Zener Voltage Regulators

500 mW SOD−323 Surface Mount Tight Tolerance Portfolio

MM3ZxxxST1G Series, SZMM3ZxxxST1G Series

SOD−323
CASE 477
STYLE 1

This series of Zener diodes is packaged in a SOD−323 surface mount package that has a power dissipation of 500 mW. 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 − 3.3 V to 36 V
- Steady State Power Rating of 500 mW
- Small Body Outline Dimensions:
  − 0.067″ x 0.049″ (1.7 mm x 1.25 mm)
- Low Body Height: 0.035″ (0.9 mm)
- Package Weight: 4.507 mg/unit
- ESD Rating of Class 3 (> 16 kV) per Human Body Model
- Tight Tolerance V_Z
- 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, Halogen Free/BFR Free and are RoHS Compliant*

Mechanical Characteristics:
CASE: Void-free, transfer-molded plastic
FINISH: All external surfaces are corrosion resistant
MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260°C for 10 Seconds
LEADS: Plated with Pb−Sn or Sn only (Pb−Free)
POLARITY: Cathode indicated by polarity band
FLAMMABILITY RATING: UL 94 V−0
MOUNTING POSITION: Any

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†
MM3ZxxxST1G	SOD−323 (Pb−Free)	3,000 / Tape & Reel
SZMM3ZxxxST1G	SOD−323 (Pb−Free)	3,000 / Tape & Reel
MM3ZxxxST3G	SOD−323 (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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MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Total Device Dissipation FR−4 Board, (Note 1) @ T_A = 25°C Derate above 25°C (Note 2) @ T_A = 25°C Derate above 25°C	P_D	 300 2.4 500 4.0	 mW mW/°C mW mW/°C
Thermal Resistance from Junction−to−Ambient (Note 1) Thermal Resistance from Junction−to−Ambient (Note 2)	$R_{\theta JA}$	416 250	°C/W °C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−65 to +150	°C

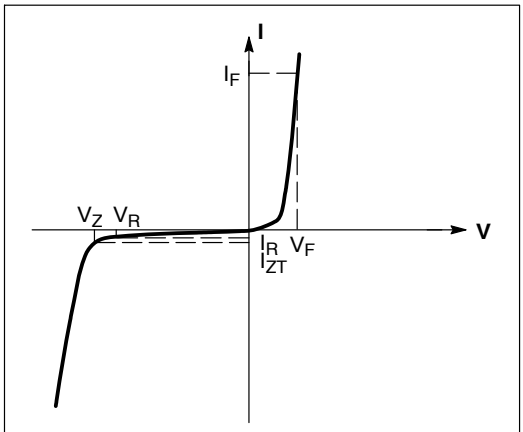
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR−4 printed circuit board, single−sided copper, standard mounting pad, PCB 1 cm^2.
2. FR−4 printed circuit board, single−sided copper, 0.72 mm^2 mounting pad, PCB 38 mm^2,1 in^2 copper heatsink.

