



SLVU2.8-8

Utralow Capacitance Transient Voltage Suppressors Array

General Description

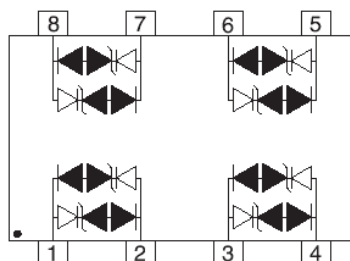
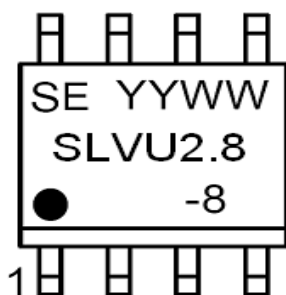
The SLVU2.8-8 is in an SOP-8 package and may be used to protect four high-speed line pairs. The “flow-thru” design minimizes trace inductance and reduces voltage overshoot associated with ESD events. The low clamping voltage of the SLVU2.8-8 minimizes the stress on the protected IC.

Applications

- Ethernet – 10/100/1000 Base T
- WAN/LAN Equipment
- Desktops, Servers, Notebooks & Handhelds, base stations Laser Diode Protection

Features

- 400 W Peak Pulse Power per Line ($t_p=8/20\mu s$)
- Protects four line pairs
- Low capacitance
- Low Leakage Current.
- Low Operating and Clamping Voltages.
- Transient Protection for High Speed Data Lines to IEC61000-4-2(ESD) $\pm 15kV$ (air), $\pm 8kV$ (Contact) IEC61000-4-4(EFT) 40A(5/50ns) IEC61000-4-5(lightning) 24A(8/20us)



Absolute Maximum Ratings

| Parameter | Symbol | Value | Units |
|--|-----------|------------|-------|
| Peak Pulse Power ($t_p = 8/20\mu s$) - See Fig1. | P_{PK} | 400 | W |
| Peak Pulse Current ($t_p = 8/20\mu s$) | I_{PP} | 24 | A |
| Storage Temperature Range | T_{STG} | -55 to 150 | °C |
| Operating Junction Temperature Range | T_J | -55 to 150 | °C |

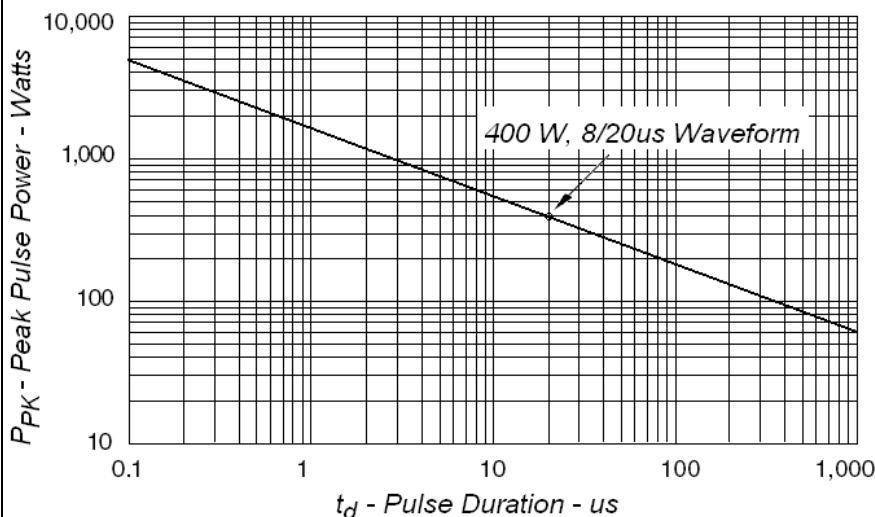


Fig1. Peak Pulse Power VS Pulse Time

Electrical Parameter

| Symbol | Parameter |
|-----------|-------------------------------------|
| I_{PP} | Peak Pulse Current |
| V_C | Clamping Voltage @ I_{PP} |
| V_{RWM} | Reverse Stand-Off Voltage |
| I_R | Reverse Leakage Current @ V_{RWM} |
| V_{SB} | Snap-Back Voltage @ I_{SB} |
| I_{SB} | Snap-Back Current |
| V_{PT} | Punch-Through Voltage |
| I_{PT} | Punch-Through Current |

