

## 500mW, 5% Tolerance SMD Zener Diode

### FEATURES

- Wide zener voltage range selection: 2.4V to 51V
- $V_Z$  tolerance selection of  $\pm 5\%$
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

### APPLICATIONS

- Low voltage stabilizers or voltage references
- Adapters
- On-board DC/DC converter

### MECHANICAL DATA

- Case: SOD-123F
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Polarity: Indicated by cathode band
- Weight: 8.85mg (approximately)

KEY PARAMETERS		
PARAMETER	VALUE	UNIT
$V_Z$	2.4 - 51	V
$P_D$	500	mW
$V_F$ at $I_F = 10\text{mA}$	0.9	V
$T_{J\text{MAX}}$	150	$^{\circ}\text{C}$
Package	SOD-123F	
Configuration	Single die	


**SOD-123F**


### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^{\circ}\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	VALUE	UNIT
Forward voltage @ $I_F = 10\text{mA}$	$V_F$	0.9	V
Power dissipation	$P_D$	500	mW
Junction temperature range	$T_J$	-65 to +150	$^{\circ}\text{C}$
Storage temperature range	$T_{\text{STG}}$	-65 to +150	$^{\circ}\text{C}$

### THERMAL PERFORMANCE

PARAMETER	SYMBOL	TYP	UNIT
Junction-to-ambient thermal resistance	$R_{\theta\text{JA}}$	330	$^{\circ}\text{C/W}$

**ELECTRICAL SPECIFICATIONS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

PART NUMBER	MARKING CODE	ZENER VOLTAGE			TEST CURRENT	REGULAR IMPEDANCE		TEST CURRENT	LEAKAGE CURRENT	
		$V_Z @ I_{ZT}$			$I_{ZT}$	$Z_{ZT} @ I_{ZT}$	$Z_{ZK} @ I_{ZK}$	$I_{ZK}$	$I_R @ V_R$	
		Min	Nom	Max	mA	$\Omega$	$\Omega$	mA	$\mu\text{A}$	V
MMSZ5221B	Z2V4	2.28	2.4	2.52	20	30	1200	0.25	100	1
MMSZ5225B	Z3V0	2.85	3.0	3.15	20	29	1600	0.25	50	1
MMSZ5226B	Z3V3	3.14	3.3	3.47	20	28	1600	0.25	25	1
MMSZ5227B	Z3V6	3.42	3.6	3.78	20	24	1700	0.25	15	1
MMSZ5228B	Z3V9	3.71	3.9	4.10	20	23	1900	0.25	10	1
MMSZ5229B	Z4V3	4.09	4.3	4.52	20	22	2000	0.25	5	1
MMSZ5230B	Z4V7	4.47	4.7	4.94	20	19	1900	0.25	5	2
MMSZ5231B	Z5V1	4.85	5.1	5.36	20	17	1600	0.25	5	2
MMSZ5232B	Z5V6	5.32	5.6	5.88	20	11	1600	0.25	5	3
MMSZ5234B	Z6V2	5.89	6.2	6.51	20	7	1000	0.25	5	4
MMSZ5235B	Z6V8	6.46	6.8	7.14	20	5	750	0.25	3	5
MMSZ5236B	Z7V5	7.13	7.5	7.88	20	6	500	0.25	3	6
MMSZ5237B	Z8V2	7.79	8.2	8.61	20	8	500	0.25	3	6.5
MMSZ5239B	Z9V1	8.65	9.1	9.56	20	10	600	0.25	3	7
MMSZ5240B	Z10V	9.50	10	10.50	20	17	600	0.25	3	8
MMSZ5241B	Z11V	10.45	11	11.55	20	22	600	0.25	2	8.4
MMSZ5242B	Z12V	11.40	12	12.60	20	30	600	0.25	1	9.1
MMSZ5243B	Z13V	12.35	13	13.65	9.5	13	600	0.25	0.5	9.9
MMSZ5244B	Z14V	13.30	14	14.70	9.0	15	600	0.25	0.1	10
MMSZ5245B	Z15V	14.25	15	15.75	8.5	16	600	0.25	0.1	11
MMSZ5246B	Z16V	15.20	16	16.80	7.8	17	600	0.25	0.1	12
MMSZ5248B	Z18V	17.10	18	18.90	7.0	21	600	0.25	0.1	14
MMSZ5250B	Z20V	19.00	20	21.00	6.2	25	600	0.25	0.1	15
MMSZ5251B	Z22V	20.90	22	23.10	5.6	29	600	0.25	0.1	17
MMSZ5252B	Z24V	22.80	24	25.20	5.2	33	600	0.25	0.1	18
MMSZ5254B	Z27V	25.65	27	28.35	4.6	41	600	0.25	0.1	21
MMSZ5256B	Z30V	28.50	30	31.50	4.2	49	600	0.25	0.1	23
MMSZ5257B	Z33V	31.35	33	34.65	3.8	58	700	0.25	0.1	25
MMSZ5258B	Z36V	34.20	36	37.80	3.4	70	700	0.25	0.1	27
MMSZ5259B	Z39V	37.05	39	40.95	3.2	80	800	0.25	0.1	30
MMSZ5260B	Z43V	40.85	43	45.15	3.0	93	900	0.25	0.1	33
MMSZ5261B	Z47V	44.65	47	49.35	2.7	105	1000	0.25	0.1	36
MMSZ5262B	Z51V	48.45	51	53.55	2.5	125	1100	0.25	0.1	39

