

## Zener Voltage Regulators

### 200 mW SOD-323 Surface Mount

#### Specification Features:

- Standard Zener Breakdown Voltage Range – 2.0 V to 75 V
- Steady State Power Rating of 200 mW
- Small Body Outline Dimensions: 0.067" 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

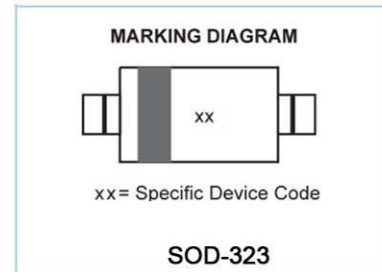
#### MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES:

260°C for 10 Seconds

**POLARITY:** Cathode indicated by polarity band

**FLAMMABILITY RATING:** UL94 V-0

**MOUNTING POSITION:** Any



#### MAXIMUM RATINGS

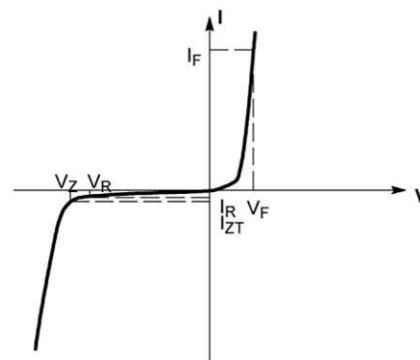
| Rating   | Symbol          | Max         | Unit        |
|--|-----------------|-------------|-------------|
| Total Device Dissipation FR-5 Board,<br>(Note 1.) @ TA = 25°C<br>Derate above 25°C | $P_D$           | 200<br>1.5  | mW<br>mW/°C |
| Thermal Resistance from<br>Junction to Ambient         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

1. FR-4 Minimum Pad

#### ELECTRICAL CHARACTERISTICS

(TA = 25°C unless otherwise noted,  
VF = 0.9 V Max. @ IF = 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

