

# NZ9F2V4T5G SERIES

## Zener Voltage Regulators

### 200 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 200 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
- 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

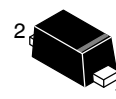
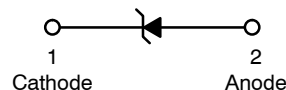
| Rating   | Symbol         | Max         | Unit |
|--|----------------|-------------|------|
| Total Device Dissipation FR-5 Board,<br>@ $T_A = 25^\circ\text{C}$ | $P_D$          | 200         | mW   |
| Junction and Storage<br>Temperature Range                          | $T_J, T_{stg}$ | -65 to +150 | °C   |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



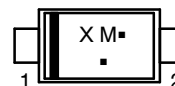
**ON Semiconductor®**

<http://onsemi.com>



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†        |
|-------------|----------------------|------------------|
| NZ9FxxxxT5G | 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

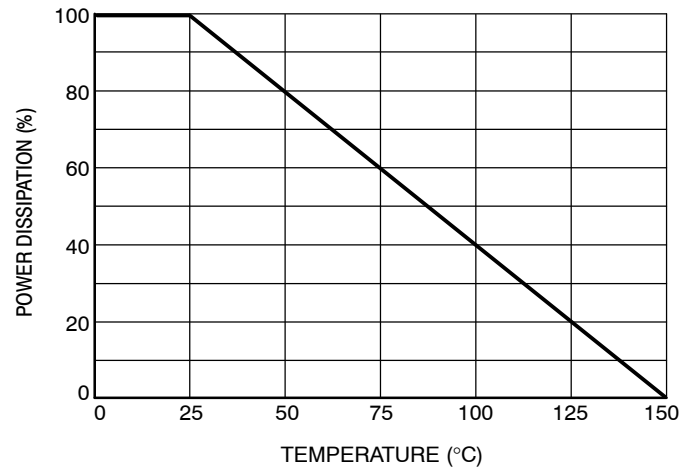
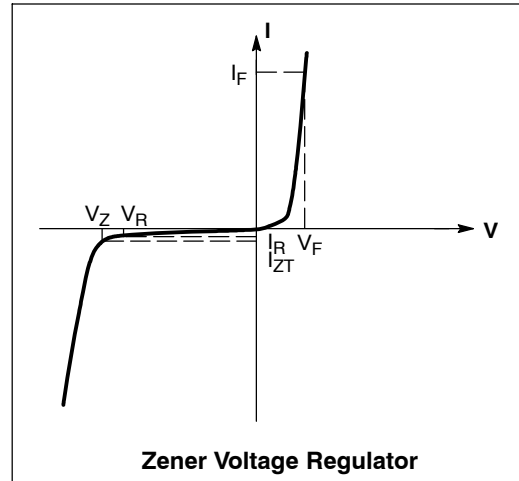
See specific marking information in the device marking column of the Electrical Characteristics tables starting on page 3 of this data sheet.

## NZ9F2V4T5G 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. Steady State Power Derating**

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

\*Rotated  $90^\circ$ .

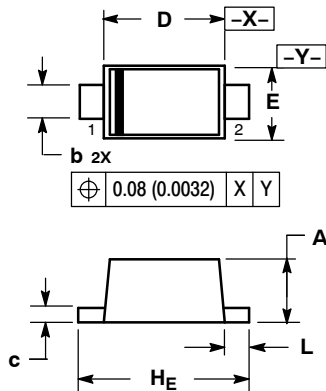
\*\*Rotated  $270^\circ$ .

1. Zener voltage is measured with a pulse test current  $I_Z$  at an ambient temperature of  $25^\circ\text{C}$ .

# NZ9F2V4T5G SERIES

## PACKAGE DIMENSIONS

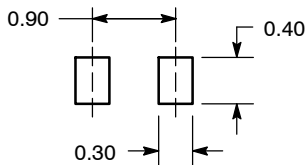
**SOD-923**  
CASE 514AB-01  
ISSUE B



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: MILLIMETERS.
  3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.


| 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_E | 0.95        | 1.00 | 1.05 | 0.037  | 0.039 | 0.041 |
| L   | 0.05        | 0.10 | 0.15 | 0.002  | 0.004 | 0.006 |

## SOLDERING FOOTPRINT\*



DIMENSIONS: MILLIMETERS

\*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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