



## Silicon 5 Watt Zener Diodes

### DESCRIPTION

The 1N5334Be3 through 1N5388Be3 JEDEC registered series of axial-leaded 5.0 watt Zeners provides a voltage selection of 3.6 V to 200 V with different tolerances as identified by a suffix letter on a part number. These plastic encapsulated Zeners have a moisture classification of level 1 with no dry pack required. They may be operated at high maximum dc currents with adequate heat sinking due to their comparatively low thermal resistance design. D0-201AE comes in tape and reel only, TR7 and TR13.

**Important:** For the latest information, visit our website <http://www.microsemi.com>.

### FEATURES

- JEDEC registered 1N5336 through 1N5388 numbers
- Zener voltage available 3.6 volts to 200 volts
- Plus/minus 10%, 5% and 2% voltage tolerances available.  
(See [Part Nomenclature](#) for all available options.)
- Low inductance
- RoHS compliant
- Plastic package classification 94V-0

### APPLICATIONS / BENEFITS

- Built-in strain relief
- Flexible axial lead mounting terminals
- Minimal changes of voltage vs current
- Regulates voltage over broad operating current and temperature ranges

### MAXIMUM RATINGS @ 25 °C unless otherwise stated

| Parameters/Test Conditions  | Symbol              | Value       | Unit |
|---|---------------------|-------------|------|
| Junction and Storage Temperature  | $T_J$ and $T_{STG}$ | -65 to +150 | °C   |
| Thermal Resistance Junction-to-Lead <sup>(1)</sup>  | $R_{\theta JL}$     | 25          | °C/W |
| Thermal Resistance Junction-to-Ambient <sup>(2)</sup>   | $R_{\theta JA}$     | 85          | °C/W |
| DC Power Dissipation @ $T_L=75$ °C, measured at zero lead length. Derate above 75 °C <sup>(3)</sup> | $P_D$               | 5           | W    |
| Solder Temperature @ 10 s   | $T_{SP}$            | 260         | °C   |

- Notes:**
1. At 3/8" (10 mm) lead length from body.
  2. Mounted on 100 mm<sup>2</sup> copper pads to each terminal.



**DO-201AE Package**

Also available in:

**T-18 Package**

(leaded alternative)



[1N5333B – 1N5388B](#)

#### MSC – Lawrence

6 Lake Street,  
Lawrence, MA 01841  
Tel: 1-800-446-1158 or  
(978) 620-2600  
Fax: (978) 689-0803

#### MSC – Ireland

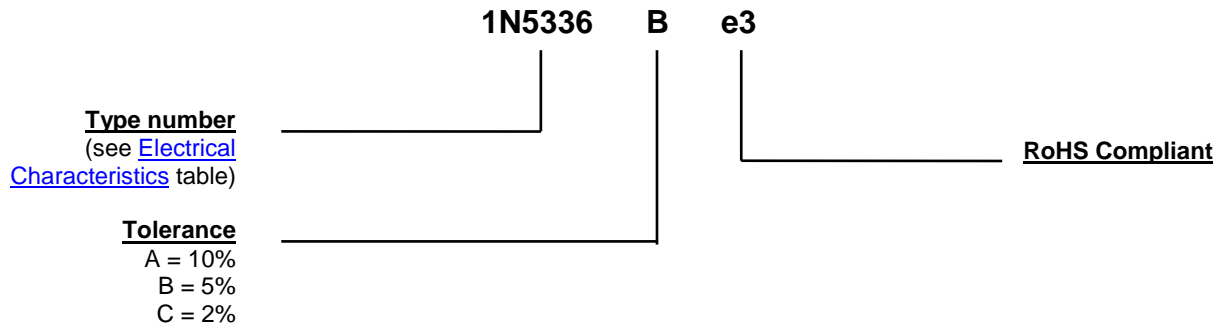
Gort Road Business Park,  
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**Website:**

[www.microsemi.com](http://www.microsemi.com)

**MECHANICAL and PACKAGING**

- CASE: JEDEC DO-201AE molded plastic body in compliance with specification 94V-0
- TERMINALS: RoHS compliant matte/tin plated axial leads. Solderable per MIL-STD-750, method 2026.
- MARKING: Part number
- POLARITY: Cathode indicated by band. (Diode to be operated with the banded end positive with respect to the opposite end.)
- TAPE & REEL option: Seven and thirteen inch reel sizes (add "TR" suffix to part number, TR7 or TR13, e.g. 1N5352Be3/TR13). Consult factory for quantities.
- WEIGHT: Approximately 1.122 grams
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**

