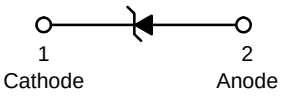
Zener Voltage Regulators

500 mW SOD-523, Standard Tolerance Series

MM5ZxxxT1G Series, SZMM5ZxxxT1G Series



SOD-523
CASE 502
STYLE 1



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 75 V
- Standard 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, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	250	°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, mounting pad 1 cm^2.

*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 = 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†
MM5ZxxxT1G	SOD-523 (Pb-Free)	3,000 / Tape & Reel
SZMM5ZxxxT1G	SOD-523 (Pb-Free)	3,000 / Tape & Reel
MM5ZxxxT5G	SOD-523 (Pb-Free)	8,000 / Tape & Reel
SZMM5ZxxxT5G	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 tables starting on page 3 of this data sheet.

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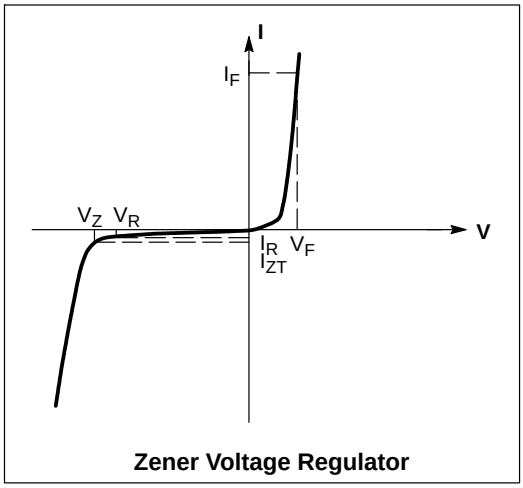
ELECTRICAL CHARACTERISTICS

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

TYPICAL CHARACTERISTICS

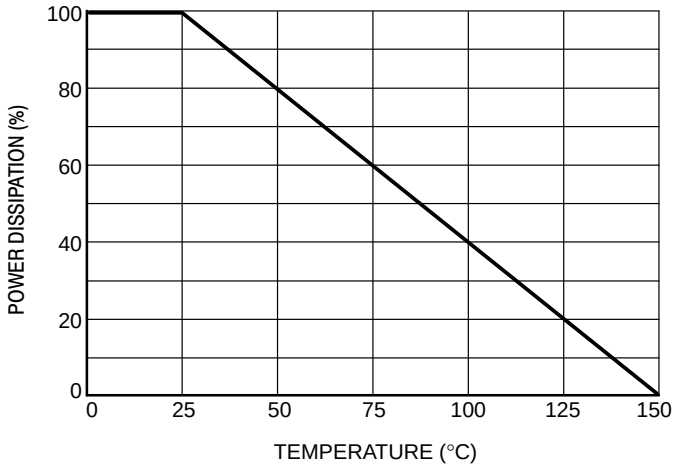


Figure 1. Steady State Power Derating

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ELECTRICAL CHARACTERISTICS − Standard Tolerance Series

