

## Features

- Planar Die Construction
- 500mW Power Dissipation
- General Purpose, Medium Current
- Ideally Suited for Automated Assembly Processes
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Notes 3 & 4)**
- Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

- Case: SOD123
- 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 
- Polarity: Cathode Band
- Weight: 0.010 grams (approximate)

SOD123



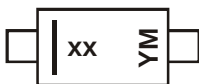
Top View

## Ordering Information (Notes 5 & 6)

| Part Number         | Qualification | Case   | Packaging          |
|---------------------|---------------|--------|--------------------|
| (Type Number)-7-F   | Commercial    | SOD123 | 3000/Tape & Reel   |
| (Type Number)Q-7-F  | Automotive    | SOD123 | 3000/Tape & Reel   |
| (Type Number)-13-F  | Commercial    | SOD123 | 10,000/Tape & Reel |
| (Type Number)Q-13-F | Automotive    | SOD123 | 10,000/Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  - See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - Product manufactured with Date 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.
  - For packaging details, go to our website at <http://www.diodes.com>.
  - For (Type Number), please see the Electrical Characteristics Table. Example: 6.2V Zener = BZT52C6V2Q-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 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | N    | P    | R    | S    | T    | U    | V    | W    | X    | Y    | Z    | A    | B    | C    | D    | E    |

| 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.)

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

| 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 7) @T <sub>L</sub> = +75°C   | P <sub>D</sub>                    | 500         | mW   |
| Power Dissipation (Note 8) @T <sub>A</sub> = +25°C   | P <sub>D</sub>                    | 370         | mW   |
| Thermal Resistance, Junction to Ambient Air (Note 8) | R <sub>θJA</sub>                  | 338         | °C/W |
| Thermal Resistance, Junction to Lead (Note 9)        | R <sub>θJL</sub>                  | 150         | °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<br>Number | Marking<br>Codes | Zener Voltage Range<br>(Note 10) |         |         |                 | Maximum Zener<br>Impedance<br>f = 1kHz |                                   |                 | Maximum<br>Reverse<br>Current<br>(Note 10) |                  | Temperature<br>Coefficient<br>@ I <sub>ZTC</sub><br>mV/°C |      | Test<br>Current<br>I <sub>ZTC</sub> |
|----------------|------------------|----------------------------------|---------|---------|-----------------|----------------------------------------|-----------------------------------|-----------------|--------------------------------------------|------------------|-----------------------------------------------------------|------|-------------------------------------|
|                |                  | 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>ZK</sub> | I <sub>R</sub>                             | @ V <sub>R</sub> | Min                                                       | Max  |                                     |
|                |                  | Nom (V)                          | Min (V) | Max (V) | mA              | Ω                                      | mA                                | μA              | V                                          |                  |                                                           |      |                                     |
| 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               | 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                                                      | -    | 5                                   |
| BZT52C24       | WO               | 24                               | 22.8    | 25.6    | 5               | 70                                     | 250                               | 1.0             | 0.1                                        | 16.8             | 18.4                                                      | -    | 5                                   |
| BZT52C27       | WP               | 27                               | 25.1    | 28.9    | 2               | 80                                     | 300                               | 0.5             | 0.1                                        | 18.9             | 21.4                                                      | -    | 2                                   |
| BZT52C30       | WQ               | 30                               | 28.0    | 32.0    | 2               | 80                                     | 300                               | 0.5             | 0.1                                        | 21.0             | 24.4                                                      | -    | 2                                   |
| BZT52C33       | WR               | 33                               | 31.0    | 35.0    | 2               | 80                                     | 325                               | 0.5             | 0.1                                        | 23.1             | 27.4                                                      | -    | 2                                   |
| BZT52C36       | WS               | 36                               | 34.0    | 38.0    | 2               | 90                                     | 350                               | 0.5             | 0.1                                        | 25.2             | 30.4                                                      | -    | 2                                   |
| BZT52C39       | WT               | 39                               | 37.0    | 41.0    | 2               | 130                                    | 350                               | 0.5             | 0.1                                        | 27.3             | 33.4                                                      | -    | 2                                   |
| BZT52C43       | WU               | 43                               | 40.0    | 46.0    | 5               | 100                                    | 700                               | 1.0             | 0.1                                        | 32.0             | 37.6                                                      | -    | 5                                   |
| BZT52C47       | WV               | 47                               | 44.0    | 50.0    | 5               | 100                                    | 750                               | 1.0             | 0.1                                        | 35.0             | 42.0                                                      | -    | 5                                   |
| BZT52C51       | WW               | 51                               | 48.0    | 54.0    | 5               | 100                                    | 750                               | 1.0             | 0.1                                        | 38.0             | 46.6                                                      | -    | 5                                   |

