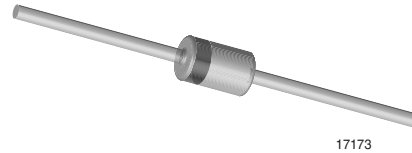


## Zener Diodes

### 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.



### Applications

Voltage stabilization

### Mechanical Data

**Case:** DO-41 Glass case

**Weight:** approx. 310 mg

**Packaging Codes/Options:**

TR / 5 k per 13" reel (52 mm tape), 25 k/box

TAP / 5 k per ammo pack (52 mm tape), 25 k/box

### Absolute Maximum Ratings

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

| Parameter  | Test condition | Symbol    | Value             | Unit |
|--|----------------|-----------|-------------------|------|
| Zener current (see Table "Electrical Characteristics") |                |           |                   |      |
| Power dissipation                                      |                | $P_{tot}$ | 1.3 <sup>1)</sup> | W    |

<sup>1)</sup> Valid provided that leads at a distance of 10 mm from case are kept at ambient temperature

### Thermal Characteristics

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

| Parameter                                  | Test condition | Symbol     | Value             | Unit                        |
|--|----------------|------------|-------------------|-----------------------------|
| Thermal resistance junction to ambient air |                | $R_{thJA}$ | 130 <sup>1)</sup> | $^{\circ}\text{C}/\text{W}$ |
| Junction temperature                       |                | $T_j$      | 175               | $^{\circ}\text{C}$          |
| Storage temperature                        |                | $T_S$      | - 55 to + 175     | $^{\circ}\text{C}$          |

<sup>1)</sup> Valid provided that leads at a distance of 10 mm from case are kept at ambient temperature

