

Description

RClamp arrays are ultra low capacitance ESD protection devices designed to protect high speed data interfaces. This series has been specifically designed to protect sensitive components which are connected to high-speed data and transmission lines from overvoltage caused by ESD (electrostatic discharge), CDE (Cable Discharge Events), and EFT (electrical fast transients).

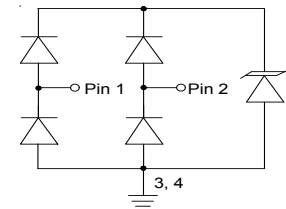
The RClamp0522P and RClamp0524P have a typical capacitance of only 0.30pF between I/O pins. This allows it to be used on circuits operating in excess of 3GHz without signal attenuation. They may be used to meet the ESD immunity requirements of IEC 61000-4-2. The RClamp0522P is designed to protect two lines, while the RClamp0524P will protect four lines. The RClamp0522P is in a 6-pin SLP1610P4 package. It measures 1.6 x 1.0 with a nominal height of 0.58mm. The RClamp0524PA is in a 10-pin SLP2510P8 package. It measures 2.5 x 1.0 with a nominal height of 0.58mm. The leads are spaced at a pitch of 0.5mm and are finished with lead-free NiPdAu. They are designed for easy PCB layout by allowing the traces to run straight through the device. The combination of small size, low capacitance, and high level of ESD protection makes them a flexible solution for applications such as HDMI, DisplayPort™, MDDI, and eSATA interfaces.

Features

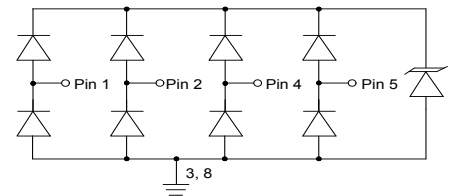
- ESD protection for high-speed data lines to
 - IEC 61000-4-2 (ESD) $\pm 17\text{kV}$ (air), $\pm 12\text{kV}$ (contact) IEC 61000-4-5 (Lightning) 5A (8/20 μs)
 - IEC 61000-4-4 (EFT) 40A (5/50ns)
- Package design optimized for high speed lines
- Flow-Through design
- Protects two or four I/O lines
- Low capacitance: 0.3pF typical (I/O to I/O)
- Low clamping voltage
- Low operating voltage: 5V
- Solid-state silicon-avalanche technology

Absolute Maximum Rating

| Rating | Symbol | Value | Units |
|--|-----------|------------------|--------------------|
| Peak Pulse Power ($t_p = 8/20\mu\text{s}$) | P_{pk} | 150 | W |
| Peak Pulse Current ($t_p = 8/20\mu\text{s}$) | I_{pp} | 5 | A |
| ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact) | V_{ESD} | +/- 17 +/- 12 | kV |
| Operating Temperature | T_J | -55 to +125 | $^{\circ}\text{C}$ |
| Storage Temperature | T_{STG} | -55 to +150 | $^{\circ}\text{C}$ |



2-Line Protection



4-Line Protection

Applications

- High Definition Multi-Media Interface (HDMI)
- Digital Visual Interface (DVI)
- DisplayPort™ Interface
- MDDI Ports
- PCI Express
- eSATA Interfaces

