

Zener Diodes



FEATURES

- Silicon planar power Zener diodes
- For use in stabilizing and clipping circuits with high power rating
- The Zener voltages are graded according to the international E 24 standard; replace suffix “C” with “B” for $\pm 2\%$ tolerance
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

LINKS TO ADDITIONAL RESOURCES



APPLICATIONS

- Voltage stabilization

| PRIMARY CHARACTERISTICS | | |
|-------------------------|---------------|------|
| PARAMETER | VALUE | UNIT |
| V_Z range nom. | 3.3 to 75 | V |
| Test current I_{ZT} | 4 to 80 | mA |
| V_Z specification | Pulse current | |
| Circuit configuration | Single | |

| ORDERING INFORMATION | | | |
|----------------------|------------------|----------------------------------|------------------------|
| DEVICE NAME | ORDERING CODE | TAPED UNITS PER REEL | MINIMUM ORDER QUANTITY |
| BZX85-series | BZX85-series-TR | 5000 (52 mm tape on 14" reel) | 25 000/box |
| BZX85-series | BZX85-series-TAP | 5000 per ammpack (52 mm tape) | 25 000/box |

| PACKAGE | | | | |
|------------------|-------------------|---|--------------------------------------|------------------------------|
| PACKAGE NAME | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL | SOLDERING CONDITIONS |
| DO-41 (DO-204AL) | approx. 310 mg | UL 94 V-0 | MSL level 1 (according J-STD-020) | Peak temperature max. 260 °C |

| ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ °C}$, unless otherwise specified) | | | | |
|---|---|------------|-------------|------|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| Power dissipation | Valid provided that leads at a distance of 4 mm from case are kept at ambient temperature $t_p = 10\text{ ms}$ | P_{tot} | 1300 | mW |
| Zener current | See Table “Electrical characteristics” | | | |
| Junction to ambient air | Valid provided that leads at a distance of 4 mm from case are kept at ambient temperature $t_p = 10\text{ ms}$ | R_{thJA} | 110 | K/W |
| Junction temperature | | T_j | 175 | °C |
| Storage temperature range | | T_{stg} | -55 to +175 | °C |



| ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | | | | | | | |
|--|------------------------------------|------|------|--------------|-----------|-------------------------|-----|-----------------------------------|-----------------------|--|--------|---|
| PART NUMBER | ZENER VOLTAGE RANGE ⁽¹⁾ | | | TEST CURRENT | | REVERSE LAEKAGE CURRENT | | DYNAMIC RESISTANCE ⁽³⁾ | | TEMPERATURE COEFFICIENT OF ZENER VOLTAGE | | ADMISSIBLE ZENER CURRENT ⁽²⁾ |
| | 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} | | I_Z |
| | V | | | mA | | μA | V | Ω | | %/°C | | mA |
| | MIN. | NOM. | MAX. | | | | | MAX. | MAX. | MIN. | MAX. | |
| BZX85C3V3 | 3.1 | 3.3 | 3.5 | 80 | 1 | < 40 | 1 | < 20 | < 400 | - 0.08 | - 0.05 | 300 |
| BZX85C3V6 | 3.4 | 3.6 | 3.8 | 60 | 1 | < 20 | 1 | < 20 | < 500 | - 0.08 | - 0.05 | 290 |
| BZX85C3V9 | 3.7 | 3.9 | 4.1 | 60 | 1 | < 10 | 1 | < 15 | < 500 | - 0.07 | - 0.02 | 280 |
| BZX85C4V3 | 4 | 4.3 | 4.6 | 50 | 1 | < 3 | 1 | < 13 | < 500 | - 0.05 | 0.01 | 250 |
| BZX85C4V7 | 4.4 | 4.7 | 5 | 45 | 1 | < 3 | 1 | < 13 | < 600 | - 0.03 | 0.04 | 215 |
| BZX85C5V1 | 4.8 | 5.1 | 5.4 | 45 | 1 | < 1 | 1.5 | < 10 | < 500 | - 0.01 | 0.04 | 200 |
| BZX85C5V6 | 5.2 | 5.6 | 6 | 45 | 1 | < 1 | 2 | < 7 | < 400 | 0 | 0.045 | 190 |
| BZX85C6V2 | 5.8 | 6.2 | 6.6 | 35 | 1 | < 1 | 3 | < 4 | < 300 | 0.01 | 0.055 | 170 |
| BZX85C6V8 | 6.4 | 6.8 | 7.2 | 35 | 1 | < 1 | 4 | < 3.5 | < 300 | 0.015 | 0.06 | 155 |
| BZX85C7V5 | 7 | 7.5 | 7.9 | 35 | 0.5 | < 1 | 4.5 | < 3 | < 200 | 0.02 | 0.065 | 140 |
| BZX85C8V2 | 7.7 | 8.2 | 8.7 | 25 | 0.5 | < 1 | 6.2 | < 5 | < 200 | 0.03 | 0.07 | 130 |
| BZX85C9V1 | 8.5 | 9.1 | 9.6 | 25 | 0.5 | < 1 | 6.8 | < 5 | < 200 | 0.035 | 0.075 | 120 |
| BZX85C10 | 9.4 | 10 | 10.6 | 25 | 0.5 | < 0.5 | 7.5 | < 7 | < 200 | 0.04 | 0.08 | 105 |
| BZX85C11 | 10.4 | 11 | 11.6 | 20 | 0.5 | < 0.5 | 8.2 | < 8 | < 300 | 0.045 | 0.08 | 97 |
| BZX85C12 | 11.4 | 12 | 12.7 | 20 | 0.5 | < 0.5 | 9.1 | < 9 | < 350 | 0.045 | 0.085 | 88 |
| BZX85C13 | 12.4 | 13 | 14.1 | 20 | 0.5 | < 0.5 | 10 | < 10 | < 400 | 0.05 | 0.085 | 79 |
| BZX85C15 | 13.8 | 15 | 15.6 | 15 | 0.5 | < 0.5 | 11 | < 15 | < 500 | 0.055 | 0.09 | 71 |
| BZX85C16 | 15.3 | 16 | 17.1 | 15 | 0.5 | < 0.5 | 12 | < 15 | < 500 | 0.055 | 0.09 | 66 |
| BZX85C18 | 16.8 | 18 | 19.1 | 15 | 0.5 | < 0.5 | 13 | < 20 | < 500 | 0.06 | 0.09 | 62 |
| BZX85C20 | 18.8 | 20 | 21.2 | 10 | 0.5 | < 0.5 | 15 | < 24 | < 600 | 0.06 | 0.09 | 56 |
| BZX85C22 | 20.8 | 22 | 23.3 | 10 | 0.5 | < 0.5 | 16 | < 25 | < 600 | 0.06 | 0.095 | 52 |
| BZX85C24 | 22.8 | 24 | 25.6 | 10 | 0.5 | < 0.5 | 18 | < 25 | < 600 | 0.06 | 0.095 | 47 |
| BZX85C27 | 25.1 | 27 | 28.9 | 8 | 0.25 | < 0.5 | 20 | < 30 | < 750 | 0.06 | 0.095 | 41 |
| BZX85C30 | 28 | 30 | 32 | 8 | 0.25 | < 0.5 | 22 | < 30 | < 1000 | 0.06 | 0.095 | 36 |
| BZX85C33 | 31 | 33 | 35 | 8 | 0.25 | < 0.5 | 24 | < 35 | < 1000 | 0.06 | 0.095 | 33 |
| BZX85C36 | 34 | 36 | 38 | 8 | 0.25 | < 0.5 | 27 | < 40 | < 1000 | 0.06 | 0.095 | 30 |
| BZX85C39 | 37 | 39 | 41 | 6 | 0.25 | < 0.5 | 30 | < 50 | < 1000 | 0.06 | 0.095 | 28 |
| BZX85C43 | 40 | 43 | 46 | 6 | 0.25 | < 0.5 | 33 | < 50 | < 1000 | 0.06 | 0.095 | 26 |
| BZX85C47 | 44 | 47 | 50 | 4 | 0.25 | < 0.5 | 36 | < 90 | < 1500 | 0.06 | 0.095 | 23 |
| BZX85C51 | 48 | 51 | 54 | 4 | 0.25 | < 0.5 | 39 | < 115 | < 1500 | 0.06 | 0.095 | 21 |
| BZX85C56 | 52 | 56 | 60 | 4 | 0.25 | < 0.5 | 43 | < 120 | < 2000 | 0.06 | 0.095 | 19 |
| BZX85C62 | 58 | 62 | 66 | 4 | 0.25 | < 0.5 | 47 | < 125 | < 2000 | 0.06 | 0.095 | 16 |
| BZX85C68 | 64 | 68 | 72 | 4 | 0.25 | < 0.5 | 51 | < 130 | < 2000 | 0.055 | 0.095 | 15 |
| BZX85C75 | 70 | 75 | 80 | 4 | 0.25 | < 0.5 | 56 | < 135 | < 2000 | 0.055 | 0.095 | 14 |

