Microsemi
SCOTTSDALE DIVISION

1N3016BUR-1 thru 1N3051BUR-1
(or MLL3016B thru MLL3051B)

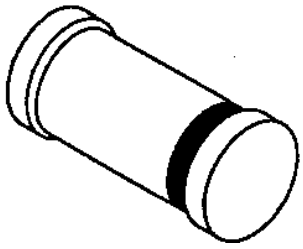
Surface Mount 1.5 W
GLASS ZENER DIODES

DESCRIPTION

This surface mountable zener diode series is similar to the 1N3016 thru 1N3051 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. This can be acquired by a source control drawing (SCD), or by ordering device types with MQ, MX, or MV prefix to part number for equivalent screening to JAN, JANTX or JANTXV.

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

APPEARANCE



DO-213AB

FEATURES

- Leadless surface mount package equivalents to the JEDEC registered 1N3016 thru 1N3051 except with higher power rating of 1.5 Watts
- Ideal for high-density mounting
- Voltage range: 6.8 to 200 volts
- Hermetically sealed, double-slug glass construction
- Metallurgically enhanced contact construction.
- Options for screening in accordance with MIL-PRF-19500/115 for JAN, JANTX, JANTXV, and JANS with MQ, MX, MV, or MSP prefixes respectively for part numbers, e.g. MX1N3016BUR-1, MV1N3051BUR-1, etc.
- Axial lead "thru-hole" DO-13 packages per JEDEC registration available as 1N3016B thru 1N3051B (see separate data sheet with MIL-PRF-19500/115 qualification)

APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Wide selection from 6.8 to 200 V
- Tight voltage tolerances available
- Low reverse (leakage) currents
- Leadless package for surface mounting
- Ideal for high-density mounting
- Metallurgically enhanced internal contact design for greater reliability and lower thermal resistance
- Nonsensitive to ESD
- Hermetically sealed glass package
- Specified capacitance (see Figure 2)
- Inherently radiation hard as described in Microsemi MicroNote 050

MAXIMUM RATINGS

- Power dissipation at 25°C: 1.5 watts (also see derating in Figure 1).
- Operating and Storage temperature: -65°C to +175°C
- Thermal Resistance: 40 °C/W junction to end cap, or 120°C/W junction to ambient when mounted on FR4 PC board (1 oz Cu) with recommended footprint (see last page)
- Steady-State Power: 1.50 watts at end-cap temperature $T_{EC} \leq 115^{\circ}C$, or 1.25 watts at $T_A = 25^{\circ}C$ when mounted on FR4 PC board and recommended footprint as described for thermal resistance (also see Figure 1)
- Forward voltage @200 mA: 1.2 volts (maximum)
- Solder Temperatures: 260 °C for 10 s (max)

MECHANICAL AND PACKAGING

- CASE: Hermetically sealed glass MELF package
- TERMINALS: Leads, tin-lead plated solderable per MIL-STD-750, method 2026
- POLARITY: Cathode indicated by band. Diode to be operated with the banded end positive with respect to the opposite end for Zener regulation
- MARKING: Cathode band only
- TAPE & REEL optional: Standard per EIA-481-1-A with 12 mm tape, 1500 per 7 inch reel or 5000 per 13 inch reel (add "TR" suffix to part number)
- WEIGHT: 0.05 grams
- See package dimensions on last page

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*ELECTRICAL CHARACTERISTICS @ 25°C