**Notes:**

1. The zener voltage ( $V_Z$ ) is tested under pulse condition of 30ms.
2. The device numbers listed have a standard tolerance on the normal zener voltage of  $\pm 5\%$ .
3. For detailed information on price, availability and delivery of normal zener voltages between the voltages shown and tighter voltage tolerances, contact your nearest Taiwan Semiconductor representative.
4. The zener impedance is derived from the 60-cycle ac voltage, which results when an ac current having a rms value equal to 10% of the DC zener current ( $I_{ZT}$  or  $I_{ZK}$ ) is superimposed to  $I_{ZT}$  or  $I_{ZK}$ .

<b>ORDERING INFORMATION</b>		
<b>ORDERING CODE<sup>(1)(2)</sup></b>	<b>PACKAGE</b>	<b>PACKING</b>
MMSZ52xB RH	SOD-123F	3K / 7" Reel
MMSZ52xB RHG	SOD-123F	3K / 7" Reel

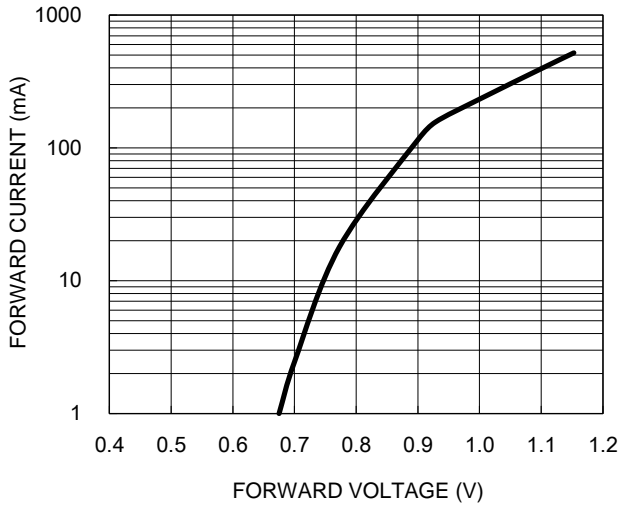
**Notes:**

1. "x" defines voltage from 2.4V (MMSZ5221B) to 51V (MMSZ5262B)
2. "G" means green compound (halogen-free)

