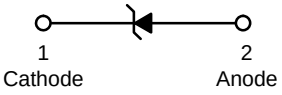
Zener Voltage Regulators

500 mW SOD-123 Surface Mount

MMSZ4xxxET1G Series, SZMMSZ4xxxET1G Series

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.

SOD-123
CASE 425
STYLE 1



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
- Peak Power − 225 W (8 x 20 μs)
- 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
Peak Power Dissipation @ 20 μs (Note 1) @ $T_L \le 25$ °C	P_{pk}	225	W
Total Power Dissipation on FR-5 Board, (Note 2) @ T_L = 75 °C Derated above 75 °C	P_D	500 6.7	mW mW/°C
Thermal Resistance, (Note 3) Junction-to-Ambient	$R_{\theta JA}$	340	°C/W
Thermal Resistance, (Note 3) 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. Nonrepetitive current pulse per Figure 11.
2. FR-5 = 3.5 x 1.5 inches, using the minimum recommended footprint.
3. 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

xxx = Device Code (Refer to page 2)
M = Date Code
▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
MMSZ4xxxET1G	SOD-123 (Pb-Free)	3,000 / Tape & Reel
SZMMSZ4xxxET1G	SOD-123 (Pb-Free)	3,000 / Tape & Reel
MMSZ4xxxET3G	SOD-123 (Pb-Free)	10,000 / Tape & Reel

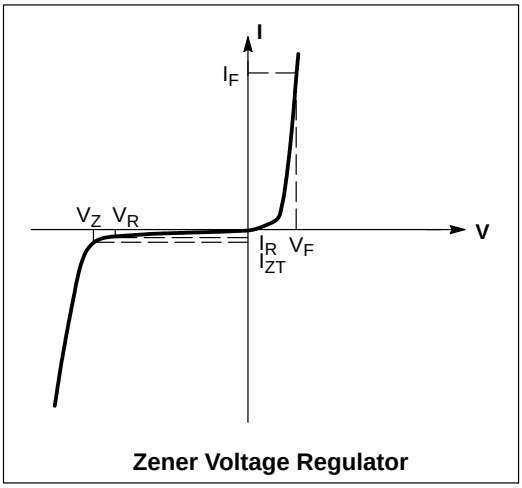
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

DEVICE MARKING INFORMATION

See specific marking information in the device marking column of the Electrical Characteristics table on page 2 of this data sheet.

ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted, V_F = 0.95 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



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 1) V_Z (V) Min	Nom	Max	@ I_{ZT} µA	Leakage Current I_R @ V_R µA	V
MMSZ4680ET1G	CF8	2.09	2.2	2.31	50	4	1
MMSZ4684ET1G	CG3	3.13	3.3	3.47	50	7.5	1.5
MMSZ4688ET1G	CG7	4.47	4.7	4.94	50	10	3
MMSZ4689ET1G	CG8	4.85	5.1	5.36	50	10	3
MMSZ4690ET1G	***CG9***	***5.32***	***5.6***	***5.88***	***50***	***10***	***4***
MMSZ4691ET1G	CH1	5.89	6.2	6.51	50	10	5
MMSZ4692ET1G	CH2	6.46	6.8	7.14	50	10	5.1
MMSZ4693ET1G	CH3	7.13	7.5	7.88	50	10	5.7
MMSZ4697ET1G	CH7	9.50	10	10.50	50	1	7.6
MMSZ4699ET1G	CH9	11.40	12	12.60	50	0.05	9.1
MMSZ4701ET1G	CJ2	13.3	14	14.7	50	0.05	10.6
MMSZ4702ET1G	CJ3	14.25	15	15.75	50	0.05	11.4
MMSZ4703ET1G	CJ4	15.20	16	16.80	50	0.05	12.1
MMSZ4705ET1G	CJ6	17.10	18	18.90	50	0.05	13.6
MMSZ4709ET1G	CK1	22.80	24	25.20	50	0.01	18.2
MMSZ4711ET1G	CK3	25.65	27	28.35	50	0.01	20.4
MMSZ4717ET1G	CK9	40.85	43	45.15	50	0.01	32.6

1. 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.

