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uClamp0511P μClamp® 1-Line ESD protection

PROTECTION PRODUCTS - MicroClamp®

Description

The uClamp® series of TVS arrays are designed to protect sensitive electronics from damage or latch-up due to ESD. They are designed to replace multilayer varistors (MLVs) in portable applications. They feature large cross-sectional area junctions for conducting high transient currents and offer superior electrical characteristics such as lower clamping voltage and no device degradation when compared to MLVs. They offer desirable characteristics for board level protection including fast response time, low operating and clamping voltage, and no device degradation.

The μClamp®0511P is in a 2-pin, SLP1006P2 package. It measures 1.0 x 0.6 x 0.5mm. The leads are spaced at a pitch of 0.65mm and are finished with lead-free NiPdAu. Each device will protect one bidirectional line operating at ±5 volts. It gives the designer the flexibility to protect single lines in applications where arrays are not practical. They may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (±15kV air, ±8kV contact discharge). The combination of small size and high ESD surge capability makes them ideal for use in portable applications such as cellular phones, digital cameras, and MP3 players.

Features

- ◆ Transient protection for data lines to **IEC 61000-4-2 (ESD) ±15kV (air), ±8kV (contact) IEC 61000-4-4 (EFT) 40A (tp = 5/50ns) Cable Discharge Event (CDE)**
- ◆ Ultra-small package (1.0 x 0.6 x 0.5mm)
- ◆ Protects one I/O or power line
- ◆ Low clamping voltage
- ◆ Working voltage: 5V
- ◆ Low leakage current
- ◆ Solid-state silicon-avalanche technology

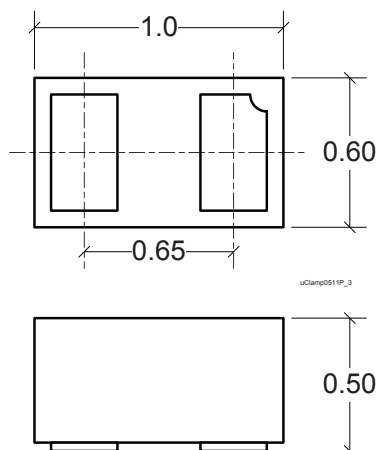
Mechanical Characteristics

- ◆ SLP1006P2 package
- ◆ Molding compound flammability rating: UL 94V-0
- ◆ Packaging : Tape and Reel
- ◆ Lead Finish: NiPdAu
- ◆ Pb-Free, Halogen Free, RoHS/WEEE Compliant

Applications

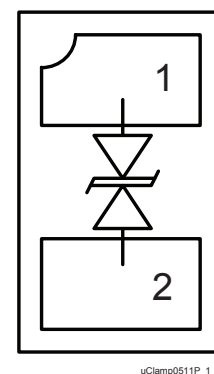
- ◆ Cellular Handsets & Accessories
- ◆ Cordless Phones
- ◆ Smart Phones
- ◆ Notebooks & Handhelds
- ◆ Portable Instrumentation
- ◆ Digital Cameras
- ◆ MP3 Players
- ◆ Automotive Applications

Package Dimensions



Nominal Dimensions (mm)

Schematic & Pin Configuration



SLP1006P2 (Bottom View)

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Absolute Maximum Ratings

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 8/20μs)	P_{pk}	170	Watts
Peak Pulse Current (tp = 8/20μs)	I_{pp}	12	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	+/- 15 +/- 8	kV
Operating Temperature	T_J	-40 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

