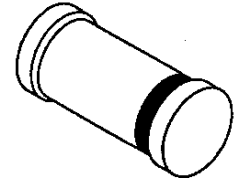


DESCRIPTION

The popular 1N5985UR-1 thru 1N6031BUR-1 (or MLL5985-1 thru MLL6031B-1) series of 0.5 watt Zener Voltage Regulators provides selection from 2.4 to 200 volts in standard 5% or 10% tolerances as well as tighter tolerances identified by different suffix letters on the part number. These glass-surface-mount DO-213AA Zeners are also available in various military screening levels by adding a prefix identifier as described in the Features section. Microsemi also offers numerous other Zener products to meet higher and lower power applications.

APPEARANCE



DO-213AA

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

FEATURES

- Surface mount equivalent to JEDEC registered 1N5985 to 1N6031
- Similar to operating current conditions of the BZV55 Pro Electron series of Zener products in Europe
- Internal metallurgical bonds
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, JANTXV, and JANS are available by adding MQ, MX, MV, or MSP prefixes respectively to part numbers with "-1" suffix.
- Axial-leaded equivalents available as 1N5985 to 1N6031 in the DO-35 package including "-1" suffix options (consult factory for others)

APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Extensive selection from 2.4 to 200 V
- Standard voltage tolerances are plus/minus 5% with B suffix, 10 % with A suffix identification
- Tight tolerances available in plus or minus 2% or 1% with C or D suffix respectively
- Nonsensitive to ESD (MIL-STD-750 Method 1020)
- Minimal capacitance (see Figure 2)
- Inherently radiation hard as described in Microsemi MicroNote 050

MAXIMUM RATINGS

- Operating and Storage temperature: -65°C to $+175^{\circ}\text{C}$
- Thermal Resistance: 100°C/W junction to end cap and 250°C/W for junction to ambient when mounted on FR4 PC board (1 oz Cu) with recommended footprint (see last page)
- Steady-State Power: 0.5 watts at end cap temperatures $T_{\text{EC}} \leq 125^{\circ}\text{C}$ or 0.5 watts at ambient $T_{\text{A}} \leq 50^{\circ}\text{C}$ when mounted on FR4 PC board as described for thermal resistance (also see Figure 1)
- Forward voltage @200 mA: 1.1 volts
- Solder Temperatures: 260°C for 10 s (max)

MECHANICAL AND PACKAGING

- CASE: Hermetically sealed glass DO-213AA (SOD80 or MLL34) MELF style package
- TERMINALS: End caps tin-lead plated solderable per MIL-STD-750, method 2026
- POLARITY: Cathode indicated by band where diode is to be operated with the banded end positive with respect to the opposite end for Zener regulation
- MARKING: cathode band only
- TAPE & REEL option: Standard per EIA-481-B with 12 mm tape, 2000 per 7 inch reel or 5000 per 13 inch reel (add "TR" suffix to part number)
- WEIGHT: 0.04 grams
- See package dimensions on last page



