



## Features

- 500mW Power Dissipation on FR-4 PCB at  $T_L = +75^\circ\text{C}$
- Specified at a Low Test Current (50 $\mu\text{A}$ ), 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

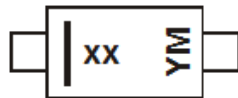
## Ordering Information (Note 5)

| 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](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/](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<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>                    | 500         | mW   |
| Thermal Resistance, Junction to Ambient Air (Note 6) | R <sub>θJA</sub>                  | 340         | °C/W |
| Thermal Resistance, Junction to Lead (Note 6)        | 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 Number | Type Code | Zener Voltage Range (Note 7)     |         |         |                 | Maximum Reverse Leakage Current (Note 8) |      |
|-------------|-----------|----------------------------------|---------|---------|-----------------|------------------------------------------|------|
|             |           | V <sub>Z</sub> @ I <sub>ZT</sub> |         |         | I <sub>ZT</sub> | I <sub>R</sub> @ V <sub>R</sub>          |      |
|             |           | 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:
- 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<sub>L</sub> = +75°C.
  - Nominal zener voltage is measured with the device junction in thermal equilibrium at T<sub>T</sub> = +30°C ±1°C.
  - Short duration pulse test used to minimize self-heating effect.

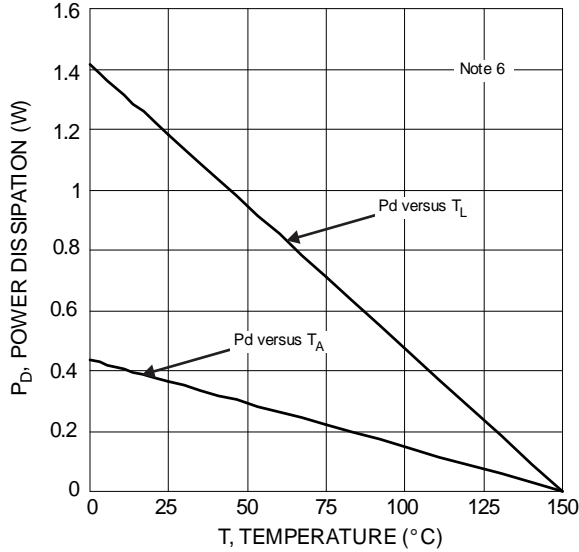


Fig. 1 Power Derating Curve

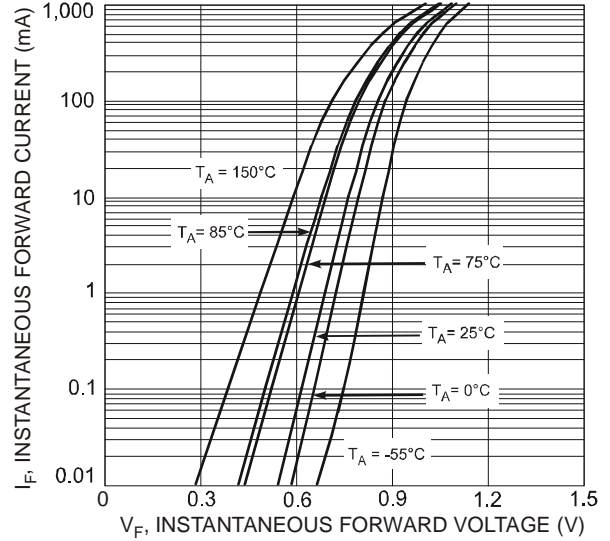


Fig. 2 Typical Forward Characteristics

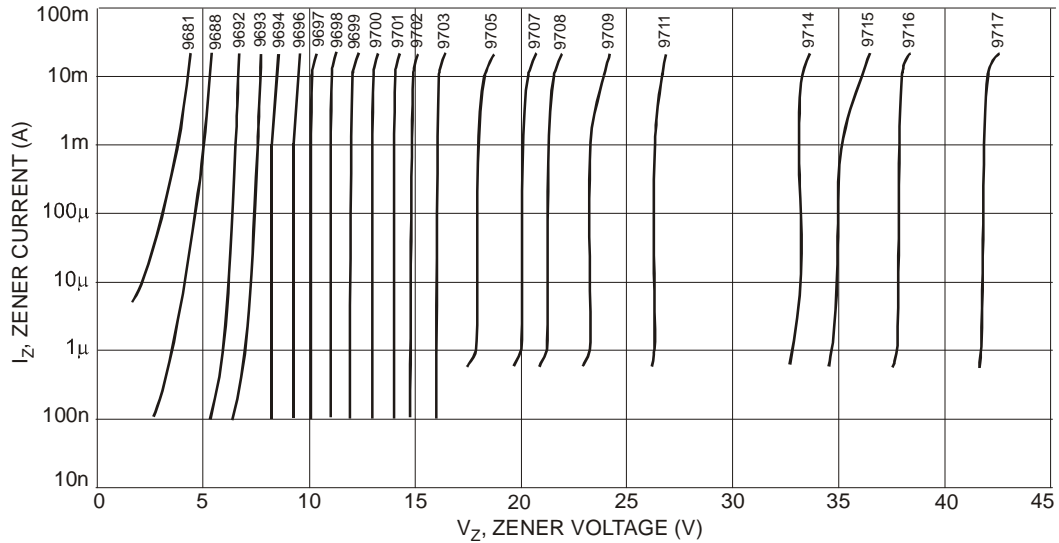


Fig. 3 Typical Zener Breakdown Characteristics

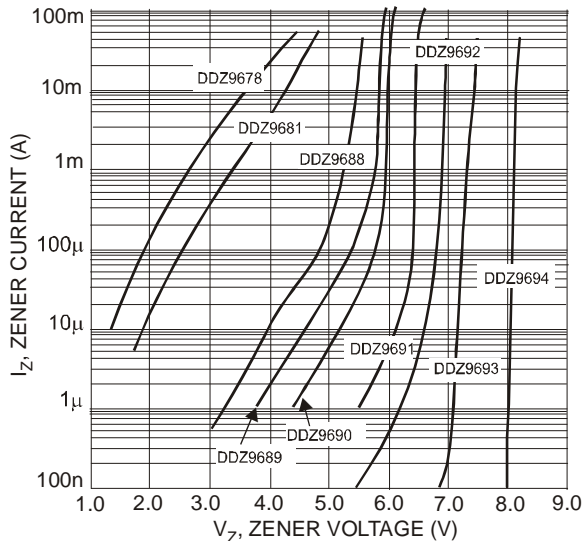


Fig. 4 Typical Zener Breakdown Characteristics, DDZ9678 - DDZ9694

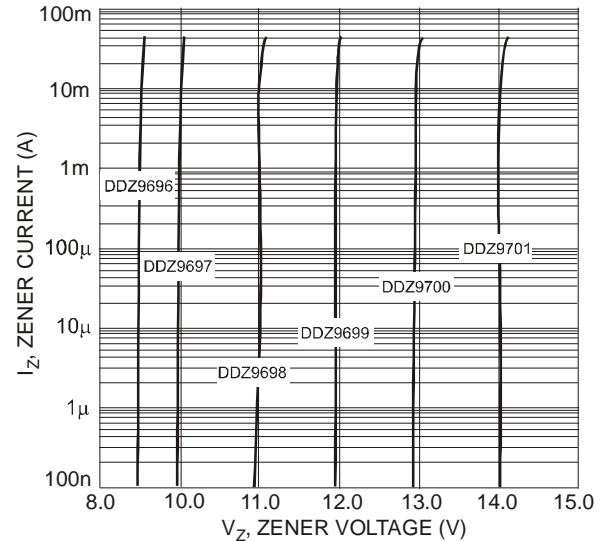


Fig. 5 Typical Zener Breakdown Characteristics, DDZ9696 - DDZ9701



