Available on commercial versions

Silicon MELF 500 mW Zener Diodes

Qualified per MIL-PRF-19500/117

Qualified Levels: JAN, JANTX, and JANTXV*

DESCRIPTION

The popular 1N957BUR-1 through 1N992BUR-1 series of 0.5 watt Zener voltage regulators provides a selection from 6.8 to 200 volts in a standard 5%, 2% and 1% tolerance versions. These glass MELF DO-213AA Zeners feature an internal metallurgical bond and are available in military qualified and commercial RoHS compliant versions. Military qualified versions are available on the 1N962BUR-1 through 1N992BUR-1 range of part numbers.

Important: For the latest information, visit our website http://www.microsemi.com.

DO-213AA MELF Package

Also available in:

DO-35 (DO-204AH) package
(axial-leaded)
1N957B-1 – 1N992B-1

FEATURES

- JEDEC registered 1N957B to 1N992B number series.
- Internal metallurgical bond.
- *JAN, JANTX, and JANTXV qualifications are available per MIL-PRF-19500/117 for part numbers 1N962BUR-1 through 1N992BUR-1.
- Upscreening is available in reference to MIL-PRF-19500 for the range of 1N957BUR-1 through 1N961BUR-1. (See part nomenclature for all available options.)
- RoHS compliant versions available (commercial grade only).

APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range.
- Extensive selection from 6.8 to 200 V.
- Standard voltage tolerance is ± 5% with optional tighter tolerances of ± 2% or 1%.
- Small size for high density mounting using the surface mount method (see package illustration).
- Non-sensitive to ESD per MIL-STD-750 method 1020.
- Minimal capacitance.
- Inherently radiation hard as described in Microsemi MicroNote 050.

MAXIMUM RATINGS

Parameters/Test Conditions	Symbol	Value	Unit
Operating and Storage Temperature	T_J and T_{STG}	-65 to +175	ºC
Thermal Resistance Junction-to-End Cap	$R_{\Theta JEC}$	100	ºC/W
Thermal Resistance Junction-to-Ambient when mounted on PCB (1)	$R_{\Theta JA}$	300	ºC/W
Steady-State Power Dissipation @ T_{EC} = +125°C (2) @ T_A = 55°C mounted on PCB	P_D	 0.5 0.4	W
Forward Voltage @ I_F = 200 mA 1N957UR – 1N985UR 1N986UR – 1N992UR	V_F	 1.1 1.3	V
Solder Temperature @ 10 s	T_{SP}	260	°C

NOTES: 1. See figure 1 for derating curves. T_A = +75°C on an FR4 PC board with 1 oz copper metalization.
2. Derate to 0 at +175°C.

MSC – Lawrence
6 Lake Street,
Lawrence, MA 01841
Tel: 1-800-446-1158 or
(978) 620-2600
Fax: (978) 689-0803

MSC – Ireland
Gort Road Business Park,
Ennis, Co. Clare, Ireland
Tel: +353 (0) 65 6840044
Fax: +353 (0) 65 6822298

