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April 1, 2003

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# HZⓂSeries

Silicon Epitaxial Planar Zener Diode for Stabilized Power Supply

**RENESAS**

ADE-208-794 (Z)

Rev. 0  
May 1999

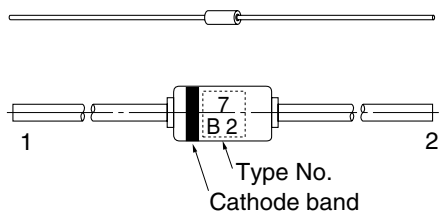
## Features

- Low leakage, low zener impedance and maximum power dissipation of 500 mW are ideally suited for stabilized power supply, etc.
- Wide spectrum from 1.9V through 38V of zener voltage provide flexible application.

## Ordering Information

| Type No.  | Mark     | Package Code |
|-----------|----------|--------------|
| HZⓂSeries | Type No. | DO-35        |

## Pin Arrangement



**Absolute Maximum Ratings**

(Ta = 25°C)

| Item                 | Symbol | Value       | Unit |
|----------------------|--------|-------------|------|
| Power dissipation    | Pd     | 500         | mW   |
| Junction temperature | Tj     | 175         | °C   |
| Storage temperature  | Tstg   | -55 to +175 | °C   |

**Electrical Characteristics**

(Ta = 25°C)

| Type   | Grade | Zener Voltage                    |     | Reverse Current     |                     | Dynamic Resistance |                    |
|--------|-------|----------------------------------|-----|---------------------|---------------------|--------------------|--------------------|
|        |       | V <sub>z</sub> (V)* <sup>1</sup> |     | Test Condition      | I <sub>R</sub> (μA) | Test Condition     | r <sub>d</sub> (Ω) |
|        |       | Min                              | Max | I <sub>z</sub> (mA) | Max                 | V <sub>R</sub> (V) | Max                |
| HZ2(H) | B1    | 1.9                              | 2.1 | 5                   | 5                   | 0.5                | 100                |
|        | B2    | 2.0                              | 2.2 |                     |                     |                    |                    |
|        | B3    | 2.1                              | 2.3 |                     |                     |                    |                    |
|        | C1    | 2.2                              | 2.4 |                     |                     |                    |                    |
|        | C2    | 2.3                              | 2.5 |                     |                     |                    |                    |
|        | C3    | 2.4                              | 2.6 |                     |                     |                    |                    |
| HZ3(H) | A1    | 2.5                              | 2.7 | 5                   | 5                   | 0.5                | 100                |
|        | A2    | 2.6                              | 2.8 |                     |                     |                    |                    |
|        | A3    | 2.7                              | 2.9 |                     |                     |                    |                    |
|        | B1    | 2.8                              | 3.0 |                     |                     |                    |                    |
|        | B2    | 2.9                              | 3.1 |                     |                     |                    |                    |
|        | B3    | 3.0                              | 3.2 |                     |                     |                    |                    |
|        | C1    | 3.1                              | 3.3 |                     |                     |                    |                    |
|        | C2    | 3.2                              | 3.4 |                     |                     |                    |                    |
|        | C3    | 3.3                              | 3.5 |                     |                     |                    |                    |
| HZ4(H) | A1    | 3.4                              | 3.6 | 5                   | 5                   | 1.0                | 100                |
|        | A2    | 3.5                              | 3.7 |                     |                     |                    |                    |
|        | A3    | 3.6                              | 3.8 |                     |                     |                    |                    |
|        | B1    | 3.7                              | 3.9 |                     |                     |                    |                    |
|        | B2    | 3.8                              | 4.0 |                     |                     |                    |                    |
|        | B3    | 3.9                              | 4.1 |                     |                     |                    |                    |

Note: 1. Tested with DC.

