MECHANICAL and PACKAGING

- CASE: Hermetically sealed glass case. DO-35 (DO-204AH) package.
- TERMINALS: Tin-lead (military) or RoHS compliant annealed matte-tin plating (commercial grade only) 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). Consult factory for quantities.
- WEIGHT: 0.2 grams.
- See Package Dimensions on last page.

PART NOMENCLATURE

Applicable to: JAN, JANTX, JANTXV and JANS 1N821, 1N823, 1N825, 1N827, and 1N829 only:

JAN 1N821 -1

Reliability Level
JAN = JAN Level
JANTX = JANTX Level
JANTXV = JANTXV Level
JANS = JANS Level
Blank = Commercial

Metallurgical Bond

JEDEC type number
(see Electrical Characteristics table)

Applicable to: commercial 1N821, 1N823, 1N825, 1N827, and 1N829 only:

1N821 A -1 -1% (e3)

JEDEC type number
(see Electrical Characteristics table)

Zener Impedance
A = 10 ohms
Blank = 15 ohms

Metallurgical Bond

RoHS Compliance
e3 = RoHS compliant (available on commercial grade only)
Blank = non-RoHS compliant

Tighter voltage tolerance
1%
2%
3%

Applicable to: 1N822 and 1N824 only:

1N822 -1 -1% (e3)

JEDEC type number
(see Electrical Characteristics table)

Metallurgical Bond

RoHS Compliance
e3 = RoHS compliant (available on commercial grade only)
Blank = non-RoHS compliant

Tighter voltage tolerance
1%
2%
3%

Continued on next page.

Applicable to: 1N826 and 1N828 only:

1N826 -1 (e3)

JEDEC type number
(see Electrical Characteristics table)

Metallurgical Bond

RoHS Compliance
e3 = RoHS compliant (available on commercial grade only)
Blank = non-RoHS compliant

SYMBOLS & DEFINITIONS	
Symbol	**Definition**
I_R	Reverse Current: The maximum reverse (leakage) current that will flow at the specified voltage and temperature.
I_Z, I_{ZT}, I_{ZK}	Regulator Current: The dc regulator current (I_Z), at a specified test point (I_{ZT}), near breakdown knee (I_{ZK}).
V_Z	Zener Voltage: The Zener voltage the device will exhibit at a specified current (I_Z) in its breakdown region.
Z_{ZT} or Z_{ZK}	Dynamic Impedance: The small signal impedance of the diode when biased to operate in its breakdown region at a specified rms current modulation (typically 10% of I_{ZT} or I_{ZK}) and superimposed on I_{ZT} or I_{ZK} respectively.

ELECTRICAL CHARACTERISTICS @ 25°C (unless otherwise specified)

JEDEC TYPE NUMBER (Notes 1 & 5)	ZENER VOLTAGE V_Z @ I_{ZT} (Note 1 and 4)	ZENER TEST CURRENT I_{ZT}	MAXIMUM ZENER IMPEDANCE Z_{ZT} @ I_{ZT} (Note 2)	MAXIMUM REVERSE CURRENT I_R @ 3 V	VOLTAGE TEMPERATURE STABILITY (ΔV_{ZT} MAX) -55°C to +100°C (Note 3 and 4)	EFFECTIVE TEMPERATURE COEFFICIENT α_{VZ}
	Volts	mA	Ohms	µA	mV	% / °C
1N821	5.89-6.51	7.5	15	2	96	0.01
1N821A	5.89-6.51	7.5	10	2	96	0.01
1N822†	5.9-6.5	7.5	15	2	96	0.01
1N823	5.89-6.51	7.5	15	2	48	0.005
1N823A	5.89-6.51	7.5	10	2	48	0.005
1N824†	5.9-6.5	7.5	15	2	48	0.005
1N825	5.89-6.51	7.5	15	2	19	0.002
1N825A	5.89-6.51	7.5	10	2	19	0.002
1N826	6.2-6.9	7.5	15	2	20	0.002
1N827	5.89-6.51	7.5	15	2	9	0.001
1N827A	5.89-6.51	7.5	10	2	9	0.001
1N828	6.2-6.9	7.5	15	2	10	0.001
1N829	5.89-6.51	7.5	15	2	5	0.0005
1N829A	5.89-6.51	7.5	10	2	5	0.0005

† Double Anode: Electrical specifications apply under both bias polarities.

NOTES:
1. Add a "-1" suffix for internal metallurgical bond. When ordering devices with tighter tolerances than specified for the V_Z voltage nominal of 6.2 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 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.
4. Voltage measurements to be performed 15 seconds after application of dc current.
5. 1N821, 1N823, 1N825, 1N827, and 1N829 also have qualification to MIL-PRF-19500/159 by adding the JAN, JANTX, JANTXV or JANS prefix to part numbers as well as the "-1" suffix.

