



**THE DATASHEET OF
DDZ9715-7**



SURFACE MOUNT LOW CURRENT ZENER DIODE
Features

- 500mW Power Dissipation on FR-4 PCB at $T_L = +75^\circ\text{C}$
- Specified at a Low Test Current (50 μA), Ideal For Low Bias and Portable Battery-Powered Applications
- 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**
- **PPAP Capable (Note 4)**

Mechanical Data

- Case: SOD123
- Case Material: Molded Plastic.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: Cathode Band
- Terminals: Finish - Matte Tin Annealed over Alloy 42 Leadframe.
Solderable per MIL-STD-202, Method 208
- Weight: 0.01 grams (Approximate)

SOD123



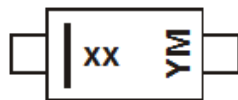
Top View

Ordering Information (Note 5)

| Part Number | Compliance | Case | Packaging |
|--------------------|------------|--------|--------------------|
| (Type Number)-7* | Standard | SOD123 | 3,000/Tape & Reel |
| (Type Number)Q-7* | Automotive | SOD123 | 3,000/Tape & Reel |
| (Type Number)Q-13* | Automotive | SOD123 | 10,000/Tape & Reel |

* Refer to the Electrical Characteristics Table for Type Number

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
 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
Y = Year (ex: E = 2017)
M = Month (ex: 9 = September)

Date Code Key

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

| 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 | 500 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 6) | R _{θJA} | 340 | °C/W |
| Thermal Resistance, Junction to Lead (Note 6) | R _{θJL} | 150 | °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 | Type Code | Zener Voltage Range (Note 7) | | | | Maximum Reverse Leakage Current (Note 8) | |
|-------------|-----------|----------------------------------|---------|---------|-----------------|--|------|
| | | V _Z @ I _{ZT} | | | I _{ZT} | I _R @ V _R | |
| | | Nom (V) | Min (V) | Max (V) | μA | μA | V |
| DDZ9678 | D1 | 1.8 | 1.71 | 1.89 | 50 | 7.5 | 1 |
| DDZ9681 | H9 | 2.4 | 2.28 | 2.52 | 50 | 2 | 1 |
| DDZ9682 | HA | 2.7 | 2.565 | 2.835 | 50 | 1 | 1 |
| DDZ9683 | HB | 3.0 | 2.85 | 3.15 | 50 | 0.8 | 1 |
| DDZ9684 | HC | 3.3 | 3.13 | 3.47 | 50 | 7.5 | 1.5 |
| DDZ9685 | HD | 3.6 | 3.42 | 3.78 | 50 | 7.5 | 2 |
| DDZ9686 | HE | 3.9 | 3.70 | 4.10 | 50 | 5 | 2 |
| DDZ9687 | HF | 4.3 | 4.09 | 4.52 | 50 | 4 | 2 |
| DDZ9688 | HG | 4.7 | 4.47 | 4.94 | 50 | 5 | 3 |
| DDZ9689 | HH | 5.1 | 4.85 | 5.36 | 50 | 5 | 3 |
| DDZ9690 | HJ | 5.6 | 5.32 | 5.88 | 50 | 2 | 4 |
| DDZ9691 | HK | 6.2 | 5.89 | 6.51 | 50 | 1 | 5 |
| DDZ9692 | HL | 6.8 | 6.46 | 7.14 | 50 | 0.1 | 5.1 |
| DDZ9693 | HM | 7.5 | 7.13 | 7.88 | 50 | 0.1 | 5.7 |
| DDZ9694 | HN | 8.2 | 7.79 | 8.61 | 50 | 0.1 | 6.2 |
| DDZ9696 | HP | 9.1 | 8.65 | 9.56 | 50 | 0.1 | 6.9 |
| DDZ9697 | HQ | 10 | 9.50 | 10.50 | 50 | 0.1 | 7.6 |
| DDZ9698 | HR | 11 | 10.45 | 11.55 | 50 | 0.05 | 8.4 |
| DDZ9699 | HS | 12 | 11.40 | 12.60 | 50 | 0.05 | 9.1 |
| DDZ9700 | HT | 13 | 12.35 | 13.65 | 50 | 0.05 | 9.8 |
| DDZ9701 | HU | 14 | 13.30 | 14.70 | 50 | 0.05 | 10.6 |
| DDZ9702 | HV | 15 | 14.25 | 15.75 | 50 | 0.05 | 11.4 |
| DDZ9703 | HW | 16 | 15.20 | 16.80 | 50 | 0.05 | 12.1 |
| DDZ9704 | H8 | 17 | 16.15 | 17.85 | 50 | 0.05 | 12.9 |
| DDZ9705 | HY | 18 | 17.10 | 18.90 | 50 | 0.05 | 13.6 |
| DDZ9707 | MD | 20 | 19.00 | 21.00 | 50 | 0.05 | 15.2 |
| DDZ9708 | ME | 22 | 20.90 | 23.10 | 50 | 0.05 | 16.7 |
| DDZ9709 | MF | 24 | 22.80 | 25.20 | 50 | 0.05 | 18.2 |
| DDZ9711 | MH | 27 | 25.65 | 28.35 | 50 | 0.05 | 20.4 |
| DDZ9712 | MJ | 28 | 26.60 | 29.40 | 50 | 0.05 | 21.2 |
| DDZ9713 | MK | 30 | 28.50 | 31.50 | 50 | 0.05 | 22.8 |
| DDZ9714 | ML | 33 | 31.35 | 34.65 | 50 | 0.05 | 25.0 |
| DDZ9715 | MM | 36 | 34.20 | 37.80 | 50 | 0.05 | 27.3 |
| DDZ9716 | MN | 39 | 37.05 | 40.95 | 50 | 0.05 | 29.6 |
| DDZ9717 | MO | 43 | 40.85 | 45.15 | 50 | 0.05 | 32.6 |