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**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 |       | $\theta_{V_Z}$ (mV/k) @ $I_{ZT}$ |      | C @ $V_R = 0$ f = 1 MHz<br>pF |     |
|---------|----------------|-------------------------|-------|------|-----------------|---------------------|---------------------|-----------------|-------|----------------------------------|------|-------------------------------|-----|
|         |                | $V_Z$ (Volts)           |       |      | $@ I_{ZT}$      | $Z_{ZT}$ @ $I_{ZT}$ | $Z_{ZK}$ @ $I_{ZK}$ | $I_R$ @ $V_R$   |       | Min                              | Max  |                               |     |
|         |                | Min                     | Nom   | Max  | mA              | $\Omega$            | $\Omega$            | $\mu\text{A}$   | Volts | Min                              | Max  |                               |     |
| MM3Z2V0 | WY             | 1.91                    | 2.0   | 2.09 | 5               | 100                 | 600                 | 1.0             | 150   | 1.0                              | -3.5 | 0                             | 450 |
| MM3Z2V4 | 00             | 2.2                     | 2.4   | 2.6  | 5               | 100                 | 1000                | 0.5             | 50    | 1.0                              | -3.5 | 0                             | 450 |
| MM3Z2V7 | 01             | 2.5                     | 2.7   | 2.9  | 5               | 100                 | 1000                | 0.5             | 20    | 1.0                              | -3.5 | 0                             | 450 |
| MM3Z3V0 | 02             | 2.8                     | 3.0   | 3.2  | 5               | 100                 | 1000                | 0.5             | 10    | 1.0                              | -3.5 | 0                             | 450 |
| MM3Z3V3 | 05             | 3.1                     | 3.3   | 3.5  | 5               | 95                  | 1000                | 0.5             | 5     | 1.0                              | -3.5 | 0                             | 450 |
| MM3Z3V6 | 06             | 3.4                     | 3.6   | 3.8  | 5               | 90                  | 1000                | 0.5             | 5     | 1.0                              | -3.5 | 0                             | 450 |
| MM3Z3V9 | 07             | 3.7                     | 3.9   | 4.1  | 5               | 90                  | 1000                | 0.5             | 3     | 1.0                              | -3.5 | -2.5                          | 450 |
| MM3Z4V3 | 08             | 4.0                     | 4.3   | 4.6  | 5               | 90                  | 1000                | 0.5             | 3     | 1.0                              | -3.5 | 0                             | 450 |
| MM3Z4V7 | 09             | 4.4                     | 4.7   | 5.0  | 5               | 80                  | 800                 | 0.5             | 3     | 2.0                              | -3.5 | 0.2                           | 260 |
| MM3Z5V1 | 0A             | 4.8                     | 5.1   | 5.4  | 5               | 60                  | 800                 | 0.5             | 2     | 2.0                              | -2.7 | 1.2                           | 225 |
| MM3Z5V6 | 0C             | 5.2                     | 5.6   | 6.0  | 5               | 40                  | 700                 | 0.5             | 1     | 2.0                              | -2.0 | 2.5                           | 200 |
| MM3Z6V2 | 0E             | 5.8                     | 6.2   | 6.6  | 5               | 10                  | 100                 | 0.5             | 3     | 4.0                              | 0.4  | 3.7                           | 185 |
| MM3Z6V8 | 0F             | 6.4                     | 6.8   | 7.2  | 5               | 15                  | 160                 | 0.5             | 2     | 4.0                              | 1.2  | 4.5                           | 155 |
| MM3Z7V5 | 0G             | 7.0                     | 7.5   | 7.9  | 5               | 15                  | 160                 | 0.5             | 1     | 5.0                              | 2.5  | 5.3                           | 140 |
| MM3Z8V2 | 0H             | 7.7                     | 8.2   | 8.7  | 5               | 15                  | 160                 | 0.5             | 0.7   | 5.0                              | 3.2  | 6.2                           | 135 |
| MM3Z9V1 | 0K             | 8.5                     | 9.1   | 9.6  | 5               | 15                  | 160                 | 0.5             | 0.2   | 7.0                              | 3.8  | 7.0                           | 130 |
| MM3Z10V | 0L             | 9.4                     | 10    | 10.6 | 5               | 20                  | 160                 | 0.5             | 0.1   | 8.0                              | 4.5  | 8.0                           | 130 |