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

Device*	Device Marking	V_{Z1} (V) @ (Note 1) (Note 2)			V_{Z2} (V) @ (Note 1) (Note 2)		Zener Impedance			Leakage Current		ΘV_Z (mV/k) @ I_{ZT}		C @ V_R = 0 f = 1 MHz
							Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}		I_R @ V_R				
		Min	Nom	Max	Min	Max	Ω	Ω	mA	μA	Volts	Min	Max	pF
MM5Z2V4T1G/T5G	00	2.2	2.4	2.6	1.7	2.1	100	1000	1.0	50	1.0	−3.5	0	450
MM5Z2V7T1G/T5G	01	2.5	2.7	2.9	1.9	2.4	100	1000	1.0	20	1.0	−3.5	0	450
MM5Z3V0T1G/T5G	02	2.8	3.0	3.2	2.1	2.7	100	1000	1.0	10	1.0	−3.5	0	450
MM5Z3V3T1G/T5G	05	3.1	3.3	3.5	2.3	2.9	95	1000	1.0	5	1.0	−3.5	0	450
MM5Z3V6T1G/T5G	06	3.4	3.6	3.8	2.7	3.3	90	1000	1.0	5	1.0	−3.5	0	450
MM5Z3V9T1G/T5G	AJ	3.7	3.9	4.2	2.9	3.5	90	1000	1.0	3	1.0	−3.5	0	450
MM5Z4V3T1G/T5G	08	4.0	4.3	4.6	3.3	4	90	1000	1.0	3	1.0	−3.5	0	450
MM5Z4V7T1G/T5G	09	4.4	4.7	5.0	3.7	4.7	80	800	1.0	3	2.0	−3.5	0.2	260
MM5Z5V1T1G/T5G	0A	4.8	5.1	5.4	4.2	5.3	60	500	1.0	2	2.0	−2.7	1.2	225
MM5Z5V6T1G/T5G	0C	5.2	5.6	6.0	4.8	6	40	200	1.0	1	2.0	−2.0	2.5	200
MM5Z6V2T1G/T5G	0E	5.8	6.2	6.6	5.6	6.6	10	100	1.0	3	4.0	0.4	3.7	185
MM5Z6V8T1G/T5G	0F	6.4	6.8	7.2	6.3	7.2	15	160	1.0	2	4.0	1.2	4.5	155
MM5Z7V5T1G/T5G	0G	7.0	7.5	7.9	6.9	7.9	15	160	1.0	1	5.0	2.5	5.3	140
MM5Z8V2T1G/T5G	0H	7.7	8.2	8.7	7.6	8.7	15	160	1.0	0.7	5.0	3.2	6.2	135
MM5Z9V1T1G/T5G	0K	8.5	9.1	9.6	8.4	9.6	15	160	1.0	0.2	7.0	3.8	7.0	130
MM5Z10VT1G/T5G	0L	9.4	10	10.6	9.3	10.6	20	160	1.0	0.1	8.0	4.5	8.0	130
MM5Z11VT1G/T5G	0M	10.4	11	11.6	10.2	11.6	20	160	1.0	0.1	8.0	5.4	9.0	130
MM5Z12VT1G/T5G	0N	11.4	12	12.7	11.2	12.7	25	80	1.0	0.1	8.0	6.0	10	130
MM5Z13VT1G/T5G	0P	12.4	13.25	14.1	12.3	14	30	80	1.0	0.1	8.0	7.0	11	120
MM5Z15VT1G/T5G	0T	14.3	15	15.8	13.7	15.5	30	80	1.0	0.05	10.5	9.2	13	110
MM5Z16VT1G/T5G	0U	15.3	16.2	17.1	15.2	17	40	80	1.0	0.05	11.2	10.4	14	105
MM5Z18VT1G/T5G	0W	16.8	18	19.1	16.7	19	45	80	1.0	0.05	12.6	12.4	16	100
MM5Z20VT1G/T5G	0Z	18.8	20	21.2	18.7	21.1	55	100	1.0	0.05	14.0	14.4	18	85
MM5Z22VT1G/T5G	10	20.8	22	23.3	20.7	23.2	55	100	1.0	0.05	15.4	16.4	20	85
MM5Z24VT1G/T5G	11	22.8	24.2	25.6	22.7	25.5	70	120	1.0	0.05	16.8	18.4	22	80
MM5Z27VT1G/T5G	12	25.1	27	28.9	25	28.9	80	300	1.0	0.05	18.9	21.4	25.3	70
MM5Z30VT1G/T5G	14	28	30	32	27.8	32	80	300	1.0	0.05	21.0	24.4	29.4	70
MM5Z33VT1G/T5G	18	31	33	35	30.8	35	80	300	1.0	0.05	23.2	27.4	33.4	70
MM5Z36VT1G/T5G	19	34	36	38	33.8	38	90	500	1.0	0.05	25.2	30.4	37.4	70
MM5Z39VT1G/T5G	20	37	39	41	36.7	41	130	500	1.0	0.05	27.3	33.4	41.2	45
MM5Z43VT1G/T5G	21	40	43	46	39.7	46	150	500	1.0	0.05	30.1	37.6	46.6	40
MM5Z47VT1G/T5G	1A	44	47	50	43.7	50	170	500	1.0	0.05	32.9	42.0	51.8	40
MM5Z51VT1G**	1C	48	51	54	47.6	54	180	500	1.0	0.05	35.7	46.6	57.2	40
MM5Z56VT1G**	1D	52	56	60	51.5	60	200	500	1.0	0.05	39.2	52.2	63.8	40
MM5Z62VT1G**	1E	58	62	66	57.4	66	215	500	1.0	0.05	43.4	58.8	71.6	35
MM5Z68VT1G**	1F	64	68	72	63.4	72	240	500	1.0	0.05	47.6	65.6	79.8	35
MM5Z75VT1G**	1G	70	75	79	69.4	79	255	500	1.0	0.05	52.5	73.4	88.6	35

