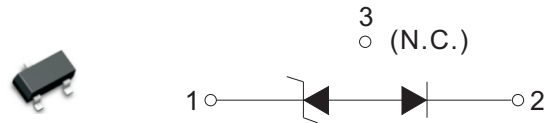




SL05 thru SL24

Low Capacitance Transient Voltage Suppressor - 5V to 24V



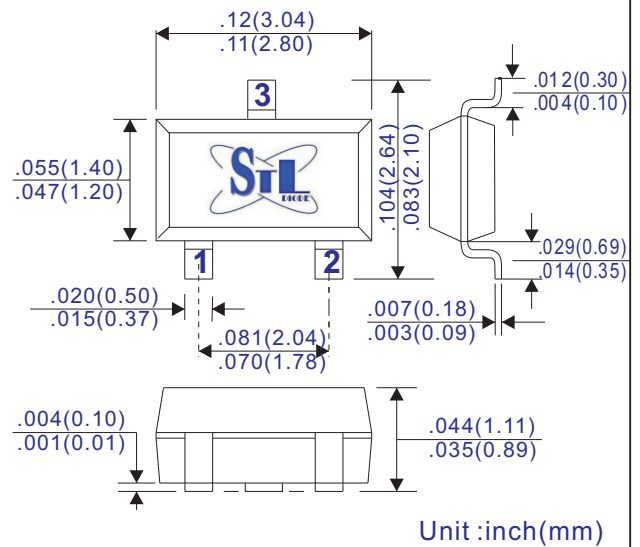
DESCRIPTION

The SL series of TVS arrays are designed to protect sensitive electronics from damage or latch-up due to ESD, lightning, and other voltage-induced transient events. They are available with operating voltages of 5V, 12V, 15V and 24V.

TVS diodes are solid-state devices designed specifically for transient suppression. They offer desirable characteristics for board level protection including fast response time, low operating and clamping voltage and no device degradation. The SL series devices feature a low capacitance, fast switching compensation diode in series with a standard TVS diode. This effectively reduces the overall capacitance of the device to less than 5pF making it an integrated, low capacitance solution for use on high-speed interfaces.

The SL series devices may be used to meet the immunity requirements of IEC 61000-4-2, level 4

SOT-23



FEATURES

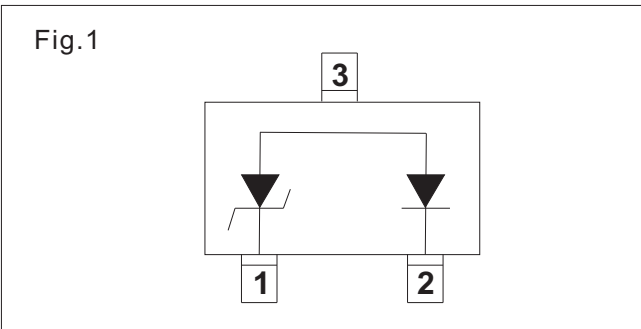
- Small package for use in portable electronics
- Two devices offer one line protection
- Transient protection for data lines to IEC 61000-4-2 (ESD) 15KV(air),8KV(contact) IEC 61000-4-4 (EFT) 40A (tp=5/50nS) IEC 61000-4-5 (Lightning) 12A (8/20µS)
- Low Capacitance for high-speed data line
- Working voltages 5V, 12V, 15V & 24V for selection
- Solid state silicon avalanche technology

APPLICATION

- High-Speed data line
- Cellular handsets & accessories
- Universal Series Bus (USB) port protection
- Portable instrumentation
- LAN/WAN equipment
- Peripherals

MECHANICAL DATA

- Case: Molded plastic SOT-23
- Epoxy: UL94-V0 rated flame retardant
- Terminals: Solderable per MIL-STD-750 Method 2026
- Schematic & PIN configuration, see Fig. 1
- Mounting Position: Any
- Weight: 0.008 grams





