

## BZX84Cx-Q1 Automotive Zener Voltage Regulator Diodes in SOT-23

### 1 Features

- Total power dissipation: 430mW (max)
- Tolerance:  $\pm 5\%$
- Temperature range:  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- AEC-Q101 qualified
- Leaded package used for automatic optical inspection (AOI)

### 2 Applications

- Voltage regulation
- Over-voltage protection

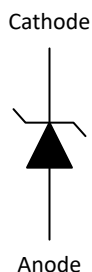
### 3 Description

The BZX84Cx-Q1 is a family of voltage regulating diodes in a SOT-23 package. The diodes are available in Zener voltages ranging from 5.6V to 39V.

#### Package Information

| PART NUMBER | PACKAGE <sup>(1)</sup> | PACKAGE SIZE <sup>(2)</sup> |
|-------------|------------------------|-----------------------------|
| BZX84Cx-Q1  | DBZ (SOT-23, 3)        | 2.92mm × 2.37mm             |

- (1) For more information, see [Section 9](#).  
(2) The package size (length × width) is a nominal value and includes pins, where applicable.



**Functional Block Diagram**



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## 4 Related Products

| ZENER FAMILY                                       | POWER DISSIPATION | PACKAGE |
|----------------------------------------------------|-------------------|---------|
| <a href="#">BZX84Cx / BZX84Cx-Q1</a>               | 430mW             | SOT-23  |
| <a href="#">BZX84WCx / BZX84WCx-Q1</a>             | 360mW             | SC-70   |
| <a href="#">BZX884Cx / BZX884Cx-Q1</a>             | 250mW             | DFN1006 |
| SZMM3Zx <sup>(1)</sup> / SZMM3Zx-Q1 <sup>(1)</sup> | 300mW             | SOD323  |
| SZMM5Zx <sup>(1)</sup> / SZMM5Zx-Q1 <sup>(1)</sup> | 290mW             | SOD523  |

(1) Preview Information (not Production Data)

## 5 Pin Configuration and Functions

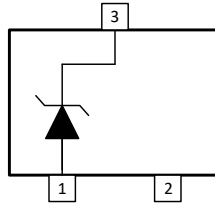


Figure 5-1. DBZ Package, 3-Pin SOT-23 (Top View)

Table 5-1. Pin Functions

| PIN<br>NO. | DESCRIPTION |
|------------|-------------|
| 1          | Anode       |
| 2          | No Connect  |
| 3          | Cathode     |

## 6 Specifications

### 6.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted) <sup>(1)</sup>

|                  |                               | MIN | MAX | UNIT |
|------------------|-------------------------------|-----|-----|------|
| T <sub>A</sub>   | Ambient Operating Temperature | -55 | 150 | °C   |
| T <sub>stg</sub> | Storage Temperature           | -65 | 155 | °C   |

- (1) Operation outside the Absolute Maximum Ratings may cause permanent device damage. Absolute maximum ratings do not imply functional operation of the device at these or any other conditions beyond those listed under Recommended Operating Conditions. If briefly operating outside the Recommended Operating Conditions but within the Absolute Maximum Ratings, the device may not sustain damage, but it may not be fully functional. Operating the device in this manner may affect device reliability, functionality, performance, and shorten the device lifetime.

### 6.2 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)

|                |                                | MIN                    | NOM | MAX | UNIT |
|----------------|--------------------------------|------------------------|-----|-----|------|
| V <sub>F</sub> | Forward Voltage                | I <sub>F</sub> = 10 mA |     | 0.9 | V    |
| T <sub>A</sub> | Operating free-air temperature | -55                    |     | 150 | °C   |