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.

1. I_{ZT1} = 5 mA: 2.4 to 24 V, I_{ZT1} = 2 mA: 27 to 75 V; I_{ZT2} = 1 mA: 2.4 to 24 V, I_{ZT2} = 0.5 mA: 27 to 75 V.
2. Zener voltage is measured with a pulse test current I_Z at an ambient temperature of 25 °C.

*Includes SZ-prefix devices where applicable.
**Contact Sales.

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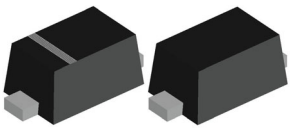
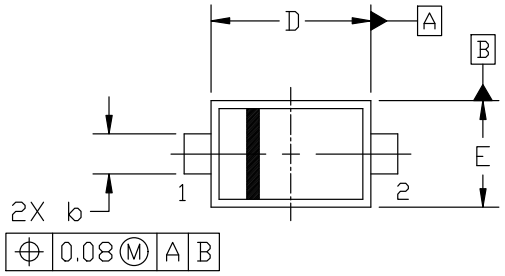
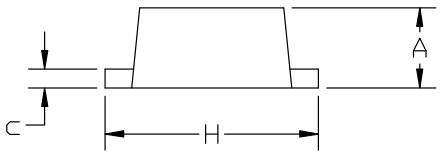


SOD−523 1.20x0.80x0.60
CASE 502
ISSUE F

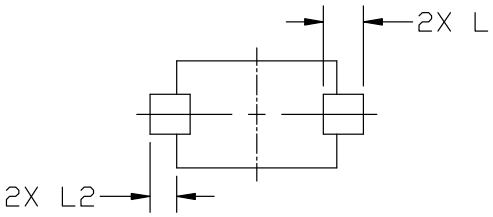
DATE 08 FEB 2024



TOP VIEW



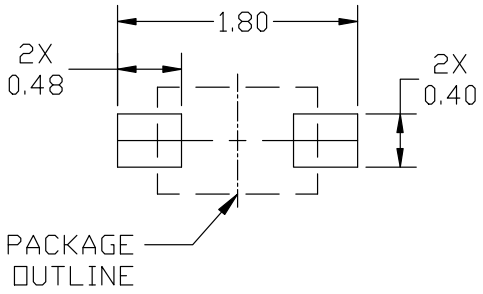
SIDE VIEW



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.

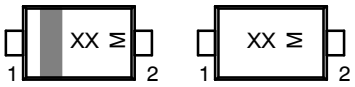
	MILLIMETERS		
DIM	MIN.	NOM.	MAX.
A	0.50	0.60	0.70
b	0.25	0.30	0.35
c	0.07	0.14	0.20
D	1.10	1.20	1.30
E	0.70	0.80	0.90
H	1.50	1.60	1.70
L	0.30 REF		
L2	0.15	0.20	0.25



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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DESCRIPTION:	**SOD−523 1.20x0.80x0.60**		**PAGE 1 OF 1**

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