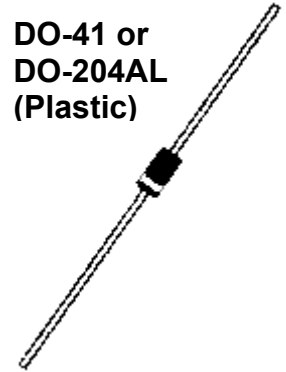


## DESCRIPTION

The 2EZ3.6D5 thru 2EZ200D5 series of axial-leaded 2.0 watt Zeners provides voltage regulation selections with 5% tolerances from 3.6 to 200 volts in a DO-41 plastic package size. Other Zener voltage tolerances are also available by changing the suffix number to the tolerance desired such as 1 and 2 for tighter tolerances or 10 for wider tolerance. These plastic encapsulated Zeners are also available in various military equivalent screening levels by adding a prefix identifier as also described in the Features section. They may be operated at high maximum dc currents or full power rating with adequate heat. Microsemi also offers numerous other Zener products to meet higher and lower power applications.

## APPEARANCE

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



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

## FEATURES

- Zener voltage available 3.6 V to 200 V
- Standard voltage tolerances are plus/minus 5% with a 5 suffix and 10 % with 10 suffix identification
- Tight tolerances available in plus or minus 2% or 1% with 2 or 1 suffix respectively
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, and JANTXV are available by adding MQ, MX, or MV prefixes respectively to part numbers.
- Surface mount equivalents available as SMBJ2EZ3.6D5 to SMBJ2EZ200D5 in the DO-214AA package, or SMBG2EZ3.6D5 to SMBG200D5 in the DO-215AA package
- RoHS compliant devices available by adding "e3" suffix

## APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Wide selection from 3.6 to 200 V
- Flexible axial-lead mounting terminals
- Nonsensitive to ESD per MIL-STD-750 Method 1020
- Withstands surge stresses
- High specified maximum current ( $I_{ZM}$ ) when adequately heat sunk

## MAXIMUM RATINGS

- Power dissipation at 25°C: 3.0 watts (also see derating in Figure 1).
- Operating and Storage temperature: -65°C to +150°C
- Thermal Resistance: 45 °C/W junction to lead at 3/8 (10 mm) lead length from body, or 105°C/W junction to ambient when mounted on FR4 PC board (1oz Cu) with 4 mm<sup>2</sup> copper pads and track width 1 mm, length 25 mm
- Steady-State Power: 2 watts at  $T_L \leq 60^\circ\text{C}$  3/8 inch (10 mm) from body, or 1.19 watts at  $T_A = 25^\circ\text{C}$  when mounted on FR4 PC described for thermal resistance (also see Figure 1)
- Forward voltage @200 mA: 1.2 volts (maximum)
- Solder Temperatures: 260 °C for 10 s (max)

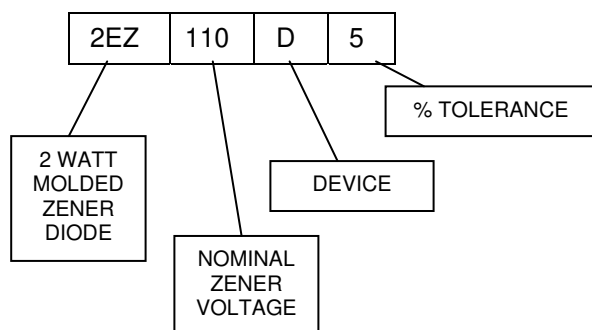
## MECHANICAL AND PACKAGING

- CASE: Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- TERMINALS: Leads, tin-lead or RoHS compliant annealed matte-Tin plating solderable per MIL-STD-750, method 2026
- POLARITY: Cathode indicated by band where diode is to be operated with the banded end positive with respect to the opposite end for Zener regulation.
- MARKING: Part number
- TAPE & REEL option: Standard per EIA-296 (add "TR" suffix to part number)
- WEIGHT: 0.4 grams
- See package dimensions on last page

