

## BZX84C 3V3 - BZX84C 33 Series Zeners

Tolerance: C = 5%

### Absolute Maximum Ratings\*

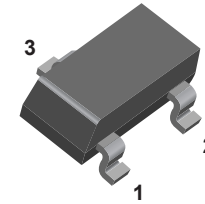
TA = 25°C unless otherwise noted

| Symbol           | Parameter                                           | Value       | Units       |
|------------------|-----------------------------------------------------|-------------|-------------|
| T <sub>STG</sub> | Storage Temperature Range                           | -55 to +150 | °C          |
| T <sub>J</sub>   | Maximum Junction Operating Temperature              | + 150       | °C          |
| P <sub>D</sub>   | Total Device Dissipation<br>Derate above 25°C       | 350<br>1.8  | mW<br>mW/°C |
| I <sub>FRM</sub> | Repetitive Peak Forward Current (I <sub>FRM</sub> ) | 250         | mA          |
| I <sub>ZRM</sub> | Repetitive Peak Working Current (I <sub>ZRM</sub> ) | 250         | mA          |

\*These ratings are limiting values above which the serviceability of the diode may be impaired.

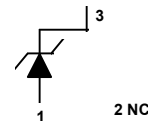
#### NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.



SOT-23

#### CONNECTION DIAGRAM



### Electrical Characteristics

TA = 25°C unless otherwise noted

| Device            | Mark | I <sub>ZT</sub> = 5.0 mA |      |                    | I <sub>ZT</sub> = 1.0 mA |      |                    | I <sub>ZT</sub> = 20 mA |      |                    |
|-------------------|------|--------------------------|------|--------------------|--------------------------|------|--------------------|-------------------------|------|--------------------|
|                   |      | V <sub>Z</sub> (V)       |      | Z <sub>Z</sub> (Ω) | V <sub>Z</sub> (V)       |      | Z <sub>Z</sub> (Ω) | V <sub>Z</sub> (V)      |      | Z <sub>Z</sub> (Ω) |
|                   |      | MIN                      | MAX  |                    | MIN                      | MAX  |                    | MIN                     | MAX  |                    |
| BZX84C 3V3        | Z14  | 3.1                      | 3.5  | 95                 | 2.3                      | 2.9  | 600                | 3.6                     | 4.2  | 40                 |
| BZX84C 3V6        | Z15  | 3.4                      | 3.8  | 90                 | 2.7                      | 3.3  | 600                | 3.9                     | 4.5  | 40                 |
| BZX84C 3V9        | Z16  | 3.7                      | 4.1  | 90                 | 2.9                      | 3.5  | 600                | 4.1                     | 4.7  | 30                 |
| BZX84C 4V3        | Z17  | 4.0                      | 4.6  | 90                 | 3.3                      | 4.0  | 600                | 4.4                     | 5.1  | 30                 |
| <b>BZX84C 4V7</b> | Z1   | 4.4                      | 5.0  | 80                 | 3.7                      | 4.7  | 500                | 4.5                     | 5.4  | 15                 |
| <b>BZX84C 5V1</b> | Z2   | 4.8                      | 5.4  | 60                 | 4.2                      | 5.3  | 480                | 5.0                     | 5.9  | 15                 |
| <b>BZX84C 5V6</b> | Z3   | 5.2                      | 6.0  | 40                 | 4.8                      | 6.0  | 400                | 5.2                     | 6.3  | 10                 |
| <b>BZX84C 6V2</b> | Z4   | 5.8                      | 6.6  | 10                 | 5.6                      | 6.6  | 150                | 5.8                     | 6.8  | 6                  |
| <b>BZX84C 6V8</b> | Z5   | 6.4                      | 7.2  | 15                 | 6.3                      | 7.2  | 80                 | 6.4                     | 7.4  | 6                  |
| BZX84C 7V5        | Z6   | 7.0                      | 7.9  | 15                 | 6.9                      | 7.9  | 80                 | 7.0                     | 8.0  | 6                  |
| <b>BZX84C 8V2</b> | Z7   | 7.7                      | 8.7  | 15                 | 7.6                      | 8.7  | 80                 | 7.7                     | 8.8  | 6                  |
| <b>BZX84C 9V1</b> | Z8   | 8.5                      | 9.6  | 15                 | 8.4                      | 9.6  | 100                | 8.5                     | 9.7  | 8                  |
| <b>BZX84C 10</b>  | Z9   | 9.4                      | 10.6 | 20                 | 9.3                      | 10.6 | 150                | 9.4                     | 10.7 | 10                 |
| BZX84C 11         | Y1   | 10.4                     | 11.6 | 20                 | 10.2                     | 11.6 | 150                | 10.4                    | 11.8 | 10                 |
| <b>BZX84C 12</b>  | Y2   | 11.4                     | 12.7 | 25                 | 11.2                     | 12.7 | 150                | 11.4                    | 12.9 | 10                 |
| BZX84C 13         | Y3   | 12.4                     | 14.1 | 30                 | 12.3                     | 14.0 | 170                | 12.5                    | 14.2 | 15                 |
| <b>BZX84C 15</b>  | Y4   | 13.8                     | 15.6 | 30                 | 13.7                     | 15.5 | 200                | 13.9                    | 15.7 | 20                 |
| BZX84C 16         | Y5   | 15.3                     | 17.1 | 40                 | 15.2                     | 17   | 200                | 15.4                    | 17.2 | 20                 |
| BZX84C 18         | Y6   | 16.8                     | 19.1 | 45                 | 16.7                     | 19   | 225                | 16.9                    | 19.2 | 20                 |
| BZX84C 20         | Y7   | 18.8                     | 21.2 | 55                 | 18.7                     | 21.1 | 225                | 18.9                    | 21.4 | 20                 |
| BZX84C 22         | Y8   | 20.8                     | 23.3 | 55                 | 20.7                     | 23.2 | 250                | 20.9                    | 23.4 | 25                 |
| BZX84C 24         | Y9   | 22.8                     | 25.6 | 70                 | 22.7                     | 25.5 | 250                | 22.9                    | 25.7 | 25                 |

