Zener Voltage Regulators

MMSZ4xxxT1G Series, SZMMSZ4xxxT1G Series

500 mW, Low I_{ZT} SOD−123 Surface Mount



SOD−123
CASE 425
STYLE 1



Three complete series of Zener diodes are offered in the convenient, surface mount plastic SOD−123 package. These devices provide a convenient alternative to the leadless 34−package style.

Features

- 500 mW Rating on FR−4 or FR−5 Board
- Wide Zener Reverse Voltage Range − 1.8 V to 43 V
- Low Reverse Current (I_{ZT}) − 50 μA
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications
- ESD Rating of Class 3 (> 16 kV) per Human Body Model
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free and are RoHS Compliant*

Mechanical Characteristics:

CASE: Void-free, transfer-molded, thermosetting plastic case
FINISH: Corrosion resistant finish, easily solderable
MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260°C for 10 Seconds
POLARITY: Cathode indicated by polarity band
FLAMMABILITY RATING: UL 94 V−0

MAXIMUM RATINGS

Rating	Symbol	Max	Units
Total Power Dissipation on FR−5 Board, (Note 1) @ T_L = 75°C Derated above 75°C	P_D	500 6.7	mW mW/°C
Thermal Resistance, (Note 2) Junction−to−Ambient	$R_{\theta JA}$	340	°C/W
Thermal Resistance, (Note 2) Junction−to−Lead	$R_{\theta JL}$	150	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.
1. FR−5 = 3.5 X 1.5 inches, using the minimum recommended footprint.
2. Thermal Resistance measurement obtained via infrared Scan Method.

*For additional information on our Pb−Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MARKING DIAGRAM



xx = Device Code (Refer to page 3)
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
MMSZ4xxxT1G	SOD−123 (Pb−Free)	3,000 / Tape & Reel
SZMMSZ4xxxT1G	SOD−123 (Pb−Free)	3,000 / Tape & Reel
MMSZ4xxxT3G	SOD−123 (Pb−Free)	10,000 / Tape & Reel
SZMMSZ4xxxT3G	SOD−123 (Pb−Free)	10,000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

DEVICE MARKING INFORMATION

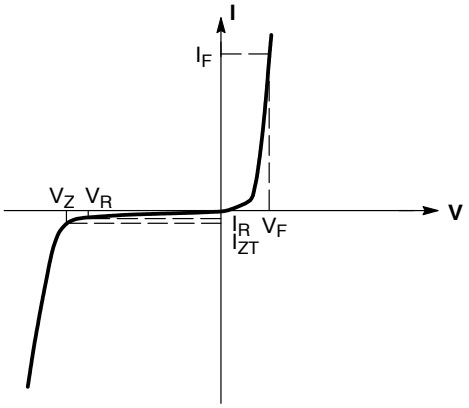
See specific marking information in the device marking column of the Electrical Characteristics table on page 3 of this data sheet.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted, V_F = 0.9 V Max. @ I_F = 10 mA)

Symbol	Parameter
V_Z	Reverse Zener Voltage @ I_{ZT}
I_{ZT}	Reverse Current
I_R	Reverse Leakage Current @ V_R
V_R	Reverse Voltage
I_F	Forward Current
V_F	Forward Voltage @ I_F

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



Zener Voltage Regulator

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted, V_F = 0.9 V Max. @ I_F = 10 mA)