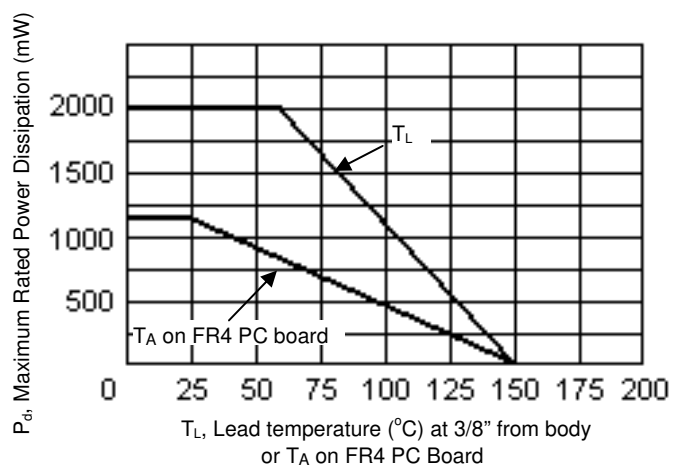
**ELECTRICAL CHARACTERISTICS @25°C**

| MICRO<br>TYPE<br>NUMBER<br>(Note 1) | NOMINAL ZENER<br>VOLTAGE<br>(Note 2) |                 | MAXIMUM ZENER IMPEDANCE<br>(Note 3) |                   |                 | MAXIMUM<br>REVERSE<br>CURRENT |                | MAXIMUM<br>RATED<br>ZENER<br>CURRENT<br>@ 100°C | MAXIMUM<br>SURGE<br>CURRENT<br>(Note 4) |
|-------------------------------------|--------------------------------------|-----------------|-------------------------------------|-------------------|-----------------|-------------------------------|----------------|-------------------------------------------------|-----------------------------------------|
|                                     | V <sub>Z</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> | I <sub>ZM</sub>                                 | I <sub>ZSM</sub>                        |
|                                     | VOLTS                                | mA              | OHMS                                | OHMS              | mA              | μA                            | VOLTS          | mA                                              | A                                       |
| 2EZ3.6D5                            | 3.6                                  | 139             | 5.0                                 | 400               | 1.0             | 80                            | 1.0            | 504                                             | 4.6                                     |
| 2EZ3.9D5                            | 3.9                                  | 128             | 5.0                                 | 400               | 1.0             | 30                            | 1.0            | 468                                             | 4.4                                     |
| 2EZ4.3D5                            | 4.3                                  | 116             | 4.5                                 | 400               | 1.0             | 20                            | 1.0            | 434                                             | 4.1                                     |
| 2EZ4.7D5                            | 4.7                                  | 106             | 4.5                                 | 550               | 1.0             | 5.0                           | 1.0            | 386                                             | 3.3                                     |
| 2EZ5.1D5                            | 5.1                                  | 98              | 3.5                                 | 600               | 1.0             | 5.0                           | 1.0            | 356                                             | 3.5                                     |
| 2EZ5.6D5                            | 5.6                                  | 89.5            | 2.5                                 | 500               | 1.0             | 5.0                           | 2.0            | 324                                             | 3.3                                     |
| 2EZ6.2D5                            | 6.2                                  | 80.5            | 1.5                                 | 700               | 1.0             | 5.0                           | 3.0            | 292                                             | 3.1                                     |
| 2EZ6.8D5                            | 6.8                                  | 73.5            | 2.0                                 | 700               | 1.0             | 5.0                           | 4.0            | 266                                             | 2.9                                     |
| 2EZ7.5D5                            | 7.5                                  | 66.5            | 2.0                                 | 700               | 0.5             | 5.0                           | 5.0            | 242                                             | 2.66                                    |
| 2EZ8.2D5                            | 8.2                                  | 61              | 2.3                                 | 700               | 0.5             | 5.0                           | 6.0            | 220                                             | 2.44                                    |
| 2EZ9.1D5                            | 9.1                                  | 55              | 2.5                                 | 700               | 0.5             | 3.0                           | 7.0            | 200                                             | 2.2                                     |
| 2EZ10D5                             | 10                                   | 50              | 3.5                                 | 700               | 0.25            | 3.0                           | 7.6            | 182                                             | 2.0                                     |
| 2EZ11D5                             | 11                                   | 45.5            | 4.0                                 | 700               | 0.25            | 1.0                           | 8.4            | 166                                             | 1.82                                    |
| 2EZ12D5                             | 12                                   | 41.5            | 4.5                                 | 700               | 0.25            | 1.0                           | 9.1            | 152                                             | 1.66                                    |
| 2EZ13D5                             | 13                                   | 38.5            | 5.0                                 | 700               | 0.25            | 0.5                           | 9.9            | 138                                             | 1.54                                    |
