Microsemi
SCOTTSDALE DIVISION

1N5221UR-1 thru 1N5281BUR-1 (or MLL5221-1 thru MLL5281B-1)

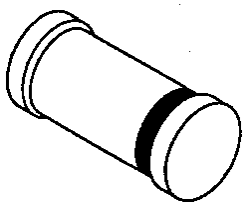
METALLURGICALLY BONDED GLASS SURFACE MOUNT 500 mW ZENERS

DESCRIPTION

The 1N5221BUR-1 thru 1N5281BUR-1 series of 0.5 watt Zener Voltage Regulators provides a surface mount equivalent to the popular JEDEC registered 1N5221B to 1N5281B for 2.4 to 200 volts in a metallurgically bonded configuration. They are available with standard 5%, 10%, or 20% tolerances as well as tighter tolerances identified by different suffix letters on the part number. Microsemi also offers numerous other Zener products to meet higher and lower power applications.

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

APPEARANCE



DO-213AA

FEATURES

- Surface mount equivalents to the JEDEC registered 1N5221 thru 1N5281B series
- Hermetically sealed surface mount package
- Internal metallurgical bond
- 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
- DO-7 or DO-35 glass body axial-leaded Zener equivalents also available per JEDEC registration (see separate data sheet for part numbers 1N5221 thru 1N5281B series

APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Selection from 2.4 to 200 V
- Standard voltage tolerances are plus/minus 5% with B suffix identification and 10 % with A suffix
- Tight tolerances available in plus or minus 2% or 1% with C or D suffix respectively
- Nonsensitive to ESD per MIL-STD-750 Method 1020
- Minimal capacitance (see Figure 3)
- Inherently radiation hard as described in Microsemi MicroNote 050

MAXIMUM RATINGS

- Operating and Storage temperature: -65°C to +175°C
- Thermal Resistance: 100°C/W junction to end cap and 250°C/W 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 temperature $T_{EC} \leq 125^{\circ}C$ or ambient temperature $T_A \leq 50^{\circ}C$ when mounted on FR4 PC board as described for thermal resistance above (see Figure 2 for derating)
- Forward voltage @200 mA: 1.1 volts (maximum)
- Solder Temperatures: 260°C for 10 seconds (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