NOTE: National preferred devices in **BOLD**

# BZX84C Series Zeners

(continued)

## Electrical Characteristics (continued)

TA = 25°C unless otherwise noted

| Device           | Mark | I <sub>ZT</sub> = 2.0 mA |      |                       | I <sub>ZT</sub> = 100 µA* |      |                       | I <sub>ZT</sub> = 10 mA |      |                       |
|------------------|------|--------------------------|------|-----------------------|---------------------------|------|-----------------------|-------------------------|------|-----------------------|
|                  |      | V <sub>Z</sub><br>(V)    |      | Z <sub>Z</sub><br>(Ω) | V <sub>Z</sub><br>(V)     |      | Z <sub>Z</sub><br>(Ω) | V <sub>Z</sub><br>(V)   |      | Z <sub>Z</sub><br>(Ω) |
|                  |      | MIN                      | MAX  |                       | MIN                       | MAX  |                       | MIN                     | MAX  |                       |
| BZX84C 27        | Y10  | 25.1                     | 28.9 | 80                    | 25                        | 28.9 | 300                   | 25.2                    | 29.3 | 45                    |
| <b>BZX84C 30</b> | Y11  | 28                       | 32   | 80                    | 27.8                      | 32   | 300                   | 28.1                    | 32.4 | 50                    |
| BZX84C 33        | Y12  | 31                       | 35   | 80                    | 30.8                      | 35   | 325                   | 31.1                    | 35.4 | 55                    |

V<sub>F</sub> Forward Voltage = 0.9 V Maximum @ I<sub>F</sub> = 10 mA for all BZX 84 series

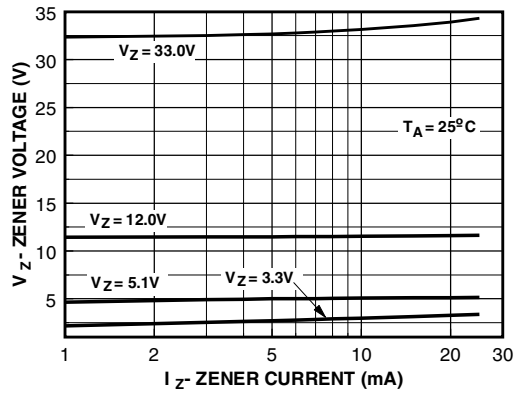
\*Capacitance @ VR= 0.0 volts; Frequency = 1.0 megahertz.

