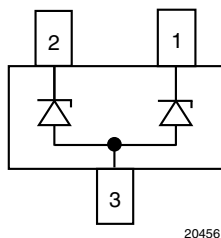


## Small Signal Zener Diodes

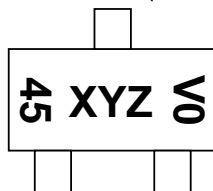


20456

### LINKS TO ADDITIONAL RESOURCES



### MARKING (example only)



XYZ = type code  
45 = working week  
0 = year  
V = Vishay

### PRIMARY CHARACTERISTICS

| PARAMETER             | VALUE         | UNIT |
|-----------------------|---------------|------|
| $V_Z$ range nom.      | 2.2 to 75     | V    |
| Test current $I_{ZT}$ | 2; 5          | mA   |
| $V_Z$ specification   | Pulse current |      |
| Circuit configuration | Common anode  |      |

### ORDERING INFORMATION

| DEVICE NAME | ORDERING CODE                         | ZENER VOLTAGE TOLERANCE | AEC-Q101 QUALIFIED | TAPED UNITS PER REEL              | MINIMUM ORDER QUANTITY |
|-------------|---------------------------------------|-------------------------|--------------------|-----------------------------------|------------------------|
| AZ23 series | AZ23C2V4-E3-08 to AZ23C75-E3-08       | 5 %                     | no                 | 3000<br>(8 mm tape on 7" reel)    | 15 000                 |
|             | AZ23B2V4-E3-08 to AZ23B75-E3-08       | 2 %                     | no                 |                                   |                        |
|             | AZ23C2V4-HE3_A-08 to AZ23C75-HE3_A-08 | 5 %                     | yes                |                                   |                        |
|             | AZ23B2V4-HE3_A-08 to AZ23B75-HE3_A-08 | 2 %                     | yes                |                                   |                        |
|             | AZ23C2V4-E3-18 to AZ23C75-E3-18       | 5 %                     | no                 | 10 000<br>(8 mm tape on 13" reel) | 10 000                 |
|             | AZ23B2V4-E3-18 to AZ23B75-E3-18       | 2 %                     | no                 |                                   |                        |
|             | AZ23C2V4-HE3_A-18 to AZ23C75-HE3_A-18 | 5 %                     | yes                |                                   |                        |
|             | AZ23B2V4-HE3_A-18 to AZ23B75-HE3_A-18 | 2 %                     | yes                |                                   |                        |

### PACKAGE

| PACKAGE NAME | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL           | SOLDERING CONDITIONS         |
|--------------|--------|--------------------------------------|--------------------------------------|------------------------------|
| SOT-23       | 9.2 mg | UL 94 V-0                            | MSL level 1<br>(according J-STD-020) | Peak temperature max. 260 °C |

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER                              | TEST CONDITION                                                              | SYMBOL     | VALUE       | UNIT |
|----------------------------------------|-----------------------------------------------------------------------------|------------|-------------|------|
| Power dissipation                      | $R_{thJL} = 250$ K/W                                                        | $P_{tot}$  | 500         | mW   |
|                                        | On FR-4 board with recommended soldering footprint                          | $P_{tot}$  | 300         | mW   |
| Thermal resistance junction to lead    |                                                                             | $R_{thJL}$ | 250         | K/W  |
| Thermal resistance junction to ambient | According to JEDEC® 51-3 on FR-4 board with recommended soldering footprint | $R_{thJA}$ | 420         | K/W  |
| Junction temperature                   |                                                                             | $T_j$      | 150         | °C   |
| Storage temperature range              |                                                                             | $T_{stg}$  | -65 to +150 | °C   |
| Operating temperature range            |                                                                             | $T_{op}$   | -55 to +150 | °C   |

### FEATURES

- Silicon planar Zener diodes
- 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  $\pm 2\%$  tolerance.
- AEC-Q101 qualified available
- ESD capability acc. to AEC-Q101:  
human body model: > 8 kV,  
machine model: > 800 V
- Base P/N-E3 - RoHS-compliant, commercial grade
- Base P/N-HE3\_A - RoHS-compliant, AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc299912](http://www.vishay.com/doc299912)



