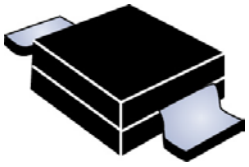
RoHS
Available on commercial versions

SILICON 2.0 Watt ZENER DIODES

DESCRIPTION

The SMBG5913B - SMBG5956B series of surface mount 2.0 watt Zeners provides a selection from 3.3 to 200 volts with different tolerance options available. This series is equivalent to the JEDEC registered 1N5913 thru 1N5956 series with identical electrical characteristics except these are rated at 2.0 W instead of 1.5 W with the lower thermal resistance features of the surface mount packaging. Its featured Gull-wing design in the DO-215AA package is ideal for visible solder connections. It is also available as RoHS compliant with an e3 suffix. Microsemi also offers numerous other Zener products to meet higher and lower power applications.

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



DO-215AA
Gull-wing Package
NOTE: All SMB series are equivalent to prior SMS package identifications.

Also available in:

DO-214AA package
(J-bend surface mount)
SMBJ5913 – SMBJ5956B

FEATURES

- Surface mount equivalent to JEDEC registered 1N5913 thru 1N5956 series.
- Ideal for high-density and low-profile mounting.
- Zener voltage available 3.3 V to 200 V.
- Standard voltage tolerances are plus/minus 5% and 10%.
- A tighter tolerance is available in plus or minus 2%.
- RoHS compliant versions available.

APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range.
- Wide selection from 3.3 to 200 V.
- Non-sensitive to ESD per MIL-STD-750 method 1020.
- Withstands high surge stresses (see Figure 2).
- Minimal changes of voltage versus current.
- High specified maximum current (I_{ZM}) when adequately heat sunk.
- Moisture classification is Level 1 per IPC/JEDEC J-STD-020B with no dry pack required.

MAXIMUM RATINGS

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T_J and T_{STG}	-65 to +150	°C
Thermal Resistance Junction-to-Lead	$R_{\Theta JL}$	35	°C/W
Thermal Resistance Junction-to-Ambient (1)	$R_{\Theta JA}$	100	°C/W
Steady-State Power Dissipation @ TL ≤ 80 °C (2)	P_D	2.0	W
Forward Voltage @ 200 mA	V_F	1.2	V
Solder Temperature @ 10 s	T_{SP}	260	°C

Notes: 1. When mounted on FR4 PC board (1oz Cu) with recommended footprint (see last page).
2. Or 1.25 watts at T_A = 25 °C when mounted on FR4 PC board with recommended footprint (also see Figure 1.)

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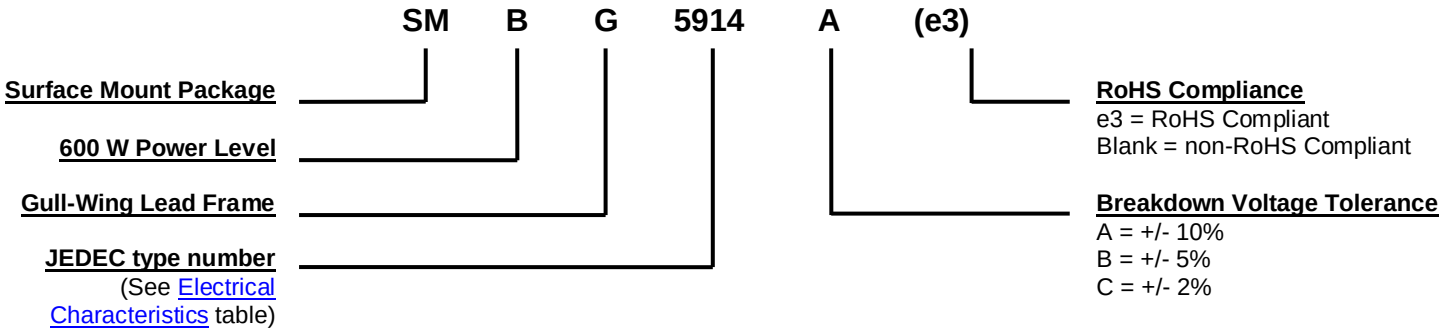
MECHANICAL and PACKAGING

