

# SEMICONDUCTOR

## TECHNICAL DATA

225 mW SOT-23

Zener Voltage Regulator Diodes

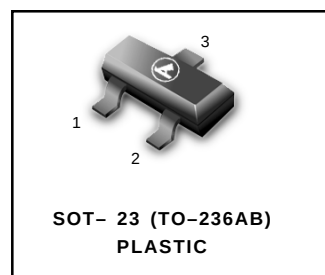
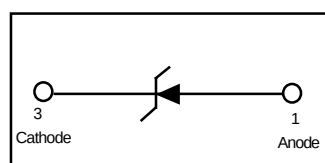
GENERAL DATA APPLICABLE TO ALL  
SERIES IN THIS GROUP

Zener Voltage  
Regulator Diodes

MAXIMUM CASE TEMPERATURE FOR SOLDERING

PURPOSES: 260°C for 10 seconds

**LBZX84C2V4LT1**  
**SERIES**  
**225mW**  
**SOT-23**



### THERMAL CHARACTERISTICS

| Characteristic                                | Symbol         | Max | Unit                 |
|-----------------------------------------------|----------------|-----|----------------------|
| Total Device Dissipation FR-5 Board*          | $P_D$          | 225 | mW                   |
| $T_A = 25^\circ\text{C}$                      |                |     |                      |
| Derate above $25^\circ\text{C}$               |                | 1.8 | mW/ $^\circ\text{C}$ |
| Thermal Resistance Junction to Ambient        | $R_{QJA}$      | 556 | $^\circ\text{C/W}$   |
| Total Device Dissipation                      | $P_D$          | 300 | mW                   |
| Alumina Substrate,** $T_A = 25^\circ\text{C}$ |                |     |                      |
| Derate above $25^\circ\text{C}$               |                | 2.4 | mW/ $^\circ\text{C}$ |
| Thermal Resistance Junction to Ambient        | $R_{QJA}$      | 417 | $^\circ\text{C/W}$   |
| Junction and Storage Temperature              | $T_J, T_{stg}$ | 150 | $^\circ\text{C}$     |

\*\*FR-5 = 1.0 x 0.75 x 0.62 in.

\*\*Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

# GENERAL DATA — 225mW SOT-23

## ELECTRICAL CHARACTERISTICS

(Pinout: 1-Anode, 2-NC, 3-Cathode) ( $V_F = 0.9V$  Max @  $I_F = 10$  mA for all types)

