



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.

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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 ⁽¹⁾ | $R_{\theta JL}$ | 25 | °C/W |
| Thermal Resistance Junction-to-Ambient ⁽²⁾ | $R_{\theta JA}$ | 85 | °C/W |
| DC Power Dissipation @ $T_L=75$ °C, measured at zero lead length. Derate above 75 °C ⁽³⁾ | 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 mm² 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

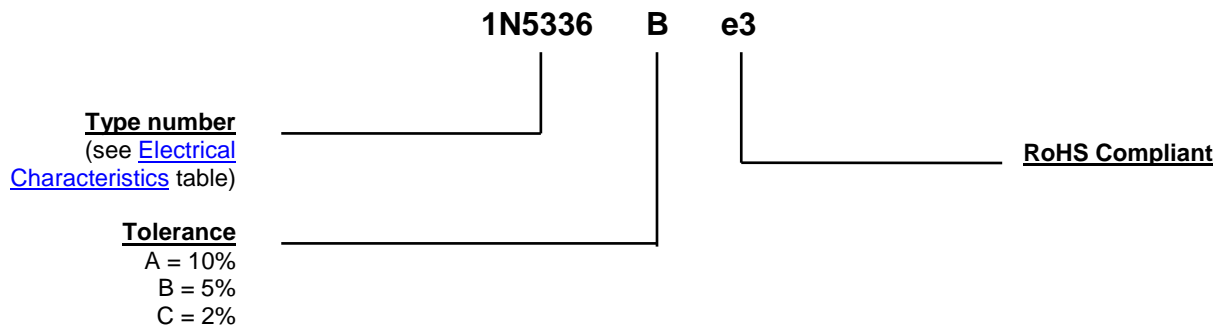
Gort Road Business Park,
Ennis, Co. Clare, Ireland
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MECHANICAL and PACKAGING

- 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 |
|-----------------------|---|
| α_{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 @ $T_A = 25^\circ\text{C}$ unless otherwise noted

| PART NUMBER | Nominal Zener Voltage | | | Maximum Zener Test Current | Maximum Zener Impedance | | | Maximum Leakage Current | |
|-------------|-----------------------|-------|-------|----------------------------|-------------------------|-------------------|----|-------------------------|------|
| | $V_Z @ I_{ZT}$ | | | I_{ZT} | $Z_{ZT} @ I_{ZT}$ | $Z_{ZK} @ I_{ZK}$ | | $I_R @ V_R$ | |
| | 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

