



**THE DATASHEET OF
SZBZX84C6V8LT3G**



Zener Voltage Regulators

250 mW SOT-23 Surface Mount

BZX84BxxxLT1G, BZX84CxxxLT1G Series, SZBZX84BxxxLT1G, SZBZX84CxxxLT1G Series

This series of Zener diodes is offered in the convenient, surface mount plastic SOT-23 package. These devices are designed to provide voltage regulation with minimum space requirement. They are well suited for applications such as cellular phones, hand held portables, and high density PC boards.

Features

- 250 mW Rating on FR-4 or FR-5 Board
- Zener Breakdown Voltage Range – 2.4 V to 75 V
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications
- ESD Rating of Class 3 (> 16 kV) per Human Body Model
- Tight Tolerance Series Available (See Page 4)
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

Mechanical Characteristics

CASE: Void-free, transfer-molded, thermosetting plastic case

FINISH: Corrosion resistant finish, easily Solderable

MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES:
260°C for 10 Seconds

POLARITY: Cathode indicated by polarity band

FLAMMABILITY RATING: UL 94 V-0



SOT-23
CASE 318
STYLE 8



MARKING DIAGRAM



XXX = Device Code
M = Date Code*
▪ = Pb-Free Package

(Note: Microdot may be in either location)

*Date Code orientation may vary depending upon manufacturing location.

ORDERING INFORMATION

| Device | Package | Shipping† |
|-----------------|---------------------|-------------------------|
| BZX84CxxxLT1G | SOT-23 (Pb-Free) | 3,000 / Tape & Reel |
| SZBZX84CxxxLT1G | SOT-23 (Pb-Free) | 3,000 / Tape & Reel |
| BZX84CxxxLT3G | SOT-23 (Pb-Free) | 10,000 / Tape & Reel |
| SZBZX84CxxxLT3G | SOT-23 (Pb-Free) | 10,000 / Tape & Reel |
| BZX84BxxxLT1G | SOT-23 (Pb-Free) | 3,000 / Tape & Reel |
| SZBZX84BxxxLT1G | SOT-23 (Pb-Free) | 3,000 / Tape & Reel |
| BZX84BxxxLT3G | SOT-23 (Pb-Free) | 10,000 / Tape & Reel |
| SZBZX84BxxxLT3G | SOT-23 (Pb-Free) | 10,000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

DEVICE MARKING INFORMATION

See specific marking information in the device marking column of the Electrical Characteristics table on page 3 of this data sheet.

*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

BZX84BxxxLT1G, BZX84CxxxLT1G Series, SZBZX84BxxxLT1G, SZBZX84CxxxLT1G Series

MAXIMUM RATINGS

| Rating | Symbol | Max | Unit |
|--|-----------------------|-------------|----------------------------|
| Total Power Dissipation on FR-5 Board, (Note 1) @ $T_A = 25^\circ\text{C}$ Derated above 25°C | P_D | 250 | mW |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 2.0 | $\text{mW}/^\circ\text{C}$ |
| | | 500 | $^\circ\text{C}/\text{W}$ |
| Total Power Dissipation on Alumina Substrate, (Note 2) @ $T_A = 25^\circ\text{C}$ Derated above 25°C | P_D | 300 | mW |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 2.4 | $\text{mW}/^\circ\text{C}$ |
| | | 417 | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range | T_J, T_{stg} | -65 to +150 | $^\circ\text{C}$ |

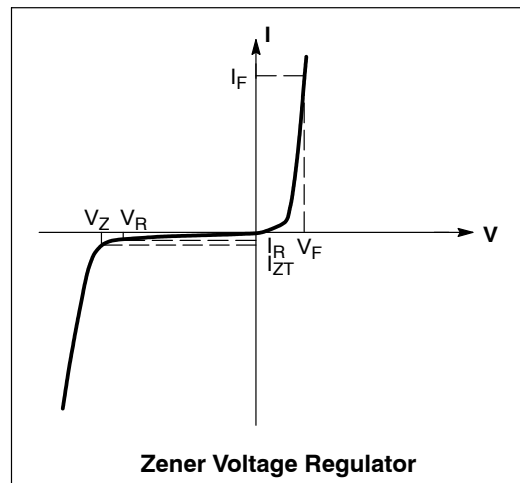
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

- FR-5 = 1.0 X 0.75 X 0.62 in.
- Alumina = 0.4 X 0.3 X 0.024 in., 99.5% alumina.