## Electrical Characteristics

| Partnumber | Zener Voltage Range <sup>1)</sup> |      | Dynamic Resistance |            |               |            | Temperature Coefficient of Zener Voltage |       | Reverse Leakage Current |         | Admissible Zener Current <sup>2)</sup> |
|------------|-----------------------------------|------|--------------------|------------|---------------|------------|--|-------|-------------------------|---------|--|
|            | $V_Z @ I_{ZT}$                    |      | $r_{ZT}^{3)}$      | @ $I_{ZT}$ | $r_{ZK}^{3)}$ | @ $I_{ZK}$ | $\alpha_{VZ} @ I_Z = I_{ZT}$             |       | @ $I_R$                 | @ $V_R$ | $I_Z$                                  |
|            | V                                 |      | $\Omega$           | mA         | $\Omega$      | mA         | %/ $^{\circ}C$                           |       | $\mu A$                 | V       | mA                                     |
|            | min                               | max  |                    |            |               |            | min                                      | max   |                         |         |  |
| BZX85C2V7  | 2.5                               | 2.9  | < 20               | 80         | < 400         | 1          | -0.08                                    | -0.05 | < 150                   | 1       | 360                                    |
| BZX85C3V0  | 2.8                               | 3.2  | < 20               | 80         | < 400         | 1          | -0.08                                    | -0.05 | < 100                   | 1       | 330                                    |
| BZX85C3V3  | 3.1                               | 3.5  | < 20               | 80         | < 400         | 1          | -0.08                                    | -0.05 | < 40                    | 1       | 300                                    |
| BZX85C3V6  | 3.4                               | 3.8  | < 20               | 60         | < 500         | 1          | -0.08                                    | -0.05 | < 20                    | 1       | 290                                    |
| BZX85C3V9  | 3.7                               | 4.1  | < 15               | 60         | < 500         | 1          | -0.07                                    | -0.02 | < 10                    | 1       | 280                                    |
| BZX85C4V3  | 4                                 | 4.6  | < 13               | 50         | < 500         | 1          | -0.05                                    | 0.01  | < 3                     | 1       | 250                                    |
| BZX85C4V7  | 4.4                               | 5    | < 13               | 45         | < 600         | 1          | -0.03                                    | 0.04  | < 3                     | 1       | 215                                    |
| BZX85C5V1  | 4.8                               | 5.4  | < 10               | 45         | < 500         | 1          | -0.01                                    | 0.04  | < 1                     | 1.5     | 200                                    |
| BZX85C5V6  | 5.2                               | 6    | < 7                | 45         | < 400         | 1          | 0  | 0.045 | < 1                     | 2       | 190                                    |
| BZX85C6V2  | 5.8                               | 6.6  | < 4                | 35         | < 300         | 1          | 0.01                                     | 0.055 | < 1                     | 3       | 170                                    |
| BZX85C6V8  | 6.4                               | 7.2  | < 3.5              | 35         | < 300         | 1          | 0.015                                    | 0.06  | < 1                     | 4       | 155                                    |
| BZX85C7V5  | 7                                 | 7.9  | < 3                | 35         | < 200         | 0.5        | 0.02                                     | 0.065 | < 1                     | 4.5     | 140                                    |
| BZX85C8V2  | 7.7                               | 8.7  | < 5                | 25         | < 200         | 0.5        | 0.03                                     | 0.07  | < 1                     | 6.2     | 130                                    |
| BZX85C9V1  | 8.5                               | 9.6  | < 5                | 25         | < 200         | 0.5        | 0.035                                    | 0.075 | < 1                     | 6.8     | 120                                    |
| BZX85C10   | 9.4                               | 10.6 | < 7                | 25         | < 200         | 0.5        | 0.04                                     | 0.08  | < 0.5                   | 7.5     | 105                                    |
| BZX85C11   | 10.4                              | 11.6 | < 8                | 20         | < 300         | 0.5        | 0.045                                    | 0.08  | < 0.5                   | 8.2     | 97                                     |
| BZX85C12   | 11.4                              | 12.7 | < 9                | 20         | < 350         | 0.5        | 0.045                                    | 0.085 | < 0.5                   | 9.1     | 88                                     |
| BZX85C13   | 12.4                              | 14.1 | < 10               | 20         | < 400         | 0.5        | 0.05                                     | 0.085 | < 0.5                   | 10      | 79                                     |
| BZX85C15   | 13.8                              | 15.6 | < 15               | 15         | < 500         | 0.5        | 0.055                                    | 0.09  | < 0.5                   | 11      | 71                                     |
| BZX85C16   | 15.3                              | 17.1 | < 15               | 15         | < 500         | 0.5        | 0.055                                    | 0.09  | < 0.5                   | 12      | 66                                     |
| BZX85C18   | 16.8                              | 19.1 | < 20               | 15         | < 500         | 0.5        | 0.06                                     | 0.09  | < 0.5                   | 13      | 62                                     |
| BZX85C20   | 18.8                              | 21.2 | < 24               | 10         | < 600         | 0.5        | 0.06                                     | 0.09  | < 0.5                   | 15      | 56                                     |
| BZX85C22   | 20.8                              | 23.3 | < 25               | 10         | < 600         | 0.5        | 0.06                                     | 0.095 | < 0.5                   | 16      | 52                                     |
| BZX85C24   | 22.8                              | 25.6 | < 25               | 10         | < 600         | 0.5        | 0.06                                     | 0.095 | < 0.5                   | 18      | 47                                     |
| BZX85C27   | 25.1                              | 28.9 | < 30               | 8          | < 750         | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 20      | 41                                     |
| BZX85C30   | 28                                | 32   | < 30               | 8          | < 1000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 22      | 36                                     |
| BZX85C33   | 31                                | 35   | < 35               | 8          | < 1000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 24      | 33                                     |
| BZX85C36   | 34                                | 38   | < 40               | 8          | < 1000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 27      | 30                                     |
| BZX85C39   | 37                                | 41   | < 50               | 6          | < 1000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 30      | 28                                     |
| BZX85C43   | 40                                | 46   | < 50               | 6          | < 1000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 33      | 26                                     |
| BZX85C47   | 44                                | 50   | < 90               | 4          | < 1500        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 36      | 23                                     |
| BZX85C51   | 48                                | 54   | < 115              | 4          | < 1500        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 39      | 21                                     |
| BZX85C56   | 52                                | 60   | < 120              | 4          | < 2000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 43      | 19                                     |
| BZX85C62   | 58                                | 66   | < 125              | 4          | < 2000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 47      | 16                                     |
| BZX85C68   | 64                                | 72   | < 130              | 4          | < 2000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 51      | 15                                     |
| BZX85C75   | 70                                | 80   | < 135              | 4          | < 2000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 56      | 14                                     |
| BZX85C82   | 77                                | 87   | < 200              | 2.7        | < 3000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 62      | 12                                     |
| BZX85C91   | 85                                | 96   | < 250              | 2.7        | < 3000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 68      | 10                                     |
| BZX85C100  | 96                                | 106  | < 350              | 2.7        | < 3000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 75      | 9.4                                    |
| BZX85C110  | 104                               | 116  | < 450              | 2.7        | < 4000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 82      | 8.6                                    |
| BZX85C120  | 114                               | 127  | < 550              | 2          | < 4500        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 91      | 7.8                                    |
| BZX85C130  | 124                               | 141  | < 700              | 2          | < 5000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 100     | 7                                      |
| BZX85C150  | 138                               | 156  | < 1000             | 2          | < 6000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 110     | 6.4                                    |



