

# MMSZ4xxxT1 Series, SZMMSZ4xxxT1G Series

## Zener Voltage Regulators

### 500 mW SOD-123 Surface Mount

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
- 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
- AEC-Q101 Qualified and PPAP Capable
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- Pb-Free Packages are Available

#### 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	Unit
Total Power Dissipation on FR-5 Board, (Note 1) @ $T_L = 75^\circ\text{C}$ Derated above $75^\circ\text{C}$	$P_D$	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

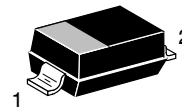
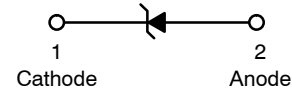
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR-5 = 3.5 X 1.5 inches, using the minimum recommended footprint.
2. Thermal Resistance measurement obtained via infrared Scan Method.



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SOD-123  
CASE 425  
STYLE 1

#### 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†
MMSZ4xxxT1	SOD-123	3000 / Tape & Reel
MMSZ4xxxT1G	SOD-123 (Pb-Free)	3000 / Tape & Reel
SZMMSZ4xxxT1G	SOD-123 (Pb-Free)	3000 / Tape & Reel
MMSZ4xxxT3	SOD-123	10000 / Tape & Reel
MMSZ4xxxT3G	SOD-123 (Pb-Free)	10000 / Tape & Reel
SZMMSZ4xxxT3G	SOD-123 (Pb-Free)	10000 / 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.

## MMSZ4xxxT1 Series, SZMMSZ4xxxT1G Series

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted,  $V_F = 0.95\text{ V Max. @ } I_F = 10\text{ mA}$ )

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 @ $I_F$



## MMSZ4xxxT1 Series, SZMMSZ4xxxT1G Series

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted,  $V_F = 0.9\text{ V Max.}$  @  $I_F = 10\text{ mA}$ )