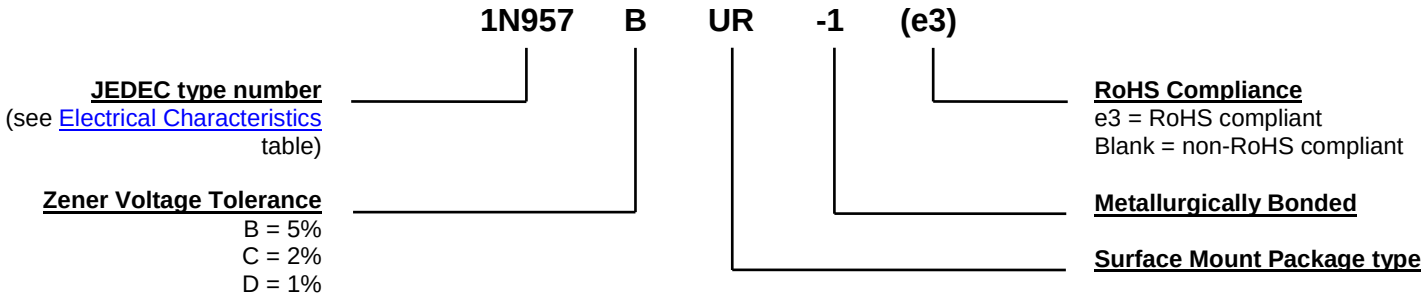
Website:
www.microsemi.com

MECHANICAL and PACKAGING

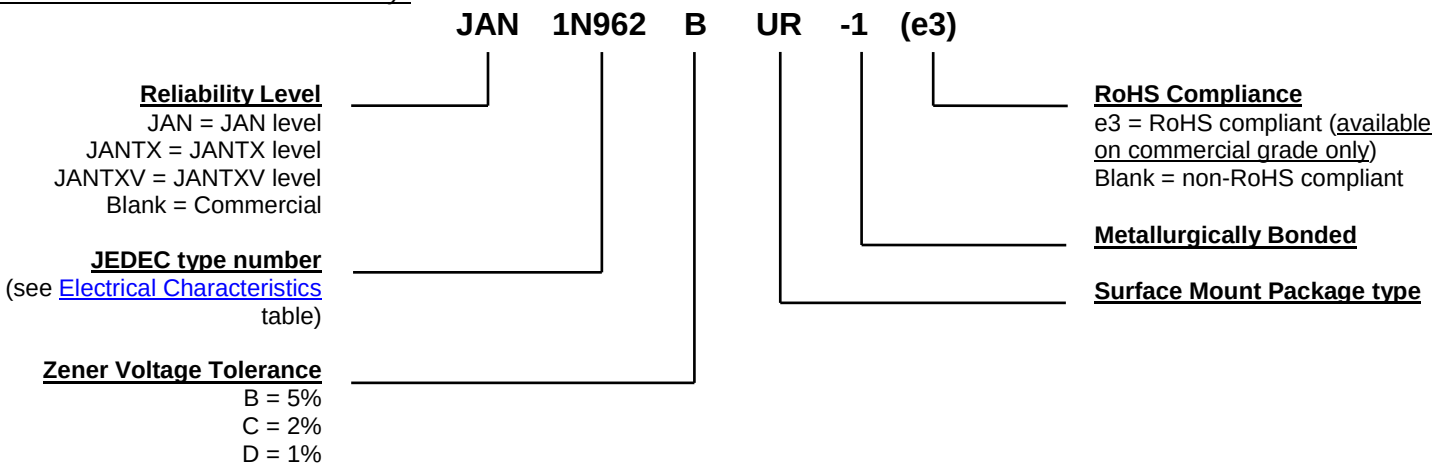
- CASE: Hermetically sealed glass case package.
- TERMINALS: Tin/lead plated or RoHS compliant matte-tin (on commercial grade only) over copper clad steel. Solderable per MIL-STD-750, method 2026.
- POLARITY: Cathode end is banded.
- MOUNTING: The axial coefficient of expansion (COE) of this device is approximately +6PPM/°C. The COE of the mounting surface system should be selected to provide a suitable match with this device.
- MARKING: Part number.
- TAPE & REEL option: Standard per EIA-296. Consult factory for quantities.
- WEIGHT: 0.04 grams.
- See Package Dimensions on last page.

PART NOMENCLATURE

1N957BUR-1 – 1N961BUR-1 only:



1N962BUR-1 – 1N992BUR-1 only:



SYMBOLS & DEFINITIONS	
Symbol	**Definition**
I_R	Reverse Current: The maximum reverse (leakage) current that will flow at the specified voltage and temperature.
I_Z, I_{ZT}, I_{ZK}	Regulator Current: The dc regulator current (I_Z), at a specified test point (I_{ZT}), near breakdown knee (I_{ZK}).
I_{ZM}	Maximum Regulator (Zener) Current: The maximum rated dc current for the specified power rating.
I_{ZSM}	Maximum Zener Surge Current: The non-repetitive peak value of Zener surge current at a specified wave form.
V_F	Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current.
V_R	Reverse Voltage: The reverse voltage dc value, no alternating component.
V_Z	Zener Voltage: The Zener voltage the device will exhibit at a specified current (I_Z) in its breakdown region.
Z_{ZT} or Z_{ZK}	Dynamic Impedance: The small signal impedance of the diode when biased to operate in its breakdown region at a specified rms current modulation (typically 10% of I_{ZT} or I_{ZK}) and superimposed on I_{ZT} or I_{ZK} respectively.