| Partnumber | Zener Voltage Range <sup>1)</sup> |     | Dynamic Resistance |            |                |            | Temperature Coefficient of Zener Voltage |         | Reverse Leakage Current |       | Admissible Zener Current <sup>2)</sup> |
|------------|-----------------------------------|-----|--------------------|------------|----------------|------------|--|---------|-------------------------|-------|--|
|            |                                   |     | $r_{ZT}^{(3)}$     | @ $I_{ZT}$ | $r_{ZK}^{(3)}$ | @ $I_{ZK}$ | $\alpha_{VZ}$ @ $I_Z = I_{ZT}$           | @ $I_R$ | @ $V_R$                 | $I_Z$ |  |
|            | min                               | max | $\Omega$           | mA         | $\Omega$       | mA         | %/ $^{\circ}$ C                          |         | $\mu$ A                 | V     | mA                                     |
| BZX85C160  | 153                               | 171 | < 1100             | 1.5        | < 6500         | 0.25       | 0.055                                    | 0.095   | < 0.5                   | 120   | 5.8                                    |
| BZX85C180  | 168                               | 191 | < 1200             | 1.5        | < 7000         | 0.25       | 0.055                                    | 0.095   | < 0.5                   | 130   | 5.2                                    |
| BZX85C200  | 188                               | 212 | < 1500             | 1.5        | < 8000         | 0.25       | 0.055                                    | 0.095   | < 0.5                   | 150   | 4.7                                    |

<sup>1)</sup> Measured with pulses  $t_p = 5$  ms

<sup>2)</sup> Valid provided that leads are kept at ambient temperature at a distance of 10 mm from case

