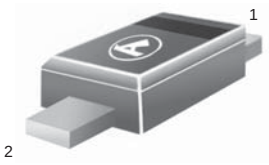
# Zener Voltage Regulators

## 200 mW SOD–523 Surface Mount

- We declare that the material of product compliance with RoHS requirements.

**LM5Z2V0T1G Series**
**S-LM5Z2V0T1G Series**




**SOD– 523**

**MARKING DIAGRAM**


xx= Specific Device Code
d =Date Code


**ORDERING INFORMATION**

| Device | Package | Shipping |
|---|---|---|
| LM5Z2V0T1G Series | SOD-523 | 3000/Tape&Reel |
| LM5Z2V0T5G Series | SOD-523 | 8000/Tape&Reel |

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 – 2.0 V to 75 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
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

### Mechanical Characteristics:

**CASE:** Void-free, transfer-molded,thermosetting plastic
Epoxy Meets UL 94 V-0

**LEAD FINISH:** 100% Matte Sn (Tin)

**QUALIFIED MAX REFLOW TEMPERATURE:**260°C
Device Meets MSL 1 Requirements

**MOUNTING POSITION:** Any

**MAXIMUM RATINGS**

| Rating | Symbol | Max | Unit |
|---|---|---|---|
| Total Device Dissipation FR−5 Board, @ $T_A$ = 25°C | $P_D$ | 200 | mW |
| Junction and Storage Temperature Range | $T_J$, $T_{stg}$ | −65 to +150 | °C |

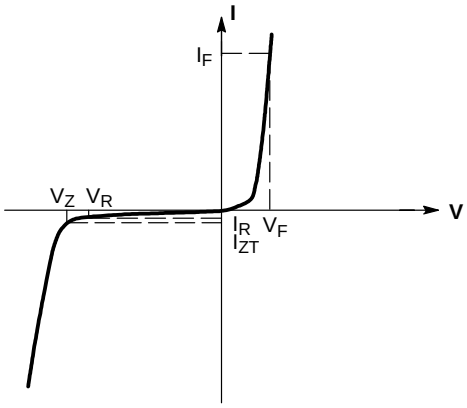
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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

## LM5Z2V0T1G Series , S-LM5Z2V0T1G Series

### 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 @ $I_F$ |
| $\Theta V_Z$ | Maximum Temperature Coefficient of $V_Z$ |
| C | Max. Capacitance @$V_R$ = 0 and f = 1 MHz |