| 2EZ14D5                             | 14                                   | 35.7            | 5.5                                 | 700               | 0.25            | 0.5                           | 10.6           | 130                                             | 1.43                                    |
| 2EZ15D5                             | 15                                   | 33.4            | 7.0                                 | 700               | 0.25            | 0.5                           | 11.4           | 122                                             | 1.33                                    |
| 2EZ16D5                             | 16                                   | 31.2            | 8.0                                 | 700               | 0.25            | 0.5                           | 12.2           | 114                                             | 1.25                                    |
| 2EZ17D5                             | 17                                   | 29.4            | 9.0                                 | 750               | 0.25            | 0.5                           | 13.0           | 107                                             | 1.18                                    |
| 2EZ18D5                             | 18                                   | 27.8            | 10                                  | 750               | 0.25            | 0.5                           | 13.7           | 100                                             | 1.11                                    |
| 2EZ19D5                             | 19                                   | 26.3            | 11                                  | 750               | 0.25            | 0.5                           | 14.4           | 95                                              | 1.05                                    |
| 2EZ20D5                             | 20                                   | 25              | 11                                  | 750               | 0.25            | 0.5                           | 15.2           | 90                                              | 1.0                                     |
| 2EZ22D5                             | 22                                   | 22.8            | 12                                  | 750               | 0.25            | 0.5                           | 16.7           | 82                                              | 0.91                                    |
| 2EZ24D5                             | 24                                   | 20.8            | 13                                  | 750               | 0.25            | 0.5                           | 18.2           | 76                                              | 0.83                                    |
| 2EZ27D5                             | 27                                   | 18.5            | 18                                  | 750               | 0.25            | 0.5                           | 20.6           | 68                                              | 0.74                                    |
| 2EZ30D5                             | 30                                   | 16.6            | 20                                  | 1000              | 0.25            | 0.5                           | 22.5           | 60                                              | 0.67                                    |
| 2EZ33D5                             | 33                                   | 15.1            | 23                                  | 1000              | 0.25            | 0.5                           | 25.1           | 55                                              | 0.61                                    |
| 2EZ36D5                             | 36                                   | 13.9            | 25                                  | 1000              | 0.25            | 0.5                           | 27.4           | 50                                              | 0.56                                    |
| 2EZ39D5                             | 39                                   | 12.8            | 30                                  | 1000              | 0.25            | 0.5                           | 29.7           | 47                                              | 0.51                                    |
| 2EZ43D5                             | 43                                   | 11.6            | 35                                  | 1500              | 0.25            | 0.5                           | 32.7           | 43                                              | 0.45                                    |
| 2EZ47D5                             | 47                                   | 10.6            | 40                                  | 1500              | 0.25            | 0.5                           | 35.8           | 39                                              | 0.42                                    |
| 2EZ51D5                             | 51                                   | 9.8             | 48                                  | 1500              | 0.25            | 0.5                           | 38.8           | 36                                              | 0.39                                    |
| 2EZ56D5                             | 56                                   | 9.0             | 55                                  | 2000              | 0.25            | 0.5                           | 42.6           | 32                                              | 0.36                                    |