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

| PART NUMBER | MARKING CODE | ZENER VOLTAGE RANGE |      |       | TEST CURRENT |           | REVERSE LEAKAGE CURRENT |      | DYNAMIC RESISTANCE<br>$f = 1\text{ kHz}$ |                       | TEMPERATURE COEFFICIENT    |      |
|-------------|--------------|---------------------|------|-------|--------------|-----------|-------------------------|------|------------------------------------------|-----------------------|----------------------------|------|
|             |              | $V_Z$ 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 $I_{ZT1}$ |      |
|             |              | V                   |      |       | mA           |           | $\mu\text{A}$           | V    | $\Omega$                                 |                       | $10^{-4}/^{\circ}\text{C}$ |      |
|             |              | MIN.                | NOM. | MAX.  |              |           | MAX.                    |      | MAX.                                     | MAX.                  | MIN.                       | MAX. |
| AZ23C2V2    | D77          | 2.09                | 2.2  | 2.31  | 5            | 1         | 100                     | 1    | 120                                      | 600                   | -9                         | -4   |
| AZ23C2V4    | D78          | 2.28                | 2.4  | 2.52  | 5            | 1         | 50                      | 1    | 100                                      | 600                   | -9                         | -4   |
| AZ23C2V7    | D41          | 2.57                | 2.7  | 2.84  | 5            | 1         | 20                      | 1    | 83                                       | 500                   | -9                         | -4   |
| AZ23C3V0    | D42          | 2.85                | 3.0  | 3.15  | 5            | 1         | 10                      | 1    | 95                                       | 500                   | -9                         | -3   |
| AZ23C3V3    | D43          | 3.14                | 3.3  | 3.47  | 5            | 1         | 5                       | 1    | 95                                       | 500                   | -8                         | -3   |
| AZ23C3V6    | D44          | 3.42                | 3.6  | 3.78  | 5            | 1         | 5                       | 1    | 90                                       | 500                   | -8                         | -3   |
| AZ23C3V9    | D45          | 3.71                | 3.9  | 4.10  | 5            | 1         | 3                       | 1    | 90                                       | 500                   | -7                         | -3   |
| AZ23C4V3    | D46          | 4.09                | 4.3  | 4.52  | 5            | 1         | 3                       | 1    | 90                                       | 500                   | -6                         | -1   |
| AZ23C4V7    | D47          | 4.47                | 4.7  | 4.94  | 5            | 1         | 3                       | 2    | 78                                       | 500                   | -5                         | 2    |
| AZ23C5V1    | D48          | 4.85                | 5.1  | 5.36  | 5            | 1         | 2                       | 2    | 60                                       | 480                   | -3                         | 4    |
| AZ23C5V1    | D48          | 4.85                | 5.1  | 5.36  | 5            | 1         | 0.1                     | 0.8  |                                          |                       | -3                         | 4    |
| AZ23C5V6    | D49          | 5.32                | 5.6  | 5.88  | 5            | 1         | 1                       | 2    | 40                                       | 400                   | -2                         | 6    |
| AZ23C5V6    | D49          | 5.32                | 5.6  | 5.88  | 5            | 1         | 0.1                     | 1    |                                          |                       | -2                         | 6    |
| AZ23C6V2    | D50          | 5.89                | 6.2  | 6.51  | 5            | 1         | 3                       | 4    | 10                                       | 150                   | -1                         | 7    |
| AZ23C6V2    | D50          | 5.89                | 6.2  | 6.51  | 5            | 1         | 0.1                     | 2    |                                          |                       | -1                         | 7    |
| AZ23C6V8    | D51          | 6.46                | 6.8  | 7.14  | 5            | 1         | 2                       | 4    | 8                                        | 80                    | 2                          | 7    |
| AZ23C6V8    | D51          | 6.46                | 6.8  | 7.14  | 5            | 1         | 0.1                     | 3    |                                          |                       | 2                          | 7    |
| AZ23C7V5    | D52          | 7.13                | 7.5  | 7.88  | 5            | 1         | 0.1                     | 5    | 7                                        | 50                    | 3                          | 7    |
| AZ23C8V2    | D53          | 7.79                | 8.2  | 8.61  | 5            | 1         | 0.1                     | 6    | 7                                        | 50                    | 4                          | 7    |