TYPICAL CHARACTERISTICS

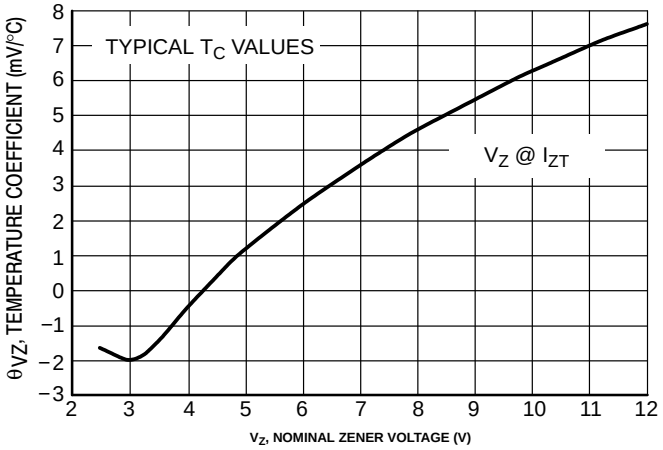


Figure 1. Temperature Coefficients (Temperature Range −55 °C to +150 °C)

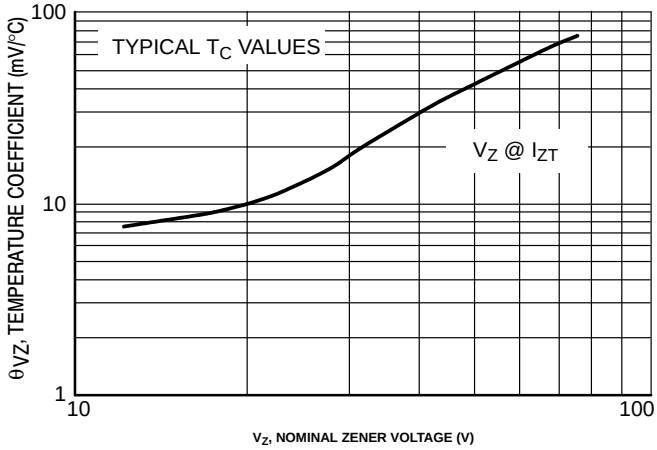


Figure 2. Temperature Coefficients (Temperature Range −55 °C to +150 °C)

