



#### SURFACE MOUNT PRECISION ZENER DIODE

#### **Features**

- Very Sharp Breakdown Characteristics
- Very Tight Tolerance on Vz
- Ideally Suited for Automated Assembly Processes
- Very Low Leakage Current
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

#### **Mechanical Data**

- Case: SOD323
- Case Material: Molded Plastic;
  UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish Matte Tin Annealed over Alloy 42
  Leadframe; Solderable per MIL-STD-202, Method 208 (3)
- Polarity: Cathode Band
- Weight: 0.004 grams (Approximate)

SOD323







Device Schematic

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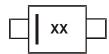
### Ordering Information (Note 4)

| Part Number      | Compliance | Case   | Packaging         |
|------------------|------------|--------|-------------------|
| (Type Number)-7* | Commercial | SOD323 | 3,000/Tape & Reel |

- \* Example: The part number for the 6.2 Volt device would be DDZ6V2BS-7.
- Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  - 2. See http://www.diodes.com/quality/lead\_free.html 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. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

### **Marking Information**

SOD323



xx = Product Type Marking Code (See Electrical Characteristics Table)



# **Maximum Ratings** (@ $T_A = +25^{\circ}C$ , 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 5) | $P_{D}$           | 200         | mW   |
| Thermal Resistance, Junction to Ambient Air | (Note 5) | $R_{	heta JA}$    | 625         | °C/W |
| Operating and Storage Temperature Range     |          | $T_{J_i} T_{STG}$ | -65 to +150 | °C   |

Note: 5. Device mounted on FR-4 PC board with recommended pad layout which can be found on our website at http://www.diodes.com/package-outlines.html.

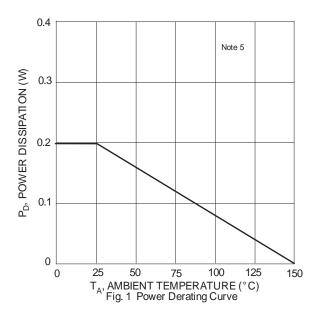
### **Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

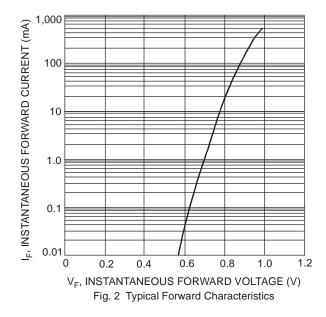
| Town Named an | Mandin a Oada            | Zener   | Voltage Rang<br>(Note 6) | je              | Maximum Zener Impedance (Note 7)  |                                   |                 | Maximum Reverse<br>Current (Note 8) |                  |
|---------------|--------------------------|---------|--------------------------|-----------------|-----------------------------------|-----------------------------------|-----------------|-------------------------------------|------------------|
| Type Number   | Type Number Marking Code |         | 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 (V) | Max (V)                  | mA              |                                   | Ω                                 | mA              | μA                                  | V                |
| DDZ5V1BS      | KM                       | 4.94    | 5.20                     | 20              | 17                                | 480                               | 1               | 5                                   | 1.5              |
| DDZ5V6BS      | KN                       | 5.45    | 5.73                     | 20              | 11                                | 400                               | 1               | 0.5                                 | 2.5              |
| DDZ6V2BS      | KO                       | 5.96    | 6.27                     | 20              | 7                                 | 150                               | 1               | 0.5                                 | 4.0              |
| DDZ6V8CS      | YP                       | 6.66    | 7.01                     | 20              | 5                                 | 150                               | 0.5             | 0.1                                 | 5.0              |
| DDZ7V5CS      | YQ                       | 7.29    | 7.67                     | 20              | 6                                 | 120                               | 0.5             | 0.1                                 | 6.0              |
| DDZ8V2CS      | YR                       | 8.03    | 8.45                     | 20              | 8                                 | 120                               | 0.5             | 0.1                                 | 6.5              |
| DDZ9V1CS      | YS                       | 8.83    | 9.30                     | 20              | 8                                 | 120                               | 0.5             | 0.1                                 | 7.0              |
| DDZ10CS       | YT                       | 9.70    | 10.20                    | 20              | 8                                 | 120                               | 0.5             | 0.1                                 | 8.0              |
| DDZ11CS       | YU                       | 10.82   | 11.38                    | 10              | 10                                | 120                               | 0.5             | 0.1                                 | 8.4              |
| DDZ12CS       | YV                       | 11.74   | 12.35                    | 10              | 12                                | 110                               | 0.5             | 0.1                                 | 9.1              |
| DDZ13BS       | KW                       | 12.55   | 13.21                    | 10              | 14                                | 110                               | 0.5             | 0.1                                 | 10.0             |
| DDZ14S        | GX                       | 13.65   | 14.35                    | 10              | 16                                | 110                               | 0.5             | 0.05                                | 11.0             |
| DDZ15S        | GY                       | 14.80   | 15.57                    | 10              | 18                                | 150                               | 0.5             | 0.05                                | 12.0             |
| DDZ16S        | YY                       | 15.69   | 16.51                    | 10              | 18                                | 150                               | 0.5             | 0.05                                | 12.0             |
| DDZ18CS       | YZ                       | 17.42   | 18.33                    | 10              | 23                                | 150                               | 0.5             | 0.05                                | 14.0             |
| DDZ20CS       | PJ                       | 19.23   | 20.22                    | 10              | 28                                | 200                               | 0.5             | 0.05                                | 15.0             |
| DDZ22DS       | 2K                       | 21.52   | 22.63                    | 5               | 30                                | 200                               | 0.5             | 0.05                                | 17.0             |
| DDZ24CS       | PL                       | 23.12   | 24.31                    | 5               | 35                                | 200                               | 0.5             | 0.05                                | 19.0             |
| DDZ27DS       | 2M                       | 26.29   | 27.64                    | 5               | 45                                | 250                               | 0.5             | 0.05                                | 21.0             |
| DDZ30DS       | 2N                       | 29.02   | 30.51                    | 5               | 55                                | 250                               | 0.5             | 0.05                                | 23.0             |
| DDZ33S        | RP                       | 32.14   | 33.79                    | 5               | 75                                | 250                               | 0.5             | 0.05                                | 27.0             |
| DDZ36S        | ZQ                       | 35.36   | 37.19                    | 5               | 85                                | 250                               | 0.5             | 0.05                                | 30.0             |
| DDZ39FS       | 5Q                       | 38.02   | 39.98                    | 5               | 85                                | 250                               | 0.5             | 0.05                                | 30.0             |
| DDZ43S        | ZR                       | 42.14   | 43.86                    | 5               | 90                                | _                                 | _               | 0.05                                | 33.0             |
| DDZ47S        | ZS                       | 46.06   | 47.94                    | 5               | 90                                | _                                 |                 | 0.05                                | 36.0             |