| AZ23C9V1    | D54          | 8.65                | 9.1  | 9.56  | 5            | 1         | 0.1                     | 7    | 10                                       | 50                    | 5                          | 8    |
| AZ23C10     | D55          | 9.50                | 10   | 10.50 | 5            | 1         | 0.1                     | 7.5  | 15                                       | 70                    | 5                          | 8    |
| AZ23C11     | D56          | 10.45               | 11   | 11.55 | 5            | 1         | 0.1                     | 8.5  | 20                                       | 70                    | 5                          | 9    |
| AZ23C12     | D57          | 11.40               | 12   | 12.60 | 5            | 1         | 0.1                     | 9    | 20                                       | 90                    | 6                          | 9    |
| AZ23C13     | D58          | 12.40               | 13   | 13.65 | 5            | 1         | 0.1                     | 10   | 25                                       | 110                   | 7                          | 9    |
| AZ23C15     | D59          | 14.25               | 15   | 15.60 | 5            | 1         | 0.05                    | 11   | 30                                       | 110                   | 7                          | 9    |
| AZ23C16     | D60          | 15.30               | 16   | 16.80 | 5            | 1         | 0.05                    | 12   | 40                                       | 170                   | 8                          | 9.5  |
| AZ23C18     | D61          | 17.10               | 18   | 18.90 | 5            | 1         | 0.05                    | 14   | 45                                       | 170                   | 8                          | 9.5  |
| AZ23C20     | D62          | 19.00               | 20   | 21.00 | 5            | 1         | 0.05                    | 15   | 50                                       | 220                   | 8                          | 10   |
| AZ23C22     | D63          | 20.90               | 22   | 23.10 | 5            | 1         | 0.05                    | 17   | 55                                       | 220                   | 8                          | 10   |
| AZ23C24     | D64          | 22.80               | 24   | 25.20 | 5            | 1         | 0.05                    | 18   | 70                                       | 220                   | 8                          | 10   |
| AZ23C27     | D65          | 25.65               | 27   | 28.35 | 2            | 0.5       | 0.05                    | 20   | 80                                       | 250                   | 8                          | 10   |
| AZ23C30     | D66          | 28.50               | 30   | 31.50 | 2            | 0.5       | 0.05                    | 22.5 | 80                                       | 250                   | 8                          | 10   |
| AZ23C33     | D67          | 31.35               | 33   | 34.65 | 2            | 0.5       | 0.05                    | 25   | 80                                       | 250                   | 8                          | 10   |
| AZ23C36     | D68          | 34.20               | 36   | 37.80 | 2            | 0.5       | 0.05                    | 27   | 87                                       | 250                   | 8                          | 10   |
| AZ23C39     | D69          | 37.05               | 39   | 40.95 | 2            | 0.5       | 0.05                    | 29   | 87                                       | 300                   | 10                         | 12   |
| AZ23C43     | D70          | 40.85               | 43   | 45.15 | 2            | 0.5       | 0.05                    | 32   | 97                                       | 375                   | 10                         | 12   |
| AZ23C47     | D71          | 44.65               | 47   | 49.35 | 2            | 0.5       | 0.05                    | 35   | 97                                       | 375                   | 10                         | 12   |
| AZ23C51     | D72          | 48.45               | 51   | 53.55 | 2            | 0.5       | 0.05                    | 38   | 100                                      | 400                   | 10                         | 12   |
| AZ23C56     | D73          | 53.20               | 56   | 58.80 | 2            | 0.5       | 0.05                    | 42   | 135                                      | 425                   | 9                          | 11   |
| AZ23C62     | D74          | 58.90               | 62   | 65.10 | 2            | 0.5       | 0.05                    | 46.5 | 150                                      | 450                   | 9                          | 12   |
| AZ23C68     | D75          | 64.60               | 68   | 71.40 | 2            | 0.5       | 0.05                    | 51   | 200                                      | 475                   | 10                         | 12   |
| AZ23C75     | D76          | 71.25               | 75   | 78.75 | 2            | 0.5       | 0.05                    | 56   | 250                                      | 500                   | 10                         | 12   |



| ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |              |                     |      |       |              |           |                         |      |                                          |                       |                            |      |
|---------------------------------------------------------------------------------------------------|--------------|---------------------|------|-------|--------------|-----------|-------------------------|------|------------------------------------------|-----------------------|----------------------------|------|
| PART NUMBER                                                                                       | MARKING CODE | ZENER VOLTAGE RANGE |      |       | TEST CURRENT |           | REVERSE LEAKAGE CURRENT |      | DYNAMIC RESISTANCE<br>$f = 1\text{ kHz}$ |                       | TEMPERATURE COEFFICIENT    |      |
|                                                                                                   |              | $V_Z$ 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 $I_{ZT1}$ |      |
|                                                                                                   |              | V                   |      |       | mA           |           | $\mu\text{A}$           | V    | $\Omega$                                 |                       | $10^{-4}/^{\circ}\text{C}$ |      |
|                                                                                                   |              | MIN.                | NOM. | MAX.  |              |           | MAX.                    |      | MAX.                                     | MAX.                  | MIN.                       | MAX. |
| AZ23B2V2                                                                                          | DG8          | 2.16                | 2.2  | 2.24  | 5            | 1         | 100                     | 1    | 120                                      | 600                   | -9                         | -4   |
| AZ23B2V4                                                                                          | DG9          | 2.35                | 2.4  | 2.45  | 5            | 1         | 50                      | 1    | 100                                      | 600                   | -9                         | -4   |
| AZ23B2V7                                                                                          | DD1          | 2.65                | 2.7  | 2.75  | 5            | 1         | 20                      | 1    | 83                                       | 500                   | -9                         | -4   |
| AZ23B3V0                                                                                          | DD2          | 2.94                | 3.0  | 3.06  | 5            | 1         | 10                      | 1    | 95                                       | 500                   | -9                         | -3   |
| AZ23B3V3                                                                                          | DD3          | 3.23                | 3.3  | 3.37  | 5            | 1         | 5                       | 1    | 95                                       | 500                   | -8                         | -3   |
| AZ23B3V6                                                                                          | DD4          | 3.53                | 3.6  | 3.67  | 5            | 1         | 5                       | 1    | 90                                       | 500                   | -8                         | -3   |
| AZ23B3V9                                                                                          | DD5          | 3.82                | 3.9  | 3.98  | 5            | 1         | 3                       | 1    | 90                                       | 500                   | -7                         | -3   |
| AZ23B4V3                                                                                          | DD6          | 4.21                | 4.3  | 4.39  | 5            | 1         | 3                       | 1    | 90                                       | 500                   | -6                         | -1   |
| AZ23B4V7                                                                                          | DD7          | 4.61                | 4.7  | 4.79  | 5            | 1         | 3                       | 2    | 78                                       | 500                   | -5                         | 2    |
| AZ23B5V1                                                                                          | DD8          | 5.00                | 5.1  | 5.20  | 5            | 1         | 2                       | 2    | 60                                       | 480                   | -3                         | 4    |
|                                                                                                   |              |                     |      |       |              |           | 0.1                     | 0.8  |                                          |                       |                            |      |
| AZ23B5V6                                                                                          | DD9          | 5.49                | 5.6  | 5.71  | 5            | 1         | 1                       | 2    | 40                                       | 400                   | -2                         | 6    |
|                                                                                                   |              |                     |      |       |              |           | 0.1                     | 1    |                                          |                       |                            |      |
| AZ23B6V2                                                                                          | DE0          | 6.08                | 6.2  | 6.32  | 5            | 1         | 3                       | 4    | 10                                       | 150                   | -1                         | 7    |
|                                                                                                   |              |                     |      |       |              |           | 0.1                     | 2    |                                          |                       |                            |      |
| AZ23B6V8                                                                                          | DE1          | 6.66                | 6.8  | 6.94  | 5            | 1         | 2                       | 4    | 8                                        | 80                    | 2                          | 7    |
|                                                                                                   |              |                     |      |       |              |           | 0.1                     | 3    |                                          |                       |                            |      |
| AZ23B7V5                                                                                          | DE2          | 7.35                | 7.5  | 7.65  | 5            | 1         | 0.1                     | 5    | 7                                        | 50                    | 3                          | 7    |
