Available on commercial versions

Temperature Compensated Zener Reference Diodes

Qualified per MIL-PRF-19500/156

Qualified Levels:
JAN, JANTX, JANTXV and JANS

DESCRIPTION

The popular 1N935BUR-1 through 1N938BUR-1 series of Zero-TC (Temperature Compensated) reference diodes provides a selection of 9.0 V nominal voltages and temperature coefficients to as low as 0.001 %/°C for minimal voltage change with temperature when operated at 7.5 mA. These glass surface mount DO-213AA reference diodes are also available in JAN, JANTX, JANTXV and JANS military qualifications. For commercial applications it is also available as RoHS compliant (not applicable to military).



DO-213AA MELF Package

Important: For the latest information, visit our website http://www.microsemi.com.

FEATURES

- Surface mount equivalent of JEDEC registered 1N935 through 1N938 number series.
- Standard reference voltage of 9.0V +/- 5%.
- Temperature compensated.
- Internal metallurgical bond.
- Double plug construction.
- JAN, JANTX, JANTXV and JANS qualification are available per MIL-PRF-19500/156.
- RoHS compliant versions available (commercial grade only).

Also available in:

DO-35 (DO-204AH) package
(axial-leaded)
1N935B-1 – 1N938B-1

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 %/ºC to 0.001 %/ºC.
- MELF surface mount.
- Non-sensitive to ESD per MIL-STD-750 method 1020.

MAXIMUM RATINGS @ T_A = 25 ºC unless otherwise stated

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage temperature	T_J and T_{STG}	-65 to +175	°C
Power Dissipation (1)	P_D	500	mW
Maximum Zener Current	I_{ZM}	50	mA
Solder Pad Temperatures at 10 s	T_{SP}	260	°C

Notes: 1. @ T_{EC} = 50 °C (see figure 1). For optimum voltage-temperature stability, I_Z = 7.5 mA (less than 50 mW in dissipated power). Derate at 3.33 mW/°C above T_A = +25 °C.

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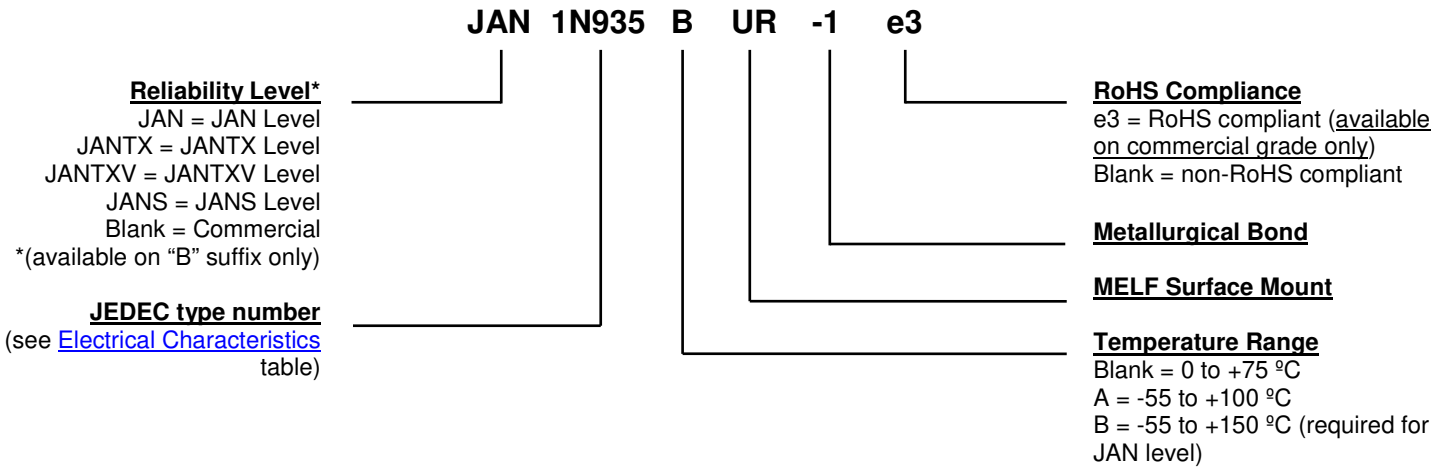
Website:
www.microsemi.com

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MECHANICAL and PACKAGING

- CASE: Hermetically sealed glass case package.
- TERMINALS: Tin/lead plated or RoHS compliant matte-tin (on commercial grade only) over copper clad steel. Solderable per MIL-STD-750, method 2026.
- POLARITY: Cathode end is banded.
- MOUNTING: The axial coefficient of expansion (COE) of this device is approximately +6PPM/°C. The COE of the mounting surface system should be selected to provide a suitable match with this device.
- MARKING: Part number.
- TAPE & REEL option: Standard per EIA-296. Consult factory for quantities.
- WEIGHT: Approximately 0.04 grams.
- See Package Dimensions on last page.

