

Date : September 05.2012

To: PIEキャラバン

# PRODUCT REFERENCE DATA SHEET

Product Description : ZNR SURGE ABSORBER  
Product Part Number : ERZE07A□□□  
: ERZE07A□□□C S  
: ERZE07B□□□C S  
: ERZE07E□□□  
: ERZE07F□□□

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**Panasonic**

|                |                                         |                   |
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| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Bulk Type) | 1 - 22            |
|                |                                         | DATE Aug. 1, 2012 |

## [HANDLING PRECAUTIONS]

### **⚠ Precautions for Safety**

In the case that a ZNR surge absorber (Type D, Series E ) (hereafter referred to as the ZNR ,or product name) is used , if an abnormality takes place because of peripheral conditions of the ZNR (material, environments, power source conditions, circuit conditions, etc. in equipment design), fire, electric shock, burn, or product failure may be occur.  
The precautions for this product are described below, understand the content thoroughly before usage.  
For more questions, contact us.

### **1. ⚠ Precautions to be strictly observe**

#### 1.1 Confirmation of performance ratings

Use the ZNR within its rated range of performance such as the Max. allowable voltage, withstanding surge current, withstanding energy, impulse life (surge life), average pulse power, and operating temperature range. If used outside the range, the ZNR can be degrade and have element fracture, which may result in smoking and ignition.

#### 1.2 To avoid accidents due to unexpected phenomena, take the following measures

- 1) In the event of fracture of the ZNR, its pieces may scatter ; hence, put the case or cover of the set product in place.
- 2) Do not install the ZNR near combustible substances (polyvinyl chloride wires, resin moldings, etc.).  
If it is difficult to do, install a nonflammable cover.
- 3) Across-the-line use  
When the ZNR is used across a line, put a current fuse in series with the ZNR.  
(Refer to Item 2.1, 1) (4) and Table 1.)
- 4) Use between line to ground
  - (1) In the case that the ZNR is used between a line to the ground, the short-circuit of the ZNR may not blow the current fuse because of grounding resistance, which may cause smoking and ignition of the ZNR's exterior resin.  
As the measure against it, install an earth leakage breaker on the power supply side of the ZNR position.  
If no earth leakage breaker is installed, use a thermal fuse together with a current fuse in series.  
(Refer to Table 1.)
  - (2) In the case that the ZNR is used between a live part and metal case, a electric shock may develop at a short circuit of the ZNR ; hence, ground the metal case to the ground or keep it from the human body.

### **2. Application notes**

#### 2.1 Pay attention to the following items to avoid the shortened life and failure of the ZNR

##### 1) Circuit conditions

- (1) Select a ZNR of which the maximum voltage including fluctuations in source voltage allows for the maximum permissible circuit voltage. (Refer to Table 1.)
  - (2) In cases that surges are intermittently applied at short intervals (for example, in the case that the voltage of the noise simulator test is impressed), do not cause them to exceed the ZNR's rated pulse power.
  - (3) Select a ZNR recommended in Table 1.
- <1> Across the Line (Line to Line) use  
If possible, use a part No. marked with \* incase of voltage temporarily rises load  
unbalance of separately-wired loads, short between hot and neutral-line, open of neutral line in single-phase-three-wired system, and due to resonance at switching for a capacitive, inductive load.

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<2> Used between line to ground

Use a different Part No. from "Across-the-line use" as table 1, because of raising voltage in case of "Line to Ground Fault".

Use a part No. marked with \*\* in table 1, in case of the insulation resistance test (500VDC) for equipment. When using a part of the varistor voltage that the insulation efficiency examination can not be cleared, there is a case where the surge absorber can be done by removing it from the circuit depending on the circuit condition (Refer examination of Japan Domestic Safety Regulations).

(4) Concerning current fuse

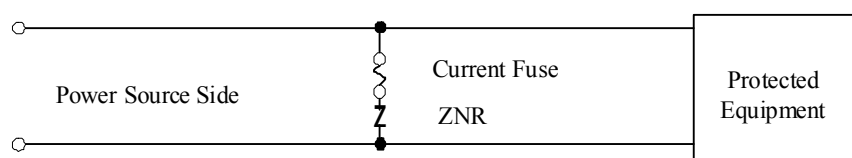
<1> We recommended to selecting a ZNR and the rated current of a current fuse as follows.

Finally, please be sure that there is no danger if the ZNR mounted on equipment breaks.

| Series                | E5        | E7        | E10       |
|-----------------------|-----------|-----------|-----------|
| Standard Part Numbers | ERZE05+++ | ERZE07+++ | ERZE10+++ |
| Fuse rated current    | 5A max.   | 7A max.   | 10A max.  |

\* Fuses shall use rated voltages appropriate for circuits.

<2> The recommended fuse position is shown in table 1, "Example of ZNR application", however, if the load current of protected equipment is larger than that of the above recommended fuse rated current, install a current fuse at the position shown below.



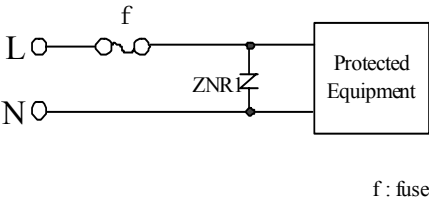
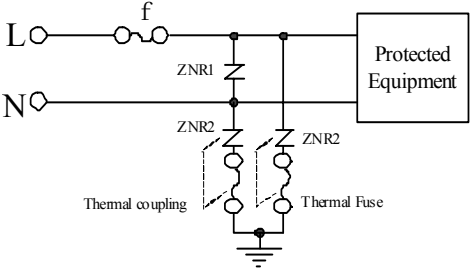
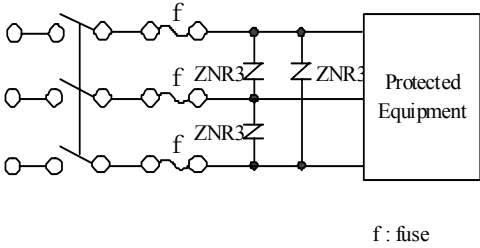
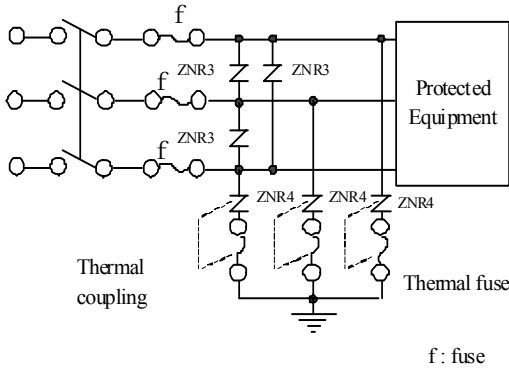
(5) Concerning thermal fuse

Set a thermal fuse to get high thermal conductivity with ZNR.

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**Table 1 Example of ZNR application**

|                             |                                                                                                    |                |                          |                                                                                                     |                   |                             |
|-----------------------------|----------------------------------------------------------------------------------------------------|----------------|--------------------------|-----------------------------------------------------------------------------------------------------|-------------------|-----------------------------|
| Connection example          | Measure against across-the-line surge                                                              |                |                          | Measure against surge across the line and between the line and ground                               |                   |                             |
|                             | DC/AC single-phase                                                                                 |                |                          | DC/AC single-phase                                                                                  |                   |                             |
|                             |  <p>f : fuse</p>  |                |                          |  <p>f : fuse</p>  |                   |                             |
|                             | AC 3-phase                                                                                         |                |                          | AC 3-phase                                                                                          |                   |                             |
|                             |  <p>f : fuse</p> |                |                          |  <p>f : fuse</p> |                   |                             |
| Example of rating selection | Across the Line (Line to Line) use                                                                 |                |                          | Line to Ground use                                                                                  |                   |                             |
|                             | ZNR                                                                                                | Source voltage | Nominal varistor voltage | ZNR                                                                                                 | Source voltage    | Nominal varistor voltage    |
|                             | ZNR1<br>ZNR3                                                                                       | AC100V         | 201 to 361*              | ZNR2<br>ZNR4                                                                                        | AC100V~<br>AC220V | 471<br>511<br>621*<br>821** |
|                             |                                                                                                    | AC120V         | 241 to 431*              |                                                                                                     |                   |                             |
|                             |                                                                                                    | AC200V         | 471 to 621*              |                                                                                                     |                   |                             |
|                             |                                                                                                    | AC220V         | 471 to 621*              |                                                                                                     | AC230V~<br>AC240V | 511<br>621*<br>821**        |
|                             |                                                                                                    | AC240V         | 511,621*                 |                                                                                                     |                   |                             |
|                             |                                                                                                    | AC380V         | 751,821*                 |                                                                                                     | AC380V            | 112**                       |

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## 2) Operating environments

- (1) The ZNR is designed to use indoors. Do not use it exposed outdoors.
- (2) Do not use the ZNR in places exposed to temperatures beyond the operating temperature range, such as places exposed to sunlight and vicinities of heating equipment.
- (3) Do not use the ZNR in places exposed to high temperatures and high humidity, such as places exposed directly to rain, wind, dew condensation, and vapor.
- (4) Do not use the ZNR in dusty and salty places and atmospheres polluted by corrosive gases.

## 3) Processing conditions

- (1) Do not wash the ZNR by such solvents (thinner, acetone, etc.) as its exterior resin deteriorates.
- (2) Do not apply a strong vibration, shock (by falling, etc.) to the ZNR, cracking to its exterior resin and element may occur.
- (3) When coating the ZNR with resin (including molding), do not use such resin.
- (4) Do not bend the ZNR lead wires at the position close to its ZNR exterior resin, or apply external force to the position.
- (5) When soldering the ZNR lead wires, follow the recommended condition and do not melt the solder and insulating materials constituting the ZNR.

| Type D | Soldering Method | Recommended Condition   | Attention                                   |
|--------|------------------|-------------------------|---------------------------------------------|
|        | Flow soldering   | 260deg.C, within 10sec. | Type D is not Reflow soldering object part. |

\*1 When using at the thing except the condition that it is possible to suggest to the above, confirm that there is not a problem.

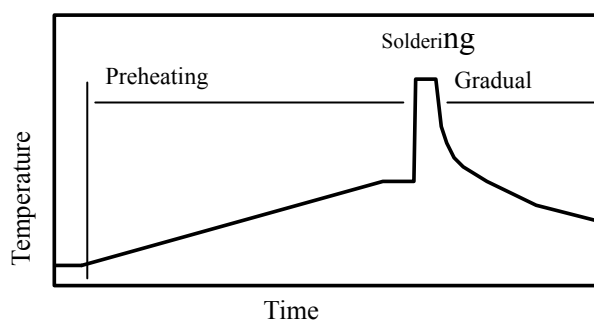
The limit of the repair be once and go in solder temperature within 400deg.C and moreover within 5 seconds.

\*2 Profile be careful because there is a margin of error in the way of measuring.

\*3 The temperature depend on the size and the package density of the substrate.

Therefore, confirm every kind of the substrate.

- Soldering temperature-time profile to recommend



|                 |                     |          |
|-----------------|---------------------|----------|
| Preheating      | The normal 130deg.C | max.120s |
| Soldering       | max.260deg.C        | max.10s  |
| Gradual cooling | Gradual cooling     |          |

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| <p>4) Long-term storage</p> <p>(1) Do not store the ZNR under high temperatures and high humidity. Store it at temperature up to 40 degree-C and at humidity below 75%RH, and use it within two years.<br/>Before using the ZNR that has been stored for a long period (two year or longer), confirm the solderability.</p> <p>(2) Avoid atmospheres full of corrosive gases (hydrogen sulfide, sulfurous acid, chlorine, ammonia, etc.).</p> <p>(3) Avoid direct sunlight and dew condensation.</p> <p><b>3. Notices</b></p> <p><b>3.1 In cases that the ZNR is used in equipment (aerospace equipment, medical equipment, etc.) requiring extremely high reliability, ask us for selection of part No., and protection coordination, etc. in advance.</b></p> <p><b>3.2 There is possibility that the ZNR will unexpectedly smoke or ignite because of abnormal rise of the circuit voltage and invasion of excessive surge. To prevent that accident from spreading over the equipment and not to expand the damage, use multiplex protection such as the adoption of frame-retardant materials for housing parts and structural parts.</b></p> <p><b>3.3 Package marking includes the product number, quantity, and country of origin.<br/>As a rule, country of origin should be indicated in English.</b></p> <p><b>4. Substances of this product</b></p> <p>4.1 This product not been manufactured with any ozone depleting chemical controlled under the Montreal Protocol.</p> <p>4.2 This product comply with RoHS(Restriction of the use of certain Hazardous Substance in electrical and electronic equipment) Directive(2002/95/EC).</p> <p>4.3 All the materials used in this part are registered material under the Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substance</p> |                                         |        |
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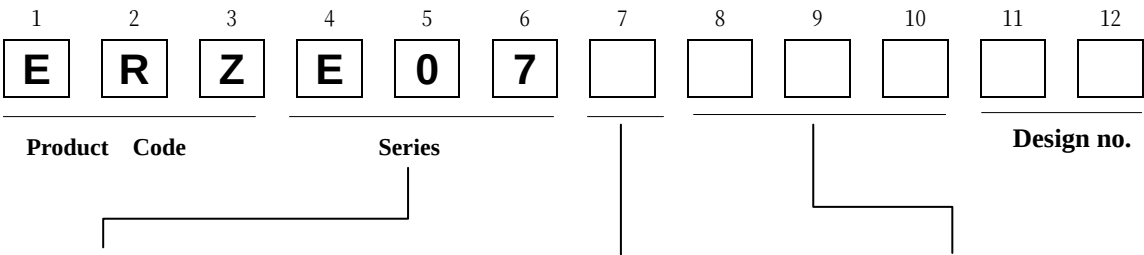
[REFERENCE]

1. Scope, Part Numbers, Construction

1.1 Scope  
This specification applies to the ZNR Surge Absorbers (Bulk Type).

1.2 Part Numbers

Explanation of Part Numbers



| Series |            |
|--------|------------|
| E05    | Series E5  |
| E07    | Series E7  |
| E08    | Series E8  |
| E10    | Series E10 |
| E11    | Series E11 |
| E14    | Series E14 |

| Lead Configuration |                    |           |
|--------------------|--------------------|-----------|
| symbol             | Lead Configuration | Packaging |
| A                  | Straight Lead      | Bulk      |
| <sup>1)</sup> B    | Crimped Lead       | Bulk      |
| <sup>2)</sup> E    | Straight Lead      | Taped     |
| <sup>2)</sup> F    | Crimped Lead       | Taped     |

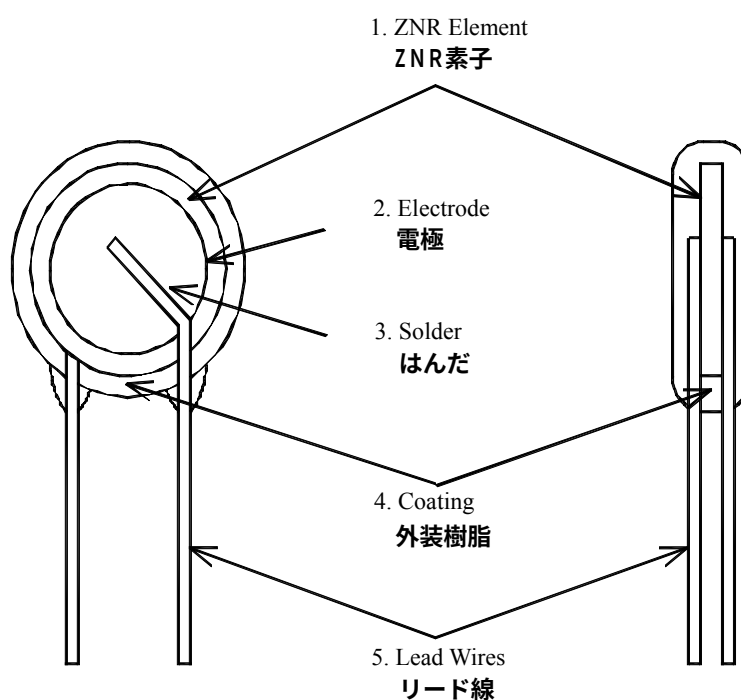
<sup>1)</sup> Cut Type  
<sup>2)</sup> Series E5, E7, E8, E10, E11

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

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### 1.3 Construction



| Item<br>部品名                          |                                                  | Material<br>材質                                              |
|--------------------------------------|--------------------------------------------------|-------------------------------------------------------------|
| 1. ZNR Element<br>ZNR素子              |                                                  | ZnO Ceramics etc.<br>酸化亜鉛 他                                 |
| 2. Electrode<br>電極                   |                                                  | Silver<br>銀                                                 |
| 3. Internal solder material<br>内部はんだ |                                                  | Sn-Ag-Cu                                                    |
| 4. Coating<br>外装樹脂                   |                                                  | Epoxy Resin (UL94 V-0 Approved)<br>エポキシ樹脂 (UL94 V-0 認定品)    |
| 5. Lead Wires<br>リード線                | Series : E5,E7<br>シリーズ : E5,E7                   | Tin(Sn100%) plated Copper-covered Steel<br>錫(Sn100%)メッキ銅覆鋼線 |
|                                      | Series : E8,E10,E11,E14<br>シリーズ : E8,E10,E11,E14 | Tin(Sn100%) Plated Copper<br>錫(Sn100%)メッキ銅線                 |

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## 2. Appearance, Dimensions

### 2.1 Appearance

Without dirt and crack, marking should be clear.

