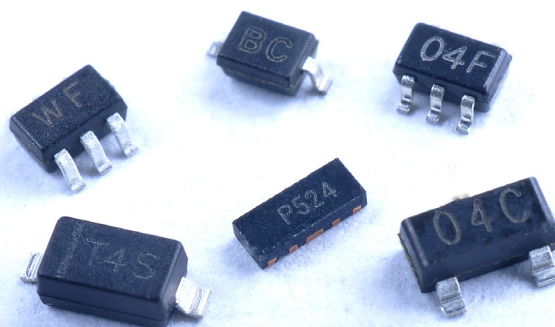




TVS/ESD Arrays

RLST23A2.82LV Series

TVS/ESD Arrays - RLST23A2.82LV Series

Features

- 400 Watts peak pulse power ($t_p = 8/20\mu s$)
- Transient protection for high speed data lines to
IEC 61000-4-2 (ESD) $\pm 15kV$ (air), $\pm 8kV$ (contact)
IEC 61000-4-4 (EFT) 40A (5/50ns)
IEC 61000-4-5 (Lightning) 24A (8/20 μs)
- One device protects one unidirectional line
- Two devices protect two high-speed line pairs
- Low capacitance
- Low leakage current
- Low operating and clamping voltages
- Solid-state EPD TVS process technology



Mechanical Characteristics

- SOT-23 package
- Molding compound flammability rating: UL 94V-0
- Packaging: Tape and Reel per EIA 481
- Lead Finish: Matte tin
- RoHS Compliant

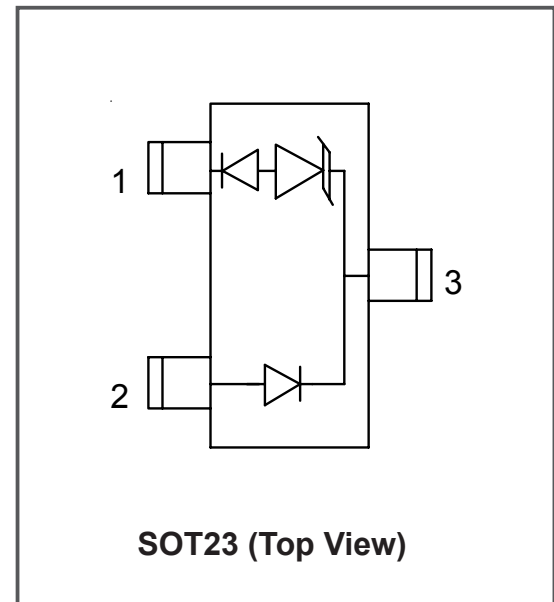
Applications

- 10/100 Ethernet
- WAN/LAN Equipment
- Switching Systems
- Desktops, Servers, Notebooks & Handhelds
- Laser Diode Protection
- Base Stations

Life Support Note

- Not Intended for Use in Life Support or Life Saving Applications
- The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated

Pinout and Functional Block Diagram



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Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu s$)	P_{pk}	400	Watts
Peak Pulse Current ($t_p = 8/20\mu s$)	I_{pp}	24	A
ESD per IEC 61000-4-2 (Air)	V_{ESD}	+/-15	Kv
ESD per IEC 61000-4-2 (Contact)	V_{ESD}	+/-8	Kv
Operating Temperature	T_J	-55 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

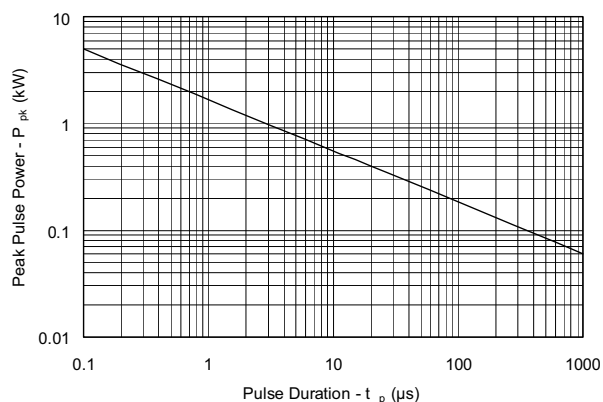
Electrical Characteristics Per Lin (@ 25°C Unless Otherwise Specified)