- CASE: Void-free transfer molded thermosetting epoxy body meeting UL94V-0.
- TERMINALS: Tin-lead or RoHS compliant annealed matte-tin plating solderable per MIL-STD-750, method 2026.
- MARKING: Part number without SMBx prefix (e.g. 5914B, 5914Be3, MX5946C, 5956D, etc.).
- POLARITY: Cathode indicated by band. Diode to be operated with the banded end positive with respect to the opposite end for Zener regulation.
- TAPE & REEL option: Standard per EIA-481-1-A with 12 mm tape (add "TR" suffix to part number). Consult factory for quantities.
- WEIGHT: 0.1 grams.
- See Package Dimensions on last page.

PART NOMENCLATURE



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.
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 @ T_L = +30 ºC

MICROSEMI PART NUMBER	ZENER VOLTAGE V_Z	TEST CURRENT I_{ZT}	DYNAMIC IMPEDANCE Z_{ZT}	KNEE CURRENT I_{ZK}	KNEE IMPEDANCE Z_{ZK}	REVERSE CURRENT I_R	REVERSE VOLTAGE V_R	MAX. DC CURRENT I_{ZM}
	Volts	mA	Ohms	mA	Ohms	µA	Volts	mA
SMBG5913B	3.3	113.6	10.0	1.0	500	100.0	1.0	606
SMBG5914B	3.6	104.2	9.0	1.0	500	75.0	1.0	554
SMBG5915B	3.9	96.1	7.5	1.0	500	25.0	1.0	512
SMBG5916B	4.3	87.2	6.0	1.0	500	10.0	1.0	464
SMBG5917B	4.7	79.8	5.0	1.0	500	5.0	1.5	425
SMBG5918B	5.1	73.5	4.0	1.0	400	5.0	2.0	392
SMBG5919B	5.6	66.9	2.0	1.0	300	5.0	3.0	356
SMBG5920B	6.2	60.5	2.0	1.0	200	5.0	4.0	321
SMBG5921B	6.8	55.1	2.5	1.0	200	5.0	5.2	293
SMBG5922B	7.5	50.0	3.0	0.5	400	5.0	6.0	266
SMBG5923B	8.2	45.7	3.5	0.5	400	5.0	6.5	242
SMBG5924B	9.1	41.2	4.0	0.5	500	5.0	7.0	218
SMBG5925B	10	37.5	4.5	0.25	500	5.0	8.0	200
SMBG5926B	11	34.1	5.5	0.25	550	1.0	8.4	181
SMBG5927B	12	31.2	6.5	0.25	550	1.0	9.1	166
SMBG5928B	13	28.8	7.0	0.25	550	1.0	9.9	153
SMBG5929B	15	25.0	9.0	0.25	600	1.0	11.4	133
SMBG5930B	16	23.4	10.0	0.25	600	1.0	12.2	122
SMBG5931B	18	20.8	12.0	0.25	650	1.0	13.7	110
SMBG5932B	20	18.7	14.0	0.25	650	1.0	15.2	100
SMBG5933B	22	17.0	17.5	0.25	650	1.0	16.7	90
SMBG5934B	24	15.6	19.0	0.25	700	1.0	18.2	82
SMBG5935B	27	13.9	23.0	0.25	700	1.0	20.6	73
SMBG5936B	30	12.5	28.0	0.25	750	1.0	22.8	66
SMBG5937B	33	11.4	33.0	0.25	800	1.0	25.1	60
SMBG5938B	36	10.4	38.0	0.25	850	1.0	27.4	54
SMBG5939B	39	9.6	45.0	0.25	900	1.0	29.7	50
SMBG5940B	43	8.7	53.0	0.25	950	1.0	32.7	45
SMBG5941B	47	8.0	67.0	0.25	1000	1.0	35.8	41
SMBG5942B	51	7.3	70.0	0.25	1100	1.0	38.8	38
SMBG5943B	56	6.7	86.0	0.25	1300	1.0	42.6	34
SMBG5944B	62	6.0	100.0	0.25	1500	1.0	47.1	32
SMBG5945B	68	5.5	120.0	0.25	1700	1.0	51.2	29
SMBG5946B	75	5.0	140.0	0.25	2000	1.0	56.0	26
SMBG5947B	82	4.6	160.0	0.25	2500	1.0	62.2	24
SMBG5948B	91	4.1	200.0	0.25	3000	1.0	69.2	10
SMBG5949B	100	3.7	250.0	0.25	3100	1.0	76.0	20
SMBG5950B	110	3.4	300.0	0.25	4000	1.0	83.6	17
SMBG5951B	120	3.1	380.0	0.25	4500	1.0	91.2	16
SMBG5952B	130	2.9	450.0	0.25	5000	1.0	98.8	14
SMBG5953B	150	2.5	600.0	0.25	6000	1.0	114.0	13
SMBG5954B	160	2.3	700.0	0.25	6500	1.0	121.6	12
SMBG5955B	180	2.1	900.0	0.25	7000	1.0	136.8	10
SMBG5956B	200	1.9	1200.0	0.25	8000	1.0	152.0	9