### 6.3 Thermal Information

| THERMAL METRIC <sup>(1)</sup> |                                              | BZX84Cx-Q1   | UNIT |
|-------------------------------|----------------------------------------------|--------------|------|
|                               |                                              | DBZ (SOT-23) |      |
|                               |                                              | 3 PINS       |      |
| R <sub>θJA</sub>              | Junction-to-ambient thermal resistance       | 285.5        | °C/W |
| R <sub>θJC(top)</sub>         | Junction-to-case (top) thermal resistance    | 197.5        | °C/W |
| R <sub>θJB</sub>              | Junction-to-board thermal resistance         | 118.5        | °C/W |
| Ψ <sub>JT</sub>               | Junction-to-top characterization parameter   | 90.6         | °C/W |
| Ψ <sub>JB</sub>               | Junction-to-board characterization parameter | 117.8        | °C/W |
| R <sub>θJC(bot)</sub>         | Junction-to-case (bottom) thermal resistance | N/A          | °C/W |

- (1) For more information about traditional and new thermal metrics, see the [Semiconductor and IC Package Thermal Metrics](#) application note.

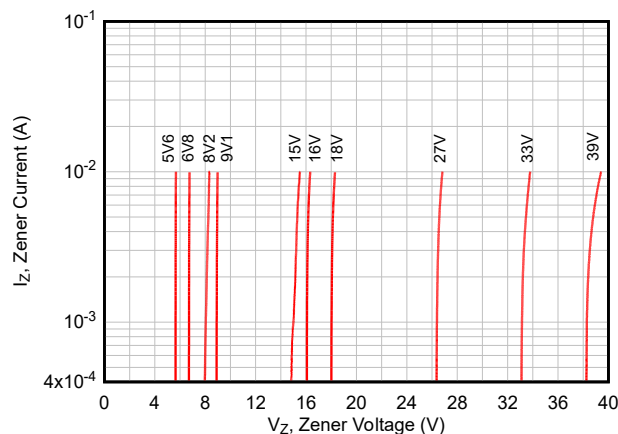
## 6.4 Electrical Characteristics

At  $T_A = 25^\circ\text{C}$  (unless otherwise noted)

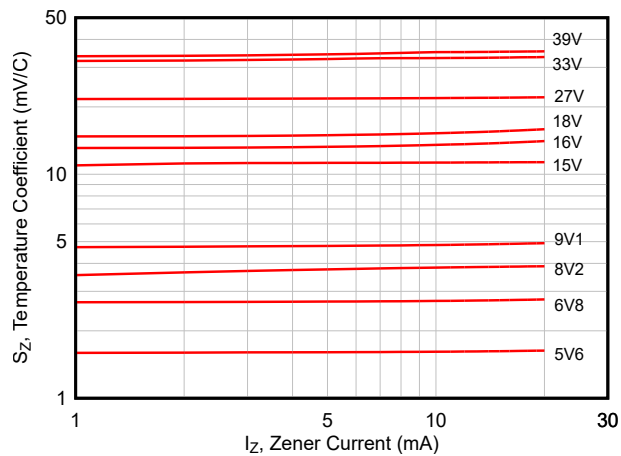
| Part Number  | Zener Voltage<br>$V_Z$ (V) at $I_Z$ |     |       |            | Zener Impedance<br>$Z_{ZT}$ ( $\Omega$ ) at $I_Z$ |            | Reverse Leakage<br>Current<br>$I_R$ ( $\mu\text{A}$ ) |           | Temperature<br>Coefficient<br>$S_Z$ (mV/C) at $I_Z$ |            | Capacitance<br>$C_D$ (pF) <sup>(1)</sup> |
|--------------|-------------------------------------|-----|-------|------------|---------------------------------------------------|------------|-------------------------------------------------------|-----------|-----------------------------------------------------|------------|------------------------------------------|
|              | MIN                                 | TYP | MAX   | $I_Z$ (mA) | MAX                                               | $I_Z$ (mA) | MAX                                                   | $V_R$ (V) | MAX                                                 | $I_Z$ (mA) | MAX                                      |
| BZX84C5V6-Q1 | 5.2                                 | 5.6 | 6     | 5          | 40                                                | 5          | 0.75                                                  | 2         | 2.5                                                 | 5          | 200                                      |
| BZX84C6V8-Q1 | 6.4                                 | 6.8 | 7.2   | 5          | 15                                                | 5          | 0.1                                                   | 4         | 4.5                                                 | 5          | 120                                      |
| BZX84C8V2-Q1 | 7.79                                | 8.2 | 8.61  | 5          | 15                                                | 5          | 0.6                                                   | 5.75      | 6.2                                                 | 5          | 80                                       |
| BZX84C9V1-Q1 | 8.5                                 | 9.1 | 9.6   | 5          | 15                                                | 5          | 0.2                                                   | 6         | 8                                                   | 5          | 90                                       |
| BZX84C15V-Q1 | 14.25                               | 15  | 15.75 | 5          | 30                                                | 5          | 0.03                                                  | 10.5      | 13                                                  | 5          | 50                                       |
| BZX84C16V-Q1 | 15.3                                | 16  | 17.1  | 5          | 40                                                | 5          | 0.03                                                  | 11.2      | 15.5                                                | 5          | 50                                       |
| BZX84C18V-Q1 | 16.8                                | 18  | 19.1  | 5          | 45                                                | 5          | 0.03                                                  | 12.6      | 19                                                  | 5          | 45                                       |
| BZX84C27V-Q1 | 25.65                               | 27  | 28.35 | 2          | 80                                                | 2          | 0.03                                                  | 18.9      | 25.3                                                | 2          | 35                                       |
| BZX84C33V-Q1 | 31                                  | 33  | 35    | 2          | 90                                                | 2          | 0.03                                                  | 23.1      | 37.5                                                | 2          | 30                                       |
| BZX84C39V-Q1 | 37.05                               | 39  | 40.95 | 2          | 130                                               | 2          | 0.03                                                  | 27.3      | 41.2                                                | 2          | 25                                       |

