

## 1-Line Bi-directional TVS Diode

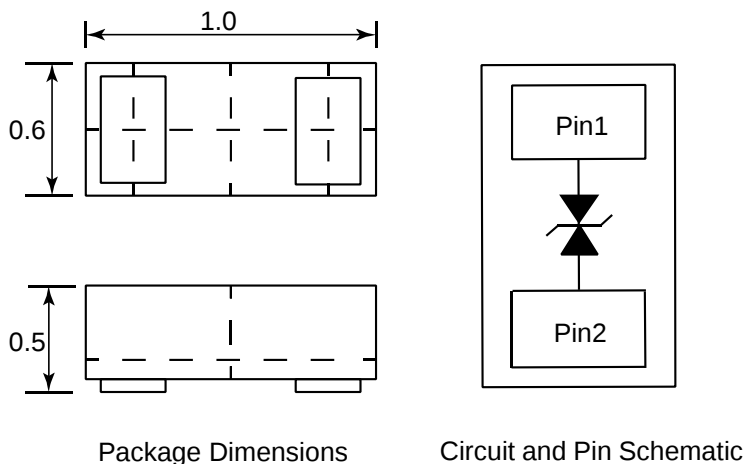
### Description

The PESDU0521P1 is a bi-directional TVS diode, to provide fast-response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive data and power line. The PESDU0521P1 complies with the IEC 61000-4-2 (ESD) standard with  $\pm 30\text{kV}$  air and  $\pm 30\text{kV}$  contact discharge. It is assembled into an ultra-small  $1.0 \times 0.6 \times 0.5\text{mm}$  lead-free DFN package. The small size and high ESD protection make PESDU0521P1 an ideal choice to protect cellphone, digital cameras, audio players and many other portable applications.

### Features

- Ultra small package:  $1.0 \times 0.6\text{mm}$
- Protects one data or power line
- Ultra low leakage: nA level
- Low operating voltage:  $5\text{V}$
- Low clamping voltage
- 2-pin leadless package
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test
    - Air discharge:  $\pm 30\text{kV}$
    - Contact discharge:  $\pm 30\text{kV}$
  - IEC61000-4-5 (Lightning)  $8\text{A}$  ( $8/20\mu\text{s}$ )
- RoHS Compliant

### Dimensions and Pin Configuration



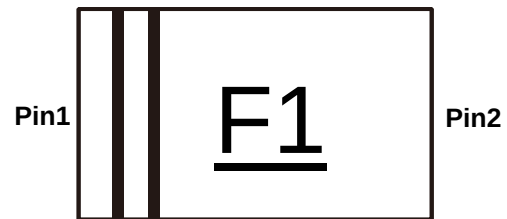
### Mechanical Characteristics

- Package: DFN1006-2 ( $1.0 \times 0.6\text{mm}$ )
- Case Material: "Green" Molding Compound.
- Moisture Sensitivity: Level 1 per J-STD-020
- Marking Information: See Below

### Applications

- Cellular Handsets and Accessories
- Personal Digital Assistants
- Notebooks and Handhelds
- Portable Instrumentation
- Digital Cameras
- Peripherals
- Audio Players
- Keypads, Side Keys, LCD Displays

### Marking Information



**F1** = Device Marking Code

### Ordering Information

| Part Number | Shipping          | Reel Size |
|-------------|-------------------|-----------|
| PESDU0521P1 | 10000/Tape & Reel | 7 inch    |

**Absolute Maximum Ratings ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)**

| Parameter                                | Symbol    | Value           | Unit               |
|------------------------------------------|-----------|-----------------|--------------------|
| Peak Pulse Power (8/20 $\mu\text{s}$ )   | $P_{PK}$  | 104             | W                  |
| Peak Pulse Current (8/20 $\mu\text{s}$ ) | $I_{PP}$  | 8               | A                  |
| ESD per IEC 61000-4-2 (Air)              | $V_{ESD}$ | $\pm 30$        | kV                 |
| ESD per IEC 61000-4-2 (Contact)          |           | $\pm 30$        |                    |
| Lead temperature                         | $T_L$     | 260             | $^{\circ}\text{C}$ |
| Junction Temperature                     | $T_J$     | 125             | $^{\circ}\text{C}$ |
| Operating Temperature Range              | $T_{OP}$  | $-40 \sim +125$ | $^{\circ}\text{C}$ |
| Storage Temperature Range                | $T_{STG}$ | $-55 \sim +150$ | $^{\circ}\text{C}$ |