| Device     | V <sub>R</sub><br>(V) | I <sub>R</sub><br>(µA) | CAP*<br>(pF) | D <sub>VZ</sub> / D <sub>t</sub> @ 5.0 mA<br>(mV/k) |       |
|------------|-----------------------|------------------------|--------------|-----------------------------------------------------|-------|
|            |                       |                        |              | MIN                                                 | MAX   |
| BZX84C 3V3 | 1.0                   | 5.0                    | 450          | - 3.5                                               | 0.0   |
| BZX84C 3V6 | 1.0                   | 5.0                    | 450          | - 3.5                                               | 0.0   |
| BZX84C 3V9 | 1.0                   | 5.0                    | 450          | - 3.5                                               | 0.0   |
| BZX84C 4V3 | 1.0                   | 5.0                    | 450          | - 3.5                                               | 0.0   |
| BZX84C 4V7 | 2.0                   | 3                      | 260          | - 3.5                                               | + 0.2 |
| BZX84C 5V1 | 2.0                   | 2                      | 225          | - 2.7                                               | + 1.2 |
| BZX84C 5V6 | 2.0                   | 1                      | 200          | - 2.0                                               | + 2.5 |
| BZX84C 6V2 | 4.0                   | 3                      | 185          | + 0.4                                               | + 3.7 |
| BZX84C 6V8 | 4.0                   | 2                      | 155          | + 1.2                                               | + 4.5 |
| BZX84C 7V5 | 5.0                   | 1                      | 140          | + 2.5                                               | + 5.3 |
| BZX84C 8V2 | 5.0                   | 0.7                    | 135          | + 3.2                                               | + 6.2 |
| BZX84C 9V1 | 6.0                   | 0.5                    | 130          | + 3.8                                               | + 7.0 |
| BZX84C 10  | 7.0                   | 0.2                    | 130          | + 4.5                                               | + 8.0 |
| BZX84C 11  | 8.0                   | 0.1                    | 130          | + 5.4                                               | + 9.0 |
| BZX84C 12  | 8.0                   | 0.1                    | 130          | + 6.0                                               | + 10  |
| BZX84C 13  | 8.0                   | 0.1                    | 120          | + 7.0                                               | + 11  |
| BZX84C 15  | 10.5                  | 0.05                   | 110          | + 9.2                                               | + 13  |
| BZX84C 16  | 11.2                  | 0.05                   | 105          | + 10.4                                              | + 14  |
| BZX84C 18  | 12.6                  | 0.05                   | 100          | + 12.4                                              | + 16  |
| BZX84C 20  | 14                    | 0.05                   | 85           | + 14.4                                              | + 18  |
| BZX84C 22  | 15.4                  | 0.05                   | 85           | + 16.4                                              | + 20  |
| BZX84C 24  | 16.8                  | 0.05                   | 80           | + 18.4                                              | + 22  |
| Device     | V <sub>R</sub><br>(V) | I <sub>R</sub><br>(µA) | CAP*<br>(pF) | D <sub>VZ</sub> / D <sub>t</sub> @ 2.0 mA<br>(mV/k) |       |
|            |                       |                        |              | MIN                                                 | MAX   |
| BZX84C 27  | 18.9                  | 0.05                   | 70           | 21.4                                                | 25.3  |
| BZX84C 30  | 21                    | 0.05                   | 70           | 24.4                                                | 29.4  |
| BZX84C 33  | 23.1                  | 0.05                   | 70           | 27.4                                                | 33.4  |