- Notes:
6. Device mounted on FR-4 PCB with minimum recommended pad layout, as shown in Diodes Incorporated's Suggested Pad Layout document, which can be found on our website at <http://www.diodes.com>, at T_L = +75°C.
 7. Nominal zener voltage is measured with the device junction in thermal equilibrium at T_T = +30°C ±1°C.
 8. Short duration pulse test used to minimize self-heating effect.



Fig. 1 Power Derating Curve

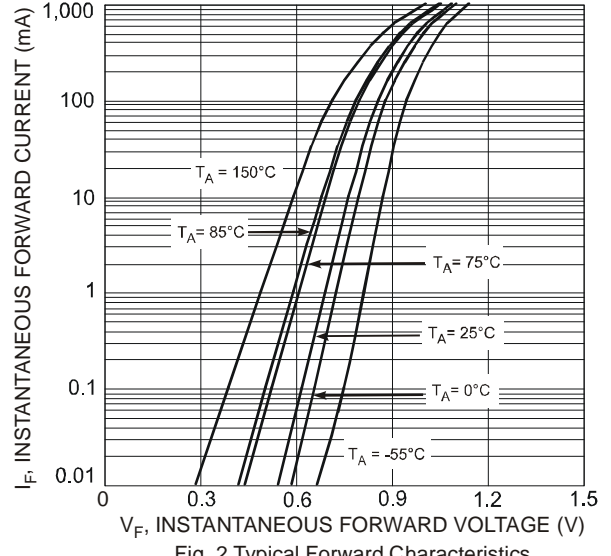


Fig. 2 Typical Forward Characteristics



Fig. 3 Typical Zener Breakdown Characteristics



Fig. 4 Typical Zener Breakdown Characteristics, DDZ9678 - DDZ9694

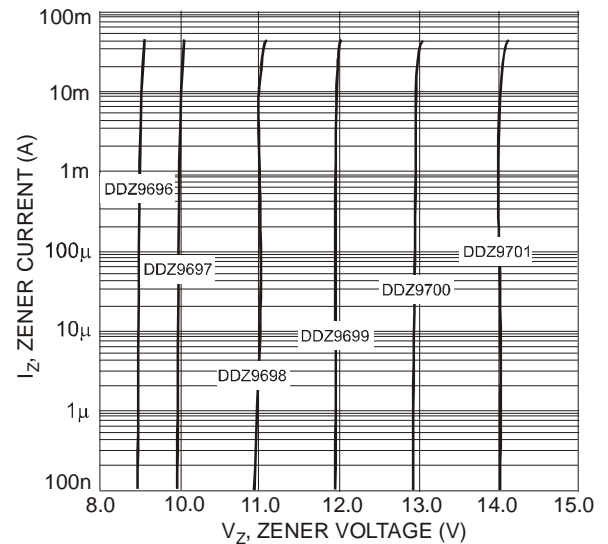


Fig. 5 Typical Zener Breakdown Characteristics, DDZ9696 - DDZ9701



Fig. 6 Typical Zener Breakdown Characteristics, DDZ9702 - DDZ9705



Fig. 7 Typical Zener Breakdown Characteristics, DDZ9707 - DDZ9709

