



**THE DATASHEET OF
BZX84C4V7Q-13-F**

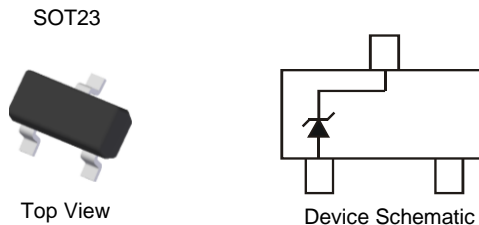


Features

- Planar Die Construction
- 350mW Power Dissipation
- Zener Voltages from 2.4V - 51V
- Ideally Suited for Automated Assembly Processes
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208^③
- Polarity: See Diagram
- Weight: 0.008 grams (Approximate)



Ordering Information (Note 5)

| Part Number | Compliance | Case | Packaging |
|---------------------|------------|-------|--------------------|
| (Type Number)-7-F | Standard | SOT23 | 3,000/Tape & Reel |
| (Type Number)Q-7-F | Automotive | SOT23 | 3,000/Tape & Reel |
| (Type Number)-13-F | Standard | SOT23 | 10,000/Tape & Reel |
| (Type Number)Q-13-F | Automotive | SOT23 | 10,000/Tape & Reel |

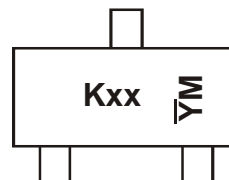
*For (Type Number), please see the Electrical Characteristics Table. Example: 6.2V Zener = BZX84C6V2-7-F.

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3), compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. BZX84C2V4-BZX84C39 products manufactured with Date Code OW (week 42, 2009) and newer are built with Green Molding Compound. BZX84C2V4-BZX84C39 products manufactured prior to Date Code OW are built with Non-Green Molding Compound and may contain Halogens or Sb₂O₃ Fire Retardants. BZX84C43-BZX84C51 products manufactured with Date Code V9 (week 33, 2008) and newer are built with Green Molding Compound. BZX84C43-BZX84C51 products manufactured prior to Date Code V9 are built with Non-Green Molding Compound and may contain Halogens or Sb₂O₃ Fire Retardants.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



xx = Product Type Marking Code
(See Electrical Characteristics Table)
YM = Date Code Marking for Shanghai
Assembly / Test site
Y = Year (ex: Z = 2012)
M = Month (ex: 9 = September)



xx = Product Type Marking Code
(See Electrical Characteristics Table)
YM = Date Code Marking for Chengdu
Assembly / Test site
Y = Year (ex: Z = 2012)
M = Month (ex: 9 = September)

Date Code Key

| Year | 1998 | ... | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | J | ... | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|----------------|-------|------|
| Forward Voltage @ I _F = 10mA | V _F | 0.9 | V |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 6) | P _D | 300 | mW |
| Power Dissipation (Note 7) | P _D | 350 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 6) | R _{θJA} | 417 | °C/W |
| Thermal Resistance, Junction to Ambient Air (Note 7) | R _{θJA} | 357 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -65 to +150 | °C |

