

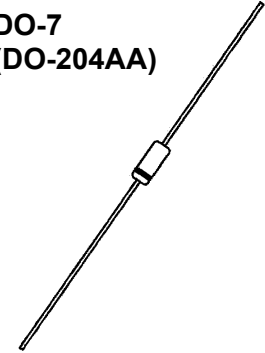


**DESCRIPTION**

The popular 1N4565 thru 1N4584A-1 series of Zero-TC Reference Diodes provides a selection of both 6.4 V nominal voltages and temperature coefficients to as low as 0.0005%/°C for minimal voltage change with temperature. Four different operating currents are available for selection at 0.5 mA, 1.0 mA, 2.00 mA, and 4.00 mA. These glass axial-led DO-7 reference diodes are internal-metallurgical-bonded and are also available in JAN, JANTX, and JANTXV military qualifications. Microsemi also offers numerous other Zener Reference Diode products for a variety of other voltages up to 200 V.

**APPEARANCE**

**DO-7  
(DO-204AA)**



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

**FEATURES**

- JEDEC registered 1N4565 thru 1N4584 series .
- Reference voltage diodes of nominal 6.4 V +/- 5% with tighter tolerance options available
- Temperature Coefficient range: 0.01%/°C to 0.0005%/°C.
- Zener Test Current selection range: 0.500 mA, 1.00 mA, 2.00 mA and 4.00 mA.
- Internal metallurgical bonded
- 1N4565 thru 1N4584 also have qualification to MIL-PRF-19500/452 by adding the JAN, JANTX, JANTXV, or JANS prefixes to part numbers as well as the "-1" suffix; e.g. JANTX1N4574A-1, etc.
- Military surface mount equivalents also available in DO-213AA by adding UR-1 suffix and the JAN, JANTX, and JANTXV prefix, e.g. JANTX1N4569AUR-1 (see separate data sheet)
- Also available in DO-35 package including military qualifications up to JANTXV (see separate data sheet)

**APPLICATIONS / BENEFITS**

- Provides minimal voltage change over a broad operating temperature range for instrumentation and other circuit designs requiring a voltage reference
- Temperature coefficient selections available from 0.01%/°C to 0.0005%/°C
- Tight reference voltage tolerances available with nominal value of 6.4 V by adding tolerance 1%, 2%, 3%, etc. after the part number for identification, e.g. 1N4569-2%, 1N4579A-1%, 1N4574A-1-1%, etc.
- Flexible axial-led mounting terminals
- Nonsensitive to ESD per MIL-STD-750 Method 1020

**MAXIMUM RATINGS**

- Operating Temperatures: -65°C to +175°C
- Storage Temperatures: -65°C to +175°C
- DC Power Dissipation: 500 mW @ T<sub>L</sub> = 25°C with maximum current I<sub>ZM</sub> 70 mA. NOTE: For optimum voltage-temperature stability, the operating test current (I<sub>ZT</sub>) should be as specified in the Electrical Characteristics Table (power less than 30 mW)
- Solder Temperatures: 260°C for 10 s (max)

**MECHANICAL AND PACKAGING**

- CASE: Hermetically sealed glass case. DO-7 (DO-204AA) package
- TERMINALS: Leads, tin-lead plated solderable per MIL-STD-750, Method 2026
- MARKING: Part number and cathode band
- POLARITY: Reference diode to be operated with the banded end positive with respect to the opposite end
- TAPE & REEL option: Standard per EIA-296 (add "TR" suffix to part number)
- WEIGHT: 0.2 grams.
- See package dimensions on last page