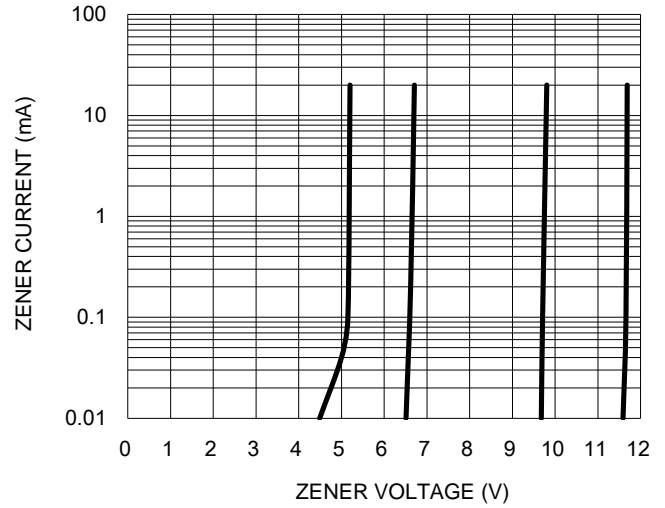
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

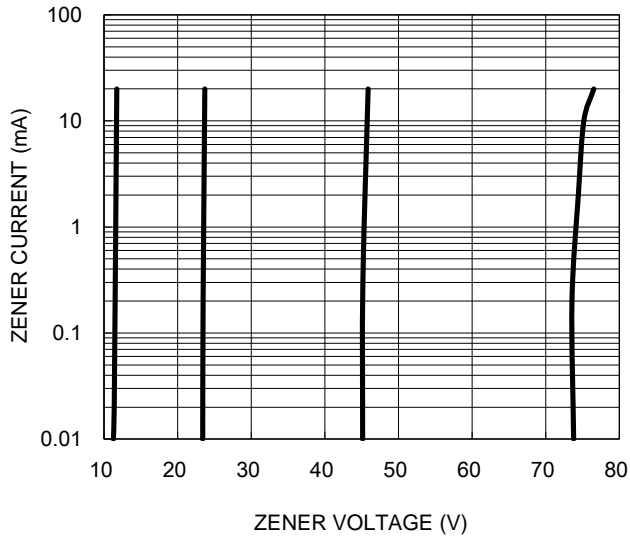
**Fig.1 Typical Forward Voltage**



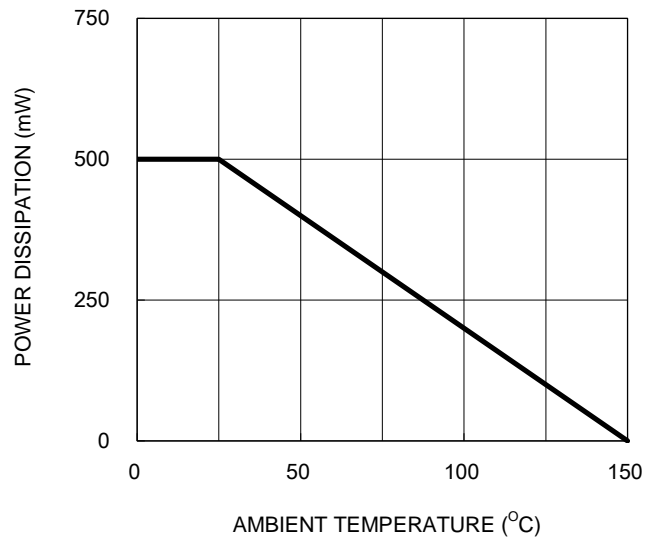
**Fig.2 Zener Breakdown Characteristics**



