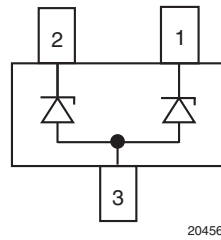
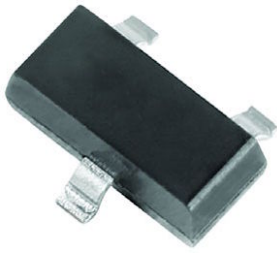


## Small Signal Zener Diodes, Dual



20456

**DESIGN SUPPORT TOOLS**
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**3D**  
Models  
Available

| PRIMARY CHARACTERISTICS      |               |      |
|------------------------------|---------------|------|
| PARAMETER                    | VALUE         | UNIT |
| V <sub>Z</sub> range nom.    | 2.7 to 51     | V    |
| Test current I <sub>ZT</sub> | 5             | mA   |
| V <sub>Z</sub> specification | Pulse current |      |
| Circuit configuration        | Common anode  |      |

**FEATURES**

- Dual silicon planar Zener diodes, common anode
- The Zener voltages are graded according to the international E24 standard. Standard Zener voltage tolerance is  $\pm 5\%$ , indicated by the "C" in the ordering code. Replace "C" with "B" for 2% tolerance
- The parameters are valid for both diodes in one case.  $\Delta V_Z$  and  $\Delta R_{zj}$  of the two diodes in one case is  $\leq 5\%$
- AEC-Q101 qualified available (part number on request)
- ESD capability according to AEC-Q101:  
human body model > 8 kV  
machine model > 800 V
- Base P/N-G3 - green, commercial grade
- Base P/N-HG3 - green, AEC-Q101 qualified (part number available on request)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

| ORDERING INFORMATION |                                 |                                |                        |
|----------------------|---------------------------------|--------------------------------|------------------------|
| DEVICE NAME          | ORDERING CODE                   | TAPED UNITS PER REEL           | MINIMUM ORDER QUANTITY |
| AZ23-G-series        | AZ23C2V7-G3-08 to AZ23C51-G3-08 | 3000 (8 mm tape on 7" reel)    | 15 000                 |
|                      | AZ23B2V7-G3-08 to AZ23B51-G3-08 |                                |                        |
|                      | AZ23C2V7-G3-18 to AZ23C51-G3-18 | 10 000 (8 mm tape on 13" reel) | 10 000                 |
|                      | AZ23B2V7-G3-18 to AZ23B51-G3-18 |                                |                        |

| PACKAGE      |        |                                      |                                      |                          |
|--------------|--------|--------------------------------------|--------------------------------------|--------------------------|
| PACKAGE NAME | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL           | SOLDERING CONDITIONS     |
| SOT-23       | 8.1 mg | UL 94 V-0                            | MSL level 1<br>(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   | Device on fiberglass substrate, see layout on page 6 | P <sub>tot</sub>  | 300                              | mW   |
| Thermal resistance, junction to ambient air                                     | Device on fiberglass substrate, see layout on page 6 | R <sub>thJA</sub> | 420                              | K/W  |
| Junction temperature  |  | T <sub>j</sub>    | 150                              | °C   |
| Storage temperature range   |  | T <sub>stg</sub>  | -65 to +150                      | °C   |
| Zener current   |  | I <sub>Z</sub>    | P <sub>tot</sub> /V <sub>Z</sub> | mA   |
| Operating temperature range   |  | T <sub>op</sub>   | -55 to +150                      | °C   |



