



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 $T_A = 25^\circ\text{C}$ 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 $R_{\theta JA}$, $T_A = 25^\circ\text{C}$ | 250 |
| | | Referencing ψ_{JL} , $T_L = 25^\circ\text{C}$ | 550 |
| $R_{\theta JA}$ | Junction-to-Ambient Thermal Resistance ⁽³⁾ | 465 | $^\circ\text{C}/\text{W}$ |
| ψ_{JL} | Junction-to-Lead Thermal Characteristics (with reference to Cathode) | 220 | $^\circ\text{C}/\text{W}$ |
| T_{STG} | Storage Temperature Range | -55 to +150 | $^\circ\text{C}$ |
| T_J | Operating Junction Temperature | -55 to +150 | $^\circ\text{C}$ |

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 $T_A = 25^\circ\text{C}$ unless otherwise noted.

| Device | Mark | $I_Z = 5.0 \text{ mA}$ | | | $I_Z = 1.0 \text{ mA}$ | | | $I_Z = 20 \text{ mA}$ | | |
|-----------|------|------------------------|------|-------------------------------|------------------------|------|-------------------------------|-----------------------|------|-------------------------------|
| | | $V_Z \text{ (V)}$ | | $Z_Z \text{ (}\Omega\text{)}$ | $V_Z \text{ (V)}$ | | $Z_Z \text{ (}\Omega\text{)}$ | $V_Z \text{ (V)}$ | | $Z_Z \text{ (}\Omega\text{)}$ |
| | | 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 $I_F = 10 \text{ mA}$ for all BZX84 series

Electrical Characteristics (Continued)Values are at $T_A = 25^\circ\text{C}$ 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

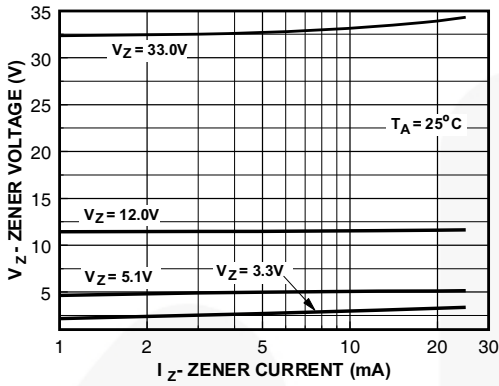


Figure 1. Zener Current vs. Zener Voltage



Figure 2. Zener Current vs. Zener Impedance

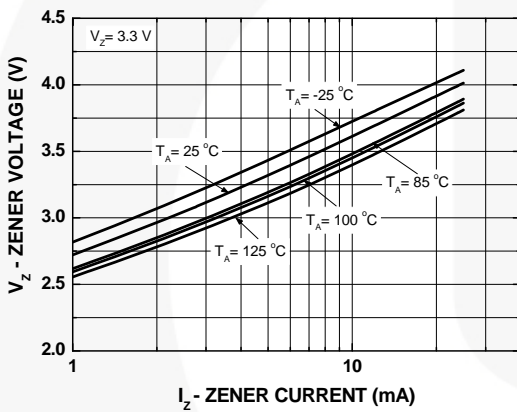


Figure 3. 3.3 V Zener Voltage vs. Temperature



Figure 4. 5.1 V Zener Voltage vs. Temperature

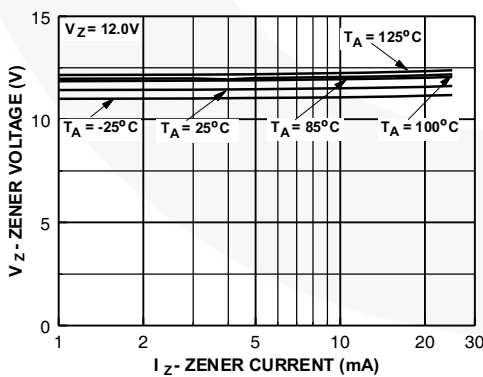


Figure 5. 12 V Zener Voltage vs. Zener Temperature

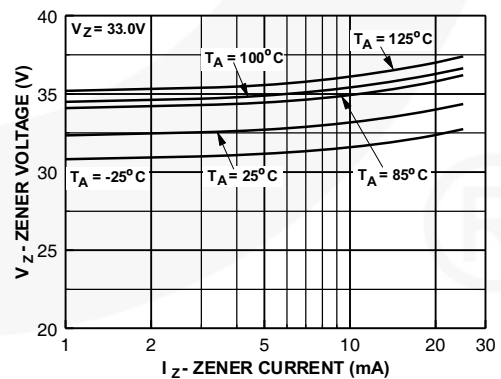


Figure 6. 33 V Zener Voltage vs. Zener Temperature



LAND PATTERN
RECOMMENDATION



SEE DETAIL A



DETAIL A
SCALE: 2X

NOTES: UNLESS OTHERWISE SPECIFIED

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- 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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