

# Zener Voltage Regulators

## 200 mW SOD-323 Surface Mount

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

### ORDERING INFORMATION

| Device*    | Package | Shipping        |
|------------|---------|-----------------|
| LM3ZxxxT1G | SOD-323 | 3000/Tape&Reel  |
| LM3ZxxxT3G | SOD-323 | 10000/Tape&Reel |

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 75 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
- Pb-Free package is 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

**POLARITY:** Cathode indicated by polarity band

**FLAMMABILITY RATING:** UL94 V-0

**MOUNTING POSITION:** Any

### MAXIMUM RATINGS

| Rating   | Symbol                            | Max        | Unit |
|--|-----------------------------------|------------|------|
| Total Device Dissipation FR-5 Board,<br>(Note 1.) @ TA = 25°C<br>Derate above 25°C | P <sub>D</sub>                    | 200        | mW   |
| Thermal Resistance from<br>Junction to Ambient                                     | R <sub>θJA</sub>                  | 635        | °C/W |
| Junction and Storage<br>Temperature Range  | T <sub>J</sub> , T <sub>stg</sub> | -65 to+150 | °C   |

1. FR-4 Minimum Pad

## LM3Z2V4T1G SERIES



**LM3Z2V4T1G 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 @ $I_F$                             |
| $\Theta V_Z$ | Maximum Temperature Coefficient of $V_Z$            |
| C            | Max. Capacitance @ $V_R = 0$ and $f = 1\text{ MHz}$ |