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |              |                                    |      |      |              |           |                 |     |                    |                       |  |      |
|--|--------------|------------------------------------|------|------|--------------|-----------|-----------------|-----|--------------------|-----------------------|--|------|
| PART NUMBER  | MARKING CODE | ZENER VOLTAGE RANGE <sup>(1)</sup> |      |      | TEST CURRENT |           | REVERSE VOLTAGE |     | DYNAMIC RESISTANCE |                       | TEMPERATURE COEFFICIENT OF ZENER VOLTAGE |      |
|  |              | $V_Z$ at $I_{ZT1}$                 |      |      | $I_{ZT1}$    | $I_{ZT2}$ | $V_R$ at $I_R$  |     | $Z_Z$ at $I_{ZT1}$ | $Z_{ZK}$ at $I_{ZT2}$ | $\alpha_{VZ}$ at $I_{ZT}$                |      |
|  |              | V                                  |      |      | mA           |           | V               | nA  | $\Omega$           |                       | $10^{-4}/^{\circ}\text{C}$               |      |
|  |              | MIN.                               | NOM. | MAX. |              |           |                 |     |                    |                       | MIN.                                     | MAX. |
| AZ23C2V7-G   | D41          | 2.5                                | 2.7  | 2.9  | 5            | 1         | -               | -   | 75 (< 83)          | < 500                 | -9                                       | -4   |
| AZ23C3V0-G   | D42          | 2.8                                | 3.0  | 3.2  | 5            | 1         | -               | -   | 80 (< 95)          | < 500                 | -9                                       | -3   |
| AZ23C3V3-G   | D43          | 3.1                                | 3.3  | 3.5  | 5            | 1         | -               | -   | 80 (< 95)          | < 500                 | -8                                       | -3   |
| AZ23C3V6-G   | D44          | 3.4                                | 3.6  | 3.8  | 5            | 1         | -               | -   | 80 (< 95)          | < 500                 | -8                                       | -3   |
| AZ23C3V9-G   | D45          | 3.7                                | 3.9  | 4.1  | 5            | 1         | -               | -   | 80 (< 95)          | < 500                 | -7                                       | -3   |
| AZ23C4V3-G   | D46          | 4                                  | 4.3  | 4.6  | 5            | 1         | -               | -   | 80 (< 95)          | < 500                 | -6                                       | -1   |
| AZ23C4V7-G   | D47          | 4.4                                | 4.7  | 5    | 5            | 1         | -               | -   | 70 (< 78)          | < 500                 | -5                                       | 2    |
| AZ23C5V1-G   | D48          | 4.8                                | 5.1  | 5.4  | 5            | 1         | > 0.8           | 100 | 30 (< 60)          | < 480                 | -3                                       | 4    |
| AZ23C5V6-G   | D49          | 5.2                                | 5.6  | 6    | 5            | 1         | > 1             | 100 | 10 (< 40)          | < 400                 | -2                                       | 6    |
| AZ23C6V2-G   | D50          | 5.8                                | 6.2  | 6.6  | 5            | 1         | > 2             | 100 | 4.8 (< 10)         | < 200                 | -1                                       | 7    |
| AZ23C6V8-G   | D51          | 6.4                                | 6.8  | 7.2  | 5            | 1         | > 3             | 100 | 4.5 (< 8)          | < 150                 | 2  | 7    |
| AZ23C7V5-G   | D52          | 7                                  | 7.5  | 7.9  | 5            | 1         | > 5             | 100 | 4 (< 7)            | < 50                  | 3  | 7    |