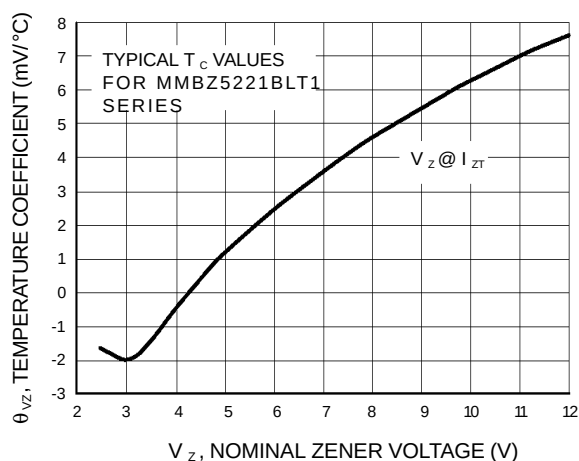
| Type Number   | Marking | Zener Voltage $V_{Z1}$ (Volts)<br>@ $I_{ZT1}=5mA$<br>(Note 1) |      |      | Max Zener Impedance $Z_{ZT1}$<br>(Ohms)<br>@ $I_{ZT1}=5mA$ | Max Reverse Leakage Current |                | Zener Voltage $V_{Z2}$ (Volts)<br>@ $I_{ZT2}=1mA$<br>(Note1) |      | Max Zener Impedance $Z_{ZT2}$<br>(Ohms)<br>@ $I_{ZT2}=1mA$ | Zener Voltage $V_{Z3}$ (Volts)<br>@ $I_{ZT3}=20mA$<br>(Note 1) |      | Max Zener Impedance $Z_{ZT3}$<br>(Ohms)<br>@ $I_{ZT3}=20mA$ | $dV_Z/dt$<br>(mV/k)<br>@ $I_{ZT1}=5mA$ |      | CpF<br>Max<br>@ $V_R=0$<br>$f=1MHz$ |
|---------------|---------|---------------------------------------------------------------|------|------|------------------------------------------------------------|-----------------------------|----------------|--------------------------------------------------------------|------|------------------------------------------------------------|----------------------------------------------------------------|------|-------------------------------------------------------------|----------------------------------------|------|-------------------------------------|
|               |         | Nom                                                           | Min  | Max  |                                                            | $I_R$<br>$\mu A$            | $V_R$<br>Volts | Min                                                          | Max  |                                                            | Min                                                            | Max  |                                                             | Min                                    | Max  |                                     |
| LBZX84C2V4LT1 | Z11     | 2.4                                                           | 2.2  | 2.6  | 100                                                        | 50                          | 1              | 1.7                                                          | 2.1  | 600                                                        | 2.6                                                            | 3.2  | 50                                                          | -3.5                                   | 0    | 450                                 |
| LBZX84C2V7LT1 | Z12     | 2.7                                                           | 2.5  | 2.9  | 100                                                        | 20                          | 1              | 1.9                                                          | 2.4  | 600                                                        | 3                                                              | 3.6  | 50                                                          | -3.5                                   | 0    | 450                                 |
| LBZX84C3V0LT1 | Z13     | 3                                                             | 2.8  | 3.2  | 95                                                         | 10                          | 1              | 2.1                                                          | 2.7  | 600                                                        | 3.3                                                            | 3.9  | 50                                                          | -3.5                                   | 0    | 450                                 |
| LBZX84C3V3LT1 | Z14     | 3.3                                                           | 3.1  | 3.5  | 95                                                         | 5                           | 1              | 2.3                                                          | 2.9  | 600                                                        | 3.6                                                            | 4.2  | 40                                                          | -3.5                                   | 0    | 450                                 |
| LBZX84C3V6LT1 | Z15     | 3.6                                                           | 3.4  | 3.8  | 90                                                         | 5                           | 1              | 2.7                                                          | 3.3  | 600                                                        | 3.9                                                            | 4.5  | 40                                                          | -3.5                                   | 0    | 450                                 |
| LBZX84C3V9LT1 | Z16     | 3.9                                                           | 3.7  | 4.1  | 90                                                         | 3                           | 1              | 2.9                                                          | 3.5  | 600                                                        | 4.1                                                            | 4.7  | 30                                                          | -3.5                                   | -2.5 | 450                                 |
| LBZX84C4V3LT1 | W9      | 4.3                                                           | 4    | 4.6  | 90                                                         | 3                           | 1              | 3.3                                                          | 4    | 600                                                        | 4.4                                                            | 5.1  | 30                                                          | -3.5                                   | 0    | 450                                 |
| LBZX84C4V7LT1 | Z1      | 4.7                                                           | 4.4  | 5    | 80                                                         | 3                           | 2              | 3.7                                                          | 4.7  | 500                                                        | 4.5                                                            | 5.4  | 15                                                          | -3.5                                   | 0.2  | 260                                 |
| LBZX84C5V1LT1 | Z2      | 5.1                                                           | 4.8  | 5.4  | 60                                                         | 2                           | 2              | 4.2                                                          | 5.3  | 480                                                        | 5                                                              | 5.9  | 15                                                          | -2.7                                   | 1.2  | 225                                 |
| LBZX84C5V6LT1 | Z3      | 5.6                                                           | 5.2  | 6    | 40                                                         | 1                           | 2              | 4.8                                                          | 6    | 400                                                        | 5.2                                                            | 6.3  | 10                                                          | -2.0                                   | 2.5  | 200                                 |
