

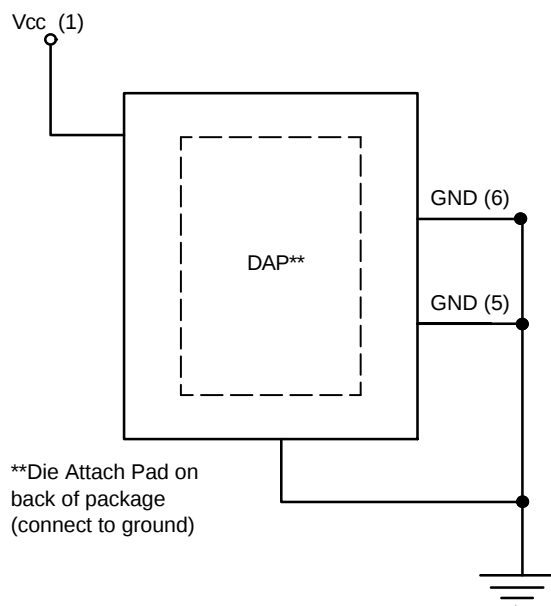
# NSPM8151, NSPM8181

## 15 V and 18 V Unidirectional ESD and Surge Protection Device

### Features

- Unidirectional High Voltage ESD & Surge Protection Device
- Provides ESD Protection to IEC61000-4-2 Level 4:  $\pm 30$  kV Contact Discharge
- IEC 61000-4-5 (lightning)
- High Voltage Zener Diode Protects Supply Rail up to 100 A (8/20  $\mu$ s)
- These Devices are Pb-Free and are RoHS Compliant

### APPLICATION DIAGRAM



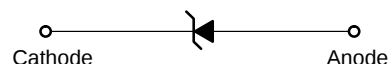
ON Semiconductor®

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



UDFN6  
D4 SUFFIX  
CASE 517CS

### BLOCK DIAGRAM



### MARKING DIAGRAM



Ax = Specific Device Code  
x = 5 or E  
M = Date Code  
■ = Pb-Free Package

### ORDERING INFORMATION

| Device        | Package         | Shipping <sup>†</sup> |
|---------------|-----------------|-----------------------|
| NSPM8151MUTBG | UDFN6 (Pb-Free) | 3000 / Tape & Reel    |
| NSPM8181MUTBG | UDFN6 (Pb-Free) | 3000 / Tape & Reel    |

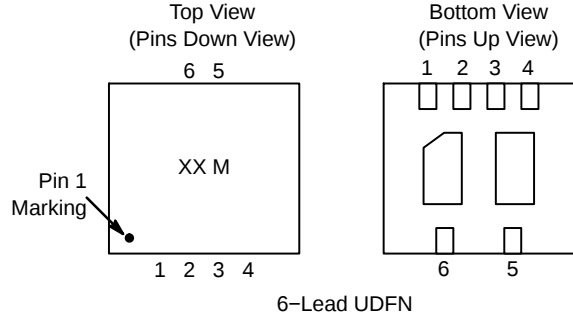
<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

# NSPM8151, NSPM8181

**Table 1. PIN DESCRIPTIONS**

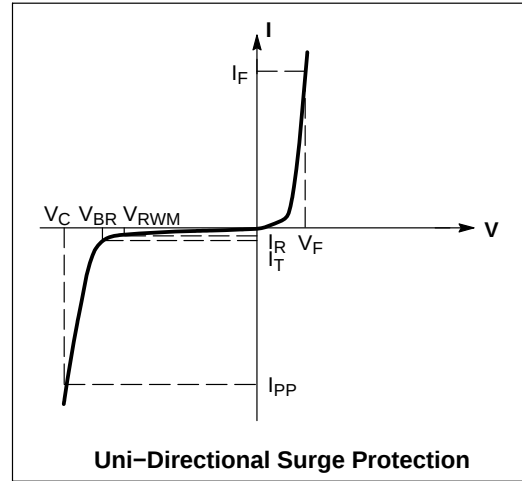
| 4-Channel, 6-Lead, UDFN-8 Package |                 |                    |                |
|-----------------------------------|-----------------|--------------------|----------------|
| Pin                               | Name            | Type               | Description    |
| 1                                 | 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         |

**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. ABSOLUTE 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) | NSPM8151: 100 | A     |
| Peak Current (t <sub>p</sub> = 8/20 μs) | NSPM8181: 119 | A     |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