| AZ23C8V2-G   | D53          | 7.7                                | 8.2  | 8.7  | 5            | 1         | > 6             | 100 | 4.5 (< 7)          | < 50                  | 4  | 7    |
| AZ23C9V1-G   | D54          | 8.5                                | 9.1  | 9.6  | 5            | 1         | > 7             | 100 | 4.8 (< 10)         | < 50                  | 5  | 8    |
| AZ23C10-G  | D55          | 9.4                                | 10   | 10.6 | 5            | 1         | > 7.5           | 100 | 5.2 (< 15)         | < 70                  | 5  | 8    |
| AZ23C11-G  | D56          | 10.4                               | 11   | 11.6 | 5            | 1         | > 8.5           | 100 | 6 (< 20)           | < 70                  | 5  | 9    |
| AZ23C12-G  | D57          | 11.4                               | 12   | 12.7 | 5            | 1         | > 9             | 100 | 7 (< 20)           | < 90                  | 6  | 9    |
| AZ23C13-G  | D58          | 12.4                               | 13   | 14.1 | 5            | 1         | > 10            | 100 | 9 (< 25)           | < 110                 | 7  | 9    |
| AZ23C15-G  | D59          | 13.8                               | 15   | 15.6 | 5            | 1         | > 11            | 100 | 11 (< 30)          | < 110                 | 7  | 9    |
| AZ23C16-G  | D60          | 15.3                               | 16   | 17.1 | 5            | 1         | > 12            | 100 | 13 (< 40)          | < 170                 | 8  | 9.5  |
| AZ23C18-G  | D61          | 16.8                               | 18   | 19.1 | 5            | 1         | > 14            | 100 | 18 (< 50)          | < 170                 | 8  | 9.5  |
| AZ23C20-G  | D62          | 18.8                               | 20   | 21.2 | 5            | 1         | > 15            | 100 | 20 (< 50)          | < 220                 | 8  | 10   |
| AZ23C22-G  | D63          | 20.8                               | 22   | 23.3 | 5            | 1         | > 17            | 100 | 25 (< 55)          | < 220                 | 8  | 10   |
| AZ23C24-G  | D64          | 22.8                               | 24   | 25.6 | 5            | 1         | > 18            | 100 | 28 (< 80)          | < 220                 | 8  | 10   |
| AZ23C27-G  | D65          | 25.1                               | 27   | 28.9 | 5            | 1         | > 20            | 100 | 30 (< 80)          | < 250                 | 8  | 10   |
| AZ23C30-G  | D66          | 28                                 | 30   | 32   | 5            | 1         | > 22.5          | 100 | 35 (< 80)          | < 250                 | 8  | 10   |
| AZ23C33-G  | D67          | 31                                 | 33   | 35   | 5            | 1         | > 25            | 100 | 40 (< 80)          | < 250                 | 8  | 10   |
| AZ23C36-G  | D68          | 34                                 | 36   | 38   | 5            | 1         | > 27            | 100 | 40 (< 90)          | < 250                 | 8  | 10   |
| AZ23C39-G  | D69          | 37                                 | 39   | 41   | 5            | 1         | > 29            | 100 | 50 (< 90)          | < 300                 | 10                                       | 12   |
| AZ23C43-G  | D70          | 40                                 | 43   | 46   | 5            | 1         | > 32            | 100 | 60 (< 100)         | < 700                 | 10                                       | 12   |
| AZ23C47-G  | D71          | 44                                 | 47   | 50   | 5            | 1         | > 35            | 100 | 70 (< 100)         | < 750                 | 10                                       | 12   |
| AZ23C51-G  | D72          | 48                                 | 51   | 50   | 5            | 1         | > 38            | 100 | 70 (< 100)         | < 750                 | 10                                       | 12   |