Mechanical Characteristics

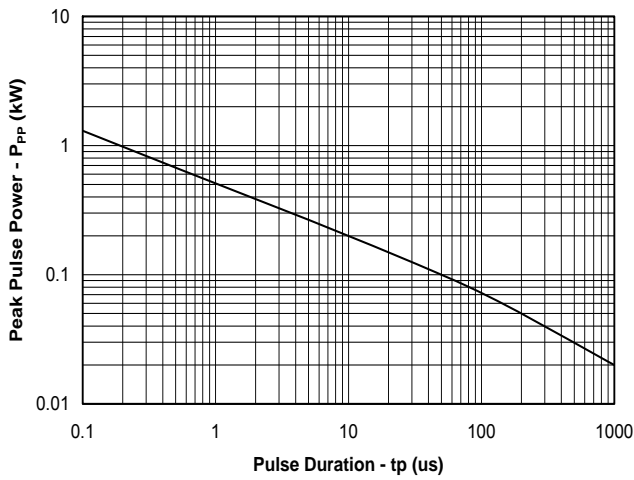
- SLP1610P4 6-pin package (1.6 x 1.0 x 0.58mm)
- SLP2510P8 10-pin package (2.5 x 1.0 x 0.58mm) Pb-Free, Halogen Free, RoHS/WEEE Compliant
- Lead Pitch: 0.5mm
- Lead finish: NiPdAu

Electrical Characteristics (T=25°C)

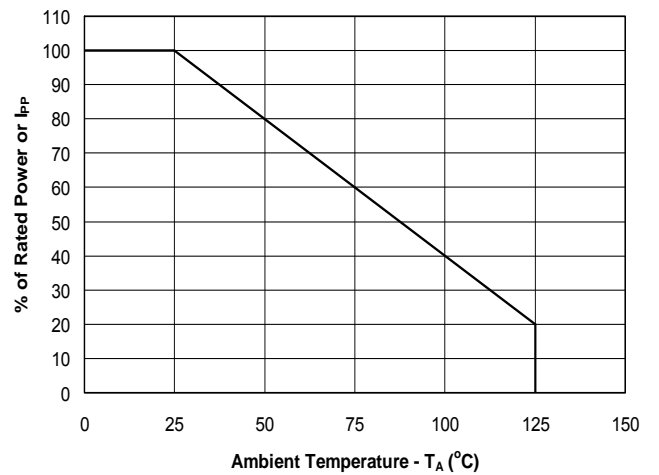
| Parameter | Symbol | Conditions | Minimum | Typical | Maximum | Units |
|---------------------------|-----------|---|---------|---------|---------|---------------|
| Reverse Stand-Off Voltage | V_{RWM} | Any I/O pin to ground | | | 5 | V |
| Reverse Breakdown Voltage | V_{BR} | $I_t = 1\text{mA}$ Any I/O pin to ground | 6 | | | V |
| Reverse Leakage Current | I_R | $V_{RWM} = 5\text{V}$, $T=25^\circ\text{C}$ Any I/O pin to ground | | | 1 | μA |
| Clamping Voltage | V_C | $I_{pp} = 1\text{A}$, $t_p = 8/20\mu\text{s}$ Any I/O pin to ground | | | 15 | V |
| Junction Capacitance | C_j | $V_R = 0\text{V}$, $f = 1\text{MHz}$ Between I/O pins | | 0.30 | 0.4 | pF |
| Junction Capacitance | C_j | $V_R = 0\text{V}$, $f = 1\text{MHz}$ Any I/O pin to ground | | | 0.8 | pF |

Typical Characteristics

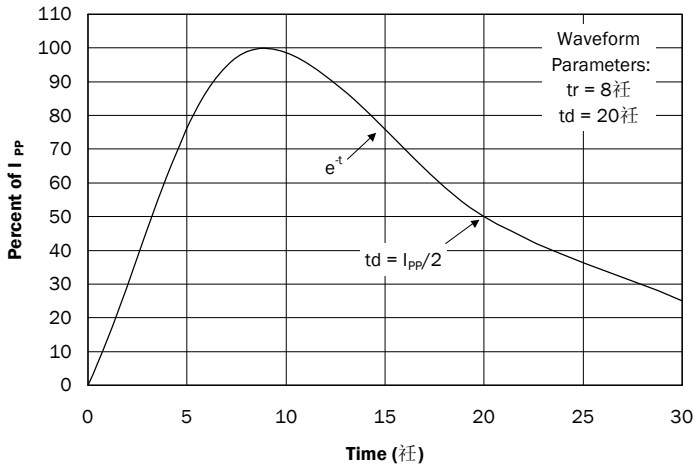
Non-Repetitive Peak Pulse Power vs. Pulse Time