ELECTRICAL CHARACTERISTICS

(Pinout: 1-Anode, 2-No Connection, 3-Cathode) ($T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 0.90\text{ V Max. @ } I_F = 10\text{ mA}$)

| Symbol | Parameter |
|--------------|---|
| V_Z | Reverse Zener Voltage @ I_{ZT} |
| I_{ZT} | Reverse Current |
| Z_{ZT} | Maximum Zener Impedance @ I_{ZT} |
| I_R | Reverse Leakage Current @ V_R |
| V_R | Reverse Voltage |
| I_F | Forward Current |
| V_F | Forward Voltage @ I_F |
| ΘV_Z | Maximum Temperature Coefficient of V_Z |
| C | Max. Capacitance @ $V_R = 0$ and $f = 1\text{ MHz}$ |



BZX84BxxxLT1G, BZX84CxxxLT1G Series, SZBZX84BxxxLT1G, SZBZX84CxxxLT1G Series

ELECTRICAL CHARACTERISTICS – BZX84CxxxLT1 SERIES (STANDARD TOLERANCE)

(Pinout: 1-Anode, 2-No Connection, 3-Cathode) (T_A = 25°C unless otherwise noted, V_F = 0.90 V Max. @ I_F = 10 mA)
 (Devices listed in **bold, italic** are onsemi Preferred devices.)