<sup>3)</sup> Measured with  $f = 1$  kHz

## Electrical Characteristics

| Partnumber | Zener Voltage Range <sup>1)</sup> |      | Dynamic Resistance |            |               |            | Temperature Coefficient of Zener Voltage |       | Reverse Leakage Current |         | Admissible Zener Current <sup>2)</sup> |
|------------|-----------------------------------|------|--------------------|------------|---------------|------------|--|-------|-------------------------|---------|--|
|            | $V_Z @ I_{ZT}$                    |      | $r_{ZT}^{3)}$      | @ $I_{ZT}$ | $r_{ZK}^{3)}$ | @ $I_{ZK}$ | $\alpha_{VZ} @ I_Z = I_{ZT}$             |       | @ $I_R$                 | @ $V_R$ | $I_Z$                                  |
|            | V                                 |      | $\Omega$           | mA         | $\Omega$      | mA         | %/ $^{\circ}$ C                          |       | $\mu$ A                 | V       | mA                                     |
|            | min                               | max  |                    |            |               |            | min                                      | max   |                         |         |  |
| BZX85B2V7  | 2.64                              | 2.76 | < 20               | 80         | < 400         | 1          | -0.08                                    | -0.05 | < 150                   | 1       | 360                                    |
| BZX85B3V0  | 2.94                              | 3.06 | < 20               | 80         | < 400         | 1          | -0.08                                    | -0.05 | < 100                   | 1       | 330                                    |
| BZX85B3V3  | 2.24                              | 3.36 | < 20               | 80         | < 400         | 1          | -0.08                                    | -0.05 | < 40                    | 1       | 300                                    |
| BZX85B3V6  | 3.53                              | 3.67 | < 20               | 60         | < 500         | 1          | -0.08                                    | -0.05 | < 20                    | 1       | 290                                    |
| BZX85B3V9  | 3.82                              | 3.98 | < 15               | 60         | < 500         | 1          | -0.07                                    | -0.02 | < 10                    | 1       | 280                                    |
| BZX85B4V3  | 4.21                              | 4.39 | < 13               | 50         | < 500         | 1          | -0.05                                    | 0.01  | < 3                     | 1       | 250                                    |
| BZX85B4V7  | 4.61                              | 4.79 | < 13               | 45         | < 600         | 1          | -0.03                                    | 0.04  | < 3                     | 1       | 215                                    |
| BZX85B5V1  | 5                                 | 5.2  | < 10               | 45         | < 500         | 1          | -0.01                                    | 0.04  | < 1                     | 1.5     | 200                                    |
| BZX85B5V6  | 5.49                              | 5.71 | < 7                | 45         | < 400         | 1          | 0  | 0.045 | < 1                     | 2       | 190                                    |
| BZX85B6V2  | 6.08                              | 6.32 | < 4                | 35         | < 300         | 1          | 0.01                                     | 0.055 | < 1                     | 3       | 170                                    |
| BZX85B6V8  | 6.66                              | 6.94 | < 3.5              | 35         | < 300         | 1          | 0.015                                    | 0.06  | < 1                     | 4       | 155                                    |
| BZX85B7V5  | 7.35                              | 7.65 | < 3                | 35         | < 200         | 0.5        | 0.02                                     | 0.065 | < 1                     | 4.5     | 140                                    |
| BZX85B8V2  | 8.04                              | 8.36 | < 5                | 25         | < 200         | 0.5        | 0.03                                     | 0.07  | < 1                     | 6.2     | 130                                    |
| BZX85B9V1  | 8.92                              | 9.28 | < 5                | 25         | < 200         | 0.5        | 0.035                                    | 0.075 | < 1                     | 6.8     | 120                                    |
| BZX85B10   | 9.8                               | 10.2 | < 7                | 25         | < 200         | 0.5        | 0.04                                     | 0.08  | < 0.5                   | 7.5     | 105                                    |
| BZX85B11   | 10.8                              | 11.2 | < 8                | 20         | < 300         | 0.5        | 0.045                                    | 0.08  | < 0.5                   | 8.2     | 97                                     |
| BZX85B12   | 11.8                              | 12.2 | < 9                | 20         | < 350         | 0.5        | 0.045                                    | 0.085 | < 0.5                   | 9.1     | 88                                     |
| BZX85B13   | 12.7                              | 13.3 | < 10               | 20         | < 400         | 0.5        | 0.05                                     | 0.085 | < 0.5                   | 10      | 79                                     |
