

Description

The SLxx is a low capacitance TVS diode array, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting sensitive semiconductor components from damage. The SLxx complies with the IEC 61000-4-2 (ESD) standard with $\pm 30\text{kV}$ air and $\pm 30\text{kV}$ contact discharge. It is assembled into a lead-free SOT-23 package. It is designed to protect components which are connected to high speed interfaces and transmission lines from voltage surges.

Mechanical Characteristics

- ◆ Package: SOT-23
- ◆ Lead Finish: Matte Tin
- ◆ Case Material: "Green" Molding Compound.
- ◆ UL Flammability Classification Rating 94V-0
- ◆ Moisture Sensitivity: Level 3 per J-STD-020
- ◆ Terminal Connections: See Diagram Below
- ◆ Marking Information: See Below

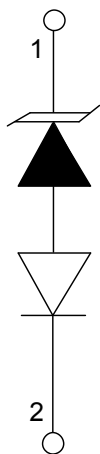
Features

- ◆ 300W peak pulse power(8/20 μs)
- ◆ Two devices protect one line
- ◆ Ultra low leakage: nA level
- ◆ Operating voltage: 3.3V, 5V, 12V, 15V, 24V, 36V
- ◆ Low clamping voltage
- ◆ Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 30\text{kV}$
 - Contact discharge: $\pm 30\text{kV}$
 - IEC61000-4-4 (EFT) 40A (5/50ns)
- ◆ RoHS Compliant

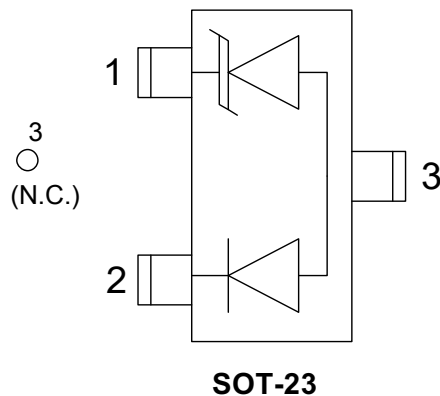
Applications

- ◆ Cellular Handsets and Accessories
- ◆ Notebooks and Handhelds
- ◆ Portable Instrumentation
- ◆ Set Top Box
- ◆ Industrial Controls
- ◆ Server and Desktop PC
- ◆ High-Speed data line
- ◆ LAN/WAN equipment

Dimensions and Pin Configuration

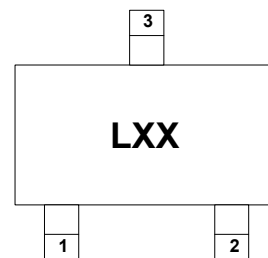


Circuit Diagram



Pin Schematic

Marking Information



Lxx: Device Marking Code

Ordering Information

Part Number	Marking	Packaging	Reel Size
SLxx	Lxx	3000/Tape & Reel	7 inch

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power(8/20 μs)	Ppk	300	W
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	VESD	± 30 ± 30	kV
Operating Temperature Range	TJ	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}\text{C}$

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

SL03 (Marking Code: L03)						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			3.3	V	
Breakdown Voltage	VBR	4			V	IT = 1mA
Reverse Leakage Current	IR			1.0	μA	VRWM = 3.3V
Clamping Voltage	VC			7.8	V	I _{PP} = 1A (8 x 20 μs pulse)
Clamping Voltage	VC			9	V	I _{PP} = 5A (8 x 20 μs pulse)
Peak Pulse Current	I _{PP}			20	A	t _p = 8/20 μs
Junction Capacitance	CJ			5	pF	VR = 0V, f = 1MHz, Pin 1 to Pin 2

SL05 (Marking Code: L05)						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			5	V	
Breakdown Voltage	VBR	6			V	IT = 1mA
Reverse Leakage Current	IR			1.0	uA	VRWM = 5V
Clamping Voltage	VC			9.8	V	I _{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	VC			11	V	I _{PP} = 5A (8 x 20μs pulse)
Peak Pulse Current	I _{PP}			17	A	t _p = 8/20μs
Junction Capacitance	CJ			5	pF	VR = 0V, f = 1MHz, Pin 1 to Pin 2