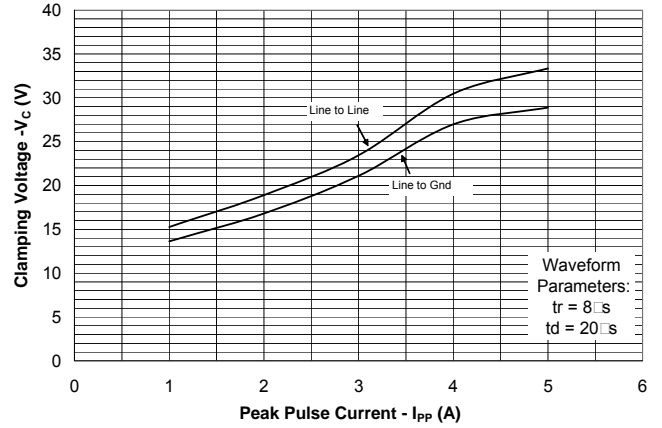
Power Derating Curve



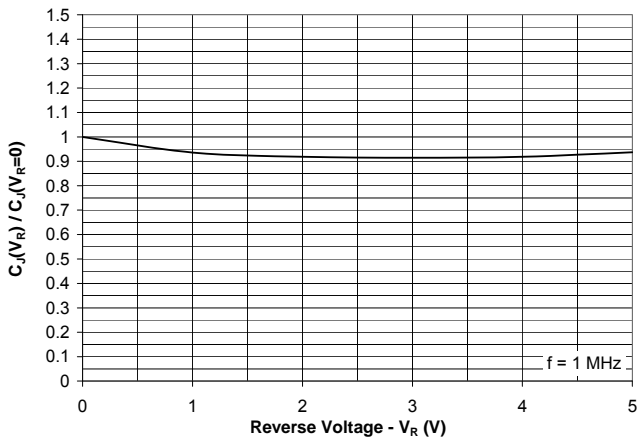
Pulse Waveform



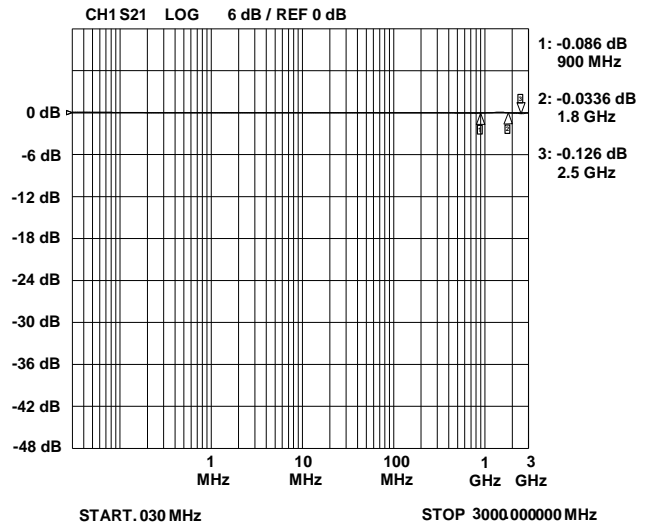
Clamping Voltage vs. Peak Pulse Current (Between any I/O and Ground)



