

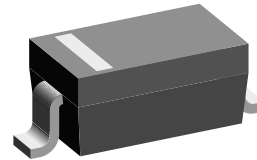
## Small Signal Zener Diodes

### Features

- Silicon planar power zener diodes
- These diodes are also available in other case styles and other configurations including: the SOT-23 case with type designation BZX84 series, the dual zener diode common anode configuration in the SOT-23 case with type designation AZ23 series and the dual zener diode common cathode configuration in the SOT-23 case with type designation DZ23 series.
- The zener voltages are graded according to the international E 24 standard.
- AEC-Q101 qualified
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC



**RoHS**  
COMPLIANT



17431

### Mechanical Data

**Case:** SOD-123

**Weight:** approx. 10.3 mg

**Packaging codes/options:**

GS18/10 k per 13 " reel (8 mm tape), 10 k/box

GS08/3 k per 7 " reel (8 mm tape), 15 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 " Characteristics " |                |           |                   |      |
| Power dissipation                           |                | $P_{tot}$ | 500 <sup>2)</sup> | mW   |
| Power dissipation                           |                | $P_{tot}$ | 410 <sup>1)</sup> | mW   |

<sup>1)</sup> Diode on ceramic substrate 0.7 mm; 2.5 mm<sup>2</sup> pad areas

<sup>2)</sup> Diode on ceramic substrate 0.7 mm; 5 mm<sup>2</sup> pad areas

### Thermal Characteristics

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

| Parameter                                  | Test condition | Symbol     | Value             | Unit                 |
|--------------------------------------------|----------------|------------|-------------------|----------------------|
| Thermal resistance junction to ambient air |                | $R_{thJA}$ | 300 <sup>1)</sup> | $^{\circ}\text{C/W}$ |
| Junction temperature                       |                | $T_J$      | 150               | $^{\circ}\text{C}$   |
| Storage temperature range                  |                | $T_S$      | - 65 to + 150     | $^{\circ}\text{C}$   |