| MM3Z11V | 0M             | 10.4                    | 11    | 11.6 | 5               | 20                  | 160                 | 0.5             | 0.1   | 8.0                              | 5.4  | 9.0                           | 130 |
| MM3Z12V | 0N             | 11.4                    | 12    | 12.7 | 5               | 25                  | 80                  | 0.5             | 0.1   | 8.0                              | 6.0  | 10                            | 130 |
| MM3Z13V | 0P             | 12.4                    | 13.25 | 14.1 | 5               | 30                  | 80                  | 0.5             | 0.1   | 8.0                              | 7.0  | 11                            | 120 |
| MM3Z15V | 0T             | 14.3                    | 15    | 15.8 | 5               | 30                  | 400                 | 0.5             | 0.05  | 10.5                             | 9.2  | 13                            | 110 |
| MM3Z16V | 0U             | 15.3                    | 16.2  | 17.1 | 5               | 40                  | 400                 | 0.5             | 0.05  | 11.2                             | 10.4 | 14                            | 105 |
| MM3Z18V | 0W             | 16.8                    | 18    | 19.1 | 5               | 45                  | 400                 | 0.5             | 0.05  | 12.6                             | 12.4 | 16                            | 100 |
| MM3Z20V | 0Z             | 18.8                    | 20    | 21.2 | 5               | 55                  | 500                 | 0.5             | 0.05  | 14.0                             | 14.4 | 18                            | 85  |
| MM3Z22V | 10             | 20.8                    | 22    | 23.3 | 5               | 55                  | 500                 | 0.5             | 0.05  | 15.4                             | 16.4 | 20                            | 85  |
| MM3Z24V | 11             | 22.8                    | 24.2  | 25.6 | 5               | 70                  | 120                 | 0.5             | 0.05  | 16.8                             | 18.4 | 22                            | 80  |
| MM3Z27V | 12             | 25.1                    | 27    | 28.9 | 2               | 80                  | 300                 | 0.5             | 0.05  | 18.9                             | 21.4 | 25.3                          | 70  |
| MM3Z30V | 14             | 28                      | 30    | 32   | 2               | 80                  | 300                 | 0.5             | 0.05  | 21.0                             | 24.4 | 29.4                          | 70  |
| MM3Z33V | 18             | 31                      | 33    | 35   | 2               | 80                  | 300                 | 0.5             | 0.05  | 23.2                             | 27.4 | 33.4                          | 70  |
| MM3Z36V | 19             | 34                      | 36    | 38   | 2               | 90                  | 500                 | 0.5             | 0.05  | 25.2                             | 30.4 | 37.4                          | 70  |
| MM3Z39V | 20             | 37                      | 39    | 41   | 2               | 130                 | 500                 | 0.5             | 0.05  | 27.3                             | 33.4 | 41.2                          | 45  |
| MM3Z43V | 21             | 40                      | 43    | 46   | 2               | 150                 | 500                 | 0.5             | 0.05  | 30.1                             | 37.6 | 46.6                          | 40  |
| MM3Z47V | 1A             | 44                      | 47    | 50   | 2               | 170                 | 500                 | 0.5             | 0.05  | 32.9                             | 42.0 | 51.8                          | 40  |
| MM3Z51V | 1C             | 48                      | 51    | 54   | 2               | 180                 | 500                 | 0.5             | 0.05  | 35.7                             | 46.6 | 57.2                          | 40  |
| MM3Z56V | 1D             | 52                      | 56    | 60   | 2               | 200                 | 500                 | 0.5             | 0.05  | 39.2                             | 52.2 | 63.8                          | 40  |
| MM3Z62V | 1E             | 58                      | 62    | 66   | 2               | 215                 | 500                 | 0.5             | 0.05  | 43.4                             | 58.8 | 71.6                          | 35  |
| MM3Z68V | 1F             | 64                      | 68    | 72   | 2               | 240                 | 500                 | 0.5             | 0.05  | 47.6                             | 65.6 | 79.8                          | 35  |
| MM3Z75V | 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  $25^\circ\text{C}$ .



