

PROTECTION PRODUCTS

Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 8/20μs)	P _{pk}	90	Watts
Maximum Peak Pulse Current (tp = 8/20μs)	I _{pp}	5	Amps
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V _{pp}	+/- 25 +/- 20	kV
Operating Temperature	T _j	-40 to +85	°C
Storage Temperature	T _{STG}	-55 to +150	°C

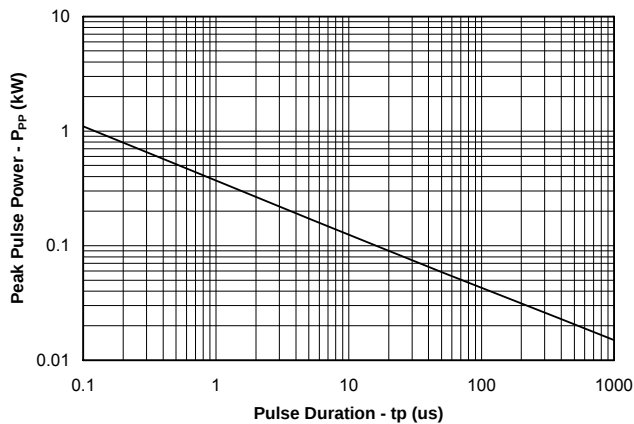
Electrical Characteristics (T=25°C)

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V _{RWM}				3.3	V
Punch-Through Voltage	V _{PT}	I _{PT} = 2μA	3.5			V
Snap-Back Voltage	V _{SB}	I _{SB} = 50mA	2.8			V
Reverse Leakage Current	I _R	V _{RWM} = 3.3V		0.05	0.5	μA
Clamping Voltage	V _C	I _{pp} = 1A, tp = 8/20μs			8	V
Clamping Voltage	V _C	I _{pp} = 5A, tp = 8/20μs			18	V
Junction Capacitance	C _j	I/O pin to Gnd V _R = 0V, f = 1MHz		12	15	pF
		I/O pin to Gnd V _R = 3.3V, f = 1MHz		10		pF

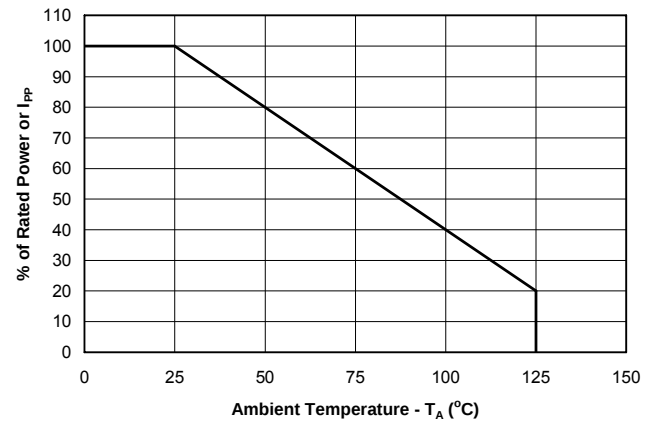
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Typical Characteristics

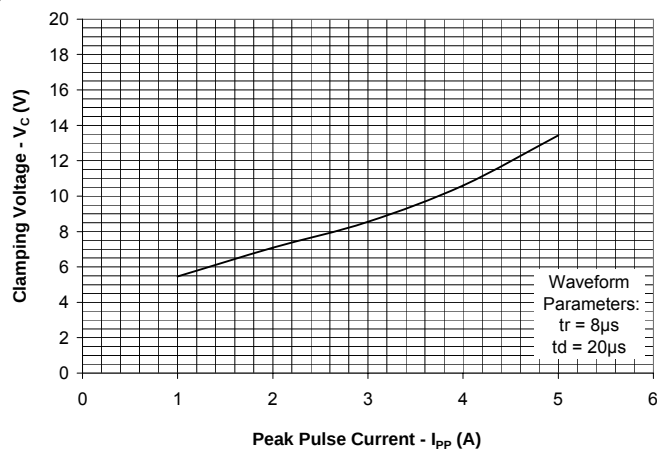
Non-Repetitive Peak Pulse Power vs. Pulse Time



