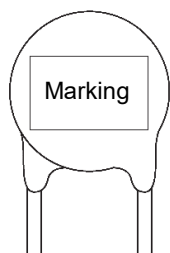
- Approvals products lists in "Reference Guide to Standard Products."
- UL and VDE : Registered in "Type name", it isn't registered in "Panasonic Part No."
- CQC : Registered in "Panasonic Part No."
- "Rated Voltages" are specified for UL recognized components in list shown below.

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. (Type name) | [□□□ Nominal varistor volage] |
| V*□□□U | | |
| ○ | Factory identification mark | None : Japan Q : Indonesia |
| ◆*1 | Year code | 2019 : 9, 2020 : K, 2021 : A 2022 : B, 2023 : C, 2024 : D |
| ◇ | Monthly code | Jan : 1 to Sep : 9, 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.

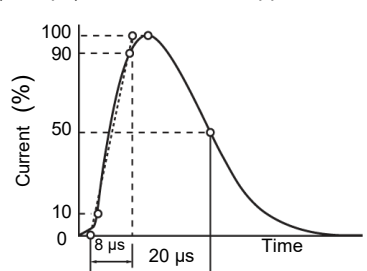
1 : A, 2 : B, 3 : C, 4 : D, 5 : E, 6 : F, 7 : G, 8 : H, 9 : J, 0 : K

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

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_{mA} DC applied is called VC or V_{CmA} . The measurement shall be made as fast as possible to avoid heat affection. | To meet the specified value. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Maximum allowable voltage | The maximum sinusoidal RMS voltage or maximum DC voltage that can be applied continuously. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Clamping voltage | The maximum voltage between two terminals with the specified standard impulse current (8/20 μ s) illustrated below applied.  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Rated power | The power that can be applied in the specified ambient temperature. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Maximum energy | The maximum energy within the varistor voltage change of ± 10 % when a single impulse current of 2 ms or 10/1000 μ s is applied. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Maximum peak current (Withstanding Surge Current) | 2 times | | The maximum current within the varistor voltage change of ± 10 % when a standard impulse current of 8/20 μ s 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 μ s is applied. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Temperature coefficient of varistor voltage | $\frac{V_{CmA} \text{ at } 85 \text{ }^\circ\text{C} - V_{CmA} \text{ at } 25 \text{ }^\circ\text{C}}{V_{CmA} \text{ at } 25 \text{ }^\circ\text{C}} \times \frac{1}{60} 100(\%/^\circ\text{C})$ | | 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 \pm 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 border="1" data-bbox="399 1321 1197 1433"> <thead> <tr> <th>Classification (Nominal varistor voltage)</th> <th>Test Voltage (AC)</th> </tr> </thead> <tbody> <tr> <td>$V_{0.1 mA}, V_{1 mA} \leq 330 \text{ V}$</td> <td>1000 Vrms</td> </tr> <tr> <td>$V_{0.1 mA}, V_{1 mA} > 330 \text{ V}$</td> <td>1500 Vrms</td> </tr> </tbody> </table> | | Classification (Nominal varistor voltage) | Test Voltage (AC) | $V_{0.1 mA}, V_{1 mA} \leq 330 \text{ V}$ | 1000 Vrms | $V_{0.1 mA}, V_{1 mA} > 330 \text{ V}$ | 1500 Vrms | No breakdown | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Classification (Nominal varistor voltage) | Test Voltage (AC) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $V_{0.1 mA}, V_{1 mA} \leq 330 \text{ V}$ | 1000 Vrms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $V_{0.1 mA}, V_{1 mA} > 330 \text{ V}$ | 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 border="1" data-bbox="430 1523 1197 2105"> <thead> <tr> <th rowspan="2">Part No.</th> <th rowspan="2">Current</th> <th>Item</th> <th>Impulse Life(I)</th> <th>Impulse Life(II)</th> </tr> <tr> <th>Times</th> <th>$\times 10^4$ Times</th> <th>$\times 10^5$ Times</th> </tr> </thead> <tbody> <tr> <td>ERZV05D180 to ERZV05D680</td> <td></td> <td></td> <td>8 A (8/20 μs)</td> <td>5 A (8/20 μs)</td> </tr> <tr> <td>ERZV07D180 to ERZV07D680</td> <td></td> <td></td> <td>25 A (8/20 μs)</td> <td>15 A (8/20 μs)</td> </tr> <tr> <td>ERZV09D180 to ERZV09D680</td> <td></td> <td></td> <td>50 A (8/20 μs)</td> <td>35 A (8/20 μs)</td> </tr> <tr> <td>ERZV10D180 to ERZV10D680</td> <td></td> <td></td> <td>50 A (8/20 μs)</td> <td>35 A (8/20 μs)</td> </tr> <tr> <td>ERZV14D180 to ERZV14D680</td> <td></td> <td></td> <td>90 A (8/20 μs)</td> <td>50 A (8/20 μs)</td> </tr> <tr> <td>ERZV20D180 to ERZV20D680</td> <td></td> <td></td> <td>130 A (8/20 μs)</td> <td>65 A (8/20 μs)</td> </tr> <tr> <td>ERZV05D820 to ERZV05D471</td> <td></td> <td></td> <td>40 A (8/20 μs)</td> <td>25 A (8/20 μs)</td> </tr> <tr> <td>ERZV07D820 to ERZV07D511</td> <td></td> <td></td> <td>100 A (8/20 μs)</td> <td>60 A (8/20 μs)</td> </tr> <tr> <td>ERZV09D820 to ERZV09D511</td> <td></td> <td></td> <td>150 A (8/20 μs)</td> <td>85 A (8/20 μs)</td> </tr> <tr> <td>ERZV10D820 to ERZV10D112</td> <td></td> <td></td> <td>150 A (8/20 μs)</td> <td>85 A (8/20 μs)</td> </tr> <tr> <td>ERZV10D182CS</td> <td></td> <td></td> <td>120 A (8/20 μs)</td> <td>75 A (8/20 μs)</td> </tr> <tr> <td>ERZV14D820 to ERZV14D112</td> <td></td> <td></td> <td>200 A (8/20 μs)</td> <td>110 A (8/20 μs)</td> </tr> <tr> <td>ERZV14D182CS</td> <td></td> <td></td> <td>150 A (8/20 μs)</td> <td>90 A (8/20 μs)</td> </tr> <tr> <td>ERZV20D820 to ERZV20D112</td> <td></td> <td></td> <td>250 A (8/20 μs)</td> <td>120 A (8/20 μs)</td> </tr> <tr> <td>ERZV20D182</td> <td></td> <td></td> <td>200 A (8/20 μs)</td> <td>100 A (8/20 μs)</td> </tr> </tbody> </table> | Part No. | Current | Item | Impulse Life(I) | Impulse Life(II) | Times | $\times 10^4$ Times | $\times 10^5$ Times | ERZV05D180 to ERZV05D680 | | | 8 A (8/20 μ s) | 5 A (8/20 μ s) | ERZV07D180 to ERZV07D680 | | | 25 A (8/20 μ s) | 15 A (8/20 μ s) | ERZV09D180 to ERZV09D680 | | | 50 A (8/20 μ s) | 35 A (8/20 μ s) | ERZV10D180 to ERZV10D680 | | | 50 A (8/20 μ s) | 35 A (8/20 μ s) | ERZV14D180 to ERZV14D680 | | | 90 A (8/20 μ s) | 50 A (8/20 μ s) | ERZV20D180 to ERZV20D680 | | | 130 A (8/20 μ s) | 65 A (8/20 μ s) | ERZV05D820 to ERZV05D471 | | | 40 A (8/20 μ s) | 25 A (8/20 μ s) | ERZV07D820 to ERZV07D511 | | | 100 A (8/20 μ s) | 60 A (8/20 μ s) | ERZV09D820 to ERZV09D511 | | | 150 A (8/20 μ s) | 85 A (8/20 μ s) | ERZV10D820 to ERZV10D112 | | | 150 A (8/20 μ s) | 85 A (8/20 μ s) | ERZV10D182CS | | | 120 A (8/20 μ s) | 75 A (8/20 μ s) | ERZV14D820 to ERZV14D112 | | | 200 A (8/20 μ s) | 110 A (8/20 μ s) | ERZV14D182CS | | | 150 A (8/20 μ s) | 90 A (8/20 μ s) | ERZV20D820 to ERZV20D112 | | | 250 A (8/20 μ s) | 120 A (8/20 μ s) | ERZV20D182 | | | 200 A (8/20 μ s) | 100 A (8/20 μ s) | $\Delta V_{CmA}/V_{CmA} \leq \pm 10 \%$ |
| Part No. | Current | | | Item | Impulse Life(I) | Impulse Life(II) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Times | $\times 10^4$ Times | $\times 10^5$ Times | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV05D180 to ERZV05D680 | | | 8 A (8/20 μ s) | 5 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV07D180 to ERZV07D680 | | | 25 A (8/20 μ s) | 15 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV09D180 to ERZV09D680 | | | 50 A (8/20 μ s) | 35 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV10D180 to ERZV10D680 | | | 50 A (8/20 μ s) | 35 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV14D180 to ERZV14D680 | | | 90 A (8/20 μ s) | 50 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV20D180 to ERZV20D680 | | | 130 A (8/20 μ s) | 65 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV05D820 to ERZV05D471 | | | 40 A (8/20 μ s) | 25 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV07D820 to ERZV07D511 | | | 100 A (8/20 μ s) | 60 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV09D820 to ERZV09D511 | | | 150 A (8/20 μ s) | 85 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV10D820 to ERZV10D112 | | | 150 A (8/20 μ s) | 85 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV10D182CS | | | 120 A (8/20 μ s) | 75 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV14D820 to ERZV14D112 | | | 200 A (8/20 μ s) | 110 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV14D182CS | | | 150 A (8/20 μ s) | 90 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV20D820 to ERZV20D112 | | | 250 A (8/20 μ s) | 120 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ERZV20D182 | | | 200 A (8/20 μ s) | 100 A (8/20 μ s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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. | | No remarkable mechanical damage | | | | | | | | | | | | | | | |
| | | <u>Terminal diameter</u> | <u>Force</u> | | | | | | | | | | | | | | | | |
| | | 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. The terminal shall gradually be bent by 90 ° in one direction, then 90 ° in the opposite direction, and again back to the original position. The damage of the terminal shall be visually examined. | | | | | | | | | | | | | | | | | |
| | <u>Terminal diameter</u> | <u>Force</u> | | | | | | | | | | | | | | | | | |
| | 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 to 2 hours. The change of V _{CmA} 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 to 2 hours. Thereafter, the change of V _{CmA} 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 to 2 hours. Thereafter, the change of V _{CmA} 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 to 2 hours. The change of V _{CmA} and mechanical damage shall be examined. | | $\Delta V_{CmA}/V_{CmA} \leq \pm 5 \%$ No remarkable mechanical damage | | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>15±3</td> </tr> <tr> <td>3</td> <td>125±2</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>15±3</td> </tr> </tbody> </table> | Step | | Temperature (°C) | Period (minutes) | 1 | -40±3 | 30±3 | 2 | Room temperature | 15±3 | 3 | 125±2 | 30±3 | 4 | Room temperature | 15±3 | |
| | 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 to 2 hours. Thereafter, the change of V _{CmA} shall be measured. | | $\Delta V_{CmA}/V_{CmA} \leq \pm 10 \%$ | | | | | | | | | | | | | | | | |
| Damp heat load/Humidity load | The specimen shall be subjected to 40±2 °C, 90 to 95 % RH and the Maximum Allowable Voltage for 1000 hours and then stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of V _{CmA} shall be measured. | | | | | | | | | | | | | | | | | | |
| 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 to 2 hours. Thereafter, the change of V _{CmA} 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" Transient/ surge absorbers | D type V series | Straight leads <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 |
| | | | 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 V series | Straight leads 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 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 | |

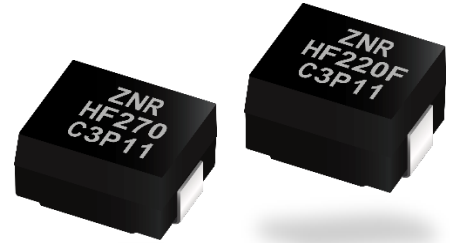
Part No., quantity and country of origin are designated on outer packages in English.

※ Please contact local sales office about packing specifications.

Varistors (ZNR Surge Absorber)

SMD type

HF series



Features

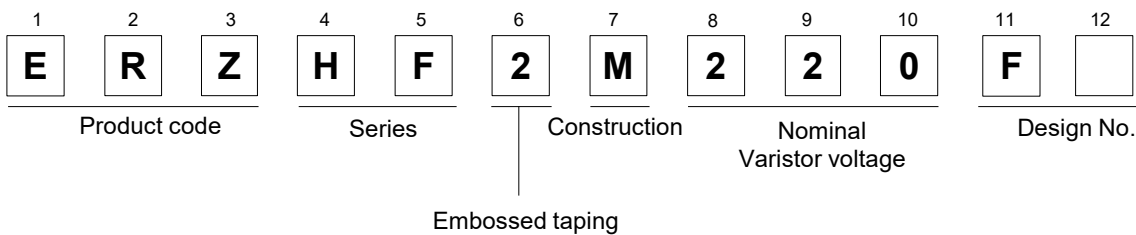
- Meet for load dump surge test (JASO D 001-94) [$V_p=70\text{ V}$, $\tau=200\text{ ms}$, $R_i=0.8\ \Omega$]
- Meet for load dump surge test ISO7637-2 and ISO16750-2
- Suitable for requirements of automotive
- Compact size SMD
- Meet flow/reflow/iron soldering
- Strong against "Soldering heat shock" due to molded construction
- RoHS compliant
- Automotive grade (this product can be tested under the conditions according to AEC-Q200 and the test results can be submitted.)

Recommended applications

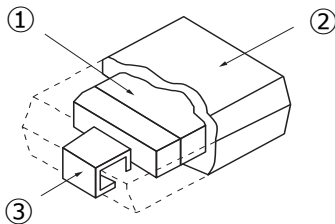
- Protection of body & accessory ECU about DC12 V automotive against load dump surge

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

Explanation of part numbers



Construction



| | |
|-----------------------|--|
| ① Multilayer varistor | ZnO, others |
| ② Mold resin | Epoxy resin |
| ③ Lead terminal | ERZHF2M220F : Sn plated Cu alloy |
| | ERZHF2M220D / ERZHF2M270 : Sn plated Ni-Fe alloy |

Dimensions in mm (not to scale)

| Part No. | Dimensions | | | | |
|-------------|------------|---------|---------|---------|---------|
| | W | L | H | S | E |
| ERZHF2M220F | 6.4±0.4 | 8.0±0.5 | 5.5±0.5 | 1.3±0.3 | 2.5±0.2 |
| ERZHF2M220D | | | 4.5±0.5 | | |
| ERZHF2M270 | | | 4.5±0.5 | | |

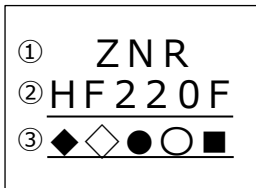
Unit : mm

Ratings and characteristics

- Operating temperature range : ERZHF2M220F -55 to 150 °C, ERZHF2M220D/ERZHF2M270 -40 to 125 °C
- Storage temperature range : ERZHF2M220F -55 to 150 °C, ERZHF2M220D/ERZHF2M270 -40 to 125 °C

| Part No. | Varistor voltage at 1 mA | Maximum allowable voltage | Short time over-voltage | Clamping voltage | Load dump surge | Load dump surge energy ISO7637-2 TEST A |
|-------------|--------------------------|---------------------------|-------------------------|------------------|---|---|
| | (V) | DC (V) | DC (V) | (V)at Ip 5(A) | | (J) |
| ERZHF2M220F | 20 to 23.2 | 16 | 24 5 min. | 35 max. | JASO Category:A, A-1 70 V, 1 time | 50 max. 10 times |
| ERZHF2M220D | | | | 43 max. | | — |
| ERZHF2M270 | 27±20 % | | | | | |

Marking contents



| | | | |
|-----------------------|---|--|--|
| ① Product name | ZNR Surge Absorbers | | |
| ② Abbreviation of P/N | HF220F (ERZHF2M220F), HF220 (ERZHF2M220D), HF270 (ERZHF2M270) | | |
| ③ Date code | ◆ Yearly | 2010:0, 2021:1, ..., 2019:9, 2020:A, 2021:B, ..., 2027:H, 2028:J, ..., 2032:N, 2033:P, 2034:R, ..., 2039:W (30 year cycle) | |
| | ◇ Monthly | Jan.: 1, Feb.: 2, ..., Aug.: 8, Sep.: 9, Oct.: O, Nov.: N, Dec.: D | |
| | ● Daily | 1st to 9th: 1 to 9, 10th: A, 11th: B, ..., 17th: H, 18th: J, ..., 22nd: N, 23rd: P, 24th: R, ..., 30th: X, 31st: Y | |
| | ○ Suffix-1 | A single digit of alphanumeric | |
| ■ Suffix-2 | A single digit of alphanumeric | | |

Minimum quantity

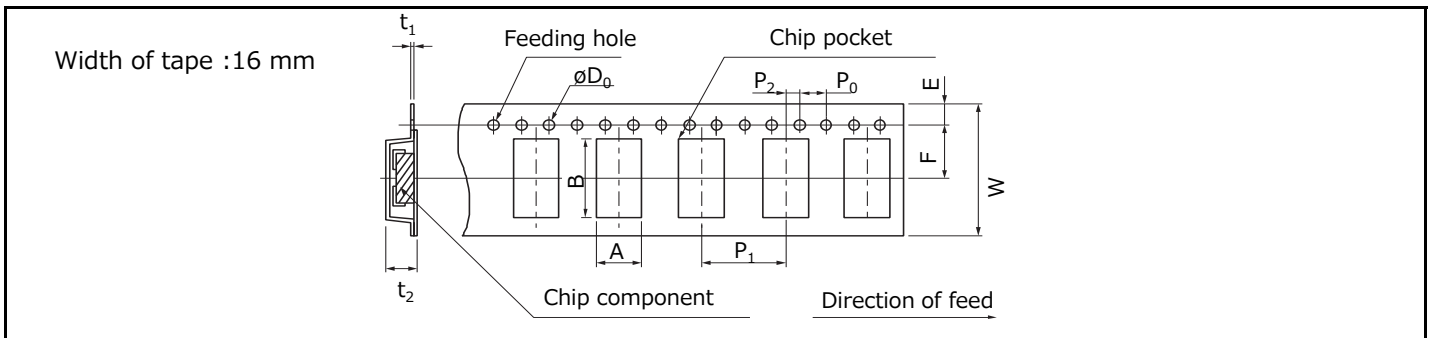
- Packing quantity

| Product | Series / Type | | Part number | Minimum quantity / Packing unit | Packing quantity in carton | Carton (about) L×W×H (mm) |
|---------------------------------|---------------|---------------|-------------|---------------------------------|----------------------------|---------------------------|
| "ZNR" Transient/surge absorbers | SMD type | Embossed (HF) | ERZHF2M220F | 800 | 3200 | 340×345×105 |
| | | | ERZHF2M220D | | | |
| | | | ERZHF2M270 | 1000 | 4000 | |

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

※ Please contact local sales office about packing specifications.

