To all our customers

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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# HZM-N Series

Silicon Epitaxial Planar Zener Diode for Stabilizer

ADE-208-130D (Z)

Rev.4
Dec. 2002

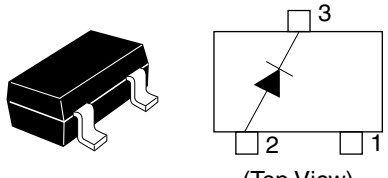
## Features

- Wide spectrum from 1.9 V through 38 V of zener voltage provide flexible application.
- MPAK Package is suitable for high density surface mounting and high speed assembly.

## Ordering Information

| Type No. | Laser Mark | Package Code |
|---|---|---|
| HZM-N Series | Let to Mark Code | MPAK |

## Pin Arrangement




(Top View)

1. NC
2. Anode
3. Cathode

## 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. See Fig. 3.

## Electrical Characteristics

(Ta = 25°C)

| | | Zener Voltage *[1] | | | Reverse Current | | Dynamic Resistance | |
|---|---|---|---|---|---|---|---|---|
| | | $V_Z$ (V) | | Test Condition | $I_R$ (µA) | Test Condition | $r_d$ (Ω) | Test Condition |
| Type | Grade | Min | Max | $I_Z$ (mA) | Max | $V_R$ (V) | Max | $I_Z$ (mA) |
| HZM2.0N | B | 1.90 | 2.20 | 5 | 120 | 0.5 | 100 | 5 |
| HZM2.2N | B | 2.10 | 2.40 | 5 | 120 | 0.7 | 100 | 5 |
| HZM2.4N | B | 2.30 | 2.60 | 5 | 120 | 1.0 | 100 | 5 |
| HZM2.7N | B | 2.50 | 2.90 | 5 | 120 | 1.0 | 110 | 5 |
| | B1 | 2.50 | 2.75 | | | | | |
| | B2 | 2.65 | 2.90 | | | | | |
| HZM3.0N | B | 2.80 | 3.20 | 5 | 50 | 1.0 | 120 | 5 |
| | B1 | 2.80 | 3.05 | | | | | |
| | B2 | 2.95 | 3.20 | | | | | |
| HZM3.3N | B | 3.10 | 3.50 | 5 | 20 | 1.0 | 130 | 5 |
| | B1 | 3.10 | 3.35 | | | | | |
| | B2 | 3.25 | 3.50 | | | | | |
| HZM3.6N | B | 3.40 | 3.80 | 5 | 10 | 1.0 | 130 | 5 |
| | B1 | 3.40 | 3.65 | | | | | |
| | B2 | 3.55 | 3.80 | | | | | |
| HZM3.9N | 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 ($P_W$ = 40 ms)

| Type | Grade | Zener Voltage *1 | | | Reverse Current | | Dynamic Resistance | |
|---|---|---|---|---|---|---|---|---|
| | | $V_Z$ (V) | | Test Condition | $I_R$ (μA) | Test Condition | $r_d$ (Ω) | Test Condition |
| | | Min | Max | $I_Z$ (mA) | Max | $V_R$ (V) | Max | $I_Z$ (mA) |
| HZM4.3N | 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 | | | | | |
| HZM4.7N | 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 | | | | | |
| HZM5.1N | 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 | | | | | |
| HZM5.6N | 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 | | | | | |
| HZM6.2N | 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 | | | | | |
| HZM6.8N | 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 | | | | | |
| HZM7.5N | 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 | | | | | |
| HZM8.2N | 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)



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| Type | Grade | Zener Voltage *1 | | | Reverse Current | | Dynamic Resistance | |
|---|---|---|---|---|---|---|---|---|
| | | $V_Z$ (V) | | Test Condition | $I_R$ (μA) | Test Condition | $r_d$ (Ω) | Test Condition |
| | | Min | Max | $I_Z$ (mA) | Max | $V_R$ (V) | Max | $I_Z$ (mA) |
| HZM9.1N | 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 | | | | | |
| HZM10N | 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 | | | | | |
| HZM11N | 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 | | | | | |
| HZM12N | 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 | | | | | |
| HZM13N | 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 | | | | | |
| HZM15N | 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 | | | | | |
| HZM16N | B | 15.37 | 17.09 | 5 | 2 | 12.0 | 40 | 5 |
| | B1 | 15.37 | 16.01 | | | | | |
| | B2 | 15.85 | 16.51 | | | | | |
| | B3 | 16.35 | 17.09 | | | | | |
| HZM18N | 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)



RENESAS

| Type | Grade | Zener Voltage *1 | | | Reverse Current | | Dynamic Resistance | |
|---|---|---|---|---|---|---|---|---|
| | | $V_Z$ (V) | | Test Condition | $I_R$ (μA) | Test Condition | $r_d$ (Ω) | Test Condition |
| | | Min | Max | $I_Z$ (mA) | Max | $V_R$ (V) | Max | $I_Z$ (mA) |
| HZM20N | 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 | | | | | |
| HZM22N | 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 | | | | | |
| HZM24N | 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 | | | | | |
| HZM27N | B | 25.10 | 28.90 | 2 | 2 | 21.0 | 70 | 2 |
| HZM30N | B | 28.00 | 32.00 | 2 | 2 | 23.0 | 80 | 2 |
| HZM33N | B | 31.00 | 35.00 | 2 | 2 | 25.0 | 80 | 2 |
| HZM36N | B | 34.00 | 38.00 | 2 | 2 | 27.0 | 90 | 2 |