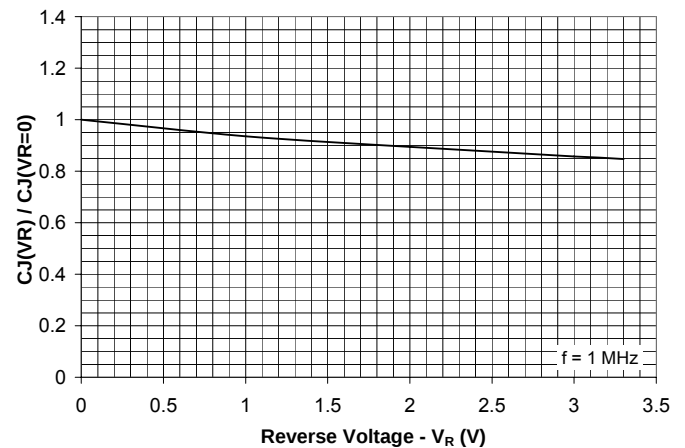
Power Derating Curve



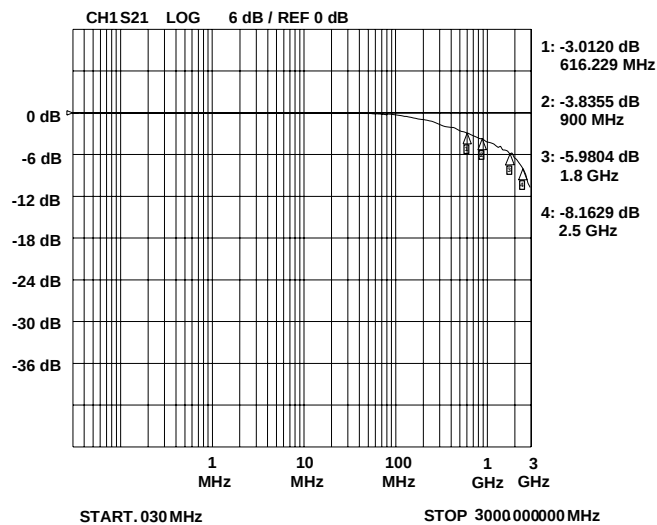
Clamping Voltage vs. Peak Pulse Current



Junction Capacitance vs. Reverse Voltage



Insertion Loss S21



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Applications Information

Device Connection Options

The μ Clamp3311P is designed to protect one data line operating up to 3.3 volts. It will present a high impedance to the protected line up to 3.3 volts. It will “turn on” when the line voltage exceeds 3.5 volts. The device is bidirectional and may be used on lines where the signal polarity is above and below ground. These devices are not recommended for use on dc power supply lines due to their snap-back voltage characteristic.

EPD TVS Characteristics

These devices are constructed using Semtech’s proprietary EPD technology. The structure of the EPD TVS is vastly different from the traditional pn-junction devices. At voltages below 5V, high leakage current and junction capacitance render conventional avalanche technology impractical for most applications. However, by utilizing the EPD technology, these devices can effectively operate at 3.3V while maintaining excellent electrical characteristics.

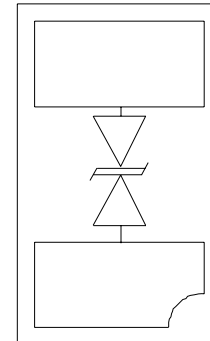
The EPD TVS employs a complex npnp structure in contrast to the pn structure normally found in traditional silicon-avalanche TVS diodes. The EPD mechanism is achieved by engineering the center region of the device such that the reverse biased junction does not avalanche, but will “punch-through” to a conducting state. This structure results in a device with superior DC electrical parameters at low voltages while maintaining the capability to absorb high transient currents.

