



# DDZ9681 - DDZ9717

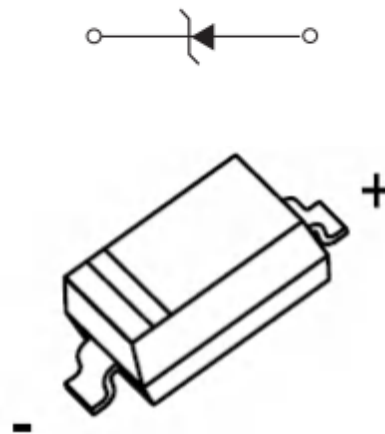
## SURFACE MOUNT PRECISION ZENER DIODE

### Features

- 500mW Power Dissipation on Ceramic PCB
- Very Tight Tolerance on  $V_Z$
- Ideally Suited for Automated Assembly Processes
- **Lead Free By Design/RoHS Compliant (Note 2)**

### Mechanical Data

- Case: SOD-123
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: Cathode Band
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Marking & Type Code Information: See Electrical Specifications Table
- Ordering Information: See Page 7
- Weight: 0.01 grams (approximate)



SOD-123

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

| Characteristic                          | Symbol         | Value       | Unit             |
|-----------------------------------------|----------------|-------------|------------------|
| Forward Voltage @ $I_F = 10\text{mA}$   | $V_F$          | 0.9         | V                |
| Operating and Storage Temperature Range | $T_j, T_{STG}$ | -65 to +150 | $^\circ\text{C}$ |

### Thermal Characteristics

| Characteristic                                       | Symbol          | Value | Unit               |
|------------------------------------------------------|-----------------|-------|--------------------|
| Power Dissipation (Note 1)                           | $P_d$           | 500   | mW                 |
| Thermal Resistance, Junction to Ambient Air (Note 1) | $R_{\theta JA}$ | 305   | $^\circ\text{C/W}$ |

- Note:
1. Device mounted on ceramic PCB = 7.6mm x 9.4mm x 0.87mm with pad areas 25mm<sup>2</sup> at  $T_A = 25^\circ\text{C}$  or mounted on FR-5 = 3.5x1.5 inches with recommended pad layout, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>, at  $T_L = 75^\circ\text{C}$ .
  2. No purposefully added lead.



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

| Type Number | Type Code | Zener Voltage Range (Note 3)     |         |         |                 | Maximum Reverse Leakage Current (Note 4) |      |
|-------------|-----------|----------------------------------|---------|---------|-----------------|------------------------------------------|------|
|             |           | 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    |
| 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: 3. Nominal Zener voltage is measured with the device junction in thermal equilibrium at T<sub>J</sub> = 30°C ±1°C.  
4. Short duration pulse test used to minimize self-heating effect.

