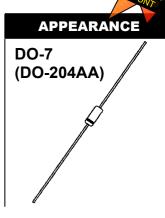
Microsemi SCOTTSDALE DIVISION

1N821 thru 1N829A-1 DO-7

6.2 & 6.55 Volt Temperature Compensated Zener Reference Diodes

DESCRIPTION

The popular 1N821 thru 1N829 series of Zero-TC Reference Diodes provides a selection of both 6.2 V and 6.55 V nominal voltages and temperature coefficients to as low as 0.0005%/°C for minimal voltage change with temperature when operated at 7.5 mA. These glass axial-leaded DO-7 reference diodes are also available in JAN, JANTX, JANTXV, and JANS military qualifications. Microsemi also offers numerous other Zener Reference Diode products for a variety of other voltages up to 200 V.



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

FEATURES

- JEDEC registered 1N821 thru 1N829 series
- Internal metallurgical bonds
- Double anode option with 1N822 and 1N824 selection
- Reference voltage selection of 6.2 V & 6.55 V +/-5% with further tight tolerance options at nominal of 6.35 V
- 1N821, 823, 825, 827 and 829 also have military qualification to MIL-PRF-19500/159 up to the JANS level by adding JAN, JANTX, JANTXV, or JANS prefixes to part numbers as well as the "-1" suffix, e.g. JANTX1N829-1. etc.
- Radiation Hardened devices available by changing "1N" prefix to "RH", e.g. RH827, RH 829, RH829A, etc. Also consult factory for "RH" data sheet brochure
- Military surface mount equivalents also available in DO-213AA with UR-1 suffix and JAN, JANTX, or JANTXV prefix, e.g. JANTX1N829UR-1 (see separate data sheet)
- Also available in smaller axial-leaded DO-35 package (see separate data sheet)

MAXIMUM RATINGS

- Operating & StorageTemperature: -65°C to +175°C
- DC Power Dissipation: 500 mW @ T_L = 25°C and maximum current I_{ZM} of 70 mA. NOTE: For optimum voltage-temperature stability, I_Z = 7.5 mA (less than 50 mW in dissipated power)
- Solder temperatures: 260 °C for 10 s (maximum)

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APPLICATIONS / BENEFITS

- Provides minimal voltage changes over a broad temperature range
- For instrumentation and other circuit designs requiring a stable voltage reference
- Maximum temperature coefficient selections available from 0.01%/°C to 0.0005%/°C
- Tight voltage tolerances with nominal reference voltages of 6.35 V available by adding tolerance 1%, 2%, 3%, etc. after the part number for identification e.g. 1N827-2%, 1N829A -1%, 1N829-1-1%, etc.
- · Flexible axial-lead mounting terminals
- Nonsensitive to ESD per MIL-STD-750 Method 1020

MECHANICAL AND PACKAGING

- CASE: Hermetically sealed glass case with DO-7 (DO-204AA) package
- TERMINALS: Tin-lead plated and solderable per MIL-STD-750, Method 2026
- MARKING: Part number and cathode band (except double anode 1N822 and 1N824)
- 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

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1N821 thru 1N829A-1 DO-7

6.2 & 6.55 Volt Temperature Compensated Zener Reference Diodes

*ELECTRICAL CHARACTERISTICS @ 25°C, unless otherwise specified **VOLTAGE MAXIMUM** ZENER ZENER **TEMPERATURE EFFECTIVE MAXIMUM ZENER** TEMPERATURE **JEDEC VOLTAGE TEST STABILITY IMPEDANCE REVERSE TYPE NUMBER** (Note 1 and 4) CURRENT (AV_{ZT} MAX) COEFFICIENT **CURRENT** (Note 2) -55°C to +100°C (Note 1, 5 & 6) Vz@IzT I_{ZT} ανΖ Ż_{zT} @ I_{zT} I_R @ 3 V (Note 3 and 4) **VOLTS** mΑ **OHMS** m۷ %/°C μΑ 1N821 5.9 – 6.5 7.5 15 2.0 96 0.01 1N821A 5.9 - 6.57.5 2.0 96 0.01 10 1N822† 59 - 6.57.5 15 2.0 96 0.01 1N823 5.9 - 6.57.5 15 2.0 48 0.005 1N823A 5.9 - 6.57.5 10 2.0 48 0.005 1N824+ 7.5 20 0.005 59-65 15 48 1N825 5.9 - 6.57.5 15 2.0 19 0.002 1N825A 5.9 - 6.57.5 10 2.0 19 0.002 1N826 6.2 - 6.97.5 15 2.0 20 0.002 1N827 5.9 - 6.57.5 15 2.0 9 0.001 7.5 2.0 9 1N827A 5.9 - 6.510 0.001 1N828 2.0 0.001 10 6.2 - 6.97.5 15 2.0 1N829 59 - 657.5 15 5 0.0005 0.0005 1N829A 5.9 - 6.57.5 10 2.0 5

