



# 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
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

| PRIMARY CHARACTERISTICS      |               |      |
|------------------------------|---------------|------|
| PARAMETER                    | VALUE         | UNIT |
| V <sub>Z</sub> range nom.    | 2.7 to 100    | V    |
| Test current I <sub>ZT</sub> | 2.7 to 80     | mA   |
| V <sub>Z</sub> specification | Pulse current |      |
| Int. construction            | Single        |      |

### APPLICATIONS

- Voltage stabilization

| ORDERING INFORMATION |                  |                               |                        |
|----------------------|------------------|-------------------------------|------------------------|
| DEVICE NAME          | ORDERING CODE    | TAPED UNITS PER REEL          | MINIMUM ORDER QUANTITY |
| BZX85-series         | BZX85-series-TR  | 5000 (52 mm tape on 13" 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        | 310 mg | UL 94 V-0                            | MSL level 1 (according J-STD-020) | 260 °C/10 s at terminals |

| ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °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 | P <sub>tot</sub>  | 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 | R <sub>thJA</sub> | 110         | K/W  |
| Junction temperature  |   | T <sub>j</sub>    | 175         | °C   |
| Storage temperature range   |   | T <sub>stg</sub>  | -55 to +175 | °C   |



ELECTRICAL CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

Table with columns: PART NUMBER, ZENER VOLTAGE RANGE (1), TEST CURRENT, REVERSE LAEKAGE CURRENT, DYNAMIC RESISTANCE (3), TEMPERATURE COEFFICIENT OF ZENER VOLTAGE, ADMISSIBLE ZENER CURRENT (2). Rows list various part numbers from BZX85C2V7 to BZX85C100 with their respective electrical characteristics.

Notes

- (1) Measured with pulses t<sub>p</sub> = 5 ms
(2) Valid provided that leads are kept at ambient temperature at a distance of 10 mm from case
(3) Measured with f = 1 kHz



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                    |      |      |              |           |                         |     |                                   |                       |  |        |   |
|--|------------------------------------|------|------|--------------|-----------|-------------------------|-----|-----------------------------------|-----------------------|--|--------|---|
| PART NUMBER  | ZENER VOLTAGE RANGE <sup>(1)</sup> |      |      | TEST CURRENT |           | REVERSE LAEKAGE CURRENT |     | DYNAMIC RESISTANCE <sup>(3)</sup> |                       | TEMPERATURE COEFFICIENT OF ZENER VOLTAGE |        | ADMISSIBLE ZENER CURRENT <sup>(2)</sup> |
|  | $V_Z$ at $I_{ZT1}$                 |      |      | $I_{ZT1}$    | $I_{ZT2}$ | $I_R$ at $V_R$          |     | $Z_Z$ at $I_{ZT1}$                | $Z_{ZK}$ at $I_{ZT2}$ | $\alpha_{VZ}$ at $I_{ZT1}$               |        | $I_Z$                                   |
|  | V                                  |      |      | mA           |           | $\mu\text{A}$           | V   | $\Omega$                          |                       | %/°C                                     |        | mA                                      |
|  | MIN.                               | NOM. | MAX. |              |           |                         |     | MAX.                              | MAX.                  | MIN.                                     | MAX.   |   |
| BZX85B2V7  | 2.64                               | 2.7  | 2.76 | 80           | 1         | < 150                   | 1   | < 20                              | < 400                 | - 0.08                                   | - 0.05 | 360                                     |
| BZX85B3V0  | 2.94                               | 3    | 3.06 | 80           | 1         | < 100                   | 1   | < 20                              | < 400                 | - 0.08                                   | - 0.05 | 330                                     |
| BZX85B3V3  | 2.24                               | 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                                      |
| BZX85B82   | 80.4                               | 82   | 83.6 | 2.7          | 0.25      | < 0.5                   | 62  | < 200                             | < 3000                | 0.055                                    | 0.095  | 12                                      |
| BZX85B91   | 89.2                               | 91   | 92.8 | 2.7          | 0.25      | < 0.5                   | 68  | < 250                             | < 3000                | 0.055                                    | 0.095  | 10                                      |
| BZX85B100  | 98                                 | 100  | 102  | 2.7          | 0.25      | < 0.5                   | 75  | < 350                             | < 3000                | 0.055                                    | 0.095  | 9.4                                     |

