

# HZM-N Series

## Silicon Epitaxial Planar Zener Diode for Stabilizer

REJ03G0483-0500  
(Previous: ADE-208-130D)  
Rev.5.00  
Dec 14, 2004

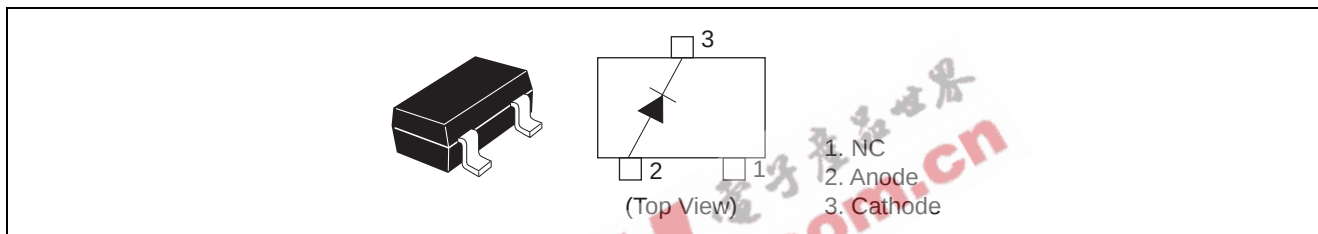
### Features

- 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



## 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)

| Type    | Grade | Zener Voltage |      | Reverse Current     |                     | Dynamic Resistance |                    |
|---------|-------|---------------|------|---------------------|---------------------|--------------------|--------------------|
|         |       | Vz (V)*1      |      | 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                |
| HZM2.0N | B     | 1.90          | 2.20 | 5                   | 120                 | 0.5                | 100                |
| HZM2.2N | B     | 2.10          | 2.40 | 5                   | 120                 | 0.7                | 100                |
| HZM2.4N | B     | 2.30          | 2.60 | 5                   | 120                 | 1.0                | 100                |
| HZM2.7N | B     | 2.50          | 2.90 | 5                   | 120                 | 1.0                | 110                |
|         | B1    | 2.50          | 2.75 |                     |                     |                    |                    |
|         | B2    | 2.65          | 2.90 |                     |                     |                    |                    |
| HZM3.0N | B     | 2.80          | 3.20 | 5                   | 50                  | 1.0                | 120                |
|         | B1    | 2.80          | 3.05 |                     |                     |                    |                    |
|         | B2    | 2.95          | 3.20 |                     |                     |                    |                    |
| HZM3.3N | B     | 3.10          | 3.50 | 5                   | 20                  | 1.0                | 130                |
|         | B1    | 3.10          | 3.35 |                     |                     |                    |                    |
|         | B2    | 3.25          | 3.50 |                     |                     |                    |                    |
| HZM3.6N | B     | 3.40          | 3.80 | 5                   | 10                  | 1.0                | 130                |
|         | B1    | 3.40          | 3.65 |                     |                     |                    |                    |
|         | B2    | 3.55          | 3.80 |                     |                     |                    |                    |
| HZM3.9N | B     | 3.70          | 4.10 | 5                   | 10                  | 1.0                | 130                |
|         | B1    | 3.70          | 3.97 |                     |                     |                    |                    |
|         | B2    | 3.87          | 4.10 |                     |                     |                    |                    |
| HZM4.3N | B     | 4.01          | 4.48 | 5                   | 10                  | 1.0                | 130                |
|         | 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                |
|         | 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                |
|         | 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                 |
|         | B1    | 5.31          | 5.55 |                     |                     |                    |                    |
|         | B2    | 5.49          | 5.73 |                     |                     |                    |                    |
|         | B3    | 5.67          | 5.92 |                     |                     |                    |                    |