NOTE 1: Zener voltage (Vz) is measured at T_L = 30 °C and 20 seconds after application of dc current.

NOTE 2: The Zener impedance is derived from 1 kHz ac voltage resulting from an ac current modulation having an rms value equal to 10% of the dc Zener current (I_{ZT} or I_{ZK}) superimposed on I_{ZT} or I_{ZK}. See MicroNote 202 for Zener impedance variation with different operating currents.

NOTE 3: The maximum dc current (I_{ZM}) is based only on the maximum power of 2.0 watts at $T_L \leq 80$ °C. These values must be reduced by 37.5% (1.25 W) when mounted on PC boards as described in Maximum Ratings.

GRAPHS

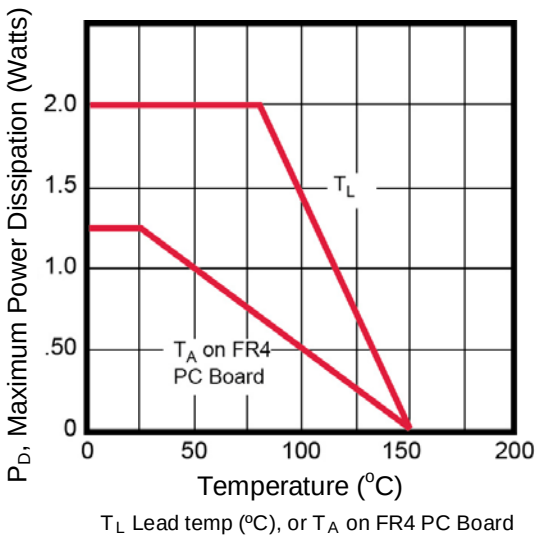


FIGURE 1 – Power Derating Curve

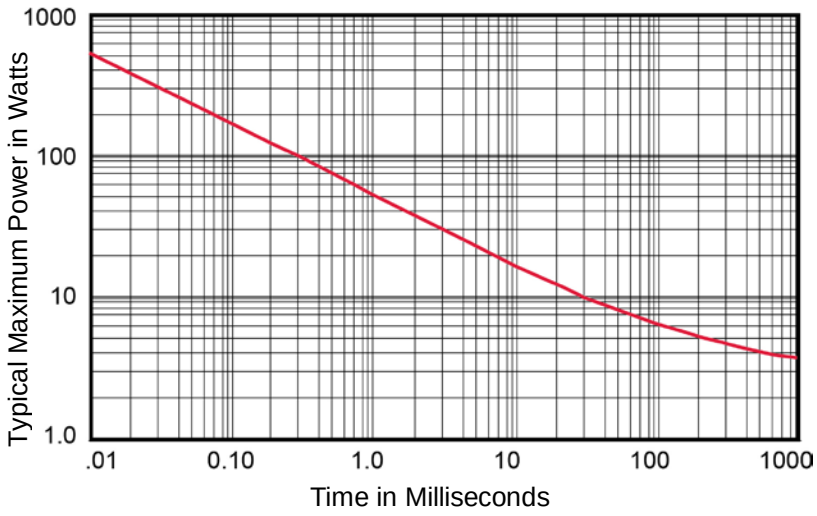


FIGURE 2 – Transient Surge Capability
Square-Wave Pulse Width
(non-Repetitive) in Milliseconds