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Type Number | Marking Code | Zener Voltage Range (Note 8) | | | | Maximum Zener Impedance f = 1KHz | | | Maximum Reverse Current (Note 8) | | Temperature Coefficient @ I _{ZT} mV/°C | |
|-------------|--------------|----------------------------------|---------|---------|-----------------|-----------------------------------|-----------------------------------|----------------|----------------------------------|------|---|------|
| | | V _Z @ I _{ZT} | | | I _{ZT} | Z _{ZT} @ I _{ZT} | Z _{ZK} @ I _{ZK} | I _R | V _R | Min | Max | |
| | | Nom (V) | Min (V) | Max (V) | (mA) | (Ω) | (Ω) | (mA) | (μA) | | | (V) |
| BZX84C2V4 | ZB | 2.4 | 2.2 | 2.6 | 5.0 | 100 | 600 | 1.0 | 50 | 1.0 | -3.5 | 0 |
| BZX84C2V7 | ZC | 2.7 | 2.5 | 2.9 | 5.0 | 100 | 600 | 1.0 | 20 | 1.0 | -3.5 | 0 |
| BZX84C3V0 | ZD | 3.0 | 2.8 | 3.2 | 5.0 | 95 | 600 | 1.0 | 10 | 1.0 | -3.5 | 0 |
| BZX84C3V3 | ZE | 3.3 | 3.1 | 3.5 | 5.0 | 95 | 600 | 1.0 | 5.0 | 1.0 | -3.5 | 0 |
| BZX84C3V6 | ZF | 3.6 | 3.4 | 3.8 | 5.0 | 90 | 600 | 1.0 | 5.0 | 1.0 | -3.5 | 0 |
| BZX84C3V9 | ZG | 3.9 | 3.7 | 4.1 | 5.0 | 90 | 600 | 1.0 | 3.0 | 1.0 | -3.5 | 0 |
| BZX84C4V3 | ZH | 4.3 | 4.0 | 4.6 | 5.0 | 90 | 600 | 1.0 | 3.0 | 1.0 | -3.5 | 0 |
| BZX84C4V7 | Z1 | 4.7 | 4.4 | 5.0 | 5.0 | 80 | 500 | 1.0 | 3.0 | 2.0 | -3.5 | 0.2 |
| BZX84C5V1 | Z2 | 5.1 | 4.8 | 5.4 | 5.0 | 60 | 480 | 1.0 | 2.0 | 2.0 | -2.7 | 1.2 |
| BZX84C5V6 | Z3 | 5.6 | 5.2 | 6.0 | 5.0 | 40 | 400 | 1.0 | 1.0 | 2.0 | -2.0 | 2.5 |
| BZX84C6V2 | Z4 | 6.2 | 5.8 | 6.6 | 5.0 | 10 | 150 | 1.0 | 3.0 | 4.0 | 0.4 | 3.7 |
| BZX84C6V8 | Z5 | 6.8 | 6.4 | 7.2 | 5.0 | 15 | 80 | 1.0 | 2.0 | 4.0 | 1.2 | 4.5 |
| BZX84C7V5 | Z6 | 7.5 | 7.0 | 7.9 | 5.0 | 15 | 80 | 1.0 | 1.0 | 5.0 | 2.5 | 5.3 |
| BZX84C8V2 | Z7 | 8.2 | 7.7 | 8.7 | 5.0 | 15 | 80 | 1.0 | 0.7 | 5.0 | 3.2 | 6.2 |
| BZX84C9V1 | Z8 | 9.1 | 8.5 | 9.6 | 5.0 | 15 | 100 | 1.0 | 0.5 | 6.0 | 3.8 | 7.0 |
| BZX84C10 | Z9 | 10 | 9.4 | 10.6 | 5.0 | 20 | 150 | 1.0 | 0.2 | 7.0 | 4.5 | 8.0 |
| BZX84C11 | Y1 | 11 | 10.4 | 11.6 | 5.0 | 20 | 150 | 1.0 | 0.1 | 8.0 | 5.4 | 9.0 |
| BZX84C12 | Y2 | 12 | 11.4 | 12.7 | 5.0 | 25 | 150 | 1.0 | 0.1 | 8.0 | 6.0 | 10.0 |
| BZX84C13 | Y3 | 13 | 12.4 | 14.1 | 5.0 | 30 | 170 | 1.0 | 0.1 | 8.0 | 7.0 | 11.0 |
| BZX84C15 | Y4 | 15 | 13.8 | 15.6 | 5.0 | 30 | 200 | 1.0 | 0.1 | 10.5 | 9.2 | 13.0 |
| BZX84C16 | Y5 | 16 | 15.3 | 17.1 | 5.0 | 40 | 200 | 1.0 | 0.1 | 11.2 | 10.4 | 14.0 |
| BZX84C18 | Y6 | 18 | 16.8 | 19.1 | 5.0 | 45 | 225 | 1.0 | 0.1 | 12.6 | 12.4 | 16.0 |
| BZX84C20 | Y7 | 20 | 18.8 | 21.2 | 5.0 | 55 | 225 | 1.0 | 0.1 | 14.0 | 14.4 | 18.0 |
| BZX84C22 | Y8 | 22 | 20.8 | 23.3 | 5.0 | 55 | 250 | 1.0 | 0.1 | 15.4 | 16.4 | - |
| BZX84C24 | Y9 | 24 | 22.8 | 25.6 | 5.0 | 70 | 250 | 1.0 | 0.1 | 16.8 | 18.4 | - |
| BZX84C27 | YA | 27 | 25.1 | 28.9 | 2.0 | 80 | 300 | 0.5 | 0.1 | 18.9 | 21.4 | - |
| BZX84C30 | YB | 30 | 28.0 | 32.0 | 2.0 | 80 | 300 | 0.5 | 0.1 | 21.0 | 24.4 | - |
| BZX84C33 | YC | 33 | 31.0 | 35.0 | 2.0 | 80 | 325 | 0.5 | 0.1 | 23.1 | 27.4 | - |
| BZX84C36 | YD | 36 | 34.0 | 38.0 | 2.0 | 90 | 350 | 0.5 | 0.1 | 25.2 | 30.4 | - |
| BZX84C39 | YE | 39 | 37.0 | 41.0 | 2.0 | 130 | 350 | 0.5 | 0.1 | 27.3 | 33.4 | - |
| BZX84C43 | YF | 43 | 40.0 | 46.0 | 2.0 | 150 | 375 | 0.5 | 0.1 | 30.1 | 37.6 | - |
| BZX84C47 | YG | 47 | 44.0 | 50.0 | 2.0 | 170 | 375 | 0.5 | 0.1 | 32.9 | 42.0 | - |
| BZX84C51 | YH | 51 | 48.0 | 54.0 | 2.0 | 180 | 400 | 0.5 | 0.1 | 35.7 | 46.6 | - |

Notes: 6. Device mounted on FR-4 PC board with recommended pad layout, which can be found on our website at <http://www.diodes.com>.
7. Valid provided the terminals are kept at ambient temperature.
8. Short duration pulse test used to minimize self-heating effect.



Fig. 1 Power Derating Curve



Fig. 2 Typical Zener Breakdown Characteristics



Fig. 3 Typical Zener Breakdown Characteristics



Fig. 4 Typical Zener Breakdown Characteristics



Fig. 5 Typical Total Capacitance vs. Nominal Zener Voltage



Fig. 6 Typical Total Capacitance vs. Nominal Zener Voltage

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| SOT23 | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.37 | 0.51 | 0.40 |
| B | 1.20 | 1.40 | 1.30 |
| C | 2.30 | 2.50 | 2.40 |
| D | 0.89 | 1.03 | 0.915 |
| F | 0.45 | 0.60 | 0.535 |
| G | 1.78 | 2.05 | 1.83 |
| H | 2.80 | 3.00 | 2.90 |
| J | 0.013 | 0.10 | 0.05 |
| K | 0.890 | 1.00 | 0.975 |
| K1 | 0.903 | 1.10 | 1.025 |
| L | 0.45 | 0.61 | 0.55 |
| L1 | 0.25 | 0.55 | 0.40 |
| M | 0.085 | 0.150 | 0.110 |
| a | 0° | 8° | -- |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 2.0 |
| X | 0.8 |
| X1 | 1.35 |
| Y | 0.9 |
| Y1 | 2.9 |

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