

# NSPU5201, NSPU5221 Series

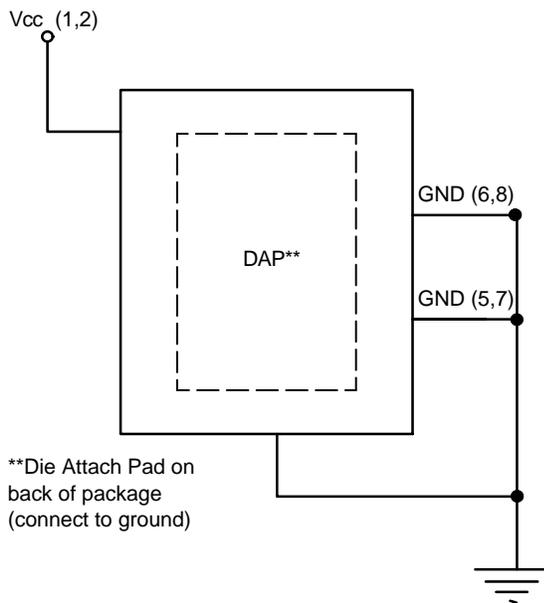
## ESD and Surge Protection Diode

### Low Clamping Voltage

#### Features

- Unidirectional High Voltage ESD and Surge Protection
- Provides ESD Protection to IEC61000-4-2 Level 4:  $\pm 30$  kV Contact Discharge
- Small Package: 1.8 mm x 2.0 mm
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### APPLICATION DIAGRAM



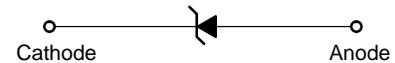
ON Semiconductor®

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



UDFN6  
CASE 517CS

#### BLOCK DIAGRAM



#### MARKING DIAGRAM



XX = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

#### ORDERING INFORMATION

Device	Package	Shipping†
NSPU5201MUTBG	UDFN6 (Pb-Free)	3000 / Tape & Reel
NSPU5221MUTBG	UDFN6 (Pb-Free)	3000 / Tape & Reel

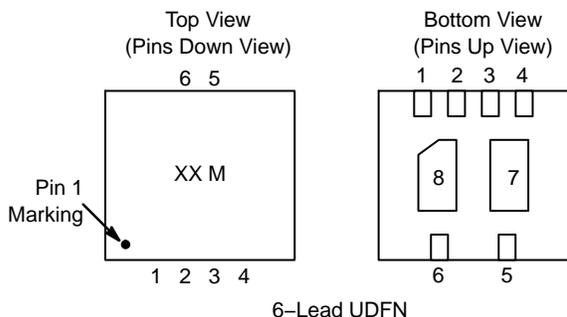
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

# NSPU5201, NSPU5221 Series

**Table 1. PIN DESCRIPTIONS**

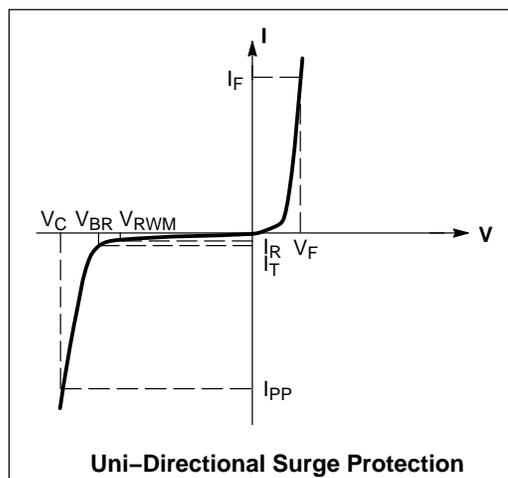
6-Lead, UDFN8 Package		
Pin	Name	Description
1	V <sub>CC</sub>	Cathode
2	V <sub>CC</sub>	Cathode
3	N/C	No Connect
4	N/C	No Connect
5	GND	Anode
6	GND	Anode
7	GND	Anode
8	GND	Anode