GRAPHS

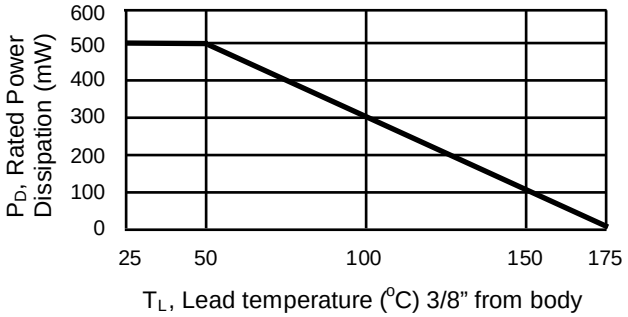


FIGURE 1
POWER DERATING CURVE

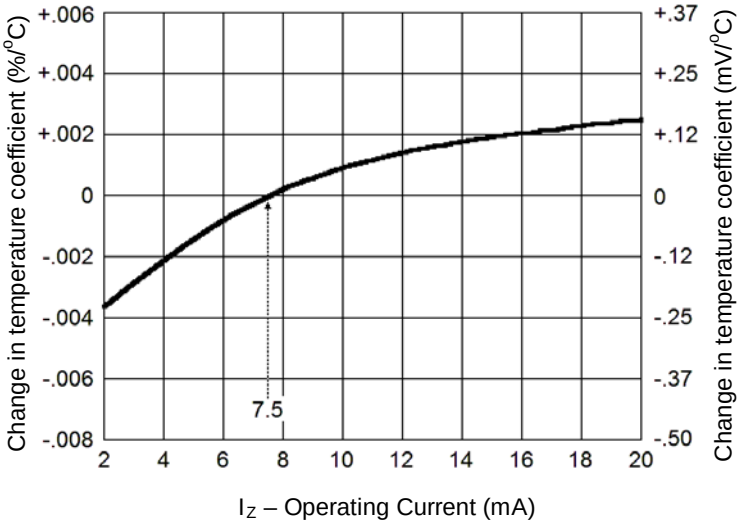


FIGURE 3
TYPICAL CHANGE OF TEMPERATURE COEFFICIENT
WITH CHANGE IN OPERATING CURRENT

The curve shown in Figure 3 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 7.5 mA.
EXAMPLE: A diode in this series is operated at a current of 7.5 mA 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 3. At a test current of 6.0mA the change in Temperature Coefficient (TC) is approximately –0.0006 %/^oC. The algebraic sum of +/-0.005 %/^oC and –0.0006 %/^oC gives the new estimated limits of +0.0044 %/^oC and -0.0056 %/^oC.

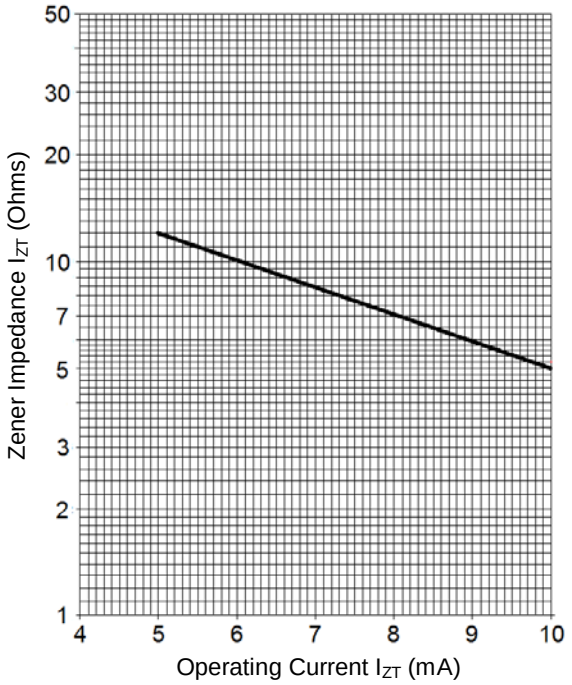


FIGURE 2
TYPICAL ZENER IMPEDANCE
VS.
OPERATING CURRENT

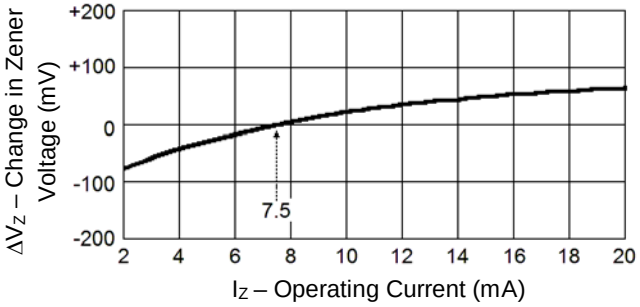
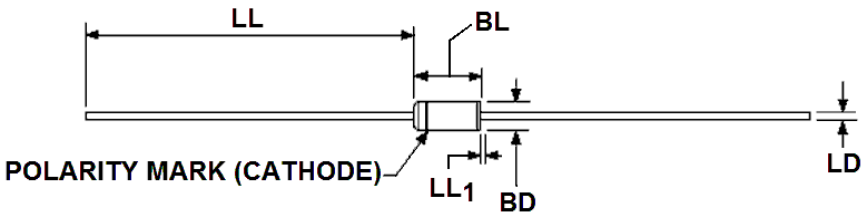


FIGURE 4
TYPICAL CHANGE OF ZENER VOLTAGE
WITH CHANGE IN OPERATING CURRENT

This curve in Figure 4 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 3, this curve can be used to estimate total voltage regulation under conditions of both varying temperature and current.

PACKAGE DIMENSIONS



Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
BD	.060	.107	1.52	2.72	3
BL	.120	.300	3.05	7.62	3
LD	.018	.023	0.46	0.58	
LL	1.000	1.500	25.40	38.10	
LL_1		.050		1.27	4

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Package contour optional within BD and length BL. Heat slugs, if any shall be included within this cylinder but shall not be subject to minimum limit of BD.
4. Within this zone, lead diameter may vary to allow for lead finishes and irregularities, other than heat slugs.
5. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.