| Device* | Device Marking | V _{Z1} (Volts) @ I _{ZT1} = 5 mA (Note 3) | | | Z _{ZT1} (Ω) @ I _{ZT1} = 5 mA | V _{Z2} (V) @ I _{ZT2} = 1 mA (Note 3) | | Z _{ZT2} (Ω) @ I _{ZT2} = 1 mA | V _{Z3} (V) @ I _{ZT3} = 20 mA (Note 3) | | Z _{ZT3} (Ω) @ I _{ZT3} = 20 mA | Max Reverse Leakage Current | | θ _{VZ} (mV/k) @ I _{ZT1} = 5 mA | | C (pF) @ V _R = 0 f = 1 MHz |
|-------------------------|----------------|--|------------|-------------|--|--|-------------|--|---|-------------|---|-----------------------------|-------------------------|--|-------------|---|
| | | Min | Nom | Max | | Min | Max | | Min | Max | | I _R μA | V _R Volts | Min | Max | |
| | | Min | Nom | Max | Min | Max | Min | Max | Min | Max | I _R μA | V _R Volts | Min | Max | | |
| BZX84C2V4LT1G | Z11 | 2.2 | 2.4 | 2.6 | 100 | 1.7 | 2.1 | 600 | 2.6 | 3.2 | 50 | 50 | 1 | -3.5 | 0 | 450 |
| BZX84C2V7LT1G | Z12 | 2.5 | 2.7 | 2.9 | 100 | 1.9 | 2.4 | 600 | 3 | 3.6 | 50 | 20 | 1 | -3.5 | 0 | 450 |
| BZX84C3V0LT1G | Z13 | 2.8 | 3 | 3.2 | 95 | 2.1 | 2.7 | 600 | 3.3 | 3.9 | 50 | 10 | 1 | -3.5 | 0 | 450 |
| BZX84C3V3LT1G | Z14 | 3.1 | 3.3 | 3.5 | 95 | 2.3 | 2.9 | 600 | 3.6 | 4.2 | 40 | 5 | 1 | -3.5 | 0 | 450 |
| BZX84C3V6LT1G | Z15 | 3.4 | 3.6 | 3.8 | 90 | 2.7 | 3.3 | 600 | 3.9 | 4.5 | 40 | 5 | 1 | -3.5 | 0 | 450 |
| BZX84C3V9LT1G | Z16 | 3.7 | 3.9 | 4.1 | 90 | 2.9 | 3.5 | 600 | 4.1 | 4.7 | 30 | 3 | 1 | -3.5 | -2.5 | 450 |
| BZX84C4V3LT1G | W9 | 4 | 4.3 | 4.6 | 90 | 3.3 | 4 | 600 | 4.4 | 5.1 | 30 | 3 | 1 | -3.5 | 0 | 450 |
| BZX84C4V7LT1/T3G | Z1 | 4.4 | 4.7 | 5 | 80 | 3.7 | 4.7 | 500 | 4.5 | 5.4 | 15 | 3 | 2 | -3.5 | 0.2 | 260 |
| BZX84C5V1LT1/T3G | Z2 | 4.8 | 5.1 | 5.4 | 60 | 4.2 | 5.3 | 480 | 5 | 5.9 | 15 | 2 | 2 | -2.7 | 1.2 | 225 |
| BZX84C5V6LT1/T3G | Z3 | 5.2 | 5.6 | 6 | 40 | 4.8 | 6 | 400 | 5.2 | 6.3 | 10 | 1 | 2 | -2.0 | 2.5 | 200 |
| BZX84C6V2LT1/T3G | Z4 | 5.8 | 6.2 | 6.6 | 10 | 5.6 | 6.6 | 150 | 5.8 | 6.8 | 6 | 3 | 4 | 0.4 | 3.7 | 185 |
| BZX84C6V8LT1/T3G | Z5 | 6.4 | 6.8 | 7.2 | 15 | 6.3 | 7.2 | 80 | 6.4 | 7.4 | 6 | 2 | 4 | 1.2 | 4.5 | 155 |
| BZX84C7V5LT1G | Z6 | 7 | 7.5 | 7.9 | 15 | 6.9 | 7.9 | 80 | 7 | 8 | 6 | 1 | 5 | 2.5 | 5.3 | 140 |
| BZX84C8V2LT1G | Z7 | 7.7 | 8.2 | 8.7 | 15 | 7.6 | 8.7 | 80 | 7.7 | 8.8 | 6 | 0.7 | 5 | 3.2 | 6.2 | 135 |
| BZX84C9V1LT1/T3G | Z8 | 8.5 | 9.1 | 9.6 | 15 | 8.4 | 9.6 | 100 | 8.5 | 9.7 | 8 | 0.5 | 6 | 3.8 | 7.0 | 130 |
| BZX84C10LT1G | Z9 | 9.4 | 10 | 10.6 | 20 | 9.3 | 10.6 | 150 | 9.4 | 10.7 | 10 | 0.2 | 7 | 4.5 | 8.0 | 130 |
| BZX84C11LT1G | Y1 | 10.4 | 11 | 11.6 | 20 | 10.2 | 11.6 | 150 | 10.4 | 11.8 | 10 | 0.1 | 8 | 5.4 | 9.0 | 130 |
| BZX84C12LT1G | Y2 | 11.4 | 12 | 12.7 | 25 | 11.2 | 12.7 | 150 | 11.4 | 12.9 | 10 | 0.1 | 8 | 6.0 | 10.0 | 130 |
