

1-Line Ultra Low Capacitance Bi-directional TVS Diode

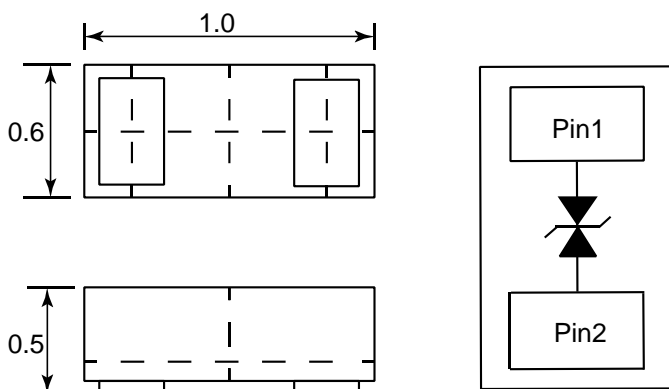
Description

The PESDR05101P1A 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 PESDR05101P1A has an ultra-low capacitance with a typical value at 0.25pF, and complies with the IEC61000-4-2 (ESD) standard with $\pm 30\text{kV}$ air and $\pm 30\text{kV}$ contact discharge. It is assembled into an ultra-small 1.0x0.6x 0.5mm lead-free DFN package. The small size, ultra-low capacitance and high surge protection make PESDR05101P1A 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: 5 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) 5.5A (8/20 μs)
- RoHS Compliant

Dimensions and Pin Configuration



Package Dimensions

Circuit and Pin Schematic

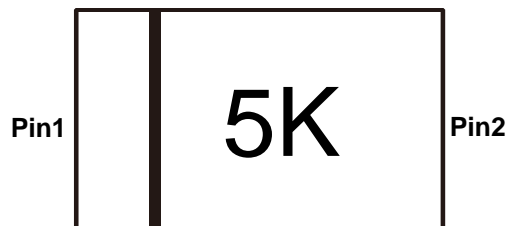
Mechanical Characteristics

- 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



5K = Device Marking Code

Ordering Information

Part Number	Shipping	Reel Size
PESDR05101P1A	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 μs)	P_{PK}	55	W
Peak Pulse Current (8/20 μs)	I_{PP}	5.5	A
ESD per IEC 61000-4-2 (Air)	V_{ESD}	± 30	kV
ESD per IEC 61000-4-2 (Contact)		± 30	
Lead temperature	T_L	260	$^{\circ}\text{C}$
Junction Temperature	T_J	125	$^{\circ}\text{C}$
Operating Temperature Range	T_{OP}	-40 ~ +125	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +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		10	V	$I_T = 1\text{mA}$
Reverse Leakage Current	I_R			0.2	μA	$V_{RWM} = 5\text{V}$
Holding Voltage	V_H	5.2			V	$I_H = 50\text{mA}$
Clamping voltage ¹⁾	V_{CL}		9		V	$I_{PP} = 16\text{A}$, $t_p = 100\text{ns}$
Dynamic resistance ¹⁾	R_{DYN}		0.22		Ω	
Clamping Voltage ²⁾	V_C		9		V	$V_{ESD} = 8\text{kV}$
Clamping Voltage ³⁾	V_C			7.5	V	$I_{PP} = 1\text{A}$ (8/20 μs pulse)
Clamping Voltage ³⁾	V_C			10	V	$I_{PP} = 5.5\text{A}$ (8/20 μs pulse)
Junction Capacitance	C_J		0.25	0.45	pF	$V_R = 0\text{V}$, $f = 1\text{MHz}$

