



**THE DATASHEET OF  
BZX84C9V1Q-7-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<sup>③</sup>
- 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 |

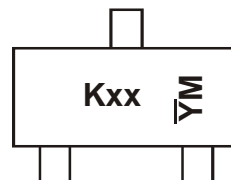
\*For (Type Number), please see the Electrical Characteristics Table. Example: 6.2V Zener = BZX84C6V2-7-F.

- 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 Sb<sub>2</sub>O<sub>3</sub> 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 Sb<sub>2</sub>O<sub>3</sub> 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<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                          | Symbol         | Value | Unit |
|---|----------------|-------|------|
| Forward Voltage @ I <sub>F</sub> = 10mA | V <sub>F</sub> | 0.9   | V    |

**Thermal Characteristics**

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

**Electrical Characteristics** (@T<sub>A</sub> = +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 <sub>ZT</sub> mV/°C |      |
|-------------|--------------|----------------------------------|---------|---------|-----------------|-----------------------------------|-----------------------------------|----------------|----------------------------------|------|---|------|
|             |              | V <sub>Z</sub> @ I <sub>ZT</sub> |         |         | I <sub>ZT</sub> | Z <sub>ZT</sub> @ I <sub>ZT</sub> | Z <sub>ZK</sub> @ I <sub>ZK</sub> | I <sub>R</sub> | V <sub>R</sub>                   | 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

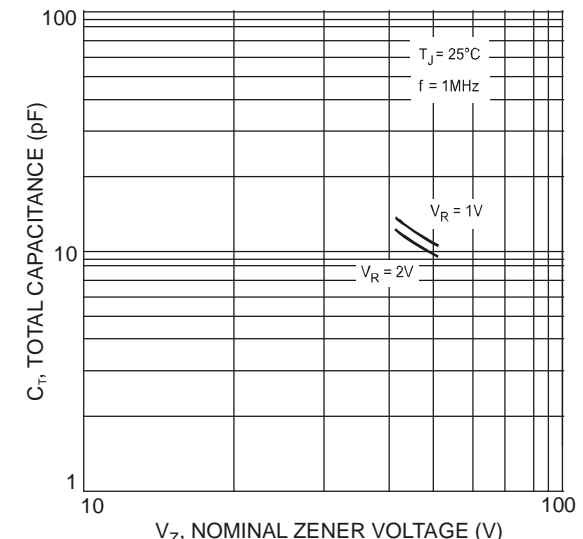


Fig. 6 Typical Total Capacitance vs. Nominal Zener Voltage

**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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