Fig. 6 Typical Zener Breakdown Characteristics, DDZ9702 - DDZ9705

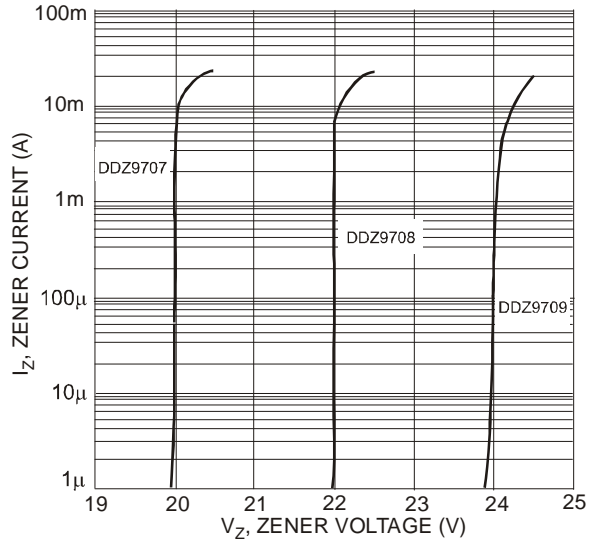


Fig. 7 Typical Zener Breakdown Characteristics, DDZ9707 - DDZ9709

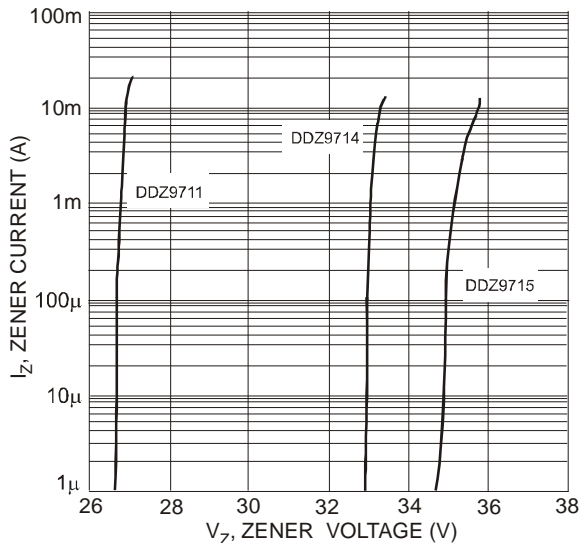


Fig. 8 Typical Zener Breakdown Characteristics, DDZ9711 - DDZ9715

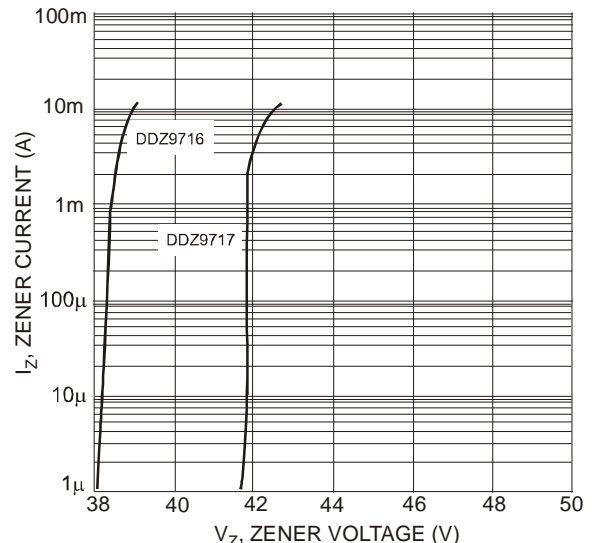


Fig. 9 Typical Zener Breakdown Characteristics, DDZ9716 - DDZ9717

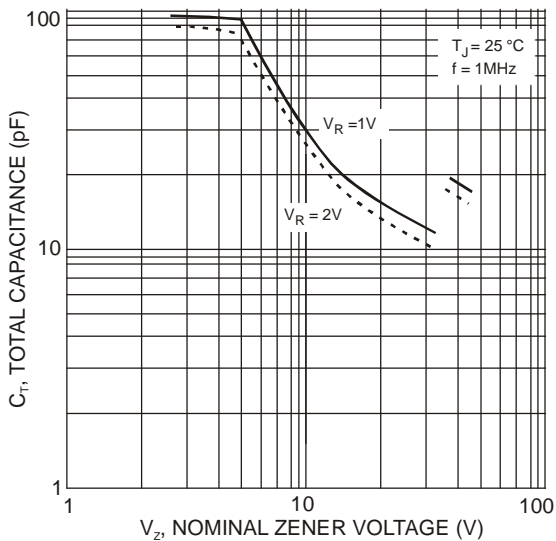


Fig. 10 Total Capacitance vs. Nominal Zener Voltage

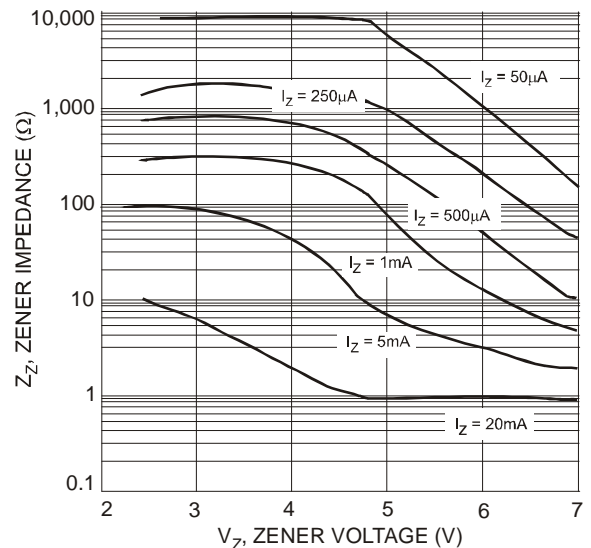


Fig. 11 Typical Zener Impedance Characteristics, DDZ9681 - DDZ9692



Fig. 12 Typical Zener Impedance Characteristics, DDZ9693 - DDZ9699