**SYMBOLS & DEFINITIONS**

| Symbol                | Definition  |
|-----------------------|---|
| $\alpha_{VZ}$         | Temperature Coefficient of Regulator Voltage: The change in regulator voltage divided by the change in temperature that caused it expressed in %/C or mV/°C.  |
| $I_R$                 | Reverse Current: The dc current flowing from the external circuit into the cathode terminal at the specified voltage $V_R$ .  |
| $I_Z, I_{ZT}, I_{ZK}$ | Regulator Current: The dc regulator current ( $I_Z$ ), at a specified test point ( $I_{ZT}$ ), near breakdown knee ( $I_{ZK}$ ).  |
| $I_{ZSM}$             | Reverse Surge Current, Nonrepetitive Peak: The peak reverse current in the breakdown region including all nonrepetitive transient currents but excluding all repetitive transients (also known as maximum Zener surge current).                       |
| $P_D$                 | Steady-State Power Dissipation: The dc power resulting from the product of $V_Z \times I_Z$ .   |
| $V_R$                 | Reverse Voltage: A positive dc cathode-anode voltage below the breakdown region.  |
| $V_Z$                 | Zener Voltage: The Zener voltage the device will exhibit at a specified current ( $I_Z$ ) in its breakdown region.  |
| $Z_Z$ or $Z_{ZK}$     | Regulator Impedance: The small signal impedance of the diode when biased to operate in its breakdown region with $I_{ZT}$ applied at $I_Z$ or $I_{ZK}$ respectively. This has also been known as Zener or dynamic impedance ( $Z_{ZT}$ or $Z_{ZK}$ ). |

