

To all our customers

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Customer Support Dept.  
April 1, 2003

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# HZU Series

Silicon Epitaxial Planar Zener Diodes for Stabilizer

**RENESAS**

ADE-208-024G (Z)

Rev.7  
Dec. 2002

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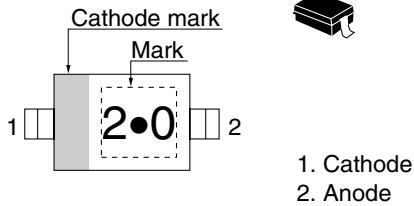
## Features

- Ultra small Resin Package (URP) is suitable for surface mount design.
- These diodes are delivered taped.

## Ordering Information

| Type No.   | Mark             | Package Code |
|------------|------------------|--------------|
| HZU Series | Let to Mark Code | URP          |

## Pin Arrangement



# HZU Series

## Absolute Maximum Ratings

(Ta = 25°C)

| Item                 | Symbol | Value       | Unit |
|----------------------|--------|-------------|------|
| Power dissipation    | Pd *1  | 200         | mW   |
| Junction temperature | Tj     | 150         | °C   |
| Storage temperature  | Tstg   | -55 to +150 | °C   |

Note: 1. With P.C. Board.

## Electrical Characteristics

(Ta = 25°C)

| Type   | Grade | Zener Voltage         |      | Reverse Current     |                     | Dynamic Resistance |                    |                     |
|--------|-------|-----------------------|------|---------------------|---------------------|--------------------|--------------------|---------------------|
|        |       | V <sub>z</sub> (V) *1 |      | Test Condition      | I <sub>R</sub> (μA) | Test Condition     | r <sub>d</sub> (Ω) | Test Condition      |
|        |       | Min                   | Max  | I <sub>z</sub> (mA) | Max                 | V <sub>R</sub> (V) | Max                | I <sub>z</sub> (mA) |
| HZU2.0 | B     | 1.90                  | 2.20 | 5                   | 120                 | 0.5                | 100                | 5                   |
| HZU2.2 | B     | 2.10                  | 2.40 | 5                   | 120                 | 0.7                | 100                | 5                   |
| HZU2.4 | B     | 2.30                  | 2.60 | 5                   | 120                 | 1.0                | 100                | 5                   |
| HZU2.7 | B     | 2.50                  | 2.90 | 5                   | 120                 | 1.0                | 110                | 5                   |
|        | B1    | 2.50                  | 2.75 |                     |                     |                    |                    |                     |
|        | B2    | 2.65                  | 2.90 |                     |                     |                    |                    |                     |
| HZU3.0 | B     | 2.80                  | 3.20 | 5                   | 50                  | 1.0                | 120                | 5                   |
|        | B1    | 2.80                  | 3.05 |                     |                     |                    |                    |                     |
|        | B2    | 2.95                  | 3.20 |                     |                     |                    |                    |                     |
| HZU3.3 | B     | 3.10                  | 3.50 | 5                   | 20                  | 1.0                | 130                | 5                   |
|        | B1    | 3.10                  | 3.35 |                     |                     |                    |                    |                     |
|        | B2    | 3.25                  | 3.50 |                     |                     |                    |                    |                     |
| HZU3.6 | B     | 3.40                  | 3.80 | 5                   | 10                  | 1.0                | 130                | 5                   |
|        | B1    | 3.40                  | 3.65 |                     |                     |                    |                    |                     |
|        | B2    | 3.55                  | 3.80 |                     |                     |                    |                    |                     |
| HZU3.9 | B     | 3.70                  | 4.10 | 5                   | 10                  | 1.0                | 130                | 5                   |
|        | B1    | 3.70                  | 3.97 |                     |                     |                    |                    |                     |
|        | B2    | 3.87                  | 4.10 |                     |                     |                    |                    |                     |

Note: 1. Tested with pulse (P<sub>w</sub> = 40 ms).