(1)  $f = 1\text{MHz}$ ,  $V_R = 0$

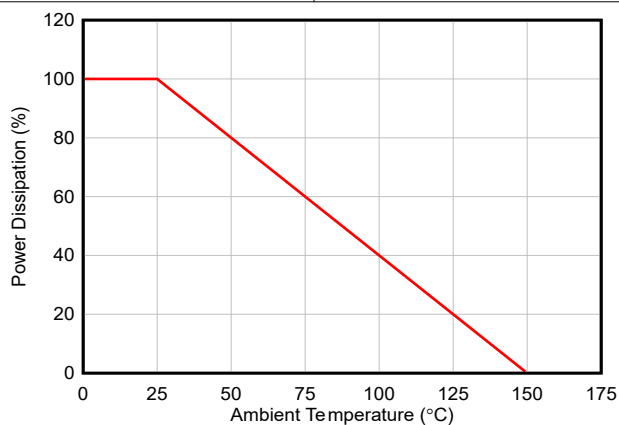
## 6.5 Typical Characteristics



**Figure 6-1. Zener Current vs Zener Voltage**



**Figure 6-2. Temperature Coefficient**



**Figure 6-3. Power Derating Curve**

## 7 Device and Documentation Support

### 7.1 Documentation Support

#### 7.1.1 Related Documentation

For related documentation, see the following:

- Texas Instruments, [Diodes Packaging and Layout Guide](#)
- Texas Instruments, [Diodes Layout Guide User's Guide](#)
- Texas Instruments, [Generic Evaluation Module User's Guide](#)
- Texas Instruments, [Why Use TI Zener Diodes for High Power Applications](#)
- Texas Instruments, [Low Noise Zeners](#)

### 7.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](https://www.ti.com). Click on *Notifications* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

### 7.3 Support Resources

TI E2E™ support forums are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

### 7.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.

All trademarks are the property of their respective owners.

### 7.5 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

### 7.6 Glossary

#### TI Glossary

This glossary lists and explains terms, acronyms, and definitions.

## 8 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

| Changes from Revision C (December 2025) to Revision D (March 2026) | Page |
|--------------------------------------------------------------------|------|
|--------------------------------------------------------------------|------|

- |                                            |   |
|--------------------------------------------|---|
| • Added BZX84C33V-Q1 to the datasheet..... | 1 |
|--------------------------------------------|---|

| Changes from Revision B (August 2025) to Revision C (December 2025) | Page |
|---------------------------------------------------------------------|------|
|---------------------------------------------------------------------|------|

- |                                                                                                   |   |
|---------------------------------------------------------------------------------------------------|---|
| • Changed the device status from Advanced to Production Data.....                                 | 1 |
| • Added the BZX84C5V6-Q1, BZX84C6V8-Q1, BZX84C9V1-Q1, BZX84C16V-Q1, and BZX84C18V-Q1 devices..... | 1 |

| Changes from Revision A (January 2025) to Revision B (August 2025) | Page |
|--------------------------------------------------------------------|------|
|--------------------------------------------------------------------|------|

- |                                                                                 |   |
|---------------------------------------------------------------------------------|---|
| • Updated power dissipation from 250mW to 430mW (max).....                      | 1 |
| • Updated <i>Electrical Characteristics</i> to include 15V and 39V devices..... | 5 |

## 9 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

## PACKAGING INFORMATION

| Orderable part number           | Status<br>(1) | Material type<br>(2) | Package   Pins   | Package qty   Carrier | RoHS<br>(3) | Lead finish/<br>Ball material<br>(4) | MSL rating/<br>Peak reflow<br>(5) | Op temp (°C)           | Part marking<br>(6) |
|---------------------------------|---------------|----------------------|------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|------------------------|---------------------|
| <a href="#">BZX84C15VDBZRQ1</a> | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -55 to 150             | 3LMG                |
| BZX84C15VDBZRQ1.B               | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | See<br>BZX84C15VDBZRQ1 | 3LMG                |
| <a href="#">BZX84C16VDBZRQ1</a> | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -                      | 3WAG                |
| <a href="#">BZX84C18VDBZRQ1</a> | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -                      | 3WDG                |
| <a href="#">BZX84C27VDBZRQ1</a> | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -55 to 150             | 3LNG                |
| BZX84C27VDBZRQ1.B               | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | See<br>BZX84C27VDBZRQ1 | 3LNG                |
| <a href="#">BZX84C33VDBZRQ1</a> | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -55 to 150             | 3WLG                |
| <a href="#">BZX84C39VDBZRQ1</a> | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -55 to 150             | 3IZG                |
| BZX84C39VDBZRQ1.B               | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | See<br>BZX84C39VDBZRQ1 | 3IZG                |
| <a href="#">BZX84C5V6DBZRQ1</a> | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -                      | 3WIG                |
| <a href="#">BZX84C6V8DBZRQ1</a> | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -                      | 3WFG                |
| <a href="#">BZX84C8V2DBZRQ1</a> | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -55 to 150             | 3IWG                |
| BZX84C8V2DBZRQ1.B               | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | See<br>BZX84C8V2DBZRQ1 | 3IWG                |
| <a href="#">BZX84C9V1DBZRQ1</a> | Active        | Production           | SOT-23 (DBZ)   3 | 3000   LARGE T&R      | Yes         | SN                                   | Level-1-260C-UNLIM                | -                      | 3WHG                |

<sup>(1)</sup> **Status:** For more details on status, see our [product life cycle](#).

<sup>(2)</sup> **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

<sup>(3)</sup> **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

<sup>(4)</sup> **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

<sup>(5)</sup> **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

**(6) Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

**Important Information and Disclaimer:** The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

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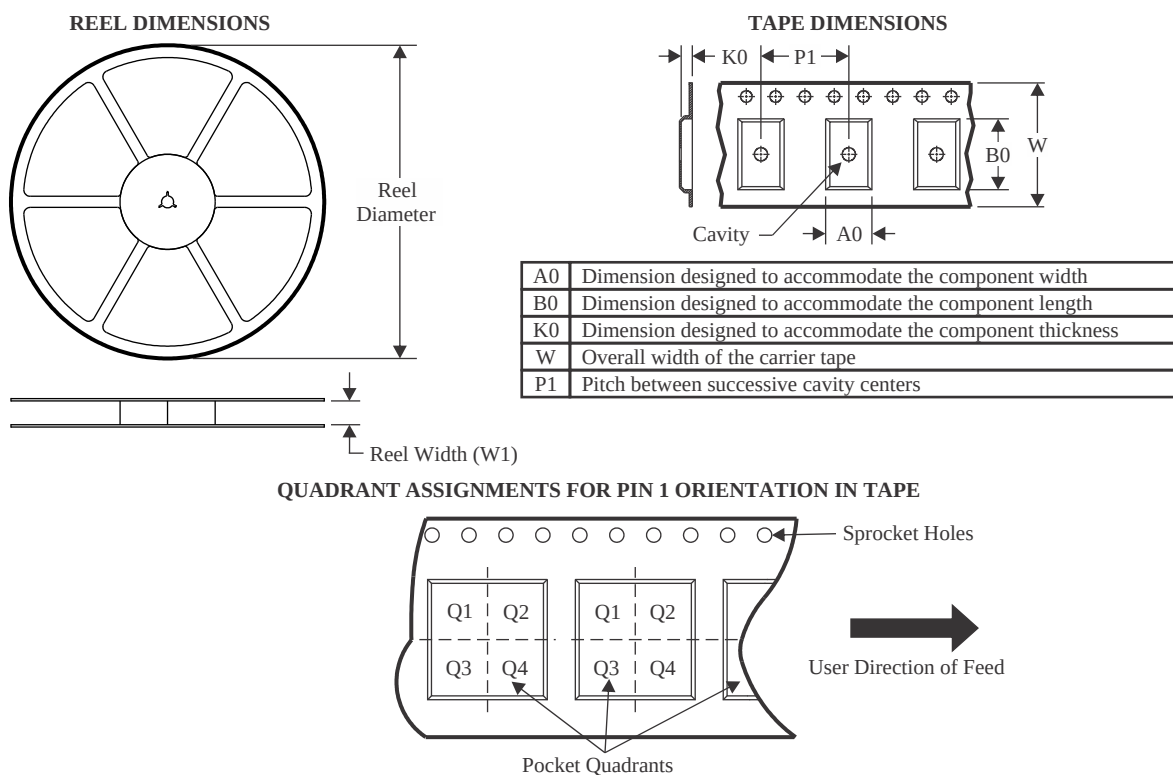
**OTHER QUALIFIED VERSIONS OF BZX84C15V-Q1, BZX84C16V-Q1, BZX84C18V-Q1, BZX84C27V-Q1, BZX84C33V-Q1, BZX84C39V-Q1, BZX84C5V6-Q1, BZX84C6V8-Q1, BZX84C8V2-Q1, BZX84C9V1-Q1 :**

- Catalog : [BZX84C15V](#), [BZX84C16V](#), [BZX84C18V](#), [BZX84C27V](#), [BZX84C33V](#), [BZX84C39V](#), [BZX84C5V6](#), [BZX84C6V8](#), [BZX84C8V2](#), [BZX84C9V1](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product