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}	Pin 3 to 1 or Pin 2 to 1	-	-	2.8	V
Punch-Through Voltage	V_{PT}	$I_{PT} = 2\mu A$, Pin 3 to 1	3.0	-	-	V
Snap-Back Voltage	V_{SB}	$I_{SB} = 50mA$, Pin 3 to 1	2.8	-	-	V
Reverse Leakage Current	I_R	$V_{RWM} = 2.5V$, $T = 25^\circ C$ Pin 3 to 1 or Pin 2 to 1	-	-	1	μA
Clamping Voltage	V_C	$I_{pp} = 1A$, $t_p = 8/20\mu s$ Pin 3 to 1	-	-	3.9	V
Clamping Voltage	V_C	$I_{pp} = 5A$, $t_p = 8/20\mu s$ Pin 3 to 1	-	-	7	V
Clamping Voltage	V_C	$I_{pp} = 1A$, $t_p = 8/20\mu s$ Pin 3 to 1	-	-	12.5	V
Clamping Voltage	V_C	$I_{pp} = 1A$, $t_p = 8/20\mu s$ Pin 2 to 1	-	-	8.5	V
Clamping Voltage	V_C	$I_{pp} = 1A$, $t_p = 8/20\mu s$ Pin 2 to 1	-	-	15	V
Junction Capacitance	C_j	Pin 3 to 1 and 2 (Pin 1 and 2 tied together) $V_R = 0V$, $f = 1MHz$	-	70	100	pF
Junction Capacitance	C_j	Pin 2 to 1 (pin 3 N.C.) $V_R = 0V$, $f = 1MHz$	-	5	10	pF
Steering Diode Characteristics						
Reverse Breakdown Voltage	V_{BR}	$I_T = 10\mu A$, Pin 3 to 2	40	-	-	V
Reverse Leakage Current	I_{RD}	$V_{RWM} = 2.5V$, $T = 25^\circ C$ Pin 3 to 2	-	-	1	μA
Forward Voltage	V_F	$I_F = 1A$, Pin 2 to 3	-	-	2	V

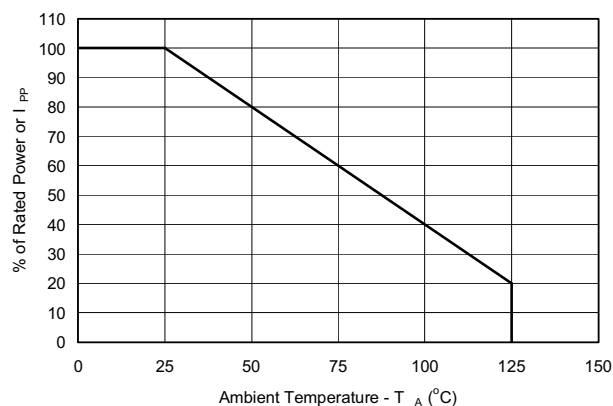
TVS/ESD Arrays - RLST23A2.82LV Series

Typical Characteristics

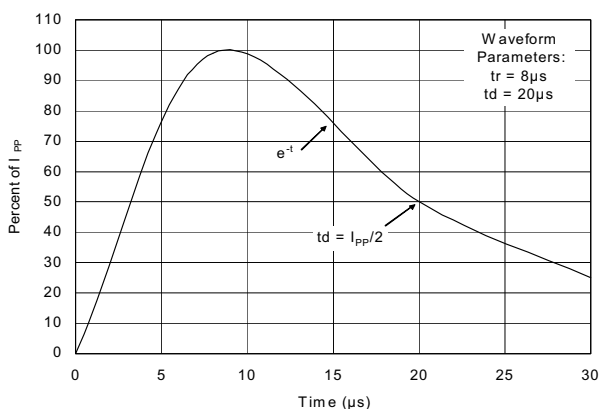
Non-Repetitive Peak Pulse Power vs. Pulse Time



