

ESD and Surge Protection Diode

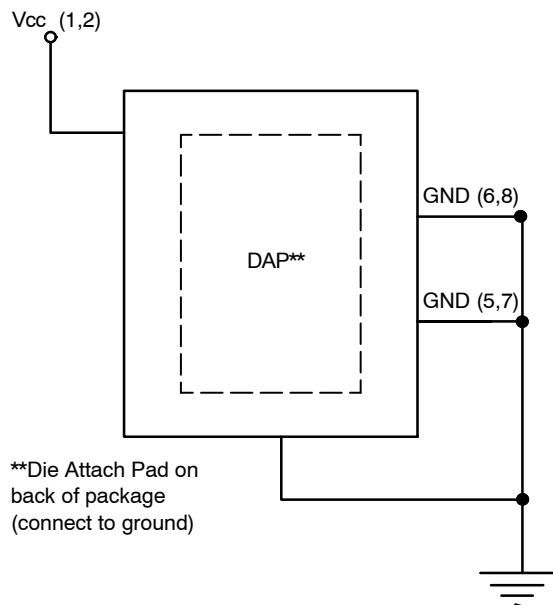
Low Clamping Voltage

NSPU5201, NSPU5221 Series

Features

- Unidirectional High Voltage ESD and Surge Protection
- Provides ESD Protection to IEC61000-4-2 Level 4: ± 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



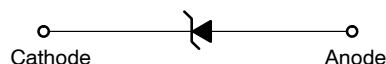
ON Semiconductor®

www.onsemi.com



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

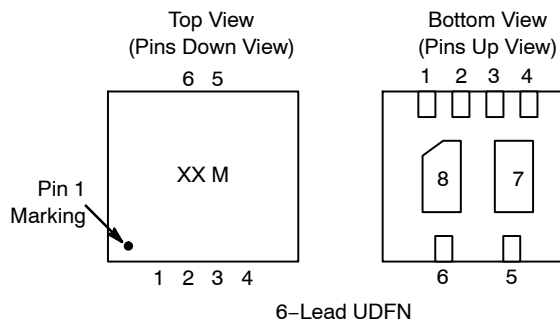
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

NSPU5201, NSPU5221 Series

Table 1. PIN DESCRIPTIONS

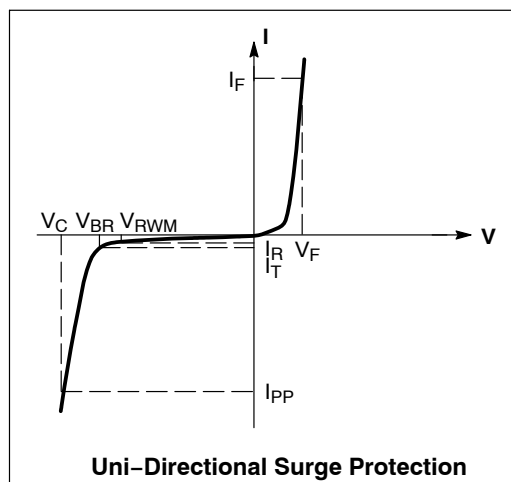
6-Lead, UDFN8 Package		
Pin	Name	Description
1	V_{CC}	Cathode
2	V_{CC}	Cathode
3	N/C	No Connect
4	N/C	No Connect
5	GND	Anode
6	GND	Anode
7	GND	Anode
8	GND	Anode

PACKAGE / PINOUT DIAGRAMS



ELECTRICAL CHARACTERISTICS

Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
θV_{BR}	Maximum Temperature Coefficient of V_{BR}
I_F	Forward Current
V_F	Forward Voltage @ I_F



NSPU5201, NSPU5221 Series

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_{RWM} (V)	I_R @ V_{RWM} (μ A)	Breakdown Voltage				I_{PP} (A) (8 x 20 μ s)	V_C @ I_{PP} (8 x 20 μ s)	
				V_{BR} V			@ I_T (mA)		V_C (V)	I_{PP} (A)
		Max	Max	Min	Nom	Max		Min	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.