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

## Mark Code

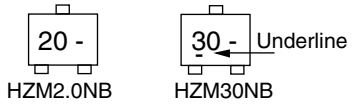
| Type | Grade | MARK No. |
|---|---|---|
| HZM2.0N | B | 2 0 – |
| HZM2.2N | B | 2 2 – |
| HZM2.4N | B | 2 4 – |
| HZM2.7N | B1 | 2 7 1 |
| | B2 | 2 7 2 |
| HZM3.0N | B1 | 3 0 1 |
| | B2 | 3 0 2 |
| HZM3.3N | B1 | 3 3 1 |
| | B2 | 3 3 2 |
| HZM3.6N | B1 | 3 6 1 |
| | B2 | 3 6 2 |
| HZM3.9N | B1 | 3 9 1 |
| | B2 | 3 9 2 |
| HZM4.3N | B1 | 4 3 1 |
| | B2 | 4 3 2 |
| | B3 | 4 3 3 |
| HZM4.7N | B1 | 4 7 1 |
| | B2 | 4 7 2 |
| | B3 | 4 7 3 |
| HZM5.1N | B1 | 5 1 1 |
| | B2 | 5 1 2 |
| | B3 | 5 1 3 |
| HZM5.6N | B1 | 5 6 1 |
| | B2 | 5 6 2 |
| | B3 | 5 6 3 |
| HZM6.2N | B1 | 6 2 1 |
| | B2 | 6 2 2 |
| | B3 | 6 2 3 |
| HZM6.8N | B1 | 6 8 1 |
| | B2 | 6 8 2 |
| | B3 | 6 8 3 |

| Type | Grade | MARK No. |
|---|---|---|
| HZM7.5N | B1 | 7 5 1 |
| | B2 | 7 5 2 |
| | B3 | 7 5 3 |
| HZM8.2N | B1 | 8 2 1 |
| | B2 | 8 2 2 |
| | B3 | 8 2 3 |
| HZM9.1N | B1 | 9 1 1 |
| | B2 | 9 1 2 |
| | B3 | 9 1 3 |
| HZM10N | B1 | 1 0 1 |
| | B2 | 1 0 2 |
| | B3 | 1 0 3 |
| HZM11N | B1 | 1 1 1 |
| | B2 | 1 1 2 |
| | B3 | 1 1 3 |
| HZM12N | B1 | 1 2 1 |
| | B2 | 1 2 2 |
| | B3 | 1 2 3 |
| HZM13N | B1 | 1 3 1 |
| | B2 | 1 3 2 |
| | B3 | 1 3 3 |
| HZM15N | B1 | 1 5 1 |
| | B2 | 1 5 2 |
| | B3 | 1 5 3 |
| HZM16N | B1 | 1 6 1 |
| | B2 | 1 6 2 |
| | B3 | 1 6 3 |
| HZM18N | B1 | 1 8 1 |
| | B2 | 1 8 2 |
| | B3 | 1 8 3 |

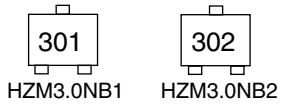
| Type | Grade | MARK No. |
|---|---|---|
| HZM20N | B1 | 2 0 1 |
| | B2 | 2 0 2 |
| | B3 | 2 0 3 |
| HZM22N | B1 | 2 2 1 |
| | B2 | 2 2 2 |
| | B3 | 2 2 3 |
| HZM24N | B1 | 2 4 1 |
| | B2 | 2 4 2 |
| | B3 | 2 4 3 |
| HZM27N | B | 2 7 – |
| HZM30N | B | 3 0 – |
| HZM33N | B | 3 3 – |
| HZM36N | B | 3 6 – |

## Example of Marking

1. One grade type (grade type B)




2. Two grade type (B1, B2)




3. Three grade type (B1, B2, B3)

Notes: 1. The grade B type includes from B1 min. to B3 (or B2) max.
2. B grade is standard and has better delivery, These are marked one of B1, B2, B3.
3. Ordering P/N HZM-N series are delivered taped (TL/TR).
Choose one taping code and adhere to parts No.
Example: HZM2.0NBTL (or TR), HZM2.2NBTL (or TR), HZM36NBTL (or TR).
(Grade B type)
HZM2.7NB1TL (or TR), HZM2.7NB2TL (or TR), HZM24NB3TL (or TR).
(Grade B1, B2, B3 type)