Notes

- (1) Measured with pulses $t_p = 5\text{ ms}$
- (2) Valid provided that electrodes at a distance of 4 mm from case are kept at ambient temperature, $t_p = 10\text{ ms}$
- (3) Measured with $f = 1\text{ kHz}$



| ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | | | | | | | |
|--|------------------------------------|------|------|--------------|-----------|-------------------------|-----|-----------------------------------|-----------------------|--|--------|---|
| PART NUMBER | ZENER VOLTAGE RANGE ⁽¹⁾ | | | TEST CURRENT | | REVERSE LAEKAGE CURRENT | | DYNAMIC RESISTANCE ⁽³⁾ | | TEMPERATURE COEFFICIENT OF ZENER VOLTAGE | | ADMISSIBLE ZENER CURRENT ⁽²⁾ |
| | 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} | | I_Z |
| | V | | | mA | | μA | V | Ω | | %/°C | | mA |
| | MIN. | NOM. | MAX. | | | | | MAX. | MAX. | MIN. | MAX. | |
| BZX85B3V3 | 3.24 | 3.3 | 3.36 | 80 | 1 | < 40 | 1 | < 20 | < 400 | - 0.08 | - 0.05 | 300 |
| BZX85B3V6 | 3.53 | 3.6 | 3.67 | 60 | 1 | < 20 | 1 | < 20 | < 500 | - 0.08 | - 0.05 | 290 |
| BZX85B3V9 | 3.82 | 3.9 | 3.98 | 60 | 1 | < 10 | 1 | < 15 | < 500 | - 0.07 | - 0.02 | 280 |
| BZX85B4V3 | 4.21 | 4.3 | 4.39 | 50 | 1 | < 3 | 1 | < 13 | < 500 | - 0.05 | 0.01 | 250 |
| BZX85B4V7 | 4.61 | 4.7 | 4.79 | 45 | 1 | < 3 | 1 | < 13 | < 600 | - 0.03 | 0.04 | 215 |
| BZX85B5V1 | 5 | 5.1 | 5.2 | 45 | 1 | < 1 | 1.5 | < 10 | < 500 | - 0.01 | 0.04 | 200 |
| BZX85B5V6 | 5.49 | 5.6 | 5.71 | 45 | 1 | < 1 | 2 | < 7 | < 400 | 0 | 0.045 | 190 |
| BZX85B6V2 | 6.08 | 6.2 | 6.32 | 35 | 1 | < 1 | 3 | < 4 | < 300 | 0.01 | 0.055 | 170 |
| BZX85B6V8 | 6.66 | 6.8 | 6.94 | 35 | 1 | < 1 | 4 | < 3.5 | < 300 | 0.015 | 0.06 | 155 |
| BZX85B7V5 | 7.35 | 7.5 | 7.65 | 35 | 0.5 | < 1 | 4.5 | < 3 | < 200 | 0.02 | 0.065 | 140 |
| BZX85B8V2 | 8.04 | 8.2 | 8.36 | 25 | 0.5 | < 1 | 6.2 | < 5 | < 200 | 0.03 | 0.07 | 130 |
| BZX85B9V1 | 8.92 | 9.1 | 9.28 | 25 | 0.5 | < 1 | 6.8 | < 5 | < 200 | 0.035 | 0.075 | 120 |
| BZX85B10 | 9.8 | 10 | 10.2 | 25 | 0.5 | < 0.5 | 7.5 | < 7 | < 200 | 0.04 | 0.08 | 105 |
| BZX85B11 | 10.8 | 11 | 11.2 | 20 | 0.5 | < 0.5 | 8.2 | < 8 | < 300 | 0.045 | 0.08 | 97 |
| BZX85B12 | 11.8 | 12 | 12.2 | 20 | 0.5 | < 0.5 | 9.1 | < 9 | < 350 | 0.045 | 0.085 | 88 |
| BZX85B13 | 12.7 | 13 | 13.3 | 20 | 0.5 | < 0.5 | 10 | < 10 | < 400 | 0.05 | 0.085 | 79 |
| BZX85B15 | 14.7 | 15 | 15.3 | 15 | 0.5 | < 0.5 | 11 | < 15 | < 500 | 0.055 | 0.09 | 71 |
| BZX85B16 | 15.7 | 16 | 16.3 | 15 | 0.5 | < 0.5 | 12 | < 15 | < 500 | 0.055 | 0.09 | 66 |
| BZX85B18 | 17.6 | 18 | 18.4 | 15 | 0.5 | < 0.5 | 13 | < 20 | < 500 | 0.06 | 0.09 | 62 |
| BZX85B20 | 19.6 | 20 | 20.4 | 10 | 0.5 | < 0.5 | 15 | < 24 | < 600 | 0.06 | 0.09 | 56 |
| BZX85B22 | 21.6 | 22 | 22.4 | 10 | 0.5 | < 0.5 | 16 | < 25 | < 600 | 0.06 | 0.095 | 52 |
| BZX85B24 | 23.5 | 24 | 24.5 | 10 | 0.5 | < 0.5 | 18 | < 25 | < 600 | 0.06 | 0.095 | 47 |
| BZX85B27 | 26.5 | 27 | 27.5 | 8 | 0.25 | < 0.5 | 20 | < 30 | < 750 | 0.06 | 0.095 | 41 |
| BZX85B30 | 29.4 | 30 | 30.6 | 8 | 0.25 | < 0.5 | 22 | < 30 | < 1000 | 0.06 | 0.095 | 36 |
| BZX85B33 | 32.3 | 33 | 33.7 | 8 | 0.25 | < 0.5 | 24 | < 35 | < 1000 | 0.06 | 0.095 | 33 |
| BZX85B36 | 35.3 | 36 | 36.7 | 8 | 0.25 | < 0.5 | 27 | < 40 | < 1000 | 0.06 | 0.095 | 30 |
| BZX85B39 | 38.2 | 39 | 39.8 | 6 | 0.25 | < 0.5 | 30 | < 50 | < 1000 | 0.06 | 0.095 | 28 |
| BZX85B43 | 42.1 | 43 | 43.9 | 6 | 0.25 | < 0.5 | 33 | < 50 | < 1000 | 0.06 | 0.095 | 26 |
| BZX85B47 | 46.1 | 47 | 47.9 | 4 | 0.25 | < 0.5 | 36 | < 90 | < 1500 | 0.06 | 0.095 | 23 |
| BZX85B51 | 50 | 51 | 52 | 4 | 0.25 | < 0.5 | 39 | < 115 | < 1500 | 0.06 | 0.095 | 21 |
| BZX85B56 | 54.9 | 56 | 57.1 | 4 | 0.25 | < 0.5 | 43 | < 120 | < 2000 | 0.06 | 0.095 | 19 |
| BZX85B62 | 60.8 | 62 | 63.2 | 4 | 0.25 | < 0.5 | 47 | < 125 | < 2000 | 0.06 | 0.095 | 16 |
| BZX85B68 | 66.6 | 68 | 69.4 | 4 | 0.25 | < 0.5 | 51 | < 130 | < 2000 | 0.055 | 0.095 | 15 |
| BZX85B75 | 73.5 | 75 | 76.5 | 4 | 0.25 | < 0.5 | 56 | < 135 | < 2000 | 0.055 | 0.095 | 14 |

