SMAJ5913 thru SMAJ5956, e3

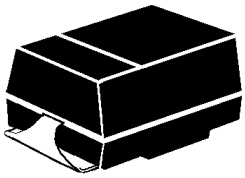
SILICON 3.0 Watt ZENER DIODE

Microsemi
SCOTTSDALE DIVISION

DESCRIPTION

The SMAJ5913-5956B series of surface mount 3.0 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. It is equivalent to the JEDEC registered 1N5913 thru 1N5956B with identical electrical characteristics except it is rated at 3.0 W instead of 1.5 W with the lower thermal resistance features of this surface mount packaging. These plastic encapsulated Zeners have a moisture classification of Level 1 with no dry pack required and are also available in military equivalent screening levels by adding a prefix identifier as further described in the Features section. Microsemi also offers numerous other Zener products to meet higher and lower power applications.

PACKAGE



DO-214AC or BA (SMAJ)

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

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 an "e3" suffix

APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Wide selection from 3.3 to 200 V
- Flexible axial-lead mounting terminals
- Nonsensitive to ESD per MIL-STD-750 Method 1020
- High specified maximum current (I_{ZM}) when adequately heat sinking
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B

MAXIMUM RATINGS

- Power dissipation at 25°C: 3.0 watts (also see derating in Figure 1).
- Operating and Storage temperature: -65°C to +150°C
- Thermal Resistance: 15 °C/W junction to lead, or 80°C/W junction to ambient when mounted on FR4 PC board (1oz Cu) with recommended footprint (see last page)
- Steady-State Power: 3 watts at $T_L \leq 105$°C, or 1.56 watts at $T_A = 25$°C when mounted on FR4 PC board with recommended footprint (also see Figure1)
- Forward voltage @200 mA: 1.2 volts (maximum)
- Solder Temperatures: 260°C for 10 s (maximum)

MECHANICAL AND PACKAGING

- CASE: Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- TERMINALS: C-bend (modified J-bend) leads, 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 the banded end positive with respect to the opposite end for Zener regulation
- MARKING: Includes part number without prefix (e.g. 5913B, 5916Be3, 5926C, 5951De3, 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

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ELECTRICAL CHARACTERISTICS @ T_L = 30°C