| BZX85B15   | 14.7                              | 15.3 | < 15               | 15         | < 500         | 0.5        | 0.055                                    | 0.09  | < 0.5                   | 11      | 71                                     |
| BZX85B16   | 15.7                              | 16.3 | < 15               | 15         | < 500         | 0.5        | 0.055                                    | 0.09  | < 0.5                   | 12      | 66                                     |
| BZX85B18   | 17.6                              | 18.4 | < 20               | 15         | < 500         | 0.5        | 0.06                                     | 0.09  | < 0.5                   | 13      | 62                                     |
| BZX85B20   | 19.6                              | 20.4 | < 24               | 10         | < 600         | 0.5        | 0.06                                     | 0.09  | < 0.5                   | 15      | 56                                     |
| BZX85B22   | 21.6                              | 22.4 | < 25               | 10         | < 600         | 0.5        | 0.06                                     | 0.095 | < 0.5                   | 16      | 52                                     |
| BZX85B24   | 23.5                              | 24.5 | < 25               | 10         | < 600         | 0.5        | 0.06                                     | 0.095 | < 0.5                   | 18      | 47                                     |
| BZX85B27   | 26.5                              | 27.5 | < 30               | 8          | < 750         | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 20      | 41                                     |
| BZX85B30   | 29.4                              | 30.6 | < 30               | 8          | < 1000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 22      | 36                                     |
| BZX85B33   | 32.3                              | 33.7 | < 35               | 8          | < 1000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 24      | 33                                     |
| BZX85B36   | 35.3                              | 36.7 | < 40               | 8          | < 1000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 27      | 30                                     |
| BZX85B39   | 38.2                              | 39.8 | < 50               | 6          | < 1000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 30      | 28                                     |
| BZX85B43   | 42.1                              | 43.9 | < 50               | 6          | < 1000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 33      | 26                                     |
| BZX85B47   | 46.1                              | 47.9 | < 90               | 4          | < 1500        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 36      | 23                                     |
| BZX85B51   | 50                                | 52   | < 115              | 4          | < 1500        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 39      | 21                                     |
| BZX85B56   | 54.9                              | 57.1 | < 120              | 4          | < 2000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 43      | 19                                     |
| BZX85B62   | 60.8                              | 63.2 | < 125              | 4          | < 2000        | 0.25       | 0.06                                     | 0.095 | < 0.5                   | 47      | 16                                     |
| BZX85B68   | 66.6                              | 69.4 | < 130              | 4          | < 2000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 51      | 15                                     |
| BZX85B75   | 73.5                              | 76.5 | < 135              | 4          | < 2000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 56      | 14                                     |
| BZX85B82   | 80.4                              | 83.6 | < 200              | 2.7        | < 3000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 62      | 12                                     |
| BZX85B91   | 89.2                              | 92.8 | < 250              | 2.7        | < 3000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 68      | 10                                     |
| BZX85B100  | 98                                | 102  | < 350              | 2.7        | < 3000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 75      | 9.4                                    |
| BZX85B110  | 108                               | 112  | < 450              | 2.7        | < 4000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 82      | 8.6                                    |
| BZX85B120  | 118                               | 122  | < 550              | 2          | < 4500        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 91      | 7.8                                    |
| BZX85B130  | 127                               | 133  | < 700              | 2          | < 5000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 100     | 7                                      |
| BZX85B150  | 147                               | 153  | < 1000             | 2          | < 6000        | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 110     | 6.4                                    |