**Note**

<sup>(1)</sup> Tested with pulses  $t_p = 5\text{ ms}$



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |              |                                    |      |      |              |           |                 |     |                    |                       |  |      |
|--|--------------|------------------------------------|------|------|--------------|-----------|-----------------|-----|--------------------|-----------------------|--|------|
| PART NUMBER  | MARKING CODE | ZENER VOLTAGE RANGE <sup>(1)</sup> |      |      | TEST CURRENT |           | REVERSE VOLTAGE |     | DYNAMIC RESISTANCE |                       | TEMPERATURE COEFFICIENT OF ZENER VOLTAGE |      |
|  |              | $V_Z$ at $I_{ZT1}$                 |      |      | $I_{ZT1}$    | $I_{ZT2}$ | $V_R$ at $I_R$  |     | $Z_Z$ at $I_{ZT1}$ | $Z_{ZK}$ at $I_{ZT2}$ | $\alpha_{VZ}$ at $I_{ZT}$                |      |
|  |              | V                                  |      |      | mA           |           | V               | nA  | $\Omega$           |                       | $10^{-4}/^{\circ}\text{C}$               |      |
|  |              | MIN.                               | NOM. | MAX. |              |           |                 |     |                    |                       | MIN.                                     | MAX. |
| AZ23B2V7-G   | D41          | 2.65                               | 2.7  | 2.75 | 5            | 1         | -               | -   | 75 (< 83)          | < 500                 | -9                                       | -4   |
| AZ23B3V0-G   | D42          | 2.94                               | 3.0  | 3.06 | 5            | 1         | -               | -   | 80 (< 95)          | < 500                 | -9                                       | -3   |
| AZ23B3V3-G   | D43          | 3.23                               | 3.3  | 3.37 | 5            | 1         | -               | -   | 80 (< 95)          | < 500                 | -8                                       | -3   |
| AZ23B3V6-G   | D44          | 3.53                               | 3.6  | 3.67 | 5            | 1         | -               | -   | 80 (< 95)          | < 500                 | -8                                       | -3   |
| AZ23B3V9-G   | D45          | 3.82                               | 3.9  | 3.98 | 5            | 1         | -               | -   | 80 (< 95)          | < 500                 | -7                                       | -3   |
| AZ23B4V3-G   | D46          | 4.21                               | 4.3  | 4.39 | 5            | 1         | -               | -   | 80 (< 95)          | < 500                 | -6                                       | -1   |
| AZ23B4V7-G   | D47          | 4.61                               | 4.7  | 4.79 | 5            | 1         | -               | -   | 70 (< 78)          | < 500                 | -5                                       | 2    |
| AZ23B5V1-G   | D48          | 5                                  | 5.1  | 5.2  | 5            | 1         | > 0.8           | 100 | 30 (< 60)          | < 480                 | -3                                       | 4    |
| AZ23B5V6-G   | D49          | 5.49                               | 5.6  | 5.71 | 5            | 1         | > 1             | 100 | 10 (< 40)          | < 400                 | -2                                       | 6    |
| AZ23B6V2-G   | D50          | 6.08                               | 6.2  | 6.32 | 5            | 1         | > 2             | 100 | 4.8 (< 10)         | < 200                 | -1                                       | 7    |
| AZ23B6V8-G   | D51          | 6.66                               | 6.8  | 6.94 | 5            | 1         | > 3             | 100 | 4.5 (< 8)          | < 150                 | 2  | 7    |
| AZ23B7V5-G   | D52          | 7.35                               | 7.5  | 7.65 | 5            | 1         | > 5             | 100 | 4 (< 7)            | < 50                  | 3  | 7    |
