Microsemi
SCOTTSDALE DIVISION

1N5985 thru 1N6031-1 DO-35

Axial-Leaded 500 mW Zener Diodes

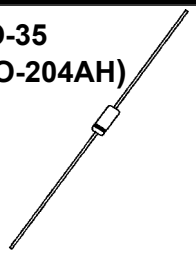
ALSO AVAILABLE IN SURFACE MOUNT

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
- 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^2 copper pads and track width 1 mm, length 25 mm
- Steady-State Power: 0.5 watts at $T_L \leq 50^oC$ 3/8 inch (10 mm) from body or 0.48 W at $T_A \leq 25^oC$ 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: 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: 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

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*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) Z_{ZT} @ I_{ZT} OHMS B,C,D Suffix	Z_{ZT} @ I_{ZT} OHMS A, Non-Suffix	Z_{ZK} @ I_{ZK} = 0.25 ma OHMS B,C,D Suffix	Z_{ZK} @ I_{ZK} = 0.25 ma OHMS A, Non-Suffix	Max. Reverse Leakage Current I_R µA @ V_R Volts B,C,D Suffix	I_R µA @ V_R Volts A, Non-Suffix	I_R µA @ V_R Volts B,C,D Suffix	I_R µA @ V_R Volts A, Non-Suffix	Max. DC Zener Current I_{ZM} (Note 3)	Typical Temp. Coeff. of Zener Voltage α_{VZ} %/°C
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	+.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:

1. 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.
2. Voltage Measurements to be performed 20 seconds after application of the dc test current.
3. 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

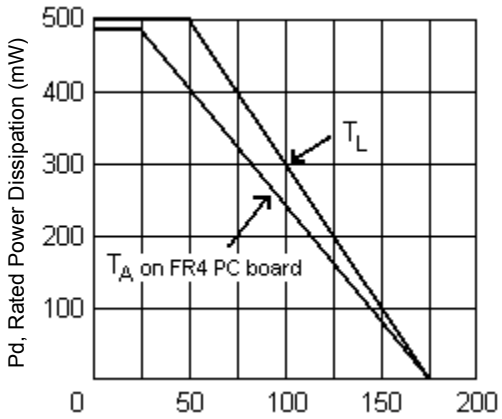


FIGURE 1
POWER DERATING CURVE

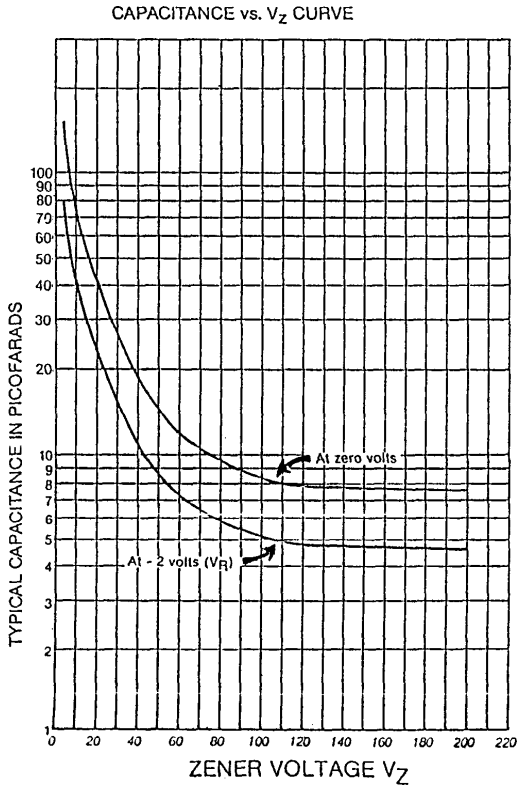
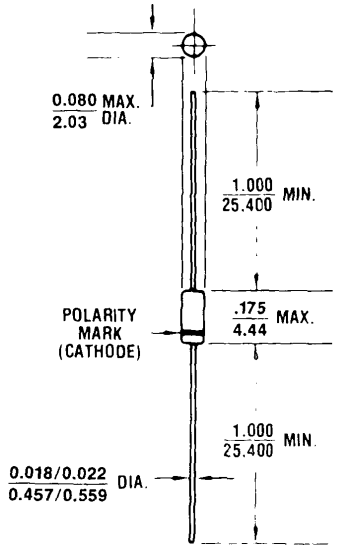


FIGURE 2
CAPACITANCE vs. ZENER VOLTAGE
(TYPICAL)

PACKAGE DIMENSIONS



All dimensions in INCH
mm