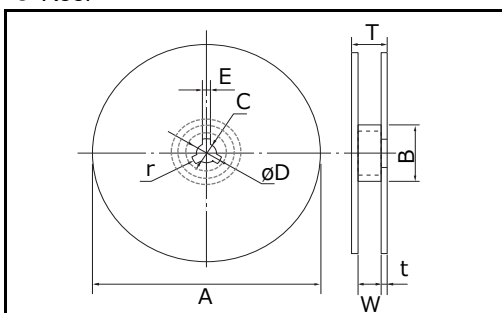
- Embossed taping



Unit : mm

| Part No. | A | B | W | F | E | P ₁ | P ₂ | P ₀ | øD ₀ | t ₁ | t ₂ |
|-------------|----------|-----------|----------|---------|-----------|----------------|----------------|----------------|-----------------|----------------|----------------|
| ERZHF2M220F | 7.5 max. | 11.9 max. | 16.0±0.3 | 7.5±0.1 | 1.75±0.10 | 12.0±0.1 | 2.0±0.1 | 4.0±0.1 | 1.5+0.1/0 | 0.8 max. | 9.0 max. |
| ERZHF2M220D | | | | | | | | | | | 8.0 max. |
| ERZHF2M270 | | | | | | | | | | | 8.0 max. |

- Reel



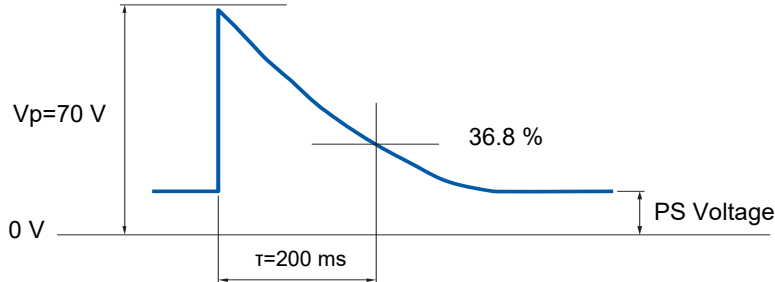
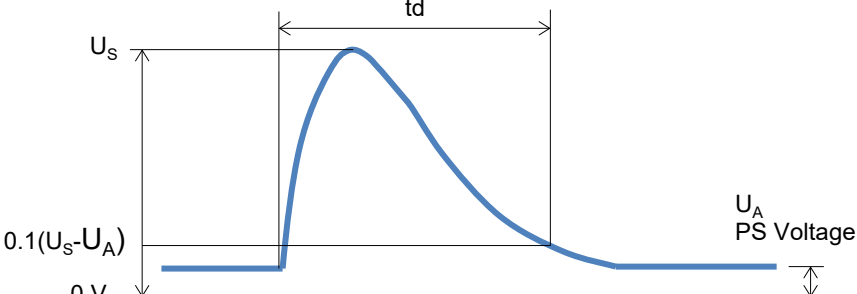
Unit : mm

| Part No. | A | B | C | øD | E |
|----------|------------|-----------|----------|----------|---------|
| ERZHF2M | 382 max. | 50 min. | 13.0±0.5 | 21.0±0.8 | 2.0±0.5 |
| | W | T | t | r | |
| | 16.4+2.0/0 | 22.4 max. | 2.5±0.5 | 1.0 | |

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

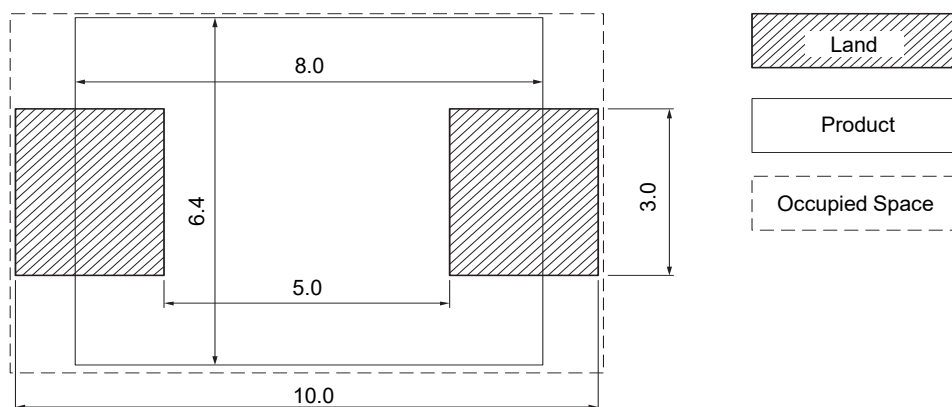
Should a safety concern arise regarding this product, please be sure to contact us immediately.

Performance characteristics

| Characteristics | Test methods | Specifications |
|---------------------------|---|-----------------------------|
| Standard test condition | Environmental conditions under which every measuring is done without doubt on the measuring results. Unless specially, specified, temperature, relative humidity are 5 ° C to 35 °C, 45 to 85% RH respectively. | - |
| Maximum allowable voltage | The maximum DC voltage that can be applied continuously in the specified environmental temperature range. | To meet the specified value |
| Short time over-voltage | The maximum DC Voltage that can be applied specified period without breakdown. | |
| Varistor voltage | Voltage between both terminals of ZNR measured when 1 mA of DC current is applied under standard conditions. It is called V1. Measuring the varistor voltage should be made promptly to avoid heat affection. | |
| Clamping voltage | The maximum voltage between two terminals with the specified impulse current (8/20 μs). | |
| Load dump surge | The test waveform of transient voltage which specified JASO Category A A-1 70 V without breakdown.  | No breakdown |
| Load dump surge energy | Surge energy which can be applied at 10 times on the condition of ISO16750-2 TEST A.  | No breakdown |

※ Please Check Specification of the products about Mechanical & Environmental etc. requirements.

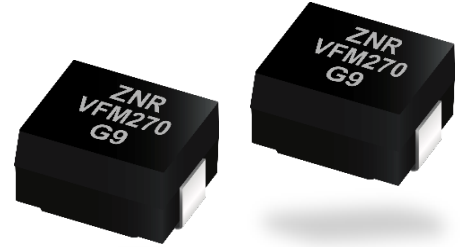
Recommendation land size



Unit : mm

Varistors (ZNR Surge Absorber)

SMD type
VF series



Features

- Large withstanding surge current capability in compact sizes
- Designed for flow/reflow solderings
- Low clamping voltage
- RoHS compliant

Recommended applications

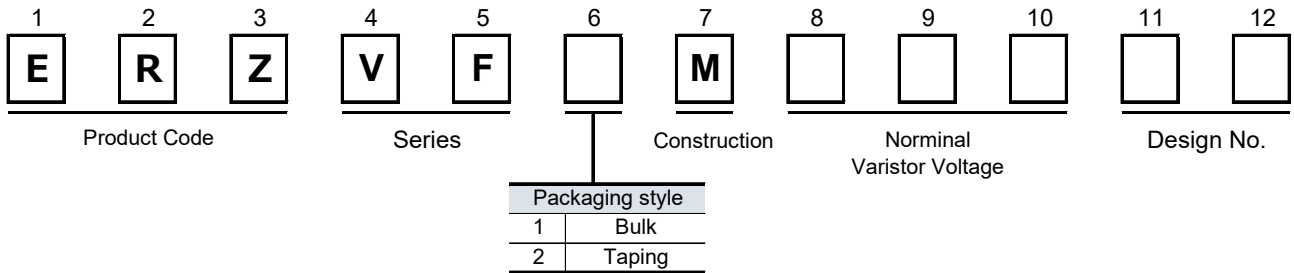
- Protection of communication modules (Modem, xDSL, Terminal Adopler)
- Protection of consumer, industrial equipment
- Absorption of switching surge from relays

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

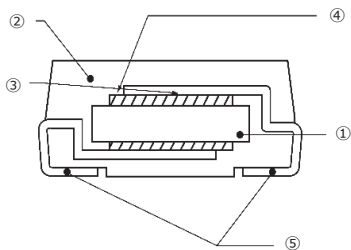
Applicable Standards

- CQC (GB/T10193, GB/T10194)
Registered in "Panasonic Part No."

Explanation of part numbers

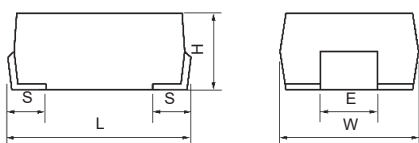


Construction



| | |
|-----------------------|-----------------------|
| ① ZNR element | ZnO etc. |
| ② Resin mold | Epoxy resin |
| ③ Conductive adhesive | Silver |
| ④ Electrode | Silver |
| ⑤ Lead terminals | Sn plated Ni-Fe Alloy |

Dimensions in mm (not to scale)



Unit : mm

| Part No. | W | L | H | S | E |
|------------|---------|---------|---------|---------|---------|
| ERZVF□M□□□ | 6.0±0.4 | 8.0±0.5 | 3.2±0.3 | 1.3±0.3 | 2.5±0.2 |

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 at I _p (max.) | | Rated power (W) | Maximum energy (2 ms) (J) | Maximum peak current (8/20μs, 2 times) (A) |
|------------|--------------------------|---------------------------|--------|---|-----------------------|-----------------|---------------------------|--|
| | (V) | ACrms (V) | DC (V) | (V) | Measuring current (A) | | | |
| ERZVF□M220 | 22(20 to 24) | 14 | 18 | 43 | 2.5 | 0.02 | 0.9 | 125 |
| ERZVF□M270 | 27(24 to 30) | 17 | 22 | 53 | 2.5 | 0.02 | 1.0 | 125 |
| ERZVF□M330 | 33(30 to 36) | 20 | 26 | 65 | 2.5 | 0.02 | 1.2 | 125 |
| ERZVF□M390 | 39(35 to 43) | 25 | 31 | 77 | 2.5 | 0.02 | 1.5 | 125 |
| ERZVF□M470 | 47(42 to 52) | 30 | 38 | 93 | 2.5 | 0.02 | 1.8 | 125 |
| ERZVF□M560 | 56(50 to 62) | 35 | 45 | 110 | 2.5 | 0.02 | 2.2 | 125 |
| ERZVF□M680 | 68(61 to 75) | 40 | 56 | 135 | 2.5 | 0.02 | 2.5 | 125 |
| ERZVF□M820 | 82(74 to 90) | 50 | 65 | 135 | 10 | 0.25 | 3.5 | 600 |
| ERZVF□M101 | 100(90 to 110) | 60 | 85 | 165 | 10 | 0.25 | 4.0 | 600 |
| ERZVF□M121 | 120(108 to 132) | 75 | 100 | 200 | 10 | 0.25 | 5.0 | 600 |
| ERZVF□M151 | 150(135 to 165) | 95 | 125 | 250 | 10 | 0.25 | 6.0 | 600 |
| ERZVF□M201 | 200(185 to 225) | 130 | 170 | 340 | 10 | 0.25 | 8.0 | 600 |
| ERZVF□M221 | 220(198 to 242) | 140 | 180 | 360 | 10 | 0.25 | 9.0 | 600 |
| ERZVF□M241 | 240(216 to 264) | 150 | 200 | 395 | 10 | 0.25 | 10.0 | 600 |
| ERZVF□M271 | 270(247 to 303) | 175 | 225 | 455 | 10 | 0.25 | 12.0 | 600 |
| ERZVF□M331 | 330(297 to 363) | 210 | 270 | 545 | 10 | 0.1 | 8.0 | 300 |
| ERZVF□M361 | 360(324 to 396) | 230 | 300 | 595 | 10 | 0.1 | 9.0 | 300 |
| ERZVF□M391 | 390(351 to 429) | 250 | 320 | 650 | 10 | 0.1 | 9.0 | 300 |
| ERZVF□M431 | 430(387 to 473) | 275 | 350 | 710 | 10 | 0.1 | 10.0 | 300 |
| ERZVF□M471 | 470(423 to 517) | 300 | 385 | 775 | 10 | 0.1 | 10.0 | 300 |

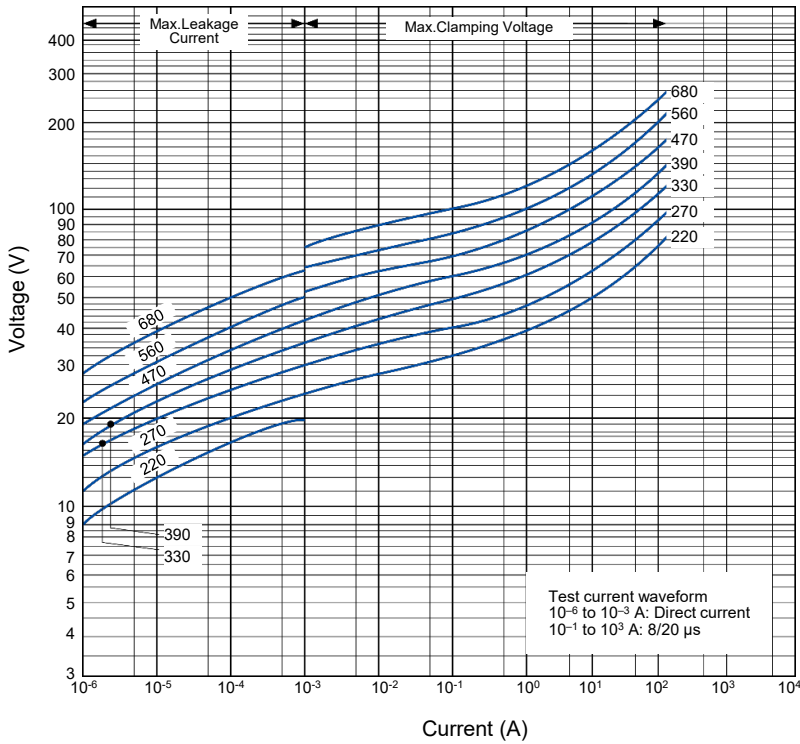


Packaging Style Code: "1" for bulk, "2" for embossed taping

Typical characteristics

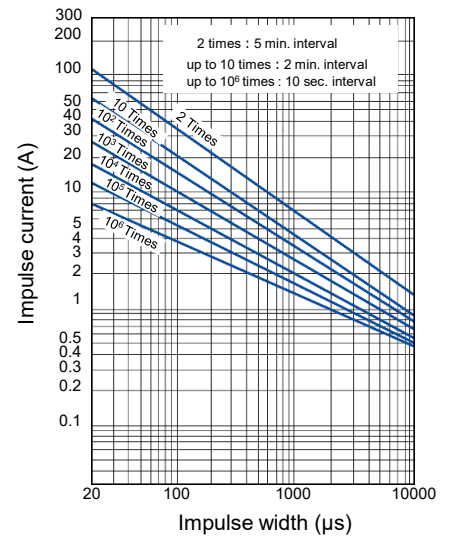
Voltage vs. Current

ERZVF1(2)M220 to ERZVF1(2)M680

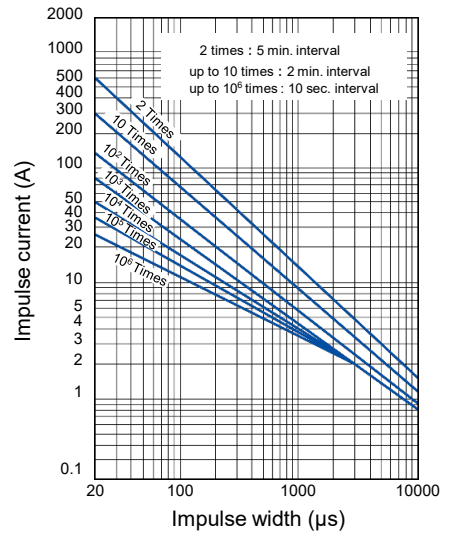


Impulse Derating (Relation between impulse width and impulse current multiple)

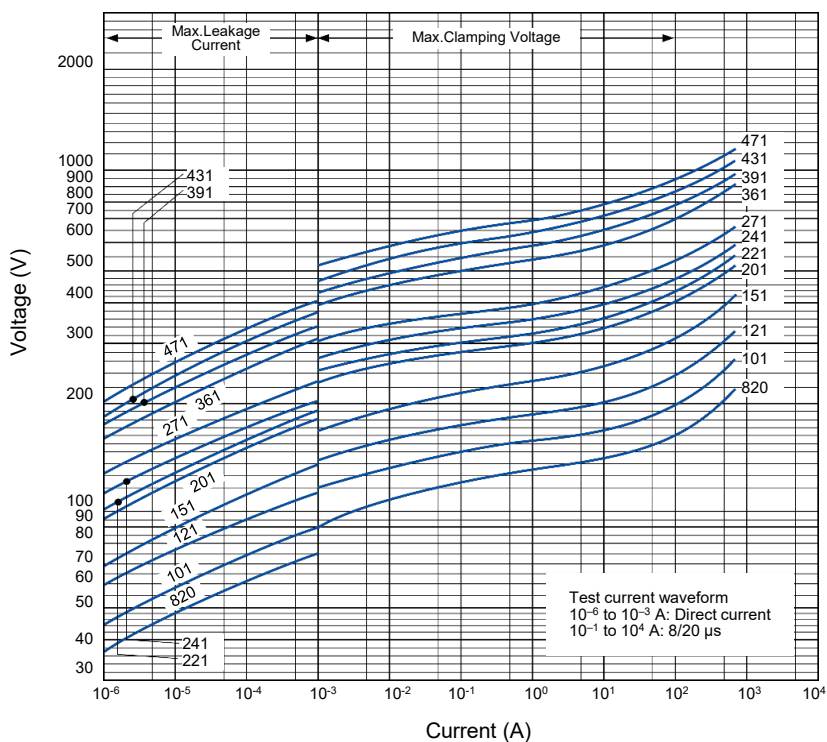
ERZVF1(2)M220 to ERZVF1(2)M680



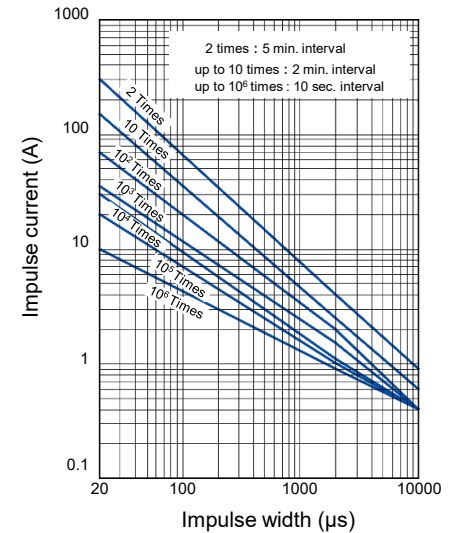
ERZVF1(2)M820 to ERZVF1(2)M271



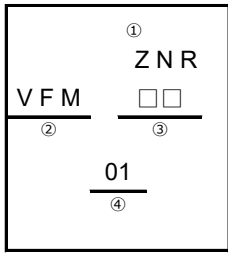
ERZVF1(2)M820 to ERZVF1(2)M471



ERZVF1(2)M331 to ERZVF1(2)M471



Marking contents



| | |
|----------------------------|---|
| ① Product Name | ZNR Surge Absorbers |
| ② Series | VF□M VF Series |
| ③ Abbreviation of Part No. | The first two digits are significant figures and the third one denotes the number of zeros following. |
| ④ Date Code | Left* (Year) 2019:9, 2020:K, 2021:A, 2022:B, 2023:C, 2024:D Right(Month) Jan. to Sep.:1 to 9, Oct.:O, Nov.:N, Dec.:D |

* 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.

Minimum quantity

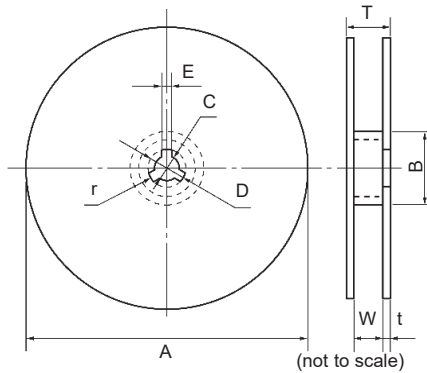
● Packing Quantity

| Product | Series / Type | Part number | Minimum quantity / Packing unit | Packing quantity in carton | Carton (about) L×W×H (mm) | |
|---------------------------------|---------------|-------------|---------------------------------|----------------------------|---------------------------|------------|
| "ZNR" Transient/surge absorbers | SMD type | Bulk (VF) | ERZVF1 | 200 | 2000 | 210×340×80 |
| | Embossed (VF) | ERZVF2 | 2000 | 6000 | 340×345×75 | |

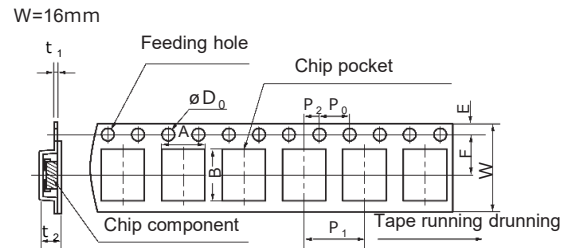
※ Part No., quantity and country of origin are designated on outer packages in English.

※ Please contact local sales office about packing specifications.

