

ULTRA LOW CAPACITANCE TVS ARRAY

**APPLICATIONS**

- ✓ Ethernet - 10/100/1000 Base T
- ✓ Cellular Phones
- ✓ Audio/Video Inputs
- ✓ Personal Digital Assistant (PDA)

**IEC COMPATIBILITY (EN61000-4)**

- ✓ 61000-4-2 (ESD): Air - 15kV, Contact - 8kV
- ✓ 61000-4-4 (EFT): 40A - 5/50ns
- ✓ 61000-4-5 (Surge): 24A, 8/20 $\mu$ s - Level 2(Line-Ground) & Level 3(Line-Line)

**FEATURES**

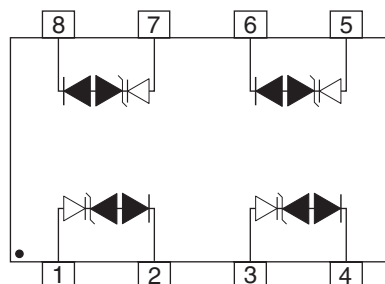
- ✓ 600 Watts Peak Pulse Power per Line (tp = 8/20 $\mu$ s)
- ✓ Provides Protection For Two Line Pairs
- ✓ ESD Protection > 40 kilovolts
- ✓ **LOW LEAKAGE CURRENT < 1.0 $\mu$ A**
- ✓ **ULTRA LOW CAPACITANCE: 3pF Typical**
- ✓ RoHS Complaint in Lead-Free Versions

**MECHANICAL CHARACTERISTICS**

- ✓ Molded JEDEC SO-8
- ✓ Weight 70 milligrams (Approximate)
- ✓ Available in Tin-Lead or Lead-Free Pure-Tin Plating(Annealed)
- ✓ Solder Reflow Temperature:
  - Tin-Lead - Sn/Pb, 85/15: 240-245°C
  - Pure-Tin - Sn, 100: 260-270°C
- ✓ Flammability Rating UL 94V-0
- ✓ 12mm Tape and Reel Per EIA Standard 481
- ✓ Device Marking: Marking Code, Logo, Date Code & Pin One Defined By DOT on Package



**PIN CONFIGURATION**



DEVICE CHARACTERISTICS

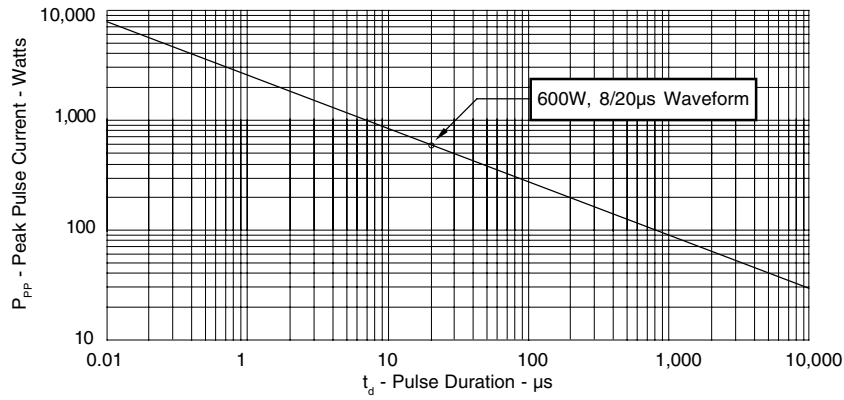
MAXIMUM RATINGS @ 25°C Unless Otherwise Specified			
PARAMETER	SYMBOL	VALUE	UNITS
Peak Pulse Power ( $t_p = 8/20\mu s$ ) - See Figure 1	$P_{PP}$	600	Watts
Peak Pulse Current ( $t_p = 8/20\mu s$ )	$I_{PP}$	30	Amps
Lead Soldering Temperature	$I_{FRM}$	260°C (10s)	°C
Operating Temperature	$T_J$	-55°C to 150°C	°C
Storage Temperature	$T_{STG}$	-55°C to 150°C	°C