**Zener Voltage Regulator**

## LM5Z2V0T1G Series , S-LM5Z2V0T1G Series

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

| Device | Device Marking | Zener Voltage (Note 1) $V_Z$ (Volts) Min | Nom | Max | @ $I_{ZT}$ mA | Zener Impedance $Z_{ZT}$ @ $I_{ZT}$ Ω | $Z_{ZK}$ @ $I_{ZK}$ Ω | mA | Leakage Current $I_R$ @ $V_R$ µA | Volts | $\Theta V_Z$ (mV/k) @ $I_{ZT}$ Min | Max | C @ $V_R$ = 0 f = 1 MHz pF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LM5Z2V0T1G | WY | 1.91 | 2.0 | 2.09 | 5 | 100 | 600 | 1.0 | 150 | 1.0 | −3.5 | 0 | 450 |
| LM5Z2V4T1G | 00 | 2.2 | 2.4 | 2.6 | 5 | 100 | 1000 | 1.0 | 50 | 1.0 | −3.5 | 0 | 450 |
| LM5Z2V7T1G | 01 | 2.5 | 2.7 | 2.9 | 5 | 100 | 1000 | 1.0 | 20 | 1.0 | −3.5 | 0 | 450 |
| LM5Z3V0T1G | 02 | 2.8 | 3.0 | 3.2 | 5 | 100 | 1000 | 1.0 | 10 | 1.0 | −3.5 | 0 | 450 |
| LM5Z3V3T1G | 05 | 3.1 | 3.3 | 3.5 | 5 | 95 | 1000 | 1.0 | 5 | 1.0 | −3.5 | 0 | 450 |
| LM5Z3V6T1G | 06 | 3.4 | 3.6 | 3.8 | 5 | 90 | 1000 | 1.0 | 5 | 1.0 | −3.5 | 0 | 450 |
| LM5Z3V9T1G | 07 | 3.7 | 3.9 | 4.1 | 5 | 90 | 1000 | 1.0 | 3 | 1.0 | −3.5 | −2.5 | 450 |
| LM5Z4V3T1G | 08 | 4.0 | 4.3 | 4.6 | 5 | 90 | 1000 | 1.0 | 3 | 1.0 | −3.5 | 0 | 450 |
| LM5Z4V7T1G | 09 | 4.4 | 4.7 | 5.0 | 5 | 80 | 800 | 1.0 | 3 | 2.0 | −3.5 | 0.2 | 260 |
| LM5Z5V1T1G | 0A | 4.8 | 5.1 | 5.4 | 5 | 60 | 500 | 1.0 | 2 | 2.0 | −2.7 | 1.2 | 225 |
| LM5Z5V6T1G | 0C | 5.2 | 5.6 | 6.0 | 5 | 40 | 400 | 1.0 | 1 | 2.0 | −2.0 | 2.5 | 200 |
| LM5Z6V2T1G | 0E | 5.8 | 6.2 | 6.6 | 5 | 10 | 100 | 1.0 | 3 | 4.0 | 0.4 | 3.7 | 185 |
| LM5Z6V8T1G | 0F | 6.4 | 6.8 | 7.2 | 5 | 15 | 160 | 1.0 | 2 | 4.0 | 1.2 | 4.5 | 155 |
| LM5Z7V5T1G | 0G | 7.0 | 7.5 | 7.9 | 5 | 15 | 160 | 1.0 | 1 | 5.0 | 2.5 | 5.3 | 140 |
| LM5Z8V2T1G | 0H | 7.7 | 8.2 | 8.7 | 5 | 15 | 160 | 1.0 | 0.7 | 5.0 | 3.2 | 6.2 | 135 |
| LM5Z9V1T1G | 0K | 8.5 | 9.1 | 9.6 | 5 | 15 | 160 | 1.0 | 0.2 | 7.0 | 3.8 | 7.0 | 130 |
| LM5Z10VT1G | 0L | 9.4 | 10 | 10.6 | 5 | 20 | 160 | 1.0 | 0.1 | 8.0 | 4.5 | 8.0 | 130 |