**Zener Voltage Regulator**

**LM3Z2V4T1G 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)

| Device     | Device Marking | Zener Voltage (Note 2.) |       |      | Zener Impedance        |                     |          | Leakage Current |               | $\theta V_Z$<br>(mV/k)<br>@ $I_{ZT}$ |      | C<br>@ $V_R = 0$<br>f = 1 MHz |     |
|------------|----------------|-------------------------|-------|------|------------------------|---------------------|----------|-----------------|---------------|--------------------------------------|------|-------------------------------|-----|
|            |                | $V_Z$ (Volts)           |       |      | $Z_{ZT}$<br>@ $I_{ZT}$ | $Z_{ZK}$ @ $I_{ZK}$ |          | $I_R$ @ $V_R$   |               | Min                                  | Max  |                               |     |
|            |                | Min                     | Nom   | Max  | mA                     | $\Omega$            | $\Omega$ | mA              | $\mu\text{A}$ | Volts                                | Min  | Max                           | pF  |
| LM3Z2V4T1G | 00             | 2.2                     | 2.4   | 2.6  | 5                      | 100                 | 1000     | 0.5             | 50            | 1.0                                  | -3.5 | 0                             | 450 |
| LM3Z2V7T1G | 01             | 2.5                     | 2.7   | 2.9  | 5                      | 100                 | 1000     | 0.5             | 20            | 1.0                                  | -3.5 | 0                             | 450 |
| LM3Z3V0T1G | 02             | 2.8                     | 3.0   | 3.2  | 5                      | 100                 | 1000     | 0.5             | 10            | 1.0                                  | -3.5 | 0                             | 450 |
| LM3Z3V3T1G | 05             | 3.1                     | 3.3   | 3.5  | 5                      | 95                  | 1000     | 0.5             | 5             | 1.0                                  | -3.5 | 0                             | 450 |
| LM3Z3V6T1G | 06             | 3.4                     | 3.6   | 3.8  | 5                      | 90                  | 1000     | 0.5             | 5             | 1.0                                  | -3.5 | 0                             | 450 |
| LM3Z3V9T1G | 07             | 3.7                     | 3.9   | 4.1  | 5                      | 90                  | 1000     | 0.5             | 3             | 1.0                                  | -3.5 | -2.5                          | 450 |
| LM3Z4V3T1G | 08             | 4.0                     | 4.3   | 4.6  | 5                      | 90                  | 1000     | 0.5             | 3             | 1.0                                  | -3.5 | 0                             | 450 |
| LM3Z4V7T1G | 09             | 4.4                     | 4.7   | 5.0  | 5                      | 80                  | 800      | 0.5             | 3             | 2.0                                  | -3.5 | 0.2                           | 260 |
| LM3Z5V1T1G | 0A             | 4.8                     | 5.1   | 5.4  | 5                      | 60                  | 800      | 0.5             | 2             | 2.0                                  | -2.7 | 1.2                           | 225 |
| LM3Z5V6T1G | 0C             | 5.2                     | 5.6   | 6.0  | 5                      | 40                  | 700      | 0.5             | 1             | 2.0                                  | -2.0 | 2.5                           | 200 |
| LM3Z6V2T1G | 0E             | 5.8                     | 6.2   | 6.6  | 5                      | 10                  | 100      | 0.5             | 3             | 4.0                                  | 0.4  | 3.7                           | 185 |
| LM3Z6V8T1G | 0F             | 6.4                     | 6.8   | 7.2  | 5                      | 15                  | 160      | 0.5             | 2             | 4.0                                  | 1.2  | 4.5                           | 155 |
| LM3Z7V5T1G | 0G             | 7.0                     | 7.5   | 7.9  | 5                      | 15                  | 160      | 0.5             | 1             | 5.0                                  | 2.5  | 5.3                           | 140 |
| LM3Z8V2T1G | 0H             | 7.7                     | 8.2   | 8.7  | 5                      | 15                  | 160      | 0.5             | 0.7           | 5.0                                  | 3.2  | 6.2                           | 135 |
| LM3Z9V1T1G | 0K             | 8.5                     | 9.1   | 9.6  | 5                      | 15                  | 160      | 0.5             | 0.2           | 7.0                                  | 3.8  | 7.0                           | 130 |
| LM3Z10VT1G | 0L             | 9.4                     | 10    | 10.6 | 5                      | 20                  | 160      | 0.5             | 0.1           | 8.0                                  | 4.5  | 8.0                           | 130 |