**1N5985UR-1 thru 1N6031BUR-1
(or MLL5985-1 thru MLL6031B-1)**

**METALLURGICALLY BONDED GLASS
SURFACE MOUNT 500 mW Zener Diodes**

*** ELECTRICAL CHARACTERISTICS @ 30°C Lead Temperature. Lead Length 3/8".**

JEDEC Type Number**	Nominal Zener Voltage V_Z @ I_{ZT} Volts (Note 2)	Test Current I_{ZT} mA	Maximum Zener Impedance (Note 1)				Maximum Reverse Current				Max. DC Zener Current I_{ZM} (Note 3)	Typical Temp. Coeff. of Zener Voltage α_{VZ} %/°C
			Z_{ZT} @ I_{ZT} OHMS		Z_{ZK} @ $I_{ZK} = 0.25$ mA OHMS		I_R @ V_R μ A		Volts			
			B, C, D Suffix	A, Non-Suffix	B, C, D Suffix	A, Non-Suffix	B, C, D Suffix	A, Non-Suffix	B, C, D Suffix	A, Non-Suffix		
1N5985BUR-1	2.4	5.0	100	110	1800	2000	100	100	1.0	0.5	208	-0.09
1N5986BUR-1	2.7	5.0	100	110	1900	2200	75	100	1.0	0.5	185	-0.075
1N5987BUR-1	3.0	5.0	95	100	2000	2300	50	100	1.0	0.5	167	-0.07
1N5988BUR-1	3.3	5.0	95	100	2200	2400	25	75	1.0	0.5	152	-0.06
1N5989BUR-1	3.6	5.0	90	95	2300	2500	15	50	1.0	0.5	139	-0.055
1N5990BUR-1	3.9	5.0	90	95	2400	2500	10	25	1.0	1.0	128	-0.045
1N5991BUR-1	4.3	5.0	88	90	2500	2500	5.0	15	1.0	1.0	116	-0.01
1N5992BUR-1	4.7	5.0	70	90	2200	2500	3.0	10	1.5	1.0	106	+0.01
1N5993BUR-1	5.1	5.0	50	88	2050	2500	2.0	5.0	2.0	1.0	98	+0.025
1N5994BUR-1	5.6	5.0	25	70	1800	2200	2.0	3.0	3.0	1.5	89	+0.035
1N5995BUR-1	6.2	5.0	10	50	1300	2050	1.0	2.0	4.0	2.0	81	+0.04
1N5996BUR-1	6.8	5.0	8.0	25	750	1800	1.0	2.0	5.2	3.0	74	+0.044
1N5997BUR-1	7.5	5.0	7.0	10	600	1300	0.5	1.0	6.0	4.0	67	+0.051
1N5998BUR-1	8.2	5.0	7.0	15	600	750	0.5	1.0	6.5	5.2	61	+0.055
1N5999BUR-1	9.1	5.0	10	18	600	600	0.1	0.5	7.0	6.0	55	+0.061
1N6000BUR-1	10	5.0	15	22	600	600	0.1	0.5	8.0	6.5	50	+0.065
1N6001BUR-1	11	5.0	18	25	600	600	0.1	0.1	8.4	7.0	45	+0.068
1N6002BUR-1	12	5.0	22	32	600	600	0.1	0.1	9.1	8.0	42	+0.073
1N6003BUR-1	13	5.0	25	36	600	600	0.1	0.1	9.9	8.4	38	+0.075
1N6004BUR-1	15	5.0	32	42	600	600	0.1	0.1	11	9.1	33	+0.079
1N6005BUR-1	16	5.0	36	48	600	600	0.1	0.1	12	9.9	31	+0.080
1N6006BUR-1	18	5.0	42	55	600	600	0.1	0.1	14	11	28	+0.083
1N6007BUR-1	20	5.0	48	62	600	600	0.1	0.1	15	12	25	+0.085
1N6008BUR-1	22	5.0	55	70	600	600	0.1	0.1	17	14	23	+0.087
1N6009BUR-1	24	5.0	62	78	600	600	0.1	0.1	18	15	21	+0.090
1N6010BUR-1	27	5.0	70	88	600	700	0.1	0.1	21	17	19	+0.091
1N6011BUR-1	30	5.0	78	95	600	700	0.1	0.1	23	18	17	+0.093
1N6012BUR-1	33	5.0	88	110	700	800	0.1	0.1	25	21	15	+0.094
1N6013BUR-1	36	5.0	95	130	700	900	0.1	0.1	27	23	14	+0.094
1N6014BUR-1	39	2.0	130	170	800	1000	0.1	0.1	30	25	13	+0.095
1N6015BUR-1	43	2.0	150	180	900	1100	0.1	0.1	33	27	12	+0.095
1N6016BUR-1	47	2.0	170	200	1000	1300	0.1	0.1	36	30	11	+0.096
1N6017BUR-1	51	2.0	180	225	1300	1400	0.1	0.1	39	33	9.8	+0.096
1N6018BUR-1	56	2.0	200	240	1400	1600	0.1	0.1	43	36	8.9	+0.096
1N6019BUR-1	62	2.0	225	265	1400	1700	0.1	0.1	47	39	8.0	+0.097
1N6020BUR-1	68	2.0	240	280	1600	2000	0.1	0.1	52	43	7.4	+0.097
1N6021BUR-1	75	2.0	265	300	1700	2300	0.1	0.1	56	47	6.7	+0.098
1N6022BUR-1	82	2.0	280	350	2000	2600	0.1	0.1	62	52	6.1	+0.098
1N6023BUR-1	91	2.0	300	400	2300	3000	0.1	0.1	69	56	5.5	+0.099
1N6024BUR-1	100	1.0	500	800	2600	4000	0.1	0.1	76	62	5.0	+0.110
1N6025BUR-1	110	1.0	650	950	3000	4500	0.1	0.1	84	69	4.5	+0.110
1N6026BUR-1	120	1.0	800	1250	4000	5000	0.1	0.1	91	76	4.2	+0.110
1N6027BUR-1	130	1.0	950	1400	4500	5500	0.1	0.1	99	84	3.8	+0.110
1N6028BUR-1	150	1.0	1250	1700	5000	6000	0.1	0.1	114	91	3.3	+0.110
1N6029BUR-1	160	1.0	1400	2000	5500	7000	0.1	0.1	122	99	3.1	+0.110
1N6030BUR-1	180	1.0	1700	2350	6000	8000	0.1	0.1	137	114	2.8	+0.110
1N6031BUR-1	200	1.0	2000	2700	7000	9000	0.1	0.1	152	122	2.5	+0.110

* Indicates JEDEC Registered Data. The type number without a suffix letter before the "UR" suffix indicates a +/-20% tolerance. For 10% tolerance, add suffix A; for 5% tolerance, add suffix B (as shown); for 2% tolerance suffix C; for 1% tolerance suffix D.