1N4565(A)(-1) thru 1N4584(A)(-1) DO-7

**\*ELECTRICAL CHARACTERISTICS @ 25°C, unless otherwise specified**

| JEDEC TYPE<br>Number<br>(Notes 1, 4 & 5) | ZENER TEST<br>CURRENT<br>(Note 3)<br>$I_{ZT}$<br>mA | MAXIMUM VOLTAGE TEMPERATURE<br>COEFFICIENT |                     |               | MAXIMUM<br>REVERSE<br>CURRENT<br>$I_R @ 3 V$<br>$\mu A$ | MAX. DYNAMIC<br>IMPEDANCE<br>(Note 2)<br>$Z_{ZT} @ I_{ZT}$<br>OHMS |
|--|---|--|---------------------|---------------|---|--|
|  |   | $\alpha_{VZ} +/- \% / ^\circ C$            | $+/- mV / ^\circ C$ | Temp. Range   |   |  |
| 1N4565                                   | .5  | .01  | .64                 | 0 to +75°C    | 2.0   | 200  |
| 1N4565A                                  | .5  | .01  | .64                 | -55 to +100°C | 2.0   | 200  |
| 1N4566                                   | .5  | .005                                       | .32                 | 0 to +75°C    | 2.0   | 200  |
| 1N4566A                                  | .5  | .005                                       | .32                 | -55 to +100°C | 2.0   | 200  |
| 1N4567                                   | .5  | .002                                       | .13                 | 0 to +75°C    | 2.0   | 200  |
| 1N4567A                                  | .5  | .002                                       | .13                 | -55 to +100°C | 2.0   | 200  |
| 1N4568                                   | .5  | .001                                       | .06                 | 0 to +75°C    | 2.0   | 200  |
| 1N4568A                                  | .5  | .001                                       | .06                 | -55 to +100°C | 2.0   | 200  |
| 1N4569                                   | .5  | .0005                                      | .03                 | 0 to +75°C    | 2.0   | 200  |
| 1N4569A                                  | .5  | .0005                                      | .03                 | -55 to +100°C | 2.0   | 200  |
| 1N4570                                   | .5  | .01  | .64                 | 0 to +75°C    | 2.0   | 100  |
| 1N4570A                                  | .5  | .01  | .64                 | -55 to +100°C | 2.0   | 100  |
| 1N4571                                   | 1.0   | .005                                       | .32                 | 0 to +75°C    | 2.0   | 100  |
| 1N4571A                                  | 1.0   | .005                                       | .32                 | -55 to +100°C | 2.0   | 100  |
| 1N4572                                   | 1.0   | .002                                       | .13                 | 0 to +75°C    | 2.0   | 100  |
| 1N4572A                                  | 1.0   | .002                                       | .13                 | -55 to +100°C | 2.0   | 100  |
| 1N4573                                   | 1.0   | .001                                       | .06                 | 0 to +75°C    | 2.0   | 100  |
| 1N4573A                                  | 1.0   | .001                                       | .06                 | -55 to +100°C | 2.0   | 100  |
| 1N4574                                   | 1.0   | .0005                                      | .03                 | 0 to +75°C    | 2.0   | 100  |
| 1N4574A                                  | 1.0   | .0005                                      | .03                 | -55 to +100°C | 2.0   | 100  |
| 1N4575                                   | 2.0   | .01  | .64                 | 0 to +75°C    | 2.0   | 50   |
| 1N4575A                                  | 2.0   | .01  | .64                 | -55 to +100°C | 2.0   | 50   |
| 1N4576                                   | 2.0   | .005                                       | .32                 | 0 to +75°C    | 2.0   | 50   |
| 1N4576A                                  | 2.0   | .005                                       | .32                 | -55 to +100°C | 2.0   | 50   |
| 1N4577                                   | 2.0   | .002                                       | .13                 | 0 to +75°C    | 2.0   | 50   |
| 1N4577A                                  | 2.0   | .002                                       | .13                 | -55 to +100°C | 2.0   | 50   |
| 1N4578                                   | 2.0   | .001                                       | .06                 | 0 to +75°C    | 2.0   | 50   |
| 1N4578A                                  | 2.0   | .001                                       | .06                 | -55 to +100°C | 2.0   | 50   |
| 1N4579                                   | 2.0   | .0005                                      | .03                 | 0 to +75°C    | 2.0   | 50   |
| 1N4579A                                  | 2.0   | .0005                                      | .03                 | -55 to +100°C | 2.0   | 50   |
| 1N4580                                   | 4.0   | .01  | .64                 | 0 to +75°C    | 2.0   | 25   |
| 1N4580A                                  | 4.0   | .01  | .64                 | -55 to +100°C | 2.0   | 25   |
| 1N4581                                   | 4.0   | .005                                       | .32                 | 0 to +75°C    | 2.0   | 25   |
| 1N4581A                                  | 4.0   | .005                                       | .32                 | -55 to +100°C | 2.0   | 25   |
| 1N4582                                   | 4.0   | .002                                       | .13                 | 0 to +75°C    | 2.0   | 25   |
| 1N4582A                                  | 4.0   | .002                                       | .13                 | -55 to +100°C | 2.0   | 25   |
| 1N4583                                   | 4.0   | .001                                       | .06                 | 0 to +75°C    | 2.0   | 25   |
| 1N4583A                                  | 4.0   | .001                                       | .06                 | -55 to +100°C | 2.0   | 25   |
| 1N4584                                   | 4.0   | .0005                                      | .03                 | 0 to +75°C    | 2.0   | 25   |
| 1N4584A                                  | 4.0   | .0005                                      | .03                 | -55 to +100°C | 2.0   | 25   |

\*JEDEC Registered Data.