PART NOMENCLATURE



SYMBOLS & DEFINITIONS

Symbol	Definition
I_{ZM}	Maximum Zener Current: The maximum rated dc current for the specified power rating.
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.

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ELECTRICAL CHARACTERISTICS @ 25 °C unless otherwise specified

MIL-PRF-19500/156	MSC TYPE NUMBER (Note 1)	ZENER VOLTAGE V_Z @ I_{ZT}	ZENER TEST CURRENT I_{ZT}	MAXIMUM ZENER IMPEDACE (Note 2) Z_{ZT}	VOLTAGE TEMPERATURE STABILITY ΔV_{ZT} MAXIMUM (Note 3)	TEMPERATURE RANGE	EFFECTIVE TEMPERATURE COEFFICIENT α_{VZ}
		Volts	mA	Ohms	mV	°C	% / °C
1N935BUR-1	CDLL935 CDLL935A CDLL935B	8.55 – 9.45 8.55 – 9.45 8.55 – 9.45	7.5 7.5 7.5	20 20 20	67 139 184	0 to +75 -55 to +100 -55 to +150	0.01 0.01 0.01
	CDLL936 CDLL936A CDLL936B	8.55 – 9.45 8.55 – 9.45 8.55 – 9.45	7.5 7.5 7.5	20 20 20	34 70 92	0 to +75 -55 to +100 -55 to +150	0.005 0.005 0.005
1N937BUR-1	CDLL937 CDLL937A CDLL937B	8.55 – 9.45 8.55 – 9.45 8.55 – 9.45	7.5 7.5 7.5	20 20 20	13 28 37	0 to +75 -55 to +100 -55 to +150	0.002 0.002 0.002
1N938BUR-1	CDLL938 CDLL938A CDLL938B	8.55 – 9.45 8.55 – 9.45 8.55 – 9.45	7.5 7.5 7.5	20 20 20	6.7 13.9 19	0 to +75 -55 to +100 -55 to +150	0.001 0.001 0.001

NOTE 1: Microsemi CDLL prefixed numbers are commercial use only. For high-reliability applications JAN prefixed 1N numbers must be selected along with the B suffix.

NOTE 2: Zener impedance is derived by superimposing on I_{ZT} A 60 Hz rms ac current equal to 10% of I_{ZT}.

NOTE 3: The maximum allowable change observed over the entire temperature range i.e., the diode voltage will not exceed the specified mV at any discrete temperature between the established limits, per JEDEC standard No. 5.

