

# NSPU5201, NSPU5221 Series

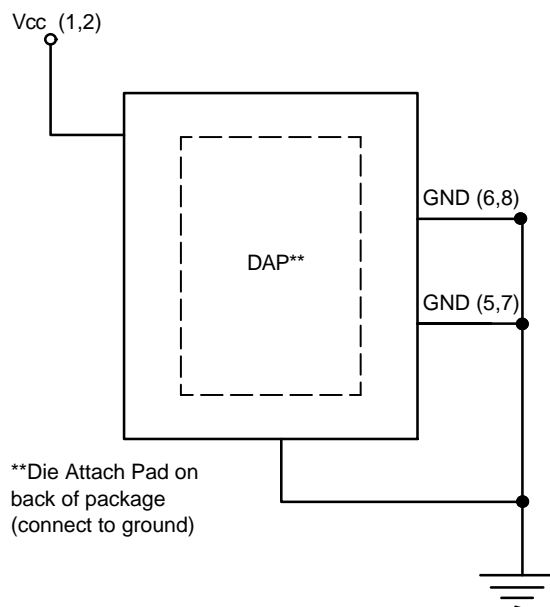
## ESD and Surge Protection Diode

### 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



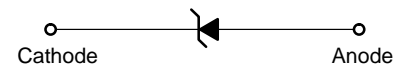
ON Semiconductor®

[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

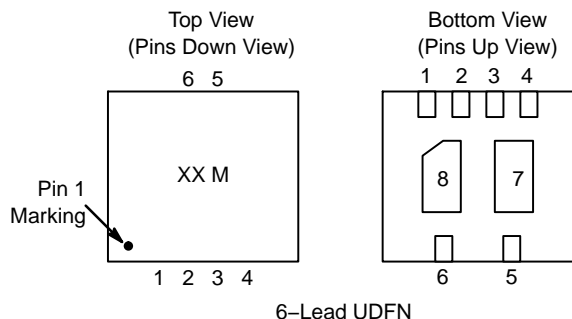
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

# NSPU5201, NSPU5221 Series

**Table 1. PIN DESCRIPTIONS**

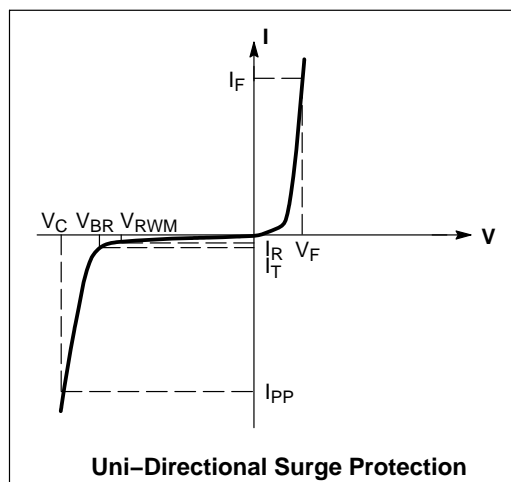
6-Lead, UDFN8 Package		
Pin	Name	Description
1	V <sub>CC</sub>	Cathode
2	V <sub>CC</sub>	Cathode
3	N/C	No Connect
4	N/C	No Connect
5	GND	Anode
6	GND	Anode
7	GND	Anode
8	GND	Anode

## 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

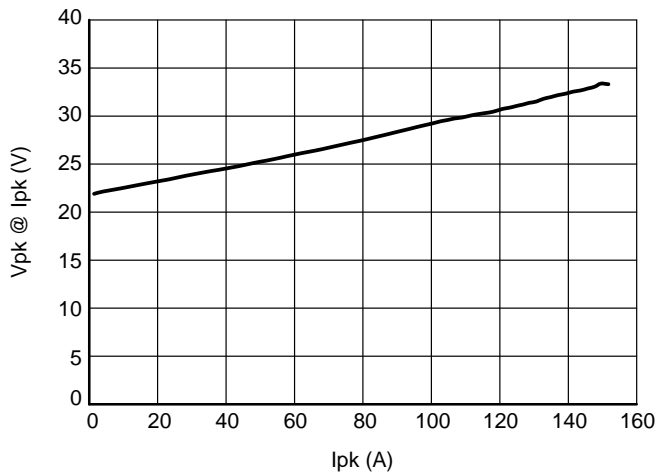


Figure 1. NSPU5201 Positive Clamping Voltage vs. Peak Pulse Current ( $t_p = 8/20 \mu s$ )

