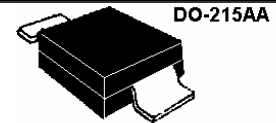


### DESCRIPTION

The SMBJ5913-5956B or SMBG5913-5956B series of surface mount 2.0 watt Zeners provides voltage regulation in a selection from 3.3 to 200 volts with different tolerances as identified by suffix letter on the part number. This series is equivalent to the JEDEC registered 1N5913 thru 1N5956B with identical electrical characteristics except it is rated at 2.0 W instead of 1.5 W with the lower thermal resistance features of the surface mount packaging. It is available in J-bend design (SMBJ) with the DO-214AA package for greater PC board mounting density or in Gull-wing design (SMBG) in the DO-215AA 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 most current data, consult MICROSEMI's website: <http://www.microsemi.com>

### APPEARANCE



**NOTE:** All SMB series are equivalent to prior SMS package identifications.

### FEATURES

- Surface mount equivalent to 1N5913 to 1N5956B
- Ideal for high-density and low-profile mounting
- Zener voltage available 3.3V to 200V
- Standard voltage tolerances are plus/minus 5% with B suffix and 10 % with A suffix identification
- Tight tolerances available in plus or minus 2% or 1% with C or D suffix respectively
- 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.
- RoHS Compliant devices available by adding an "e3" suffix

### MAXIMUM RATINGS

- Power dissipation at 25°C: 2.0 watts (also see derating in Figure 1).
- Operating and Storage temperature: -65°C to +150°C
- Thermal Resistance: 35 °C/W junction to lead, or 100 °C/W junction to ambient when mounted on FR4 PC board (1oz Cu) with recommended footprint (see last page)
- Steady-State Power: 2 watts at  $T_L \leq 80^\circ\text{C}$ , or 1.25 watts at  $T_A = 25^\circ\text{C}$  when mounted on FR4 PC board with recommended footprint (also see Figure 1)
- Forward voltage @200 mA: 1.2 volts (maximum)
- Solder Temperatures: 260 °C for 10 s (maximum)

### APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Wide selection from 3.3 to 200 V
- Popular DO-214AA or DO-215AA packages and footprints for either high density J-bend or Gull-wing designs for visible solder joints
- Nonsensitive to ESD per MIL-STD-750 Method 1020
- Withstands high surge stresses (see Figure 2)
- Moisture classification: Level 1 per IPC/JEDEC J-STD-020B with no dry pack required

### MECHANICAL AND PACKAGING

- CASE: Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- TERMINALS: Gull-wing or C-bend (modified J-bend) tin-lead or RoHS compliant annealed matte-Tin plating solderable per MIL-STD-750, method 2026
- POLARITY: Cathode indicated by band. Diode to be operated with banded end positive with respect to opposite end for Zener regulation
- MARKING: Includes part number without prefix (e.g. 5913B, 5913Be3, 5948C, 5956D, etc.)
- TAPE & REEL option: Standard per EIA-481-1-A with 12 mm tape, 750 per 7 inch reel or 2500 per 13 inch reel (add "TR" suffix to part number)
- WEIGHT: 0.1 grams
- See package dimensions on last page

**ELECTRICAL CHARACTERISTICS @  $T_L = 30^\circ\text{C}$**

MICROSEMI PART NUMBER		ZENER VOLTAGE	TEST CURRENT	DYNAMIC IMPEDANCE	KNEE CURRENT	KNEE IMPEDANCE	REVERSE CURRENT	REVERSE VOLTAGE	MAX. DC CURRENT
GULL-WING LEAD	C-BEND (MOD. "J")	$V_Z$	$I_{ZT}$	$Z_{ZT}$	$I_{ZK}$	$Z_{ZK}$	$I_R$	$V_R$	$I_{ZM}$
		Volts	mA	Ohms	mA	Ohms	$\mu\text{adc}$	Volts	mA
SMBG5913	SMBJ5913	3.3	113.6	10.0	1.0	500	100.0	1.0	606
SMBG5914	SMBJ5914	3.6	104.2	9.0	1.0	500	75.0	1.0	554
SMBG5915	SMBJ5915	3.9	96.1	7.5	1.0	500	25.0	1.0	512
SMBG5916	SMBJ5916	4.3	87.2	6.0	1.0	500	5.0	1.0	464
SMBG5917	SMBJ5917	4.7	79.8	5.0	1.0	500	5.0	1.5	425
SMBG5918	SMBJ5918	5.1	73.5	4.0	1.0	350	5.0	2.0	392
SMBG5919	SMBJ5919	5.6	66.9	2.0	1.0	250	5.0	3.0	356
SMBG5920	SMBJ5920	6.2	60.5	2.0	1.0	200	5.0	4.0	321
SMBG5921	SMBJ5921	6.8	55.1	2.5	1.0	200	5.0	5.2	293
SMBG5922	SMBJ5922	7.5	50.0	3.0	0.5	400	5.0	6.0	266
SMBG5923	SMBJ5923	8.2	45.7	3.5	0.5	400	5.0	6.5	242
SMBG5924	SMBJ5924	9.1	41.2	4.0	0.5	500	5.0	7.0	218
SMBG5925	SMBJ5925	10	37.5	4.5	0.25	500	5.0	8.0	200
SMBG5926	SMBJ5926	11	34.1	5.5	0.25	550	1.0	8.4	181
SMBG5927	SMBJ5927	12	31.2	6.5	0.25	550	1.0	9.1	166
SMBG5928	SMBJ5928	13	28.8	7.0	0.25	550	1.0	9.9	153
SMBG5929	SMBJ5929	15	25.0	9.0	0.25	600	1.0	11.4	133
SMBG5930	SMBJ5930	16	23.4	10.0	0.25	600	1.0	12.2	122
SMBG5931	SMBJ5931	18	20.8	12.0	0.25	650	1.0	13.7	110
SMBG5932	SMBJ5932	20	18.7	14.0	0.25	650	1.0	15.2	100
SMBG5933	SMBJ5933	22	17.0	17.5	0.25	650	1.0	16.7	90
SMBG5934	SMBJ5934	24	15.6	19.0	0.25	700	1.0	18.2	82
SMBG5935	SMBJ5935	27	13.9	23.0	0.25	700	1.0	20.6	73
SMBG5936	SMBJ5936	30	12.5	28.0	0.25	750	1.0	22.8	66
SMBG5937	SMBJ5937	33	11.4	33.0	0.25	800	1.0	25.1	60
SMBG5938	SMBJ5938	36	10.4	38.0	0.25	850	1.0	27.4	54
SMBG5939	SMBJ5939	39	9.6	45.0	0.25	900	1.0	29.7	50
SMBG5940	SMBJ5940	43	8.7	53.0	0.25	950	1.0	32.7	45
SMBG5941	SMBJ5941	47	8.0	67.0	0.25	1000	1.0	35.8	41
SMBG5942	SMBJ5942	51	7.3	70.0	0.25	1100	1.0	38.8	38
SMBG5943	SMBJ5943	56	6.7	86.0	0.25	1300	1.0	42.6	34
SMBG5944	SMBJ5944	62	6.0	100.0	0.25	1500	1.0	47.1	32
SMBG5945	SMBJ5945	68	5.5	120.0	0.25	1700	1.0	51.2	29
SMBG5946	SMBJ5946	75	5.0	140.0	0.25	2000	1.0	56.0	26
SMBG5947	SMBJ5947	82	4.6	160.0	0.25	2500	1.0	62.2	24
SMBG5948	SMBJ5948	91	4.1	200.0	0.25	3000	1.0	69.2	10
SMBG5949	SMBJ5949	100	3.7	250.0	0.25	3100	1.0	76.0	20
SMBG5950	SMBJ5950	110	3.4	300.0	0.25	4000	1.0	83.6	17
SMBG5951	SMBJ5951	120	3.1	380.0	0.25	4500	1.0	91.2	16
SMBG5952	SMBJ5952	130	2.9	450.0	0.25	5000	1.0	98.8	14
SMBG5953	SMBJ5953	150	2.5	600.0	0.25	6000	1.0	114.0	13
SMBG5954	SMBJ5954	160	2.3	700.0	0.25	6500	1.0	121.6	12
SMBG5955	SMBJ5955	180	2.1	900.0	0.25	7000	1.0	136.8	10
SMBG5956	SMBJ5956	200	1.9	1200.0	0.25	8000	1.0	152.0	9

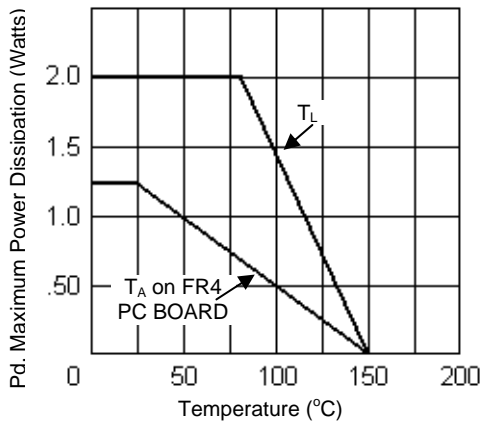
**NOTE 1:** No suffix indicates a +/- 20% tolerance on nominal  $V_Z$ . Suffix A denotes a +/-10% tolerance, B denotes a +/-5% tolerance, C denotes a +/-2% tolerance, and D denotes a +/-1% tolerance.

**NOTE 2:** Zener voltage ( $V_Z$ ) is measured at  $T_L = 30^\circ\text{C}$  and 20 seconds after application of dc current.