Notes

- (1) Measured with pulses $t_p = 5\text{ ms}$
- (2) Valid provided that electrodes at a distance of 4 mm from case are kept at ambient temperature, $t_p = 10\text{ ms}$
- (3) Measured with $f = 1\text{ kHz}$

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

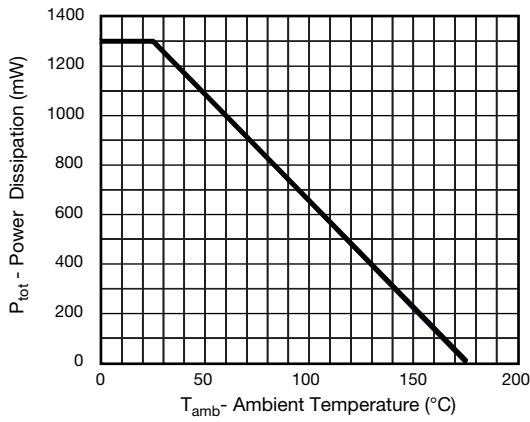


Fig. 1 - Admissible Power Dissipation vs. Ambient Temperature
 $P_{tot} = f(T_{amb})$

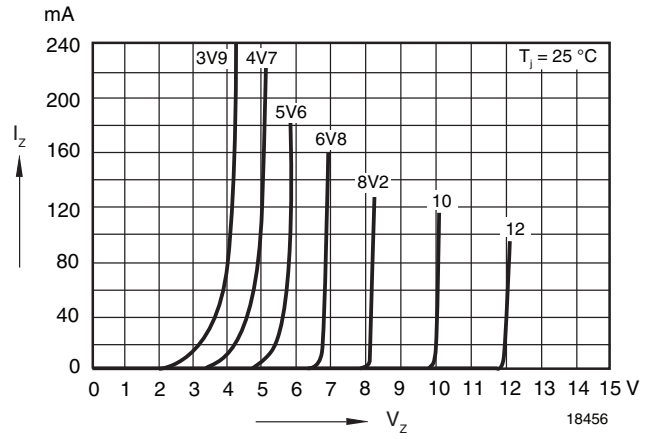


Fig. 3 - Typical Breakdown Characteristics

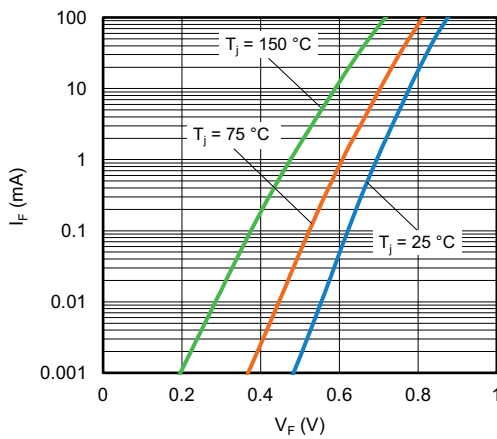


Fig. 2 - Typical Forward Current I_F vs. Forward Voltage V_F

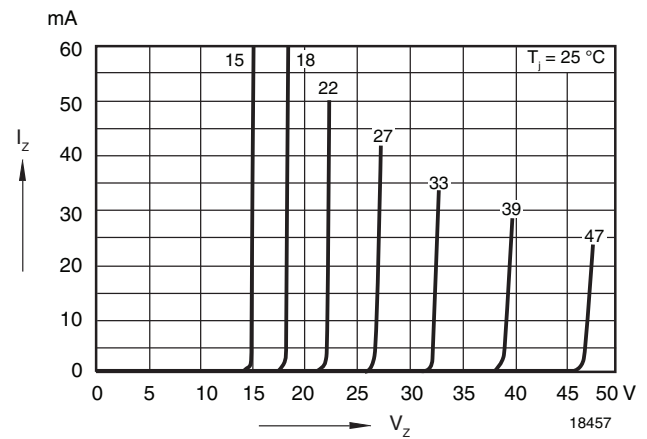
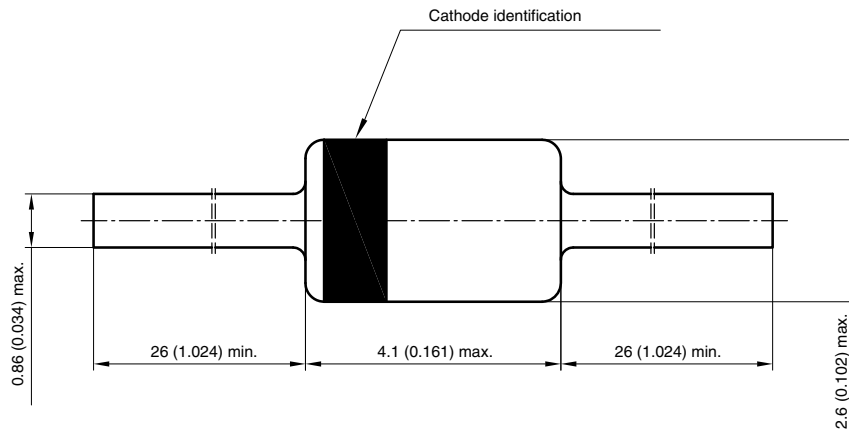


Fig. 4 - Typical Breakdown Characteristics

PACKAGE DIMENSIONS in millimeters (inches): **DO-41 (DO-204AL)**



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