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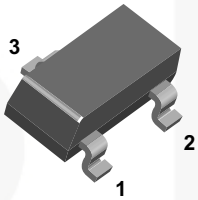
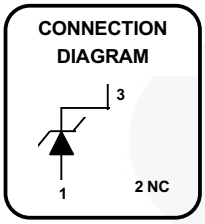
November 2015

# BZX84C3V3 - BZX84C33
# Zeners

**Tolerance: C = 5%**




**SOT-23**




## Absolute Maximum Ratings(1),(2)

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_A$ = 25°C unless otherwise noted.

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $I_{FRM}$ | Repetitive Peak Forward Current | | 250 | mA |
| $I_{ZRM}$ | Repetitive Peak Working Current | | 250 | mA |
| $P_D$ | Power Dissipation | Referencing $R_{\theta JA}$, $T_A$ = 25°C | 250 | mW |
| | | Referencing $\psi_{JL}$, $T_L$ = 25°C | 550 | |
| $R_{\theta JA}$ | Junction-to-Ambient Thermal Resistance(3) | | 465 | °C/W |
| $\psi_{JL}$ | Junction-to-Lead Thermal Characteristics (with reference to Cathode) | | 220 | °C/W |
| $T_{STG}$ | Storage Temperature Range | | -55 to +150 | °C |
| $T_J$ | Operating Junction Temperature | | -55 to +150 | °C |

**Notes:**

1. These ratings are based on a maximum junction temperature of 150°C.
2. These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty-cycle operations.
3. Device mounted on FR-4 PCB, board size = 76.2 mm x 114.3 mm

## Electrical Characteristics

Values are at $T_A$ = 25°C unless otherwise noted.

| Device | Mark | $I_Z$ = 5.0 mA | | | $I_Z$ = 1.0 mA | | | $I_Z$ = 20 mA | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $V_Z$ (V) | | $Z_Z$ (Ω) | $V_Z$ (V) | | $Z_Z$ (Ω) | $V_Z$ (V) | | $Z_Z$ (Ω) |
| | | Min. | Max. | | Min. | Max. | | Min. | Max. | |
| BZX84C3V3 | Z14 | 3.1 | 3.5 | 95 | 2.3 | 2.9 | 600 | 3.6 | 4.2 | 40 |
| BZX84C3V6 | Z15 | 3.4 | 3.8 | 90 | 2.7 | 3.3 | 600 | 3.9 | 4.5 | 40 |
| BZX84C3V9 | Z16 | 3.7 | 4.1 | 90 | 2.9 | 3.5 | 600 | 4.1 | 4.7 | 30 |
| BZX84C4V3 | Z17 | 4.0 | 4.6 | 90 | 3.3 | 4.0 | 600 | 4.4 | 5.1 | 30 |
| BZX84C4V7 | Z1 | 4.4 | 5.0 | 80 | 3.7 | 4.7 | 500 | 4.5 | 5.4 | 15 |
| BZX84C5V1 | Z2 | 4.8 | 5.4 | 60 | 4.2 | 5.3 | 480 | 5.0 | 5.9 | 15 |
| BZX84C5V6 | Z3 | 5.2 | 6.0 | 40 | 4.8 | 6.0 | 400 | 5.2 | 6.3 | 10 |
| BZX84C6V2 | Z4 | 5.8 | 6.6 | 10 | 5.6 | 6.6 | 150 | 5.8 | 6.8 | 6 |
| BZX84C6V8 | Z5 | 6.4 | 7.2 | 15 | 6.3 | 7.2 | 80 | 6.4 | 7.4 | 6 |
| BZX84C7V5 | Z6 | 7.0 | 7.9 | 15 | 6.9 | 7.9 | 80 | 7.0 | 8.0 | 6 |
| BZX84C8V2 | Z7 | 7.7 | 8.7 | 15 | 7.6 | 8.7 | 80 | 7.7 | 8.8 | 6 |
| BZX84C9V1 | Z8 | 8.5 | 9.6 | 15 | 8.4 | 9.6 | 100 | 8.5 | 9.7 | 8 |
| BZX84C10 | Z9 | 9.4 | 10.6 | 20 | 9.3 | 10.6 | 150 | 9.4 | 10.7 | 10 |
| BZX84C11 | Y1 | 10.4 | 11.6 | 20 | 10.2 | 11.6 | 150 | 10.4 | 11.8 | 10 |
| BZX84C12 | Y2 | 11.4 | 12.7 | 25 | 11.2 | 12.7 | 150 | 11.4 | 12.9 | 10 |
| BZX84C13 | Y3 | 12.4 | 14.1 | 30 | 12.3 | 14.0 | 170 | 12.5 | 14.2 | 15 |
| BZX84C15 | Y4 | 13.8 | 15.6 | 30 | 13.7 | 15.5 | 200 | 13.9 | 15.7 | 20 |
| BZX84C16 | Y5 | 15.3 | 17.1 | 40 | 15.2 | 17.0 | 200 | 15.4 | 17.2 | 20 |
| BZX84C18 | Y6 | 16.8 | 19.1 | 45 | 16.7 | 19.0 | 225 | 16.9 | 19.2 | 20 |
| BZX84C20 | Y7 | 18.8 | 21.2 | 55 | 18.7 | 21.1 | 225 | 18.9 | 21.4 | 20 |
| BZX84C22 | Y8 | 20.8 | 23.3 | 55 | 20.7 | 23.2 | 250 | 20.9 | 23.4 | 25 |
| BZX84C24 | Y9 | 22.8 | 25.6 | 70 | 22.7 | 25.5 | 250 | 22.9 | 25.7 | 25 |
| BZX84C27 | Y10 | 25.1 | 28.9 | 80 | 25.0 | 28.9 | 300 | 25.2 | 29.3 | 45 |
| BZX84C30 | Y11 | 28.0 | 32.0 | 80 | 27.8 | 32.0 | 300 | 28.1 | 32.4 | 50 |
| BZX84C33 | Y12 | 31.0 | 35.0 | 80 | 30.8 | 35.0 | 325 | 31.1 | 35.4 | 55 |
| **$V_F$ Forward Voltage = 0.9 V Maximum at $I_F$ =10 mA for all BZX84 series** | | | | | | | | | | |

