

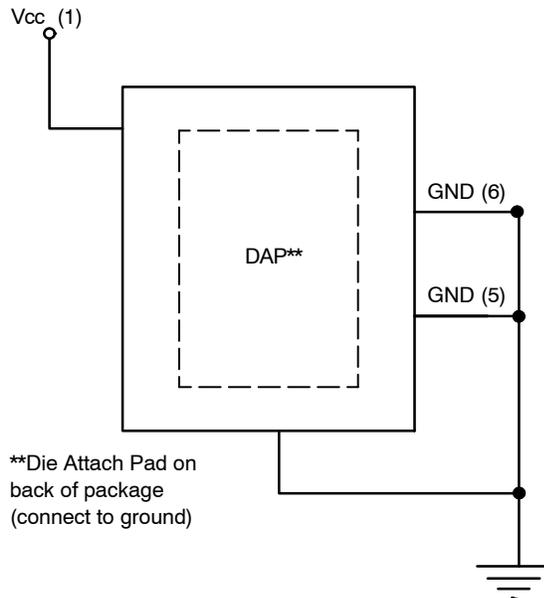
# NSPM5131

## ESD Protection Diode Low Clamping Voltage

### Features

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

### APPLICATION DIAGRAM



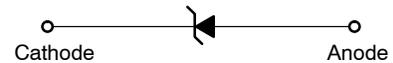
ON Semiconductor®

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UDFN6  
CASE 517CS

### BLOCK DIAGRAM



### MARKING DIAGRAM



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

### ORDERING INFORMATION

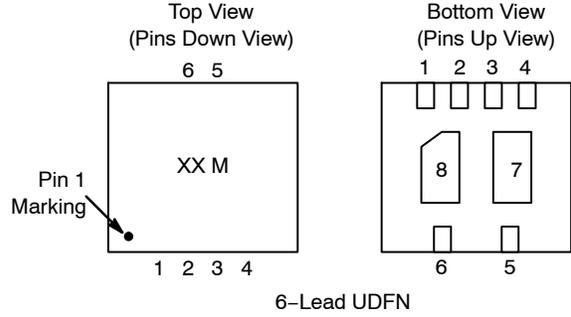
| Device        | Package            | Shipping†           |
|---------------|--------------------|---------------------|
| NSPM5131MUTBG | UDFN6<br>(Pb-Free) | 3000/Tape &<br>Reel |

†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

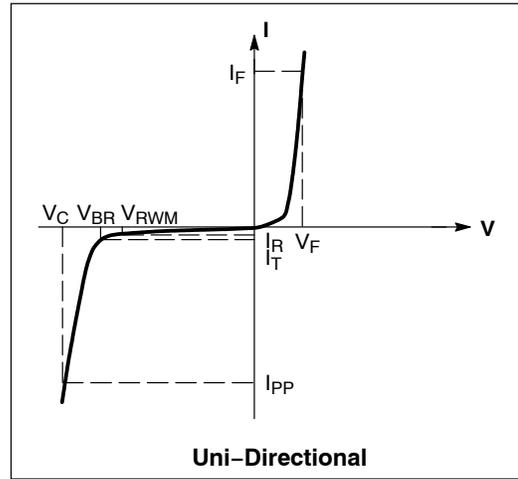
| 4-Channel, 6-Lead, UDFN-8 Package |                 |                    |                |
|-----------------------------------|-----------------|--------------------|----------------|
| Pin                               | Name            | Type               | Description    |
| 1                                 | 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)<br>(Note 1)<br>Max | I <sub>R</sub> @ V <sub>RWM</sub> (μA)<br>Max | Breakdown Voltage          |      |      | V <sub>C</sub> @ I <sub>PP</sub><br>(8 x 20 μs) (Note 3) |                     |     |
|-------------|----------------|---|---|----------------------------|------|------|--|---------------------|-----|
|             |                |   |   | V <sub>BR</sub> V (Note 2) |      |      | V <sub>C</sub> (V)<br>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

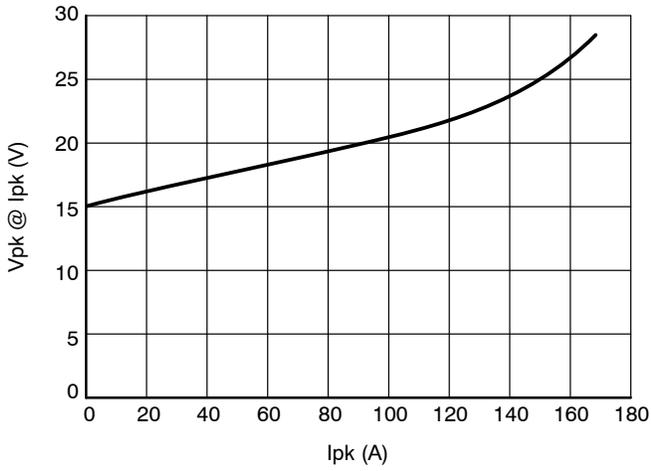


Figure 1. Clamping Voltage vs. Peak Pulse Current ( $t_p = 8/20 \mu s$ )