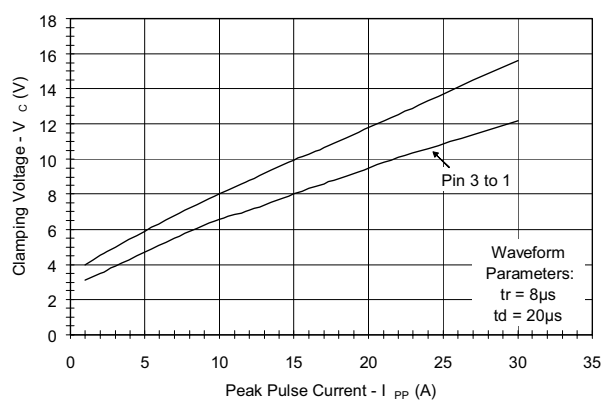
Power Derating Curve



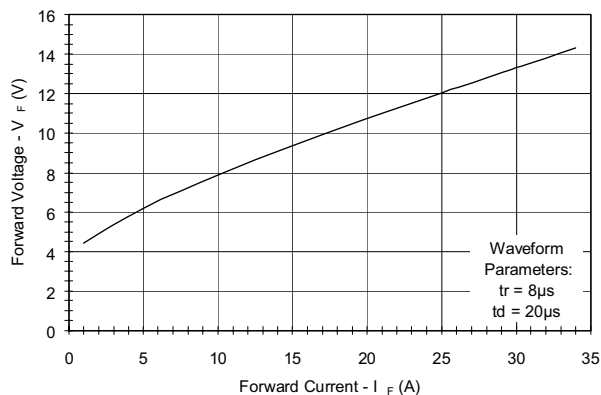
Pulse Waveform



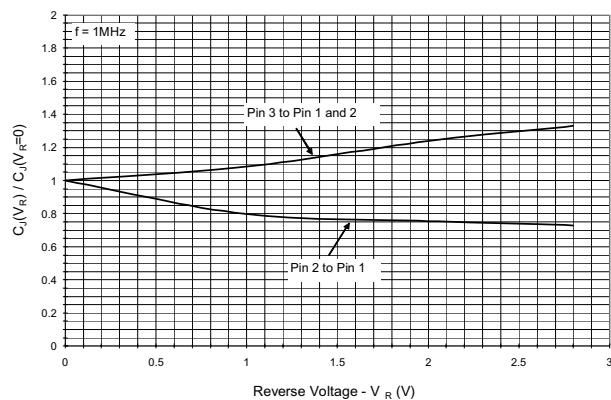
Clamping Voltage vs. Peak Pulse Current



Forward Voltage vs. Forward Current



Normalized Capacitance vs. Reverse Voltage



TVS/ESD Arrays - RLST23A2.82LV Series

Applications Information

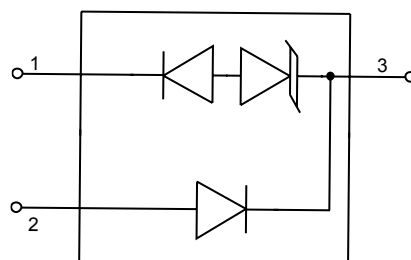
Device Connection Options

Electronic equipment is susceptible to transient disturbances from a variety of sources including: ESD to an open connector or interface, direct or nearby lightning strikes to cables and wires, and charged cables "hot plugged" into I/O ports. The RLST23A2.82LV is designed to protect sensitive components from damage and latchup which may result from such transient events. The RLST23A2.82LV can be configured to protect either one unidirectional line or two (one line pair) high-speed data lines. The options for connecting the devices are as follows:

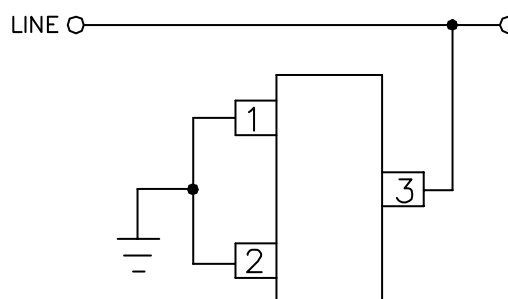
1. Protection of one unidirectional I/O line: Protection of one data line is achieved by connecting pin 3 to the protected line, and pins 1 and 2 to ground. This connection option will allow the device to operate on lines with positive polarity signal transitions (during normal operation). In this configuration, the device adds a maximum loading capacitance of 100pF. During positive duration transients, the internal TVS diode will be reversed biased and will act in the avalanche mode, conducting the transient current from pin 3 to 1. The transient will be clamped at or below the rated clamping voltage of the device. For negative duration transients, the internal steering diode is forward biased, conducting the transient current from pin 2 to 3. The transient is clamped below the rated forward voltage drop of the diode.

