

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

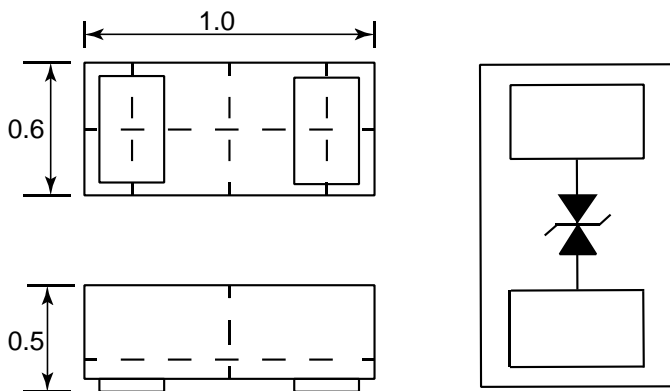
**Description**

The PESDR1511P1 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 high speed data lines. The PESDR1511P1 has an ultra-low capacitance with a typical value at 0.25pF, and complies with the IEC61000-4-2 (ESD) standard with ±20kV air and ±20kV contact discharge. It is assembled into an ultra-small 1.0x0.6x 0.5mm lead-free DFN package. The small size, ultra-low capacitance and high surge protection make PESDR1511P1 an ideal choice to protect cellphone, digital video interfaces and other high speed ports.

**Features**

- Ultra small package: 1.0x0.6x0.5mm
- Ultra low capacitance: 0.25pF typical
- Low operating voltage: 15 V
- Low clamping voltage
- 2-pin leadless package
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test
    - Air discharge: ±20kV
    - Contact discharge: ±20kV
  - IEC61000-4-5 (Lightning) 3A (8/20µs)
- RoHS Compliant

**Dimensions and Pin Configuration**



Package Dimensions

Circuit and Pin Schematic

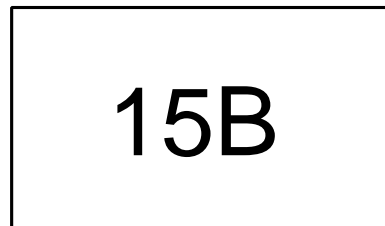
**Mechanical Characteristics**

- Package: DFN1006-2 (1.0x0.6x0.5mm)
- Case Material: “Green” Molding Compound.
- Moisture Sensitivity: Level 1 per J-STD-020
- 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**



**15B** = Device Marking Code

**Ordering Information**

Part Number	Shipping	Reel Size
PESDR1511P1	10000/Tape & Reel	7 inch

**Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise specified)**

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	P <sub>PK</sub>	105	W
Peak Pulse Current (8/20μs)	I <sub>PP</sub>	3	A
ESD per IEC 61000-4-2 (Air)	V <sub>ESD</sub>	±20	kV
ESD per IEC 61000-4-2 (Contact)		±20	
Lead temperature	T <sub>L</sub>	260	°C
Operating Temperature Range	T <sub>OP</sub>	-40 ~ +85	°C
Storage Temperature Range	T <sub>STG</sub>	-55 ~ +150	°C

**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise specified)**

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V <sub>RWM</sub>			15	V	
Breakdown Voltage	V <sub>BR</sub>	16.5			V	I <sub>T</sub> = 1mA
Reverse Leakage Current	I <sub>R</sub>			0.1	μA	V <sub>RWM</sub> = 5V
Clamping voltage <sup>1)</sup>	V <sub>CL</sub>		50		V	I <sub>PP</sub> =16A, t <sub>p</sub> =100ns
Dynamic resistance <sup>1)</sup>	R <sub>DYN</sub>		0.3		Ω	
Clamping Voltage <sup>2)</sup>	V <sub>C</sub>		50		V	V <sub>ESD</sub> = 8kV
Clamping Voltage <sup>3)</sup>	V <sub>C</sub>		24	26	V	I <sub>PP</sub> = 1A (8/20μs pulse)
Clamping Voltage <sup>3)</sup>	V <sub>C</sub>		32	35	V	I <sub>PP</sub> = 3A (8/20μs pulse)
Junction Capacitance	C <sub>J</sub>		0.25	0.35	pF	V <sub>R</sub> = 0V, f = 1MHz