JEDEC TYPE 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 (MAX.)	REVERSE VOLTAGE V_R	MAX. DC CURRENT I_{ZM}
	Volts	mA	Ohms	mA	Ohms	µAdc	Volts	mA
SMAJ5913	3.3	113.6	10	1.0	500	100	1.0	908
SMAJ5914	3.6	104.2	9.0	1.0	500	75	1.0	832
SMAJ5915	3.9	96.1	7.5	1.0	500	25	1.0	768
SMAJ5916	4.3	87.2	6.0	1.0	500	5.0	1.0	696
SMAJ5917	4.7	79.8	5.0	1.0	500	5.0	1.5	638
SMAJ5918	5.1	73.5	4.0	1.0	350	5.0	2.0	588
SMAJ5919	5.6	66.9	2.0	1.0	250	5.0	3.0	534
SMAJ5920	6.2	60.5	2.0	1.0	200	5.0	4.0	482
SMAJ5921	6.8	55.1	2.5	1.0	200	5.0	5.2	440
SMAJ5922	7.5	50	3.0	0.5	400	5.0	6.0	400
SMAJ5923	8.2	45.7	3.5	0.5	400	5.0	6.5	364
SMAJ5924	9.1	41.2	4.0	0.5	500	5.0	7.0	328
SMAJ5925	10	37.5	4.5	0.25	500	5.0	8.0	300
SMAJ5926	11	34.1	5.5	0.25	550	1.0	8.4	272
SMAJ5927	12	31.2	6.5	0.25	550	1.0	9.1	250
SMAJ5928	13	28.8	7.0	0.25	550	1.0	9.9	230
SMAJ5929	15	25	9.0	0.25	600	1.0	11.4	200
SMAJ5930	16	23.4	10	0.25	600	1.0	12.2	186
SMAJ5931	18	20.8	12	0.25	650	1.0	13.7	166
SMAJ5932	20	18.7	14	0.25	650	1.0	15.2	150
SMAJ5933	22	17	17.5	0.25	650	1.0	16.7	136
SMAJ5934	24	15.6	19	0.25	700	1.0	18.2	124
SMAJ5935	27	13.9	23	0.25	700	1.0	20.6	110
SMAJ5936	30	12.5	28	0.25	750	1.0	22.8	100
SMAJ5937	33	11.4	33	0.25	800	1.0	25.1	90
SMAJ5938	36	10.4	38	0.25	850	1.0	27.4	82
SMAJ5939	39	9.6	45	0.25	900	1.0	29.7	76
SMAJ5940	43	8.7	53	0.25	950	1.0	32.7	68
SMAJ5941	47	8.0	67	0.25	1000	1.0	35.8	62
SMAJ5942	51	7.3	70	0.25	1100	1.0	38.8	58
SMAJ5943	56	6.7	86	0.25	1300	1.0	42.6	52
SMAJ5944	62	6.0	100	0.25	1500	1.0	47.1	48
SMAJ5945	68	5.5	120	0.25	1700	1.0	51.2	44
SMAJ5946	75	5.0	140	0.25	2000	1.0	56	40
SMAJ5947	82	4.6	160	0.25	2500	1.0	62.2	36
SMAJ5948	91	4.1	200	0.25	3000	1.0	69.2	32
SMAJ5949	100	3.7	250	0.25	3100	1.0	76	30
SMAJ5950	110	3.4	300	0.25	4000	1.0	83.6	26
SMAJ5951	120	3.1	380	0.25	4500	1.0	91.2	24
SMAJ5952	130	2.9	450	0.25	5000	1.0	98.8	22
SMAJ5953	150	2.5	600	0.25	6000	1.0	114	20
SMAJ5954	160	2.3	700	0.25	6500	1.0	121.6	18
SMAJ5955	180	2.1	900	0.25	7000	1.0	136.8	16
SMAJ5956	200	1.9	1200	0.25	8000	1.0	152	14

NOTES:

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.
2. Zener voltage (V_Z) is measured at T_L = 30°C and 90 seconds after application of dc current.
3. The zener impedance is derived from the 60 Hz ac voltage, which results when an 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}.
4. The maximum dc current (I_{ZM}) is based only on the maximum power of 3.0 watts at $T_L \leq 105$°C. These values must be reduced by 48% (1.56 W) when mounted on PC boards as described in Maximum Ratings.