● Reel



● Embossed Taping

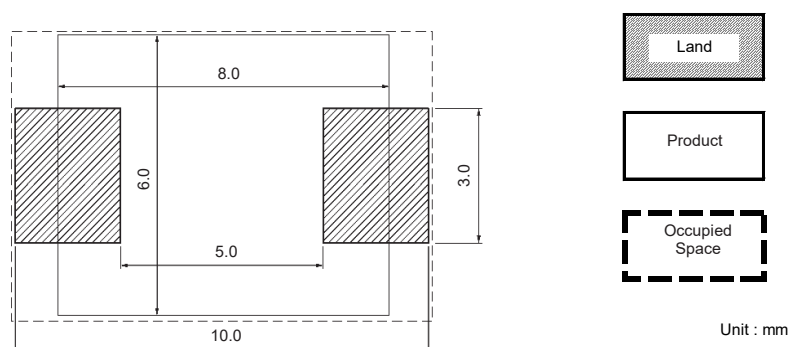


| Part No. | A | B | C |
|-------------|-----------|---------|-------------------------------------|
| ERZVF□M□□□□ | 382 max. | 50 min. | 13.0±0.5 |
| Part No. | D | E | W |
| ERZVF□M□□□□ | 21.0±0.8 | 2.0±0.5 | 16.4 ^{+2.0} _{..0} |
| Part No. | T | t | r |
| ERZVF□M□□□□ | 22.4 max. | 2.5±0.5 | 1.0 |

| Part No. | A | B | W |
|-------------|----------------|----------------|------------------------------------|
| ERZVF□M□□□□ | 6.8±0.2 | 11.9 max. | 16.0±0.3 |
| Part No. | F | E | P ₁ |
| ERZVF□M□□□□ | 7.5±0.10 | 1.75±0.10 | 8.0±0.1 |
| Part No. | P ₂ | P ₀ | øD ₀ |
| ERZVF□M□□□□ | 2.0±0.1 | 4.0±0.1 | 1.5 ^{+0.1} _{..0} |
| Part No. | t ₁ | t ₂ | |
| ERZVF□M□□□□ | 0.6 max. | 6.5 max. | |

| Performance characteristics | | | | | | | | | | | | | | |
|--|---|------------------------------|----------|---------|--------------------------|--------------------|------|--------------------------|--------------------|------|--------------------------|--------------------|------|--|
| Characteristics | Test methods | Specifications | | | | | | | | | | | | |
| Standard test condition | Electrical measurements (initial/after tests) shall be conducted at temperature of 5 to 35 °C, relative humidity of maximum 85 %. | — | | | | | | | | | | | | |
| Varistor voltage | The voltage between two terminals with the specified measuring current 1 mA DC applied is called V_1 or $V_{1\text{ mA}}$. 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. | | | | | | | | | | | | | |
| Rated power | The power that can be applied in the specified ambient temperature. | | | | | | | | | | | | | |
| Maximum energy | Maximum energy of less than $\pm 10\%$ of the varistor voltage change when the standard impulse (2 ms) is applied one time. | | | | | | | | | | | | | |
| Maximum peak current (Withstanding surge current) | Maximum current of less than $\pm 10\%$ of the varistor voltage change when impulse current (8/20 μs) is applied twice continuously with an interval of 5 minutes. | | | | | | | | | | | | | |
| Temperature coefficient of varistor voltage | $\frac{V_{1\text{ mA at } 85\text{ }^\circ\text{C}} - V_{1\text{ mA at } 25\text{ }^\circ\text{C}}}{V_{1\text{ mA at } 25\text{ }^\circ\text{C}}} \times \frac{1}{60} \times 100(\%/^\circ\text{C})$ | 0 to -0.05 %/°C | | | | | | | | | | | | |
| Impulse life (I) | <p>The change of V_c shall be measured after the specified impulse is applied 10000 times continuously with an interval of 10 seconds at room temperature.</p> <table border="1"> <thead> <tr> <th>Part No.</th> <th>Waveform</th> <th>Current</th> </tr> </thead> <tbody> <tr> <td>ERZVF□M220 to ERZVF□M680</td> <td>8/20 μs</td> <td>18 A</td> </tr> <tr> <td>ERZVF□M820 to ERZVF□M271</td> <td>8/20 μs</td> <td>50 A</td> </tr> <tr> <td>ERZVF□M331 to ERZVF□M471</td> <td>8/20 μs</td> <td>30 A</td> </tr> </tbody> </table> | Part No. | Waveform | Current | ERZVF□M220 to ERZVF□M680 | 8/20 μs | 18 A | ERZVF□M820 to ERZVF□M271 | 8/20 μs | 50 A | ERZVF□M331 to ERZVF□M471 | 8/20 μs | 30 A | $\Delta V_{1\text{ mA}}/V_{1\text{ mA}} \leq \pm 10\%$ |
| Part No. | Waveform | Current | | | | | | | | | | | | |
| ERZVF□M220 to ERZVF□M680 | 8/20 μs | 18 A | | | | | | | | | | | | |
| ERZVF□M820 to ERZVF□M271 | 8/20 μs | 50 A | | | | | | | | | | | | |
| ERZVF□M331 to ERZVF□M471 | 8/20 μs | 30 A | | | | | | | | | | | | |
| Impulse life (II) | <p>The change of V_c shall be measured after the specified impulse is applied 10000 times continuously with an interval of 10 seconds at room temperature.</p> <table border="1"> <thead> <tr> <th>Part No.</th> <th>Waveform</th> <th>Current</th> </tr> </thead> <tbody> <tr> <td>ERZVF□M220 to ERZVF□M680</td> <td>8/20 μs</td> <td>12 A</td> </tr> <tr> <td>ERZVF□M820 to ERZVF□M271</td> <td>8/20 μs</td> <td>35 A</td> </tr> <tr> <td>ERZVF□M331 to ERZVF□M471</td> <td>8/20 μs</td> <td>20 A</td> </tr> </tbody> </table> | Part No. | Waveform | Current | ERZVF□M220 to ERZVF□M680 | 8/20 μs | 12 A | ERZVF□M820 to ERZVF□M271 | 8/20 μs | 35 A | ERZVF□M331 to ERZVF□M471 | 8/20 μs | 20 A | $\Delta V_{1\text{ mA}}/V_{1\text{ mA}} \leq \pm 10\%$ |
| Part No. | Waveform | Current | | | | | | | | | | | | |
| ERZVF□M220 to ERZVF□M680 | 8/20 μs | 12 A | | | | | | | | | | | | |
| ERZVF□M820 to ERZVF□M271 | 8/20 μs | 35 A | | | | | | | | | | | | |
| ERZVF□M331 to ERZVF□M471 | 8/20 μs | 20 A | | | | | | | | | | | | |

Recommendation land size



Matters to Be Observed When Using This Product (E / CK / SC-type)

Safety measures

An abnormal state of E-Type, CK-type, and SC-type varistors (ZNR surge absorber, 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 and product life

To know the detailed specifications of individual products or specific evaluation test scores, please contact 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 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) of the device, remove the surge absorber from the device after getting approval from the parties concerned.

Current fuse

- (1) Select a surge absorber and fuses to use in as 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.

| Series | ERZC 20EK□□□(□) | ERZC 32EK□□□(□) | ERZV S34C□□□ | ERZC □□CK□□□W |
|--|--------------------|--------------------|------------------|------------------|
| Current fuse (placed between lines) | 10 A max. | 20 A max. | 20 A max. | 20 A max. |
| Temperature fuse (placed between a line and the ground) | 100 to 120°C 5A | 100 to 120°C 10A | 100 to 120°C 10A | 100 to 120°C 10A |

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

* Connect a temperature fuse directly to the terminal so that heat from the terminal is easily transferred to the fuse and that the fusing element of the fuse extends along its sides.

- (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.

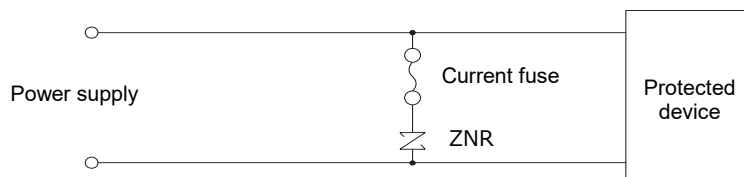
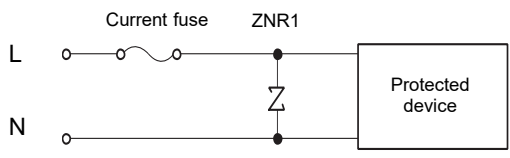
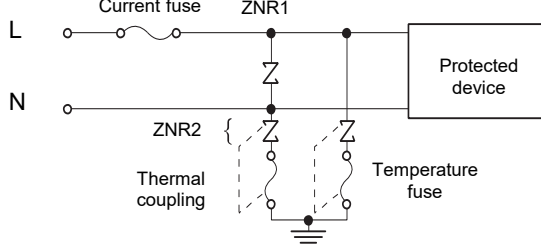
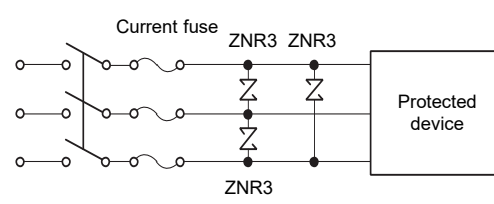
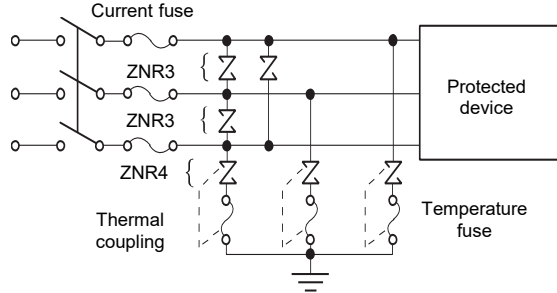


Table 1 Application example of the product (ordinary application example)

| Connection | Surge absorber placed between lines | Surge absorber placed between a line and the ground | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--|--|-----|---------------------------|-------------------------------|--|----------------|-------|----------------------------------|-------------|-------|-------------|----------------|-------------|-------|-----------|---|-----|---------------------------|-------------------------------|--|----------------|---------------|----------------------------------|-------------------------------|
| | <p>DC Single-phase AC</p>  | <p>DC Single-phase AC</p>  | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Three-phase AC</p>  | | | <p>Three-phase AC</p>  | | | | | | | | | | | | | | | | | | | | | | | |
| | Varistor voltage selection | <table border="1"> <thead> <tr> <th>ZNR</th> <th>Power supply voltage [AC]</th> <th colspan="2">Part number E, CK, SC-type</th> </tr> </thead> <tbody> <tr> <td rowspan="4">ZNR 1 ZNR 3</td> <td>100 V</td> <td rowspan="4">ERZC□□EK ERZC□□CK ERZVS34C</td> <td>201 to 361*</td> </tr> <tr> <td>120 V</td> <td>241 to 431*</td> </tr> <tr> <td>200 V to 220 V</td> <td>471 to 621*</td> </tr> <tr> <td>240 V</td> <td>511, 621*</td> </tr> </tbody> </table> | | ZNR | Power supply voltage [AC] | Part number E, CK, SC-type | | ZNR 1 ZNR 3 | 100 V | ERZC□□EK ERZC□□CK ERZVS34C | 201 to 361* | 120 V | 241 to 431* | 200 V to 220 V | 471 to 621* | 240 V | 511, 621* | <table border="1"> <thead> <tr> <th>ZNR</th> <th>Power supply voltage [AC]</th> <th colspan="2">Part number E, CK, SC-type</th> </tr> </thead> <tbody> <tr> <td rowspan="2">ZNR 2 ZNR 4</td> <td>100V to 220 V</td> <td rowspan="2">ERZC□□EK ERZC□□CK ERZVS34C</td> <td>471 511 821 or higher**</td> </tr> <tr> <td>240 V</td> <td>511 821 or higher**</td> </tr> </tbody> </table> | ZNR | Power supply voltage [AC] | Part number E, CK, SC-type | | ZNR 2 ZNR 4 | 100V to 220 V | ERZC□□EK ERZC□□CK ERZVS34C | 471 511 821 or higher** |
| ZNR | | Power supply voltage [AC] | Part number E, CK, SC-type | | | | | | | | | | | | | | | | | | | | | | | |
| ZNR 1 ZNR 3 | 100 V | ERZC□□EK ERZC□□CK ERZVS34C | 201 to 361* | | | | | | | | | | | | | | | | | | | | | | | |
| | 120 V | | 241 to 431* | | | | | | | | | | | | | | | | | | | | | | | |
| | 200 V to 220 V | | 471 to 621* | | | | | | | | | | | | | | | | | | | | | | | |
| | 240 V | | 511, 621* | | | | | | | | | | | | | | | | | | | | | | | |
| ZNR | Power supply voltage [AC] | Part number E, CK, SC-type | | | | | | | | | | | | | | | | | | | | | | | | |
| ZNR 2 ZNR 4 | 100V to 220 V | ERZC□□EK ERZC□□CK ERZVS34C | 471 511 821 or higher** | | | | | | | | | | | | | | | | | | | | | | | |
| | 240 V | | 511 821 or higher** | | | | | | | | | | | | | | | | | | | | | | | |

* To find out about surge absorbers that can be used in an AC withstand voltage test, please contact us.

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 the surge absorber or apply force thereto close to the insulation cover of the lead terminal.
- Make the wire as short and straight as possible.

Mounting and storage conditions

- Do not melt solder or the insulation material making up the surge absorber when soldering the lead terminal.
- 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.
- 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.

Varistors (ZNR Surge Absorber) SC type



Varistors (ZNR Surge Absorber) Type SC protects power supply facilities, communications equipment from steep lightning surges, and it is a suitable product to incorporate it in a surge protective device corresponding to the Japanese Industrial Standards (JIS C 5381-1).

Features

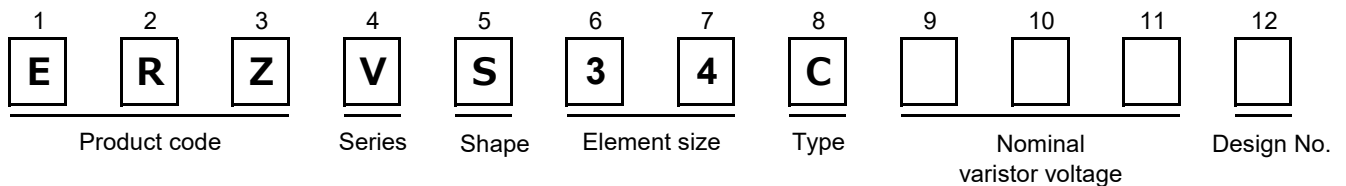
- Very large surge withstanding capability with a compact size
- Fast response to steep impulse voltage
- Low clamping voltage for better surge protection
- No follow-on current
- RoHS compliant

Recommended applications

- Power suppliers for OA, FA, telecommunication or industrial equipment
- Traffic or railroad systems
- Surge protection of automatic control devices for power distribution line

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

Explanation of part numbers



Ratings and characteristics

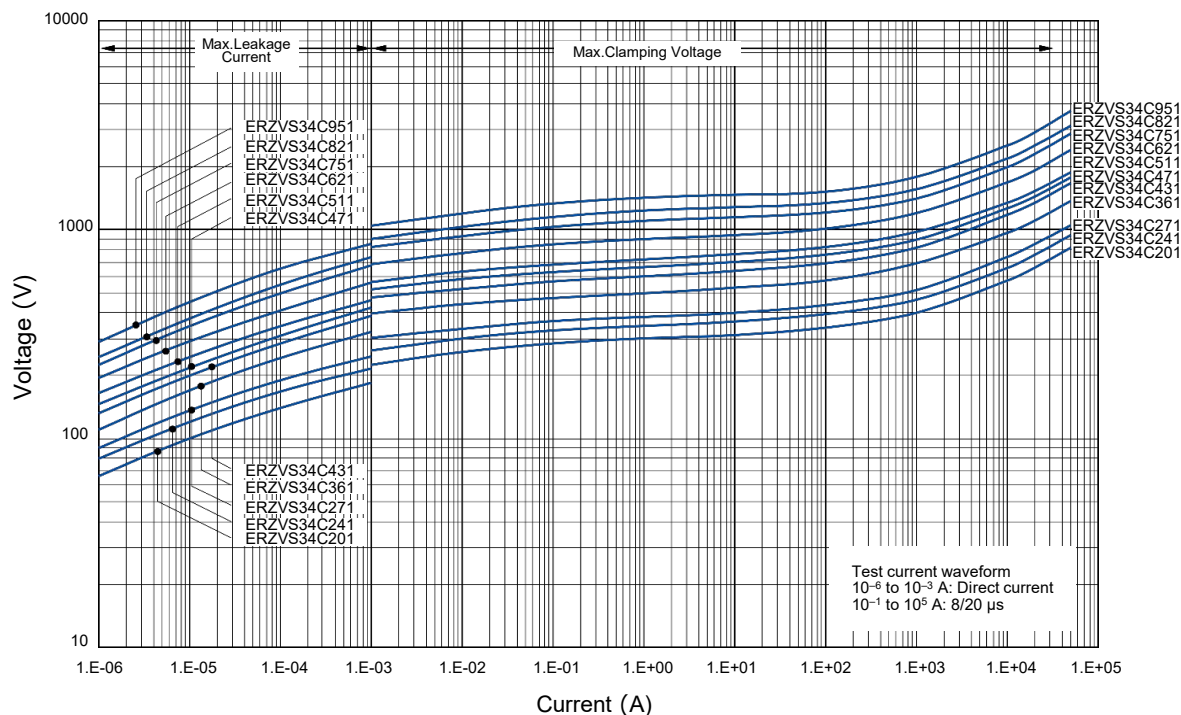
● Operating temperature range : -40 to 85 °C

● Storage temperature range : -40 to 125 °C

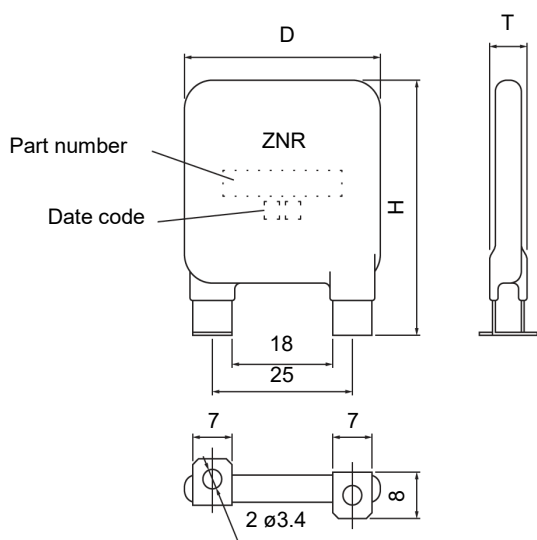
| Part No. | Varistor voltage at 1 m A | Maximum allowable voltage | | Maximum clamping voltage | Voltage protection level | Nominal discharge current | Maximum discharge current |
|-------------|---------------------------|---------------------------|--------|--------------------------|--------------------------|---------------------------|----------------------------|
| | (V) | Acrms (V) | DC (V) | V250 A | UP(V) (at In) | In(8/20 μS) | I _{max} (8/20 μS) |
| ERZVS34C201 | 200(185 to 225) | 130 | 170 | 340 | 800 | 20kA | 40kA |
| ERZVS34C241 | 240(216 to 264) | 150 | 200 | 395 | 900 | | |
| ERZVS34C271 | 270(247 to 303) | 175 | 225 | 455 | 1000 | | |
| ERZVS34C361 | 360(324 to 396) | 230 | 300 | 595 | 1200 | | |
| ERZVS34C431 | 430(387 to 473) | 275 | 350 | 710 | 1500 | | |
| ERZVS34C471 | 470(423 to 517) | 300 | 385 | 775 | 1500 | | |
| ERZVS34C511 | 510(459 to 561) | 320 | 415 | 845 | 1500 | | |
| ERZVS34C621 | 620(558 to 682) | 385 | 505 | 1025 | 2000 | | |
| ERZVS34C751 | 750(675 to 825) | 460 | 615 | 1240 | 2500 | | |
| ERZVS34C821 | 820(738 to 902) | 510 | 670 | 1355 | 2500 | | |
| ERZVS34C951 | 950(855 to 1045) | 575 | 765 | 1570 | 3000 | | |

Typical characteristics

Voltage vs. Current (ERZVS34C201 to ERZVS34C951)



Dimensions in mm (not to scale)



| Unit : mm | | | |
|-------------|--------|--------|--------|
| Part No. | D max. | H max. | T max. |
| ERZVS34C201 | 36 | 47 | 9.0 |
| ERZVS34C241 | | | 9.2 |
| ERZVS34C271 | | | 9.5 |
| ERZVS34C361 | | | 10.4 |
| ERZVS34C431 | | | 11.1 |
| ERZVS34C471 | | | 11.3 |
| ERZVS34C511 | | | 9.7 |
| ERZVS34C621 | | | 9.7 |
| ERZVS34C751 | | | 10.5 |
| ERZVS34C821 | | | 11.0 |
| ERZVS34C951 | | | 11.5 |

Minimum quantity / Packing unit

| Product | Series / Type | Part number | Minimum quantity / Packing unit | Packing quantity in carton | Carton (about) L×W×H (mm) |
|---------------------------------|---------------|-------------|---------------------------------|----------------------------|---------------------------|
| "ZNR" Transient/surge absorbers | SC type | ERZVS34C□□□ | 10 | 200 | 320×430×65 |

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

※ Please contact local sales office about packing specifications.

Varistors (ZNR Surge Absorber) E type



Varistors (ZNR Surge Absorber) Type E is capable of handling larger surge energy than Type D in applications to protect electronic equipment or semiconductor devices from switching and induced lightning surges.