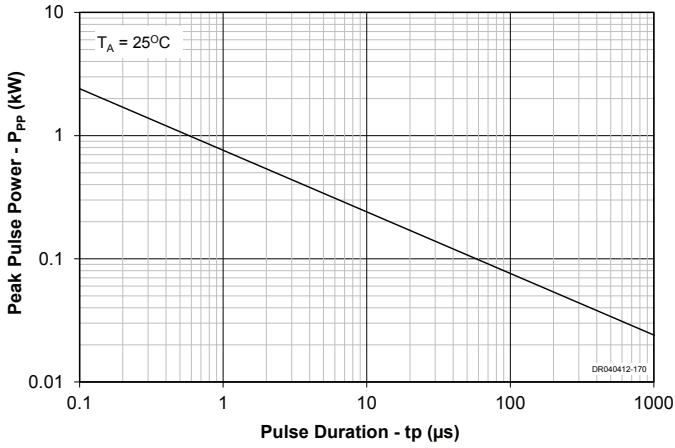
Electrical Characteristics (T=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}	Pin 1 to 2 or 2 to 1			5	V
Reverse Breakdown Voltage	V_{BR}	$I_t = 1mA$ Pin 1 to 2 or 2 to 1 $T = -40°C$ to $+125°C$	6	8	10	V
Reverse Leakage Current	I_R	$V_{RWM} = 5V$, Pin 1 to 2 or 2 to 1		0.025	1	μA
Clamping Voltage	V_C	$I_{pp} = 1A$, $t_p = 8/20μs$ Pin 1 to 2 or 2 to 1			11	V
Clamping Voltage	V_C	$I_{pp} = 12A$, $t_p = 8/20μs$ Pin 1 to 2 or 2 to 1			14	V
Junction Capacitance	C_j	$V_R = 0V$, $f = 1MHz$ Pin 1 to 2 or 2 to 1			75	pF

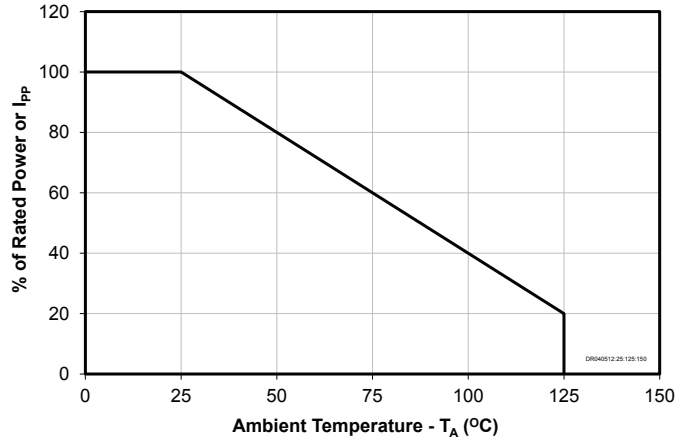
PROTECTION PRODUCTS

Typical Characteristics

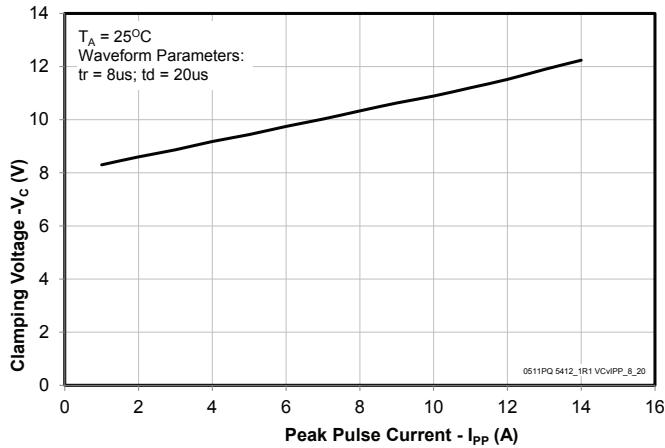
Non-Repetitive Peak Pulse Power vs. Pulse Time