<sup>1)</sup> Valid provided that electrodes are kept at ambient temperature

## Electrical Characteristics

| Part number | Marking code | Zener voltage range <sup>1)</sup> |      | Dynamic resistance    |                       | Test current | Temp. coefficient                            | Reverse voltage          | Admissible zener current <sup>4)</sup> |                             |
|-------------|--------------|-----------------------------------|------|-----------------------|-----------------------|--------------|----------------------------------------------|--------------------------|----------------------------------------|-----------------------------|
|             |              | $V_Z$ at $I_{ZT1}$                |      | $r_{zj}$ at $I_{ZT1}$ | $r_{zj}$ at $I_{ZT2}$ | $I_{ZT1}$    | at $I_{ZT1}$                                 | $V_R$ at $I_R = 100$ nA, | $I_Z$ at $T_{amb} = 45$ °C,            | $I_Z$ at $T_{amb} = 25$ °C, |
|             |              | V                                 |      | $\Omega$              |                       | mA           | $\alpha_{VZ}$ ( $10^{-4}/^{\circ}\text{C}$ ) | V                        | mA                                     |                             |
|             |              | min.                              | max. |                       |                       |              |                                              |                          |                                        |                             |
| BZT52C2V4-V | W1           | 2.2                               | 2.6  | 85                    | 600                   | 5            | - 9 to - 4                                   | -                        | -                                      | -                           |
| BZT52C2V7-V | W2           | 2.5                               | 2.9  | 75 (< 83)             | < 500                 | 5            | - 9 to - 4                                   | -                        | 113                                    | 134                         |
| BZT52C3V0-V | W3           | 2.8                               | 3.2  | 80 (< 95)             | < 500                 | 5            | - 9 to - 3                                   | -                        | 98                                     | 118                         |
| BZT52C3V3-V | W4           | 3.1                               | 3.5  | 80 (< 95)             | < 500                 | 5            | - 8 to - 3                                   | -                        | 92                                     | 109                         |
| BZT52C3V6-V | W5           | 3.4                               | 3.8  | 80 (< 95)             | < 500                 | 5            | - 8 to - 3                                   | -                        | 85                                     | 100                         |
| BZT52C3V9-V | W6           | 3.7                               | 4.1  | 80 (< 95)             | < 500                 | 5            | - 7 to - 3                                   | -                        | 77                                     | 92                          |
| BZT52C4V3-V | W7           | 4                                 | 4.6  | 80 (< 95)             | < 500                 | 5            | - 6 to - 1                                   | -                        | 71                                     | 84                          |
| BZT52C4V7-V | W8           | 4.4                               | 5    | 70 (< 78)             | < 500                 | 5            | - 5 to +2                                    | -                        | 64                                     | 76                          |
| BZT52C5V1-V | W9           | 4.8                               | 5.4  | 30 (< 60)             | < 480                 | 5            | - 3 to +4                                    | > 0.8                    | 56                                     | 67                          |
| BZT52C5V6-V | WA           | 5.2                               | 6    | 10 (< 40)             | < 400                 | 5            | - 2 to +6                                    | > 1                      | 50                                     | 59                          |
| BZT52C6V2-V | WB           | 5.8                               | 6.6  | 4.8 (< 10)            | < 200                 | 5            | - 1 to +7                                    | > 2                      | 45                                     | 54                          |
| BZT52C6V8-V | WC           | 6.4                               | 7.2  | 4.5 (< 8)             | < 150                 | 5            | + 2 to +7                                    | > 3                      | 41                                     | 49                          |
| BZT52C7V5-V | WD           | 7                                 | 7.9  | 4 (< 7)               | < 50                  | 5            | + 3 to +7                                    | > 5                      | 37                                     | 44                          |
| BZT52C8V2-V | WE           | 7.7                               | 8.7  | 4.5 (< 7)             | < 50                  | 5            | + 4 to +7                                    | > 6                      | 34                                     | 40                          |
| BZT52C9V1-V | WF           | 8.5                               | 9.6  | 4.8 (< 10)            | < 50                  | 5            | + 5 to +8                                    | > 7                      | 30                                     | 36                          |
| BZT52C10-V  | WG           | 9.4                               | 10.6 | 5.2 (< 15)            | < 70                  | 5            | + 5 to +8                                    | > 7.5                    | 28                                     | 33                          |