Fig. 13 Typical Zener Impedance Characteristics, DDZ9699 - DDZ9705

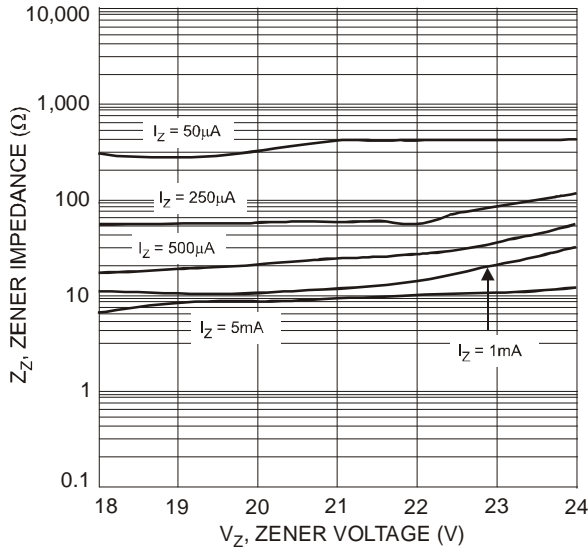


Fig. 14 Typical Zener Impedance Characteristics, DDZ9705 - DDZ9709

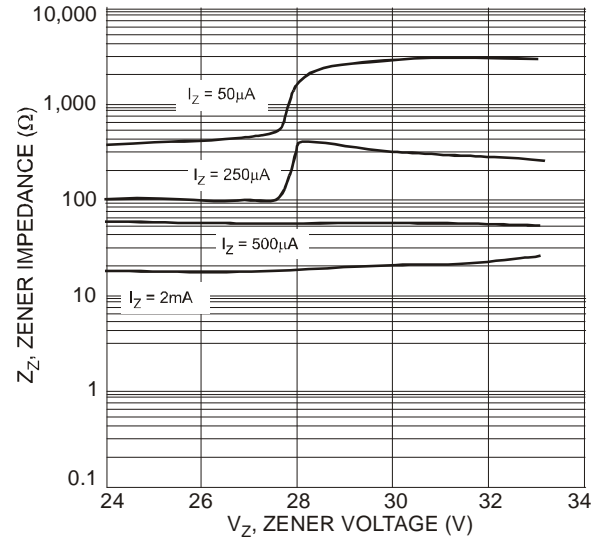


Fig. 15 Typical Zener Impedance Characteristics, DDZ9709 - DDZ9714

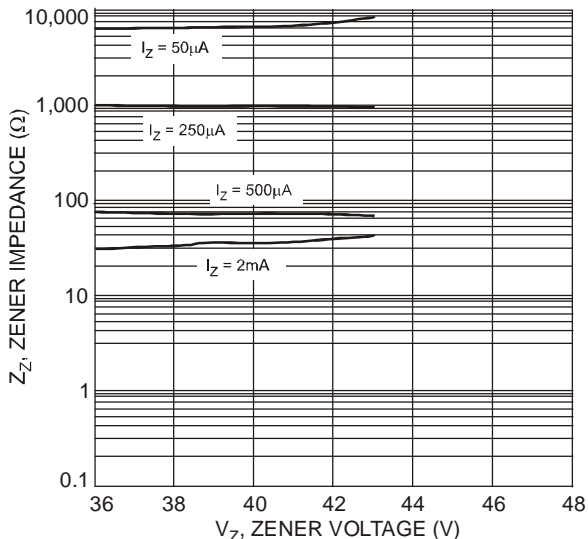


Fig. 16 Typical Zener Impedance Characteristics, DDZ9715 - DDZ9717

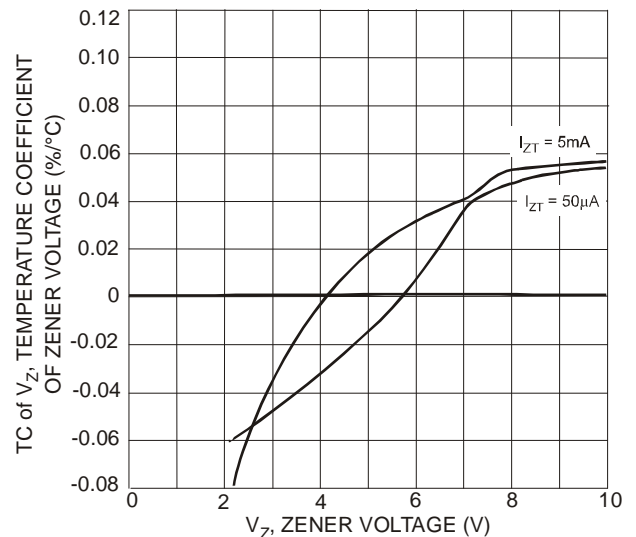


Fig. 17 Typical Temperature Coefficient of Zener Voltage vs. Zener Voltage, DDZ9681 - DDZ9697

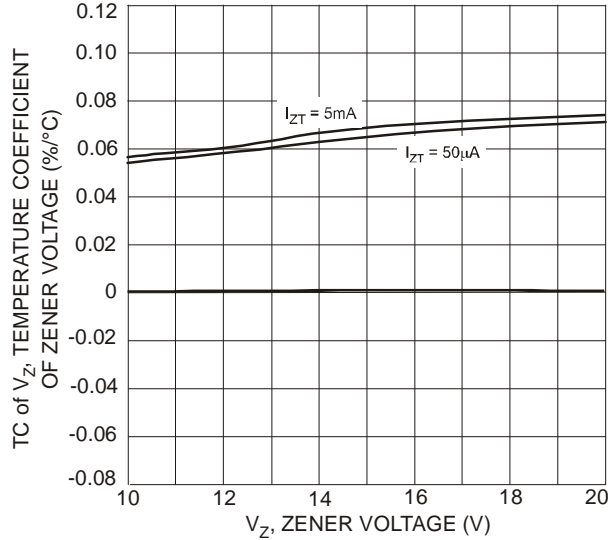


Fig. 18 Typical Temperature Coefficient of Zener Voltage vs. Zener Voltage, DDZ9697 - DDZ9707