### 2.2 Dimensions

Refer to Figure 1.1 and 1.2 and table 1.1 to 1.3.

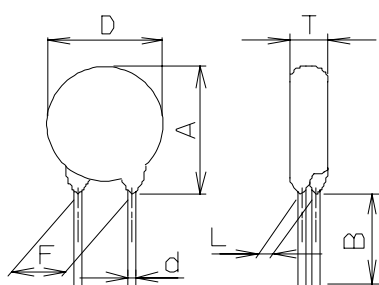


Fig. 1.1

Straight Lead Type

Part No :ERZE\*\*A□□□

Part No :ERZE\*\*A□□□CS

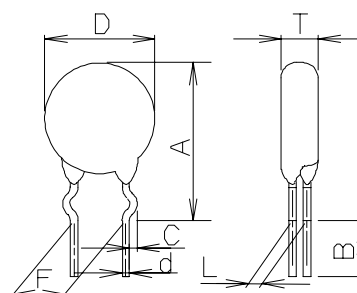


Fig. 1.2

Crimped Leads Cut Type

Part No:ERZE\*\*B□□□CS

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### 3. Electrical Requirements

Listed below of Specifications, Test Specifications, and Test Methods.  
Individual specifications is in the table 2 .

| Characteristics |                                                      | Specifications             | Test Specifications                              |
|-----------------|------------------------------------------------------|----------------------------|--------------------------------------------------|
| 3.1             | Max. allowable voltage                               | AC: Table 2<br>DC: Table 2 |                                                  |
| 3.2             | Rated wattage                                        | Table 2                    |                                                  |
| 3.3             | Varistor voltage                                     | $V_1$ : Table 2            | Measuring current : 1mA DC                       |
| 3.4             | Clamping voltage                                     | Table 2                    | Measuring current : Table 2                      |
|                 |                                                      |                            | Current Waveform : 8/20 $\mu$ s                  |
| 3.5             | Maximum peak current<br>(Withstanding surge current) | 1pulse: Table 2            | Impulse : 8/20 $\mu$ s                           |
|                 |                                                      | 2pulse: Table 2            | Impulse : 8/20 $\mu$ s at interval 5min          |
| 3.6             | Maximum energy                                       | Table 2                    | Impulse : 2ms, 1 pulse                           |
|                 |                                                      | Table 2                    | Impulse : 10/1000 $\mu$ s, 1pulse                |
| 3.7             | Temperature coefficient of<br>varistor voltage       | 0 to -0.05%/deg.C          | Measured voltage : $V_1$                         |
|                 |                                                      |                            | Temp. range : +25deg.C to +85deg.C               |
| 3.8             | Capacitance                                          | Table 2                    | Measuring frequency : 1kHz<br>1MHz (below 100pF) |
| 3.9             | Dielectric loss                                      | Table 2                    | Measuring frequency : 1kHz<br>1MHz (below 100pF) |
| 3.10            | Withstand voltage                                    | No breakdown               | Applied voltage : Table 2                        |
|                 |                                                      |                            | Time : 1min                                      |

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| Characteristics                                                                                                            |                                                   | Test Methods/Description                                                                                                                                                                                           |  |         |
|                                                                                                                            | Standard test condition                           | Environmental conditions under which every measuring is done without doubt on the measuring results. Unless specially, specified, temperature, relative humidity are 5deg.C to 35deg.C, 45 to 85%RH. respectively. |  |         |
| 3.1                                                                                                                        | Maximum allowable voltage                         | The maximum Sine wave voltage (rms) that can be applied continuously or maximum DC voltage in the specified environmental temperature range.                                                                       |  |         |
| 3.2                                                                                                                        | Rated wattage                                     | The maximum power to be loaded with in the specified environmental temperature                                                                                                                                     |  |         |
| 3.3                                                                                                                        | Varistor voltage                                  | Voltage between both terminals of ZNR measured when CmA of DC current is applied under standard conditions. It is called Vc. Measuring the varistor voltage should be made promptly to avoid heat affection.       |  |         |
| 3.4                                                                                                                        | Clamping voltage                                  | The maximum voltage between two terminals with the specified standard impulse current (8/20 μs).                                                                                                                   |  |         |
| 3.5                                                                                                                        | Maximum peak current (Withstanding surge current) | The maximum current within the varistor voltage change of ±10% with the standard impulse (8/20 μs) applied by the specified condition.                                                                             |  |         |
| 3.6                                                                                                                        | Maximum energy                                    | The maximum energy within the varistor voltage change of ±10% when the specified impulse is applied.                                                                                                               |  |         |
| 3.7                                                                                                                        | Temperature coefficient of varistor voltage       | Coefficient indicating dependency of varistor voltage on specified temperature.                                                                                                                                    |  |         |
| 3.8                                                                                                                        | Capacitance                                       | Capacitance shall be measured at 1kHz±10%, 1Vrms max. ( 1MHz±10% below 100pF ), 0V bias and 20±2deg.C.                                                                                                             |  |         |
| 3.9                                                                                                                        | Dielectric loss                                   | Dielectric loss tangent shall be measured at 1kHz±10%, 1Vrms max. ( 1MHz±10% below 100pF ), 0V bias and 20±2deg.C.                                                                                                 |  |         |
| 3.10                                                                                                                       | Withstand voltage                                 | The specified voltage shall be applied both terminals of the specimen connected together and metal foil closely wrapped round its body for 1 minute.                                                               |  |         |
| Note : Varistor Voltage change of forward direction shall be measured in the test of uni-pole surge life and DC load life. |                                                   |                                                                                                                                                                                                                    |  |         |
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| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET            |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Bulk Type) |         |
|                |                                         | 11 - 22 |

#### 4. Mechanical Requirements

Listed below of Specifications, Test Specifications, and Test Methods.

| Characteristics |                                      | Specifications                                                       | Test Specifications |                                                    |
|-----------------|--------------------------------------|----------------------------------------------------------------------|---------------------|----------------------------------------------------|
| 4.1             | Robustness of terminations (Tensile) | No outstanding damage                                                | Force :             | 9.8N(Series E5,E7,E8,E10,E11)<br>19.6N(Series E14) |
|                 |                                      |                                                                      | Time :              | 10 sec                                             |
| 4.2             | Robustness of terminations (Bending) | No outstanding damage                                                | Force :             | 4.9N(Series E5,E7,E8,E10,E11)<br>9.8N(Series E14)  |
| 4.3             | Vibration                            | No outstanding damage                                                | Frequency :         | 10 to 55Hz                                         |
|                 |                                      |                                                                      | Amplitude :         | 0.75mm                                             |
|                 |                                      |                                                                      | Time :              | each 2 hours                                       |
| 4.4             | Solderability                        | Minimum 95% of the terminals should be covered with solder uniformly | Solder temp. :      | 235+/-5deg.C                                       |
|                 |                                      |                                                                      | Immersed time :     | 2+/-0.5s                                           |
| 4.5             | Resistance to soldering heat         | $\Delta V1 \leq \pm 5\%$                                             | Solder temp. :      | 260+/-5deg.C                                       |
|                 |                                      |                                                                      | Immersed time :     | 10+/-1sec                                          |

| Characteristics |                                      | Test Methods/Description                                                                                                                                                                                                                                                                            |
|-----------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.1             | Robustness of terminations (Tensile) | After gradually applying the specified load and keeping the unit fixed for 10 seconds, the terminal shall be visually examined for any damage.                                                                                                                                                      |
| 4.2             | Robustness of terminations (Bending) | The unit shall be secured with its terminals kept vertical and the specified load is applied, gradually bent by 90° in one direction, back to the original position, then 90° in the opposite direction, and again back to the original position. The damage of the terminals is visually examined. |
| 4.3             | Vibration                            | After repeatedly applying a single harmonic vibration (amplitude ; 0.75mm ; double amplitude ; 1.5mm with 1 minute vibration frequency cycles(10Hz to 55Hz to 10Hz) to each of three perpendicular directions for 2 hours. The varistor shall then be visually examined.                            |
| 4.4             | Solderability                        | After dipping the terminals to a depth of about 3mm from the body, in the melted solder of 235+/-5deg.C for 2+/-0.5 seconds, the terminals are visually examined.                                                                                                                                   |
| 4.5             | Resistance to Soldering Heat         | After each lead shall be dipped into a solder bath having a temperature 260+/-5deg.C to a point 2.0~2.5mm from the body of the unit, be held there for specified time, and then be stored at room temperature and humidity for 1 to 2 hour. The change of Vc and mechanical damages are examined.   |

Note : Varistor Voltage change of forward direction shall be measured in the test of uni-pole surge life and DC load life.

Note/Revision

|                |                                         |         |
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| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET            |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Bulk Type) |         |
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## 5. Environmental Requirements

Listed below of Specifications, Test Specifications, and Test Methods.  
Individual specifications is in the table 2.1 to 2.3 .

| Characteristics             |                                          | Specifications                                      | Test Specifications                                                                                                                                                                                                                                                                         |                                                 |        |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
|-----------------------------|------------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|--------|------|-------|--------|---|--------------|--------|---|------------|--------|---|---------------|--------|---|------------|--------|
| 5.1                         | High temperature storage<br>(Dry heat)   | $\Delta V1 \leq \pm 5\%$                            | Ambient temp. :<br>Time :                                                                                                                                                                                                                                                                   | 125+/-2deg.C<br>1000h                           |        |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
| 5.2                         | Damp heat                                | $\Delta V1 \leq \pm 5\%$                            | Ambient<br>condition :<br>Time :                                                                                                                                                                                                                                                            | 40+/-2deg.C, .0 to 95%RH<br>1000h               |        |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
| 5.3                         | Low temperature storage<br>(Cold)        | $\Delta V1 \leq \pm 5\%$                            | Ambient temp. :<br>Time :                                                                                                                                                                                                                                                                   | -40+/-2deg.C<br>1000 h                          |        |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
| 5.4                         | Heat cycle                               | $\Delta V1 \leq \pm 5\%$<br>No outstanding damage   | <table><tr><td>Step</td><td>Temp.</td><td>Period</td></tr><tr><td>1</td><td>−40+/-3deg.C</td><td>30min.</td></tr><tr><td>2</td><td>Room Temp.</td><td>15min.</td></tr><tr><td>3</td><td>+125+/-2deg.C</td><td>30min.</td></tr><tr><td>4</td><td>Room Temp.</td><td>15min.</td></tr></table> |                                                 |        | Step | Temp. | Period | 1 | −40+/-3deg.C | 30min. | 2 | Room Temp. | 15min. | 3 | +125+/-2deg.C | 30min. | 4 | Room Temp. | 15min. |
|                             |                                          |                                                     | Step                                                                                                                                                                                                                                                                                        | Temp.                                           | Period |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
|                             |                                          |                                                     | 1                                                                                                                                                                                                                                                                                           | −40+/-3deg.C                                    | 30min. |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
|                             |                                          |                                                     | 2                                                                                                                                                                                                                                                                                           | Room Temp.                                      | 15min. |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
|                             |                                          |                                                     | 3                                                                                                                                                                                                                                                                                           | +125+/-2deg.C                                   | 30min. |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
| 4                           | Room Temp.                               | 15min.                                              |                                                                                                                                                                                                                                                                                             |                                                 |        |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
| 5 cycles                    |                                          |                                                     |                                                                                                                                                                                                                                                                                             |                                                 |        |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
| 5.5                         | High temperature load<br>(Dry heat load) | $\Delta V1 \leq \pm 10\%$                           | Ambient temp. :<br>Time :                                                                                                                                                                                                                                                                   | 85+/-2deg.C<br>1000 h                           |        |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
| 5.6                         | Damp heat load                           | $\Delta V1 \leq \pm 10\%$                           | Ambient<br>condition :<br>Time :                                                                                                                                                                                                                                                            | 40+/-2deg.C, 90 to 95%RH.<br>1000 h             |        |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
| 5.7                         | Impulse life I<br>(Surge life I)         | $\Delta V1 \leq +20\% / -0\%$<br>at listed table 2. | Impulse :<br>Applied<br>condition :                                                                                                                                                                                                                                                         | 8/20μs<br>10 <sup>4</sup> times by interval 10s |        |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
| 5.8                         | Impulse life II<br>(Surge life II)       | $\Delta V1 \leq +20\% / -0\%$<br>at listed table 2  | Impulse :<br>Applied<br>condition :                                                                                                                                                                                                                                                         | 8/20μs<br>10 <sup>5</sup> times by interval 10s |        |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
| Operating Temperature Range |                                          | -40deg.C to +85deg.C                                |                                                                                                                                                                                                                                                                                             |                                                 |        |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |
| Storage Temperature Range   |                                          | -40deg.C to +125deg.C                               |                                                                                                                                                                                                                                                                                             |                                                 |        |      |       |        |   |              |        |   |            |        |   |               |        |   |            |        |