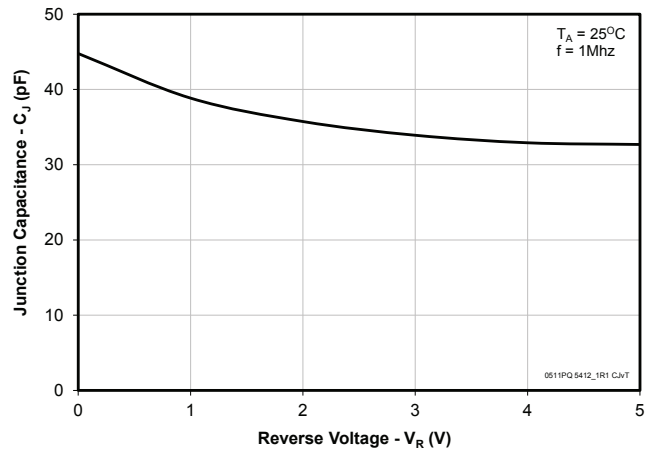
Power Derating Curve



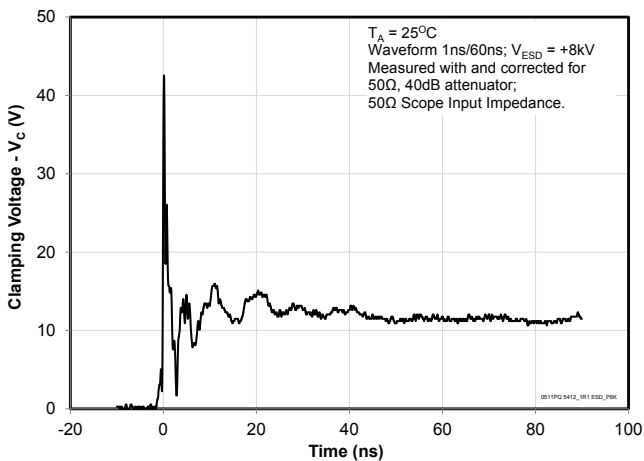
Clamping Voltage vs. Peak Pulse Current



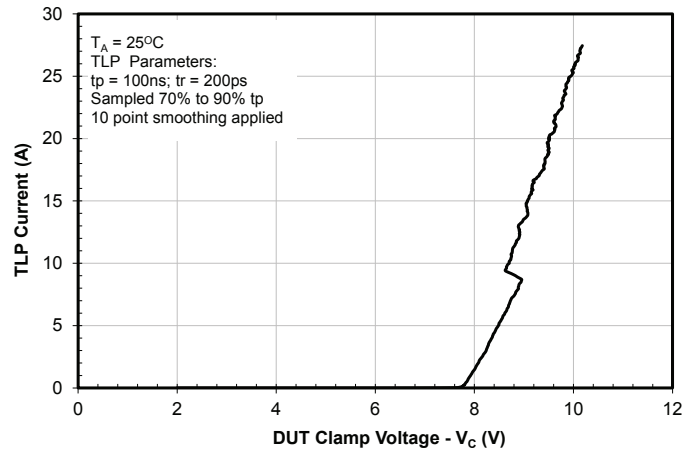
Capacitance vs. Reverse Voltage



ESD Clamping (8kV Contact per IEC 61000-4-2)



TLP Clamping Voltage vs. Current



Device Connection Options

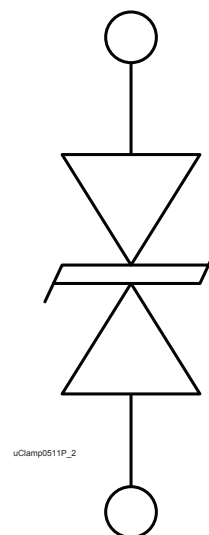
These TVS diodes are designed to protect one data, I/O, or power supply line. The device is bidirectional and may be used on lines where the signal polarity can go above and below ground.

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:

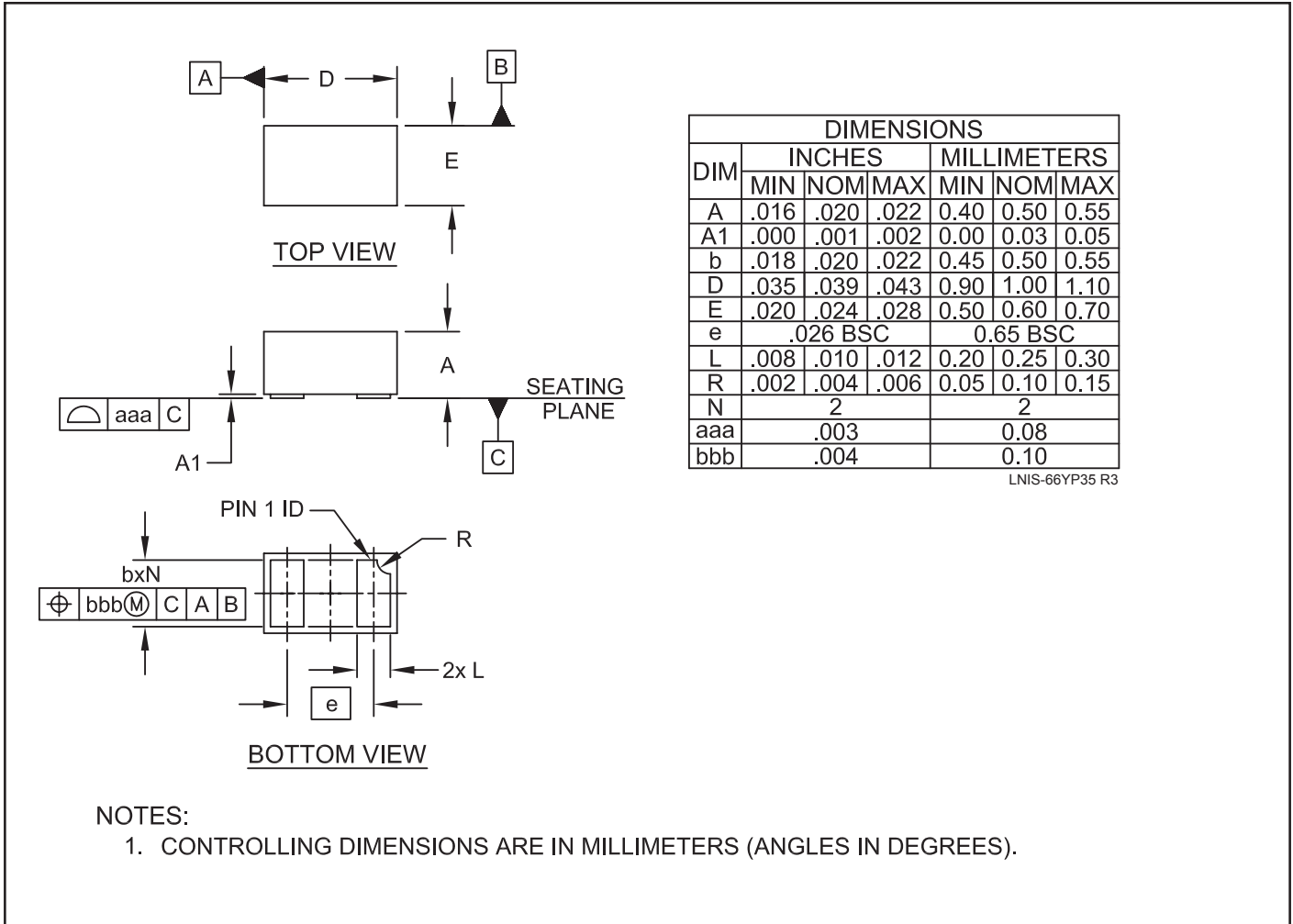
- Place the TVS near the input terminals or connectors to restrict transient coupling.
- Minimize the path length between the TVS and the protected line.
- Minimize all conductive loops including power and ground loops.
- The ESD transient return path to ground should be kept as short as possible.
-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