| AZ23B8V2                                                                                          | DE3          | 8.04                | 8.2  | 8.36  | 5            | 1         | 0.1                     | 6    | 7                                        | 50                    | 4                          | 7    |
| AZ23B9V1                                                                                          | DE4          | 8.92                | 9.1  | 9.28  | 5            | 1         | 0.1                     | 7    | 10                                       | 50                    | 5                          | 8    |
| AZ23B10                                                                                           | DE5          | 9.80                | 10   | 10.20 | 5            | 1         | 0.1                     | 7.5  | 15                                       | 70                    | 5                          | 8    |
| AZ23B11                                                                                           | DE6          | 10.78               | 11   | 11.22 | 5            | 1         | 0.1                     | 8.5  | 20                                       | 70                    | 5                          | 9    |
| AZ23B12                                                                                           | DE7          | 11.76               | 12   | 12.24 | 5            | 1         | 0.1                     | 9    | 20                                       | 90                    | 6                          | 9    |
| AZ23B13                                                                                           | DE8          | 12.74               | 13   | 13.26 | 5            | 1         | 0.1                     | 10   | 25                                       | 110                   | 7                          | 9    |
| AZ23B15                                                                                           | DE9          | 14.70               | 15   | 15.30 | 5            | 1         | 0.05                    | 11   | 30                                       | 110                   | 7                          | 9    |
| AZ23B16                                                                                           | DF0          | 15.68               | 16   | 16.32 | 5            | 1         | 0.05                    | 12   | 40                                       | 170                   | 8                          | 9.5  |
| AZ23B18                                                                                           | DF1          | 17.64               | 18   | 18.36 | 5            | 1         | 0.05                    | 14   | 45                                       | 170                   | 8                          | 9.5  |
| AZ23B20                                                                                           | DF2          | 19.60               | 20   | 20.40 | 5            | 1         | 0.05                    | 15   | 50                                       | 220                   | 8                          | 10   |
| AZ23B22                                                                                           | DF3          | 21.56               | 22   | 22.44 | 5            | 1         | 0.05                    | 17   | 55                                       | 220                   | 8                          | 10   |
| AZ23B24                                                                                           | DF4          | 23.52               | 24   | 24.48 | 5            | 1         | 0.05                    | 18   | 70                                       | 220                   | 8                          | 10   |
| AZ23B27                                                                                           | DF5          | 26.46               | 27   | 27.54 | 2            | 0.5       | 0.05                    | 20   | 80                                       | 250                   | 8                          | 10   |
| AZ23B30                                                                                           | DF6          | 29.40               | 30   | 30.60 | 2            | 0.5       | 0.05                    | 22.5 | 80                                       | 250                   | 8                          | 10   |
| AZ23B33                                                                                           | DF7          | 32.34               | 33   | 33.66 | 2            | 0.5       | 0.05                    | 25   | 80                                       | 250                   | 8                          | 10   |
| AZ23B36                                                                                           | DF8          | 35.28               | 36   | 36.72 | 2            | 0.5       | 0.05                    | 27   | 87                                       | 250                   | 8                          | 10   |
| AZ23B39                                                                                           | DF9          | 38.22               | 39   | 39.78 | 2            | 0.5       | 0.05                    | 29   | 87                                       | 300                   | 10                         | 12   |
| AZ23B43                                                                                           | DG0          | 42.14               | 43   | 43.86 | 2            | 0.5       | 0.05                    | 32   | 97                                       | 375                   | 10                         | 12   |
| AZ23B47                                                                                           | DG1          | 46.06               | 47   | 47.94 | 2            | 0.5       | 0.05                    | 35   | 97                                       | 375                   | 10                         | 12   |
| AZ23B51                                                                                           | DG2          | 49.98               | 51   | 52.02 | 2            | 0.5       | 0.05                    | 38   | 100                                      | 400                   | 10                         | 12   |
| AZ23B56                                                                                           | DG3          | 54.88               | 56   | 57.12 | 2            | 0.5       | 0.05                    | 42   | 135                                      | 425                   | 9                          | 11   |
| AZ23B62                                                                                           | DG5          | 60.76               | 62   | 63.24 | 2            | 0.5       | 0.05                    | 46.5 | 150                                      | 450                   | 9                          | 12   |
| AZ23B68                                                                                           | DG6          | 66.64               | 68   | 69.36 | 2            | 0.5       | 0.05                    | 51   | 200                                      | 475                   | 10                         | 12   |
| AZ23B75                                                                                           | DG7          | 73.50               | 75   | 76.50 | 2            | 0.5       | 0.05                    | 56   | 250                                      | 500                   | 10                         | 12   |