## Electrical Characteristics (Continued)

Values are at $T_A$ = 25°C unless otherwise noted.

| Device | $V_R$ (V) | $I_R$ (µA) | Cap[4] (pF) | $D_{VZ}$ / $D_t$ at 5.0 mA (mV/k) | |
|---|---|---|---|---|---|
| | | | | Min. | Max. |
| BZX84C3V3 | 1.0 | 5.0 | 450 | -3.5 | 0.0 |
| BZX84C3V6 | 1.0 | 5.0 | 450 | -3.5 | 0.0 |
| BZX84C3V9 | 1.0 | 5.0 | 450 | -3.5 | 0.0 |
| BZX84C4V3 | 1.0 | 5.0 | 450 | -3.5 | 0.0 |
| BZX84C4V7 | 2.0 | 3 | 260 | -3.5 | 0.2 |
| BZX84C5V1 | 2.0 | 2 | 225 | -2.7 | 1.2 |
| BZX84C5V6 | 2.0 | 1 | 200 | -2.0 | 2.5 |
| BZX84C6V2 | 4.0 | 3 | 185 | 0.4 | 3.7 |
| BZX84C6V8 | 4.0 | 2 | 155 | 1.2 | 4.5 |
| BZX84C7V5 | 5.0 | 1 | 140 | 2.5 | 5.3 |
| BZX84C8V2 | 5.0 | 0.7 | 135 | 3.2 | 6.2 |
| BZX84C9V1 | 6.0 | 0.5 | 130 | 3.8 | 7.0 |
| BZX84C10 | 7.0 | 0.2 | 130 | 4.5 | 8.0 |
| BZX84C11 | 8.0 | 0.1 | 130 | 5.4 | 9.0 |
| BZX84C12 | 8.0 | 0.1 | 130 | 6.0 | 10 |
| BZX84C13 | 8.0 | 0.1 | 120 | 7.0 | 11 |
| BZX84C15 | 10.5 | 0.05 | 110 | 9.2 | 13 |
| BZX84C16 | 11.2 | 0.05 | 105 | 10.4 | 14 |
| BZX84C18 | 12.6 | 0.05 | 100 | 12.4 | 16 |
| BZX84C20 | 14 | 0.05 | 85 | 14.4 | 18 |
| BZX84C22 | 15.4 | 0.05 | 85 | 16.4 | 20 |
| BZX84C24 | 16.8 | 0.05 | 80 | 18.4 | 22 |
| BZX84C27 | 18.9 | 0.05 | 70 | 21.4 | 25.3 |
| BZX84C30 | 21 | 0.05 | 70 | 24.4 | 29.4 |
| BZX84C33 | 23.1 | 0.05 | 70 | 27.4 | 33.4 |

