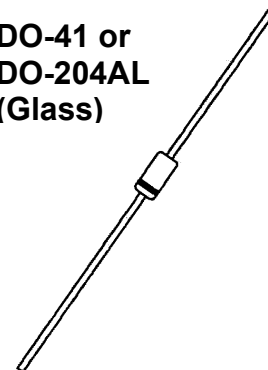


### DESCRIPTION

The 1N5913BG-5956BG series of 1.5 watt Zeners provides voltage regulation in a selection from 3.3 to 200 volts with different tolerances as identified by suffix letter on the part. These glass encapsulated Zeners with a G suffix provide hermetic-sealed qualities and higher rated temperature when required beyond that optionally provided in equivalent plastic-body constructions (P suffix) for the same JEDEC part numbers. Both package options are available by Microsemi. A variety of other Zener product offerings and packages are available by Microsemi to meet higher or lower power and test-current applications.

### APPEARANCE

**DO-41 or  
DO-204AL  
(Glass)**



**IMPORTANT:** For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

### FEATURES

- JEDEC registered 1N5913B to 1N5956B
- Zener voltage available 3.3V to 200V
- Standard voltage tolerances are plus/minus 5% with B suffix and 10 % with A suffix identification
- Tight tolerances available in plus or minus 2% or 1% with C or D suffix respectively
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, JANTXV, and JANS are available by adding MQ, MX, MV, or MSP prefixes respectively to part numbers.
- Surface mount equivalents available as SMBJ5913 to SMBJ5956B, SMBG5913 to SMBG5956B, or MLL5913B to MLL5956B
- Plastic body axial-leaded Zener equivalents are also available as 1N5913BP to 1N5956BP

### APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Wide selection from 3.3 to 200 V
- Flexible axial-lead mounting terminals
- Metallurgically enhanced internal contact design for greater reliability and lower thermal resistance in glass hermetically sealed package
- Nonsensitive to ESD
- Hermetically sealed glass body construction
- Specified capacitance (see Figure 3)
- Inherently radiation hard as described in Microsemi MicroNote 050

### MAXIMUM RATINGS

- Power dissipation at 25°C: 1.5 watts (also see derating in Figure 1).
- Operating and Storage temperature: -65°C to +175°C
- Thermal Resistance: 60°C/W junction to lead at 3/8 (10 mm) lead length from body, or 120°C/W junction to ambient when mounted on FR4 PC board (1 oz Cu) with 4 mm<sup>2</sup> copper pads and track width 1 mm, length 25 mm
- Steady-State Power: 1.5 watts at T<sub>L</sub> ≤ 85°C 3/8 inch (10 mm) from body, or 1.25 watts at T<sub>A</sub> = 25°C when mounted on FR4 PC board as described for thermal resistance (also see Figure 1)
- Forward voltage @200 mA: 1.2 volts (maximum)
- Solder Temperatures: 260°C for 10 s (max)

### MECHANICAL AND PACKAGING

- CASE: Hermetically sealed axial-lead glass package
- TERMINALS: Leads, tin-lead plated solderable per MIL-STD-750, method 2026
- POLARITY: Cathode indicated by band. Diode to be operated with the banded end positive with respect to the opposite end for Zener regulation
- MARKING: Part number
- TAPE & REEL optional: Standard per EIA-296 (add "TR" suffix to part number)
- WEIGHT: 0.4 grams
- See package dimensions on last page

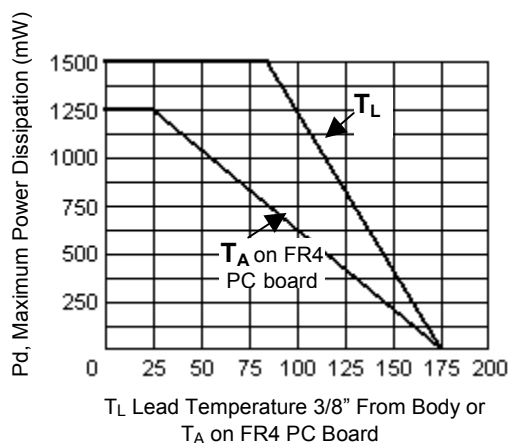
**ELECTRICAL CHARACTERISTICS @  $T_L = 30^\circ\text{C}$** 

