Zener Voltage Regulators
500 mW SOD−523, Tight Tolerance Series

MM5ZxxxST1G Series, SZMM5ZxxxST1G Series

This series of Zener diodes is packaged in a SOD−523 surface mount package. They are designed to provide voltage regulation protection and are especially attractive in situations where space is at a premium. They are well suited for applications such as cellular phones, hand held portables, and high density PC boards.

Specification Features

- Standard Zener Breakdown Voltage Range −2.4 V to 18 V
- Tight Tolerance Series
- Steady State Power Rating of 500 mW
- Small Body Outline Dimensions:
  0.047″ x 0.032″ (1.20 mm x 0.80 mm)
  Low Body Height: 0.028″ (0.7 mm)
- 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
Epoxy Meets UL 94, V−0
LEAD FINISH: 100% Matte Sn (Tin)
MOUNTING POSITION: Any
QUALIFIED MAX REFLOW TEMPERATURE: 260°C
Device Meets MSL 1 Requirements

MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Total Device Dissipation FR−4 Board, (Note 1) @ T_A = 25°C Derate above 25°C	P_D	500 4.0	mW mW/°C
Thermal Resistance from Junction−to−Ambient (Note 1)	$R_{\theta JA}$	250	°C/W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	−65 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−4 printed circuit board, single−sided copper, mounting pad 1 cm^2.

*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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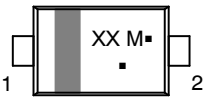
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SOD−523
CASE 502
STYLE 1



MARKING DIAGRAM



XX = Specific Device Code
M = Date Code*
▪ = Pb−Free Package
(Note: Microdot may be in either location)

*Date Code orientation may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
MM5ZxxxST1G	SOD−523 (Pb−Free)	3,000 / Tape & Reel
SZMM5ZxxxST1G	SOD−523 (Pb−Free)	3,000 / Tape & Reel
MM5ZxxxST5G	SOD−523 (Pb−Free)	8,000 / Tape & Reel
SZMM5ZxxxST5G	SOD−523 (Pb−Free)	8,000 / 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.

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ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter
V_Z	Reverse Zener Voltage @ I_{ZT}
I_{ZT}	Reverse Current
Z_{ZT}	Maximum Zener Impedance @ I_{ZT}
I_{ZK}	Reverse Current
Z_{ZK}	Maximum Zener Impedance @ I_{ZK}
I_R	Reverse Leakage Current @ V_R
V_R	Reverse Voltage
I_F	Forward Current
V_F	Forward Voltage @ I_F
ΘV_Z	Maximum Temperature Coefficient of V_Z
C	Max. Capacitance @V_R = 0 and f = 1 MHz

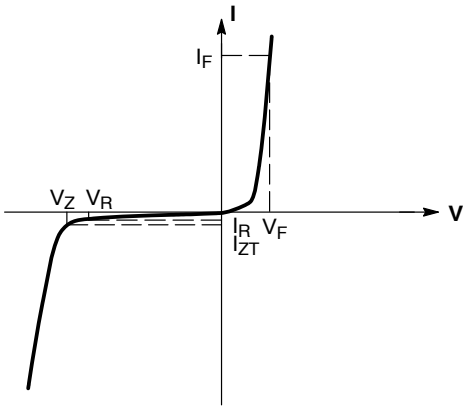


Figure 1. Zener Voltage Regulator

ELECTRICAL CHARACTERISTICS – Tight Tolerance Series

(V_F = 0.9 Max @ I_F = 10 mA for all types)

Device*	Device Marking	Test Current Izt mA	Zener Voltage VZ		Z_{ZK} I_Z = 1.0 mA Ω Max	Z_{ZT} I_Z = IZT @ 10% Mod Ω Max	Max IR @ VR		d_{VZ}/dt (mV/k) @ I_{ZT1} = 5 mA		C pF Max @ V_R = 0 f = 1 MHz
			Min	Max			μA	V	Min	Max	
MM5Z2V4ST1G/T5G	T2	5.0	2.43	2.63	1000	100	120	1.0	–3.5	0	450
MM5Z2V7ST1G	T3	5.0	2.67	2.91	1000	100	100	1.0	–3.5	0	450
MM5Z3V3ST1G	T5	5.0	3.32	3.53	1000	95	5.0	1.0	–3.5	0	450
MM5Z3V6ST1G	T6	5.0	3.60	3.85	1000	90	5.0	1.0	–3.5	0	450
MM5Z3V9ST1G	T7	5.0	3.89	4.16	1000	90	3.0	1.0	–3.5	–2.5	450
MM5Z4V3ST1G	T8	5.0	4.17	4.43	1000	90	3.0	1.0	–3.5	0	450
MM5Z4V7ST1G/T5G	T9	5.0	4.55	4.75	800	80	3.0	2.0	–3.5	0.2	260
MM5Z5V1ST1G/T5G	TA	5.0	4.98	5.2	500	60	2.0	2.0	–2.7	1.2	225
MM5Z5V6ST1G/T5G	TC	5.0	5.49	5.73	200	40	1.0	2.0	–2.0	2.5	200
MM5Z6V2ST1G/T5G	TE	5.0	6.06	6.33	100	10	3.0	4.0	0.4	3.7	185
MM5Z6V8ST1G/T5G	TF	5.0	6.65	6.93	160	15	2.0	4.0	1.2	4.5	155
MM5Z7V5ST1G	TG	5.0	7.28	7.6	160	15	1.0	5.0	2.5	5.3	140
MM5Z8V2ST1G/T5G	TH	5.0	8.02	8.36	160	15	0.7	5.0	3.2	6.2	135
MM5Z9V1ST1G/T5G	TK	5.0	8.85	9.23	160	15	0.5	6.0	3.8	7.0	130
MM5Z12VST1G	TN	5.0	11.74	12.24	80	25	0.1	8.0	6.0	10	130
MM5Z16VST1G	TU	5.0	15.85	16.51	80	40	0.05	11.2	10.4	14	105
MM5Z18VST1G	TW	5.0	17.56	18.35	80	45	0.05	12.6	12.4	16	100

