

# NZ9F2V4ST5G, SZNZ9F2V4ST5G 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 18 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
- Tight Tolerance  $V_Z$
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These are Pb-Free Devices

#### 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,<br>(Note 1) @ $T_A = 25^\circ\text{C}$<br>Derate above 25°C | $P_D$           | 250<br>2.0     | mW<br>mW/°C |
| Thermal Resistance from<br>Junction-to-Ambient   | $R_{\theta JA}$ | 500            | °C/W        |
| Junction and Storage Temperature Range   | $T_J, T_{stg}$  | -65 to<br>+150 | °C          |

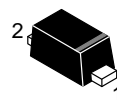
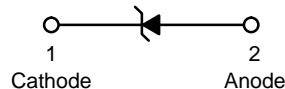
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR-4 Minimum Pad.



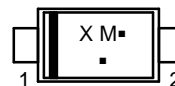
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SOD-923  
CASE 514AB

#### MARKING DIAGRAM



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

#### ORDERING INFORMATION

| Device                        | Package              | Shipping†        |
|-------------------------------|----------------------|------------------|
| NZ9FxxxST5G,<br>SZNZ9FxxxST5G | SOD-923<br>(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 table on page 3 of this data sheet.

# NZ9F2V4ST5G, SZNZ9F2V4ST5G 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)

| 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 @ $I_F$                             |
| $\Theta V_Z$ | Maximum Temperature Coefficient of $V_Z$            |
| C            | Max. Capacitance @ $V_R = 0$ and $f = 1\text{ MHz}$ |



