



**THE DATASHEET OF  
MM3Z3V6ST1**



# MM3Z2V4ST1 SERIES

## Zener Voltage Regulators

200 mW SOD-323 Surface Mount

### Tight Tolerance Portfolio

This series of Zener diodes is packaged in a SOD-323 surface mount package that has a power dissipation of 200 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 – 2.4 V to 12 V
- Steady State Power Rating of 200 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  $V_Z$
- Pb-Free Packages are Available

#### 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

#### MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Total Device Dissipation FR-5 Board, (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above 25°C	$P_D$	200 1.5	mW mW/°C
Thermal Resistance from Junction-to-Ambient	$R_{\theta JA}$	635	°C/W
Junction and Storage Temperature Range	$T_J, T_{stg}$	-65 to +150	°C

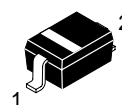
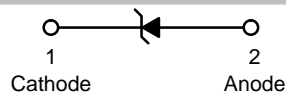
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. FR-4 Minimum Pad



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SOD-323  
CASE 477  
STYLE 1

#### MARKING DIAGRAM



xx = Specific Device Code  
M = Date Code

#### ORDERING INFORMATION

Device	Package	Shipping†
MM3ZxxxST1	SOD-323	3000/Tape & Reel
MM3ZxxxST3	SOD-323	10,000/Tape & Reel
MM3ZxxxST1G	SOD-323 (Pb-Free)	3000/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

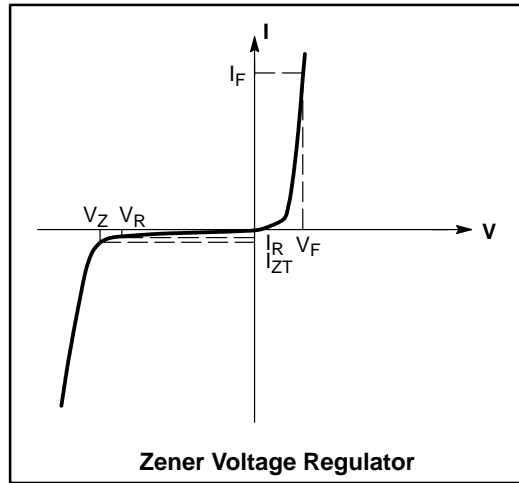
See specific marking information in the device marking column of the Electrical Characteristics table on page 2 of this data sheet.

# MM3Z2V4ST1 SERIES

## ELECTRICAL CHARACTERISTICS

( $T_A = 25^\circ\text{C}$  unless otherwise noted,  
 $V_F = 0.9\text{ V Max. @ } I_F = 10\text{ mA}$  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 @ $I_F$
$\Theta_{VZ}$	Maximum Temperature Coefficient of $V_Z$
C	Max. Capacitance @ $V_R = 0$ and $f = 1\text{ MHz}$



## ELECTRICAL CHARACTERISTICS ( $V_F = 0.9\text{ Max @ } I_F = 10\text{ mA}$ for all types)

Device	Device Marking	Test Current $I_{zt}$ mA	Zener Voltage $V_Z$		$Z_{ZK}$ $I_Z = 0.5\text{ mA}$ $\Omega$ Max	$Z_{ZT}$ $I_Z = I_{ZT}$ @ 10% Mod $\Omega$ Max	Max $I_R$ @ $V_R$		$dV_Z/dt$ (mV/k) @ $I_{ZT1} = 5\text{ mA}$		C pF Max @ $V_R = 0$ $f = 1\text{ MHz}$
			Min	Max			$\mu\text{A}$	V	Min	Max	
MM3Z2V4ST1	T2	5.0	2.43	2.63	1000	100	120	1.0	-3.5	0	450
MM3Z2V7ST1	T3	5.0	2.67	2.91	1000	100	100	1.0	-3.5	0	450
MM3Z3V3ST1	T5	5.0	3.32	3.53	1000	95	5.0	1.0	-3.5	0	450
MM3Z3V3TT1, G	TX	5.0	3.19	3.41	100	95	5.0	1.0	-3.5	0	450
MM3Z3V6ST1, G	T6	5.0	3.60	3.85	1000	90	5.0	1.0	-3.5	0	450
MM3Z3V9ST1, G	T7	5.0	3.89	4.16	1000	90	3.0	1.0	-3.5	-2.5	450
MM3Z4V3ST1	T8	5.0	4.17	4.43	1000	90	3.0	1.0	-3.5	0	450
MM3Z4V7ST1, G	T9	5.0	4.55	4.75	800	80	3.0	2.0	-3.5	0.2	260
MM3Z5V1ST1	TA	5.0	4.98	5.2	500	60	2.0	2.0	-2.7	1.2	225
MM3Z5V6ST1	TC	5.0	5.49	5.73	200	40	1.0	2.0	-2.0	2.5	200
MM3Z6V2ST1	TE	5.0	6.06	6.33	100	10	3.0	4.0	0.4	3.7	185
MM3Z6V8ST1	TF	5.0	6.65	6.93	160	15	2.0	4.0	1.2	4.5	155
MM3Z7V5ST1	TG	5.0	7.28	7.6	160	15	1.0	5.0	2.5	5.3	140
MM3Z8V2ST1	TH	5.0	8.02	8.36	160	15	0.7	5.0	3.2	6.2	1358
MM3Z9V1ST1	TK	5.0	8.85	9.23	160	15	0.5	6.0	3.8	7.0	130
MM3Z10VST1	WB	5.0	9.80	10.20	160	15	0.5	6.0	4.5	8.0	130
MM3Z11VST1	WC	5.0	10.78	11.22	160	15	0.5	7.0	5.4	9.0	130
MM3Z12VST1	TN	5.0	11.74	12.24	80	25	0.1	8.0	6.0	10	130
MM3Z15VST1*	WF	5.0	14.7	15.3	80	30	0.05	10.5	9.2	13	110

