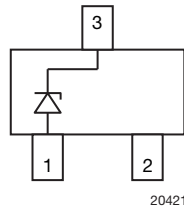
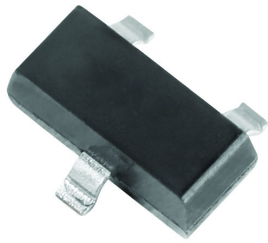


Small Signal Zener Diodes


DESIGN SUPPORT TOOLS
[click logo to get started](#)

FEATURES

- Silicon planar Zener diodes
- The Zener voltages are graded according to the international E24 standard. Standard Zener voltage tolerance is $\pm 5\%$, indicated by the "C" in the ordering code. Replace "C" with "B" for $\pm 2\%$ tolerance.
- AEC-Q101 qualified available
- ESD capability acc. to AEC-Q101:
human body model: $> 8\text{ kV}$,
machine model: $> 800\text{ V}$
- Base P/N-E3 - RoHS-compliant, commercial grade
- Base P/N-HE3 - RoHS-compliant, AEC-Q101 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



| PRIMARY CHARACTERISTICS | | |
|-------------------------|---------------|------|
| PARAMETER | VALUE | UNIT |
| V_Z range nom. | 2.4 to 75 | V |
| Test current I_{ZT} | 2; 5 | mA |
| V_Z specification | Pulse current | |
| Circuit configuration | Single | |

| ORDERING INFORMATION | | | |
|----------------------|-------------------------------------|--------------------------------|------------------------|
| DEVICE NAME | ORDERING CODE | TAPED UNITS PER REEL | MINIMUM ORDER QUANTITY |
| BZX84-series | BZX84C2V4-E3-08 to BZX84C75-E3-08 | 3000 (8 mm tape on 7" reel) | 15 000 |
| | BZX84B2V4-E3-08 to BZX84B75-E3-08 | | |
| | BZX84C2V4-HE3-08 to BZX84C75-HE3-08 | | |
| | BZX84B2V4-HE3-08 to BZX84B75-HE3-08 | | |
| | BZX84C2V4-E3-18 to BZX84C75-E3-18 | 10 000 (8 mm tape on 13" reel) | 10 000 |
| | BZX84B2V4-E3-18 to BZX84B75-E3-18 | | |
| | BZX84C2V4-HE3-18 to BZX84C75-HE3-18 | | |
| | BZX84B2V4-HE3-18 to BZX84B75-HE3-18 | | |

| PACKAGE | | | | |
|--------------|--------|--------------------------------------|--------------------------------------|--------------------------|
| PACKAGE NAME | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL | SOLDERING CONDITIONS |
| SOT-23 | 8.8 mg | UL 94 V-0 | MSL level 1 (according J-STD-020) | 260 °C/10 s at terminals |

| ABSOLUTE MAXIMUM RATINGS | | | | | |
|--|--|------------|-------------|------|--|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT | |
| Power dissipation | $T_{amb} = 25\text{ °C}$, device on fiberglass substrate, acc. layout on page 7 | P_{tot} | 300 | mW | |
| Thermal resistance junction to ambient air | $T_{amb} = 25\text{ °C}$, device on fiberglass substrate, acc. layout on page 7 | R_{thJA} | 420 | K/W | |
| Junction temperature | | T_j | 150 | °C | |
| Storage temperature range | | T_{stg} | -65 to +150 | °C | |
| Operating temperature range | | T_{op} | -55 to +150 | °C | |



| ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | | | | | | | |
|--|--------------|---------------------|------|------|--------------|-----------|-------------------------|------|--|-----------------------|----------------------------|------|
| PART NUMBER | MARKING CODE | ZENER VOLTAGE RANGE | | | TEST CURRENT | | REVERSE LEAKAGE CURRENT | | DYNAMIC RESISTANCE $f = 1\text{ kHz}$ | | TEMPERATURE COEFFICIENT | |
| | | V_Z at I_{ZT1} | | | I_{ZT1} | I_{ZT2} | I_R at V_R | | Z_Z at I_{ZT1} | Z_{ZK} at I_{ZT2} | α_{VZ} at I_{ZT1} | |
| | | V | | | mA | | μA | V | Ω | | $10^{-4}/^{\circ}\text{C}$ | |
| | | MIN. | NOM. | MAX. | | | | | MAX. | MAX. | MIN. | MAX. |
| BZX84C2V4 | Z11 | 2.2 | 2.4 | 2.6 | 5 | 1 | 50 | 1 | 100 | 275 | -9 | -4 |
| BZX84C2V7 | Z12 | 2.5 | 2.7 | 2.9 | 5 | 1 | 20 | 1 | 100 | 600 | -9 | -4 |
| BZX84C3V0 | Z13 | 2.8 | 3.0 | 3.2 | 5 | 1 | 10 | 1 | 95 | 600 | -9 | -3 |
| BZX84C3V3 | Z14 | 3.1 | 3.3 | 3.5 | 5 | 1 | 5 | 1 | 95 | 600 | -8 | -3 |
| BZX84C3V6 | Z15 | 3.4 | 3.6 | 3.8 | 5 | 1 | 5 | 1 | 90 | 600 | -8 | -3 |
| BZX84C3V9 | Z16 | 3.7 | 3.9 | 4.1 | 5 | 1 | 3 | 1 | 90 | 600 | -7 | -3 |
| BZX84C4V3 | Z17 | 4.0 | 4.3 | 4.6 | 5 | 1 | 3 | 1 | 90 | 600 | -6 | -1 |
| BZX84C4V7 | Z1 | 4.4 | 4.7 | 5.0 | 5 | 1 | 3 | 2 | 80 | 500 | -5 | 2 |
| BZX84C5V1 | Z2 | 4.8 | 5.1 | 5.4 | 5 | 1 | 2 | 2 | 60 | 480 | -3 | 4 |
| BZX84C5V6 | Z3 | 5.2 | 5.6 | 6.0 | 5 | 1 | 1 | 2 | 40 | 400 | -2 | 6 |
| BZX84C6V2 | Z4 | 5.8 | 6.2 | 6.6 | 5 | 1 | 3 | 4 | 10 | 150 | -1 | 7 |
| BZX84C6V8 | Z5 | 6.4 | 6.8 | 7.2 | 5 | 1 | 2 | 4 | 15 | 80 | 2 | 7 |
| BZX84C7V5 | Z6 | 7.0 | 7.5 | 7.9 | 5 | 1 | 1 | 5 | 15 | 80 | 3 | 7 |
| BZX84C8V2 | Z7 | 7.7 | 8.2 | 8.7 | 5 | 1 | 0.7 | 5 | 15 | 80 | 4 | 7 |
| BZX84C9V1 | Z8 | 8.5 | 9.1 | 9.6 | 5 | 1 | 0.5 | 6 | 15 | 100 | 5 | 8 |