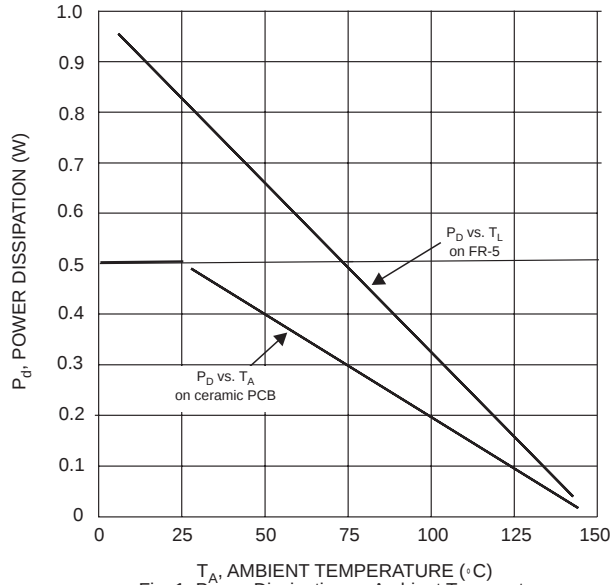


Fig. 1 Power Dissipation vs Ambient Temperature

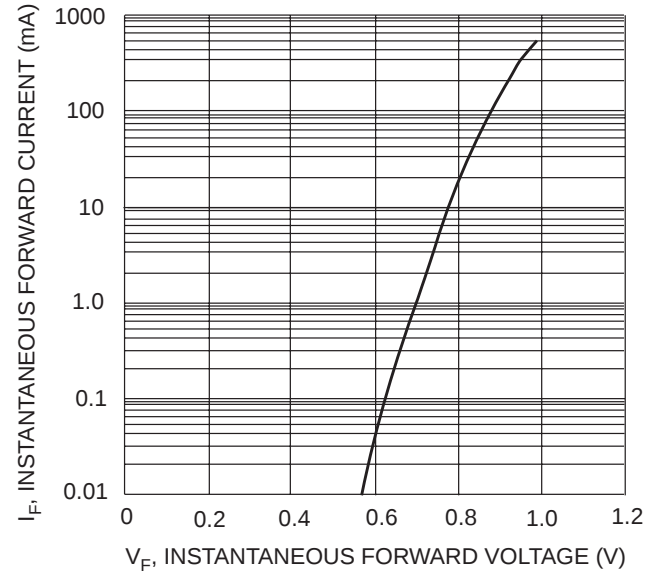


Fig. 2 Typical Forward Characteristics

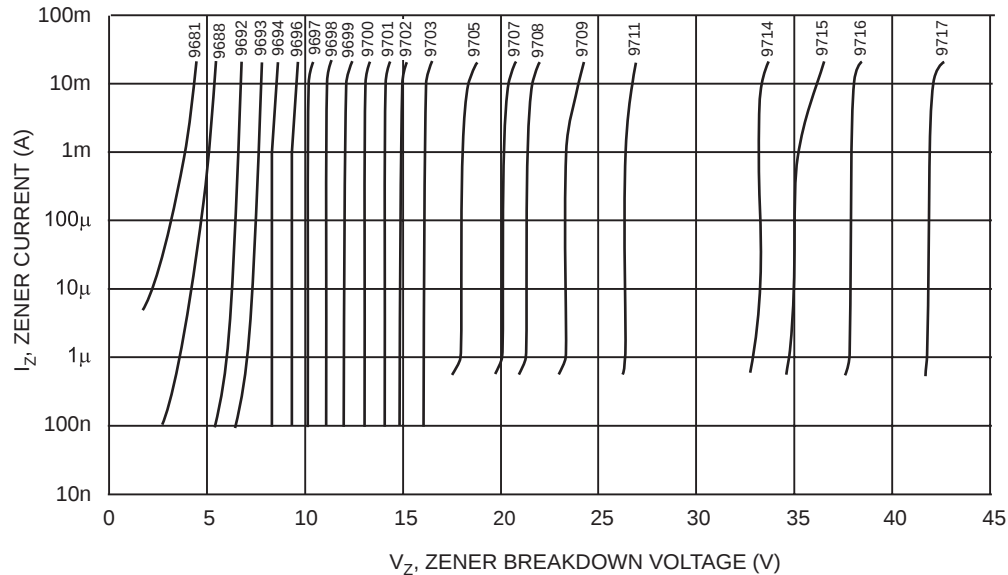


Fig. 3 Typical Reverse Characteristics

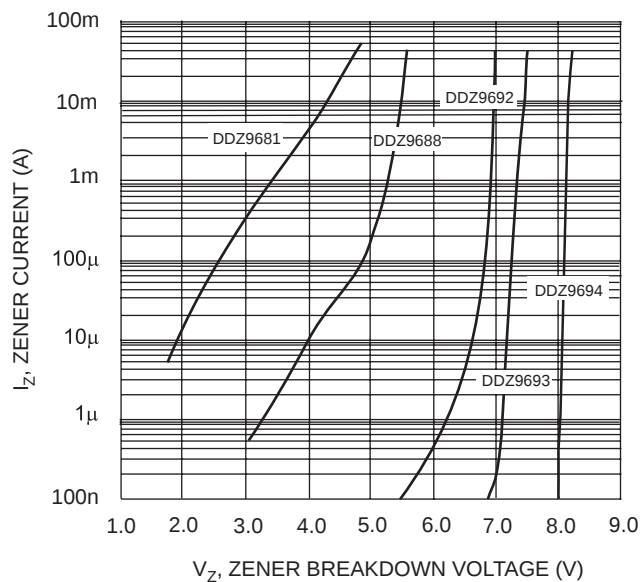


Fig. 4 Typical Reverse Characteristics, DDZ9681 - DDZ9694

