

**1-Line Ultra Low Capacitance Bi-directional TVS Diode**

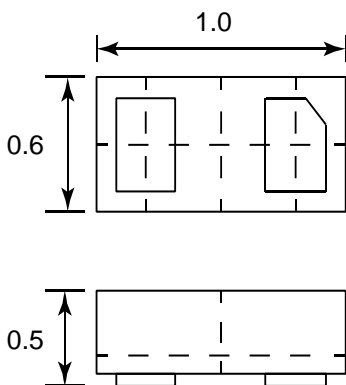
**Description**

The PESDR0521P1 is a bi-directional TVS diode, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines. The PESDR0521P1 has an ultra-low capacitance with a typical value at 0.3pF, and complies with the IEC 61000-4-2 (ESD) with  $\pm 25kV$  air and  $\pm 22kV$  contact discharge. It is assembled into an ultra-small 1.0x0.6x0.5mm lead-free DFN package. The small size, ultra-low capacitance and high ESD surge protection make PESDR0521P1 an ideal choice to protect cell phone, digital video interfaces and other high speed ports.

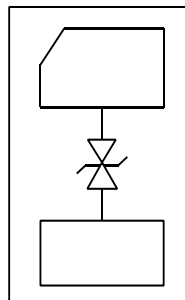
**Features**

- Ultra small package: 1.0x0.6x0.5mm
- Ultra low capacitance: 0.3pF typical
- Ultra low leakage: nA level
- Operating voltage: 5V
- Low clamping voltage
- 2-pin leadless package
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test
    - Air discharge:  $\pm 25kV$
    - Contact discharge:  $\pm 22kV$
  - IEC61000-4-5 (Lightning) 4A (8/20 $\mu s$ )
- RoHS Compliant

**Dimensions and Pin Configuration**



Package Dimensions



Circuit and Pin Schematic

**Mechanical Characteristics**

- Package: DFN1006-2 (1.0x0.6x0.5mm)
- Case Material: "Green" Molding Compound.
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Below

**Applications**

- Cellular Handsets and Accessories
- Display Ports
- MDDI Ports
- USB Ports
- Digital Video Interface (DVI)
- PCI Express and Serial SATA Ports

**Marking Information**



21 = Device Marking Code

**Ordering Information**

| Part Number | Packaging         | Reel Size |
|-------------|-------------------|-----------|
| PESDR0521P1 | 10000/Tape & Reel | 7 inch    |

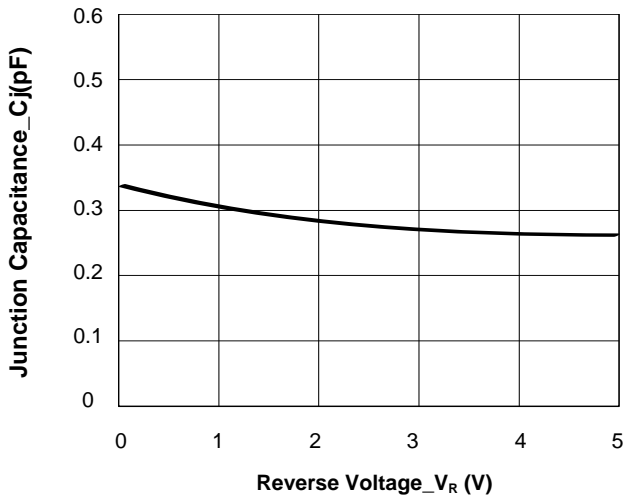
**Absolute Maximum Ratings ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)**

| Parameter  | Symbol    | Value                | Unit               |
|--|-----------|----------------------|--------------------|
| Peak Pulse Power (8/20 $\mu\text{s}$ )                         | $P_{PK}$  | 100                  | W                  |
| Peak Pulse Current (8/20 $\mu\text{s}$ )                       | $I_{PP}$  | 4                    | A                  |
| ESD per IEC 61000-4-2 (Air)<br>ESD per IEC 61000-4-2 (Contact) | $V_{ESD}$ | $\pm 25$<br>$\pm 22$ | kV                 |
| Operating Temperature Range                                    | $T_J$     | -55 to +125          | $^{\circ}\text{C}$ |
| Storage Temperature Range                                      | $T_{stg}$ | -55 to +150          | $^{\circ}\text{C}$ |