**ELECTRICAL CHARACTERISTICS @ T<sub>A</sub> = 25 °C unless otherwise noted**

| PART NUMBER | Nominal Zener Voltage            |       |       | Maximum Zener Test Current | Maximum Zener Impedance           |                                   |    | Maximum Leakage Current         |      |
|-------------|----------------------------------|-------|-------|----------------------------|-----------------------------------|-----------------------------------|----|---------------------------------|------|
|             | V <sub>Z</sub> @ I <sub>ZT</sub> |       |       | I <sub>ZT</sub>            | Z <sub>ZT</sub> @ I <sub>ZT</sub> | Z <sub>ZK</sub> @ I <sub>ZK</sub> |    | I <sub>R</sub> @ V <sub>R</sub> |      |
|             | Nom V                            | Min V | Max V | mA                         | Ω                                 | Ω                                 | mA | μA                              | V    |
| 1N5334Be3   | 3.6                              | 3.42  | 3.79  | 350                        | 2.5                               | 500                               | 1  | 150                             | 1    |
| 1N5335Be3   | 3.9                              | 3.70  | 4.09  | 320                        | 2                                 | 500                               | 1  | 50                              | 1    |
| 1N5336Be3   | 4.3                              | 4.08  | 4.52  | 290                        | 2                                 | 500                               | 1  | 10                              | 1    |
| 1N5337Be3   | 4.7                              | 4.47  | 4.94  | 260                        | 2                                 | 450                               | 1  | 5                               | 1    |
| 1N5338Be3   | 5.1                              | 4.84  | 5.35  | 240                        | 1.5                               | 400                               | 1  | 1                               | 1    |
| 1N5339Be3   | 5.6                              | 5.32  | 5.88  | 220                        | 1                                 | 400                               | 1  | 1                               | 2    |
| 1N5340Be3   | 6                                | 5.70  | 6.31  | 200                        | 1                                 | 300                               | 1  | 1                               | 3    |
| 1N5341Be3   | 6.2                              | 5.89  | 6.51  | 200                        | 1                                 | 200                               | 1  | 1                               | 3    |
| 1N5342Be3   | 6.8                              | 6.46  | 7.14  | 175                        | 1                                 | 200                               | 1  | 10                              | 5.2  |
| 1N5343Be3   | 7.5                              | 7.12  | 7.89  | 175                        | 1.5                               | 200                               | 1  | 10                              | 5.7  |
| 1N5344Be3   | 8.2                              | 7.79  | 8.61  | 150                        | 1.5                               | 200                               | 1  | 10                              | 6.2  |
| 1N5345Be3   | 8.7                              | 8.26  | 9.14  | 150                        | 2                                 | 200                               | 1  | 10                              | 6.6  |
| 1N5346Be3   | 9.1                              | 8.64  | 9.56  | 150                        | 2                                 | 150                               | 1  | 7.5                             | 6.9  |
| 1N5347Be3   | 10                               | 9.50  | 10.50 | 125                        | 2                                 | 125                               | 1  | 5                               | 7.6  |
| 1N5348Be3   | 11                               | 10.45 | 11.55 | 125                        | 2.5                               | 125                               | 1  | 5                               | 8.4  |
| 1N5349Be3   | 12                               | 11.40 | 12.60 | 100                        | 2.5                               | 125                               | 1  | 2                               | 9.1  |
| 1N5350Be3   | 13                               | 12.35 | 13.65 | 100                        | 2.5                               | 100                               | 1  | 1                               | 9.9  |
| 1N5351Be3   | 14                               | 13.30 | 14.70 | 100                        | 2.5                               | 75                                | 1  | 1                               | 10.6 |
| 1N5352Be3   | 15                               | 14.25 | 15.75 | 75                         | 2.5                               | 75                                | 1  | 1                               | 11.5 |
| 1N5353Be3   | 16                               | 15.20 | 16.80 | 75                         | 2.5                               | 75                                | 1  | 1                               | 12.2 |
| 1N5354Be3   | 17                               | 16.15 | 17.85 | 70                         | 2.5                               | 75                                | 1  | 0.5                             | 12.9 |
| 1N5355Be3   | 18                               | 17.10 | 18.90 | 65                         | 2.5                               | 75                                | 1  | 0.5                             | 13.7 |
| 1N5356Be3   | 19                               | 18.05 | 19.95 | 65                         | 3                                 | 75                                | 1  | 0.5                             | 14.4 |
| 1N5357Be3   | 20                               | 19.00 | 21.00 | 65                         | 3                                 | 75                                | 1  | 0.5                             | 15.2 |
| 1N5358Be3   | 22                               | 20.90 | 23.10 | 50                         | 3.5                               | 75                                | 1  | 0.5                             | 16.7 |