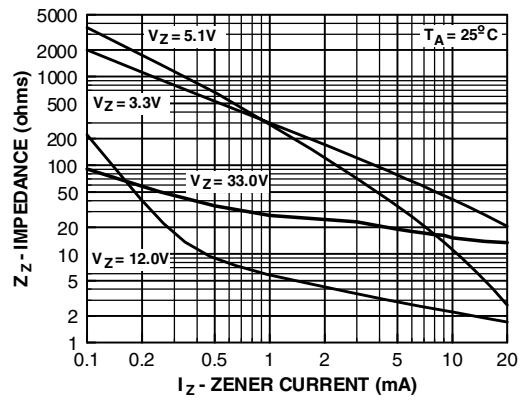
BZX84C 3V3 - BZX84C 33 Series

## Typical Characteristics

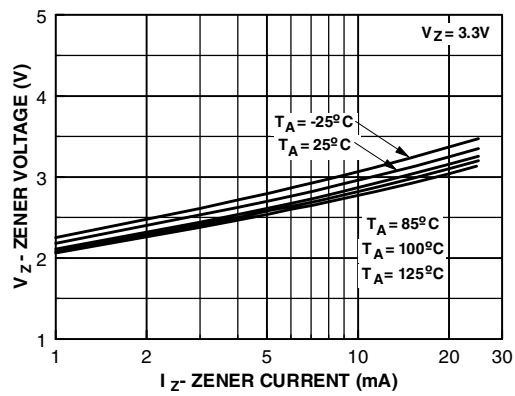
Zener Current vs. Zener Voltage



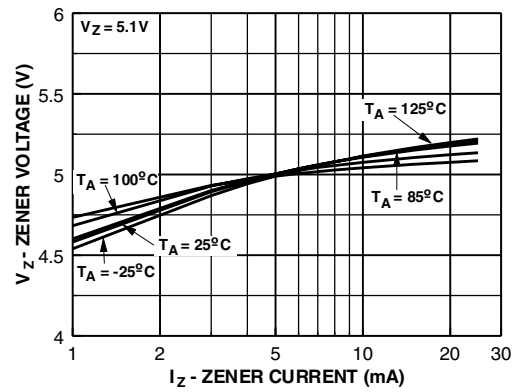
Zener Current vs. Zener Impedance



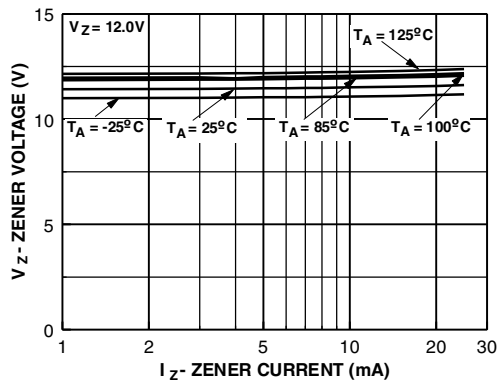
3.3 Zener Voltage vs. Temperature



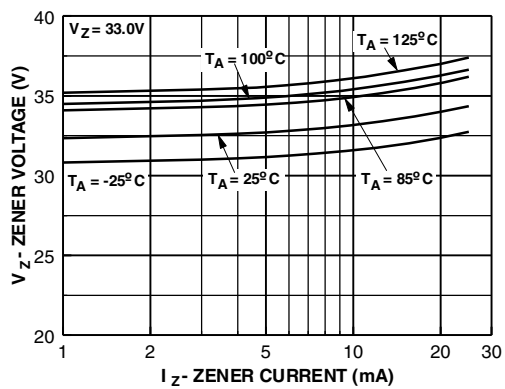
5.1 Zener Voltage vs. Temperature



12 Zener Voltage vs. Zener Temperature



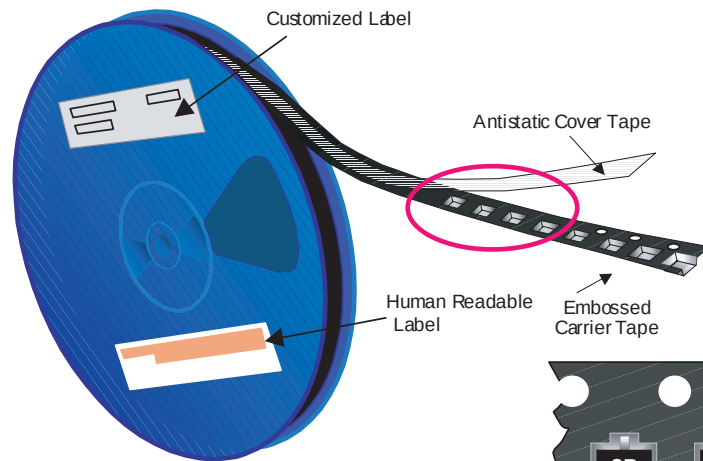
33 Zener Voltage vs. Zener Temperature



## SOT-23 Tape and Reel Data



**SOT-23 Packaging Configuration:** Figure 10



### Packaging Description:

SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 177mm diameter reel. The reels are dark blue in color and are made of polystyrene plastic (anti-static coated). Other option comes in 10,000 units per 13" or 330mm diameter reel. This and some other options are described in the Packaging Information table.