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.
*Includes SZ-prefix devices where applicable.

TYPICAL CHARACTERISTICS

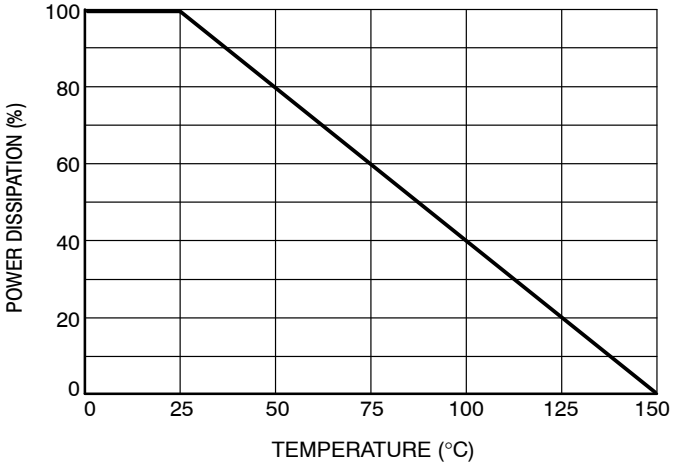
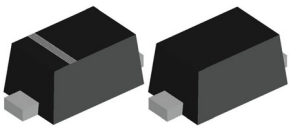


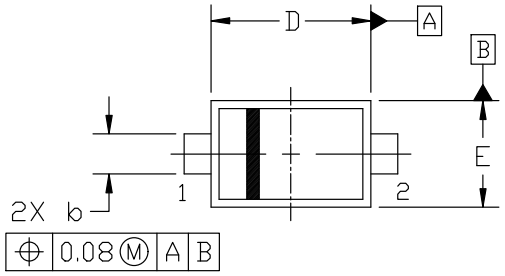
Figure 2. Steady State Power Derating

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

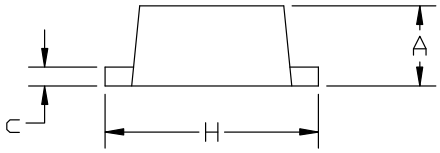


SOD−523 1.20x0.80x0.60
CASE 502
ISSUE F

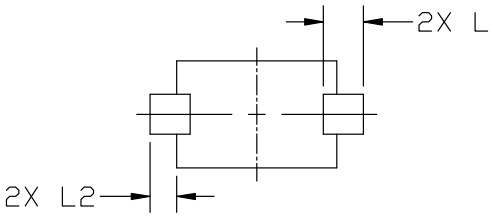
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TOP VIEW



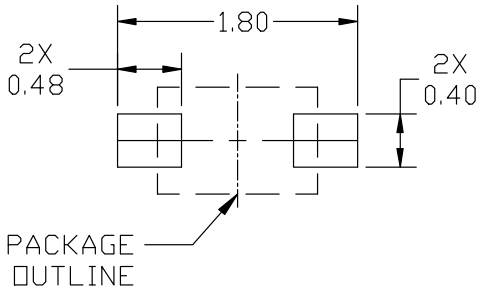
SIDE VIEW



BOTTOM VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH, MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

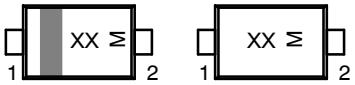
	MILLIMETERS		
DIM	MIN.	NOM.	MAX.
A	0.50	0.60	0.70
b	0.25	0.30	0.35
c	0.07	0.14	0.20
D	1.10	1.20	1.30
E	0.70	0.80	0.90
H	1.50	1.60	1.70
L	0.30 REF		
L2	0.15	0.20	0.25



RECOMMENDED MOUNTING FOOTPRINT

*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*



STYLE 1 STYLE 2

XX = Specific Device Code
M = Date Code

*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 (POLARITY BAND)
2. ANODE

STYLE 2:
NO POLARITY

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