| JEDEC<br>TYPE<br>NUMBER<br>(note 1) | ZENER<br>VOLTAGE<br>$V_Z$ | TEST<br>CURRENT<br>$I_{ZT}$ | MAXIMUM<br>DYNAMIC<br>IMPEDANCE<br>$Z_{ZT}$ | KNEE<br>CURRENT<br>$I_{ZK}$ | MAXIMUM<br>KNEE<br>IMPEDANCE<br>$Z_{ZK}$ | MAXIMUM<br>REVERSE<br>CURRENT<br>$I_R @ V_R$ | REVERSE<br>VOLTAGE<br>$V_R$ | MAX. DC<br>CURRENT<br>$I_{ZM}$ |
|-------------------------------------|---------------------------|-----------------------------|---------------------------------------------|-----------------------------|------------------------------------------|----------------------------------------------|-----------------------------|--------------------------------|
|                                     | Volts                     | mA                          | Ohms                                        | mA                          | Ohms                                     | $\mu\text{A}_{dc}$                           | Volts                       | mA                             |
| 1N5913B                             | 3.3                       | 113.6                       | 10                                          | 1.0                         | 500                                      | 100                                          | 1.0                         | 454                            |
| 1N5914B                             | 3.6                       | 104.2                       | 9.0                                         | 1.0                         | 500                                      | 75                                           | 1.0                         | 416                            |
| 1N5915B                             | 3.9                       | 96.1                        | 7.5                                         | 1.0                         | 500                                      | 25                                           | 1.0                         | 384                            |
| 1N5916B                             | 4.3                       | 87.2                        | 6.0                                         | 1.0                         | 500                                      | 5.0                                          | 1.0                         | 348                            |
| 1N5917B                             | 4.7                       | 79.8                        | 5.0                                         | 1.0                         | 500                                      | 5.0                                          | 1.5                         | 319                            |
| 1N5918B                             | 5.1                       | 73.5                        | 4.0                                         | 1.0                         | 350                                      | 5.0                                          | 2.0                         | 294                            |
| 1N5919B                             | 5.6                       | 66.9                        | 2.0                                         | 1.0                         | 250                                      | 5.0                                          | 3.0                         | 267                            |
| 1N5920B                             | 6.2                       | 60.5                        | 2.0                                         | 1.0                         | 200                                      | 5.0                                          | 4.0                         | 241                            |
| 1N5921B                             | 6.8                       | 55.1                        | 2.5                                         | 1.0                         | 200                                      | 5.0                                          | 5.2                         | 220                            |
| 1N5922B                             | 7.5                       | 50                          | 3.0                                         | 0.5                         | 400                                      | 5.0                                          | 6.0                         | 200                            |
| 1N5923B                             | 8.2                       | 45.7                        | 3.5                                         | 0.5                         | 400                                      | 5.0                                          | 6.5                         | 182                            |
| 1N5924B                             | 9.1                       | 41.2                        | 4.0                                         | 0.5                         | 500                                      | 5.0                                          | 7.0                         | 164                            |
| 1N5925B                             | 10                        | 37.5                        | 4.5                                         | 0.25                        | 500                                      | 5.0                                          | 8.0                         | 150                            |
| 1N5926B                             | 11                        | 34.1                        | 5.5                                         | 0.25                        | 550                                      | 1.0                                          | 8.4                         | 136                            |
| 1N5927B                             | 12                        | 31.2                        | 6.5                                         | 0.25                        | 550                                      | 1.0                                          | 9.1                         | 125                            |
| 1N5928B                             | 13                        | 28.8                        | 7.0                                         | 0.25                        | 550                                      | 1.0                                          | 9.9                         | 115                            |
| 1N5929B                             | 15                        | 25                          | 9.0                                         | 0.25                        | 600                                      | 1.0                                          | 11.4                        | 100                            |
| 1N5930B                             | 16                        | 23.4                        | 10                                          | 0.25                        | 600                                      | 1.0                                          | 12.2                        | 93                             |
| 1N5931B                             | 18                        | 20.8                        | 12                                          | 0.25                        | 650                                      | 1.0                                          | 13.7                        | 83                             |
| 1N5932B                             | 20                        | 18.7                        | 14                                          | 0.25                        | 650                                      | 1.0                                          | 15.2                        | 75                             |
| 1N5933B                             | 22                        | 17                          | 17.5                                        | 0.25                        | 650                                      | 1.0                                          | 16.7                        | 68                             |