**Electrical Characteristics ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)**

| Parameter                        | Symbol    | Min. | Typ. | Max. | Unit          | Test Condition                                  |
|----------------------------------|-----------|------|------|------|---------------|-------------------------------------------------|
| Reverse Working Voltage          | $V_{RWM}$ |      |      | 5    | V             |                                                 |
| Breakdown Voltage                | $V_{BR}$  | 5.5  |      |      | V             | $I_T = 1\text{mA}$                              |
| Reverse Leakage Current          | $I_R$     |      |      | 0.5  | $\mu\text{A}$ | $V_{RWM} = 5\text{V}$                           |
| Clamping voltage <sup>1)</sup>   | $V_{CL}$  |      | 9.0  |      | V             | $I_{PP} = 16\text{A}$ , $t_p = 100\text{ns}$    |
| Dynamic resistance <sup>1)</sup> | $R_{DYN}$ |      | 0.2  |      | $\Omega$      |                                                 |
| Clamping voltage <sup>2)</sup>   | $V_{CL}$  |      | 9.0  |      | V             | $V_{ESD} = 8\text{kV}$                          |
| Clamping Voltage <sup>3)</sup>   | $V_C$     |      | 8    | 9    | V             | $I_{PP} = 1\text{A}$ (8/20 $\mu\text{s}$ pulse) |
| Clamping Voltage <sup>3)</sup>   | $V_C$     |      | 10   | 13   | V             | $I_{PP} = 8\text{A}$ (8/20 $\mu\text{s}$ pulse) |
| Junction Capacitance             | $C_J$     |      | 16   | 21   | pF            | $V_R = 0\text{V}$ , $f = 1\text{MHz}$           |

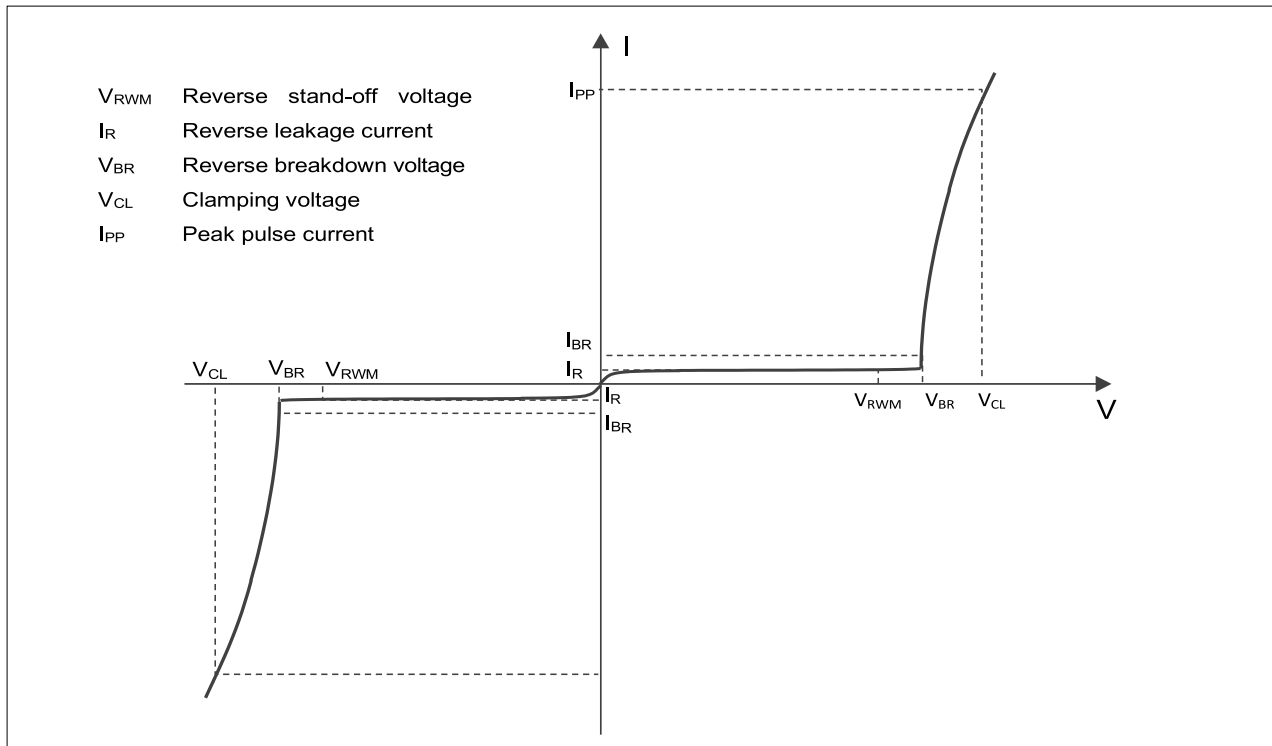
Notes:

1) TLP parameter:  $Z_0 = 50\Omega$ ,  $t_p = 100\text{ns}$ ,  $t_r = 2\text{ns}$ , averaging window from 60ns to 80ns.  $R_{DYN}$  is calculated from 4A to 16A.

2) Contact discharge mode, according to IEC61000-4-2.

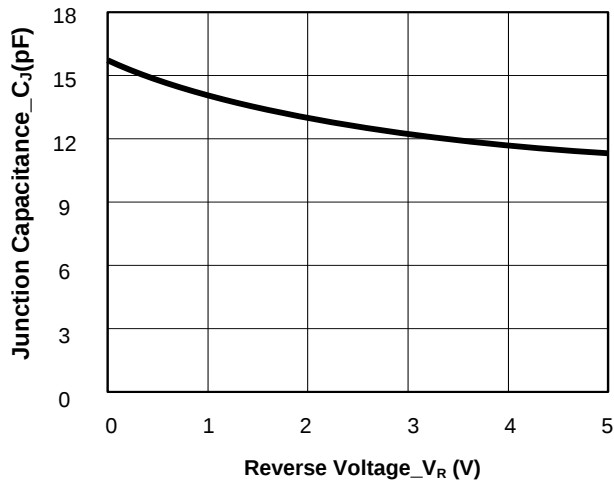
3) Non-repetitive current pulse, according to IEC61000-4-5.