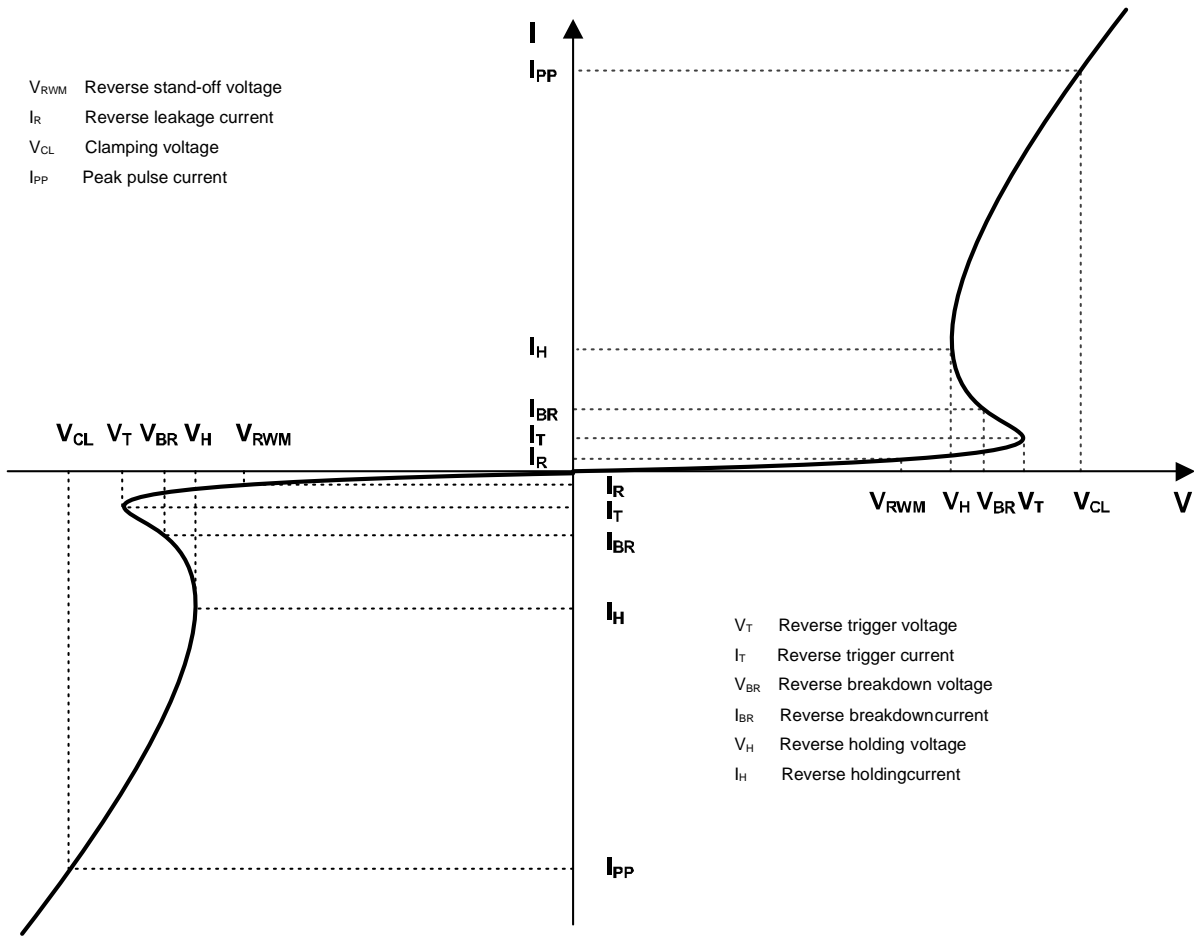
Notes:

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.

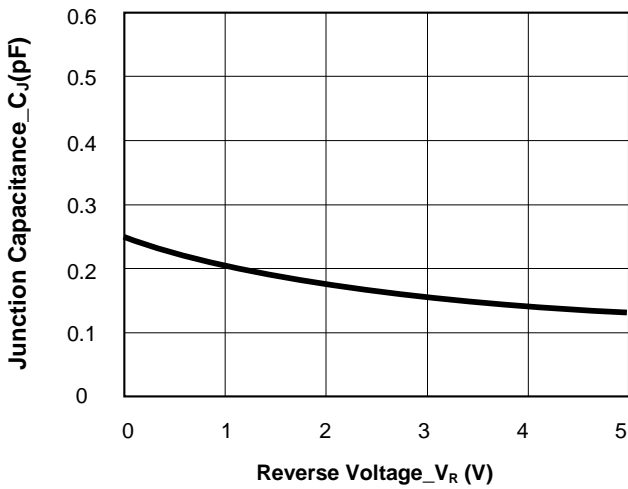
3) Non-repetitive current pulse, according to IEC61000-4-5.