ELECTRICAL CHARACTERISTICS

JEDEC TYPE NUMBER (NOTE 1)	NOMINAL ZENER VOLTAGE (NOTE 2) V_Z	ZENER TEST CURRENT I_{ZT}	MAXIMUM ZENER IMPEDANCE Z_{ZT}			MAXIMUM DC ZENER CURRENT (NOTE 4) I_{ZM}	MAXIMUM SURGE CURRENT (NOTE 5) I_{ZSM}	MAXIMUM REVERSE LEAKAGE CURRENT I_R @ V_R		MAXIMUM TEMPERATURE COEFFICIENT α_{VZ}
	Volts	mA	Z_Z Ohms	Z_{ZK} @ I_{ZK} Ohms	µA	mA	mA	µA	Volts	%/°C
1N957BUR-1	6.8	18.5	4.5	700	250	55	300	150	5.2	+0.050
1N958BUR-1	7.5	16.5	5.5	700	250	50	275	75	5.7	+0.058
1N959BUR-1	8.2	15.0	6.5	700	250	45	250	50	6.2	+0.065
1N960BUR-1	9.1	14.0	7.5	700	250	41	225	25	6.9	+0.068
1N961BUR-1	10	12.5	8.5	700	250	38	200	10	7.6	+0.075
1N962BUR-1	11	11.5	9.5	700	250	35	590	1.0	8.4	+0.073
1N963BUR-1	12	10.5	11.5	700	250	32	540	1.0	9.1	+0.076
1N964BUR-1	13	9.5	13.0	700	250	30	500	0.5	9.9	+0.079
1N965BUR-1	15	8.5	16	700	250	26	433	0.5	11	+0.082
1N966BUR-1	16	7.8	17	700	250	25	406	0.5	12	+0.083
1N967BUR-1	18	7.0	21	750	250	21	361	0.5	14	+0.085
1N968BUR-1	20	6.2	25	750	250	19	325	0.5	15	+0.086
1N969BUR-1	22	5.6	29	750	250	17	295	0.5	17	+0.087
1N970BUR-1	24	5.2	33	750	250	16	271	0.5	18	+0.088
1N971BUR-1	27	4.6	41	750	250	14	240	0.5	21	+0.090
1N972BUR-1	30	4.2	49	1000	250	13	216	0.5	23	+0.091
1N973BUR-1	33	3.8	58	1000	250	12	197	0.5	25	+0.092
1N974BUR-1	36	3.4	70	1000	250	11	180	0.5	27	+0.093
1N975BUR-1	39	3.2	80	1000	250	9.1	166	0.5	30	+0.094
1N976BUR-1	43	3.0	93	1000	250	8.8	151	0.5	33	+0.095
1N977BUR-1	47	2.7	105	1500	250	7.9	138	0.5	36	+0.095
1N978BUR-1	51	2.5	125	1500	250	7.4	127	0.5	39	+0.096
1N979BUR-1	56	2.2	150	2000	250	6.9	116	0.5	43	+0.096
1N980BUR-1	62	2.0	185	2000	250	6.0	105	0.5	47	+0.097
1N981BUR-1	68	1.8	230	2000	250	5.5	95	0.5	52	+0.097
1N982BUR-1	75	1.7	270	2000	250	5.1	86	0.5	56	+0.098
1N983BUR-1	82	1.5	330	3000	250	4.6	79	0.5	62	+0.098
1N984BUR-1	91	1.4	400	3000	250	4.2	71	0.5	69	+0.099
1N985BUR-1	100	1.3	500	3000	250	3.7	65	0.5	76	+0.110
1N986BUR-1	110	1.1	750	4000	250	3.3	59	0.5	84	+0.110
1N987BUR-1	120	1.0	900	4500	250	3.1	54	0.5	91	+0.110
1N988BUR-1	130	0.95	1100	5000	250	2.7	50	0.5	99	+0.110
1N989BUR-1	150	0.85	1500	6000	250	2.4	43	0.5	114	+0.110
1N990BUR-1	160	0.80	1700	6500	250	2.2	40	0.5	122	+0.110
1N991BUR-1	180	0.68	2200	7100	250	2.0	36	0.5	137	+0.110
1N992BUR-1	200	0.65	2500	8000	250	1.8	32	0.5	152	+0.110

NOTES:

1 The JEDEC type numbers shown (B suffix) have a ± 5% tolerance on nominal Zener voltage. The suffix C will have ± 2% tolerance; and suffix D will have ± 1% tolerance.