| BZT52C11-V  | WH           | 10.4                              | 11.6 | 6 (< 20)              | < 70                  | 5            | + 5 to +9                                    | > 8.5                    | 25                                     | 30                          |
| BZT52C12-V  | WI           | 11.4                              | 12.7 | 7 (< 20)              | < 90                  | 5            | + 6 to +9                                    | > 9                      | 23                                     | 28                          |
| BZT52C13-V  | WK           | 12.4                              | 14.1 | 9 (< 25)              | < 110                 | 5            | + 7 to +9                                    | > 10                     | 21                                     | 25                          |
| BZT52C15-V  | WL           | 13.8                              | 15.6 | 11 (< 30)             | < 110                 | 5            | + 7 to +9                                    | > 11                     | 19                                     | 23                          |
| BZT52C16-V  | WM           | 15.3                              | 17.1 | 13 (< 40)             | < 170                 | 5            | + 8 to +9.5                                  | > 12                     | 17                                     | 20                          |
| BZT52C18-V  | WN           | 16.8                              | 19.1 | 18 (< 50)             | < 170                 | 5            | + 8 to +9.5                                  | > 14                     | 15                                     | 18                          |
| BZT52C20-V  | WO           | 18.8                              | 21.2 | 20 (< 50)             | < 220                 | 5            | + 8 to +10                                   | > 15                     | 14                                     | 17                          |
| BZT52C22-V  | WP           | 20.8                              | 23.3 | 25 (< 55)             | < 220                 | 5            | + 8 to +10                                   | > 17                     | 13                                     | 16                          |
| BZT52C24-V  | WR           | 22.8                              | 25.6 | 28 (< 80)             | < 220                 | 5            | + 8 to +10                                   | > 18                     | 11                                     | 13                          |
| BZT52C27-V  | WS           | 25.1                              | 28.9 | 30 (< 80)             | < 250                 | 5            | + 8 to +10                                   | > 20                     | 10                                     | 12                          |
| BZT52C30-V  | WT           | 28                                | 32   | 35 (< 80)             | < 250                 | 5            | + 8 to +10                                   | > 22.5                   | 9                                      | 10                          |
| BZT52C33-V  | WU           | 31                                | 35   | 40 (< 80)             | < 250                 | 5            | + 8 to +10                                   | > 25                     | 8                                      | 9                           |
| BZT52C36-V  | WW           | 34                                | 38   | 40 (< 90)             | < 250                 | 5            | + 8 to +10                                   | > 27                     | 8                                      | 9                           |
| BZT52C39-V  | WX           | 37                                | 41   | 50 (< 90)             | < 300                 | 5            | + 10 to +12                                  | > 29                     | 7                                      | 8                           |
| BZT52C43-V  | WY           | 40                                | 46   | 60 (< 100)            | < 700                 | 5            | + 10 to +12                                  | > 32                     | 6                                      | 7                           |
| BZT52C47-V  | WZ           | 44                                | 50   | 70 (< 100)            | < 750                 | 5            | + 10 to +12                                  | > 35                     | 5                                      | 6                           |
| BZT52C51-V  | X1           | 48                                | 54   | 70 (< 100)            | < 750                 | 5            | + 10 to +12                                  | > 38                     | 5                                      | 6                           |
| BZT52C56-V  | X2           | 52                                | 60   | < 135 <sup>(2)</sup>  | < 1000 <sup>(3)</sup> | 2.5          | typ. +10 <sup>(2)</sup>                      | -                        | -                                      | -                           |
| BZT52C62-V  | X3           | 58                                | 66   | < 150 <sup>(2)</sup>  | < 1000 <sup>(3)</sup> | 2.5          | typ. +10 <sup>(2)</sup>                      | -                        | -                                      | -                           |
| BZT52C68-V  | X4           | 64                                | 72   | < 200 <sup>(2)</sup>  | < 1000 <sup>(3)</sup> | 2.5          | typ. +10 <sup>(2)</sup>                      | -                        | -                                      | -                           |
| BZT52C75-V  | X5           | 70                                | 79   | < 250 <sup>(2)</sup>  | < 1500 <sup>(3)</sup> | 2.5          | typ. +10 <sup>(2)</sup>                      | -                        | -                                      | -                           |