**NOTES:**

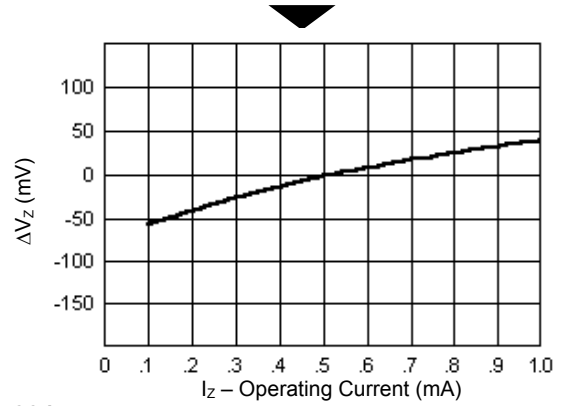
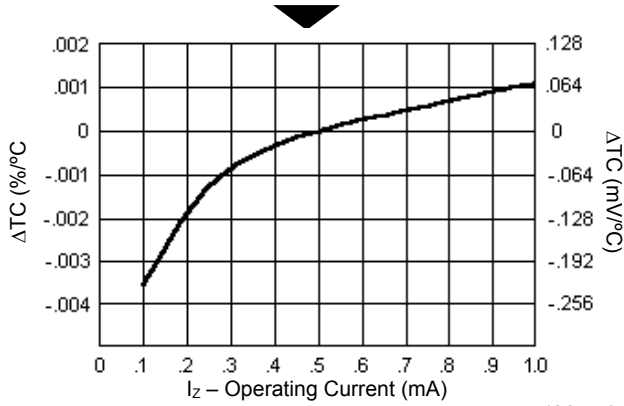
1. When ordering devices with tighter tolerances than specified for the  $V_Z$  voltage nominal of 6.40V, add a hyphenated suffix to the part number for desired tolerance, e.g. 1N4569A-2%, 1N4574A-1-1%, 1N4579-1-2%, 1N4584A-1-3%, etc.
2. Zener impedance is measured by superimposing 0.75 mA ac rms on 7.5 mA dc @ 25°C.
3. Voltage measurements to be performed 15 seconds after application of dc test current  $I_{ZT}$ .
4. 1N4565 thru 1N4584 also have qualification to MIL-PRF-19500/452 by adding the JAN, JANTX, JANTXV, or JANS prefixes to part numbers as well as the "-1" suffix; e.g. JANTX1N4569A-1, JANTXV1N4574A-1, etc.
5. Designate Radiation Hardened devices with "RH" prefix instead of "1N," i.e., RH4584A.



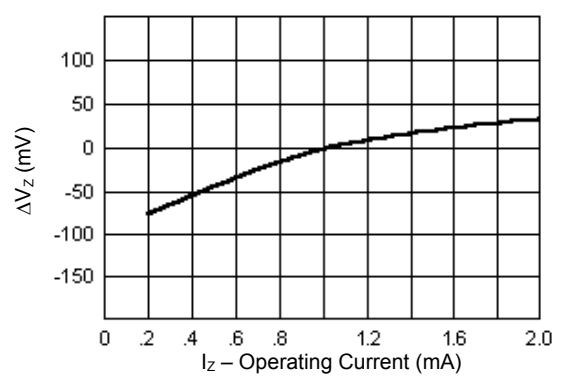
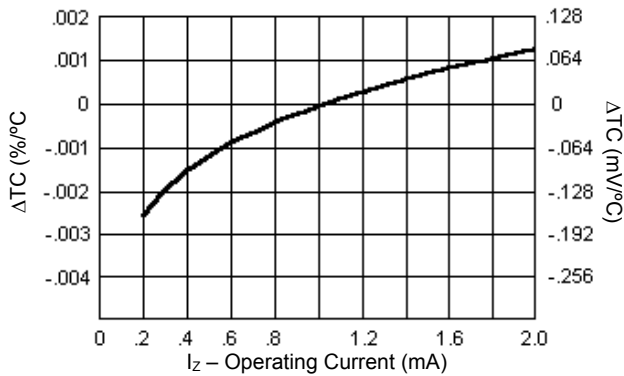
**GRAPHS**