Device*	Device Marking	Zener Voltage (Note 3)				Leakage Current	
		V_Z (Volts)			@ I_{ZT}	I_R @ V_R	
		Min	Nom	Max	μA	μA	Volts
MMSZ4678T1G	CC	1.71	1.8	1.89	50	7.5	1
MMSZ4679T1G	CD	1.90	2.0	2.10	50	5	1
MMSZ4680T1G	CE	2.09	2.2	2.31	50	4	1
MMSZ4681T1G	CF	2.28	2.4	2.52	50	2	1
MMSZ4682T1G	CH	2.565	2.7	2.835	50	1	1
MMSZ4683T1G	CJ	2.85	3.0	3.15	50	0.8	1
MMSZ4684T1G	CK	3.13	3.3	3.47	50	7.5	1.5
MMSZ4685T1G	CM	3.42	3.6	3.78	50	7.5	2
MMSZ4686T1G	CN	3.70	3.9	4.10	50	5	2
MMSZ4687T1G	CP	4.09	4.3	4.52	50	4	2
SZMMSZ4687T1G	CG6	4.09	4.3	4.52	50	4	2
MMSZ4688T1G	CT	4.47	4.7	4.94	50	10	3
MMSZ4689T1G	CU	4.85	5.1	5.36	50	10	3
MMSZ4690T1G/T3G	CV	5.32	5.6	5.88	50	10	4
MMSZ4691T1G	CA	5.89	6.2	6.51	50	10	5
MMSZ4692T1G	CX	6.46	6.8	7.14	50	10	5.1
MMSZ4693T1G	CY	7.13	7.5	7.88	50	10	5.7
MMSZ4694T1G	CZ	7.79	8.2	8.61	50	1	6.2
MMSZ4695T1G	DC	8.27	8.7	9.14	50	1	6.6
MMSZ4696T1G	DD	8.65	9.1	9.56	50	1	6.9
MMSZ4697T1G	DE	9.50	10	10.50	50	1	7.6
MMSZ4698T1G	DF	10.45	11	11.55	50	0.05	8.4
MMSZ4699T1G	DH	11.40	12	12.60	50	0.05	9.1
MMSZ4700T1G	DJ	12.35	13	13.65	50	0.05	9.8
MMSZ4701T1G	DK	13.30	14	14.70	50	0.05	10.6
MMSZ4702T1G	DM	14.25	15	15.75	50	0.05	11.4
MMSZ4703T1G †	DN	15.20	16	16.80	50	0.05	12.1
MMSZ4704T1G	DP	16.15	17	17.85	50	0.05	12.9
MMSZ4705T1G	DT	17.10	18	18.90	50	0.05	13.6
MMSZ4706T1G	DU	18.05	19	19.95	50	0.05	14.4
MMSZ4707T1G	DV	19.00	20	21.00	50	0.01	15.2
MMSZ4708T1G	DA	20.90	22	23.10	50	0.01	16.7
MMSZ4709T1G	DX	22.80	24	25.20	50	0.01	18.2
MMSZ4710T1G	DY	23.75	25	26.25	50	0.01	19.0
MMSZ4711T1G †	EA	25.65	27	28.35	50	0.01	20.4
MMSZ4712T1G	EC	26.60	28	29.40	50	0.01	21.2
MMSZ4713T1G	ED	28.50	30	31.50	50	0.01	22.8
MMSZ4714T1G	EE	31.35	33	34.65	50	0.01	25.0
MMSZ4715T1G	EF	34.20	36	37.80	50	0.01	27.3
MMSZ4716T1G	EH	37.05	39	40.95	50	0.01	29.6
MMSZ4717T1G	EJ	40.85	43	45.15	50	0.01	32.6

3. Nominal Zener voltage is measured with the device junction in thermal equilibrium at T_L = 30°C ±1°C.
*Include SZ-prefix devices where applicable.
†MMSZ4703 and MMSZ4711 Not Available in 10,000/Tape & Reel