Features

- UL and CSA recognized components
- Very large surge withstanding capability with a compact size
- Direct mounting on boards like a power distribution board available
- Fast response to steep impulse voltage
- Low clamping voltage for better surge protection
- RoHS compliant

Recommended applications

- Transistor, diode, IC, thyristor or triac semiconductor protection
- Surge protection in industrial power plant operations
- Relay or electromagnetic valve surge absorption
- Surge absorption applications in broadcasting, communications devices, traffic/railroad, agricultural facilities, waterworks
- Surge protection of automatic control devices for power distribution line

Related standards

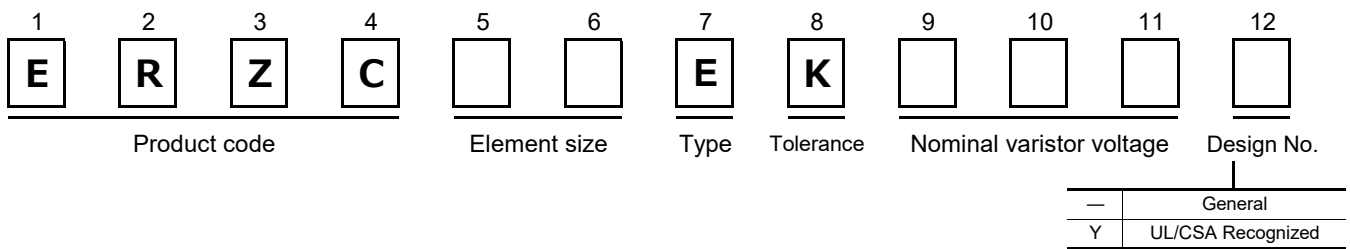
| Standard No. | UL1449 | CSA C22.2 No.269.5 |
|--------------|--------------------------|--|
| Title | Surge protective devices | Surge protective devices - Type 5 – Components |

● Each type designation is not registered by Part Number.

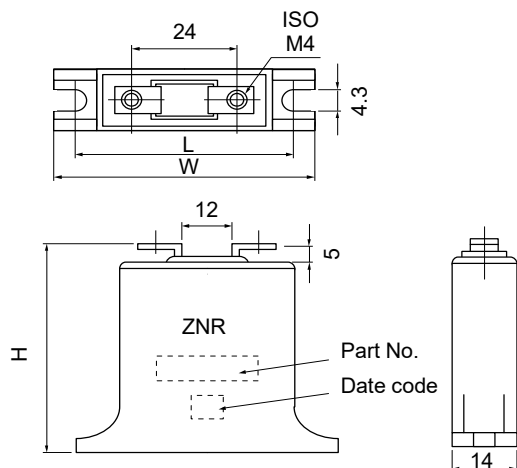
Note : Ask our factory for Product Specification before use.

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

Explanation of part numbers



Dimensions in mm (not to scale)



Unit : mm

| Part No. | W | H | L |
|----------------|------|------|------|
| ERZC20EK□□□(Y) | 48±1 | 42±1 | 39±1 |
| ERZC32EK□□□(Y) | 60±1 | 55±1 | 51±1 |

E type / 20, 32 series (UL and CSA Recognized)

Ratings and characteristics (20 series)

● Operating temperature range : -40 to 85 °C

● Storage temperature range : -40 to 110 °C

| Part No. (UL/CSA Recognized) | Type designation | Varistor voltage at 1 mA | Maximum allowable voltage | | Maximum clamping voltage at 100 A | Maximum energy (2ms) 1 time | Maximum peak current (8/20μs) 1 time | Rated voltage (UL/CSA) ACrms (V) |
|------------------------------------|---------------------|--------------------------------|---------------------------------|--------------|--|--|--|---|
| | | | (V) | Acrms (V) | | | | |
| | | (V) | Acrms (V) | DC (V) | (V) | (J) | (A) | ACrms (V) |
| ERZC20EK201Y | 20EK201U | 200 (185 to 225) | 130 | 170 | 340 | 80 | 8000 | 118 |
| ERZC20EK241Y | 20EK241U | 240 (216 to 264) | 150 | 200 | 395 | 95 | 8000 | 136 |
| ERZC20EK271Y | 20EK271U | 270 (247 to 303) | 175 | 225 | 455 | 100 | 8000 | 159 |
| ERZC20EK361Y | 20EK361U | 360 (324 to 396) | 230 | 300 | 595 | 120 | 8000 | 209 |
| ERZC20EK391Y | 20EK391U | 390 (351 to 429) | 250 | 320 | 650 | 130 | 8000 | 227 |
| ERZC20EK431Y | 20EK431U | 430 (387 to 473) | 275 | 350 | 710 | 140 | 8000 | 250 |
| ERZC20EK471Y | 20EK471U | 470 (423 to 517) | 300 | 385 | 775 | 150 | 8000 | 272 |
| ERZC20EK511Y | 20EK511U | 510 (459 to 561) | 320 | 415 | 845 | 150 | 8000 | 291 |
| ERZC20EK621Y | 20EK621U | 620 (558 to 682) | 385 | 505 | 1025 | 160 | 8000 | 350 |
| ERZC20EK681Y | 20EK681U | 680 (612 to 748) | 420 | 560 | 1120 | 175 | 8000 | 381 |
| ERZC20EK751Y | 20EK751U | 750 (675 to 825) | 460 | 615 | 1240 | 190 | 8000 | 418 |
| ERZC20EK781Y | 20EK781U | 780 (702 to 858) | 485 | 640 | 1290 | 200 | 8000 | 440 |
| ERZC20EK821Y | 20EK821U | 820 (738 to 902) | 510 | 670 | 1355 | 215 | 8000 | 463 |
| ERZC20EK911Y | 20EK911U | 910 (819 to 1001) | 550 | 745 | 1500 | 240 | 8000 | 500 |
| ERZC20EK102Y | 20EK102U | 1000 (900 to 1100) | 625 | 825 | 1650 | 245 | 8000 | 568 |
| ERZC20EK112Y | 20EK112U | 1100 (990 to 1210) | 680 | 895 | 1815 | 250 | 8000 | 600 |

Ratings and characteristics (32 series)

● Operating temperature range : -40 to 85 °C

● Storage temperature range : -40 to 110 °C

| Part No. (UL/CSA Recognized) | Type designation | Varistor voltage at 1 mA | Maximum allowable voltage | | Maximum clamping voltage at 200 A | Maximum energy (2ms) 1 time | Maximum peak current (8/20μs) 1 time | Rated voltage (UL/CSA) ACrms (V) |
|------------------------------------|---------------------|--------------------------------|---------------------------------|--------------|--|--|--|---|
| | | | (V) | Acrms (V) | | | | |
| | | (V) | Acrms (V) | DC (V) | (V) | (J) | (A) | ACrms (V) |
| ERZC32EK201Y | 32EK201U | 200 (185 to 225) | 130 | 170 | 340 | 210 | 25000 | 118 |
| ERZC32EK241Y | 32EK241U | 240 (216 to 264) | 150 | 200 | 395 | 240 | 25000 | 136 |
| ERZC32EK271Y | 32EK271U | 270 (247 to 303) | 175 | 225 | 455 | 255 | 25000 | 159 |
| ERZC32EK361Y | 32EK361U | 360 (324 to 396) | 230 | 300 | 595 | 325 | 25000 | 209 |
| ERZC32EK391Y | 32EK391U | 390 (351 to 429) | 250 | 320 | 650 | 350 | 25000 | 227 |
| ERZC32EK431Y | 32EK431U | 430 (387 to 473) | 275 | 350 | 710 | 400 | 25000 | 250 |
| ERZC32EK471Y | 32EK471U | 470 (423 to 517) | 300 | 385 | 775 | 405 | 25000 | 272 |
| ERZC32EK511Y | 32EK511U | 510 (459 to 561) | 320 | 415 | 845 | 405 | 25000 | 291 |
| ERZC32EK621Y | 32EK621U | 620 (558 to 682) | 385 | 505 | 1025 | 415 | 25000 | 350 |
| ERZC32EK681Y | 32EK681U | 680 (612 to 748) | 420 | 560 | 1120 | 450 | 25000 | 381 |
| ERZC32EK751Y | 32EK751U | 750 (675 to 825) | 460 | 615 | 1240 | 500 | 25000 | 418 |
| ERZC32EK781Y | 32EK781U | 780 (702 to 858) | 485 | 640 | 1290 | 520 | 25000 | 440 |
| ERZC32EK821Y | 32EK821U | 820 (738 to 902) | 510 | 670 | 1355 | 545 | 25000 | 463 |
| ERZC32EK911Y | 32EK911U | 910 (819 to 1001) | 550 | 745 | 1500 | 600 | 25000 | 500 |
| ERZC32EK102Y | 32EK102U | 1000 (900 to 1100) | 625 | 825 | 1650 | 620 | 25000 | 568 |
| ERZC32EK112Y | 32EK112U | 1100 (990 to 1210) | 680 | 895 | 1815 | 640 | 25000 | 600 |

Ratings and characteristics (20 series)

● Operating temperature range : -40 to 85 °C

● Storage temperature range : -40 to 110 °C

| Part No. | Varistor voltage at 1 mA (V) | Maximum allowable voltage | | Maximum clamping voltage at 100 A (V) | Rated power (W) | Maximum energy (2ms) (J) | Maximum peak current (8/20 μs) | | Typical capacitance (Reference) at 1 kHz (pF) |
|-------------|---------------------------------|---------------------------|--------|--|--------------------|-----------------------------|--------------------------------|----------------|--|
| | | Acrms (V) | DC (V) | | | | 1 time (A) | 2 times (A) | |
| ERZC20EK201 | 200 (185 to 225) | 130 | 170 | 340 | 0.8 | 80 | 8000 | 5000 | 2300 |
| ERZC20EK241 | 240 (216 to 264) | 150 | 200 | 395 | 0.8 | 95 | 8000 | 5000 | 1500 |
| ERZC20EK271 | 270 (247 to 303) | 175 | 225 | 455 | 0.8 | 100 | 8000 | 5000 | 1400 |
| ERZC20EK361 | 360 (324 to 396) | 230 | 300 | 595 | 0.8 | 120 | 8000 | 5000 | 1300 |
| ERZC20EK391 | 390 (351 to 429) | 250 | 320 | 650 | 0.8 | 130 | 8000 | 5000 | 1200 |
| ERZC20EK431 | 430 (387 to 473) | 275 | 350 | 710 | 0.8 | 140 | 8000 | 5000 | 1000 |
| ERZC20EK471 | 470 (423 to 517) | 300 | 385 | 775 | 0.8 | 150 | 8000 | 5000 | 950 |
| ERZC20EK511 | 510 (459 to 561) | 320 | 415 | 845 | 0.8 | 150 | 8000 | 5000 | 930 |
| ERZC20EK621 | 620 (558 to 682) | 385 | 505 | 1025 | 0.8 | 160 | 8000 | 5000 | 900 |
| ERZC20EK681 | 680 (612 to 748) | 420 | 560 | 1120 | 0.8 | 175 | 8000 | 5000 | 850 |
| ERZC20EK751 | 750 (675 to 825) | 460 | 615 | 1240 | 0.8 | 190 | 8000 | 5000 | 800 |
| ERZC20EK781 | 780 (702 to 858) | 485 | 640 | 1290 | 0.8 | 200 | 8000 | 5000 | 800 |
| ERZC20EK821 | 820 (738 to 902) | 510 | 670 | 1355 | 0.8 | 215 | 8000 | 5000 | 700 |
| ERZC20EK911 | 910 (819 to 1001) | 550 | 745 | 1500 | 0.8 | 240 | 8000 | 5000 | 700 |
| ERZC20EK102 | 1000 (900 to 1100) | 625 | 825 | 1650 | 0.8 | 245 | 8000 | 5000 | 400 |
| ERZC20EK112 | 1100 (990 to 1210) | 680 | 895 | 1815 | 0.8 | 250 | 8000 | 5000 | 350 |

Ratings and characteristics (32 series)

● Operating temperature range : -40 to 85 °C

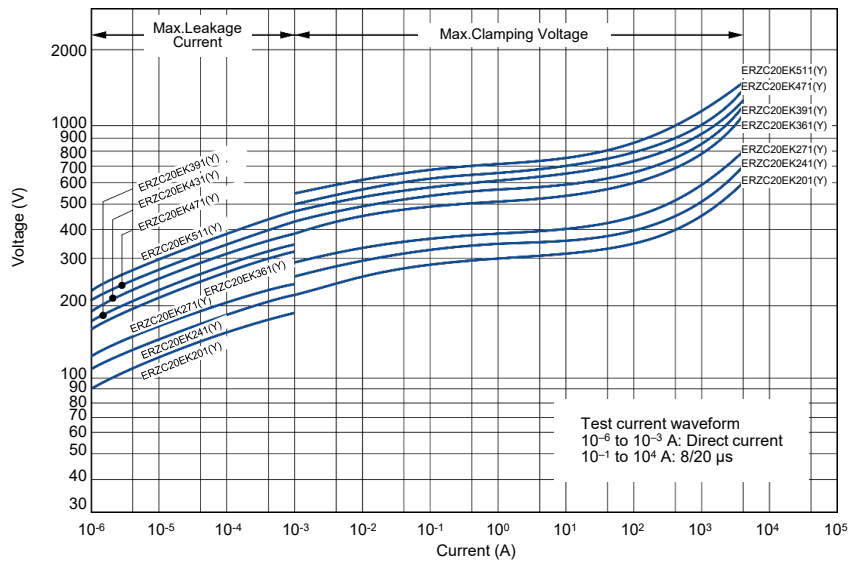
● Storage temperature range : -40 to 110 °C

| Part No. | Varistor voltage at 1 mA (V) | Maximum allowable voltage | | Maximum clamping voltage at 200 A (V) | Rated power (W) | Maximum energy (2ms) (J) | Maximum peak current (8/20 μs) | | Typical capacitance (Reference) at 1 kHz (pF) |
|-------------|---------------------------------|---------------------------|--------|--|--------------------|-----------------------------|--------------------------------|----------------|--|
| | | Acrms (V) | DC (V) | | | | 1 time (A) | 2 times (A) | |
| ERZC32EK201 | 200 (185 to 225) | 130 | 170 | 340 | 1.2 | 210 | 25000 | 20000 | 5500 |
| ERZC32EK241 | 240 (216 to 264) | 150 | 200 | 395 | 1.2 | 240 | 25000 | 20000 | 5000 |
| ERZC32EK271 | 270 (247 to 303) | 175 | 225 | 455 | 1.2 | 255 | 25000 | 20000 | 4200 |
| ERZC32EK361 | 360 (324 to 396) | 230 | 300 | 595 | 1.2 | 325 | 25000 | 20000 | 3500 |
| ERZC32EK391 | 390 (351 to 429) | 250 | 320 | 650 | 1.2 | 350 | 25000 | 20000 | 3000 |
| ERZC32EK431 | 430 (387 to 473) | 275 | 350 | 710 | 1.2 | 400 | 25000 | 20000 | 2500 |
| ERZC32EK471 | 470 (423 to 517) | 300 | 385 | 775 | 1.2 | 405 | 25000 | 20000 | 2500 |
| ERZC32EK511 | 510 (459 to 561) | 320 | 415 | 845 | 1.2 | 405 | 25000 | 20000 | 2400 |
| ERZC32EK621 | 620 (558 to 682) | 385 | 505 | 1025 | 1.2 | 415 | 25000 | 20000 | 2200 |
| ERZC32EK681 | 680 (612 to 748) | 420 | 560 | 1120 | 1.2 | 450 | 25000 | 20000 | 2100 |
| ERZC32EK751 | 750 (675 to 825) | 460 | 615 | 1240 | 1.2 | 500 | 25000 | 20000 | 2000 |
| ERZC32EK781 | 780 (702 to 858) | 485 | 640 | 1290 | 1.2 | 520 | 25000 | 20000 | 1900 |
| ERZC32EK821 | 820 (738 to 902) | 510 | 670 | 1355 | 1.2 | 545 | 25000 | 20000 | 1800 |
| ERZC32EK911 | 910 (819 to 1001) | 550 | 745 | 1500 | 1.2 | 600 | 25000 | 20000 | 1700 |
| ERZC32EK102 | 1000 (900 to 1100) | 625 | 825 | 1650 | 1.2 | 620 | 25000 | 20000 | 1000 |
| ERZC32EK112 | 1100 (990 to 1210) | 680 | 895 | 1815 | 1.2 | 640 | 25000 | 20000 | 800 |

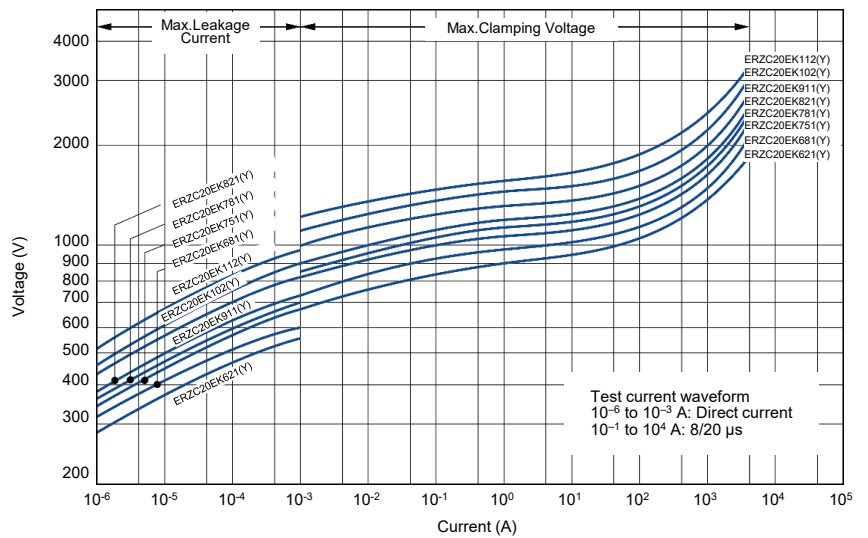
Typical characteristics

Voltage vs. Current

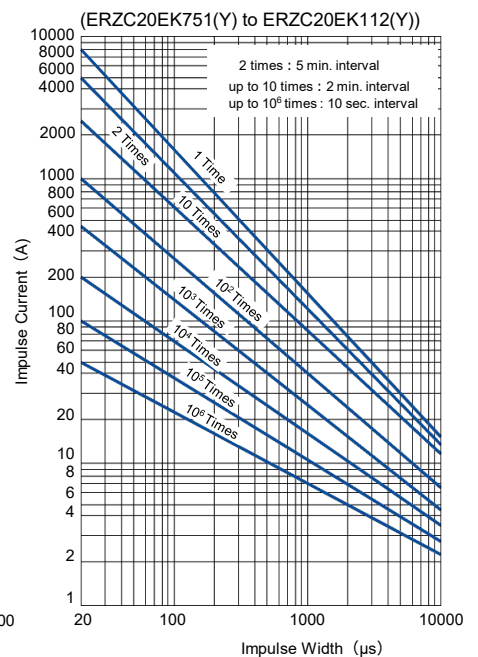
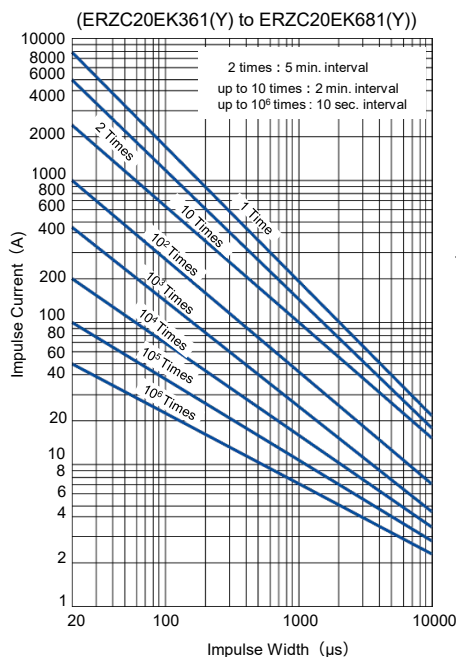
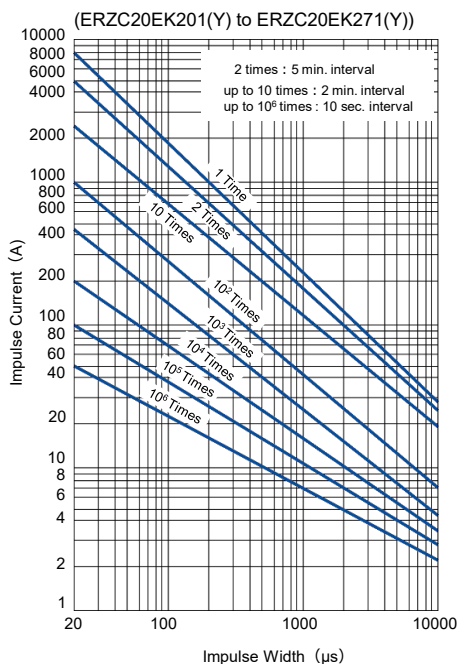
(ERZC20EK201(Y) to ERZC20EK511(Y))



