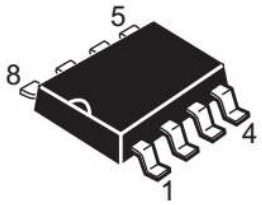
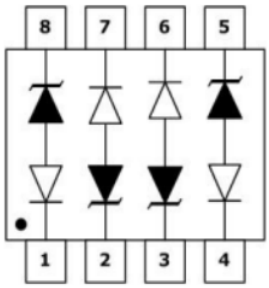
Low Capacitance TVS/ESD Diode Array For High-Speed Data Interfaces



Top View of SOP-8



Pin Configuration

Features

* 800 Watts Peak Pulse Power Per Line(tp=8/20us)
* Ultra Low Leakage :nA Level
* Low Clamping Voltage
* Operating Voltage : 3.3V, 5V, 12V, 24V, 36V
* Complies with following standards:
  IEC61000-4-2(ESD)+/-15KV(air), +/-8KV(contact)
  IEC61000-4-4(EFT) 40A (5/50ns)
  IEC61000-4-5 (Lightning) 24A (8/20us)
* RoHS Compliant

Applications

* USB 2.0 Power and Data Line Protection
* Set-top box and digital TV
* Digital video interface (DVI)
* Notebooks Computers, Desktops, and Servers
* SIM Ports and 10/100 Ethernet

Mechanical Characteristics

* Package: SOP-8
* Lead Finish: Lead Free
* UL Flammability Classification Rating 94V-0

Ordering Information

SESM8LC □ — □ □

- TR: Tape & Reel
- M8: SOP-8
- 03 : 3.3V
  05 : 5.0V
  12 : 12.0V
  24 : 24.0V
  36 : 36.0V

Ordering Code

Part Number	Device Marking	V_{RWM} (V)	Package	Shipping	Weight (mg)/pcs
SESM8LC03-M8TR	SM8LC03	3.3	SOP-8	2500pcs/Reel	9
SESM8LC05-M8TR	SM8LC05	5.0	SOP-8	2500pcs/Reel	9
SESM8LC12-M8TR	SM8LC12	12.0	SOP-8	2500pcs/Reel	9
SESM8LC24-M8TR	SM8LC24	24.0	SOP-8	2500pcs/Reel	9
SESM8LC36-M8TR	SM8LC36	36.0	SOP-8	2500pcs/Reel	9

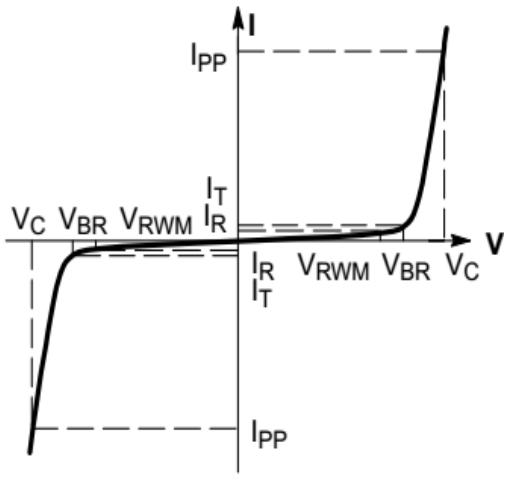
Absolute Maximum Ratings (T_A = 25'C unless otherwise note)

Parameter		Symbol	Limits	Unit
Peak Pulse Power (8X20us) @TA=25'C		P_{pp}(note 1)	800	W
Peak Pulse Voltage (IEC 61000-4-2)	Air	V_{ESD}	+/-15	KV
	Contact		+/-8	
ESD Voltage	Per human body model		16	KV
	Per machine model		400	V
Lead Soldering Temperature		T_L	260(10 sec.)	'C
Operating Junction Temperature Range		T_J	-55 to 125	'C
Storage Temperature Range		T_{stg}	-55 to 150	'C

Note 1: For a surge greater than the maximum values, the diode will fail in short-circuit.