** These part numbers may also be ordered as MLL5985B-1 thru MLL6031B-1 for the applicable part number and tolerance in this series.

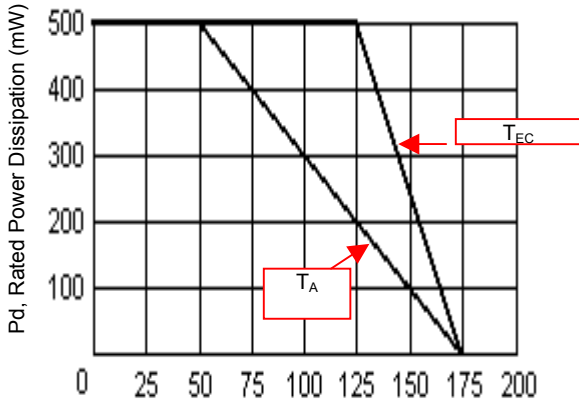
NOTES:

- Zener Impedance is derived from the 1 kHz ac voltage that results when an ac current having an rms value equal to 10% of dc zener current (I_{ZT} or I_{ZK}) is superimposed on I_{ZT} or I_{ZK} . See MicroNote 202 for dynamic impedance variation with other operating currents.
- Voltage Measurements to be performed 20 seconds after application of the dc test current.
- The maximum zener current I_{ZM} shown is for the nominal voltages. The following formula can be used to determine the worst case current for any tolerance device:

$$I_{ZM} = \frac{P}{V_{ZM}}$$

Where V_{ZM} is the high end of the voltage tolerance specified and P is the rated power of the device.

GRAPHS



T_{EC} , End Cap Temperature ($^{\circ}C$) or T_A
Ambient temperature on FR4 PC board

FIGURE 1
POWER DERATING CURVE

CAPACITANCE vs. V_Z CURVE

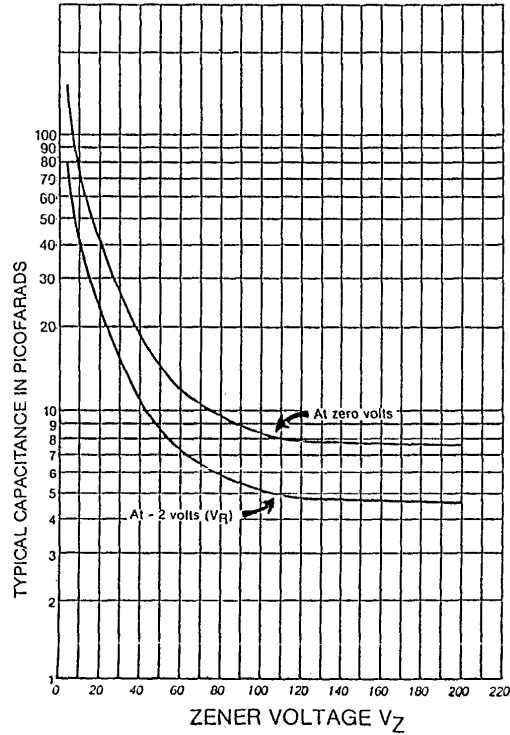
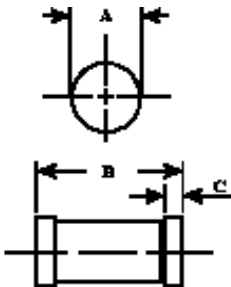
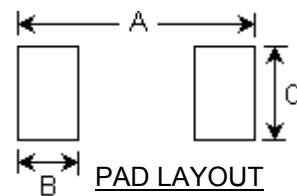


FIGURE 2
CAPACITANCE vs. ZENER VOLTAGE
(TYPICAL)

PACKAGE DIMENSIONS and PAD LAYOUT



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.063	0.067	1.60	1.70
B	0.130	0.146	3.30	3.70
C	0.016	0.022	0.41	0.55



	INCHES	mm
A	.200	5.08
B	.055	1.40
C	.080	2.03