Device*	Device Marking	Zener Voltage (Note 3)				Leakage Current	
		V <sub>Z</sub> (Volts)			@ I <sub>ZT</sub>	I <sub>R</sub> @ V <sub>R</sub>	
		Min	Nom	Max	μA	μA	Volts
SZ/MMSZ4678T1, G	CC	1.71	1.8	1.89	50	7.5	1
MMSZ4679T1, G	CD	1.90	2.0	2.10	50	5	1
<b>MMSZ4680T1, G</b>	<b>CE</b>	<b>2.09</b>	<b>2.2</b>	<b>2.31</b>	<b>50</b>	<b>4</b>	<b>1</b>
MMSZ4681T1, G	CF	2.28	2.4	2.52	50	2	1
MMSZ4682T1, G	CH	2.565	2.7	2.835	50	1	1
SZ/MMSZ4683T1, G	CJ	2.85	3.0	3.15	50	0.8	1
SZ/MMSZ4684T1, G	CK	3.13	3.3	3.47	50	7.5	1.5
<b>SZ/MMSZ4685T1, G</b>	<b>CM</b>	<b>3.42</b>	<b>3.6</b>	<b>3.78</b>	<b>50</b>	<b>7.5</b>	<b>2</b>
SZ/MMSZ4686T1, G	CN	3.70	3.9	4.10	50	5	2
SZ/MMSZ4687T1, G	CP	4.09	4.3	4.52	50	4	2
SZ/MMSZ4688T1, G	CT	4.47	4.7	4.94	50	10	3
SZ/MMSZ4689T1, G	CU	4.85	5.1	5.36	50	10	3
<b>SZ/MMSZ4690T1/T3, G</b>	<b>CV</b>	<b>5.32</b>	<b>5.6</b>	<b>5.88</b>	<b>50</b>	<b>10</b>	<b>4</b>
SZ/MMSZ4691T1, G	CA	5.89	6.2	6.51	50	10	5
SZ/MMSZ4692T1, G	CX	6.46	6.8	7.14	50	10	5.1
SZ/MMSZ4693T1, G	CY	7.13	7.5	7.88	50	10	5.7
SZ/MMSZ4694T1, G	CZ	7.79	8.2	8.61	50	1	6.2
MMSZ4695T1, G	DC	8.27	8.7	9.14	50	1	6.6
SZ/MMSZ4696T1, G	DD	8.65	9.1	9.56	50	1	6.9
SZ/MMSZ4697T1, G	DE	9.50	10	10.50	50	1	7.6
SZ/MMSZ4698T1, G	DF	10.45	11	11.55	50	0.05	8.4
SZ/MMSZ4699T1, G	DH	11.40	12	12.60	50	0.05	9.1
MMSZ4700T1, G	DJ	12.35	13	13.65	50	0.05	9.8
SZ/MMSZ4701T1, G	DK	13.30	14	14.70	50	0.05	10.6
SZ/MMSZ4702T1, G	DM	14.25	15	15.75	50	0.05	11.4
SZ/MMSZ4703T1, G †	DN	15.20	16	16.80	50	0.05	12.1
SZ/MMSZ4704T1, G	DP	16.15	17	17.85	50	0.05	12.9
SZ/MMSZ4705T1, G	DT	17.10	18	18.90	50	0.05	13.6
MMSZ4706T1, G	DU	18.05	19	19.95	50	0.05	14.4
MMSZ4707T1, G	DV	19.00	20	21.00	50	0.01	15.2
MMSZ4708T1, G	DA	20.90	22	23.10	50	0.01	16.7
SZ/MMSZ4709T1, G	DX	22.80	24	25.20	50	0.01	18.2
MMSZ4710T1, G	DY	23.75	25	26.25	50	0.01	19.0
SZ/MMSZ4711T1, G †	EA	25.65	27	28.35	50	0.01	20.4
MMSZ4712T1	EC	26.60	28	29.40	50	0.01	21.2
SZ/MMSZ4713T1, G	ED	28.50	30	31.50	50	0.01	22.8
MMSZ4714T1, G	EE	31.35	33	34.65	50	0.01	25.0
SZ/MMSZ4715T1, G	EF	34.20	36	37.80	50	0.01	27.3
MMSZ4716T1, G	EH	37.05	39	40.95	50	0.01	29.6
MMSZ4717T1, G	EJ	40.85	43	45.15	50	0.01	32.6

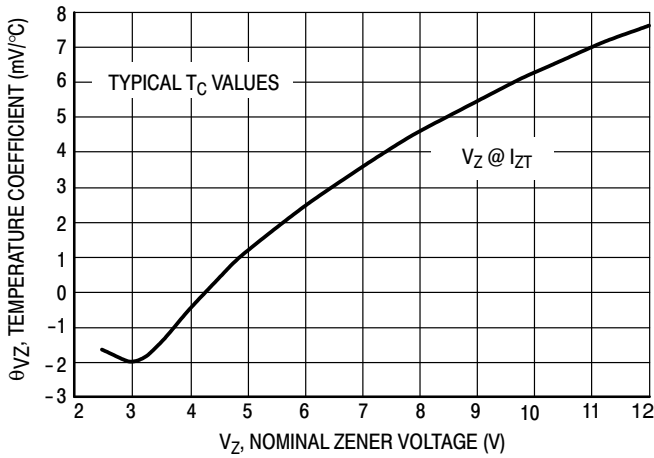
3. Nominal Zener voltage is measured with the device junction in thermal equilibrium at  $T_L = 30^\circ\text{C} \pm 1^\circ\text{C}$ .

\*The "G" suffix indicates Pb-Free package available.