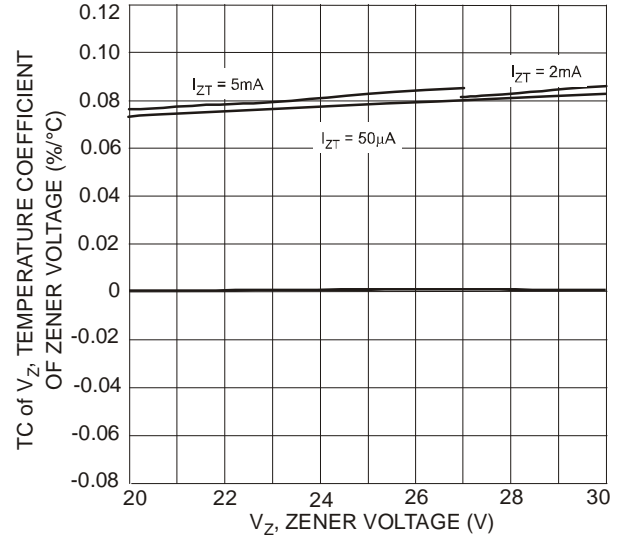


Fig. 19 Typical Temperature Coefficient of Zener Voltage vs. Zener Voltage, DDZ9707 - DDZ9713

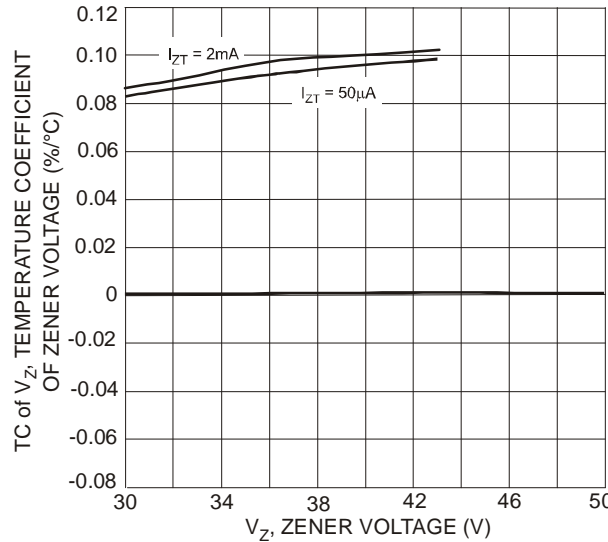


Fig. 20 Typical Temperature Coefficient of Zener Voltage vs. Zener Voltage, DDZ9713 - DDZ9717

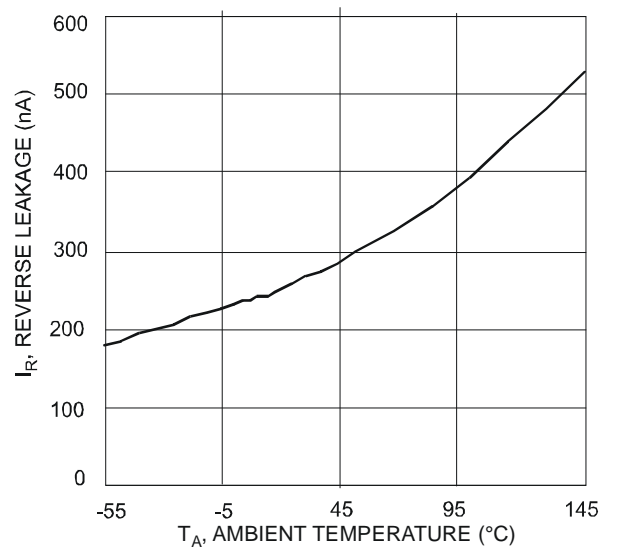


Fig. 21 Typical Leakage vs. Ambient Temperature, DDZ9681

**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°   | --   |
| <b>All Dimensions in mm</b> |      |      |      |

## 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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