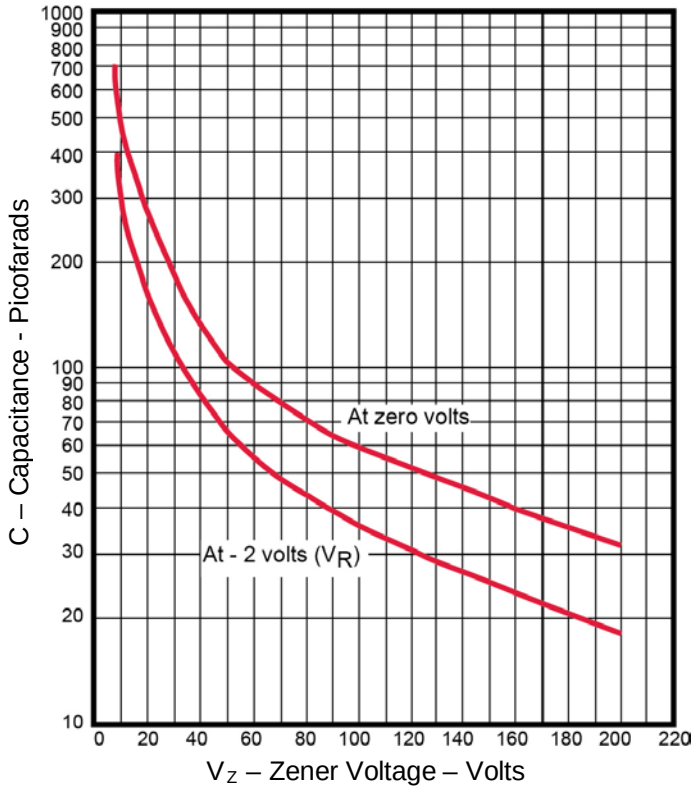
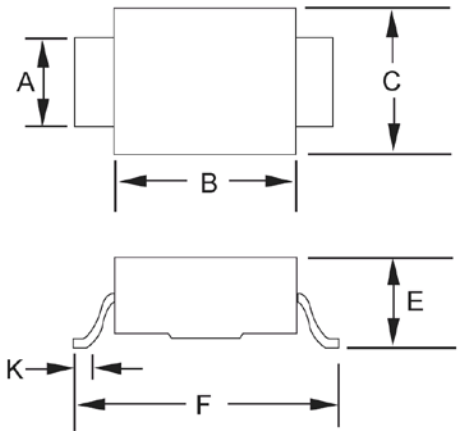


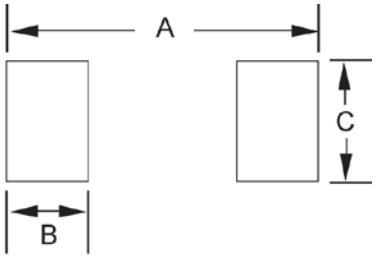
FIGURE 3 – Capacitance vs Zener Voltage

PACKAGE DIMENSIONS



Ltr	Dimensions			
	Inch		Millimeters	
	Min	Max	Min	Max
A	.077	.083	1.96	2.10
B	.160	.180	4.06	4.57
C	.130	.155	3.30	3.94
E	.077	.104	1.95	2.65
F	.235	.255	5.97	6.48
K	.015	.030	.381	.762

PAD LAYOUT



	Inch	Millimeters
A	0.320	8.13
B	0.085	2.16
C	0.110	2.79