(ERZC20EK621(Y) to ERZC20EK112(Y))



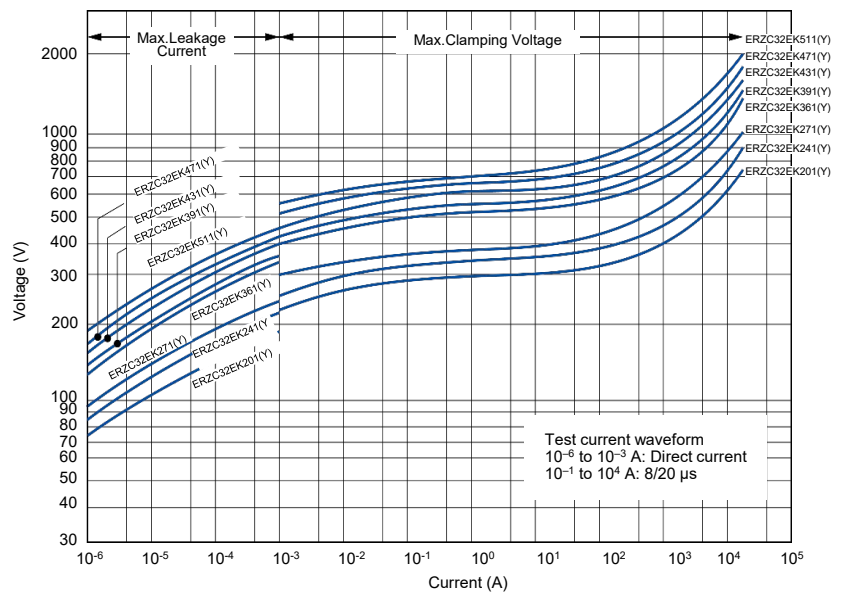
Impulse derating curve (Relation between impulse width and surge, repetitively)



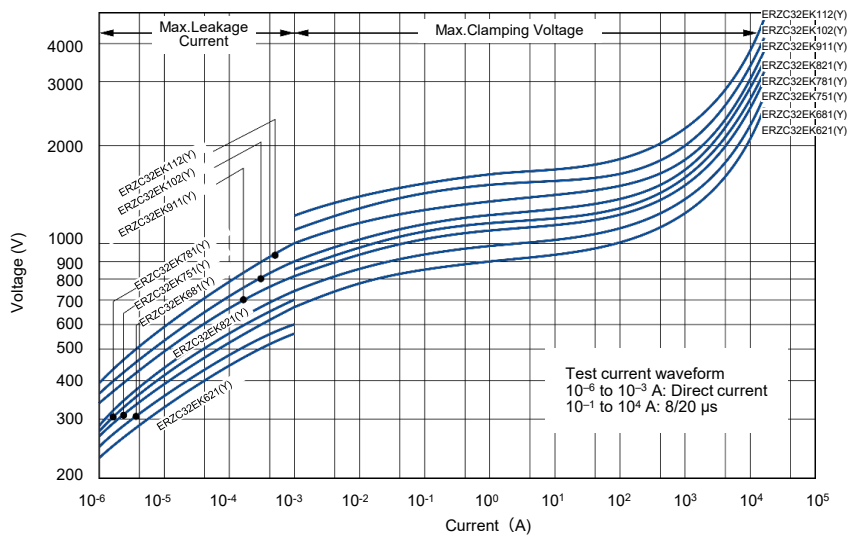
Typical characteristics

Voltage vs. Current

(ERZC32EK201(Y) to ERZC32EK511(Y))

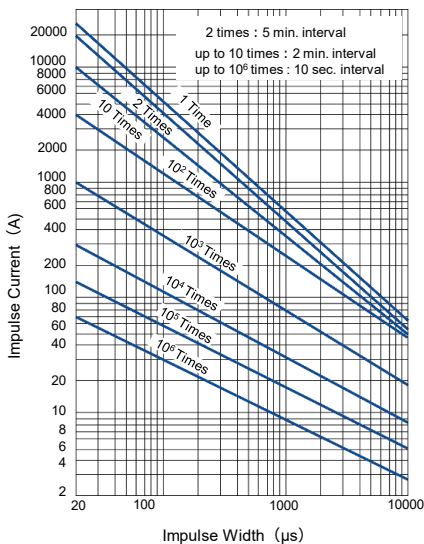


(ERZC32EK621(Y) to ERZC32EK112(Y))

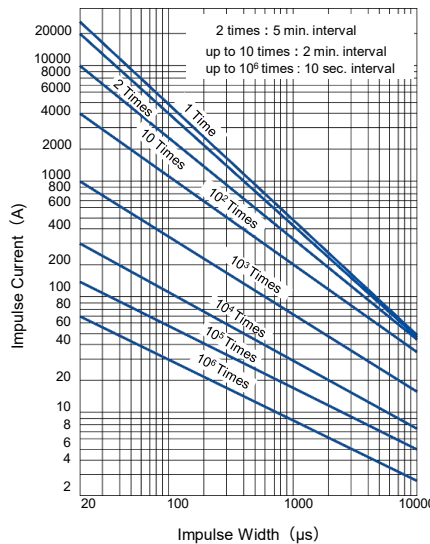


Impulse derating curve (Relation between impulse width and surge, repetitively)

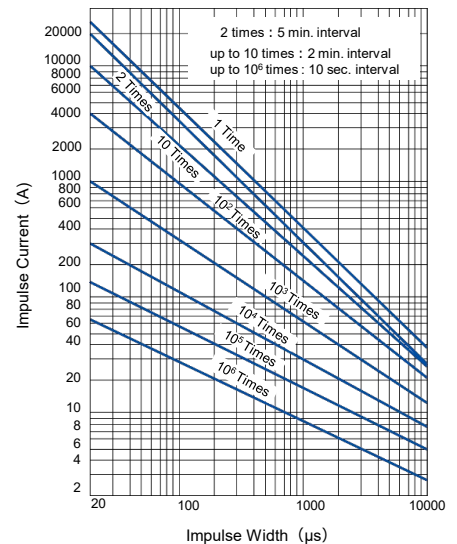
(ERZC32EK201(Y) to ERZC32EK271(Y))



(ERZC32EK361(Y) to ERZC32EK681(Y))



(ERZC32EK751(Y) to ERZC32EK112(Y))



Performance characteristics

| Characteristics | | Test methods / Description | Specifications | | | | | | | | | | | | | | | |
|--|--|---|-----------------------------|--|------------------|----------------------|--|------------------|---|------------|--------|---|--------------------|------------------|---|------------|--------|---|
| Electrical | Standard test condition | Electrical measurements (initial/after tests) shall be conducted at temperature of 5 to 35 °C, relative humidity of maximum 85 %. | — | | | | | | | | | | | | | | | |
| | Varistor voltage | The voltage between two terminals with the specified measuring current C_{mA} DC applied is called V_C or V_{CmA} . The measurement shall be made as fast as possible to avoid heat affection. | To meet the specified value | | | | | | | | | | | | | | | |
| | Maximum allowable voltage | The maximum sinusoidal wave voltage (rms) or the maximum DC voltage that can be applied continuously. | | | | | | | | | | | | | | | | |
| | Clamping voltage | The maximum voltage between two terminals with the specified standard impulse current (8/20 μ s). | | | | | | | | | | | | | | | | |
| | Rated power | The maximum power that can be applied within the specified ambient temperature. | | | | | | | | | | | | | | | | |
| | Maximum energy | The maximum energy within the varistor voltage change of ± 10 % when one impulse of 2 ms is applied. | | | | | | | | | | | | | | | | |
| | Maximum peak current | 2 times | | The maximum current within the varistor voltage change of ± 10 % with the standard impulse current (8/20 μ s) applied two times with an interval of 5 minutes. | | | | | | | | | | | | | | |
| | | 1 time | | The maximum current within the varistor voltage change of ± 10 % with the standard impulse current (8/20 μ s) applied one time. | | | | | | | | | | | | | | |
| | Temperature coefficient of varistor voltage | $\frac{V_C \text{ at } 70^\circ\text{C} - V_C \text{ at } 20^\circ\text{C}}{V_C \text{ at } 20^\circ\text{C}} \times \frac{1}{50} \times 100(\%/^\circ\text{C})$ | 0 to -0.05 %/ °C max. | | | | | | | | | | | | | | | |
| | Impulse life | The change of VC shall be measured after the impulse current listed below is applied 10000 times continuously with the interval of 10 seconds at room temperature. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Series 20</td> <td>200 A (8/20 μs)</td> </tr> <tr> <td>Series 32</td> <td>300 A (8/20 μs)</td> </tr> </table> | Series 20 | 200 A (8/20 μ s) | Series 32 | 300 A (8/20 μ s) | $\Delta V_{1\text{mA}}/V_{1\text{mA}} \leq \pm 10\%$ | | | | | | | | | | | |
| Series 20 | 200 A (8/20 μ s) | | | | | | | | | | | | | | | | | |
| Series 32 | 300 A (8/20 μ s) | | | | | | | | | | | | | | | | | |
| Withstanding voltage (Body insulation) | The commercial frequency voltage of AC 2.5 kV shall be applied between terminals and the bottom of the unit for one minute. | | | | | | | | | | | | | | | | | |
| Mechanical | Robustness of terminations (Tensile) | After gradually applying the load of 49 N (5 kgf) and keeping the unit fixed for 10 seconds in an axial direction, the terminal shall be visually examined for any damage. | No remarkable damage | | | | | | | | | | | | | | | |
| | 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 damage of the terminals is visually examined. | | | | | | | | | | | | | | | | |
| Environmental | Dry heat/ High temperature storage | The specimen shall be subjected to $110 \pm 3^\circ\text{C}$ for 500 hours in a thermostatic bath without load and then stored at room temperature and humidity for one to two hours. Thereafter, the change of V_C shall be measured. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-25 0 -3</td> <td>30 +3 .0</td> </tr> <tr> <td>2</td> <td>Room Temp.</td> <td>3 max.</td> </tr> <tr> <td>3</td> <td>85 +3 .0</td> <td>30 +3 .0</td> </tr> <tr> <td>4</td> <td>Room temp.</td> <td>3 max.</td> </tr> </tbody> </table> | Step | Temperature (°C) | Period (minutes) | 1 | -25 0 -3 | 30 +3 .0 | 2 | Room Temp. | 3 max. | 3 | 85 +3 .0 | 30 +3 .0 | 4 | Room temp. | 3 max. | $\Delta V_{1\text{mA}}/V_{1\text{mA}} \leq \pm 5\%$ |
| | Step | Temperature (°C) | Period (minutes) | | | | | | | | | | | | | | | |
| | 1 | -25 0 -3 | 30 +3 .0 | | | | | | | | | | | | | | | |
| | 2 | Room Temp. | 3 max. | | | | | | | | | | | | | | | |
| | 3 | 85 +3 .0 | 30 +3 .0 | | | | | | | | | | | | | | | |
| 4 | Room temp. | 3 max. | | | | | | | | | | | | | | | | |
| Temperature cycle | The temperature cycle shown below shall be repeated five times and then stored at room temperature and humidity for one to two hours. The change of V_C and mechanical damage shall be examined. | $\Delta V_{1\text{mA}}/V_{1\text{mA}} \leq \pm 5\%$ | | | | | | | | | | | | | | | | |
| Dry heat load/ High temperature load | After being continuously applied the Maximum Allowable Voltage at $85 \pm 5^\circ\text{C}$ for 500 hours, the specimen shall be stored at room temperature and humidity for one to two hours. Thereafter, the change of V_C shall be measured. | $\Delta V_{1\text{mA}}/V_{1\text{mA}} \leq \pm 10\%$ | | | | | | | | | | | | | | | | |
| Damp heat/Humidity (Steady state) | The specimen shall be subjected to $40 \pm 2^\circ\text{C}$, 90 to 95 %RH for 1000 hours without load and then stored at room temperature and humidity for one to two hours. Thereafter, the change of V_C shall be measured. | $\Delta V_{1\text{mA}}/V_{1\text{mA}} \leq \pm 5\%$ | | | | | | | | | | | | | | | | |

Minimum quantity / Packing unit

| Product | Series / Type | Part number | Minimum quantity / Packing unit | Packing quantity in carton | Carton (about) L×W×H (mm) | |
|------------------------------------|---------------|-----------------------|---------------------------------|----------------------------|---------------------------|------------|
| "ZNR" Transient/surge absorbers | E type | General product | ERZC□□EK□□□ | 5 | 100 | 380×405×85 |
| | | UL and CSA recognized | ERZC□□EK□□□Y | 5 | 100 | 380×405×85 |

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.

Varistors (ZNR Surge Absorber)

CK type (UL and CSA Recognized)



Varistors (ZNR Surge Absorber) with Tabs is a heavy duty type ZNR with very unique tab terminals which bring forth a higher reliability. These tabs are used as electrical connecting terminals and also its mounting legs. This type of ZNR is meant for applications in power supplies or transient voltage surge suppressor units where large surge current or high surge energy absorption is required.

Features

- UL and CSA recognized components
- High energy handling capability (210 to 750 joules)
- Large withstanding peak current (20 to 25 kA, 8/20 μ s, 2 times)
- Common terminals for electrical connection and mounting
- RoHS compliant

Recommended applications

- Power suppliers for OA, FA, telecommunication or industrial equipment
- Power strips
- Transient voltage surge suppressor units

Related standards

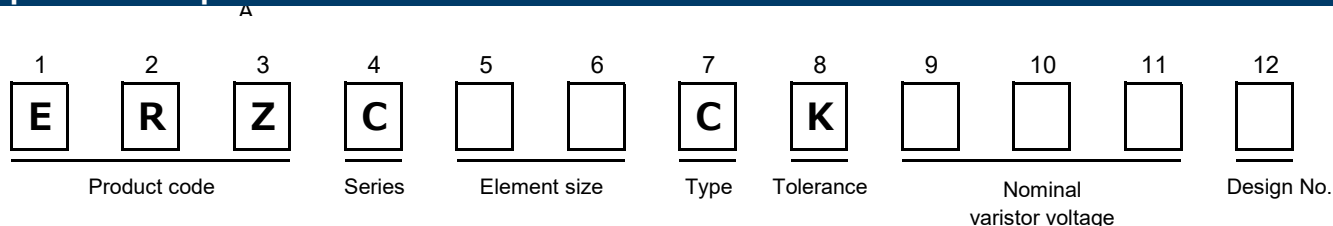
| Standard No. | UL1449 | CSA C22.2 No.269.5 |
|--------------|--------------------------|--|
| Title | Surge protective devices | Surge protective devices - Type 5 – Components |

- Each type designation is not registered by Part Number.
Please contact us for further questions regarding type designation.

Note : Ask our factory for Product Specification before use.

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

Explanation of part numbers



Ratings and characteristics

●Operating temperature range : -40 to 85 °C

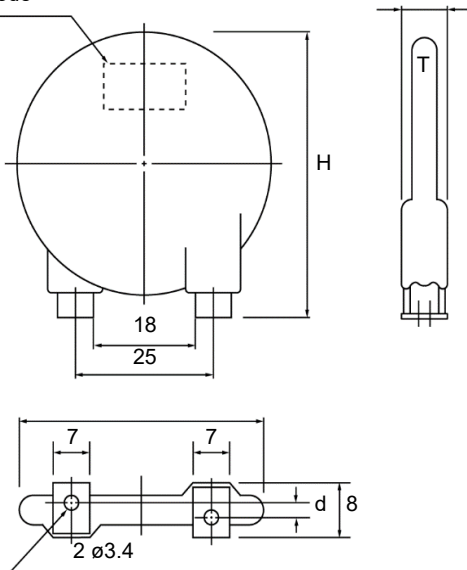
●Operating temperature range : -40 to 125 °C

| Part No. (UL/CSA Recognized) | Type designation | Varistor voltage at 1m A (V) | Maximum allowable voltage | | Maximum clamping voltage | | Maximum energy (2ms) | | Maximum peak current (8/20 μs) | |
|------------------------------------|---------------------|---------------------------------------|---------------------------------|--------|--------------------------------|--------------------|----------------------------|----------------|--------------------------------------|--|
| | | | AC rms(V) | DC (V) | VXA (V) | I _p (A) | 1 time (J) | 1 time (kA) | 2 times (kA) | |
| ERZC32CK201W | 32K201U | 200 (185 to 225) | 130 | 170 | 340 | 200 | 210 | 25 | 20 | |
| ERZC32CK241W | 32K241U | 240 (216 to 264) | 150 | 200 | 395 | 200 | 240 | 25 | 20 | |
| ERZC32CK271W | 32K271U | 270 (247 to 303) | 175 | 225 | 455 | 200 | 255 | 25 | 20 | |
| ERZC32CK361W | 32K361U | 360 (324 to 396) | 230 | 300 | 595 | 200 | 325 | 25 | 20 | |
| ERZC32CK391W | 32K391U | 390 (351 to 429) | 250 | 320 | 650 | 200 | 350 | 25 | 20 | |
| ERZC32CK431W | 32K431U | 430 (387 to 473) | 275 | 350 | 710 | 200 | 400 | 25 | 20 | |
| ERZC32CK471W | 32K471U | 470 (423 to 517) | 300 | 385 | 775 | 200 | 405 | 25 | 20 | |
| ERZC32CK511W | 32K511U | 510 (459 to 561) | 320 | 415 | 845 | 200 | 405 | 25 | 20 | |
| ERZC32CK621W | 32K621U | 620 (558 to 682) | 385 | 505 | 1025 | 200 | 415 | 25 | 20 | |
| ERZC32CK681W | 32K681U | 680 (612 to 748) | 420 | 560 | 1120 | 200 | 450 | 25 | 20 | |
| ERZC32CK751W | 32K751U | 750 (675 to 825) | 460 | 615 | 1240 | 200 | 500 | 25 | 20 | |
| ERZC32CK781W | 32K781U | 780 (702 to 858) | 485 | 640 | 1290 | 200 | 520 | 25 | 20 | |
| ERZC32CK821W | 32K821U | 820 (738 to 902) | 510 | 670 | 1355 | 200 | 545 | 25 | 20 | |
| ERZC32CK911W | 32K911U | 910 (819 to 1001) | 550 | 745 | 1500 | 200 | 600 | 25 | 20 | |
| ERZC32CK951W | 32K951U | 950 (855 to 1045) | 575 | 765 | 1570 | 200 | 600 | 25 | 20 | |
| ERZC40CK201W | 40K201U | 200 (185 to 225) | 130 | 170 | 340 | 250 | 260 | 30 | 25 | |
| ERZC40CK241W | 40K241U | 240 (216 to 264) | 150 | 200 | 395 | 250 | 300 | 30 | 25 | |
| ERZC40CK271W | 40K271U | 270 (247 to 303) | 175 | 225 | 455 | 250 | 340 | 30 | 25 | |
| ERZC40CK361W | 40K361U | 360 (324 to 396) | 230 | 300 | 595 | 250 | 405 | 30 | 25 | |
| ERZC40CK391W | 40K391U | 390 (351 to 429) | 250 | 320 | 650 | 250 | 435 | 30 | 25 | |
| ERZC40CK431W | 40K431U | 430 (387 to 473) | 275 | 350 | 710 | 250 | 500 | 30 | 25 | |
| ERZC40CK471W | 40K471U | 470 (423 to 517) | 300 | 385 | 775 | 250 | 505 | 30 | 25 | |
| ERZC40CK511W | 40K511U | 510 (459 to 561) | 320 | 415 | 845 | 250 | 505 | 30 | 25 | |
| ERZC40CK621W | 40K621U | 620 (558 to 682) | 385 | 505 | 1025 | 250 | 515 | 30 | 25 | |
| ERZC40CK681W | 40K681U | 680 (612 to 748) | 420 | 560 | 1120 | 250 | 560 | 30 | 25 | |
| ERZC40CK751W | 40K751U | 750 (675 to 825) | 460 | 615 | 1240 | 250 | 625 | 30 | 25 | |
| ERZC40CK781W | 40K781U | 780 (702 to 858) | 485 | 640 | 1290 | 250 | 650 | 30 | 25 | |
| ERZC40CK821W | 40K821U | 820 (738 to 902) | 510 | 670 | 1355 | 250 | 680 | 30 | 25 | |
| ERZC40CK911W | 40K911U | 910 (819 to 1001) | 550 | 745 | 1500 | 250 | 750 | 30 | 25 | |
| ERZC40CK951W | 40K951U | 950 (855 to 1045) | 575 | 765 | 1570 | 250 | 750 | 30 | 25 | |

Dimensions (not to scale)

