



0.5W Zener Diode - 1N5538B to 1N5546B

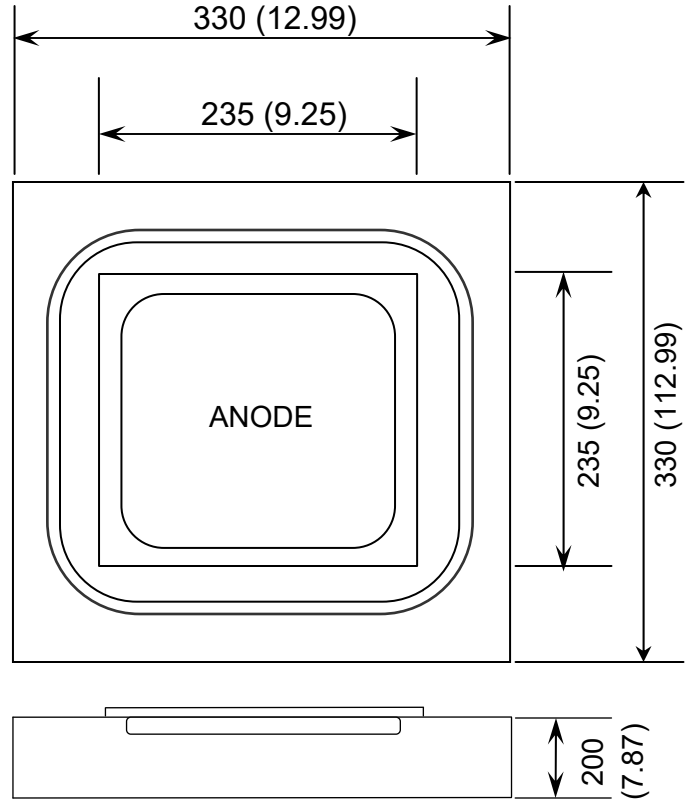
Rev 1.0
05/04/19

Silicon Planar Zener diode in bare die form – 5% tolerance

Features:

- Sharp Reverse Characteristics
- Low Reverse Current Levels
- High Reliability Gold Back Metal
- High Reliability Tested Grades.

Die Dimensions in μm (mils)



CHIP BACKSIDE IS CATHODE

Ordering Information

The following part suffixes apply:

- No suffix - Commercial grade die
- “H” – Hi-rel grade die + MIL-STD-38534 Class H LAT
- “K” – Hi-rel grade die + MIL-STD-38534 Class K LAT.

LAT = Lot acceptance Test.

For information on Hi-Rel LAT flows please see below.

www.siliconsupplies.com/bare-die-lot-qualification

Supply Formats:

- Default – Die in Waffle Pack (400 per tray capacity)
- Sawn Wafer on Tape – By specific request
- Unsawn Wafer – By specific request
- With additional electrical selection – By specific request

Mechanical Specification

| | | |
|------------------------|----------------------------|-----------------------|
| Die Size (Unsawn) | 330 x 330 12.99 x 12.99 | μm mils |
| Anode Pad Size | 235 x 235 9.25 x 9.25 | μm mils |
| Die Thickness | 200 7.87 | μm mils |
| Top Metal Composition | Al | |
| Back Metal Composition | AuAs | |





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Absolute Maximum Ratings¹ T_A = 25°C unless otherwise stated

| PARAMETER | SYMBOL | VALUE | UNIT |
|--|------------------|-------------|------|
| Power Dissipation ² | P _{TOT} | 500 | mW |
| Junction Temperature | T _J | 175 | °C |
| Storage Temperature Range | T _S | -65 to +175 | °C |
| Forward Voltage @ I _F = 200mA | V _F | 1.1 | V |

