RoHS
Available on commercial versions

1 Watt Surface Mount Zener Diodes

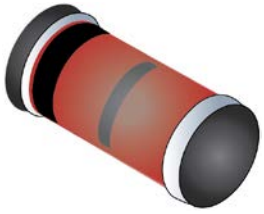
Qualified per MIL-PRF-19500/115

Qualified Levels: JAN, JANTX, and JANTXV

DESCRIPTION

This surface mountable Zener diode series is similar to the 1N3016B-1 through 1N3045B-1 JEDEC registration in the DO-13 package except that it meets the surface mount DO-213AB outline. It is an ideal selection for applications of high density and low parasitic requirements. Due to its glass hermetic seal qualities and metallurgically enhanced internal construction, it is also well suited for high-reliability applications where it is available in JAN, JANTX, and JANTXV military qualifications. Lower voltages are also available in the 1N3821AUR-1 through 1N3828AUR-1 series (3.3 V to 7.5 V) in the same package (see separate data sheet).

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



DO-213AB (MELF, LL41) Package

Also available in:

DO-41 package
(glass axial-leaded)
1N3016B-1 – 1N3045B-1

FEATURES

- Leadless surface mount equivalents to the JEDEC registered 1N3016 through 1N3045 number series.
- Zener voltage range: 6.8 volts to 110 volts.
- Hermetically sealed, double plug glass construction.
- Metallurgically bonded.
- Voltage tolerances of 5%, 2%, and 1% available.
- JAN, JANTX, and JANTXV qualifications also available per MIL-PRF-19500/115.
  (See part nomenclature for all available options.)
- RoHS compliant versions available (commercial grade only).

APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range.
- Wide selection from 6.8 to 110 V.
- Low reverse (leakage) currents.
- Leadless package for surface mounting.
- Ideal for high-density situations.
- Metallurgically enhanced internal contact design for greater reliability and lower thermal resistance.
- Non-sensitive to ESD.
- Inherently radiation hard as described in Microsemi "MicroNote 050".

MAXIMUM RATINGS

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T_J and T_{STG}	-55 to +175	ºC
Thermal Resistance Junction-to-End Cap	$R_{\Theta JEC}$	50	ºC/W
DC Power Dissipation (1)	P_D	1.0	W
Forward Voltage @ 200 mA	V_F	1.2	V
Solder Temperature @ 10 s	T_{SP}	260	°C

Notes: 1. Derate linearly starting at T_{EC} 125 ºC to zero at 175 ºC (see Figure1).

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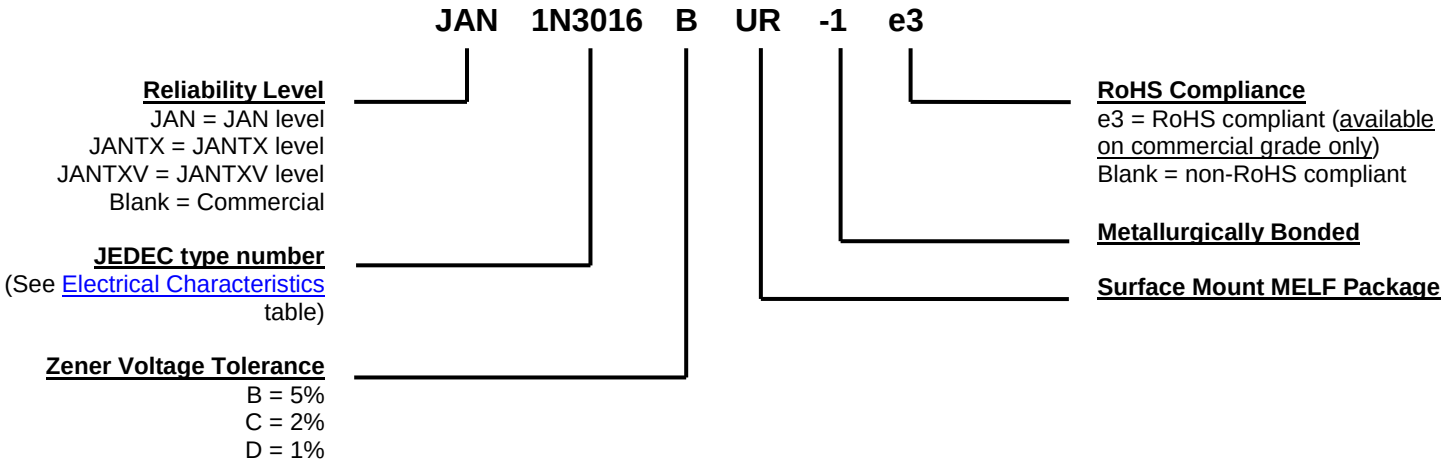
MECHANICAL and PACKAGING