INDUSTRY PART NUMBER **	MICROSEMI PART NUMBER	NOMINAL ZENER VOLTAGE V_Z @ I_{ZT} (NOTE 1)	ZENER TEST CURRENT I_{ZT}	MAXIMUM ZENER IMPEDANCE (Note 2)			MAXIMUM ZENER CURRENT	MAXIMUM REVERSE LEAKAGE CURRENT † I_R @ V_R		TYPICAL TEMP.COEFF OF ZENER VOLTAGE α_{VZ}
				Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}		I_{ZM}			
		VOLTS	mA	OHMS	OHMS	mA	mA	µA	Volts	%/°C
1N3016BUR-1	MLL3016B	6.8	37	3.5	700	1.0	210	5	5.2	.040
1N3017BUR-1	MLL3017B	7.5	34	4.0	700	.5	187.5	5	5.7	.045
1N3018BUR-1	MLL3018B	8.2	31	4.5	700	.5	172.5	5	6.2	.048
1N3019BUR-1	MLL3019B	9.1	28	5	700	.5	157.5	5	6.9	.050
1N3020BUR-1	MLL3020B	10	25	7	700	.25	142.5	5	7.6	.055
1N3021BUR-1	MLL3021B	11	23	8	700	.25	127.5	1.0	8.4	.060
1N3022BUR-1	MLL3022B	12	21	9	700	.25	120	1.0	9.1	.065
1N3023BUR-1	MLL3023B	13	19	10	700	.25	111	0.5	9.9	.065
1N3024BUR-1	MLL3024B	15	17	14	700	.25	94.5	0.5	11.4	.070
1N3025BUR-1	MLL3025B	16	15.5	16	700	.25	90	0.5	12.2	.070
1N3026BUR-1	MLL3026B	18	14.0	20	750	.25	78	0.5	13.7	.075
1N3027BUR-1	MLL3027B	20	12.5	22	750	.25	70.5	0.5	15.2	.075
1N3028BUR-1	MLL3028B	22	11.5	23	750	.25	64.5	0.5	16.7	.080
1N3029BUR-1	MLL3029B	24	10.5	25	750	.25	60	0.5	18.2	.080
1N3030BUR-1	MLL3030B	27	9.5	35	1000	.25	51	0.5	20.6	.085
1N3031BUR-1	MLL3031B	30	8.5	40	1000	.25	46.5	0.5	22.8	.085
1N3032BUR-1	MLL3032B	33	7.5	45	1000	.25	42	0.5	25.1	.085
1N3033BUR-1	MLL3033B	36	7.0	50	1000	.25	39	0.5	27.4	.085
1N3034BUR-1	MLL3034B	39	6.5	60	1000	.25	34.5	0.5	29.7	.090
1N3035BUR-1	MLL3035B	40	6.0	70	1500	.25	31.5	0.5	32.7	.090
1N3036BUR-1	MLL3036B	47	5.5	80	1500	.25	28.5	0.5	35.8	.090
1N3037BUR-1	MLL3037B	51	5.0	95	1500	.25	27	0.5	38.8	.090
1N3038BUR-1	MLL3038B	56	4.5	110	2000	.25	25.5	0.5	42.6	.090
1N3039BUR-1	MLL3039B	62	4.0	125	2000	.25	22.5	0.5	47.1	.090
1N3040BUR-1	MLL3040B	68	3.7	150	2000	.25	21	0.5	51.7	.090
1N3041BUR-1	MLL3041B	75	3.3	175	2000	.25	18	0.5	56.0	.090
1N3042BUR-1	MLL3042B	82	3.0	200	3000	.25	16.5	0.5	62.2	.090
1N3043BUR-1	MLL3043B	91	2.8	250	3000	.25	15	0.5	69.2	.090
1N3044BUR-1	MLL3044B	100	2.5	350	3000	.25	13.5	0.5	76.0	.090
1N3045BUR-1	MLL3045B	110	2.3	450	4000	.25	12.45	0.5	83.6	.095
1N3046BUR-1	MLL3046B	120	2.0	550	4500	.25	12	0.5	91.2	.095
1N3047BUR-1	MLL3047B	130	1.9	700	5000	.25	10.35	0.5	98.8	.095
1N3048BUR-1	MLL3048B	150	1.7	1000	6000	.25	8.55	0.5	114.0	.095
1N3049BUR-1	MLL3049B	160	1.6	1100	6500	.25	8.1	0.5	121.6	.095
1N3050BUR-1	MLL3050B	180	1.4	1200	7000	.25	7.35	0.5	136.8	.095
1N3051BUR-1	MLL3051B	200	1.2	1500	8000	.25	6.9	0.5	152.0	.100

* JEDEC registered data for 1N3016B thru 3051B equivalents except reverse (leakage) currents I_R are lower and maximum Zener current I_{ZM} is higher.
** When applicable, add MQ, MX, MV, MSP prefix for 1N3016B to 1N3051B screening options in accordance with MIL-PRF-19500/115.
† Not JEDEC Data.

NOTE 1: Suffix "B" shown signifies a +/-5% tolerance on nominal zener voltage. No suffix designates a +/-20% and suffix "A" is +/-10%. If tighter tolerance is required, suffix C is used to identify +/-2%; and suffix D is to identify +/-1% tolerance. V_Z is measured with the diode in thermal equilibrium in 25°C still air. The test currents (I_{ZT}) at nominal voltages provide a constant 0.25 watts for this device series.

NOTE 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.

NOTE 3: This product series has previously been identified as MLL3016B thru MLL3051B by Microsemi. This alternate name may still be used, however the Industry name of 1N3016BUR-1 thru 1N3051BUR-1 is preferred.

