

## 1-Line Uni-directional TVS Diode

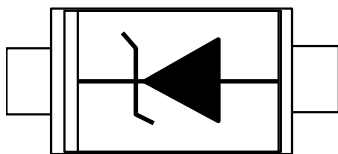
### Description

The PESDUxx71D3 is an uni-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 PESDUxx71D3 complies with the IEC 61000-4-22 (ESD) standard with  $\pm 30kV$  air and  $\pm 30kV$  contact discharge. It is assembled into an ultra-small 1.6x1.0x0.5mm lead free DFN package. The small size and high ESD protection make PESDUxx71D3 an ideal choice to protect cellphone, phone, digital cameras, audios, audio players and many other portable applications

### Features

- Small SOD-323 package
- Protects one data or power line
- Working Voltage: 3.3V, 5V, 7V, 12V, 15V, 18V, 24V, 36V
- High peak pulse current capability
- Ultra low clamping voltage
- 2-pin leadless package
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test  
Air discharge:  $\pm 30kV$   
Contact discharge:  $\pm 30kV$
  - IEC61000-4-4 (EFT) 80A (5/50ns)
  - IEC61000-4-5 (Lightning) 20A - 90A (8/20 $\mu s$ )
- RoHS Compliant

### Dimensions and Pin Configuration



**SOD-323 (Top View)**

Circuit Schematic

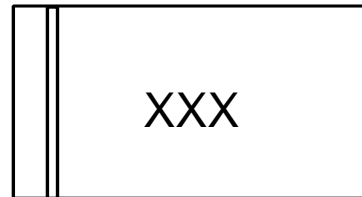
### Mechanical Characteristics

- Package: SOD-323
- Lead Finish: NiPdAu
- Case Material: "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Marking Information: See Below

### Applications

- Mobile Phones and Accessories
- Battery Protection
- USB VBus
- Power Line Protection
- Hand Held Portable Applications

### Marking Information



XXX= Device Marking Code

### Ordering Information

Part Number	Marking	Shipping	Reel Size
PESDU0371D3	73D	3000/Tape & Reel	7 inch
PESDU0571D3	91D	3000/Tape & Reel	7 inch
PESDU0771D3	77D	3000/Tape & Reel	7 inch
PESDU1271D3	72D	3000/Tape & Reel	7 inch
PESDU1571D3	75D	3000/Tape & Reel	7 inch
PESDU1871D3	78D	3000/Tape & Reel	7 inch
PESDU2471D3	74D	3000/Tape & Reel	7 inch
PESDU3671D3	79D	3000/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 $\mu\text{s}$ )	$P_{PK}$	1200-2800	W
ESD per IEC 61000-4-2 (Air)	$V_{ESD}$	$\pm 30$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 30$	
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)**

PESDU0371D3						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	$V_{RWM}$			3.3	V	
Breakdown Voltage	$V_{BR}$	3.5			V	$I_T = 1\text{mA}$
Reverse Leakage Current	$I_R$			1.0	$\mu\text{A}$	$V_{RWM} = 3.3\text{V}$
Forward Voltage	$V_F$		1.0	1.2	V	$I_F = 10\text{mA}$
Peak Pulse Current	$I_{PP}$			90	A	$t_p = 8/20\mu\text{s}$
Clamping Voltage	$V_C$			5.5	V	$I_{PP} = 10\text{A}$ (8/20 $\mu\text{s}$ pulse)
Clamping Voltage	$V_C$			13	V	$I_{PP} = 90\text{A}$ (8/20 $\mu\text{s}$ pulse)
Junction Capacitance	$C_J$			750	pF	$V_R = 0\text{V}$ , $f = 1\text{MHz}$

PESDU0571D3						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	$V_{RWM}$			5	V	
Breakdown Voltage	$V_{BR}$	6			V	$I_T = 1\text{mA}$
Reverse Leakage Current	$I_R$			1.0	$\mu\text{A}$	$V_{RWM} = 5\text{V}$
Forward Voltage	$V_F$		1.0	1.2	V	$I_F = 10\text{mA}$
Peak Pulse Current	$I_{PP}$			120	A	$t_p = 8/20\mu\text{s}$
Clamping Voltage	$V_C$			9.5	V	$I_{PP} = 20\text{A}$ (8/20 $\mu\text{s}$ pulse)
Clamping Voltage	$V_C$			15	V	$I_{PP} = 120\text{A}$ (8/20 $\mu\text{s}$ pulse)
Junction Capacitance	$C_J$		450		pF	$V_R = 0\text{V}$ , $f = 1\text{MHz}$

<b>PESDU0771D3</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	V <sub>RWM</sub>			7	V	
Breakdown Voltage	V <sub>BR</sub>	8			V	I <sub>T</sub> = 1mA
Reverse Leakage Current	I <sub>R</sub>			1	μA	V <sub>RWM</sub> = 7V
Forward Voltage	V <sub>F</sub>		1.0	1.2	V	I <sub>F</sub> = 10mA
Peak Pulse Current	I <sub>PP</sub>			120	A	t <sub>p</sub> = 8/20μs
Clamping Voltage	V <sub>C</sub>			11	V	I <sub>PP</sub> = 20A (8/20μs pulse)
Clamping Voltage	V <sub>C</sub>			20	V	I <sub>PP</sub> = 120A (8/20μs pulse)
Junction Capacitance	C <sub>J</sub>			550	pF	V <sub>R</sub> = 0V, f = 1MHz

<b>PESDU1271D3</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	V <sub>RWM</sub>			12	V	
Breakdown Voltage	V <sub>BR</sub>	13.3		17.8	V	I <sub>T</sub> = 1mA
Reverse Leakage Current	I <sub>R</sub>			0.2	μA	V <sub>RWM</sub> = 12V
Forward Voltage	V <sub>F</sub>			1.2	V	I <sub>F</sub> = 10mA
Peak Pulse Current	I <sub>PP</sub>			75	A	t <sub>p</sub> = 8/20μs
Clamping Voltage	V <sub>C</sub>			18	V	I <sub>PP</sub> = 10A (8/20μs pulse)
Clamping Voltage	V <sub>C</sub>			25	V	I <sub>PP</sub> = 75A (8/20μs pulse)
Junction Capacitance	C <sub>J</sub>			300	pF	V <sub>R</sub> = 0V, f = 1MHz

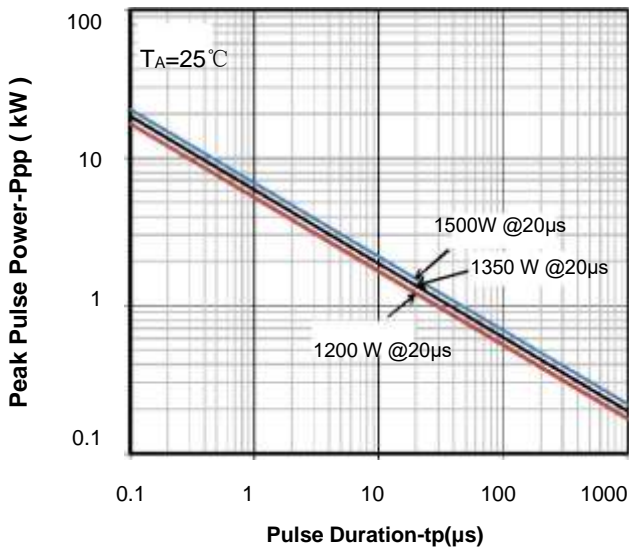
<b>PESDU1571D3</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	V <sub>RWM</sub>			15	V	
Breakdown Voltage	V <sub>BR</sub>	16.5			V	I <sub>T</sub> = 1mA
Reverse Leakage Current	I <sub>R</sub>			1	μA	V <sub>RWM</sub> = 15V
Peak Pulse Current	I <sub>PP</sub>			60	A	t <sub>p</sub> = 8/20μs
Clamping Voltage	V <sub>C</sub>			20	V	I <sub>PP</sub> = 20A (8/20μs pulse)
Clamping Voltage	V <sub>C</sub>			33	V	I <sub>PP</sub> = 60A (8/20μs pulse)
Junction Capacitance	C <sub>J</sub>			450	pF	V <sub>R</sub> = 0V, f = 1MHz

