

Qualified Levels: RoHS 1 Watt Glass Case Zener Diodes JAN, JANTX, and Available on JANTXV commercial Qualified per MIL-PRF-19500/115 versions DESCRIPTION This well established Zener diode series for the 1N3016B-1 through 1N3045B-1 JEDEC registration in the glass DO-41 package provides a glass hermetic seal for 6.8 to 110 volts. 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 1N3821 through 1N3828 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. **FEATURES DO-41 Package** • JEDEC registered 1N3016 through 1N3045 numbers. Zener voltage range: 6.8 volts to 110 volts. Hermetically sealed DO-41 glass package. Also available in: Metallurgically bonded. Double plug construction. DO-213AB package Voltage tolerances of 5%, 2%, and 1% available. (surface mount) 1N3016BUR-1 -JAN, JANTX, and JANTXV qualifications also available per MIL-PRF-19500/115. 1N3045BUR-1 (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 volts. Low reverse (leakage) currents. 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 °C Thermal Resistance Junction-to-Lead ⁽¹⁾ MSC – Lawrence °C/W Rejl 80 6 Lake Street, DC Power Dissipation ⁽²⁾ 1.0 W PD Lawrence, MA 01841 Forward Voltage @ 200 mA VF 1.2 V Tel: 1-800-446-1158 or °C Solder Temperature @ 10 s T_{SP} 260 (978) 620-2600 Fax: (978) 689-0803 Notes: 1. At L = 0.375 inches (10 mm) from body. 2. At T_L ≤ +95 °C 3/8" (10 mm) from body or 1.0 watts at T_L ≤ +65 °C when mounted on FR4 PC board as MSC – Ireland described for thermal resistance above (also see Figure 1). (Derate power to 0 at $T_{L} = +175$ °C). Gort Road Business Park, Ennis, Co. Clare, Ireland Tel: +353 (0) 65 6840044 Fax: +353 (0) 65 6822298 Website: www.microsemi.com



MECHANICAL and PACKAGING

- CASE: Hermetically sealed voidless hard glass with tungsten slugs.
- TERMINALS: Tin/lead or RoHS compliant matte/tin (commercial grade only) over copper.
- MARKING: Body coated in blue with part number.
- POLARITY: Cathode indicated by band.
- TAPE & REEL option: Standard per EIA-296. Consult factory for quantities.
- WEIGHT: 340 milligrams.
- See <u>Package Dimensions</u> 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.							
VF	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.							
Vz	Zener Voltage: The Zener voltage the device will exhibit at a specified current (Iz) 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.							



JEDEC TYPE	NOMINAL ZENER VOLTAGE V _Z @ I _{ZT}	ZENER TEST CURRENT	MAXIMUM ZENER IMPEDANCE (Note 3)			MAXIMUM ZENER CURRENT I _{ZM}	MAXIMUM REVERSE LEAKAGE CURRENT†		MAXIMUM TEMP. COEFF. OF ZENER VOLTAGE
NUMBER	(Note 1)	Izt	Z _{ZT} @ I _{ZT}	Z _{zk} (D I _{zk}	(Note 3)	I _R @	V _R	ανΖ
_	Volts	mA	Ohms	Ohms	mA	mA	μA	Volts	%/°C
1N3016B-1	6.8	37	3.5	700	1.0	140	150	5.2	0.061
1N3017B-1	7.5	34	4.0	700	.5	125	100	5.7	0.065
1N3018B-1	8.2	31	4.5	700	.5	115	50	6.2	0.070
1N3019B-1	9.1	28	6	700	.5	105	25	6.9	0.073
1N3020B-1	10	25	7	700	.25	95	25	7.6	0.076
1N3021B-1	11	23	8	700	.25	85	10	8.4	0.078
1N3022B-1	12	21	9	700	.25	80	10	9.1	0.081
1N3023B-1	13	19	10	700	.25	74	10	9.9	0.085
1N3024B-1	15	17	14	700	.25	63	10	11.4	0.088
1N3025B-1	16	15.5	16	700	.25	60	10	12.2	0.089
1N3026B-1	18	14	20	750	.25	52	10	13.7	0.091
1N3027B-1	20	12.5	22	750	.25	47	10	15.2	0.092
1N3028B-1	22	11.5	23	750	.25	43	10	16.7	0.093
1N3029B-1	24	10.5	25	750	.25	40	10	18.2	0.094
1N3030B-1	27	9.5	35	750	.25	34	10	20.6	0.096
1N3031B-1	30	8.5	40	1000	.25	31	10	22.8	0.098
1N3032B-1	33	7.5	45	1000	.25	28	10	25.1	0.099
1N3033B-1	36	7.0	50	1000	.25	26	10	27.4	0.100
1N3034B-1	39	6.5	60	1000	.25	23	10	29.7	0.101
1N3035B-1	43	6.0	70	1500	.25	21	10	32.7	0.102
1N3036B-1	47	5.5	80	1500	.25	19	10	35.8	0.102
1N3037B-1	51	5.0	95	1500	.25	18	10	38.8	0.103
1N3038B-1	56	4.5	110	2000	.25	17	10	42.6	0.103
1N3039B-1	62	4.0	125	2000	.25	15	10	47.1	0.104
1N3040B-1	68	3.7	150	2000	.25	14	10	51.7	0.104
1N3041B-1	75	3.3	175	2000	.25	12	10	56.0	0.105
1N3042B-1	82	3.0	200	3000	.25	11	10	62.2	0.106
1N3043B-1	91	2.8	250	3000	.25	10	10	69.2	0.108
1N3044B-1	100	2.5	350	3000	.25	9.0	10	76.0	0.11
1N3045B-1	110	2.3	450	4000	.25	8.3	10	83.6	0.11

*ELECTRICAL CHARACTERISTICS @ 25°C

*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 <u>MicroNote 202</u> 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.



GRAPHS



FIGURE 1 Temperature-Power Derating Curve



PACKAGE DIMENSIONS



NOTES:

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

Ltr	IN	СН	MILLIM	Notes	
	Min	Max	Min	Max	
BD	0.080	0.107	2.03	2.72	2
BL	0.160	0.205	4.06	5.21	2
LD	0.028	0.034	0.71	0.86	
LL	1.000	-	25.40	-	
LU	-	0.050	-	1.27	3