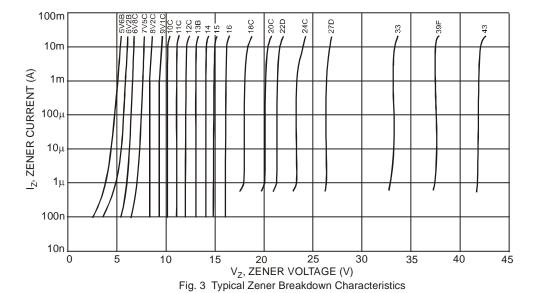
Notes:

- 6. The Zener voltage is measured <40ms after power is supplied.
- f = 1kHz.
- 8. Short duration pulse test used to minimize self-heating effect.











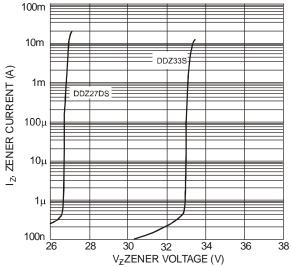


Fig. 4 Typical Zener Breakdown Characteristics, DDZ27DS - DDZ33S

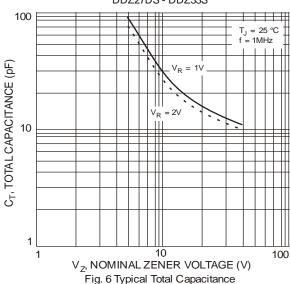


Fig. 6 Typical Total Capacitance vs. Nominal Zener Voltage

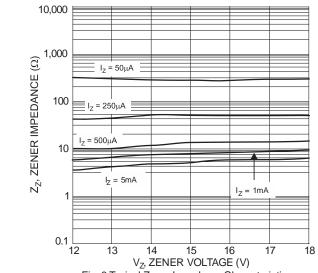


Fig. 8 Typical Zener Impedance Characteristics, DDZ12CS - DDZ18CS

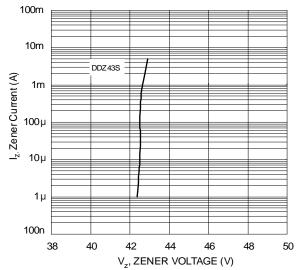


Fig.5 Typical Zener Breakdown Characteristics DDZ43S

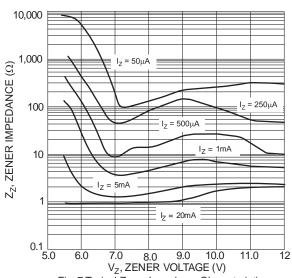


Fig. 7 Typical Zener Impedance Characteristics, DDZ5V6BS - DDZ12CS

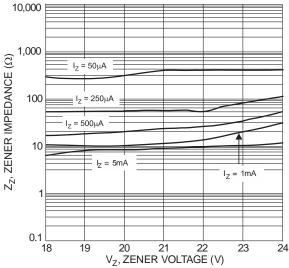
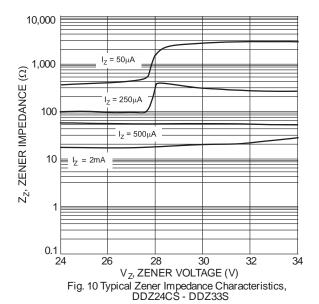
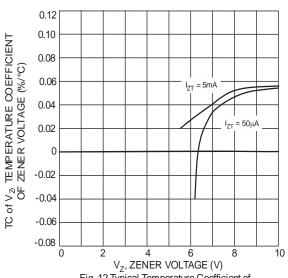
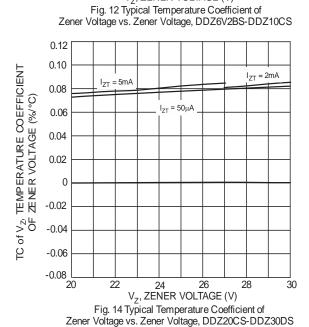


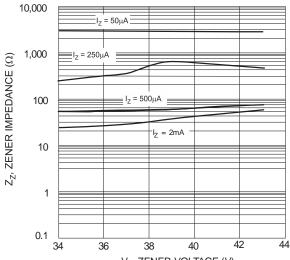
Fig. 9 Typical Zener Impedance Characteristics, DDZ18CS - DDZ24CS











 $V_Z$ , ZENER VOLTAGE (V) Fig. 11 Typical Zener Impedance Characteristics, DDZ36S - DDZ43S

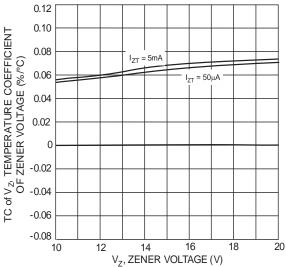


Fig. 13 Typical Temperature Coefficient of Zener Voltage vs. Zener Voltage, DDZ10CS-DDZ20CS

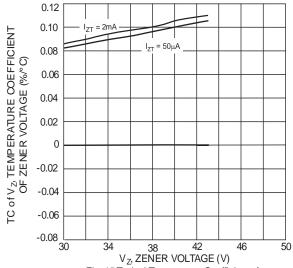