**Note:**

4. Capacitance at $V_R$= 0.0 V, f = 1.0 MHz.

## Typical Performance Characteristics

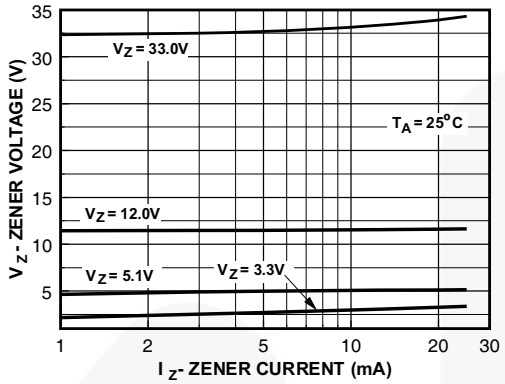



**Figure 1. Zener Current vs. Zener Voltage**

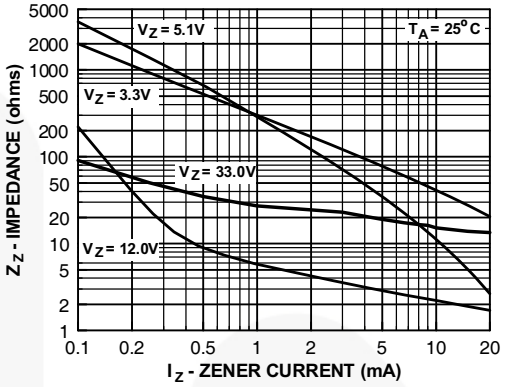



**Figure 2. Zener Current vs. Zener Impedance**

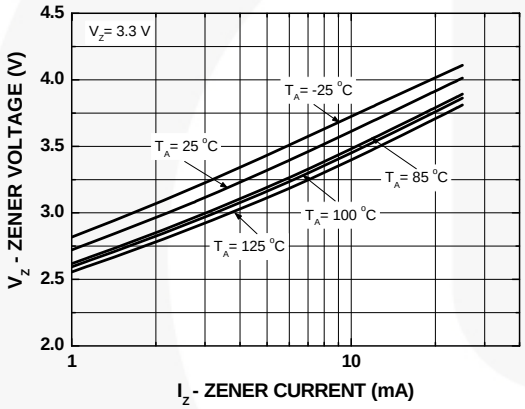



**Figure 3. 3.3 V Zener Voltage vs. Temperature**

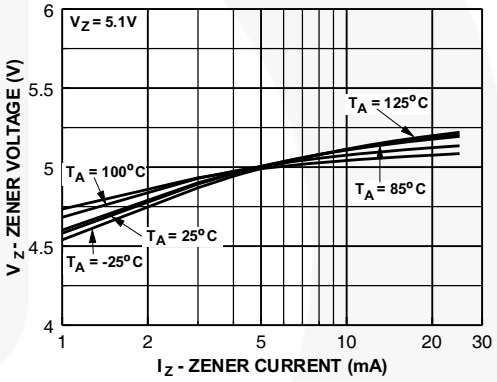



**Figure 4. 5.1 V Zener Voltage vs. Temperature**

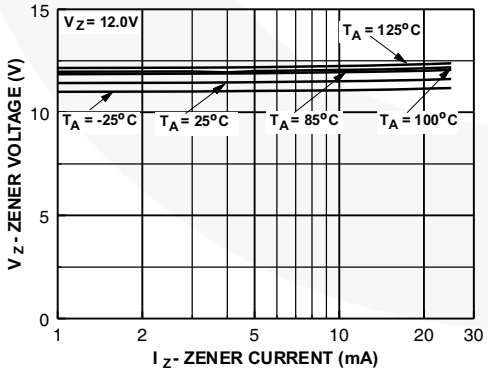



**Figure 5. 12 V Zener Voltage vs. Zener Temperature**

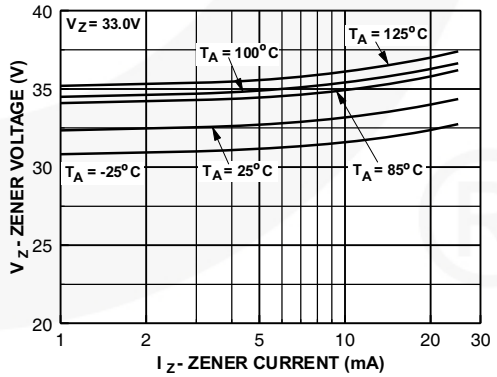