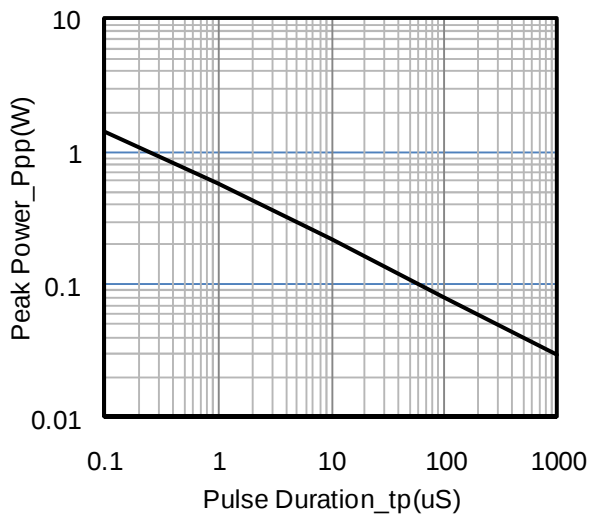
SL12 (Marking Code: L12)						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			12	V	
Breakdown Voltage	VBR	13.3			V	IT = 1mA
Reverse Leakage Current	IR			0.5	uA	VRWM = 12V
Clamping Voltage	VC			19	V	I _{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	VC			24	V	I _{PP} = 5A (8 x 20μs pulse)
Peak Pulse Current	I _{PP}			12	A	t _p = 8/20μs
Junction Capacitance	CJ			5	pF	VR = 0V, f = 1MHz, Pin 1 to Pin 2

SL15 (Marking Code: L15)						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			15	V	
Breakdown Voltage	VBR	16.7			V	IT = 1mA
Reverse Leakage Current	IR			0.5	uA	VRWM = 15V
Clamping Voltage	VC			22	V	I _{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	VC			27	V	I _{PP} = 5A (8 x 20μs pulse)
Peak Pulse Current	I _{PP}			10	A	t _p = 8/20μs
Junction Capacitance	CJ			5	pF	VR = 0V, f = 1MHz, Pin 1 to Pin 2

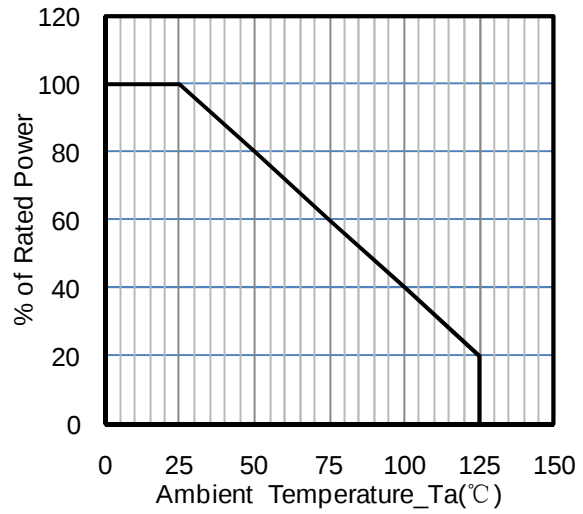
SL24 (Marking Code: L24)						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			24	V	
Breakdown Voltage	VBR	27			V	IT = 1mA
Reverse Leakage Current	IR			0.5	uA	VRWM = 24V
Clamping Voltage	VC			40	V	IPP = 1A (8 x 20μs pulse)
Clamping Voltage	VC			55	V	IPP = 5A (8 x 20μs pulse)
Peak Pulse Current	IPP			5	A	tp = 8/20μs
Junction Capacitance	CJ			5	pF	VR = 0V, f = 1MHz, Pin 1 to Pin 2

SL36 (Marking Code: L36)						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			36	V	
Breakdown Voltage	VBR	38			V	IT = 1mA
Reverse Leakage Current	IR			0.2	uA	VRWM = 36V
Clamping Voltage	VC			50	V	IPP = 1A (8 x 20μs pulse)
Peak Pulse Current	IPP			4	A	tp = 8/20μs
Junction Capacitance	CJ			5	pF	VR = 0V, f = 1MHz, Pin 1 to Pin 2

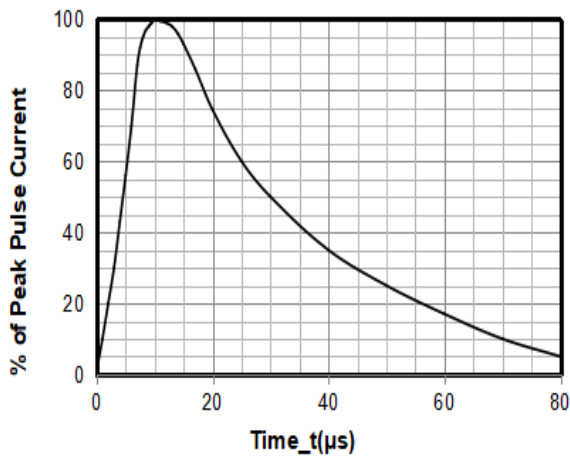
Typical Performance Characteristics (TA=25°C unless otherwise Specified)



