

## Features

- Planar Die Construction
- 500mW Power Dissipation on Ceramic PCB
- General Purpose, Medium Current
- Ideally Suited for Automated Assembly Processes
- **Lead, Halogen and Antimony Free, RoHS Compliant "Green" Device (Notes 2 and 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

- Case: SOD-123
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe)
- Polarity: Cathode Band
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.010 grams (approximate)



Top View

## Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Single phase, half wave, 60Hz, resistive or inductive load.  
 For capacitance load, derate current by 20%.

| Characteristic                        | Symbol | Value | Unit |
|---------------------------------------|--------|-------|------|
| Forward Voltage @ $I_F = 10\text{mA}$ | $V_F$  | 0.9   | V    |

## Thermal Characteristics

| Characteristic                                       | Symbol          | Value       | Unit               |
|--|-----------------|-------------|--------------------|
| Power Dissipation (Note 1)                           | $P_D$           | 500         | mW                 |
| Thermal Resistance, Junction to Ambient Air (Note 1) | $R_{\theta JA}$ | 250         | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range              | $T_J, T_{STG}$  | -65 to +150 | $^\circ\text{C}$   |

- Notes:
1. Device mounted on ceramic PCB; 7.6mm x 9.4mm x 0.87mm with pad areas 25mm<sup>2</sup>.
  2. No purposefully added lead. Halogen and Antimony Free.
  3. Product manufactured with Data Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product 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.