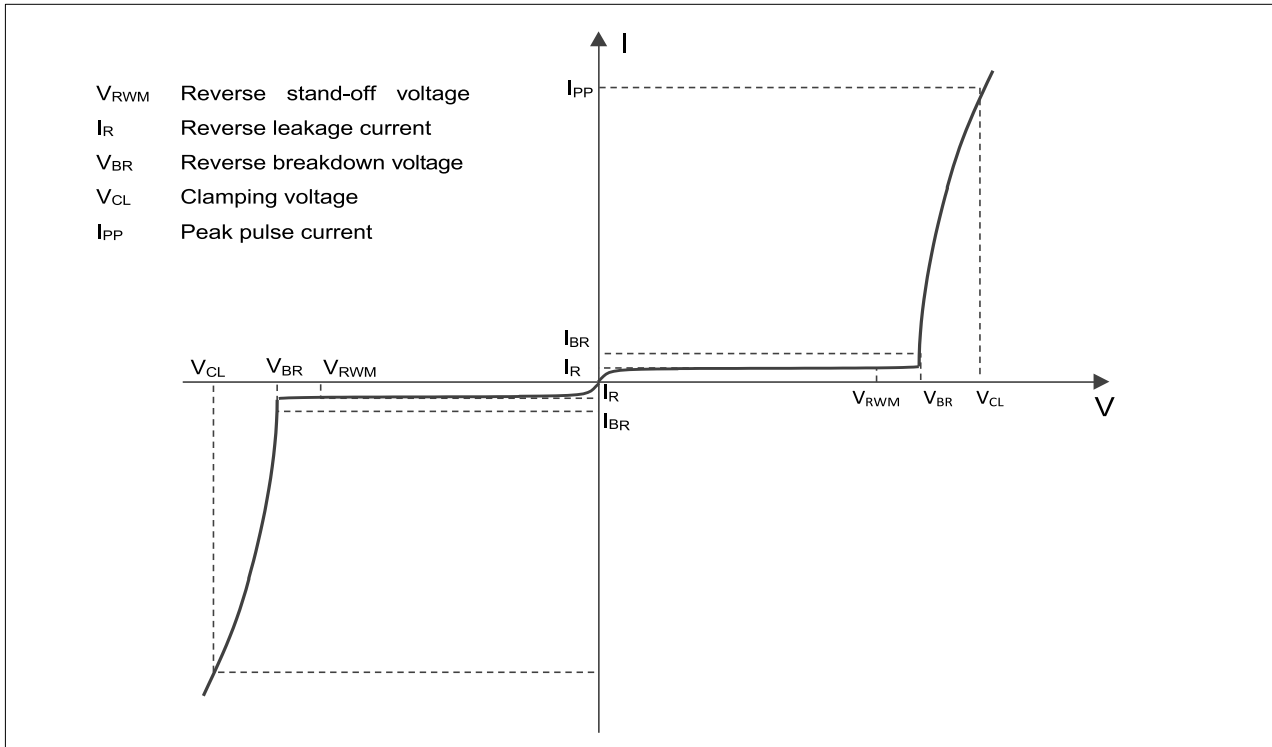
Notes:

1) TLP parameter: Z<sub>0</sub> = 50Ω, t<sub>p</sub> = 100ns, t<sub>r</sub> = 2ns, averaging window from 60ns to 80ns. R<sub>DYN</sub> is calculated from 4A to 16A.

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

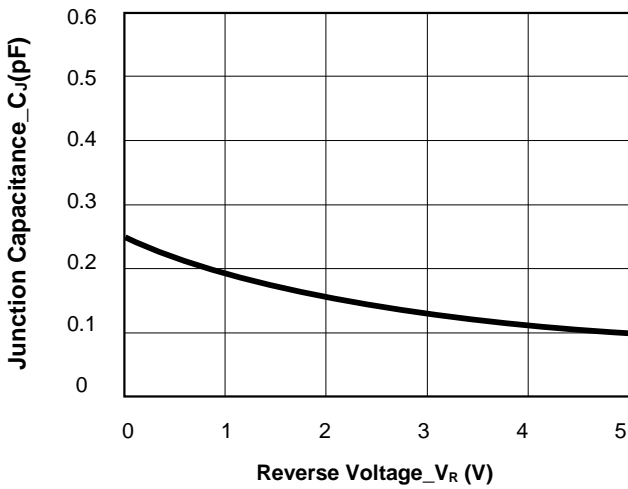
3) Non-repetitive current pulse, according to IEC61000-4-5.

