

# 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
- 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

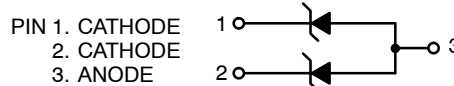
#### QUALIFIED MAX REFLOW TEMPERATURE:

260°C Device Meets MSL 1 Requirements



**ON Semiconductor**<sup>®</sup>

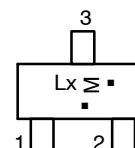
[www.onsemi.com](http://www.onsemi.com)



#### MARKING DIAGRAM



SC-89  
CASE 463C  
STYLE 4



- 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>
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

<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.

\*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.

# NZL5V6AXV3T1 Series

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Total Power Dissipation on FR-5 Board (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	240 1.9	mW 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)		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.

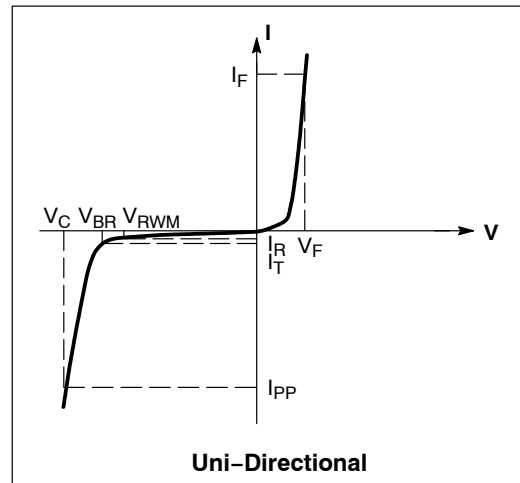
\*Other voltages may be available upon request.

## 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)

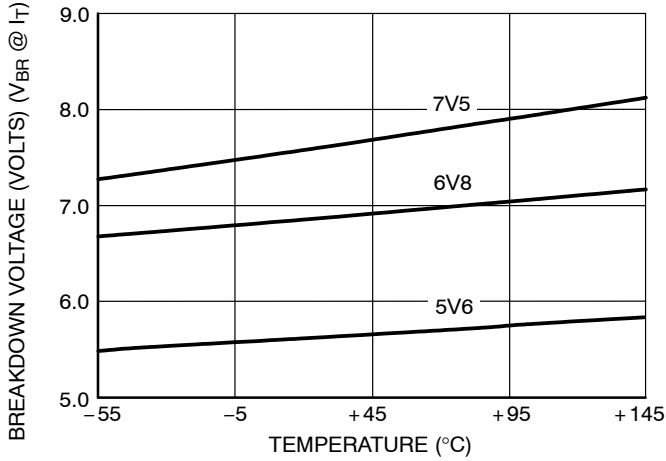
Device	Device Marking	$V_{RWM}$ V	$I_R$ @ $V_{RWM}$ $\mu\text{A}$	Breakdown Voltage				Surge			
				$V_{BR}$ (Note 2) (V)			$@ I_{zT}$ mA	$V_C$ (V) @ $I_{pp} = 1.0$ A $^\dagger$ Typ	$V_C$ (V) @ Max $I_{pp}^\dagger$ Max	Max $I_{pp}$ (A) $^\dagger$	$P_{pk}$ (W) $^\dagger$ Typ
				Min	Nom	Max					
NZL5V6AXV3T1	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  $25^\circ\text{C}$ .

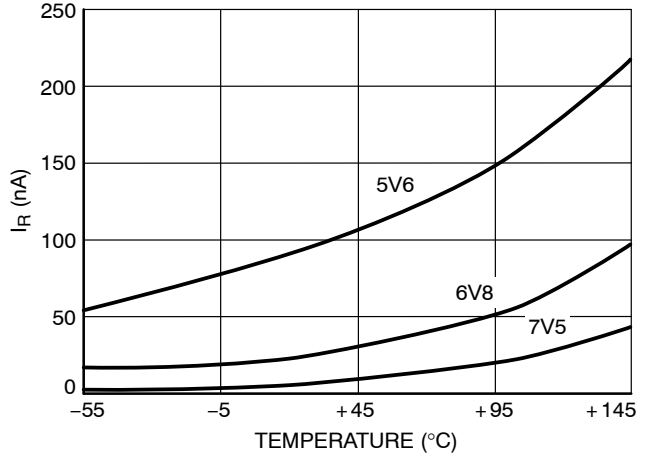
$^\dagger$  Surge current waveform per Figure 5.

