

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

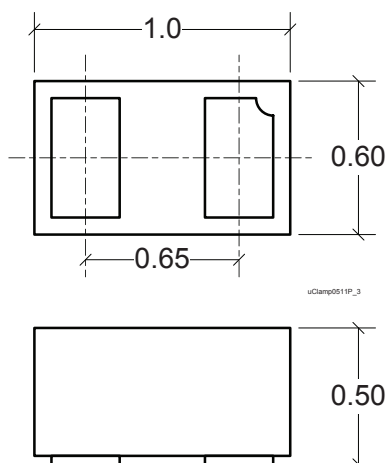
- ◆ Transient protection for data lines to **IEC 61000-4-2 (ESD) ±15kV (air), ±8kV (contact) IEC 61000-4-4 (EFT) 40A (tp = 5/50ns) Cable Discharge Event (CDE)**
- ◆ Ultra-small package (1.0 x 0.6 x 0.5mm)
- ◆ Protects one I/O or power line
- ◆ Low clamping voltage
- ◆ Working voltage: 5V
- ◆ Low leakage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

Mechanical Characteristics

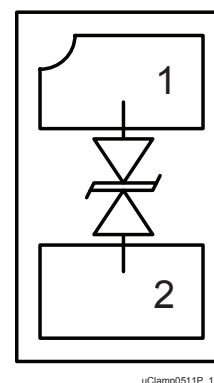
- ◆ SLP1006P2 package
- ◆ Molding compound flammability rating: UL 94V-0
- ◆ Packaging : Tape and Reel
- ◆ Lead Finish: NiPdAu
- ◆ Pb-Free, Halogen Free, RoHS/WEEE Compliant

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 ($t_p = 8/20\mu s$) | P_{pk} | 170 | Watts |
| Peak Pulse Current ($t_p = 8/20\mu s$) | 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 |

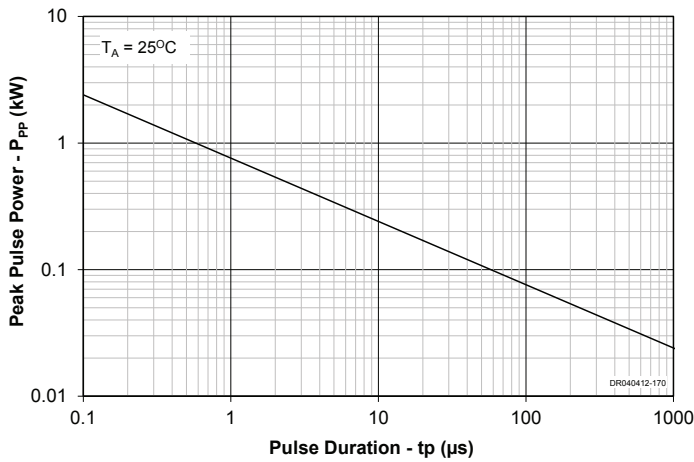
Electrical Characteristics (T=25°C unless otherwise specified)

| 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} | $I_L = 1mA$ Pin 1 to 2 or 2 to 1 $T = -40^\circ C$ to $+125^\circ C$ | 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 | $I_{pp} = 1A$, $t_p = 8/20\mu s$ Pin 1 to 2 or 2 to 1 | | | 11 | V |
| Clamping Voltage | V_C | $I_{pp} = 12A$, $t_p = 8/20\mu s$ 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 |