| LM5Z11VT1G | 0M | 10.4 | 11 | 11.6 | 5 | 20 | 160 | 1.0 | 0.1 | 8.0 | 5.4 | 9.0 | 130 |
| LM5Z12VT1G | 0N | 11.4 | 12 | 12.7 | 5 | 25 | 80 | 1.0 | 0.1 | 8.0 | 6.0 | 10 | 130 |
| LM5Z13VT1G | 0P | 12.4 | 13.25 | 14.1 | 5 | 30 | 80 | 1.0 | 0.1 | 8.0 | 7.0 | 11 | 120 |
| LM5Z15VT1G | 0T | 14.3 | 15 | 15.8 | 5 | 30 | 200 | 1.0 | 0.05 | 10.5 | 9.2 | 13 | 110 |
| LM5Z16VT1G | 0U | 15.3 | 16.2 | 17.1 | 2 | 40 | 200 | 1.0 | 0.05 | 11.2 | 10.4 | 14 | 105 |
| LM5Z18VT1G | 0W | 16.8 | 18 | 19.1 | 2 | 45 | 225 | 1.0 | 0.05 | 12.6 | 12.4 | 16 | 100 |
| LM5Z20VT1G | 0Z | 18.8 | 20 | 21.2 | 2 | 55 | 225 | 1.0 | 0.05 | 14.0 | 14.4 | 18 | 85 |
| LM5Z22VT1G | 10 | 20.8 | 22 | 23.3 | 2 | 55 | 250 | 1.0 | 0.05 | 15.4 | 16.4 | 20 | 85 |
| LM5Z24VT1G | 11 | 22.8 | 24.2 | 25.6 | 2 | 70 | 120 | 1.0 | 0.05 | 16.8 | 18.4 | 22 | 80 |
| LM5Z27VT1G | 12 | 25.1 | 27 | 28.9 | 2 | 80 | 300 | 1.0 | 0.05 | 18.9 | 21.4 | 25.3 | 70 |
| LM5Z30VT1G | 14 | 28 | 30 | 32 | 2 | 80 | 300 | 1.0 | 0.05 | 21.0 | 24.4 | 29.4 | 70 |
| LM5Z33VT1G | 18 | 31 | 33 | 35 | 2 | 80 | 300 | 1.0 | 0.05 | 23.2 | 27.4 | 33.4 | 70 |
| LM5Z36VT1G | 19 | 34 | 36 | 38 | 2 | 90 | 500 | 1.0 | 0.05 | 25.2 | 30.4 | 37.4 | 70 |
| LM5Z39VT1G | 20 | 37 | 39 | 41 | 2 | 130 | 500 | 1.0 | 0.05 | 27.3 | 33.4 | 41.2 | 45 |
| LM5Z43VT1G | 21 | 40 | 43 | 46 | 2 | 150 | 500 | 1.0 | 0.05 | 30.1 | 37.6 | 46.6 | 40 |
| LM5Z47VT1G | 1A | 44 | 47 | 50 | 2 | 170 | 500 | 1.0 | 0.05 | 32.9 | 42.0 | 51.8 | 40 |
| LM5Z51VT1G | 1C | 48 | 51 | 54 | 2 | 180 | 500 | 1.0 | 0.05 | 35.7 | 46.6 | 57.2 | 40 |
| LM5Z56VT1G | 1D | 52 | 56 | 60 | 2 | 200 | 500 | 1.0 | 0.05 | 39.2 | 52.2 | 63.8 | 40 |
| LM5Z62VT1G | 1E | 58 | 62 | 66 | 2 | 215 | 500 | 1.0 | 0.05 | 43.4 | 58.8 | 71.6 | 35 |
| LM5Z68VT1G | 1F | 64 | 68 | 72 | 2 | 240 | 500 | 1.0 | 0.05 | 47.6 | 65.6 | 79.8 | 35 |
| LM5Z75VT1G | 1G | 70 | 75 | 79 | 2 | 255 | 500 | 1.0 | 0.05 | 52.5 | 73.4 | 88.6 | 35 |

