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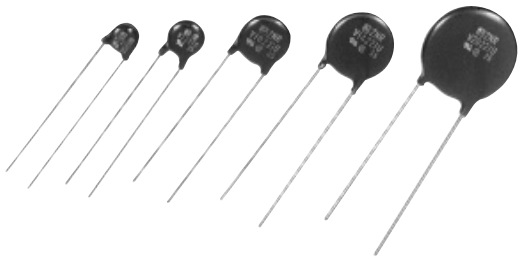
Jameco Part Number 1386128

# "ZNR" Transient/Surge Absorbers

Type: **D**
Series: **V**

"ZNR" Transient/Surge Absorber, Series V, Type D features large surge current and energy handling capability for absorbing transient overvoltage in a compact size.



## ■ Features

- Large withstanding surge current capability in compact sizes
- Large "Energy Handling Capability" absorbing transient overvoltages in compact sizes
- Wide range of varistor voltages
- The standard products shown below have received UL, CSA and VDE standards
  Varistor voltage 82-150V : UL, VDE
  Varistor voltage 200V over : UL, CSA, VDE
  (cf. Application Notes for UL/CSA, VDE recognized parts on page 103 to 104)
- RoHS compliant

## ■ Related Standards

- UL1414, UL1449
- CSA C22.2 No.1 Class 2221 01
  VDE CECC42000, CECC42200, CECC42201, IEC61051
- "Type Designation(UL)", "Part Number(CSA)" ,"Style Ref. (VDE)"
  Are not registered by product Part No..

(Refer to page 103, for the details)

## ■ Recommended Applications

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

## ■ Handling Precautions

See Page 113 to 115

## ■ Packaging Specifications

See Page 144

## ■ Explanation of Part Numbers (Bulk)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | R | Z | V | □ | □ | D | □ | □ | □ | □ | □ |
| Product Code | | | Series | | | | | | | Design No. | |

| Element Size | | | |
|---|---|---|---|
| 05 | $\phi$5 mm | 10 | $\phi$10 mm |
| 07 | $\phi$7 mm | 14 | $\phi$14 mm |
| 09 | $\phi$10 mm | 20 | $\phi$20 mm |

| Lead Configuration | |
|---|---|
| D | Straight Lead |
| V | Crimped Lead✻ |

✻ Excluding $\phi$20.
✻ Only the lead cut

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

## ■ Explanation of Part Numbers (Taping)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | R | Z | V | □ | □ | D | □ | □ | □ | □ | □ |
| Product Code | | | Series | | | | | | | Design No. | |

| Taping / Packaging | |
|---|---|
| A to D | Radial Taping ($P_0$=12.7 mm) |
| E to H | Radial Taping ($P_0$=15.0 mm) |

| Element Size | |
|---|---|
| 5 | $\phi$5 mm |
| 7 | $\phi$7 mm |
| 9 | $\phi$10 mm |
| A | $\phi$10 mm |
| E | $\phi$14 mm |

