# Zener Voltage Regulators

## 250 mW SOD-923 Surface Mount

# NZ9F2V4ST5G, SZNZ9F2V4ST5G SERIES

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

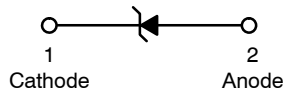
### Mechanical Characteristics

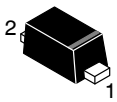
**CASE:** Void-free, transfer-molded, thermosetting plastic Epoxy Meets UL 94, V-0
**LEAD FINISH:** 100% Matte Sn (Tin)
**MOUNTING POSITION:** Any
**QUALIFIED MAX REFLOW TEMPERATURE:** 260°C
Device Meets MSL 1 Requirements

### MAXIMUM RATINGS

| Rating | Symbol | Max | Unit |
|---|---|---|---|
| Total Device Dissipation FR-5 Board, (Note 1) @ $T_A$ = 25 °C<br>Derate above 25 °C | $P_D$ | 250<br>2.0 | mW<br>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 |

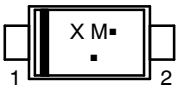
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.
1. FR-4 Minimum Pad.




**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, SZNZ9FxxxST5G | 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 Specification Brochure, BRD8011/D.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 3.

### DEVICE MARKING INFORMATION

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

## ELECTRICAL CHARACTERISTICS

($T_A$ = 25 °C unless otherwise noted,
$V_F$ = 0.9 V Max. @ $I_F$ = 10 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 MHz |

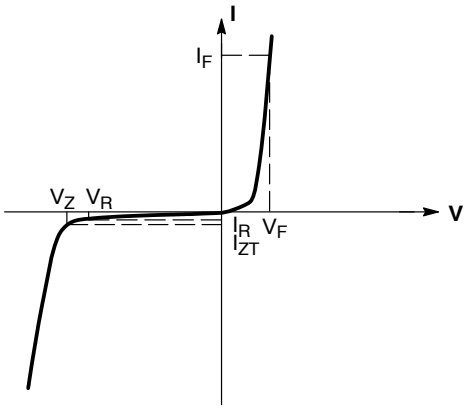



**Figure 1. Zener Voltage Regulator**

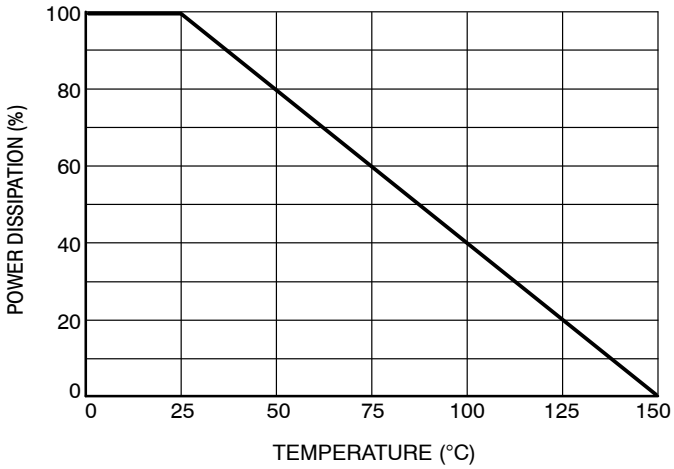



**Figure 2. Steady State Power Derating**

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

| Device*** | Device Marking | Zener Voltage VZ | | Test Current Izt mA | $Z_{ZT}$ $I_Z$ = IZT @ 10% Mod Ω Max | $Z_{ZK}$ $I_Z$ = 1.0 mA Ω Max | $I_{ZK}$ mA | Max IR @ VR | | $d_{VZ}$/dt (mV/k) @ $I_{ZT1}$ = 5 mA | | CpF Max @ $V_R$ = 0 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 |
| SZNZ9F3V0ST5G | 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 |
| SZNZ9F3V6ST5G | 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 |
| SZNZ9F4V3ST5G | 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 |
| SZNZ9F8V2ST5G | Q** | 8.02 | 8.36 | 5 | 30 | 60 | 0.5 | 0.5 | 5 | 3.2 | 6.2 | 90 |
| SZNZ9F9V1ST5G | 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 |
| SZNZ9F13VST5G | 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 |