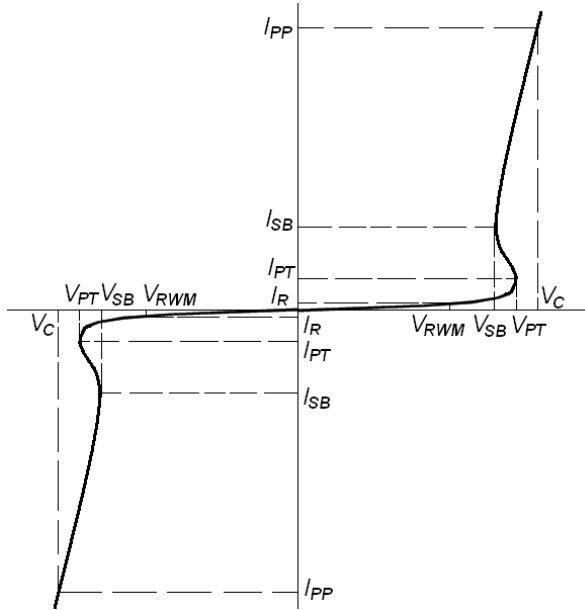


Fig2. SLVU2.8-8 IV Characteristic Curve

Electrical Characteristics

| Parameter | Symbol | Conditions | Minimum | Typical | Maximum | Units |
|---------------------------|-----------|---|---------|---------|---------|---------|
| Reverse Stand-Off Voltage | V_{RWM} | | | | 2.8 | V |
| Punch-Through Voltage | V_{PT} | $I_{PT} = 2\mu A$ | 3.0 | | | V |
| Snap-Back Voltage | V_{SB} | $I_{SB} = 50mA$ | 2.8 | | | V |
| Reverse Leakage Current | I_R | $V_{RWM} = 2.8V, T = 25^\circ C$ (Each Line) | | | 1 | μA |
| Clamping Voltage | V_C | $I_{PP} = 2A, t_p = 8/20\mu s$ (Each Line) | | | 5.5 | V |
| Clamping Voltage | V_C | $I_{PP} = 5A, t_p = 8/20\mu s$ (Each Line) | | | 8.5 | V |
| Clamping Voltage | V_C | $I_{PP} = 24A, t_p = 8/20\mu s$ (Each Line) | | | 15 | V |
| Junction Capacitance | C_j | $V_R = 0V, f = 1MHz$ (Each Line) | | 7 | 10 | pF |