| 1N5359Be3   | 24                               | 22.80 | 25.20 | 50                         | 3.5                               | 100                               | 1  | 0.5                             | 18.2 |
| 1N5360Be3   | 25                               | 23.75 | 26.25 | 50                         | 4                                 | 110                               | 1  | 0.5                             | 19   |
| 1N5361Be3   | 27                               | 25.65 | 28.35 | 50                         | 5                                 | 120                               | 1  | 0.5                             | 20.6 |
| 1N5362Be3   | 28                               | 26.60 | 29.40 | 50                         | 6                                 | 130                               | 1  | 0.5                             | 21.2 |
| 1N5363Be3   | 30                               | 28.50 | 31.50 | 40                         | 8                                 | 140                               | 1  | 0.5                             | 22.8 |
| 1N5364Be3   | 33                               | 31.35 | 34.65 | 40                         | 10                                | 150                               | 1  | 0.5                             | 25.1 |
| 1N5365Be3   | 36                               | 34.20 | 37.80 | 30                         | 11                                | 160                               | 1  | 0.5                             | 27.4 |
| 1N5366Be3   | 39                               | 37.05 | 40.65 | 30                         | 14                                | 170                               | 1  | 0.5                             | 29.7 |
| 1N5367Be3   | 43                               | 40.85 | 45.15 | 30                         | 20                                | 190                               | 1  | 0.5                             | 32.7 |
| 1N5368Be3   | 47                               | 44.65 | 49.35 | 25                         | 25                                | 210                               | 1  | 0.5                             | 35.8 |
| 1N5369Be3   | 51                               | 48.45 | 53.55 | 25                         | 27                                | 230                               | 1  | 0.5                             | 38.8 |
| 1N5370Be3   | 56                               | 53.20 | 58.80 | 25                         | 35                                | 280                               | 1  | 0.5                             | 42.6 |
| 1N5371Be3   | 60                               | 57.00 | 63.00 | 20                         | 40                                | 350                               | 1  | 0.5                             | 45.5 |
| 1N5372Be3   | 62                               | 58.90 | 65.10 | 20                         | 42                                | 400                               | 1  | 0.5                             | 47.1 |
| 1N5373Be3   | 68                               | 64.60 | 71.40 | 20                         | 44                                | 500                               | 1  | 0.5                             | 51.7 |
| 1N5374Be3   | 75                               | 71.25 | 78.75 | 20                         | 45                                | 620                               | 1  | 0.5                             | 56   |
| 1N5375Be3   | 82                               | 77.90 | 86.10 | 15                         | 65                                | 720                               | 1  | 0.5                             | 62.2 |
| 1N5376Be3   | 87                               | 82.65 | 91.35 | 15                         | 75                                | 760                               | 1  | 0.5                             | 66   |
| 1N5377Be3   | 91                               | 86.45 | 95.55 | 15                         | 75                                | 760                               | 1  | 0.5                             | 69.2 |
| 1N5378Be3   | 100                              | 95.00 | 105.0 | 12                         | 90                                | 800                               | 1  | 0.5                             | 76   |
| 1N5379Be3   | 110                              | 104.5 | 115.5 | 12                         | 125                               | 1000                              | 1  | 0.5                             | 83.6 |
| 1N5380Be3   | 120                              | 114.0 | 126.0 | 10                         | 170                               | 1150                              | 1  | 0.5                             | 91.2 |
| 1N5381Be3   | 130                              | 123.5 | 136.5 | 10                         | 190                               | 1250                              | 1  | 0.5                             | 98.8 |
| 1N5382Be3   | 140                              | 133.0 | 147.0 | 8                          | 230                               | 1500                              | 1  | 0.5                             | 106  |
| 1N5383Be3   | 150                              | 142.5 | 157.5 | 8                          | 330                               | 1500                              | 1  | 0.5                             | 114  |
| 1N5384Be3   | 160                              | 152.0 | 168.0 | 8                          | 350                               | 1650                              | 1  | 0.5                             | 122  |
| 1N5385Be3   | 170                              | 161.5 | 178.5 | 8                          | 380                               | 1750                              | 1  | 0.5                             | 129  |
| 1N5386Be3   | 180                              | 171.0 | 189.0 | 5                          | 430                               | 1750                              | 1  | 0.5                             | 137  |
| 1N5387Be3   | 190                              | 180.5 | 199.5 | 5                          | 450                               | 1850                              | 1  | 0.5                             | 144  |
| 1N5388Be3   | 200                              | 190.0 | 210.0 | 5                          | 480                               | 1850                              | 1  | 0.5                             | 152  |