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified										
PART NUMBER	DEVICE MARKING CODE	RATED STAND-OFF VOLTAGE (See Note 1)	MINIMUM BREAKDOWN VOLTAGE (See Note 1)	MINIMUM SNAPBACK VOLTAGE (See Note 1)	MAXIMUM CLAMPING VOLTAGE (See Note 1) (See Fig. 2)	MAXIMUM CLAMPING VOLTAGE (See Note 1) (See Fig. 2)	MAXIMUM CLAMPING VOLTAGE (See Note 1) (See Fig. 2)	MAXIMUM CLAMPING VOLTAGE (See Note 1) (See Fig. 2)	MAXIMUM LEAKAGE CURRENT (See Note 1)	TYPICAL CAPACITANCE (See Note 1)
		$V_{WM}$ VOLTS	@ 1mA $V_{(BR)}$ VOLTS	@ $I_{SB} = 50mA$ $V_{SB}$ VOLTS	@ $I_p = 2A$ $V_C$ VOLTS	@ $I_p = 5A$ $V_C$ VOLTS	@ $I_p = 24A$ $V_C$ VOLTS	@ $I_p = 30A$ $V_C$ VOLTS	@ $V_{WM}$ $I_D$ $\mu A$	@ 0V, 1MHz C pF
SLVU2.8-4	SL4	2.8	3.0	2.8	5.5	8.5	15	21	1.0	3

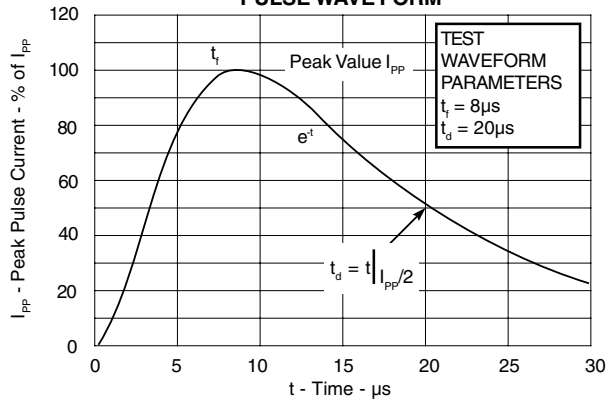
Note 1: Device measured between pin 1 to 2, pin 3 to 4, pin 5 to 6 and pin 7 to 8.

GRAPHS

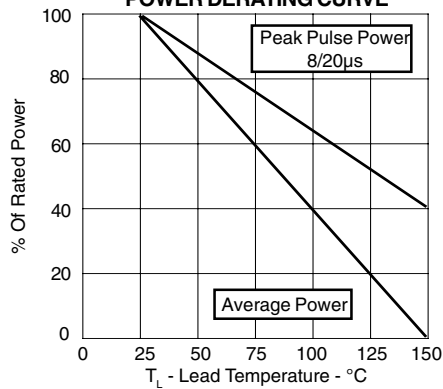
**FIGURE 1  
PEAK PULSE POWER VS PULSE TIME**



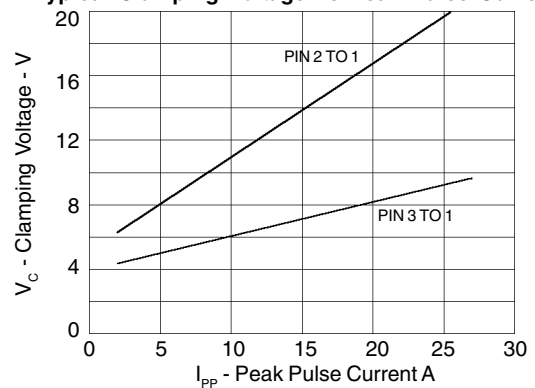
**FIGURE 2  
PULSE WAVE FORM**



**FIGURE 3  
POWER DERATING CURVE**



**FIGURE 4  
Typical Clamping Voltage vs Peak Pulse Current**



## 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.

### UNIDIRECTIONAL COMMON-MODE CONFIGURATION (Figure 1)

The SLVU2.8-4 provides up to four lines of protection in a common-mode configuration as depicted in figure 1.