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

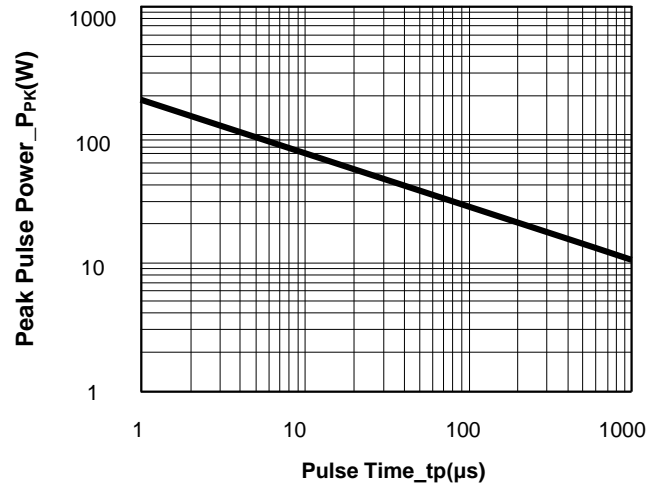


Definitions of electrical characteristics

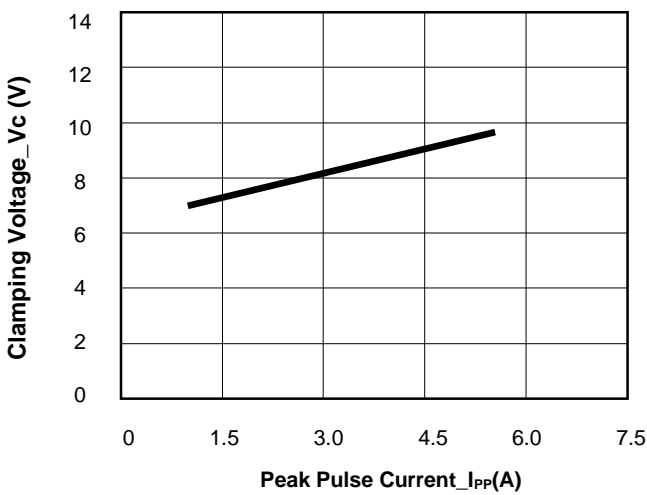
Typical Performance Characteristics (TA=25°C unless otherwise Specified)



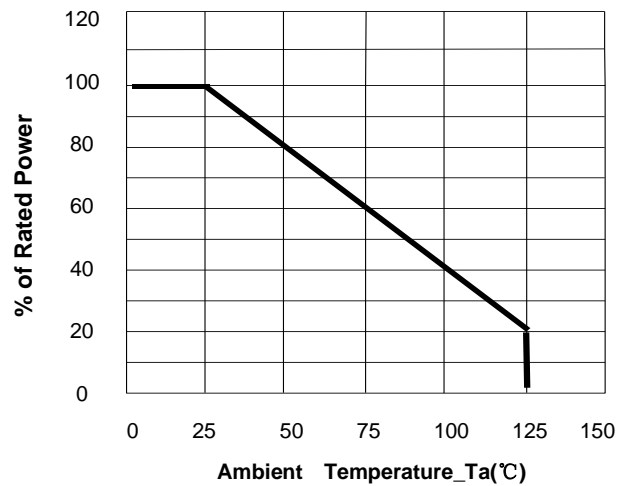
Junction Capacitance vs. Reverse Voltage