| LBZX84C6V2LT1 | Z4      | 6.2                                                           | 5.8  | 6.6  | 10                                                         | 3                           | 4              | 5.6                                                          | 6.6  | 150                                                        | 5.8                                                            | 6.8  | 6                                                           | 0.4                                    | 3.7  | 185                                 |
| LBZX84C6V8LT1 | Z5      | 6.8                                                           | 6.4  | 7.2  | 15                                                         | 2                           | 4              | 6.3                                                          | 7.2  | 80                                                         | 6.4                                                            | 7.4  | 6                                                           | 1.2                                    | 4.5  | 155                                 |
| LBZX84C7V5LT1 | Z6      | 7.5                                                           | 7    | 7.9  | 15                                                         | 1                           | 5              | 6.9                                                          | 7.9  | 80                                                         | 7                                                              | 8    | 6                                                           | 2.5                                    | 5.3  | 140                                 |
| LBZX84C8V2LT1 | Z7      | 8.2                                                           | 7.7  | 8.7  | 15                                                         | 0.7                         | 5              | 7.6                                                          | 8.7  | 80                                                         | 7.7                                                            | 8.8  | 6                                                           | 3.2                                    | 6.2  | 135                                 |
| LBZX84C9V1LT1 | Z8      | 9.1                                                           | 8.5  | 9.6  | 15                                                         | 0.5                         | 6              | 8.4                                                          | 9.6  | 100                                                        | 8.5                                                            | 9.7  | 8                                                           | 3.8                                    | 7.0  | 130                                 |
| LBZX84C10LT1  | Z9      | 10                                                            | 9.4  | 10.6 | 20                                                         | 0.2                         | 7              | 9.3                                                          | 10.6 | 150                                                        | 9.4                                                            | 10.7 | 10                                                          | 4.5                                    | 8.0  | 130                                 |
| LBZX84C11LT1  | Y1      | 11                                                            | 10.4 | 11.6 | 20                                                         | 0.1                         | 8              | 10.2                                                         | 11.6 | 150                                                        | 10.4                                                           | 11.8 | 10                                                          | 5.4                                    | 9.0  | 130                                 |
| LBZX84C12LT1  | Y2      | 12                                                            | 11.4 | 12.7 | 25                                                         | 0.1                         | 8              | 11.2                                                         | 12.7 | 150                                                        | 11.4                                                           | 12.9 | 10                                                          | 6.0                                    | 10.0 | 130                                 |
| LBZX84C13LT1  | Y3      | 13                                                            | 12.4 | 14.1 | 30                                                         | 0.1                         | 8              | 12.3                                                         | 14   | 170                                                        | 12.5                                                           | 14.2 | 15                                                          | 7.0                                    | 11.0 | 120                                 |
| LBZX84C15LT1  | Y4      | 15                                                            | 13.8 | 15.6 | 30                                                         | 0.05                        | 10.5           | 13.7                                                         | 15.5 | 200                                                        | 13.9                                                           | 15.7 | 20                                                          | 9.2                                    | 13.0 | 110                                 |
| LBZX84C16LT1  | Y5      | 16                                                            | 15.3 | 17.1 | 40                                                         | 0.05                        | 11.2           | 15.2                                                         | 17   | 200                                                        | 15.4                                                           | 17.2 | 20                                                          | 10.4                                   | 14.0 | 105                                 |
| LBZX84C18LT1  | Y6      | 18                                                            | 16.8 | 19.1 | 45                                                         | 0.05                        | 12.6           | 16.7                                                         | 19   | 225                                                        | 16.9                                                           | 19.2 | 20                                                          | 12.4                                   | 16.0 | 100                                 |
| LBZX84C20LT1  | Y7      | 20                                                            | 18.8 | 21.2 | 55                                                         | 0.05                        | 14             | 18.7                                                         | 21.1 | 225                                                        | 18.9                                                           | 21.4 | 20                                                          | 14.4                                   | 18.0 | 85                                  |
| LBZX84C22LT1  | Y8      | 22                                                            | 20.8 | 23.3 | 55                                                         | 0.05                        | 15.4           | 20.7                                                         | 23.2 | 250                                                        | 20.9                                                           | 23.4 | 25                                                          | 16.4                                   | 20.0 | 85                                  |