**Note**(1) Tested with pulses  $t_0 = 5\text{ ms}$

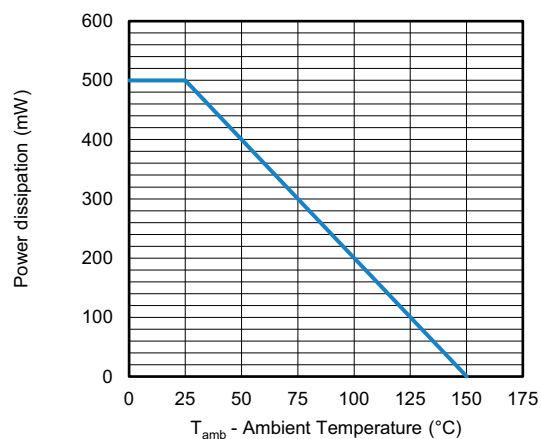
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Admissible Power Dissipation vs. Ambient Temperature

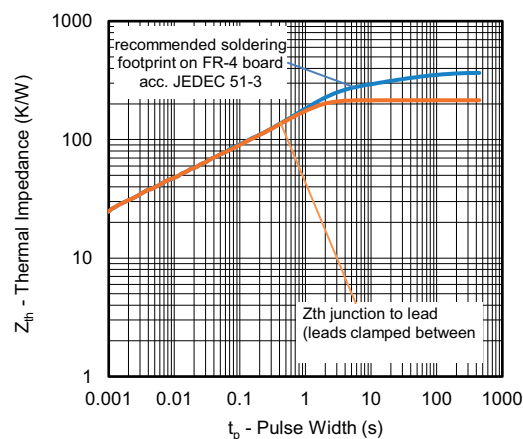
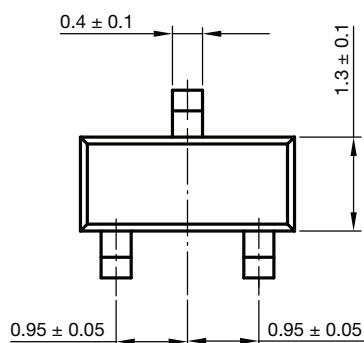
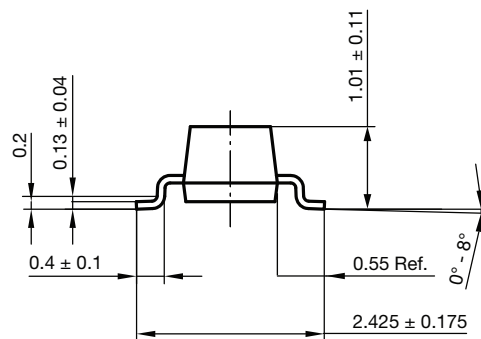
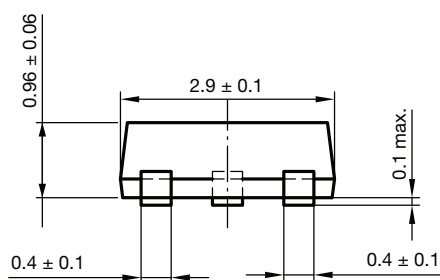
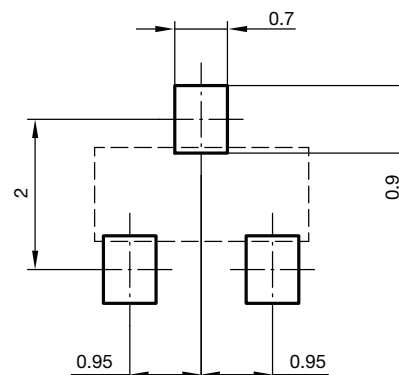


