

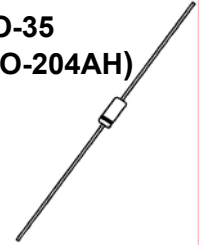
ALSO  
AVAILABLE IN  
SURFACE  
MOUNT

### DESCRIPTION

The popular 1N5985 thru 1N6031 series of 0.5 watt Zener Voltage Regulators provides a 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 axial-leaded DO-35 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-35  
(DO-204AH)**



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

### FEATURES

- JEDEC registered 1N5985 to 1N6031
- Similar to operating current conditions of the BZX55 Pro Electron series of Zener products in Europe
- Internal bonds optionally available with "-1" suffix
- RoHS Compliant devices available by adding "e3" suffix
- 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.
- Surface mount equivalents available as MLL5985 to MLL6031 in the DO-213AA MELF style package including "-1" suffix options (consult factory for others)
- DO-7 glass body axial-leaded Zener equivalents are also available

### 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
- Flexible axial-lead mounting terminals
- Nonsensitive to ESD (MIL-STD-750 Method 1020)
- Minimal capacitance (see Figure 2)
- Inherently radiation hard as described in Microsemi MicroNote 050

### MAXIMUM RATINGS

- Power dissipation at 25°C: 0.5 watts (also see derating in Figure 1).
- Operating and Storage temperature: -65°C to +175°C
- Thermal Resistance: 250 °C/W junction to lead at 3/8 (10 mm) lead length from body, or 310 °C/W junction to ambient when mounted on FR4 PC board (1 oz Cu) with 4 mm<sup>2</sup> copper pads and track width 1 mm, length 25 mm
- Steady-State Power: 0.5 watts at  $T_L \leq 50^\circ\text{C}$  3/8 inch (10 mm) from body or 0.48 W at  $T_A \leq 25^\circ\text{C}$  when mounted on FR4 PC board as described for thermal resistance above (also see Figure1)
- Forward voltage @200 mA: 1.1 volts (maximum)
- Solder Temperatures: 260 °C for 10 s (max)

### MECHANICAL AND PACKAGING

- CASE: Hermetically sealed axial-lead glass DO-35 (DO-204AH) package
- TERMINALS: Tin-lead or RoHS Compliant matte-Tin plating 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: Part number
- TAPE & REEL option: Standard per EIA-296 (add "TR" suffix to part number)
- WEIGHT: 0.2 grams
- See package dimensions on last page

\*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	Max. Zener Impedance (Note 1)				Max. Reverse Leakage Current				Max. DC Zener Current $I_{ZM}$ (Note 3)	Typical Temp. Coeff. of Zener Voltage $\alpha_{VZ}$ %/°C
			$Z_{ZT} @ I_{ZT}$ OHMS		$Z_{ZK} @ I_{ZK} = 0.25$ ma OHMS		$I_R @ V_R$ $\mu$ 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		
1N5985	2.4	5.0	100	110	1800	2000	100	100	1.0	0.5	208	-0.09
1N5986	2.7	5.0	100	110	1900	2200	75	100	1.0	0.5	185	-0.075
1N5987	3.0	5.0	95	100	2000	2300	50	100	1.0	0.5	167	-0.07
1N5988	3.3	5.0	95	100	2200	2400	25	75	1.0	0.5	152	-0.06
1N5989	3.6	5.0	90	95	2300	2500	15	50	1.0	0.5	139	-0.055
1N5990	3.9	5.0	90	95	2400	2500	10	25	1.0	1.0	128	-0.045
1N5991	4.3	5.0	88	90	2500	2500	5.0	15	1.0	1.0	116	-0.01
1N5992	4.7	5.0	70	90	2200	2500	3.0	10	1.5	1.0	106	+0.01
1N5993	5.1	5.0	50	88	2050	2500	2.0	5.0	2.0	1.0	98	+0.025
1N5994	5.6	5.0	25	70	1800	2200	2.0	3.0	3.0	1.5	89	+0.035
1N5995	6.2	5.0	10	50	1300	2050	1.0	2.0	4.0	2.0	81	+0.04
1N5996	6.8	5.0	8.0	25	750	1800	1.0	2.0	5.2	3.0	74	+0.044
1N5997	7.5	5.0	7.0	10	600	1300	0.5	1.0	6.0	4.0	67	+0.051
1N5998	8.2	5.0	7.0	15	600	750	0.5	1.0	6.5	5.2	61	+0.055
1N5999	9.1	5.0	10	18	600	600	0.1	0.5	7.0	6.0	55	+0.061
1N6000	10	5.0	15	22	600	600	0.1	0.5	8.0	6.5	50	+0.065
1N6001	11	5.0	18	25	600	600	0.1	0.1	8.4	7.0	45	+0.068
1N6002	12	5.0	22	32	600	600	0.1	0.1	9.1	8.0	42	+0.073
1N6003	13	5.0	25	36	600	600	0.1	0.1	9.9	8.4	38	+0.075
1N6004	15	5.0	32	42	600	600	0.1	0.1	11	9.1	33	+0.079
1N6005	16	5.0	36	48	600	600	0.1	0.1	12	9.9	31	+0.080
1N6006	18	5.0	42	55	600	600	0.1	0.1	14	11	28	+0.083
1N6007	20	5.0	48	62	600	600	0.1	0.1	15	12	25	+0.085
1N6008	22	5.0	55	70	600	600	0.1	0.1	17	14	23	+0.087
1N6009	24	5.0	62	78	600	600	0.1	0.1	18	15	21	+0.090
1N6010	27	5.0	70	88	600	700	0.1	0.1	21	17	19	+0.091
1N6011	30	5.0	78	95	600	700	0.1	0.1	23	18	17	+0.093
1N6012	33	5.0	88	110	700	800	0.1	0.1	25	21	15	+0.094
1N6013	36	5.0	95	130	700	900	0.1	0.1	27	23	14	+0.094
1N6014	39	2.0	130	170	800	1000	0.1	0.1	30	25	13	+0.095
1N6015	43	2.0	150	180	900	1100	0.1	0.1	33	27	12	+0.095
1N6016	47	2.0	170	200	1000	1300	0.1	0.1	36	30	11	+0.096
1N6017	51	2.0	180	225	1300	1400	0.1	0.1	39	33	9.8	+0.096
1N6018	56	2.0	200	240	1400	1600	0.1	0.1	43	36	8.9	+0.096
1N6019	62	2.0	225	265	1400	1700	0.1	0.1	47	39	8.0	+0.097
1N6020	68	2.0	240	280	1600	2000	0.1	0.1	52	43	7.4	+0.097
1N6021	75	2.0	265	300	1700	2300	0.1	0.1	56	47	6.7	+0.098
1N6022	82	2.0	280	350	2000	2600	0.1	0.1	62	52	6.1	+0.098
1N6023	91	2.0	300	400	2300	3000	0.1	0.1	69	56	5.5	+0.099
1N6024	100	1.0	500	800	2600	4000	0.1	0.1	76	62	5.0	+0.110
1N6025	110	1.0	650	950	3000	4500	0.1	0.1	84	69	4.5	+0.110
1N6026	120	1.0	800	1250	4000	5000	0.1	0.1	91	76	4.2	+0.110
1N6027	130	1.0	950	1400	4500	5500	0.1	0.1	99	84	3.8	+0.110
1N6028	150	1.0	1250	1700	5000	6000	0.1	0.1	114	91	3.3	+0.110
1N6029	160	1.0	1400	2000	5500	7000	0.1	0.1	122	99	3.1	+0.110
1N6030	180	1.0	1700	2350	6000	8000	0.1	0.1	137	114	2.8	+0.110
1N6031	200	1.0	2000	2700	7000	9000	0.1	0.1	152	122	2.5	+0.110