$I_{ZT1} = 5$  mA,  $I_{ZT2} = 1$  mA

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

<sup>(2)</sup> =  $I_{ZT1} = 2.5$  mA

<sup>(3)</sup> =  $I_{ZT2} = 0.5$  mA

<sup>(4)</sup> Valid provided that electrodes are kept at ambient temperature.

## Electrical Characteristics

| Part number | Marking code | Zener voltage range <sup>1)</sup> |      | Dynamic resistance    |                       | Test current | Temp. coefficient                            | Reverse voltage          | Admissible zener current <sup>4)</sup> |                             |
|-------------|--------------|-----------------------------------|------|-----------------------|-----------------------|--------------|----------------------------------------------|--------------------------|----------------------------------------|-----------------------------|
|             |              | $V_Z$ at $I_{ZT1}$                |      | $r_{zj}$ at $I_{ZT1}$ | $r_{zj}$ at $I_{ZT2}$ | $I_{ZT1}$    | at $I_{ZT1}$                                 | $V_R$ at $I_R = 100$ nA, | $I_Z$ at $T_{amb} = 45$ °C,            | $I_Z$ at $T_{amb} = 25$ °C, |
|             |              | V                                 |      | $\Omega$              |                       | mA           | $\alpha_{VZ}$ ( $10^{-4}/^{\circ}\text{C}$ ) | V                        | mA                                     |                             |
|             |              | min.                              | max. |                       |                       |              |                                              |                          |                                        |                             |
| BZT52B2V4-V | W1           | 2.35                              | 2.45 | 85                    | 600                   | 5            | - 9 to - 4                                   | -                        | -                                      | -                           |
| BZT52B2V7-V | W2           | 2.65                              | 2.75 | 75 (< 83)             | < 500                 | 5            | - 9 to - 4                                   | -                        | 113                                    | 134                         |
| BZT52B3V0-V | W3           | 2.94                              | 3.06 | 80 (< 95)             | < 500                 | 5            | - 9 to - 3                                   | -                        | 98                                     | 118                         |
| BZT52B3V3-V | W4           | 3.23                              | 3.37 | 80 (< 95)             | < 500                 | 5            | - 8 to - 3                                   | -                        | 92                                     | 109                         |
| BZT52B3V6-V | W5           | 3.53                              | 3.67 | 80 (< 95)             | < 500                 | 5            | - 8 to - 3                                   | -                        | 85                                     | 100                         |
| BZT52B3V9-V | W6           | 3.82                              | 3.98 | 80 (< 95)             | < 500                 | 5            | - 7 to - 3                                   | -                        | 77                                     | 92                          |
| BZT52B4V3-V | W7           | 4.21                              | 4.39 | 80 (< 95)             | < 500                 | 5            | - 6 to - 1                                   | -                        | 71                                     | 84                          |
| BZT52B4V7-V | W8           | 4.61                              | 4.79 | 70 (< 78)             | < 500                 | 5            | - 5 to + 2                                   | -                        | 64                                     | 76                          |
| BZT52B5V1-V | W9           | 5                                 | 5.2  | 30 (< 60)             | < 480                 | 5            | - 3 to + 4                                   | > 0.8                    | 56                                     | 67                          |
| BZT52B5V6-V | WA           | 5.49                              | 5.71 | 10 (< 40)             | < 400                 | 5            | - 2 to + 6                                   | > 1                      | 50                                     | 59                          |
| BZT52B6V2-V | WB           | 6.08                              | 6.32 | 4.8 (< 10)            | < 200                 | 5            | - 1 to + 7                                   | > 2                      | 45                                     | 54                          |
| BZT52B6V8-V | WC           | 6.66                              | 6.94 | 4.5 (< 8)             | < 150                 | 5            | + 2 to + 7                                   | > 3                      | 41                                     | 49                          |
| BZT52B7V5-V | WD           | 7.35                              | 7.65 | 4 (< 7)               | < 50                  | 5            | + 3 to + 7                                   | > 5                      | 37                                     | 44                          |
| BZT52B8V2-V | WE           | 8.04                              | 8.36 | 4.5 (< 7)             | < 50                  | 5            | + 4 to + 7                                   | > 6                      | 34                                     | 40                          |
| BZT52B9V1-V | WF           | 8.92                              | 9.28 | 4.8 (< 10)            | < 50                  | 5            | + 5 to + 8                                   | > 7                      | 30                                     | 36                          |