| 1N5934B                             | 24                        | 15.6                        | 19                                          | 0.25                        | 700                                      | 1.0                                          | 18.2                        | 62                             |
| 1N5935B                             | 27                        | 13.9                        | 23                                          | 0.25                        | 700                                      | 1.0                                          | 20.6                        | 55                             |
| 1N5936B                             | 30                        | 12.5                        | 28                                          | 0.25                        | 750                                      | 1.0                                          | 22.8                        | 50                             |
| 1N5937B                             | 33                        | 11.4                        | 33                                          | 0.25                        | 800                                      | 1.0                                          | 25.1                        | 45                             |
| 1N5938B                             | 36                        | 10.4                        | 38                                          | 0.25                        | 850                                      | 1.0                                          | 27.4                        | 41                             |
| 1N5939B                             | 39                        | 9.6                         | 45                                          | 0.25                        | 900                                      | 1.0                                          | 29.7                        | 38                             |
| 1N5940B                             | 43                        | 8.7                         | 53                                          | 0.25                        | 950                                      | 1.0                                          | 32.7                        | 34                             |
| 1N5941B                             | 47                        | 8.0                         | 67                                          | 0.25                        | 1000                                     | 1.0                                          | 35.8                        | 31                             |
| 1N5942B                             | 51                        | 7.3                         | 70                                          | 0.25                        | 1100                                     | 1.0                                          | 38.8                        | 29                             |
| 1N5943B                             | 56                        | 6.7                         | 86                                          | 0.25                        | 1300                                     | 1.0                                          | 42.6                        | 26                             |
| 1N5944B                             | 62                        | 6.0                         | 100                                         | 0.25                        | 1500                                     | 1.0                                          | 47.1                        | 24                             |
| 1N5945B                             | 68                        | 5.5                         | 120                                         | 0.25                        | 1700                                     | 1.0                                          | 51.2                        | 22                             |
| 1N5946B                             | 75                        | 5.0                         | 140                                         | 0.25                        | 2000                                     | 1.0                                          | 56                          | 20                             |
| 1N5947B                             | 82                        | 4.6                         | 160                                         | 0.25                        | 2500                                     | 1.0                                          | 62.2                        | 18                             |
| 1N5948B                             | 91                        | 4.1                         | 200                                         | 0.25                        | 3000                                     | 1.0                                          | 69.2                        | 16                             |
| 1N5949B                             | 100                       | 3.7                         | 250                                         | 0.25                        | 3100                                     | 1.0                                          | 76                          | 15                             |
| 1N5950B                             | 110                       | 3.4                         | 300                                         | 0.25                        | 4000                                     | 1.0                                          | 83.6                        | 13                             |
| 1N5951B                             | 120                       | 3.1                         | 380                                         | 0.25                        | 4500                                     | 1.0                                          | 91.2                        | 12                             |
| 1N5952B                             | 130                       | 2.9                         | 450                                         | 0.25                        | 5000                                     | 1.0                                          | 98.8                        | 11                             |
| 1N5953B                             | 150                       | 2.5                         | 600                                         | 0.25                        | 6000                                     | 1.0                                          | 114                         | 10                             |
| 1N5954B                             | 160                       | 2.3                         | 700                                         | 0.25                        | 6500                                     | 1.0                                          | 121.6                       | 9.0                            |
| 1N5955B                             | 180                       | 2.1                         | 900                                         | 0.25                        | 7000                                     | 1.0                                          | 136.8                       | 8.0                            |
| 1N5956B                             | 200                       | 1.9                         | 1200                                        | 0.25                        | 8000                                     | 1.0                                          | 152                         | 7.0                            |