\*Indicates JEDEC Registered Data. The type number listed indicates a 20% tolerance. For 10% tolerance, add suffix A; for 5% tolerance, add suffix B; for 2% tolerance add suffix C; for 1% tolerance, add suffix D.

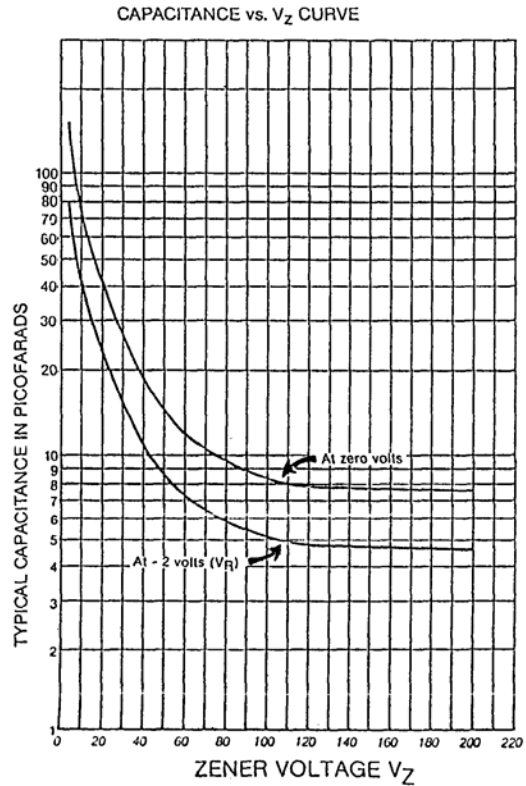
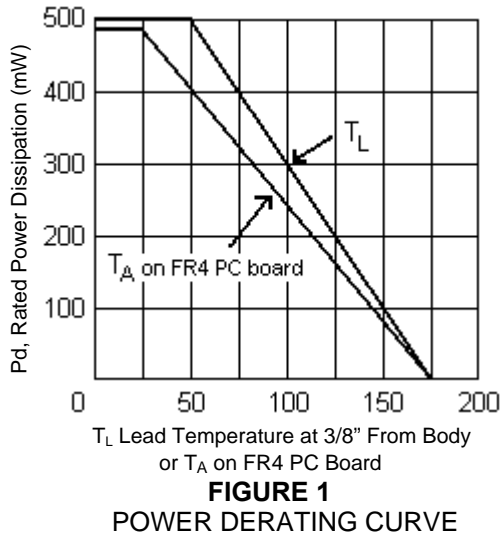
NOTES:

- Zener Impedance is derived from the 1 kHz ac voltage which 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:

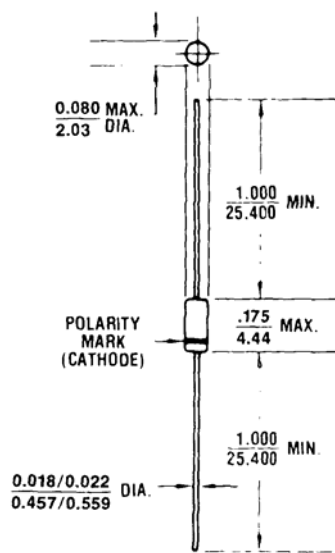
$$I_{ZM} = \frac{P}{V_{ZM}}$$

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

GRAPHS



PACKAGE DIMENSIONS



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