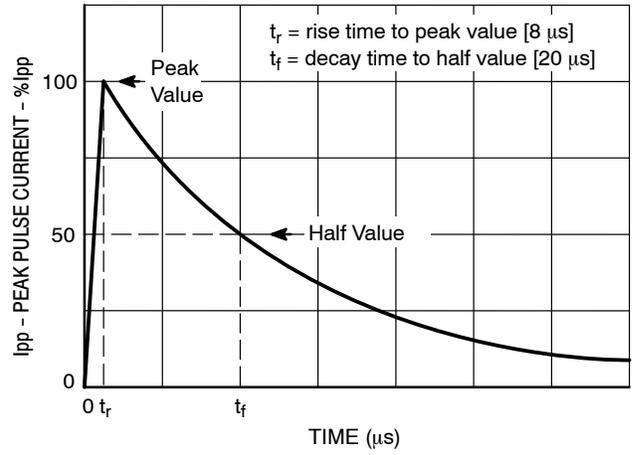
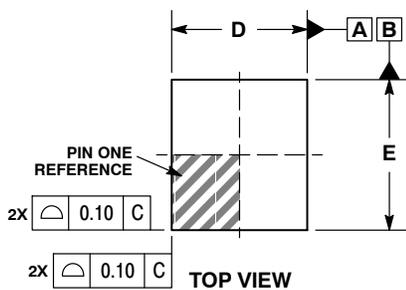


Figure 2. IEC61000-4-5 8/20 μs Pulse Waveform

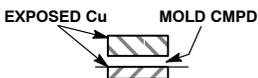
# NSPM5131

## PACKAGE DIMENSIONS

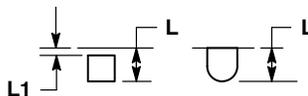
### UDFN6, 1.8 x 2, 0.4P CASE 517CS ISSUE O



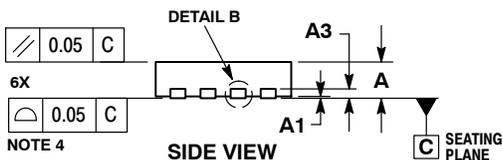
TOP VIEW



DETAIL B  
ALTERNATE  
CONSTRUCTION



DETAIL A  
ALTERNATE  
CONSTRUCTIONS

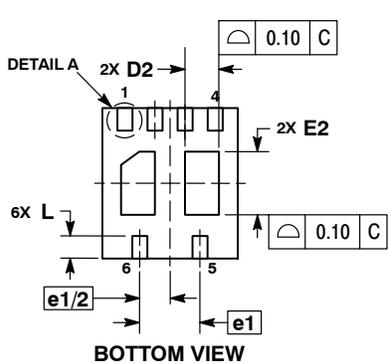


SIDE VIEW

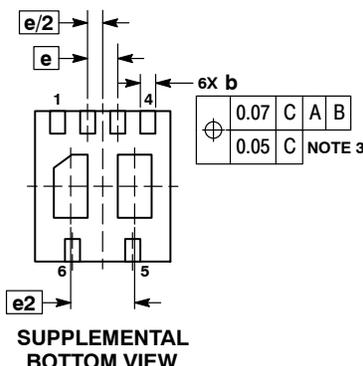
NOTES:

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 |

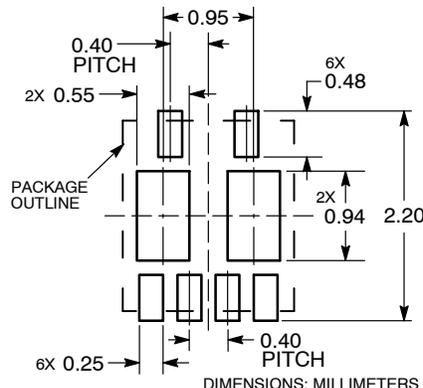


BOTTOM VIEW



SUPPLEMENTAL  
BOTTOM VIEW

### RECOMMENDED MOUNTING FOOTPRINT\*



DIMENSIONS: MILLIMETERS

\*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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