| Type   | Grade | Zener Voltage           |     | Reverse Current |            | Dynamic Resistance |           |
|--------|-------|-------------------------|-----|-----------------|------------|--------------------|-----------|
|        |       | $V_z$ (V)* <sup>1</sup> |     | Test Condition  | $I_R$ (μA) | Test Condition     | $r_d$ (Ω) |
|        |       | Min                     | Max | $I_z$ (mA)      | Max        | $V_R$ (V)          | Max       |
| HZ4(H) | C1    | 4.0                     | 4.2 | 5               | 5          | 1.0                | 100       |
|        | C2    | 4.1                     | 4.3 |                 |            |                    |           |
|        | C3    | 4.2                     | 4.4 |                 |            |                    |           |
| HZ5(H) | A1    | 4.3                     | 4.5 | 5               | 5          | 1.5                | 100       |
|        | A2    | 4.4                     | 4.6 |                 |            |                    |           |
|        | A3    | 4.5                     | 4.7 |                 |            |                    |           |
|        | B1    | 4.6                     | 4.8 |                 |            |                    |           |
|        | B2    | 4.7                     | 4.9 |                 |            |                    |           |
|        | B3    | 4.8                     | 5.0 |                 |            |                    |           |
|        | C1    | 4.9                     | 5.1 |                 |            |                    |           |
|        | C2    | 5.0                     | 5.2 |                 |            |                    |           |
|        | C3    | 5.1                     | 5.3 |                 |            |                    |           |
| HZ6(H) | A1    | 5.2                     | 5.5 | 5               | 5          | 2.0                | 40        |
|        | A2    | 5.3                     | 5.6 |                 |            |                    |           |
|        | A3    | 5.4                     | 5.7 |                 |            |                    |           |
|        | B1    | 5.5                     | 5.8 |                 |            |                    |           |
|        | B2    | 5.6                     | 5.9 |                 |            |                    |           |
|        | B3    | 5.7                     | 6.0 |                 |            |                    |           |
|        | C1    | 5.8                     | 6.1 |                 |            |                    |           |
|        | C2    | 6.0                     | 6.3 |                 |            |                    |           |
|        | C3    | 6.1                     | 6.4 |                 |            |                    |           |
| HZ7(H) | A1    | 6.3                     | 6.6 | 5               | 1          | 3.5                | 15        |
|        | A2    | 6.4                     | 6.7 |                 |            |                    |           |
|        | A3    | 6.6                     | 6.9 |                 |            |                    |           |
|        | B1    | 6.7                     | 7.0 |                 |            |                    |           |
|        | B2    | 6.9                     | 7.2 |                 |            |                    |           |
|        | B3    | 7.0                     | 7.3 |                 |            |                    |           |
|        | C1    | 7.2                     | 7.6 |                 |            |                    |           |
|        | C2    | 7.3                     | 7.7 |                 |            |                    |           |
|        | C3    | 7.5                     | 7.9 |                 |            |                    |           |

Note: 1. Tested with DC.

| Type  | Grade | Zener Voltage           |      | Reverse Current |            | Dynamic Resistance |           |
|-------|-------|-------------------------|------|-----------------|------------|--------------------|-----------|
|       |       | $V_z$ (V)* <sup>1</sup> |      | Test Condition  | $I_R$ (μA) | Test Condition     | $r_d$ (Ω) |
|       |       | Min                     | Max  | $I_z$ (mA)      | Max        | $V_R$ (V)          | Max       |
| HZ9Ⓜ  | A1    | 7.7                     | 8.1  | 5               | 1          | 5.0                | 20        |
|       | A2    | 7.9                     | 8.3  |                 |            |                    |           |
|       | A3    | 8.1                     | 8.5  |                 |            |                    |           |
|       | B1    | 8.3                     | 8.7  |                 |            |                    |           |
|       | B2    | 8.5                     | 8.9  |                 |            |                    |           |
|       | B3    | 8.7                     | 9.1  |                 |            |                    |           |
|       | C1    | 8.9                     | 9.3  |                 |            |                    |           |
|       | C2    | 9.1                     | 9.5  |                 |            |                    |           |
|       | C3    | 9.3                     | 9.7  |                 |            |                    |           |
| HZ11Ⓜ | A1    | 9.5                     | 9.9  | 5               | 1          | 7.5                | 25        |
|       | A2    | 9.7                     | 10.1 |                 |            |                    |           |
|       | A3    | 9.9                     | 10.3 |                 |            |                    |           |
|       | B1    | 10.2                    | 10.6 |                 |            |                    |           |
|       | B2    | 10.4                    | 10.8 |                 |            |                    |           |
|       | B3    | 10.7                    | 11.1 |                 |            |                    |           |
|       | C1    | 10.9                    | 11.3 |                 |            |                    |           |
|       | C2    | 11.1                    | 11.6 |                 |            |                    |           |
|       | C3    | 11.4                    | 11.9 |                 |            |                    |           |
| HZ12Ⓜ | A1    | 11.6                    | 12.1 | 5               | 1          | 9.5                | 35        |
|       | A2    | 11.9                    | 12.4 |                 |            |                    |           |
|       | A3    | 12.2                    | 12.7 |                 |            |                    |           |
|       | B1    | 12.4                    | 12.9 |                 |            |                    |           |
|       | B2    | 12.6                    | 13.1 |                 |            |                    |           |
|       | B3    | 12.9                    | 13.4 |                 |            |                    |           |
|       | C1    | 13.2                    | 13.7 |                 |            |                    |           |
|       | C2    | 13.5                    | 14.0 |                 |            |                    |           |
|       | C3    | 13.8                    | 14.3 |                 |            |                    |           |
| HZ15Ⓜ | 1     | 14.1                    | 14.7 | 5               | 1          | 11.0               | 40        |
|       | 2     | 14.5                    | 15.1 |                 |            |                    |           |
|       | 3     | 14.9                    | 15.5 |                 |            |                    |           |

