

# SEMICONDUCTOR

## TECHNICAL DATA

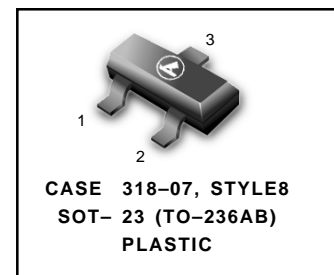
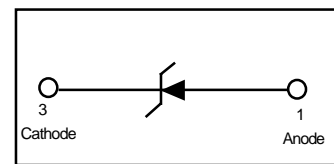
225 mW SOT-23

Zener Voltage Regulator Diodes

**GENERAL DATA APPLICABLE TO ALL SERIES IN THIS GROUP**

**Zener Voltage Regulator Diodes**

**BZX84C2V4LT1**  
**SERIES**  
**225mW**  
**SOT-23**



**MAXIMUM CASE TEMPERATURE FOR SOLDERING**

**PURPOSES:** 260°C for 10 seconds

**THERMAL CHARACTERISTICS**

| Characteristic  | Symbol                            | Max | Unit |
|---|-----------------------------------|-----|------|
| Total Device Dissipation FR-5 Board*<br>T <sub>A</sub> = 25°C<br>Derate above 25°C          | P <sub>D</sub>                    | 225 | mW   |
| Thermal Resistance Junction to Ambient  | R <sub>QJA</sub>                  | 556 | °C/W |
| Total Device Dissipation<br>Alumina Substrate,** T <sub>A</sub> = 25°C<br>Derate above 25°C | P <sub>D</sub>                    | 300 | mW   |
| Thermal Resistance Junction to Ambient  | R <sub>QJA</sub>                  | 417 | °C/W |
| Junction and Storage Temperature  | T <sub>J</sub> , T <sub>stg</sub> | 150 | °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**

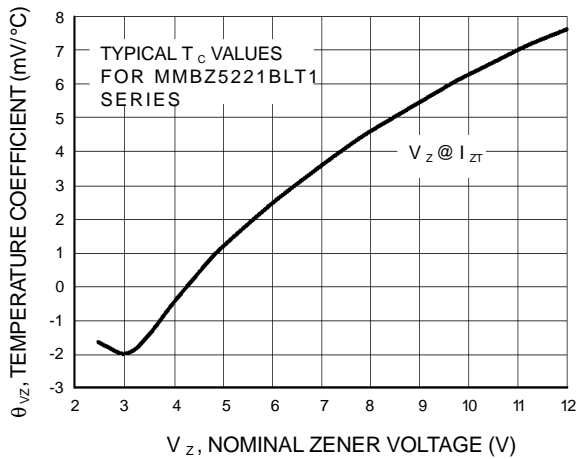
(Pinout: 1-Anode, 2-NC, 3-Cathode) ( $V_F = 0.9V$  Max @  $I_F = 10$  mA for all types)