| Type   | Grade | Zener Voltage |      | Reverse Current |                  |                | Dynamic Resistance |                |
|--------|-------|---------------|------|-----------------|------------------|----------------|--------------------|----------------|
|        |       | $V_z$ (V) *1  |      | Test Condition  | $I_R$ ( $\mu$ A) | Test Condition | $r_d$ ( $\Omega$ ) | Test Condition |
|        |       | Min           | Max  | $I_z$ (mA)      | Max              | $V_R$ (V)      | Max                | $I_z$ (mA)     |
| HZU4.3 | B     | 4.01          | 4.48 | 5               | 10               | 1.0            | 130                | 5              |
|        | B1    | 4.01          | 4.21 |                 |                  |                |                    |                |
|        | B2    | 4.15          | 4.34 |                 |                  |                |                    |                |
|        | B3    | 4.28          | 4.48 |                 |                  |                |                    |                |
| HZU4.7 | B     | 4.42          | 4.90 | 5               | 10               | 1.0            | 130                | 5              |
|        | B1    | 4.42          | 4.61 |                 |                  |                |                    |                |
|        | B2    | 4.55          | 4.75 |                 |                  |                |                    |                |
|        | B3    | 4.69          | 4.90 |                 |                  |                |                    |                |
| HZU5.1 | B     | 4.84          | 5.37 | 5               | 5                | 1.5            | 130                | 5              |
|        | B1    | 4.84          | 5.04 |                 |                  |                |                    |                |
|        | B2    | 4.98          | 5.20 |                 |                  |                |                    |                |
|        | B3    | 5.14          | 5.37 |                 |                  |                |                    |                |
| HZU5.6 | B     | 5.31          | 5.92 | 5               | 5                | 2.5            | 80                 | 5              |
|        | B1    | 5.31          | 5.55 |                 |                  |                |                    |                |
|        | B2    | 5.49          | 5.73 |                 |                  |                |                    |                |
|        | B3    | 5.67          | 5.92 |                 |                  |                |                    |                |
| HZU6.2 | B     | 5.86          | 6.53 | 5               | 2                | 3.0            | 50                 | 5              |
|        | B1    | 5.86          | 6.12 |                 |                  |                |                    |                |
|        | B2    | 6.06          | 6.33 |                 |                  |                |                    |                |
|        | B3    | 6.26          | 6.53 |                 |                  |                |                    |                |
| HZU6.8 | B     | 6.47          | 7.14 | 5               | 2                | 3.5            | 30                 | 5              |
|        | B1    | 6.47          | 6.73 |                 |                  |                |                    |                |
|        | B2    | 6.65          | 6.93 |                 |                  |                |                    |                |
|        | B3    | 6.86          | 7.14 |                 |                  |                |                    |                |
| HZU7.5 | B     | 7.06          | 7.84 | 5               | 2                | 4.0            | 30                 | 5              |
|        | B1    | 7.06          | 7.36 |                 |                  |                |                    |                |
|        | B2    | 7.28          | 7.60 |                 |                  |                |                    |                |
|        | B3    | 7.52          | 7.84 |                 |                  |                |                    |                |
| HZU8.2 | B     | 7.76          | 8.64 | 5               | 2                | 5.0            | 30                 | 5              |
|        | B1    | 7.76          | 8.10 |                 |                  |                |                    |                |
|        | B2    | 8.02          | 8.36 |                 |                  |                |                    |                |
|        | B3    | 8.28          | 8.64 |                 |                  |                |                    |                |

Note: 1. Tested with pulse ( $P_w = 40$  ms).