2. Low capacitance protection of one differential line pair: Protection of a high-speed differential line pair is achieved by connecting two devices in antiparallel. Pin 1 of the first device is connected to line 1 and pin 2 is connected to line 2. Pin 2 of the second device is connected to line 1 and pin 1 is connected to line 2 as shown. Pin 3 must be left open on both devices. During negative duration transients, the first device will conduct from pin 2 to 1. The steering diode conducts in the forward direction while the TVS will avalanche and conduct in the reverse direction. During positive transients, the second device will conduct in the same manner. In this configuration, the total loading capacitance is the sum of the capacitance (between pins 1 and 2) of each device (typically <10pF) making this configuration suitable for high-speed interfaces such as 10/100 Ethernet (See application note SI98-02).

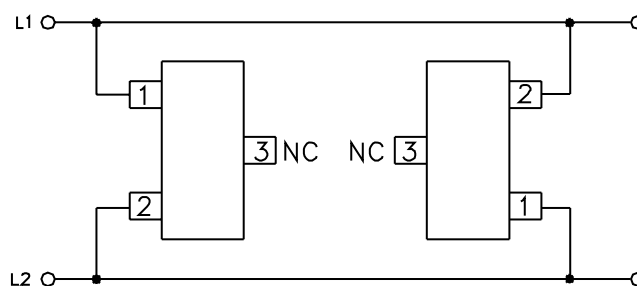
RLST23A2.82LV Circuit Diagram



Protection of one unidirectional line



Low capacitance protection of one high-speed line pair



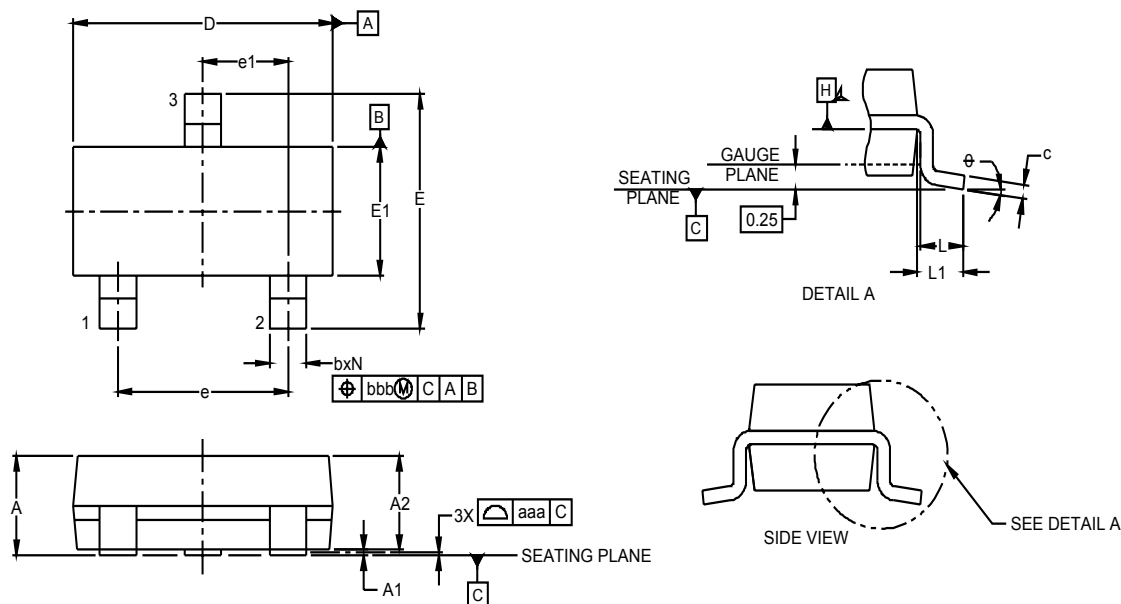
EPD TVS Characteristics

The RLST23A2.82LV is constructed using Semtech's proprietary EPD technology. The structure of the EPD TVS is vastly different from the traditional pn-junction devices. At voltages below 5V, high leakage current and junction capacitance render conventional avalanche technology impractical for most applications. However, by utilizing the EPD technology, the RLST23A2.82LV can effectively operate at 2.8V while maintaining excellent electrical characteristics.