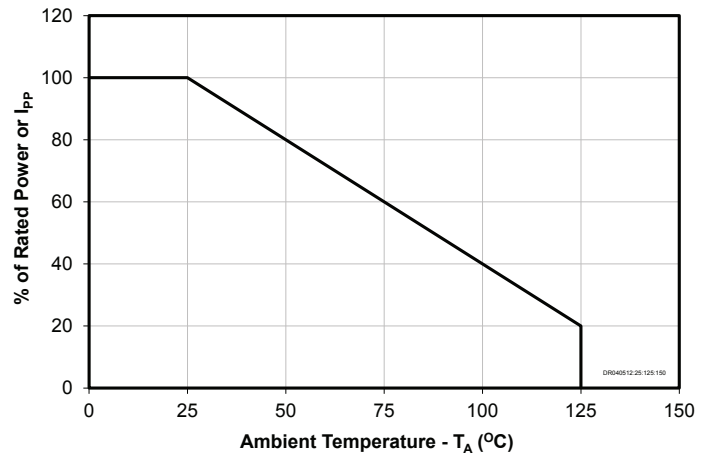
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Typical Characteristics

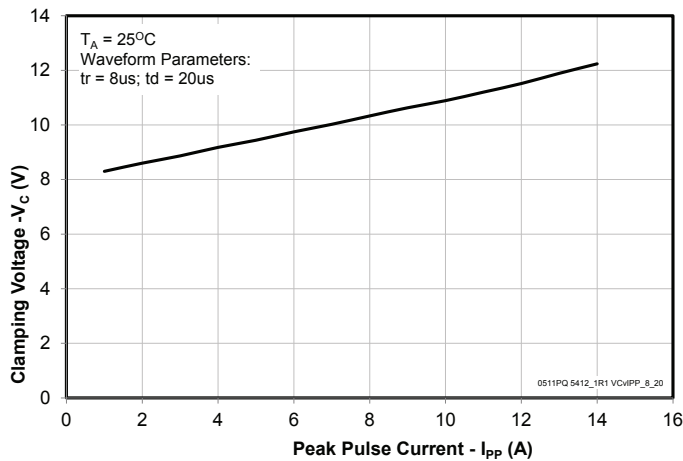
Non-Repetitive Peak Pulse Power vs. Pulse Time