Peak Pulse Power vs. Pulse Time



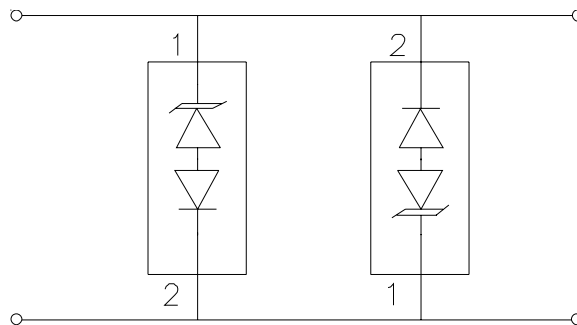
Power Derating Curve



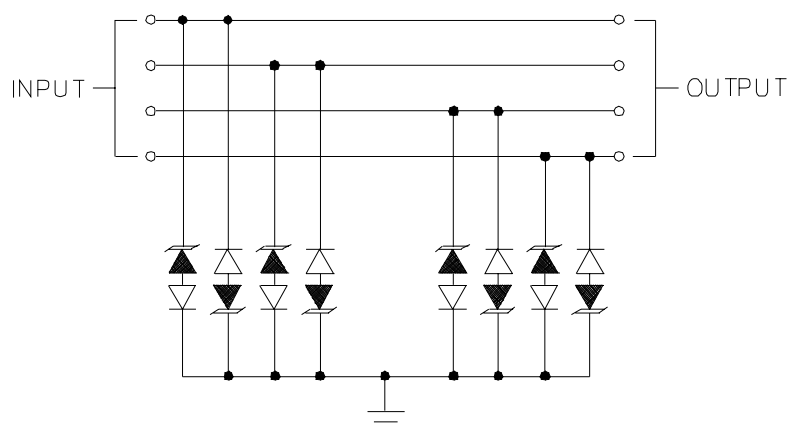
8 X 20us Pulse Waveform

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.

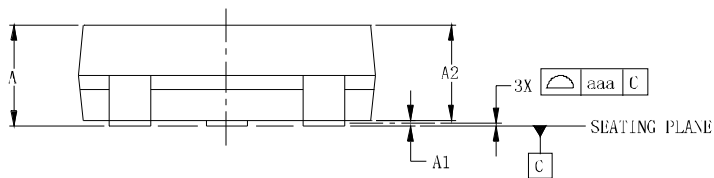
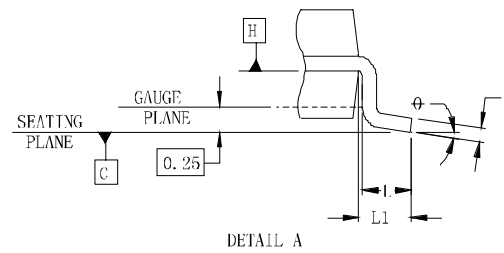
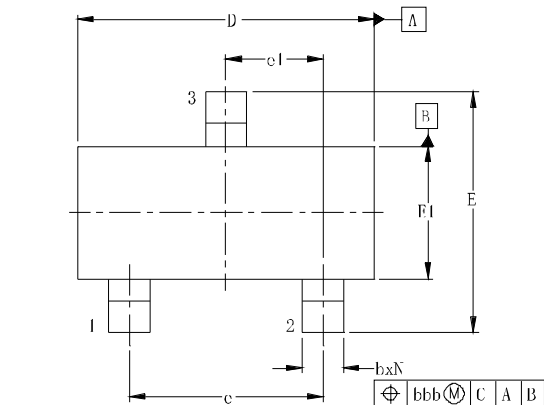


Two Devices : Bidirectional or Unidirectional Line

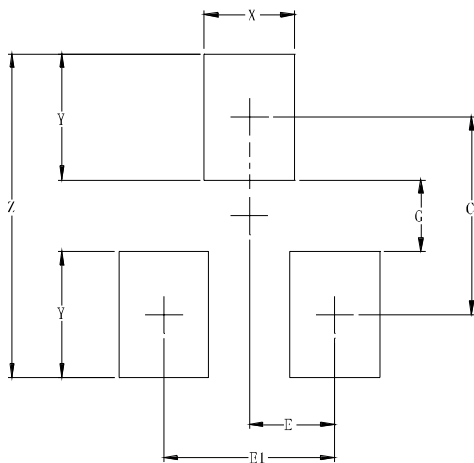


I/O Line Protection

SOT-23 Package Outline Drawing



Suggested Land Pattern



DIMENSIONS						
SYM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.035	-	0.044	0.89	-	1.12
A1	0.000	-	0.004	0.01	-	0.10
A2	0.035	0.037	0.040	0.88	0.95	1.02
b	0.012	-	0.020	0.30	-	0.51
c	0.003	-	0.007	0.08	-	0.18
D	0.110	0.114	0.120	2.80	2.90	3.04
E	0.082	0.093	0.104	2.10	2.37	2.64
E1	0.047	0.051	0.055	1.20	1.30	1.40
e	0.075			1.90BSC		
e1	0.037			0.95BSC		
L	0.015	0.020	0.024	0.40	0.50	0.60
L1	0.022			0.55		
N	3			3		
θ	0°	-	8°	0°	-	8°
aaa	0.004			0.10		
bbb	0.008			0.20		

DIMENSIONS		
SYM	INCHES	MILLIMETERS
C	0.087	2.20
E	0.037	0.95
E1	0.075	1.90
G	0.031	0.80
X	0.039	1.00
Y	0.055	1.40
Z	0.141	3.60