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

| Type    | Grade | Zener Voltage                    |       | Test Condition | Reverse Current     |                | Dynamic Resistance |                |
|---------|-------|----------------------------------|-------|----------------|---------------------|----------------|--------------------|----------------|
|         |       | V <sub>Z</sub> (V)* <sup>1</sup> |       |                | 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            |
| 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  |                |                     |                |                    |                |
| 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 |                |                     |                |                    |                |
| 5M15N   | 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)

| Type   | Grade | Zener Voltage           |       | Test Condition | Reverse Current |                | Dynamic Resistance |                |
|--------|-------|-------------------------|-------|----------------|-----------------|----------------|--------------------|----------------|
|        |       | $V_Z$ (V)* <sup>1</sup> |       |                | $I_R$ (μA)      | Test Condition | $r_d$ (Ω)          | Test Condition |
|        |       | Min                     | Max   | $I_Z$ (mA)     | Max             | $V_R$ (V)      | Max                | $I_Z$ (mA)     |
| H2M20N | 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 |                |                 |                |                    |                |
| H2M22N | 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 |                |                 |                |                    |                |
| H2M24N | 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 |                |                 |                |                    |                |
| H2M27N | B     | 25.10                   | 28.90 | 2              | 2               | 21.0           | 70                 | 2              |
| H2M30N | B     | 28.00                   | 32.00 | 2              | 2               | 23.0           | 80                 | 2              |
| H2M33N | B     | 31.00                   | 35.00 | 2              | 2               | 25.0           | 80                 | 2              |
| H2M36N | B     | 34.00                   | 38.00 | 2              | 2               | 27.0           | 90                 | 2              |

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

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## Mark Code

| Type    | Grade | Mark No. |
|---------|-------|----------|
| H2M2.0N | B     | 2 0 –    |
| H2M2.2N | B     | 2 2 –    |
| H2M2.4N | B     | 2 4 –    |
| H2M2.7N | B1    | 2 7 1    |
|         | B2    | 2 7 2    |
| H2M3.0N | B1    | 3 0 1    |
|         | B2    | 3 0 2    |
| H2M3.3N | B1    | 3 3 1    |
|         | B2    | 3 3 2    |
| H2M3.6N | B1    | 3 6 1    |
|         | B2    | 3 6 2    |
| H2M3.9N | B1    | 3 9 1    |
|         | B2    | 3 9 2    |
| H2M4.3N | B1    | 4 3 1    |
|         | B2    | 4 3 2    |
|         | B3    | 4 3 3    |
| H2M4.7N | B1    | 4 7 1    |
|         | B2    | 4 7 2    |
|         | B3    | 4 7 3    |
| H2M5.1N | B1    | 5 1 1    |
|         | B2    | 5 1 2    |
|         | B3    | 5 1 3    |
| H2M5.6N | B1    | 5 6 1    |
|         | B2    | 5 6 2    |
|         | B3    | 5 6 3    |

| Type    | Grade | Mark No.     |
|---------|-------|--------------|
| H2M6.2N | B1    | 6 2 1        |
|         | B2    | 6 2 2        |
|         | B3    | 6 2 3        |
| H2M6.8N | B1    | 6 8 1        |
|         | B2    | 6 8 2        |
|         | B3    | 6 8 3        |
| H2M7.5N | B1    | 7 5 1        |
|         | B2    | 7 5 2        |
|         | B3    | 7 5 3        |
| H2M8.2N | B1    | 8 2 1        |
|         | B2    | 8 2 2        |
|         | B3    | 8 2 3        |
| H2M9.1N | B1    | 9 1 1        |
|         | B2    | 9 1 2        |
|         | B3    | 9 1 3        |
| H2M10N  | B1    | <u>1</u> 0 1 |
|         | B2    | <u>1</u> 0 2 |
|         | B3    | <u>1</u> 0 3 |
| H2M11N  | B1    | <u>1</u> 1 1 |
|         | B2    | <u>1</u> 1 2 |
|         | B3    | <u>1</u> 1 3 |
| H2M12N  | B1    | <u>1</u> 2 1 |
|         | B2    | <u>1</u> 2 2 |
|         | B3    | <u>1</u> 2 3 |