| Lead Configuration | |
|---|---|
| D | Straight Lead |
| V | Crimped Lead |

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

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

## ■ Reference Guide to Standard Products (ERZV○○D180 to ERZV○○D680)

| Part No. | Varistor Voltage* | Maximum Allowable Voltage | | Clamping Voltage @8/20µs | | Maximum Energy (Joule) | | Maximum Peak Current @8/20µs(A) | | Recommended Applications |
|---|---|---|---|---|---|---|---|---|---|---|
| | (V) | ACrms (V) | DC (V) | max.(V) | Ip (A) | 10/1000 µs | 2 ms | 1 time | 2 times | |
| ERZV05D180 | 18 (16–20) | 11 | 14 | 40 | 1 | 0.6 | 0.4 | 250 | 125 | For the low voltage circuit |
| ERZV07D180 | | | | 36 | 2.5 | 1.1 | 0.9 | 500 | 250 | |
| ERZV09D180 | | | | 36 | 5 | 2.6 | 2.2 | 1000 | 500 | |
| ERZV10D180 | | | | 36 | 5 | 2.6 | 2.2 | 1000 | 500 | |
| ERZV14D180 | | | | 36 | 10 | 5.2 | 4.3 | 2000 | 1000 | |
| ERZV20D180 | | | | 36 | 20 | 13 | 12 | 3000 | 2000 | |
| ERZV05D220 | 22 (20–24) | 14 | 18 | 48 | 1 | 0.7 | 0.5 | 250 | 125 | |
| ERZV07D220 | | | | 43 | 2.5 | 1.3 | 1.1 | 500 | 250 | |
| ERZV09D220 | | | | 43 | 5 | 3.2 | 2.6 | 1000 | 500 | |
| ERZV10D220 | | | | 43 | 5 | 3.2 | 2.6 | 1000 | 500 | |
| ERZV14D220 | | | | 43 | 10 | 6.3 | 5.3 | 2000 | 1000 | |
| ERZV20D220 | | | | 43 | 20 | 16 | 14 | 3000 | 2000 | |
| ERZV05D270 | 27 (24–30) | 17 | 22 | 60 | 1 | 0.9 | 0.7 | 250 | 125 | |
| ERZV07D270 | | | | 53 | 2.5 | 1.6 | 1.3 | 500 | 250 | |
| ERZV09D270 | | | | 53 | 5 | 3.9 | 3.2 | 1000 | 500 | |
| ERZV10D270 | | | | 53 | 5 | 3.9 | 3.2 | 1000 | 500 | |
| ERZV14D270 | | | | 53 | 10 | 7.8 | 6.5 | 2000 | 1000 | |
| ERZV20D270 | | | | 53 | 20 | 19 | 17 | 3000 | 2000 | |
| ERZV05D330 | 33 (30–36) | 20 | 26 | 73 | 1 | 1.1 | 0.8 | 250 | 125 | |
| ERZV07D330 | | | | 65 | 2.5 | 2.0 | 1.6 | 500 | 250 | |
| ERZV09D330 | | | | 65 | 5 | 4.8 | 4.0 | 1000 | 500 | |
| ERZV10D330 | | | | 65 | 5 | 4.8 | 4.0 | 1000 | 500 | |
| ERZV14D330 | | | | 65 | 10 | 9.5 | 7.9 | 2000 | 1000 | |
| ERZV20D330 | | | | 65 | 20 | 24 | 21 | 3000 | 2000 | |
| ERZV05D390 | 39 (35–43) | 25 | 31 | 86 | 1 | 1.2 | 0.9 | 250 | 125 | |
| ERZV07D390 | | | | 77 | 2.5 | 2.4 | 1.9 | 500 | 250 | |
| ERZV09D390 | | | | 77 | 5 | 5.6 | 4.7 | 1000 | 500 | |
| ERZV10D390 | | | | 77 | 5 | 5.6 | 4.7 | 1000 | 500 | |
| ERZV14D390 | | | | 77 | 10 | 11 | 9.4 | 2000 | 1000 | |
| ERZV20D390 | | | | 77 | 20 | 28 | 25 | 3000 | 2000 | |
| ERZV05D470 | 47 (42–52) | 30 | 38 | 104 | 1 | 1.5 | 1.1 | 250 | 125 | |
| ERZV07D470 | | | | 93 | 2.5 | 2.8 | 2.3 | 500 | 250 | |
| ERZV09D470 | | | | 93 | 5 | 6.8 | 5.6 | 1000 | 500 | |
| ERZV10D470 | | | | 93 | 5 | 6.8 | 5.6 | 1000 | 500 | |
| ERZV14D470 | | | | 93 | 10 | 14 | 11 | 2000 | 1000 | |
| ERZV20D470 | | | | 93 | 20 | 34 | 30 | 3000 | 2000 | |
| ERZV05D560 | 56 (50–62) | 35 | 45 | 123 | 1 | 1.8 | 1.3 | 250 | 125 | |
| ERZV07D560 | | | | 110 | 2.5 | 3.4 | 2.7 | 500 | 250 | |
| ERZV09D560 | | | | 110 | 5 | 8.1 | 6.7 | 1000 | 500 | |
| ERZV10D560 | | | | 110 | 5 | 8.1 | 6.7 | 1000 | 500 | |
| ERZV14D560 | | | | 110 | 10 | 16 | 13 | 2000 | 1000 | |
| ERZV20D560 | | | | 110 | 20 | 41 | 36 | 3000 | 2000 | |
| ERZV05D680 | 68 (61–75) | 40 | 56 | 150 | 1 | 2.2 | 1.6 | 250 | 125 | |
| ERZV07D680 | | | | 135 | 2.5 | 4.1 | 3.3 | 500 | 250 | |
| ERZV09D680 | | | | 135 | 5 | 9.8 | 8.2 | 1000 | 500 | |
| ERZV10D680 | | | | 135 | 5 | 9.8 | 8.2 | 1000 | 500 | |
| ERZV14D680 | | | | 135 | 10 | 20 | 16 | 2000 | 1000 | |
| ERZV20D680 | | | | 135 | 20 | 49 | 44 | 3000 | 2000 | |