Typical Characteristics

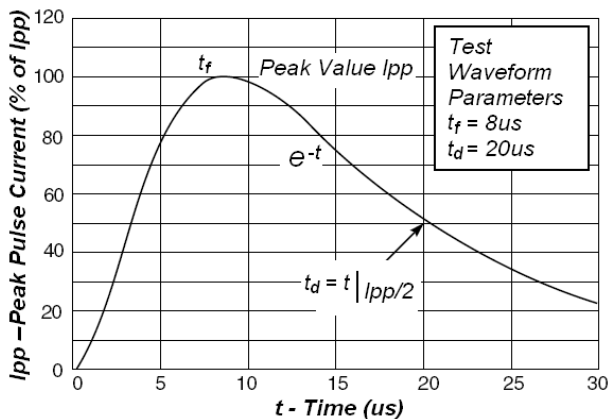


Fig3. Pulse Waveform

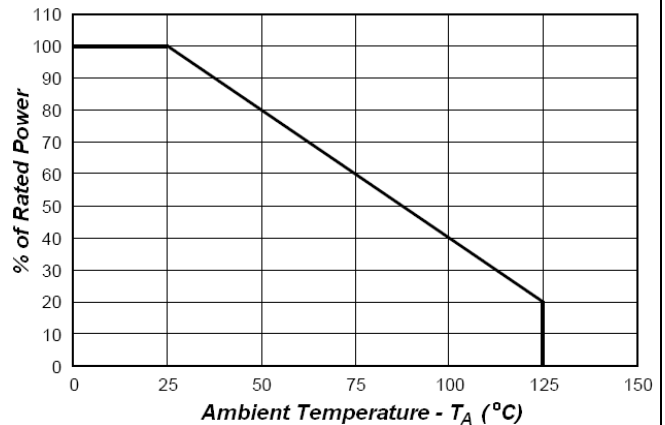


Fig4. Power Derating Curve

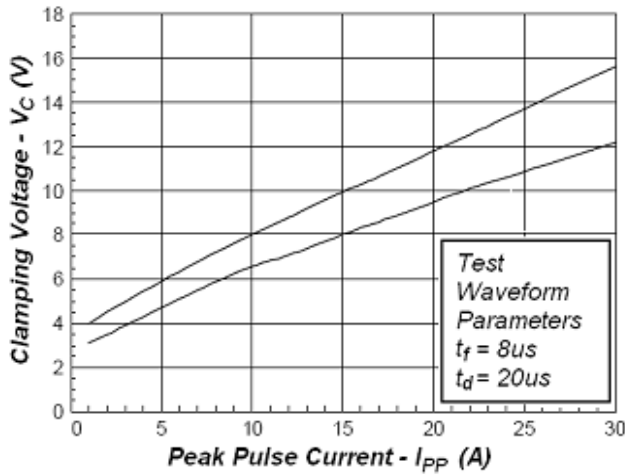


Fig5. Clamping Voltage vs. Peak Pulse Current

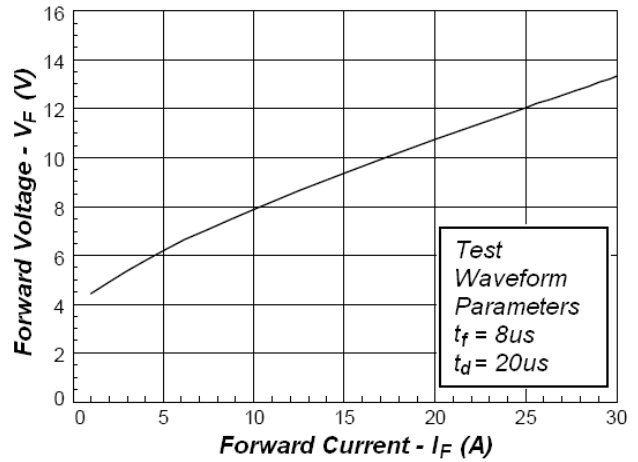


Fig6. Forward Voltage vs. Forward Current

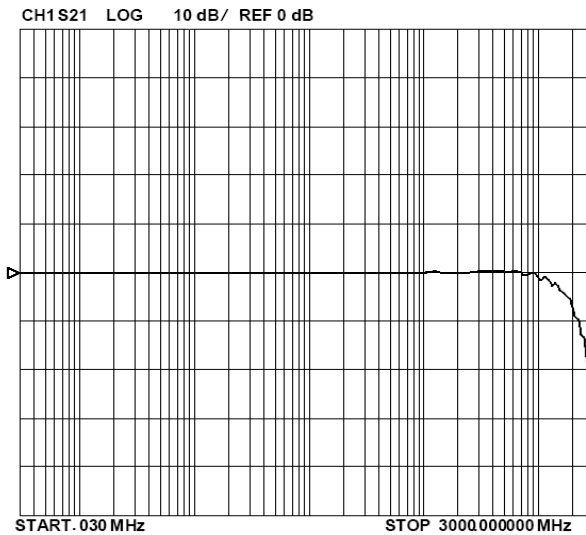


Fig7. Insertion Loss S21

Application Note

Electronic equipment is susceptible to damage caused by Electrostatic Discharge (ESD), Electrical Fast Transients (EFT), and tertiary lightning effects. Knowing that equipment can be damaged, the SLVU2.8-4 was designed to provide the level of protection required to safe guard sensitive equipment. This product can be used in different configurations to provide a level of protection to meet unidirectional line requirements as well as bidirectional requirements either in a common-mode or differential-mode configuration.

Bidirectional Common-Mode Protection (Figure 9)

The SLVU2.8-8 provides up to four lines of protection in a common-mode configuration as depicted in figure 9.

Circuit connectivity is as follows:

- Line 1 is connected to Pin 1
- Line 2 is connected to Pin 7
- Line 3 is connected to Pin 3
- Line 4 is connected to Pin 5
- Pins 2, 4, 7 and 8 are connected to ground

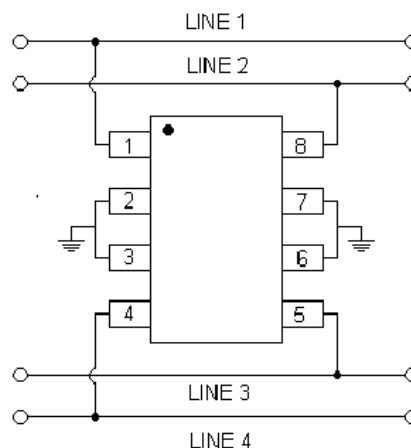


Fig 9.

Bidirectional different--Mode Protection (Figure 10)

The SLVU2.8-8 provides up to two-line pairs of protection in a differential-mode configuration as depicted in figure 11.

