

MM3Z3V3ST1 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 – 3.3 V to 36 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/ $^\circ\text{C}$ |
| Thermal Resistance from Junction-to-Ambient | $R_{\theta JA}$ | 635 | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range | T_J, T_{stg} | -65 to +150 | $^\circ\text{C}$ |

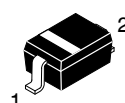
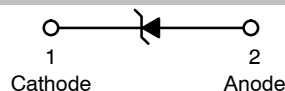
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR-4 Minimum Pad.



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**SOD-323
CASE 477
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† |
|-------------|----------------------|--------------------|
| MM3ZxxxST1 | SOD-323 | 3000/Tape & Reel |
| MM3ZxxxST1G | SOD-323 (Pb-Free) | 3000/Tape & Reel |
| MM3ZxxxST3 | SOD-323 | 10,000/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

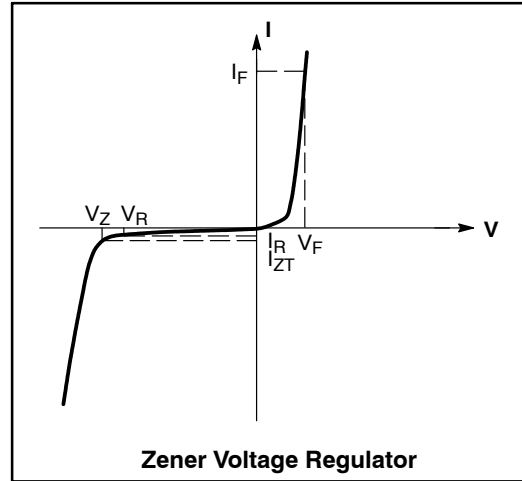
See specific marking information in the device marking column of the Electrical Characteristics table on page 2 of this data sheet.

MM3Z3V3ST1 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 |
| Θ_{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 Ω Max | Max IR @ V_R | | dV_Z/dt (mV/k) @ $I_{ZT1} = 5\text{ mA}$ | | C pF Max @ $V_R = 0$ $f = 1\text{ MHz}$ |
|---------------|----------------|--------------------------|---------------------|-------|--|--|----------------|------|--|------|---|
| | | | Min | Max | | | μA | V | Min | Max | |
| MM3Z3V0ST1, G | T4 | 5.0 | 2.90 | 3.11 | 1000 | 100 | 10 | 1.0 | -3.5 | 0 | 450 |
| MM3Z3V3ST1, G | T5 | 5.0 | 3.32 | 3.53 | 1000 | 95 | 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, G | 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, G | TA | 5.0 | 4.98 | 5.2 | 500 | 60 | 2.0 | 2.0 | -2.7 | 1.2 | 225 |
| MM3Z5V6ST1, G | TC | 5.0 | 5.49 | 5.73 | 200 | 40 | 1.0 | 2.0 | -2.0 | 2.5 | 200 |
| MM3Z6V2ST1, G | TE | 5.0 | 6.06 | 6.33 | 100 | 10 | 3.0 | 4.0 | 0.4 | 3.7 | 185 |
| MM3Z6V8ST1, G | TF | 5.0 | 6.65 | 6.93 | 160 | 15 | 2.0 | 4.0 | 1.2 | 4.5 | 155 |
| MM3Z7V5ST1, G | TG | 5.0 | 7.28 | 7.6 | 160 | 15 | 1.0 | 5.0 | 2.5 | 5.3 | 140 |
| MM3Z8V2ST1, G | TH | 5.0 | 8.02 | 8.36 | 160 | 15 | 0.7 | 5.0 | 3.2 | 6.2 | 135 |
| MM3Z9V1ST1, G | TK | 5.0 | 8.85 | 9.23 | 160 | 15 | 0.5 | 6.0 | 3.8 | 7.0 | 130 |
| MM3Z10VST1, G | WB | 5.0 | 9.80 | 10.20 | 160 | 15 | 0.5 | 6.0 | 4.5 | 8.0 | 130 |
| MM3Z12VST1, G | TN | 5.0 | 11.74 | 12.24 | 80 | 25 | 0.1 | 8.0 | 6.0 | 10 | 130 |
| MM3Z15VST1, G | TP | 5.0 | 14.34 | 14.98 | 80 | 40 | 0.1 | 11 | 8.8 | 12.7 | 130 |
| MM3Z16VST1, G | TU | 5.0 | 15.85 | 16.51 | 80 | 40 | 0.05 | 11.2 | 10.4 | 14 | 105 |
| MM3Z18VST1, G | TW | 5.0 | 17.56 | 18.35 | 80 | 45 | 0.05 | 12.6 | 12.4 | 16 | 100 |
| 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 |
| 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 |

*The "G" suffix indicates Pb-Free package available.