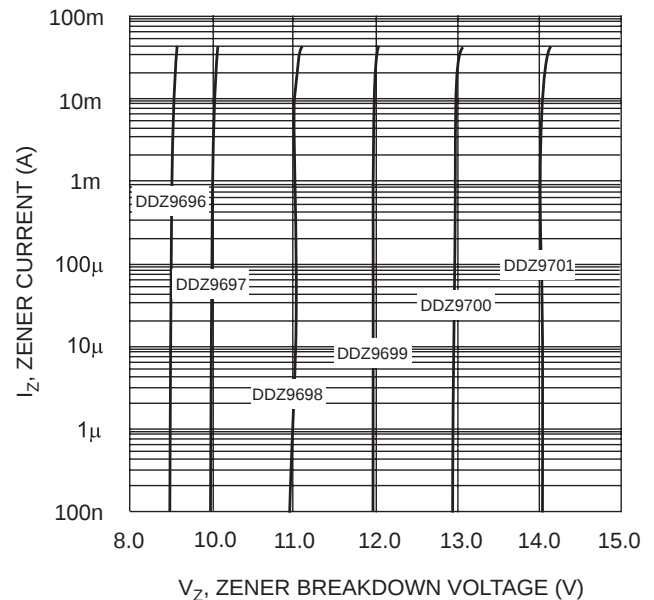


Fig. 5 Typical Reverse Characteristics, DDZ9696 - DDZ9701

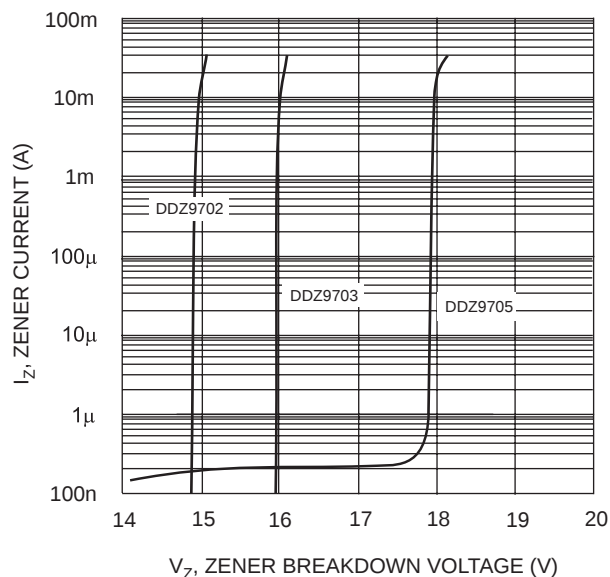


Fig. 6 Typical Reverse Characteristics, DDZ9702 - DDZ9705

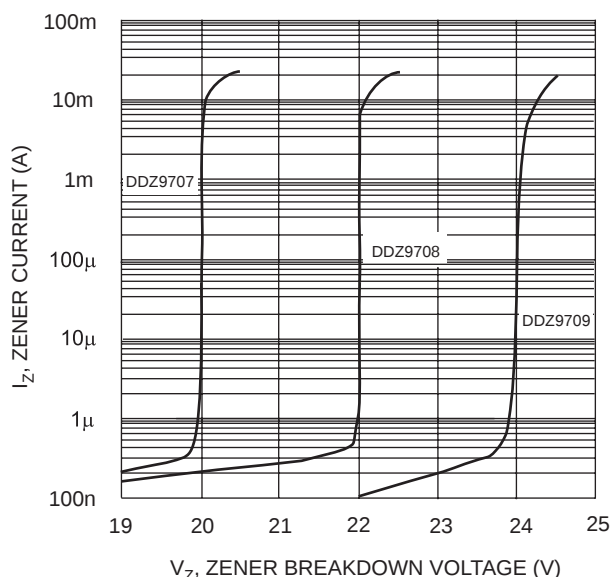


Fig. 7 Typical Reverse Characteristics, DDZ9707 - DDZ9709

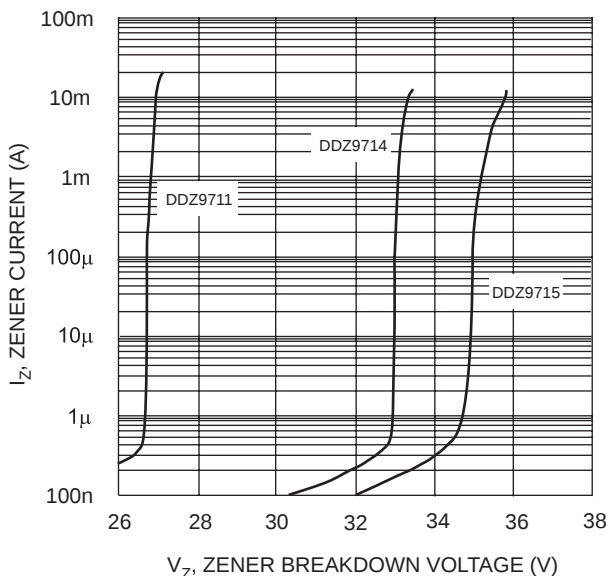