Note: 1. Tested with DC.

| Type    | Grade | Zener Voltage           |      | Reverse Current |                  | Dynamic Resistance |                    |
|---------|-------|-------------------------|------|-----------------|------------------|--------------------|--------------------|
|         |       | $V_z$ (V)* <sup>1</sup> |      | Test Condition  | $I_R$ ( $\mu$ A) | Test Condition     | $r_d$ ( $\Omega$ ) |
|         |       | Min                     | Max  | $I_z$ (mA)      | Max              | $V_R$ (V)          | Max                |
| HZ16(H) | 1     | 15.3                    | 15.9 | 5               | 1                | 12.0               | 45                 |
|         | 2     | 15.7                    | 16.5 |                 |                  |                    |                    |
|         | 3     | 16.3                    | 17.1 |                 |                  |                    |                    |
| HZ18(H) | 1     | 16.9                    | 17.7 | 5               | 1                | 13.0               | 55                 |
|         | 2     | 17.5                    | 18.3 |                 |                  |                    |                    |
|         | 3     | 18.1                    | 19.0 |                 |                  |                    |                    |
| HZ20(H) | 1     | 18.8                    | 19.7 | 2               | 1                | 15.0               | 60                 |
|         | 2     | 19.5                    | 20.4 |                 |                  |                    |                    |
|         | 3     | 20.2                    | 21.1 |                 |                  |                    |                    |
| HZ22(H) | 1     | 20.9                    | 21.9 | 2               | 1                | 17.0               | 65                 |
|         | 2     | 21.6                    | 22.6 |                 |                  |                    |                    |
|         | 3     | 22.3                    | 23.3 |                 |                  |                    |                    |
| HZ24(H) | 1     | 22.9                    | 24.0 | 2               | 1                | 19.0               | 70                 |
|         | 2     | 23.6                    | 24.7 |                 |                  |                    |                    |
|         | 3     | 24.3                    | 25.5 |                 |                  |                    |                    |
| HZ27(H) | 1     | 25.2                    | 26.6 | 2               | 1                | 21.0               | 80                 |
|         | 2     | 26.2                    | 27.6 |                 |                  |                    |                    |
|         | 3     | 27.2                    | 28.6 |                 |                  |                    |                    |
| HZ30(H) | 1     | 28.2                    | 29.6 | 2               | 1                | 23.0               | 100                |
|         | 2     | 29.2                    | 30.6 |                 |                  |                    |                    |
|         | 3     | 30.2                    | 31.6 |                 |                  |                    |                    |
| HZ33(H) | 1     | 31.2                    | 32.6 | 2               | 1                | 25.0               | 120                |
|         | 2     | 32.2                    | 33.6 |                 |                  |                    |                    |
|         | 3     | 33.2                    | 34.6 |                 |                  |                    |                    |
| HZ36(H) | 1     | 34.2                    | 35.7 | 2               | 1                | 27.0               | 140                |
|         | 2     | 35.3                    | 36.8 |                 |                  |                    |                    |
|         | 3     | 36.4                    | 38.0 |                 |                  |                    |                    |

Note: 1. Tested with DC.

Note: 2. Type No. is as follows; HZ2(H)B1, HZ 2(H)B2, HZ36(H)3.

