

1N821UR thru 1N829AUR-1 (or MLL821 thru MLL829-1)

6.2 & 6.55 Volt Temperature Compensated Surface Mount Zener Reference Diodes

DESCRIPTION

The 1N821UR thru 1N829AUR-1 series of surface mount 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 surface mount DO-213AA (MELF) reference diodes are optionally available with an internal-metallurgical-bond by adding a "-1" suffix. This type of bonded Zener package construction is 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



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

FEATURES

- Surface mount equivalent of JEDEC registered 1N821 thru 1N829 series
- Internal metallurgical bond option available by adding a "-1" suffix
- Reference voltage selection of 6.2 V & 6.55 V +/-5% with further tight tolerance options at lower voltage
- 1N821, 823, 825, 827 and 829 also have surface mount qualification to MIL-PRF-19500/159 by adding the JAN, JANTX, or JANTXV prefixes to part numbers a well as the "-1" suffix; e.g. JANTX1N829-1, etc.
- Axial-leaded equivalents also available in DO-35 or DO-7 without the UR suffix (see separate data sheet) including military qualifications up to JANS for DO-7 (see separate data sheet)
- JANS equivalent available in DO-213AA via SCD

MAXIMUM RATINGS

- Operating Temperatures: -65°C to +175°C
- Storage Temperatures: -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 (max)

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 reference voltage tolerances available with center nominal value of 6.15 V by adding designated tolerance such as 1%, 2%, 3%, etc. after the part number for identification

e.g. 1N827UR-2%, 1N829AUR-1-1%, etc.

- Small surface-mount footprint
- Nonsensitive to ESD per MIL-STD-750 Method 1020
- · Typical low capacitance of 100 pF or less

MECHANICAL AND PACKAGING

- CASE: Hermetically sealed glass case. DO-213AA package
- TERMINALS: Leads, tin-lead plated solderable per MIL-STD-750, Method 2026
- MARKING: 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-481-B with 12 mm tape, 2000 per 7 inch reel or 5000 oer 13 inch reel (add "TR" suffix to part number)
- WEIGHT: 0.04 grams.
- See package dimensions on last page



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,	*ELECTRICAL CHARACTERISTICS @ 25°C, unless otherwise specified						
	JEDEC TYPE NUMBER (Notes 1, 5 & 6)	ZENER VOLTAGE (Note 1 and 4) Vz @ I _{ZT}	ZENER TEST CURRENT I _{ZT}	MAXIMUM ZENER IMPEDANCE (Note 2) Z _{ZT} @ I _{ZT}	MAXIMUM REVERSE CURRENT I _R @ 3 V	VOLTAGE TEMPERATURE STABILITY $(\Delta V_{2T} MAX)$ -55°C to +100°C (Note 3 and 4)	EFFECTIVE TEMPERATURE COEFFICIENT αvz
		VOLTS	mA	OHMS	μA	mV	%/°C
	1N821UR	5.9 – 6.5	7.5	15	2.0	96	0.01
	1N821AUR	5.9 – 6.5	7.5	10	2.0	96	0.01
	1N822UR †	5.9 – 6.5	7.5	15	2.0	96	0.01
	1N823UR	5.9 – 6.5	7.5	15	2.0	48	0.005
	1N823AUR	5.9 – 6.5	7.5	10	2.0	48	0.005
	1N824UR †	5.9 – 6.5	7.5	15	2.0	48	0.005
	1N825UR	5.9 – 6.5	7.5	15	2.0	19	0.002
	1N825AUR	5.9 – 6.5	7.5	10	2.0	19	0.002
	1N826UR	6.2 – 6.9	7.5	15	2.0	20	0.002
	1N827UR	5.9 – 6.5	7.5	15	2.0	9	0.001
	1N827AUR	5.9 – 6.5	7.5	10	2.0	9	0.001
	1N828UR	6.2 – 6.9	7.5	15	2.0	10	0.001
	1N829UR	5.9 - 6.5	7.5	15	2.0	5	0.0005
	1N829AUR	5.9 - 6.5	7.5	10	2.0	5	0.0005

*JEDEC Registered Data.

†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 Vz voltage nominal 1. of 6.15 V, add a further hyphened suffix number % to the part number for desired tolerance, e.g. 1N827UR-1-2%, 1N829UR-1-1%, 1N829AUR-1%, 1N829AUR-1-1%, etc.
- 2. Zener impedance is 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 any discrete temperature between the established limits.
- Voltage measurements to be performed 15 seconds after application of dc current. 4.
- 1N821UR-1, 1N823UR-1, 1N825UR-1, 1N827UR-1, and 1N829UR-1 also have qualification to MIL-PRF-19500/159 by adding the JAN, 5. JANTX, or JANTXV prefix to part numbers as well as the "-1" suffix; e.g. JANTX1N827UR-1, JANTXV1N829UR-1, etc. This product series has also been previously identified as the MLL821 thru MLL829A-1. This alternate name may still be used.
- 6.



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GRAPHS



YPICAL CHANGE OF TEMPERATURE COEFFICIENT WITH CHANGE IN OPERATING CURRENT.

The curve shown in Figure 2 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%^oC. To obtain the typical Temperature Coefficient limits for this same diode operated at a current of 6.0mA, the new TC limits (%^oC) can be estimated using the graph in FIGURE 2. At a test current of 6.0mA the change in Temperature Coefficient (TC) is approximately $-0.006\%^{\circ}$ C. The algebraic sum of +/-0.005%°C and $-0.006\%^{\circ}$ C gives the new estimated limits of +0.0044%/oC and -0.0056%/oC.



WITH CHANGE IN OPERATING CURRENT

This curve in Figure 3 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 2, this curve can be used to estimate total voltage regulation under conditions of both varying temperature and current.



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	INC	THES	MILLIMETERS		
DIM	MIN	MAX	MIN	MAX	
Α	0.063	0.067	1.60	1.70	
В	0.130	0.146	3.30	3.70	
С	0.016	0.022	0.41	0.55	



	INCHES	mm
Α	.200	5.08
В	.055	1.40
С	.080	2.03

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