Fig. 8 Typical Reverse Characteristics, DDZ9711 - DDZ9715

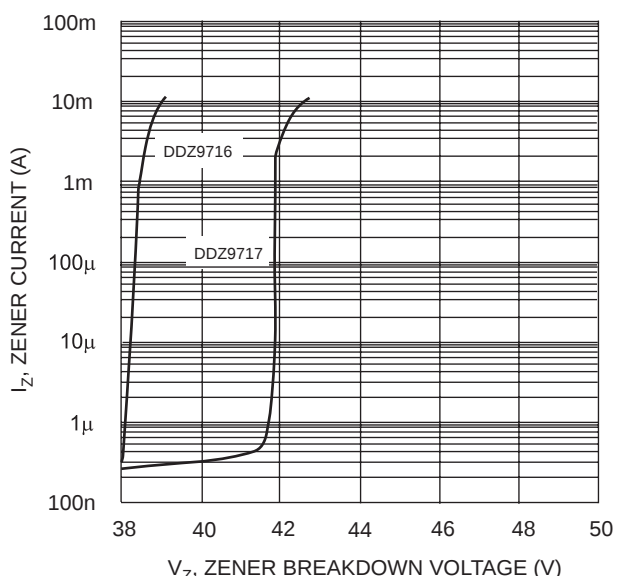


Fig. 9 Typical Reverse Characteristics, DDZ9716 - DDZ9717

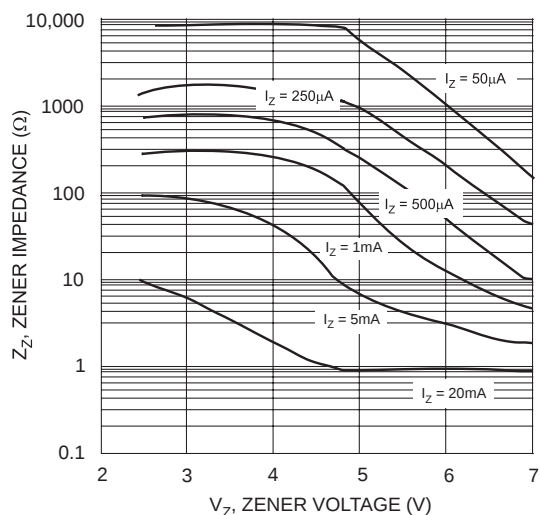


Fig. 10 Typical Zener Impedance Characteristics, DDZ9681 - DDZ9692

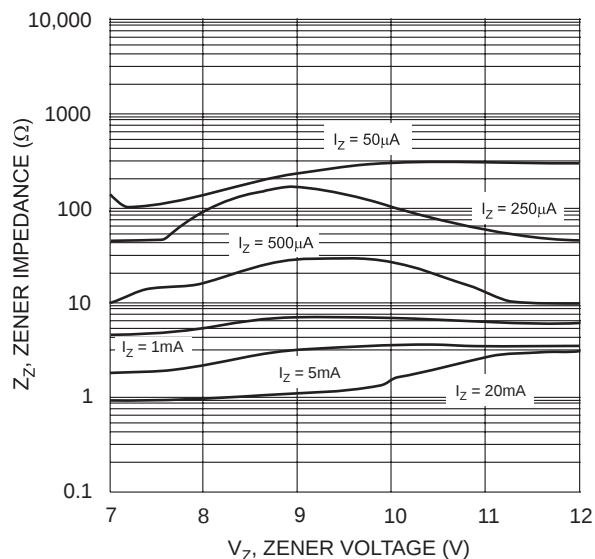


Fig. 11 Typical Zener Impedance Characteristics, DDZ9693 - DDZ9699