Note/Revision

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| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET            |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Bulk Type) |         |
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| Characteristics                                                                                                            |                                       | Test Methods/Description                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5.1                                                                                                                        | High temperature storage (Dry heat)   | The specimen shall be subjected to 125+/-2deg.C for 1000 hours in a thermostatic bath without load and then stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured.                              |
| 5.2                                                                                                                        | Damp heat                             | The specimen shall be subjected to 40+/-2deg.C, 90 to 95%RH for 1000 hours without load and then stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured.                                         |
| 5.3                                                                                                                        | Low temperature storage (Cold)        | The specimen shall be subjected to -40+/-2deg.C without load for 1000 hours and then stored at room temperature for 1 to 2 hours. Thereafter, the change of Vc shall be measured.                                                                  |
| 5.4                                                                                                                        | Heat cycle                            | The temperature cycling shall be repeated 5 times and stored at room temperature and humidity for 1 to 2 hours. The change of Vc as well as mechanical damage shall be examined.                                                                   |
| 5.5                                                                                                                        | High temperature load (Dry heat load) | After being continuously applied the maximum allowable voltage at 85+/-2deg.C for 1000 hours, the specimen shall be stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured.                      |
| 5.6                                                                                                                        | Damp heat load                        | The specimen shall be subjected to 40+/-2deg.C, 90 to 95%RH and the maximum allowable voltage for 1000 hours and then stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured.                    |
| 5.7                                                                                                                        | Impulse life I (Surge life I)         | After the specified impulse is applied 10000 times continuously with the interval 10 seconds at room temperature, the specimen shall be stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured.  |
| 5.8                                                                                                                        | Impulse life II (Surge life II)       | After the specified impulse is applied 100000 times continuously with the interval 10 seconds at room temperature, the specimen shall be stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured. |
| Note : Varistor Voltage change of forward direction shall be measured in the test of uni-pole surge life and DC load life. |                                       |                                                                                                                                                                                                                                                    |

**Individual specifications of Dimensions and Electrical Requirements and Environmental Requirements are indicated below.**

Dimensions : Table 1.1 to 1.3  
Electrical Requirements : Table 2  
Environmental Requirements : Table 2

Note/Revision

|                |                                         |         |
|----------------|-----------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET            |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Bulk Type) |         |
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Table 1.1 Series E7 Straight Lead Type

| 品番<br>Part No. | 付図番号<br>Fig. No.   | D<br>max.<br>(mm) | A<br>max.<br>(mm) | T<br>max.<br>(mm) | F<br>+/-1.0<br>(mm) | L<br>+/-1.0<br>(mm) | B<br>min.<br>(mm) | C<br>+/-0.4<br>(mm) | Φd<br>+/-<br>(mm)      | <sup>1)</sup> Weight<br>Approx.<br>(g) |
|----------------|--------------------|-------------------|-------------------|-------------------|---------------------|---------------------|-------------------|---------------------|------------------------|----------------------------------------|
| ERZE07A201     | 付図 1.1<br>Fig. 1.1 | 9.0               | 12.0              | 5.3               | 7.5                 | 3.1                 | 20.0              | -                   | 0.80<br>+0.08<br>-0.05 | 0.7                                    |
| ERZE07A221     |                    |                   |                   | 5.4               |                     | 3.3                 |                   |                     |                        | 0.8                                    |
| ERZE07A241     |                    |                   |                   | 5.5               |                     | 3.3                 |                   |                     |                        | 0.8                                    |
| ERZE07A271     |                    |                   |                   | 5.7               |                     | 3.5                 |                   |                     |                        | 0.9                                    |
| ERZE07A331     |                    |                   |                   | 6.0               |                     | 3.8                 |                   |                     |                        | 1.0                                    |
| ERZE07A361     |                    |                   |                   | 6.2               |                     | 3.9                 |                   |                     |                        | 1.0                                    |
| ERZE07A391     |                    |                   |                   | 6.3               |                     | 4.0                 |                   |                     |                        | 1.0                                    |
| ERZE07A431     |                    |                   |                   | 6.5               |                     | 4.1                 |                   |                     |                        | 1.1                                    |
| ERZE07A471     |                    |                   |                   | 6.8               |                     | 4.3                 |                   |                     |                        | 1.2                                    |
| ERZE07A511     |                    |                   |                   | 7.0               |                     | 4.5                 |                   |                     |                        | 1.2                                    |
| ERZE07A561     |                    |                   |                   | 7.4               |                     | 4.8                 |                   |                     |                        | 1.3                                    |
| ERZE07A621     |                    | 10.0              | 13.0              | 7.8               |                     | 5.0                 |                   |                     |                        | 1.4                                    |

<sup>1)</sup>参考値, Typical

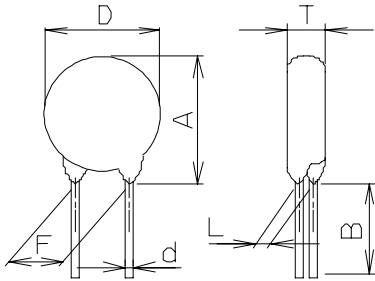


Fig. 1.1

Straight Lead Type

Part No. : ERZE\*\*A□□□

Part No. : ERZE\*\*A□□□CS

Note/Revision

|                |                                         |         |
|----------------|-----------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET            |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Bulk Type) |         |
|                |                                         | 15 - 22 |

Table 1.2 Series E7 Straight Leads Cut Type

| 品番<br>Part No. | 付図番号<br>Fig. No.   | D<br>max.<br>(mm) | A<br>max.<br>(mm) | T<br>max.<br>(mm) | F<br>+/-1.0<br>(mm) | L<br>+/-1.0<br>(mm) | B<br>+/-1.0<br>(mm) | C<br>+/-0.4<br>(mm) | Φd<br>+/-<br>(mm)      | <sup>1)</sup> Weight<br>Approx.<br>(g) |
|----------------|--------------------|-------------------|-------------------|-------------------|---------------------|---------------------|---------------------|---------------------|------------------------|----------------------------------------|
| ERZE07A201CS   | 付図 1.1<br>Fig. 1.1 | 9.0               | 12.0              | 5.3               | 7.5                 | 3.1                 | 4.0                 | -                   | 0.80<br>+0.08<br>-0.05 | 0.7                                    |
| ERZE07A221CS   |                    |                   |                   | 5.4               |                     | 3.3                 |                     |                     |                        | 0.8                                    |
| ERZE07A241CS   |                    |                   |                   | 5.5               |                     | 3.3                 |                     |                     |                        | 0.8                                    |
| ERZE07A271CS   |                    |                   |                   | 5.7               |                     | 3.5                 |                     |                     |                        | 0.9                                    |
| ERZE07A331CS   |                    |                   |                   | 6.0               |                     | 3.8                 |                     |                     |                        | 1.0                                    |
| ERZE07A361CS   |                    |                   |                   | 6.2               |                     | 3.9                 |                     |                     |                        | 1.0                                    |
| ERZE07A391CS   |                    |                   |                   | 6.3               |                     | 4.0                 |                     |                     |                        | 1.0                                    |
| ERZE07A431CS   |                    |                   |                   | 6.5               |                     | 4.1                 |                     |                     |                        | 1.1                                    |
| ERZE07A471CS   |                    |                   |                   | 6.8               |                     | 4.3                 |                     |                     |                        | 1.2                                    |
| ERZE07A511CS   |                    |                   |                   | 7.0               |                     | 4.5                 |                     |                     |                        | 1.2                                    |
| ERZE07A561CS   |                    |                   |                   | 7.4               |                     | 4.8                 |                     |                     |                        | 1.3                                    |
| ERZE07A621CS   |                    | 10.0              | 13.0              | 7.8               |                     | 5.0                 |                     |                     |                        | 1.4                                    |

<sup>1)</sup>参考値, Typical

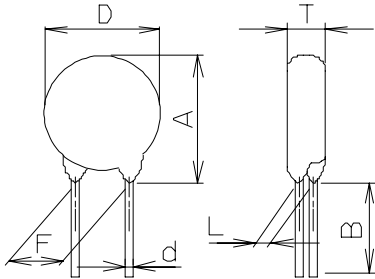


Fig. 1.1

Straight Lead Type

Part No. : ERZE\*\*A□□□

Part No. : ERZE\*\*A□□□CS

Note/Revision

|                |                                         |         |
|----------------|-----------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET            |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Bulk Type) |         |
|                |                                         | 16 - 22 |

Table 1.3 Series E7 Crimped Leads Cut Type

| 品番<br>Part No. | 付図番号<br>Fig. No.   | D<br>max.<br>(mm) | A<br>max.<br>(mm) | T<br>max.<br>(mm) | F<br>+/-1.0<br>(mm) | L<br>+/-1.0<br>(mm) | B<br>+/-1.0<br>(mm) | C<br>+/-0.4<br>(mm) | Φd<br>+/-<br>(mm)      | <sup>1)</sup> Weight<br>Approx.<br>(g) |
|----------------|--------------------|-------------------|-------------------|-------------------|---------------------|---------------------|---------------------|---------------------|------------------------|----------------------------------------|
| ERZE07B201CS   | 付図 1.2<br>Fig. 1.2 | 9.0               | 15.0              | 5.3               | 7.5                 | 3.1                 | 4.0                 | 1.4                 | 0.80<br>+0.08<br>-0.05 | 0.7                                    |
| ERZE07B221CS   |                    |                   |                   | 5.4               |                     | 3.3                 |                     |                     |                        | 0.8                                    |
| ERZE07B241CS   |                    |                   |                   | 5.5               |                     | 3.3                 |                     |                     |                        | 0.8                                    |
| ERZE07B271CS   |                    |                   |                   | 5.7               |                     | 3.5                 |                     |                     |                        | 0.9                                    |
| ERZE07B331CS   |                    |                   |                   | 6.0               |                     | 3.8                 |                     |                     |                        | 1.0                                    |
| ERZE07B361CS   |                    |                   |                   | 6.2               |                     | 3.9                 |                     |                     |                        | 1.0                                    |
| ERZE07B391CS   |                    |                   |                   | 6.3               |                     | 4.0                 |                     |                     |                        | 1.0                                    |
| ERZE07B431CS   |                    |                   |                   | 6.5               |                     | 4.1                 |                     |                     |                        | 1.1                                    |
| ERZE07B471CS   |                    |                   |                   | 6.8               |                     | 4.3                 |                     |                     |                        | 1.2                                    |
| ERZE07B511CS   |                    |                   |                   | 7.0               |                     | 4.5                 |                     |                     |                        | 1.2                                    |
| ERZE07B561CS   |                    |                   |                   | 7.4               |                     | 4.8                 |                     |                     |                        | 1.3                                    |
| ERZE07B621CS   |                    | 10.0              | 16.0              | 7.8               |                     | 5.0                 |                     |                     |                        | 1.4                                    |

<sup>1)</sup>参考値, Typical

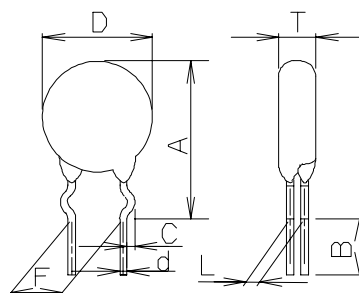


Fig. 1.2

Crimped Leads Cut Type

Part No. : ERZE\*\*B□□□CS

Note/Revision

|                |                                         |         |
|----------------|-----------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET            |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Bulk Type) |         |
|                |                                         | 17 - 22 |

Table 2 Series E7

| Part Number  | Applicable Standards             |                        | Electrical                |     |                   |                     |                     |        |                         |      |                   |        |                  |                         |                           |                              | Environmental |          |
|--------------|----------------------------------|------------------------|---------------------------|-----|-------------------|---------------------|---------------------|--------|-------------------------|------|-------------------|--------|------------------|-------------------------|---------------------------|------------------------------|---------------|----------|
|              | Part Number                      |                        | Part Number               |     |                   |                     |                     |        |                         |      |                   |        |                  |                         |                           |                              | Part Number   |          |
|              | Abbrevia-<br>tion of Part<br>No. | 1) Authorized Standard | Maximum Allowable Voltage |     | Rated<br>watt-age | Varistor<br>Voltage | Clamping<br>Voltage |        | Maximum<br>Peak Current |      | Maximum<br>Energy |        | Capaci-<br>tance | Di-<br>electric<br>Loss | With-<br>stand<br>voltage | Impulse Life<br>(Surge Life) |               |          |
|              |                                  |                        | ACrms                     | DC  |                   |                     | (max.)              | 1 time | 2 times                 | 2ms  | 10/1000<br>μs     | (max.) | (max.)           | (max.)                  | I                         | II                           |               |          |
| (V)          |                                  |                        | (V)                       | (W) |                   |                     |                     |        |                         |      |                   |        |                  |                         |                           |                              | (V)           | Vx(A)(V) |
| ERZE07*201++ | E7201                            | ○☆                     | 130                       | 170 | 0.25              | 185 to 225          | 340                 | 25     | 2500                    | 1250 | 19                | 26     | 430              | 10                      | 1500                      | 100                          | 70            |          |
| ERZE07*221++ | E7221                            | ○☆                     | 140                       | 180 | 0.25              | 198 to 242          | 360                 | 25     | 2500                    | 1250 | 22                | 30     | 410              | 10                      | 1500                      | 100                          | 70            |          |
| ERZE07*241++ | E7241                            | ○☆                     | 150                       | 200 | 0.25              | 216 to 264          | 395                 | 25     | 2500                    | 1250 | 24                | 33     | 380              | 10                      | 1500                      | 100                          | 70            |          |
| ERZE07*271++ | E7271                            | ○☆                     | 175                       | 225 | 0.25              | 247 to 303          | 455                 | 25     | 2500                    | 1250 | 28                | 39     | 350              | 10                      | 1500                      | 100                          | 70            |          |
| ERZE07*331++ | E7331                            | ○☆                     | 210                       | 270 | 0.25              | 297 to 363          | 545                 | 25     | 2500                    | 1250 | 32                | 44     | 300              | 10                      | 1500                      | 100                          | 70            |          |
| ERZE07*361++ | E7361                            | ○☆                     | 230                       | 300 | 0.25              | 324 to 396          | 595                 | 25     | 2500                    | 1250 | 36                | 50     | 300              | 10                      | 1500                      | 100                          | 70            |          |
| ERZE07*391++ | E7391                            | ○☆                     | 250                       | 320 | 0.25              | 351 to 429          | 650                 | 25     | 2500                    | 1250 | 38                | 53     | 300              | 10                      | 1500                      | 100                          | 70            |          |
| ERZE07*431++ | E7431                            | ○☆                     | 275                       | 350 | 0.25              | 387 to 473          | 710                 | 25     | 2500                    | 1250 | 43                | 60     | 270              | 10                      | 1500                      | 100                          | 70            |          |
| ERZE07*471++ | E7471                            | ○☆                     | 300                       | 385 | 0.25              | 423 to 517          | 775                 | 25     | 2500                    | 1250 | 47                | 65     | 230              | 10                      | 1500                      | 100                          | 70            |          |
| ERZE07*511++ | E7511                            | ○☆                     | 320                       | 410 | 0.25              | 459 to 561          | 845                 | 25     | 2500                    | 1250 | 50                | 70     | 210              | 10                      | 1500                      | 100                          | 70            |          |
| ERZE07*561++ | E7561                            | ○☆                     | 350                       | 450 | 0.25              | 504 to 616          | 930                 | 25     | 2500                    | 1250 | 55                | 75     | 200              | 10                      | 1500                      | 100                          | 70            |          |
| ERZE07*621++ | E7621                            | ○☆                     | 385                       | 505 | 0.25              | 558 to 682          | 1025                | 25     | 2500                    | 1250 | 60                | 80     | 190              | 10                      | 1500                      | 100                          | 70            |          |

1) Authorized Standard

○:UL1449 Ed.3, ●:UL1449 Ed.3 Type3(or Code-Connected and Direct plug-in), ◎:UL1449 Ed.3 Type2(or Permanently Connected)

☆:VDE(IEC61051-1, -2, -2-2), ★:VDE(IEC60950-1 Ed.2 Annex.Q)

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

Note/Revision

|                |                                         |         |
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| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET            |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Bulk Type) |         |
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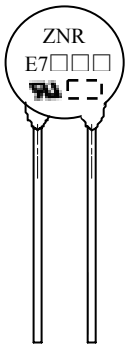
## 6. Marking Contents

Refer to table 3.