| BZT52B10-V  | WG           | 9.8                               | 10.2 | 5.2 (< 15)            | < 70                  | 5            | + 5 to + 8                                   | > 7.5                    | 28                                     | 33                          |
| BZT52B11-V  | WH           | 10.8                              | 11.2 | 6 (< 20)              | < 70                  | 5            | + 5 to + 9                                   | > 8.5                    | 25                                     | 30                          |
| BZT52B12-V  | WI           | 11.8                              | 12.2 | 7 (< 20)              | < 90                  | 5            | + 6 to + 9                                   | > 9                      | 23                                     | 28                          |
| BZT52B13-V  | WK           | 12.7                              | 13.3 | 9 (< 25)              | < 110                 | 5            | + 7 to + 9                                   | > 10                     | 21                                     | 25                          |
| BZT52B15-V  | WL           | 14.7                              | 15.3 | 11 (< 30)             | < 110                 | 5            | + 7 to + 9                                   | > 11                     | 19                                     | 23                          |
| BZT52B16-V  | WM           | 15.7                              | 16.3 | 13 (< 40)             | < 170                 | 5            | + 8 to + 9.5                                 | > 12                     | 17                                     | 20                          |
| BZT52B18-V  | WN           | 17.6                              | 18.4 | 18 (< 50)             | < 170                 | 5            | + 8 to + 9.5                                 | > 14                     | 15                                     | 18                          |
| BZT52B20-V  | WO           | 19.6                              | 20.4 | 20 (< 50)             | < 220                 | 5            | + 8 to + 10                                  | > 15                     | 14                                     | 17                          |
| BZT52B22-V  | WP           | 21.6                              | 22.4 | 25 (< 55)             | < 220                 | 5            | + 8 to + 10                                  | > 17                     | 13                                     | 16                          |
| BZT52B24-V  | WR           | 23.5                              | 24.5 | 28 (< 80)             | < 220                 | 5            | + 8 to + 10                                  | > 18                     | 11                                     | 13                          |
| BZT52B27-V  | WS           | 26.5                              | 27.5 | 30 (< 80)             | < 250                 | 5            | + 8 to + 10                                  | > 20                     | 10                                     | 12                          |
| BZT52B30-V  | WT           | 29.4                              | 30.6 | 35 (< 80)             | < 250                 | 5            | + 8 to + 10                                  | > 22.5                   | 9                                      | 10                          |
| BZT52B33-V  | WU           | 32.3                              | 33.7 | 40 (< 80)             | < 250                 | 5            | + 8 to + 10                                  | > 25                     | 8                                      | 9                           |
| BZT52B36-V  | WW           | 35.3                              | 36.7 | 40 (< 90)             | < 250                 | 5            | + 8 to + 10                                  | > 27                     | 8                                      | 9                           |
| BZT52B39-V  | WX           | 38.2                              | 39.8 | 50 (< 90)             | < 300                 | 5            | + 10 to + 12                                 | > 29                     | 7                                      | 8                           |
| BZT52B43-V  | WY           | 42.1                              | 43.9 | 60 (< 100)            | < 700                 | 5            | + 10 to + 12                                 | > 32                     | 6                                      | 7                           |
| BZT52B47-V  | WZ           | 46.1                              | 47.9 | 70 (< 100)            | < 750                 | 5            | + 10 to + 12                                 | > 35                     | 5                                      | 6                           |
| BZT52B51-V  | X1           | 50                                | 52   | 70 (< 100)            | < 750                 | 5            | + 10 to + 12                                 | > 38                     | 5                                      | 6                           |
| BZT52B56-V  | X2           | 54.9                              | 57.1 | < 135 <sup>(2)</sup>  | < 1000 <sup>(3)</sup> | 2.5          | typ. + 10 <sup>(2)</sup>                     | -                        | -                                      | -                           |
| BZT52B62-V  | X3           | 60.8                              | 63.2 | < 150 <sup>(2)</sup>  | < 1000 <sup>(3)</sup> | 2.5          | typ. + 10 <sup>(2)</sup>                     | -                        | -                                      | -                           |
| BZT52B68-V  | X4           | 66.6                              | 69.4 | < 200 <sup>(2)</sup>  | < 1000 <sup>(3)</sup> | 2.5          | typ. + 10 <sup>(2)</sup>                     | -                        | -                                      | -                           |
| BZT52B75-V  | X5           | 73.5                              | 76.5 | < 250 <sup>(2)</sup>  | < 1500 <sup>(3)</sup> | 2.5          | typ. + 10 <sup>(2)</sup>                     | -                        | -                                      | -                           |