†Double Anode; electrical specifications apply under both bias polarities.

NOTES:

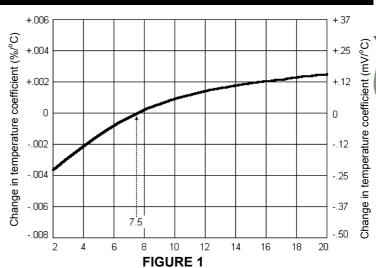
- Add a "-1" suffix for internal metallurgical bond. When ordering devices with tighter tolerances than specified for the V_Z voltage nominal of 6.35 V, add a hyphened suffix to the part number for desired tolerance, e.g. 1N827-1-2%, 1N829-1-1%, 1N829A-1%, 1N829A-1-1%, etc.
- 2. Zener impedance measured by superimposing 0.75 mA ac rms on 7.5 mA dc @ 25°C.
- 3. The maximum allowable change observed over the entire temperature range i.e., the diode voltage will not exceed the specified mV change at discrete temperature between the established limits.
- 4. Voltage measurements to be performed 15 seconds after application of dc current.
- 1N821, 1N823, 1N825, 1N827, and 1N829 also have qualification to MIL-PRF-19500/159 by adding the JAN, JANTXV, or JANS prefix to part numbers as well as the "-1" suffix; e.g. JANTX1N827-1, JANTXV1N829-1, etc.
- 6. Designate Radiation Hardened devices with "RH" prefix instead of "1N", e.g. RH829A instead of 1N829A.

GRAPHS

The curve shown in Figure 1 is typical of the diode series and greatly simplifies the estimation of the Temperature Coefficient (TC) when the diode is operated at currents other than 7.5mA.

EXAMPLE: A diode in this series is operated at a current of 7.5mA and has specified Temperature Coefficient (TC) limits of +/-0.005%°C. To obtain the typical Temperature Coefficient limits for this same diode operated at a current of 6.0mA, the new TC limits (%°C) can be estimated using the graph in FIGURE 1

At a test current of 6.0mA the change in Temperature Coefficient (TC) is approximately -0.0006%.°C. The algebraic sum of +/-0.005%°C and -0.0006%,°C gives the estimated limits of +0.0044%,°C and -0.0056%,°C.



TYPICAL CHANGE OF TEMPERATURE COEFFICIENT WITH CHANGE IN OPERATING CURRENT.

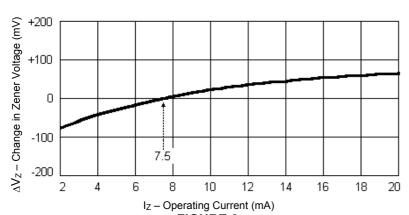
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^{*}JEDEC Registered Data.

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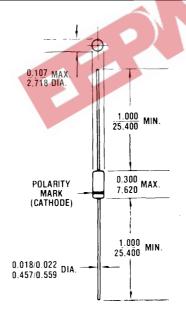


This curve in Figure 2 illustrates the change of diode voltage arising from the effect of impedance. It is in effect an exploded view of the zener operating region of the I-V characteristic.

In conjunction with Figure 1, this curve can be used to estimate total voltage regulation under conditions of both varying temperature and current.

FIGURE 2
TYPICAL CHANGE OF ZENER VOLTAGE WITH
CHANGE IN OPERATING CURRENT

DIMENSIONS



All dimensions in INCH mm