| 2EZ62D5                             | 62                                   | 8.1             | 60                                  | 2000              | 0.25            | 0.5                           | 47.1           | 29                                              | 0.32                                    |
| 2EZ68D5                             | 68                                   | 7.4             | 75                                  | 2000              | 0.25            | 0.5                           | 51.7           | 27                                              | 0.29                                    |
| 2EZ75D5                             | 75                                   | 6.7             | 90                                  | 2000              | 0.25            | 0.5                           | 56             | 24                                              | 0.27                                    |
| 2EZ82D5                             | 82                                   | 6.1             | 100                                 | 3000              | 0.25            | 0.5                           | 62.2           | 22                                              | 0.24                                    |
| 2EZ91D5                             | 91                                   | 5.5             | 125                                 | 3000              | 0.25            | 0.5                           | 69.2           | 20                                              | 0.22                                    |
| 2EZ100D5                            | 100                                  | 5.0             | 175                                 | 3000              | 0.25            | 0.5                           | 76.0           | 18                                              | 0.20                                    |
| 2EZ110D5                            | 110                                  | 4.5             | 250                                 | 4000              | 0.25            | 0.5                           | 83.6           | 17                                              | 0.18                                    |
| 2EZ120D5                            | 120                                  | 4.2             | 325                                 | 4500              | 0.25            | 0.5                           | 91.2           | 15                                              | 0.16                                    |
| 2EZ130D5                            | 130                                  | 3.8             | 400                                 | 5000              | 0.25            | 0.5                           | 98.8           | 14                                              | 0.15                                    |
| 2EZ140D5                            | 140                                  | 3.6             | 500                                 | 5500              | 0.25            | 0.5                           | 106.4          | 13                                              | 0.14                                    |
| 2EZ150D5                            | 150                                  | 3.3             | 575                                 | 6000              | 0.25            | 0.5                           | 114            | 12                                              | 0.13                                    |
| 2EZ160D5                            | 160                                  | 3.1             | 650                                 | 6500              | 0.25            | 0.5                           | 121.6          | 11                                              | 0.12                                    |
| 2EZ170D5                            | 170                                  | 2.9             | 675                                 | 7000              | 0.25            | 0.5                           | 130.4          | 11                                              | 0.12                                    |
| 2EZ180D5                            | 180                                  | 2.8             | 725                                 | 7000              | 0.25            | 0.5                           | 136.8          | 10                                              | 0.11                                    |
| 2EZ190D5                            | 190                                  | 2.6             | 825                                 | 8000              | 0.25            | 0.5                           | 144.8          | 10                                              | 0.10                                    |
| 2EZ200D5                            | 200                                  | 2.5             | 900                                 | 8000              | 0.25            | 0.5                           | 152            | 9                                               | 0.10                                    |

- NOTES:**
- Suffix 1 indicates +/-1% tolerance, suffix 2 indicates +/-2% tolerance, suffix 5 indicates +/-5% tolerance. Suffix 10 indicates +/-10%, no suffix indicates +/-20%.
  - The V<sub>Z</sub> is measured after allowing a 90 second stabilization period when mounted with a 3/8" minimum lead length from body. Ambient temperature, T<sub>A</sub> = 25°C (+8°C/-2°C).
  - The Zener impedance is derived from 60 cycle ac voltage resulting from an ac current having an rms value equal to 10% of the dc Zener current (I<sub>ZT</sub> or I<sub>ZK</sub>) is superimposed on I<sub>ZT</sub> or I<sub>ZK</sub>.
  - Maximum Surge Current I<sub>ZSM</sub> is a non-recurrent maximum peak reverse surge with a pulse width of 8.3 ms.



## GRAPHS



**FIGURE 1**  
POWER DERATING CURVE

## PACKAGE DIMENSIONS