Electrical Characteristics (T_A = 25'C unless otherwise note)

Symbol	Parameter
I_{pp}	Reverse Peak Pulse Current
V_C	Clamping Voltage @Ipp
V_{RWM}	Working Peak Reverse Voltage
I_R	Reverse Leakage Current @V_{RWM}
V_{BR}	Breakdown Voltage @I_T
I_T	Test Current
C_T	Max. Capacitance @V_R=0 and F=1MHz



Bi-Directional TVS

Order Code	V_{RWM}	V_{BR} at I_T note2	I_T	V_C	V_C		I_R	C_T
	max.	max.	-	@1A	max.	(@ A)	Max.	Typ.
	V	V	mA	V	V	A	uA	pF
SESM8LC03	3.3	4.5	1	7.0	20.0	45	50	15
SESM8LC05	5.0	6.0	1	10.0	24.0	37	10	15
SESM8LC12	12.0	13.3	1	19.0	33.0	25	1	15
SESM8LC24	24.0	26.7	1	40.0	57.0	15	1	15
SESM8LC36	36.0	40.0	1	53.0	72.0	10	1	15

Note 2: VBR is measured with a pulse test current IT at an ambient temperature of 25'C

IEC 61000−4−2 Spec.

Level	Test Voltage (kV)	First Peak Current (A)	Current at 30 ns (A)	Current at 60 ns (A)
1	2	7.5	4	2
2	4	15	8	4
3	6	22.5	12	6
4	8	30	16	8

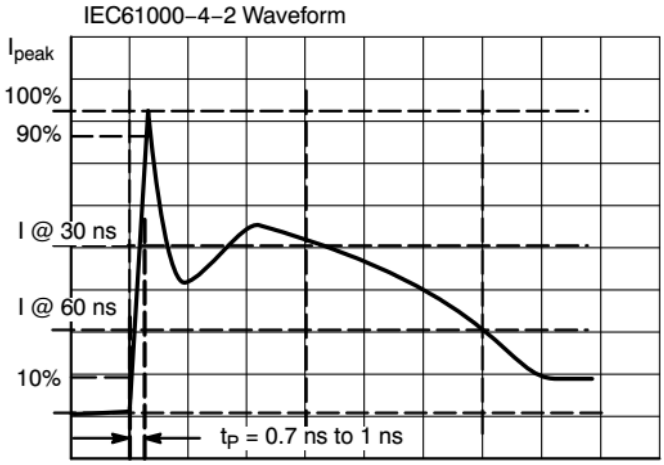


Figure 1. IEC61000−4−2 Spec

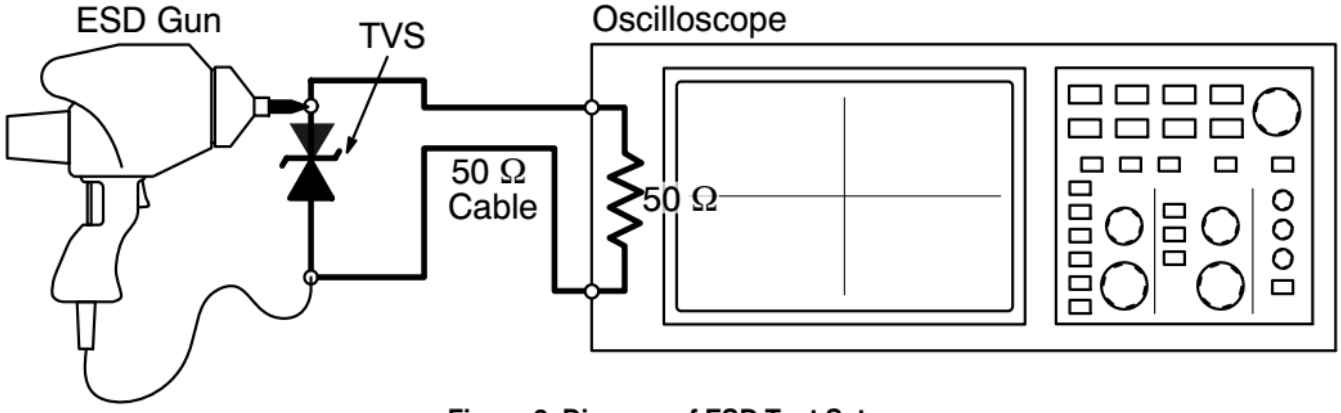


Figure 2. Diagram of ESD Test Setup

The following is taken from Application Note AND8308/D − Interpretation of Datasheet Parameters for ESD Devices.

