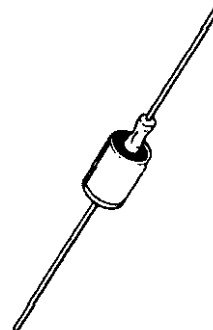


## DESCRIPTION

This well established zener diode series for the 1N3821 thru 1N3830A JEDEC registration in the glass hermetic sealed DO-13 package provides a low voltage selection for 3.3 to 7.5 volts. It is also well suited for high-reliability applications where it is available in JAN, JANTX, and JANTXV military qualifications. Higher voltages are also available in the 1N3016 thru 1N3051 series (6.8 V to 200 V) in the same package (see separate data sheet). Microsemi also offers numerous other Zener diode products for a variety of other packages including surface mount.

## APPEARANCE



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

## FEATURES

- Zener Voltage Range: 3.3 V to 7.5 V
- Hermetically sealed DO-13 metal package
- Internally solder-bonded construction.
- Also available in JAN, JANTX, JANTXV qualifications per MIL-PRF19500/115 by adding the JAN, JANTX, or JANTXV prefixes to part numbers for desired level of screening, e.g. JANTX1N3821, JANTXV1N3051A, etc.
- Surface mount also available with 1N3821UR-1 thru 1N30330AUR-1 series on separate data sheet

## APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Low voltage selection from 3.3 to 7.5 V
- Tight voltage tolerances available
- Low reverse (leakage) currents
- Nonsensitive to ESD
- Hermetically sealed metal package
- Inherently radiation hard as described in Microsemi MicroNote 050

## MAXIMUM RATINGS

- Operating Junction and Storage Temperatures: -65°C to +175°C
- THERMAL RESISTANCE: 50°C/W\* junction to lead at 0.375 inches (10 mm) from body or 110°C/W junction to ambient when leads are mounted on FR4 PC board with 4 mm<sup>2</sup> copper pads (1 oz) and track width 1 mm, length 25 mm
- DC Power Dissipation\*: 1 Watt at  $T_L \leq +125^\circ\text{C}$  3/8" (10 mm) from body or 1.0 Watts at  $T_L \leq +65^\circ\text{C}$  when mounted on FR4 PC board as described for thermal resistance above (also see Fig 1)
- Forward Voltage @ 200 mA: 1.5 Volts.
- Solder Temperatures: 260 °C for 10 s (maximum)

## MECHANICAL AND PACKAGING

- CASE: DO-13 (DO-202AA), welded, hermetically sealed metal and glass
- FINISH: All external surfaces are Tin-Lead (Pb/Sn) plated and solderable per MIL-STD-750 method 2026
- POLARITY: Cathode connected case.
- WEIGHT: 1.4 grams.
- Tape & Reel option: Standard per EIA-296 (add "TR" suffix to part number)
- See package dimensions on last page

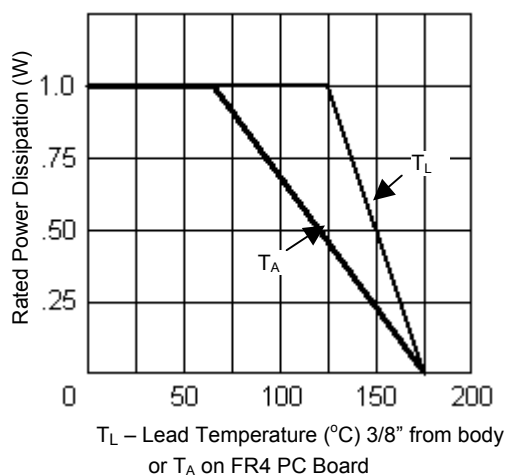
\* For further mounting reference, thermal resistance from junction to metal case may be reduced to  $\leq 20^\circ\text{C/W}$  when mounting DO-13 metal case directly on heat sink.