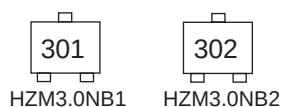
| Type   | Grade | Mark No.     |
|--------|-------|--------------|
| H2M13N | B1    | <u>1</u> 3 1 |
|        | B2    | <u>1</u> 3 2 |
|        | B3    | <u>1</u> 3 3 |
| H2M15N | B1    | <u>1</u> 5 1 |
|        | B2    | <u>1</u> 5 2 |
|        | B3    | <u>1</u> 5 3 |
| H2M16N | B1    | <u>1</u> 6 1 |
|        | B2    | <u>1</u> 6 2 |
|        | B3    | <u>1</u> 6 3 |
| H2M18N | B1    | <u>1</u> 8 1 |
|        | B2    | <u>1</u> 8 2 |
|        | B3    | <u>1</u> 8 3 |
| H2M20N | B1    | <u>2</u> 0 1 |
|        | B2    | <u>2</u> 0 2 |
|        | B3    | <u>2</u> 0 3 |
| H2M22N | B1    | <u>2</u> 2 1 |
|        | B2    | <u>2</u> 2 2 |
|        | B3    | <u>2</u> 2 3 |
| H2M24N | B1    | <u>2</u> 4 1 |
|        | B2    | <u>2</u> 4 2 |
|        | B3    | <u>2</u> 4 3 |
| H2M27N | B     | <u>2</u> 7 – |
| H2M30N | B     | <u>3</u> 0 – |
| H2M33N | B     | <u>3</u> 3 – |
| H2M36N | B     | <u>3</u> 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 H2M-N series are delivered taped (TL/TR).  
 Choose one taping code and adhere to parts No.  
 Example: H2M2.0NBTL (or TR), H2M2.2NBTL (or TR), H2M36NBTL (or TR).  
 (Grade B type)  
 H2M2.7NB1TL (or TR), H2M2.7NB2TL (or TR), H2M24NB3TL (or TR).  
 (Grade B1, B2, B3 type)