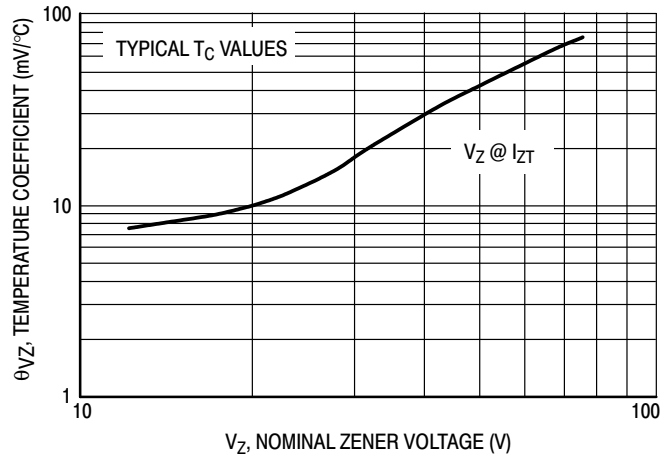
†MMSZ4703 and MMSZ4711 Not Available in 10,000/Tape & Reel

# MMSZ4xxxT1 Series, SZMMSZ4xxxT1G Series

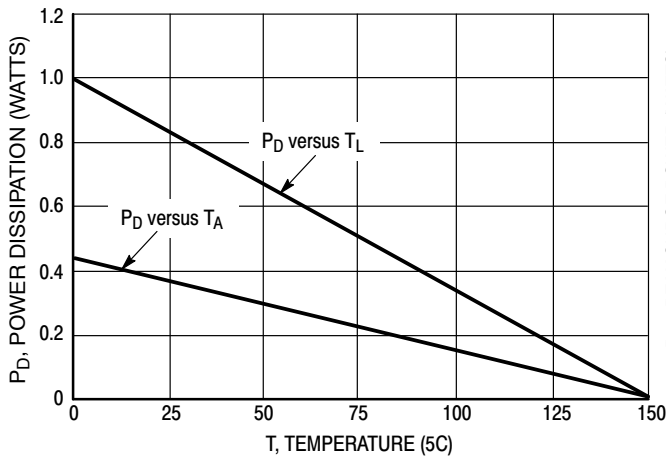
## TYPICAL CHARACTERISTICS



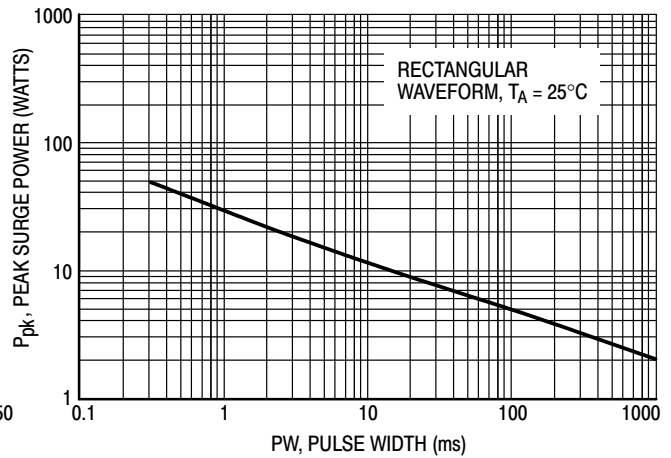
**Figure 1. Temperature Coefficients  
(Temperature Range -55°C to +150°C)**



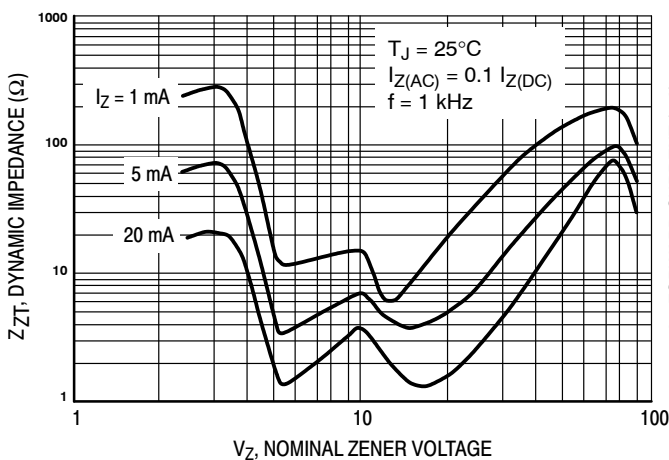
**Figure 2. Temperature Coefficients  
(Temperature Range -55°C to +150°C)**