| BZX84C10 | Z9 | 9.4 | 10 | 10.6 | 5 | 1 | 0.2 | 7 | 20 | 150 | 5 | 8 |
| BZX84C11 | Y1 | 10.4 | 11 | 11.6 | 5 | 1 | 0.1 | 8 | 20 | 150 | 5 | 9 |
| BZX84C12 | Y2 | 11.4 | 12 | 12.7 | 5 | 1 | 0.1 | 8 | 25 | 150 | 6 | 9 |
| BZX84C13 | Y3 | 12.4 | 13 | 14.1 | 5 | 1 | 0.1 | 8 | 30 | 170 | 7 | 9 |
| BZX84C15 | Y4 | 13.8 | 15 | 15.6 | 5 | 1 | 0.05 | 10.5 | 30 | 200 | 7 | 9 |
| BZX84C16 | Y5 | 15.3 | 16 | 17.1 | 5 | 1 | 0.05 | 11.2 | 40 | 200 | 8 | 9.5 |
| BZX84C18 | Y6 | 16.8 | 18 | 19.1 | 5 | 1 | 0.05 | 12.6 | 45 | 225 | 8 | 9.5 |
| BZX84C20 | Y7 | 18.8 | 20 | 21.2 | 5 | 1 | 0.05 | 14.0 | 55 | 225 | 8 | 10 |
| BZX84C22 | Y8 | 20.8 | 22 | 23.3 | 5 | 1 | 0.05 | 15.4 | 55 | 250 | 8 | 10 |
| BZX84C24 | Y9 | 22.8 | 24 | 25.6 | 5 | 1 | 0.05 | 16.8 | 70 | 250 | 8 | 10 |
| BZX84C27 | Y10 | 25.1 | 27 | 28.9 | 2 | 0.5 | 0.05 | 18.9 | 80 | 300 | 8 | 10 |
| BZX84C30 | Y11 | 28 | 30 | 32 | 2 | 0.5 | 0.05 | 21.0 | 80 | 300 | 8 | 10 |
| BZX84C33 | Y12 | 31 | 33 | 35 | 2 | 0.5 | 0.05 | 23.1 | 80 | 325 | 8 | 10 |
| BZX84C36 | Y13 | 34 | 36 | 38 | 2 | 0.5 | 0.05 | 25.2 | 90 | 350 | 8 | 10 |
| BZX84C39 | Y14 | 37 | 39 | 41 | 2 | 0.5 | 0.05 | 27.3 | 130 | 350 | 10 | 12 |
| BZX84C43 | Y15 | 40 | 43 | 46 | 2 | 0.5 | 0.05 | 30.1 | 150 | 375 | 10 | 12 |
| BZX84C47 | Y16 | 44 | 47 | 50 | 2 | 0.5 | 0.05 | 32.9 | 170 | 375 | 10 | 12 |
| BZX84C51 | Y17 | 48 | 51 | 54 | 2 | 0.5 | 0.05 | 35.7 | 180 | 400 | 10 | 12 |
| BZX84C56 | Y18 | 52 | 56 | 60 | 2 | 0.5 | 0.05 | 39.2 | 200 | 425 | 9 | 11 |
| BZX84C62 | Y19 | 58 | 62 | 66 | 2 | 0.5 | 0.05 | 43.4 | 215 | 450 | 9 | 12 |
| BZX84C68 | Y20 | 64 | 68 | 72 | 2 | 0.5 | 0.05 | 47.6 | 240 | 475 | 10 | 12 |
| BZX84C75 | Y21 | 70 | 75 | 79 | 2 | 0.5 | 0.05 | 52.5 | 255 | 500 | 10 | 12 |



| ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | | | | | | | |
|--|--------------|---------------------|------|------|--------------|-----------|-------------------------|------|--|-----------------------|----------------------------|------|
| PART NUMBER | MARKING CODE | ZENER VOLTAGE RANGE | | | TEST CURRENT | | REVERSE LEAKAGE CURRENT | | DYNAMIC RESISTANCE $f = 1\text{ kHz}$ | | TEMPERATURE COEFFICIENT | |
| | | V_Z at I_{ZT1} | | | I_{ZT1} | I_{ZT2} | I_R at V_R | | Z_Z at I_{ZT1} | Z_{ZK} at I_{ZT2} | α_{VZ} at I_{ZT1} | |
| | | V | | | mA | | μA | V | Ω | | $10^{-4}/^{\circ}\text{C}$ | |
| | | MIN. | NOM. | MAX. | | | | | MAX. | MAX. | MIN. | MAX. |
| BZX84B2V4 | Z50 | 2.35 | 2.4 | 2.45 | 5 | 1 | 50 | 1 | 100 | 275 | -9 | -4 |
| BZX84B2V7 | Z51 | 2.65 | 2.7 | 2.75 | 5 | 1 | 20 | 1 | 100 | 600 | -9 | -4 |
| BZX84B3V0 | Z52 | 2.94 | 3.0 | 3.06 | 5 | 1 | 10 | 1 | 95 | 600 | -9 | -3 |
| BZX84B3V3 | Z53 | 3.23 | 3.3 | 3.37 | 5 | 1 | 5 | 1 | 95 | 600 | -8 | -3 |
| BZX84B3V6 | Z54 | 3.53 | 3.6 | 3.67 | 5 | 1 | 5 | 1 | 90 | 600 | -8 | -3 |
| BZX84B3V9 | Z55 | 3.82 | 3.9 | 3.98 | 5 | 1 | 3 | 1 | 90 | 600 | -7 | -3 |
| BZX84B4V3 | Z56 | 4.21 | 4.3 | 4.39 | 5 | 1 | 3 | 1 | 90 | 600 | -6 | -1 |
| BZX84B4V7 | Z57 | 4.61 | 4.7 | 4.79 | 5 | 1 | 3 | 2 | 80 | 500 | -5 | 2 |
| BZX84B5V1 | Z58 | 5.0 | 5.1 | 5.2 | 5 | 1 | 2 | 2 | 60 | 480 | -3 | 4 |
| BZX84B5V6 | Z59 | 5.49 | 5.6 | 5.71 | 5 | 1 | 1 | 2 | 40 | 400 | -2 | 6 |
| BZX84B6V2 | Z60 | 6.08 | 6.2 | 6.32 | 5 | 1 | 3 | 4 | 10 | 150 | -1 | 7 |
| BZX84B6V8 | Z61 | 6.66 | 6.8 | 6.94 | 5 | 1 | 2 | 4 | 15 | 80 | 2 | 7 |
| BZX84B7V5 | Z62 | 7.35 | 7.5 | 7.65 | 5 | 1 | 1 | 5 | 15 | 80 | 3 | 7 |
| BZX84B8V2 | Z63 | 8.04 | 8.2 | 8.36 | 5 | 1 | 0.7 | 5 | 15 | 80 | 4 | 7 |
| BZX84B9V1 | Z64 | 8.92 | 9.1 | 9.28 | 5 | 1 | 0.5 | 6 | 15 | 100 | 5 | 8 |