# HZU Series

| Type   | Grade | Zener Voltage            |       | Reverse Current |                  | Dynamic Resistance |                    |                |
|--------|-------|--------------------------|-------|-----------------|------------------|--------------------|--------------------|----------------|
|        |       | $V_z$ (V) * <sup>1</sup> |       | Test Condition  | $I_R$ ( $\mu$ A) | Test Condition     | $r_d$ ( $\Omega$ ) | Test Condition |
|        |       | Min                      | Max   | $I_z$ (mA)      | Max              | $V_R$ (V)          | Max                | $I_z$ (mA)     |
| HZU9.1 | B     | 8.56                     | 9.55  | 5               | 2                | 6.0                | 30                 | 5              |
|        | B1    | 8.56                     | 8.93  |                 |                  |                    |                    |                |
|        | B2    | 8.85                     | 9.23  |                 |                  |                    |                    |                |
|        | B3    | 9.15                     | 9.55  |                 |                  |                    |                    |                |
| HZU10  | B     | 9.45                     | 10.55 | 5               | 2                | 7.0                | 30                 | 5              |
|        | B1    | 9.45                     | 9.87  |                 |                  |                    |                    |                |
|        | B2    | 9.77                     | 10.21 |                 |                  |                    |                    |                |
|        | B3    | 10.11                    | 10.55 |                 |                  |                    |                    |                |
| HZU11  | B     | 10.44                    | 11.56 | 5               | 2                | 8.0                | 30                 | 5              |
|        | B1    | 10.44                    | 10.88 |                 |                  |                    |                    |                |
|        | B2    | 10.76                    | 11.22 |                 |                  |                    |                    |                |
|        | B3    | 11.10                    | 11.56 |                 |                  |                    |                    |                |
| HZU12  | B     | 11.42                    | 12.60 | 5               | 2                | 9.0                | 35                 | 5              |
|        | B1    | 11.42                    | 11.90 |                 |                  |                    |                    |                |
|        | B2    | 11.74                    | 12.24 |                 |                  |                    |                    |                |
|        | B3    | 12.08                    | 12.60 |                 |                  |                    |                    |                |
| HZU13  | B     | 12.47                    | 13.96 | 5               | 2                | 10.0               | 35                 | 5              |
|        | B1    | 12.47                    | 13.03 |                 |                  |                    |                    |                |
|        | B2    | 12.91                    | 13.49 |                 |                  |                    |                    |                |
|        | B3    | 13.37                    | 13.96 |                 |                  |                    |                    |                |
| HZU15  | B     | 13.84                    | 15.52 | 5               | 2                | 11.0               | 40                 | 5              |
|        | B1    | 13.84                    | 14.46 |                 |                  |                    |                    |                |
|        | B2    | 14.34                    | 14.98 |                 |                  |                    |                    |                |
|        | B3    | 14.85                    | 15.52 |                 |                  |                    |                    |                |
| HZU16  | B     | 15.37                    | 17.09 | 5               | 2                | 12.0               | 40                 | 5              |
|        | B1    | 15.37                    | 16.01 |                 |                  |                    |                    |                |
|        | B2    | 15.58                    | 16.51 |                 |                  |                    |                    |                |
|        | B3    | 16.35                    | 17.09 |                 |                  |                    |                    |                |
| HZU18  | B     | 16.94                    | 19.03 | 5               | 2                | 13.0               | 45                 | 5              |
|        | B1    | 16.94                    | 17.70 |                 |                  |                    |                    |                |
|        | B2    | 17.56                    | 18.35 |                 |                  |                    |                    |                |
|        | B3    | 18.21                    | 19.03 |                 |                  |                    |                    |                |

Note: 1. Tested with pulse ( $P_w = 40$  ms).

| Type  | Grade | Zener Voltage            |       | Reverse Current |                  | Dynamic Resistance |                    |                |
|-------|-------|--------------------------|-------|-----------------|------------------|--------------------|--------------------|----------------|
|       |       | $V_z$ (V) * <sup>1</sup> |       | Test Condition  | $I_R$ ( $\mu$ A) | Test Condition     | $r_d$ ( $\Omega$ ) | Test Condition |
|       |       | Min                      | Max   | $I_z$ (mA)      | Max              | $V_R$ (V)          | Max                | $I_z$ (mA)     |
| HZU20 | B     | 18.86                    | 21.08 | 5               | 2                | 15.0               | 50                 | 5              |
|       | B1    | 18.86                    | 19.70 |                 |                  |                    |                    |                |
|       | B2    | 19.52                    | 20.39 |                 |                  |                    |                    |                |
|       | B3    | 20.21                    | 21.08 |                 |                  |                    |                    |                |
| HZU22 | B     | 20.88                    | 23.17 | 5               | 2                | 17.0               | 55                 | 5              |
|       | B1    | 20.88                    | 21.77 |                 |                  |                    |                    |                |
|       | B2    | 21.54                    | 22.47 |                 |                  |                    |                    |                |
|       | B3    | 22.23                    | 23.17 |                 |                  |                    |                    |                |
| HZU24 | B     | 22.93                    | 25.57 | 5               | 2                | 19.0               | 60                 | 5              |
|       | B1    | 22.93                    | 23.96 |                 |                  |                    |                    |                |
|       | B2    | 23.72                    | 24.78 |                 |                  |                    |                    |                |
|       | B3    | 24.54                    | 25.57 |                 |                  |                    |                    |                |
| HZU27 | B     | 25.10                    | 28.90 | 2               | 2                | 21.0               | 70                 | 2              |
| HZU30 | B     | 28.00                    | 32.00 | 2               | 2                | 23.0               | 80                 | 2              |
| HZU33 | B     | 31.00                    | 35.00 | 2               | 2                | 25.0               | 80                 | 2              |
| HZU36 | B     | 34.00                    | 38.00 | 2               | 2                | 27.0               | 90                 | 2              |