- Notes:
7. R<sub>θJL</sub> = 132°C/W
  8. Device mounted on ceramic PCB with copper pad areas 40mm<sup>2</sup>.
  9. Thermal Resistance measurement obtained via infrared scan method.
  10. Short duration pulse test used to minimize self-heating effect.

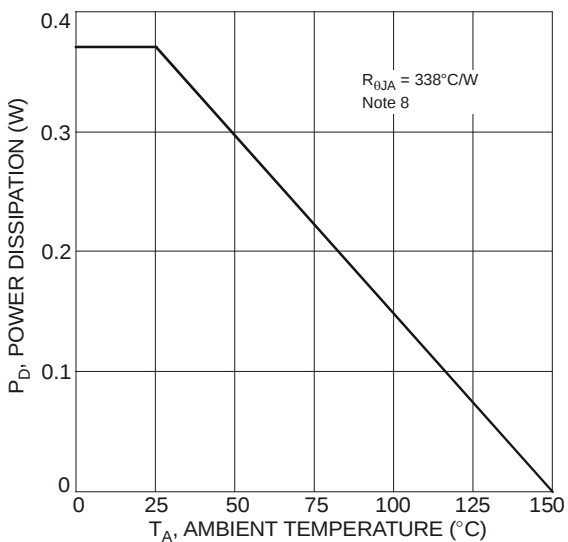


Fig. 1 Power Derating Curve

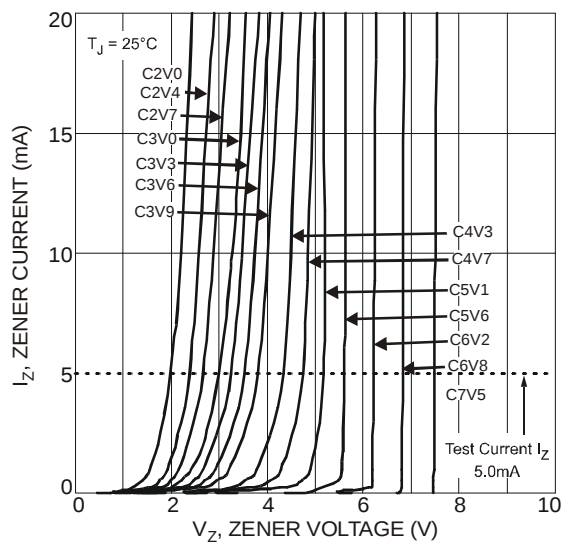


Fig. 2 Typical Zener Breakdown Characteristics

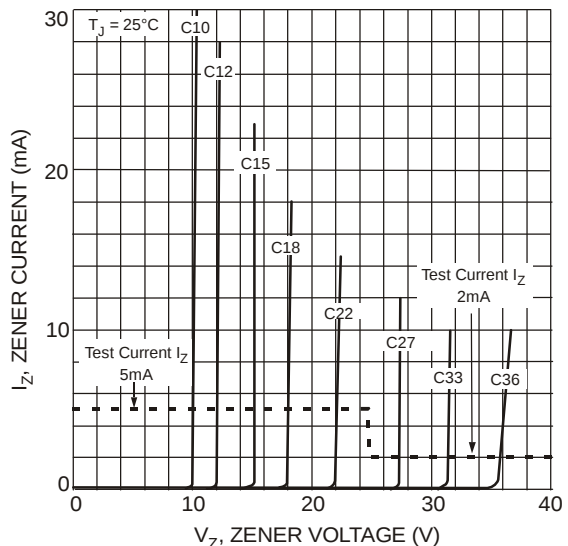


Fig. 3 Typical Zener Breakdown Characteristics

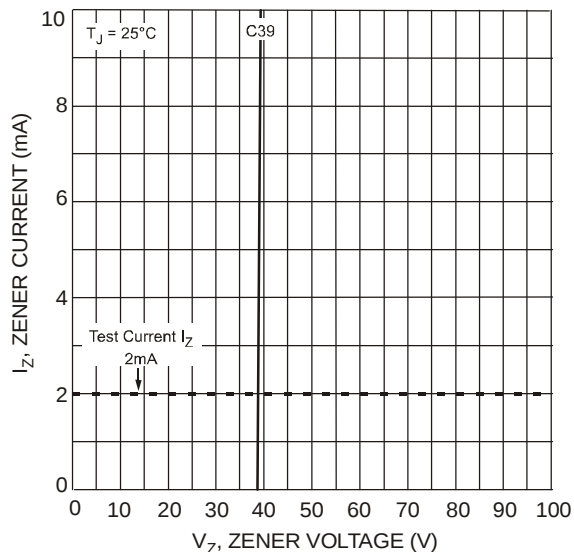


Fig. 4 Typical Zener Breakdown Characteristics

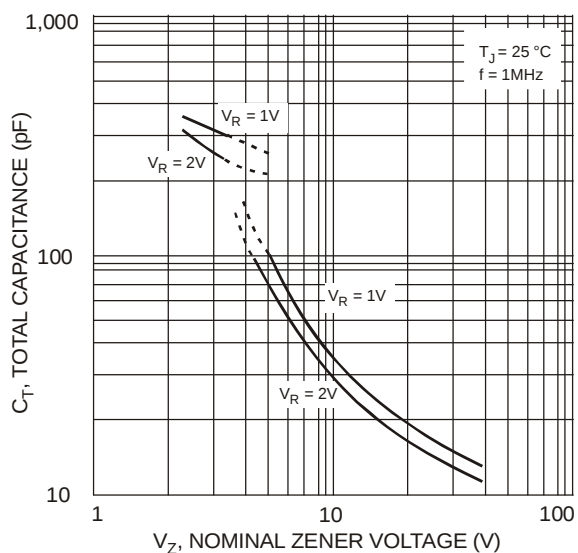