# NZL5V6AXV3T1 Series

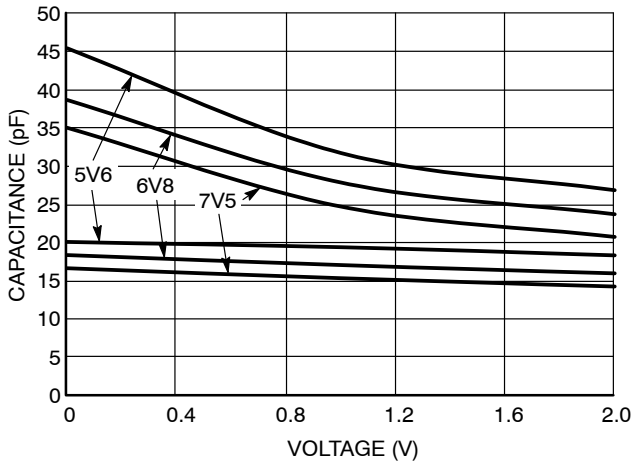
## TYPICAL CHARACTERISTICS



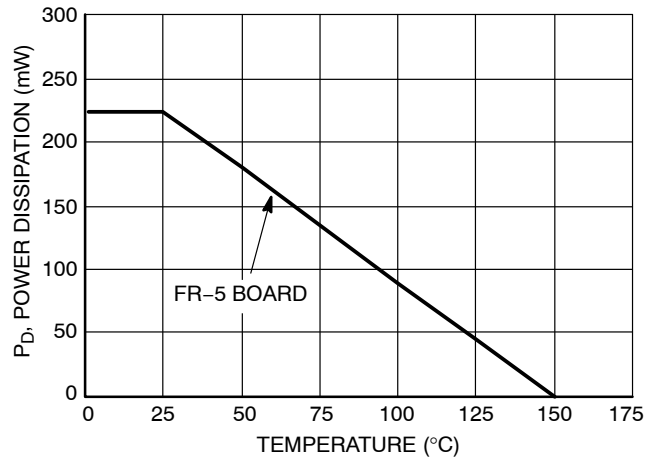
**Figure 1. Typical Breakdown Voltage versus Temperature**



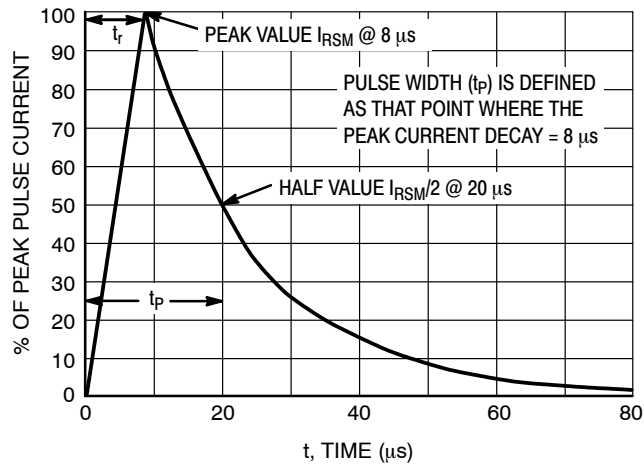
**Figure 2. Typical Leakage Current versus Temperature**