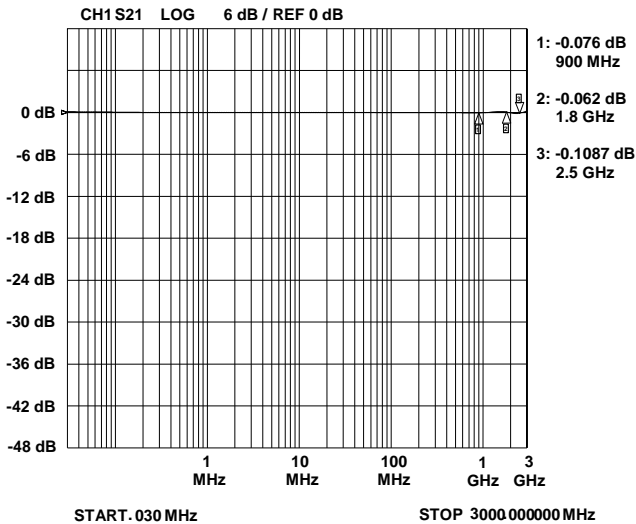
Normalized Capacitance vs. Reverse Voltage



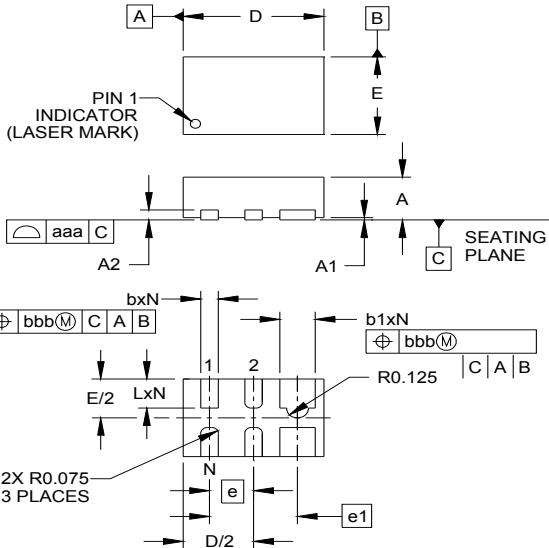
Insertion Loss S21 - I/O to GND



Insertion Loss S21 - I/O to I/O



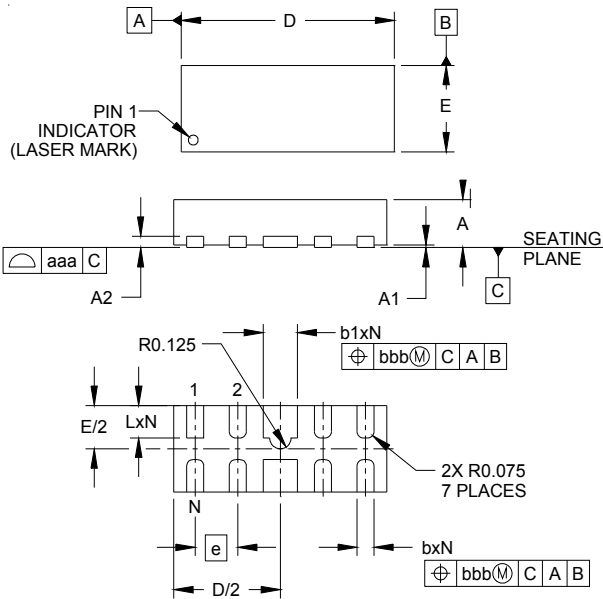
Outline Drawing - SLP1610P4/SLP2510P8



| DIM | INCHES | | | MILLIMETERS | | |
|-----|----------|------|----------|-------------|------|------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | .020 | .023 | .026 | 0.50 | 0.58 | 0.65 |
| A1 | 0.00 | .001 | .002 | 0.00 | 0.03 | 0.05 |
| A2 | (.005) | | | (0.13) | | |
| b | .006 | .008 | .010 | 0.15 | 0.20 | 0.25 |
| b1 | .014 | .016 | .018 | 0.35 | 0.40 | 0.45 |
| D | .059 | .063 | .067 | 1.50 | 1.60 | 1.70 |
| E | .035 | .039 | .043 | 0.90 | 1.00 | 1.10 |
| e | .020 BSC | | 0.50 BSC | | | |
| e1 | .039 BSC | | 1.00 BSC | | | |
| L | .012 | .015 | .017 | 0.30 | 0.38 | 0.43 |
| N | 4 | | | 4 | | |
| aaa | .003 | | | 0.08 | | |
| bbb | .004 | | | 0.10 | | |