| Partnumber | Zener Voltage Range <sup>1)</sup> |     | Dynamic Resistance     |            |                        |            | Temperature Coefficient of Zener Voltage |       | Reverse Leakage Current |         | Admissible Zener Current <sup>2)</sup> |
|------------|-----------------------------------|-----|------------------------|------------|------------------------|------------|--|-------|-------------------------|---------|--|
|            | $V_Z @ I_{ZT}$                    |     | $r_{ZT}$ <sup>3)</sup> | @ $I_{ZT}$ | $r_{ZK}$ <sup>3)</sup> | @ $I_{ZK}$ | $\alpha_{VZ} @ I_Z = I_{ZT}$             |       | @ $I_R$                 | @ $V_R$ | $I_Z$                                  |
|            | V                                 |     | $\Omega$               | mA         | $\Omega$               | mA         | %/°C                                     |       | $\mu A$                 | V       | mA                                     |
|            | min                               | max |                        |            |                        |            | min                                      | max   |                         |         |  |
| BZX85B160  | 157                               | 163 | < 1100                 | 1.5        | < 6500                 | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 120     | 5.8                                    |
| BZX85B180  | 176                               | 184 | < 1200                 | 1.5        | < 7000                 | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 130     | 5.2                                    |
| BZX85B200  | 196                               | 204 | < 1500                 | 1.5        | < 8000                 | 0.25       | 0.055                                    | 0.095 | < 0.5                   | 150     | 4.7                                    |

<sup>1)</sup> Measured with pulses  $t_p = 5$  ms

<sup>2)</sup> Valid provided that leads are kept at ambient temperature at a distance of 10 mm from case

<sup>3)</sup> Measured with  $f = 1$  kHz

### Typical Characteristics ( $T_{amb} = 25$ °C unless otherwise specified)

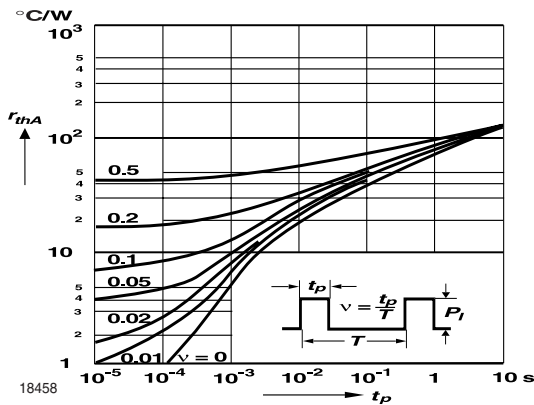


Figure 1. Pulse Thermal Resistance vs. Pulse Duration

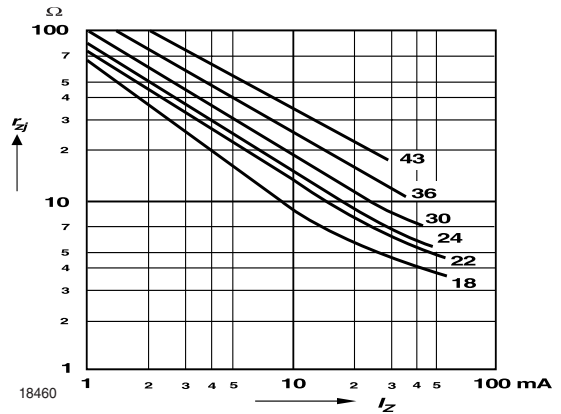


Figure 3. Dynamic Resistance vs. Zener Current

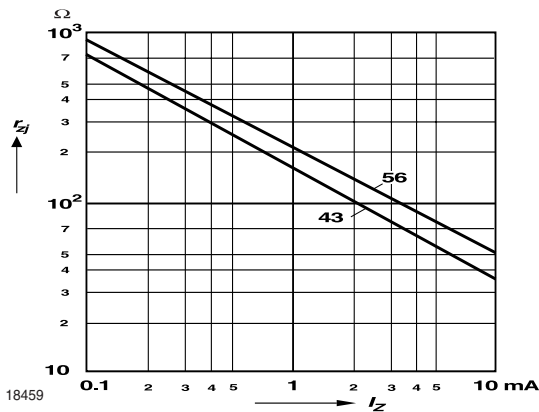


Figure 2. Dynamic Resistance vs. Zener Current

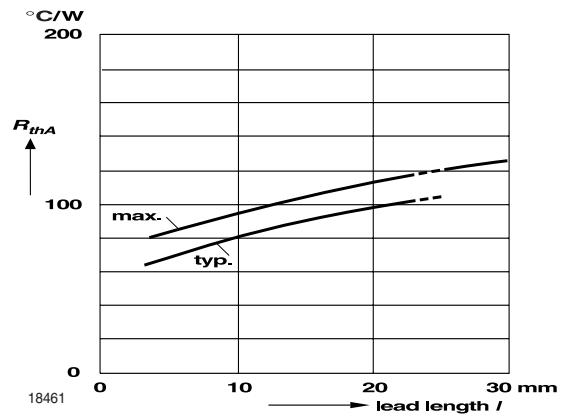


Figure 4. Thermal Resistance vs. Lead Length

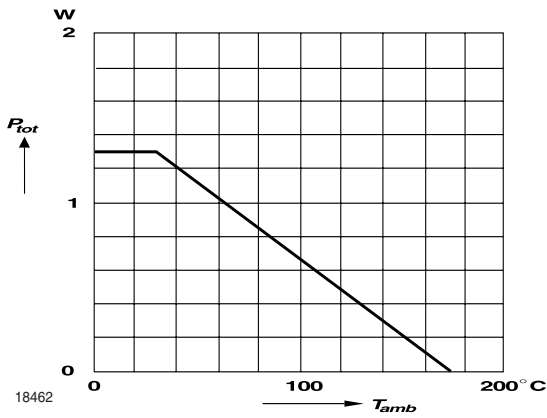


Figure 5. Admissible Power Dissipation vs. Ambient Temperature

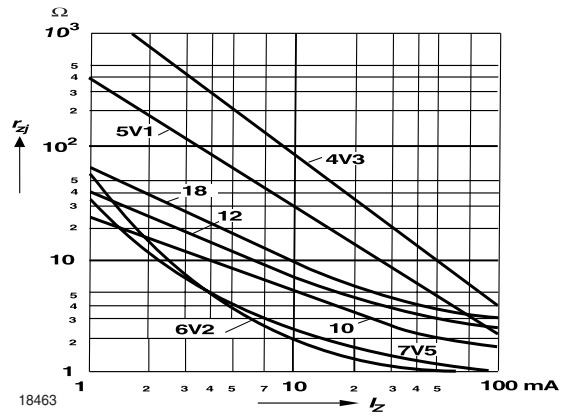