Applicable Part No. : ERZE07A□□□, ERZE07A□□□CS, ERZE07B□□□CS

Table 3.

Part Numbers symbol : ++is None or CS.

| Part Number<br>品番                                                                                                    | Marking<br>Contents<br>表示の内容 |
|----------------------------------------------------------------------------------------------------------------------|------------------------------|
| ERZE07A(B)201++<br>to<br>ERZE07A(B)621++                                                                             | ZNR<br>E7□□□<br>○◆◇          |
|  <p><b>部品表示の一例</b><br/>Example</p> |                              |

Explanation of the content

内容の説明

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
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| ZNR                                                                               | Product Name<br>品名                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| E7□□□                                                                             | Registered Part No.(VDE)<br>Type Designation(UL),<br>登録品番<br>□□□・・・ Nominal Varistor Voltage<br>公称バリスタ電圧略称                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
|  | UL Recognized Component Mark<br>UL 認定マーク                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| ○                                                                                 | Factory Identification Marking<br>工場識別コード<br>None 表記なし     ・・・Japan     日本国<br>Q     ・・・Indonesia     インドネシア                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| ◆                                                                                 | Year Code(example)<br>年コード(例) <table><tr><td>2010</td><td>0</td><td>2020</td><td>K</td><td>2030</td><td>0</td></tr><tr><td>2011</td><td>1</td><td>2021</td><td>A</td><td>2031</td><td>1</td></tr><tr><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td></tr><tr><td>2018</td><td>8</td><td>2028</td><td>H</td><td>2038</td><td>8</td></tr><tr><td>2019</td><td>9</td><td>2029</td><td>J</td><td>2039</td><td>9</td></tr></table> <ul style="list-style-type: none"><li>When the tens digit of Christian era is even number, an alphabetic character (1:A, 2:B...9:J, 0:K, I is excluded.) shall be used for the abbreviation of end of Christian era.</li><li>・西暦年の+の位が偶数年は末尾略称に英字 (1:A, 2:B...9:J, 0:K, Iを除く)を使用する。</li><li>When the tens digit of Christian era is odd number, a numeric character (End of Christian era) shall be used for the abbreviation of end of Christian era.</li><li>・西暦年の+の位が奇数年は末尾略称に数字(西暦末尾)を使用する。</li></ul> | 2010 | 0 | 2020 | K | 2030 | 0 | 2011 | 1 | 2021 | A | 2031 | 1 | ⋮    | ⋮ | ⋮    | ⋮ | ⋮    | ⋮ | 2018 | 8 | 2028 | H | 2038 | 8 | 2019 | 9 | 2029 | J | 2039 | 9 |
| 2010                                                                              | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2020 | K | 2030 | 0 |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| 2011                                                                              | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2021 | A | 2031 | 1 |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| ⋮                                                                                 | ⋮                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ⋮    | ⋮ | ⋮    | ⋮ |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| 2018                                                                              | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2028 | H | 2038 | 8 |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| 2019                                                                              | 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2029 | J | 2039 | 9 |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| ◇                                                                                 | Monthly Code<br>月コード <table><tr><td>Jan.</td><td>1</td><td>Jul.</td><td>7</td></tr><tr><td>Feb.</td><td>2</td><td>Aug.</td><td>8</td></tr><tr><td>Mar.</td><td>3</td><td>Sep.</td><td>9</td></tr><tr><td>Apr.</td><td>4</td><td>Oct.</td><td>O</td></tr><tr><td>May.</td><td>5</td><td>Nov.</td><td>N</td></tr><tr><td>Jun.</td><td>6</td><td>Dec.</td><td>D</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Jan. | 1 | Jul. | 7 | Feb. | 2 | Aug. | 8 | Mar. | 3 | Sep. | 9 | Apr. | 4 | Oct. | O | May. | 5 | Nov. | N | Jun. | 6 | Dec. | D |      |   |      |   |      |   |
| Jan.                                                                              | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Jul. | 7 |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| Feb.                                                                              | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Aug. | 8 |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| Mar.                                                                              | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Sep. | 9 |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| Apr.                                                                              | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Oct. | O |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| May.                                                                              | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Nov. | N |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| Jun.                                                                              | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Dec. | D |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |

Note/Revision

|                |                                         |         |
|----------------|-----------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET            |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Bulk Type) |         |
|                |                                         | 19 - 22 |

### 7. Packing

- 7.1 Packing quantity shall be shown Table 4.  
 7.2 ZNR Surge Absorbers shall be packed in plastic bag, and then packed into carton box.  
 7.3 Dimensions of packing materials and marking on the packing materials shall be shown Fig. 2.1 and Fig. 2.2

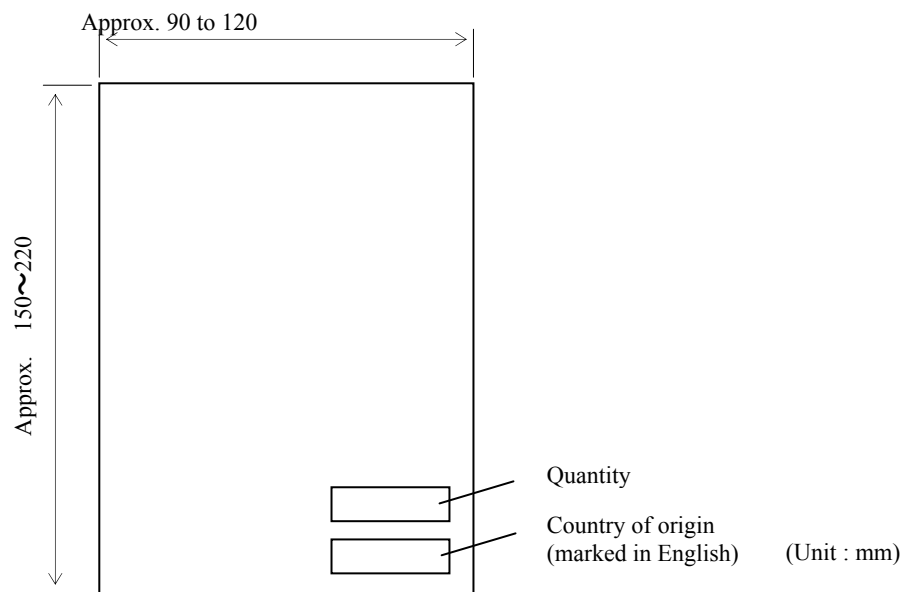


Fig 2.1 Bag

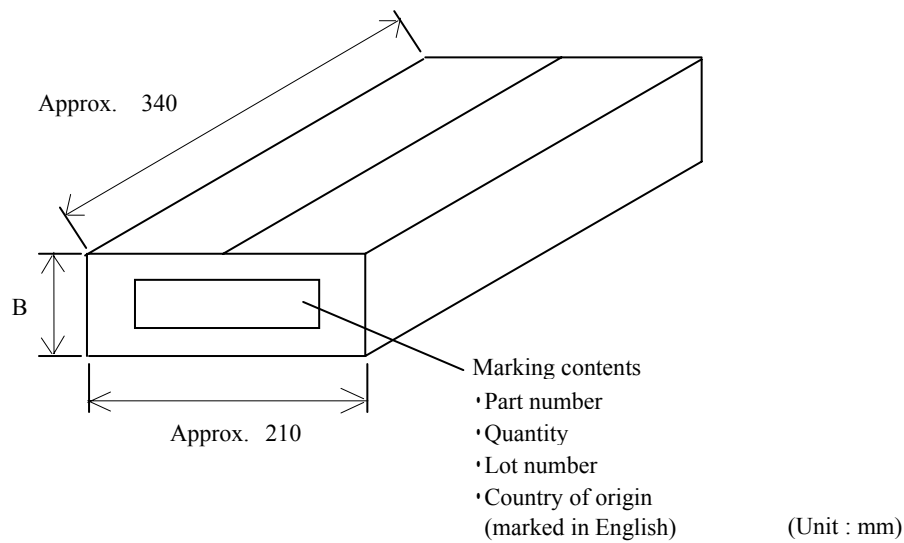


Fig 2.2 Carton box

Note/Revision

|                                                        |                                         |                                    |                     |         |
|--------------------------------------------------------|-----------------------------------------|------------------------------------|---------------------|---------|
| CLASSIFICATION                                         | PRODUCT REFERENCE DATA SHEET            |                                    |                     |         |
| SUBJECT                                                | ZNR SURGE ABSORBER E-SERIES (Bulk Type) |                                    |                     |         |
|                                                        |                                         |                                    |                     | 20 - 22 |
| Table 4 Series E7<br>Part Numbers symbol : * is A or B |                                         |                                    |                     |         |
| Part Numbers                                           | Quantity in Packing Unit<br>pcs.        | Packing Quantity in Carton<br>pcs. | Dimension B<br>(mm) |         |
| ERZE07A201 to<br>ERZE07A621                            | 50                                      | 3,000                              | Approx. 110         |         |
| ERZE07*201CS to<br>ERZE07*3911CS                       | 100                                     | 4,000                              | Approx. 110         |         |
| ERZE07*431CS to<br>ERZE07*621CS                        | 50                                      | 4,000                              | Approx. 110         |         |
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|----------------|-----------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET            |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Bulk Type) |         |
|                |                                         | 21 - 22 |

#### 7.4 Packing Indication Contents of Label

##### 7.4.1 Bar Code Label Specification

|                       |                       |
|-----------------------|-----------------------|
| Bar code symbology    | :EIAJ Code39          |
| Label size            | :90.0 mm x 45.0 mm    |
| Bar code height       | :5 mm                 |
| Bar code dimension    |                       |
| Wide element width    | :0.334 mm             |
| Narrow/Wide bar ratio | :1:2                  |
| Inter character gap   | :0.167 mm             |
| Quiet zone            | :3.81 mm              |
| Bar code resolution   | :11.70 character/inch |

##### 7.4.2 Bar Code Contents

|             |                                       |                   |
|-------------|---------------------------------------|-------------------|
| Bar Code 1  | * 3N 1 Panasonic P/N SP Quantity *    | symbols of things |
| Bar Code 2  | * 3N 2 SP Serial No. SP Vender code * |                   |
| Bar Code 3  | * 1P Panasonic P/N *                  |                   |
| issued date | 2012/04/02 Lot No. 2403GHA33          |                   |

Part No. **ERZE07A221** Quantity **1000 pcs**

**ZNR**  
MADE IN JAPAN

**Panasonic** Panasonic Corporation

##### 7.4.3 Constitution of Lot No.

2 4 03 GH A33  
 | | day Fix Consecutive No(ex. A01,A02,...,A99,B01,...)  
 | Month(1,2,...,9,O,N,D)  
 Year(Last digit)

##### 7.4.4 Label Form and Examples (ERZE07A221)



Note/Revision

|                |                                         |         |
|----------------|-----------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET            |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Bulk Type) |         |
|                |                                         | 22 - 22 |

## 8. Country of origin

|                                   |                                                             |                                                                       |
|-----------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|
| 8.1 Country of origin             | Japan                                                       | Indonesia                                                             |
| 8.2 Factory name                  | Panasonic Corporation                                       | PT. Panasonic Industrial Devices Batam                                |
| 8.3 Address                       | 1037-2 Kamiosatsu, Chitose City,<br>Hokkaido 066-8502 Japan | Puri Industrial Park 2000, Batam Centre, Kelurahan Baloi Permai Batam |
| 8.4 Factory Identification Method | Factory Identification Marking<br>: None                    | Factory Identification Marking<br>: Q                                 |

Note/Revision

|                |                                           |                   |
|----------------|-------------------------------------------|-------------------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |                   |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) | 1 - 23            |
|                |                                           | DATE Aug. 1, 2012 |

## [PRECAUTIONS FOR HANDLING]

### **⚠ Precautions for Safety**

In the case that a ZNR surge absorber (Type D, Series E ) (hereafter referred to as the ZNR ,or product name) is used in mounted condition, if an abnormality takes place because of peripheral conditions of the ZNR (material, environments, power source conditions, circuit conditions, etc. in equipment design), fire, electric shock, burn, or product failure may be occur.  
The precautions for this product are described below, understand the content thoroughly before usage.  
For more questions, contact us.

### **1. ⚠ Precautions to be strictly observe**

#### **1.1 Confirmation of performance ratings**

Use the ZNR within its rated range of performance such as the Max. allowable voltage, withstanding surge current, withstanding energy, impulse life (surge life), average pulse power, and operating temperature range. If used outside the range, the ZNR can be degrade and have element fracture, which may result in smoking and ignition.

#### **1.2 To avoid accidents due to unexpected phenomena, take the following measures**

- 1) In the event of fracture of the ZNR, its pieces may scatter ; hence, put the case or cover of the set product in place.
- 2) Do not install the ZNR near combustible substances (polyvinyl chloride wires, resin moldings, etc.).  
If it is difficult to do, install a nonflammable cover.
- 3) Across-the-line use  
When the ZNR is used across a line, put a current fuse in series with the ZNR.  
(Refer to Item 2.1, 1) (4) and Table 1.)
- 4) Use between line to ground
  - (1) In the case that the ZNR is used between a line to the ground, the short-circuit of the ZNR may not blow the current fuse because of grounding resistance, which may cause smoking and ignition of the ZNR's exterior resin.  
As the measure against it, install an earth leakage breaker on the power supply side of the ZNR position.  
If no earth leakage breaker is installed, use a thermal fuse together with a current fuse in series.  
(Refer to Table 1.)
  - (2) In the case that the ZNR is used between a live part and metal case, a electric shock may develop at a short circuit of the ZNR ; hence, ground the metal case to the ground or keep it from the human body.

### **2. Application notes**

#### **2.1 Pay attention to the following items to avoid the shortened life and failure of the ZNR**

##### **1) Circuit conditions**

- (1) Select a ZNR of which the maximum voltage including fluctuations in source voltage allows for the maximum permissible circuit voltage. (Refer to Table 1.)
- (2) In cases that surges are intermittently applied at short intervals (for example, in the case that the voltage of the noise simulator test is impressed), do not cause them to exceed the ZNR's rated pulse power.
- (3) Select a ZNR recommended in Table 1.

##### **<1> Across the Line (Line to Line) use**

If possible, use a part No. marked with \* incase of voltage temporarily rises load  
unbalance of separately-wired loads, short between hot and neutral-line, open of neutral line in single-phase-three-wired system, and due to resonance at switching for a capacitive, inductive load.

Note / Revision

|                |                                           |        |
|----------------|-------------------------------------------|--------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |        |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |        |
|                |                                           | 2 - 23 |

<2> Used between line to ground

Use a different Part No. from "Across-the-line use" as table 1, because of raising voltage in case of "Line to Ground Fault".

Use a part No. marked with \*\* in table 1, in case of the insulation resistance test (500VDC) for equipment. When using a part of the varistor voltage that the insulation efficiency examination can not be cleared, there is a case where the surge absorber can be done by removing it from the circuit depending on the circuit condition (Refer examination of Japan Domestic Safety Regulations).

(4) Concerning current fuse

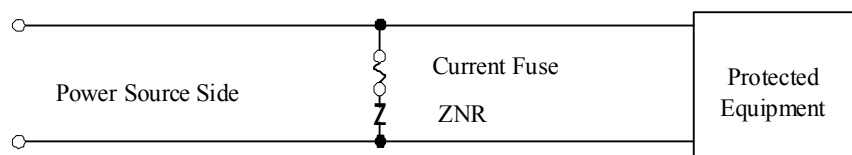
<1> We recommended to selecting a ZNR and the rated current of a current fuse as follows.