- CASE: Hermetically sealed glass MELF package.
- TERMINALS: Tin/lead or RoHS compliant matte-tin finished copper clad steel available (commercial grade only). Solderable per MIL-STD-750, method 2026.
- MARKING: Cathode band.
- POLARITY: Diode to be operated with the banded end positive with respect to the opposite end for Zener regulation.
- MOUNTING SURFACE SELECTION: 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.
- TAPE & REEL optional: Standard per EIA-481-1-A with 12 mm tape. Consult factory for quantities.
- WEIGHT: Approximately 0.05 grams.
- See Package Dimensions on last page.

PART NOMENCLATURE



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}).
I_{ZM}	Maximum Regulator (Zener) Current: The maximum rated dc current for the specified power rating.
V_F	Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current.
V_R	Reverse Voltage: The reverse voltage dc value, no alternating component.
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

JEDEC TYPE NUMBER	NOMINAL ZENER VOLTAGE V_Z @ I_{ZT} (Note 1)	ZENER TEST CURRENT I_{ZT}	MAXIMUM ZENER IMPEDANCE (Note 3)			MAXIMUM ZENER CURRENT I_{ZM} (Note 3)	MAXIMUM REVERSE LEAKAGE CURRENT† I_R @ V_R		MAXIMUM TEMP. COEFF. OF ZENER VOLTAGE α_{VZ}
			Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}					
	Volts	mA	Ohms	Ohms	mA	mA	µA	Volts	%/°C
1N3016BUR-1	6.8	37	3.5	700	1.0	140	150	5.2	0.061
1N3017BUR-1	7.5	34	4.0	700	.5	125	100	5.7	0.065
1N3018BUR-1	8.2	31	4.5	700	.5	115	50	6.2	0.070
1N3019BUR-1	9.1	28	6	700	.5	105	25	6.9	0.073
1N3020BUR-1	10	25	7	700	.25	95	25	7.6	0.076
1N3021BUR-1	11	23	8	700	.25	85	10	8.4	0.078
1N3022BUR-1	12	21	9	700	.25	80	10	9.1	0.081
1N3023BUR-1	13	19	10	700	.25	74	10	9.9	0.085
1N3024BUR-1	15	17	14	700	.25	63	10	11.4	0.088
1N3025BUR-1	16	15.5	16	700	.25	60	10	12.2	0.089
1N3026BUR-1	18	14	20	750	.25	52	10	13.7	0.091
1N3027BUR-1	20	12.5	22	750	.25	47	10	15.2	0.092
1N3028BUR-1	22	11.5	23	750	.25	43	10	16.7	0.093
1N3029BUR-1	24	10.5	25	750	.25	40	10	18.2	0.094
1N3030BUR-1	27	9.5	35	750	.25	34	10	20.6	0.096
1N3031BUR-1	30	8.5	40	1000	.25	31	10	22.8	0.098
1N3032BUR-1	33	7.5	45	1000	.25	28	10	25.1	0.099
1N3033BUR-1	36	7.0	50	1000	.25	26	10	27.4	0.100
1N3034BUR-1	39	6.5	60	1000	.25	23	10	29.7	0.101
1N3035BUR-1	43	6.0	70	1500	.25	21	10	32.7	0.102
1N3036BUR-1	47	5.5	80	1500	.25	19	10	35.8	0.102
1N3037BUR-1	51	5.0	95	1500	.25	18	10	38.8	0.103
1N3038BUR-1	56	4.5	110	2000	.25	17	10	42.6	0.103
1N3039BUR-1	62	4.0	125	2000	.25	15	10	47.1	0.104
1N3040BUR-1	68	3.7	150	2000	.25	14	10	51.7	0.104
1N3041BUR-1	75	3.3	175	2000	.25	12	10	56.0	0.105
1N3042BUR-1	82	3.0	200	3000	.25	11	10	62.2	0.106
1N3043BUR-1	91	2.8	250	3000	.25	10	10	69.2	0.108
1N3044BUR-1	100	2.5	350	3000	.25	9.0	10	76.0	0.11
1N3045BUR-1	110	2.3	450	4000	.25	8.3	10	83.6	0.11

*JEDEC Registered Data. †Not JEDEC Data.

NOTES: 1. Zener voltage (V_Z) is measured with junction in thermal equilibrium with still air at a temperature of 25 °C. The test currents (I_{ZT}) at nominal voltages provide a constant 0.25 watts.

2. 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.

