Microsemi

SCOTTSDALE DIVISION

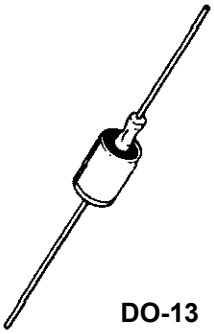
1N3016B thru 1N3051B

1 WATT METAL CASE ZENER DIODES

DESCRIPTION

This well established zener diode series for the 1N3016 thru 1N3051 JEDEC registration in the metal case DO-13 package provides a glass hermetic seal for 6.8 to 200 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 thru 1N3830 series (3.3 V to 7.5 V) in the same package (see separate data sheet). Microsemi also offers numerous other Zener diode products for a variety of other packages including surface mount.

APPEARANCE



DO-13

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

FEATURES

- Zener Voltage Range: 6.8V to 200V
- Hermetically sealed DO-13 metal package
- Internally solder-bonded construction.
- Also available in JAN, JANTX, JANTXV qualifications per MIL-PRF19500/115 by adding the JAN, JANTX, or JANTXV prefixes to part numbers for desired level of screening, e.g. JANTX1N3016B, JANTXV1N3051B, etc.
- Surface mount also available with 1N3016BUR-1 thru 1N3051BUR-1 series on separate data sheet

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
- Nonsensitive to ESD
- Hermetically sealed metal package
- Inherently radiation hard as described in Microsemi MicroNote 050

MAXIMUM RATINGS

- Operating Junction and Storage Temperatures: -65°C to +175°C
- THERMAL RESISTANCE: 50°C/W* junction to lead at 0.375 inches (10 mm) from body or 110 °C/W junction to ambient when leads are mounted on FR4 PC board with 4 mm^2 copper pads (1 oz) and track width 1 mm, length 25 mm
- DC Power Dissipation*: 1.0 Watt at $T_L \leq +125°C$ 3/8" (10 mm) from body or 1.0 Watts at $T_L \leq +65°C$ when mounted on FR4 PC board as described for thermal resistance above (also see Fig 1)
- Forward Voltage @ 200 mA: 1.5 Volts.
- Solder Temperatures: 260 ° C for 10 s (maximum)

MECHANICAL AND PACKAGING

- CASE: DO-13 (DO-202AA), welded, hermetically sealed metal and glass
- FINISH: All external surfaces are Tin-Lead (Pb/Sn) plated and solderable per MIL-STD-750 method 2026
- POLARITY: Cathode connected case.
- WEIGHT: 1.4 grams.
- Tape & Reel option: Standard per EIA-296 (add "TR" suffix to part number)
- See package dimensions on last page

* For further mounting reference, thermal resistance from junction to metal case may be reduced to ≤ 20 °C/W when mounting DO-13 metal case directly on heat sink.

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*ELECTRICAL CHARACTERISTICS @ 25°C

JEDEC TYPE NUMBER (Note 1)	NOMINAL ZENER VOLTAGE V_Z @ I_{ZT} (Note 2)	ZENER TEST CURRENT I_{ZT}	MAXIMUM ZENER IMPEDANCE (Note 3) Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}		MAXIMUM ZENER CURRENT I_{ZM} (Note 4)	MAXIMUM REVERSE LEAKAGE CURRENT† I_R @ V_R		TYPICAL TEMP. COEFF. OF ZENER VOLTAGE α_{VZ}
	Volts	mA	OHMS	OHMS	mA	mA	µA	Volts	%/°C
1N3016B	6.8	37	3.5	700	1.0	140	150	5.2	.040
1N3017B	7.5	34	4.0	700	.5	125	100	5.7	.045
1N3018B	8.2	31	4.5	700	.5	115	50	6.2	.048
1N3019B	9.1	28	5	700	.5	105	25	6.9	.050
1N3020B	10	25	7	700	.25	95	25	7.6	.055
1N3021B	11	23	8	700	.25	85	10	8.4	.060
1N3022B	12	21	9	700	.25	80	10	9.1	.065
1N3023B	13	19	10	700	.25	74	10	9.9	.065
1N3024B	15	17	14	700	.25	63	10	11.4	.070
1N3025B	16	15.5	16	700	.25	60	10	12.2	.070
1N3026B	18	14	20	750	.25	52	10	13.7	.075
1N3027B	20	12.5	22	750	.25	47	10	15.2	.075
1N3028B	22	11.5	23	750	.25	43	10	16.7	.080
1N3029B	24	10.5	25	750	.25	40	10	18.2	.080
1N3030B	27	9.5	35	750	.25	34	10	20.6	.085
1N3031B	30	8.5	40	1000	.25	31	10	22.8	.085
1N3032B	33	7.5	45	1000	.25	28	10	25.1	.085
1N3033B	36	7.0	50	1000	.25	26	10	27.4	.085
1N3034B	39	6.5	60	1000	.25	23	10	29.7	.090
1N3035B	43	6.0	70	1500	.25	21	10	32.7	.090
1N3036B	47	5.5	80	1500	.25	19	10	35.8	.090
1N3037B	51	5.0	95	1500	.25	18	10	38.8	.090
1N3038B	56	4.5	110	2000	.25	17	10	42.6	.090
1N3039B	62	4.0	125	2000	.25	15	10	47.1	.090
1N3040B	68	3.7	150	2000	.25	14	10	51.7	.090
1N3041B	75	3.3	175	2000	.25	12	10	56.0	.090
1N3042B	82	3.0	200	3000	.25	11	10	62.2	.090
1N3043B	91	2.8	250	3000	.25	10	10	69.2	.090
1N3044B	100	2.5	350	3000	.25	9.0	10	76.0	.090
1N3045B	110	2.3	450	4000	.25	8.3	10	83.6	.095
1N3046B	120	2.0	550	4500	.25	8.0	10	91.2	.095
1N3047B	130	1.9	700	5000	.25	6.9	10	98.8	.095
1N3048B	150	1.7	1000	6000	.25	5.7	10	114.0	.095
1N3049B	160	1.6	1100	6500	.25	5.4	10	121.6	.095
1N3050B	180	1.4	1200	7000	.25	4.9	10	136.8	.095
1N3051B	200	1.2	1500	8000	.25	4.6	10	152.0	.100

*JEDEC Registered Data. †Not JEDEC Data.