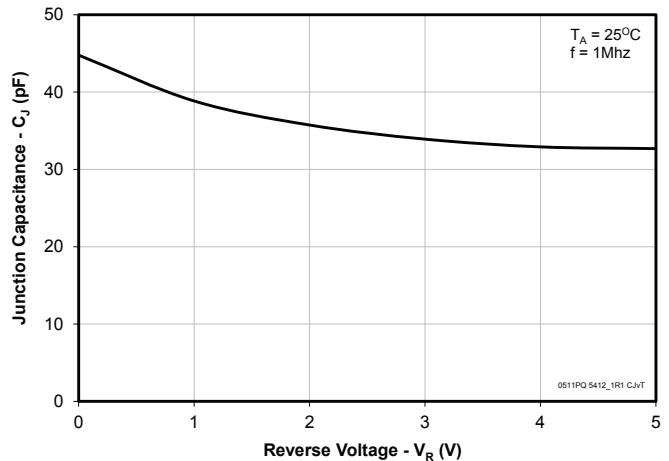
Power Derating Curve



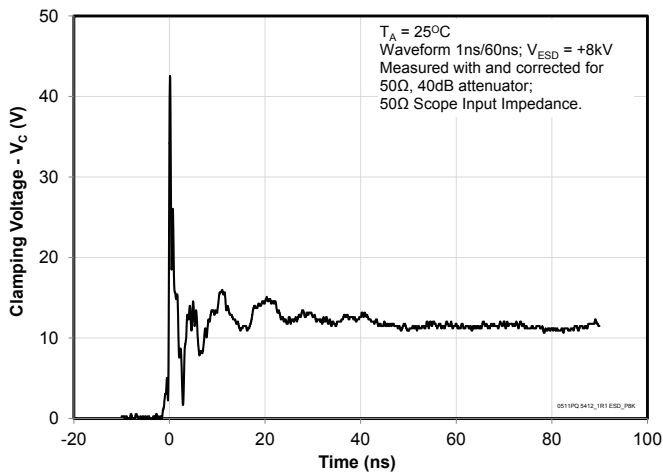
Clamping Voltage vs. Peak Pulse Current



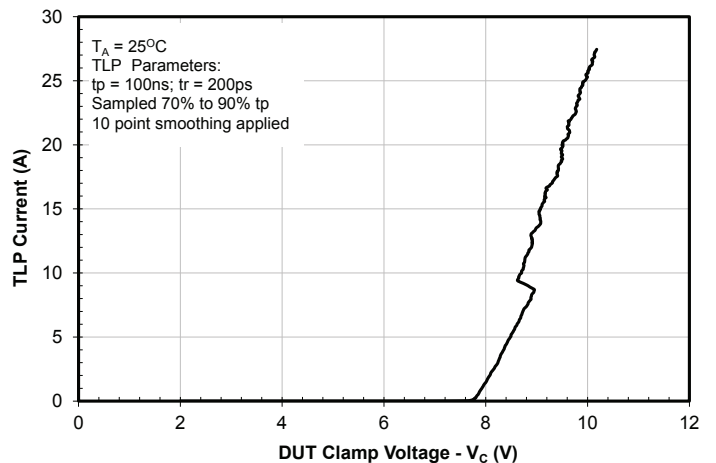
Capacitance vs. Reverse Voltage



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



TLP Clamping Voltage vs. Current



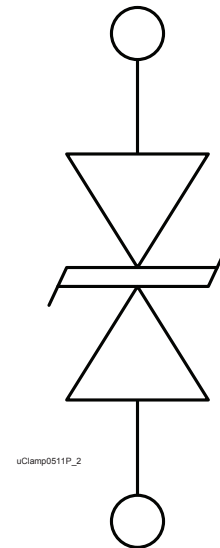
Device Connection Options

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.

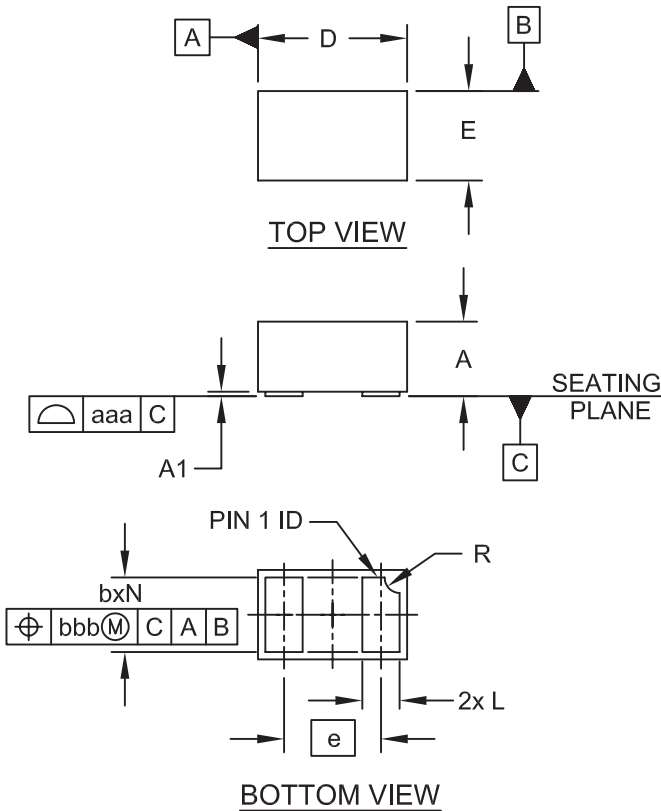
Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

- 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



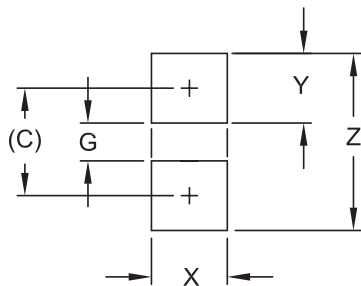
| DIM | DIMENSIONS | | | | | |
|-----|------------|------|------|-------------|------|------|
| | INCHES | | | MILLIMETERS | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | .016 | .020 | .022 | 0.40 | 0.50 | 0.55 |
| A1 | .000 | .001 | .002 | 0.00 | 0.03 | 0.05 |
| b | .018 | .020 | .022 | 0.45 | 0.50 | 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 | | |