The EPD TVS employs a complex npnn structure in contrast to the pn structure normally found in traditional silicon-avalanche TVS diodes. The EPD mechanism is achieved by engineering the center region of the device such that the reverse biased junction does

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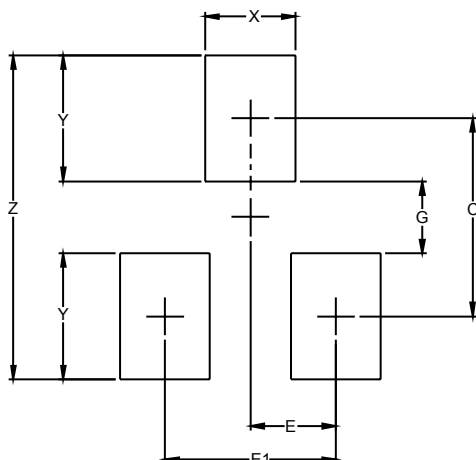
Package dimension SOT-23



Dimensions						
DIM	Inches			Millimeters		
	Min	Nom	Max	Min	Nom	Max
A	.035	-	.044	0.89	-	1.12
A1	-	-	.004	0.01	-	0.10
A2	.035	.037	.040	0.01	-	0.10
b	.012	-	.020	0.30	-	0.51
c	.003	-	.007	0.08	-	0.18
D	.110	.114	.120	2.80	2.90	3.04
E	.082	.093	.104	2.10	2.37	2.64
E1	0.47	.051	.055	1.20	1.30	1.40
e		.075			1.90 BCS	
e1		.037			0.95 BCS	
L	.015	.020	.024	0.40	0.50	0.60
L1		.022			(0.55)	
N		3			3	

TVS/ESD Arrays - RLST23A2.82LV Series

Land Pattern -SOT-23

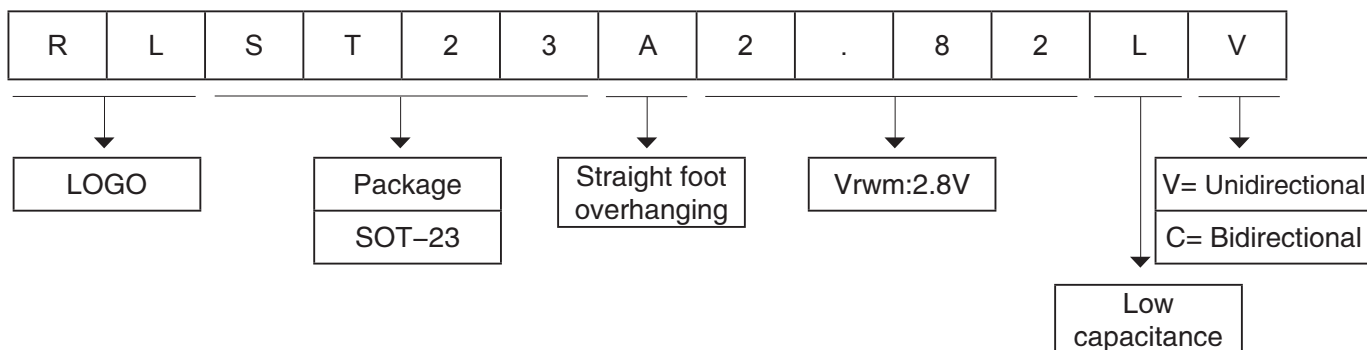


NOTES:

1. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY
CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR
COMPANY'S MANUFACTURING GUIDELINES ARE MET.
2. REFERENCE IPC-SM-782A.

DIM	DIMENSIONS	
	INCHES	MILLIMETERS
C	(.087)	(2.20)
E	.037	0.95
E1	.075	1.90
G	.031	0.80
X	.039	1.00
Y	.055	1.40
Z	.141	3.60

Part Number Code



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