NOTES:

1. When using JEDEC numbers, B suffix signifies +/-5% tolerance on nominal zener voltage. The suffix A is used to identify +/-10% tolerance; no suffix indicates +/-20% tolerance: suffix C is used to identify +/- 2%; and suffix D is used to identify +/- 1% tolerance.
2. 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.
3. 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.
4. 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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OUTLINE AND CIRCUIT

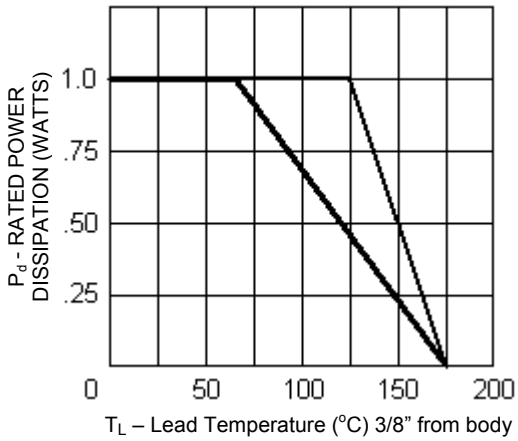


FIGURE 1
Power Derating Curve

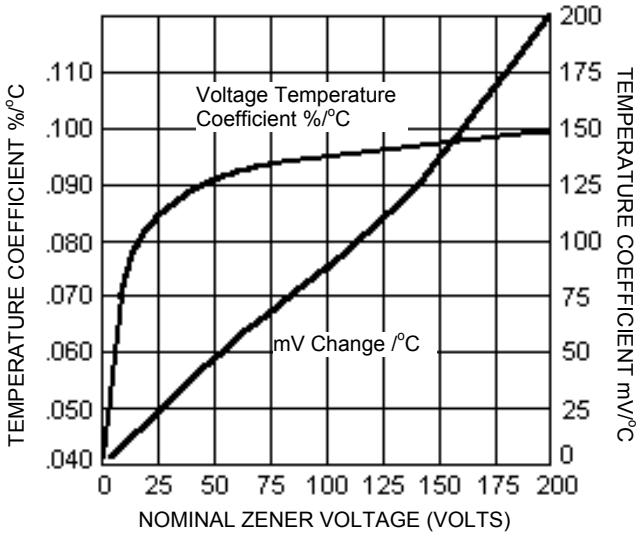


FIGURE 2
Typical Zener Voltage Temperature Coeff. vs. Zener Voltage

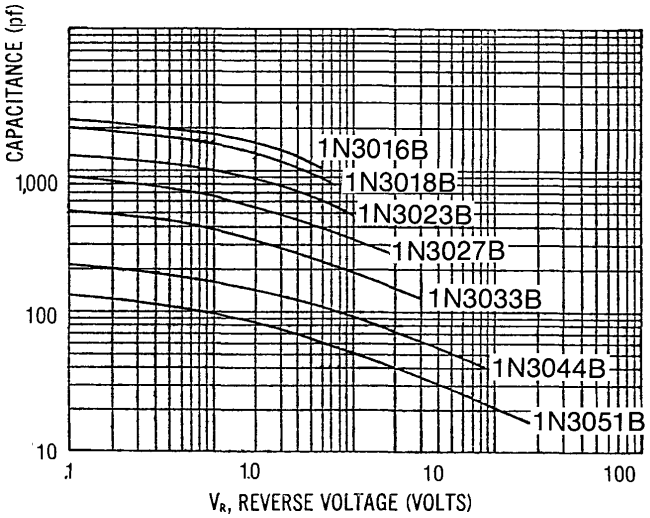
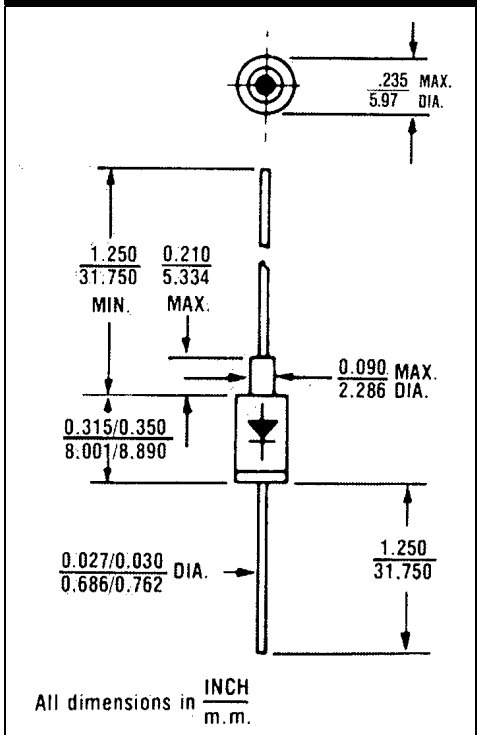


FIGURE 3
Typical Capacitance vs. Reverse Voltage for 1-Watt Zeners

PACKAGE DIMENSIONS



DO-13 (DO-202AA)

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