LNIS-66YP35 R3

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 |

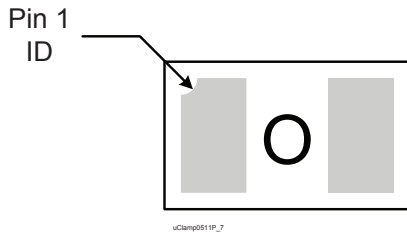
LNIS-66YP35 R3

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.

PROTECTION PRODUCTS

Marking



Ordering Information

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

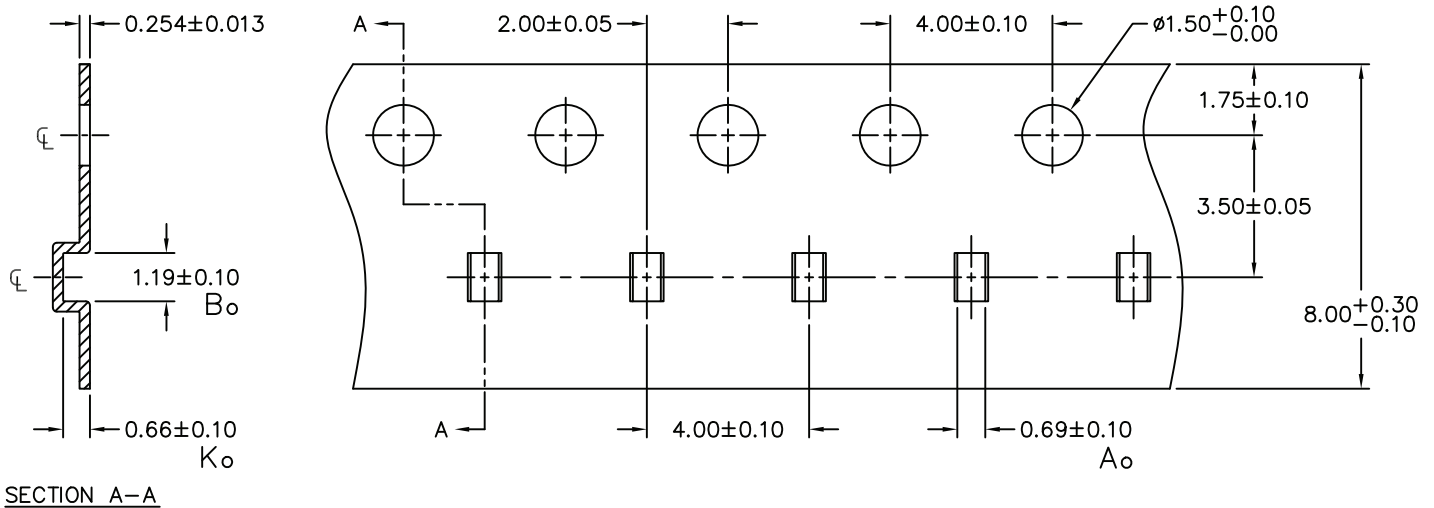
Notes:

1) Device is electrically symmetrical

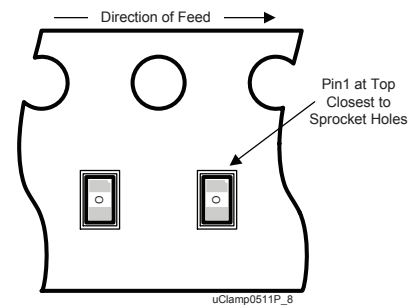
Note: Lead finish is lead-free NiPdAu.

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.



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