GRAPHS

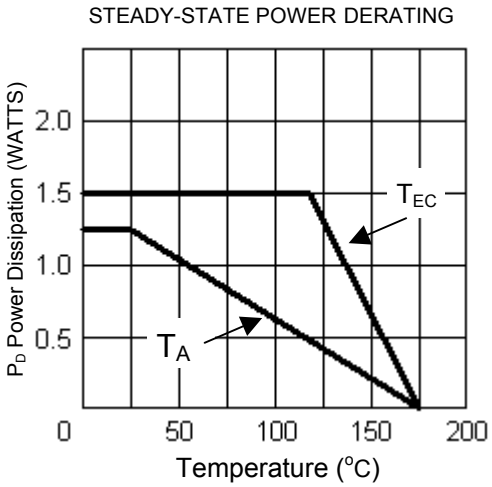


FIGURE 1
Power Derating Curve Where T_{EC} is End Cap Temp and T_A is Ambient Temperature on FR4 PC board.

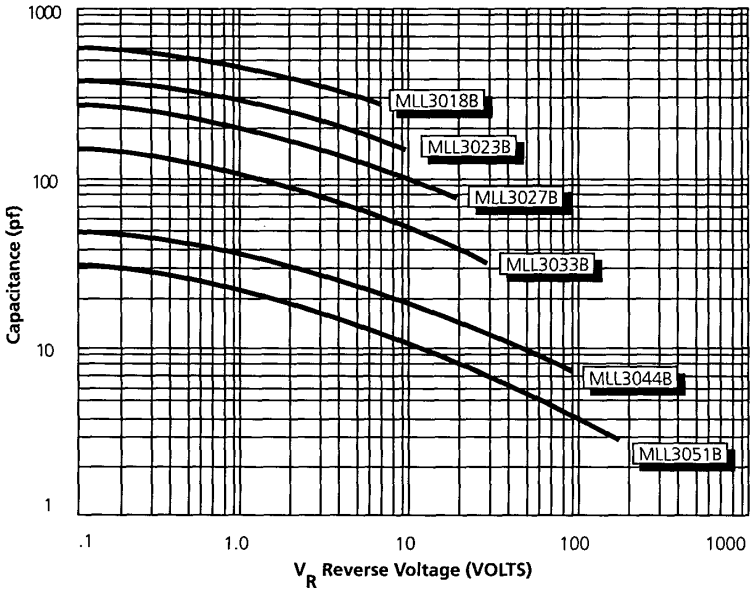


FIGURE 2
Typical Capacitance vs. Reverse Voltage

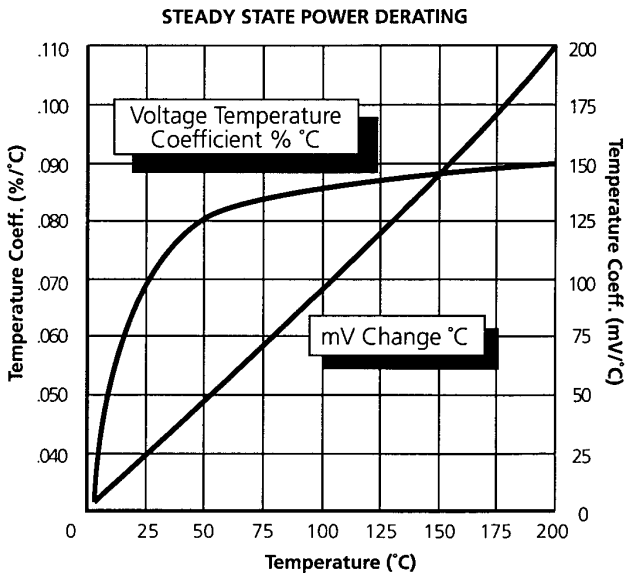
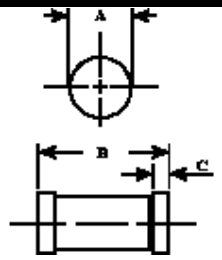
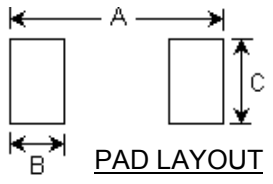


FIGURE 3 Typical Zener Voltage Temperature Coeff. vs. Zener Voltage

PACKAGE DIMENSIONS



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.094	0.105	2.39	2.66
B	0.189	0.205	4.80	5.20
C	0.016	0.022	0.41	0.55



PAD LAYOUT

	INCHES	mm
A	.276	7.00
B	0.070	1.8
C	0.110	2.8