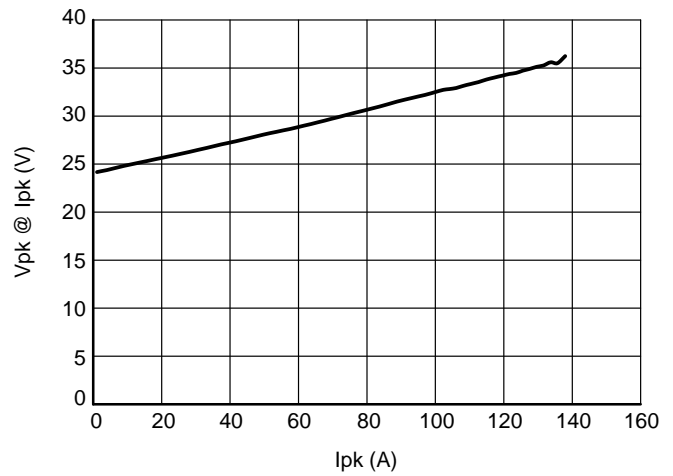


Figure 2. NSPU5221 Positive Clamping Voltage vs. Peak Pulse Current ( $t_p = 8/20 \mu s$ )

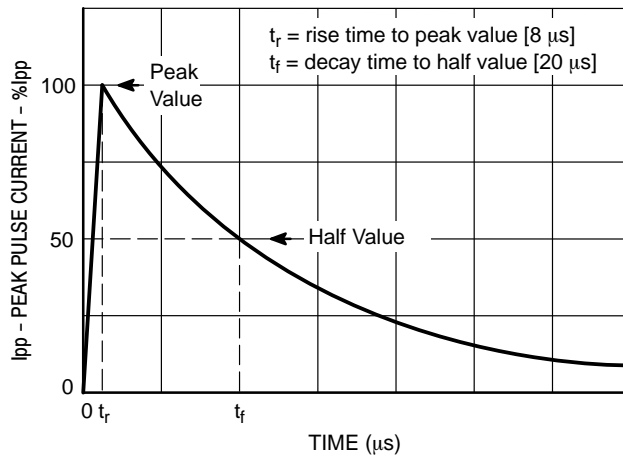
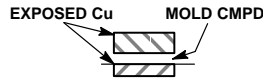
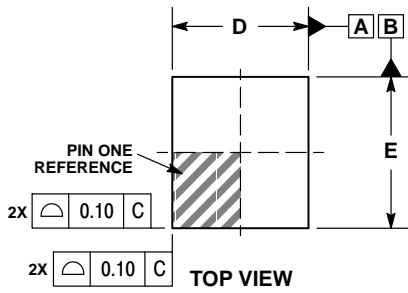


Figure 3. IEC61000-4-5 8/20  $\mu s$  Pulse Waveform

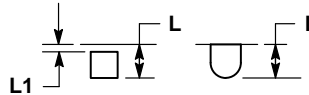
# NSPU5201, NSPU5221 Series

## PACKAGE DIMENSIONS

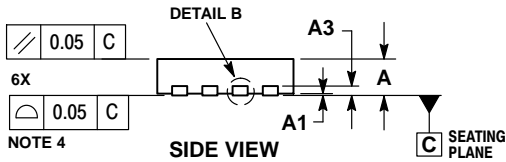
### UDFN6, 1.8 x 2, 0.4P CASE 517CS ISSUE O



DETAIL B  
ALTERNATE  
CONSTRUCTION



DETAIL A  
ALTERNATE  
CONSTRUCTIONS

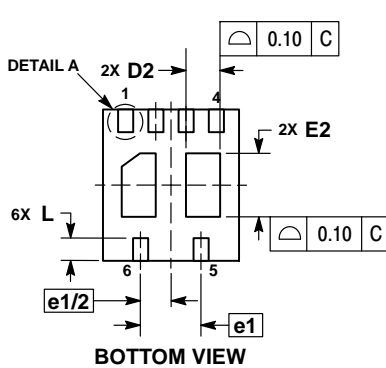


SIDE VIEW

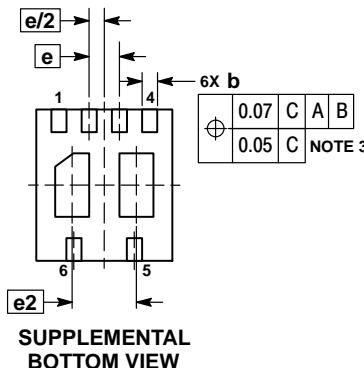
NOTES:

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

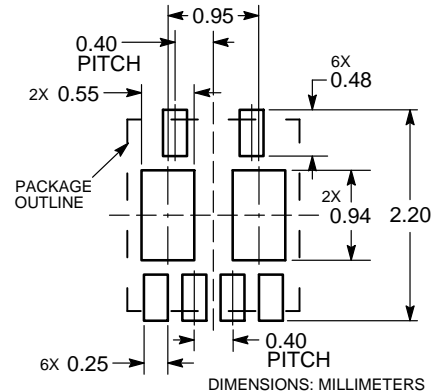


BOTTOM VIEW



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.

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