

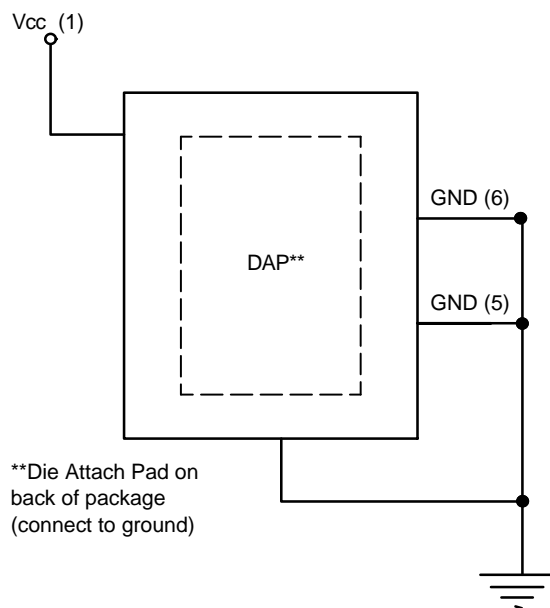
# NSPM5131

## 13.5 V Unidirectional ESD and Surge Protection Device

### Features

- Unidirectional High Voltage ESD Protection
- Provides ESD Protection to IEC61000-4-2 Level 4:  $\pm 30$  kV Contact Discharge
- IEC 61000-4-5 (lighting)
- High Voltage Zener Diode Protects Supply Rail up to 160 A (8/20  $\mu$ s)
- These Devices are Pb-Free and are RoHS Compliant

### APPLICATION DIAGRAM



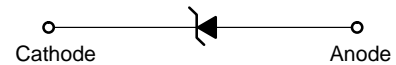
**ON Semiconductor®**

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**UDFN6  
CASE 517CS**

### BLOCK DIAGRAM



### MARKING DIAGRAM



A3 = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

### ORDERING INFORMATION

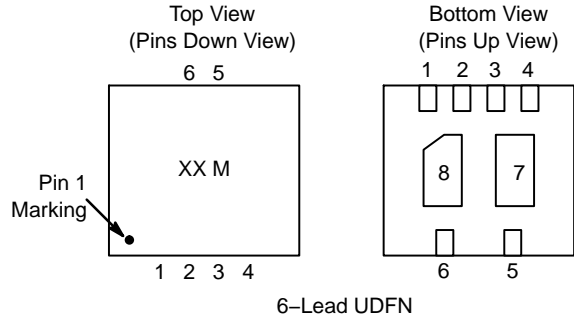
Device	Package	Shipping†
NSPM5131MUTBG	UDFN6 (Pb-Free)	3000/Tape & Reel

†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.

Table 1. PIN DESCRIPTIONS

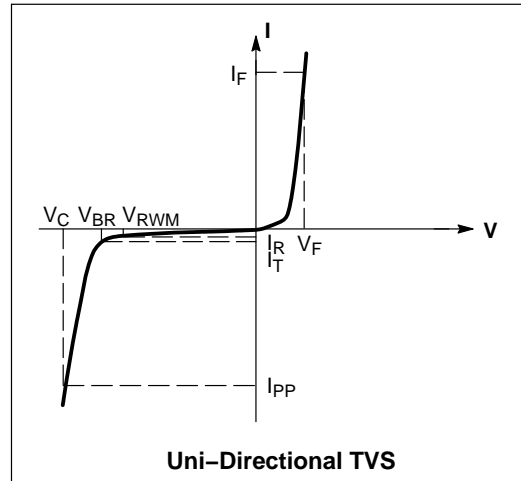
4-Channel, 6-Lead, UDFN-8 Package			
Pin	Name	Type	Description
1	V <sub>CC</sub>	HV V <sub>DD</sub>	HV ESD Channel
2	N/C		No Connect
3	N/C		No Connect
4	N/C		No Connect
5	GND		Ground
6	GND		Ground
7	GND		Ground
8	GND		Ground

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
Peak Current (t <sub>p</sub> = 8/20 μs)	160	A

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) (Note 1) Max	I <sub>R</sub> @ V <sub>RWM</sub> (μA) Max	Breakdown Voltage			V <sub>C</sub> @ I <sub>PP</sub> (8 x 20 μs) (Note 3)		
				V <sub>BR</sub> V (Note 2)			V <sub>C</sub> (V) Max	I <sub>PP</sub> (A)	
				Min	Nom	Max			
NSPM5131	A3	13.5	1	13.6	15.5	17.5	1	21.5	100

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.

1. A transient suppressor is normally selected according to the working peak reverse voltage (V<sub>RWM</sub>), which should be equal to or greater than the DC or continuous peak operating voltage level.
2. V<sub>BR</sub> measured at pulse test current I<sub>T</sub> at an ambient temperature of 25°C.
3. Surge current waveform per Figure 2.