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ELECTRICAL CHARACTERISTICS*

INDUSTRY PART NUMBER (NOTES 1 & 4)	Nominal Zener Voltage V_Z @ I_{ZT} (Note 2)	Test Current I_{ZT}	Max Zener Impedance A and B suffix only		Max Reverse Leakage Current				Max Zener Voltage Temperature Coeff. (A and B Suffix only) (Note 3)
					A and B Suffix only			Non-Suffix	
	Volts	mA	Z_{ZT} @ I_{ZT} Ohms	Z_{ZK} @ I_{ZK} = 0.25Ma Ohms	I_R µA	@ A	V_R Volts B	I_R @ V_R Used for Suffix A µA	α_{VZ} (%/°C)
1N5221UR-1	2.4	20	30	1200	100	0.95	1.0	200	-0.085
1N5222UR-1	2.5	20	30	1250	100	0.95	1.0	200	-0.085
1N5223UR-1	2.7	20	30	1300	75	0.95	1.0	150	-0.080
1N5224UR-1	2.8	20	30	1400	75	0.95	1.0	150	-0.080
1N5225UR-1	3.0	20	29	1600	50	0.95	1.0	100	-0.075
1N5226UR-1	3.3	20	28	1600	25	0.95	1.0	100	-0.070
1N5227UR-1	3.6	20	24	1700	15	0.95	1.0	100	-0.065
1N5228UR-1	3.9	20	23	1900	10	0.95	1.0	75	-0.060
1N5229UR-1	4.3	20	22	2000	5.0	0.95	1.0	50	+/-0.055
1N5230UR-1	4.7	20	19	1900	5.0	1.9	2.0	50	+/-0.030
1N5231UR-1	5.1	20	17	1600	5.0	1.9	2.0	50	+/-0.030
1N5232UR-1	5.6	20	11	1600	5.0	2.9	3.0	50	+0.038
1N5233UR-1	6.0	20	7.0	1600	5.0	3.3	3.5	50	+0.038
1N5234UR-1	6.2	20	7.0	1000	5.0	3.8	4.0	50	+0.045
1N5235UR-1	6.8	20	5.0	750	3.0	4.8	5.0	30	+0.050
1N5236UR-1	7.5	20	6.0	500	3.0	5.7	6.0	30	+0.058
1N5237UR-1	8.2	20	8.0	500	3.0	6.2	6.5	30	+0.062
1N5238UR-1	8.7	20	8.0	600	3.0	6.2	6.5	30	+0.065
1N5239UR-1	9.1	20	10	600	3.0	6.7	7.0	30	+0.068
1N5240UR-1	10	20	17	600	3.0	7.6	8.0	30	+0.075
1N5241UR-1	11	20	22	600	2.0	8.0	8.4	30	+0.076
1N5242UR-1	12	20	30	600	1.0	8.7	9.1	10	+0.077
1N5243UR-1	13	9.5	13	600	0.5	9.4	9.9	10	+0.079
1N5244UR-1	14	9.0	15	600	0.1	9.5	10	10	+0.082
1N5245UR-1	15	8.5	16	600	0.1	10.5	11	10	+0.082
1N5246UR-1	16	7.8	17	600	0.1	11.4	12	10	+0.083
1N5247UR-1	17	7.4	19	600	0.1	12.4	13	10	+0.084
1N5248UR-1	18	7.0	21	600	0.1	13.3	14	10	+0.085
1N5249UR-1	19	6.6	23	600	0.1	13.3	14	10	+0.086
1N5250UR-1	20	6.2	25	600	0.1	14.3	15	10	+0.086
1N5251UR-1	22	5.6	29	600	0.1	16.2	17	10	+0.087
1N5252UR-1	24	5.2	33	600	0.1	17.1	18	10	+0.088
1N5253UR-1	25	5.0	35	600	0.1	18.1	19	10	+0.089
1N5254UR-1	27	4.6	41	600	0.1	20	21	10	+0.090
1N5255UR-1	28	4.5	44	600	0.1	20	21	10	+0.091
1N5256UR-1	30	4.2	49	600	0.1	22	23	10	+0.091
1N5257UR-1	33	3.8	58	700	0.1	24	25	10	+0.092
1N5258UR-1	36	3.4	70	700	0.1	26	27	10	+0.093
1N5259UR-1	39	3.2	80	800	0.1	29	30	10	+0.094
1N5260UR-1	43	3.0	93	900	0.1	31	33	10	+0.095
1N5261UR-1	47	2.7	105	1000	0.1	34	36	10	+0.095
1N5262UR-1	51	2.5	125	1100	0.1	37	39	10	+0.096
1N5263UR-1	56	2.2	150	1300	0.1	41	43	10	+0.096
1N5264UR-1	60	2.1	170	1400	0.1	44	46	10	+0.097
1N5265UR-1	62	2.0	185	1400	0.1	45	47	10	+0.097
1N5266UR-1	68	1.8	230	1600	0.1	49	52	10	+0.097
1N5267UR-1	75	1.7	270	1700	0.1	53	56	10	+0.098
1N5268UR-1	82	1.5	330	2000	0.1	59	62	10	+0.098
1N5269UR-1	87	1.4	370	2200	0.1	65	68	10	+0.099
1N5270UR-1	91	1.4	400	2300	0.1	66	69	10	+0.099
1N5271UR-1	100	1.3	500	2600	0.1	72	76	10	+0.0110
1N5272UR-1	110	1.1	750	3000	0.1	80	84	10	+0.0110
1N5273UR-1	120	1.0	900	4000	0.1	86	91	10	+0.0110
1N5274UR-1	130	.95	1100	4500	0.1	94	99	10	+0.0110
1N5275UR-1	140	.90	1300	4500	0.1	101	106	10	+0.0110
1N5276UR-1	150	.85	1500	5000	0.1	108	114	10	+0.0110
1N5277UR-1	160	.80	1700	5500	0.1	116	122	10	+0.0110
1N5278UR-1	170	.74	1900	5500	0.1	123	129	10	+0.0110
1N5279UR-1	180	.68	2200	6000	0.1	130	137	10	+0.0110
1N5280UR-1	190	.66	2400	6500	0.1	137	144	10	+0.0110
1N5281UR-1	200	.65	2500	7000	0.1	144	152	10	+0.0110

* T_A = 25°C unless otherwise noted. Based on dc measurements at thermal equilibrium; case temperature maintained at 30 +/- 2°C. V_F = 1.1V max @ I_F = 200 mA for all types. See further Notes on following page.

NOTE 1: Table as shown lists type numbers, which indicate a tolerance of +/-20% with guaranteed limits on only V_Z, I_R, and V_F. Devices with guaranteed limits on all six parameters are indicated by suffix "A" for +/-10%, "B" for +/-5%, "C" for +/-2%, and "D" for +/-1% tolerance.