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



Zener Voltage Regulator

ELECTRICAL CHARACTERISTICS (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 = 0.5 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	
MM3Z2V4ST1G	T2	5.0	2.29	2.51	1000	100	50	1.0	−3.5	0	450
MM3Z2V7ST1G	T3	5.0	2.59	2.81	1000	100	20	1.0	−3.5	0	450
MM3Z3V0ST1G	T4	5.0	2.90	3.11	1000	100	10	1.0	−3.5	0	450
MM3Z3V3ST1G	T5	5.0	3.32	3.53	1000	95	5.0	1.0	−3.5	0	450
MM3Z3V6ST1G	T6	5.0	3.49	3.71	1000	90	5.0	1.0	−3.5	0	450
MM3Z3V9ST1G	T7	5.0	3.89	4.16	1000	90	3.0	1.0	−3.5	−2.5	450
MM3Z4V3ST1G	T8	5.0	4.17	4.43	1000	90	3.0	1.0	−3.5	0	450
MM3Z4V7ST1G	T9	5.0	4.55	4.75	800	80	3.0	2.0	−3.5	0.2	260
MM3Z5V1ST1G	TA	5.0	4.98	5.2	500	60	2.0	2.0	−2.7	1.2	225
MM3Z5V6ST1G	TC	5.0	5.49	5.73	200	40	1.0	2.0	−2.0	2.5	200
MM3Z6V2ST1G	TE	5.0	6.06	6.33	100	10	3.0	4.0	0.4	3.7	185
MM3Z6V8ST1G	TF	5.0	6.65	6.93	160	15	2.0	4.0	1.2	4.5	155
MM3Z7V5ST1G	TG	5.0	7.28	7.6	160	15	1.0	5.0	2.5	5.3	140
MM3Z8V2ST1G	TH	5.0	8.02	8.36	160	15	0.7	5.0	3.2	6.2	135
MM3Z9V1ST1G	TK	5.0	8.85	9.23	160	15	0.5	6.0	3.8	7.0	130
MM3Z10VST1G	WB	5.0	9.80	10.20	160	15	0.5	6.0	4.5	8.0	130
MM3Z11VST1G	WC	5.0	10.78	11.22	160	20	0.1	8.0	5.4	9.0	130
MM3Z12VST1G	TN	5.0	11.74	12.24	80	25	0.1	8.0	6.0	10	130
MM3Z13VST1G	TQ	5.0	12.91	13.49	160	30	0.1	8.0	7.0	11	120
MM3Z15VST1G	TP	5.0	14.34	14.98	80	40	0.1	11	8.8	12.7	130
MM3Z16VST1G	TU	5.0	15.85	16.51	80	40	0.05	11.2	10.4	14	105
MM3Z18VST1G	TW	5.0	17.56	18.35	80	45	0.05	12.6	12.4	16	100
MM3Z20VST1G	U8	5.0	19.48	20.46	100	55	0.05	14.0	14.4	18	85
MM3Z22VST1G	WP	5.0	21.54	22.47	100	55	0.05	15.4	16.4	20	85
MM3Z24VST1G	WT	5.0	23.72	24.78	120	70	0.05	16.8	18.4	22	80
MM3Z27VST1G	WQ	5.0	26.19	27.53	300	80	0.05	18.9	21.4	25.3	70
MM3Z30VST1G	WV	5.0	29.19	30.69	300	80	0.05	21.0	24.4	29.4	70
MM3Z33VST1G	WR	5.0	32.15	33.79	300	80	0.05	23.2	27.4	33.4	70
MM3Z36VST1G	WU	5.0	35.07	36.87	500	90	0.05	25.2	30.4	37.4	70
MM3Z39VST1G	WN	2.0	38.22	39.78	500	130	0.05	27.3	33.4	41.2	45

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.
*Include SZ-prefix devices where applicable.