Figure 1. Zener Voltage Regulator

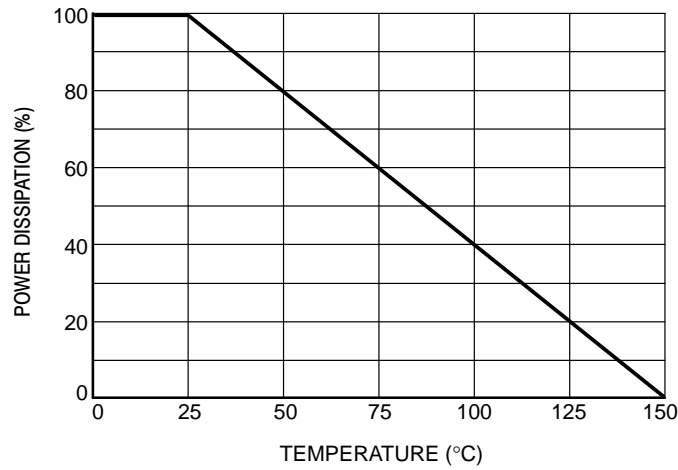


Figure 2. Steady State Power Derating

## NZ9F2V4ST5G, SZNZ9F2V4ST5G SERIES

**ELECTRICAL CHARACTERISTICS** ( $V_F = 0.9$  Max @  $I_F = 10$  mA for all types)

| Device***       | Device Marking | Zener Voltage VZ |       | Test Current Izt mA | Z <sub>ZT</sub><br>I <sub>Z</sub> = I <sub>ZT</sub><br>@ 10%<br>Mod Ω<br>Max | Z <sub>ZK</sub> I <sub>Z</sub><br>= 1.0<br>mA Ω<br>Max | I <sub>ZK</sub><br>mA | Max IR @ VR |     | dV <sub>Z</sub> /dt (mV/k)<br>@ I <sub>ZT1</sub> = 5 mA |      | CpF Max @<br>V <sub>R</sub> = 0<br>f = 1 MHz |
|-----------------|----------------|------------------|-------|---------------------|--|--|-----------------------|-------------|-----|---|------|--|
|                 |                | Min              | Max   |                     |  |  |                       | μA          | V   | Min   | Max  |  |
| SZ, NZ9F2V4ST5G | 2*             | 2.43             | 2.63  | 5                   | 100  | 1000   | 1                     | 50          | 1   | -3.5  | 0    | 210  |
| SZ, NZ9F2V7ST5G | 3*             | 2.67             | 2.91  | 5                   | 100  | 1000   | 1                     | 20          | 1   | -3.5  | 0    | 210  |
| SZ, NZ9F3V0ST5G | 4*             | 2.94             | 3.26  | 5                   | 100  | 1000   | 1                     | 10          | 1   | -3.5  | 0    | 210  |
| SZ, NZ9F3V3ST5G | 5*             | 3.32             | 3.53  | 5                   | 100  | 1000   | 1                     | 10          | 1   | -3.5  | 0    | 210  |
| SZ, NZ9F3V6ST5G | 6*             | 3.6              | 3.85  | 5                   | 100  | 1000   | 1                     | 10          | 1   | -3.5  | 0    | 210  |
| SZ, NZ9F3V9ST5G | A**            | 3.89             | 4.16  | 5                   | 100  | 1000   | 1                     | 5           | 1   | -3.5  | -2.5 | 210  |
| SZ, NZ9F4V3ST5G | D**            | 4.17             | 4.43  | 5                   | 100  | 1000   | 1                     | 5           | 1   | -3.5  | 0    | 210  |
| SZ, NZ9F4V7ST5G | E**            | 4.55             | 4.75  | 5                   | 100  | 800  | 0.5                   | 2           | 1   | -3.5  | 0.2  | 150  |
| SZ, NZ9F5V1ST5G | F**            | 4.989            | 5.2   | 5                   | 80   | 500  | 0.5                   | 2           | 1.5 | -2.7  | 1.2  | 130  |
| SZ, NZ9F5V6ST5G | J**            | 5.49             | 5.73  | 5                   | 60   | 200  | 0.5                   | 1           | 2.5 | -2.0  | 2.5  | 115  |
| SZ, NZ9F6V2ST5G | K**            | 6.06             | 6.33  | 5                   | 60   | 100  | 0.5                   | 1           | 3   | 0.4   | 3.7  | 110  |
| SZ, NZ9F6V8ST5G | L**            | 6.65             | 6.93  | 5                   | 40   | 60   | 0.5                   | 0.5         | 3.5 | 1.2   | 4.5  | 105  |
| SZ, NZ9F7V5ST5G | P**            | 7.28             | 7.6   | 5                   | 30   | 60   | 0.5                   | 0.5         | 4   | 2.5   | 5.3  | 100  |
| SZ, NZ9F8V2ST5G | Q**            | 8.02             | 8.36  | 5                   | 30   | 60   | 0.5                   | 0.5         | 5   | 3.2   | 6.2  | 90   |
| SZ, NZ9F9V1ST5G | R**            | 8.85             | 9.23  | 5                   | 30   | 60   | 0.5                   | 0.5         | 6   | 3.8   | 7    | 80   |
| SZ, NZ9F10VST5G | T**            | 9.77             | 10.21 | 5                   | 30   | 60   | 0.5                   | 0.1         | 7   | 4.5   | 8    | 80   |
| SZ, NZ9F11VST5G | V**            | 10.76            | 11.22 | 5                   | 30   | 60   | 0.5                   | 0.1         | 8   | 5.4   | 9    | 80   |
| SZ, NZ9F12VST5G | Y**            | 11.74            | 12.24 | 5                   | 30   | 80   | 0.5                   | 0.1         | 9   | 6   | 10   | 80   |
| SZ, NZ9F13VST5G | 2**            | 12.91            | 13.49 | 5                   | 37   | 80   | 0.5                   | 0.1         | 10  | 7   | 11   | 75   |
| SZ, NZ9F15VST5G | 3**            | 14.34            | 14.98 | 5                   | 42   | 80   | 0.5                   | 0.1         | 11  | 9.2   | 13   | 70   |
| SZ, NZ9F16VST5G | 4**            | 15.85            | 16.51 | 5                   | 50   | 80   | 0.5                   | 0.1         | 12  | 10.4  | 14   | 65   |
| SZ, NZ9F18VST5G | 5**            | 17.56            | 18.35 | 5                   | 50   | 80   | 0.5                   | 0.1         | 14  | 12.4  | 16   | 60   |

\*Rotated 90°.

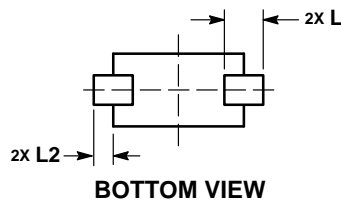
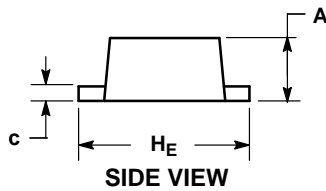
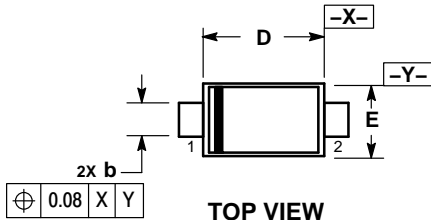
\*\*Rotated 180°.

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

# NZ9F2V4ST5G, SZNZ9F2V4ST5G SERIES

## PACKAGE DIMENSIONS

**SOD-923**  
CASE 514AB  
ISSUE C

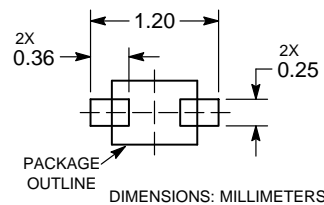


**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| DIM            | MILLIMETERS |      |      | INCHES    |       |       |
|----------------|-------------|------|------|-----------|-------|-------|
|                | MIN         | NOM  | MAX  | MIN       | NOM   | MAX   |
| A              | 0.34        | 0.37 | 0.40 | 0.013     | 0.015 | 0.016 |
| b              | 0.15        | 0.20 | 0.25 | 0.006     | 0.008 | 0.010 |
| c              | 0.07        | 0.12 | 0.17 | 0.003     | 0.005 | 0.007 |
| D              | 0.75        | 0.80 | 0.85 | 0.030     | 0.031 | 0.033 |
| E              | 0.55        | 0.60 | 0.65 | 0.022     | 0.024 | 0.026 |
| H <sub>E</sub> | 0.95        | 1.00 | 1.05 | 0.037     | 0.039 | 0.041 |
| L              | 0.19 REF    |      |      | 0.007 REF |       |       |
| L2             | 0.05        | 0.10 | 0.15 | 0.002     | 0.004 | 0.006 |

**SOLDERING FOOTPRINT\***



See Application Note AND8455/D for more mounting details

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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