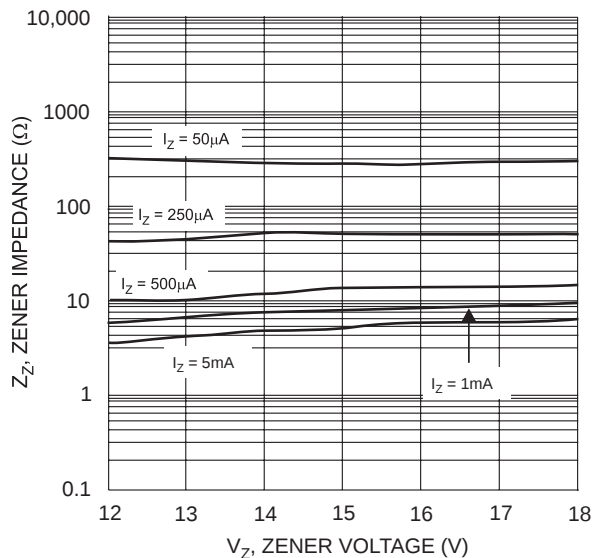


Fig. 12 Typical Zener Impedance Characteristics, DDZ9699 - DDZ9705

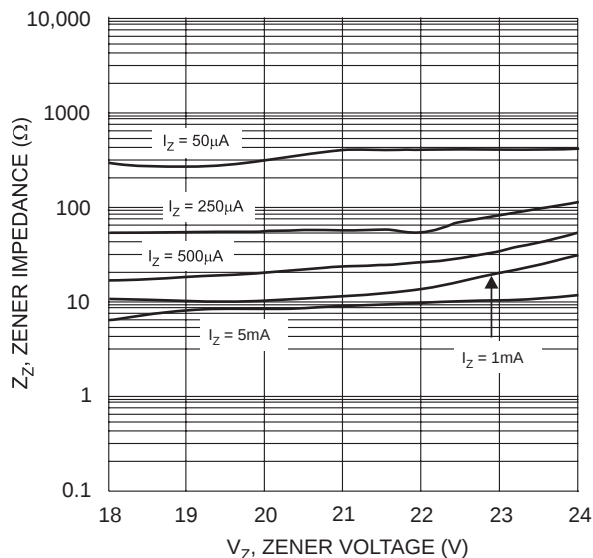


Fig. 13 Typical Zener Impedance Characteristics, DDZ9705 - DDZ9709

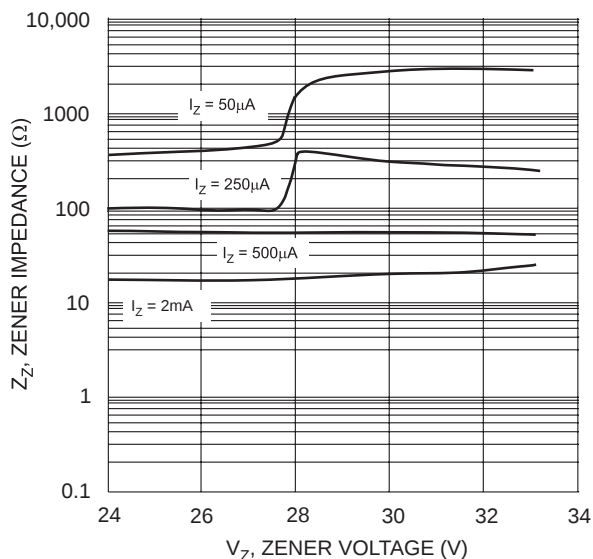


Fig. 14 Typical Zener Impedance Characteristics, DDZ9709 - DDZ9714

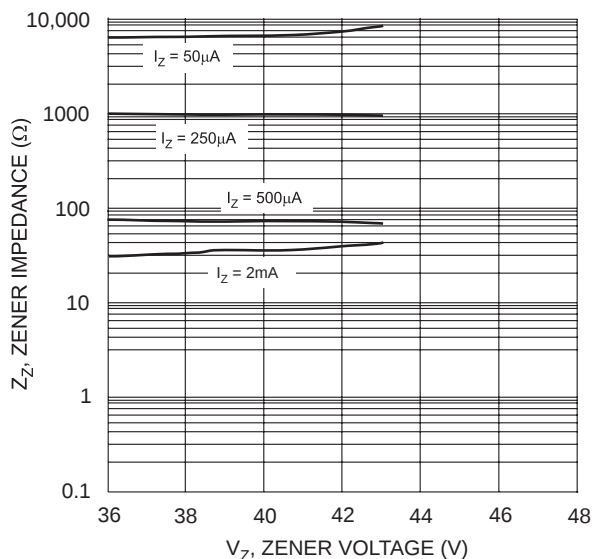