| AZ23B8V2-G   | D53          | 8.04                               | 8.2  | 8.36 | 5            | 1         | > 6             | 100 | 4.5 (< 7)          | < 50                  | 4  | 7    |
| AZ23B9V1-G   | D54          | 8.92                               | 9.1  | 9.28 | 5            | 1         | > 7             | 100 | 4.8 (< 10)         | < 50                  | 5  | 8    |
| AZ23B10-G  | D55          | 9.8                                | 10   | 10.2 | 5            | 1         | > 7.5           | 100 | 5.2 (< 15)         | < 70                  | 5  | 8    |
| AZ23B11-G  | D56          | 10.8                               | 11   | 11.2 | 5            | 1         | > 8.5           | 100 | 6 (< 20)           | < 70                  | 5  | 9    |
| AZ23B12-G  | D57          | 11.8                               | 12   | 12.2 | 5            | 1         | > 9             | 100 | 7 (< 20)           | < 90                  | 6  | 9    |
| AZ23B13-G  | D58          | 12.7                               | 13   | 13.3 | 5            | 1         | > 10            | 100 | 9 (< 25)           | < 110                 | 7  | 9    |
| AZ23B15-G  | D59          | 14.7                               | 15   | 15.3 | 5            | 1         | > 11            | 100 | 11 (< 30)          | < 110                 | 7  | 9    |
| AZ23B16-G  | D60          | 15.7                               | 16   | 16.3 | 5            | 1         | > 12            | 100 | 13 (< 40)          | < 170                 | 8  | 9.5  |
| AZ23B18-G  | D61          | 17.6                               | 18   | 18.4 | 5            | 1         | > 14            | 100 | 18 (< 50)          | < 170                 | 8  | 9.5  |
| AZ23B20-G  | D62          | 19.6                               | 20   | 20.4 | 5            | 1         | > 15            | 100 | 20 (< 50)          | < 220                 | 8  | 10   |
| AZ23B22-G  | D63          | 21.6                               | 22   | 22.4 | 5            | 1         | > 17            | 100 | 25 (< 55)          | < 220                 | 8  | 10   |
| AZ23B24-G  | D64          | 23.5                               | 24   | 24.5 | 5            | 1         | > 18            | 100 | 28 (< 80)          | < 220                 | 8  | 10   |
| AZ23B27-G  | D65          | 26.5                               | 27   | 27.5 | 5            | 1         | > 20            | 100 | 30 (< 80)          | < 250                 | 8  | 10   |
| AZ23B30-G  | D66          | 29.4                               | 30   | 30.6 | 5            | 1         | > 22.5          | 100 | 35 (< 80)          | < 250                 | 8  | 10   |
| AZ23B33-G  | D67          | 32.3                               | 33   | 33.7 | 5            | 1         | > 25            | 100 | 40 (< 80)          | < 250                 | 8  | 10   |
| AZ23B36-G  | D68          | 35.3                               | 36   | 36.7 | 5            | 1         | > 27            | 100 | 40 (< 90)          | < 250                 | 8  | 10   |
| AZ23B39-G  | D69          | 38.2                               | 39   | 39.8 | 5            | 1         | > 29            | 100 | 50 (< 90)          | < 300                 | 10                                       | 12   |
| AZ23B43-G  | D70          | 42.1                               | 43   | 43.9 | 5            | 1         | > 32            | 100 | 60 (< 100)         | < 700                 | 10                                       | 12   |
| AZ23B47-G  | D71          | 46.1                               | 47   | 47.9 | 5            | 1         | > 35            | 100 | 70 (< 100)         | < 750                 | 10                                       | 12   |
| AZ23B51-G  | D72          | 50                                 | 51   | 52   | 5            | 1         | > 38            | 100 | 70 (< 100)         | < 750                 | 10                                       | 12   |