| BZX84C13LT1G | Y3 | 12.4 | 13 | 14.1 | 30 | 12.3 | 14 | 170 | 12.5 | 14.2 | 15 | 0.1 | 8 | 7.0 | 11.0 | 120 |
| BZX84C15LT1/T3G | Y4 | 13.8 | 15 | 15.6 | 30 | 13.7 | 15.5 | 200 | 13.9 | 15.7 | 20 | 0.05 | 10.5 | 9.2 | 13.0 | 110 |
| BZX84C16LT1G | Y5 | 15.3 | 16 | 17.1 | 40 | 15.2 | 17 | 200 | 15.4 | 17.2 | 20 | 0.05 | 11.2 | 10.4 | 14.0 | 105 |
| BZX84C18LT1/T3G | Y6 | 16.8 | 18 | 19.1 | 45 | 16.7 | 19 | 225 | 16.9 | 19.2 | 20 | 0.05 | 12.6 | 12.4 | 16.0 | 100 |
| BZX84C20LT1G | Y7 | 18.8 | 20 | 21.2 | 55 | 18.7 | 21.1 | 225 | 18.9 | 21.4 | 20 | 0.05 | 14 | 14.4 | 18.0 | 85 |
| BZX84C22LT1G | Y8 | 20.8 | 22 | 23.3 | 55 | 20.7 | 23.2 | 250 | 20.9 | 23.4 | 25 | 0.05 | 15.4 | 16.4 | 20.0 | 85 |
| BZX84C24LT1G | Y9 | 22.8 | 24 | 25.6 | 70 | 22.7 | 25.5 | 250 | 22.9 | 25.7 | 25 | 0.05 | 16.8 | 18.4 | 22.0 | 80 |
| Device* | Device Marking | V _{Z1} Below @ I _{ZT1} = 2 mA | | | Z _{ZT1} Below @ I _{ZT1} = 2 mA | V _{Z2} Below @ I _{ZT2} = 0.1 mA | | Z _{ZT2} Below @ I _{ZT2} = 0.5 mA | V _{Z3} Below @ I _{ZT3} = 10 mA | | Z _{ZT3} Below @ I _{ZT3} = 10 mA | Max Reverse Leakage Current | | θ _{VZ} (mV/k) Below @ I _{ZT1} = 2 mA | | C (pF) @ V _R = 0 f = 1 MHz |
| | | Min | Nom | Max | | Min | Max | | Min | Max | | I _R μA | V _R (V) | Min | Max | |
| | | Min | Nom | Max | Min | Max | Min | Max | Min | Max | I _R μA | V _R (V) | Min | Max | | |
| BZX84C27LT1G | Y10 | 25.1 | 27 | 28.9 | 80 | 25 | 28.9 | 300 | 25.2 | 29.3 | 45 | 0.05 | 18.9 | 21.4 | 25.3 | 70 |
| BZX84C30LT1G | Y11 | 28 | 30 | 32 | 80 | 27.8 | 32 | 300 | 28.1 | 32.4 | 50 | 0.05 | 21 | 24.4 | 29.4 | 70 |
| BZX84C33LT1/T3G | Y12 | 31 | 33 | 35 | 80 | 30.8 | 35 | 325 | 31.1 | 35.4 | 55 | 0.05 | 23.1 | 27.4 | 33.4 | 70 |
| BZX84C36LT1G | Y13 | 34 | 36 | 38 | 90 | 33.8 | 38 | 350 | 34.1 | 38.4 | 60 | 0.05 | 25.2 | 30.4 | 37.4 | 70 |
| BZX84C39LT1G | Y14 | 37 | 39 | 41 | 130 | 36.7 | 41 | 350 | 37.1 | 41.5 | 70 | 0.05 | 27.3 | 33.4 | 41.2 | 45 |
| BZX84C43LT1G | Y15 | 40 | 43 | 46 | 150 | 39.7 | 46 | 375 | 40.1 | 46.5 | 80 | 0.05 | 30.1 | 37.6 | 46.6 | 40 |
| BZX84C47LT1G | Y16 | 44 | 47 | 50 | 170 | 43.7 | 50 | 375 | 44.1 | 50.5 | 90 | 0.05 | 32.9 | 42.0 | 51.8 | 40 |
| BZX84C51LT1G | Y17 | 48 | 51 | 54 | 180 | 47.6 | 54 | 400 | 48.1 | 54.6 | 100 | 0.05 | 35.7 | 46.6 | 57.2 | 40 |
| BZX84C56LT1G | Y18 | 52 | 56 | 60 | 200 | 51.5 | 60 | 425 | 52.1 | 60.8 | 110 | 0.05 | 39.2 | 52.2 | 63.8 | 40 |
| BZX84C62LT1G | Y19 | 58 | 62 | 66 | 215 | 57.4 | 66 | 450 | 58.2 | 67 | 120 | 0.05 | 43.4 | 58.8 | 71.6 | 35 |
| BZX84C68LT1G | Y20 | 64 | 68 | 72 | 240 | 63.4 | 72 | 475 | 64.2 | 73.2 | 130 | 0.05 | 47.6 | 65.6 | 79.8 | 35 |
| BZX84C75LT1G | Y21 | 70 | 75 | 79 | 255 | 69.4 | 79 | 500 | 70.3 | 80.2 | 140 | 0.05 | 52.5 | 73.4 | 88.6 | 35 |