Unit : mm

- ZNR
- Abbreviation of Part No.
- Date code



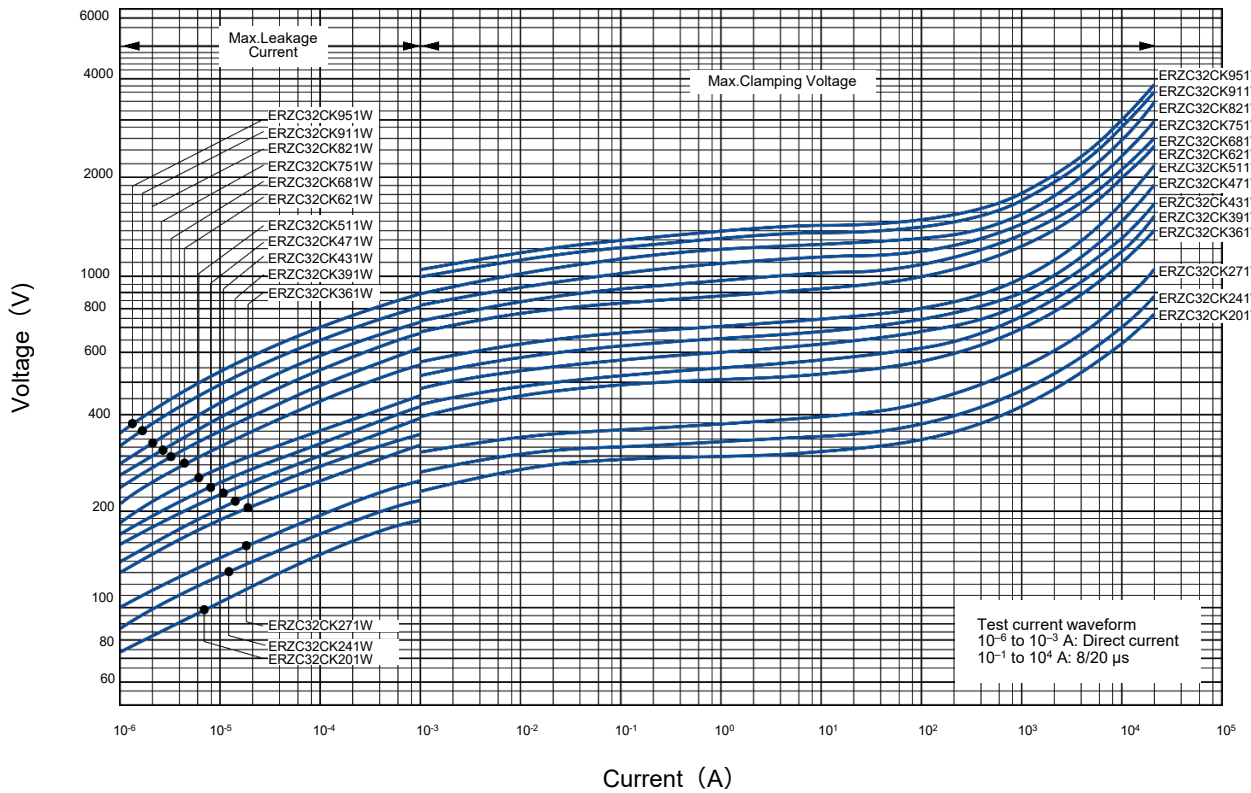
| Part No. (UL/CSA recognized) | Type designation | D max. | H max. | T max. | d |
|---------------------------------|------------------|--------|---------|--------|---------|
| ERZC32CK201W | 32K201U | 36 | 46 | 7.5 | 5.7±1.0 |
| ERZC32CK241W | 32K241U | | | 7.5 | 5.4±1.0 |
| ERZC32CK271W | 32K271U | | | 8.5 | 5.2±1.0 |
| ERZC32CK361W | 32K361U | | | 9.0 | 4.6±1.0 |
| ERZC32CK391W | 32K391U | | | 9.0 | 4.4±1.0 |
| ERZC32CK431W | 32K431U | | | 9.0 | 4.1±1.0 |
| ERZC32CK471W | 32K471U | | | 9.7 | 3.9±1.0 |
| ERZC32CK511W | 32K511U | | | 9.7 | 4.5±1.0 |
| ERZC32CK621W | 32K621U | | | 9.7 | 3.9±1.0 |
| ERZC32CK681W | 32K681U | | | 9.7 | 3.6±1.0 |
| ERZC32CK751W | 32K751U | | | 10.5 | 3.3±1.0 |
| ERZC32CK781W | 32K781U | | | 10.5 | 3.1±1.0 |
| ERZC32CK821W | 32K821U | | | 10.5 | 2.9±1.0 |
| ERZC32CK911W | 32K911U | | | 11.5 | 2.5±1.0 |
| ERZC32CK951W | 32K951U | | | 11.5 | 2.3±1.0 |
| ERZC40CK201W | 40K201U | | | 44 | 50 |
| ERZC40CK241W | 40K241U | 7.5 | 5.4±1.0 | | |
| ERZC40CK271W | 40K271U | 8.5 | 5.2±1.0 | | |
| ERZC40CK361W | 40K361U | 9.0 | 4.6±1.0 | | |
| ERZC40CK391W | 40K391U | 9.0 | 4.4±1.0 | | |
| ERZC40CK431W | 40K431U | 9.0 | 4.1±1.0 | | |
| ERZC40CK471W | 40K471U | 9.7 | 3.9±1.0 | | |
| ERZC40CK511W | 40K511U | 9.7 | 4.5±1.0 | | |
| ERZC40CK621W | 40K621U | 9.7 | 3.9±1.0 | | |
| ERZC40CK681W | 40K681U | 9.7 | 3.6±1.0 | | |
| ERZC40CK751W | 40K751U | 10.5 | 3.3±1.0 | | |
| ERZC40CK781W | 40K781U | 10.5 | 3.1±1.0 | | |
| ERZC40CK821W | 40K821U | 10.5 | 2.9±1.0 | | |
| ERZC40CK911W | 40K911U | 11.5 | 2.5±1.0 | | |
| ERZC40CK951W | 40K951U | 11.5 | 2.3±1.0 | | |

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.

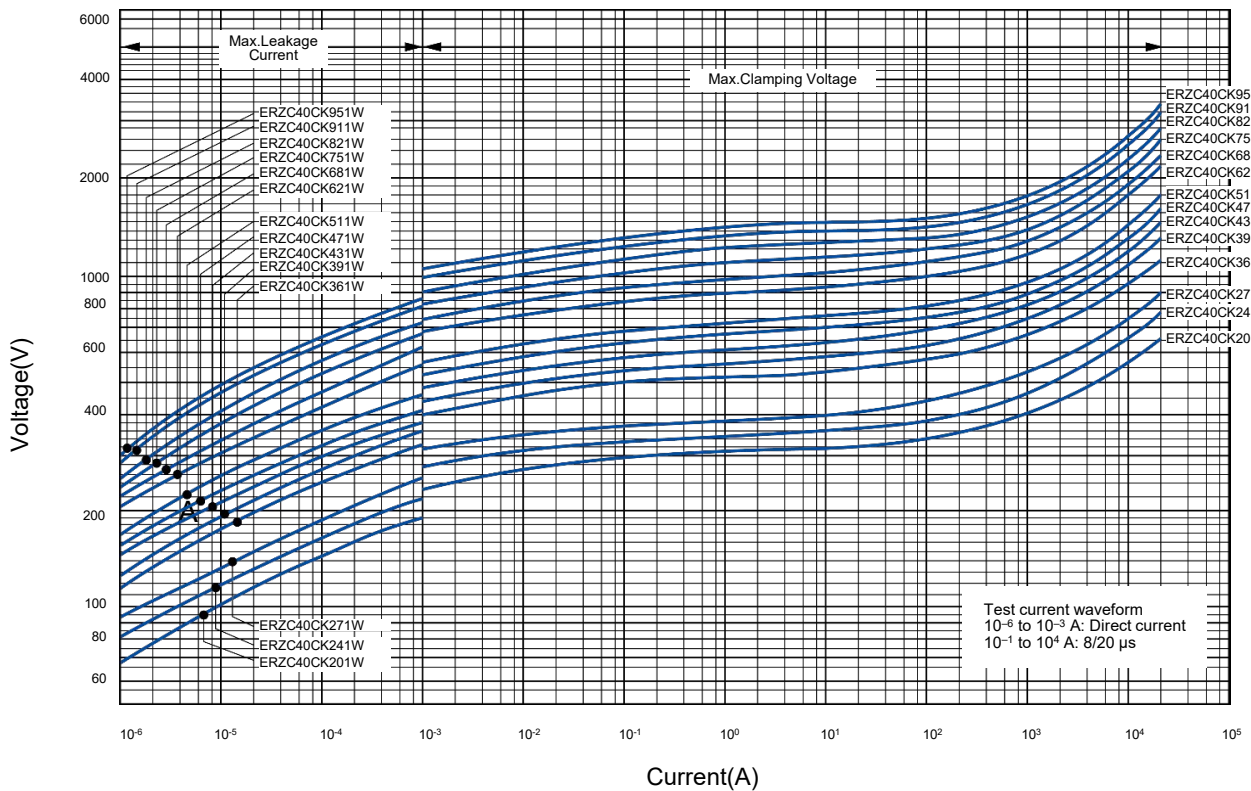
Typical characteristics

Voltage vs. Current

(ERZC32CK201W to ERZC32CK951W)



(ERZC40CK201W to ERZC40CK951W)



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

| Part No. (UL/CSA recognized) | Maximum allowable voltage | | Rated voltage (Vrms) | |
|---------------------------------|---------------------------|--------|----------------------|--------------------|
| | AC rms (V) | DC (V) | UL1449 | CSA C22.2 No.269.5 |
| ERZC32CK201W | 130 | 170 | 118 | 118 |
| ERZC32CK241W | 150 | 200 | 136 | 136 |
| ERZC32CK271W | 175 | 225 | 159 | 159 |
| ERZC32CK361W | 230 | 300 | 209 | 209 |
| ERZC32CK391W | 250 | 320 | 227 | 227 |
| ERZC32CK431W | 275 | 350 | 250 | 250 |
| ERZC32CK471W | 300 | 385 | 272 | 272 |
| ERZC32CK511W | 320 | 415 | 291 | 291 |
| ERZC32CK621W | 385 | 505 | 350 | 350 |
| ERZC32CK681W | 420 | 560 | 381 | 381 |
| ERZC32CK751W | 460 | 615 | 418 | 418 |
| ERZC32CK781W | 485 | 640 | 440 | 440 |
| ERZC32CK821W | 510 | 670 | 463 | 463 |
| ERZC32CK911W | 550 | 745 | 500 | 500 |
| ERZC32CK951W | 575 | 765 | 522 | 522 |
| ERZC40CK201W | 130 | 170 | 118 | 118 |
| ERZC40CK241W | 150 | 200 | 136 | 136 |
| ERZC40CK271W | 175 | 225 | 159 | 159 |
| ERZC40CK361W | 230 | 300 | 209 | 209 |
| ERZC40CK391W | 250 | 320 | 227 | 227 |
| ERZC40CK431W | 275 | 350 | 250 | 250 |
| ERZC40CK471W | 300 | 385 | 272 | 272 |
| ERZC40CK511W | 320 | 415 | 291 | 291 |
| ERZC40CK621W | 385 | 505 | 350 | 350 |
| ERZC40CK681W | 420 | 560 | 381 | 381 |
| ERZC40CK751W | 460 | 615 | 418 | 418 |
| ERZC40CK781W | 485 | 640 | 440 | 440 |
| ERZC40CK821W | 510 | 670 | 463 | 463 |
| ERZC40CK911W | 550 | 745 | 500 | 500 |
| ERZC40CK951W | 575 | 765 | 522 | 522 |

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 1mA DC applied is called V_1 or V_{1mA} . The measurement shall be made as fast as possible to avoid heat affection. | To meet the specified value | | | | | | | | | | | | | | | | |
| | Maximum allowable voltage | The maximum sinusoidal wave voltage (rms) or the maximum DC voltage that can be applied continuously. | | | | | | | | | | | | | | | | | |
| | Clamping voltage | The maximum voltage between two terminals with the specified standard impulse current (8/20 μ s). | | | | | | | | | | | | | | | | | |
| | Rated power | The maximum power that can be applied within the specified ambient temperature. | | | | | | | | | | | | | | | | | |
| | Maximum energy | The maximum energy within the varistor voltage change of ± 10 % when one impulse of 2 ms is applied. | | | | | | | | | | | | | | | | | |
| | Maximum peak current | 2 times | | The maximum current within the varistor voltage change of ± 10 % with the standard impulse current (8/20 μ s) applied two times with an interval of 5 minutes. | | | | | | | | | | | | | | | |
| 1 time | | The maximum current within the varistor voltage change of ± 10 % with the standard impulse current (8/20 μ s) applied one time. | | | | | | | | | | | | | | | | | |
| Mechanical | Robustness of terminations (Tensile) | After gradually applying the load of 19.6 N (2 kgf) and keeping the unit fixed for 10 seconds, the terminal shall be visually examined for any damage. | No remarkable damage | | | | | | | | | | | | | | | | |
| | Vibration | After repeatedly applying a single harmonic vibration (amplitude: 0.35 mm): double amplitude: 0.7 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. | No remarkable damage | | | | | | | | | | | | | | | | |
| | Solderability | After dipping the terminal to a depth of approximately 3 mm from the body in a soldering bath of 230 ± 5 °C for 5.0 ± 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 | The terminal shall be dipped into a soldering bath having a temperature of 350 ± 10 °C to a point 4.0 ± 0.8 mm from the body of the unit and then be held there for 3.0 ± 0.5 seconds. The change of V_c and mechanical damage shall be examined. | $\Delta V_{1mA}/V_{1mA} \leq \pm 5 \%$ | | | | | | | | | | | | | | | | |
| Environmental | Dry heat/ high temperature storage | The specimen shall be subjected to 125 ± 2 °C for 500 hours in a thermostatic bath without load and then stored at room temperature and humidity for one to two hours. Thereafter, the change of V_c shall be measured. | $\Delta V_{1mA}/V_{1mA} \leq \pm 5 \%$ | | | | | | | | | | | | | | | | |
| | Damp heat/humidity (Steady State) | The specimen shall be subjected to 40 ± 2 °C, 90 to 95 %RH for 1000 hours without load and then stored at room temperature and humidity for one to two hours. Thereafter, the change of V_c shall be measured. | | | | | | | | | | | | | | | | | |
| | Temperature cycle | <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-25 ± 3</td> <td>30⁺³ ..0</td> </tr> <tr> <td>2</td> <td>Room Temp.</td> <td>3 max.</td> </tr> <tr> <td>3</td> <td>85 ± 2</td> <td>30⁺³ ..0</td> </tr> <tr> <td>4</td> <td>Room Temp.</td> <td>3 max.</td> </tr> </tbody> </table> | | Step | Temperature (°C) | Period (minutes) | 1 | -25 ± 3 | 30 ⁺³ ..0 | 2 | Room Temp. | 3 max. | 3 | 85 ± 2 | 30 ⁺³ ..0 | 4 | Room Temp. | 3 max. | $\Delta V_{1mA}/V_{1mA} \leq \pm 5 \%$ No remarkable damage |
| | | Step | Temperature (°C) | Period (minutes) | | | | | | | | | | | | | | | |
| 1 | -25 ± 3 | 30 ⁺³ ..0 | | | | | | | | | | | | | | | | | |
| 2 | Room Temp. | 3 max. | | | | | | | | | | | | | | | | | |
| 3 | 85 ± 2 | 30 ⁺³ ..0 | | | | | | | | | | | | | | | | | |
| 4 | Room Temp. | 3 max. | | | | | | | | | | | | | | | | | |
| Dry heat load/ high temperature load | After being continuously applied the Maximum Allowable Voltage at 85 ± 2 °C for 500 hours, the specimen shall be stored at room temperature and humidity for one to two hours. Thereafter, the change of V_c shall be measured. | $\Delta V_{1mA}/V_{1mA} \leq \pm 10 \%$ | | | | | | | | | | | | | | | | | |

Minimum quantity / Packing unit

| Product | Series / Type | | Part number | Minimum quantity / Packing unit | Packing quantity in carton | Carton (about) L×W×H (mm) |
|---------------------------------|---------------|-----------------------|--------------|---------------------------------|----------------------------|---------------------------|
| "ZNR" Transient/surge absorbers | CK type | UL and CSA recognized | ERZC□□CK□□□W | 10 | 200 | 320×430×65 |

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

※ Please contact local sales office about packing specifications.

Matters to Be Observed When Using This Product

(P, J, G-type / Arrestor box / E, J-type for thyristor)

Safety measures

An abnormal state for varistors (ZNR surge absorbers) of P-type, J-type, G-type, an arrestor box, and varistors for thyristors (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
 - ① When the surge absorber is placed between lines, connect a normal type current fuse in series with the surge absorber.
 - ② The P-type surge absorber has a built-in temperature fuse but its breaking capacity is low (0.3 A). For this reason, a current fuse needs to be connected in series with the surge absorber.
- (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.

■ Do not touch a live part of the surge absorber. You may get an electric shock when touching it. In case the surge absorber should short-circuit and generate smoke or ignite, immediately cut off current flow to 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 and product life

- To know the detailed specifications of individual products or specific evaluation test scores, please contact us.
- We recommend you to carry out a maintenance check of the varistor to measure its varistor voltage once every two years. The varistor should be replaced when a difference between the current varistor voltage (1 mA V) and the initial varistor voltage exceeds $\pm 10\%$.

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.
- 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.
- Use an arrestor box with the specified power distribution layout.

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 the surge absorber or apply force thereto close to the insulation cover of the lead terminal.
- Make the wire as short and straight as possible.

Mounting and storage conditions

- Do not melt solder or the insulation material making up the surge absorber when soldering the lead terminal.
- 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.
- 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.

Varistors (ZNR Surge Absorber)

P type

Varistors (ZNR Surge Absorber), Type P is a suitable device to protect various electric equipment and semiconductive devices from instantaneous over-voltages like switching surges and induced lightnings. The Type P is characterized by the unique construction of plug-in type with a deterioration indicator.



Features

- RoHS compliant

Recommended applications

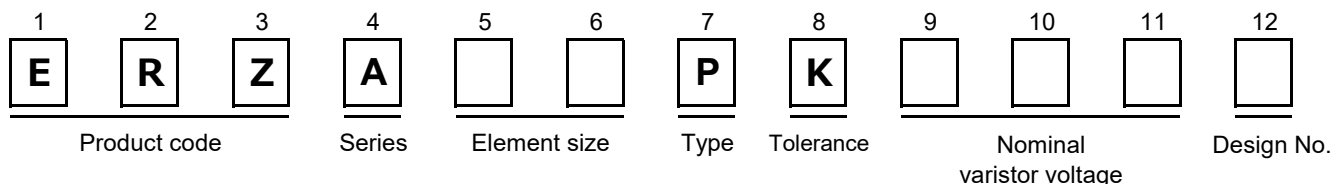
Protection of semiconductor devices used for the electronic equipment includes:

- Broadcasting, communication equipment
- Traffic or railroad systems
- Automatic control devices for power distribution
- Waterworks
- Protection of motor coils, vacuum switches

Note : Ask our factory for product specification before use.