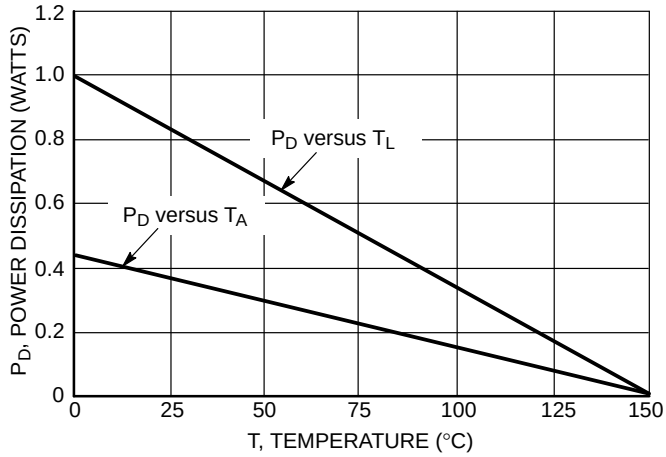


Figure 3. Steady State Power Derating

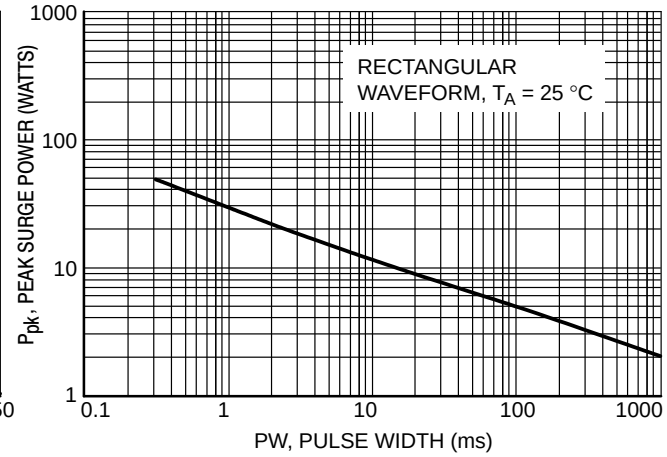


Figure 4. Maximum Nonrepetitive Surge Power

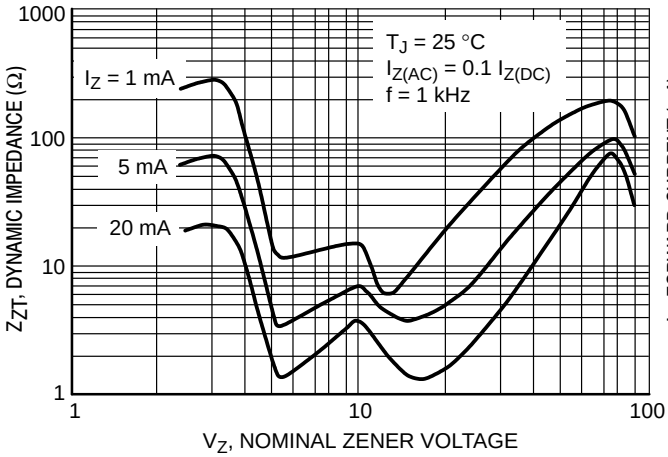


Figure 5. Effect of Zener Voltage on Zener Impedance

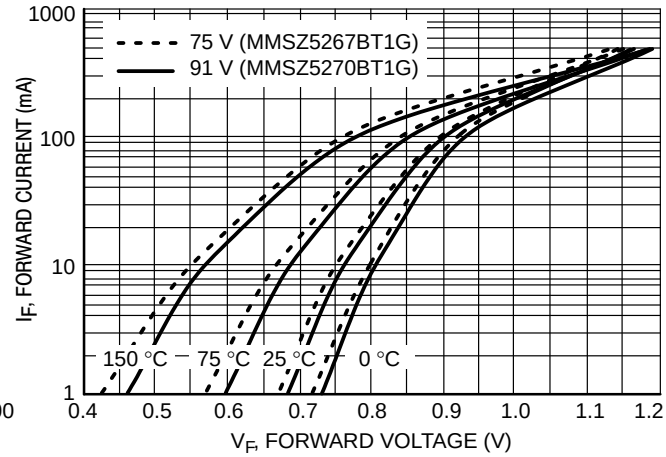


Figure 6. Typical Forward Voltage

TYPICAL CHARACTERISTICS