| LM3Z11VT1G | 0M             | 10.4                    | 11    | 11.6 | 5                      | 20                  | 160      | 0.5             | 0.1           | 8.0                                  | 5.4  | 9.0                           | 130 |
| LM3Z12VT1G | 0N             | 11.4                    | 12    | 12.7 | 5                      | 25                  | 80       | 0.5             | 0.1           | 8.0                                  | 6.0  | 10                            | 130 |
| LM3Z13VT1G | 0P             | 12.4                    | 13.25 | 14.1 | 5                      | 30                  | 80       | 0.5             | 0.1           | 8.0                                  | 7.0  | 11                            | 120 |
| LM3Z15VT1G | 0T             | 14.3                    | 15    | 15.8 | 5                      | 30                  | 400      | 0.5             | 0.05          | 10.5                                 | 9.2  | 13                            | 110 |
| LM3Z16VT1G | 0U             | 15.3                    | 16.2  | 17.1 | 5                      | 40                  | 400      | 0.5             | 0.05          | 11.2                                 | 10.4 | 14                            | 105 |
| LM3Z18VT1G | 0W             | 16.8                    | 18    | 19.1 | 5                      | 45                  | 400      | 0.5             | 0.05          | 12.6                                 | 12.4 | 16                            | 100 |
| LM3Z20VT1G | 0Z             | 18.8                    | 20    | 21.2 | 5                      | 55                  | 500      | 0.5             | 0.05          | 14.0                                 | 14.4 | 18                            | 85  |
| LM3Z22VT1G | 10             | 20.8                    | 22    | 23.3 | 5                      | 55                  | 500      | 0.5             | 0.05          | 15.4                                 | 16.4 | 20                            | 85  |
| LM3Z24VT1G | 11             | 22.8                    | 24.2  | 25.6 | 5                      | 70                  | 120      | 0.5             | 0.05          | 16.8                                 | 18.4 | 22                            | 80  |
| LM3Z27VT1G | 12             | 25.1                    | 27    | 28.9 | 2                      | 80                  | 300      | 0.5             | 0.05          | 18.9                                 | 21.4 | 25.3                          | 70  |
| LM3Z30VT1G | 14             | 28                      | 30    | 32   | 2                      | 80                  | 300      | 0.5             | 0.05          | 21.0                                 | 24.4 | 29.4                          | 70  |
| LM3Z33VT1G | 18             | 31                      | 33    | 35   | 2                      | 80                  | 300      | 0.5             | 0.05          | 23.2                                 | 27.4 | 33.4                          | 70  |
| LM3Z36VT1G | 19             | 34                      | 36    | 38   | 2                      | 90                  | 500      | 0.5             | 0.05          | 25.2                                 | 30.4 | 37.4                          | 70  |
| LM3Z39VT1G | 20             | 37                      | 39    | 41   | 2                      | 130                 | 500      | 0.5             | 0.05          | 27.3                                 | 33.4 | 41.2                          | 45  |
| LM3Z43VT1G | 21             | 40                      | 43    | 46   | 2                      | 150                 | 500      | 0.5             | 0.05          | 30.1                                 | 37.6 | 46.6                          | 40  |
| LM3Z47VT1G | 1A             | 44                      | 47    | 50   | 2                      | 170                 | 500      | 0.5             | 0.05          | 32.9                                 | 42.0 | 51.8                          | 40  |
| LM3Z51VT1G | 1C             | 48                      | 51    | 54   | 2                      | 180                 | 500      | 0.5             | 0.05          | 35.7                                 | 46.6 | 57.2                          | 40  |
| LM3Z56VT1G | 1D             | 52                      | 56    | 60   | 2                      | 200                 | 500      | 0.5             | 0.05          | 39.2                                 | 52.2 | 63.8                          | 40  |
| LM3Z62VT1G | 1E             | 58                      | 62    | 66   | 2                      | 215                 | 500      | 0.5             | 0.05          | 43.4                                 | 58.8 | 71.6                          | 35  |
| LM3Z68VT1G | 1F             | 64                      | 68    | 72   | 2                      | 240                 | 500      | 0.5             | 0.05          | 47.6                                 | 65.6 | 79.8                          | 35  |
| LM3Z75VT1G | 1G             | 70                      | 75    | 79   | 2                      | 255                 | 500      | 0.5             | 0.05          | 52.5                                 | 73.4 | 88.6                          | 35  |