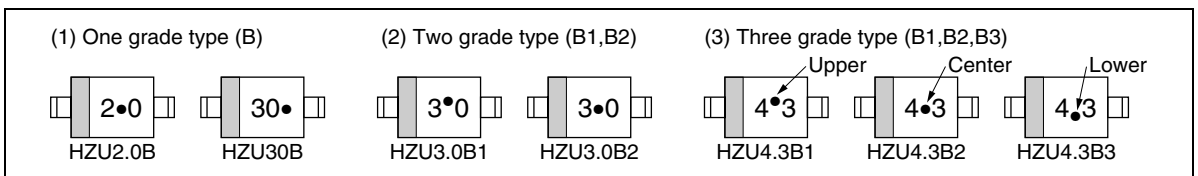
Note: 1. Tested with pulse ( $P_w = 40$  ms).

# HZU Series

## Mark Code

| Type   | Grade | Mark No. | Type   | Grade | Mark No. | Type  | Grade | Mark No. |
|--------|-------|----------|--------|-------|----------|-------|-------|----------|
| HZU2.0 | B     | 2•0      | HZU6.2 | B1    | 6•2      | HZU13 | B1    | 13•      |
| HZU2.2 | B     | 2•2      |        | B2    | 6•2      |       | B2    | 13•      |
| HZU2.4 | B     | 2•4      |        | B3    | 6•2      |       | B3    | 13•      |
| HZU2.7 | B1    | 2•7      | HZU6.8 | B1    | 6•8      | HZU15 | B1    | 15•      |
|        | B2    | 2•7      |        | B2    | 6•8      |       | B2    | 15•      |
| HZU3.0 | B1    | 3•0      |        | B3    | 6•8      |       | B3    | 15•      |
|        | B2    | 3•0      | HZU7.5 | B1    | 7•5      | HZU16 | B1    | 16•      |
| HZU3.3 | B1    | 3•3      |        | B2    | 7•5      |       | B2    | 16•      |
|        | B2    | 3•3      |        | B3    | 7•5      |       | B3    | 16•      |
| HZU3.6 | B1    | 3•6      | HZU8.2 | B1    | 8•2      | HZU18 | B1    | 18•      |
|        | B2    | 3•6      |        | B2    | 8•2      |       | B2    | 18•      |
| HZU3.9 | B1    | 3•9      |        | B3    | 8•2      |       | B3    | 18•      |
|        | B2    | 3•9      | HZU9.1 | B1    | 9•1      | HZU20 | B1    | 20•      |
| HZU4.3 | B1    | 4•3      |        | B2    | 9•1      |       | B2    | 20•      |
|        | B2    | 4•3      |        | B3    | 9•1      |       | B3    | 20•      |
|        | B3    | 4•3      | HZU10  | B1    | 10•      | HZU22 | B1    | 22•      |
| HZU4.7 | B1    | 4•7      |        | B2    | 10•      |       | B2    | 22•      |
|        | B2    | 4•7      |        | B3    | 10•      |       | B3    | 22•      |
|        | B3    | 4•7      | HZU11  | B1    | 11•      | HZU24 | B1    | 24•      |
| HZU5.1 | B1    | 5•1      |        | B2    | 11•      |       | B2    | 24•      |
|        | B2    | 5•1      |        | B3    | 11•      |       | B3    | 24•      |
|        | B3    | 5•1      | HZU12  | B1    | 12•      | HZU27 | B     | 27•      |
| HZU5.6 | B1    | 5•6      |        | B2    | 12•      | HZU30 | B     | 30•      |
|        | B2    | 5•6      |        | B3    | 12•      | HZU33 | B     | 33•      |
|        | B3    | 5•6      |        |       |          | HZU36 | B     | 36•      |

Notes: 1. Example of Marking



- The grade B type includes from B1 min. to B3 (or B2) max.
- B grade is standard and has better delivery, These are marked one of B1, B2, B3.
- Type No. is as follows; HZU2.0B, HZU2.2B, ... HZU36B. (B grade)
- Type No. is as follows; HZU2.7B1, HZU2.7B2, ... HZU24B3. (B 1, B2,B3 grade)