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

SLP1610P4

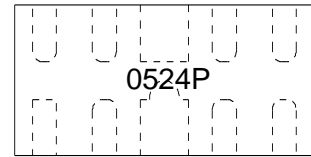
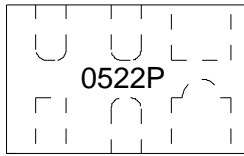


| DIM | INCHES | | | MILLIMETERS | | |
|-----|----------|------|----------|-------------|------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | .020 | .023 | .026 | 0.50 | 0.58 | 0.65 |
| A1 | 0.00 | .001 | .002 | 0.00 | 0.03 | 0.05 |
| A2 | (.005) | | | (0.13) | | |
| b | .006 | .008 | .010 | 0.15 | 0.20 | 0.25 |
| b1 | .014 | .016 | .018 | 0.35 | 0.40 | 0.45 |
| D | .094 | .098 | .102 | 2.40 | 2.50 | 2.60 |
| E | .035 | .039 | .043 | 0.90 | 1.00 | 1.10 |
| e | .020 BSC | | 0.50 BSC | | | |
| L | .012 | .015 | .017 | 0.30 | 0.38 | 0.425 |
| N | 8 | | | 8 | | |
| aaa | .003 | | | 0.08 | | |
| bbb | .004 | | | 0.10 | | |

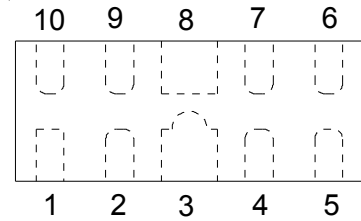
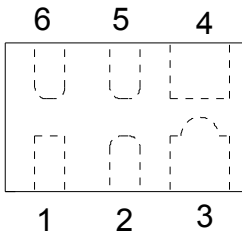
NOTES:
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).

SLP2510P8

Marking



Pin Identification and Configuration

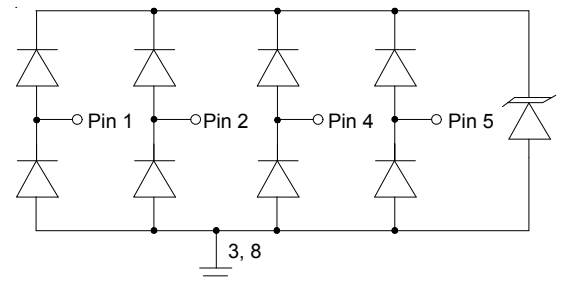
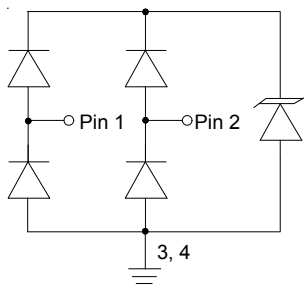


| Pin | Identification |
|-------|--|
| 1 - 2 | Input Lines |
| 5 - 6 | Output Lines (No Internal Connection) |
| 3 - 4 | Ground |

| Pin | Identification |
|-------------|--|
| 1, 2, 4, 5 | Input Lines |
| 6, 7, 9, 10 | Output Lines (No Internal Connection) |
| 3, 8 | Ground |

SLP1610P4 Pin Configuration (Top View)

SLP2510P8 Pin Configuration (Top View)



Circuit Diagram

Circuit Diagram

Ordering information

| Order code | Package | Base qty | Delivery mode |
|---------------------|-----------|----------|---------------|
| UMW RCLAMP0522P.TCT | SLP1610P4 | 3000 | Tape and reel |
| UMW RCLAMP0524P | SLP2510P8 | 3000 | Tape and reel |