| LBZX84C24LT1  | Y9      | 24                                                            | 22.8 | 25.6 | 70                                                         | 0.05                        | 16.8           | 22.7                                                         | 25.5 | 250                                                        | 22.9                                                           | 25.7 | 25                                                          | 18.4                                   | 22.0 | 80                                  |
| LBZX84C27LT1  | Y10     | 27                                                            | 25.1 | 28.9 | 80                                                         | 0.05                        | 18.9           | 25                                                           | 28.9 | 300                                                        | 25.2                                                           | 29.3 | 45                                                          | 21.4                                   | 25.3 | 70                                  |
| LBZX84C30LT1  | Y11     | 30                                                            | 28   | 32   | 80                                                         | 0.05                        | 21             | 27.8                                                         | 32   | 300                                                        | 28.1                                                           | 32.4 | 50                                                          | 24.4                                   | 29.4 | 70                                  |
| LBZX84C33LT1  | Y12     | 33                                                            | 31   | 35   | 80                                                         | 0.05                        | 23.1           | 30.8                                                         | 35   | 325                                                        | 31.1                                                           | 35.4 | 55                                                          | 27.4                                   | 33.4 | 70                                  |
| LBZX84C36LT1  | Y13     | 36                                                            | 34   | 38   | 90                                                         | 0.05                        | 25.2           | 33.8                                                         | 38   | 350                                                        | 34.1                                                           | 38.4 | 60                                                          | 30.4                                   | 37.4 | 70                                  |
| LBZX84C39LT1  | Y14     | 39                                                            | 37   | 41   | 130                                                        | 0.05                        | 27.3           | 36.7                                                         | 41   | 350                                                        | 37.1                                                           | 41.5 | 70                                                          | 33.4                                   | 41.2 | 45                                  |
| LBZX84C43LT1  | Y15     | 43                                                            | 40   | 46   | 150                                                        | 0.05                        | 30.1           | 39.7                                                         | 46   | 375                                                        | 40.1                                                           | 46.5 | 80                                                          | 37.6                                   | 46.6 | 40                                  |
| LBZX84C47LT1  | Y16     | 47                                                            | 44   | 50   | 170                                                        | 0.05                        | 32.9           | 43.7                                                         | 50   | 375                                                        | 44.1                                                           | 50.5 | 90                                                          | 42.0                                   | 51.8 | 40                                  |
| LBZX84C51LT1  | Y17     | 51                                                            | 48   | 54   | 180                                                        | 0.05                        | 35.7           | 47.6                                                         | 54   | 400                                                        | 48.1                                                           | 54.6 | 100                                                         | 46.6                                   | 57.2 | 40                                  |
| LBZX84C56LT1  | Y18     | 56                                                            | 52   | 60   | 200                                                        | 0.05                        | 39.2           | 51.5                                                         | 60   | 425                                                        | 52.1                                                           | 60.8 | 110                                                         | 52.2                                   | 63.8 | 40                                  |
| LBZX84C62LT1  | Y19     | 62                                                            | 58   | 66   | 215                                                        | 0.05                        | 43.4           | 57.4                                                         | 66   | 450                                                        | 58.2                                                           | 67   | 120                                                         | 58.8                                   | 71.6 | 35                                  |
| LBZX84C68LT1  | Y20     | 68                                                            | 64   | 72   | 240                                                        | 0.05                        | 47.6           | 63.4                                                         | 72   | 475                                                        | 64.2                                                           | 73.2 | 130                                                         | 65.6                                   | 79.8 | 35                                  |
| LBZX84C75LT1  | Y21     | 75                                                            | 70   | 79   | 255                                                        | 0.05                        | 52.5           | 69.4                                                         | 79   | 500                                                        | 70.3                                                           | 80.2 | 140                                                         | 73.4                                   | 88.6 | 35                                  |