NOTE 2: The electrical characteristics are measured after allowing the device to stabilize for 20 seconds.

NOTE 3: Temperature coefficient (α_{VZ}). Test conditions for temperature coefficient are as follows:

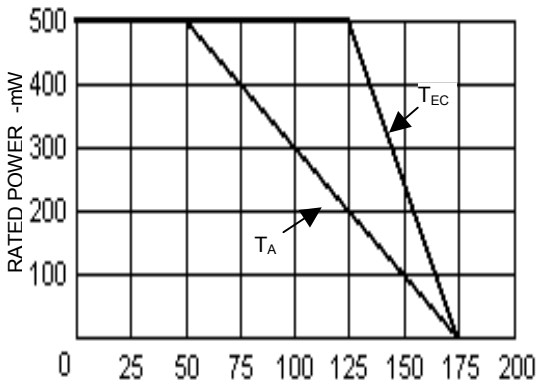
a. I_{ZT} = 7.5 mA, T_1 = 25°C,
T_2 = 125°C (1N5221AUR-1 & BUR-1 thru 1N5242AUR-1 & BUR-1)

b. I_{ZT} = Rated I_{ZT}, T_1 = 25°C,
T_2 = 125°C (1N5243AUR-1 & BUR-1 thru 1N5281AUR-1 & BUR-1)

Device to be temperature stabilized with current applied prior to reading breakdown voltage at the specified ambient temperature.

NOTE 4: These devices may be ordered as either 1N5221UR-1 thru 1N5281BUR-1 or as MLL5221-1 thru MLL5281B-1 part numbers.

GRAPHS



T_{EC} End Cap Temperature (ºC), or
T_A Ambient Temperature on FR4 PC BOARD

FIGURE 1
POWER DERATING CURVE

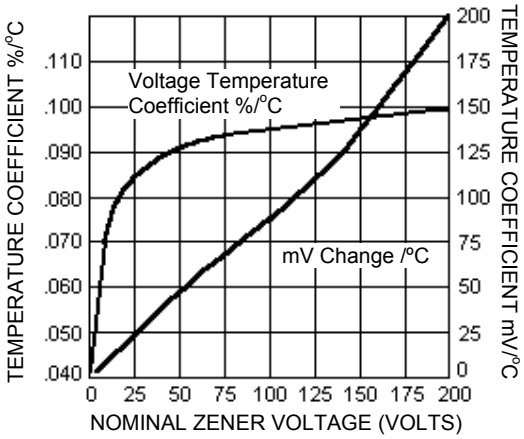


FIGURE 2
ZENER VOLTAGE TEMPERATURE
COEFFICIENT vs. ZENER VOLTAGE

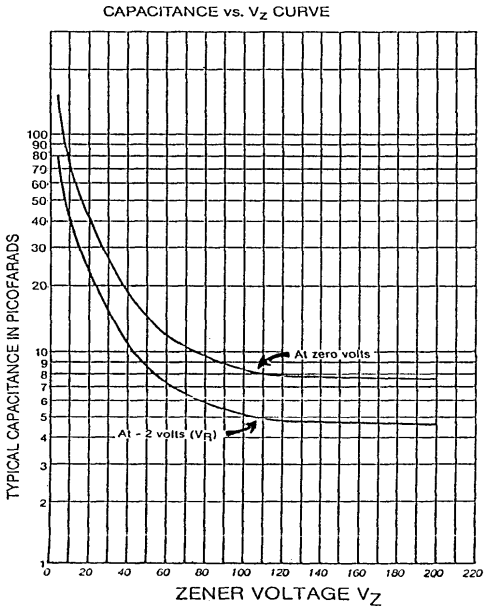
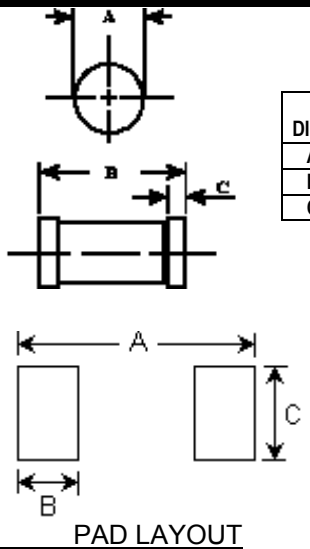


FIGURE 3
CAPACITANCE vs. ZENER VOLTAGE
(TYPICAL)

PACKAGE DIMENSIONS



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

PAD LAYOUT