MAXIMUM RATING AND ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified

	Symbols	SL05	SL12	SL15	SL24	Units
Peak Pulse Power (tp=8/20µS)	PPK	300				Watts
ESD Voltage (HBM per IEC 61000-4-2)	-	>25				KV
Minimum Breakdown Voltage @IR=1.0mA	VBR	6.0	13.3	16.7	26.7	Volts
Maximum Stand-off Voltage	VRWM	5.0	12.0	15.0	24.0	Volts
Maximum Leakage Current	IR	20	1.0	1.0	1.0	µA
Maximum Clamping Voltage, IPP=1A, tp=8/20µS	VC	9,8	19	24	43	Volts
Maximum Calmping Voltage, IPP=5A, tp=8/20µS	VC	11	24	30	55	Volts
Maxunyn Peak Pulse Current, tp=8/20µS	IPP	17	12	10	5	A
Junction Cap waveform parameters tr=8µS, td=20µS in 1-2	CJ	5	5	5	5	pF
Storage Temperature Range	TSTG	-55 ~ +150				°C
Operation Temperature Range	TJ	-55 ~ +125				°C

Fig. 1 - Power Dissipation Curve

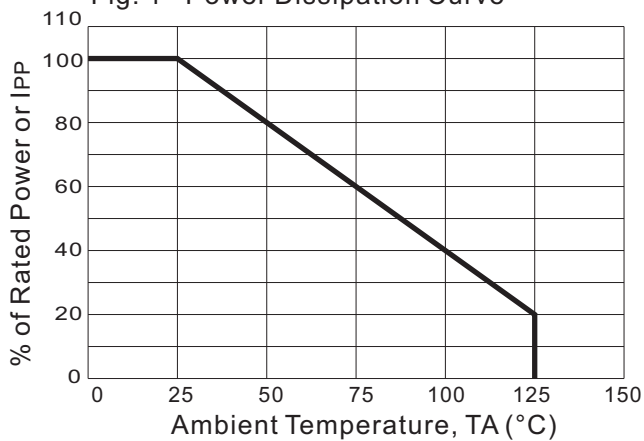


Fig. 2 - Peak Power Dissipation

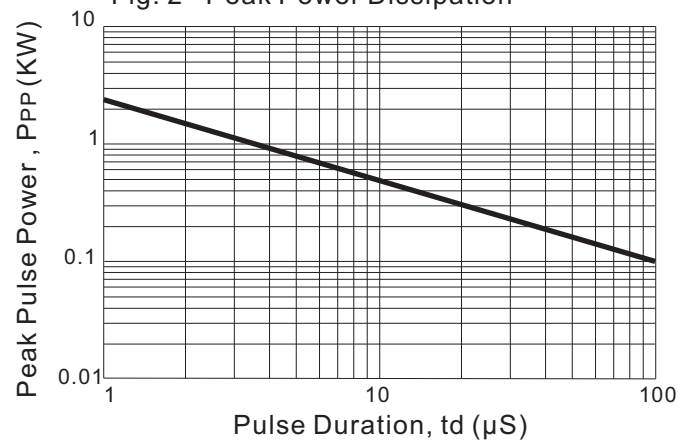


Fig. 3 - Pulse Waveform

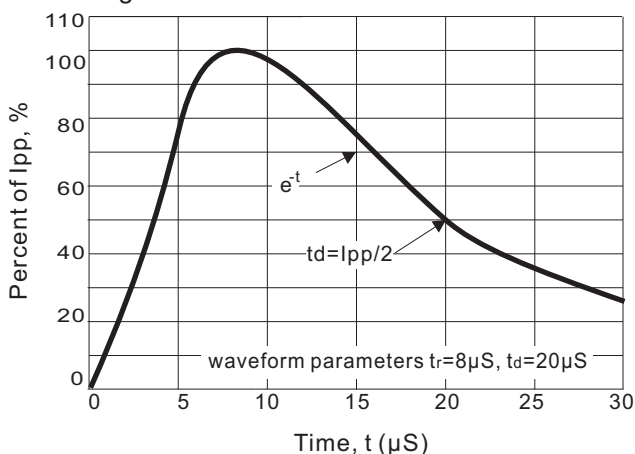
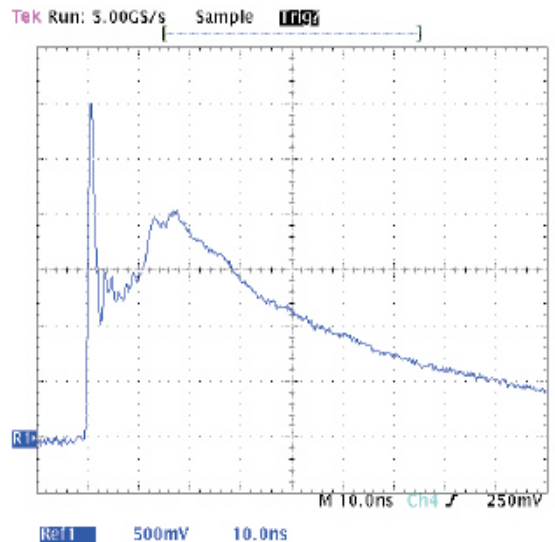