* Measuring Current of Varistor Voltage
5 Series (ERZV05D180 to ERZV05D680): 0.1 mA
Others: 1 mA

● Rated Power

| Part Number | Rated Power (W) |
|---|---|
| ERZV05D180 to ERZV05D680 | 0.01 |
| ERZV07D180 to ERZV07D680 | 0.02 |
| ERZV09D180 to ERZV09D680 | 0.05 |
| ERZV10D180 to ERZV10D680 | 0.05 |
| ERZV14D180 to ERZV14D680 | 0.10 |
| ERZV20D180 to ERZV20D680 | 0.20 |

● Operating Temperature Range: –40 to 85 °C
● Storage Temperature Range: –40 to 125 °C

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

## ■ Reference Guide to Standard Products (ERZV○○D820 to ERZV○○D182)

| Part No. | Varistor Voltage* | Maximum Allowable Voltage | | Clamping Voltage @8/20 µs | | Maximum Energy (Joule) | | Maximum Peak Current @8/20 µs(A) | | Recommended Applications |
|---|---|---|---|---|---|---|---|---|---|---|
| | (V) | ACrms (V) | DC (V) | max.(V) | Ip (A) | 10/1000 µs | 2 ms | 1 time | 2 times | |
| ERZV05D820 | 82 (74–90) | 50 | 65 | 145 | 5 | 3.5 | 2.5 | 800 | 600 | Telephone, Communication Line (DC 48 V) |
| ERZV07D820 | | | | 135 | 10 | 7 | 5 | 1750 | 1250 | |
| ERZV09D820 | | | | 135 | 25 | 14 | 10 | 3500 | 2500 | |
| ERZV10D820 | | | | 135 | 25 | 14 | 10 | 3500 | 2500 | |
| ERZV14D820 | | | | 135 | 50 | 28 | 20 | 6000 | 5000 | |
| ERZV20D820 | | | | 135 | 100 | 56 | 40 | 10000 | 7000 | |
| ERZV05D101 | 100 (90–110) | 60 | 85 | 175 | 5 | 4 | 3 | 800 | 600 | |
| ERZV07D101 | | | | 165 | 10 | 8.5 | 6 | 1750 | 1250 | |
| ERZV09D101 | | | | 165 | 25 | 17 | 12 | 3500 | 2500 | |
| ERZV10D101 | | | | 165 | 25 | 17 | 12 | 3500 | 2500 | |
| ERZV14D101 | | | | 165 | 50 | 35 | 25 | 6000 | 5000 | |
| ERZV20D101 | | | | 165 | 100 | 70 | 50 | 10000 | 7000 | |
| ERZV05D121 | 120 (108–132) | 75 | 100 | 210 | 5 | 5 | 3.5 | 800 | 600 | |
| ERZV07D121 | | | | 200 | 10 | 10 | 7 | 1750 | 1250 | |
| ERZV09D121 | | | | 200 | 25 | 20 | 14.5 | 3500 | 2500 | |
| ERZV10D121 | | | | 200 | 25 | 20 | 14.5 | 3500 | 2500 | |
| ERZV14D121 | | | | 200 | 50 | 42 | 30 | 6000 | 5000 | |
| ERZV20D121 | | | | 200 | 100 | 85 | 60 | 10000 | 7000 | |
| ERZV05D151 | 150 (135–165) | 95 | 125 | 260 | 5 | 6.5 | 4.5 | 800 | 600 | |
| ERZV07D151 | | | | 250 | 10 | 13 | 9 | 1750 | 1250 | |
| ERZV09D151 | | | | 250 | 25 | 25 | 18 | 3500 | 2500 | |
| ERZV10D151 | | | | 250 | 25 | 25 | 18 | 3500 | 2500 | |
| ERZV14D151 | | | | 250 | 50 | 53 | 37.5 | 6000 | 5000 | |
| ERZV20D151 | | | | 250 | 100 | 106 | 75 | 10000 | 7000 | |
| ERZV05D201 | 200 (185–225) | 130 | 170 | 355 | 5 | 8.5 | 6 | 800 | 600 | AC 100 V Line–Line Applications |
| ERZV07D201 | | | | 340 | 10 | 17.5 | 12.5 | 1750 | 1250 | |
