2-Line Ultra-Low Capacitance TVS Diode Array

Description

The SESDM5V0T143 is a 2-line ultra-low capacitance TVS diode array, to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines. The SESDM5V0T143 has a very low capacitance with a typical value at 0.4pF, and complies with the IEC 61000-4-2 (ESD) with ±15Kv air and ±8kV contact discharge. It is assembled into a 4-pin SOT-143 lead-free package. The small size, very low capacitance and high ESD protection make SESDM5V0T143 an ideal choice to protect cell phone, digital video interfaces, high speed data ports, and many other portable applications.

Features

- Ultra low capacitance: 0.4pF typical
- Ultra low leakage: nA level
- Operating voltage: 5V
- Low clamping voltage
- 4-pin SOT-143 package
- Protects two data lines and one power line
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test
    Air discharge: ±15kV
    Contact discharge: ±8kV
  - IEC61000-4-5 (Lightning) 6.5A (8/20μs)
- RoHS Compliant

Ordering Information

Part Number	Shipping	Reel Size
SESDM5V0T143	3000/Tape & Reel	7 inch

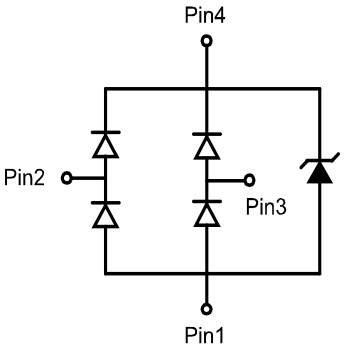
Mechanical Characteristics

- Package: SOT-143
- Lead Finish: Matte Tin
- Case Material: “Green” Molding Compound
- Moisture Sensitivity: Level 3 per J-STD-020

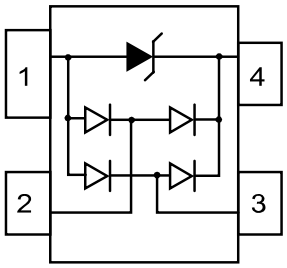
Applications

- FireWire & USB
- Sensitive Analog Inputs
- Portable Electronics
- LAN/WAN equipment
- Video Line Protection
- Microcontroller Input Protection

Dimensions and Pin Configuration



Circuit Diagram



Pin Schematic

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Absolute Maximum Ratings (T_A=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	P_{PK}	100	W
Peak Pulse Current (8/20μs)	I_{PP}	6.5	A
ESD per IEC 61000−4−2 (Air)	V_{ESD}	±15	kV
ESD per IEC 61000−4−2 (Contact)		±8	
Operating Temperature Range	T_{OP}	−55 to +125	℃
Storage Temperature Range	Tstg	−55 to +150	℃

Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			5	V	Any I/O pin to ground
Breakdown Voltage	V_{BR}	6			V	I_T = 1mA, any I/O pin to ground
Reverse Leakage Current	I_R			20	nA	V_{RWM} = 5V, any I/O pin to ground
Clamping Voltage	V_C			10	V	I_{PP} = 1A (8 x 20μs pulse), any I/O pin to ground
Clamping Voltage	V_C		16	17.6	V	I_{PP} =6.5A (8 x 20μs pulse), any I/O pin to ground
Junction Capacitance	C_J		0.8	1.0	pF	V_R = 0V, f = 1MHz, between I/O pins
Junction Capacitance	C_J		0.4	0.6	pF	V_R = 0V, f = 1MHz, any I/O pin to ground