These full reels are individually labeled and placed inside a standard intermediate made of recyclable corrugated brown paper with a Fairchild logo printing. One pizza box contains eight reels maximum. And these intermediate boxes are placed inside a labeled shipping box which comes in different sizes depending on the number of parts shipped.

| SOT-23 Packaging Information |                         |            |
|------------------------------|-------------------------|------------|
| Packaging Option             | Standard (no flow code) | D87Z       |
| Packaging type               | TNR                     | TNR        |
| Qty per Reel/Tube/Bag        | 3,000                   | 10,000     |
| Reel Size                    | 7" Dia                  | 13"        |
| Box Dimension (mm)           | 187x107x183             | 343x343x64 |
| Max qty per Box              | 24,000                  | 30,000     |
| Weight per unit (gm)         | 0.0082                  | 0.0082     |
| Weight per Reel (kg)         | 0.1175                  | 0.4006     |
| Note/Comments                |                         |            |

### SOT-23 Unit Orientation

343mm x 342mm x 64mm  
Intermediate box for L87Z Option

Human Readable Label

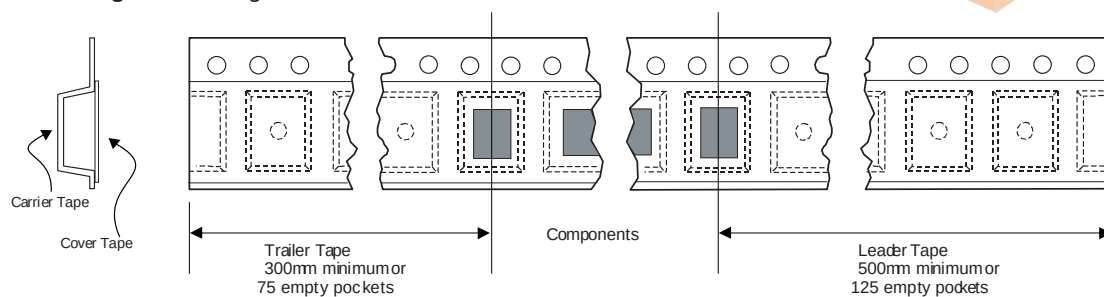
Human Readable Label sample



Human readable Label

187mm x 107mm x 183mm  
Intermediate Box for Standard Option

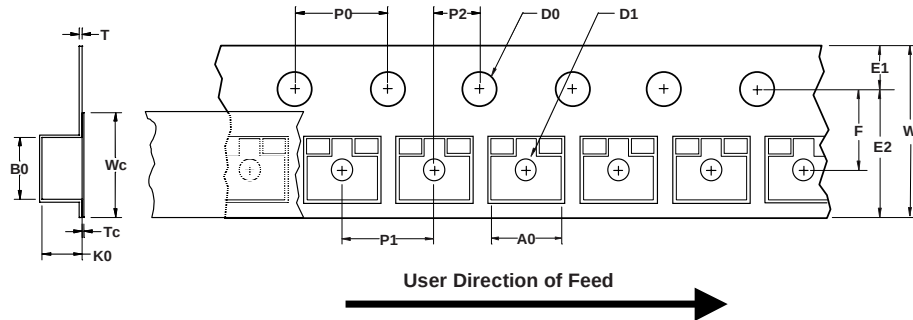
**SOT-23 Tape Leader and Trailer Configuration:** Figure 20



## SOT-23 Tape and Reel Data, continued

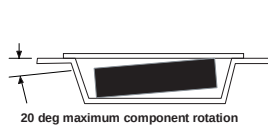
### SOT-23 Embossed Carrier Tape

Configuration: Figure 3.0

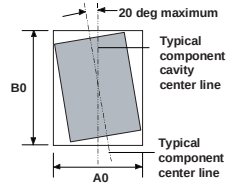


| Dimensions are in millimeter |                 |                 |               |                 |                   |                 |             |                 |               |               |                 |                   |               |                 |
|------------------------------|-----------------|-----------------|---------------|-----------------|-------------------|-----------------|-------------|-----------------|---------------|---------------|-----------------|-------------------|---------------|-----------------|
| Pkg type                     | A0              | B0              | W             | D0              | D1                | E1              | E2          | F               | P1            | P0            | K0              | T                 | Wc            | Tc              |
| SOT-23 (8mm)                 | 3.15<br>+/-0.10 | 2.77<br>+/-0.10 | 8.0<br>+/-0.3 | 1.55<br>+/-0.05 | 1.125<br>+/-0.125 | 1.75<br>+/-0.10 | 6.25<br>min | 3.50<br>+/-0.05 | 4.0<br>+/-0.1 | 4.0<br>+/-0.1 | 1.30<br>+/-0.10 | 0.228<br>+/-0.013 | 5.2<br>+/-0.3 | 0.06<br>+/-0.02 |

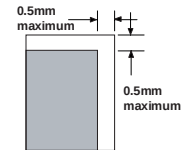
Notes: A0, B0, and K0 dimensions are determined with respect to the EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).