| BZX84B10 | Z65 | 9.8 | 10 | 10.2 | 5 | 1 | 0.2 | 7 | 20 | 150 | 5 | 8 |
| BZX84B11 | Z66 | 10.8 | 11 | 11.2 | 5 | 1 | 0.1 | 8 | 20 | 150 | 5 | 9 |
| BZX84B12 | Z67 | 11.8 | 12 | 12.2 | 5 | 1 | 0.1 | 8 | 25 | 150 | 6 | 9 |
| BZX84B13 | Z68 | 12.7 | 13 | 13.3 | 5 | 1 | 0.1 | 8 | 30 | 170 | 7 | 9 |
| BZX84B15 | Z69 | 14.7 | 15 | 15.3 | 5 | 1 | 0.05 | 10.5 | 30 | 200 | 7 | 9 |
| BZX84B16 | Z70 | 15.7 | 16 | 16.3 | 5 | 1 | 0.05 | 11.2 | 40 | 200 | 8 | 9.5 |
| BZX84B18 | Z71 | 17.6 | 18 | 18.4 | 5 | 1 | 0.05 | 12.6 | 45 | 225 | 8 | 9.5 |
| BZX84B20 | Z72 | 19.6 | 20 | 20.4 | 5 | 1 | 0.05 | 14 | 55 | 225 | 8 | 10 |
| BZX84B22 | Z73 | 21.6 | 22 | 22.4 | 5 | 1 | 0.05 | 15.4 | 55 | 250 | 8 | 10 |
| BZX84B24 | Z74 | 23.5 | 24 | 24.5 | 5 | 1 | 0.05 | 16.8 | 70 | 250 | 8 | 10 |
| BZX84B27 | Z75 | 26.5 | 27 | 27.5 | 2 | 0.5 | 0.05 | 18.9 | 80 | 300 | 8 | 10 |
| BZX84B30 | Z76 | 29.4 | 30 | 30.6 | 2 | 0.5 | 0.05 | 21 | 80 | 300 | 8 | 10 |
| BZX84B33 | Z77 | 32.3 | 33 | 33.7 | 2 | 0.5 | 0.05 | 23.1 | 80 | 325 | 8 | 10 |
| BZX84B36 | Z78 | 35.3 | 36 | 36.7 | 2 | 0.5 | 0.05 | 25.2 | 90 | 350 | 8 | 10 |
| BZX84B39 | Z79 | 38.2 | 39 | 39.8 | 2 | 0.5 | 0.05 | 27.3 | 130 | 350 | 10 | 12 |
| BZX84B43 | Z80 | 42.1 | 43 | 43.9 | 2 | 0.5 | 0.05 | 30.1 | 150 | 375 | 10 | 12 |
| BZX84B47 | Z81 | 46.1 | 47 | 47.9 | 2 | 0.5 | 0.05 | 32.9 | 170 | 375 | 10 | 12 |
| BZX84B51 | Z82 | 50 | 51 | 52 | 2 | 0.5 | 0.05 | 35.7 | 180 | 400 | 10 | 12 |
| BZX84B56 | Z83 | 54.9 | 56 | 57.1 | 2 | 0.5 | 0.05 | 39.2 | 200 | 425 | 9 | 11 |
| BZX84B62 | Z84 | 60.8 | 62 | 63.2 | 2 | 0.5 | 0.05 | 43.4 | 215 | 450 | 9 | 12 |
| BZX84B68 | Z85 | 66.6 | 68 | 69.4 | 2 | 0.5 | 0.05 | 47.6 | 240 | 475 | 10 | 12 |
| BZX84B75 | Z86 | 73.5 | 75 | 76.5 | 2 | 0.5 | 0.05 | 52.5 | 255 | 500 | 10 | 12 |

TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

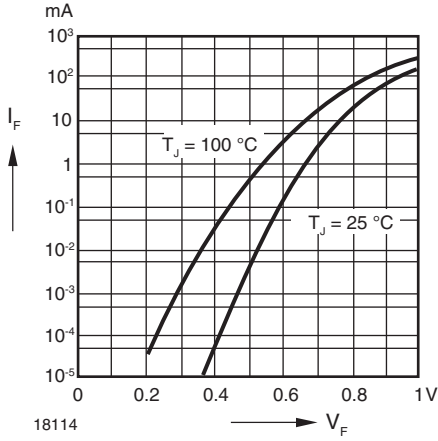


Fig. 1 - Forward Characteristics

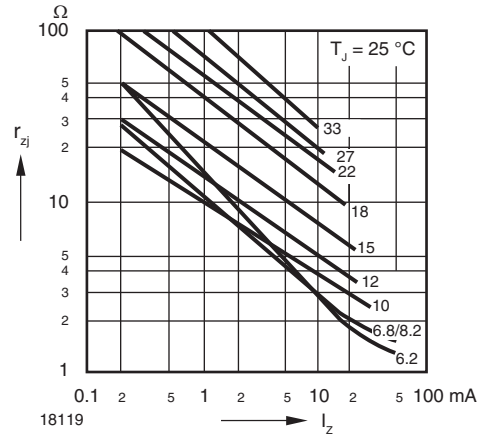


Fig. 4 - Dynamic Resistance vs. Zener Current

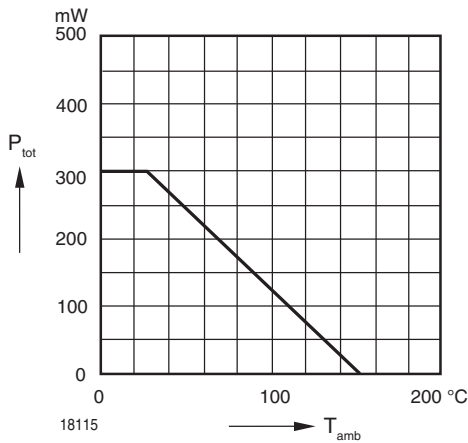


Fig. 2 - Admissible Power Dissipation vs. Ambient Temperature

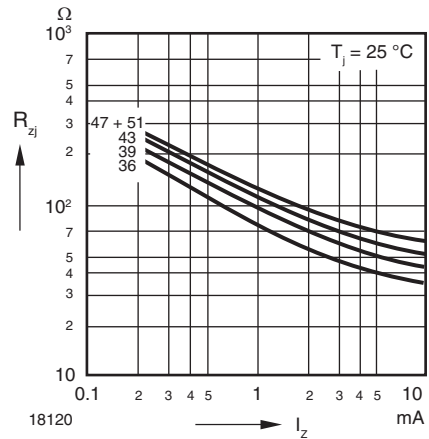


Fig. 5 - Dynamic Resistance vs. Zener Current

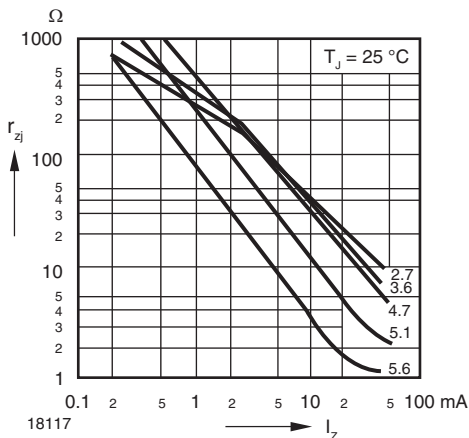


Fig. 3 - Dynamic Resistance vs. Zener Current



Fig. 6 - Thermal Differential Resistance vs. Zener Voltage



Fig. 7 - Dynamic Resistance vs. Zener Voltage

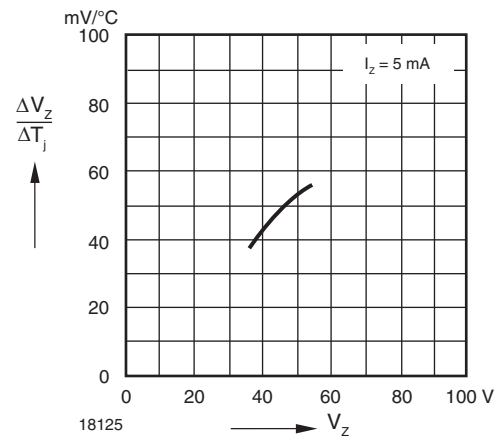


