# THE DATASHEET OF

# MMSZ4684T3G

# 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<br>Derated above 75°C | $P_D$ | 500<br>6.7 | mW<br>mW/°C |
| Thermal Resistance, (Note 2)<br>Junction−to−Ambient | $R_{\theta JA}$ | 340 | °C/W |
| Thermal Resistance, (Note 2)<br>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<br>(Pb−Free) | 3,000 /<br>Tape & Reel |
| SZMMSZ4xxxT1G | SOD−123<br>(Pb−Free) | 3,000 /<br>Tape & Reel |
| MMSZ4xxxT3G | SOD−123<br>(Pb−Free) | 10,000 /<br>Tape & Reel |
| SZMMSZ4xxxT3G | SOD−123<br>(Pb−Free) | 10,000 /<br>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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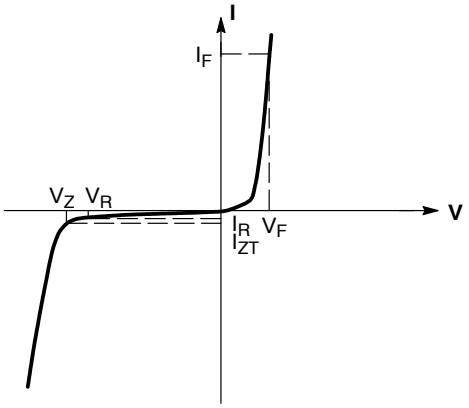
**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C unless otherwise noted, $V_F$ = 0.9 V Max. @ $I_F$ = 10 mA)