Equivalent Circuit Diagram

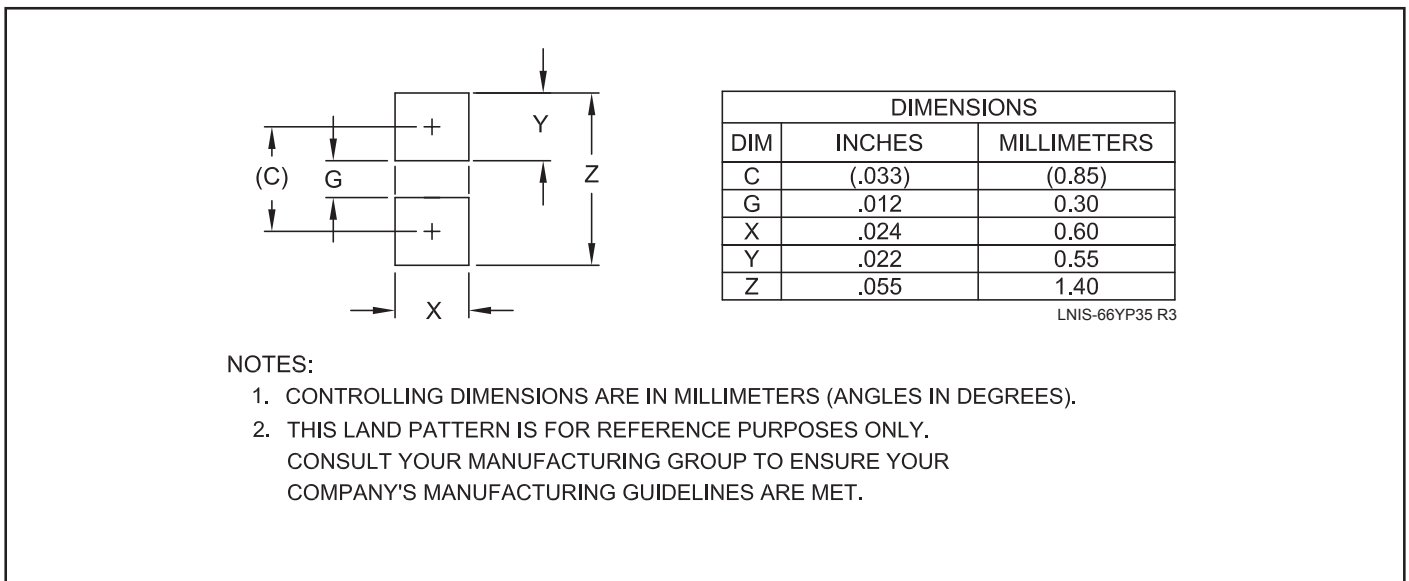


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Outline Drawing - SLP1006P2

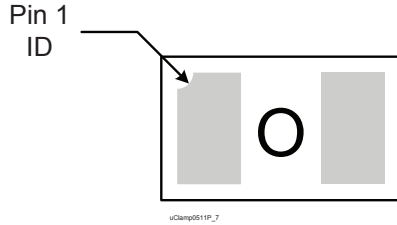


Land Pattern - SLP1006P2



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Marking



Ordering Information

Part Number	Qty per Reel	Reel Size
uClamp0511P.TCT	3,000	7 Inch
uClamp0511P.TNT	10,000	7 Inch

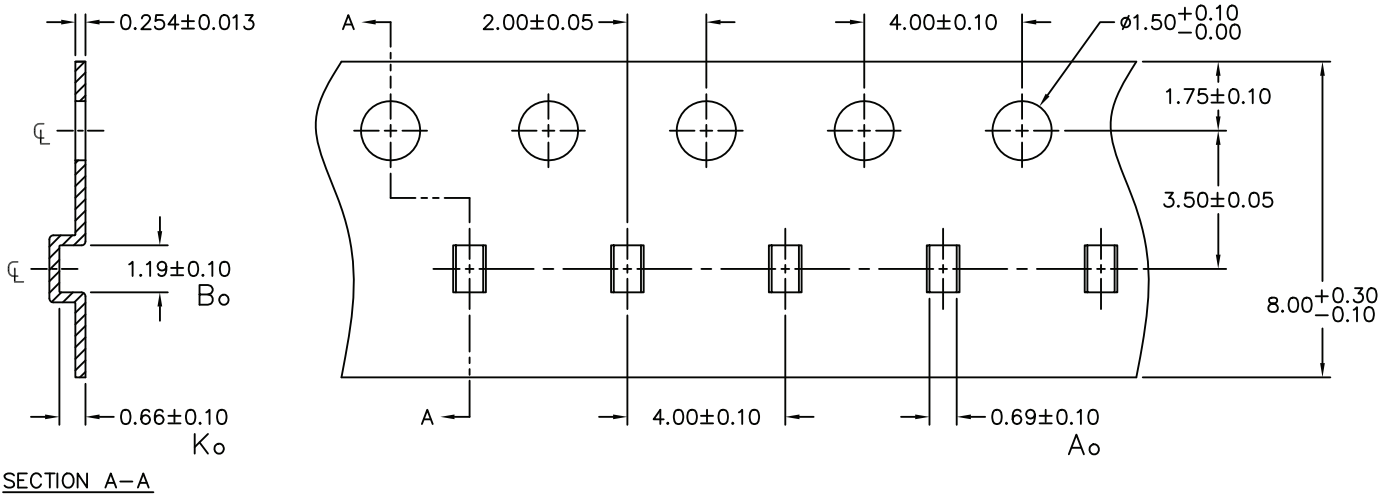
Notes:

1) Device is electrically symmetrical

Note: Lead finish is lead-free NiPdAu.

MicroClamp, uClamp and μ Clamp are marks of Semtech Corporation.

Tape and Reel Specification (4mm Pitch, 3,000 Piece Reel)



NOTES: 1.) ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