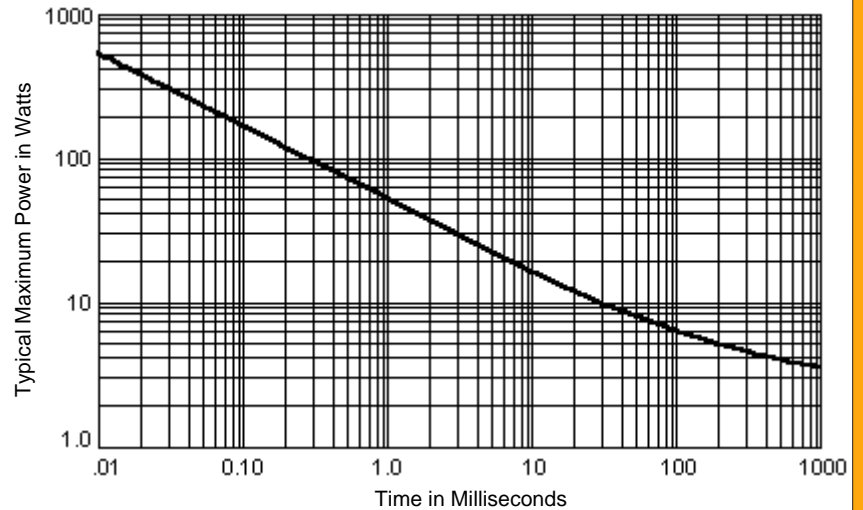
**NOTE 3:** The zener impedance is derived from 1 kHz ac voltage resulting from an ac current modulation having an rms value equal to 10% of the dc zener current ( $I_{ZT}$  or  $I_{ZK}$ ) superimposed on  $I_{ZT}$  or  $I_{ZK}$ . See Micro Note 202 for zener impedance variation with different operating currents.

**NOTE 4:** The maximum dc current ( $I_{ZM}$ ) is based only on the maximum power of 2.0 watts at  $T_L \leq 80^\circ\text{C}$ . These values must be reduced by 37.5% (1.25 W) when mounted on PC boards as described in Maximum Ratings.

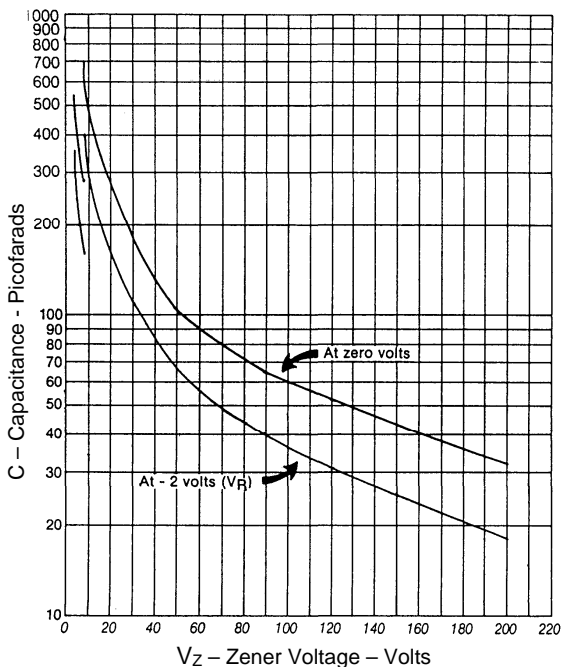
**GRAPHS**



$T_L$  Lead temp (°C), or  $T_A$  on FR4 PC Board  
**FIGURE 1 – Power Derating Curve**

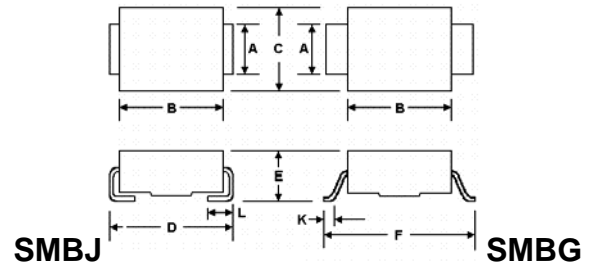


**FIGURE 2 – Transient Surge Capability**  
Square-Wave Pulse Width  
(non-Repetitive) in Milliseconds



**FIGURE 3 – Capacitance vs Zener Voltage**

**PACKAGE DIMENSIONS & PAD LAYOUT**



	A	B	C	D	E	F	K	L
<b>MIN</b>	.077	.160	.130	.205	.077	.235	.015	.030
<b>MAX</b>	.083	.180	.155	.220	.104	.255	.030	.060
DIMENSIONS IN MILLIMETERS								
<b>MIN</b>	1.96	4.06	3.30	5.21	1.95	5.97	.381	.760
<b>MAX</b>	2.10	4.57	3.94	5.59	2.65	6.48	.762	1.520

	INCHES	mm	
<b>A</b>	0.320	8.13	<b>SMBG</b>
<b>B</b>	0.085	2.16	
<b>C</b>	0.110	2.79	
	INCHES	mm	
<b>A</b>	.260	6.60	<b>SMBJ</b>
<b>B</b>	.085	2.16	
<b>C</b>	.110	2.79	