| 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

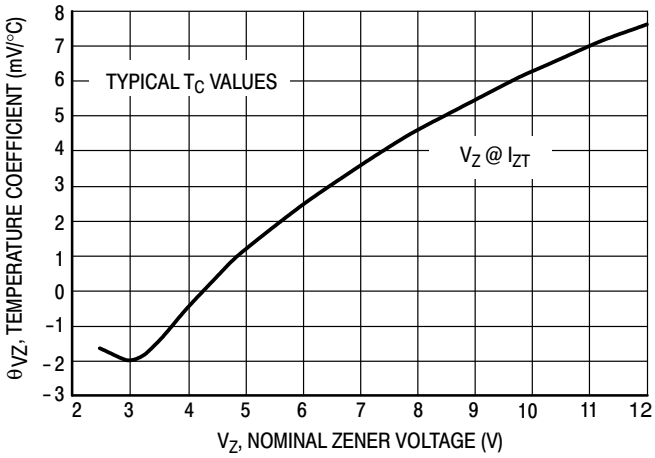



**Figure 1. Temperature Coefficients (Temperature Range −55°C to +150°C)**

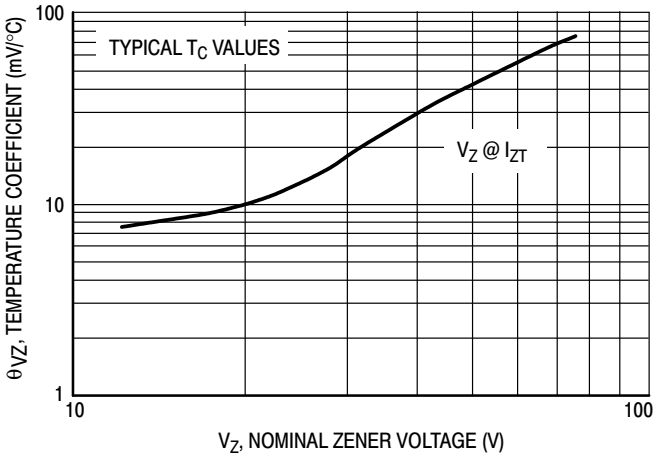



**Figure 2. Temperature Coefficients (Temperature Range −55°C to +150°C)**

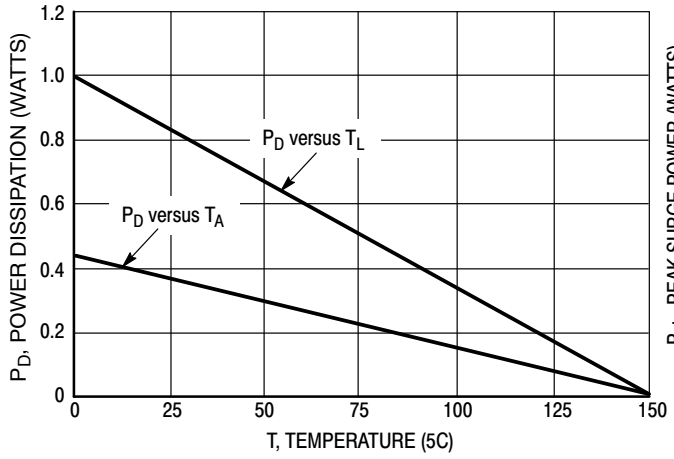



**Figure 3. Steady State Power Derating**

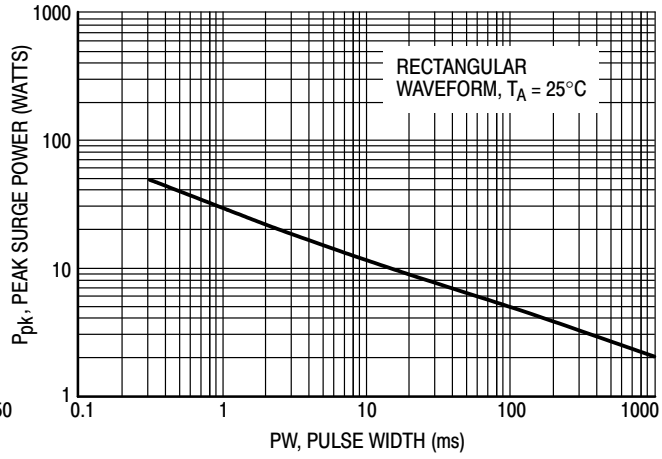



**Figure 4. Maximum Nonrepetitive Surge Power**

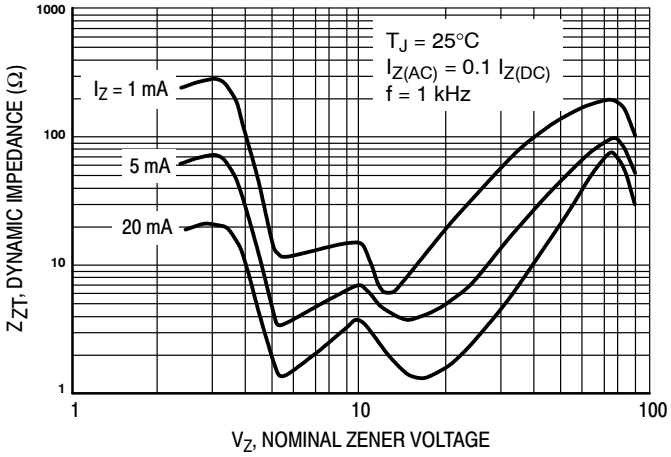



**Figure 5. Effect of Zener Voltage on Zener Impedance**

## TYPICAL CHARACTERISTICS

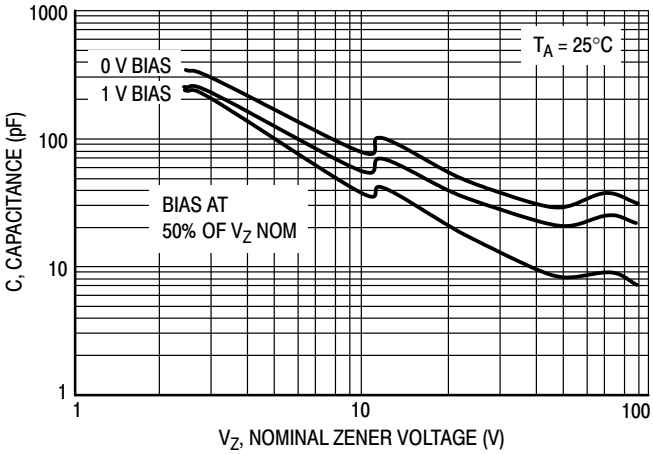



**Figure 6. Typical Capacitance**

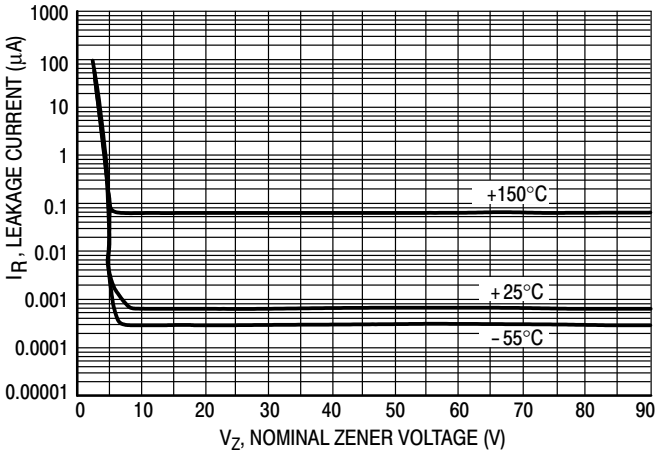



**Figure 7. Typical Leakage Current**

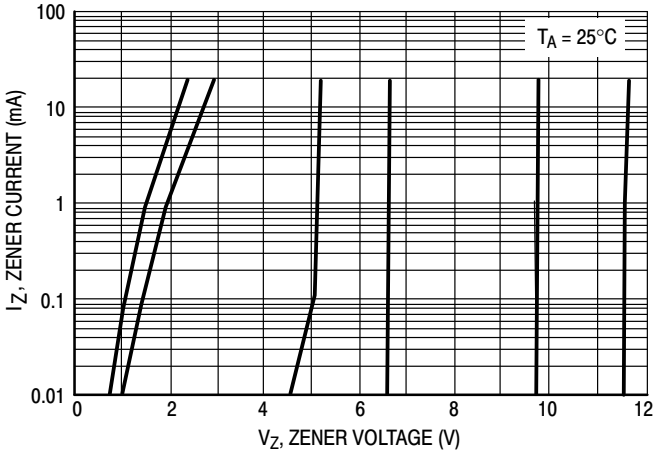