**Electrical characteristics ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)**

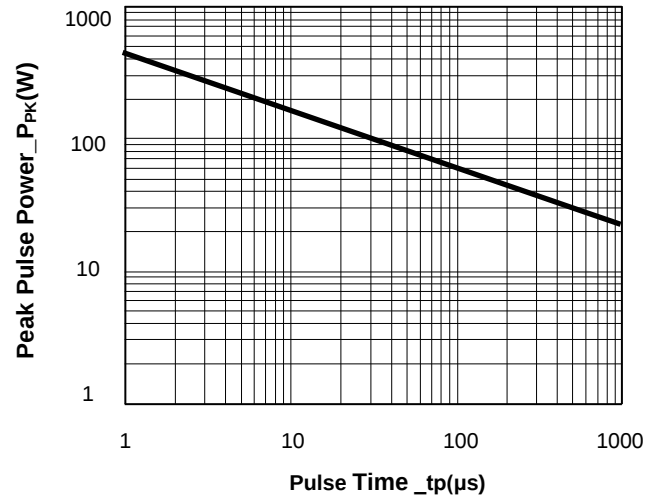


Definitions of electrical characteristics

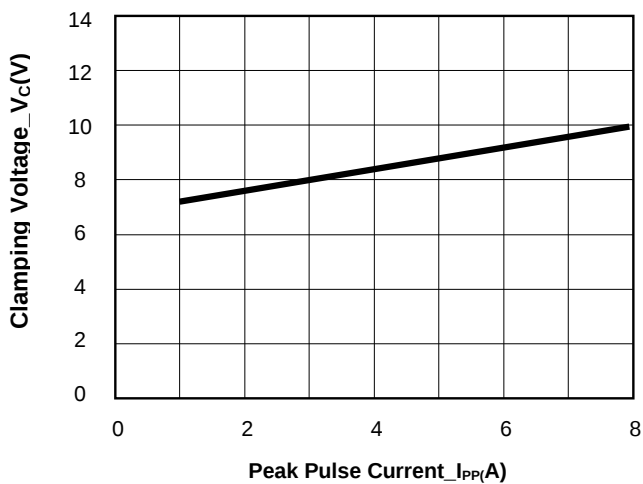
**Typical Performance Characteristics (T<sub>A</sub>=25°C unless otherwise Specified)**



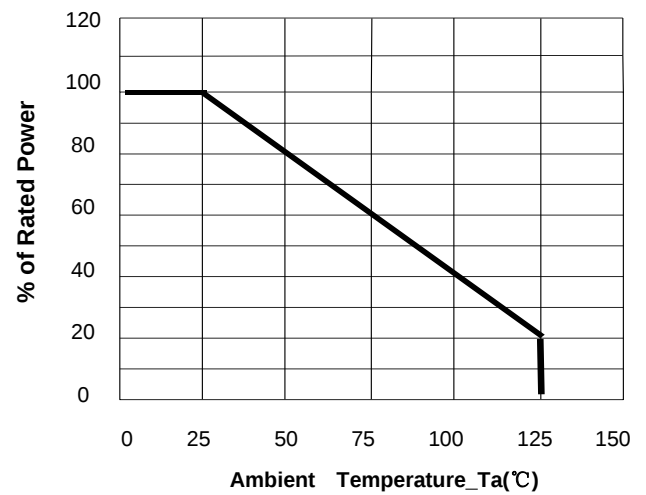
Junction Capacitance vs. Reverse Voltage



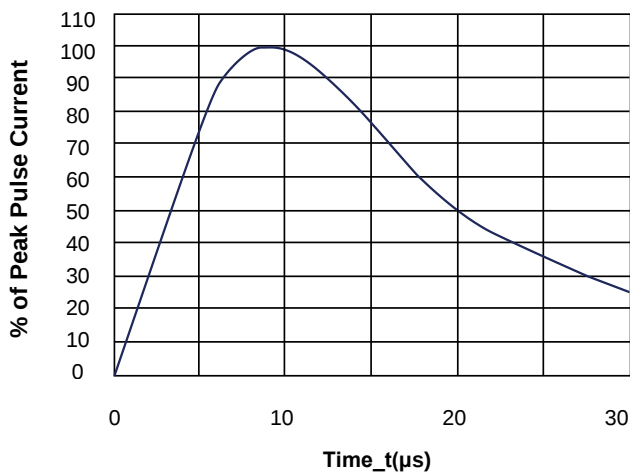
Peak Pulse Power vs. Pulse Time



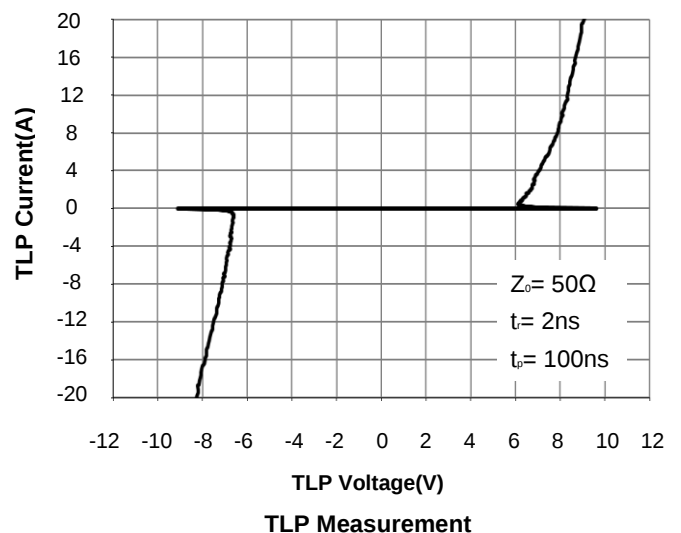
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve

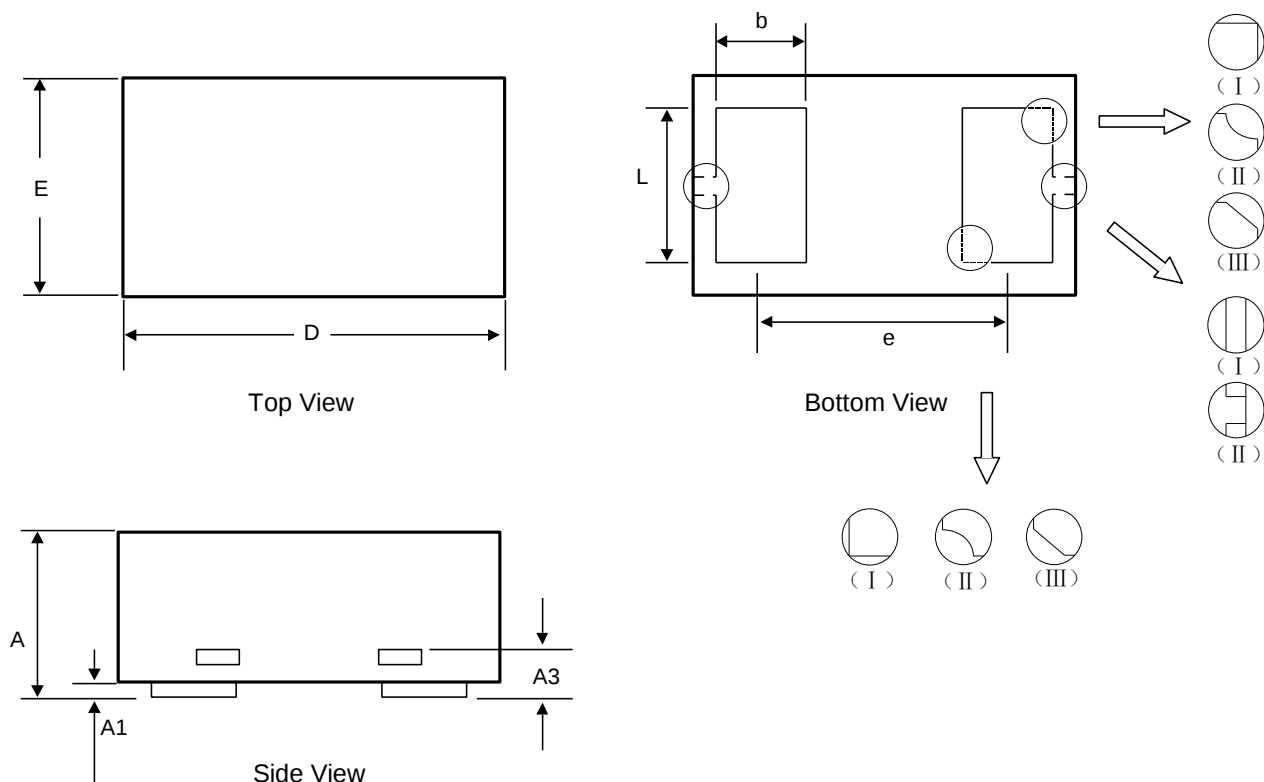


8/20 μs Pulse Waveform



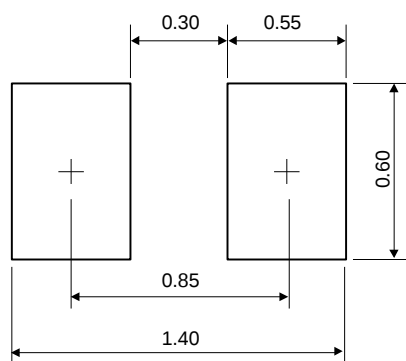
TLP Measurement

## DFN1006-2 Package Outline Drawing



| Symbol | Dimensions in Millimeters |       |       |
|--------|---------------------------|-------|-------|
|        | Min.                      | Typ.  | Max.  |
| A      | 0.340                     | 0.450 | 0.550 |
| A1     | 0.000                     | 0.020 | 0.050 |
| A3     | 0.125 Ref.                |       |       |
| D      | 0.950                     | 1.000 | 1.075 |
| E      | 0.490                     | 0.600 | 0.675 |
| b      | 0.200                     | 0.250 | 0.300 |
| L      | 0.450                     | 0.500 | 0.550 |
| e      | 0.650 BSC                 |       |       |