Typical change of Temperature Coefficient with change in Operating Current

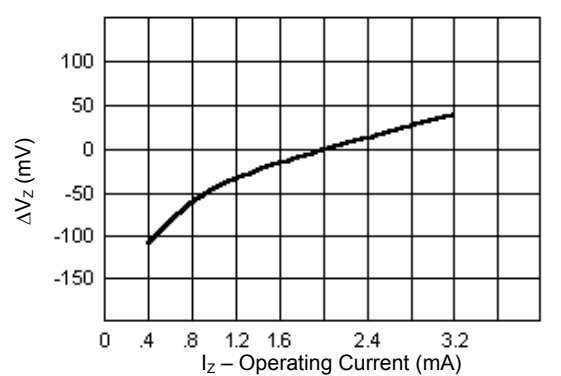
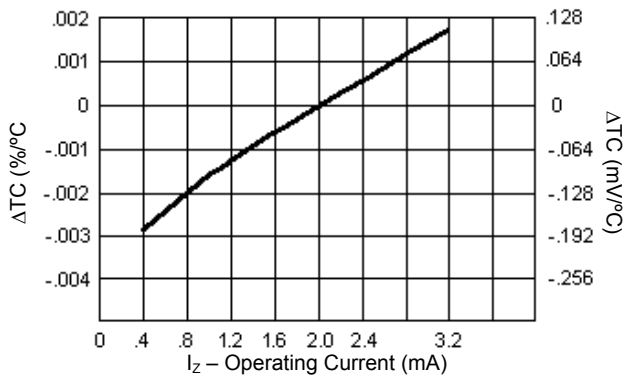
Typical Change in Zener Voltage with change in Operating Current



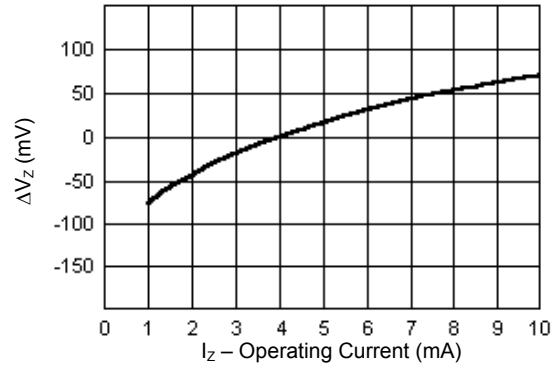
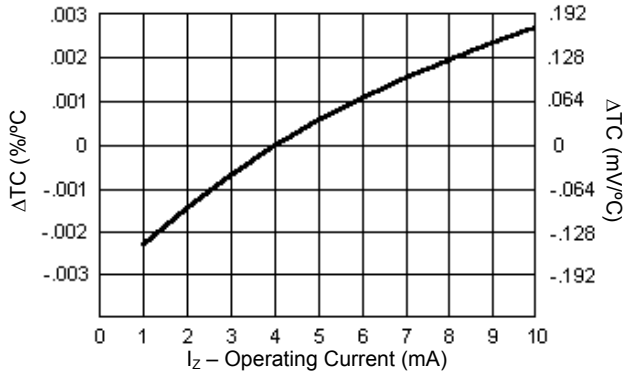
1N4565 – 1N4569A



1N4570 – 1N4574A

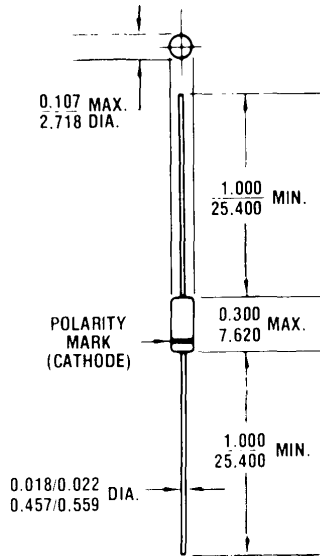


1N4575 – 1N4579A



1N4580 - 1N4584A

**PACKAGE DIMENSIONS**



All dimensions in INCH  
mm