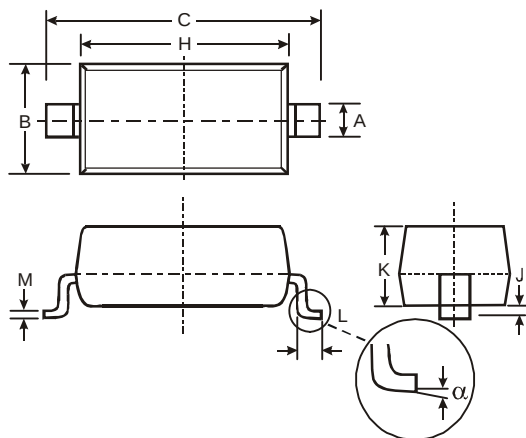


Fig. 5 Typical Total Capacitance vs. Nominal Zener Voltage

## Package Outline Dimensions

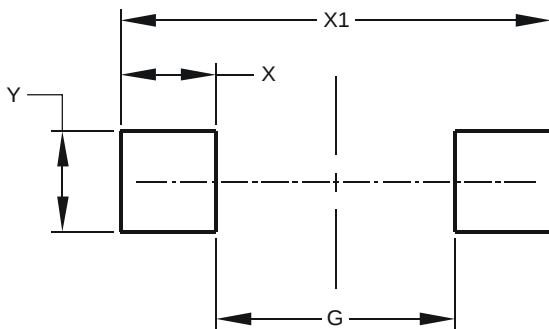
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOD123               |          |      |
|----------------------|----------|------|
| 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°   |
| All Dimensions in mm |          |      |

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| G          | 2.250         |
| X          | 0.900         |
| X1         | 4.050         |
| Y          | 0.950         |

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