### Recommended PCB Layout (Unit: mm)

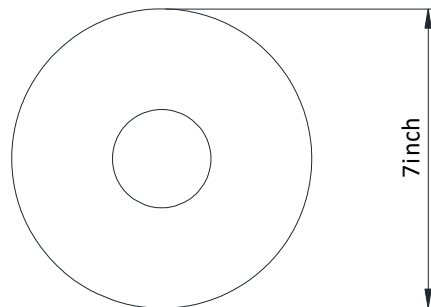


#### Notes:

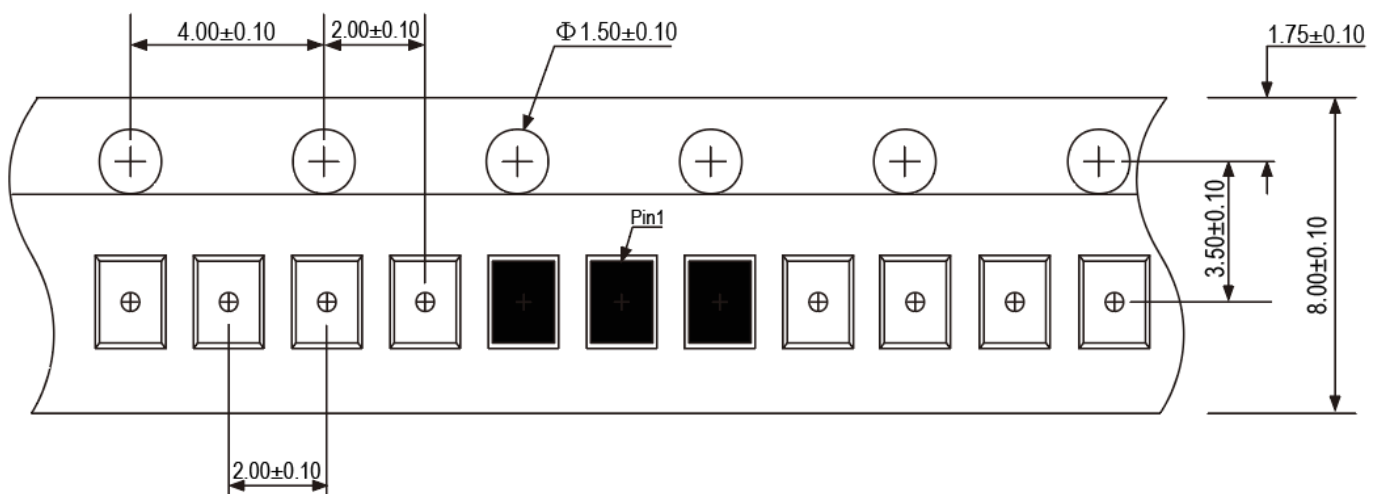
This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met.

## TAPE AND REEL INFORMATION

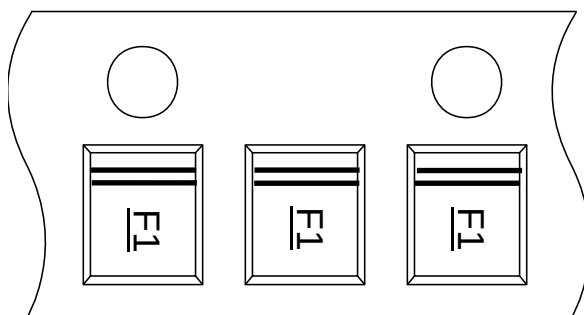
Reel Dimensions



Tape Dimensions



Unit:mm



→  
User Direction of Feed

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