Fig. 15 Typical Zener Impedance Characteristics, DDZ9715 - DDZ9717

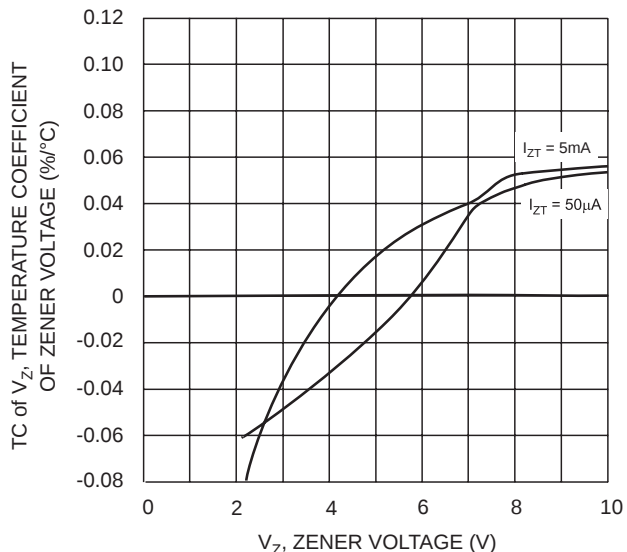


Fig. 16 Typical Temperature Coefficient of Zener Voltage vs. Zener Voltage, DDZ9681 - DDZ9697

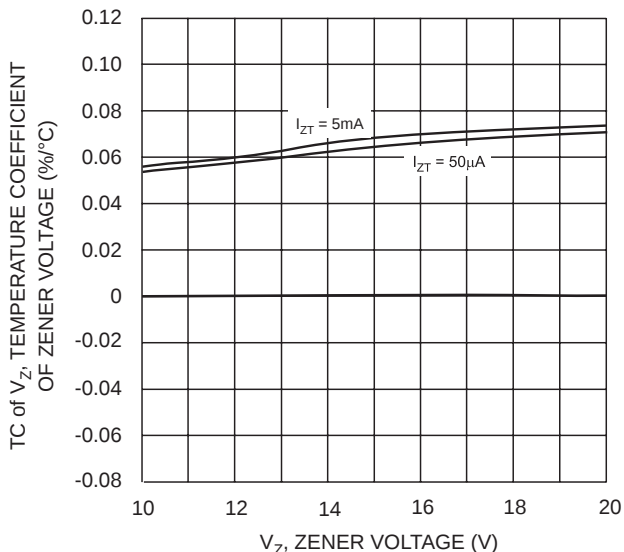


Fig. 17 Typical Temperature Coefficient of Zener Voltage vs. Zener Voltage, DDZ9697 - DDZ9707