TYPICAL CHARACTERISTICS

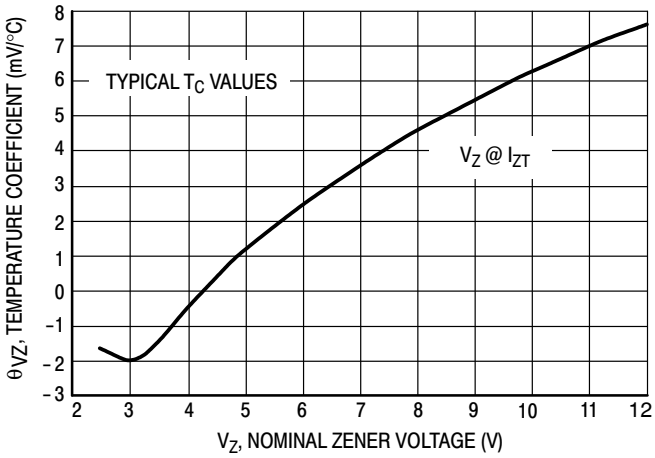


Figure 1. Temperature Coefficients (Temperature Range −55°C to +150°C)

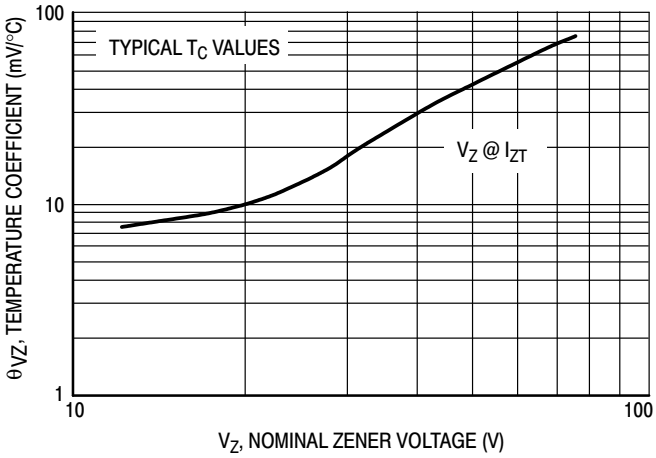


Figure 2. Temperature Coefficients (Temperature Range −55°C to +150°C)