ESD Voltage Clamping

For sensitive circuit elements it is important to limit the voltage that an IC will be exposed to during an ESD event to as low a voltage as possible. The ESD clamping voltage is the voltage drop across the ESD protection diode during an ESD event per the IEC61000−4−2 waveform. Since the IEC61000−4−2 was written as a pass/fail spec for larger systems such as cell phones or laptop computers it is not clearly defined in the spec how to specify a clamping voltage at the device level. Star wing Semiconductor has developed a way to examine the entire voltage waveform across the ESD protection diode over the time domain of an ESD pulse in the form of an oscilloscope screenshot, which can be found on the datasheets for all ESD protection diodes.For more information on how Star wing Semiconductor creates these screenshots and how to interpret them please refer to AND8307/D.

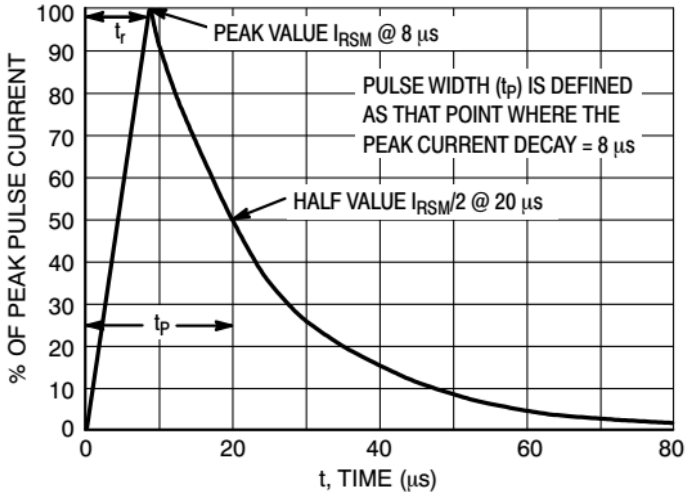


Figure 3. 8 X 20 μs Pulse Waveform

Typical Characteristics (T_J = 25'C unless otherwise noted)

Figure 4. Pulse Derating Curve

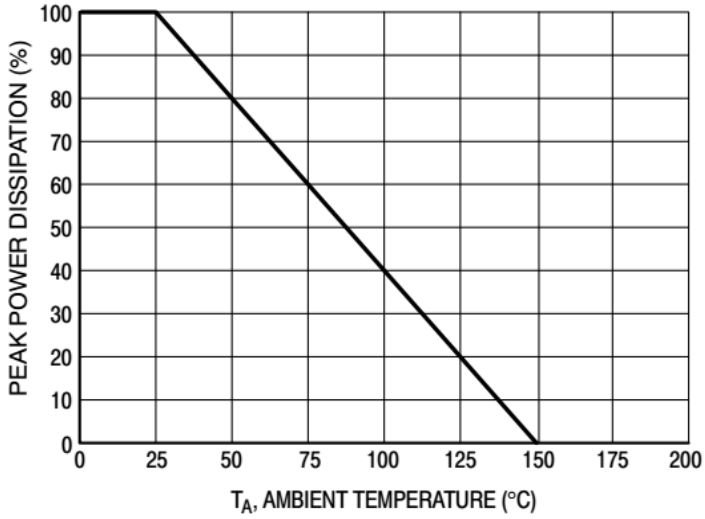


Figure 5. Junction Capacitance vs Reverse Voltage

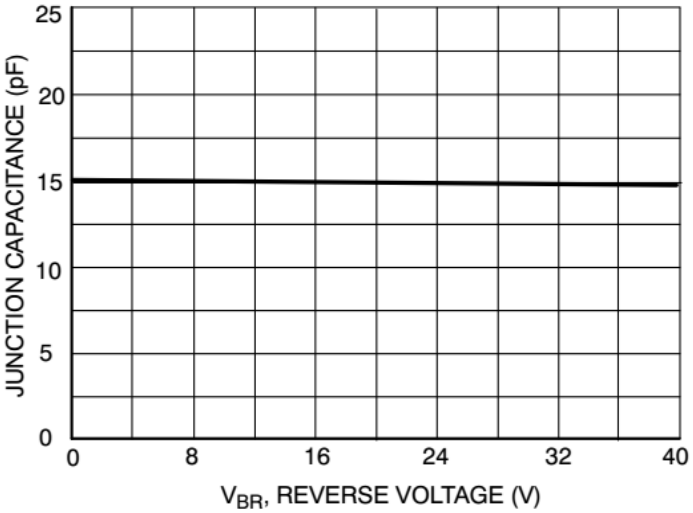
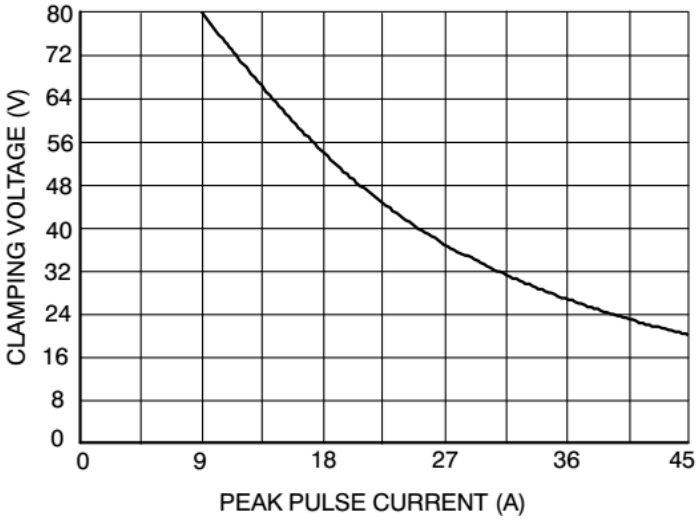