Circuit Board Layout Recommendations for Suppression of ESD.

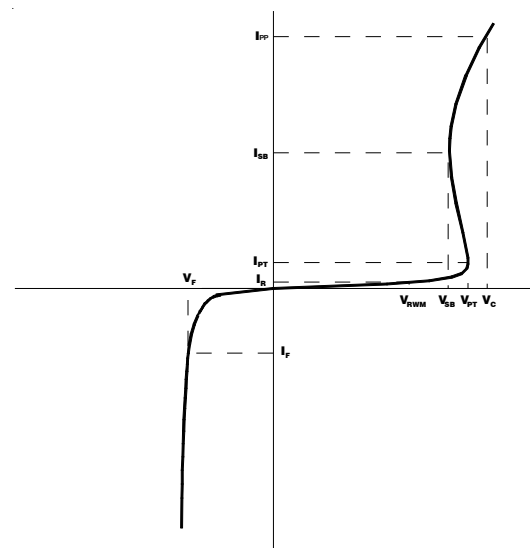
Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

- Place the TVS near the input terminals or connectors to restrict transient coupling.
- Minimize the path length between the TVS and the protected line.
- Minimize all conductive loops including power and ground loops.
- The ESD transient return path to ground should be kept as short as possible.
- Never run critical signals near board edges.
- Use ground planes whenever possible.

Device Schematic & Pin Configuration



EPD TVS IV Characteristic Curve



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Applications Information - Spice Model

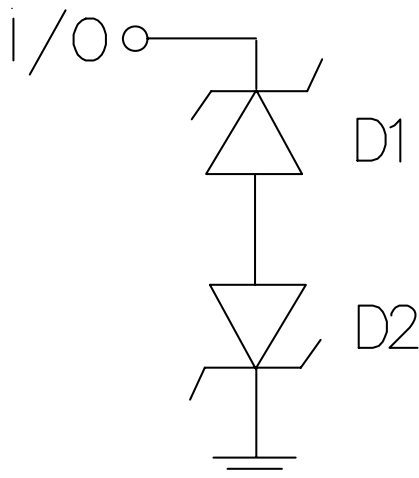
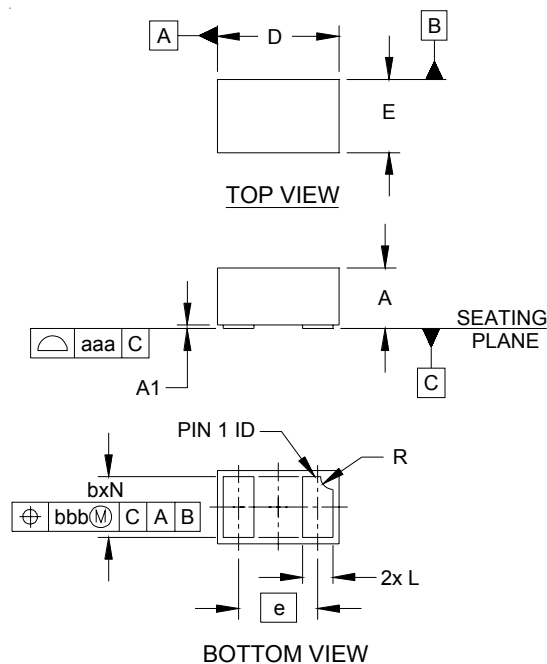


Figure 1 - uClamp3311P Spice Model

Table 1 - uClamp3311P Spice Parameters			
Parameter	Unit	D1 (TVS)	D2 (TVS)
IS	Amp	1E-20	1E-20
BV	Volt	3.8	3.8
VJ	Volt	0.7	0.7
RS	Ohm	1.1	1.1
IBV	Amp	1E-3	1E-3
CJO	Farad	20E-12	20E-12
TT	sec	2.541E-9	2.541E-9
M	--	0.214	0.214
N	--	1.1	1.1
EG	eV	1.11	1.11