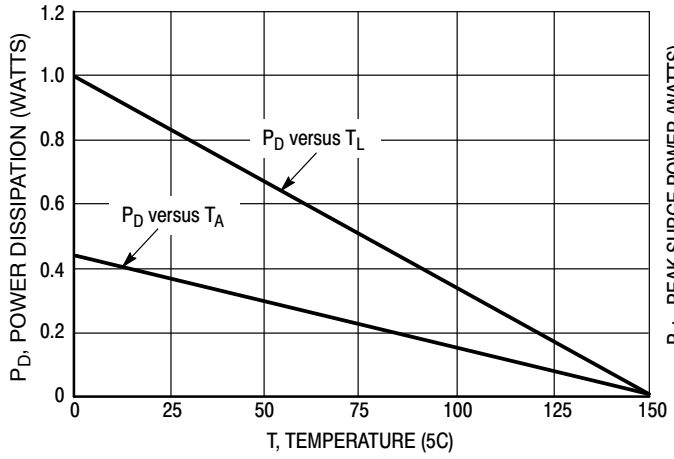


Figure 3. Steady State Power Derating

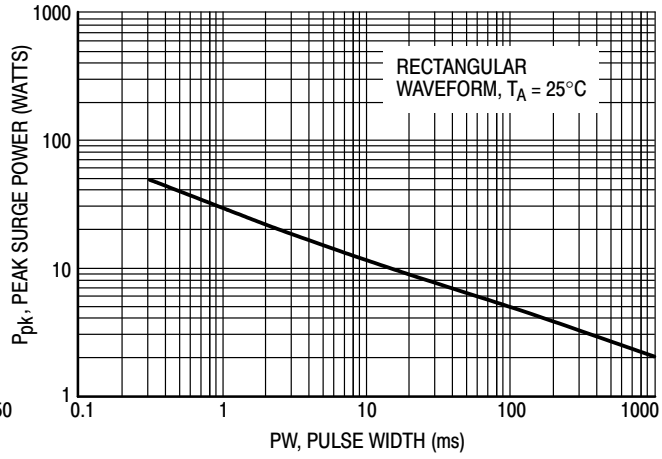


Figure 4. Maximum Nonrepetitive Surge Power

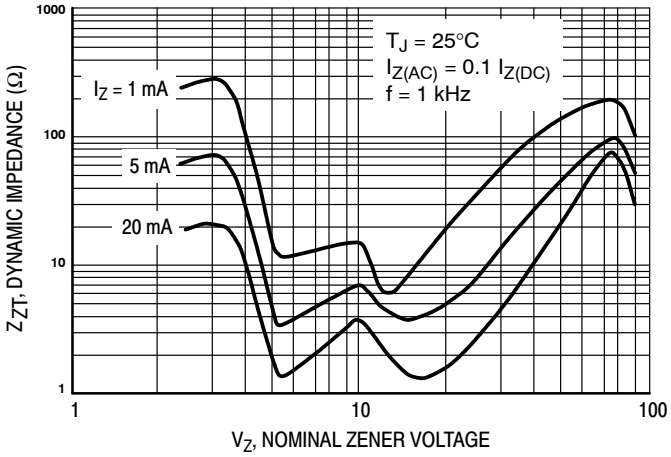


Figure 5. Effect of Zener Voltage on Zener Impedance

TYPICAL CHARACTERISTICS

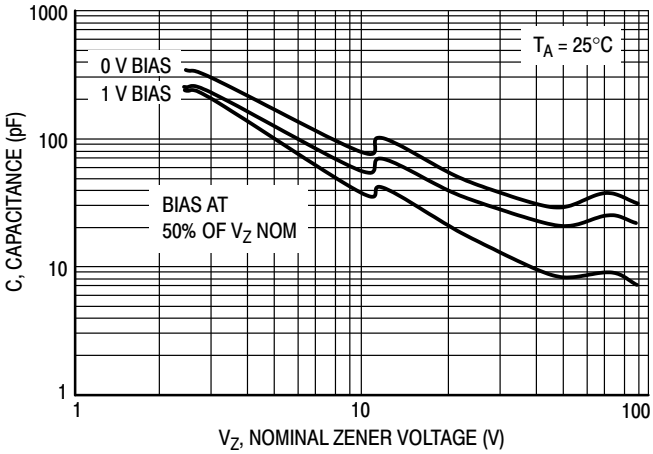


Figure 6. Typical Capacitance

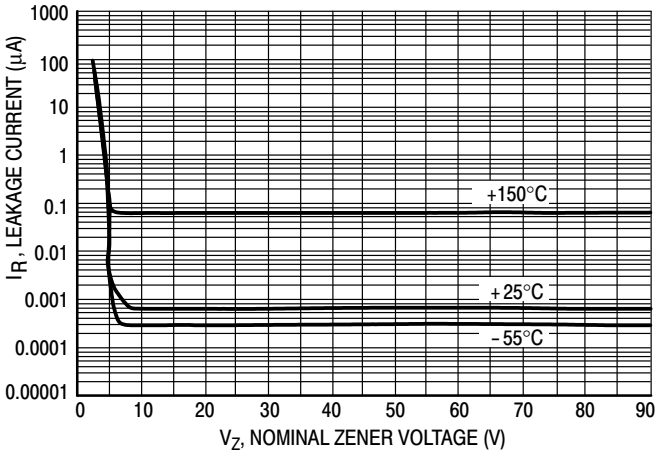


Figure 7. Typical Leakage Current

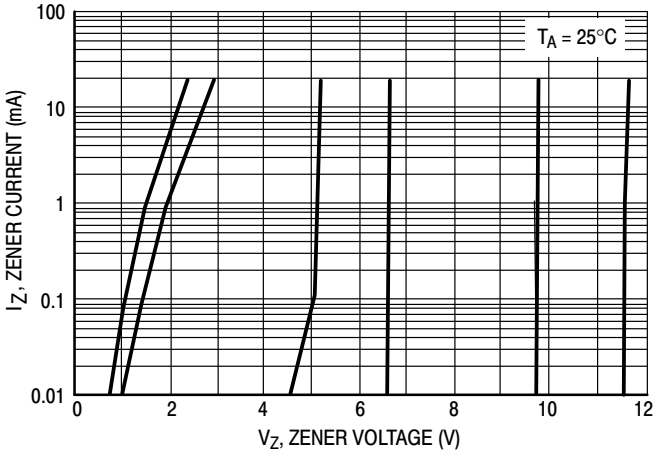


Figure 8. Zener Voltage versus Zener Current (V_Z Up to 12 V)

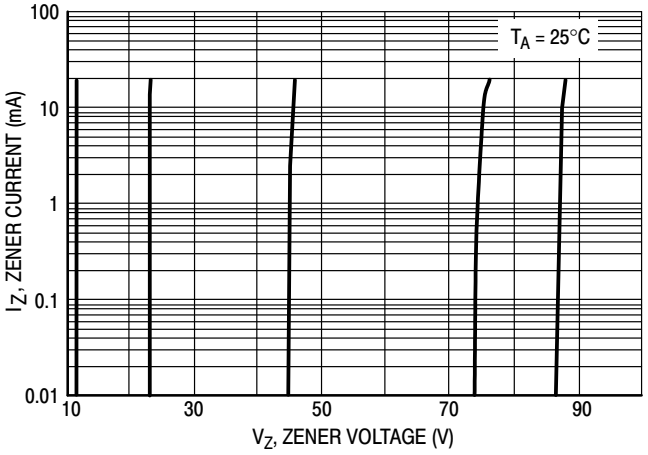


Figure 9. Zener Voltage versus Zener Current (12 V to 91 V)

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

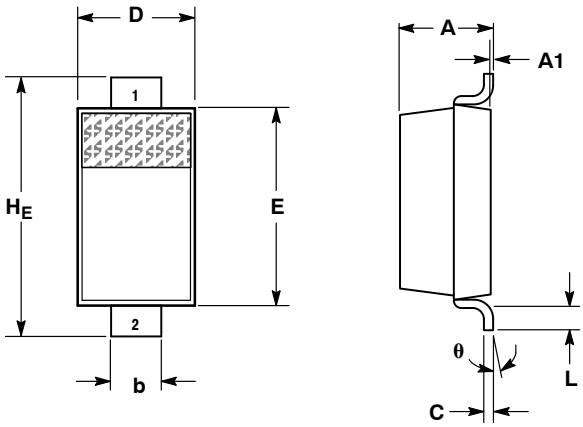
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SCALE 5:1

SOD−123
CASE 425−04
ISSUE G

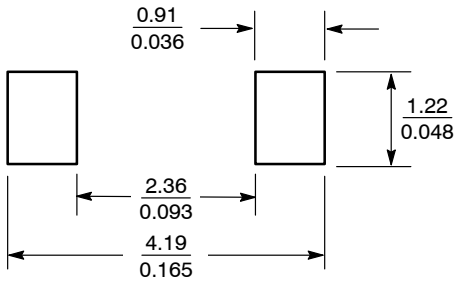
DATE 07 OCT 2009



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.94	1.17	1.35	0.037	0.046	0.053
A1	0.00	0.05	0.10	0.000	0.002	0.004
b	0.51	0.61	0.71	0.020	0.024	0.028
c	---	---	0.15	---	---	0.006
D	1.40	1.60	1.80	0.055	0.063	0.071
E	2.54	2.69	2.84	0.100	0.106	0.112
H_E	3.56	3.68	3.86	0.140	0.145	0.152
L	0.25	---	---	0.010	---	---
θ	0°	---	10°	0°	---	10°

SOLDERING FOOTPRINT*



SCALE 10:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present.

STYLE 1:
PIN 1. CATHODE
2. ANODE

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