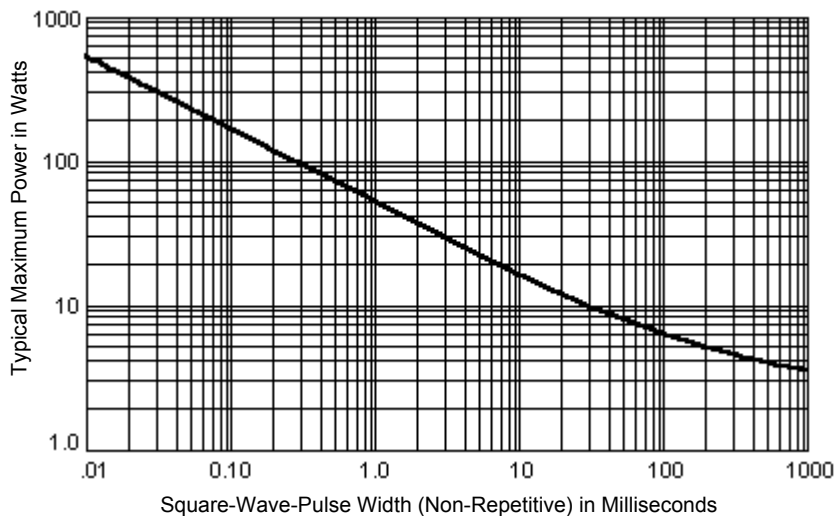
**NOTES:**

- No suffix indicates a +/-20% tolerance on nominal  $V_Z$ . Suffix A denotes a +/-10% tolerance, B denotes a +/-5% tolerance, C denotes a 2% tolerance, and D denotes a +/-1% tolerance. Also add a G suffix for Glass construction, e.g. 1N5956BG (P suffix designates plastic body options described by separate data sheet).
- Zener voltage ( $V_Z$ ) is measured at  $T_L = 30^\circ\text{C}$  and 90 seconds after application of dc current.
- The zener impedance is derived from the 60 Hz ac voltage, which results when an ac current having an rms value equal to 10% of the dc zener current ( $I_{ZT}$  or  $I_{ZK}$ ) is superimposed on  $I_{ZT}$  or  $I_{ZK}$ . See MicroNote 202 for zener impedance variation with different operating currents.

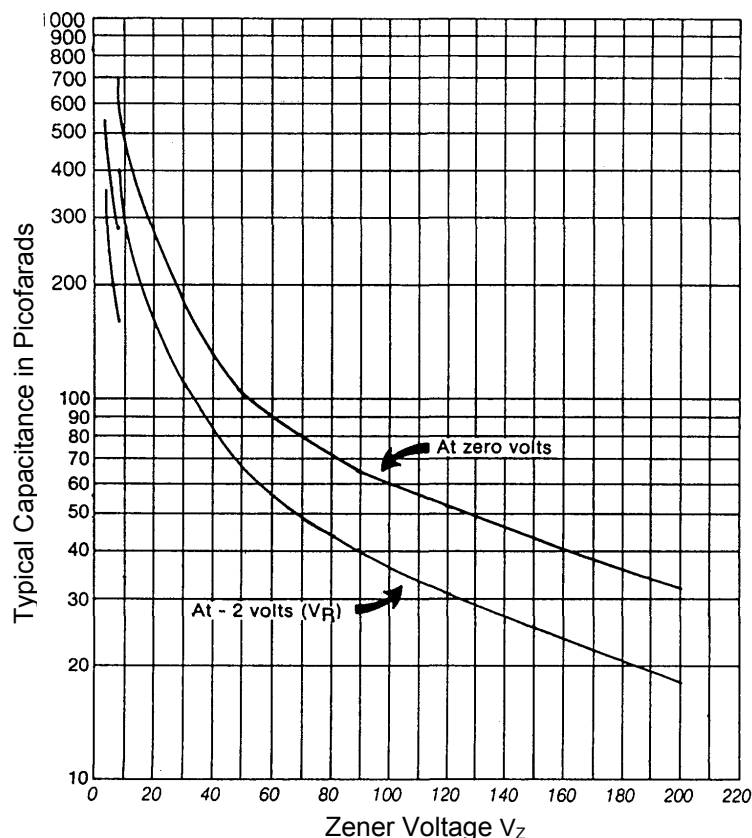
**GRAPHS**



**FIGURE 1**  
POWER DERATING CURVE



**FIGURE 2**  
TRANSIENT SURGE CAPABILITY



**FIGURE 3 - CAPACITANCE vs.  $V_Z$  CURVE**

**PACKAGE DIMENSIONS**  
**DO-41 or DO-204AL**