**Figure 8. Zener Voltage versus Zener Current ($V_Z$ Up to 12 V)**

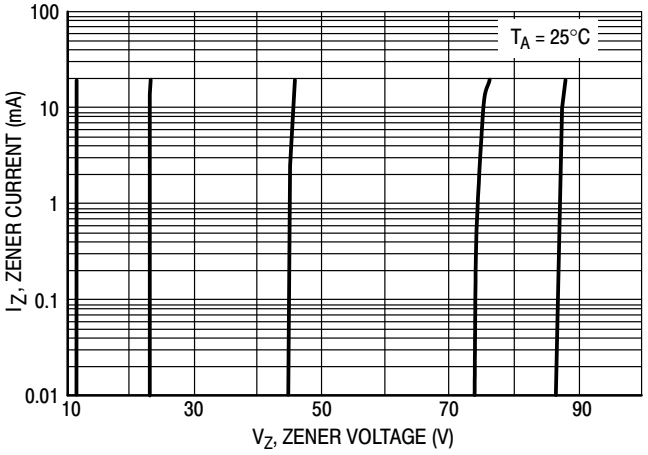
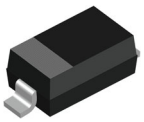


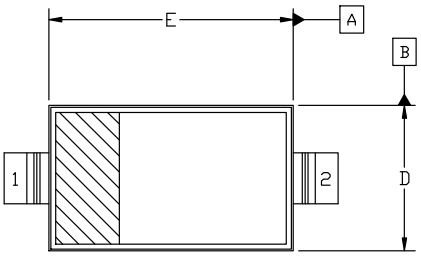

**Figure 9. Zener Voltage versus Zener Current (12 V to 91 V)**

# MECHANICAL CASE OUTLINE
## PACKAGE DIMENSIONS

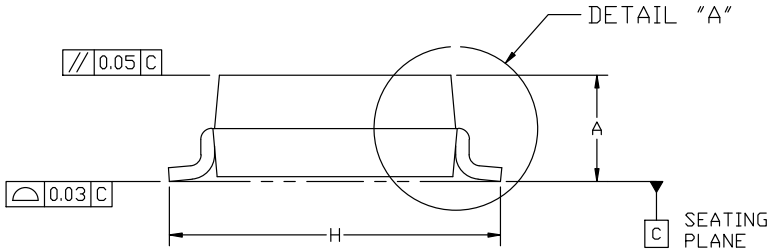


**SOD−123 2L 1.60x2.69x1.16**
CASE 425
ISSUE H

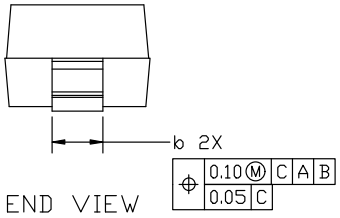
DATE 29 FEB 2024



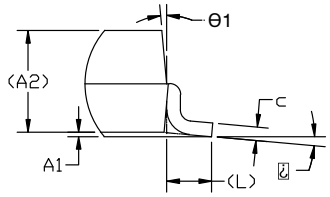

TOP VIEW




SIDE VIEW



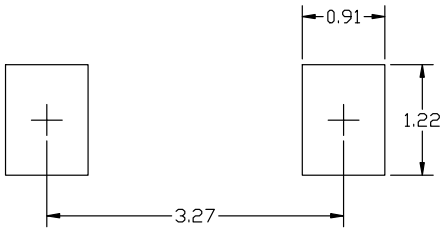

END VIEW




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 2L 1.60x2.69x1.16** | **PAGE 1 OF 1** |

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