Figure 6. Dynamic Resistance vs. Zener Current

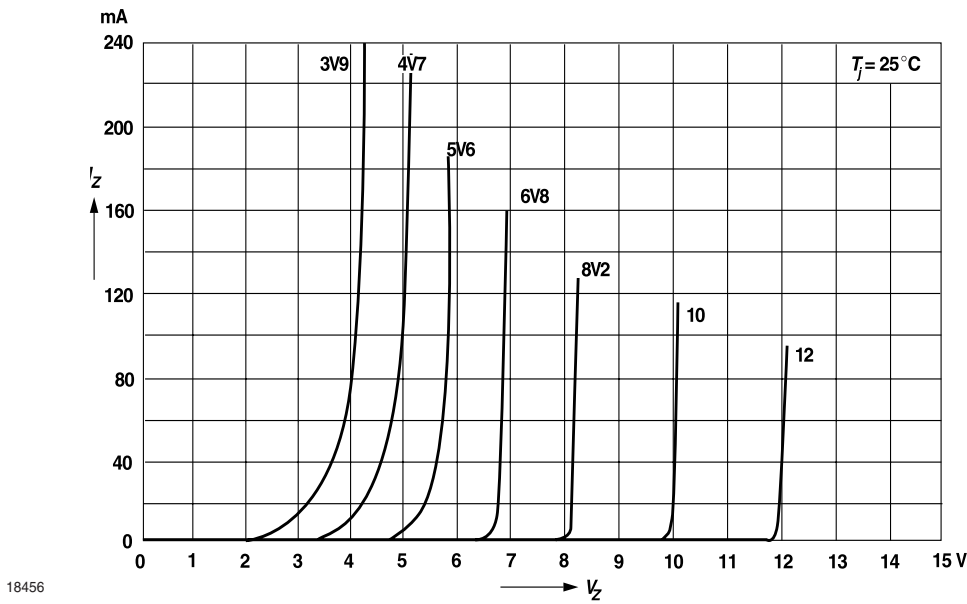


Figure 7. Breakdown Characteristics

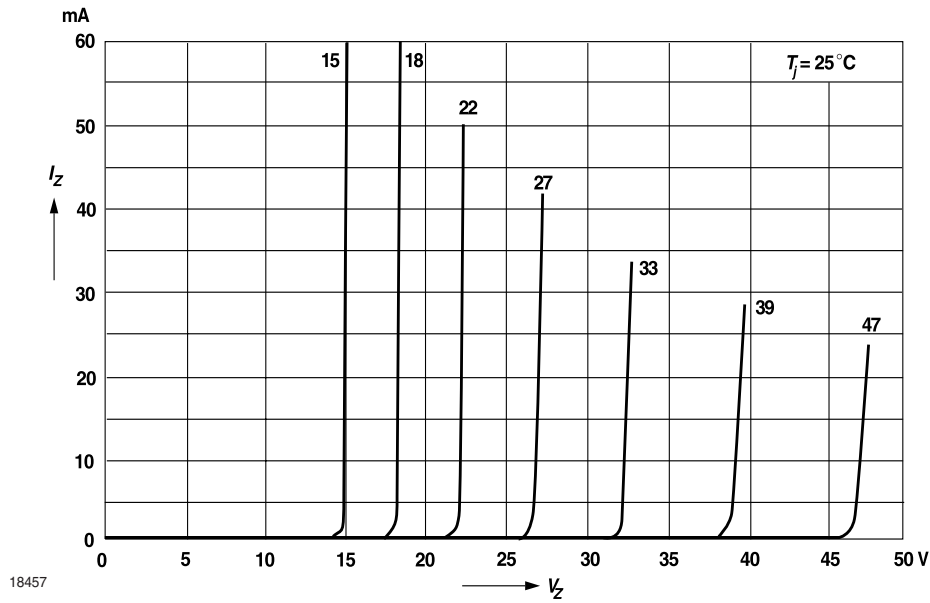
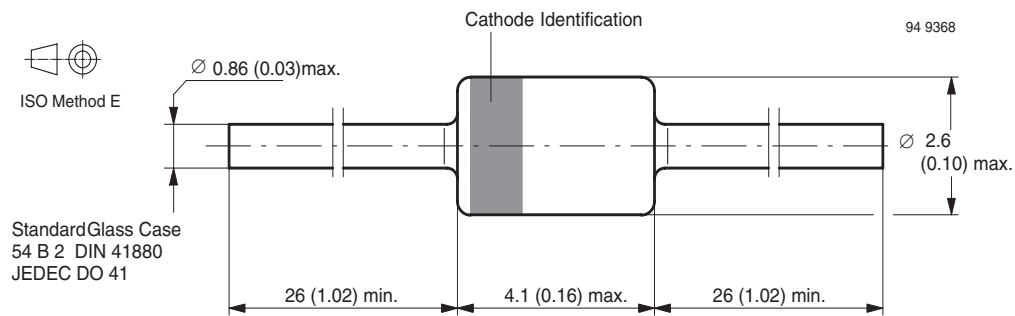


Figure 8. Breakdown Characteristics

## Package Dimensions in mm (Inches)



### Ozone Depleting Substances Policy Statement

It is the policy of **Vishay Semiconductor GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

**Vishay Semiconductor GmbH** has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

**Vishay Semiconductor GmbH** can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

**We reserve the right to make changes to improve technical design  
and may do so without further notice.**

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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