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Outline Drawing - SLP1006P2

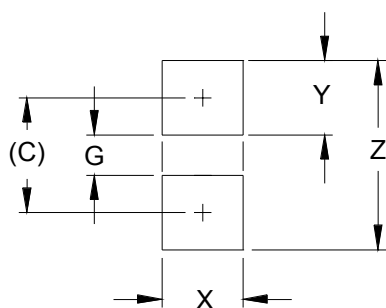


DIM	DIMENSIONS					
	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.016	.020	.022	0.40	0.50	0.55
A1	.000	.001	.002	0.00	0.03	0.05
b	.018	.020	.022	0.45	0.50	0.55
D	.035	.039	.043	0.90	1.00	1.10
E	.020	.024	.028	0.50	0.60	0.70
e	.026 BSC			0.65 BSC		
L	.008	.010	.012	0.20	0.25	0.30
R	.002	.004	.006	0.05	0.10	0.15
N	2			2		
aaa	.003			0.08		
bbb	.004			0.10		

NOTES:

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).

Land Pattern - SLP1006P2



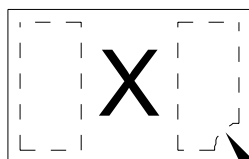
DIM	DIMENSIONS	
	INCHES	MILLIMETERS
C	(.033)	(0.85)
G	.012	0.30
X	.024	0.60
Y	.022	0.55
Z	.055	1.40

NOTES:

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY.
CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR
COMPANY'S MANUFACTURING GUIDELINES ARE MET.

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Marking Code



PIN 1 ID

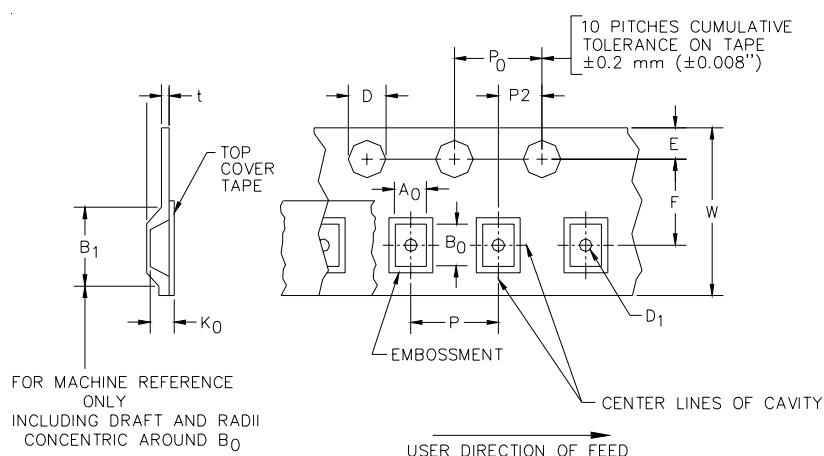
Ordering Information

Part Number	Working Voltage	Qty per Reel	Reel Size
uClamp3311P.TCT	3.3V	3,000	7 Inch

Notes:

1) This is a lead-free, RoHS/WEEE compliant product
MicroClamp, uClamp and μ Clamp are marks of Semtech Corporation

Tape and Reel Specification



A0	B0	K0
0.69 +/-0.10 mm	1.19 +/-0.10 mm	0.66 +/-0.10 mm

Tape Width	B, (Max)	D	D1	E	F	P	P0	P2	T	W
8 mm	4.2 mm (.165)	1.5 + 0.1 mm - 0.0 mm (0.59 +.005 - .000)	0.4 mm ±0.25 (.031)	1.750±.10 mm (.069±.004)	3.5±0.05 mm (.138±.002)	4.0±0.10 mm (.157±.004)	4.0±0.1 mm (.157±.004)	2.0±0.05 mm (.079±.002)	0.254±0.02 mm (.016)	8.0 mm + 0.3 mm - 0.1 mm (.312±.012)

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