**Notes**

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

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



Fig. 1 - Pulse Thermal Resistance vs. Pulse Duration

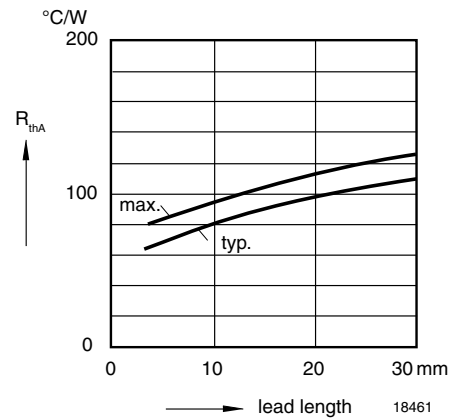


Fig. 4 - Thermal Resistance vs. Lead Length

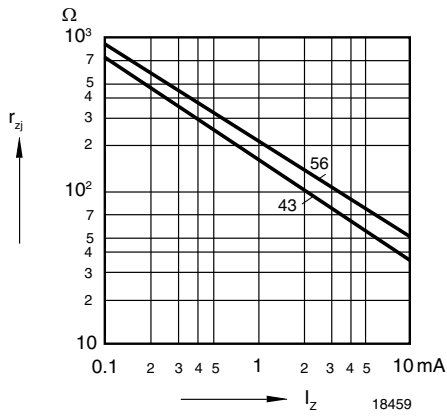


Fig. 2 - Dynamic Resistance vs. Zener Current

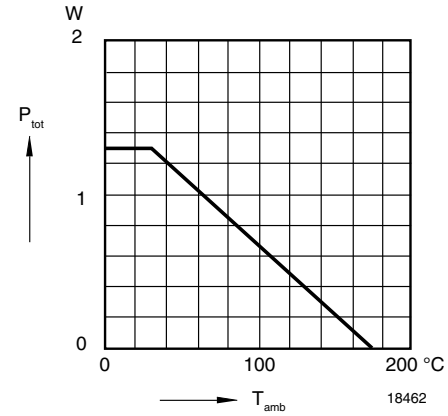


Fig. 5 - Admissible Power Dissipation vs. Ambient Temperature

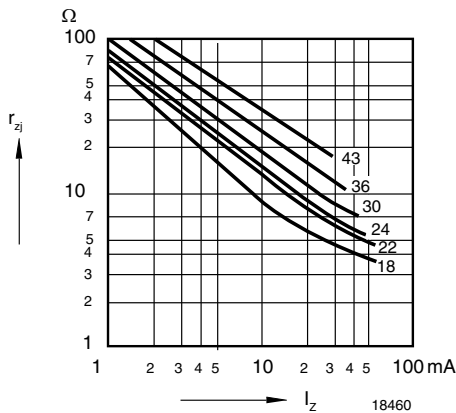


Fig. 3 - Dynamic Resistance vs. Zener Current

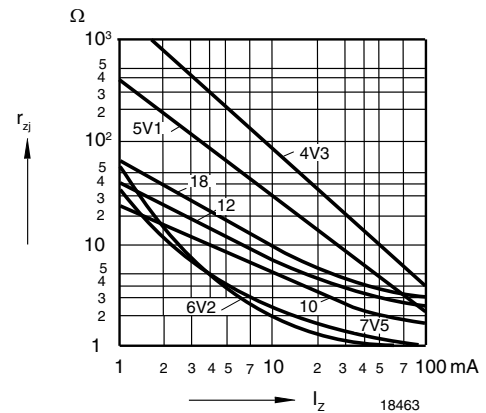


Fig. 6 - Dynamic Resistance vs. Zener Current

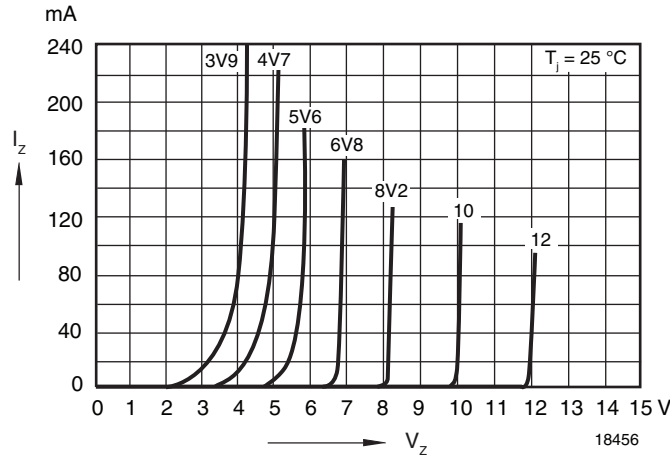


Fig. 7 - Breakdown Characteristics

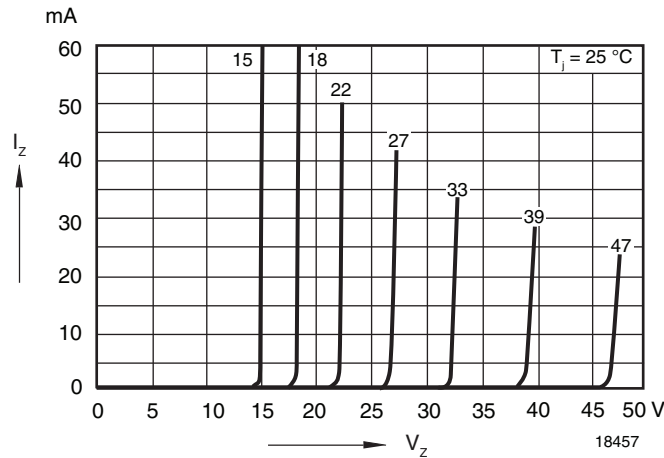


Fig. 8 - Breakdown Characteristics

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



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