Circuit connectivity is as follows:

- Line Pair 1 is connected to Pins 1 & 2
- Line Pair 2 is connected to Pins 3 & 4
- Line Pair 3 is connected to Pins 7 & 8
- Line Pair 4 is connected to Pins 5 & 6

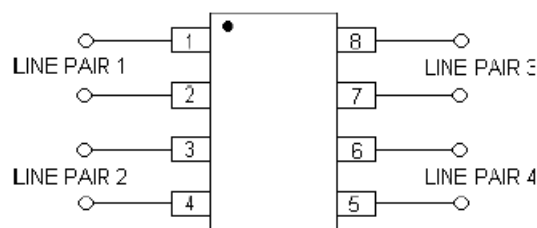


Fig10.

Circuit Board Layout Protection

Circuit board layout is critical for Electromagnetic Compatibility (EMC) protection. The following guidelines are recommended:

- The protection device should be placed near the input terminals or connectors, the device will divert the transient current immediately before it can be coupled into the nearby traces.
- The path length between the TVS device and the protected line should be minimized.
- All conductive loops including power and ground loops should be minimized.
- The transient current return path to ground should be kept as short as possible to reduce parasitic inductance.
- Ground planes should be used whenever possible. For multilayer PCBs, use ground vias.

Typical Applications

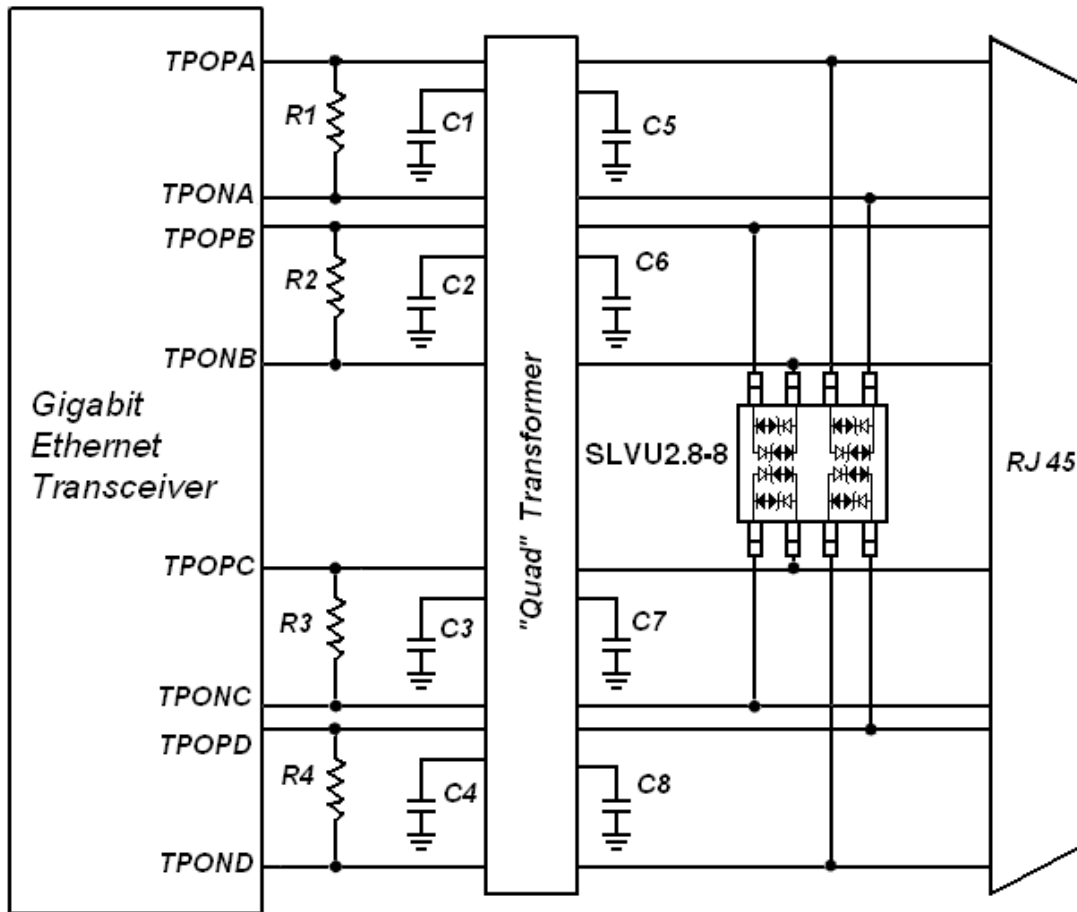


Fig11. Gigabit Ethernet Protection Circuit

Typical Applications

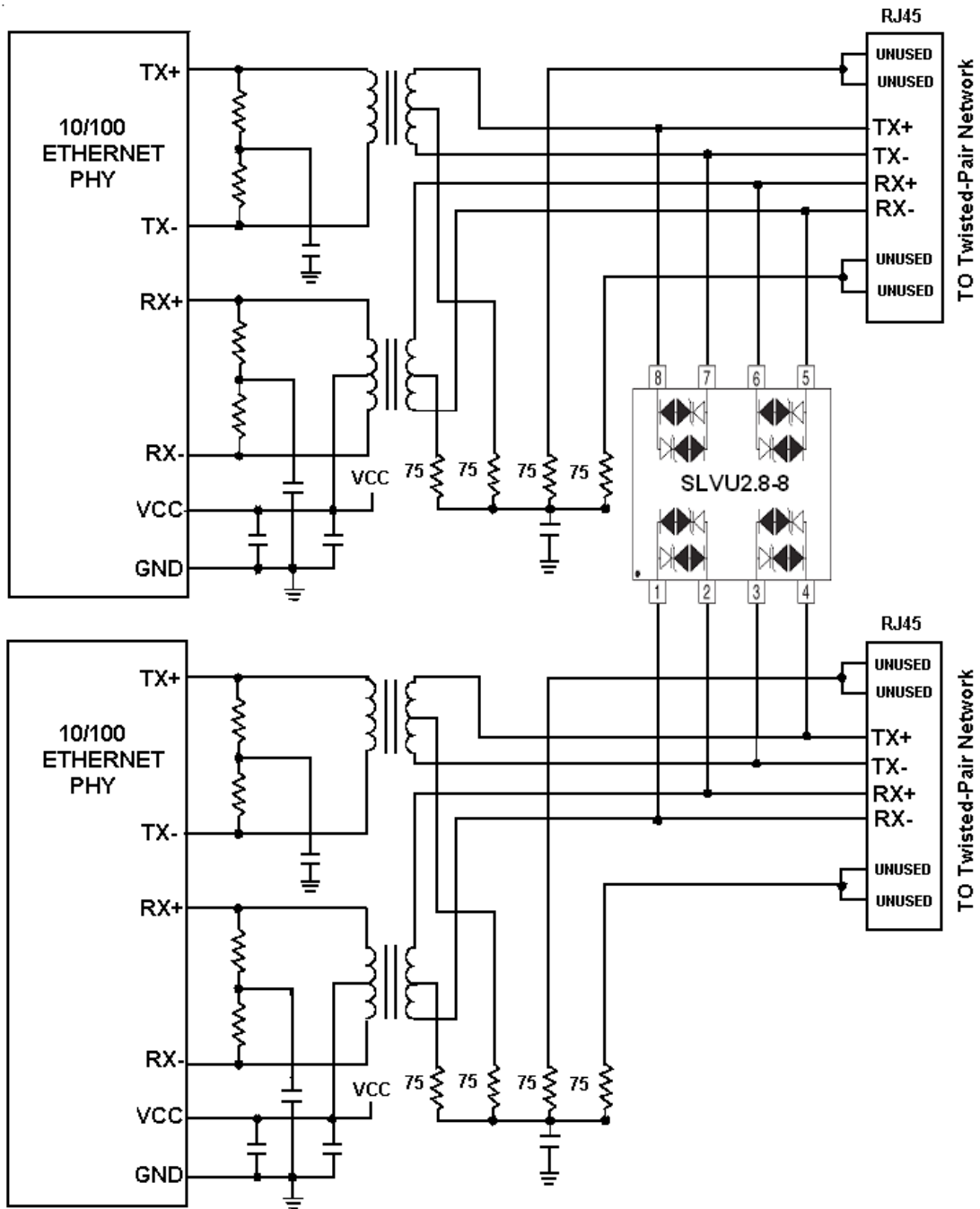


Fig12. One SLVU2.8-8 Protecting Two 10/100 Ethernet Port

SOP-8 MECHANICAL DATA

| DIM | Millimeters | | |
|-----|-------------|------|------|
| | MIN | TYP | MAX |
| A | | | 1.75 |
| A1 | 0.10 | | 0.25 |
| A2 | 1.35 | 1.55 | 1.75 |
| B | 0.35 | 0.42 | 0.49 |
| C | 0.19 | | 0.25 |
| D | 4.80 | 4.90 | 5.00 |
| E | 5.80 | 6.00 | 6.20 |
| E1 | 3.80 | 3.95 | 4.00 |
| e | | 1.27 | |
| L | 0.40 | | 0.90 |
| K | 0° | | 8° |