**DISCONTINUED** (Note 2)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NZ9F2V7ST5G | 3* | 2.67 | 2.91 | 5 | 100 | 1000 | 1 | 20 | 1 | –3.5 | 0 | 210 |
| NZ9F3V6ST5G | 6* | 3.6 | 3.85 | 5 | 100 | 1000 | 1 | 10 | 1 | –3.5 | 0 | 210 |
| NZ9F4V3ST5G | D** | 4.17 | 4.43 | 5 | 100 | 1000 | 1 | 5 | 1 | –3.5 | 0 | 210 |
| NZ9F8V2ST5G | Q** | 8.02 | 8.36 | 5 | 30 | 60 | 0.5 | 0.5 | 5 | 3.2 | 6.2 | 90 |
| NZ9F9V1ST5G | R** | 8.85 | 9.23 | 5 | 30 | 60 | 0.5 | 0.5 | 6 | 3.8 | 7 | 80 |
| NZ9F13VST5G | 2** | 12.91 | 13.49 | 5 | 37 | 80 | 0.5 | 0.1 | 10 | 7 | 11 | 75 |

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.

2. **DISCONTINUED:** These devices are not available. Please contact your **onsemi** representative for information. The most current information on these devices may be available on www.onsemi.com.

* Rotated 90°.

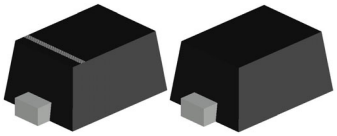
* *Rotated 180°.

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

## REVISION HISTORY

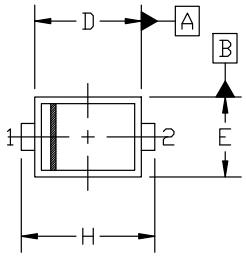
| Revision | Description of Changes | Date |
|---|---|---|
| 4 | Rebranded the Data Sheet to **onsemi** format.<br>NZ9F2V7ST5G, NZ9F3V6ST5G, NZ9F4V3ST5G, NZ9F8V2ST5G, NZ9F9V1ST5G, NZ9F13VST5G OPNs Marked as Discontinued. | 09/18/2025 |

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

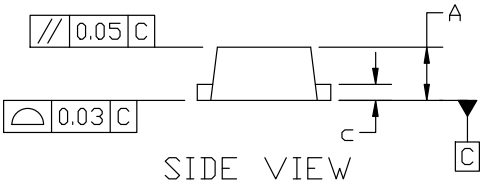


**SOD−923 0.80x0.60x0.37**
CASE 514AB
ISSUE E

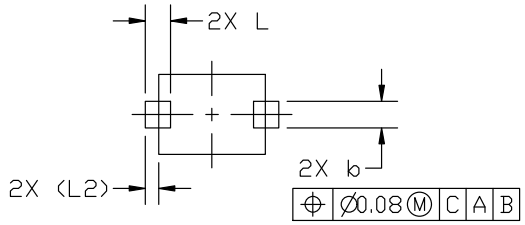
DATE 08 FEB 2024




TOP VIEW



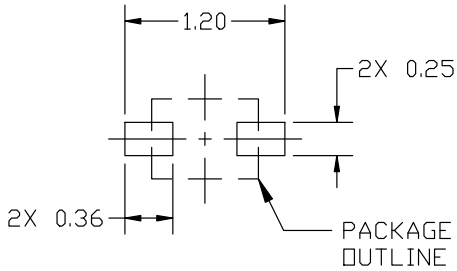

SIDE VIEW




BOTTOM VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
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.
5. DIMENSION L WILL NOT EXCEED 0.30mm.

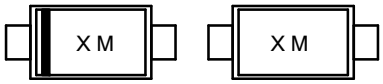
| MILLIMETERS | | | |
|---|---|---|---|
| DIM | MIN. | NOM. | MAX. |
| A | 0.34 | 0.37 | 0.40 |
| b | 0.15 | 0.20 | 0.25 |
| c | 0.07 | 0.12 | 0.17 |
| D | 0.75 | 0.80 | 0.85 |
| E | 0.55 | 0.60 | 0.65 |
| H | 0.95 | 1.00 | 1.05 |
| L | 0.19 REF | | |
| L2 | 0.05 | 0.10 | 0.15 |




RECOMMENDED MOUNTING FOOTPRINT

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

**GENERIC MARKING DIAGRAM***




STYLE 1 STYLE 2

X = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

STYLE 1:
PIN 1. CATHODE (POLARITY BAND)
2. ANODE

STYLE 2:
NO POLARITY

| | | | |
|---|---|---|---|
| **DOCUMENT NUMBER:** | **98AON23284D** | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red. | |
| **DESCRIPTION:** | **SOD−923 0.80x0.60x0.37** | | **PAGE 1 OF 1** |

## ADDITIONAL INFORMATION

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