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GRAPHS

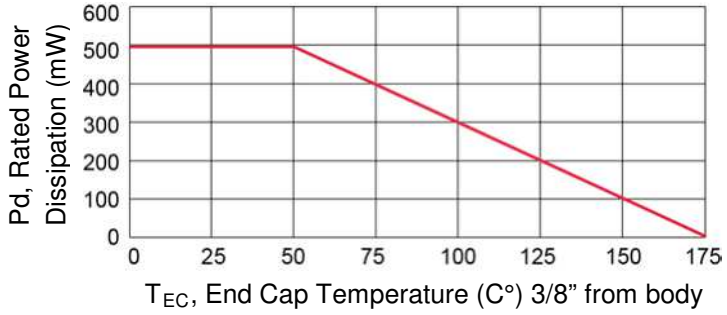


FIGURE 1
Power Derating Curve

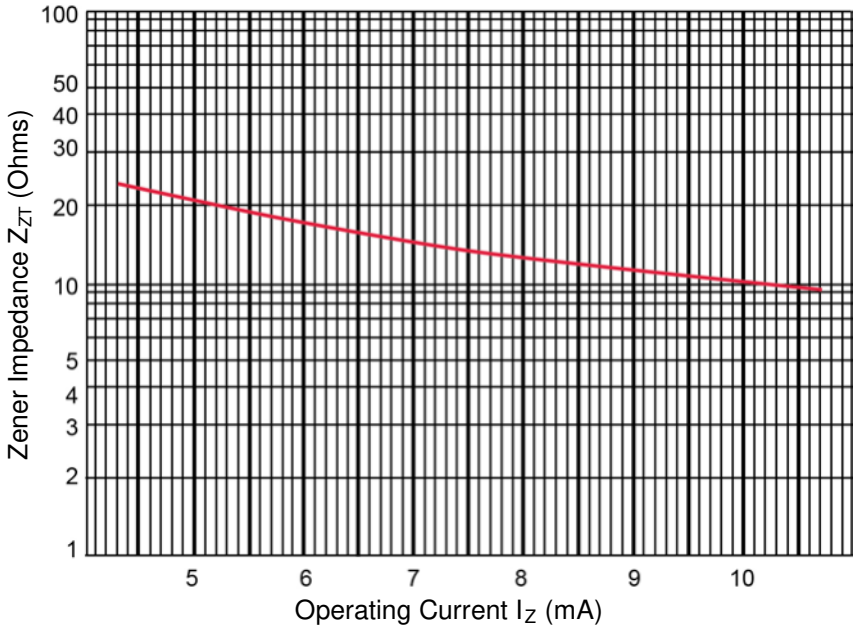


FIGURE 2
Zener Impedance vs. Operating Current

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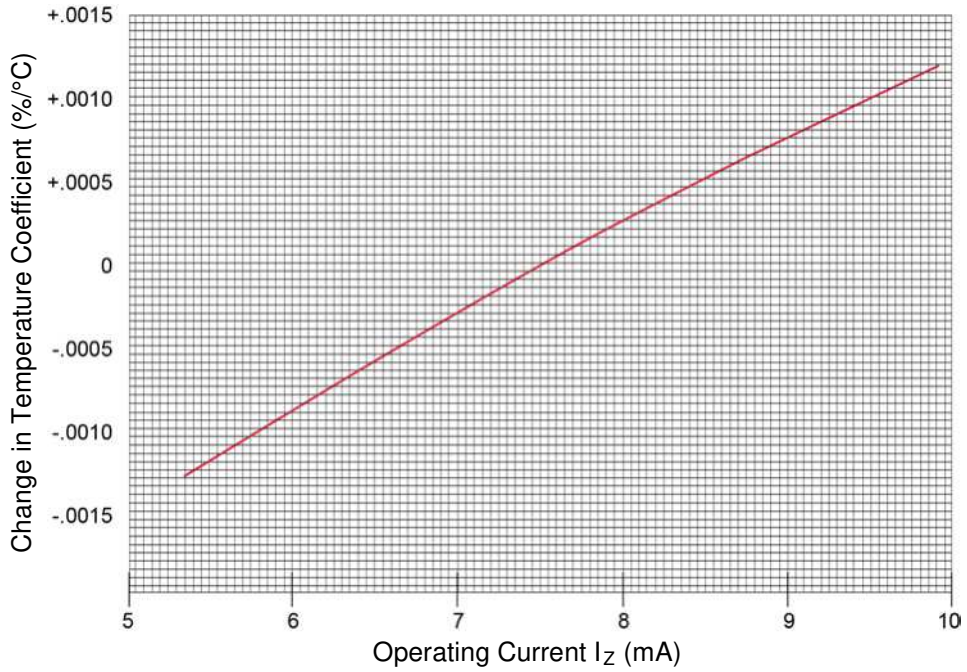
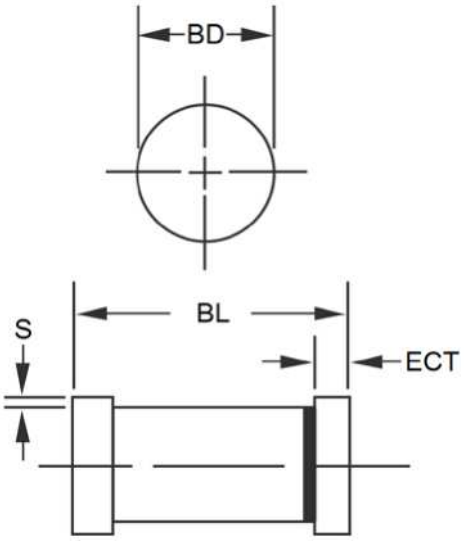


FIGURE 3
Typical Change of Temperature Coefficient with Change in Operating Current

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PACKAGE DIMENSIONS

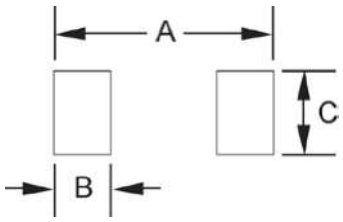


DIM	INCH		MILLIMETERS	
	MIN	MAX	MIN	MAX
BD	0.063	0.067	1.60	1.70
BL	0.130	0.146	3.30	3.71
ECT	0.016	0.022	0.41	0.56
S	0.001	-	0.03	-

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Dimensions are pre-solder dip.
3. Referencing to dimension S, minimum clearance of glass body to mounting surface on all orientations.
4. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

PAD LAYOUT



	INCH	mm
A	0.200	5.08
B	0.055	1.40
C	0.080	2.03

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