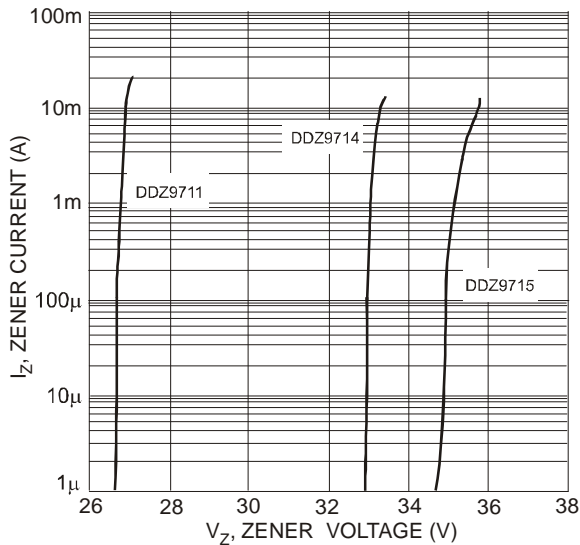


Fig. 8 Typical Zener Breakdown Characteristics, DDZ9711 - DDZ9715

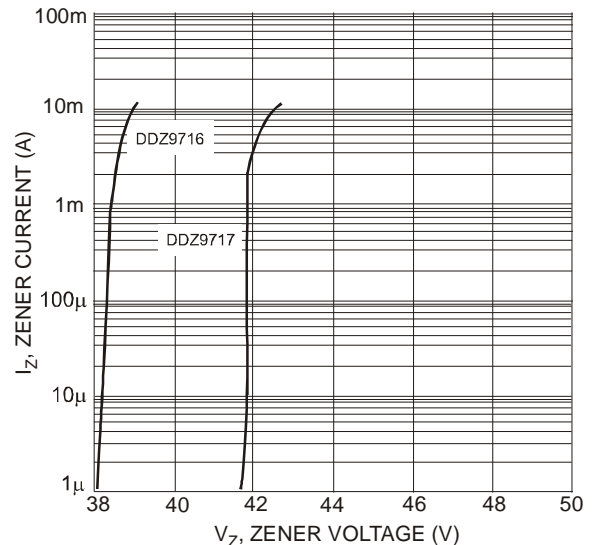


Fig. 9 Typical Zener Breakdown Characteristics, DDZ9716 - DDZ9717

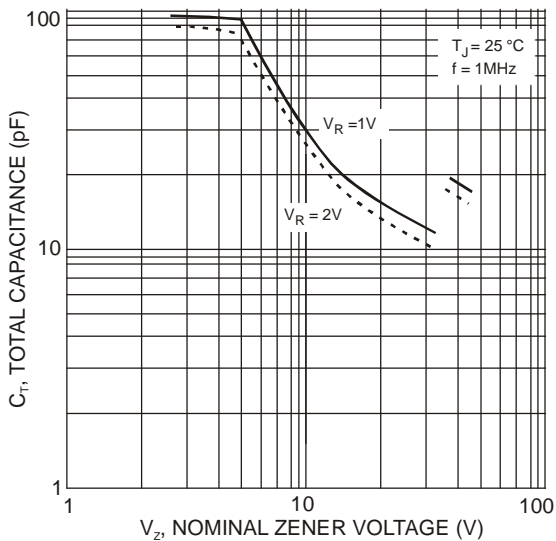


Fig. 10 Total Capacitance vs. Nominal Zener Voltage

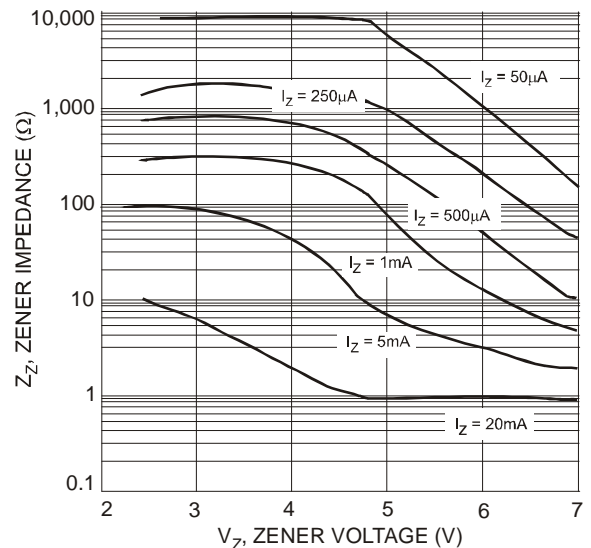


Fig. 11 Typical Zener Impedance Characteristics, DDZ9681 - DDZ9692



Fig. 12 Typical Zener Impedance Characteristics, DDZ9693 - DDZ9699



Fig. 13 Typical Zener Impedance Characteristics, DDZ9699 - DDZ9705



Fig. 14 Typical Zener Impedance Characteristics, DDZ9705 - DDZ9709



Fig. 15 Typical Zener Impedance Characteristics, DDZ9709 - DDZ9714



Fig. 16 Typical Zener Impedance Characteristics, DDZ9715 - DDZ9717



Fig. 17 Typical Temperature Coefficient of Zener Voltage vs. Zener Voltage, DDZ9681 - DDZ9697