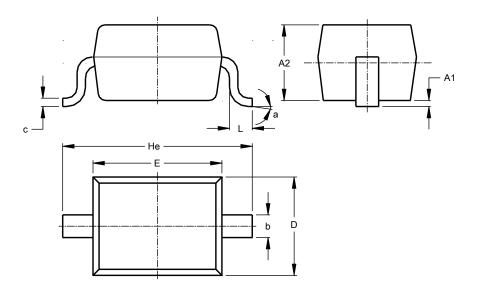
Fig. 15 Typical Temperature Coefficient of Zener Voltage vs. Zener Voltage, DDZ30DS-DDZ43S



# Package Outline Dimensions

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

#### **SOD323**

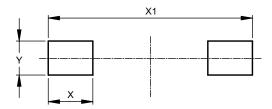


| SOD323               |      |      |      |  |  |
|----------------------|------|------|------|--|--|
| Dim                  | Min  | Max  | Тур  |  |  |
| A1                   |      | 0.10 | 0.05 |  |  |
| A2                   | 1.00 | 1.10 | 1.05 |  |  |
| b                    | 0.25 | 0.35 | 0.30 |  |  |
| С                    | 0.10 | 0.15 | 0.11 |  |  |
| D                    | 1.20 | 1.40 | 1.30 |  |  |
| Е                    | 1.60 | 1.80 | 1.70 |  |  |
| He                   | 2.30 | 2.70 | 2.50 |  |  |
| L                    | 0.20 | 0.40 | 0.30 |  |  |
| а                    | 00   | 8°   |      |  |  |
| All Dimensions in mm |      |      |      |  |  |

## **Suggested Pad Layout**

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

#### **SOD323**



| Dimensions | Value (in mm) |  |  |
|------------|---------------|--|--|
| Х          | 0.590         |  |  |
| X1         | 2.700         |  |  |
| Υ          | 0.450         |  |  |



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