Main Characteristic

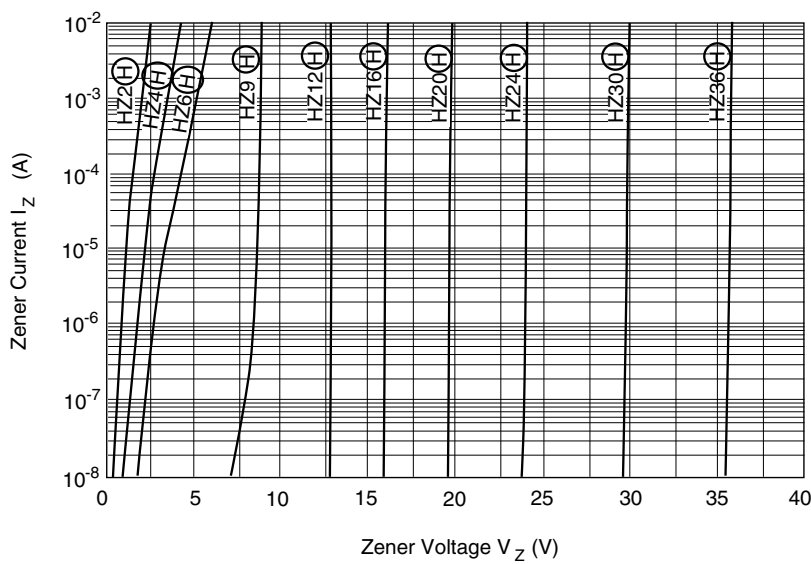


Fig.1 Zener current Vs. Zener voltage

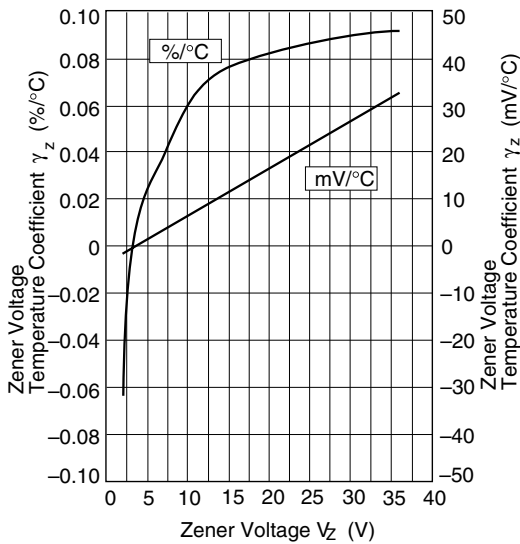


Fig.2 Temperature Coefficient Vs. Zener voltage

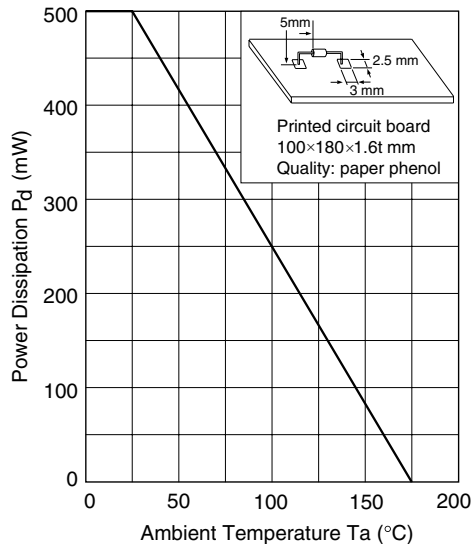
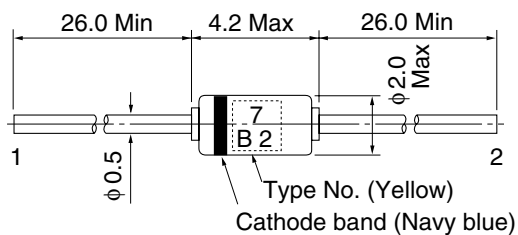


Fig.3 Power Dissipation Vs. Ambient Temperature

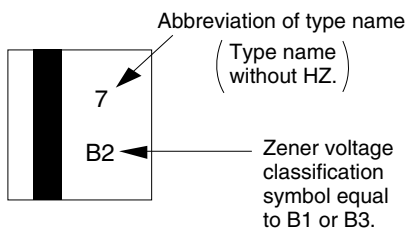


# Package Dimensions

Unit: mm



1. Cathode  
2. Anode



Expanded drawing of marking

|              |       |
|--------------|-------|
| Hitachi Code | DO-35 |
| JEDECCode    | DO-35 |
| EIAJCode     | SC-48 |
| Weight(g)    | 0.13  |

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