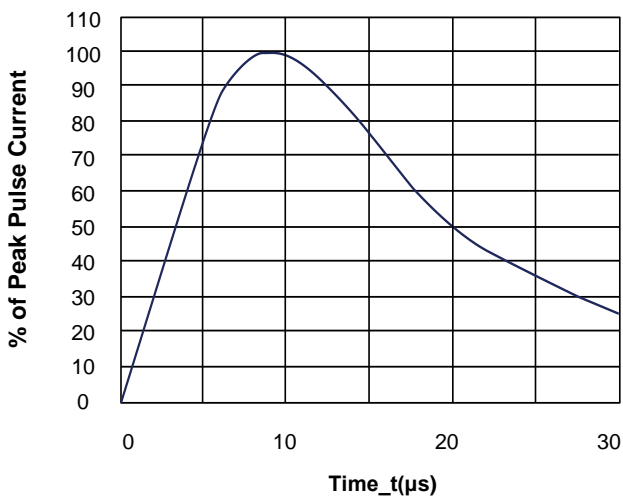
Peak Pulse Power vs. Pulse Time



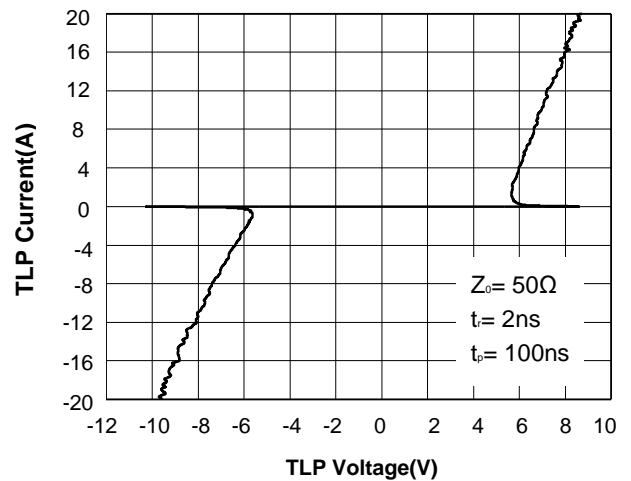
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve

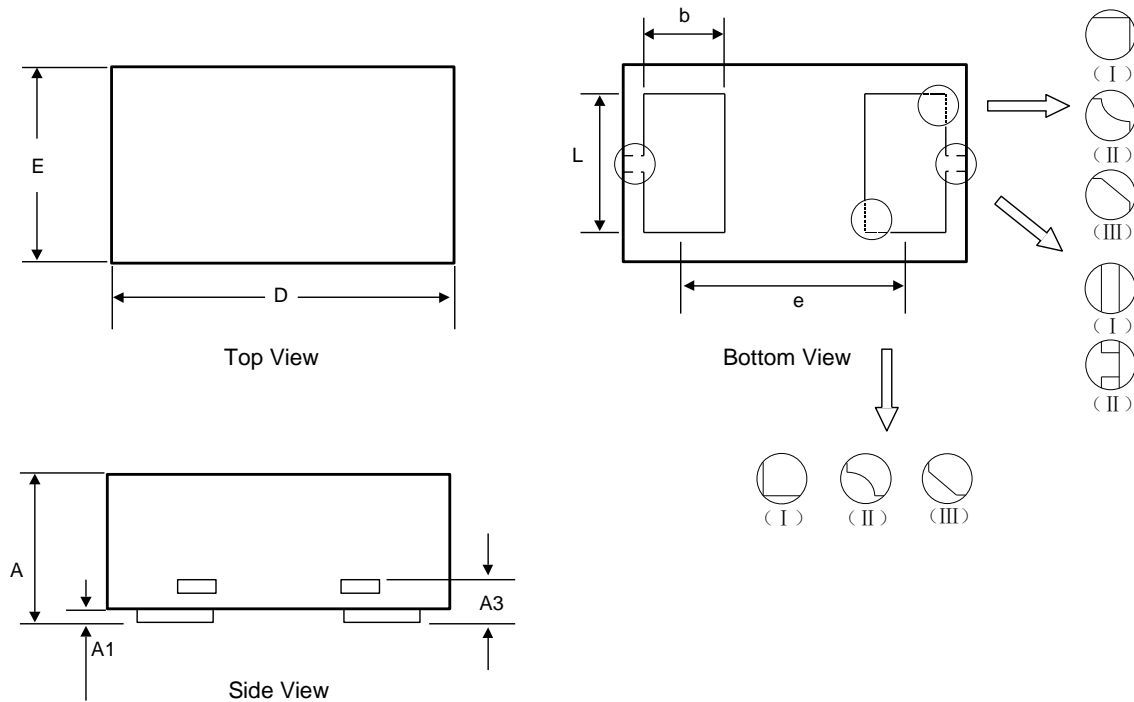


8/20μs Pulse Waveform



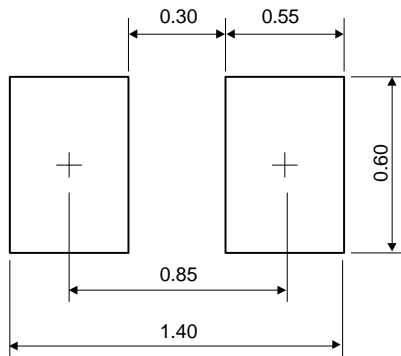
TLP Measurement

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.

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