2. Zener voltage is measured with a pulse test current  $I_Z$  at an ambient temperature of  $25^\circ\text{C}$ .

LM3Z2V4T1G SERIES

Typical Characteristics

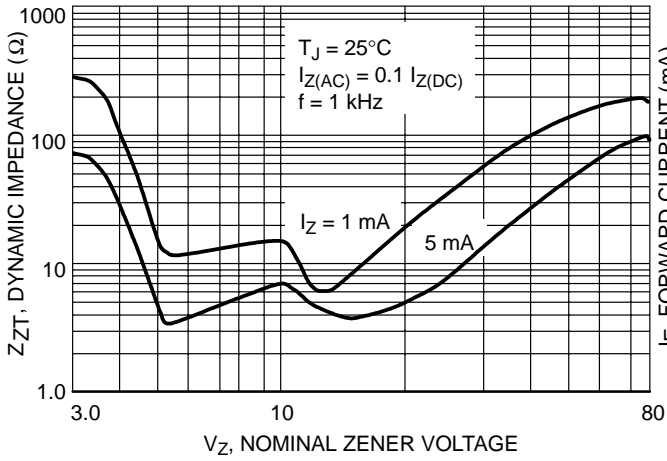


Figure 1. Effect of Zener Voltage on Zener Impedance

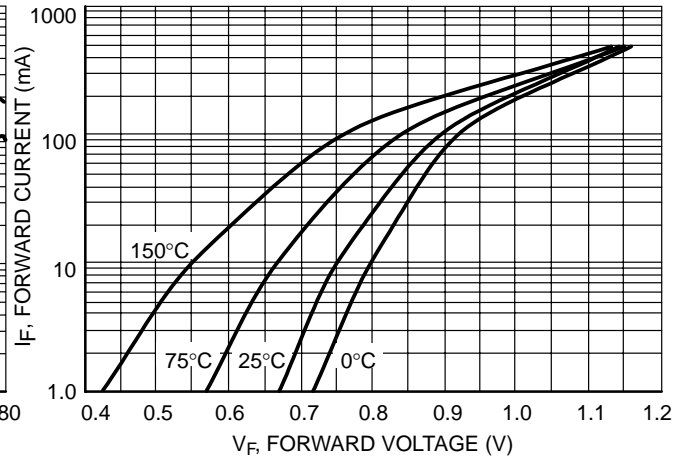


Figure 2. Typical Forward Voltage

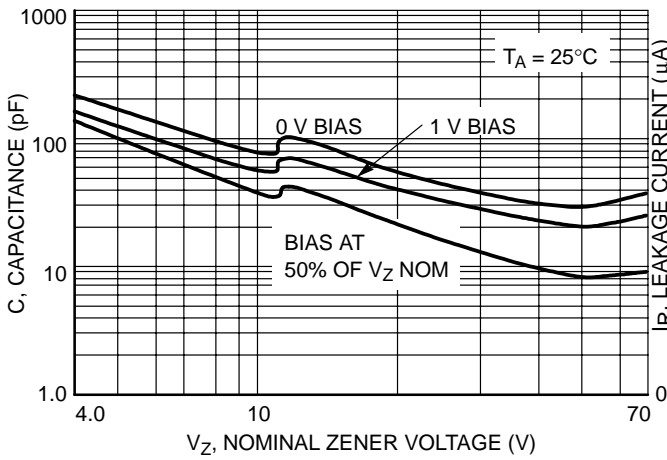


Figure 3. Typical Capacitance

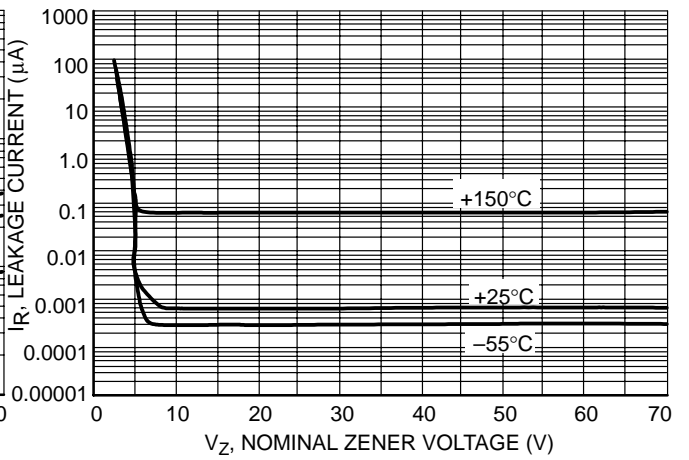


Figure 4. Typical Leakage Current

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Typical Characteristics



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



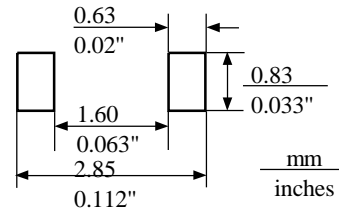
Figure 6. Zener Voltage versus Zener Current (12 V to 75 V)



Figure 7. Steady State Power Derating

**LM3Z2V4T1G SERIES**

**PACKAGE DIMENSIONS  
SOD-323**



- NOTES:  
 1. CONTROLLING DIMENSION: MILLIMETERS  
 2. LEAD THICKNESS SPECIFIED PER L/F DRAWING WITH SOLDER PLATING.

| DIN | 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  | 0.0000    | 0.004  |
| J   | 0.089       | 0.177 | 0.0035    | 0.0070 |
| K   | 2.30        | 2.70  | 0.091     | 0.106  |

STYLE 1:  
 PIN 1: CATHODE  
 2: ANODE

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