

NZ9F2V4T5G, SZNZ9F2V4T5G SERIES

Zener Voltage Regulators

250 mW SOD-923 Surface Mount

This series of Zener diodes is packaged in a SOD-923 surface mount package. They are designed to provide voltage regulation protection and are especially attractive in situations where space is at a premium. They are well suited for applications such as cellular phones, hand held portables, and high density PC boards.

Specification Features:

- Standard Zener Breakdown Voltage Range – 2.4 V to 24 V
- Steady State Power Rating of 250 mW
- Small Body Outline Dimensions:
0.039" x 0.024" (1.00 mm x 0.60 mm)
- Low Body Height: 0.016" (0.40 mm)
- ESD Rating of Class 3 (>16 kV) per Human Body Model
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Mechanical Characteristics:

CASE: Void-free, transfer-molded, thermosetting plastic
Epoxy Meets UL 94 V-0

LEAD FINISH: 100% Matte Sn (Tin)

MOUNTING POSITION: Any

QUALIFIED MAX REFLOW TEMPERATURE: 260°C

Device Meets MSL 1 Requirements

MAXIMUM RATINGS

| Rating | Symbol | Max | Unit |
|--|-----------------|----------------|-------------|
| Total Device Dissipation FR-5 Board, (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 250 2.0 | mW mW/°C |
| Thermal Resistance from Junction-to-Ambient | $R_{\theta JA}$ | 500 | °C/W |
| Junction and Storage Temperature Range | T_J, T_{stg} | -65 to +150 | °C |

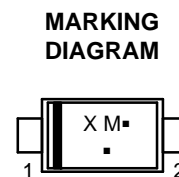
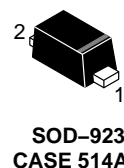
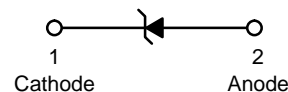
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR-4 Minimum Pad.



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X = Specific Device Code
M = Month Code
▪ = Pb-Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping† |
|-------------------------------|----------------------|------------------|
| NZ9FxxxxT5G, SZNZ9FxxxxT5G | SOD-923 (Pb-Free) | 8000/Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

DEVICE MARKING INFORMATION

See specific marking information in the device marking column of the Electrical Characteristics tables starting on page 3 of this data sheet.

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ELECTRICAL CHARACTERISTICS

($T_A = 25^\circ\text{C}$ unless otherwise noted,
 $V_F = 0.9\text{ V Max. @ } I_F = 10\text{ mA}$ for all types)

| Symbol | Parameter |
|---------------|---|
| V_Z | Reverse Zener Voltage @ I_{ZT} |
| I_{ZT} | Reverse Current |
| Z_{ZT} | Maximum Zener Impedance @ I_{ZT} |
| I_{ZK} | Reverse Current |
| Z_{ZK} | Maximum Zener Impedance @ I_{ZK} |
| I_R | Reverse Leakage Current @ V_R |
| V_R | Reverse Voltage |
| I_F | Forward Current |
| V_F | Forward Voltage @ I_F |
| Θ_{VZ} | Maximum Temperature Coefficient of V_Z |
| C | Max. Capacitance @ $V_R = 0$ and $f = 1\text{ MHz}$ |

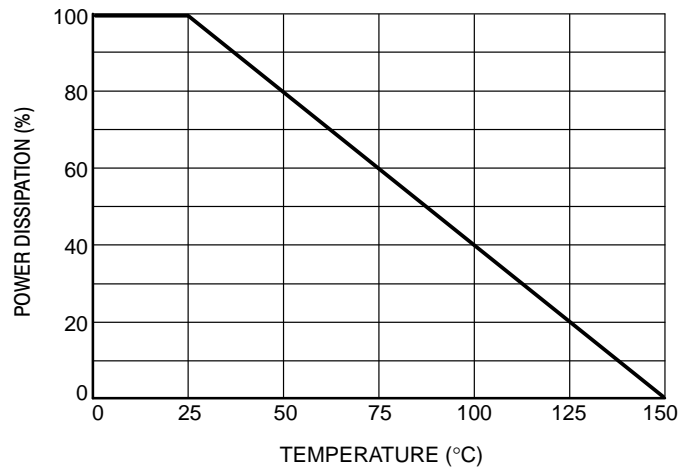
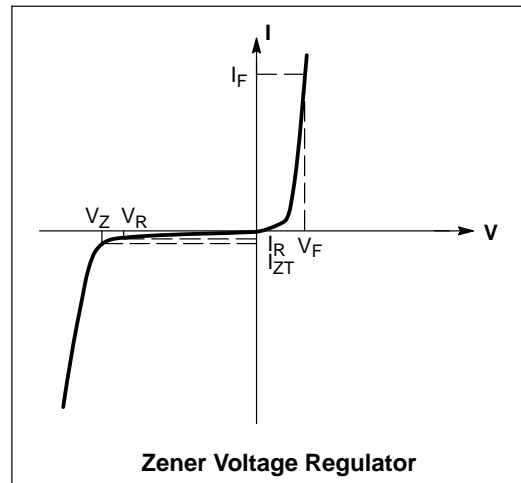