$I_{ZT1} = 5$  mA,  $I_{ZT2} = 1$  mA

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

<sup>2)</sup>  $I_{ZT1} = 2.5$  mA

<sup>3)</sup>  $I_{ZT2} = 0.5$  mA

<sup>4)</sup> Valid provided that electrodes are kept at ambient temperature.

## Typical Characteristics ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

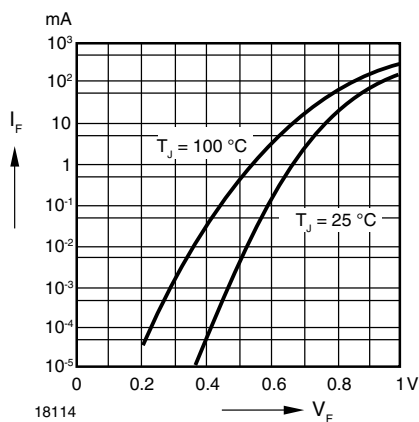


Figure 1. Forward characteristics

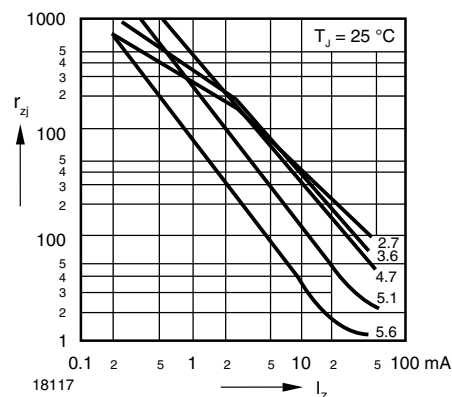


Figure 4. Dynamic Resistance vs. Zener Current

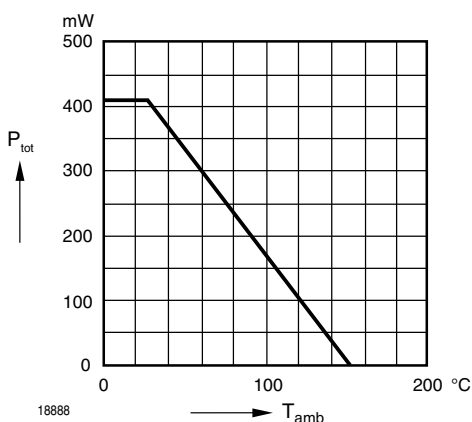


Figure 2. Admissible Power Dissipation vs. Ambient Temperature

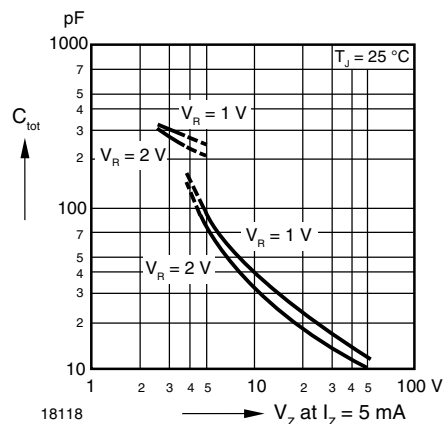


Figure 5. Capacitance vs. Zener Voltage

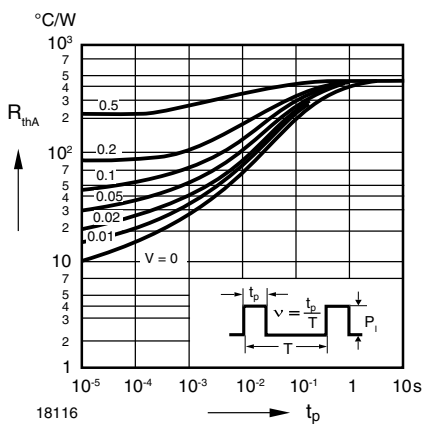


Figure 3. Pulse Thermal Resistance vs. Pulse Duration