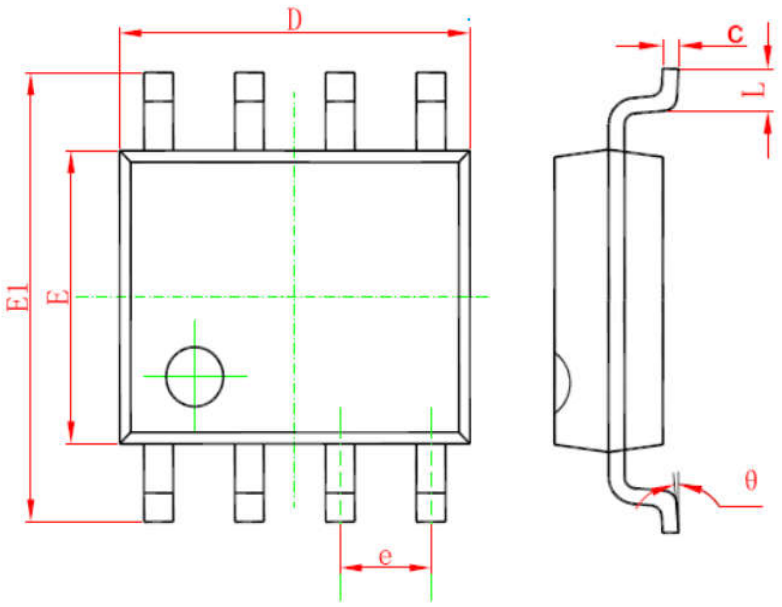
Figure 6. Clamping Voltage vs. Peak Pulse Current (8 x 20 μs Waveform)



Package Dimensions

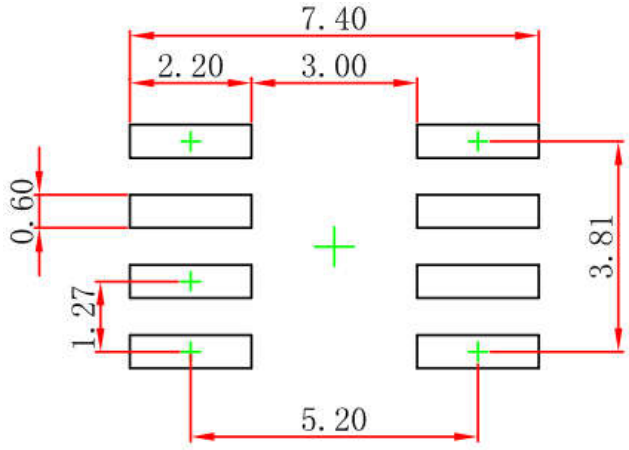
PKG: SOP-8

UNIT: mm



Symbol	Millimeters			Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.35	-	1.75	0.053	-	0.069
A1	0.100	-	0.250	0.004	-	0.010
A2	1.35	1.45	1.55	0.053	0.057	0.061
b	0.330	-	0.510	0.013	-	0.020
c	0.170	-	0.250	0.006	-	0.010
D	4.70	4.90	5.10	0.185	0.193	0.200
E1	5.80	6.00	6.20	0.228	0.236	0.244
E	3.80	3.90	4.00	0.150	0.154	0.157
e	1.27 BSC			0.050 BSC		
L	0.40	-	1.27	0.016	-	0.050
θ	0^0	-	8^0	0^0	-	8^0

SOP-8 Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.