**\*ELECTRICAL CHARACTERISTICS @ 25°C**

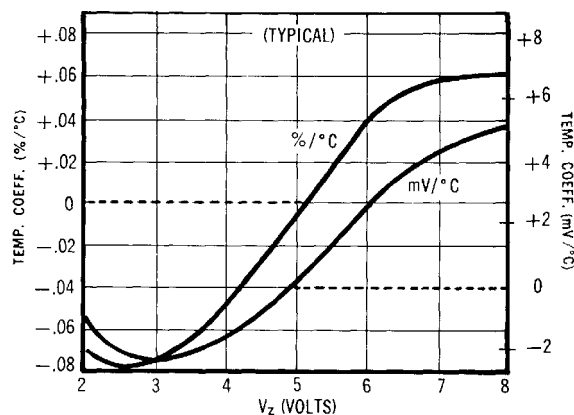
JEDEC TYPE NUMBER	NOMINAL ZENER VOLTAGE $V_Z @ I_{ZT}$ (Note 1)	ZENER TEST CURRENT $I_{ZT}$	MAXIMUM ZENER IMPEDANCE (Note 2)		MAXIMUM ZENER CURRENT $I_{ZM}$ (Note 3)	MAXIMUM REVERSE LEAKAGE CURRENT $I_R @ V_R$		TYPICAL TEMP. COEFF. OF ZENER VOLTAGE $\alpha_{VZ}$
			$Z_{ZT} @ I_{ZT}$	$Z_{ZK} @ I_{ZK} = 1mA$		$\mu A$	Volts	
			OHMS	OHMS				
1N3821	3.3	76	10	400	276	100	1	-.066
1N3821A	3.3	76	10	400	276	100	1	-.066
1N3822	3.6	69	10	400	252	100	1	-.058
1N3822A	3.6	69	10	400	252	100	1	-.058
1N3823	3.9	64	9	400	238	50	1	-.046
1N3823A	3.9	64	9	400	238	50	1	-.046
1N3824	4.3	58	9	400	213	10	1	-.033
1N3824A	4.3	58	9	400	213	10	1	-.033
1N3825	4.7	53	8	500	194	10	1	-.015
1N3825A	4.7	53	8	500	194	10	1	-.015
1N3826	5.1	49	7	550	178	10	1	+/- .010
1N3826A	5.1	49	7	550	178	10	1	+/- .010
1N3827	5.6	45	5	600	162	10	2	+ .030
1N3827A	5.6	45	5	600	162	10	2	+ .030
1N3828	6.2	41	2	700	146	10	3	+ .049
1N3828A	6.2	41	2	700	146	10	3	+ .049
1N3829	6.8	37	1.5	500	133	10	3	+ .053
1N3829A	6.8	37	1.5	500	133	10	3	+ .053
1N3830	7.5	34	1.5	250	121	10	3	+ .057
1N3830A	7.5	34	1.5	250	121	10	3	+ .057

\*JEDEC Registered Data.

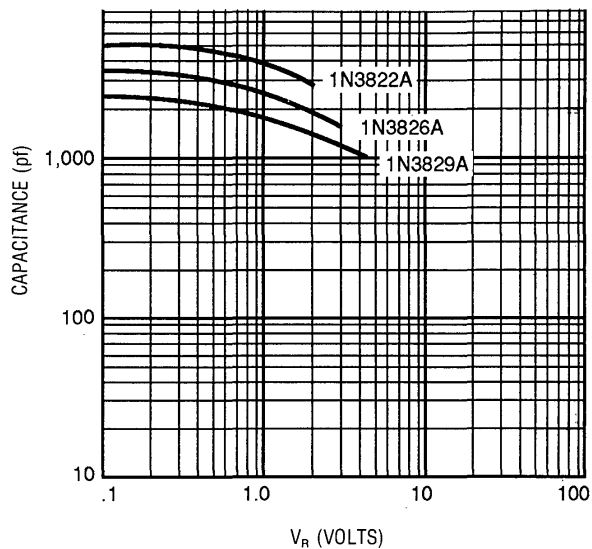
- NOTES:**
- The JEDEC type numbers shown with suffix A have a standard tolerance of +/-5% on the nominal zener voltage.  $V_Z$  measured with device in thermal equilibrium in 25°C still air and mounted in test clips, 3/4" from unit body. if tighter tolerance on  $V_Z$  is required, consult factory.
  - The zener impedance is derived when a 60 cycle 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  $I_{ZK}$ . Zener impedance is measured at 2 points to ensure a sharp knee on the breakdown curve and to eliminate unstable units. See MicroNote 202 for variation in dynamic impedance with different zener currents.
  - Allowance has been made for the increase in  $V_Z$  due to  $Z_Z$  and for the increase in junction temperature as the unit approaches thermal equilibrium at the power dissipation of 1 watt.

**GRAPHS**


**FIGURE 1**  
Power Derating



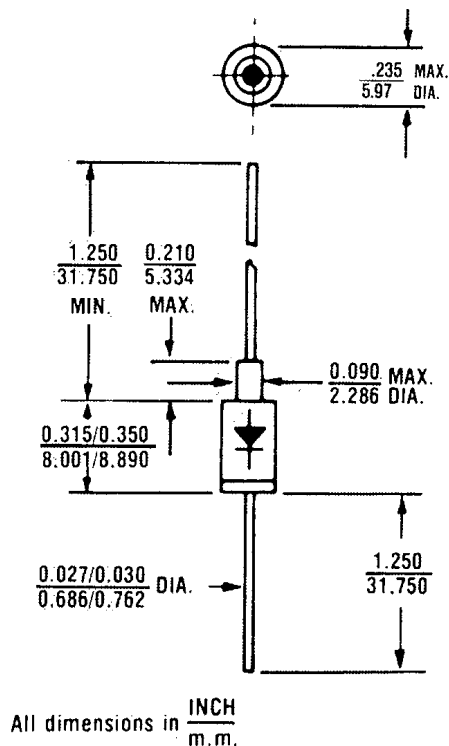
**FIGURE 2**  
Temperature Coeff. vs. Zener Voltage



**FIGURE 4**

Typical Capacitance vs. Reverse Voltage  
for 1-Watt Zeners

## PACKAGE DIMENSIONS



**DO-13**