## PACKAGE / PINOUT DIAGRAMS



## ELECTRICAL CHARACTERISTICS

Symbol	Parameter
I <sub>PP</sub>	Maximum Reverse Peak Pulse Current
V <sub>C</sub>	Clamping Voltage @ I <sub>PP</sub>
V <sub>RWM</sub>	Working Peak Reverse Voltage
I <sub>R</sub>	Maximum Reverse Leakage Current @ V <sub>RWM</sub>
V <sub>BR</sub>	Breakdown Voltage @ I <sub>T</sub>
I <sub>T</sub>	Test Current
ΘV <sub>BR</sub>	Maximum Temperature Coefficient of V <sub>BR</sub>
I <sub>F</sub>	Forward Current
V <sub>F</sub>	Forward Voltage @ I <sub>F</sub>



## SPECIFICATIONS

**Table 2. MAXIMUM RATINGS**

Parameter	Rating	Units
Operating Temperature Range	-55 to +125	°C
Storage Temperature Range	-65 to +150	°C

Stresses at or above those listed in Maximum Ratings table may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Also, due to variations in test equipment, stresses shown above are averages.

## ELECTRICAL CHARACTERISTICS

Device Name	Device Marking	V <sub>RWM</sub> (V) Max	I <sub>R</sub> @ V <sub>RWM</sub> (μA) Max	Breakdown Voltage				I <sub>PP</sub> (A) (8 x 20 μs)	V <sub>C</sub> @ I <sub>PP</sub> (8 x 20 μs)		
				V <sub>BR</sub> V			@ I <sub>T</sub> (mA)	Min	Max	Min	Max
				Min	Nom	Max					
NSPU5201	AZ	20	1	21.7	22.7	23.7	1	140	31.5	110	
NSPU5221	A2	20	1	24	25	26	1	120	33	100	
		22	2						35	120	

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.

# NSPU5201, NSPU5221 Series

## TYPICAL CHARACTERISTICS

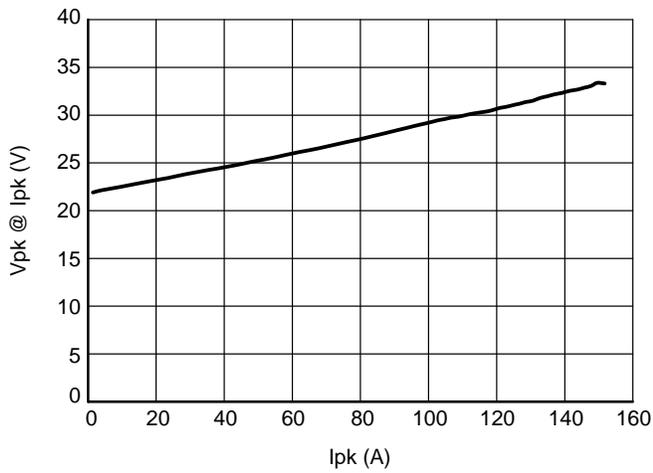


Figure 1. NSPU5201 Positive Clamping Voltage vs. Peak Pulse Current ( $t_p = 8/20 \mu s$ )

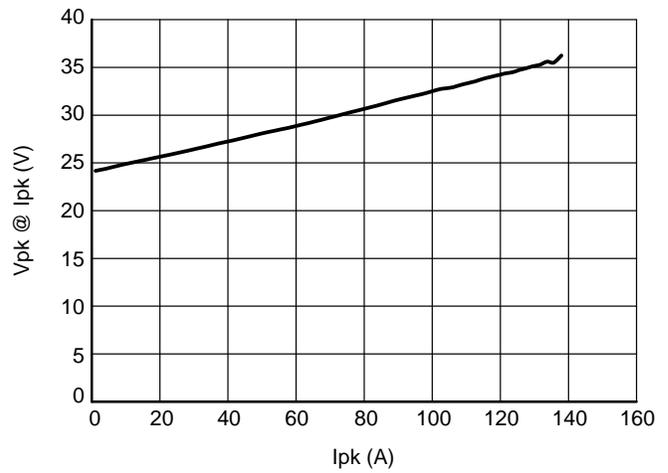


Figure 2. NSPU5221 Positive Clamping Voltage vs. Peak Pulse Current ( $t_p = 8/20 \mu s$ )