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

| Type Number (Note 4) | Marking Codes | Zener Voltage Range (Note 5)     |         |         |                 | Maximum Zener Impedance (Note 4)  |                                   |                 | Maximum Reverse Current (Note 5) |                  | Typical Temperature Coefficient @ I <sub>ZT</sub> C mV/°C |      | Test Current I <sub>ZT</sub> C mA |
|----------------------|---------------|----------------------------------|---------|---------|-----------------|-----------------------------------|-----------------------------------|-----------------|----------------------------------|------------------|---|------|-----------------------------------|
|                      |               | V <sub>Z</sub> @ I <sub>ZT</sub> |         |         | I <sub>ZT</sub> | Z <sub>KT</sub> @ I <sub>ZT</sub> | Z <sub>ZK</sub> @ I <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                                 |                                   | mA              | μA                               | V                | Min   | Max  |                                   |
| BZT52C2V0            | WY            | 2.0                              | 1.91    | 2.09    | 5               | 100                               | 600                               | 1.0             | 150                              | 1.0              | -3.5  | 0    | 5                                 |
| BZT52C2V4            | WX            | 2.4                              | 2.2     | 2.6     | 5               | 100                               | 600                               | 1.0             | 50                               | 1.0              | -3.5  | 0    | 5                                 |
| BZT52C2V7            | W1            | 2.7                              | 2.5     | 2.9     | 5               | 100                               | 600                               | 1.0             | 20                               | 1.0              | -3.5  | 0    | 5                                 |
| BZT52C3V0            | W2            | 3.0                              | 2.8     | 3.2     | 5               | 95                                | 600                               | 1.0             | 10                               | 1.0              | -3.5  | 0    | 5                                 |
| BZT52C3V3            | W3            | 3.3                              | 3.1     | 3.5     | 5               | 95                                | 600                               | 1.0             | 5.0                              | 1.0              | -3.5  | 0    | 5                                 |
| BZT52C3V6            | W4            | 3.6                              | 3.4     | 3.8     | 5               | 90                                | 600                               | 1.0             | 5.0                              | 1.0              | -3.5  | 0    | 5                                 |
| BZT52C3V9            | W5            | 3.9                              | 3.7     | 4.1     | 5               | 90                                | 600                               | 1.0             | 3.0                              | 1.0              | -3.5  | 0    | 5                                 |
| BZT52C4V3            | W6, UB        | 4.3                              | 4.0     | 4.6     | 5               | 90                                | 600                               | 1.0             | 3.0                              | 1.0              | -3.5  | 0    | 5                                 |
| BZT52C4V7            | W7            | 4.7                              | 4.4     | 5.0     | 5               | 80                                | 500                               | 1.0             | 3.0                              | 2.0              | -3.5  | 0.2  | 5                                 |
| BZT52C5V1            | W8            | 5.1                              | 4.8     | 5.4     | 5               | 60                                | 480                               | 1.0             | 2.0                              | 2.0              | -2.7  | 1.2  | 5                                 |
| BZT52C5V6            | W9            | 5.6                              | 5.2     | 6.0     | 5               | 40                                | 400                               | 1.0             | 1.0                              | 2.0              | -2  | 2.5  | 5                                 |
| BZT52C6V2            | WA            | 6.2                              | 5.8     | 6.6     | 5               | 10                                | 150                               | 1.0             | 3.0                              | 4.0              | 0.4   | 3.7  | 5                                 |
| BZT52C6V8            | WB            | 6.8                              | 6.4     | 7.2     | 5               | 15                                | 80                                | 1.0             | 2.0                              | 4.0              | 1.2   | 4.5  | 5                                 |
| BZT52C7V5            | WC            | 7.5                              | 7.0     | 7.9     | 5               | 15                                | 80                                | 1.0             | 1.0                              | 5.0              | 2.5   | 5.3  | 5                                 |
| BZT52C8V2            | WD            | 8.2                              | 7.7     | 8.7     | 5               | 15                                | 80                                | 1.0             | 0.7                              | 5.0              | 3.2   | 6.2  | 5                                 |
| BZT52C9V1            | WE            | 9.1                              | 8.5     | 9.6     | 5               | 15                                | 100                               | 1.0             | 0.5                              | 6.0              | 3.8   | 7.0  | 5                                 |
| BZT52C10             | WF            | 10                               | 9.4     | 10.6    | 5               | 20                                | 150                               | 1.0             | 0.2                              | 7.0              | 4.5   | 8.0  | 5                                 |
| BZT52C11             | WG            | 11                               | 10.4    | 11.6    | 5               | 20                                | 150                               | 1.0             | 0.1                              | 8.0              | 5.4   | 9.0  | 5                                 |
| BZT52C12             | WH            | 12                               | 11.4    | 12.7    | 5               | 25                                | 150                               | 1.0             | 0.1                              | 8.0              | 6.0   | 10.0 | 5                                 |
| BZT52C13             | WI            | 13                               | 12.4    | 14.1    | 5               | 30                                | 170                               | 1.0             | 0.1                              | 8.0              | 7.0   | 11.0 | 5                                 |
| BZT52C15             | WJ            | 15                               | 13.8    | 15.6    | 5               | 30                                | 200                               | 1.0             | 0.1                              | 10.5             | 9.2   | 13.0 | 5                                 |
| BZT52C16             | WK            | 16                               | 15.3    | 17.1    | 5               | 40                                | 200                               | 1.0             | 0.1                              | 11.2             | 10.4  | 14.0 | 5                                 |
| BZT52C18             | WL            | 18                               | 16.8    | 19.1    | 5               | 45                                | 225                               | 1.0             | 0.1                              | 12.6             | 12.4  | 16.0 | 5                                 |
| BZT52C20             | WM            | 20                               | 18.8    | 21.2    | 5               | 55                                | 225                               | 1.0             | 0.1                              | 14.0             | 14.4  | 18.0 | 5                                 |
| BZT52C22             | WN            | 22                               | 20.8    | 23.3    | 5               | 55                                | 250                               | 1.0             | 0.1                              | 15.4             | 16.4  | 20.0 | 5                                 |
| BZT52C24             | WO            | 24                               | 22.8    | 25.6    | 5               | 70                                | 250                               | 1.0             | 0.1                              | 16.8             | 18.4  | 22.0 | 5                                 |
| BZT52C27             | WP            | 27                               | 25.1    | 28.9    | 2               | 80                                | 300                               | 0.5             | 0.1                              | 18.9             | 21.4  | 25.3 | 2                                 |
| BZT52C30             | WQ            | 30                               | 28.0    | 32.0    | 2               | 80                                | 300                               | 0.5             | 0.1                              | 21.0             | 24.4  | 29.4 | 2                                 |
| BZT52C33             | WR            | 33                               | 31.0    | 35.0    | 2               | 80                                | 325                               | 0.5             | 0.1                              | 23.1             | 27.4  | 33.4 | 2                                 |
| BZT52C36             | WS            | 36                               | 34.0    | 38.0    | 2               | 90                                | 350                               | 0.5             | 0.1                              | 25.2             | 30.4  | 37.4 | 2                                 |
| BZT52C39             | WT            | 39                               | 37.0    | 41.0    | 2               | 130                               | 350                               | 0.5             | 0.1                              | 27.3             | 33.4  | 41.2 | 2                                 |

Notes: 4. f = 1kHz.  
5. Short duration pulse test used to minimize self-heating effect.