Sketch A (Side or Front Sectional View)  
Component Rotation

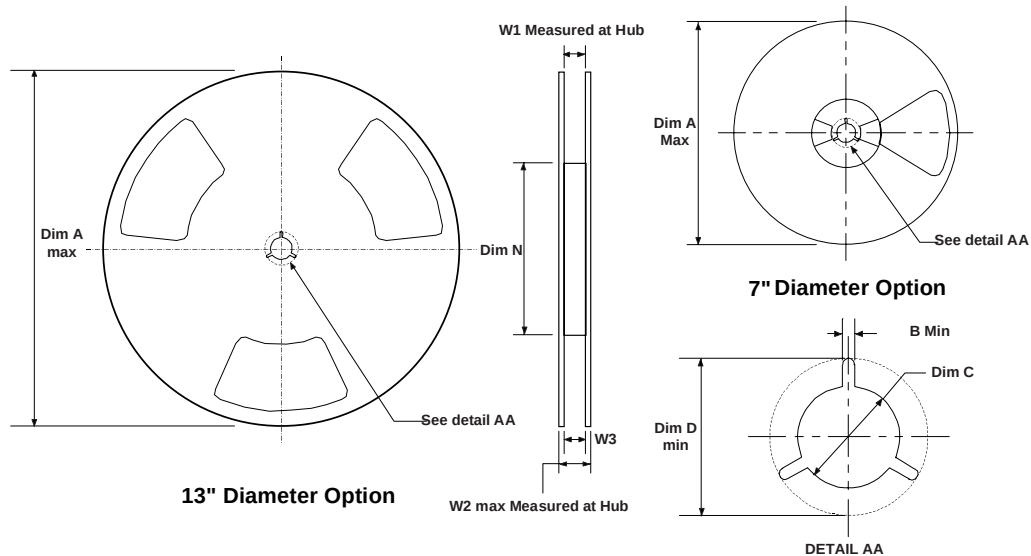


Sketch B (Top View)  
Component Rotation



Sketch C (Top View)  
Component lateral movement

### SOT-23 Reel Configuration: Figure 4.0

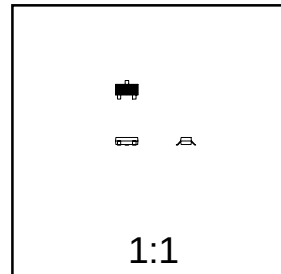
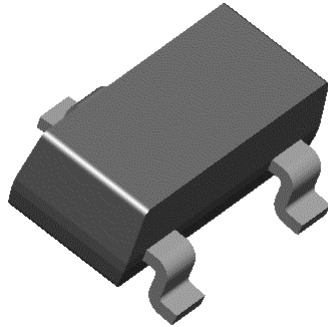


| Dimensions are in inches and millimeters |             |               |              |                                   |               |             |                                   |               |                             |
|------------------------------------------|-------------|---------------|--------------|-----------------------------------|---------------|-------------|-----------------------------------|---------------|-----------------------------|
| Tape Size                                | Reel Option | Dim A         | Dim B        | Dim C                             | Dim D         | Dim N       | Dim W1                            | Dim W2        | Dim W3 (LSL-USL)            |
| 8mm                                      | 7" Dia      | 7.00<br>177.8 | 0.059<br>1.5 | 512 +0.020/-0.008<br>13 +0.5/-0.2 | 0.795<br>20.2 | 2.165<br>55 | 0.331 +0.059/-0.000<br>8.4 +1.5/0 | 0.567<br>14.4 | 0.311 - 0.429<br>7.9 - 10.9 |
| 8mm                                      | 13" Dia     | 13.00<br>330  | 0.059<br>1.5 | 512 +0.020/-0.008<br>13 +0.5/-0.2 | 0.795<br>20.2 | 4.00<br>100 | 0.331 +0.059/-0.000<br>8.4 +1.5/0 | 0.567<br>14.4 | 0.311 - 0.429<br>7.9 - 10.9 |