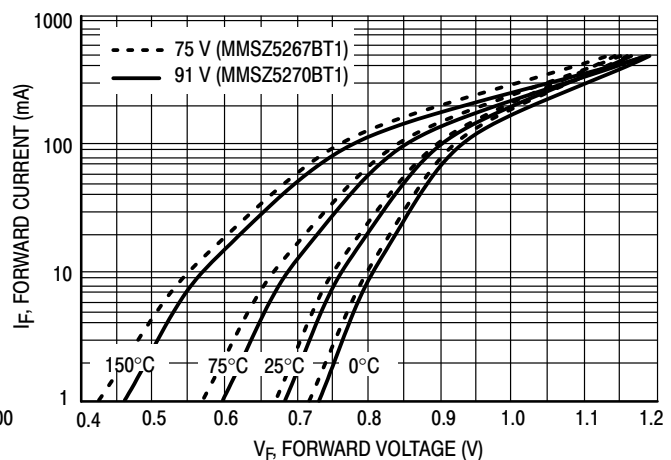
**Figure 3. Steady State Power Derating**



**Figure 4. Maximum Nonrepetitive Surge Power**



**Figure 5. Effect of Zener Voltage on  
Zener Impedance**



**Figure 6. Typical Forward Voltage**

# MMSZ4xxxT1 Series, SZMMSZ4xxxT1G Series

## TYPICAL CHARACTERISTICS

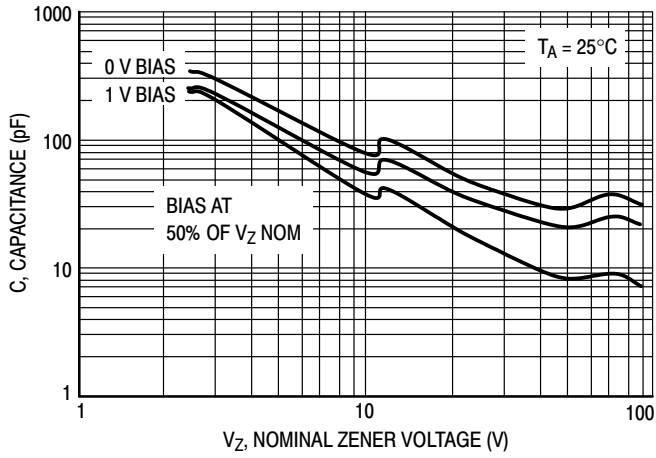


Figure 7. Typical Capacitance

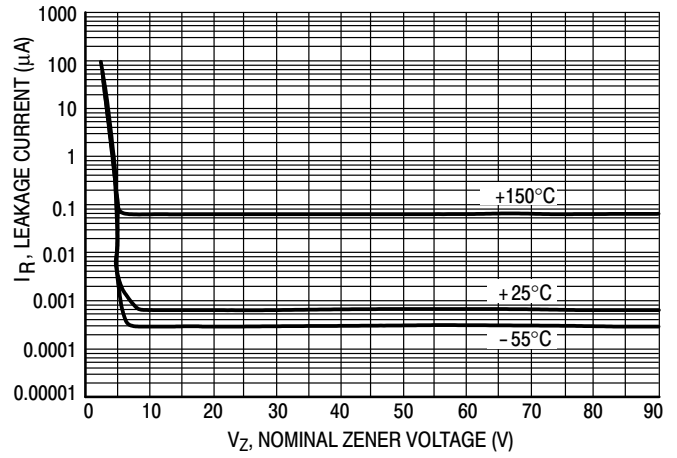


Figure 8. Typical Leakage Current

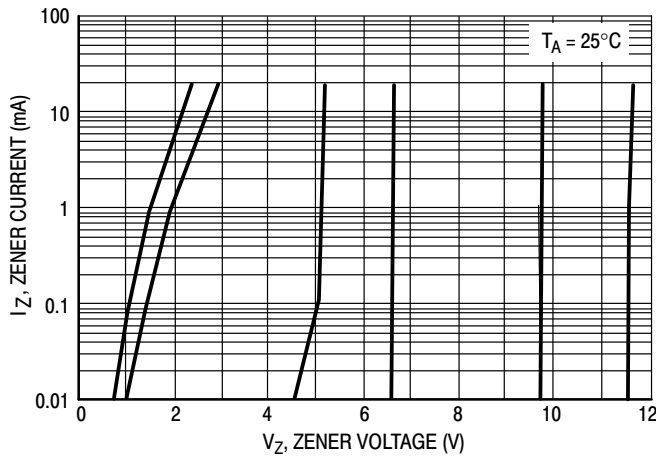


Figure 9. Zener Voltage versus Zener Current  
( $V_Z$  Up to 12 V)

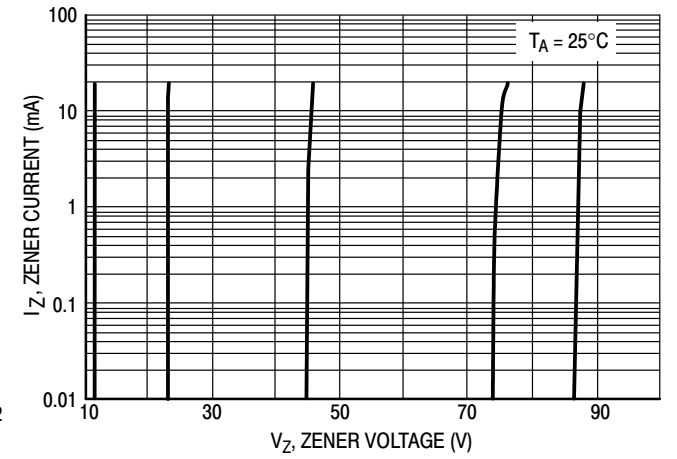
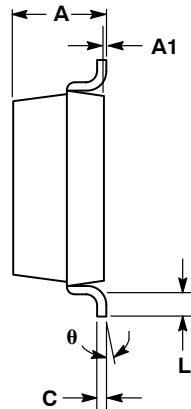