3. Zener voltage is measured with a pulse test current I_Z at an ambient temperature of 25°C.

*Includes SZ-prefix devices where applicable.

BZX84BxxxLT1G, BZX84CxxxLT1G Series, SZBZX84BxxxLT1G, SZBZX84CxxxLT1G Series

ELECTRICAL CHARACTERISTICS – BZX84BxxxL (Tight Tolerance Series)

(Pinout: 1-Anode, 2-No Connection, 3-Cathode) ($T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 0.90\text{ V Max. @ } I_F = 10\text{ mA}$)

| Device | Device Marking | V _Z (Volts) @ I _{ZT} = 5 mA (Note 4) | | | Z _{ZT} (Ω) @ I _{ZT} = 5 mA (Note 4) | Max Reverse Leakage Current | | θ _{VZ} (mV/k) @ I _{ZT} = 5 mA | | C (pF) @ V _R = 0, f = 1 MHz |
|--------------------|----------------|---|-----|------|---|-----------------------------|----------------|---|-----|--|
| | | Min | Nom | Max | | I _R | V _R | Min | Max | |
| | | | | | Max | μA | @ Volts | | | |
| BZX84B3V3LT1G | T2A | 3.23 | 3.3 | 3.37 | 95 | 5 | 1 | -3.5 | 0 | 450 |
| BZX84B4V7LT1G | T10 | 4.61 | 4.7 | 4.79 | 80 | 3 | 2 | -3.5 | 0.2 | 260 |
| BZX84B5V1LT1G | T11 | 5.00 | 5.1 | 5.20 | 60 | 2 | 2 | -2.7 | 1.2 | 225 |
| BZX84B5V6LT1G | T12 | 5.49 | 5.6 | 5.71 | 40 | 1 | 2 | -2 | 2.5 | 200 |
| BZX84B6V2LT1G | T13 | 6.08 | 6.2 | 6.32 | 10 | 3 | 4 | 0.4 | 3.7 | 185 |
| BZX84B6V8LT1G | T14 | 6.66 | 6.8 | 6.94 | 15 | 2 | 4 | 1.2 | 4.5 | 155 |
| BZX84B7V5LT1G | T15 | 7.35 | 7.5 | 7.65 | 15 | 1 | 5 | 2.5 | 5.3 | 140 |
| BZX84B8V2LT1G | T16 | 8.04 | 8.2 | 8.36 | 15 | 0.7 | 5 | 3.2 | 6.2 | 135 |
| BZX84B9V1LT1G, T3G | T17 | 8.92 | 9.1 | 9.28 | 15 | 0.5 | 6 | 3.8 | 7 | 130 |
| BZX84B10LT1G | T2E | 9.8 | 10 | 10.2 | 20 | 0.2 | 7 | 4.5 | 8 | 130 |
| BZX84B12LT1G | T18 | 11.8 | 12 | 12.2 | 25 | 0.1 | 8 | 6 | 10 | 130 |
| BZX84B15LT1G | T22 | 14.7 | 15 | 15.3 | 30 | 0.05 | 10.5 | 9.2 | 13 | 110 |
| BZX84B16LT1G | T19 | 15.7 | 16 | 16.3 | 40 | 0.05 | 11.2 | 10.4 | 14 | 105 |
| BZX84B18LT1G | T20 | 17.6 | 18 | 18.4 | 45 | 0.05 | 12.6 | 12.4 | 16 | 100 |
| BZX84B22LT1G | T24 | 21.6 | 22 | 22.4 | 55 | 0.05 | 15.4 | 16.4 | 20 | 85 |
| BZX84B24LT1G | T25 | 23.5 | 24 | 24.5 | 70 | 0.05 | 16.8 | 18.4 | 22 | 80 |