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

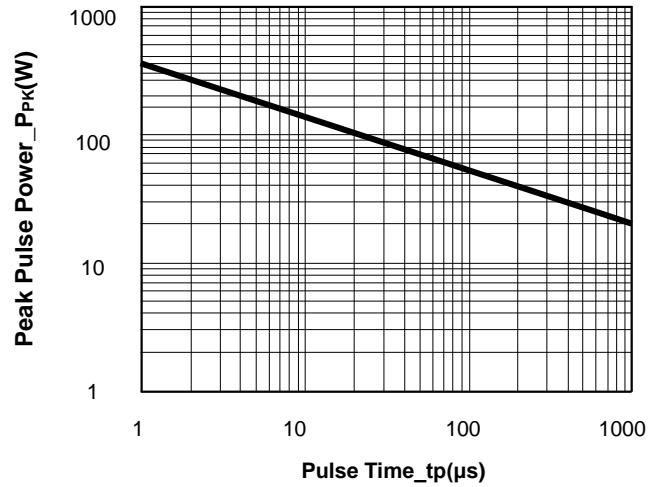


Definitions of electrical characteristics

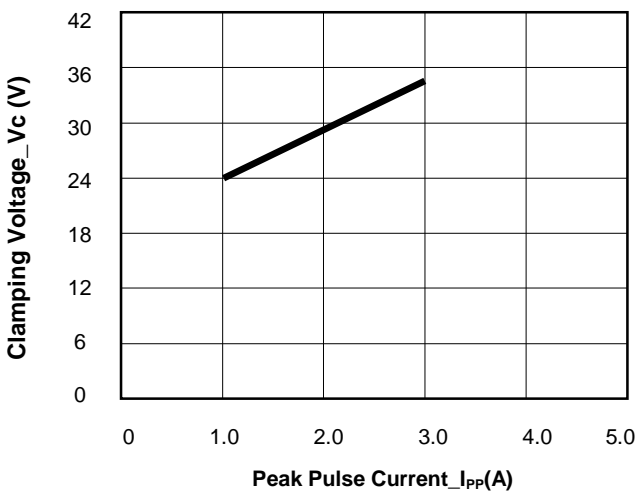
**Typical Performance Characteristics (TA=25°C unless otherwise Specified)**



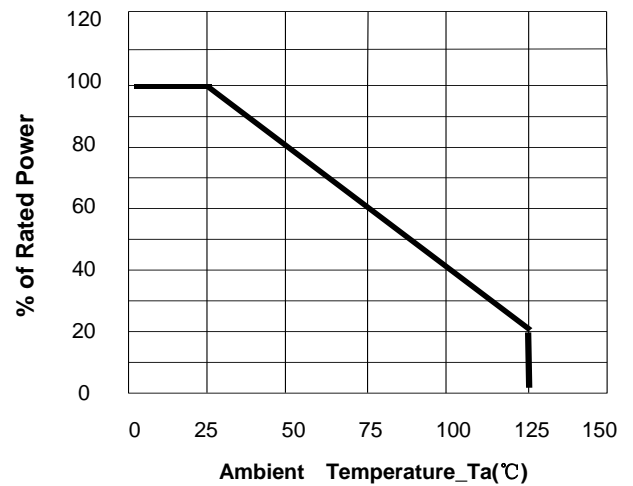
**Junction Capacitance vs. Reverse Voltage**