Fig. 10 - Temperature Dependence of Zener Voltage vs. Zener Voltage

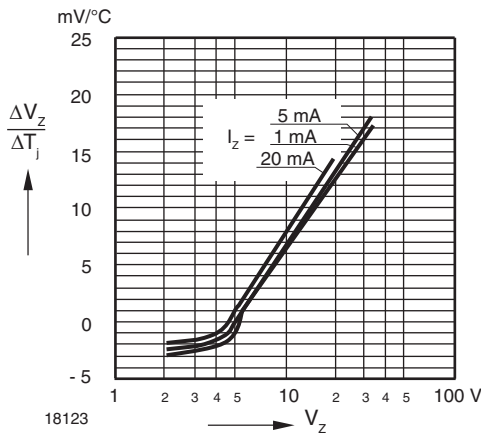


Fig. 8 - Temperature Dependence of Zener Voltage vs. Zener Voltage

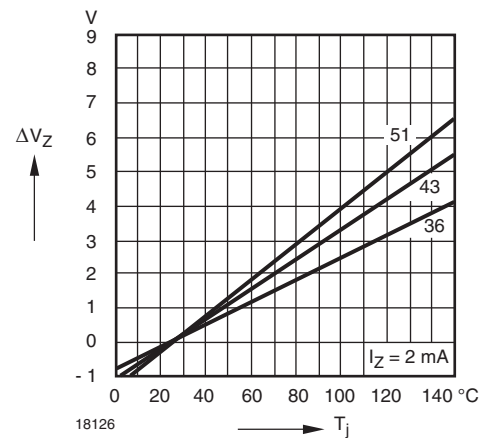


Fig. 11 - Change of Zener Voltage vs. Junction Temperature

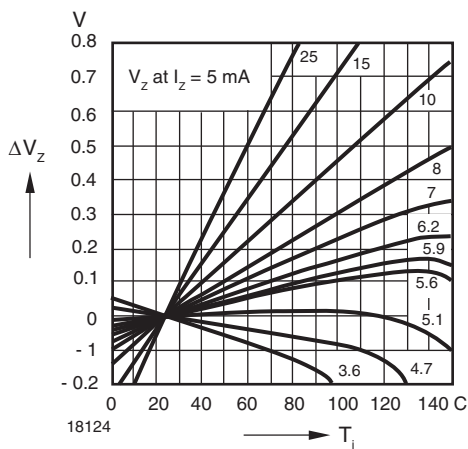


Fig. 9 - Change of Zener Voltage vs. Junction Temperature

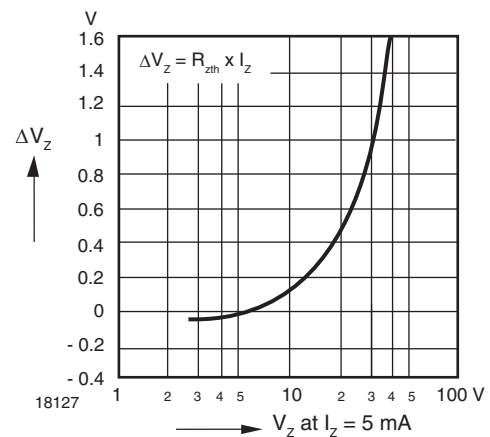


Fig. 12 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage

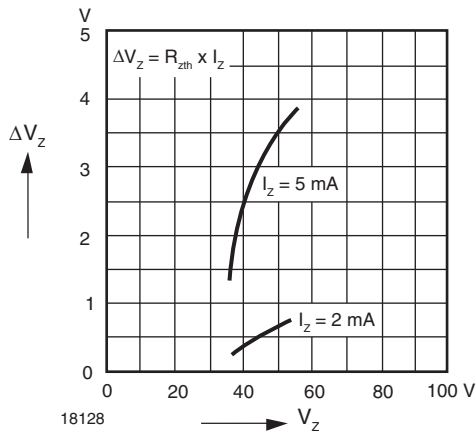


Fig. 13 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage



Fig. 15 - Breakdown Characteristics