# Main Characteristic

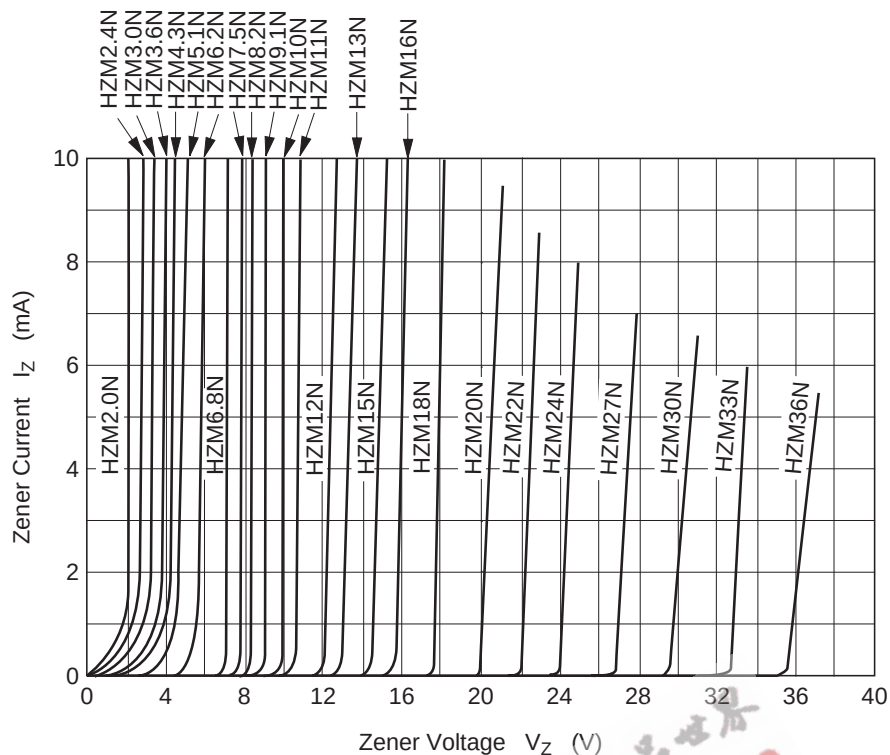


Fig.1 Zener current vs. Zener voltage

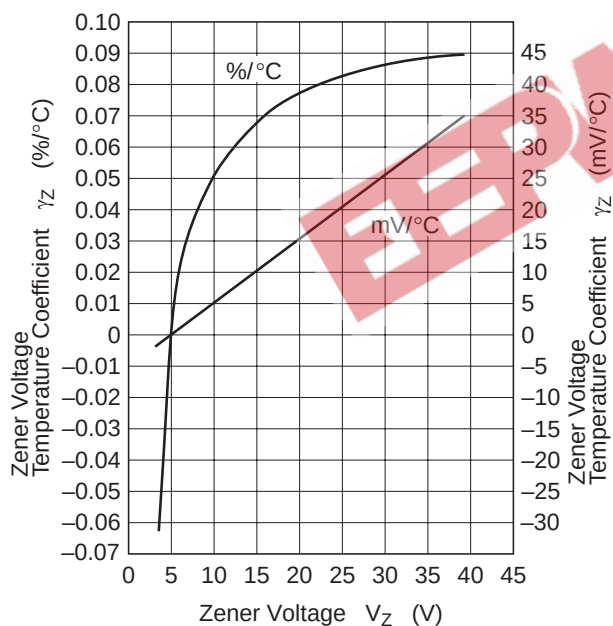


Fig.2 Temperature Coefficient vs. Zener voltage

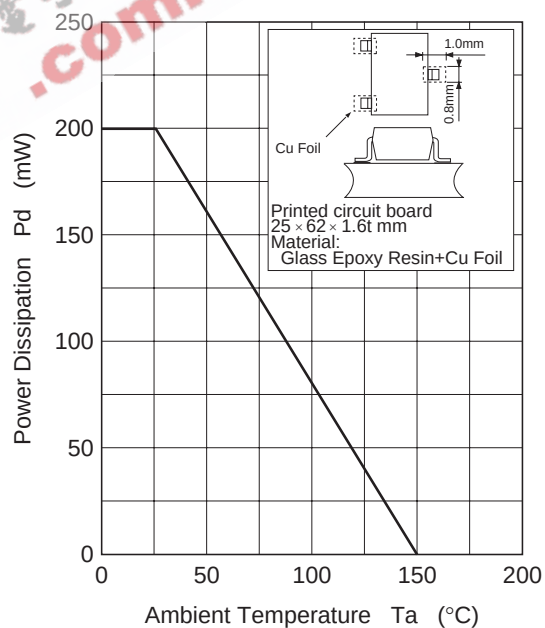
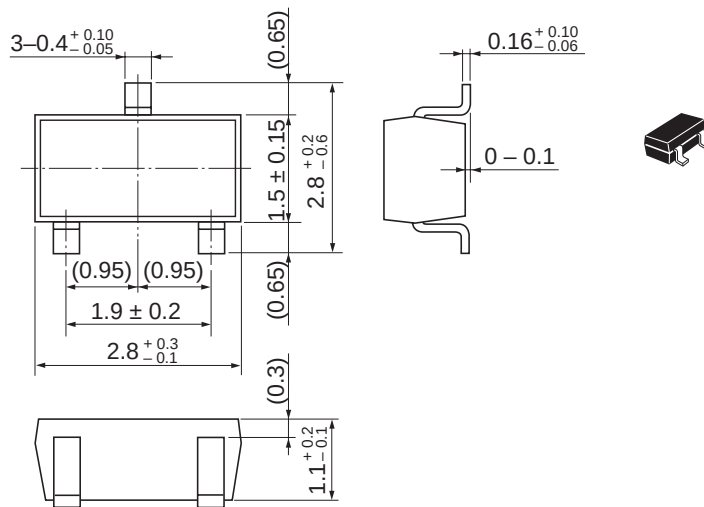


Fig.3 Power Dissipation vs. Ambient Temperature

## Package Dimensions

As of January, 2003  
Unit: mm

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

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