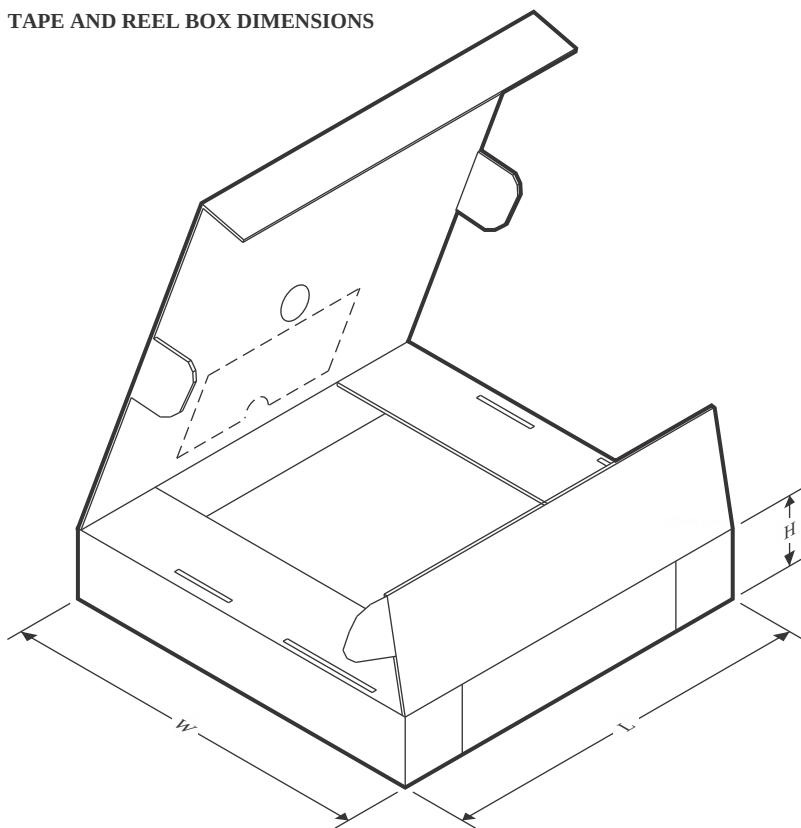
## TAPE AND REEL INFORMATION



\*All dimensions are nominal

| Device          | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|-----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| BZX84C15VDBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 180.0              | 8.4                | 3.2     | 2.85    | 1.3     | 4.0     | 8.0    | Q3            |
| BZX84C16VDBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 180.0              | 8.4                | 3.2     | 2.85    | 1.3     | 4.0     | 8.0    | Q3            |
| BZX84C18VDBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 180.0              | 8.4                | 3.2     | 2.85    | 1.3     | 4.0     | 8.0    | Q3            |
| BZX84C27VDBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 180.0              | 8.4                | 3.2     | 2.85    | 1.3     | 4.0     | 8.0    | Q3            |
| BZX84C33VDBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 180.0              | 8.4                | 3.2     | 2.85    | 1.3     | 4.0     | 8.0    | Q3            |
| BZX84C39VDBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 180.0              | 8.4                | 3.2     | 2.85    | 1.3     | 4.0     | 8.0    | Q3            |
| BZX84C5V6DBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 180.0              | 8.4                | 3.2     | 2.85    | 1.3     | 4.0     | 8.0    | Q3            |
| BZX84C6V8DBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 180.0              | 8.4                | 3.2     | 2.85    | 1.3     | 4.0     | 8.0    | Q3            |
| BZX84C8V2DBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 180.0              | 8.4                | 3.2     | 2.85    | 1.3     | 4.0     | 8.0    | Q3            |
| BZX84C9V1DBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 180.0              | 8.4                | 3.2     | 2.85    | 1.3     | 4.0     | 8.0    | Q3            |

## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

| Device          | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|-----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| BZX84C15VDBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 210.0       | 185.0      | 35.0        |
| BZX84C16VDBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 210.0       | 185.0      | 35.0        |
| BZX84C18VDBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 210.0       | 185.0      | 35.0        |
| BZX84C27VDBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 210.0       | 185.0      | 35.0        |
| BZX84C33VDBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 210.0       | 185.0      | 35.0        |
| BZX84C39VDBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 210.0       | 185.0      | 35.0        |
| BZX84C5V6DBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 210.0       | 185.0      | 35.0        |
| BZX84C6V8DBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 210.0       | 185.0      | 35.0        |
| BZX84C8V2DBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 210.0       | 185.0      | 35.0        |
| BZX84C9V1DBZRQ1 | SOT-23       | DBZ             | 3    | 3000 | 210.0       | 185.0      | 35.0        |

