

# NZL5V6AXV3T1 Series

## ESD Protection Diode

### Dual Common Anode

These dual monolithic silicon ESD protection diodes are intended for use in voltage and ESD sensitive equipment such as computers, printers, business machines, communication systems, medical equipment and other applications. Their dual junction common anode design protects two separate lines using only one package. These devices are ideal for situations where board space is at a premium.

#### Specification Features:

- SC-89 Package Allows Either Two Separate Unidirectional Configurations or a Single Bidirectional Configuration
- ESD Rating of Class N (exceeding 16 kV) per the Human Body Model
- Meets IEC61000-4-2 Level 4
- Low Leakage < 5.0  $\mu$ A
- 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)

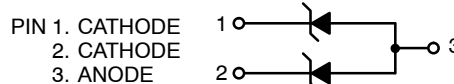
**MOUNTING POSITION:** Any

**QUALIFIED MAX REFLOW TEMPERATURE:**  
260°C Device Meets MSL 1 Requirements



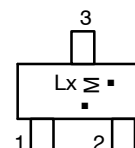
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**SC-89  
CASE 463C  
STYLE 4**

#### MARKING DIAGRAM



- L = Device Code
- x = Specific Device
- M = Date Code
- = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

| Device          | Package | Shipping <sup>†</sup> |
|-----------------|---------|-----------------------|
| NZL5V6AXV3T1G   | SC-89   | 3000/Tape & Reel      |
| SZNZL5V6AXV3T1G | SC-89   | 3000/Tape & Reel      |
| NZL6V8AXV3T1G   | SC-89   | 3000/Tape & Reel      |
| SZNZL6V8AXV3T1G | SC-89   | 3000/Tape & Reel      |
| NZL6V8AXV3T3G   | SC-89   | 10000/Tape & Reel     |
| SZNZL6V8AXV3T3G | SC-89   | 10000/Tape & Reel     |
| NZL7V5AXV3T1G   | SC-89   | 3000/Tape & Reel      |
| SZNZL7V5AXV3T1G | SC-89   | 3000/Tape & Reel      |

<sup>†</sup>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.

#### DEVICE MARKING INFORMATION

See specific marking information in the device marking column of the table on page 2 of this data sheet.

# NZL5V6AXV3T1 Series

## MAXIMUM RATINGS

| Rating   | Symbol          | Value       | Unit                       |
|--|-----------------|-------------|----------------------------|
| Total Power Dissipation on FR-5 Board (Note 1) @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$           | 240<br>1.9  | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance Junction to Ambient   | $R_{\theta JA}$ | 525         | $^\circ\text{C/W}$         |
| Junction and Storage Temperature Range   | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$           |
| Lead Solder Temperature – Maximum (10 Second Duration)   | $T_L$           | 260         | $^\circ\text{C}$           |
| IEC61000-4-2 Contact<br>IEC61000-4-2 Air   | ESD             | 10<br>10    | kV                         |

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-5 board with minimum recommended mounting pad.

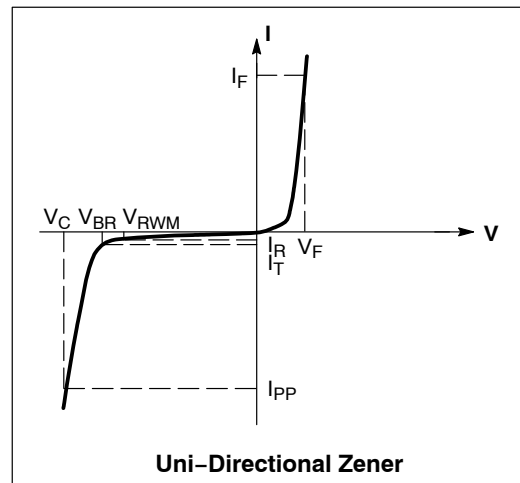
\*Other voltages may be available upon request.