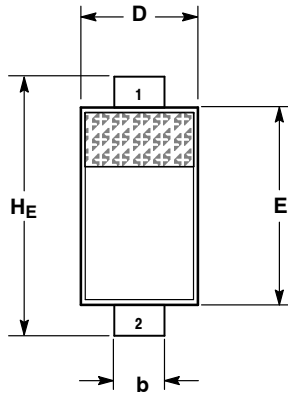


Figure 10. Zener Voltage versus Zener Current  
(12 V to 91 V)

# MMSZ4xxxT1 Series, SZMMSZ4xxxT1G Series

## PACKAGE DIMENSIONS

SOD-123  
CASE 425-04  
ISSUE G

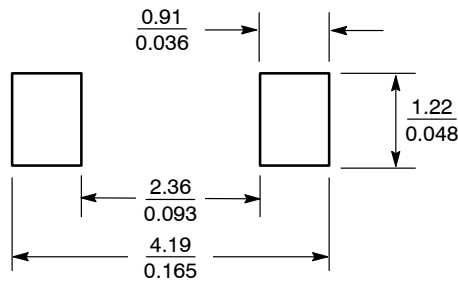


- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS			INCHES		
	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
HE	3.56	3.68	3.86	0.140	0.145	0.152
L	0.25	---	---	0.010	---	---
θ	0°	---	10°	0°	---	10°

STYLE 1:  
PIN 1. CATHODE  
2. ANODE

## SOLDERING FOOTPRINT\*



SCALE 10:1 (mm/inches)

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

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