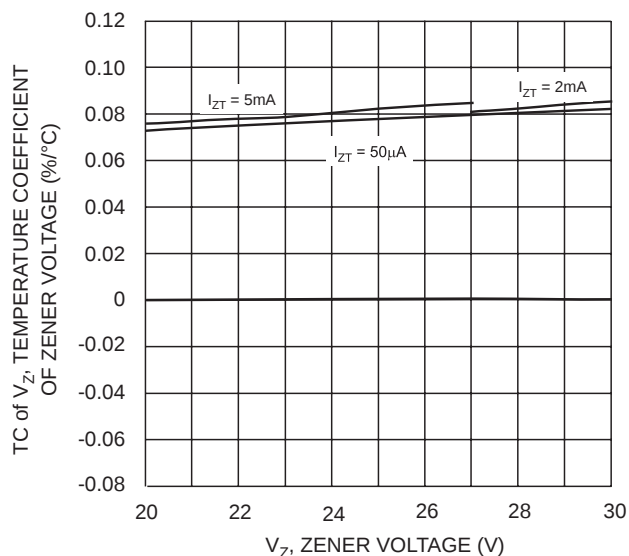


Fig. 18 Typical Temperature Coefficient of Zener Voltage, DDZ9707 - DDZ9713

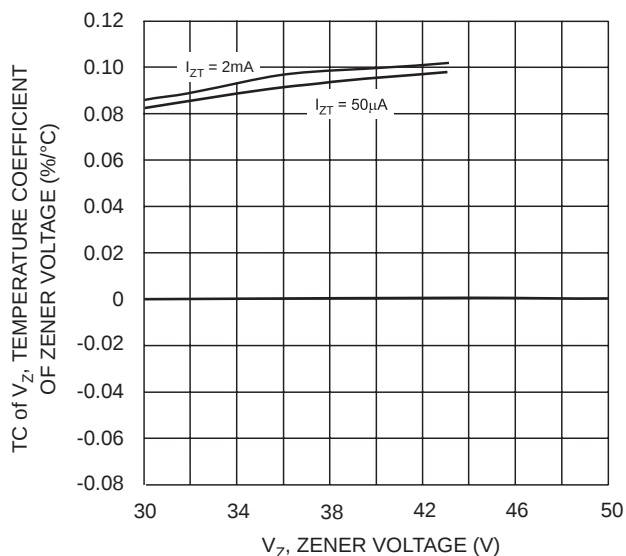


Fig. 19 Typical Temperature Coefficient of Zener Voltage, DDZ9713 - DDZ9717

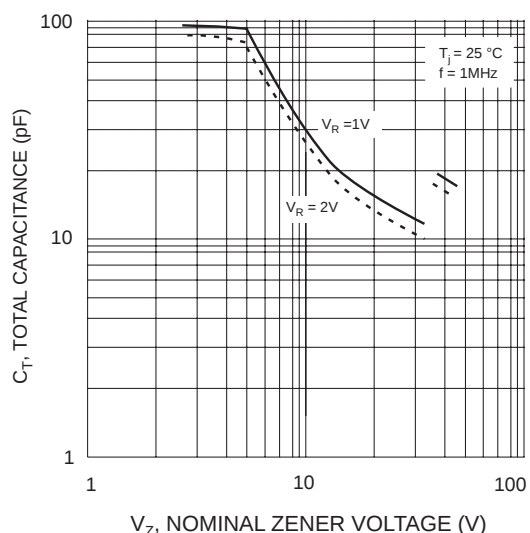


Fig. 20 Total Capacitance vs Nominal Zener Voltage

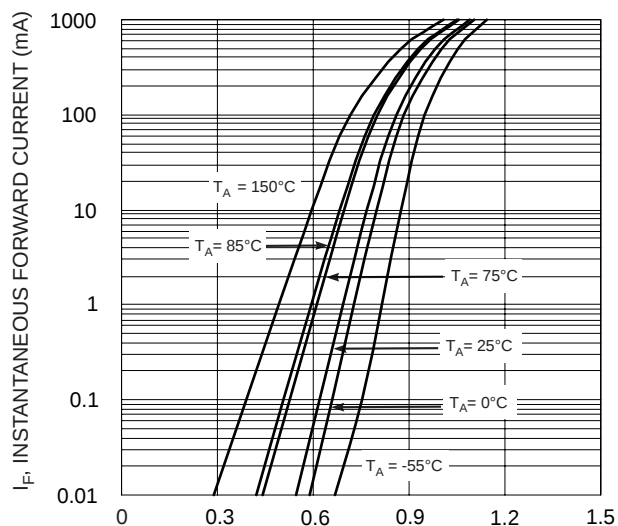


Fig. 21 Typical Forward Characteristics, DDZ9681

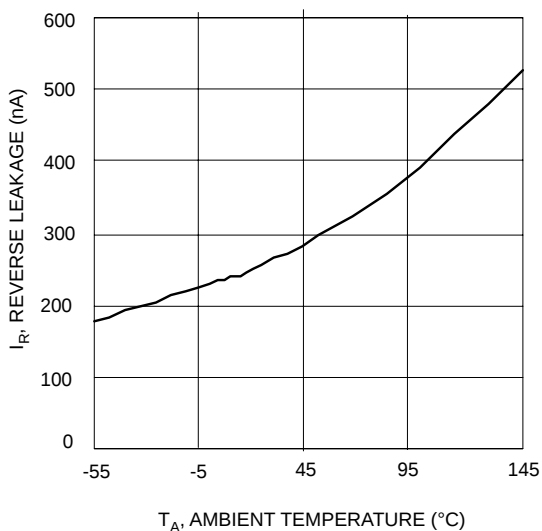


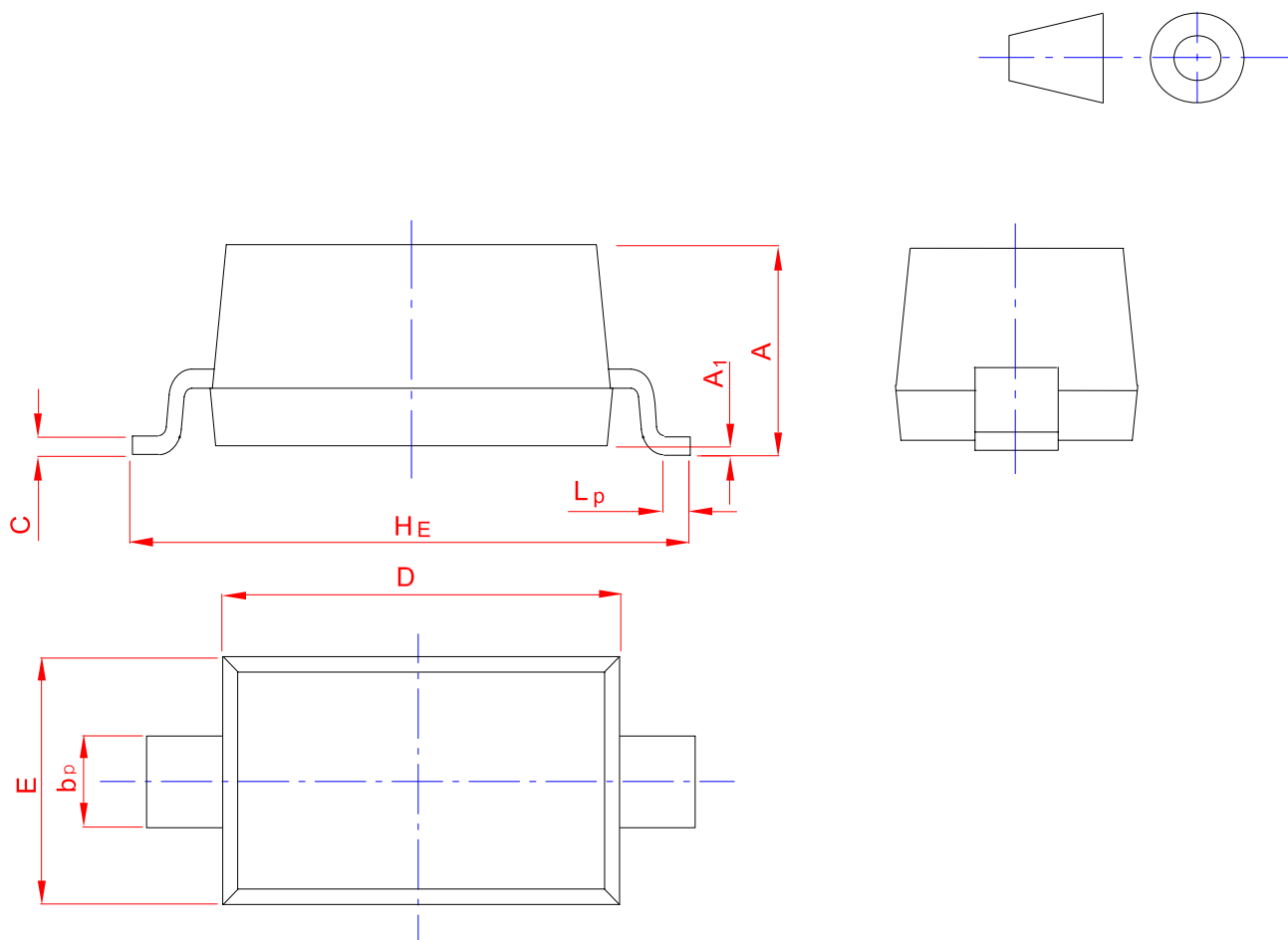
Fig. 22 Typical Leakage vs. Ambient Temperature, DDZ9681



## PACKAGE OUTLINE

Plastic surface mounted package; 2 leads

SOD-123



| UNIT | A            | bp           | C              | D            | E            | HE           | A1           | Lp           |
|------|--------------|--------------|----------------|--------------|--------------|--------------|--------------|--------------|
| mm   | 1.20<br>0.90 | 0.60<br>0.50 | 0.135<br>0.100 | 2.75<br>2.55 | 1.65<br>1.55 | 3.85<br>3.55 | 0.10<br>0.01 | 0.50<br>0.20 |