\*Product preview – parts available upon request.

# MM3Z2V4ST1 SERIES

## Typical Characteristics

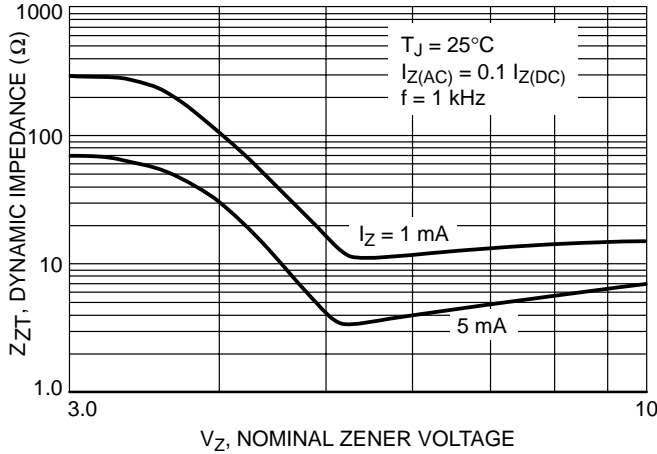


Figure 1. Effect of Zener Voltage on Zener Impedance

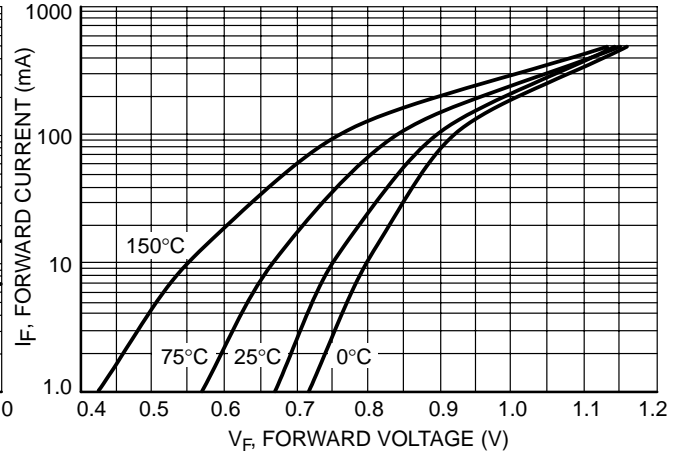


Figure 2. Typical Forward Voltage

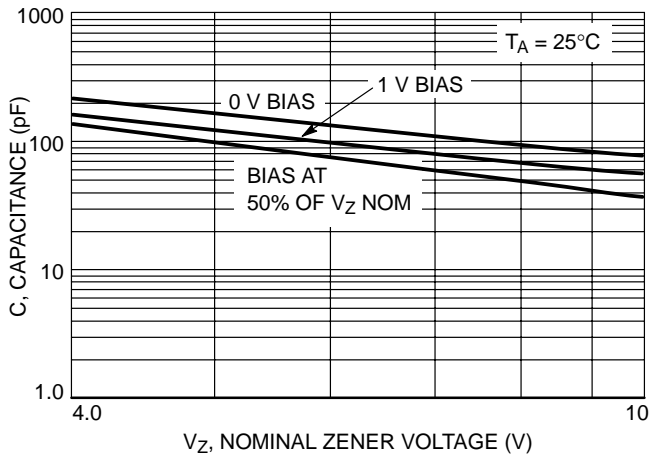


Figure 3. Typical Capacitance

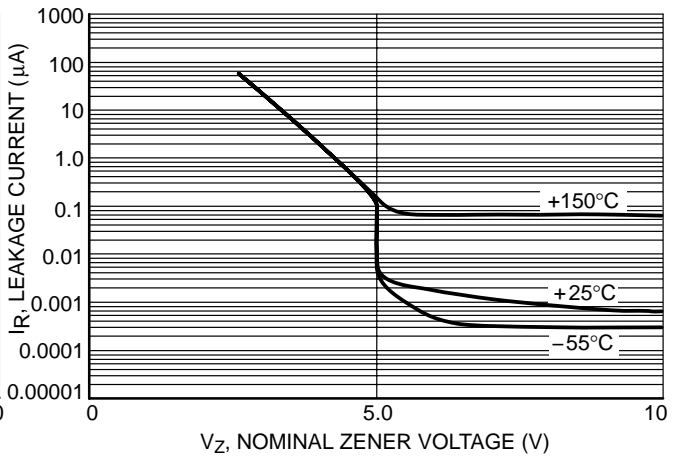


Figure 4. Typical Leakage Current

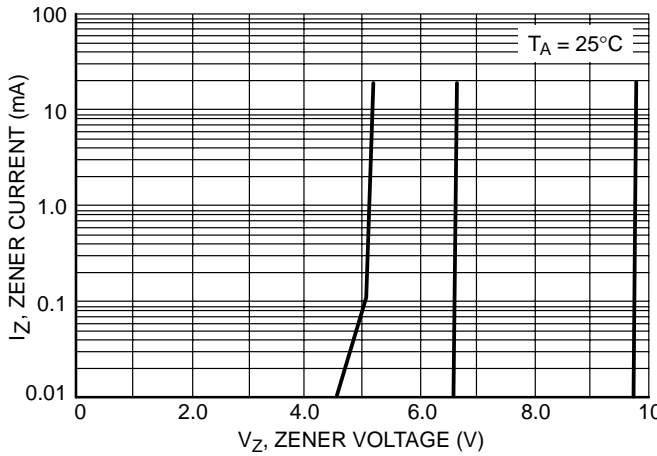


Figure 5. Zener Voltage versus Zener Current ( $V_Z$  Up to 9 V)

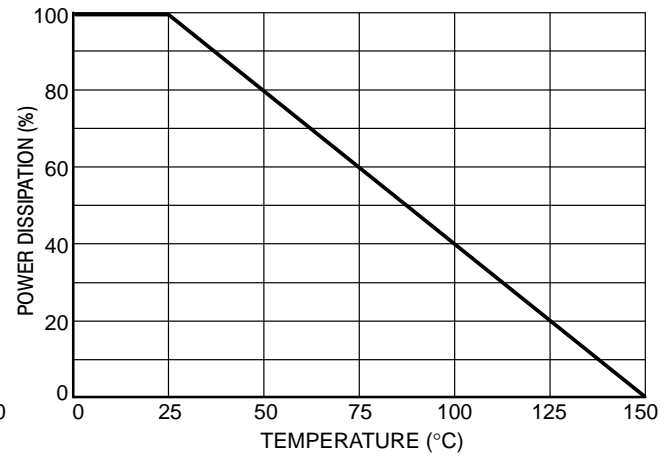
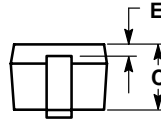
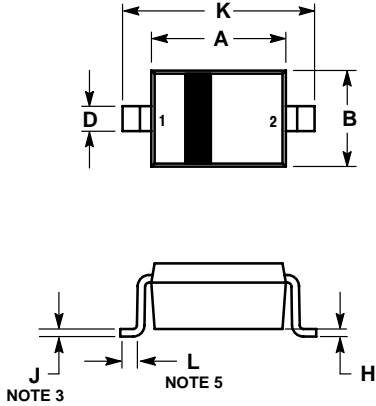


Figure 6. Steady State Power Derating

# MM3Z2V4ST1 SERIES

## PACKAGE DIMENSIONS

**SOD-323**  
CASE 477-02  
ISSUE D



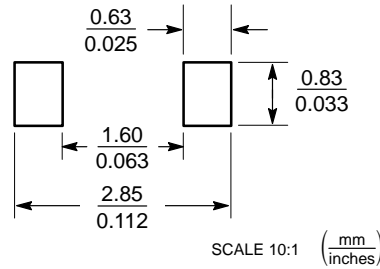
**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
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 MEASURED FROM END OF RADIUS.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.60	1.80	0.063	0.071
B	1.15	1.35	0.045	0.053
C	0.80	1.00	0.031	0.039
D	0.25	0.40	0.010	0.016
E	0.15 REF		0.006 REF	
H	0.00	0.10	0.000	0.004
J	0.089	0.177	0.0035	0.0070
K	2.30	2.70	0.091	0.106
L	0.075	---	0.003	---

STYLE 1:  
PIN 1. CATHODE  
2. ANODE

### SOLDERING 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.

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