| Type Number  | Marking | Zener Voltage $V_{z1}$ (Volts) @ $I_{zT1}=5mA$ (Note 1) |      |      | Max Zener Impedance $Z_{zT1}$ (Ohms) @ $I_{zT1}=5mA$ | Max Reverse Leakage Current |             | Zener Voltage $V_{z2}$ (Volts) @ $I_{zT2}=1mA$ (Note1) |      | Max Zener Impedance $Z_{zT2}$ (Ohms) @ $I_{zT2}=5mA$ | Zener Voltage $V_{z1}$ (Volts) @ $I_{zT1}=5mA$ (Note 1) |      | Max Zener Impedance $Z_{zT3}$ (Ohms) @ $I_{zT3}=20mA$ | $d_{vz}/dt$ (mv/k) @ $I_{zT1}=5mA$ |      | CpF Max @ $V_R=0$ f=1MHz |
|--------------|---------|---|------|------|--|-----------------------------|-------------|--|------|--|---|------|---|------------------------------------|------|--------------------------|
|              |         | Nom   | Min  | Max  |  | $I_R$ @ $V_R$ $\mu A$       | $V_R$ Volts | Min  | Max  |  | Min   | Max  |   | Min                                | Max  |                          |
| BZX84C2V4LT1 | Z11     | 2.4   | 2.2  | 2.6  | 100  | 50                          | 1           | 1.7  | 2.1  | 600  | 2.6   | 3.2  | 50  | -3.5                               | 0    | 450                      |
| BZX84C2V7LT1 | Z12     | 2.7   | 2.5  | 2.9  | 100  | 20                          | 1           | 1.9  | 2.4  | 600  | 3   | 3.6  | 50  | -3.5                               | 0    | 450                      |
| BZX84C3V0LT1 | Z13     | 3   | 2.8  | 3.2  | 95   | 10                          | 1           | 2.1  | 2.7  | 600  | 3.3   | 3.9  | 50  | -3.5                               | 0    | 450                      |
| BZX84C3V3LT1 | Z14     | 3.3   | 3.1  | 3.5  | 95   | 5                           | 1           | 2.3  | 2.9  | 600  | 3.6   | 4.2  | 40  | -3.5                               | 0    | 450                      |
| BZX84C3V6LT1 | Z15     | 3.6   | 3.4  | 3.8  | 90   | 5                           | 1           | 2.7  | 3.3  | 600  | 3.9   | 4.5  | 40  | -3.5                               | 0    | 450                      |
| BZX84C3V9LT1 | 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                      |
| BZX84C4V3LT1 | W9      | 4.3   | 4    | 4.6  | 90   | 3                           | 1           | 3.3  | 4    | 600  | 4.4   | 5.1  | 30  | -3.5                               | 0    | 450                      |
| BZX84C4V7LT1 | Z1      | 4.7   | 4.4  | 5    | 80   | 3                           | 2           | 3.7  | 4.7  | 500  | 4.5   | 5.4  | 15  | -3.5                               | 0.2  | 260                      |
| BZX84C5V1LT1 | Z2      | 5.1   | 4.8  | 5.4  | 60   | 2                           | 2           | 4.2  | 5.3  | 480  | 5   | 5.9  | 15  | -2.7                               | 1.2  | 225                      |
| BZX84C5V6LT1 | Z3      | 5.6   | 5.2  | 6    | 40   | 1                           | 2           | 4.8  | 6    | 400  | 5.2   | 6.3  | 10  | -2.0                               | 2.5  | 200                      |
| BZX84C6V2LT1 | 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                      |
| BZX84C6V8LT1 | 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                      |
| BZX84C7V5LT1 | Z6      | 7.5   | 7    | 7.9  | 15   | 1                           | 5           | 6.9  | 7.9  | 80   | 7   | 8    | 6   | 2.5                                | 5.3  | 140                      |
| BZX84C8V2LT1 | 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                      |
| BZX84C9V1LT1 | 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                      |