Main Characteristic

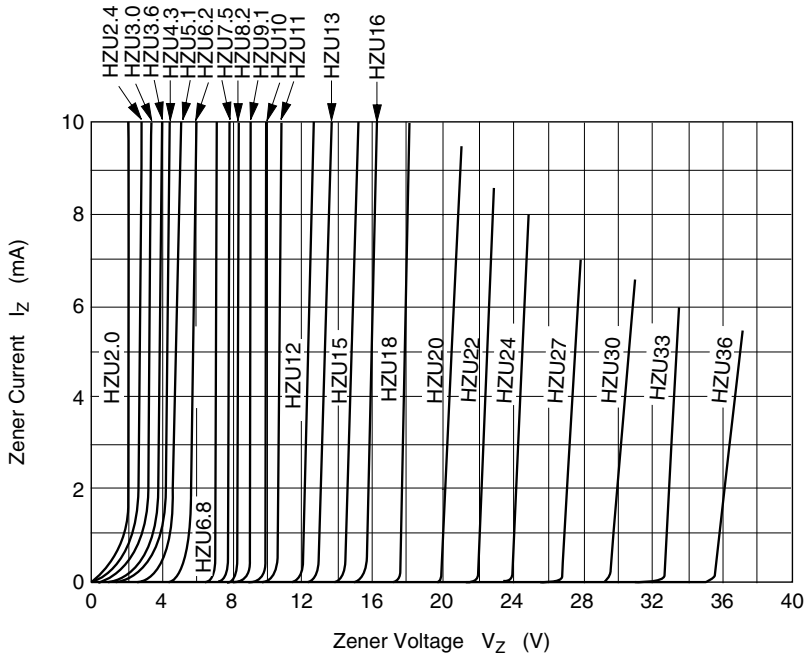


Fig.1 Zener current vs. Zener voltage

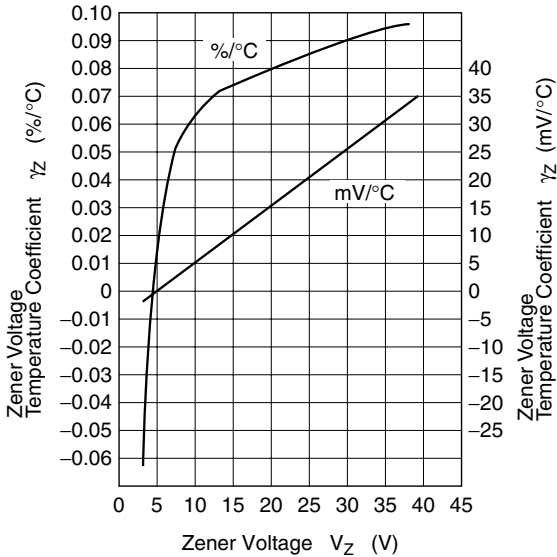


Fig.2 Temperature Coefficient vs. Zener voltage

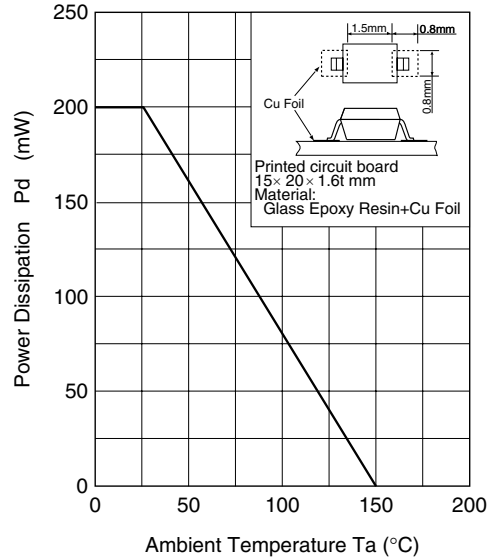
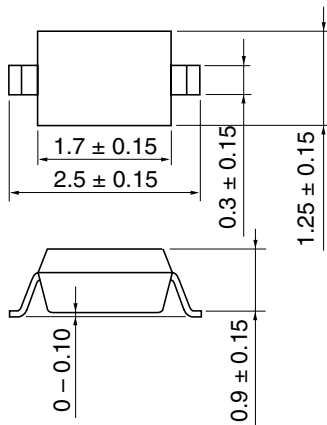


Fig.3 Power Dissipation vs. Ambient Temperature

## Package Dimensions

As of July, 2002

Unit: mm



|                        |          |
|------------------------|----------|
| Hitachi Code           | URP      |
| JEDEC                  | Conforms |
| JEITA                  | —        |
| Mass (reference value) | 0.004 g  |

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