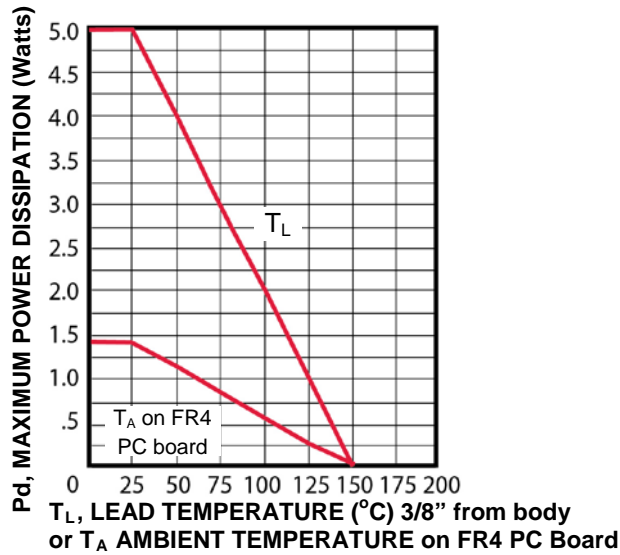


Figure 1 – Power temperature Derating Curve

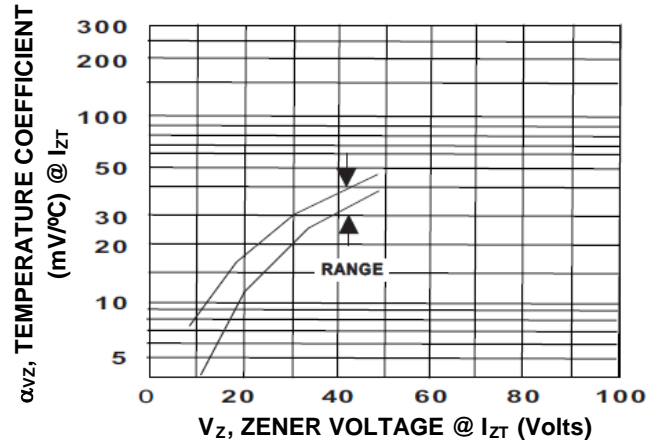


Figure 2 – V_z Temperature Coefficient

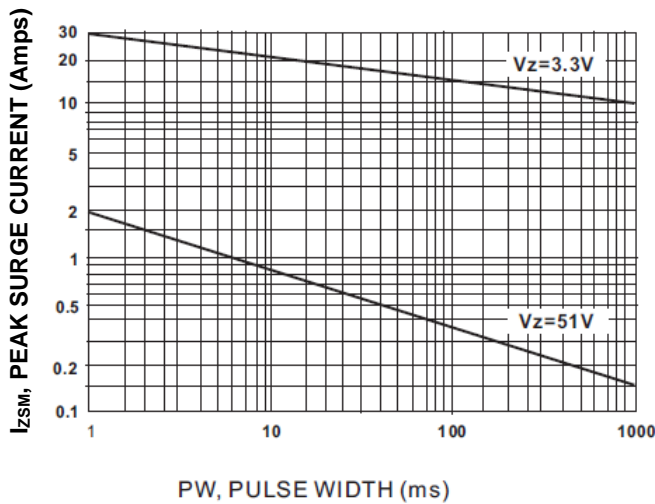


Figure 3 – Peak Surge Current vs. Pulse Width

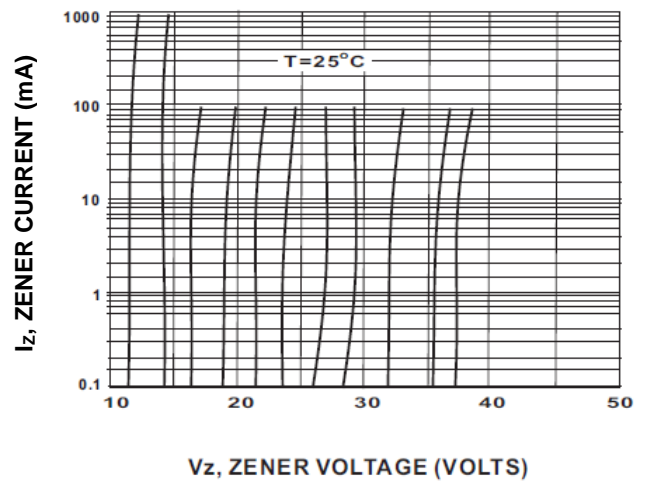
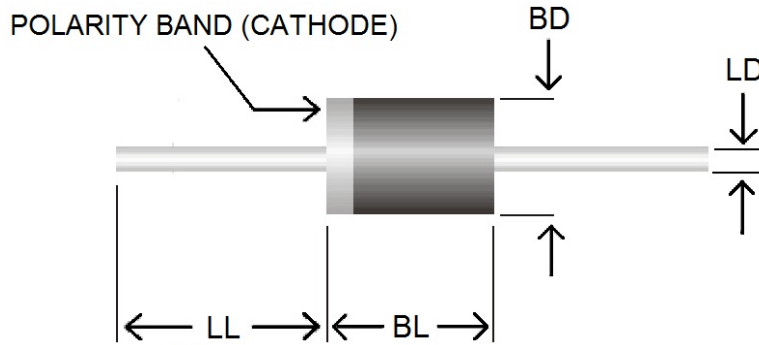


Figure 4 – Zener Voltage vs Zener Current
 $V_z = 11$ through 39 Volts

PACKAGE DIMENSIONS


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

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[1N5363Ce3/TR12](#) [1N5362Ae3/TR12](#) [1N5336e3/TR13](#) [1N5388/TR8](#) [1N5376A/TR12](#) [1N5387Ce3/TR12](#)
[1N5362Ae3/TR13](#) [1N5353C/TR8](#) [1N5378Be3/TR13](#) [1N5347Be3/TR13](#) [1N5338Ae3/TR12](#) [1N5348B/TR12](#)
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[1N5380A/TR12](#) [1N5360B/TR8](#) [1N5388B/TR12](#) [1N5361C/TR8](#) [1N5339Ae3/TR13](#) [1N5351C/TR8](#) [1N5351/TR8](#)
[1N5349Ce3/TR13](#) [1N5385A/TR12](#) [1N5385Be3/TR12](#) [1N5348Ae3/TR13](#) [1N5384A/TR12](#) [1N5336Be3/TR8](#)
[1N5336Ae3/TR8](#) [1N5387/TR8](#) [1N5334A/TR12](#) [1N5336B/TR8](#) [1N5366/TR12](#) [1N5387Ce3/TR13](#) [1N5352Be3/TR13](#)
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