## Main Characteristic

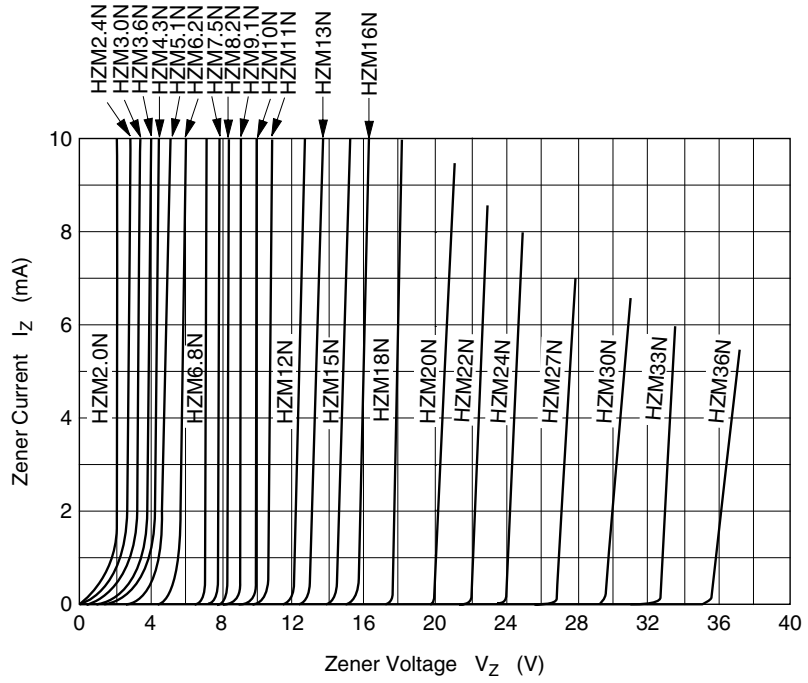



Fig.1 Zener current vs. Zener voltage

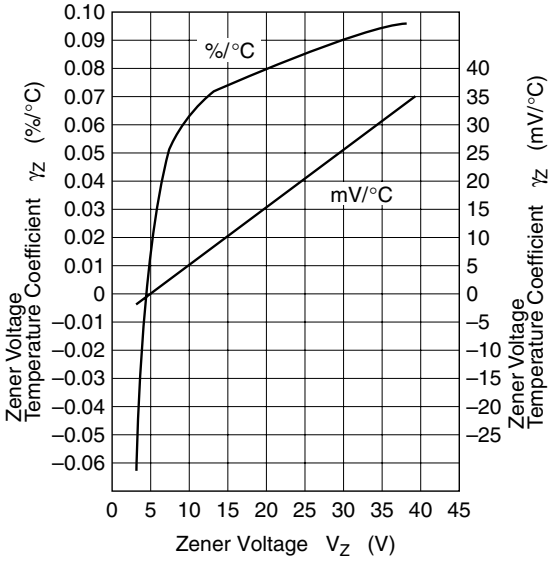



Fig.2 Temperature Coefficient vs. Zener voltage

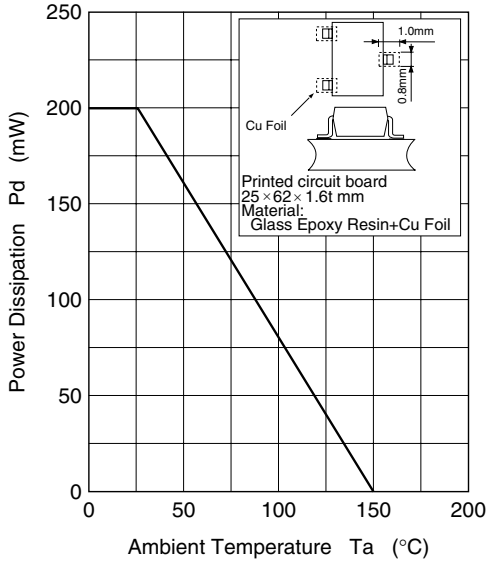
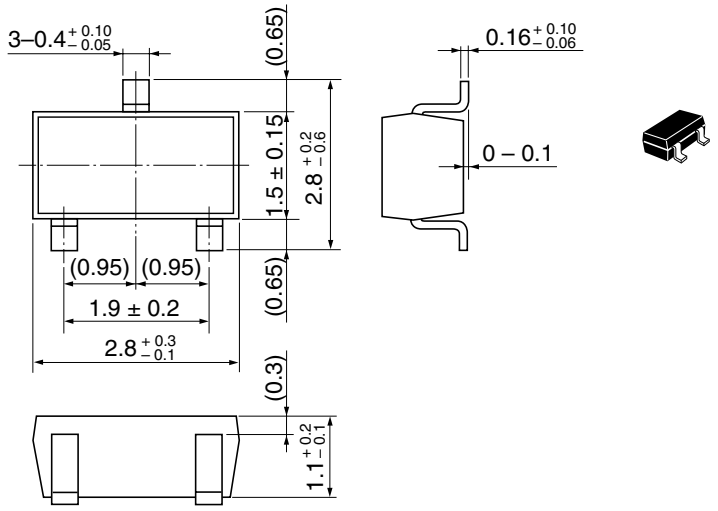



Fig.3 Power Dissipation vs. Ambient Temperature

## Package Dimensions

As of July, 2002

Unit: mm




| | |
|---|---|
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| JEDEC | — |
| JEITA | Conforms |
| Mass (reference value) | 0.011 g |

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