

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

3 Watt Plastic Surface Mount Silicon Zener Diodes

This complete new line of 3 Watt Zener Diodes offers the following advantages.

Specification Features:

- A Complete Voltage Range — 3.3 to 200 Volts
- Flat Handling Surface for Accurate Placement
- Package Design for Top Side or Bottom Circuit Board Mounting
- Available in Tape and Reel

Mechanical Characteristics:

CASE: Void-free, transfer-molded plastic

MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260°C for 10 seconds

FINISH: All external surfaces are corrosion resistant with readily solderable leads

POLARITY: Cathode indicated by molded polarity notch. When operated in zener mode, cathode will be positive with respect to anode.

MOUNTING POSITION: Any

WEIGHT: Modified L-Bend providing more contact area to bond pad

WAFER FAB LOCATION: Phoenix, Arizona

ASSEMBLY/TEST LOCATION: Seremban, Malaysia

**1SMB5913BT3
through
1SMB5956BT3**

**PLASTIC SURFACE MOUNT
ZENER DIODES
3 WATTS
3.3-200 VOLTS**



**CASE 403A
PLASTIC**

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
DC Power Dissipation @ $T_L = 75^\circ\text{C}$, Measured at Zero Lead Length Derate above 75°C	P_D	3 40	Watts $\text{mW}/^\circ\text{C}$
DC Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	830 6.6	mW $\text{mW}/^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	- 65 to +150	$^\circ\text{C}$

*FR4 Board, within 1" to device, using Motorola minimum recommended footprint, as shown in case 403A outline dimensions spec.

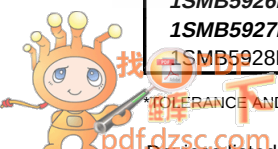
ELECTRICAL CHARACTERISTICS ($T_L = 30^\circ\text{C}$ unless otherwise noted.) ($V_F = 1.5$ Volts Max @ $I_F = 200$ mAdc for all types.)

Device*	Nominal Zener Voltage V_Z @ I_Z Volts (Note 1)	Test Current I_Z mA	Max Zener Impedance (Note 2)			Max Reverse Leakage Current		Maximum DC Zener Current I_{ZM} mAdc	Device Marking
			Z_{ZT} @ I_Z Ohms	Z_{ZK} Ohms	@ I_{ZK} mA	I_R μA	@ V_R Volts		
1SMB5913BT3	3.3	113.6	10	500	1	100	1	454	913B
1SMB5914BT3	3.6	104.2	9	500	1	75	1	416	914B
1SMB5915BT3	3.9	96.1	7.5	500	1	25	1	384	915B
1SMB5916BT3	4.3	87.2	6	500	1	5	1	348	916B
1SMB5917BT3	4.7	79.8	5	500	1	5	1.5	319	917B
1SMB5918BT3	5.1	73.5	4	350	1	5	2	294	918B
1SMB5919BT3	5.6	66.9	2	250	1	5	3	267	919B
1SMB5920BT3	6.2	60.5	2	200	1	5	4	241	920B
1SMB5921BT3	6.8	55.1	2.5	200	1	5	5.2	220	921B
1SMB5922BT3	7.5	50	3	400	0.5	5	6.8	200	922B
1SMB5923BT3	8.2	45.7	3.5	400	0.5	5	6.5	182	923B
1SMB5924BT3	9.1	41.2	4	500	0.5	5	7	164	924B
1SMB5925BT3	10	37.5	4.5	500	0.25	5	8	150	925B
1SMB5926BT3	11	34.1	5.5	550	0.25	1	8.4	136	926B
1SMB5927BT3	12	31.2	6.5	550	0.25	1	9.1	125	927B
1SMB5928BT3	13	28.8	7	550	0.25	1	9.9	115	928B

TOLERANCE AND VOLTAGE DESIGNATION Tolerance designation — The type numbers listed indicate a tolerance of $\pm 5\%$.

(continued)

Devices listed in bold, italic are Motorola preferred devices.



1SMB5913BT3 Series

ELECTRICAL CHARACTERISTICS — continued ($T_L = 30^\circ\text{C}$ unless otherwise noted.) ($V_F = 1.5$ Volts Max @ $I_F = 200$ mAdc for all types.)

Device*	Nominal Zener Voltage $V_Z @ I_{ZT}$ Volts (Note 1)	Test Current I_{ZT} mA	Max Zener Impedance (Note 2)			Max Reverse Leakage Current		Maximum DC Zener Current I_{ZM} mAdc	Device Marking
			$Z_{ZT} @ I_{ZT}$ Ohms	Z_{ZK} Ohms	@ I_{ZK} mA	I_R μA	@ V_R Volts		
1SMB5929BT3	15	25	9	600	0.25	1	11.4	100	929B
1SMB5930BT3	16	23.4	10	600	0.25	1	12.2	93	930B
1SMB5931BT3	18	20.8	12	650	0.25	1	13.7	83	931B
1SMB5932BT3	20	18.7	14	650	0.25	1	15.2	75	932B
1SMB5933BT3	22	17	17.5	650	0.25	1	16.7	68	933B
1SMB5934BT3	24	15.6	19	700	0.25	1	18.2	62	934B
1SMB5935BT3	27	13.9	23	700	0.25	1	20.6	55	935B
1SMB5936BT3	30	12.5	26	750	0.25	1	22.8	50	936B
1SMB5937BT3	33	11.4	33	800	0.25	1	25.1	45	937B
1SMB5938BT3	36	10.4	38	850	0.25	1	27.4	41	938B
1SMB5939BT3	39	9.6	45	900	0.25	1	29.7	38	939B
1SMB5940BT3	43	8.7	53	950	0.25	1	32.7	34	940B
1SMB5941BT3	47	8	67	1000	0.25	1	35.8	31	941B
1SMB5942BT3	51	7.3	70	1100	0.25	1	38.8	29	942B
1SMB5943BT3	56	6.7	86	1300	0.25	1	42.6	26	943B
1SMB5944BT3	62	6	100	1500	0.25	1	47.1	24	944B
1SMB5945BT3	68	5.5	120	1700	0.25	1	51.7	22	945B
1SMB5946BT3	75	5	140	2000	0.25	1	56	20	946B
1SMB5947BT3	82	4.6	160	2500	0.25	1	62.2	18	947B
1SMB5948BT3	91	4.1	200	3000	0.25	1	69.2	16	948B
1SMB5949BT3	100	3.7	250	3100	0.25	1	76	15	949B
1SMB5950BT3	110	3.4	300	4000	0.25	1	83.6	13	950B
1SMB5951BT3	120	3.1	380	4500	0.25	1	91.2	12	951B
1SMB5952BT3	130	2.9	450	5000	0.25	1	98.8	11	952B
1SMB5953BT3	150	2.5	600	6000	0.25	1	114	10	953B
1SMB5954BT3	160	2.3	700	6500	0.25	1	121.6	9	954B
1SMB5955BT3	180	2.1	900	7000	0.25	1	136.8	8	955B
1SMB5956BT3	200	1.9	1200	8000	0.25	1	152	7	956B

*TOLERANCE AND VOLTAGE DESIGNATION Tolerance designation — The type numbers listed indicate a tolerance of $\pm 5\%$.

1SMB5913BT3 Series

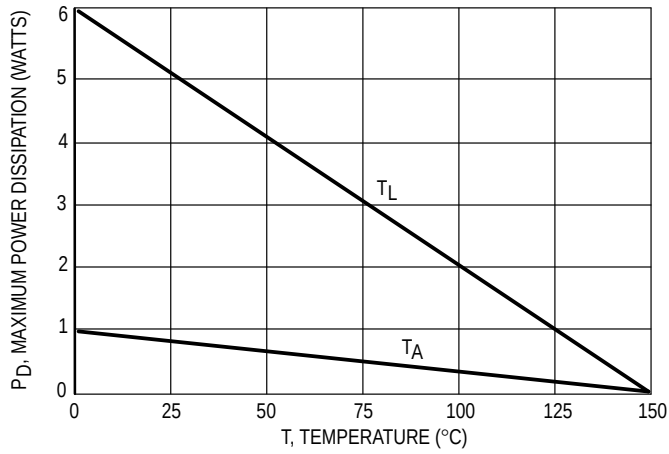


Figure 1. Steady State Power Derating

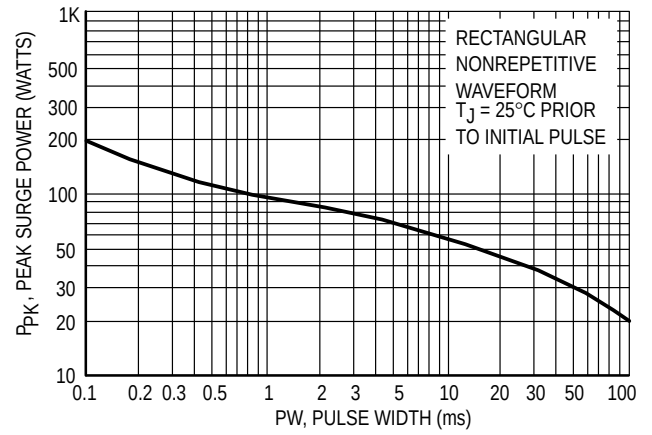


Figure 2. Maximum Surge Power

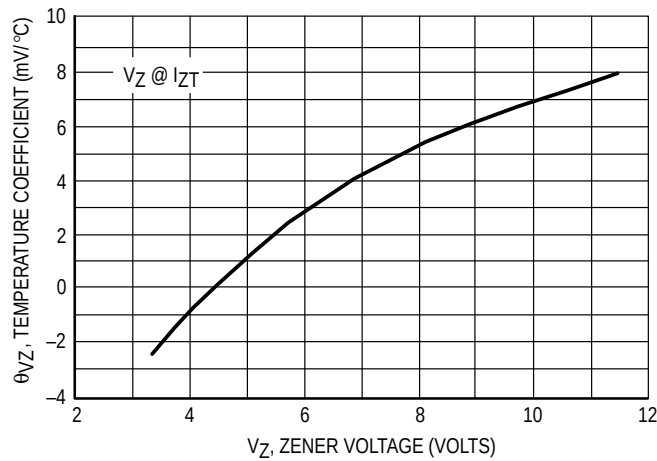


Figure 3. Zener Voltage — To 12 Volts

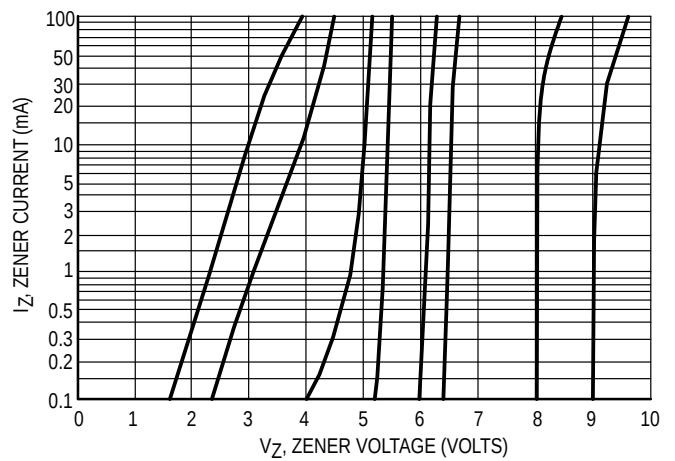


Figure 4. $V_Z = 3.3$ thru 10 Volts

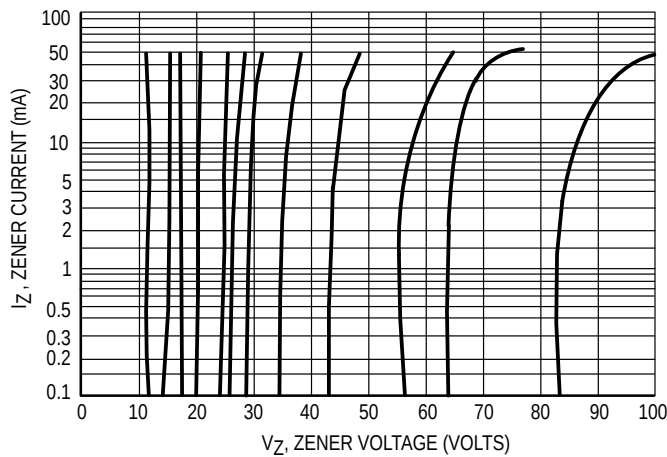


Figure 5. $V_Z = 12$ thru 82 Volts

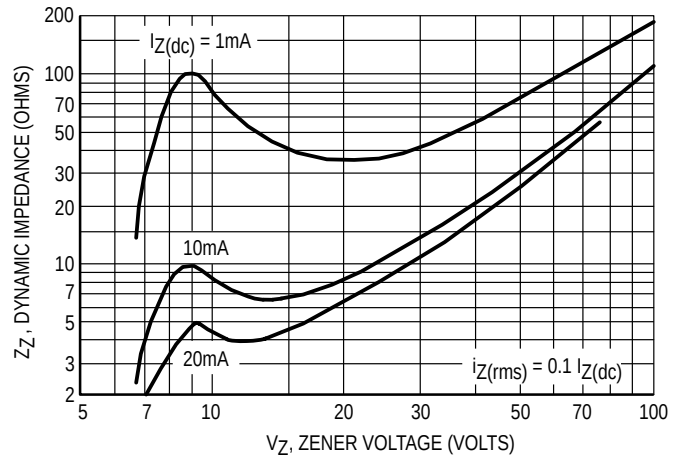


Figure 6. Effect of Zener Voltage

1SMB5913BT3 Series

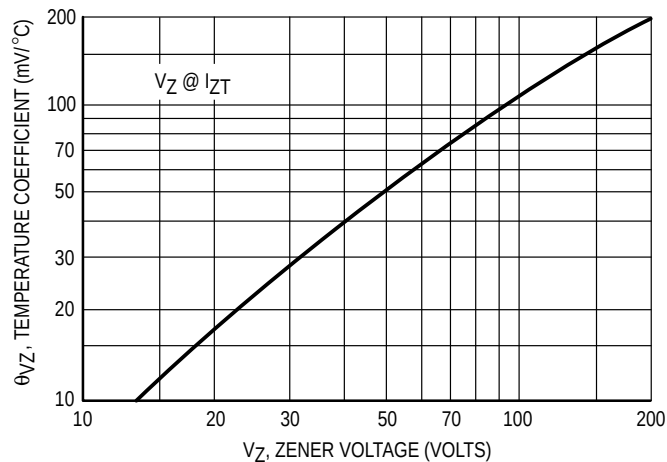


Figure 7. Zener Voltage — 14 To 200 Volts

NOTE 1. ZENER VOLTAGE (V_Z) MEASUREMENT

Nominal zener voltage is measured with the device junction in thermal equilibrium with ambient temperature at 25°C.

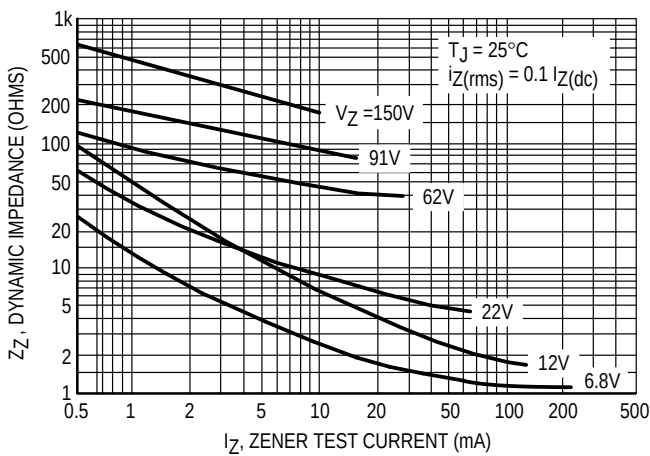


Figure 8. Effect of Zener Current

NOTE 2. ZENER IMPEDANCE (Z_Z) DERIVATION

Z_{ZT} and Z_{ZK} are measured by dividing the ac voltage drop across the device by the ac current applied. The specified limits are for $I_{Z(\text{ac})} = 0.1 I_{Z(\text{dc})}$ with the ac frequency = 60 Hz.