GRAPHS

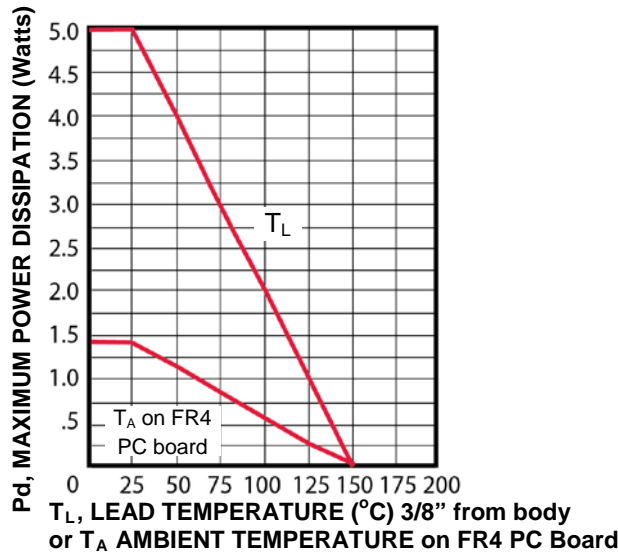


Figure 1 – Power temperature Derating Curve

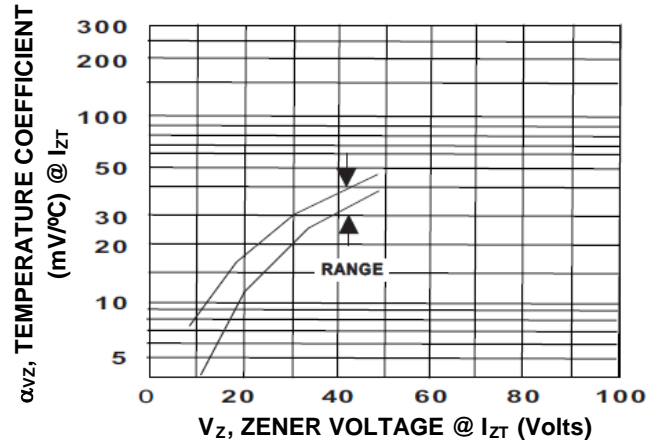


Figure 2 –  $V_Z$  Temperature Coefficient

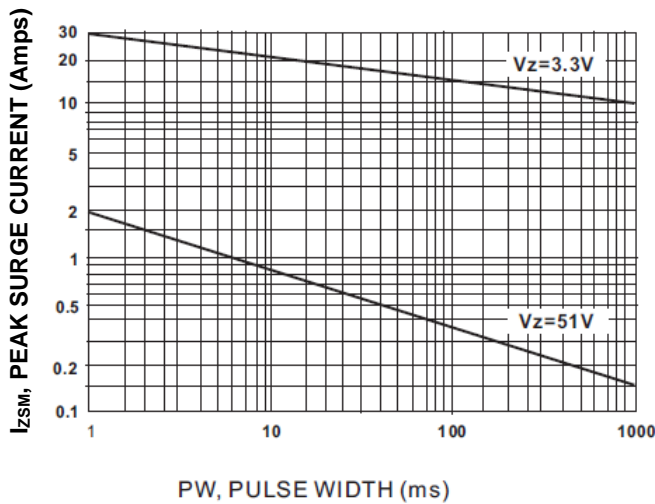


Figure 3 – Peak Surge Current vs. Pulse Width

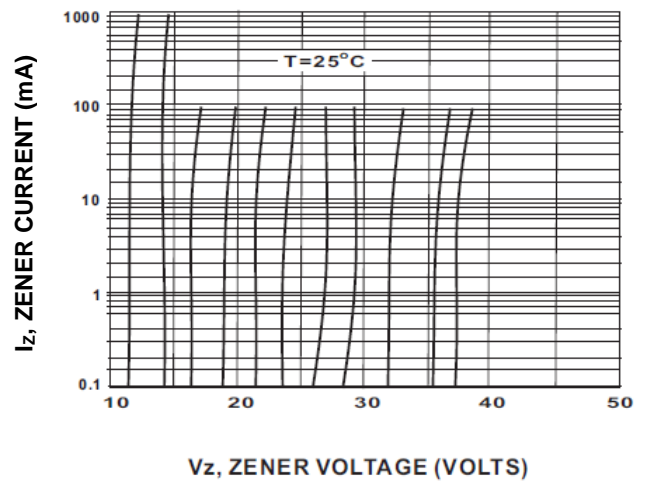
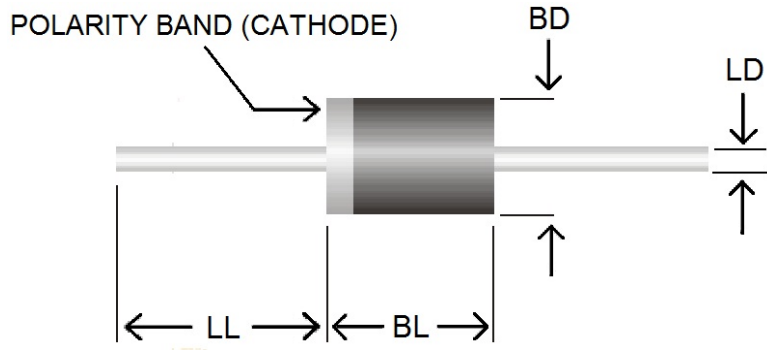


Figure 4 – Zener Voltage vs Zener Current  
 $V_Z = 11$  through 39 Volts

**PACKAGE DIMENSIONS**


| Ltr       | Dimensions |       |             |      |
|-----------|------------|-------|-------------|------|
|           | Inch       |       | Millimeters |      |
|           | Min        | Max   | Min         | Max  |
| <b>LL</b> | 1.00       | -     | 25.4        | -    |
| <b>BL</b> | 0.285      | 0.375 | 7.2         | 9.5  |
| <b>BD</b> | 0.188      | 0.210 | 4.8         | 5.3  |
| <b>LD</b> | 0.037      | 0.042 | 0.94        | 1.07 |