

MM5Z2V4ST1 SERIES

Zener Voltage Regulators

200 mW SOD-523 Surface Mount

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
- Steady State Power Rating of 200 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
- Tight Tolerance V_Z
- These are Pb-Free Devices

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-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 |

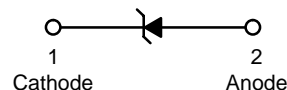
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR-4 Minimum Pad.



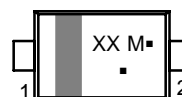
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SOD-523
CASE 502
PLASTIC

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† |
|-------------|----------|------------------|
| MM5ZxxxST1 | SOD-523* | 3000/Tape & Reel |
| MM5ZxxxST1G | SOD-523* | 3000/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.

*This package is inherently Pb-Free.

DEVICE MARKING INFORMATION

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

MM5Z2V4ST1 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 |
| ΘV_Z | Maximum Temperature Coefficient of V_Z |
| C | Max. Capacitance @ $V_R = 0$ and $f = 1\text{ MHz}$ |

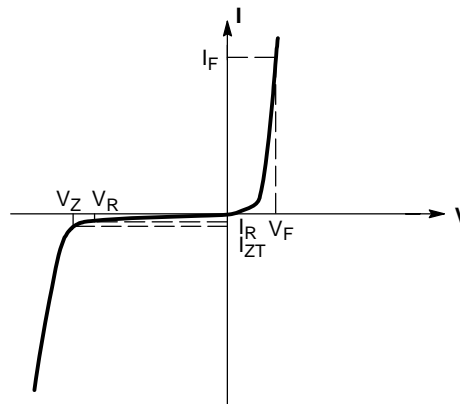


Figure 1. Zener Voltage Regulator

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 VZ | | $Z_{ZK} I_Z = 1.0\text{ mA } \Omega$ Max | $Z_{ZT} I_Z = I_{ZT} @ 10\% \text{ Mod } \Omega$ 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 | |
| MM5Z2V4ST1 | T2 | 5.0 | 2.43 | 2.63 | 1000 | 100 | 120 | 1.0 | -3.5 | 0 | 450 |
| MM5Z2V7ST1 | T3 | 5.0 | 2.67 | 2.91 | 1000 | 100 | 100 | 1.0 | -3.5 | 0 | 450 |
| MM5Z3V3ST1 | T5 | 5.0 | 3.32 | 3.53 | 1000 | 95 | 5.0 | 1.0 | -3.5 | 0 | 450 |
| MM5Z3V6ST1 | T6 | 5.0 | 3.60 | 3.85 | 1000 | 90 | 5.0 | 1.0 | -3.5 | 0 | 450 |
| MM5Z3V9ST1 | T7 | 5.0 | 3.89 | 4.16 | 1000 | 90 | 3.0 | 1.0 | -3.5 | -2.5 | 450 |
| MM5Z4V3ST1 | T8 | 5.0 | 4.17 | 4.43 | 1000 | 90 | 3.0 | 1.0 | -3.5 | 0 | 450 |
| MM5Z4V7ST1 | T9 | 5.0 | 4.55 | 4.75 | 800 | 80 | 3.0 | 2.0 | -3.5 | 0.2 | 260 |
| MM5Z5V1ST1 | TA | 5.0 | 4.98 | 5.2 | 500 | 60 | 2.0 | 2.0 | -2.7 | 1.2 | 225 |
| MM5Z5V6ST1 | TC | 5.0 | 5.49 | 5.73 | 200 | 40 | 1.0 | 2.0 | -2.0 | 2.5 | 200 |
| MM5Z6V2ST1 | TE | 5.0 | 6.06 | 6.33 | 100 | 10 | 3.0 | 4.0 | 0.4 | 3.7 | 185 |
| MM5Z6V8ST1 | TF | 5.0 | 6.65 | 6.93 | 160 | 15 | 2.0 | 4.0 | 1.2 | 4.5 | 155 |
| MM5Z7V5ST1 | TG | 5.0 | 7.28 | 7.6 | 160 | 15 | 1.0 | 5.0 | 2.5 | 5.3 | 140 |
| MM5Z8V2ST1 | TH | 5.0 | 8.02 | 8.36 | 160 | 15 | 0.7 | 5.0 | 3.2 | 6.2 | 135 |
| MM5Z9V1ST1 | TK | 5.0 | 8.85 | 9.23 | 160 | 15 | 0.5 | 6.0 | 3.8 | 7.0 | 130 |
| MM5Z12VST1 | TN | 5.0 | 11.74 | 12.24 | 80 | 25 | 0.1 | 8.0 | 6.0 | 10 | 130 |
| MM5Z16VST1 | TU | 5.0 | 15.85 | 16.51 | 80 | 40 | 0.05 | 11.2 | 10.4 | 14 | 105 |
| MM5Z18VST1 | TW | 5.0 | 17.56 | 18.35 | 80 | 45 | 0.05 | 12.6 | 12.4 | 16 | 100 |