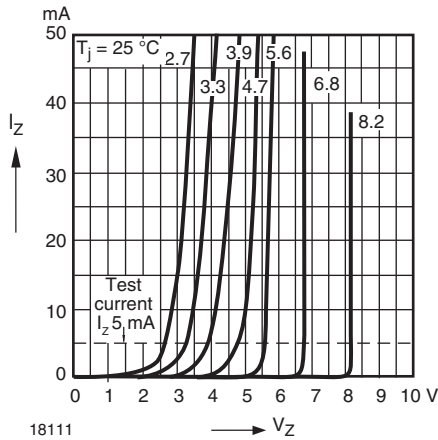


Fig. 14 - Breakdown Characteristics

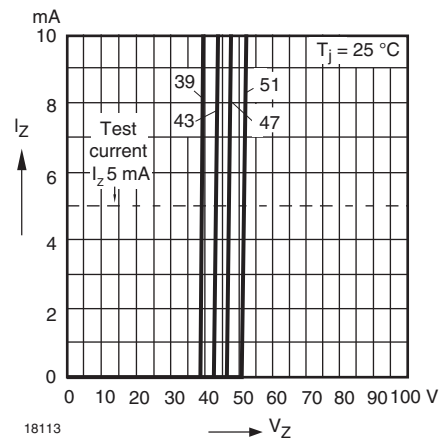
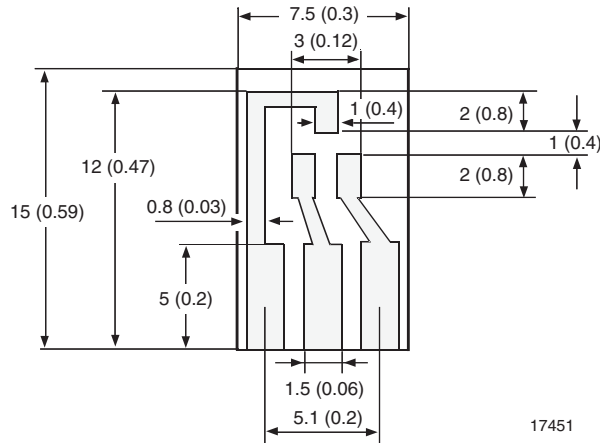


Fig. 16 - Breakdown Characteristics

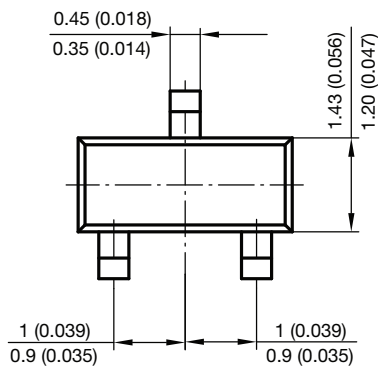
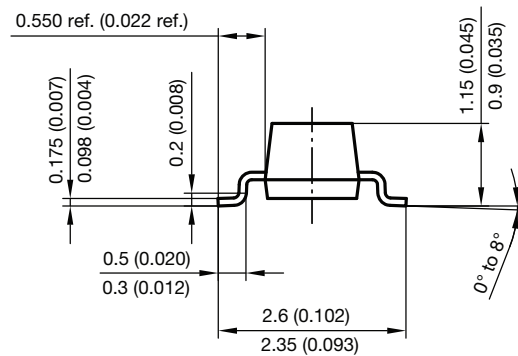
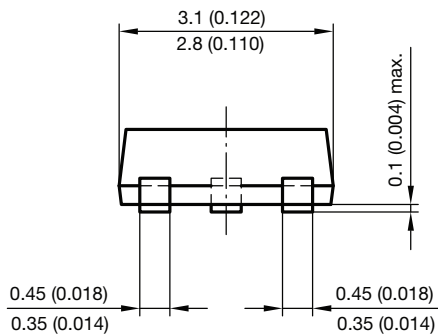


LAYOUT FOR R_{thJA} TEST

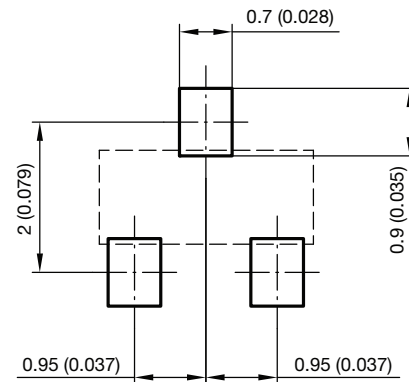
Thickness: fiberglass 0.059" (1.5 mm)
Copper leads 0.012" (0.3 mm)



PACKAGE DIMENSIONS in millimeters (inches): SOT-23



Foot print recommendation:



Document no.: 6.541-5014.01-4
Rev. 8 - Date: 23. Sep. 2009
17418



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