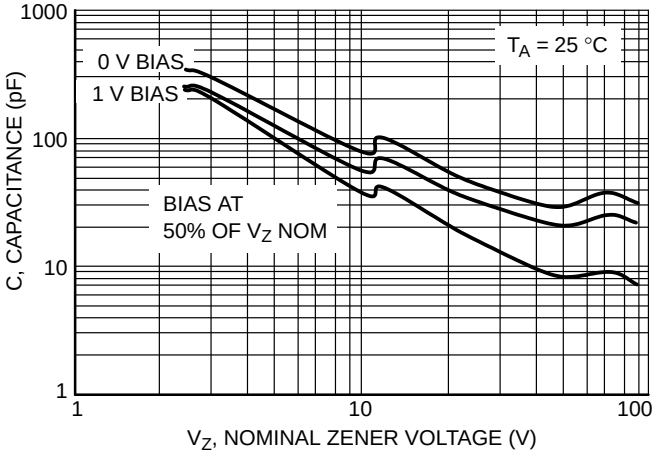


Figure 7. Typical Capacitance

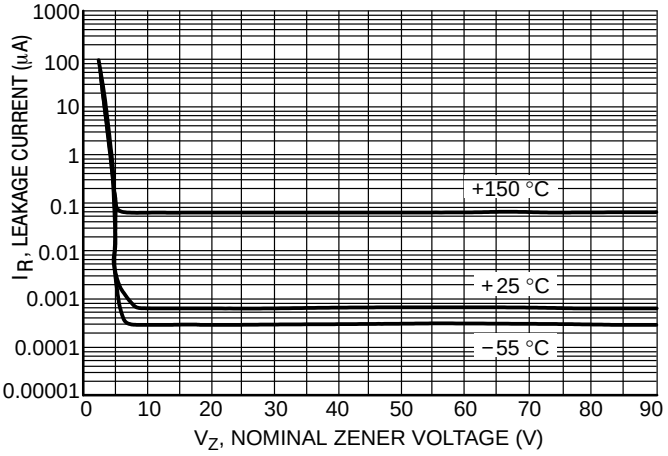


Figure 8. Typical Leakage Current

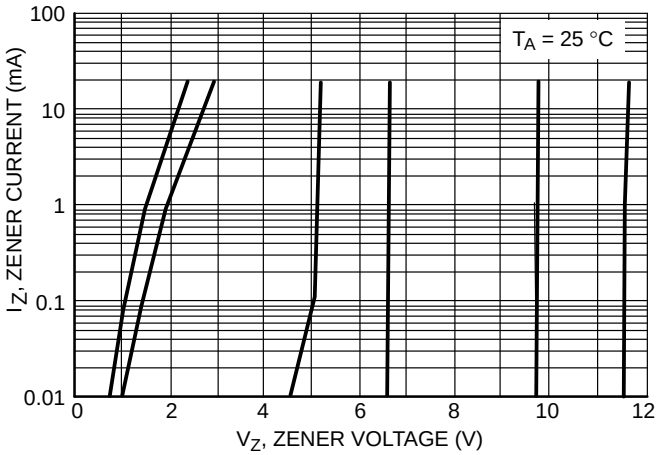


Figure 9. Zener Voltage versus Zener Current (V_Z Up to 12 V)

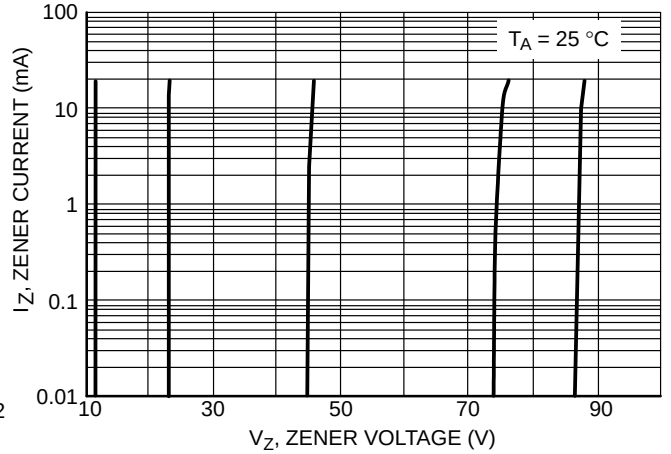


Figure 10. Zener Voltage versus Zener Current (12 V to 91 V)