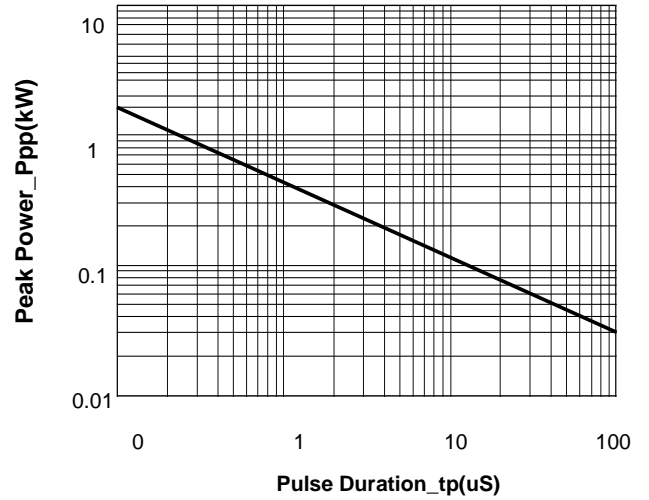
**Electrical Characteristics ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)**

| Parameter               | Symbol    | Min | Typ | Max | Unit          | Test Condition                                    |
|-------------------------|-----------|-----|-----|-----|---------------|---|
| Reverse Working Voltage | $V_{RWM}$ |     |     | 5   | V             |   |
| Breakdown Voltage       | $V_{BR}$  | 6.5 |     | 9.5 | V             | $I_T = 1\text{mA}$                                |
| Reverse Leakage Current | $I_R$     |     |     | 0.2 | $\mu\text{A}$ | $V_{RWM} = 5\text{V}$                             |
| Clamping Voltage        | $V_C$     |     |     | 12  | V             | $I_{PP} = 1\text{A}$ (8 x 20 $\mu\text{s}$ pulse) |
| Clamping Voltage        | $V_C$     |     |     | 25  | V             | $I_{PP} = 4\text{A}$ (8 x 20 $\mu\text{s}$ pulse) |
| Junction Capacitance    | $C_J$     |     | 0.3 | 0.5 | pF            | $V_R = 0\text{V}$ , $f = 1\text{MHz}$             |

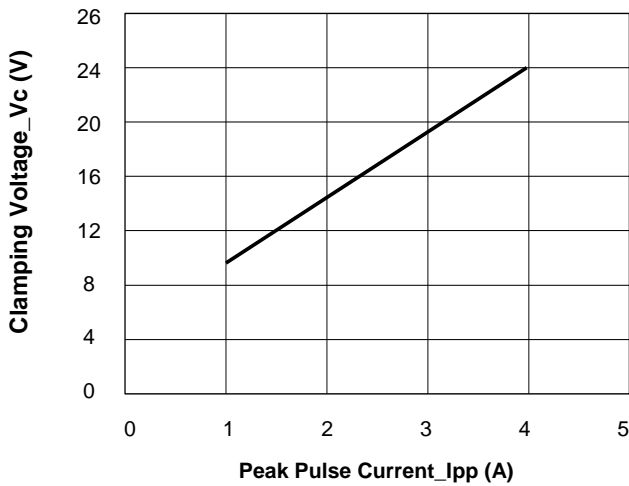
**Typical Performance Characteristics (T<sub>A</sub>=25°C unless otherwise Specified)**



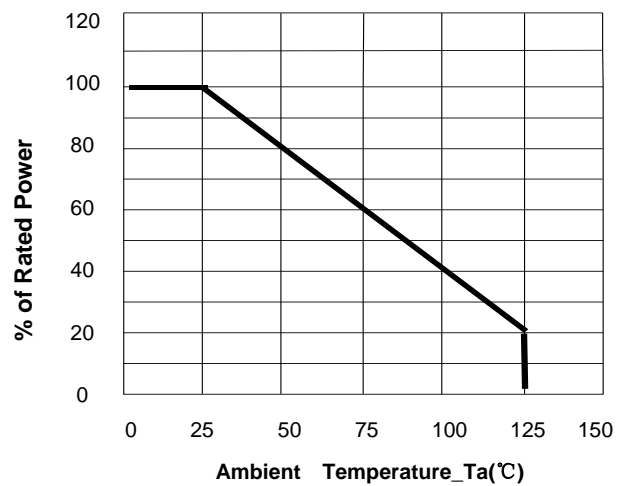
**Junction Capacitance vs. Reverse Voltage**