1. Zener voltage is measured with a pulse test current $I_Z$ at an ambient temperature of 25°C.

## Typical Characteristics

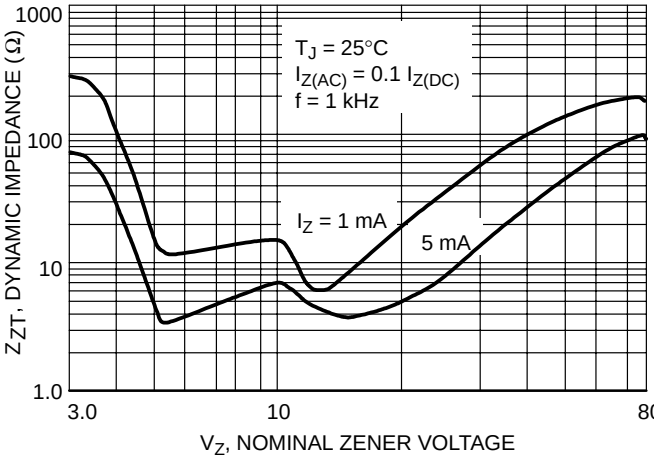



**Figure 1. Effect of Zener Voltage on Zener Impedance**

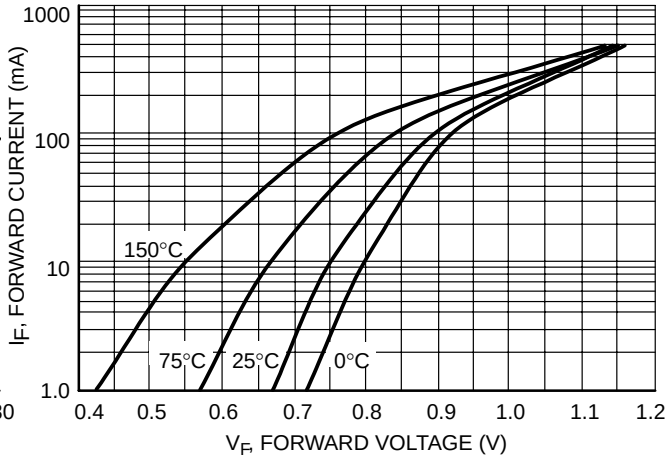



**Figure 2. Typical Forward Voltage**

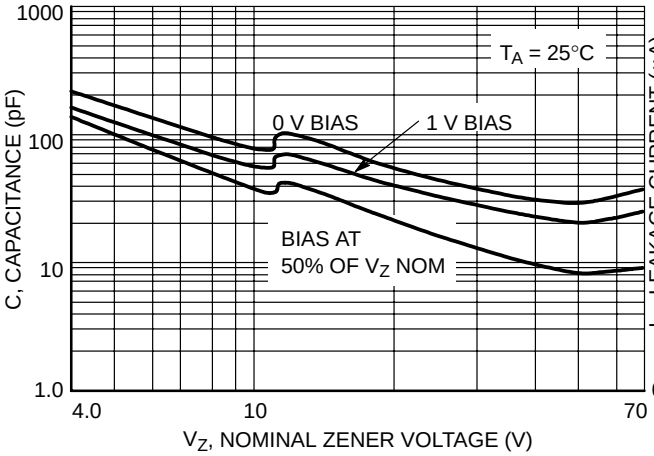



**Figure 3. Typical Capacitance**

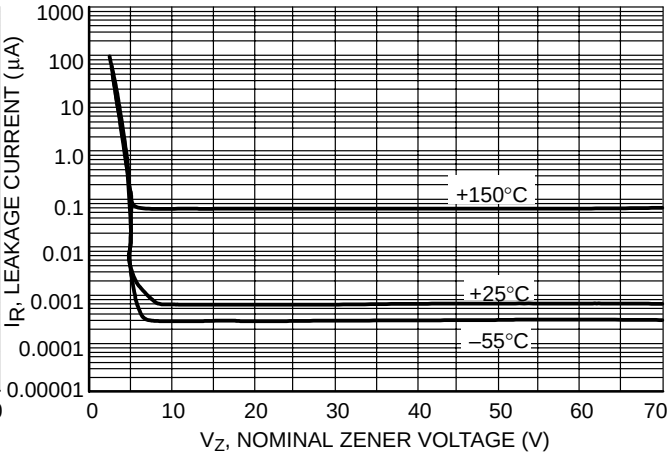



**Figure 4. Typical Leakage Current**

## Typical Characteristics

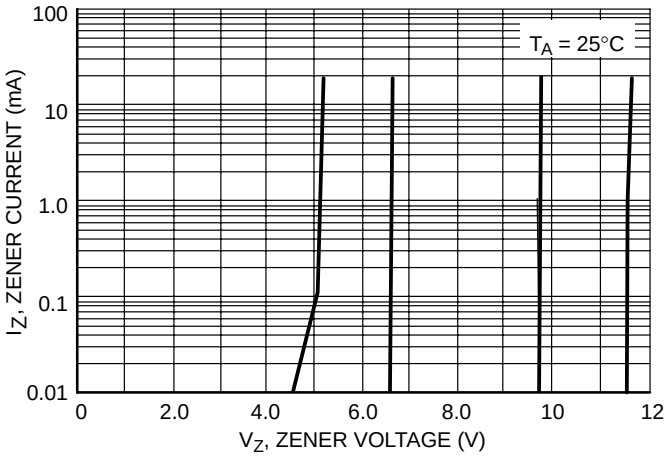



**Figure 5. Zener Voltage versus Zener Current ($V_Z$ Up to 12 V)**

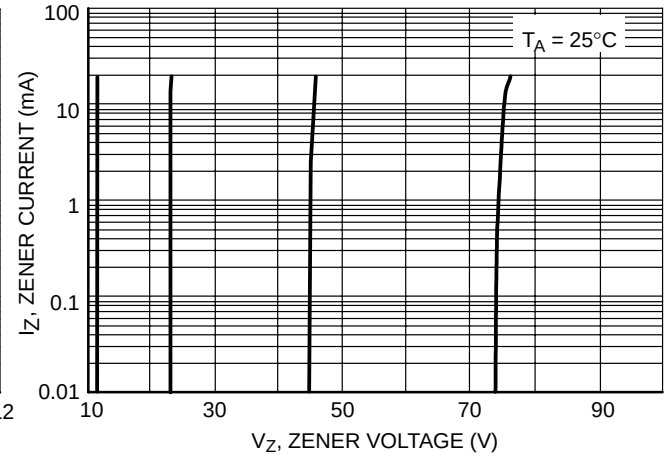