Fig. 2 - Thermal Impedance vs. Time

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


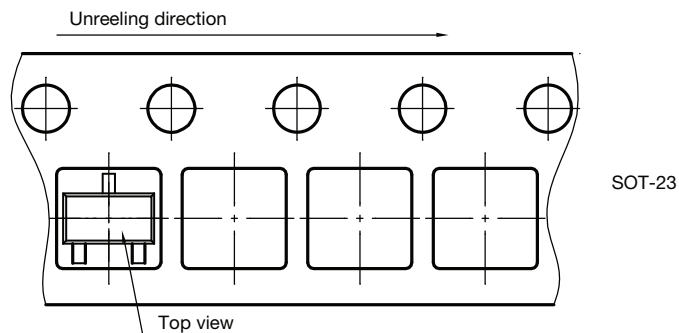
Foot print recommendation:



Document no.: S8-V-3929.01-009 (4)  
Created - Date: 18. Oct. 2021  
Rev. 01 - Date: 18. Jan. 2022

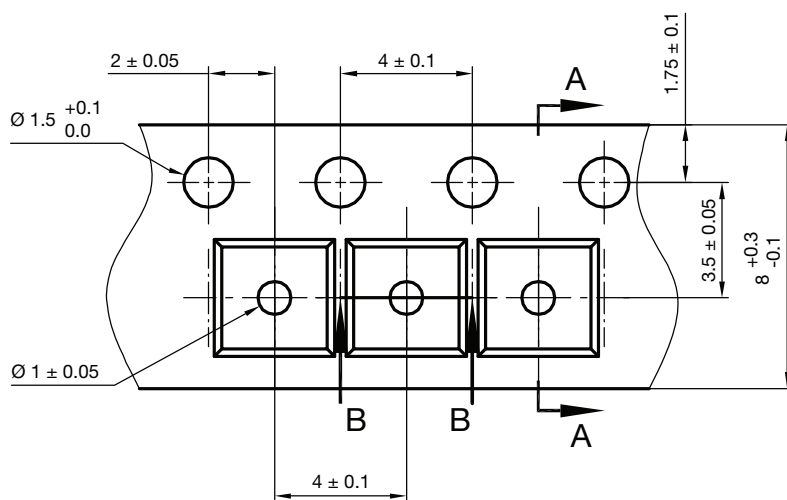


**ORIENTATION IN CARRIER TAPE**

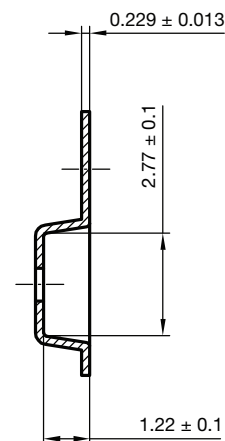


S8-V-3929.01-006 (4)  
Created Date: 04.02.2010  
Rev. 02 Date: 07.11.2022

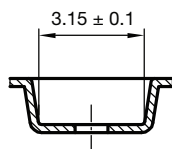
**CARRIER TAPE**



A-A Section



B-B Section



Document no.: S8-V-3929.01-005 (4)  
Created - Date: 04. Feb. 2010



## Disclaimer

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