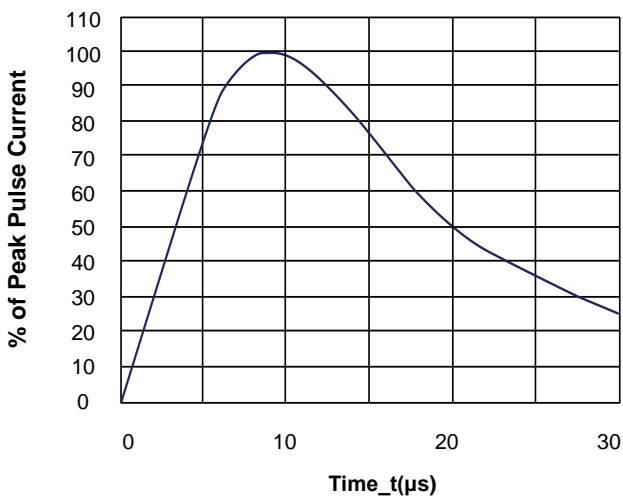
**Peak Pulse Power vs. Pulse Time**



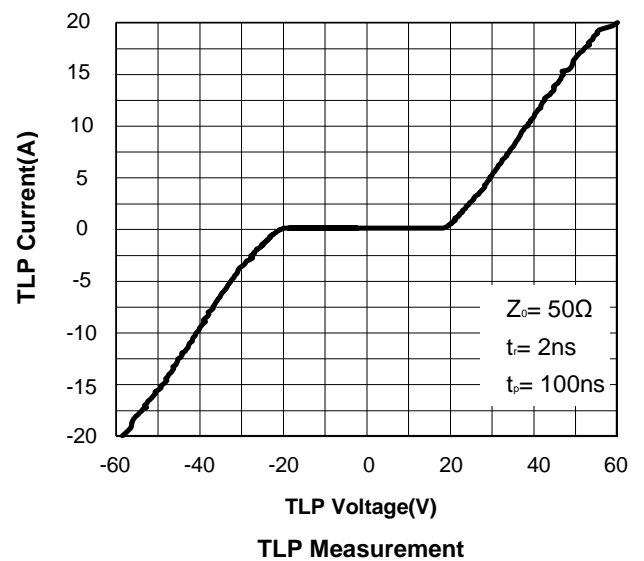
**Clamping Voltage vs. Peak Pulse Current**