<b>PESDU1871D3</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	VRWM			18	V	
Breakdown Voltage	VBR	19.6			V	IT = 1mA
Reverse Leakage Current	IR			0.1	μA	VRWM = 18V
Forward Voltage	VF		1.0	1.2	V	IF = 10mA
Peak Pulse Current	IPP			46	A	tp = 8/20μs
Clamping Voltage	VC			26	V	IPP = 10A (8/20μs pulse)
Clamping Voltage	VC			35	V	IPP = 46A (8/20μs pulse)
Junction Capacitance	CJ			350	pF	VR = 0V, f = 1MHz

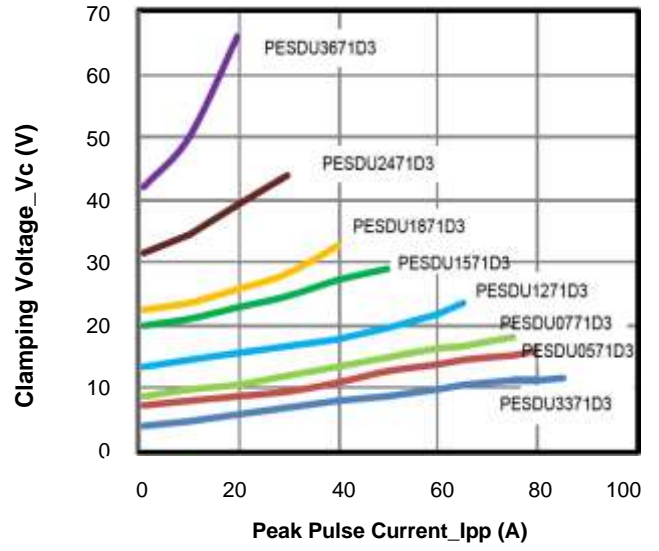
<b>PESDU2471D3</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	VRWM			24	V	
Breakdown Voltage	VBR	26.7			V	IT = 1mA
Reverse Leakage Current	IR			0.1	μA	VRWM = 24V
Forward Voltage	VF			1.2	V	IF = 10mA
Peak Pulse Current	IPP			30	A	tp = 8/20μs
Clamping Voltage	VC			42	V	IPP = 10A (8/20μs pulse)
Clamping Voltage	VC			55	V	IPP = 30A (8/20μs pulse)
Junction Capacitance	CJ			200	pF	VR = 0V, f = 1MHz

<b>PESDU3671D3</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	VRWM			36	V	
Breakdown Voltage	VBR	37			V	IT = 1mA
Reverse Leakage Current	IR			0.1	μA	VRWM = 36V
Forward Voltage	VF			1.2	V	IF = 10mA
Peak Pulse Current	IPP			20	A	tp = 8/20μs
Clamping Voltage	VC			60	V	IPP = 10A (8/20μs pulse)
Clamping Voltage	VC			80	V	IPP = 20A (8/20μs pulse)
Junction Capacitance	CJ			150	pF	VR = 0V, f = 1MHz

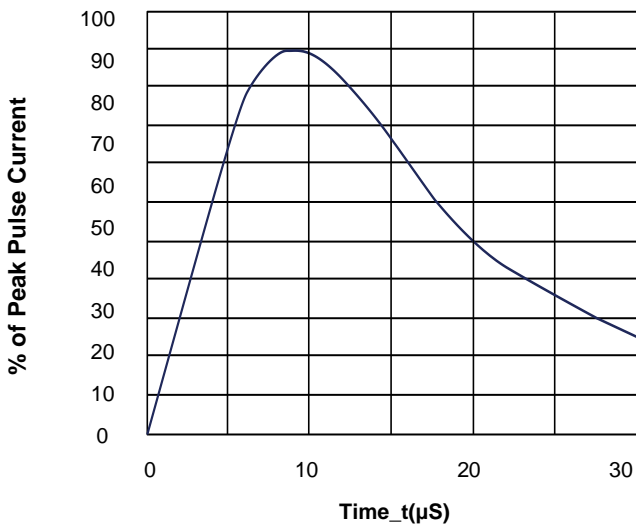
**Typical Performance Characteristics (T<sub>A</sub>=25°C unless otherwise Specified)**