| BZX84C10LT1  | 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                      |
| BZX84C11LT1  | 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                      |
| BZX84C12LT1  | 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                      |
| BZX84C13LT1  | Y3      | 13  | 12.4 | 14.1 | 30   | 0.1                         | 8           | 12.3   | 14   | 170  | 12.5  | 14.2 | 15  | 7.0                                | 11.0 | 120                      |
| BZX84C15LT1  | 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                      |
| BZX84C16LT1  | 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                      |
| BZX84C18LT1  | 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                      |
| BZX84C20LT1  | 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                       |
| BZX84C22LT1  | 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                       |
| BZX84C24LT1  | 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                       |
| BZX84C27LT1  | 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                       |
| BZX84C30LT1  | Y11     | 30  | 28   | 32   | 80   | 0.05                        | 21          | 27.8   | 32   | 300  | 28.1  | 32.4 | 50  | 24.4                               | 29.4 | 70                       |
| BZX84C33LT1  | Y12     | 33  | 31   | 35   | 80   | 0.05                        | 23.1        | 30.8   | 35   | 325  | 31.1  | 35.4 | 55  | 27.4                               | 33.4 | 70                       |
| BZX84C36LT1  | Y13     | 36  | 34   | 38   | 90   | 0.05                        | 25.2        | 33.8   | 38   | 350  | 34.1  | 38.4 | 60  | 30.4                               | 37.4 | 70                       |
| BZX84C39LT1  | Y14     | 39  | 37   | 41   | 130  | 0.05                        | 27.3        | 36.7   | 41   | 350  | 37.1  | 41.5 | 70  | 33.4                               | 41.2 | 45                       |
| BZX84C43LT1  | Y15     | 43  | 40   | 46   | 150  | 0.05                        | 30.1        | 39.7   | 46   | 375  | 40.1  | 46.5 | 80  | 37.6                               | 46.6 | 40                       |
| BZX84C47LT1  | Y16     | 47  | 44   | 50   | 170  | 0.05                        | 32.9        | 43.7   | 50   | 375  | 44.1  | 50.5 | 90  | 42.0                               | 51.8 | 40                       |
| BZX84C51LT1  | Y17     | 51  | 48   | 54   | 180  | 0.05                        | 35.7        | 47.6   | 54   | 400  | 48.1  | 54.6 | 100   | 46.6                               | 57.2 | 40                       |
| BZX84C56LT1  | Y18     | 56  | 52   | 60   | 200  | 0.05                        | 39.2        | 51.5   | 60   | 425  | 52.1  | 60.8 | 110   | 52.2                               | 63.8 | 40                       |
| BZX84C62LT1  | Y19     | 62  | 58   | 66   | 215  | 0.05                        | 43.4        | 57.4   | 66   | 450  | 58.2  | 67   | 120   | 58.8                               | 71.6 | 35                       |
| BZX84C68LT1  | Y20     | 68  | 64   | 72   | 240  | 0.05                        | 47.6        | 63.4   | 72   | 475  | 64.2  | 73.2 | 130   | 65.6                               | 79.8 | 35                       |
| BZX84C75LT1  | Y21     | 75  | 70   | 79   | 255  | 0.05                        | 52.5        | 69.4   | 79   | 500  | 70.3  | 80.2 | 140   | 73.4                               | 88.6 | 35                       |