Fig. 4 - ESD Waveform & Discharge Parameters
 (Per IEC 61000-4-2)

Level	First Peak Current of Discharge ($\pm 10\%$) (A)	Peak Current @30nS ($\pm 30\%$) (A)	Peak Current @60nS ($\pm 30\%$) (A)	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1	7.5	4	2	2	2
2	15	8	4	4	4
3	22.5	12	6	6	8
4	30	16	8	8	15



Device Connection for Protection of One High Speed Data Line

The SL series devices are designed to protect high-speed data lines. The SLXX utilizes a low capacitance compensation diode in series with, but in opposite polarity to a TVS diode in each line to achieve an effective capacitance of less than 5pF per device. During a transient event, the internal rectifier must be forward biased (TVS is reversed biased). Therefore, each device will only suppress transient events in one polarity. To achieve protection in both positive and negative polarity, a second device is connected in anti-parallel to the first. On unidirectional lines, a fast switching steering diode may be used as an alternative to using two SL devices.

The options for connecting the devices are as follows:

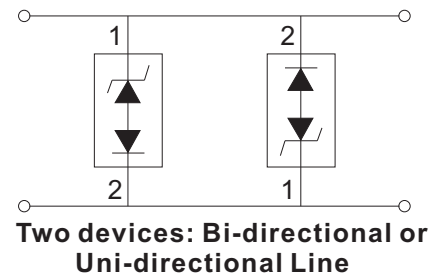
• Low Capacitance Protection of One High Speed Line:

Protection of one uni-directional or bi-directional high-speed line is achieved by connecting two devices in anti-parallel. Pin 1 of the first device is connected to the line and pin 2 is connected to ground (or to a second line for differential protection). Pin 2 of the second device is connected line 1 and pin 1 is connected to ground (or line 2) as shown. Pin 3 is not connected. During positive duration transients, the first device will conduct from pin 1 to 2. The steering diode conducts in the forward direction while the TVS will avalanche and conduct in the reverse direction. During negative transients, the second device will conduct in the same manner. For optimum protection, the ground connections should be made directly to the ground plane for best results. The path length is kept as short as possible to reduce the effects of parasitic inductance in the board traces. The path length between the TVS and the protected line should also be minimized.

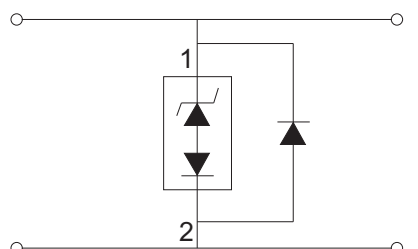
• Connection Option For Uni-directional Lines Only:

An optional method for protecting uni-directional (normal signal polarities above ground) lines is to add a fast switching steering diode in parallel to the SL TVS. Input/outputs are connected to pin 1 of the SL device and the cathode of the rectifier. The anode of the diode and pin 2 of the SL TVS are connected to ground.

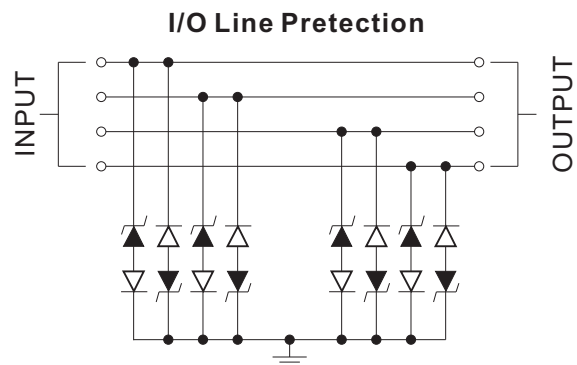
SL Connection Options



Two devices: Bi-directional or Uni-directional Line



One Device with Steering Diode: Uni-directional Line Only



I/O Line Protection