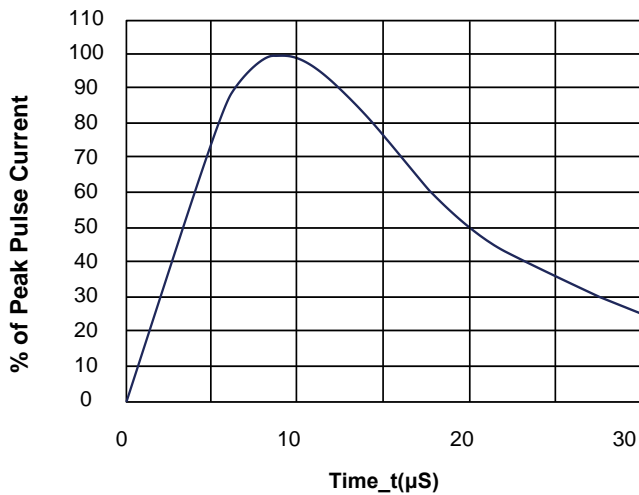
**Peak Pulse Power vs. Pulse Time**



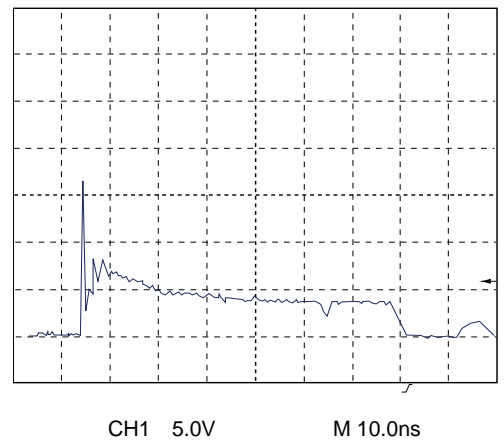
**Clamping Voltage vs. Peak Pulse Current**



**Power Derating Curve**

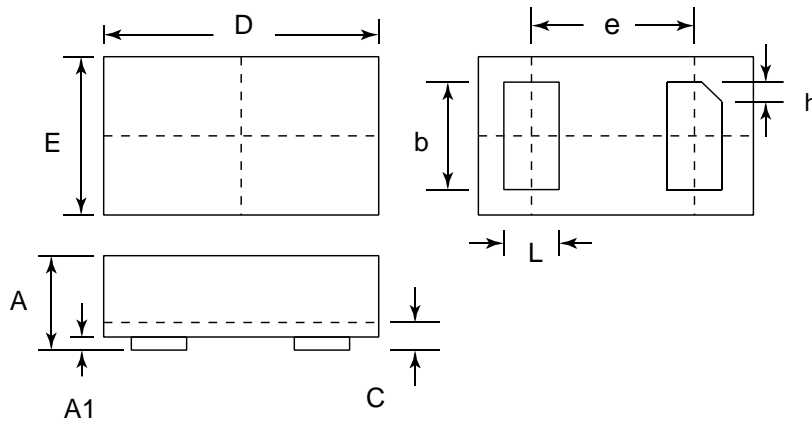


**8 X 20uS Pulse Waveform**



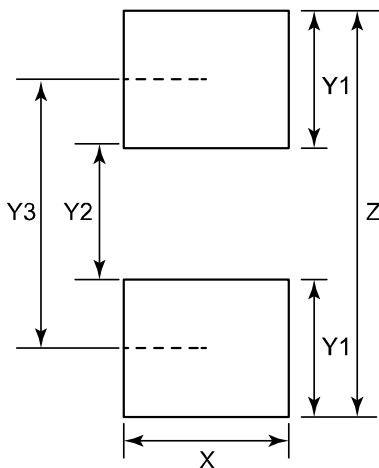
**ESD Clamping Voltage  
8 kV Contact per IEC61000-4-2**

**DFN1006-2 Package Outline Drawing**



| SYM | DIMENSIONS  |      |      |           |       |       |
|-----|-------------|------|------|-----------|-------|-------|
|     | MILLIMETERS |      |      | INCHES    |       |       |
|     | MIN         | NOM  | MAX  | MIN       | NOM   | MAX   |
| A   | 0.45        | 0.50 | 0.55 | 0.018     | 0.020 | 0.022 |
| A1  | 0.00        | 0.02 | 0.05 | 0.000     | 0.001 | 0.002 |
| b   | 0.45        | 0.50 | 0.55 | 0.018     | 0.020 | 0.022 |
| c   | 0.12        | 0.15 | 0.18 | 0.005     | 0.006 | 0.007 |
| D   | 0.95        | 1.00 | 1.05 | 0.037     | 0.039 | 0.041 |
| e   | 0.65 BSC    |      |      | 0.026 BSC |       |       |
| E   | 0.55        | 0.60 | 0.65 | 0.022     | 0.024 | 0.026 |
| L   | 0.20        | 0.25 | 0.30 | 0.008     | 0.010 | 0.012 |
| h   | 0.07        | 0.12 | 0.17 | 0.003     | 0.005 | 0.007 |

**Suggested Land Pattern**



| SYM | DIMENSIONS  |        |
|-----|-------------|--------|
|     | MILLIMETERS | INCHES |
| X   | 0.60        | 0.024  |
| Y1  | 0.50        | 0.020  |
| Y2  | 0.30        | 0.012  |
| Y3  | 0.80        | 0.032  |
| Z   | 1.30        | 0.052  |

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