Figure 1. Steady State Power Derating

NZ9F2V4T5G, SZNZ9F2V4T5G SERIES

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 0.9\text{ V Max.}$ @ $I_F = 10\text{ mA}$ for all types)

| Device*** | Device Marking | Zener Voltage (Note 1) | | Zener Impedance | | | Leakage Current | | θ_{V_Z} (mV/k) @ I_{ZT} | | C @ $V_R = 0$ $f = 1\text{ MHz}$ | |
|----------------|----------------|---------------------------|-------|------------------------|---------------------|----------|-----------------|---------------|-------------------------------------|------|--|-----|
| | | V_Z (Volts) | | Z_{ZT} @ I_{ZT} | Z_{ZK} @ I_{ZK} | | I_R @ V_R | | | | | |
| | | Min | Max | mA | Ω | Ω | mA | μA | Volts | Min | Max | pF |
| SZ, NZ9F2V4T5G | J | 2.28 | 2.52 | 5 | 100 | 1000 | 1 | 50 | 1 | -3.5 | 0 | 210 |
| SZ, NZ9F2V7T5G | E** | 2.57 | 2.84 | 5 | 100 | 1000 | 1 | 20 | 1 | -3.5 | 0 | 210 |
| SZ, NZ9F3V0T5G | T** | 2.85 | 3.15 | 5 | 100 | 1000 | 1 | 10 | 1 | -3.5 | 0 | 210 |
| SZ, NZ9F3V3T5G | Q | 3.14 | 3.47 | 5 | 100 | 1000 | 1 | 10 | 1 | -3.5 | 0 | 210 |
| SZ, NZ9F3V6T5G | 3** | 3.42 | 3.78 | 5 | 100 | 1000 | 1 | 10 | 1 | -3.5 | 0 | 210 |
| SZ, NZ9F3V9T5G | V** | 3.71 | 4.10 | 5 | 100 | 1000 | 1 | 5 | 1 | -3.5 | -2.5 | 210 |
| SZ, NZ9F4V3T5G | Y** | 4.09 | 4.52 | 5 | 100 | 1000 | 1 | 5 | 1 | -3.5 | 0 | 210 |
| SZ, NZ9F4V7T5G | 3 | 4.47 | 4.94 | 5 | 100 | 800 | 0.5 | 2 | 1 | -3.5 | 0.2 | 150 |
| SZ, NZ9F5V1T5G | 4 | 4.85 | 5.36 | 5 | 80 | 500 | 0.5 | 2 | 1.5 | -2.7 | 1.2 | 130 |
| SZ, NZ9F5V6T5G | 5 | 5.32 | 5.88 | 5 | 60 | 200 | 0.5 | 1 | 2.5 | -2.0 | 2.5 | 115 |
| SZ, NZ9F6V2T5G | 6 | 5.89 | 6.51 | 5 | 60 | 100 | 0.5 | 1 | 3 | 0.4 | 3.7 | 110 |
| SZ, NZ9F6V8T5G | A* | 6.46 | 7.14 | 5 | 40 | 60 | 0.5 | 0.5 | 3.5 | 1.2 | 4.5 | 105 |
| SZ, NZ9F7V5T5G | D* | 7.13 | 7.88 | 5 | 30 | 60 | 0.5 | 0.5 | 4 | 2.5 | 5.3 | 100 |
| SZ, NZ9F8V2T5G | E* | 7.79 | 8.61 | 5 | 30 | 60 | 0.5 | 0.5 | 5 | 3.2 | 6.2 | 90 |
| SZ, NZ9F9V1T5G | F* | 8.65 | 9.56 | 5 | 30 | 60 | 0.5 | 0.5 | 6 | 3.8 | 7 | 80 |
| SZ, NZ9F10VT5G | J* | 9.50 | 10.50 | 5 | 30 | 60 | 0.5 | 0.1 | 7 | 4.5 | 8 | 80 |
| SZ, NZ9F11VT5G | K* | 10.45 | 11.55 | 5 | 30 | 60 | 0.5 | 0.1 | 8 | 5.4 | 9 | 80 |
| SZ, NZ9F12VT5G | L* | 11.40 | 12.60 | 5 | 30 | 80 | 0.5 | 0.1 | 9 | 6 | 10 | 80 |
| SZ, NZ9F13VT5G | P* | 12.35 | 13.65 | 5 | 37 | 80 | 0.5 | 0.1 | 10 | 7 | 11 | 75 |
| SZ, NZ9F15VT5G | Q* | 14.25 | 15.75 | 5 | 42 | 80 | 0.5 | 0.1 | 11 | 9.2 | 13 | 70 |
| SZ, NZ9F16VT5G | R* | 15.20 | 16.80 | 5 | 50 | 80 | 0.5 | 0.1 | 12 | 10.4 | 14 | 65 |
| SZ, NZ9F18VT5G | T* | 17.10 | 18.90 | 5 | 50 | 80 | 0.5 | 0.1 | 14 | 12.4 | 16 | 60 |
| SZ, NZ9F20VT5G | V* | 19.00 | 21.00 | 5 | 55 | 100 | 0.5 | 0.1 | 15.4 | 14.4 | 18 | 55 |
| SZ, NZ9F22VT5G | Y* | 20.90 | 23.10 | 5 | 55 | 100 | 0.5 | 0.1 | 16.8 | 15.4 | 20 | 55 |
| SZ, NZ9F24VT5G | F | 22.80 | 25.20 | 5 | 70 | 120 | 0.5 | 0.1 | 18.9 | 16.8 | 22 | 50 |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

*Rotated 90°.

**Rotated 270°.

***SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

1. Zener voltage is measured with a pulse test current I_Z at an ambient temperature of 25°C.

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