Finally, please be sure that there is no danger if the ZNR mounted on equipment breaks.

| Series                | E5        | E7        | E10       |
|-----------------------|-----------|-----------|-----------|
| Standard Part Numbers | ERZE05+++ | ERZE07+++ | ERZE10+++ |
| Fuse rated current    | 5A max.   | 7A max.   | 10A max.  |

✱ Fuses shall use rated voltages appropriate for circuits.

<2> The recommended fuse position is shown in table 1, "Example of ZNR application", however, if the load current of protected equipment is larger than that of the above recommended fuse rated current, install a current fuse at the position shown below.

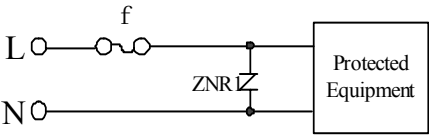
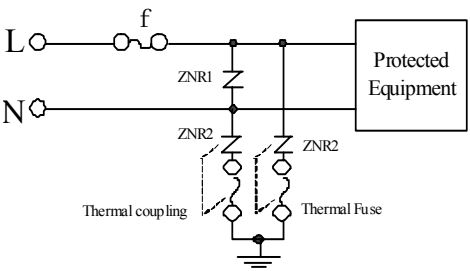
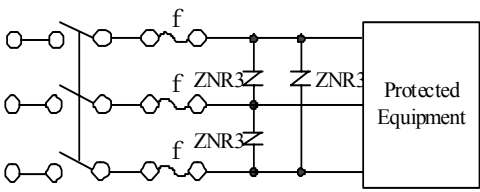
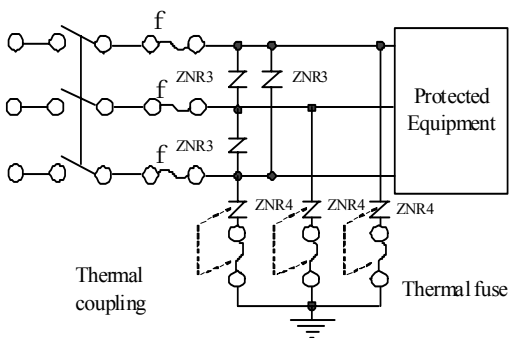


(5) Concerning thermal fuse

Set a thermal fuse to get high thermal conductivity with ZNR.

|                |                                           |        |
|----------------|-------------------------------------------|--------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |        |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |        |
|                |                                           | 3 - 23 |

**Table 1 Example of ZNR application**

|                             |                                                                                                                                |                |                          |                                                                                                                                 |                   |                             |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------|
| Connection example          | Measure against across-the-line surge                                                                                          |                |                          | Measure against surge across the line and between the line and ground                                                           |                   |                             |
|                             | DC/AC single-phase                                                                                                             |                |                          | DC/AC single-phase                                                                                                              |                   |                             |
|                             |  <p style="text-align: center;">f : fuse</p>  |                |                          |  <p style="text-align: center;">f : fuse</p>  |                   |                             |
|                             | AC 3-phase                                                                                                                     |                |                          | AC 3-phase                                                                                                                      |                   |                             |
|                             |  <p style="text-align: center;">f : fuse</p> |                |                          |  <p style="text-align: center;">f : fuse</p> |                   |                             |
| Example of rating selection | Across the Line (Line to Line) use                                                                                             |                |                          | Line to Ground use                                                                                                              |                   |                             |
|                             | ZNR                                                                                                                            | Source voltage | Nominal varistor voltage | ZNR                                                                                                                             | Source voltage    | Nominal varistor voltage    |
|                             | ZNR1<br>ZNR3                                                                                                                   | AC100V         | 201 to 361*              | ZNR2<br>ZNR4                                                                                                                    | AC100V~<br>AC220V | 471<br>511<br>621*<br>821** |
|                             |                                                                                                                                | AC120V         | 241 to 431*              |                                                                                                                                 |                   |                             |
|                             |                                                                                                                                | AC200V         | 471 to 621*              |                                                                                                                                 |                   |                             |
|                             |                                                                                                                                | AC220V         | 471 to 621*              |                                                                                                                                 | AC230V~<br>AC240V | 511<br>621*<br>821**        |
|                             |                                                                                                                                | AC240V         | 511,621*                 |                                                                                                                                 |                   |                             |
|                             |                                                                                                                                | AC380V         | 751,821*                 |                                                                                                                                 |                   | 112**                       |

Note / Revision

|                |                                           |        |
|----------------|-------------------------------------------|--------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |        |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) | 4 - 23 |

## 2) Operating environments

- (1) The ZNR is designed to use indoors. Do not use it exposed outdoors.
- (2) Do not use the ZNR in places exposed to temperatures beyond the operating temperature range, such as places exposed to sunlight and vicinities of heating equipment.
- (3) Do not use the ZNR in places exposed to high temperatures and high humidity, such as places exposed directly to rain, wind, dew condensation, and vapor.
- (4) Do not use the ZNR in dusty and salty places and atmospheres polluted by corrosive gases.

## 3) Processing conditions

- (1) Do not wash the ZNR by such solvents (thinner, acetone, etc.) as its exterior resin deteriorates.
- (2) Do not apply a strong vibration, shock (by falling, etc.) to the ZNR, cracking to its exterior resin and element may occur.
- (3) When coating the ZNR with resin (including molding), do not use such resin.
- (4) Do not bend the ZNR lead wires at the position close to its ZNR exterior resin, or apply external force to the position.
- (5) When soldering the ZNR lead wires, follow the recommended condition and do not melt the solder and insulating materials constituting the ZNR.

| Type D | Soldering Method | Recommended Condition   | Attention                                   |
|--------|------------------|-------------------------|---------------------------------------------|
|        | Flow soldering   | 260deg.C, within 10sec. | Type D is not Reflow soldering object part. |

\*1 When using at the thing except the condition that it is possible to suggest to the above, confirm that there is not a problem.

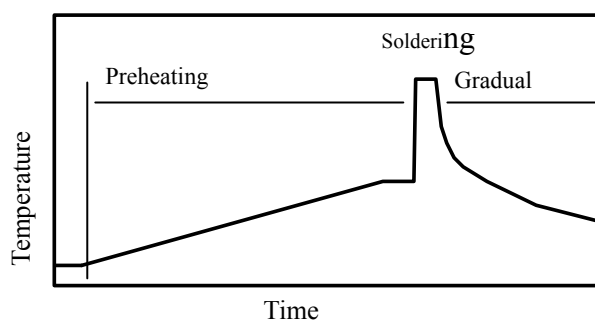
The limit of the repair be once and go in solder temperature within 400deg.C and moreover within 5 seconds.

\*2 Profile be careful because there is a margin of error in the way of measuring.

\*3 The temperature depend on the size and the package density of the substrate.

Therefore, confirm every kind of the substrate.

- Soldering temperature-time profile to recommend



|                 |                     |          |
|-----------------|---------------------|----------|
| Preheating      | The normal 130deg.C | max.120s |
| Soldering       | max.260deg.C        | max.10s  |
| Gradual cooling | Gradual cooling     |          |

Note / Revision

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                           |        |
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| CLASSIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | PRODUCT REFERENCE DATA SHEET              |        |
| SUBJECT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ZNR SURGE ABSORBER E-SERIES (Taping Type) | 5 - 23 |
| <p>4) Long-term storage</p> <p>(1) Do not store the ZNR under high temperatures and high humidity. Store it at temperature up to 40 degree-C and at humidity below 75%RH, and use it within two years.<br/>Before using the ZNR that has been stored for a long period (two year or longer), confirm the Solderability.</p> <p>(2) Avoid atmospheres full of corrosive gases (hydrogen sulfide, sulfurous acid, chlorine, ammonia, etc.).</p> <p>(3) Avoid direct sunlight and dew condensation.</p> <p><b>3. Notices</b></p> <p><b>3.1 In cases that the ZNR is used in equipment (aerospace equipment, medical equipment, etc.) requiring extremely high reliability, ask us for selection of part No., and protection coordination, etc. in advance.</b></p> <p><b>3.2 There is possibility that the ZNR will unexpectedly smoke or ignite because of abnormal rise of the circuit voltage and invasion of excessive surge. To prevent that accident from spreading over the equipment and not to expand the damage, use multiplex protection such as the adoption of frame-retardant materials for housing parts and structural parts.</b></p> <p><b>3.3 Package marking includes the product number, quantity, and country of origin.<br/>As a rule, country of origin should be indicated in English.</b></p> <p><b>4. Substances of this product</b></p> <p>4.1 This product not been manufactured with any ozone depleting chemical controlled under the Montreal Protocol.</p> <p>4.2 This product comply with RoHS(Restriction of the use of certain Hazardous Substance in electrical and electronic equipment) Directive(2002/95/EC).</p> <p>4.3 All the materials used in this part are registered material under the Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substance</p> |                                           |        |
| Note / Revision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                           |        |

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|----------------|-------------------------------------------|--------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |        |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |        |
|                |                                           | 6 - 23 |

[REFERENCE]

1. Scope, Part Numbers, Construction

- 1.1 Scope

This specification applies to the ZNR Surge Absorbers(Taping Type).
- 1.2 Part Numbers

Explanation of Part Numbers

1

2

3

4

5

6

7

8

9

10

11

12

E

R

Z

E

0

7

Product Code

Series

Design no.

| Series |            |
|--------|------------|
| E05    | Series E5  |
| E07    | Series E7  |
| E08    | Series E8  |
| E10    | Series E10 |
| E11    | Series E11 |

| Lead Configuration |                    |           |
|--------------------|--------------------|-----------|
| symbol             | Lead Configuration | Packaging |
| A                  | Straight Lead      | Bulk      |
| <sup>1)</sup> B    | Crimped Lead       | Bulk      |
| <sup>2)</sup> E    | Straight Lead      | Taped     |
| <sup>2)</sup> F    | Crimped Lead       | Taped     |

<sup>1)</sup> Cut Type

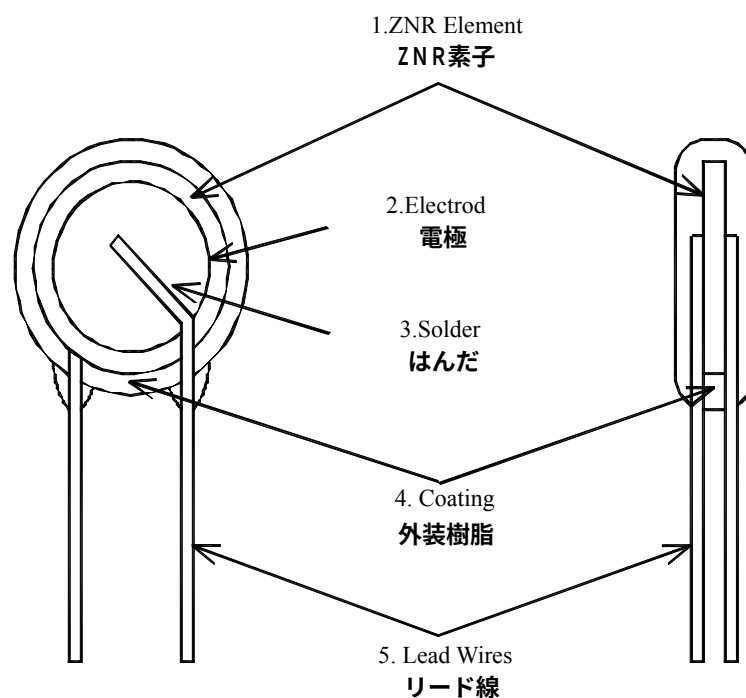
<sup>2)</sup> Series E5, E7, E8, E10, E11

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

Note / Revision

|                |                                           |        |
|----------------|-------------------------------------------|--------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |        |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |        |
|                |                                           | 7 - 23 |

### 1.3 Construction



| Item<br>部品名                          |                                                        | Material<br>材質                                              |
|--------------------------------------|--------------------------------------------------------|-------------------------------------------------------------|
| 1. ZNR Element<br>ZNR素子              |                                                        | ZnO Ceramics etc.<br>酸化亜鉛 他                                 |
| 2. Electrode<br>電極                   |                                                        | Silver<br>銀                                                 |
| 3. Internal solder material<br>内部はんだ |                                                        | Sn-Ag-Cu                                                    |
| 4. Coating<br>外装樹脂                   |                                                        | Epoxy Resin (UL94 V-0 Approved)<br>エポキシ樹脂 (UL94 V-0 認定品)    |
| 5. Lead Wires<br>リード線                | Series : E5,E7<br>シリーズ : E5,E7                         | Tin(Sn100%) plated Copper-covered Steel<br>錫(Sn100%)メッキ銅覆鋼線 |
|                                      | Series :<br>E8,E10,E11,E14<br>シリーズ :<br>E8,E10,E11,E14 | Tin(Sn100%) Plated Copper<br>錫(Sn100%)メッキ銅線                 |

Note / Revision

|                |                                           |        |
|----------------|-------------------------------------------|--------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |        |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |        |
|                |                                           | 8 - 23 |

## 2. Appearance, Dimensions

### 2.1 Appearance

Without dirt and crack, marking should be clear.

### 2.2 Dimensions

Refer to Figure 1.1 , 1.2 and table 1.1, 1.2.

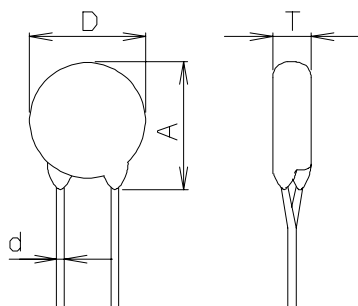


**Fig. 1.1 Straight Leads and Taping**

Part No. : ERZE\*\*E□□□

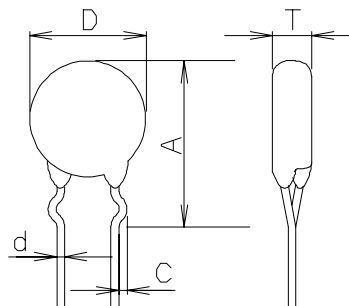


**Fig. 1.2 Crimped Leads and Taping**

Part No. : ERZE\*\*F□□□

### 2.3 Taping Dimensions

Refer to Figure 1.3 , 1.4 and table 1.3, 1.4.