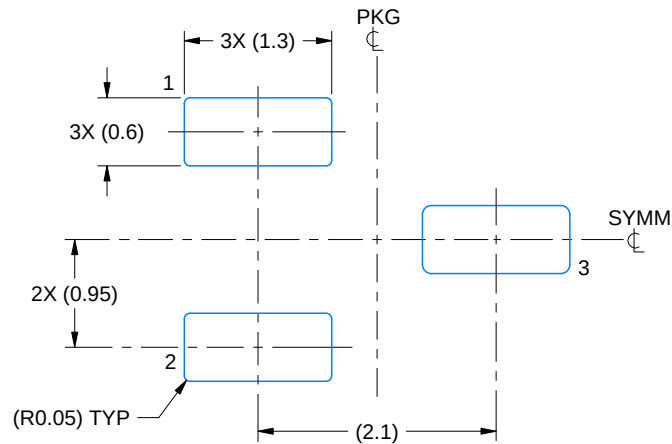


# EXAMPLE BOARD LAYOUT

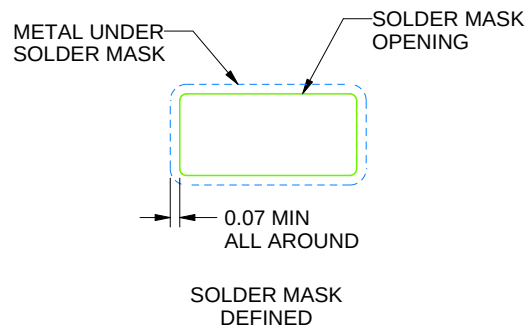
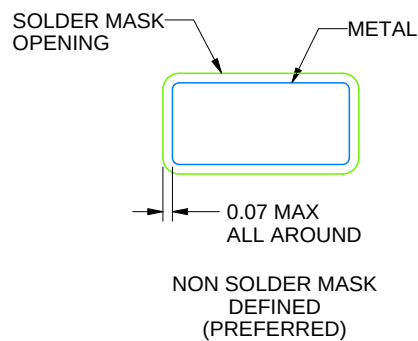
DBZ0003A

SOT-23 - 1.12 mm max height

SMALL OUTLINE TRANSISTOR



LAND PATTERN EXAMPLE  
SCALE:15X



SOLDER MASK DETAILS

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NOTES: (continued)

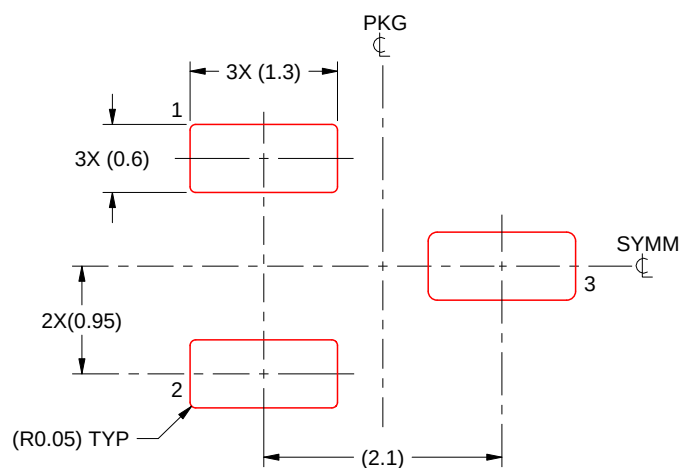
- 5. Publication IPC-7351 may have alternate designs.
- 6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

DBZ0003A

SOT-23 - 1.12 mm max height

SMALL OUTLINE TRANSISTOR



SOLDER PASTE EXAMPLE  
BASED ON 0.125 THICK STENCIL  
SCALE:15X

4214838/F 08/2024

NOTES: (continued)

7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

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