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

MM5Z2V4ST1 SERIES

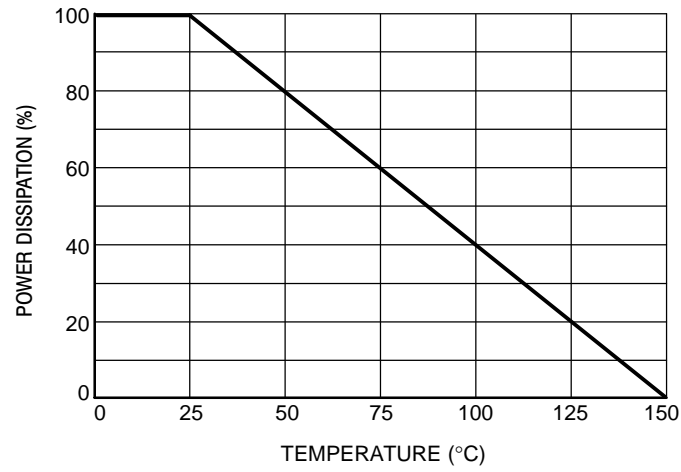
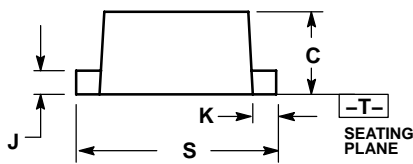
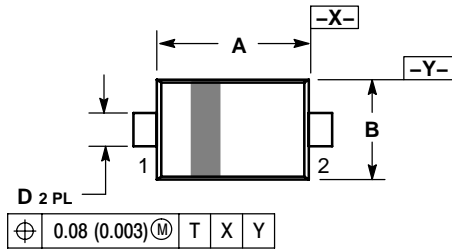


Figure 2. Steady State Power Derating

MM5Z2V4ST1 SERIES

PACKAGE DIMENSIONS

SOD-523
CASE 502-01
ISSUE B

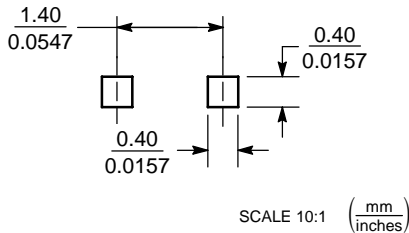


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

| DIM | MILLIMETERS | | | INCHES | | |
|-----|-------------|------|------|--------|--------|--------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.10 | 1.20 | 1.30 | 0.043 | 0.047 | 0.051 |
| B | 0.70 | 0.80 | 0.90 | 0.028 | 0.032 | 0.035 |
| C | 0.50 | 0.60 | 0.70 | 0.020 | 0.024 | 0.028 |
| D | 0.25 | 0.30 | 0.35 | 0.010 | 0.012 | 0.014 |
| J | 0.07 | 0.14 | 0.20 | 0.0028 | 0.0055 | 0.0079 |
| K | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |
| S | 1.50 | 1.60 | 1.70 | 0.059 | 0.063 | 0.067 |

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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