TYPICAL CHARACTERISTICS

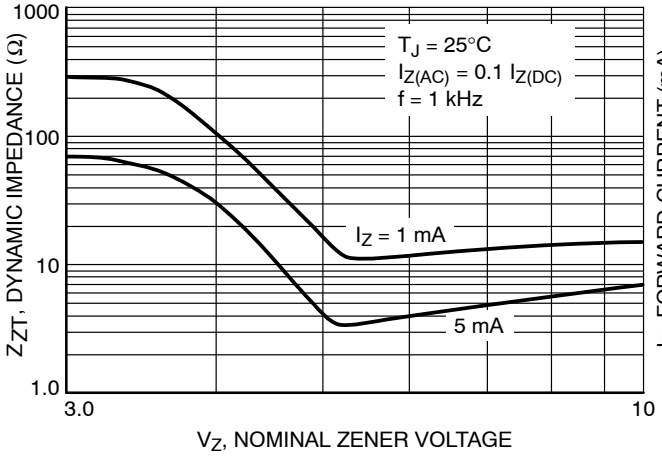


Figure 1. Effect of Zener Voltage on Zener Impedance

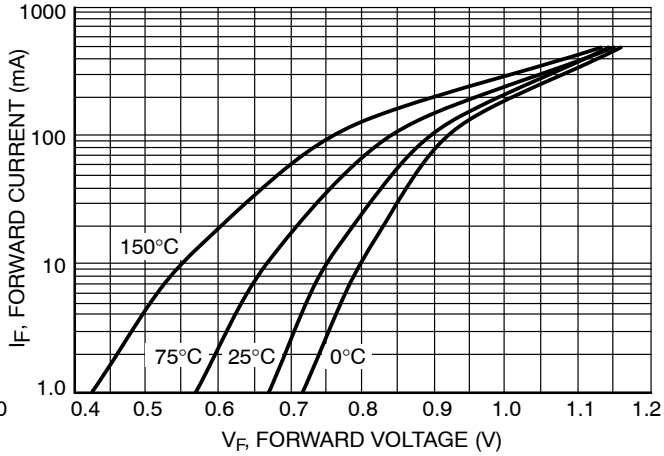


Figure 2. Typical Forward Voltage

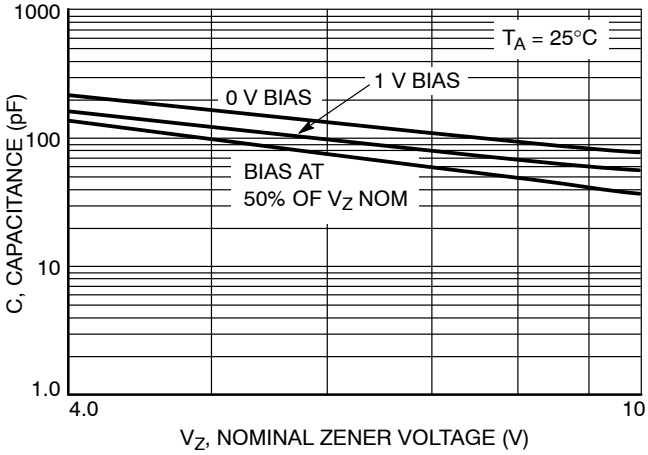


Figure 3. Typical Capacitance

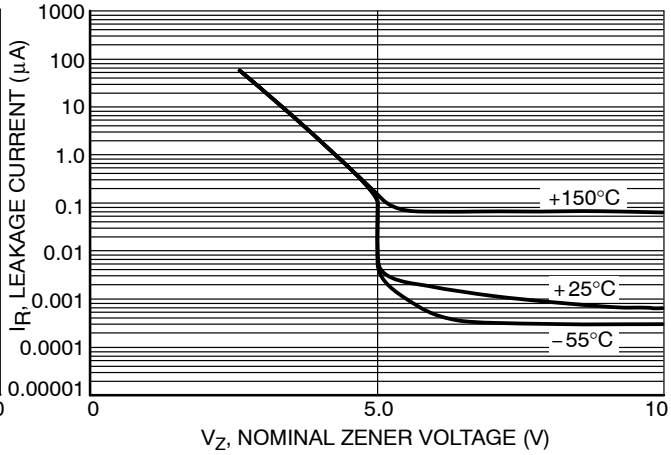


Figure 4. Typical Leakage Current

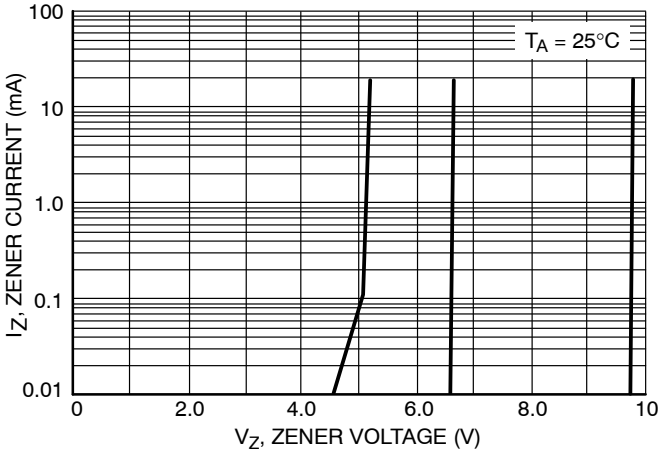


Figure 5. Zener Voltage versus Zener Current (V_Z Up to 9 V)

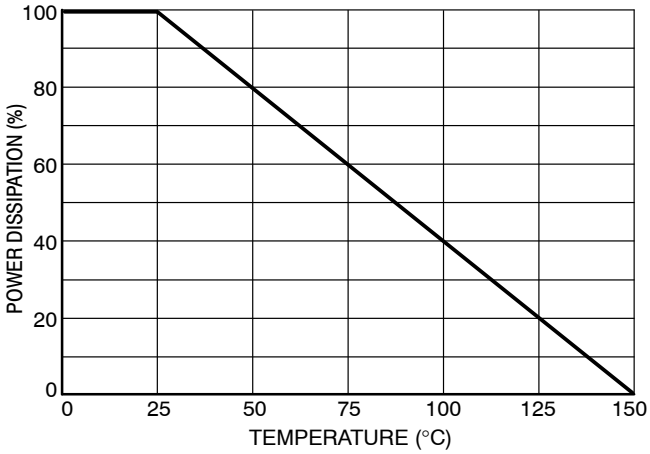
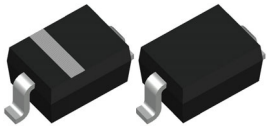
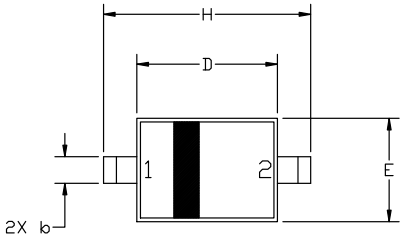


Figure 6. Steady State Power Derating

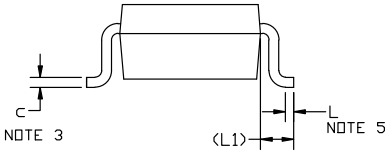


SOD−323 1.70x1.25x0.85
CASE 477
ISSUE K

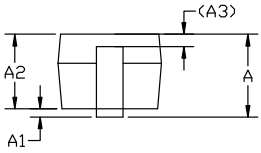
DATE 11 MAR 2024



TOP VIEW



SIDE VIEW

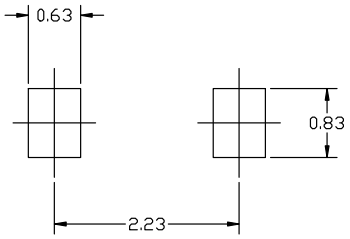


END VIEW

NOTES:

1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. LEAD THICKNESS SPECIFIED PER L/F DRAWING WITH SOLDER PLATING.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
5. DIMENSION L IS MEASURE FROM END OF RADIUS.

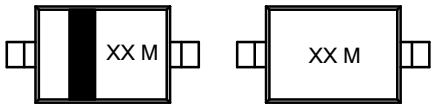
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.80	0.90	1.00
A1	0.00	0.05	0.10
A2	0.75	0.85	0.95
A3	0.15 (REF)		
b	0.25	0.32	0.4
c	0.09	0.12	0.18
D	1.60	1.70	1.80
E	1.15	1.25	1.35
H	2.30	2.50	2.70
L	0.08	---	---
L1	0.40 (REF)		



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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DESCRIPTION:	SOD−323 1.70x1.25x0.85	PAGE 1 OF 1

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