## ELECTRICAL CHARACTERISTICS

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

**UNIDIRECTIONAL** (Circuit tied to Pins 1 and 3 or 2 and 3)

| Symbol    | Parameter                                   |
|-----------|---|
| $V_{RWM}$ | Working Peak Reverse Voltage                |
| $I_R$     | Maximum Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$  | Breakdown Voltage @ $I_T$                   |
| $I_T$     | Test Current                                |
| $I_F$     | Forward Current                             |
| $V_F$     | Forward Voltage @ $I_F$                     |



**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)

**UNIDIRECTIONAL** (Circuit tied to Pins 1 and 3 or Pins 2 and 3)

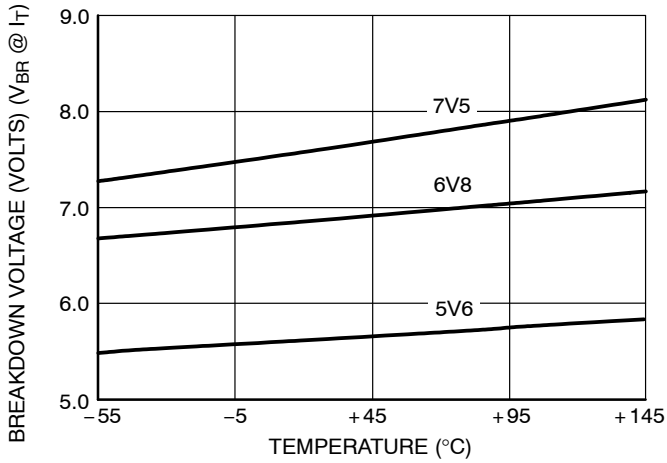
| Device       | Device Marking | Breakdown Voltage |                                       |                       |     |      |                  | Surge  |                                    |                               |                           |
|--------------|----------------|-------------------|---------------------------------------|-----------------------|-----|------|------------------|--|------------------------------------|-------------------------------|---------------------------|
|              |                | $V_{RWM}$<br>V    | $I_R$ @<br>$V_{RWM}$<br>$\mu\text{A}$ | $V_{BR}$ (Note 2) (V) |     |      | @ $I_{zT}$<br>mA | $V_C$ (V) @<br>$I_{PP} = 1.0$<br>A $\dagger$ | $V_C$ (V) @<br>Max $I_{PP}\dagger$ | Max $I_{PP}$<br>(A) $\dagger$ | $P_{pk}$<br>(W) $\dagger$ |
|              |                |                   |                                       | Min                   | Nom | Max  |                  | Typ  | Max                                |                               |                           |
| NZL5V6AXV3T1 | L0             | 3.0               | 5.0                                   | 5.32                  | 5.6 | 5.88 | 5.0              | 7.0  | 10.1                               | 4.8                           | 50                        |
| NZL6V8AXV3T1 | L2             | 4.5               | 1.0                                   | 6.46                  | 6.8 | 7.14 | 5.0              | 7.9  | 11.9                               | 6.7                           | 73                        |
| NZL6V8AXV3T3 | L2             | 4.5               | 1.0                                   | 6.46                  | 6.8 | 7.14 | 5.0              | 7.9  | 11.9                               | 6.7                           | 73                        |
| NZL7V5AXV3T1 | L3             | 5.0               | 1.0                                   | 7.12                  | 7.5 | 7.88 | 5.0              | 8.8  | 13.5                               | 5.7                           | 75                        |

2.  $V_{BR}$  measured at pulse test current  $I_T$  at an ambient temperature of  $25^\circ\text{C}$ .

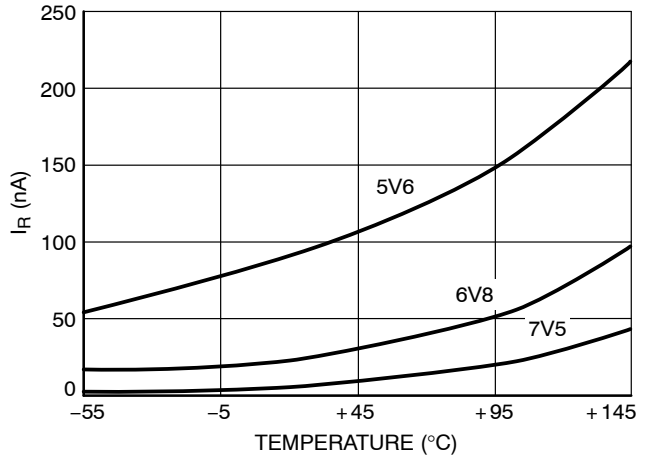
$\dagger$  Surge current waveform per Figure 5.

# NZL5V6AXV3T1 Series

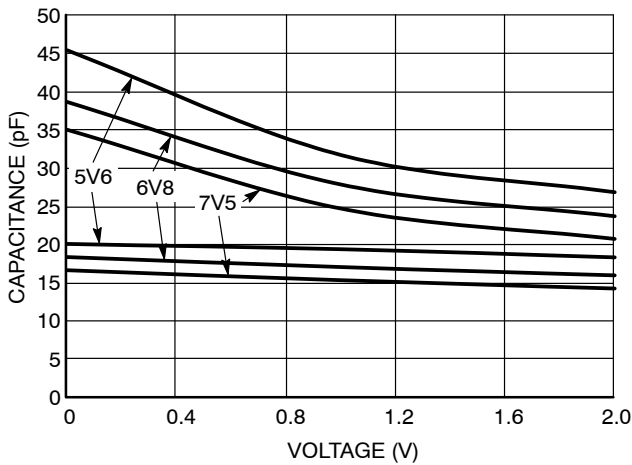
## TYPICAL CHARACTERISTICS



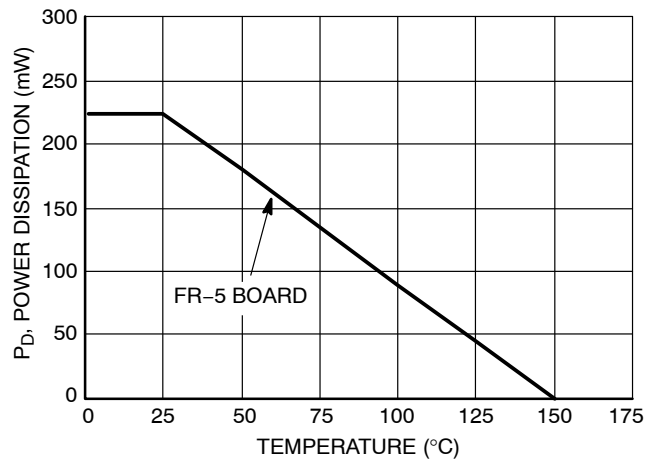
**Figure 1. Typical Breakdown Voltage versus Temperature**



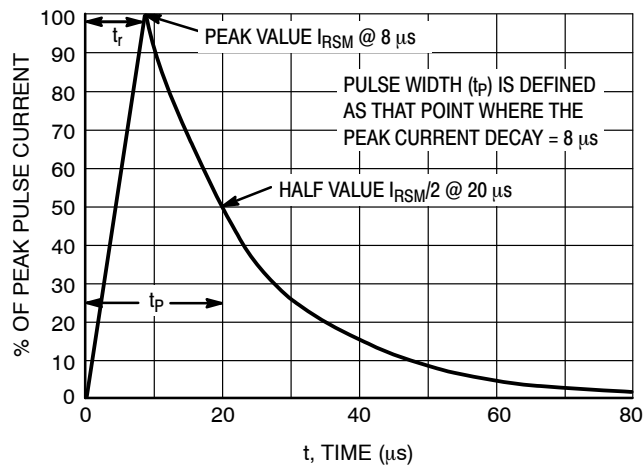
**Figure 2. Typical Leakage Current versus Temperature**



**Figure 3. Typical Capacitance versus Bias Voltage**  
(Upper curve for each part is unidirectional mode, lower curve is bidirectional mode)



**Figure 4. Steady State Power Derating Curve**



**Figure 5. 8 x 20  $\mu s$  Pulse Waveform**

# NZL5V6AXV3T1 Series

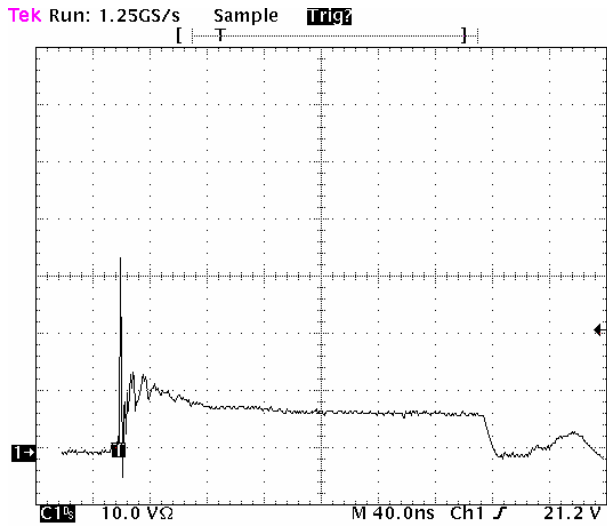


Figure 6. Positive 8 kV contact per IEC 6100-4-2  
- NZL6V8AXV3T1G

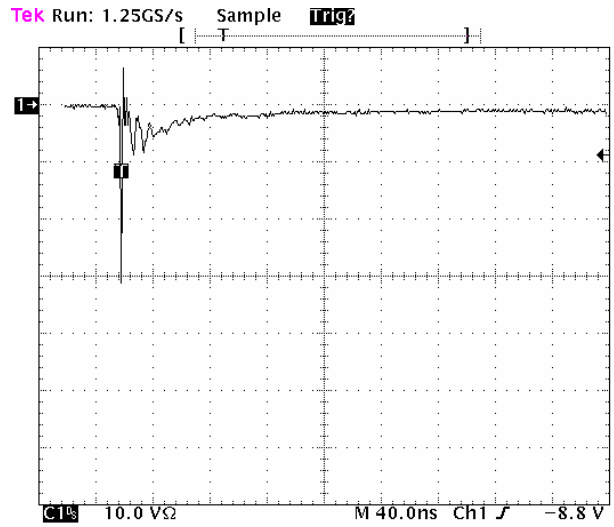


Figure 7. Negative 8 kV contact per IEC 6100-4-2  
- NZL6V8AXV3T1G

# NZL5V6AXV3T1 Series

## TYPICAL COMMON ANODE APPLICATIONS

A dual junction common anode design in an SC-89 package protects two separate lines using only one package. This adds flexibility and creativity to PCB design especially

when board space is at a premium. Two simplified examples of surge protection applications are illustrated below.

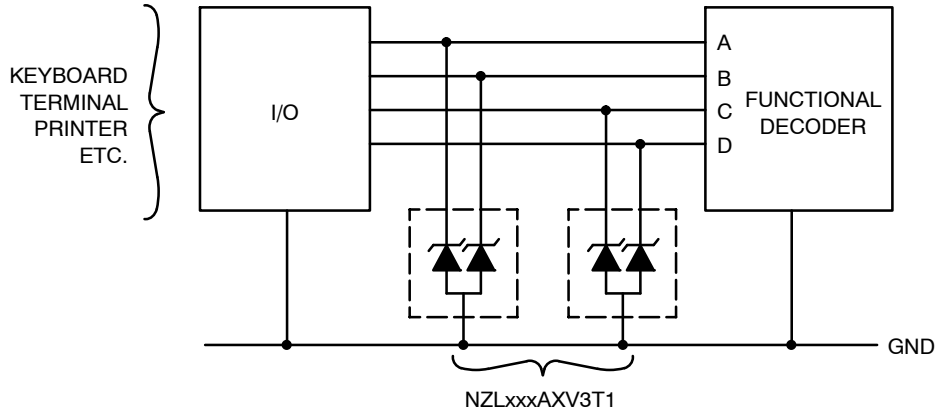


Figure 8. Computer Interface Protection

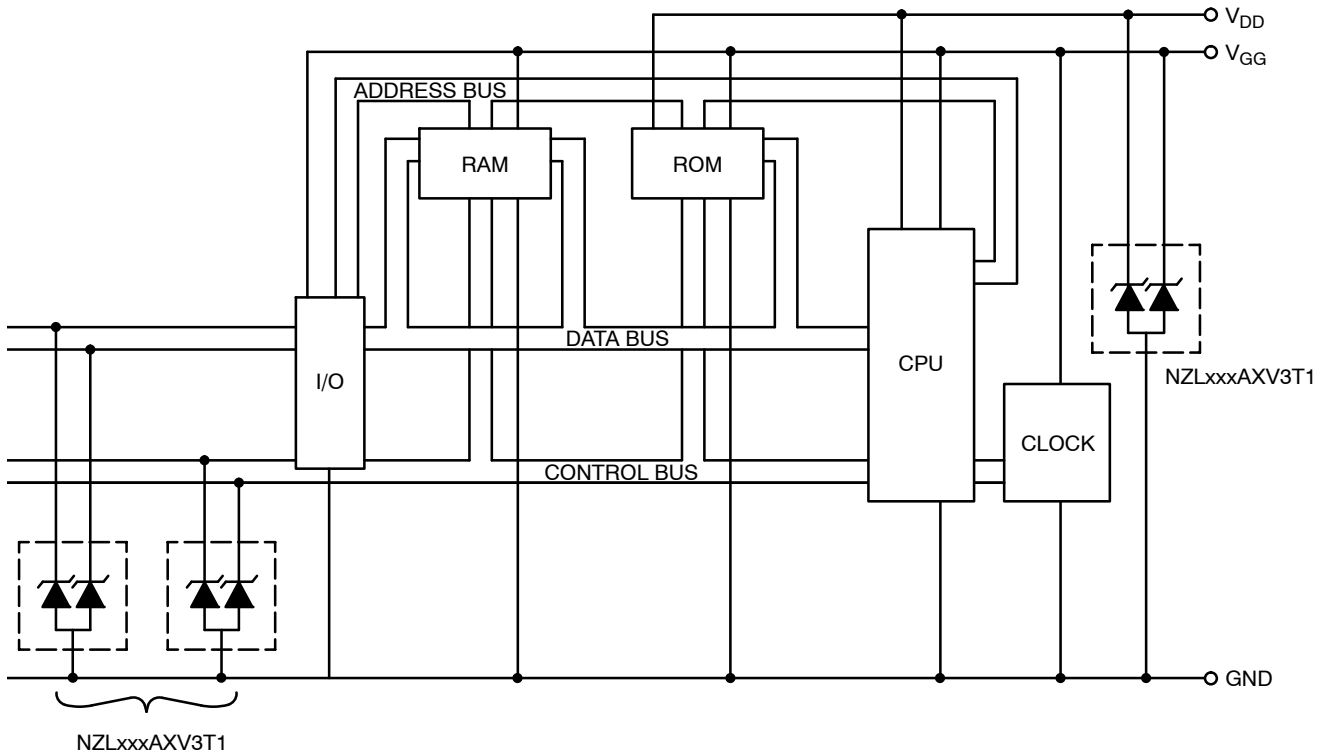


Figure 9. Microprocessor Protection

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

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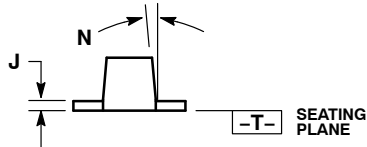
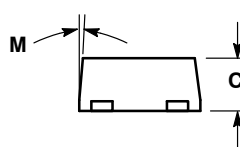
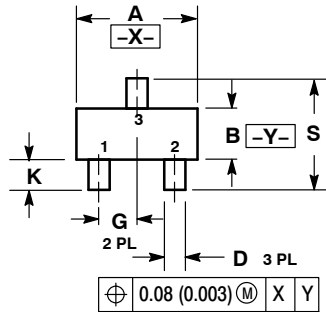


### SC-89, 3 LEAD CASE 463C-03 ISSUE C

DATE 31 JUL 2003



SCALE 4:1

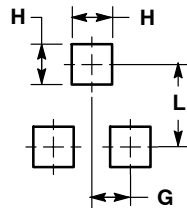


STYLE 1:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

STYLE 2:  
PIN 1. ANODE  
2. N/C  
3. CATHOD-

STYLE 3:  
PIN 1. ANODE  
2. ANODE  
3. CATHODE

STYLE 4:  
PIN 1. CATHODE  
2. CATHODE  
3. ANODE



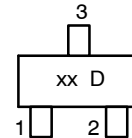
RECOMMENDED PATTERN OF SOLDER PADS

NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: MILLIMETERS
- MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
- 463C-01 OBSOLETE, NEW STANDARD 463C-02.

| DIM | MILLIMETERS |      |      | INCHES    |       |       |
|-----|-------------|------|------|-----------|-------|-------|
|     | MIN         | NOM  | MAX  | MIN       | NOM   | MAX   |
| A   | 1.50        | 1.60 | 1.70 | 0.059     | 0.063 | 0.067 |
| B   | 0.75        | 0.85 | 0.95 | 0.030     | 0.034 | 0.040 |
| C   | 0.60        | 0.70 | 0.80 | 0.024     | 0.028 | 0.031 |
| D   | 0.23        | 0.28 | 0.33 | 0.009     | 0.011 | 0.013 |
| G   | 0.50 BSC    |      |      | 0.020 BSC |       |       |
| H   | 0.53 REF    |      |      | 0.021 REF |       |       |
| J   | 0.10        | 0.15 | 0.20 | 0.004     | 0.006 | 0.008 |
| K   | 0.30        | 0.40 | 0.50 | 0.012     | 0.016 | 0.020 |
| L   | 1.10 REF    |      |      | 0.043 REF |       |       |
| M   | ---         | ---  | 10   | ---       | ---   | 10    |
| N   | ---         | ---  | 10   | ---       | ---   | 10    |
| S   | 1.50        | 1.60 | 1.70 | 0.059     | 0.063 | 0.067 |

### GENERIC MARKING DIAGRAM\*



xx = Specific Device Code  
D = Date Code

\*This information is generic. Please refer to device data sheet for actual part marking.

|                  |               |  |
|------------------|---------------|--|
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