3. These values of I_{ZM} may often be exceeded in the case of individual diodes. The values shown are calculated for a unit at the high voltage end of its tolerance range. Allowance has also been made for the rise in Zener voltage above V_{ZT} that results from Zener impedance and the increase in junction temperature as a unit approaches thermal equilibrium at a dissipation of 1 watt. The I_{ZM} values shown for +/- 5% tolerance units may be used with little error for +/- 10% tolerance units, but should be reduced by 7% to include a +/- 20% tolerance unit near the high voltage end of its tolerance range.

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GRAPHS

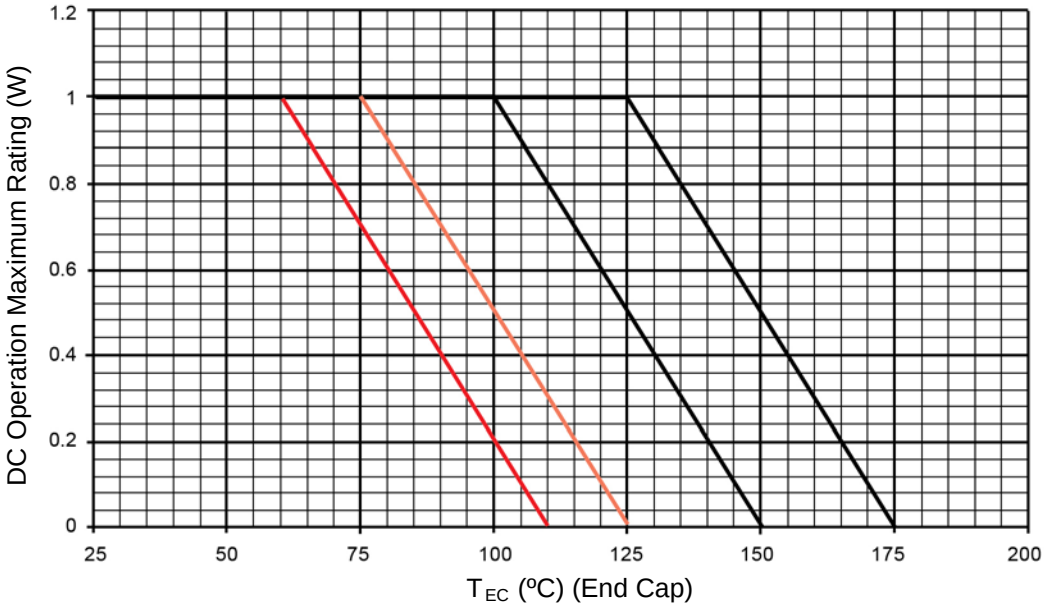

FIGURE 1
Temperature-Power Derating Curve

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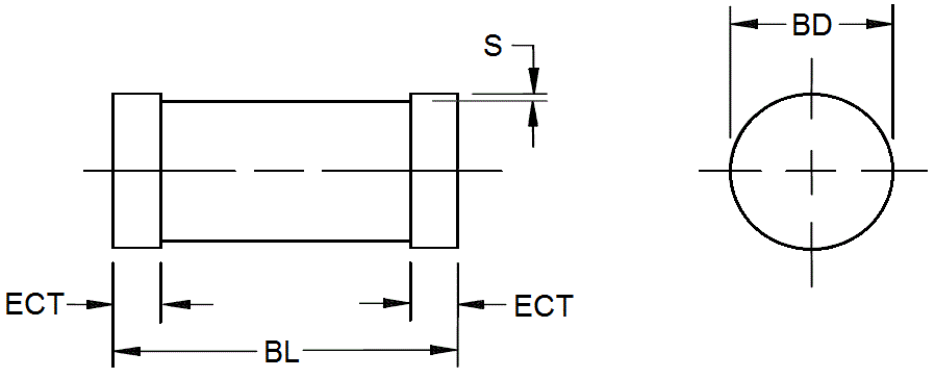
PACKAGE DIMENSIONS

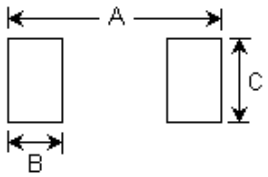


Symbol	Dimensions			
	Inch		Millimeters	
	Min	Max	Min	Max
BD	0.094	0.105	2.39	2.67
BL	0.189	0.205	4.80	5.21
ECT	0.014	0.022	0.360	0.560
S	0.001 min		0.03 min	

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Gap not controlled, shape of body and gap not controlled.
3. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

PAD LAYOUT



Ltr	Inch	mm
A	0.276	7.00
B	0.070	1.8
C	0.110	2.8

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