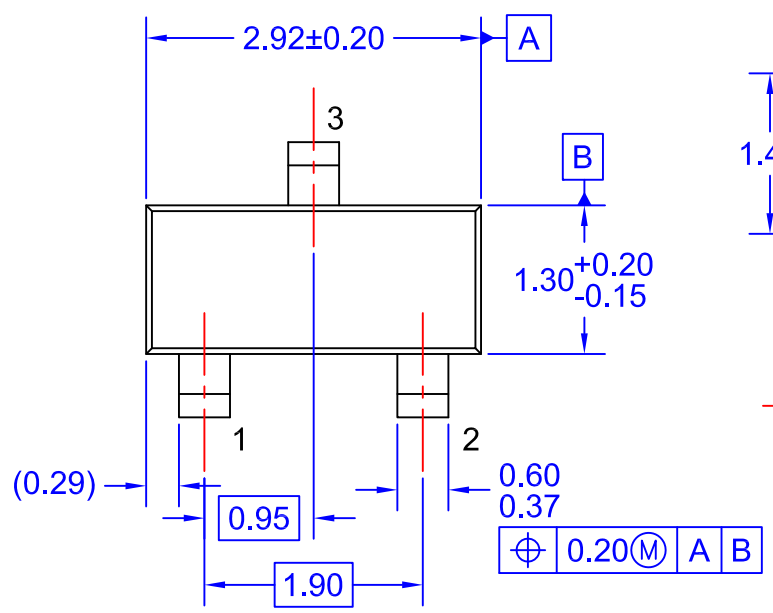
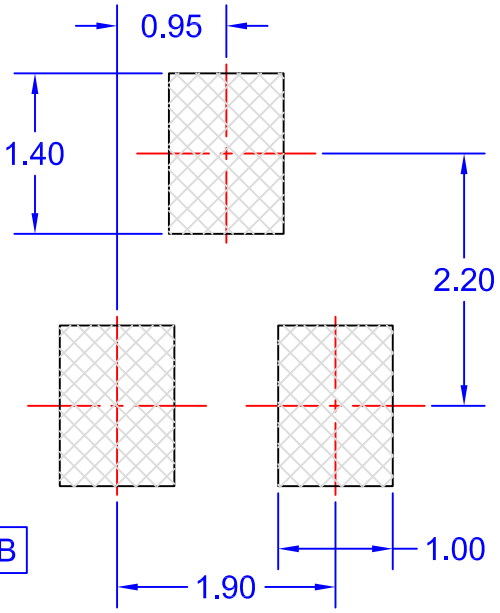
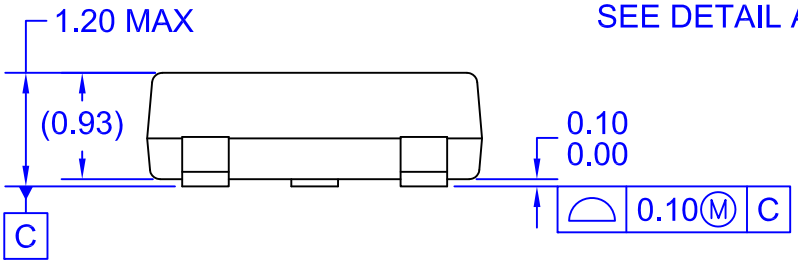


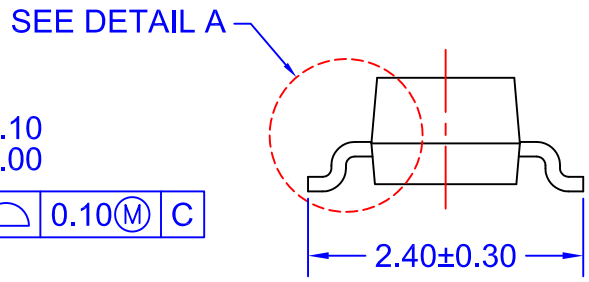

**Figure 6. 33 V Zener Voltage vs. Zener Temperature**

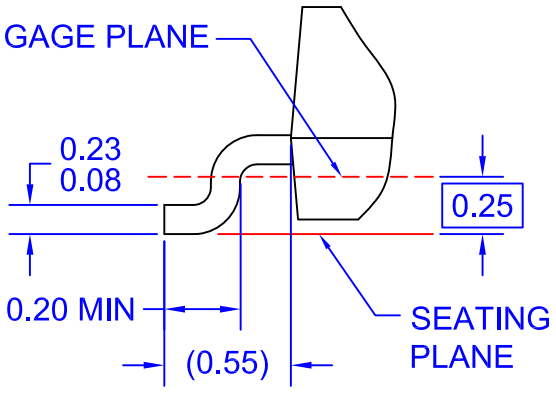



LAND PATTERN
RECOMMENDATION




DETAIL A
SCALE: 2X

NOTES: UNLESS OTHERWISE SPECIFIED

A) REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE H.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 2009.
E) DRAWING FILE NAME: MA03DREV12

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