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

### BIDIRECTIONAL COMMON-MODE CONFIGURATION (Figure 2)

The SLVU2.8-4 provides up to two lines of protection in a common-mode configuration as depicted in figure 1.

Circuit connectivity is as follows:

- ✓ Line 1 is connected to Pins 1 & 8
- ✓ Line 2 is connected to Pins 4 & 5
- ✓ Pins 2, 3, 6, and 7 are connected to ground

### BIDIRECTIONAL DIFFERENTIAL-MODE CONFIGURATION (Figure 3)

The SLVU2.8-4 provides up to two-line pairs of protection in a differential-mode configuration as depicted in figure 1.

Circuit connectivity is as follows:

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

### CIRCUIT BOARD LAYOUT RECOMMENDATIONS

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.

Figure 1. Unidirectional Common-Mode Protection

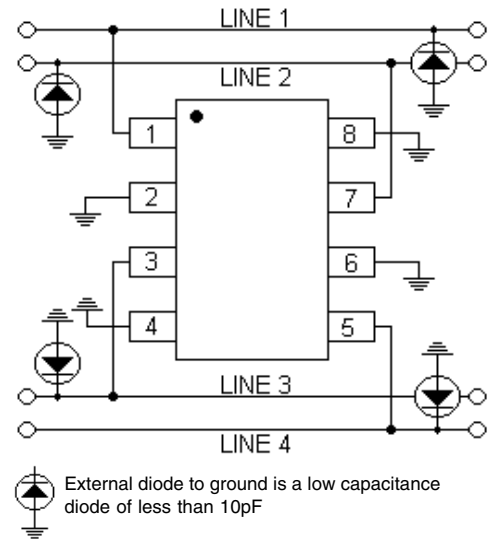


Figure 2. Bidirectional Common-Mode Protection

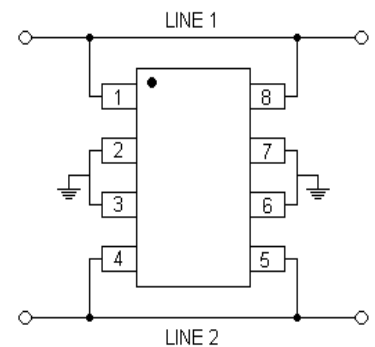