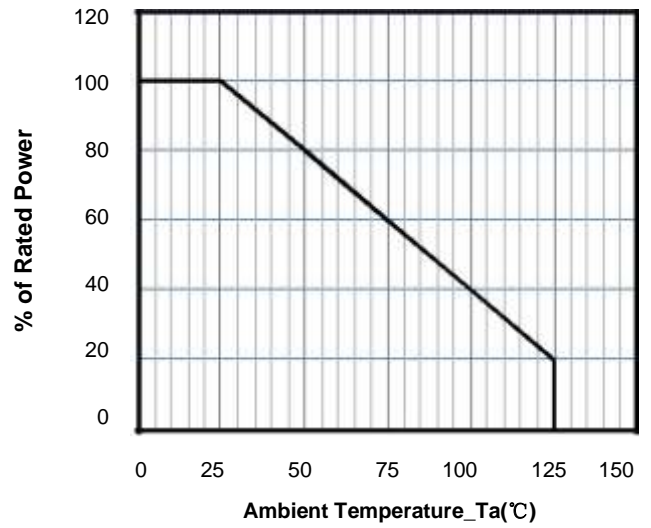
**Peak Pulse Power vs. Pulse Time**



**Clamping Voltage vs. Peak Pulse Current**

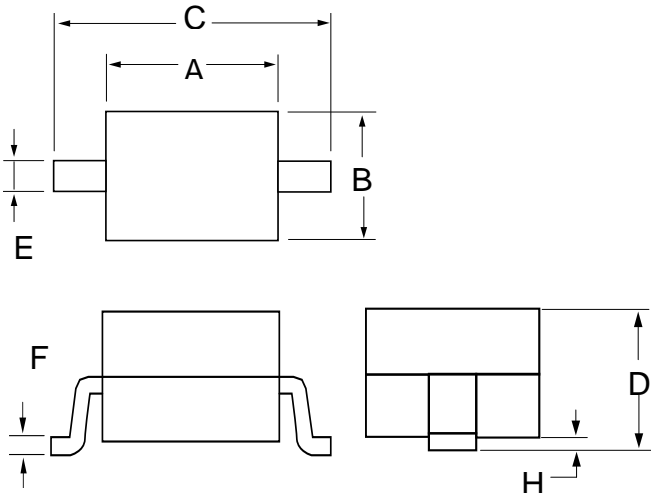


**8/0uS Pulse Waveform**



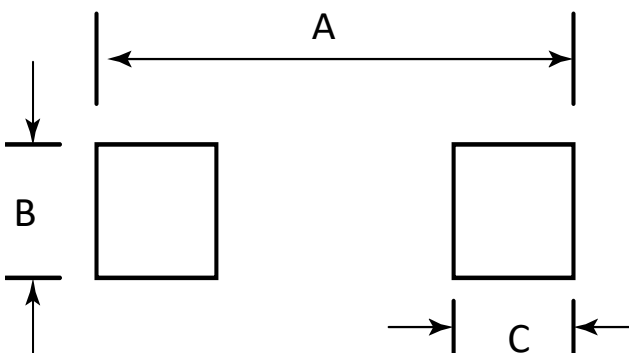
**Power Derating Curve**

**SOD-323 Package Outline Drawing**



SYM	DIMENSIONS				
	MILLIMETERS			INCHES	
	MIN	Nom	MAX	MIN	MAX
A	1.50	1.65	1.80	0.060	0.071
B	1.20	1.30	1.40	0.045	0.054
C	2.30	2.50	2.70	0.090	0.107
D	-		1.10	-	0.043
E	0.30		0.40	0.012	0.016
F	0.10		0.25	0.004	0.010
H	-		0.10	-	0.004

**Suggested Land Pattern**



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
A	3.15	0.120
B	0.80	0.031
C	0.80	0.031