MM3Z3V3ST1 SERIES

TYPICAL CHARACTERISTICS

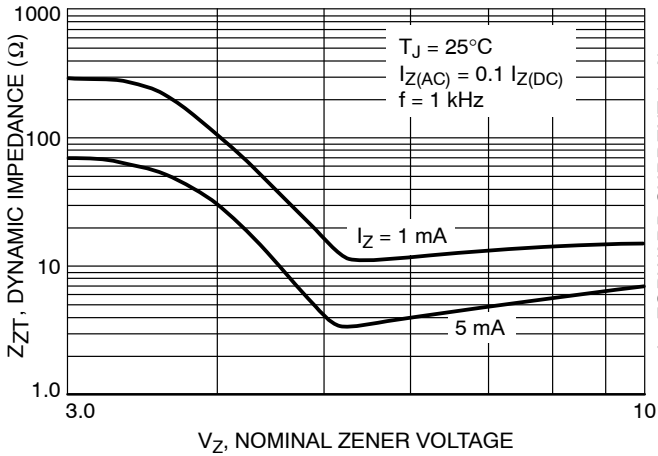


Figure 1. Effect of Zener Voltage on Zener Impedance

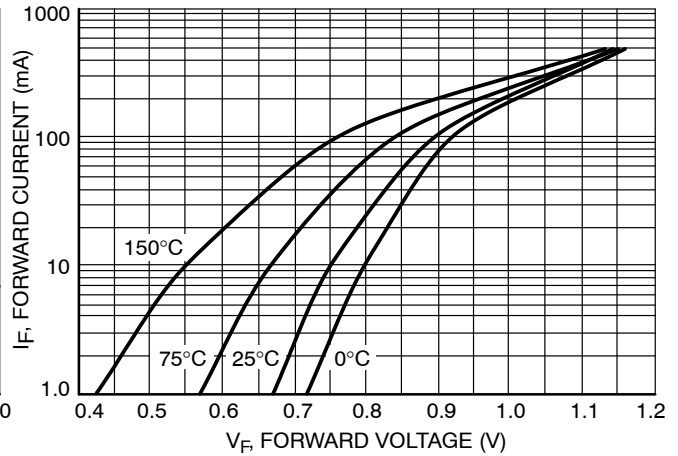


Figure 2. Typical Forward Voltage

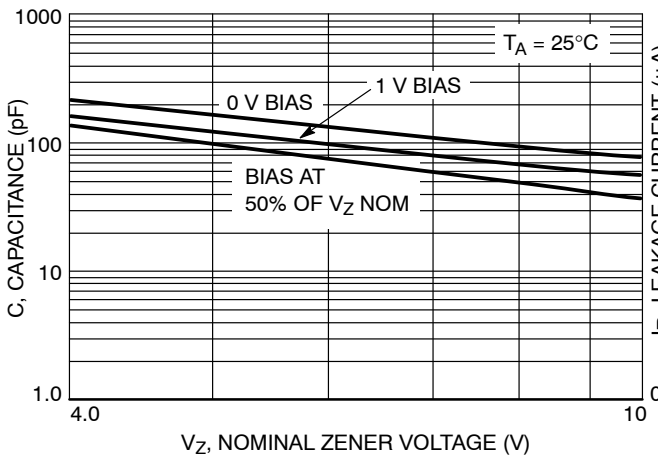


Figure 3. Typical Capacitance

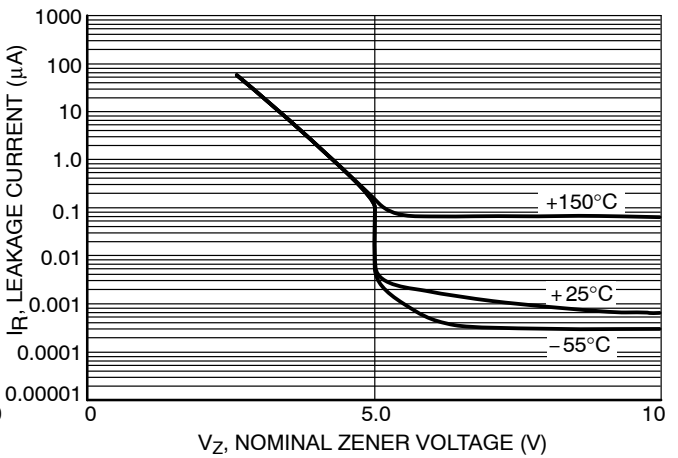


Figure 4. Typical Leakage Current

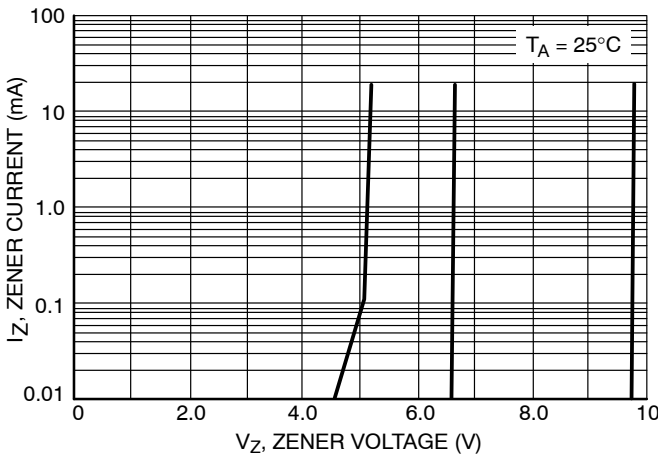


Figure 5. Zener Voltage versus Zener Current (V_Z Up to 9 V)

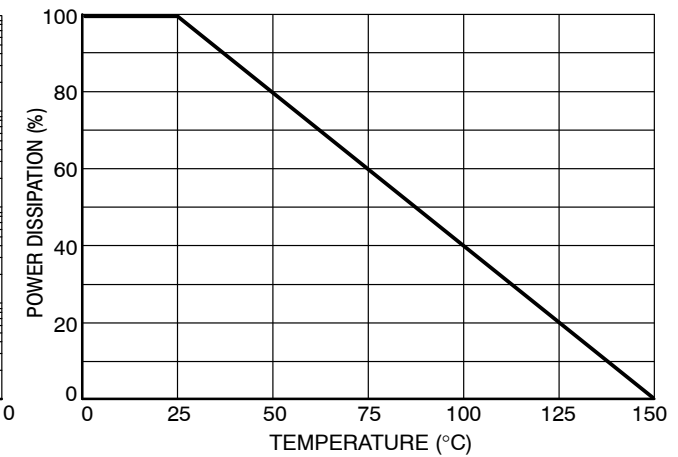
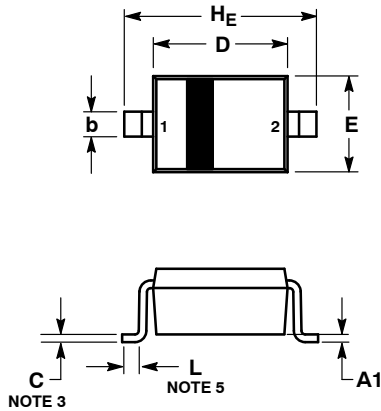


Figure 6. Steady State Power Derating

MM3Z3V3ST1 SERIES

PACKAGE DIMENSIONS

SOD-323
CASE 477-02
ISSUE G



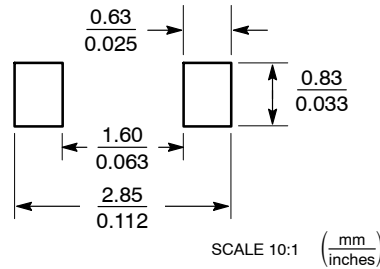
NOTES:

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 | NOM | MAX | MIN | NOM | MAX |
| A | 0.80 | 0.90 | 1.00 | 0.031 | 0.035 | 0.040 |
| A1 | 0.00 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 |
| A3 | 0.15 REF | | | 0.006 REF | | |
| b | 0.25 | 0.32 | 0.4 | 0.010 | 0.012 | 0.016 |
| C | 0.089 | 0.12 | 0.177 | 0.003 | 0.005 | 0.007 |
| D | 1.60 | 1.70 | 1.80 | 0.062 | 0.066 | 0.070 |
| E | 1.15 | 1.25 | 1.35 | 0.045 | 0.049 | 0.053 |
| L | 0.08 | | | 0.003 | | |
| HE | 2.30 | 2.50 | 2.70 | 0.090 | 0.098 | 0.105 |

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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