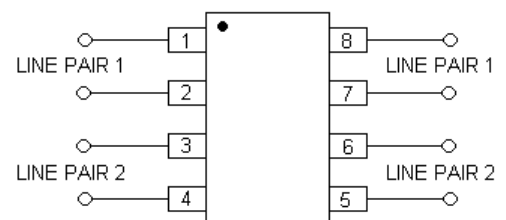
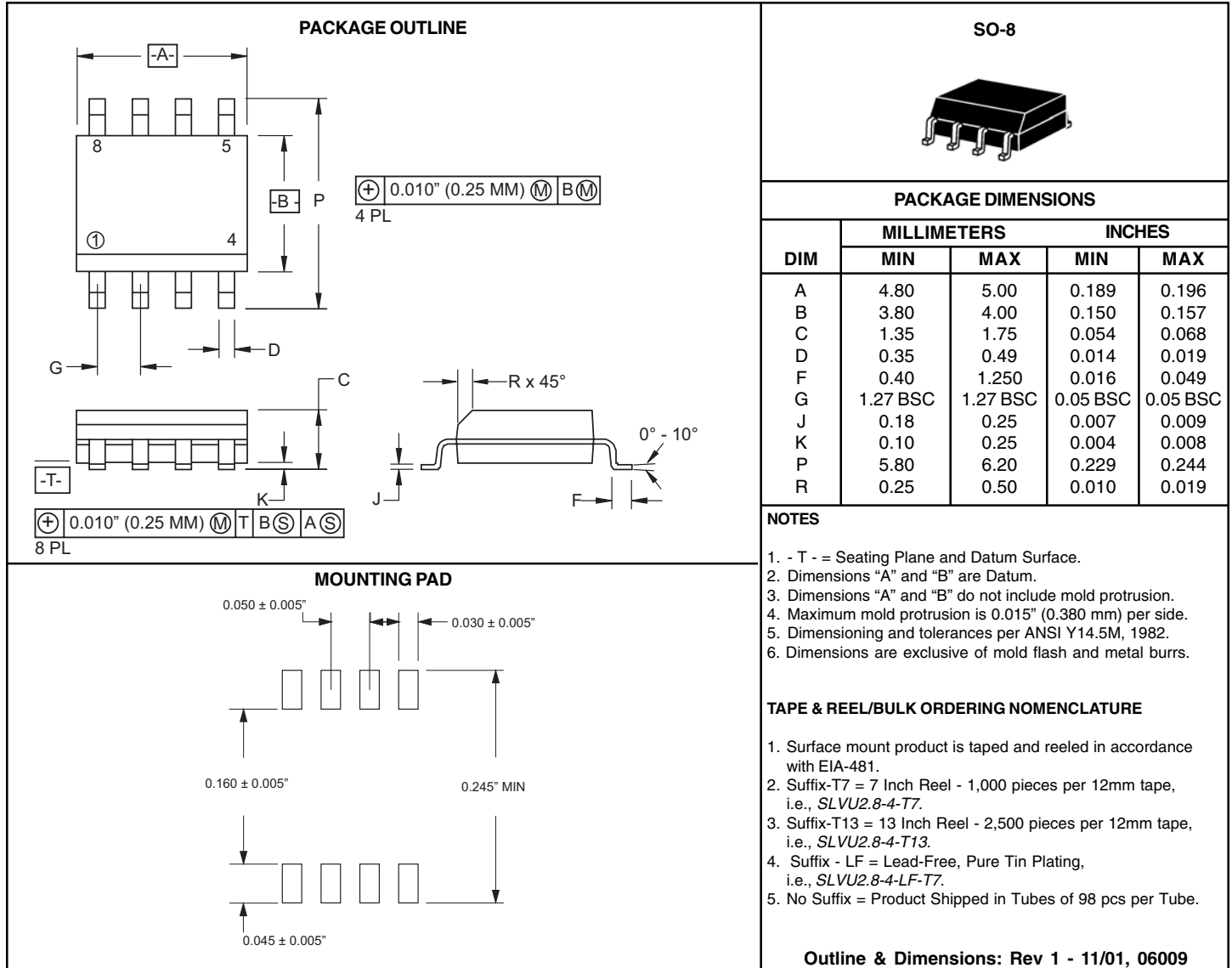


Figure 3. Bidirectional Differential-Mode Protection



## PACKAGE OUTLINE & DIMENSIONS



**COPYRIGHT © ProTek Devices 2005**

SPECIFICATIONS: ProTek reserves the right to change the electrical and or mechanical characteristics described herein without notice (except JEDEC).

DESIGN CHANGES: ProTek reserves the right to discontinue product lines without notice, and that the final judgement concerning selection and specifications is the buyer's and that in furnishing engineering and technical assistance, ProTek assumes no responsibility with respect to the selection or specifications of such products.

**ProTek Devices**  
 2929 South Fair Lane, Tempe, AZ 85282  
 Tel: 602-431-8101 Fax: 602-431-2288  
 E-Mail: [sales@protekdevices.com](mailto:sales@protekdevices.com)  
 Web Site: [www.protekdevices.com](http://www.protekdevices.com)