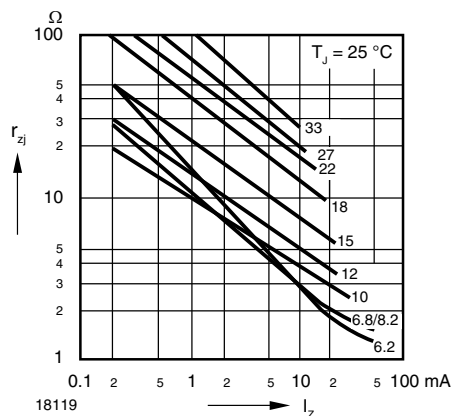


Figure 6. Dynamic Resistance vs. Zener Current

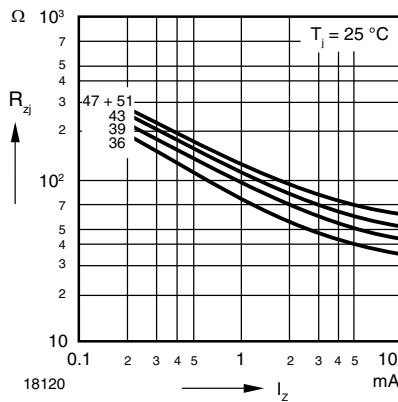


Figure 7. Dynamic Resistance vs. Zener Current

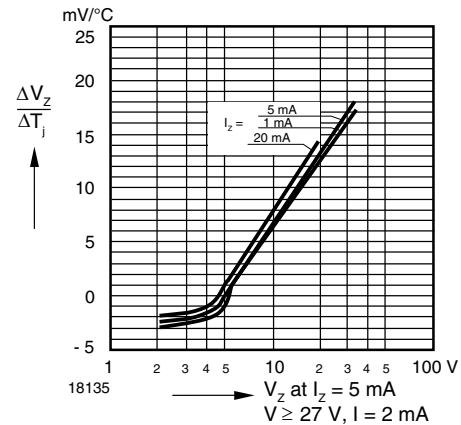


Figure 10. Temperature Dependence of Zener Voltage vs. Zener Voltage

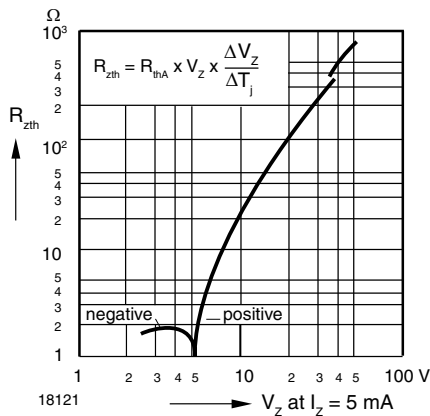


Figure 8. Thermal Differential Resistance vs. Zener Voltage

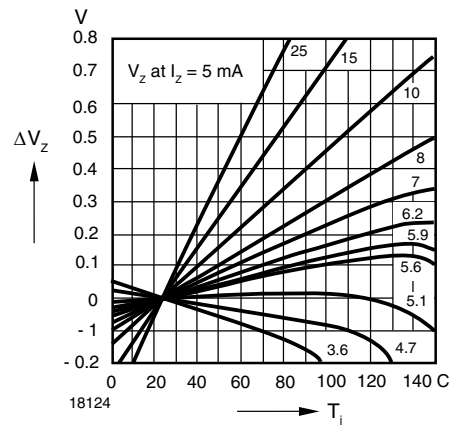


Figure 11. Change of Zener Voltage vs. Junction Temperature

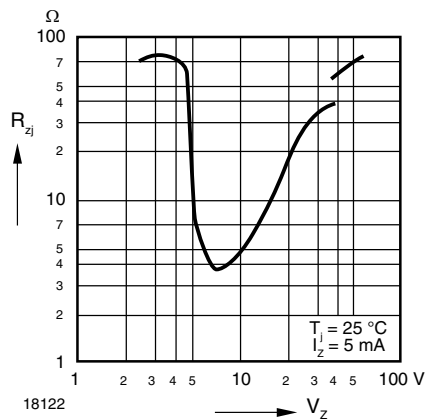


Figure 9. Dynamic Resistance vs. Zener Voltage

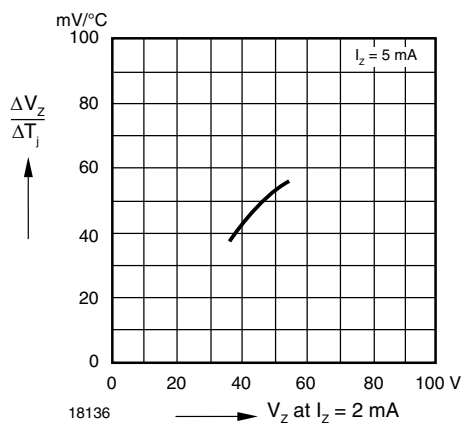


Figure 12. Temperature Dependence of Zener Voltage vs. Zener Voltage

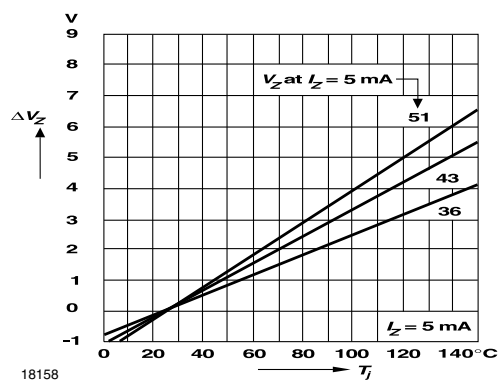