**Power Derating Curve**

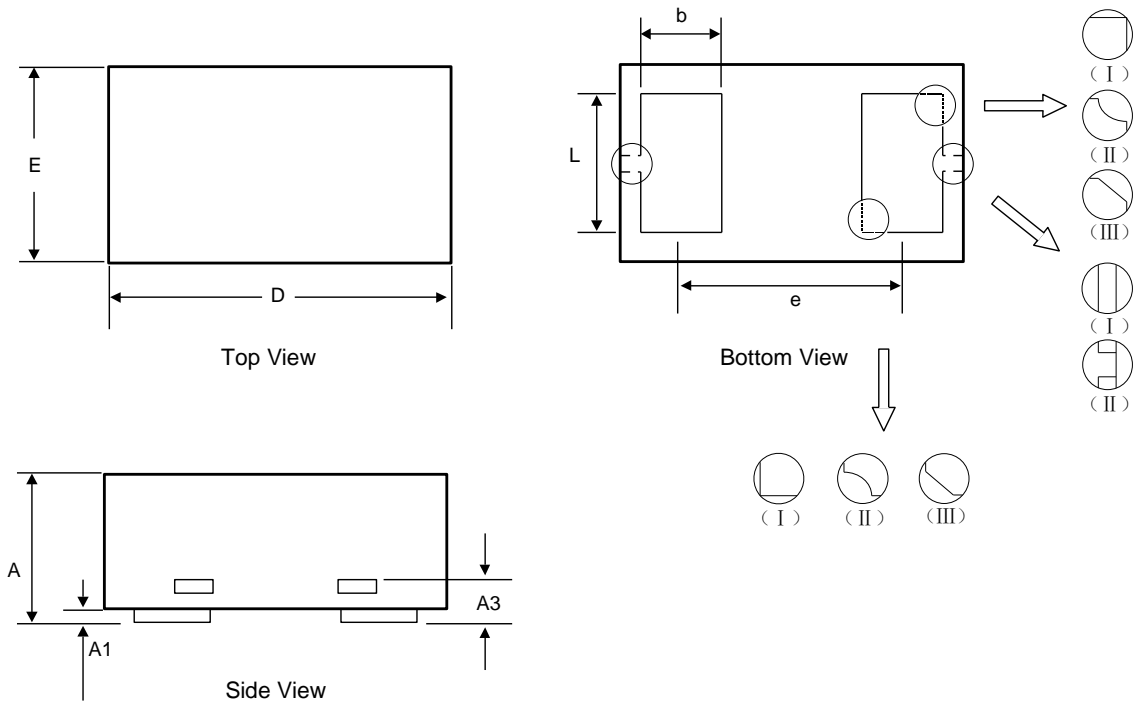


**8/20μs Pulse Waveform**



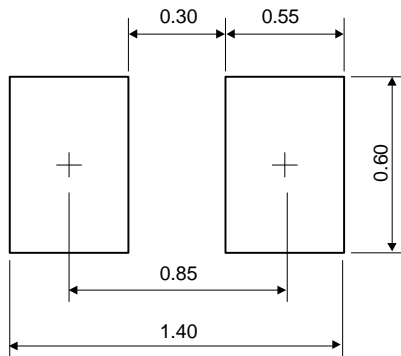
**TLP Measurement**

**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)**

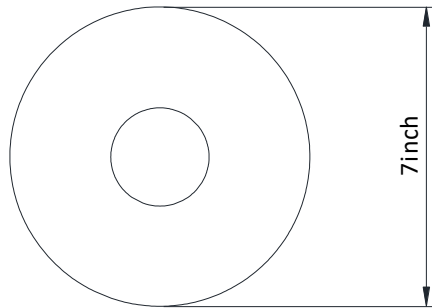


**Notes:**

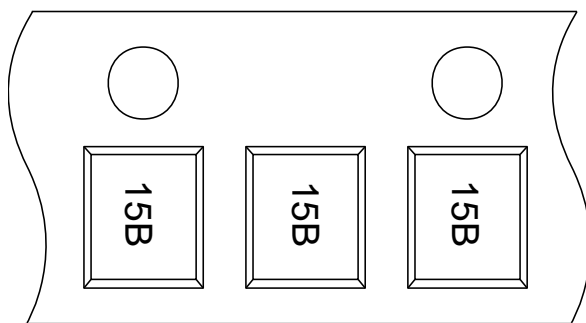
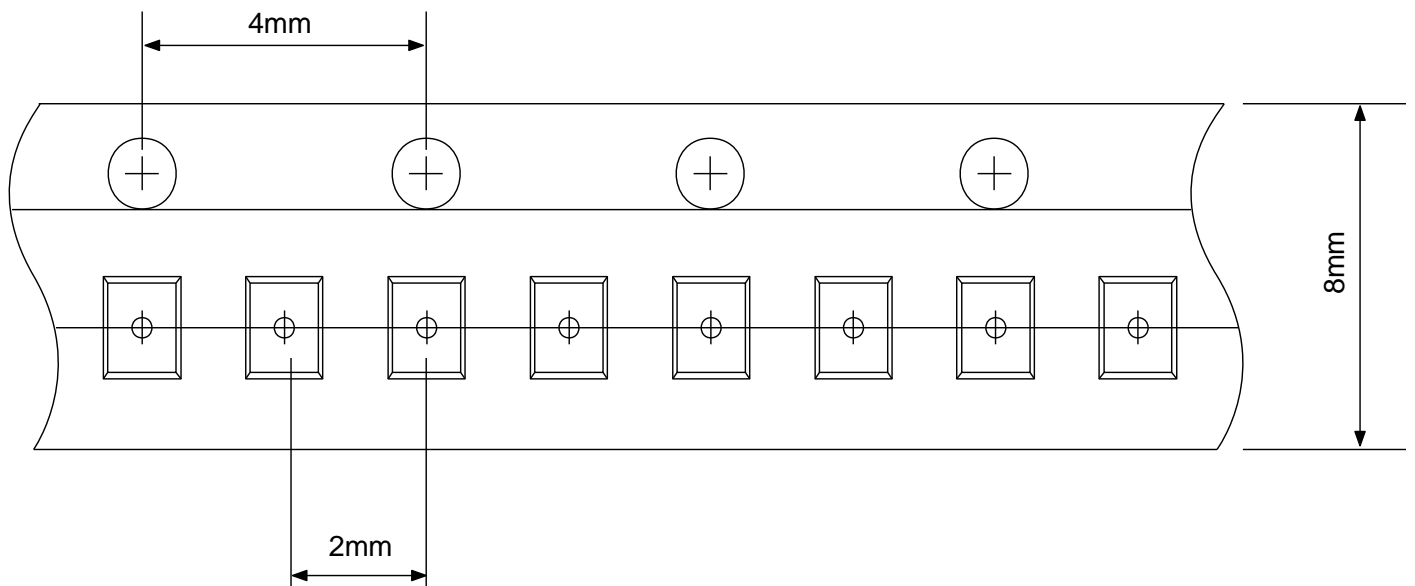
This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met.

**TAPE AND REEL INFORMATION**

Reel Dimensions



Tape Dimensions



User Direction of Feed

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