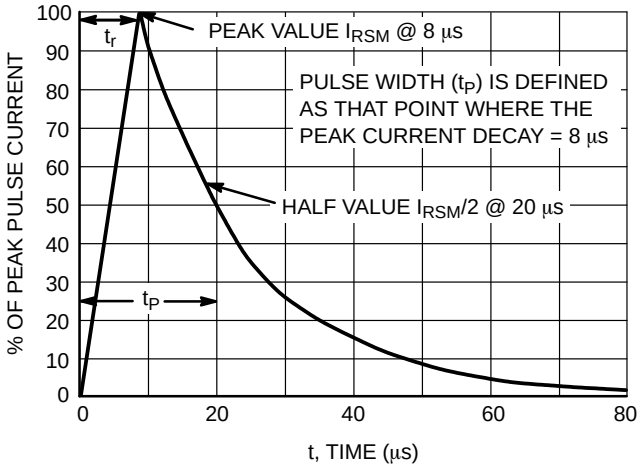
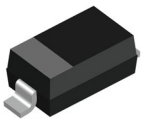
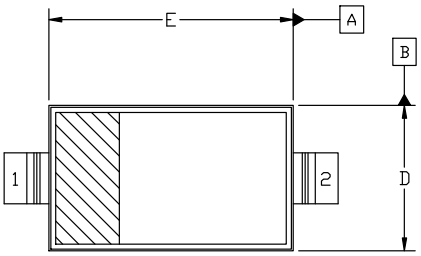


Figure 11. 8 × 20 μs Pulse Waveform

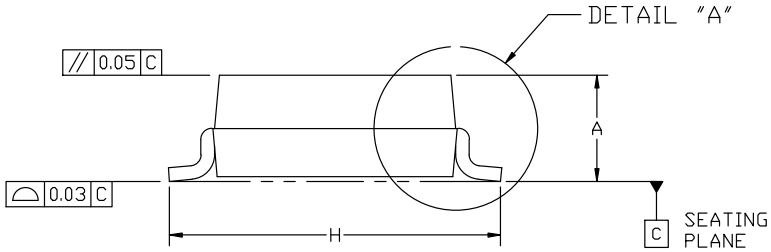


SOD−123 2−LEAD, 1.60x2.69x1.16
CASE 425
ISSUE H

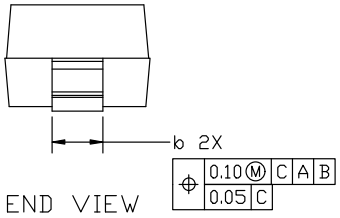
DATE 29 FEB 2024



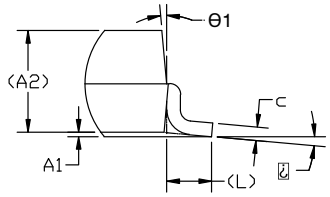
TOP VIEW



SIDE VIEW



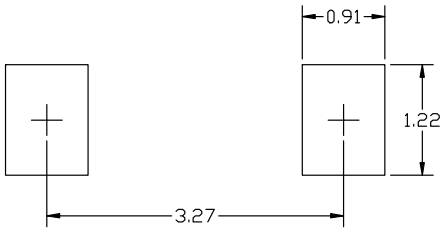
END VIEW



DETAIL "A"

NOTES:
1. DIMENSION AND TOLERANCING PER ASME Y14.5M, 2018
2. CONTROLLING DIMENSION: MILLIMETERS

	MILLIMETER		
DIM	MIN.	NOM.	MAX.
A	0.94	1.17	1.35
A1	0.00	0.05	0.10
A2		1.16 REF.	
b	0.51	0.61	0.71
c	–	–	0.15
D	1.40	1.60	1.80
E	2.54	2.69	2.84
H	3.56	3.68	3.86
L		0.25 REF.	
∠	0°		10°
θ1	0°		10°



RECOMMENDED MOUNTING FOOTPRINT

*For additional information on or 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. Some products may not follow the Generic Marking.

STYLE 1:
PIN 1. CATHODE
2. ANODE

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DESCRIPTION:	**SOD−123 2−LEAD, 1.60x2.69x1.16**	**PAGE 1 OF 1**

ADDITIONAL INFORMATION

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