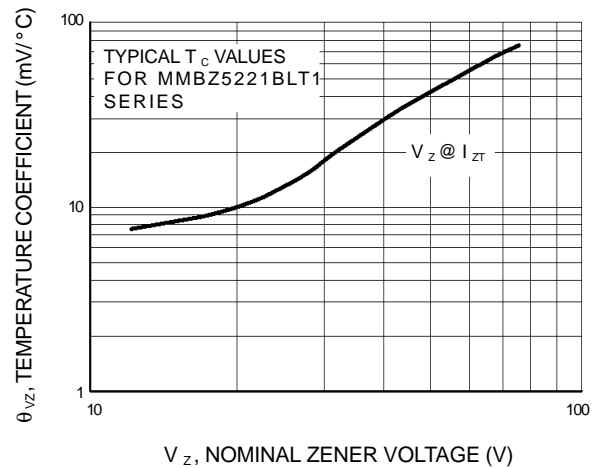
**NOTES:** 1. Zener voltage is measured with a pulse test current ( $I_z$ ) applied at an ambient temperature of 25°C.  
 2. The zener impedance,  $Z_{zT2}$ , for the 27 through 75 volt types is tested at 0.5 mA rather than the test current of 0.1 mA used for  $V_{z2}$ .

GENERAL DATA — 225mW SOT-23

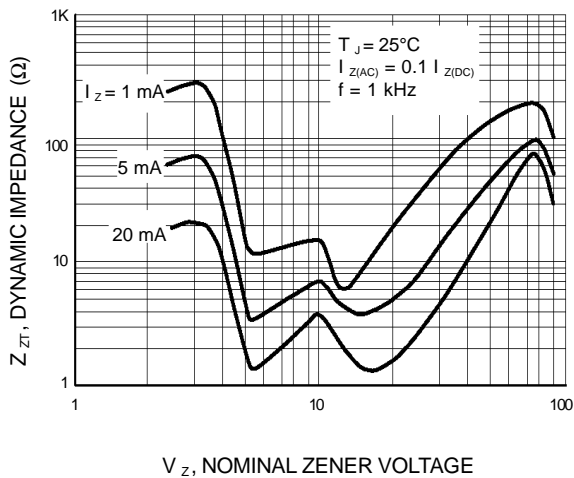
TYPICAL CHARACTERISTICS



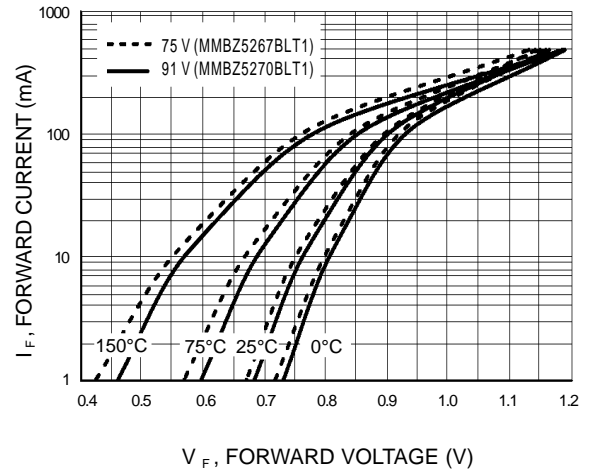
**Figure 1. Temperature Coefficients**  
(Temperature Range  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$ )



**Figure 2. Temperature Coefficients**  
(Temperature Range  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$ )



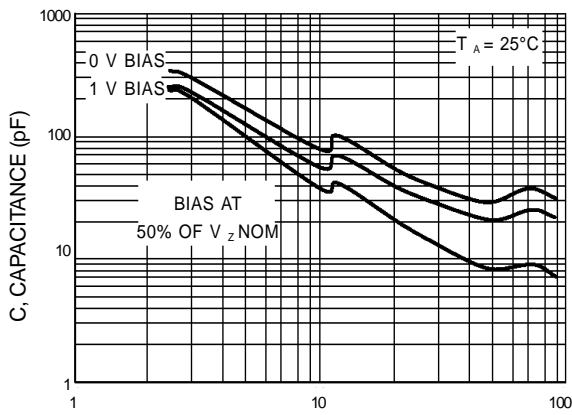
**Figure 3. Effect of Zener Voltage on**  
**Zener Impedance**