Electrical Characteristics T_A = 25°C unless otherwise stated

| DEVICE | ZENER VOLTAGE RANGE | TEST CURRENT | REVERSE LEAKAGE CURRENT | | ZENER ³ IMPEDANCE | ZENER REG ⁴ | LOW V _Z CURRENT | MAX CURRENT | NOISE DENSITY |
|---------|----------------------------------|-----------------|---------------------------------|------|-----------------------------------|------------------------|----------------------------|-----------------|------------------------|
| | V _Z @ I _{ZT} | I _{ZT} | I _R @ V _R | | Z _{ZT} @ I _{ZT} | ΔV _Z | I _{ZL} | I _{ZM} | N _D @ 250μA |
| | V | mA | μA | V | Ω | V | mA | mA | μV/VHz |
| | Nom. | | Max. | | Max. | Typ. | | | |
| 1N5518B | 3.3 | 20 | 5.0 | 1.0 | 26 | 0.90 | 2.0 | 115 | 0.5 |
| 1N5519B | 3.6 | 20 | 3.0 | 1.0 | 24 | 0.90 | 2.0 | 105 | 0.5 |
| 1N5520B | 3.9 | 20 | 1.0 | 1.0 | 22 | 0.85 | 2.0 | 98 | 0.5 |
| 1N5521B | 4.3 | 20 | 3.0 | 1.5 | 18 | 0.75 | 2.0 | 88 | 0.5 |
| 1N5522B | 4.7 | 10 | 2.0 | 2.0 | 22 | 0.60 | 1.0 | 81 | 0.5 |
| 1N5523B | 5.1 | 5.0 | 2.0 | 2.5 | 26 | 0.65 | 0.25 | 75 | 0.5 |
| 1N5524B | 5.6 | 3.0 | 2.0 | 3.5 | 30 | 0.30 | 0.25 | 68 | 1.0 |
| 1N5525B | 6.2 | 1.0 | 1.0 | 5.0 | 30 | 0.20 | 0.01 | 61 | 1.0 |
| 1N5526B | 6.8 | 1.0 | 1.0 | 6.2 | 30 | 0.10 | 0.01 | 56 | 1.0 |
| 1N5527B | 7.5 | 1.0 | 0.5 | 6.8 | 35 | 0.05 | 0.01 | 51 | 2.0 |
| 1N5528B | 8.2 | 1.0 | 0.5 | 7.5 | 40 | 0.05 | 0.01 | 46 | 4.0 |
| 1N5529B | 9.1 | 1.0 | 0.1 | 8.2 | 45 | 0.05 | 0.01 | 42 | 4.0 |
| 1N5530B | 10.0 | 1.0 | 0.05 | 9.1 | 60 | 0.10 | 0.01 | 38 | 4.0 |
| 1N5531B | 11.0 | 1.0 | 0.05 | 9.9 | 80 | 0.20 | 0.01 | 35 | 5.0 |
| 1N5532B | 12.0 | 1.0 | 0.05 | 10.8 | 90 | 0.20 | 0.01 | 32 | 10 |
| 1N5533B | 13.0 | 1.0 | 0.01 | 11.7 | 90 | 0.20 | 0.01 | 29 | 15 |
| 1N5534B | 14.0 | 1.0 | 0.01 | 12.6 | 100 | 0.20 | 0.01 | 27 | 20 |
| 1N5535B | 15.0 | 1.0 | 0.01 | 13.5 | 100 | 0.20 | 0.01 | 25 | 20 |
| 1N5536B | 16.0 | 1.0 | 0.01 | 14.4 | 100 | 0.20 | 0.01 | 24 | 20 |
| 1N5537B | 17.0 | 1.0 | 0.01 | 15.3 | 100 | 0.20 | 0.01 | 22 | 20 |
| 1N5538B | 18.0 | 1.0 | 0.01 | 16.2 | 100 | 0.20 | 0.01 | 21 | 20 |
| 1N5539B | 19.0 | 1.0 | 0.01 | 17.1 | 100 | 0.20 | 0.01 | 20 | 20 |





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| DEVICE | ZENER VOLTAGE RANGE ³ | TEST CURRENT | REVERSE LEAKAGE CURRENT | | ZENER ⁴ IMPEDANCE | ZENER REG ⁵ | LOW V_Z CURRENT | MAX CURRENT | NOISE DENSITY |
|---------|----------------------------------|--------------|-------------------------|------|------------------------------|------------------------|-------------------|-------------|--------------------------|
| | $V_Z @ I_{ZT}$ | I_{ZT} | $I_R @ V_R$ | | $Z_{ZT} @ I_{ZT}$ | ΔV_Z | I_{ZL} | I_{ZM} | $N_D @ 250\mu\text{A}$ |
| | V | mA | μA | V | Ω | V | mA | mA | $\mu\text{V}/\text{VHz}$ |
| | Nom. | | Max. | | Max. | Typ. | | | |
| 1N5540B | 20.0 | 1.0 | 0.01 | 18.0 | 100 | 0.20 | 0.01 | 19 | 20 |
| 1N5541B | 22.0 | 1.0 | 0.01 | 19.8 | 100 | 0.25 | 0.01 | 17 | 20 |
| 1N5542B | 24.0 | 1.0 | 0.01 | 21.6 | 100 | 0.30 | 0.01 | 16 | 20 |
| 1N5543B | 25.0 | 1.0 | 0.01 | 22.4 | 100 | 0.35 | 0.01 | 15 | 20 |
| 1N5544B | 28.0 | 1.0 | 0.01 | 25.2 | 100 | 0.40 | 0.01 | 14 | 20 |
| 1N5545B | 30.0 | 1.0 | 0.01 | 27.0 | 100 | 0.45 | 0.01 | 13 | 20 |
| 1N5546B | 33.0 | 1.0 | 0.01 | 29.7 | 100 | 0.50 | 0.01 | 12 | 20 |

1. Operation above the absolute maximum rating may cause device failure. Operation at the absolute maximum ratings, for extended periods, may reduce device reliability. 2. Assembled in DO-35 package. Performance in die form subject to assembly heat sinking and die attach methods.

3. No Suffix type numbers are $\pm 20\%$ with guaranteed limits for only V_Z , I_R , and V_F . Units with "A" suffix are $\pm 10\%$ with guaranteed limits for V_Z , I_R , and V_F . Units with guaranteed limits for all six parameters are indicated by a "B" suffix for $+5.0\%$ units, "C" suffix for $+2.0\%$ and "D" suffix for $+1.0\%$

4. Zener impedance is derived by superimposing on I_{ZT} a 60Hz rms AC current equal to 10% of I_{ZT} 5. ΔV_Z is the maximum difference between $V_Z @ I_{ZT}$ and $V_Z @ I_{ZL}$ measured with the device junction in thermal equilibrium at an ambient temperature of $+25^\circ \pm 3^\circ\text{C}$.

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