**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

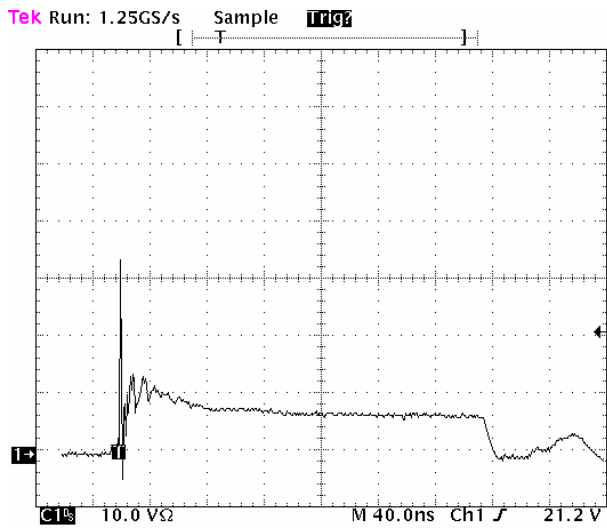


Figure 6. Positive 8 kV contact per IEC 6100-4-2  
- NZL6V8AXV3T1G

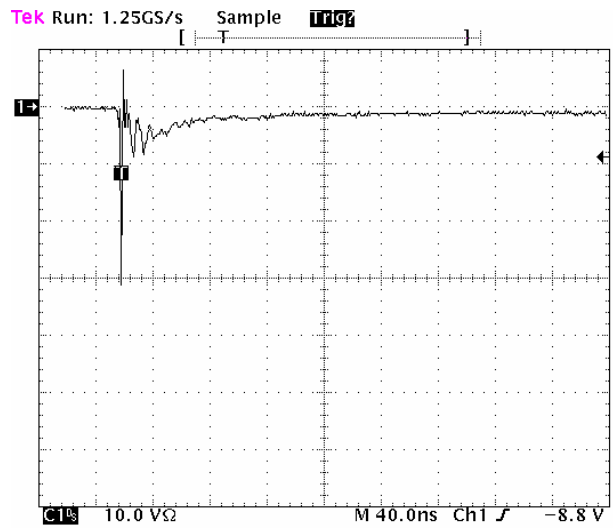


Figure 7. Negative 8 kV contact per IEC 6100-4-2  
- NZL6V8AXV3T1G

# 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.

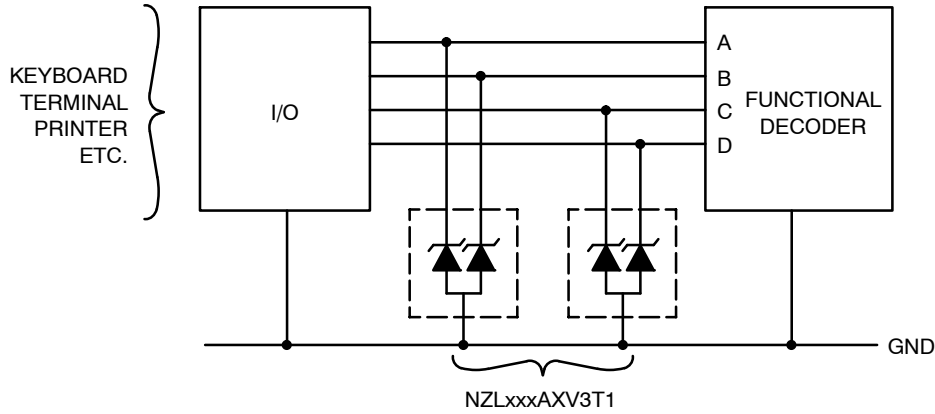


Figure 8. Computer Interface Protection

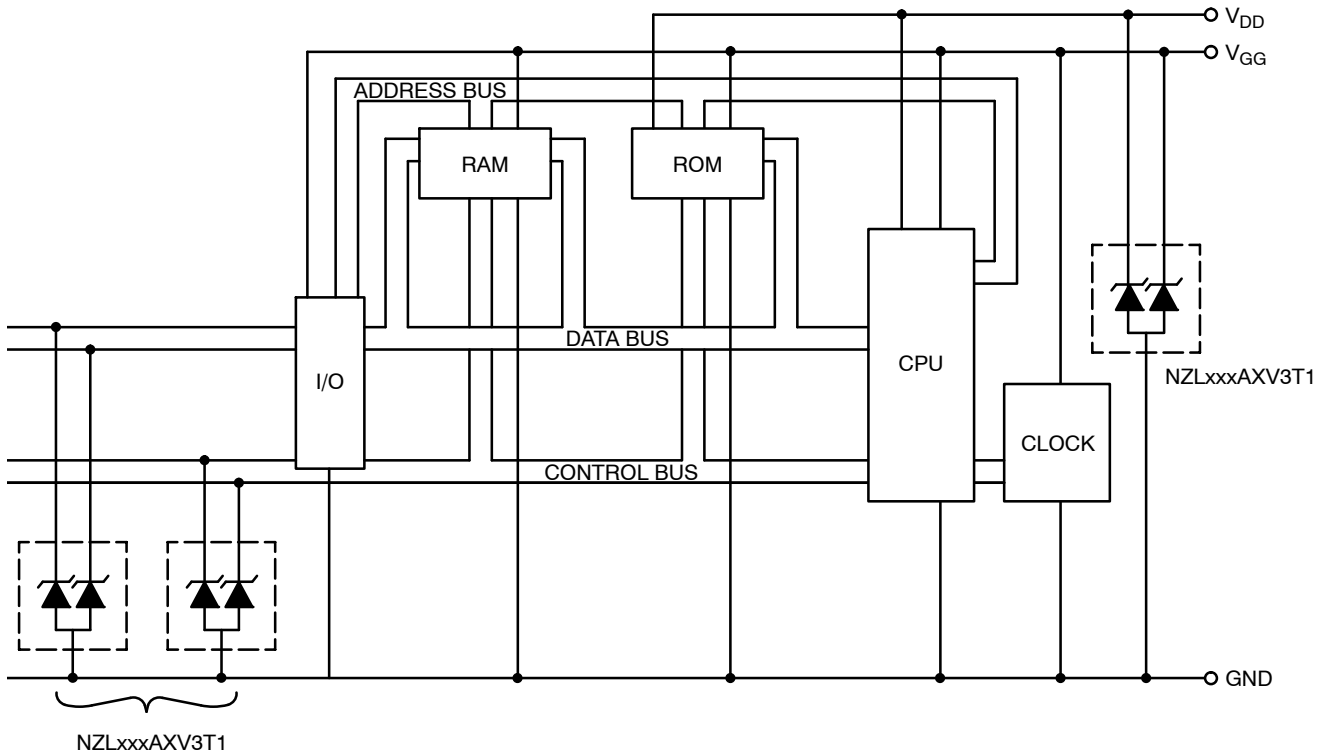
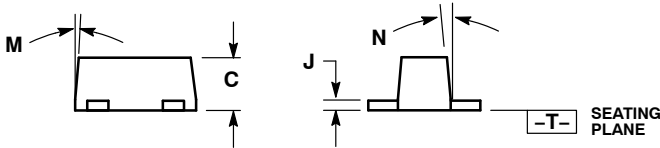
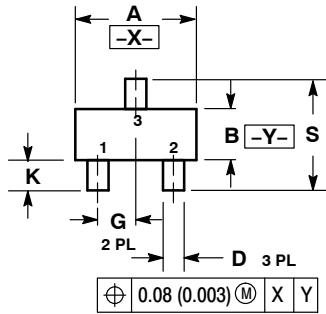


Figure 9. Microprocessor Protection

# NZL5V6AXV3T1 Series

## PACKAGE DIMENSIONS

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



NOTES:

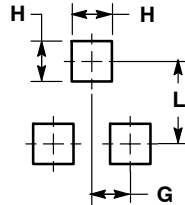
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 463C-01 OBSOLETE, NEW STANDARD 463C-02.

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

STYLE 4:

1. CATHODE
2. CATHODE
3. ANODE

### SOLDERING FOOTPRINT



### RECOMMENDED PATTERN OF SOLDER PADS

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

### PUBLICATION ORDERING INFORMATION

**LITERATURE FULFILLMENT:**

Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
Email: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5817-1050

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)

**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative