# NZL5V6AXV3T1 Series

**Preferred Devices**

# Dual Common Anode ESD Protection Diodes

## SC−89 Package

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 μA
- 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)

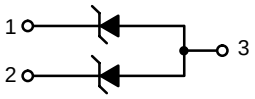
**MOUNTING POSITION:** Any

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

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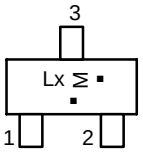
PIN 1. CATHODE
2. CATHODE
3. ANODE






**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† |
|---|---|---|
| NZL5V6AXV3T1 | SC−89* | 3000/Tape & Reel |
| NZL5V6AXV3T1G | SC−89* | 3000/Tape & Reel |
| NZL6V8AXV3T1 | SC−89* | 3000/Tape & Reel |
| NZL6V8AXV3T1G | SC−89* | 3000/Tape & Reel |
| NZL6V8AXV3T3G | SC−89* | 10000/Tape & Reel |
| NZL7V5AXV3T1 | SC−89* | 3000/Tape & Reel |
| NZL7V5AXV3T1G | SC−89* | 3000/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.

*This package is inherently Pb−Free.

**DEVICE MARKING INFORMATION**

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

**Preferred** devices are recommended choices for future use and best overall value.

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## MAXIMUM RATINGS

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

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.

1. FR−5 board with minimum recommended mounting pad.

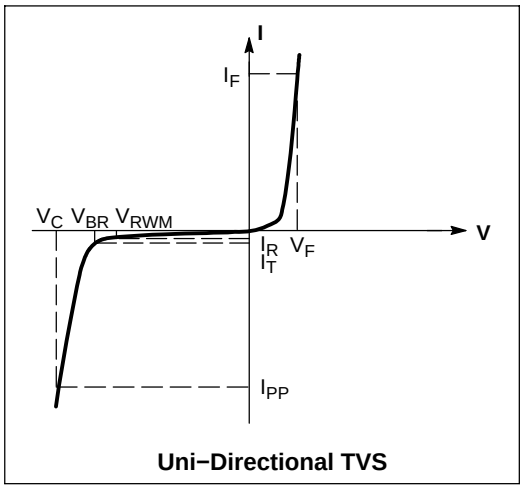
*Other voltages may be available upon request.

## ELECTRICAL CHARACTERISTICS

($T_A$ = 25°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 @ $I_F$ |




**Uni−Directional TVS**

**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C unless otherwise noted, $V_F$ = 0.9 V Max @ $I_F$ = 10 mA for all types)

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

| Device | Device Marking | $V_{RWM}$ | $I_R$ @ $V_{RWM}$ | Breakdown Voltage | | | | Surge | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | $V_{BR}$ (Note 2) (V) | | | @ $Iz_T$ | $V_C$ (V) @ $I_{PP}$ = 1.0 A† | $V_C$ (V) @ Max $I_{PP}$† | Max $I_{PP}$ (A)† | $P_{pk}$ (W)† |
| | | V | μA | Min | Nom | Max | mA | Typ | Max | | Typ |
| 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°C.

† Surge current waveform per Figure 5.

## TYPICAL CHARACTERISTICS

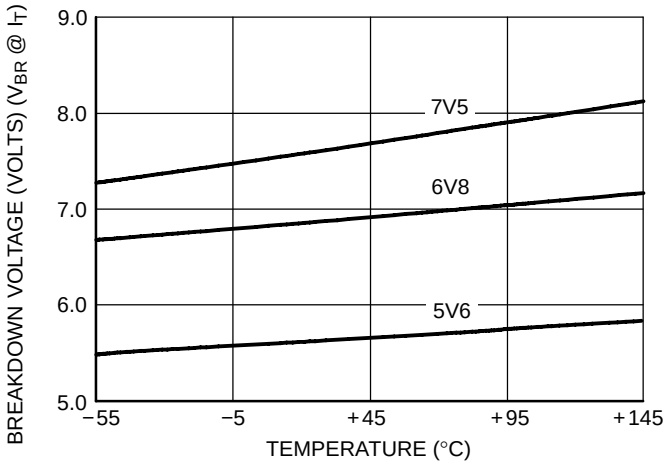



**Figure 1. Typical Breakdown Voltage versus Temperature**

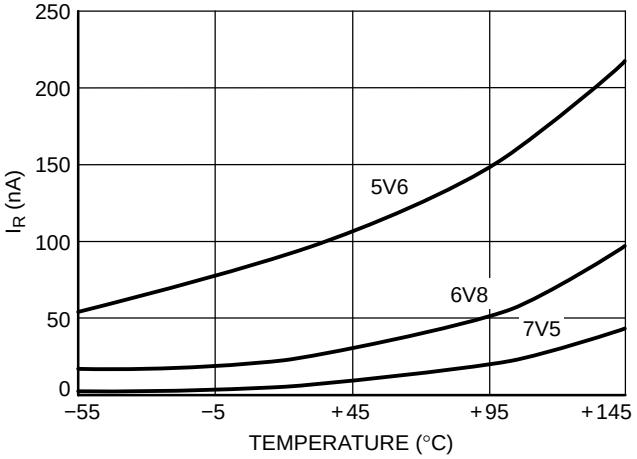



**Figure 2. Typical Leakage Current versus Temperature**

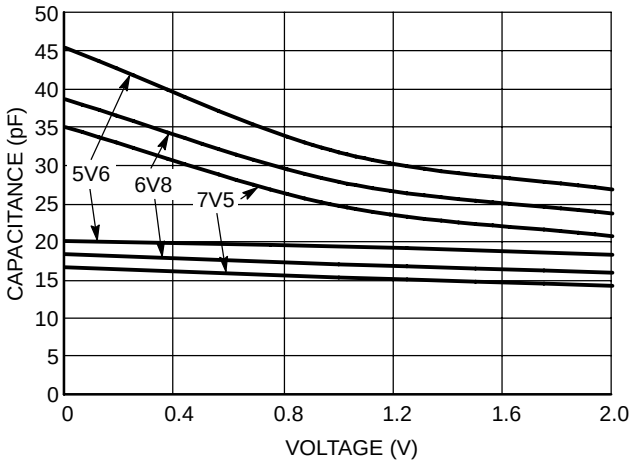



**Figure 3. Typical Capacitance versus Bias Voltage**
(Upper curve for each part is unidirectional mode, lower curve is bidirectional mode)

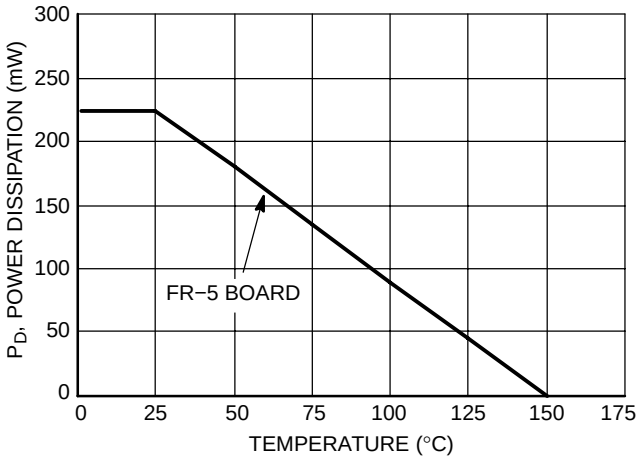



**Figure 4. Steady State Power Derating Curve**

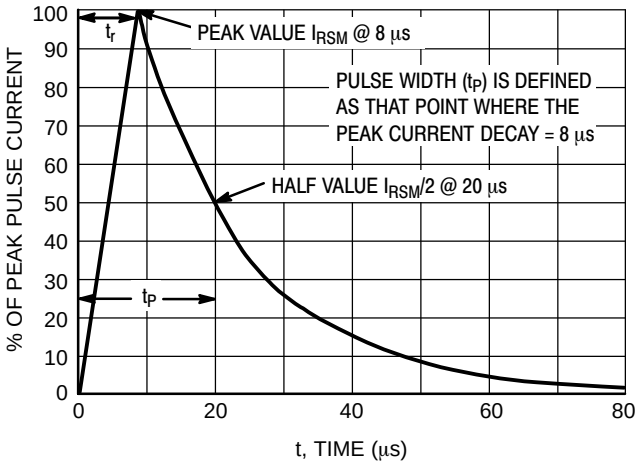



**Figure 5. 8 X 20 μs Pulse Waveform**

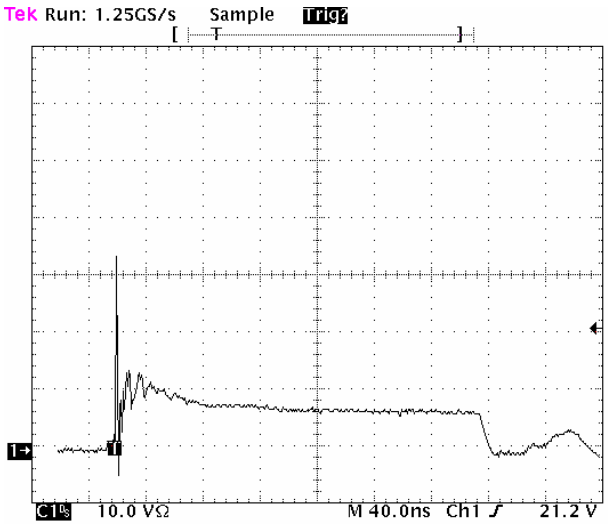



**Figure 6. Positive 8 kV contact per IEC 6100−4−2 − NZL6V8AXV3T1G**

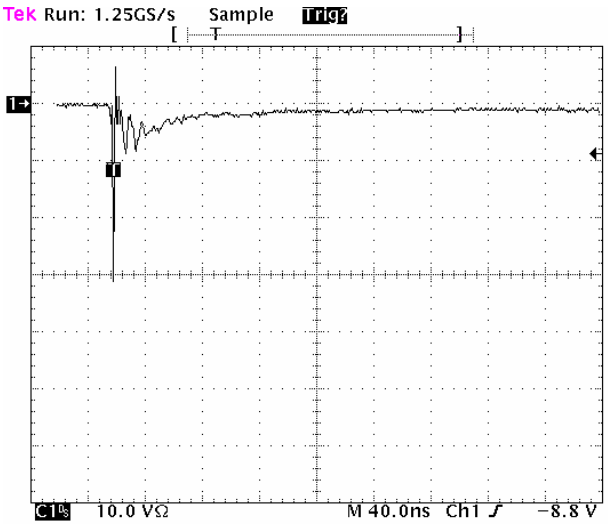



**Figure 7. Negative 8 kV contact per IEC 6100−4−2 − NZL6V8AXV3T1G**

## 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 TVS applications are illustrated below.

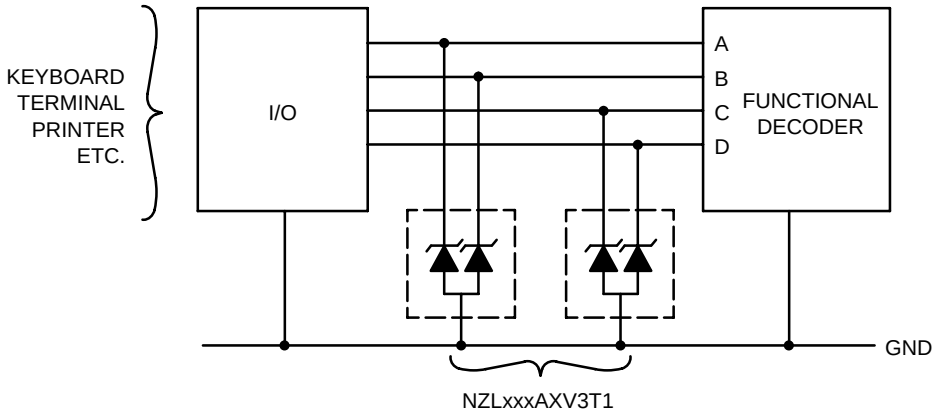



**Figure 8. Computer Interface Protection**

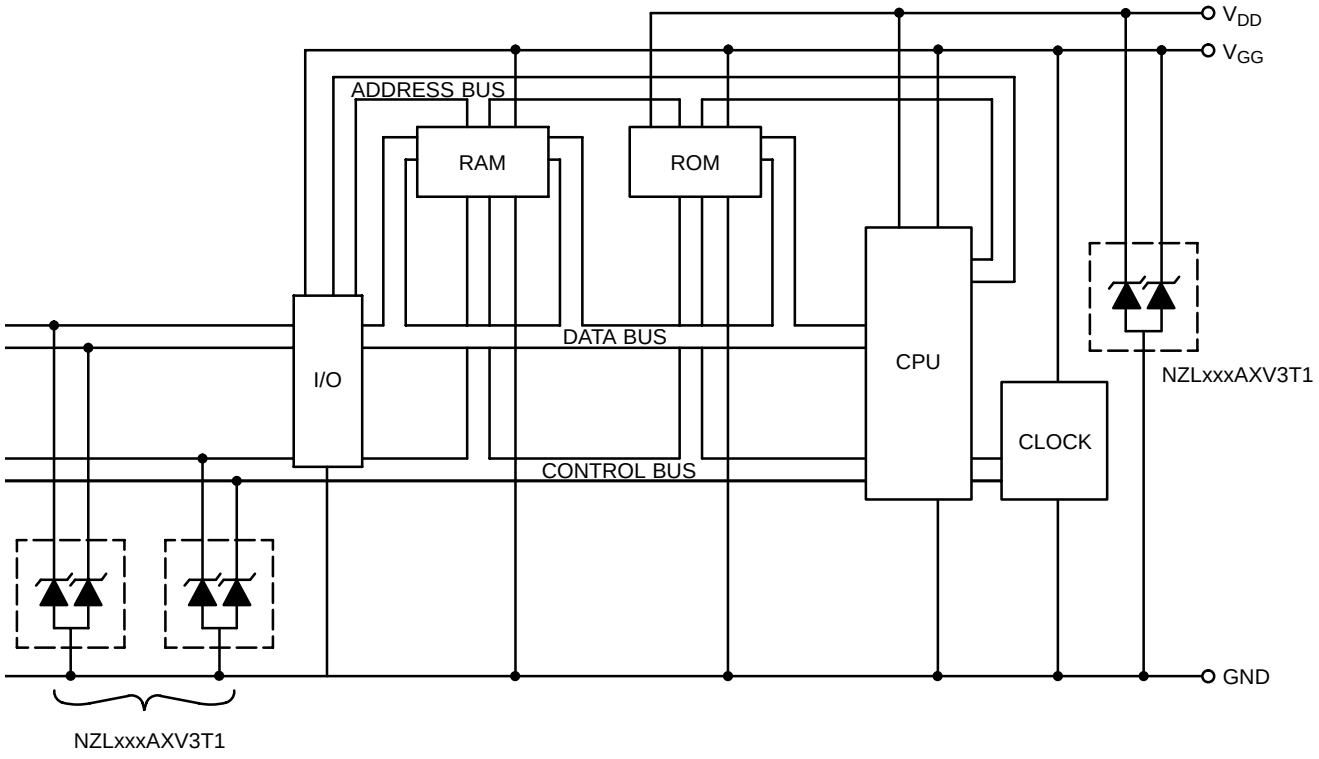
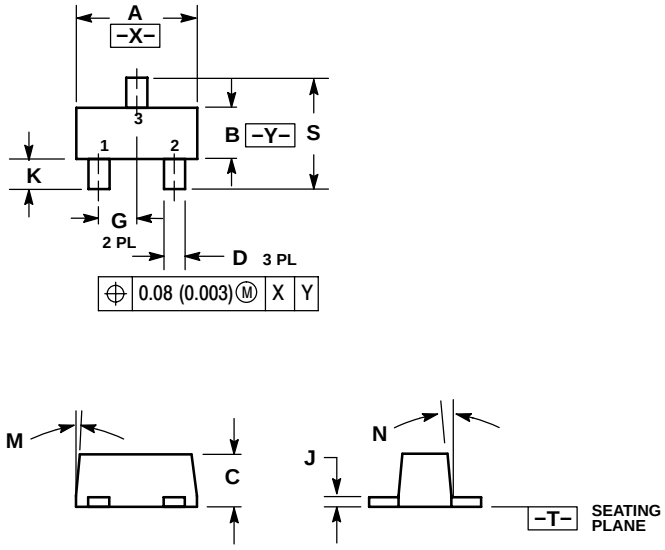



**Figure 9. Microprocessor Protection**

## PACKAGE DIMENSIONS

**SC−89, 3−LEAD**
CASE 463C−03
ISSUE C

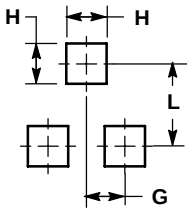



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 463C−01 OBSOLETE, NEW STANDARD 463C−02.

| | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| DIM | 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 |

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

## SOLDERING FOOTPRINT




**RECOMMENDED PATTERN OF SOLDER PADS**

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