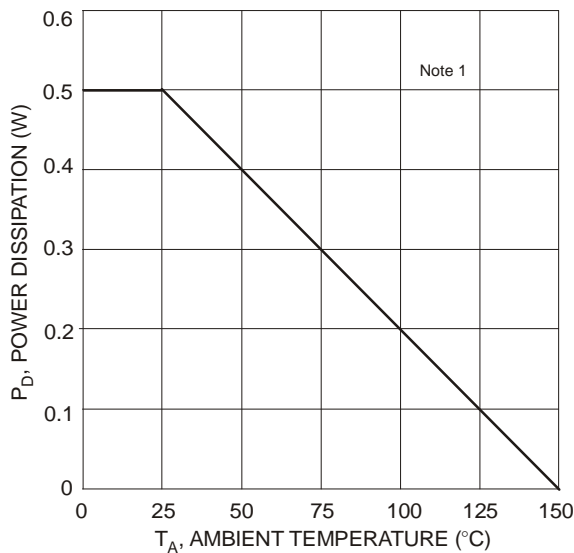


Fig. 1 Power Derating Curve

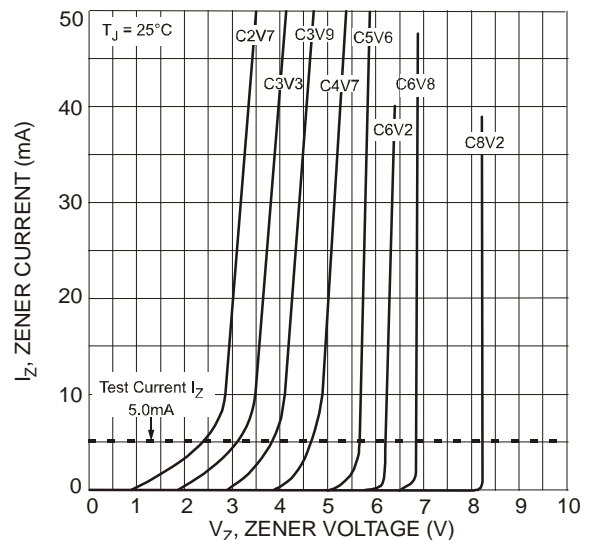


Fig. 2 Typical Zener Breakdown Characteristics

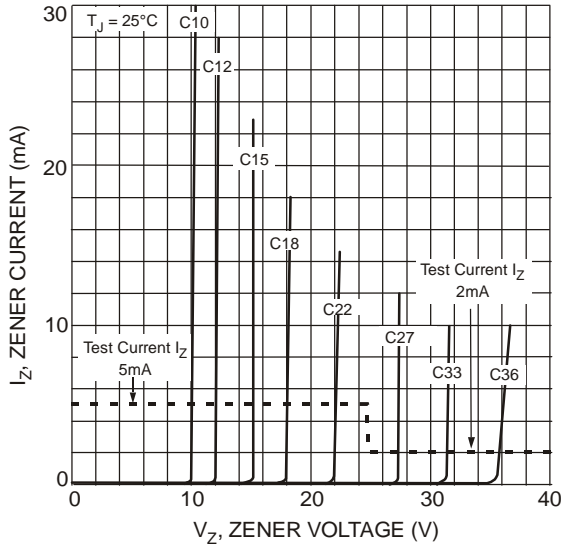


Fig. 3 Typical Zener Breakdown Characteristics

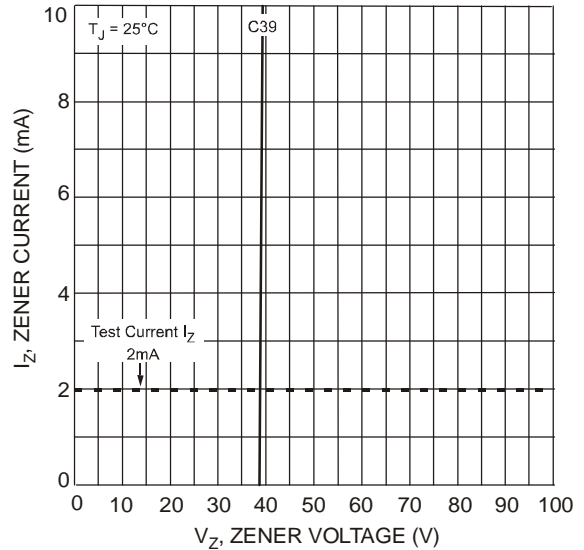


Fig. 4 Typical Zener Breakdown Characteristics

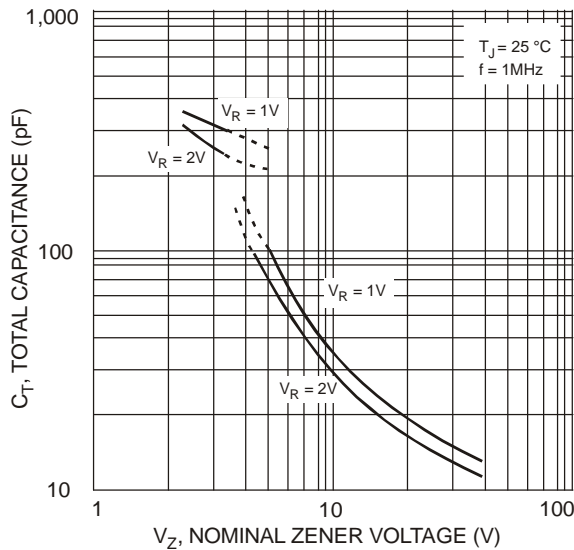


Fig. 5 Typical Total Capacitance vs. Nominal Zener Voltage

### Ordering Information (Note 6)

| Part Number                 | Case    | Packaging          |
|-----------------------------|---------|--------------------|
| (Type Number)-7-F (Note 7)  | SOD-123 | 3000/Tape & Reel   |
| (Type Number)-13-F (Note 8) | SOD-123 | 10,000/Tape & Reel |

- Notes:
- For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.
  - Add "-7-F" to the appropriate type number in Electrical Characteristics Table, example: 6.2V Zener = BZT52C6V2-7-F.
  - Add "-13-F" to the appropriate type number in Electrical Characteristics Table, example: 20V Zener = BZT52C20-13-F.

### Marking Information



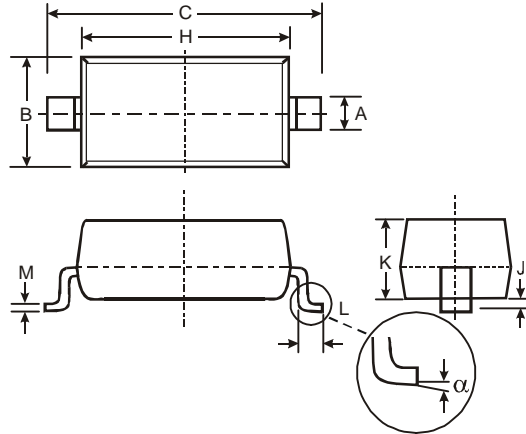
xx = Product Type Marking Code  
 (See Electrical Characteristics Table)  
 YM = Date Code Marking  
 Y = Year (ex: N = 2002)  
 M = Month (ex: 9 = September)