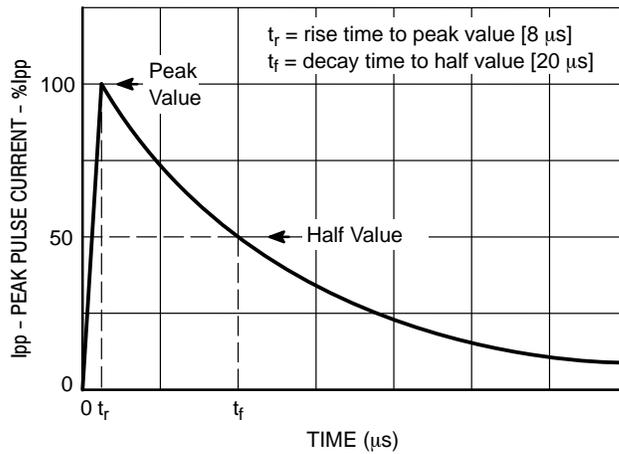
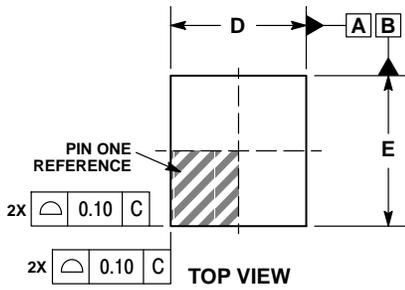


Figure 3. IEC61000-4-5 8/20  $\mu s$  Pulse Waveform

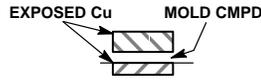
# NSPU5201, NSPU5221 Series

## PACKAGE DIMENSIONS

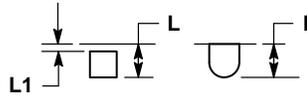
### UDFN6, 1.8 x 2, 0.4P CASE 517CS ISSUE O



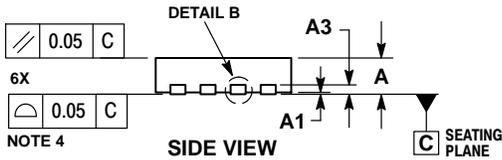
TOP VIEW



DETAIL B  
ALTERNATE  
CONSTRUCTION



DETAIL A  
ALTERNATE  
CONSTRUCTIONS

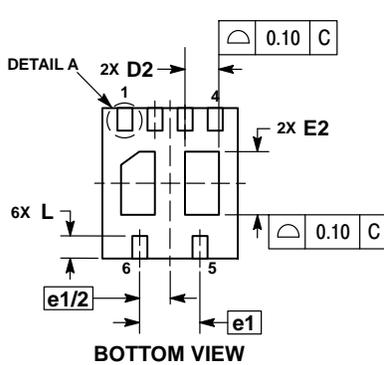


SIDE VIEW

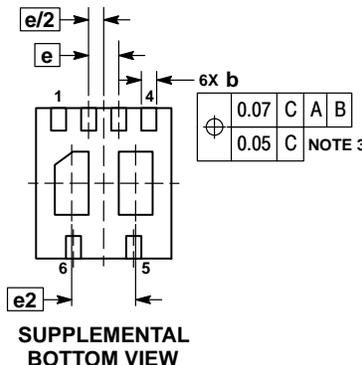
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINALS AND IS MEASURED BETWEEN 0.15 AND 0.30mm FROM THE TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

DIM	MILLIMETERS	
	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.125 REF	
b	0.15	0.25
D	1.80 BSC	
D2	0.35	0.55
E	2.00 BSC	
E2	0.74	0.94
e	0.40 BSC	
e1	0.80 BSC	
e2	0.95 BSC	
L	0.20	0.40
L1	---	0.15

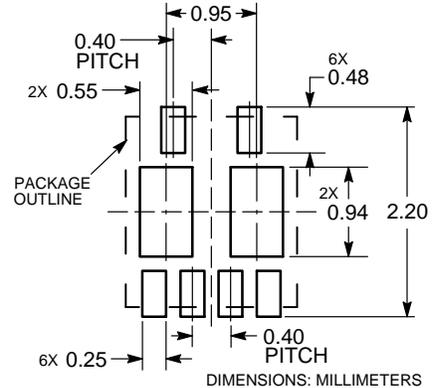


BOTTOM VIEW



SUPPLEMENTAL  
BOTTOM VIEW

### 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.

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

**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