## Typical Characteristics

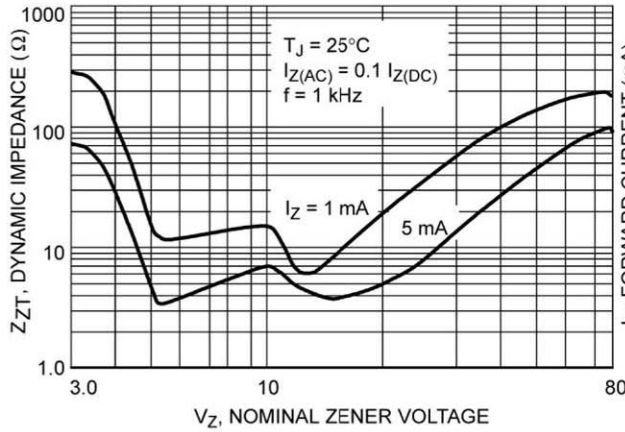


Figure 1. Effect of Zener Voltage on Zener Impedance

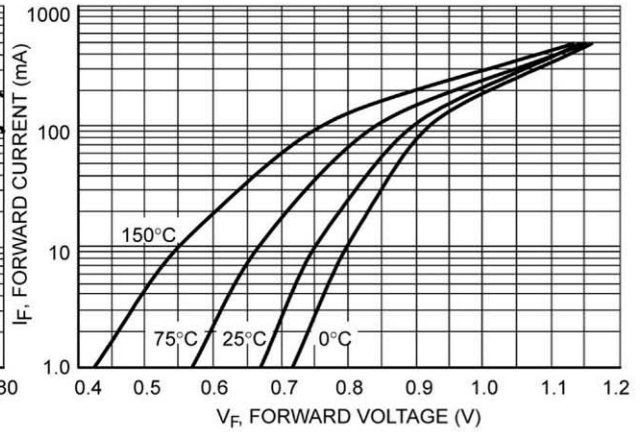


Figure 2. Typical Forward Voltage

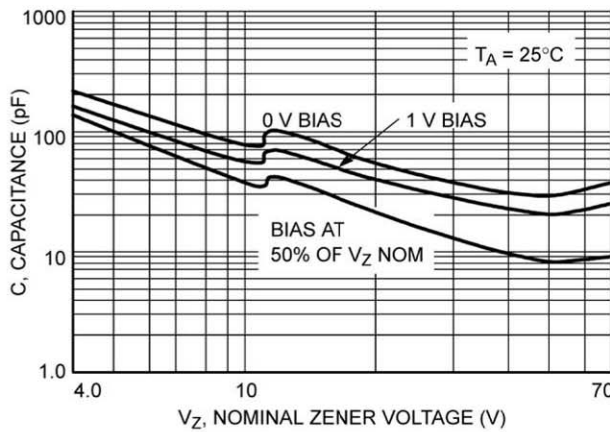


Figure 3. Typical Capacitance

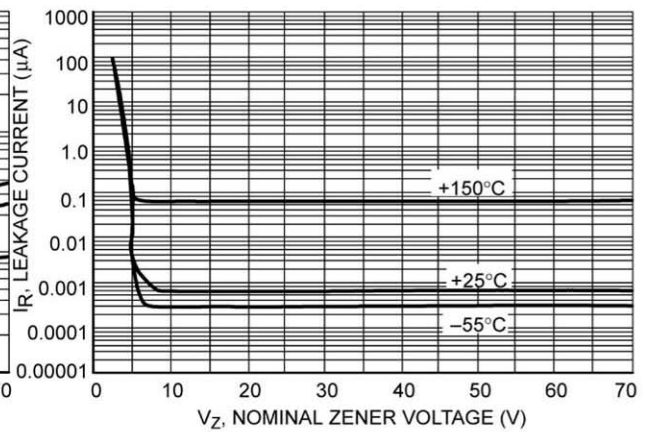


Figure 4. Typical Leakage Current



## Typical Characteristics

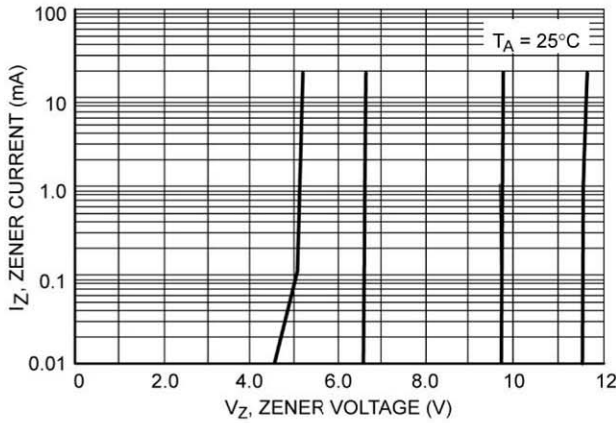


Figure 5. Zener Voltage versus Zener Current  
( $V_Z$  Up to 12 V)

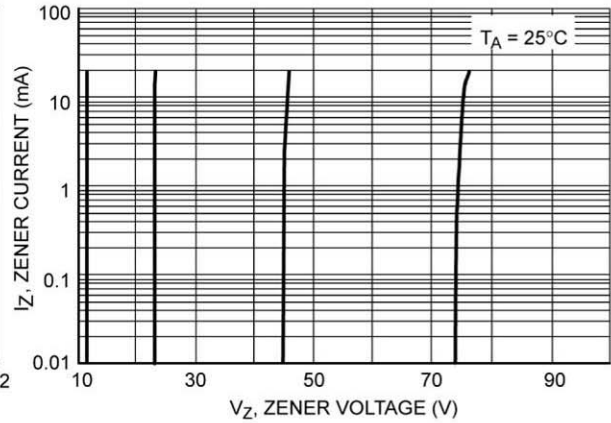


Figure 6. Zener Voltage versus Zener Current  
(12 V to 75 V)

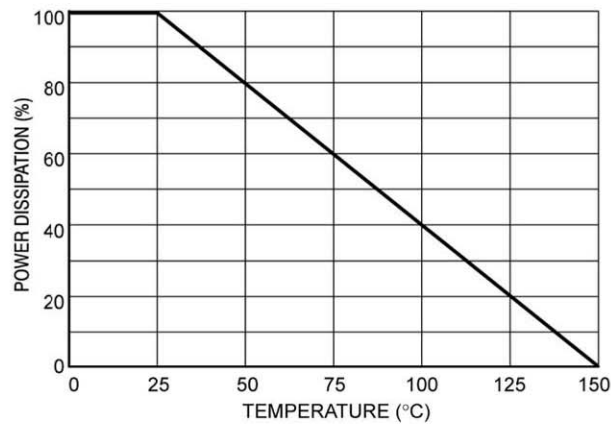


Figure 7. Steady State Power Derating



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