2 Zener voltage (V_Z) is measured after the test current has been applied for 20 ± 5 seconds. Mounting clips shall be maintained at temperature of 25 ± 8/ - 2 °C.

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 The values of I_{ZM} are calculated for a ± 5% tolerance on nominal Zener voltage. Allowance has been made for the rise in Zener voltage above V_{ZT} which results from Zener impedance and the increase in junction temperature as power dissipation approaches 400 mW. In the case of individual diodes I_{ZM} is that value of current which results in a dissipation of 400 mW at 75°C lead temperature at 3/8" from body.

5 The surge for I_{ZSM} is a square wave or equivalent half-sine wave pulse of 1/120 sec. duration.

GRAPHS

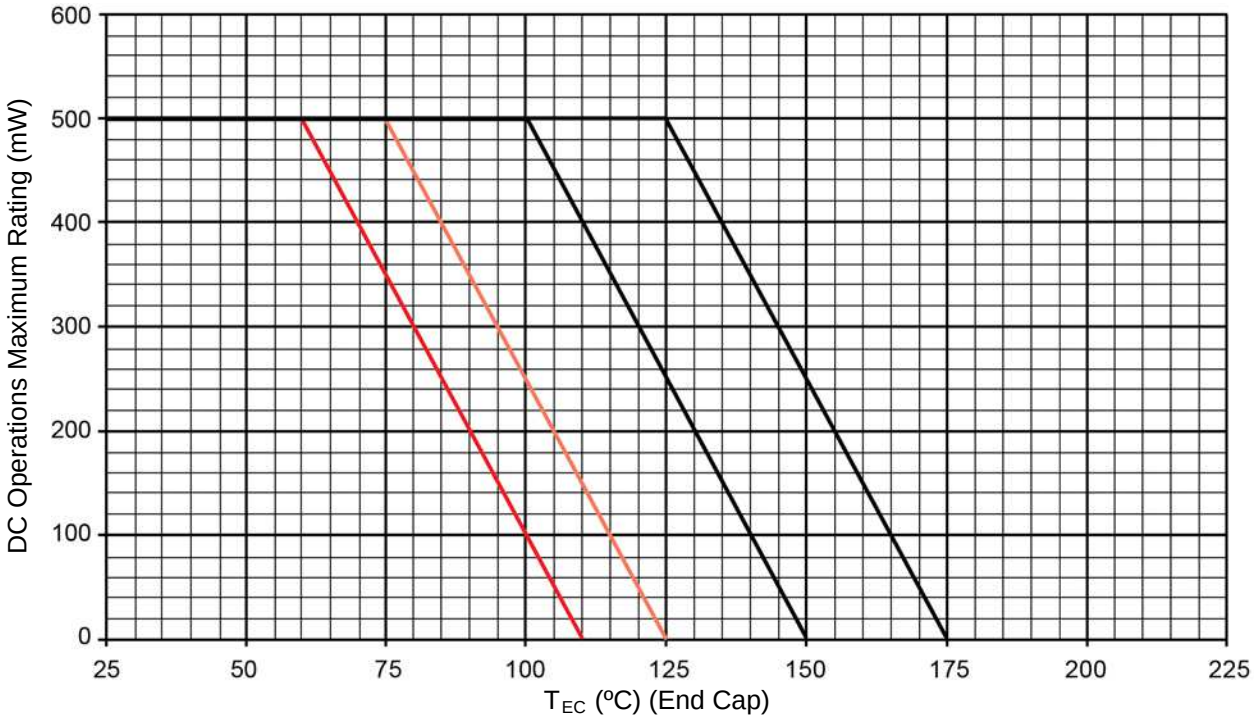


FIGURE 1
Temperature-Power Derating Curve

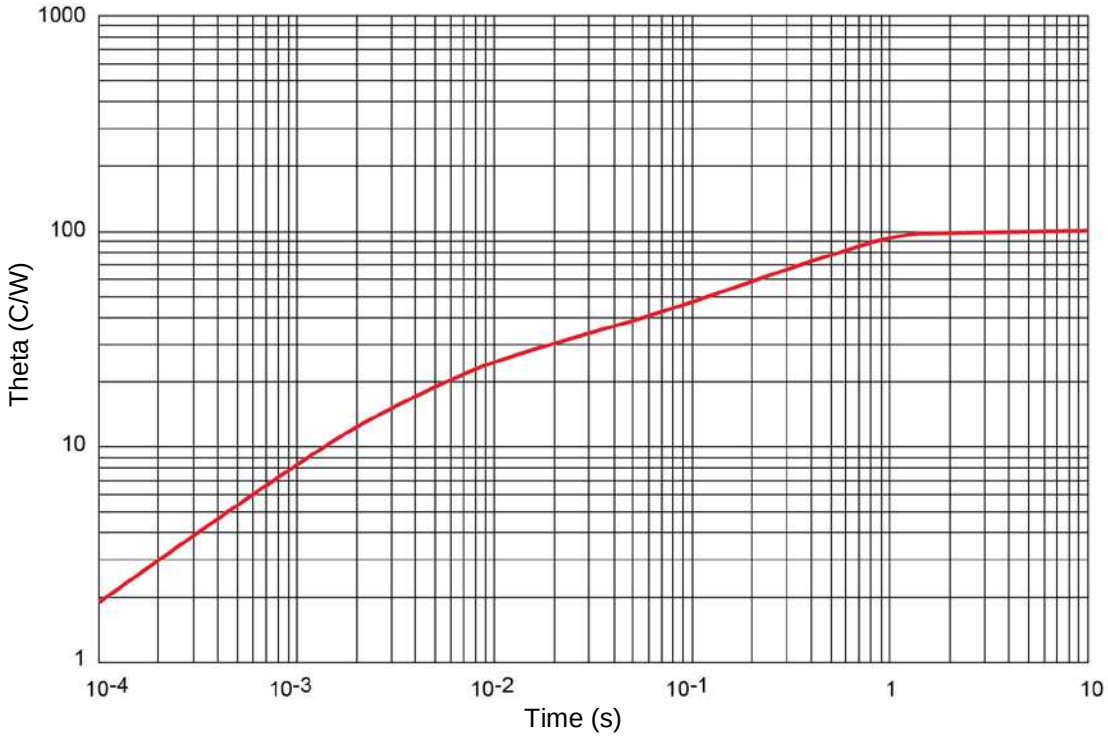
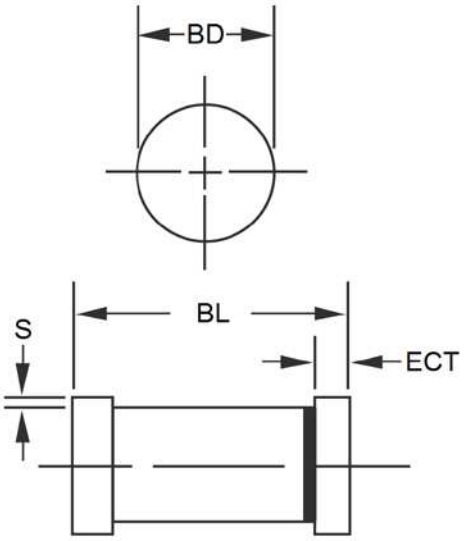


FIGURE 2
Thermal Impedance

PACKAGE DIMENSIONS

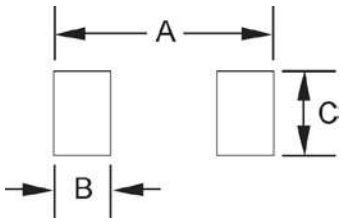


DIM	INCH		MILLIMETERS	
	MIN	MAX	MIN	MAX
BD	0.063	0.067	1.60	1.70
BL	0.130	0.146	3.30	3.71
ECT	0.016	0.022	0.41	0.56
S	0.001	-	0.03	-

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Dimensions are pre-solder dip.
3. Referencing to dimension S, minimum clearance of glass body to mounting surface on all orientations.
4. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

PAD LAYOUT



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