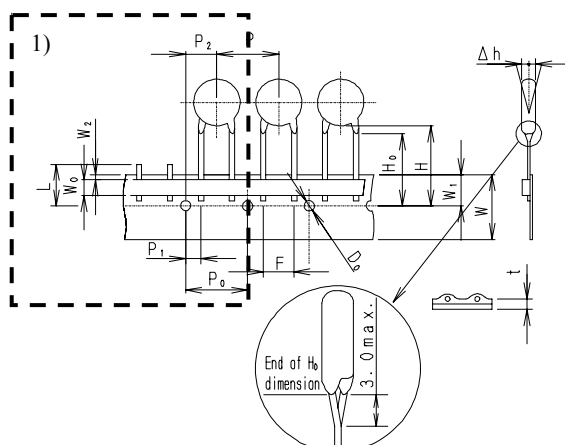


**Fig. 1.3 Straight Leads and taping**

Part No. : ERZE\*\*E□□□

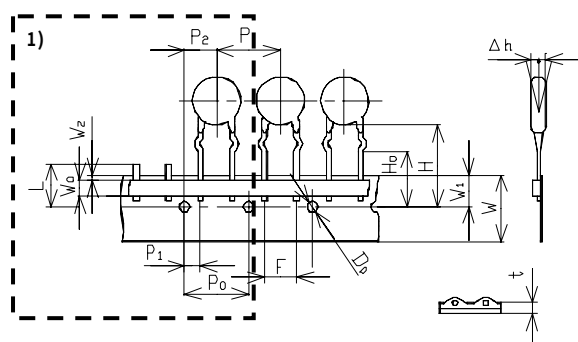


**Fig. 1.4 Crimped Leads and Taping**

Part No. : ERZE\*\*F□□□

Note / Revision

|                |                                           |        |
|----------------|-------------------------------------------|--------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |        |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) | 9 - 23 |

### 3. Electrical Requirements

Listed below of Specifications, Test Specifications, and Test Methods.  
Individual specifications is in the table 2 .

| Characteristics |                                                      | Specifications             | Test Specifications                              |
|-----------------|------------------------------------------------------|----------------------------|--------------------------------------------------|
| 3.1             | Max. allowable voltage                               | AC: Table 2<br>DC: Table 2 |                                                  |
| 3.2             | Rated wattage                                        | Table 2                    |                                                  |
| 3.3             | Varistor voltage                                     | $V_1$ : Table 2            | Measuring current : 1mA DC                       |
| 3.4             | Clamping voltage                                     | Table 2                    | Measuring current : Table 2                      |
|                 |                                                      |                            | Current Waveform : 8/20 $\mu$ s                  |
| 3.5             | Maximum peak current<br>(Withstanding surge current) | 1pulse: Table 2            | Impulse : 8/20 $\mu$ s                           |
|                 |                                                      | 2pulse: Table 2            | Impulse : 8/20 $\mu$ s at interval 5min          |
| 3.6             | Maximum energy                                       | Table 2                    | Impulse : 2ms, 1 pulse                           |
|                 |                                                      | Table 2                    | Impulse : 10/1000 $\mu$ s, 1pulse                |
| 3.7             | Temperature coefficient of<br>varistor voltage       | 0 to -0.05%/deg.C          | Measured voltage : $V_1$                         |
|                 |                                                      |                            | Temp. range : +25deg.C to +85deg.C               |
| 3.8             | Capacitance                                          | Table 2                    | Measuring frequency : 1kHz<br>1MHz (below 100pF) |
| 3.9             | Dielectric loss                                      | Table 2                    | Measuring frequency : 1kHz<br>1MHz (below 100pF) |
| 3.10            | Withstand voltage                                    | No breakdown               | Applied voltage : Table 2                        |
|                 |                                                      |                            | Time : 1min                                      |

Note / Revision

|                                                                                                                            |                                                   |                                                                                                                                                                                                                    |  |         |
|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------|
| CLASSIFICATION                                                                                                             |                                                   | PRODUCT REFERENCE DATA SHEET                                                                                                                                                                                       |  |         |
| SUBJECT                                                                                                                    |                                                   | ZNR SURGE ABSORBER E-SERIES (Taping Type)                                                                                                                                                                          |  |         |
|                                                                                                                            |                                                   |                                                                                                                                                                                                                    |  | 10 - 23 |
|                                                                                                                            |                                                   |                                                                                                                                                                                                                    |  |         |
| Characteristics                                                                                                            |                                                   | Test Methods/Description                                                                                                                                                                                           |  |         |
|                                                                                                                            | Standard test condition                           | Environmental conditions under which every measuring is done without doubt on the measuring results. Unless specially, specified, temperature, relative humidity are 5deg.C to 35deg.C, 45 to 85%RH. respectively. |  |         |
| 3.1                                                                                                                        | Maximum allowable voltage                         | The maximum Sine wave voltage (rms) that can be applied continuously or maximum DC voltage in the specified environmental temperature range.                                                                       |  |         |
| 3.2                                                                                                                        | Rated wattage                                     | The maximum power to be loaded with in the specified environmental temperature                                                                                                                                     |  |         |
| 3.3                                                                                                                        | Varistor voltage                                  | Voltage between both terminals of ZNR measured when CmA of DC current is applied under standard conditions. It is called Vc. Measuring the varistor voltage should be made promptly to avoid heat affection.       |  |         |
| 3.4                                                                                                                        | Clamping voltage                                  | The maximum voltage between two terminals with the specified standard impulse current (8/20 μs).                                                                                                                   |  |         |
| 3.5                                                                                                                        | Maximum peak current (Withstanding surge current) | The maximum current within the varistor voltage change of ±10% with the standard impulse (8/20 μs) applied by the specified condition.                                                                             |  |         |
| 3.6                                                                                                                        | Maximum energy                                    | The maximum energy within the varistor voltage change of ±10% when the specified impulse is applied.                                                                                                               |  |         |
| 3.7                                                                                                                        | Temperature coefficient of varistor voltage       | Coefficient indicating dependency of varistor voltage on specified temperature.                                                                                                                                    |  |         |
| 3.8                                                                                                                        | Capacitance                                       | Capacitance shall be measured at 1kHz±10%, 1Vrms max. ( 1MHz±10% below 100pF ), 0V bias and 20±2deg.C.                                                                                                             |  |         |
| 3.9                                                                                                                        | Dielectric loss                                   | Dielectric loss tangent shall be measured at 1kHz±10%, 1Vrms max. ( 1MHz±10% below 100pF ), 0V bias and 20±2deg.C.                                                                                                 |  |         |
| 3.10                                                                                                                       | Withstand voltage                                 | The specified voltage shall be applied both terminals of the specimen connected together and metal foil closely wrapped round its body for 1 minute.                                                               |  |         |
| Note : Varistor Voltage change of forward direction shall be measured in the test of uni-pole surge life and DC load life. |                                                   |                                                                                                                                                                                                                    |  |         |
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|----------------|-------------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |         |
|                |                                           | 11 - 23 |

#### 4. Mechanical Requirements

Listed below of Specifications, Test Specifications, and Test Methods.

| Characteristics |                                      | Specifications                                                       | Test Specifications                                                         |
|-----------------|--------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 4.1             | Robustness of terminations (Tensile) | No outstanding damage                                                | Force : 9.8N(Series E5,E7,E8,E10,E11)<br>19.6N(Series E14)<br>Time : 10 sec |
| 4.2             | Robustness of terminations (Bending) | No outstanding damage                                                | Force : 4.9N(Series E5,E7,E8,E10,E11)<br>9.8N(Series E14)                   |
| 4.3             | Vibration                            | No outstanding damage                                                | Frequency : 10 to 55Hz<br>Amplitude : 0.75mm<br>Time : each 2 hours         |
| 4.4             | Solderability                        | Minimum 95% of the terminals should be covered with solder uniformly | Solder temp. : 235+/-5deg.C<br>Immersed time : 2+/-0.5s                     |
| 4.5             | Resistance to soldering heat         | $\Delta V_1 \leq \pm 5\%$                                            | Solder temp. : 260+/-5deg.C<br>Immersed time : 10+/-1sec                    |

| Characteristics |                                      | Test Methods/Description                                                                                                                                                                                                                                                                            |
|-----------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.1             | Robustness of terminations (Tensile) | After gradually applying the specified load and keeping the unit fixed for 10 seconds, the terminal shall be visually examined for any damage.                                                                                                                                                      |
| 4.2             | Robustness of terminations (Bending) | The unit shall be secured with its terminals kept vertical and the specified load is applied, gradually bent by 90° in one direction, back to the original position, then 90° in the opposite direction, and again back to the original position. The damage of the terminals is visually examined. |
| 4.3             | Vibration                            | After repeatedly applying a single harmonic vibration (amplitude ; 0.75mm ; double amplitude ; 1.5mm with 1 minute vibration frequency cycles(10Hz to 55Hz to 10Hz) to each of three perpendicular directions for 2 hours. The varistor shall then be visually examined.                            |
| 4.4             | Solderability                        | After dipping the terminals to a depth of about 3mm from the body, in the melted solder of 235+/-5deg.C for 2+/-0.5 seconds, the terminals are visually examined.                                                                                                                                   |
| 4.5             | Resistance to Soldering Heat         | After each lead shall be dipped into a solder bath having a temperature 260+/-5deg.C to a point 2.0~2.5mm from the body of the unit, be held there for specified time, and then be stored at room temperature and humidity for 1 to 2 hour. The change of Vc and mechanical damages are examined.   |

Note : Varistor Voltage change of forward direction shall be measured in the test of uni-pole surge life and DC load life.

Note / Revision

|                |                                           |         |
|----------------|-------------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) | 12 - 23 |

## 5. Environmental Requirements

Listed below of Specifications, Test Specifications, and Test Methods.  
Individual specifications is in the table 2 .

| Characteristics             |                                          | Specifications                                      | Test Specifications                 |                                                 |        |  |
|-----------------------------|------------------------------------------|-----------------------------------------------------|-------------------------------------|-------------------------------------------------|--------|--|
| 5.1                         | High temperature storage<br>(Dry heat)   | $\Delta V1 \leq \pm 5\%$                            | Ambient temp. :<br>Time :           | 125+/-2deg.C<br>1000h                           |        |  |
| 5.2                         | Damp heat                                | $\Delta V1 \leq \pm 5\%$                            | Ambient<br>condition :<br>Time :    | 40+/-2deg.C, .0 to 95%RH<br>1000h               |        |  |
| 5.3                         | Low temperature storage<br>(Cold)        | $\Delta V1 \leq \pm 5\%$                            | Ambient temp. :<br>Time :           | -40+/-2deg.C<br>1000 h                          |        |  |
| 5.4                         | Heat cycle                               | $\Delta V1 \leq \pm 5\%$<br>No outstanding damage   |                                     |                                                 |        |  |
|                             |                                          |                                                     | Step                                | Temp.                                           | Period |  |
|                             |                                          |                                                     | 1                                   | −40+/-3deg.C                                    | 30min. |  |
|                             |                                          |                                                     | 2                                   | Room Temp.                                      | 15min. |  |
|                             |                                          |                                                     | 3                                   | +125+/-2deg.C                                   | 30min. |  |
|                             |                                          |                                                     | 4                                   | Room Temp.                                      | 15min. |  |
| 5 cycles                    |                                          |                                                     |                                     |                                                 |        |  |
| 5.5                         | High temperature load<br>(Dry heat load) | $\Delta V1 \leq \pm 10\%$                           | Ambient temp. :<br>Time :           | 85+/-2deg.C<br>1000 h                           |        |  |
| 5.6                         | Damp heat load                           | $\Delta V1 \leq \pm 10\%$                           | Ambient<br>condition :<br>Time :    | 40+/-2deg.C, 90 to 95%RH.<br>1000 h             |        |  |
| 5.7                         | Impulse life I<br>(Surge life I)         | $\Delta V1 \leq +20\% / -0\%$<br>at listed table 2. | Impulse :<br>Applied<br>condition : | 8/20μs<br>10 <sup>4</sup> times by interval 10s |        |  |
| 5.8                         | Impulse life II<br>(Surge life II)       | $\Delta V1 \leq +20\% / -0\%$<br>at listed table 2  | Impulse :<br>Applied<br>condition : | 8/20μs<br>10 <sup>5</sup> times by interval 10s |        |  |
| Operating Temperature Range |                                          | -40deg.C to +85deg.C                                |                                     |                                                 |        |  |
| Storage Temperature Range   |                                          | -40deg.C to +125deg.C                               |                                     |                                                 |        |  |

Note / Revision

|                |                                           |         |
|----------------|-------------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |         |
|                |                                           | 13 - 23 |

| Characteristics                                                                                                            |                                       | Test Methods/Description                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5.1                                                                                                                        | High temperature storage (Dry heat)   | The specimen shall be subjected to 125+/-2deg.C for 1000 hours in a thermostatic bath without load and then stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured.                              |
| 5.2                                                                                                                        | Damp heat                             | The specimen shall be subjected to 40+/-2deg.C, 90 to 95%RH for 1000 hours without load and then stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured.                                         |
| 5.3                                                                                                                        | Low temperature storage (Cold)        | The specimen shall be subjected to -40+/-2deg.C without load for 1000 hours and then stored at room temperature for 1 to 2 hours. Thereafter, the change of Vc shall be measured.                                                                  |
| 5.4                                                                                                                        | Heat cycle                            | The temperature cycling shall be repeated 5 times and stored at room temperature and humidity for 1 to 2 hours. The change of Vc as well as mechanical damage shall be examined.                                                                   |
| 5.5                                                                                                                        | High temperature load (Dry heat load) | After being continuously applied the maximum allowable voltage at 85+/-2deg.C for 1000 hours, the specimen shall be stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured.                      |
| 5.6                                                                                                                        | Damp heat load                        | The specimen shall be subjected to 40+/-2deg.C, 90 to 95%RH and the maximum allowable voltage for 1000 hours and then stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured.                    |
| 5.7                                                                                                                        | Impulse life I (Surge life I)         | After the specified impulse is applied 10000 times continuously with the interval 10 seconds at room temperature, the specimen shall be stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured.  |
| 5.8                                                                                                                        | Impulse life II (Surge life II)       | After the specified impulse is applied 100000 times continuously with the interval 10 seconds at room temperature, the specimen shall be stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured. |
| Note : Varistor Voltage change of forward direction shall be measured in the test of uni-pole surge life and DC load life. |                                       |                                                                                                                                                                                                                                                    |

**Individual specifications of Dimensions and Electrical Requirements and Environmental Requirements are indicated below.**

Dimensions : Table 1.1 to 1.4  
Electrical Requirements : Table 2  
Environmental Requirements : Table 2

Note / Revision

|                |                                           |         |
|----------------|-------------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |         |
|                |                                           | 14 - 23 |

Table 1.1 Series E7 Straight Leads and Taping

| 品番<br>Part No. | 付図番号<br>Fig. No.   | D<br>max.<br>(mm) | A<br>max.<br>(mm) | T<br>max.<br>(mm) | C<br>+/-0.4<br>(mm) | Φd<br>+/-<br>(mm)      | <sup>1)</sup> Weight<br>Approx.<br>(g) |
|----------------|--------------------|-------------------|-------------------|-------------------|---------------------|------------------------|----------------------------------------|
| ERZE07E201     | 付図 1.1<br>Fig. 1.1 | 9.0               | 15.0              | 5.3               | -                   | 0.80<br>+0.08<br>-0.05 | 0.7                                    |
| ERZE07E221     |                    |                   |                   | 5.4               |                     |                        | 0.8                                    |
| ERZE07E241     |                    |                   |                   | 5.5               |                     |                        | 0.8                                    |
| ERZE07E271     |                    |                   |                   | 5.7               |                     |                        | 0.9                                    |
| ERZE07E331     |                    |                   |                   | 6.0               |                     |                        | 1.0                                    |
| ERZE07E361     |                    |                   |                   | 6.2               |                     |                        | 1.0                                    |
| ERZE07E391     |                    |                   |                   | 6.3               |                     |                        | 1.0                                    |
| ERZE07E431     |                    |                   |                   | 6.5               |                     |                        | 1.1                                    |
| ERZE07E471     |                    |                   |                   | 6.8               |                     |                        | 1.2                                    |
| ERZE07E511     |                    |                   |                   | 7.0               |                     |                        | 1.2                                    |
| ERZE07E561     |                    |                   |                   | 7.4               |                     |                        | 1.3                                    |
| ERZE07E621     |                    |                   |                   | 7.8               |                     |                        | 1.4                                    |

<sup>1)</sup>参考値, Typical

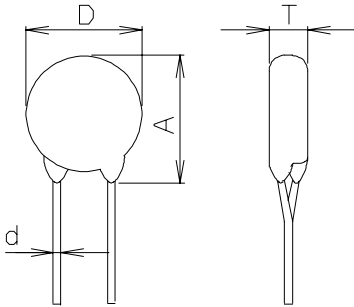


Fig. 1.1 Straight Leads and Taping  
Part No. : ERZE\*\*E□□□

|                |                                           |         |
|----------------|-------------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |         |
|                |                                           | 15 - 23 |

Table 1.5 Taping Dimensions Series E7 Straight Leads and Taping

| 品番<br>Part No. | P    | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | F    | Δh   | W    | W <sub>0</sub> | W <sub>1</sub> | W <sub>2</sub> | H             | H <sub>0</sub> or F1                        | L    | ℓ                | D <sub>0</sub>       | t                   |
|----------------|------|----------------|----------------|----------------|------|------|------|----------------|----------------|----------------|---------------|---------------------------------------------|------|------------------|----------------------|---------------------|
|                | +/-  | +/-            | +/-            | +/-            | +/-  | +/-  | +/-  | min.           | +/-            | max.           | typical       | +/-                                         | max. | max.             | +/-                  | +/-                 |
|                | (mm) | (mm)           | (mm)           | (mm)           | (mm) | (mm) | (mm) | (mm)           | (mm)           | (mm)           | (mm)          | (mm)                                        | (mm) | (mm)             | (mm)                 | (mm)                |
| ERZE07E201     | 15.0 | 15.0           | 3.75           | 7.5            | 7.5  | 0    | 18.0 | 5.0            | 9.0            | 3.0            | Approx.<br>22 | H <sub>0</sub> :<br>18.0<br>+2.0<br>-0.0    | 11.0 | 5.0<br>or<br>1.0 | φ4.0<br>+0.2<br>-0.2 | 0.6<br>+0.3<br>-0.3 |
| ERZE07E221     | +1.0 | +0.3           | +0.70          | +1.3           | +0.5 | +2   | +1.0 |                | +0.5           |                |               |                                             |      |                  |                      |                     |
|                | -1.0 | -0.3           | -0.70          | -1.3           | -0.5 | -2   | -0.5 |                | -0.5           |                |               |                                             |      |                  |                      |                     |
| ERZE07E241     |      |                |                |                |      |      |      |                |                |                |               |                                             |      |                  |                      |                     |
| ERZE07E271     |      |                |                |                |      |      |      |                |                |                |               |                                             |      |                  |                      |                     |
| ERZE07E331     |      |                |                |                |      |      |      |                |                |                |               |                                             |      |                  |                      |                     |
| ERZE07E361     | 15.0 | 15.0           | 3.75           | 7.5            | 7.5  | 0    | 18.0 | 5.0            | 9.0            | 3.0            | Approx.<br>22 | F <sub>1</sub> :<br>16.00<br>+0.75<br>-0.50 | 11.0 | 5.0<br>or<br>1.0 | φ4.0<br>+0.2<br>-0.2 | 0.6<br>+0.3<br>-0.3 |
| ERZE07E391     | +1.0 | +0.3           | +0.70          | +1.3           | +0.5 | +2   | +1.0 |                | +0.5           |                |               |                                             |      |                  |                      |                     |
|                | -1.0 | -0.3           | -0.70          | -1.3           | -0.5 | -2   | -0.5 |                | -0.5           |                |               |                                             |      |                  |                      |                     |
| ERZE07E431     |      |                |                |                |      |      |      |                |                |                |               |                                             |      |                  |                      |                     |
| ERZE07E471     |      |                |                |                |      |      |      |                |                |                |               |                                             |      |                  |                      |                     |
| ERZE07E511     |      |                |                |                |      |      |      |                |                |                |               |                                             |      |                  |                      |                     |
| ERZE07E561     |      |                |                |                |      |      |      |                |                |                |               |                                             |      |                  |                      |                     |
| ERZE07E621     |      |                |                |                |      |      |      |                |                |                |               |                                             |      |                  |                      |                     |

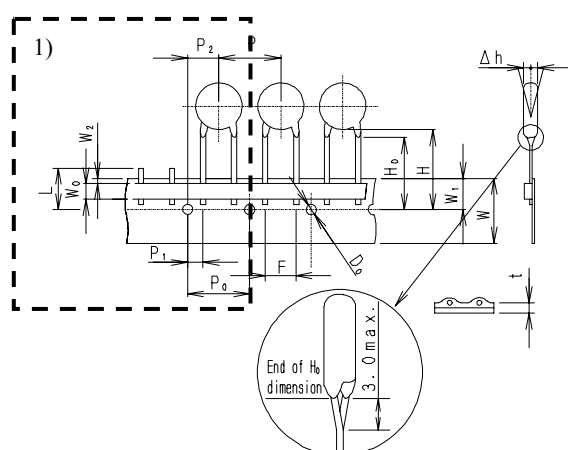
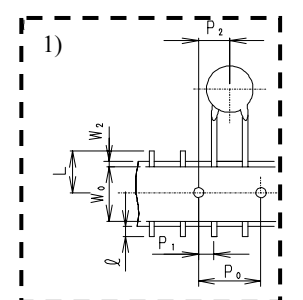


Fig. 1.3 Straight Leads and taping



<sup>1)</sup>There are two types of W<sub>0</sub>.

Note / Revision

|                |                                           |         |
|----------------|-------------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |         |
|                |                                           | 16 - 23 |

Table 1.2 Series E7 Crimped Leads and Taping

| 品番<br>Part No. | 付図番号<br>Fig. No.   | D<br>max.<br>(mm) | A<br>max.<br>(mm) | T<br>max.<br>(mm) | C<br>+/-0.4<br>(mm) | Φd<br>+/-<br>(mm)      | <sup>1)</sup> Weight<br>Approx.<br>(g) |
|----------------|--------------------|-------------------|-------------------|-------------------|---------------------|------------------------|----------------------------------------|
| ERZE07F201     | 付図 1.2<br>Fig. 1.2 | 9.0               | 17.0              | 5.3               | 1.4                 | 0.80<br>+0.08<br>-0.05 | 0.7                                    |
| ERZE07F221     |                    |                   |                   | 5.4               |                     |                        | 0.8                                    |
| ERZE07F241     |                    |                   |                   | 5.5               |                     |                        | 0.8                                    |
| ERZE07F271     |                    |                   |                   | 5.7               |                     |                        | 0.9                                    |
| ERZE07F331     |                    |                   |                   | 6.0               |                     |                        | 1.0                                    |
| ERZE07F361     |                    |                   |                   | 6.2               |                     |                        | 1.0                                    |
| ERZE07F391     |                    |                   |                   | 6.3               |                     |                        | 1.0                                    |
| ERZE07F431     |                    |                   |                   | 6.5               |                     |                        | 1.1                                    |
| ERZE07F471     |                    |                   |                   | 6.8               |                     |                        | 1.2                                    |
| ERZE07F511     |                    |                   |                   | 7.0               |                     |                        | 1.2                                    |
| ERZE07F561     |                    |                   |                   | 7.4               |                     |                        | 1.3                                    |
| ERZE07F621     |                    |                   |                   | 7.8               |                     |                        | 1.4                                    |

<sup>1)</sup>参考値, Typical

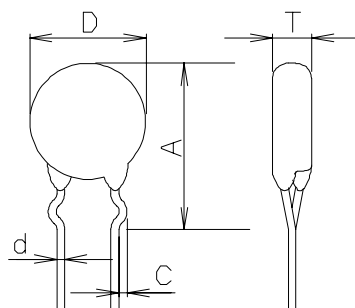


Fig. 1.2 Crimped Leads and Taping

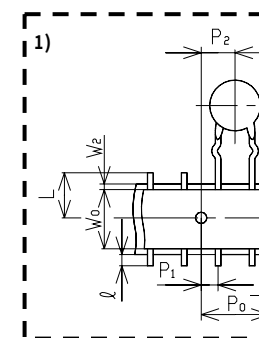
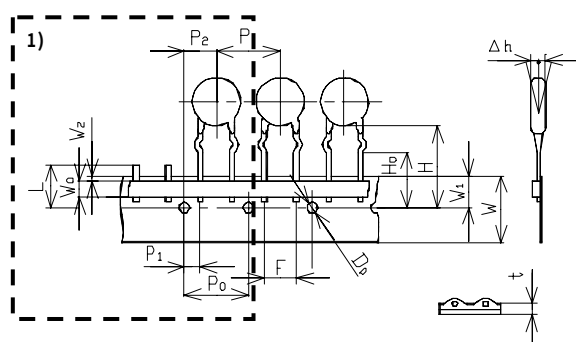
Part No. : ERZE\*\*F□□□

Note / Revision

|                |                                           |         |
|----------------|-------------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |         |
|                |                                           | 17 - 23 |

Table 1.6 Taping Dimensions Series E7 Crimped Leads and Taping.

| 品番<br>Part No. | P    | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | F    | Δh   | W    | W <sub>0</sub> | W <sub>1</sub> | W <sub>2</sub> | H             | H <sub>0</sub> or Fl                     | L    | ℓ                | D <sub>0</sub>       | t                   |
|----------------|------|----------------|----------------|----------------|------|------|------|----------------|----------------|----------------|---------------|------------------------------------------|------|------------------|----------------------|---------------------|
|                | +/-  | +/-            | +/-            | +/-            | +/-  | +/-  | +/-  | min.           | +/-            | max.           | typical       | +/-                                      | max. | max.             | +/-                  | +/-                 |
|                | (mm) | (mm)           | (mm)           | (mm)           | (mm) | (mm) | (mm) | (mm)           | (mm)           | (mm)           | (mm)          | (mm)                                     | (mm) | (mm)             | (mm)                 | (mm)                |
| ERZE07F201     | 15.0 | 15.0           | 3.75           | 7.5            | 7.5  | 0    | 18.0 | 5.0            | 9.0            | 3.0            | Approx.<br>22 | H <sub>0</sub> :<br>16.0<br>+0.5<br>-0.5 | 11.0 | 5.0<br>or<br>1.0 | φ4.0<br>+0.2<br>-0.2 | 0.6<br>+0.3<br>-0.3 |
| ERZE07F221     | +1.0 | +0.3           | +0.70          | +1.3           | +0.5 | +2   | +1.0 |                | +0.5           |                |               |                                          |      |                  |                      |                     |
| ERZE07F241     | -1.0 | -0.3           | -0.70          | -1.3           | -0.5 | -2   | -0.5 |                | -0.5           |                |               |                                          |      |                  |                      |                     |
| ERZE07F271     |      |                |                |                |      |      |      |                |                |                |               |                                          |      |                  |                      |                     |
| ERZE07F331     |      |                |                |                |      |      |      |                |                |                |               |                                          |      |                  |                      |                     |
| ERZE07F361     |      |                |                |                |      |      |      |                |                |                |               |                                          |      |                  |                      |                     |
| ERZE07F391     |      |                |                |                |      |      |      |                |                |                |               |                                          |      |                  |                      |                     |
| ERZE07F431     |      |                |                |                |      |      |      |                |                |                |               |                                          |      |                  |                      |                     |
| ERZE07F471     |      |                |                |                |      |      |      |                |                |                |               |                                          |      |                  |                      |                     |
| ERZE07F511     |      |                |                |                |      |      |      |                |                |                |               |                                          |      |                  |                      |                     |
| ERZE07F561     |      |                |                |                |      |      |      |                |                |                |               |                                          |      |                  |                      |                     |
| ERZE07F621     |      |                |                |                |      |      |      |                |                |                |               |                                          |      |                  |                      |                     |



<sup>1)</sup>There are two types of W<sub>0</sub>.

Fig. 1.4 Crimped Leads and Taping

Note / Revision

|                |                                           |         |
|----------------|-------------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |         |
|                |                                           | 18 - 23 |

Table 2 Series E7  
Part Numbers symbol : \* is E or F

| Part Number | Applicable Standards |                       | Electrical                |     |                |                  |                  |      |                      |         |                |            |             |                  |                    | Environmental             |     |
|-------------|----------------------|-----------------------|---------------------------|-----|----------------|------------------|------------------|------|----------------------|---------|----------------|------------|-------------|------------------|--------------------|---------------------------|-----|
|             | Nominal Part No.     | 1)Authorized Standard | Maximum Allowable Voltage |     | Rated watt-age | Varistor Voltage | Clamping Voltage |      | Maximum Peak Current |         | Maximum Energy |            | Capacitance | Di-electric Loss | With-stand voltage | Impulse Life (Surge Life) |     |
|             |                      |                       | ACrms                     | DC  |                |                  | (max.)           |      | 1 time               | 2 times | 2ms            | 10/1000 μs | (max.)      | (max.)           | (max.)             | I                         | II  |
|             |                      |                       | (V)                       | (V) | (W)            | (V)              | Vx(A)(V)         | x(A) | (A)                  | (A)     | (J)            | (J)        | 1kHz (pF)   | 1kHz (%)         | (V)                | (A)                       | (A) |
| ERZE07*201  | E7201                | ○☆                    | 130                       | 170 | 0.25           | 185 to 225       | 340              | 25   | 2500                 | 1250    | 19             | 26         | 430         | 10               | 1500               | 100                       | 70  |
| ERZE07*221  | E7221                | ○☆                    | 140                       | 180 | 0.25           | 198 to 242       | 360              | 25   | 2500                 | 1250    | 22             | 30         | 410         | 10               | 1500               | 100                       | 70  |
| ERZE07*241  | E7241                | ○☆                    | 150                       | 200 | 0.25           | 216 to 264       | 395              | 25   | 2500                 | 1250    | 24             | 33         | 380         | 10               | 1500               | 100                       | 70  |
| ERZE07*271  | E7271                | ○☆                    | 175                       | 225 | 0.25           | 247 to 303       | 455              | 25   | 2500                 | 1250    | 28             | 39         | 350         | 10               | 1500               | 100                       | 70  |
| ERZE07*331  | E7331                | ○☆                    | 210                       | 270 | 0.25           | 297 to 363       | 545              | 25   | 2500                 | 1250    | 32             | 44         | 300         | 10               | 1500               | 100                       | 70  |
| ERZE07*361  | E7361                | ○☆                    | 230                       | 300 | 0.25           | 324 to 396       | 595              | 25   | 2500                 | 1250    | 36             | 50         | 300         | 10               | 1500               | 100                       | 70  |
| ERZE07*391  | E7391                | ○☆                    | 250                       | 320 | 0.25           | 351 to 429       | 650              | 25   | 2500                 | 1250    | 38             | 53         | 300         | 10               | 1500               | 100                       | 70  |
| ERZE07*431  | E7431                | ○☆                    | 275                       | 350 | 0.25           | 387 to 473       | 710              | 25   | 2500                 | 1250    | 43             | 60         | 270         | 10               | 1500               | 100                       | 70  |
| ERZE07*471  | E7471                | ○☆                    | 300                       | 385 | 0.25           | 423 to 517       | 775              | 25   | 2500                 | 1250    | 47             | 65         | 230         | 10               | 1500               | 100                       | 70  |
| ERZE07*511  | E7511                | ○☆                    | 320                       | 410 | 0.25           | 459 to 561       | 845              | 25   | 2500                 | 1250    | 50             | 70         | 210         | 10               | 1500               | 100                       | 70  |
| ERZE07*561  | E7561                | ○☆                    | 350                       | 450 | 0.25           | 504 to 616       | 930              | 25   | 2500                 | 1250    | 55             | 75         | 200         | 10               | 1500               | 100                       | 70  |
| ERZE07*621  | E7621                | ○☆                    | 385                       | 505 | 0.25           | 558 to 682       | 1025             | 25   | 2500                 | 1250    | 60             | 80         | 190         | 10               | 1500               | 100                       | 70  |

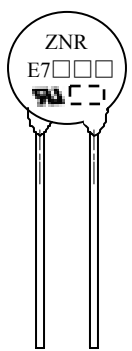
1) Authorized Standard

○:UL1449 Ed.3, ●:UL1449 Ed.3 Type3(or Code-Connected and Direct plug-in), ◎:UL1449 Ed.3 Type2(or Permanently Connected)

☆:VDE(IEC61051-1, -2, -2-2), ★:VDE(IEC60950-1 Ed.2 Annex.Q)

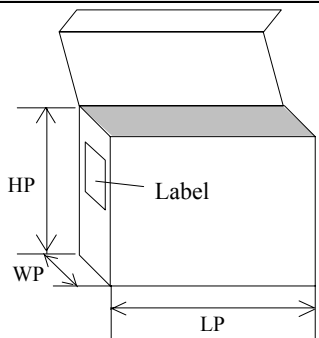
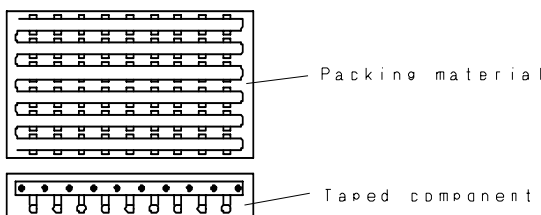
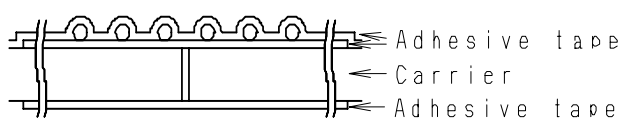
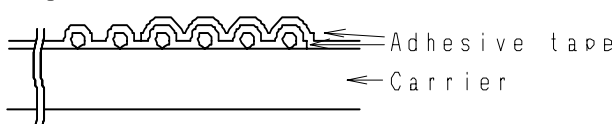
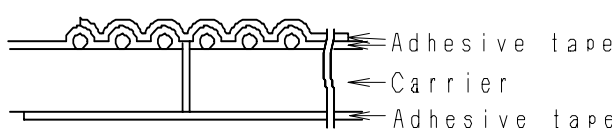
※Approval number (File No.) of safety regulations are subject to revision without notice. Ask factory for a copy of the latest file No..

Note / Revision

|                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| CLASSIFICATION                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | PRODUCT REFERENCE DATA SHEET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| SUBJECT                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| ZNR SURGE ABSORBER E-SERIES (Taping Type)                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   | 19 - 23 |   |      |                    |      |   |      |   |       |                                                                                                           |      |   |      |   |                                                                                   |                                          |      |   |      |   |      |                                                                                                                              |      |   |      |   |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |   |   |   |   |   |   |      |   |      |   |      |   |      |   |      |   |      |   |   |                                                                                                                                                                                                                                                                                                                                                                                |  |  |  |  |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| 6. Marking Contents                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| Refer to table 3.                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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                                                                           |  |  |  |  |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| Applicable Part No. : ERZE07E□□□,ERZE07F□□□                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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                                                                           |  |  |  |  |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| Table 3                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| Part Number<br>品番                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Marking<br>Contents<br>表示の内容                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| ERZE07E(F)201<br>to<br>ERZE07E(F)621                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ZNR<br>E7□□□<br>○◆◇                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| <div><div><div>ZNR</div><div>E7□□□</div><div></div></div><div></div></div> <div>部品表示の一例</div> <div>Example</div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <div>Explanation of the content</div> <div>内容の説明</div> <table><tr><td>ZNR</td><td colspan="5">Product Name<br/>品名</td></tr><tr><td>E7□□□</td><td colspan="5">Registered Part No.(VDE)<br/>Type Designation(UL),<br/>登録品番<br/>□□□・・・Nominal Varistor Voltage<br/>公称バリスタ電圧略称</td></tr><tr><td></td><td colspan="5">UL Recognized Component Mark<br/>UL 認定マーク</td></tr><tr><td>○</td><td colspan="5">Factory Identification Marking<br/>工場識別コード<br/>None 表記なし     ・・・Japan     日本国<br/>Q                     ・・・Indonesia     インドネシア</td></tr><tr><td>◆</td><td colspan="5">Year Code(example)<br/>年コード(例)<table><tr><td>2010</td><td>0</td><td>2020</td><td>K</td><td>2030</td><td>0</td></tr><tr><td>2011</td><td>1</td><td>2021</td><td>A</td><td>2031</td><td>1</td></tr><tr><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td></tr><tr><td>2018</td><td>8</td><td>2028</td><td>H</td><td>2038</td><td>8</td></tr><tr><td>2019</td><td>9</td><td>2029</td><td>J</td><td>2039</td><td>9</td></tr></table><div>・ When the tens digit of Christian era is even number, an alphabetic character (1:A, 2:B...9:J, 0:K, I is excluded.) shall be used for the abbreviation of end of Christian era.</div><div>・西暦年の+の位が偶数年は末尾略称に英字 (1:A,2:B...9:J,0:K, Iを除く)を使用する。</div><div>・ When the tens digit of Christian era is odd number, a numeric character (End of Christian era) shall be used for the abbreviation of end of Christian era.</div><div>・西暦年の+の位が奇数年は末尾略称に数字(西暦末尾)を使用する。</div></td></tr><tr><td>◇</td><td colspan="5">Monthly Code<br/>月コード<table><tr><td>Jan.</td><td>1</td><td>Jul.</td><td>7</td></tr><tr><td>Feb.</td><td>2</td><td>Aug.</td><td>8</td></tr><tr><td>Mar.</td><td>3</td><td>Sep.</td><td>9</td></tr><tr><td>Apr.</td><td>4</td><td>Oct.</td><td>O</td></tr><tr><td>May.</td><td>5</td><td>Nov.</td><td>N</td></tr><tr><td>Jun.</td><td>6</td><td>Dec.</td><td>D</td></tr></table></td></tr></table> |   |         |   | ZNR  | Product Name<br>品名 |      |   |      |   | E7□□□ | Registered Part No.(VDE)<br>Type Designation(UL),<br>登録品番<br>□□□・・・Nominal Varistor Voltage<br>公称バリスタ電圧略称 |      |   |      |   |  | UL Recognized Component Mark<br>UL 認定マーク |      |   |      |   | ○    | Factory Identification Marking<br>工場識別コード<br>None 表記なし     ・・・Japan     日本国<br>Q                     ・・・Indonesia     インドネシア |      |   |      |   | ◆    | Year Code(example)<br>年コード(例) <table><tr><td>2010</td><td>0</td><td>2020</td><td>K</td><td>2030</td><td>0</td></tr><tr><td>2011</td><td>1</td><td>2021</td><td>A</td><td>2031</td><td>1</td></tr><tr><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td></tr><tr><td>2018</td><td>8</td><td>2028</td><td>H</td><td>2038</td><td>8</td></tr><tr><td>2019</td><td>9</td><td>2029</td><td>J</td><td>2039</td><td>9</td></tr></table> <div>・ When the tens digit of Christian era is even number, an alphabetic character (1:A, 2:B...9:J, 0:K, I is excluded.) shall be used for the abbreviation of end of Christian era.</div> <div>・西暦年の+の位が偶数年は末尾略称に英字 (1:A,2:B...9:J,0:K, Iを除く)を使用する。</div> <div>・ When the tens digit of Christian era is odd number, a numeric character (End of Christian era) shall be used for the abbreviation of end of Christian era.</div> <div>・西暦年の+の位が奇数年は末尾略称に数字(西暦末尾)を使用する。</div> |      |   |      |   | 2010 | 0 | 2020 | K | 2030 | 0 | 2011 | 1 | 2021 | A | 2031 | 1 | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | 2018 | 8 | 2028 | H | 2038 | 8 | 2019 | 9 | 2029 | J | 2039 | 9 | ◇ | Monthly Code<br>月コード <table><tr><td>Jan.</td><td>1</td><td>Jul.</td><td>7</td></tr><tr><td>Feb.</td><td>2</td><td>Aug.</td><td>8</td></tr><tr><td>Mar.</td><td>3</td><td>Sep.</td><td>9</td></tr><tr><td>Apr.</td><td>4</td><td>Oct.</td><td>O</td></tr><tr><td>May.</td><td>5</td><td>Nov.</td><td>N</td></tr><tr><td>Jun.</td><td>6</td><td>Dec.</td><td>D</td></tr></table> |  |  |  |  | Jan. | 1 | Jul. | 7 | Feb. | 2 | Aug. | 8 | Mar. | 3 | Sep. | 9 | Apr. | 4 | Oct. | O | May. | 5 | Nov. | N | Jun. | 6 | Dec. | D |
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| Mar.                                                                                                                                                                                                                                                                                | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Sep.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 9 |         |   |      |                    |      |   |      |   |       |                                                                                                           |      |   |      |   |                                                                                   |                                          |      |   |      |   |      |                                                                                                                              |      |   |      |   |      |                                                                                                                                                                                                                                                                                                                                                                               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                                                                           |  |  |  |  |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| Apr.                                                                                                                                                                                                                                                                                | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Oct.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | O |         |   |      |                    |      |   |      |   |       |                                                                                                           |      |   |      |   |                                                                                   |                                          |      |   |      |   |      |                                                                                                                              |      |   |      |   |      |                                                                                                                                                                                                                                                                                                                                                                               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                                                                           |  |  |  |  |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| May.                                                                                                                                                                                                                                                                                | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Nov.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | N |         |   |      |                    |      |   |      |   |       |                                                                                                           |      |   |      |   |                                                                                   |                                          |      |   |      |   |      |                                                                                                                              |      |   |      |   |      |                                                                                                                                                                                                                                                                                                                                                                               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                                                                           |  |  |  |  |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| Jun.                                                                                                                                                                                                                                                                                | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Dec.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | D |         |   |      |                    |      |   |      |   |       |                                                                                                           |      |   |      |   |                                                                                   |                                          |      |   |      |   |      |                                                                                                                              |      |   |      |   |      |                                                                                                                                                                                                                                                                                                                                                                               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                                                                           |  |  |  |  |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |      |   |
| Note / Revision                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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|                |                                           |         |
|----------------|-------------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |         |
|                |                                           | 20 - 23 |

## 7. Packing

|          |                                              |                                                                                                                                                                                                                                                     |                                                                                                                                        |          |                                              |    |            |    |             |
|----------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------------|----|------------|----|-------------|
| 7.1      | Packing quantity                             | Table 4                                                                                                                                                                                                                                             |                                                                                                                                        |          |                                              |    |            |    |             |
| 7.2      | Packing dimensions                           |                                                                                                                                                                    | <table><tr><td>LP</td><td>340 mm max.</td></tr><tr><td>WP</td><td>55 mm max.</td></tr><tr><td>HP</td><td>330 mm max.</td></tr></table> | LP       | 340 mm max.                                  | WP | 55 mm max. | HP | 330 mm max. |
|          | LP                                           |                                                                                                                                                                                                                                                     | 340 mm max.                                                                                                                            |          |                                              |    |            |    |             |
| WP       | 55 mm max.                                   |                                                                                                                                                                                                                                                     |                                                                                                                                        |          |                                              |    |            |    |             |
| HP       | 330 mm max.                                  |                                                                                                                                                                                                                                                     |                                                                                                                                        |          |                                              |    |            |    |             |
|          | Marking of box packing                       |                                                                                                                                                                                                                                                     | <table><tr><td>Material</td><td>Corrugated cardboard with thickness of 3.0mm</td></tr></table>                                         | Material | Corrugated cardboard with thickness of 3.0mm |    |            |    |             |
| Material | Corrugated cardboard with thickness of 3.0mm |                                                                                                                                                                                                                                                     |                                                                                                                                        |          |                                              |    |            |    |             |
|          |                                              | Following shall be marked on packing box.<br>1. Part number<br>2. Quantity<br>3. Lot number                                                                                                                                                         |                                                                                                                                        |          |                                              |    |            |    |             |
| 7.3      | Packing method                               | <p>Taped components shall be packed in ammunition packing boxes as shown below.<br/>Empty space ceiling part of boxes may be filled with packing material.</p>  |                                                                                                                                        |          |                                              |    |            |    |             |
| 7.4      | Taping conjunction                           | <p>a) Carrier tape</p>                                                                                                                                          |                                                                                                                                        |          |                                              |    |            |    |             |
|          |                                              | <p>b) Adhesive tape</p>                                                                                                                                         |                                                                                                                                        |          |                                              |    |            |    |             |
|          |                                              | <p>c) Both tapes</p>                                                                                                                                            |                                                                                                                                        |          |                                              |    |            |    |             |
| 7.5      | Tape material                                | Kraft paper , Adhesive tape                                                                                                                                                                                                                         |                                                                                                                                        |          |                                              |    |            |    |             |

Note / Revision

|                |                                           |         |
|----------------|-------------------------------------------|---------|
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Table 4 Series E7 Part Numbers symbol : \* is E or F.

| Part Numbers                | Quantity in Packing Unit<br>pcs | Packing Quantity in Carton<br>pcs. |
|-----------------------------|---------------------------------|------------------------------------|
| ERZE07*201 to<br>ERZE07*471 | 1,000                           | 10,000                             |
| ERZE07*511 to<br>ERZE07*621 | 500                             | 5,000                              |

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|                |                                           |         |
|----------------|-------------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) | 22 - 23 |

## 7.6 Packing Indication Contents of Label

### 7.6.1 Bar Code Label Specification

|                       |                       |
|-----------------------|-----------------------|
| Bar code symbology    | :EIAJ Code39          |
| Label size            | :90.0 mm x 45.0 mm    |
| Bar code height       | :5 mm                 |
| Bar code dimension    |                       |
| Wide element width    | :0.334 mm             |
| Narrow/Wide bar ratio | :1:2                  |
| Inter character gap   | :0.167 mm             |
| Quiet zone            | :3.81 mm              |
| Bar code resolution   | :11.70 character/inch |

### 7.6.2 Bar Code Contents

|             |                                              |  |
|-------------|----------------------------------------------|--|
| Bar Code 1  | * 3N 1 Panasonic P/N SP Quantity *           |  |
| Bar Code 2  | * 3N 2 SP Serial No. SP Vender code *        |  |
| Bar Code 3  | * 1P Panasonic P/N *                         |  |
| issued date | 2012/04/02 Lot No. 2403GHA33                 |  |
|             | Part No. <b>ERZE07E221</b> Quantity 2000 pcs |  |
|             | <b>ZNR</b> MADE IN JAPAN                     |  |
|             | Panasonic Panasonic Corporation              |  |

symbols of things

### 7.6.3 Constitution of Lot No.

2 4 02 GH A67  
 | | day Fix Consecutive No(ex. A01,A02,...,A99,B01,...)  
 | Month(1,2,...,9,O,N,D)  
 Year(Last digit)

### 7.6.4 Label Form and Examples (ERZE07E221)



Note / Revision

|                |                                           |         |
|----------------|-------------------------------------------|---------|
| CLASSIFICATION | PRODUCT REFERENCE DATA SHEET              |         |
| SUBJECT        | ZNR SURGE ABSORBER E-SERIES (Taping Type) |         |
|                |                                           | 23 - 23 |

## 8. Country of origin

|                                   |                                                             |                                                                       |
|-----------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|
| 8.1 Country of origin             | Japan                                                       | Indonesia                                                             |
| 8.2 Factory name                  | Panasonic Corporation                                       | PT. Panasonic Industrial Devices Batam                                |
| 8.3 Address                       | 1037-2 Kamiosatsu, Chitose City,<br>Hokkaido 066-8502 Japan | Puri Industrial Park 2000, Batam Centre, Kelurahan Baloi Permai Batam |
| 8.4 Factory Identification Method | Factory Identification Marking<br>: None                    | Factory Identification Marking<br>: Q                                 |

Note / Revision