**Note**

<sup>(1)</sup> Tested with pulses  $t_p = 5\text{ ms}$

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

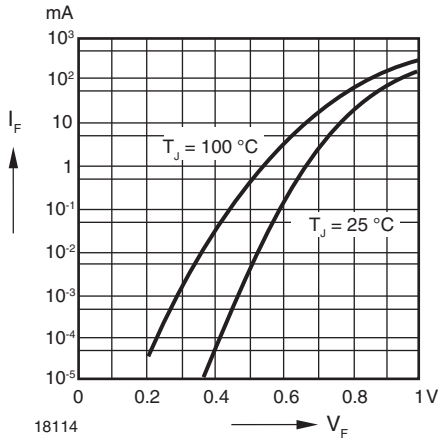


Fig. 1 - Forward Characteristics

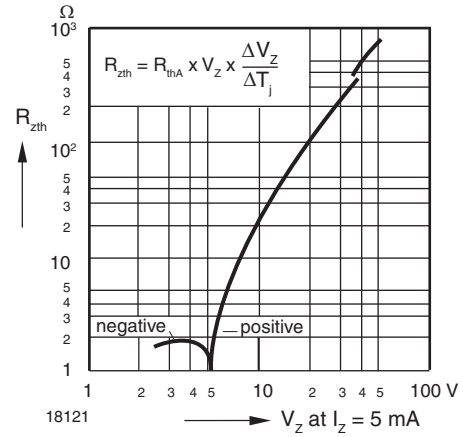


Fig. 4 - Thermal Differential Resistance vs. Zener Voltage

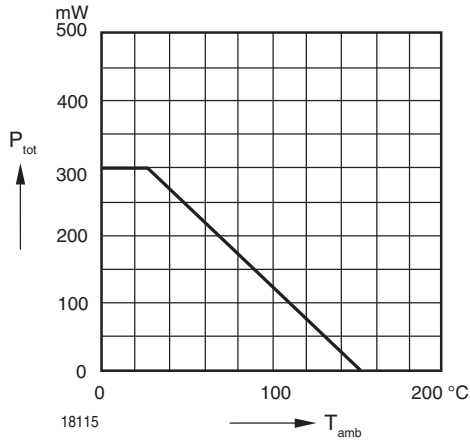


Fig. 2 - Admissible Power Dissipation vs. Ambient Temperature

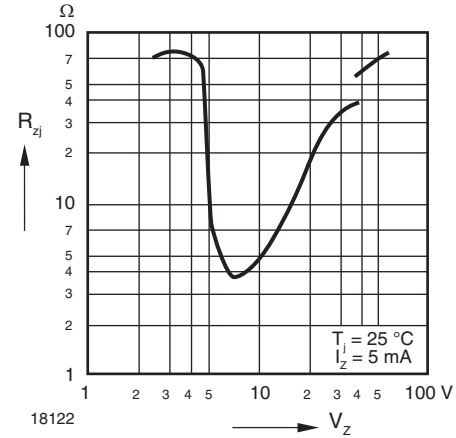


Fig. 5 - Dynamic Resistance vs. Zener Voltage

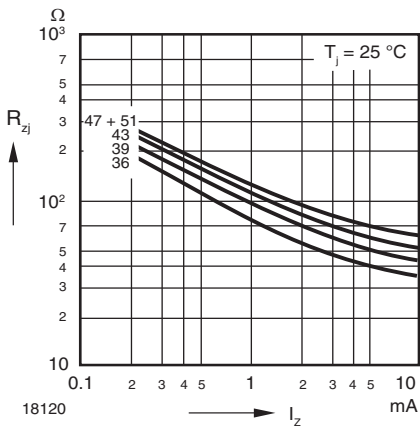


Fig. 3 - Dynamic Resistance vs. Zener Current

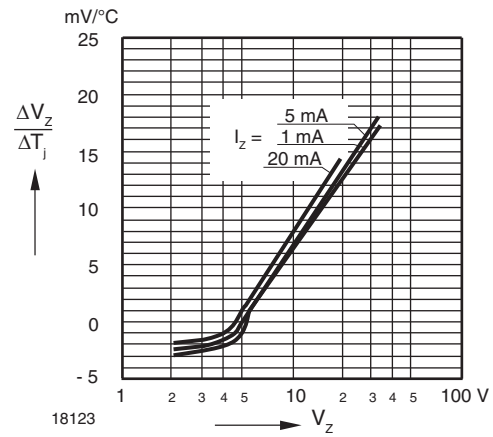


Fig. 6 - Temperature Dependence of Zener Voltage vs. Zener Voltage

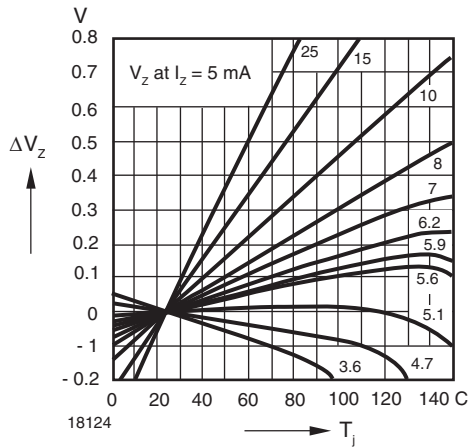


Fig. 7 - Change of Zener Voltage vs. Junction Temperature



Fig. 10 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage



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



Fig. 11 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage



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

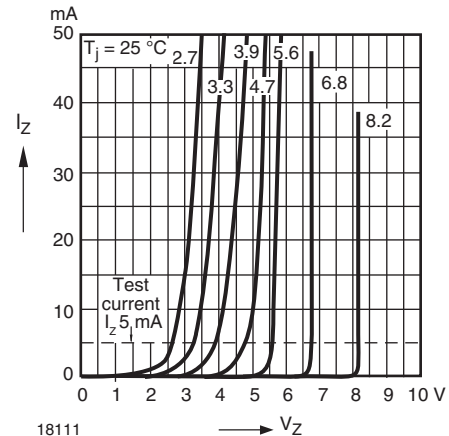


Fig. 12 - Breakdown Characteristics



Fig. 13 - Breakdown Characteristics

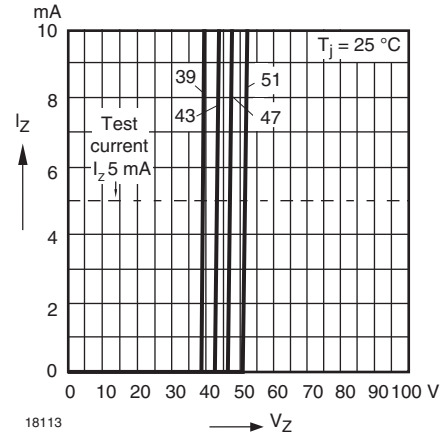
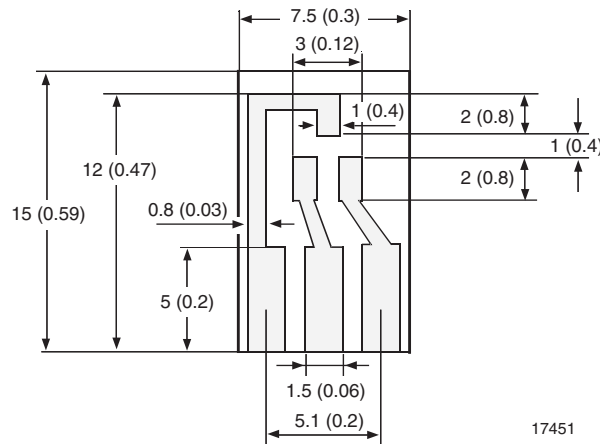


Fig. 14 - Breakdown Characteristics

**LAYOUT FOR R<sub>thJA</sub> TEST**

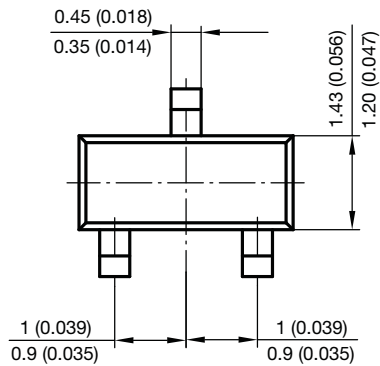
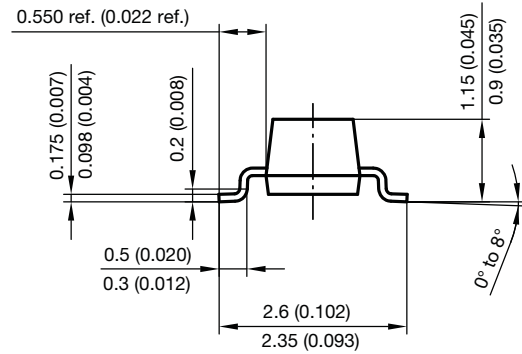
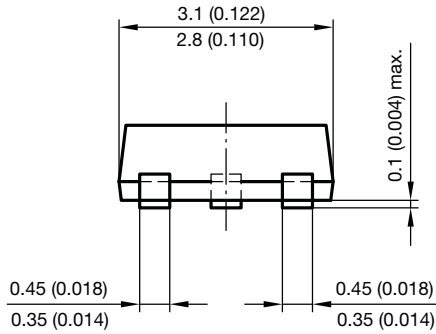
Thickness: fiberglass 0.059" (1.5 mm)

Copper leads 0.012" (0.3 mm)

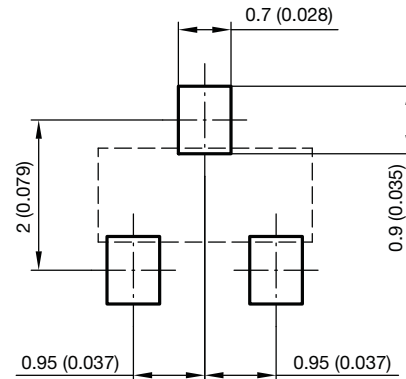




**PACKAGE DIMENSIONS** in millimeters (inches): **SOT-23**



Foot print recommendation:



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



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