## SOT-23 Package Dimensions



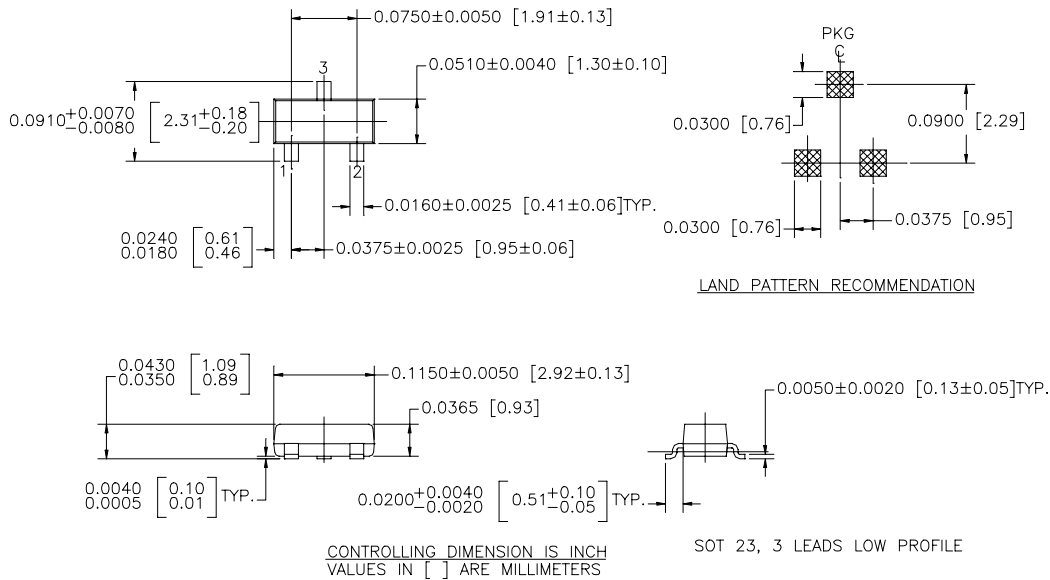
### SOT-23 (FS PKG Code 49)



Scale 1:1 on letter size paper

Dimensions shown below are in:  
inches [millimeters]

Part Weight per unit (gram): 0.0082



NOTE : UNLESS OTHERWISE SPECIFIED

1. STANDARD LEAD FINISH 150 MICROINCHES / 3.81 MICROMETERS  
MINIMUM TIN / LEAD (SOLDER) ON ALLOY 42
2. REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE G, DATED JUL 1993

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| Bottomless <sup>™</sup>          | GlobalOptoisolator <sup>™</sup> | QFET <sup>™</sup>               | TinyLogic <sup>™</sup> |
| CoolFET <sup>™</sup>             | GTO <sup>™</sup>                | QS <sup>™</sup>                 | UHC <sup>™</sup>       |
| CROSSVOLT <sup>™</sup>           | HiSeC <sup>™</sup>              | QT Optoelectronics <sup>™</sup> | VCX <sup>™</sup>       |
| DOVE <sup>™</sup>                | ISOPLANAR <sup>™</sup>          | Quiet Series <sup>™</sup>       |                        |
| E <sup>2</sup> CMOS <sup>™</sup> | MICROWIRE <sup>™</sup>          | SILENT SWITCHER <sup>®</sup>    |                        |
| EnSigna <sup>™</sup>             | OPTOLOGIC <sup>™</sup>          | SMART START <sup>™</sup>        |                        |
| FACT <sup>™</sup>                | OPTOPLANAR <sup>™</sup>         | SuperSOT <sup>™</sup> -3        |                        |
| FACT Quiet Series <sup>™</sup>   | PACMAN <sup>™</sup>             | SuperSOT <sup>™</sup> -6        |                        |
| FAST <sup>®</sup>                | POP <sup>™</sup>                | SuperSOT <sup>™</sup> -8        |                        |

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

## PRODUCT STATUS DEFINITIONS

### Definition of Terms

| Datasheet Identification | Product Status         | Definition                                                                                                                                                                                                            |
|--------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Advance Information      | Formative or In Design | This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.                                                                                    |
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