| ERZV09D201 | | | | 340 | 25 | 35 | 25 | 3500 | 2500 | |
| ERZV10D201 | | | | 340 | 25 | 35 | 25 | 3500 | 2500 | |
| ERZV14D201 | | | | 340 | 50 | 70 | 50 | 6000 | 5000 | |
| ERZV20D201 | | | | 340 | 100 | 140 | 100 | 10000 | 7000 | |
| ERZV05D221 | 220 (198–242) | 140 | 180 | 380 | 5 | 9 | 6.5 | 800 | 600 | |
| ERZV07D221 | | | | 360 | 10 | 19 | 13.5 | 1750 | 1250 | |
| ERZV09D221 | | | | 360 | 25 | 39 | 27.5 | 3500 | 2500 | |
| ERZV10D221 | | | | 360 | 25 | 39 | 27.5 | 3500 | 2500 | |
| ERZV14D221 | | | | 360 | 50 | 78 | 55 | 6000 | 5000 | |
| ERZV20D221 | | | | 360 | 100 | 155 | 110 | 10000 | 7000 | |
| ERZV05D241 | 240 (216–264) | 150 | 200 | 415 | 5 | 10.5 | 7.5 | 800 | 600 | |
| ERZV07D241 | | | | 395 | 10 | 21 | 15 | 1750 | 1250 | |
| ERZV09D241 | | | | 395 | 25 | 42 | 30 | 3500 | 2500 | |
| ERZV10D241 | | | | 395 | 25 | 42 | 30 | 3500 | 2500 | |
| ERZV14D241 | | | | 395 | 50 | 84 | 60 | 6000 | 5000 | |
| ERZV20D241 | | | | 395 | 100 | 168 | 120 | 10000 | 7000 | AC 100 V to 120 V, Line–Line Applications |
| ERZV05D271 | 270 (247–303) | 175 | 225 | 475 | 5 | 11 | 8 | 800 | 600 | |
| ERZV07D271 | | | | 455 | 10 | 24 | 17 | 1750 | 1250 | |
| ERZV09D271 | | | | 455 | 25 | 49 | 35 | 3500 | 2500 | |
| ERZV10D271 | | | | 455 | 25 | 49 | 35 | 3500 | 2500 | |
| ERZV14D271 | | | | 455 | 50 | 99 | 70 | 6000 | 5000 | |
| ERZV20D271 | | | | 455 | 100 | 190 | 135 | 10000 | 7000 | |
| ERZV05D331 | 330 (297–363) | 210 | 270 | 570 | 5 | 13 | 9.5 | 800 | 600 | |
| ERZV07D331 | | | | 545 | 10 | 28 | 20 | 1750 | 1250 | |
| ERZV09D331 | | | | 545 | 25 | 58 | 42 | 3500 | 2500 | |
| ERZV10D331 | | | | 545 | 25 | 58 | 42 | 3500 | 2500 | |
| ERZV14D331 | | | | 545 | 50 | 115 | 80 | 6000 | 4500 | |
| ERZV20D331 | | | | 545 | 100 | 228 | 160 | 10000 | 6500 | |
| ERZV05D361 | 360 (324–396) | 230 | 300 | 620 | 5 | 16 | 11 | 800 | 600 | AC 100 V to 120 V, Line–Line Applications<br><br>Telephone Line Applications, (250 V Insulation Resistance Test Applicable) |
| ERZV07D361 | | | | 595 | 10 | 32 | 23 | 1750 | 1250 | |
| ERZV09D361 | | | | 595 | 25 | 65 | 45 | 3500 | 2500 | |
| ERZV10D361 | | | | 595 | 25 | 65 | 45 | 3500 | 2500 | |
| ERZV14D361 | | | | 595 | 50 | 130 | 90 | 6000 | 4500 | |
| ERZV20D361 | | | | 595 | 100 | 255 | 180 | 10000 | 6500 | |
| ERZV05D391 | 390 (351–429) | 250 | 320 | 675 | 5 | 17 | 12 | 800 | 600 | |
| ERZV07D391 | | | | 650 | 10 | 35 | 25 | 1750 | 1250 | |
| ERZV09D391 | | | | 650 | 25 | 70 | 50 | 3500 | 2500 | |
| ERZV10D391 | | | | 650 | 25 | 70 | 50 | 3500 | 2500 | |
| ERZV14D391 | | | | 650 | 50 | 140 | 100 | 6000 | 4500 | |
| ERZV20D391 | | | | 650 | 100 | 275 | 195 | 10000 | 6500 | |