Figure 13. Change of Zener Voltage vs. Junction Temperature

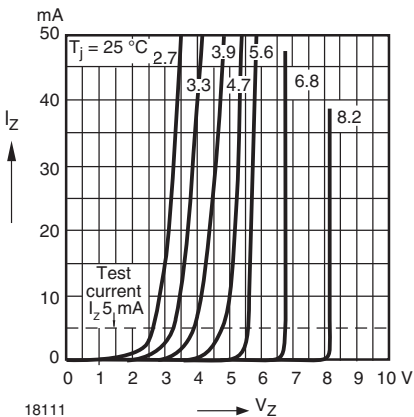


Figure 16. Breakdown Characteristics

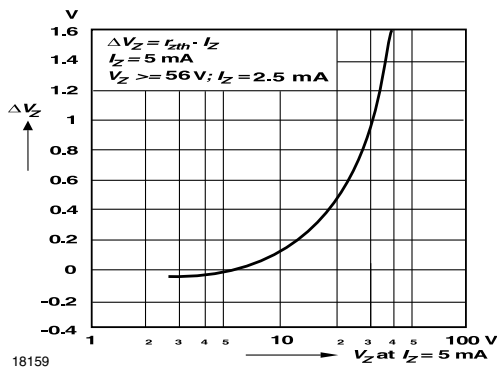


Figure 14. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

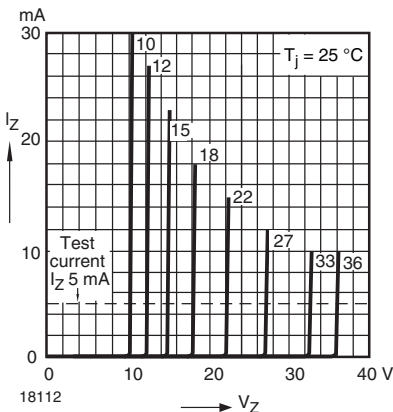


Figure 17. Breakdown Characteristics

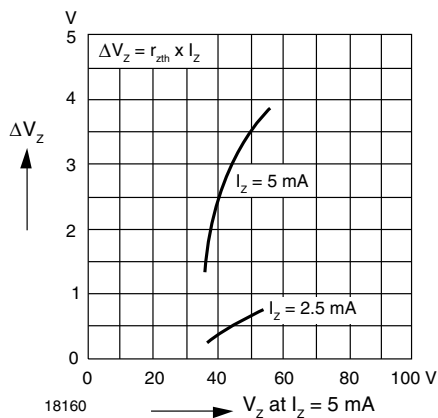


Figure 15. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

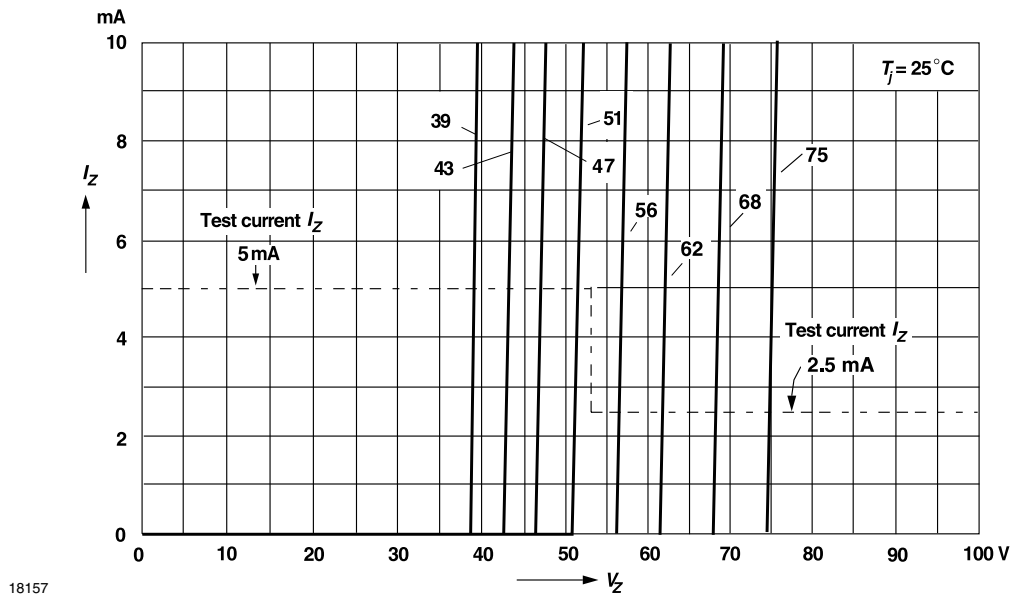
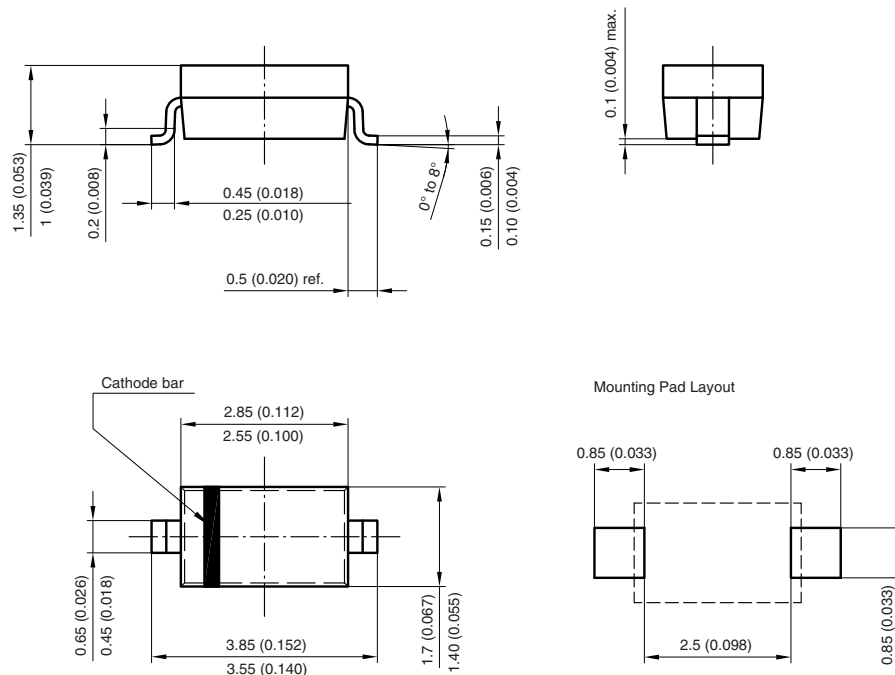


Figure 18. Breakdown Characteristics

## Package Dimensions in millimeters (inches): SOD-123



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## Disclaimer

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