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

Explanation of part numbers



Ratings and characteristics

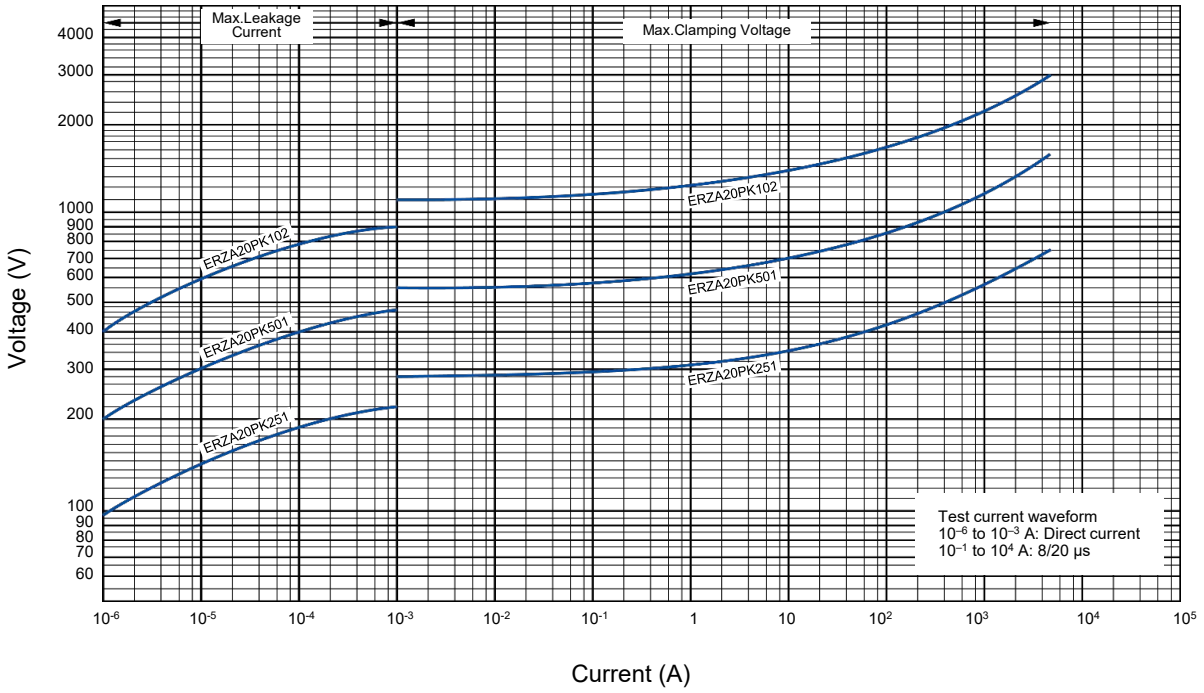
● Operating temperature range : -25 to 70 °C

● Storage temperature range : -25 to 70 °C

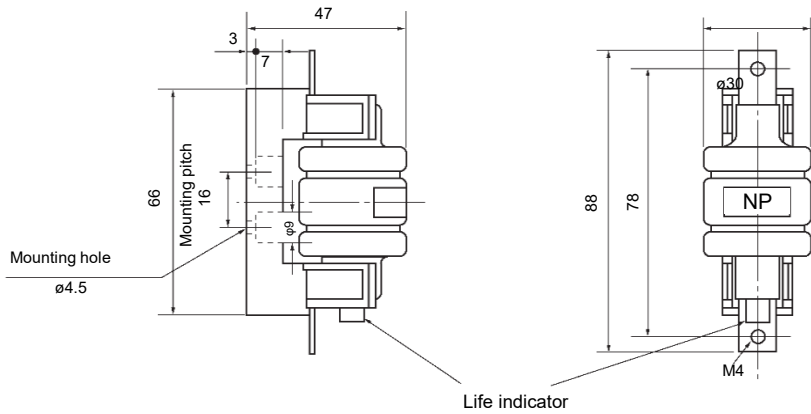
| Part No. | Varistor voltage at 1 m A | Maximum allowable voltage | | Maximum clamping voltage at 100A | Maximum peak current (8/20 μs, 2 times) | Maximum energy (2 ms, 1 time) | Typical capacitance (Reference) at 1 kHz |
|-------------|---------------------------|---------------------------|--------|----------------------------------|---|-------------------------------|--|
| | (V) | ACrms(V) | DC (V) | (V) | (A) | (J) | (pF) |
| ERZA20PK251 | 250±10 % | 130 | 180 | 410 | 5000 | 90 | 1200 |
| ERZA20PK501 | 500±10 % | 260 | 360 | 825 | 5000 | 150 | 600 |
| ERZA20PK102 | 1000±10 % | 520 | 730 | 1650 | 5000 | 240 | 300 |

Typical characteristics

Voltage vs. Current (ERA20PK251 to ERZA20PK102)



Dimensions in mm (not to scale)



Unit : mm

Minimum quantity / Packing unit

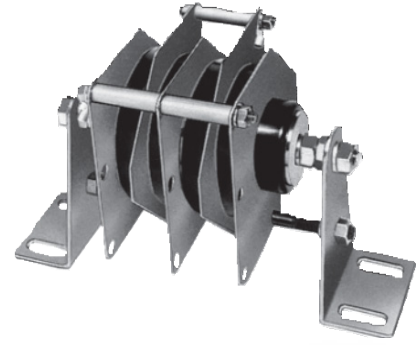
| Product | Series / Type | Part number | Minimum quantity / Packing unit | Packing quantity in carton | Carton (about) L×W×H (mm) |
|---------------------------------|---------------|-------------|---------------------------------|----------------------------|---------------------------|
| "ZNR" Transient/surge absorbers | P type | ERZA20PK□□□ | 1 | 40 | 380×405×75 |

Part No., quantity and country of origin are designated on outer packages in English.
 ※ Please contact local sales office about packing specifications.

Varistors (ZNR Surge Absorber)

J type

Varistors (ZNR Surge Absorber), Type J, are designed especially for surge protection of industrial equipment from high energy transient voltages which are generated by switching of the inductive loads such as DC magnet relays or transformers.



Features

- Low clamping voltage
- Fast response to steep impulse voltage
- A bilateral and symmetrical V-I characteristic curve
- Higher energy handling capability (5000 to 44000 J)
- No follow-on current
- Wide product range [Varistor Voltage] 500 V to 1300 V
- RoHS compliant

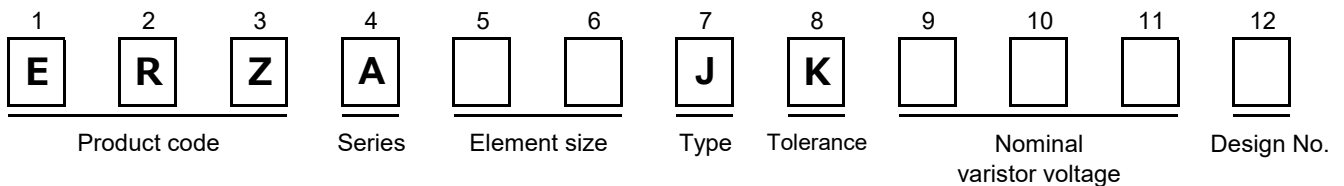
Recommended applications

- Suppression of volume surges such as those produced by switching of DC lifting magnets and within equipment in railroad vehicles
- Protection of a current transformer from overheating caused with secondary opening
- Protection of thyristors or diodes employed in power supply equipment

Note : Ask our factory for product specification before use.

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

Explanation of part numbers



Ratings and characteristics

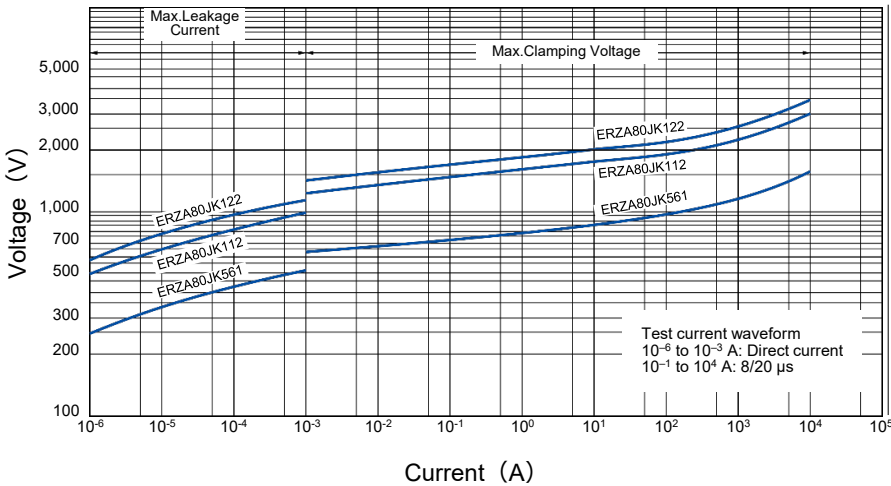
● Operating temperature range : -25 to 70 °C

● Storage temperature range : -25 to 110 °C

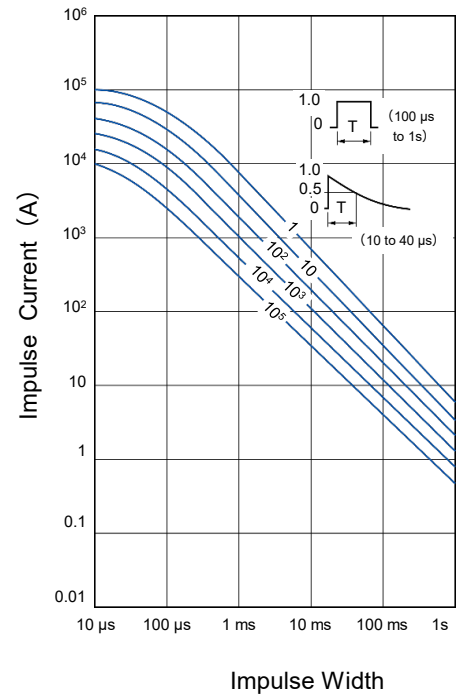
| Part No. | Varistor voltage at 1m A | Maximum allowable voltage | | Maximum clamping voltage at 100 A | Maximum energy | Maximum peak current (4/10 μs, 2 times) | Typical capacitance (Reference) at 1 kHz |
|--------------|--------------------------|---------------------------|--------|-----------------------------------|----------------|---|--|
| | (V) | ACrms (V) | DC (V) | (V) | (J) | (kA) | (pF) |
| ERZA80JK561 | 560 (505 to 615) | 250 | 350 | 925 | 5000 | 80 | 9800 |
| ERZA80JK561A | | | | | 10000 | 80 ×2 | 19600 |
| ERZA80JK561B | | | | | 15000 | 80 ×3 | 29400 |
| ERZA80JK561C | | | | | 20000 | 80 ×4 | 39200 |
| ERZA80JK112 | 1100 (980 to 1200) | 485 | 680 | 1800 | 10000 | 80 | 4800 |
| ERZA80JK112A | | | | | 20000 | 80 ×2 | 9600 |
| ERZA80JK112B | | | | | 30000 | 80 ×3 | 14400 |
| ERZA80JK112C | | | | | 40000 | 80 ×4 | 19200 |
| ERZA80JK122 | 1250 (1120 to 1380) | 550 | 775 | 2070 | 11000 | 80 | 4400 |
| ERZA80JK122A | | | | | 22000 | 80 ×2 | 8800 |
| ERZA80JK122B | | | | | 33000 | 80 ×3 | 13200 |
| ERZA80JK122C | | | | | 44000 | 80 ×4 | 17600 |

Typical characteristics

Voltage vs. Current

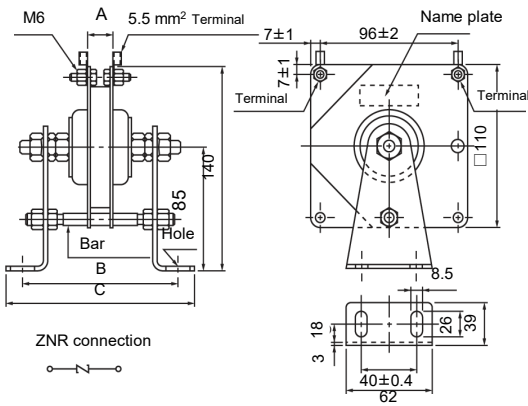


Impulse Derating (Relation between impulse width and impulse current multiple)

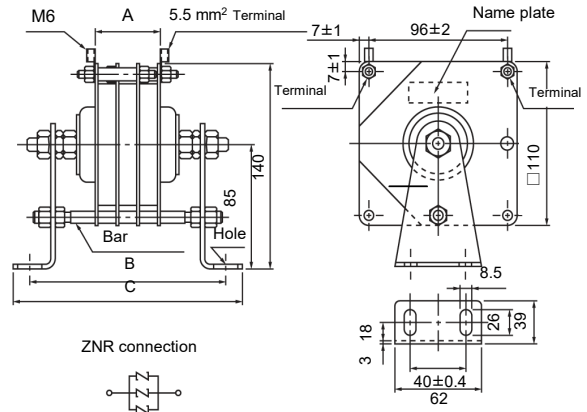


Dimensions in mm (not to scale)

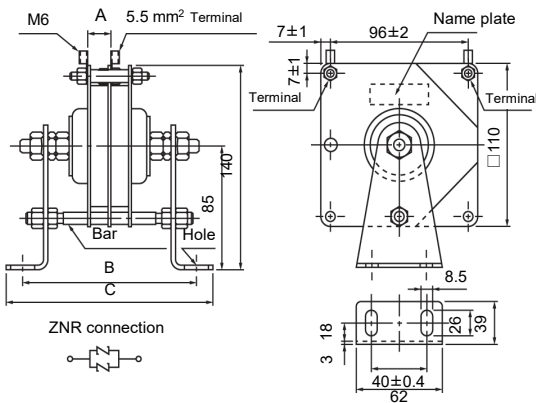
ERZA80JK□□□



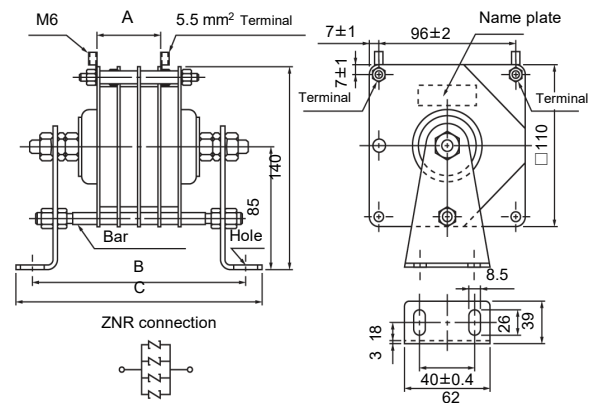
ERZA80JK□□□B



ERZA80JK□□□A



ERZA80JK□□□C



Unit : mm

| Part No. | A | B | C |
|--------------|------|-----------|-----------|
| ERZA80JK561 | 14.0 | 125.0±4.0 | 161.0±4.0 |
| ERZA80JK561A | 14.0 | 138.0±8.0 | 174.0±8.0 |
| ERZA80JK561B | 40.0 | 151.0±8.0 | 187.0±8.0 |
| ERZA80JK561C | 40.0 | 164.0±8.0 | 200.0±8.0 |
| ERZA80JK112 | 19.0 | 130.0±4.0 | 166.0±4.0 |
| ERZA80JK112A | 19.0 | 148.0±8.0 | 184.0±8.0 |
| ERZA80JK112B | 56.0 | 167.0±8.0 | 203.0±8.0 |
| ERZA80JK112C | 56.0 | 185.0±8.0 | 221.0±8.0 |
| ERZA80JK122 | 21.0 | 132.0±4.0 | 168.0±4.0 |
| ERZA80JK122A | 21.0 | 152.0±8.0 | 188.0±8.0 |
| ERZA80JK122B | 61.0 | 172.0±8.0 | 208.0±8.0 |
| ERZA80JK122C | 61.0 | 192.0±8.0 | 228.0±8.0 |

Minimum quantity / Packing unit

| Product | Series / Type | Part number | Minimum quantity / Packing unit | Packing quantity in carton | Carton (about) L×W×H (mm) |
|---------------------------------|---------------|-------------|---------------------------------|----------------------------|---------------------------|
| "ZNR" Transient/surge absorbers | J type | ERZA80JK□□□ | 1 | 3 | 220×280×195 |

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

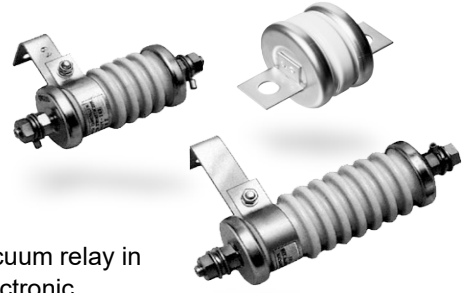
※ Please contact local sales office about packing specifications.

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.

Varistors (ZNR Surge Absorber)

G type



High energy transient over voltages generated by switching on/off of a vacuum relay in power distribution line can cause insulation breakdown of high voltage electronic equipment/devices and power cables etc...

Varistors (ZNR Surge Absorber), Type G are gapless type arresters using sintered bodies of zinc-oxide and are characterized by the excellent characteristics of high energy handling capability, fast response time and low clamp ratio etc... The ZNR and G have wide applications for protection of high-voltage motors, transformers, rectifiers and anticorrosion layers of powercables from high energy transient overvoltages/surges.

Features

- RoHS compliant

Recommended applications

- Protection of high voltage motors, transformers or rectifiers from switching surges
- Switching surge absorption in vacuum circuit interrupters
- Protection of anti-corrosion layer of under ground electric power cable from induced lightning or switching surges

Note : Ask our factory for Product Specification before use.

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

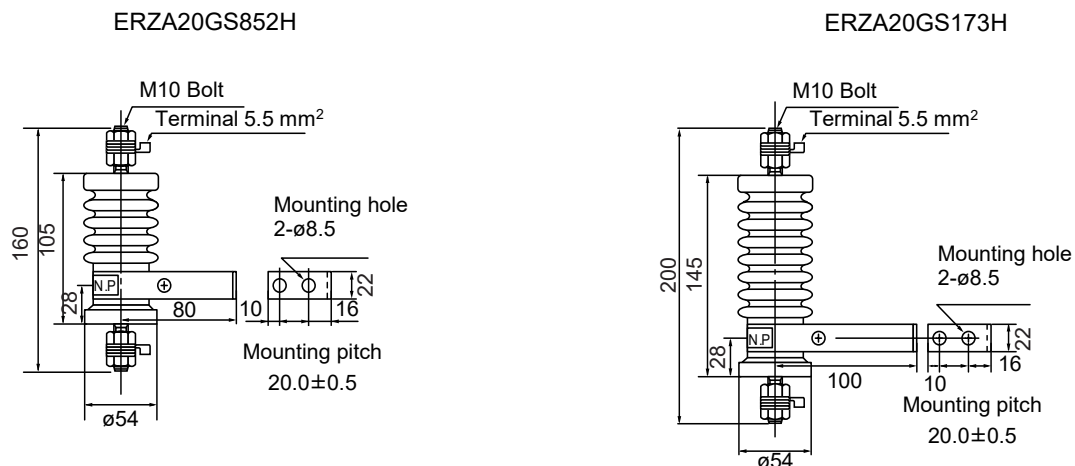
Ratings and characteristics

● Operating temperature range : -25 to 70 °C

● Storage temperature range : -40 to 85 °C

| Characteristics | Part No. | ERZA20GS852H | ERZA20GS173H |
|--|----------|--|---|
| Connection | | AC 3.3 kV Line-Ground | AC 6.6 kV Line-Ground |
| Varistor voltage (V_{1mA}) | | 8.50 $\begin{smallmatrix} +0.75 \\ -0.50 \end{smallmatrix}$ kV | 17.0 $\begin{smallmatrix} +1.50 \\ -1.0 \end{smallmatrix}$ kV |
| Maximum clamping voltage @100 A (8/20 μ s) | | 12.75 kV | 25.5 kV |
| Maximum peak current (8/20 μ s, 2 times) | | 5000 A | 5000 A |
| Maximum allowable voltage | | AC 3.45 kV | AC 6.9 kV |
| Impulse life (2 ms, 10^4 times) | | 20 A | 20 A |
| Maximum allowable energy | | 1300 J | 2600 J |

Dimensions in mm (not to scale)



Unit : mm

Ratings and characteristics

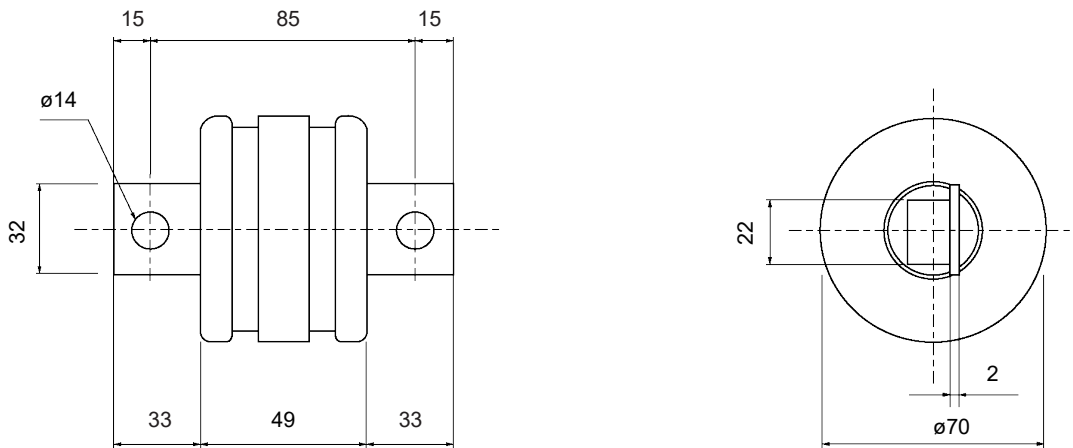
● Operating temperature range : 0 to 50 °C

● Storage temperature range : -10 to 70 °C

| | |
|---|----------------------------------|
| Part No. | ERZA48GK502 |
| Characteristics | |
| Connection | Across the Anti-corrosion layers |
| Varistor voltage (V_{1mA}) | 5.0 kV±0.5 kV |
| Maximum clamping voltage (8/20 μ s) | 14 kV at V23 kA |
| Maximum peak current (8/20 μ s) | 21 kA at 100 times |

Dimensions in mm (not to scale)