TYPICAL CHARACTERISTICS

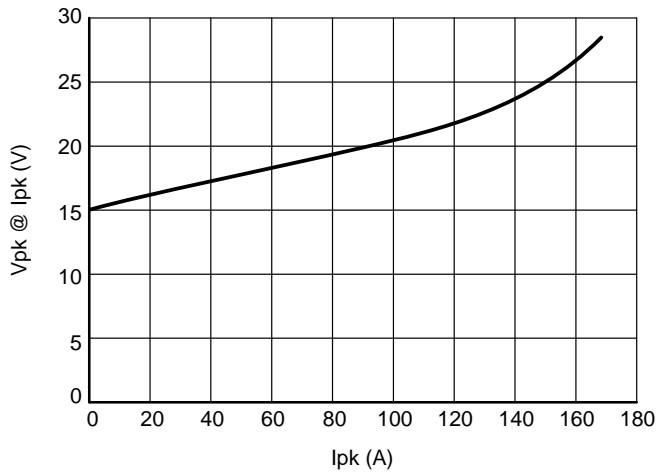


Figure 1. Clamping Voltage vs. Peak Pulse Current ( $t_p = 8/20 \mu s$ )

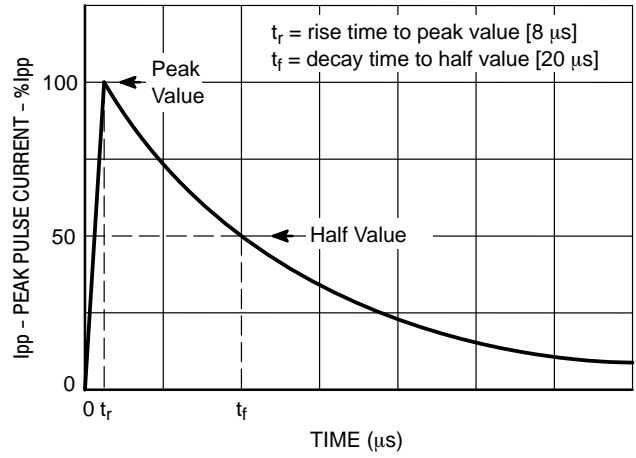
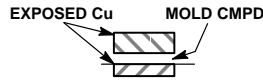
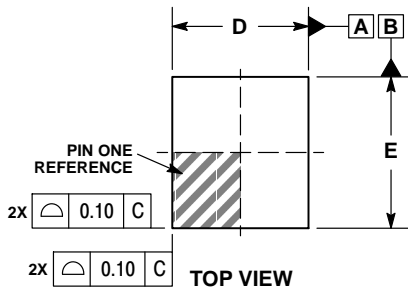


Figure 2. IEC61000-4-5 8/20  $\mu s$  Pulse Waveform

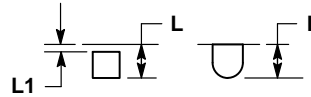
# NSPM5131

## PACKAGE DIMENSIONS

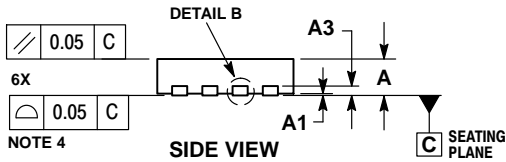
### UDFN6, 1.8x2, 0.4P CASE 517CS ISSUE O



DETAIL B  
ALTERNATE  
CONSTRUCTION



DETAIL A  
ALTERNATE  
CONSTRUCTIONS

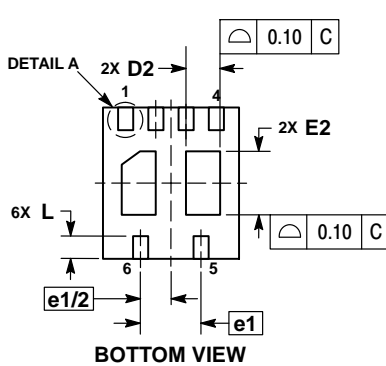


SIDE VIEW

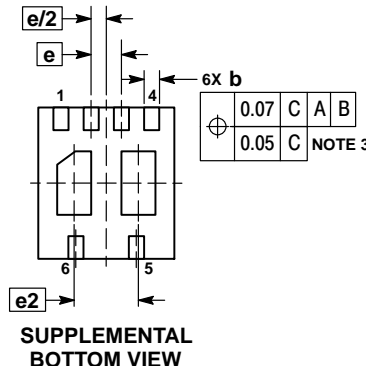
NOTES:

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

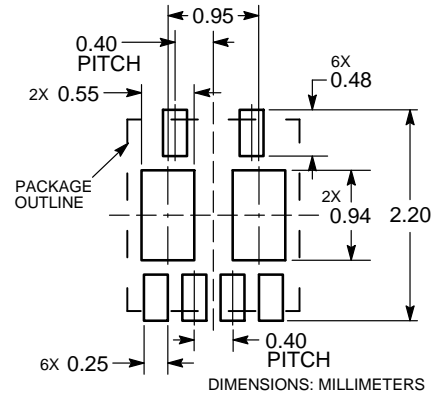


BOTTOM VIEW



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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