ELECTRICAL CHARACTERISTICS (NSPU5221)

	Description	Min	Typ	Max	Unit
V_{CLAMP} Clamp Voltage	24 A IEC61000–4–5 Surge (8/20 μ s) from IO to GND, V_{IN} = 0 V before surge, 25°C		26.8	28.5	V
	40 A IEC61000–4–5 Surge (8/20 μ s) from IO to GND, V_{IN} = 0 V before surge, 25°C		28.3	30	V
	35 A IEC61000–4–5 Surge (8/20 μ s) from IO to GND, V_{IN} = V_{RWM} before surge, T_A = 125°C		29.4	31	V

NSPU5201, NSPU5221 Series

TYPICAL CHARACTERISTICS

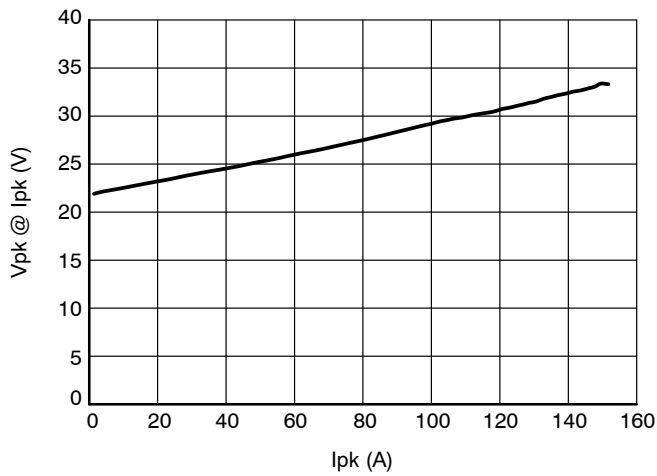


Figure 1. NSPU5021 Positive Clamping Voltage vs. Peak Pulse Current ($t_p = 8/20 \mu s$)

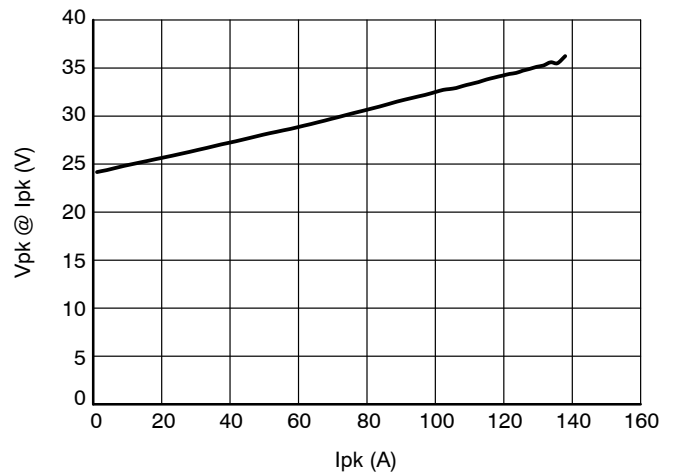


Figure 2. NSPU5221 Positive Clamping Voltage vs. Peak Pulse Current ($t_p = 8/20 \mu s$)