ERZA48GK502



Unit : mm

Minimum quantity / Packing unit

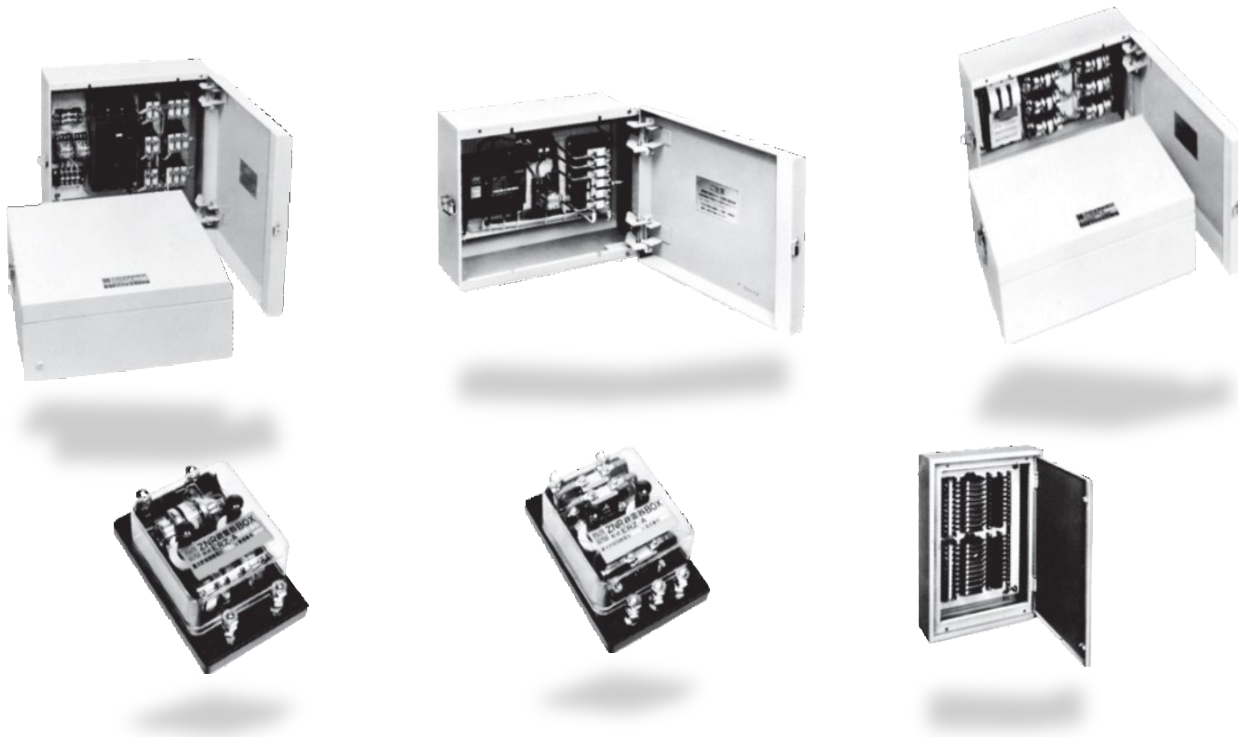
| Product | Series / Type | Part number | Minimum quantity / Packing unit | Packing quantity in carton | Carton (about) L×W×H (mm) |
|---------------------------------|---------------|-------------|---------------------------------|----------------------------|---------------------------|
| "ZNR" Transient/surge absorbers | G type | ERZA□□GK□□□ | 1 | 3 | 220×280×195 |

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

※ Please contact local sales office about packing specifications.

Varistors (ZNR Surge Absorber)

Surge absorber units



The Surge Absorber Unit contains Y, Δ or p connected ZNRs surge absorbers (and, if necessary, a circuit breaker) in a box.

These Surge Absorber Units are designed for surge protection of industrial electric equipment where reliability is essential.

Recommended applications

Surge Protection of

- Railway/traffic signal control systems
- Distribution line control systems
- Broadcasting systems, communication systems
- Measuring instruments
- Controllers of low voltage distribution line
- Controllers of waterworks

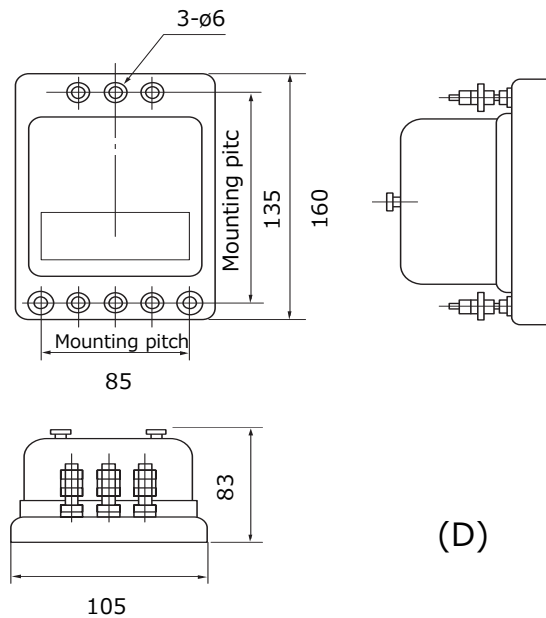
Note : Ask our factory for Product Specification before use.

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

ZNR Surge absorber units

| Application | Maximum peak current | Rated voltage | Part No. | Dimensions | Connection |
|--|----------------------|---------------|--------------|------------|---|
| For signal system (Line to line and Line to ground use) | 5000 A | DC 12 V | ERZA5F220AC | D | Coil: 1 mH max. Max. continuous current: 0.6 A |
| | | DC 24 V | ERZA5F390AC | | |
| | | DC 48 V | ERZA5F680AC | | |
| | | DC 80 V | ERZA5F101AC | | |
| | | DC 100 V | ERZA5F201ACA | | |
| For signal system (Line to line use only) | 5000 A | DC 12 V | ERZA5F220BC | D | Coil: 1 mH max. Max. continuous current: 0.6 A |
| | | DC 24 V | ERZA5F390BC | | |
| | | DC 48 V | ERZA5F680BC | | |
| | | DC 80 V | ERZA5F101BC | | |
| | | DC 100 V | ERZA5F201BC | | |

Dimensions in mm (not to scale)



Unit:mm

Minimum quantity / Packing unit

| Product | Series / Type | Part number | Minimum quantity / Packing unit | Packing quantity in carton | Carton (about) L×W×H (mm) |
|---------------------------------|----------------------|--------------|---------------------------------|----------------------------|---------------------------|
| "ZNR" Transient/surge absorbers | Surge absorber units | ERZA□□□□□□□□ | 1 | — | 275×345×145 |

Part No., quantity and country of origin are designated on outer packages in English.
 ※ Please contact local sales office about packing specifications.

Varistors (ZNR Surge Absorber) For thyristor protection

E type
J type



Varistors (ZNR Surge Absorber) for thyristors is especially designed to protect Thyristor power controllers and Thyristor power sources from high energy transient over voltages.

The ZNR is smaller in size and excellent in the clamping voltage characteristics as compared with a conventional selenium surge absorber.

Type E is for relatively low handling capacity of trans-former and Type J is for heavy duty use.

Features

- RoHS compliant

Recommended applications

- Surge protection of thyristor power controllers
- Surge protection of thyristor power sources

Note : Ask our factory for product specification before use.

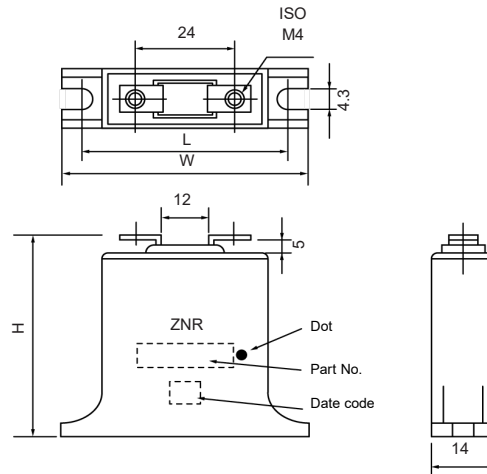
■ As for handling precautions and minimum quantity / Packing unit please see related information.

Ratings and characteristics (E type)

- Operating temperature range : -40 to 85 °C
- Storage temperature range : -40 to 110 °C

| Part No. | Varistor voltage at 1 mA | Maximum allowable voltage | | Maximum clamping voltage | | Impulse life (2 ms, 10 ⁴ times) (A) | Commutation surge ratio |
|--------------|--------------------------|---------------------------|--------|--------------------------|--------------------|--|-------------------------|
| | (V) | ACrms(V) | DC (V) | V _{ip} (V) | I _p (A) | | |
| ERZC20EK511P | 498 to 542 | 242 | 342 | 760 | 10 | 10 | 1.45 |
| ERZC20EK541P | 523 to 560 | 264 | 373 | 785 | | | 1.40 |
| ERZC20EK681P | 630 to 678 | 330 | 467 | 950 | | | 1.35 |
| ERZC20EK821P | 788 to 848 | 412 | 583 | 1185 | | | 1.35 |
| ERZC20EK911P | 840 to 904 | 440 | 622 | 1265 | | | 1.35 |
| ERZC20EK102P | 945 to 1017 | 495 | 700 | 1425 | | | 1.35 |
| ERZC20EK112P | 1051 to 1181 | 550 | 775 | 1655 | | | 1.35 |
| ERZC32EK511P | 498 to 542 | 242 | 342 | 760 | | | 20 |
| ERZC32EK541P | 523 to 560 | 264 | 373 | 785 | 1.40 | | |
| ERZC32EK681P | 630 to 678 | 330 | 467 | 950 | 1.35 | | |
| ERZC32EK821P | 788 to 848 | 412 | 583 | 1185 | 1.35 | | |
| ERZC32EK911P | 840 to 904 | 440 | 622 | 1265 | 1.35 | | |
| ERZC32EK102P | 945 to 1017 | 495 | 700 | 1425 | 1.35 | | |
| ERZC32EK112P | 1051 to 1181 | 550 | 775 | 1655 | 1.35 | | |

Dimensions in mm (not to scale) (E type)



Unit : mm

| Part No. | W | H | L |
|--------------|------|------|------|
| ERZC20EK□□□P | 48±1 | 42±1 | 39±1 |
| ERZC32EK□□□P | 60±1 | 55±1 | 51±1 |

Ratings and characteristics (J type)

● Operating temperature range : -40 to 70 °C

● Storage temperature range : -40 to 110 °C

| Part No. | Connection | Maximum allowable voltage | | Maximum clamping voltage | | Impulse life (2 ms, 10 ⁴ times) (A) | Commutation surge ratio | Dimensions in mm | | | |
|--------------|------------|---------------------------|--------|--------------------------|--------------------|--|----------------------------|------------------|-----|-----|----|
| | | ACrms (V) | DC (V) | V _{lp} (V) | I _p (A) | | | Style | A | B | C |
| ERZU11JP511 | Single | 242 | 342 | 760 | 40 | 40 | 1.45 | (1) | 88 | 108 | 20 |
| ERZU12JP511 | | | | | 70 | 70 | | | 104 | 124 | |
| ERZU13JP511 | | | | | 95 | 95 | | | 121 | 141 | |
| ERZU14JP511 | | | | | 125 | 125 | | | 138 | 158 | |
| ERZU15JP511 | | | | | 150 | 150 | | | 155 | 175 | |
| ERZU16JP511 | | | | | 180 | 180 | | | 172 | 192 | |
| ERZU17JP511 | | | | | 210 | 210 | | | 189 | 209 | |
| ERZU11JP511B | Delta | 242 | — | 760 | 40 | 40 | 1.45 | (2) | 120 | 140 | 20 |
| ERZU12JP511B | | | | | 70 | 70 | | | 169 | 189 | |
| ERZU13JP511B | | | | | 95 | 95 | | | 219 | 239 | |
| ERZU14JP511B | | | | | 125 | 125 | | | 260 | 280 | |
| ERZU11JP541 | Single | 264 | 373 | 785 | 40 | 40 | 1.40 | (1) | 88 | 108 | 20 |
| ERZU12JP541 | | | | | 70 | 70 | | | 105 | 125 | |
| ERZU13JP541 | | | | | 95 | 95 | | | 122 | 142 | |
| ERZU14JP541 | | | | | 125 | 125 | | | 139 | 159 | |
| ERZU15JP541 | | | | | 150 | 150 | | | 156 | 176 | |
| ERZU16JP541 | | | | | 180 | 180 | | | 172 | 192 | |
| ERZU17JP541 | | | | | 210 | 210 | | | 189 | 209 | |
| ERZU11JP541B | Delta | 264 | — | 785 | 40 | 40 | 1.40 | (2) | 121 | 141 | 20 |
| ERZU12JP541B | | | | | 70 | 70 | | | 171 | 191 | |
| ERZU13JP541B | | | | | 95 | 95 | | | 221 | 241 | |
| ERZU14JP541B | | | | | 125 | 125 | | | 270 | 290 | |

Ratings and characteristics (J type)

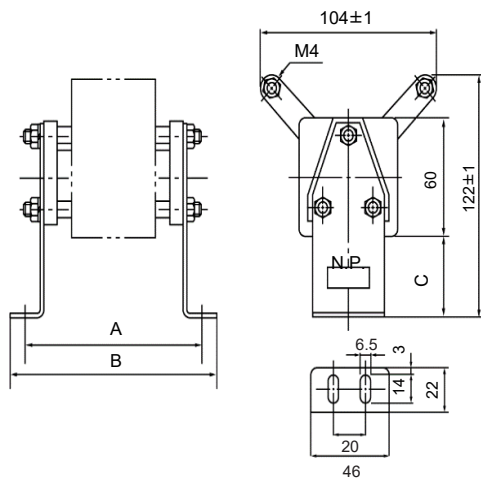
● Operating temperature range : -40 to 70 °C

● Storage temperature range : -40 to 110 °C

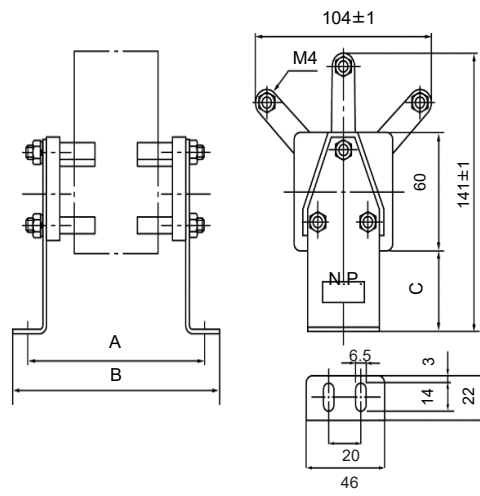
| Part No. | Connection | Maximum allowable voltage | | Maximum clamping voltage | | Impulse life (2 ms, 10 ⁴ times) (A) | Commutation surge ratio | Dimensions in mm | | | |
|--------------|------------|---------------------------|--------|--------------------------|--------------------|--|-------------------------|------------------|-----|-----|----|
| | | ACrms (V) | DC (V) | V _{ip} (V) | I _p (A) | | | Style | A | B | C |
| ERZU21JP102 | Single | 484 | 684 | 1520 | 40 | 40 | 1.45 | (1) | 102 | 122 | 20 |
| ERZU22JP102 | | | | | 70 | 70 | | | 135 | 155 | |
| ERZU23JP102 | | | | | 95 | 95 | | | 168 | 188 | |
| ERZU24JP102 | | | | | 125 | 125 | | | 199 | 219 | |
| ERZU25JP102 | | | | | 150 | 150 | | | 230 | 250 | |
| ERZU26JP102 | | | | | 180 | 180 | | | 261 | 281 | |
| ERZU21JP102B | Delta | 484 | — | 1520 | 40 | 40 | 1.45 | (2) | 166 | 186 | 20 |
| ERZU22JP102B | | | | | 70 | 70 | | | 261 | 281 | |
| ERZU21JP112 | Single | 528 | 746 | 1570 | 40 | 40 | 1.40 | (1) | 103 | 123 | 20 |
| ERZU22JP112 | | | | | 70 | 70 | | | 136 | 156 | |
| ERZU23JP112 | | | | | 95 | 95 | | | 169 | 189 | |
| ERZU24JP112 | | | | | 125 | 125 | | | 200 | 220 | |
| ERZU25JP112 | | | | | 150 | 150 | | | 232 | 252 | |
| ERZU26JP112 | | | | | 180 | 180 | | | 264 | 284 | |
| ERZU21JP112B | Delta | 528 | — | 1570 | 40 | 40 | 1.40 | (2) | 168 | 188 | 20 |
| ERZU22JP112B | | | | | 70 | 70 | | | 264 | 284 | |
| ERZU21JP132F | Single | 660 | 933 | 1900 | 40 | 40 | 1.35 | (1) | 149 | 169 | 40 |
| ERZU22JP132F | | | | | 70 | 70 | | | 182 | 202 | |
| ERZU23JP132F | | | | | 95 | 95 | | | 214 | 234 | |
| ERZU24JP132F | | | | | 125 | 125 | | | 246 | 266 | |
| ERZU25JP132F | | | | | 150 | 150 | | | 278 | 298 | |
| ERZU26JP132F | | | | | 180 | 180 | | | 310 | 330 | |
| ERZU21JP132H | Delta | 660 | — | 1900 | 40 | 40 | 1.35 | (2) | 213 | 233 | 40 |
| ERZU22JP132H | | | | | 70 | 70 | | | 309 | 329 | |
| ERZU21JP162F | Single | 825 | 1167 | 2375 | 40 | 40 | 1.35 | (1) | 150 | 170 | 40 |
| ERZU22JP162F | | | | | 70 | 70 | | | 184 | 204 | |
| ERZU23JP162F | | | | | 95 | 95 | | | 218 | 238 | |
| ERZU24JP162F | | | | | 125 | 125 | | | 252 | 272 | |
| ERZU25JP162F | | | | | 150 | 150 | | | 286 | 306 | |
| ERZU26JP162F | | | | | 180 | 180 | | | 320 | 340 | |
| ERZU21JP162H | Delta | 825 | — | 2375 | 40 | 40 | 1.35 | (2) | 217 | 237 | 40 |
| ERZU22JP162H | | | | | 70 | 70 | | | 317 | 337 | |
| ERZU21JP192F | Single | 990 | 1400 | 2850 | 40 | 40 | 1.35 | (1) | 152 | 172 | 40 |
| ERZU22JP192F | | | | | 70 | 70 | | | 187 | 207 | |
| ERZU23JP192F | | | | | 95 | 95 | | | 222 | 242 | |
| ERZU24JP192F | | | | | 125 | 125 | | | 257 | 277 | |
| ERZU25JP192F | | | | | 150 | 150 | | | 292 | 312 | |
| ERZU26JP192F | | | | | 180 | 180 | | | 327 | 347 | |
| ERZU21JP192H | Delta | 990 | — | 2850 | 40 | 40 | 1.35 | (2) | 222 | 242 | 40 |
| ERZU22JP192H | | | | | 70 | 70 | | | 327 | 347 | |
| ERZU21JP222F | Single | 1100 | 1550 | 3325 | 40 | 40 | 1.35 | (1) | 154 | 174 | 40 |
| ERZU22JP222F | | | | | 70 | 70 | | | 190 | 210 | |
| ERZU23JP222F | | | | | 95 | 95 | | | 227 | 247 | |
| ERZU24JP222F | | | | | 125 | 125 | | | 264 | 284 | |
| ERZU21JP222H | Delta | 1100 | — | 3325 | 40 | 40 | 1.35 | (2) | 227 | 247 | 40 |
| ERZU31JP252F | Single | 1320 | 1867 | 3800 | 40 | 40 | 1.35 | (1) | 167 | 187 | 40 |
| ERZU32JP252F | | | | | 70 | 70 | | | 218 | 238 | |
| ERZU33JP252F | | | | | 95 | 95 | | | 269 | 289 | |
| ERZU34JP252F | | | | | 125 | 125 | | | 320 | 340 | |
| ERZU31JP252H | Delta | 1320 | — | 3800 | 40 | 40 | 1.35 | (2) | 266 | 288 | 40 |

Dimensions in mm (not to scale) (J type)

Style (1)



Style (2)



Unit : mm

Minimum quantity / Packing unit

| Product | Series / Type | | Part number | Minimum quantity / Packing unit | Packing quantity in carton | Carton (about) L×W×H (mm) |
|---------------------------------|--------------------------|--------|--------------|---------------------------------|----------------------------|---------------------------|
| "ZNR" Transient/surge absorbers | For thyristor protection | E type | ERZC□□EK□□□P | 5 | 100 | 300×355×65 |
| | | J type | ERZU□□JP□□□ | 1 | — | 160×420×185 |

Part No., quantity and country of origin are designated on outer packages in English.
 ※ Please contact local sales office about packing specifications.

Safety Precautions

When using our products, no matter what sort of equipment they might be used for, be sure to confirm the applications and environmental conditions with our specifications in advance.

Panasonic
INDUSTRY

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