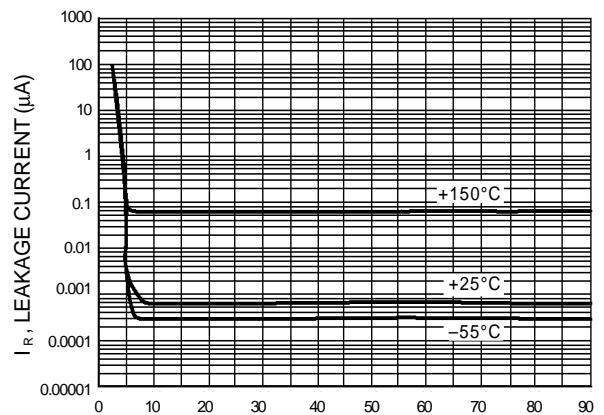
**Figure 4. Typical Forward Voltage**

GENERAL DATA — 225mW SOT-23

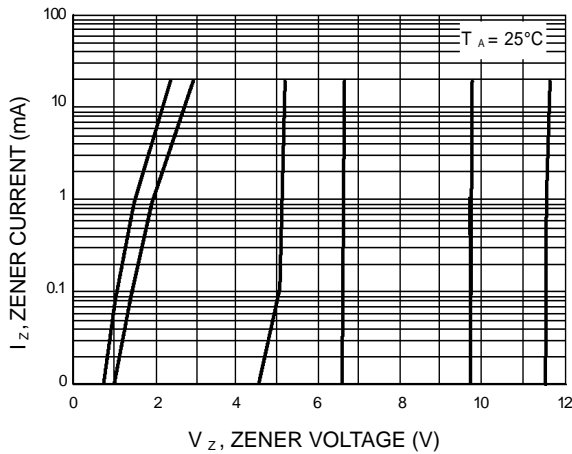
TYPICAL CHARACTERISTICS



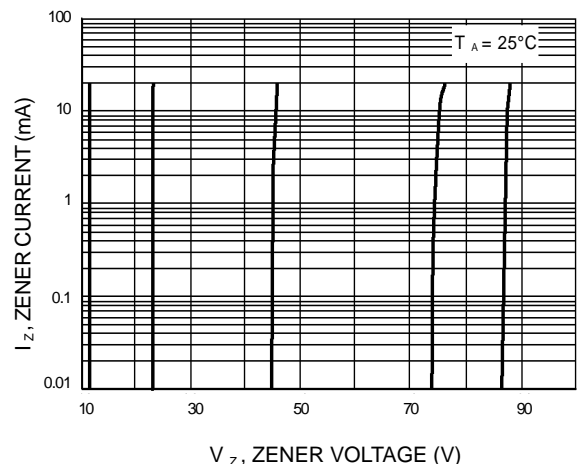
**Figure 5. Typical Capacitance**



**Figure 6. Typical Leakage Current**



**Figure 7. Zener Voltage versus Zener Current (V<sub>z</sub> Up to 12 V)**



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

**GENERAL DATA — 225 mW SOT-23**

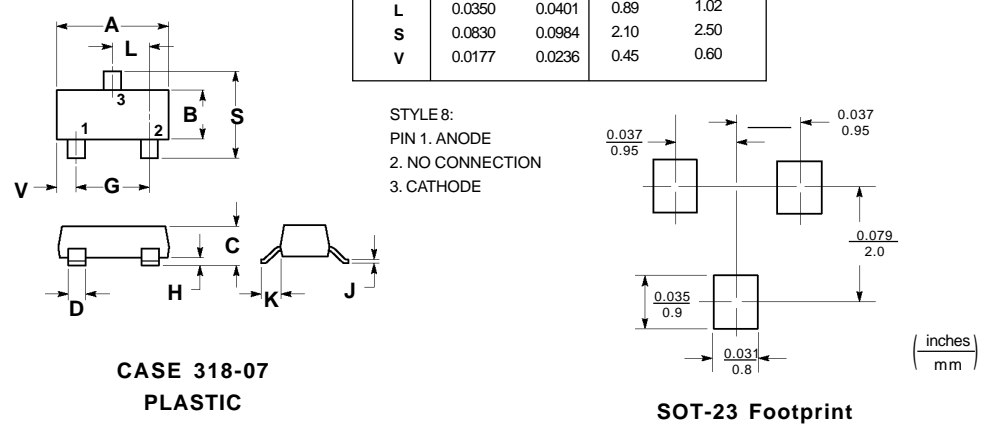
**Zener Voltage Regulator Diodes — Surface Mounted**

**225 mW SOT-23**

NOTES:

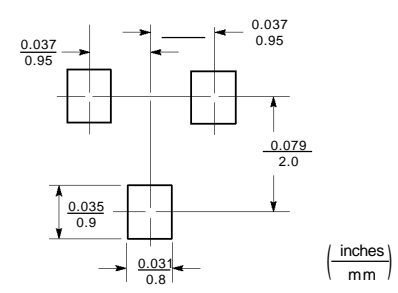
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

| DIM | INCHES |        | MILLIMETERS |       |
|-----|--------|--------|-------------|-------|
|     | MIN    | MAX    | MIN         | MAX   |
| A   | 0.1102 | 0.1197 | 2.80        | 3.04  |
| B   | 0.0472 | 0.0551 | 1.20        | 1.40  |
| C   | 0.0350 | 0.0440 | 0.89        | 1.11  |
| D   | 0.0150 | 0.0200 | 0.37        | 0.50  |
| G   | 0.0701 | 0.0807 | 1.78        | 2.04  |
| H   | 0.0005 | 0.0040 | 0.013       | 0.100 |
| J   | 0.0034 | 0.0070 | 0.085       | 0.177 |
| K   | 0.0180 | 0.0236 | 0.45        | 0.60  |
| L   | 0.0350 | 0.0401 | 0.89        | 1.02  |
| S   | 0.0830 | 0.0984 | 2.10        | 2.50  |
| V   | 0.0177 | 0.0236 | 0.45        | 0.60  |



**CASE 318-07  
PLASTIC**

STYLE 8:  
PIN 1. ANODE  
2. NO CONNECTION  
3. CATHODE



**SOT-23 Footprint**

(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.)