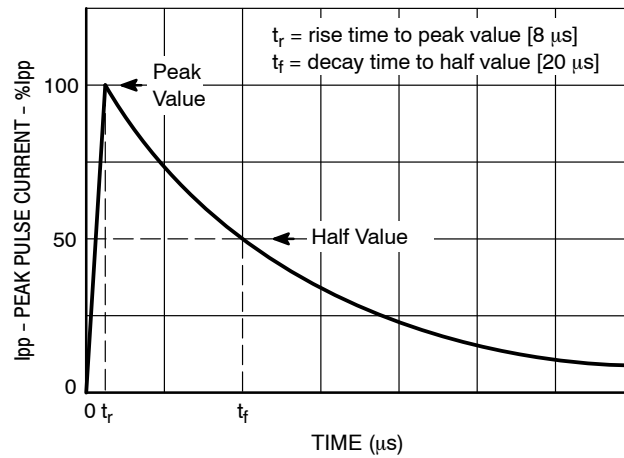


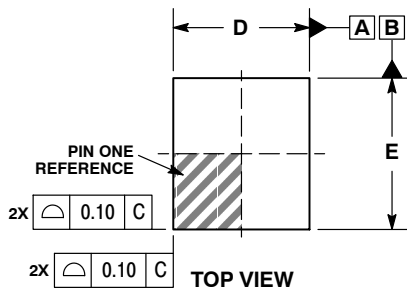
Figure 3. IEC61000-4-5 8/20 μs Pulse Waveform



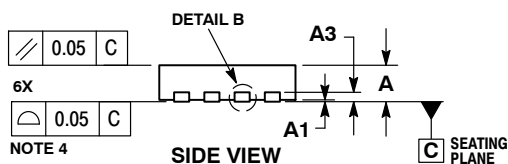
SCALE 4:1

UDFN6, 1.8x2, 0.4P
CASE 517CS
ISSUE O

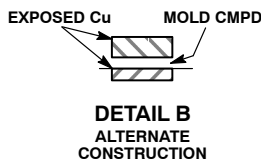
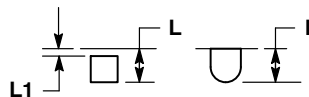
DATE 30 APR 2013



TOP VIEW



SIDE VIEW


DETAIL B
ALTERNATE
CONSTRUCTION

DETAIL A
ALTERNATE
CONSTRUCTIONS

NOTES:

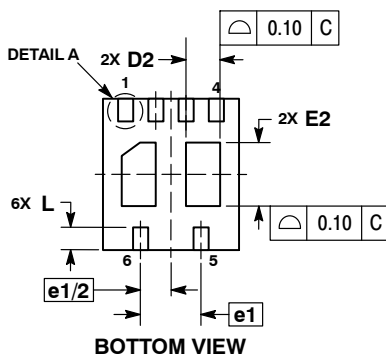
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINALS AND IS MEASURED BETWEEN 0.15 AND 0.30mm FROM THE TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

MILLIMETERS		
DIM	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

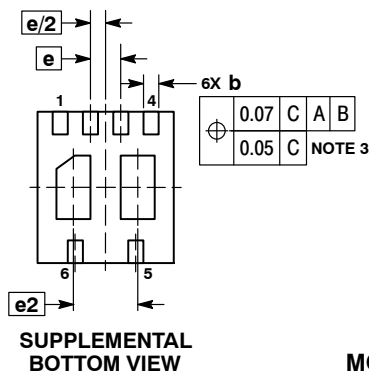
GENERIC MARKING DIAGRAM*

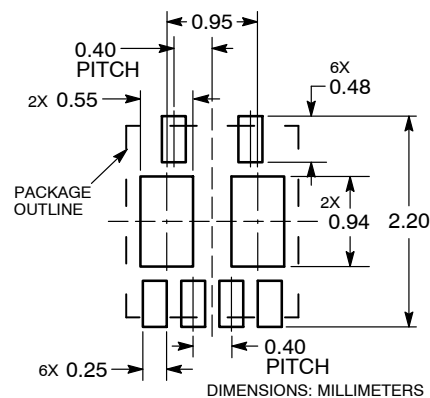
XX = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.



BOTTOM VIEW


SUPPLEMENTAL
BOTTOM VIEW

RECOMMENDED MOUNTING FOOTPRINT*


DIMENSIONS: MILLIMETERS

*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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DESCRIPTION:	UDFN6 1.8X2, 0.4P	PAGE 1 OF 1

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