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

## ■ Reference Guide to Standard Products

| Part No. | Varistor Voltage* | Maximum Allowable Voltage | | Clamping Voltage @8/20 µs | | Maximum Energy (Joule) | | Maximum Peak Current @8/20 µs(A) | | Recommended Applications |
|---|---|---|---|---|---|---|---|---|---|---|
| | (V) | ACrms (V) | DC (V) | max.(V) | Ip (A) | 10/1000 µs | 2 ms | 1 time | 2 times | |
| ERZV05D431 | 430 (387–473) | 275 | 350 | 745 | 5 | 20 | 13.5 | 800 | 600 | AC 100 V to 220 V, Line–Line and AC 100 V to 220 V, Line–Ground Applications |
| ERZV07D431 | | | | 710 | 10 | 40 | 27.5 | 1750 | 1250 | |
| ERZV09D431 | | | | 710 | 25 | 80 | 55 | 3500 | 2500 | |
| ERZV10D431 | | | | 710 | 25 | 80 | 55 | 3500 | 2500 | |
| ERZV14D431 | | | | 710 | 50 | 155 | 110 | 6000 | 4500 | |
| ERZV20D431 | | | | 710 | 100 | 303 | 215 | 10000 | 6500 | |
| ERZV05D471 | 470 (423–517) | 300 | 385 | 810 | 5 | 21 | 15 | 800 | 600 | AC 100 V to 220 V, Line–Line and AC 100 V to 220 V, Line–Ground Applications |
| ERZV07D471 | | | | 775 | 10 | 42 | 30 | 1750 | 1250 | |
| ERZV09D471 | | | | 775 | 25 | 85 | 60 | 3500 | 2500 | |
| ERZV10D471 | | | | 775 | 25 | 85 | 60 | 3500 | 2500 | |
| ERZV14D471 | | | | 775 | 50 | 175 | 125 | 6000 | 4500 | |
| ERZV20D471 | | | | 775 | 100 | 350 | 250 | 10000 | 6500 | |
| ERZV07D511 | 510 (459–561) | 320 | 410 | 845 | 10 | 45 | 32 | 1750 | 1250 | AC 100 to 240 V, Line–Line Applications AC 100 to 240 V, Line–Ground Applications |
| ERZV09D511 | | | | 845 | 25 | 92 | 67 | 3500 | 2500 | |
| ERZV10D511 | | | | 845 | 25 | 92 | 67 | 3500 | 2500 | |
| ERZV14D511 | | | | 845 | 50 | 190 | 136 | 6000 | 4500 | |
| ERZV20D511 | | | | 845 | 100 | 382 | 273 | 10000 | 6500 | |
| ERZV10D621 | 620 (558–682) | 385 | 505 | 1025 | 25 | 92 | 67 | 3500 | 2500 | |
| ERZV14D621 | | | | 1025 | 50 | 190 | 136 | 5000 | 4500 | |
| ERZV20D621 | | | | 1025 | 100 | 382 | 273 | 7500 | 6500 | |
| ERZV10D681 | 680 (612–748) | 420 | 560 | 1120 | 25 | 92 | 67 | 3500 | 2500 | |
| ERZV14D681 | | | | 1120 | 50 | 190 | 136 | 5000 | 4500 | |
| ERZV20D681 | | | | 1120 | 100 | 382 | 273 | 7500 | 6500 | |
| ERZV10D751 | 750 (675–825) | 460 | 615 | 1240 | 25 | 100 | 70 | 3500 | 2500 | AC 380 V, Line–Line and Line–Ground Applications (For DC 500 V Insulating Test) |
| ERZV14D751 | | | | 1240 | 50 | 210 | 150 | 5000 | 4500 | |
| ERZV20D751 | | | | 1240 | 100 | 420 | 300 | 7500 | 6500 | |
| ERZV10D821 | 820 (738–902) | 510 | 670 | 1355 | 25 | 110 | 80 | 3500 | 2500 | |
| ERZV14D821 | | | | 1355 | 50 | 235 | 165 | 5000 | 4500 | |
| ERZV20D821 | | | | 1355 | 100 | 460 | 325 | 7500 | 6500 | |
| ERZV10D911 | 910 (819–1001) | 550 | 745 | 1500 | 25 | 130 | 90 | 3500 | 2500 | AC 415 V, Line–Line and Line–Ground Applications (For DC 500 V Insulating Test) |
| ERZV14D911 | | | | 1500 | 50 | 255 | 180 | 5000 | 4500 | |
| ERZV20D911 | | | | 1500 | 100 | 510 | 360 | 7500 | 6500 | |
| ERZV10D102 | 1000 (900–1100) | 625 | 825 | 1650 | 25 | 140 | 100 | 3500 | 2500 | AC 480 V, Line–Line and Line–Ground Applications (For DC 500 V Insulating Test) |
| ERZV14D102 | | | | 1650 | 50 | 280 | 200 | 5000 | 4500 | |
| ERZV20D102 | | | | 1650 | 100 | 565 | 400 | 7500 | 6500 | |
| ERZV10D112 | 1100 (990–1210) | 680 | 895 | 1815 | 25 | 155 | 110 | 3500 | 2500 | |
| ERZV14D112 | | | | 1815 | 50 | 310 | 220 | 5000 | 4500 | |
| ERZV20D112 | | | | 1815 | 100 | 620 | 440 | 7500 | 6500 | |
| ERZV10D182CS | 1800 (1700–1980) | 1000 | 1465 | 2970 | 25 | 247 | 183 | 3500 | 2500 | Line–Ground Applications (For AC 1200 V Withstanding Test) |
| ERZV14D182CS | | | | 2970 | 50 | 510 | 360 | 5000 | 4500 | |
| ERZV20D182 | | | | 2970 | 100 | 1020 | 720 | 7500 | 6500 | |

* Measuring Current of Varistor Voltage
5 Series (ERZV05D820 to ERZV05D471): 0.1 mA
Others: 1 mA

● Rated Power

| Part Number | Rated Power (W) |
|---|---|
| ERZV05D820 to ERZV05D471 | 0.10 |
| ERZV07D820 to ERZV07D511 | 0.25 |
| ERZV09D820 to ERZV09D511 | 0.40 |
| ERZV10D820 to ERZV10D182CS | 0.40 |
| ERZV14D820 to ERZV14D182CS | 0.60 |
| ERZV20D820 to ERZV20D182 | 1.00 |

● Operating Temperature Range: –40 to 85 °C
● Storage Temperature Range: –40 to 125 °C

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.