**Figure 6. Zener Voltage versus Zener Current (12 V to 75 V)**

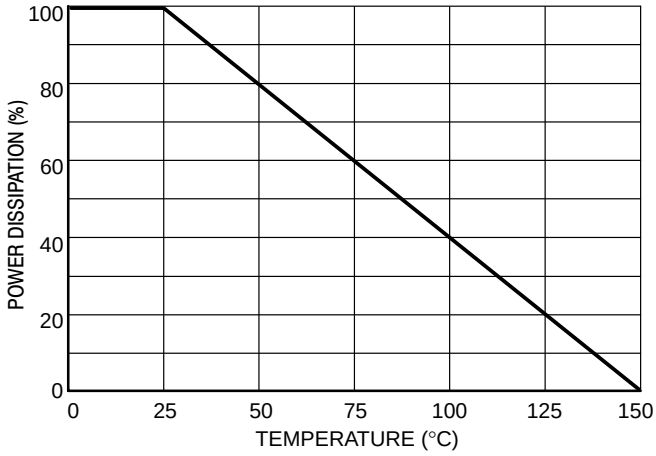
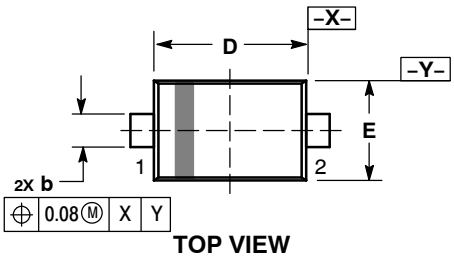


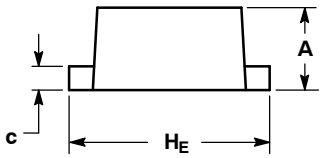

**Figure 7. Steady State Power Derating**

## LM5Z2V0T1G Series , S-LM5Z2V0T1G Series

# SC-79/SOD-523




TOP VIEW

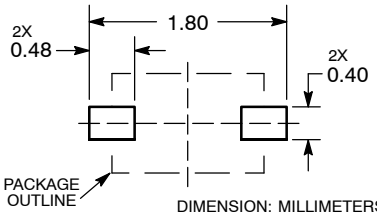



SIDE VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
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 |
| HE | 1.50 | 1.60 | 1.70 |
| L | 0.30 REF | | |
| L2 | 0.15 | 0.20 | 0.25 |

**RECOMMENDED SOLDERING FOOTPRINT***




DIMENSION: MILLIMETERS

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