GRAPHS

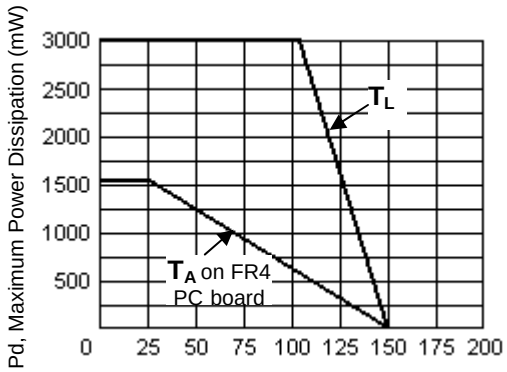


FIGURE 1
POWER DERATING CURVE

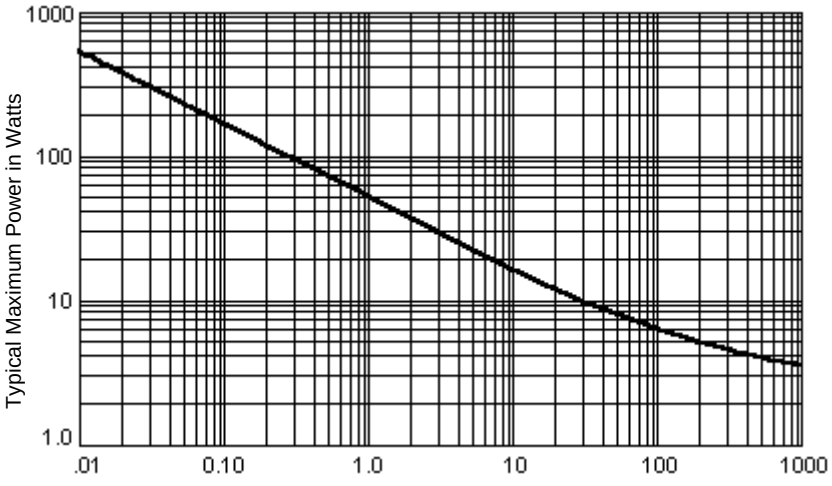


FIGURE 2
TRANSIENT SURGE CAPABILITY

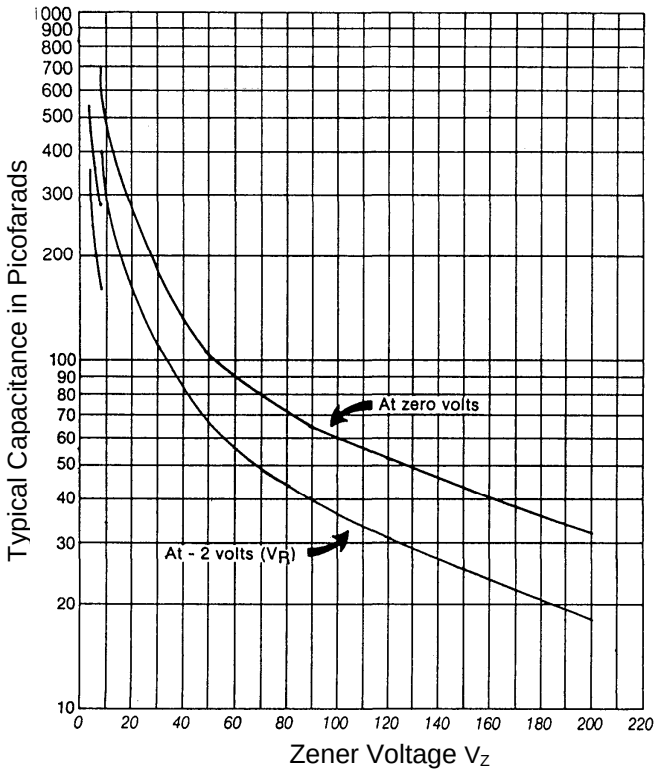
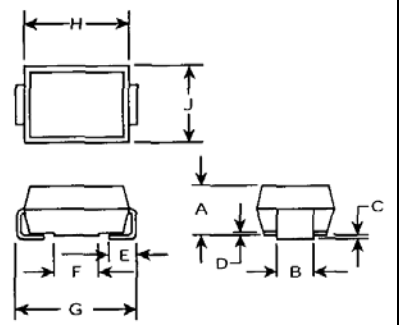
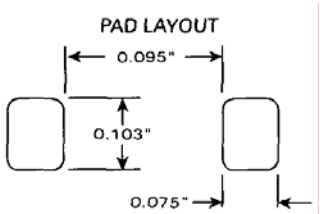


FIGURE 3 - CAPACITANCE vs. V_Z CURVE

DIMENSIONS & LAYOUT





DIM	INCHES MIN / MAX	MILLIMETERS MIN / MAX	NOTE
A	.078 / .115	1.98 / 2.92	1
B	.052 / .103	1.32 / 2.61	1
C	- / .005	- / .127	
D	- / .02	- / .51	
E	.030 / .060	.76 / 1.52	
F	.055 / .075	1.65 / 2.13	
G	.194 / .216	4.93 / 5.48	
H	.160 / .180	3.99 / 4.50	
J	.100 / .110	2.57 / 2.79	

NOTE 1: DIMENSION A IS WITHIN DO-214BA BUT HIGHER THAN DO-214AC STANDARD JEDEC OUTLINES. DIMENSION B IS WIDER THAN BOTH JEDEC OUTLINES FOR LOWER THERMAL RESISTANCE.