4. Zener voltage is measured with a pulse test current I_Z at an ambient temperature of 25°C.

ELECTRICAL CHARACTERISTICS – BZX84BxxxL (Tight Tolerance Series)

(Pinout: 1-Anode, 2-No Connection, 3-Cathode) ($T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 0.90\text{ V Max. @ } I_F = 10\text{ mA}$)

| Device* | Device Marking | V _Z (Volts) @ I _{ZT} = 2 mA (Note 4) | | | Z _{ZT} (Ω) @ I _{ZT} = 2 mA (Note 4) | Max Reverse Leakage Current | | θ _{VZ} (mV/k) @ I _{ZT} = 2 mA | | C (pF) @ V _R = 0, f = 1 MHz |
|--------------|----------------|---|-----|------|---|-----------------------------|----------------|---|------|--|
| | | Min | Nom | Max | | I _R | V _R | Min | Max | |
| | | | | | Max | μA | @ Volts | | | |
| BZX84B27LT1G | T27 | 26.5 | 27 | 27.5 | 80 | 0.05 | 18.9 | 21.4 | 25.3 | 70 |

*Includes SZ-prefix devices where applicable.

BZX84BxxxLT1G, BZX84CxxxLT1G Series, SZBZX84BxxxLT1G, SZBZX84CxxxLT1G Series

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

BZX84BxxxLT1G, BZX84CxxxLT1G Series, SZBZX84BxxxLT1G, SZBZX84CxxxLT1G Series

TYPICAL CHARACTERISTICS



Figure 5. Typical Capacitance

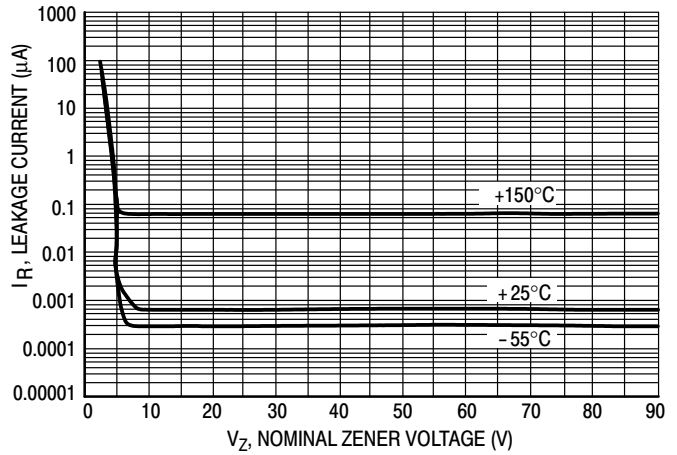
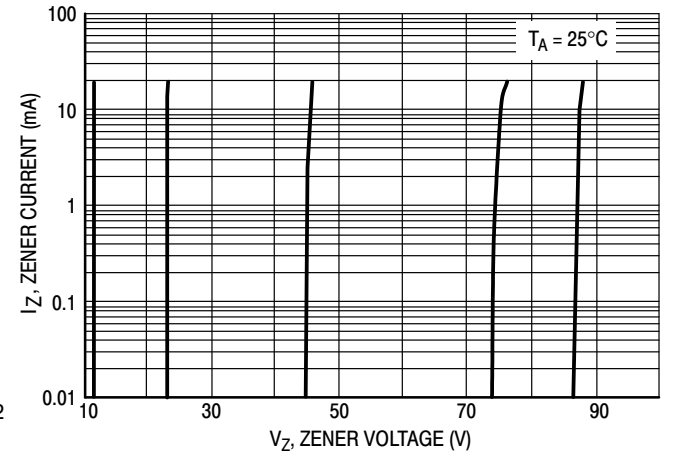


Figure 6. Typical Leakage Current



**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)**

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

 [View SZBZX84C6V8LT3G on WIN SOURCE](#)

 [ON Semiconductor](#) Information

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management