**NOTES:** 1. Zener voltage is measured with a pulse test current ( $I_Z$ ) applied at an ambient temperature of 25°C.

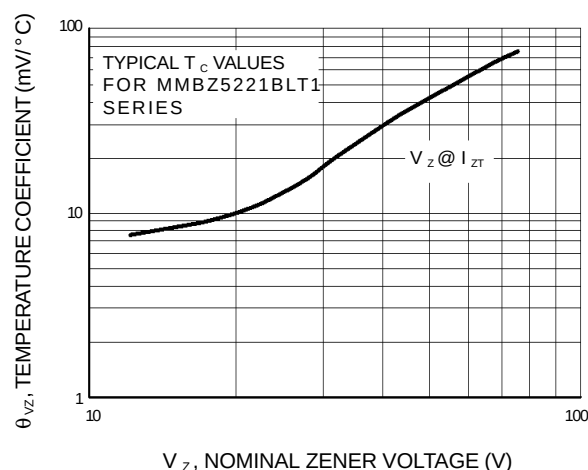
2. The zener impedance,  $Z_{ZT2}$ , for the 27 through 75 volt types is tested at 0.5 mA rather than the test current of 0.1 mA used for  $V_{Z2}$ .

## GENERAL DATA — 225mW SOT-23

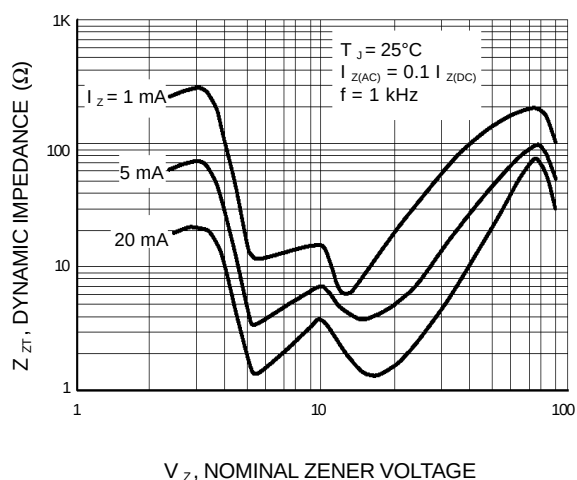
### TYPICAL CHARACTERISTICS



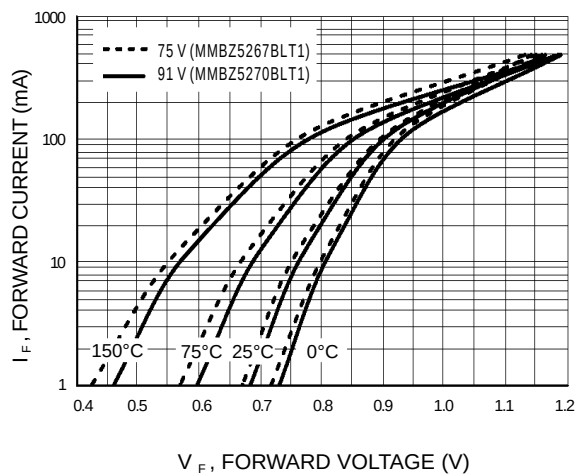
**Figure 1. Temperature Coefficients**  
(Temperature Range -55°C to +150°C)



**Figure 2. Temperature Coefficients**  
(Temperature Range -55°C to +150°C)



**Figure 3. Effect of Zener Voltage on**  
**Zener Impedance**



**Figure 4. Typical Forward Voltage**

## GENERAL DATA — 225mW SOT-23

### TYPICAL CHARACTERISTICS

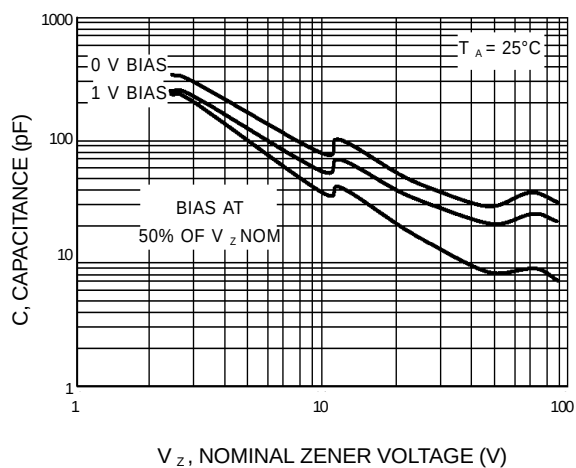


Figure 5. Typical Capacitance

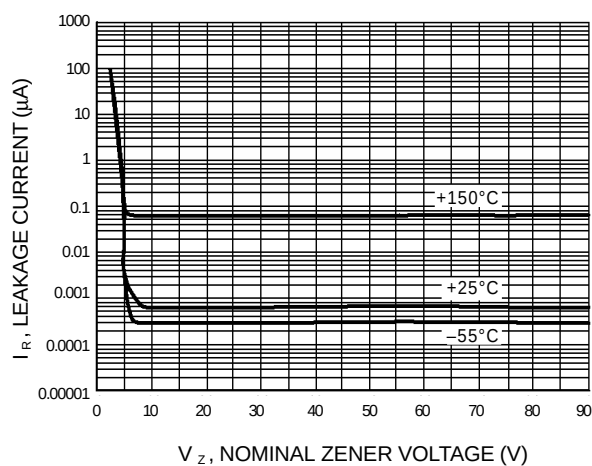


Figure 6. Typical Leakage Current

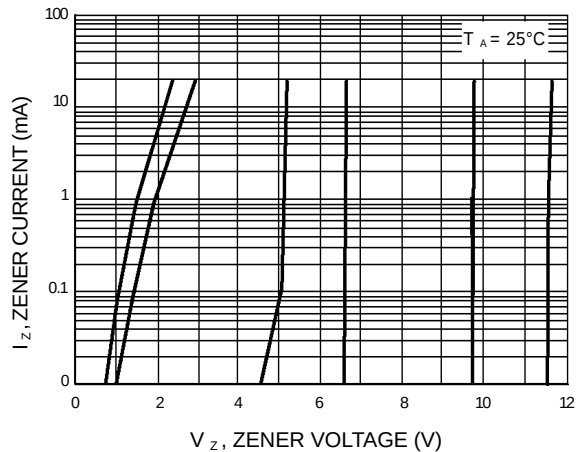


Figure 7. Zener Voltage versus Zener Current  
( $V_Z$  Up to 12 V)