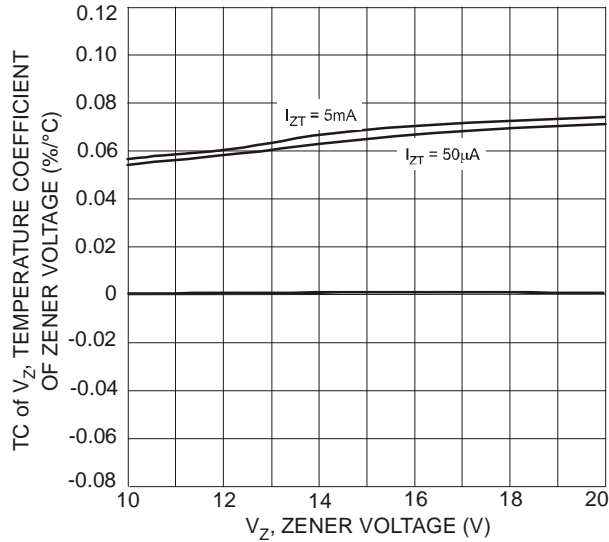


Fig. 18 Typical Temperature Coefficient of Zener Voltage vs. Zener Voltage, DDZ9697 - DDZ9707

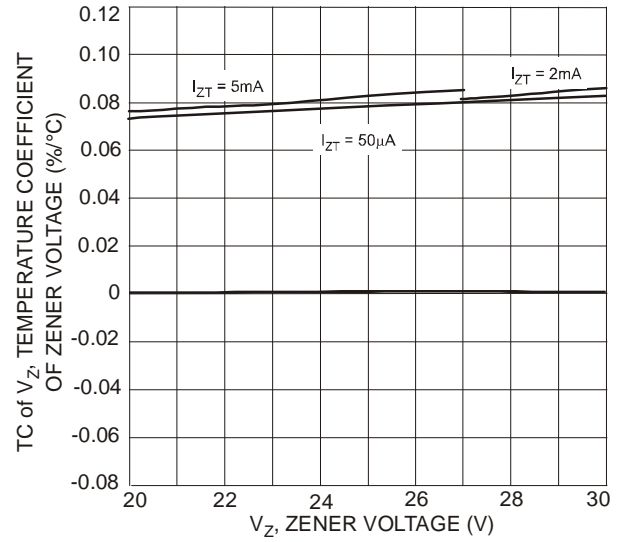


Fig. 19 Typical Temperature Coefficient of Zener Voltage vs. Zener Voltage, DDZ9707 - DDZ9713



Fig. 20 Typical Temperature Coefficient of Zener Voltage vs. Zener Voltage, DDZ9713 - DDZ9717

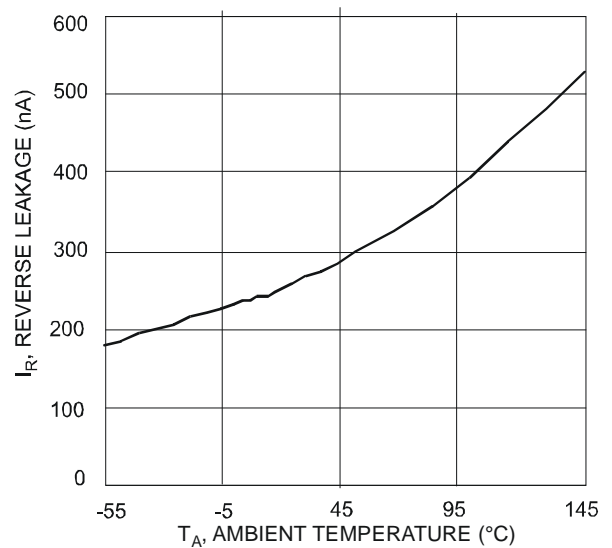


Fig. 21 Typical Leakage vs. Ambient Temperature, DDZ9681

Package Outline Dimensions

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



| SOD123 | | | |
|-----------------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 1.00 | 1.35 | 1.05 |
| A1 | 0.00 | 0.10 | 0.05 |
| b | 0.52 | 0.62 | 0.57 |
| c | 0.10 | 0.15 | 0.11 |
| D | 1.40 | 1.70 | 1.55 |
| E | 2.55 | 2.85 | 2.65 |
| He | 3.55 | 3.85 | 3.65 |
| L | 0.25 | 0.40 | 0.30 |
| 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) |
|------------|---------------|
| X | 0.900 |
| X1 | 4.050 |
| Y | 0.950 |

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