#### Date Code Key

| Year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | J    | K    | L    | M    | N    | P    | R    | S    | T    | U    | V    | W    | X    | Y    | Z    |

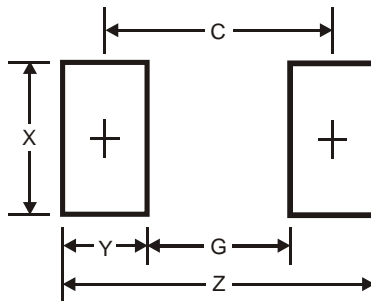
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

**Package Outline Dimensions**



| SOD-123                     |          |      |
|-----------------------------|----------|------|
| Dim                         | Min      | Max  |
| A                           | 0.55 Typ |      |
| B                           | 1.40     | 1.70 |
| C                           | 3.55     | 3.85 |
| H                           | 2.55     | 2.85 |
| J                           | 0.00     | 0.10 |
| K                           | 1.00     | 1.35 |
| L                           | 0.25     | 0.40 |
| M                           | 0.10     | 0.15 |
| $\alpha$                    | 0        | 8°   |
| <b>All Dimensions in mm</b> |          |      |

**Suggested Pad Layout**



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 4.9           |
| G          | 2.5           |
| X          | 0.7           |
| Y          | 1.2           |
| C          | 3.7           |

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