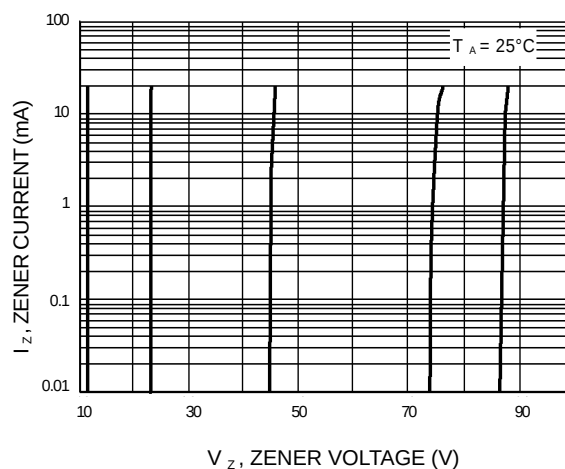
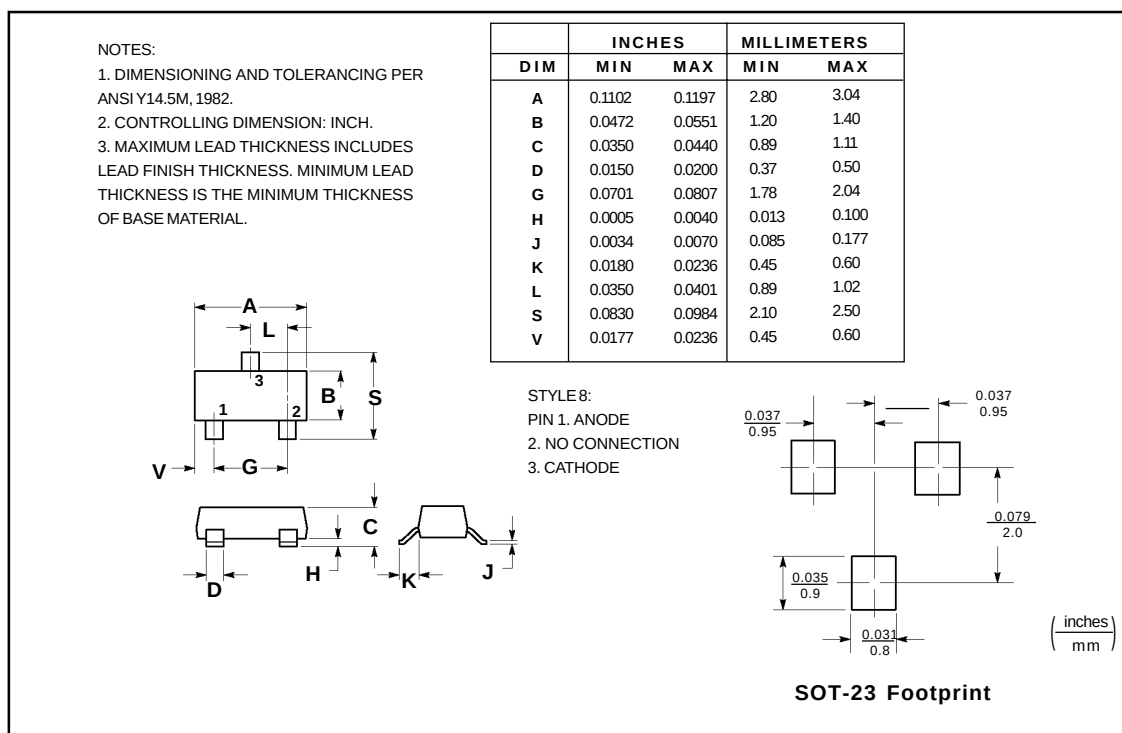


Figure 8. Zener Voltage versus Zener Current  
(12 V to 91 V)

## GENERAL DATA — 225 mW SOT-23

### Zener Voltage Regulator Diodes — Surface Mounted

#### 225 mW SOT-23



(Refer to Section 10 for Surface Mount, Thermal Data and Footprint Information.)

#### MULTIPLE PACKAGE QUANTITY (MPQ) REQUIREMENTS

| Package Option | Type No. Suffix | MPQ (Units) |
|----------------|-----------------|-------------|
| Tape and Reel  | T1              | 3K          |
| Tape and Ammo  | T3              | 10K         |

(Refer to Section 10 for more information on Packaging Specifications.)