## ELECTRICAL CHARACTERISTICS

| Device Name | Device Marking | V <sub>RWM</sub> (V)<br>(Note 1) | I <sub>R</sub> @ V <sub>RWM</sub> (μA) | Breakdown Voltage          |      |      |                       | V <sub>C</sub> @ I <sub>PP</sub><br>(8 x 20 μs) (Note 3) |                     |
|-------------|----------------|----------------------------------|----------------------------------------|----------------------------|------|------|-----------------------|----------------------------------------------------------|---------------------|
|             |                |                                  |                                        | V <sub>BR</sub> V (Note 2) |      |      | @ I <sub>T</sub> (mA) | V <sub>C</sub> (V)                                       | I <sub>PP</sub> (A) |
|             |                | Max                              | Max                                    | Min                        | Nom  | Max  |                       | Max                                                      |                     |
| NSPM8151    | A5             | 15                               | 1                                      | 16                         | 17.5 | 18.5 | 1                     | 27                                                       | 100                 |
| NSPM8181    | A8             | 18                               | 1                                      | 20                         | 22.5 | 23.5 | 1                     | 28<br>30                                                 | 70<br>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 surge protector 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 1.

TYPICAL CHARACTERISTICS

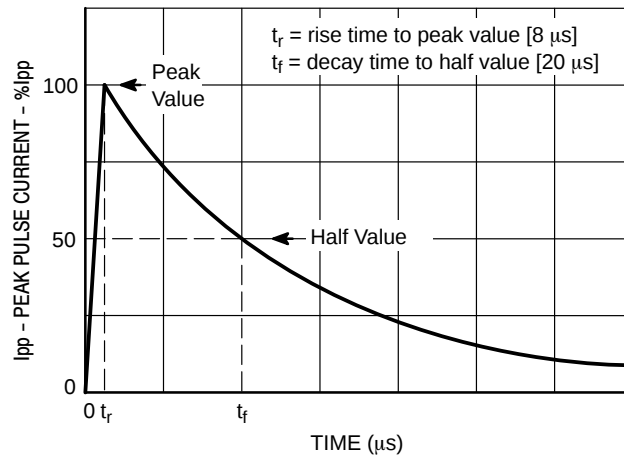
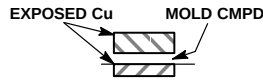
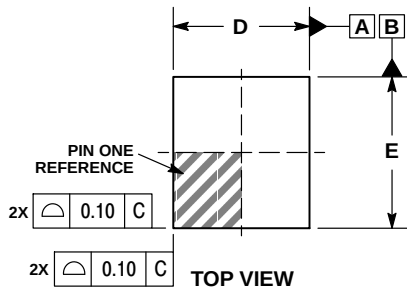


Figure 1. IEC61000-4-5 8/20  $\mu\text{s}$  Pulse Waveform

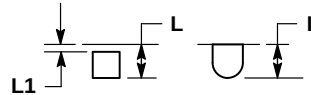
# NSPM8151, NSPM8181

## PACKAGE DIMENSIONS

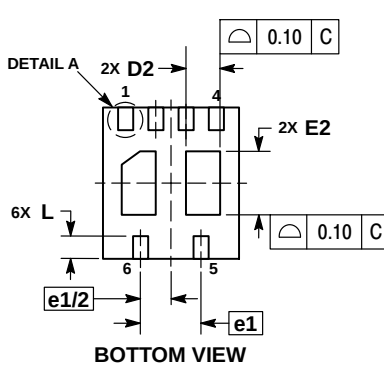
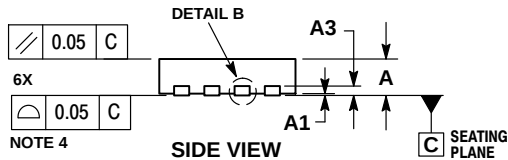
### UDFN6, 1.8x2, 0.4P CASE 517CS ISSUE O



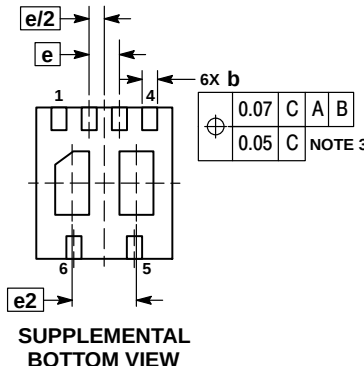
DETAIL B  
ALTERNATE  
CONSTRUCTION



DETAIL A  
ALTERNATE  
CONSTRUCTIONS



BOTTOM VIEW



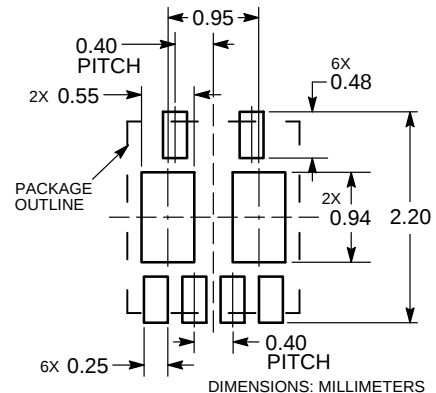
SUPPLEMENTAL  
BOTTOM VIEW

#### 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 |

#### 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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