**Fig.3 Zener Breakdown Characteristics**



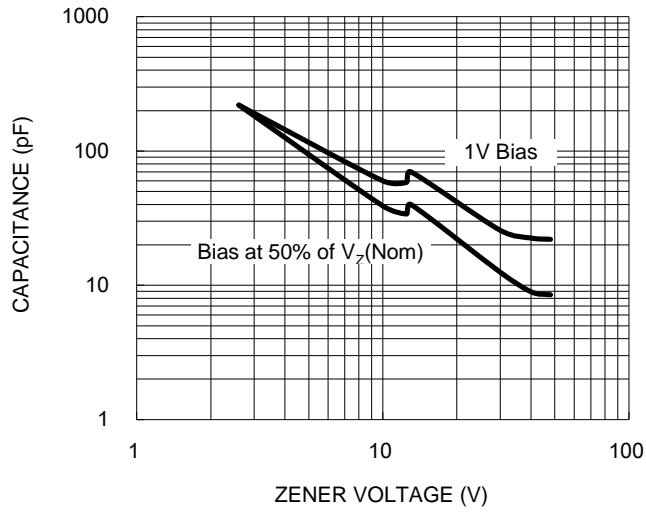
**Fig.4 Power Dissipation Curve**



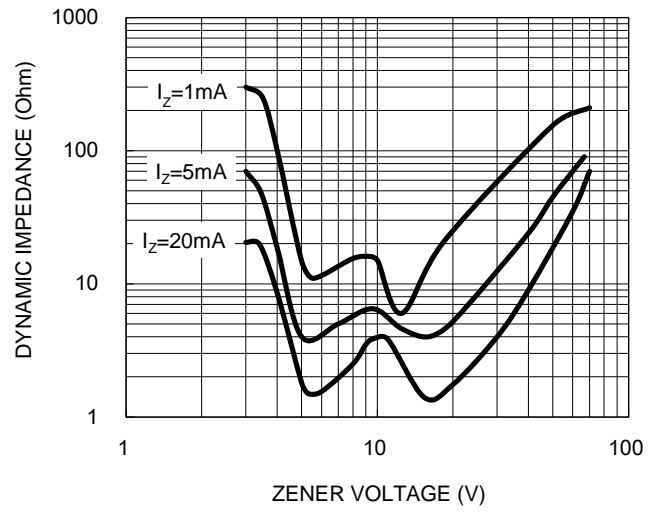
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

**Fig.5 Typical Capacitance**

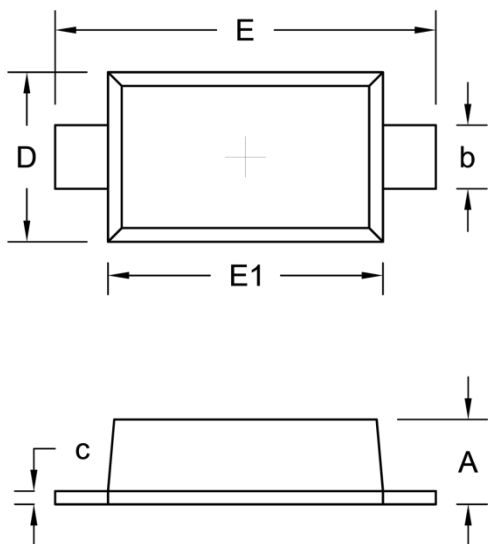


**Fig.6 Effect of Zener Voltage on Impedance**



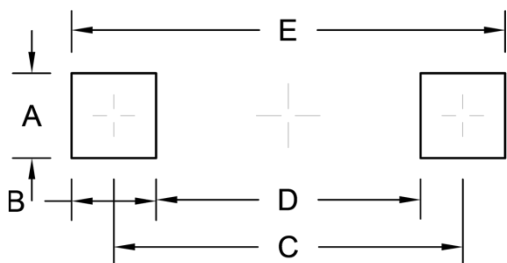
**PACKAGE OUTLINE DIMENSION**

SOD-123F



DIM.	Unit (mm)		Unit (inch)	
	Min.	Max.	Min.	Max.
A	0.80	1.15	0.031	0.045
b	0.50	0.70	0.020	0.028
c	0.05	0.20	0.002	0.008
D	1.50	1.70	0.059	0.067
E	3.30	3.90	0.130	0.154
E1	2.50	2.70	0.098	0.106

**SUGGEST PAD LAYOUT**



Symbol	Unit (mm)	Unit (inch)
A	0.80	0.031
B	0.80	0.031
C	3.30	0.130
D	2.50	0.098
E	4.10	0.161

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