Note 1: I/O pins are pin 2 & 3

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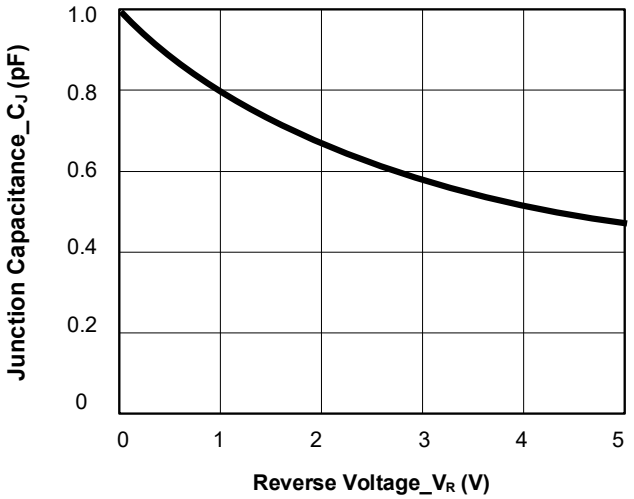
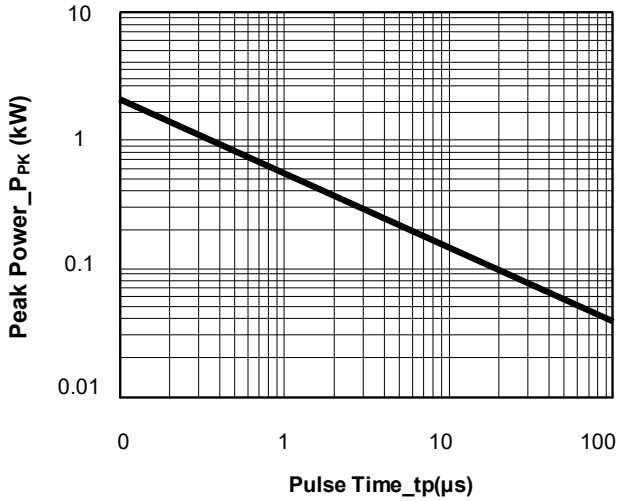
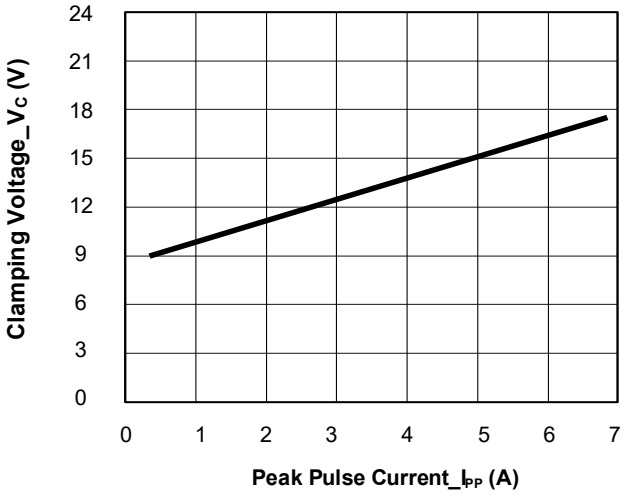
Typical Performance Characteristics (T_A=25°C unless otherwise Specified)



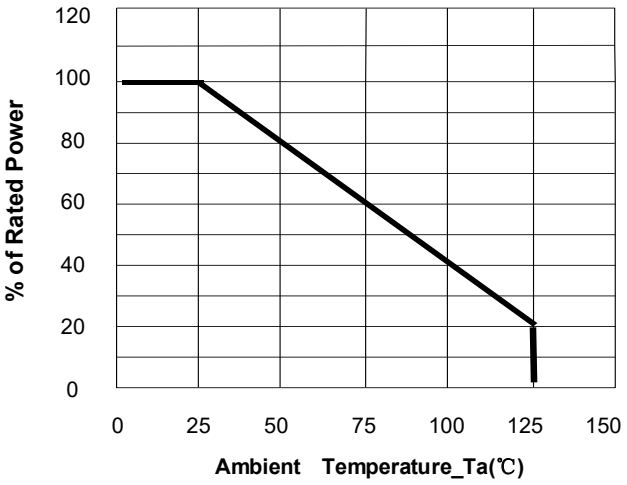
Junction Capacitance vs. Reverse Voltage



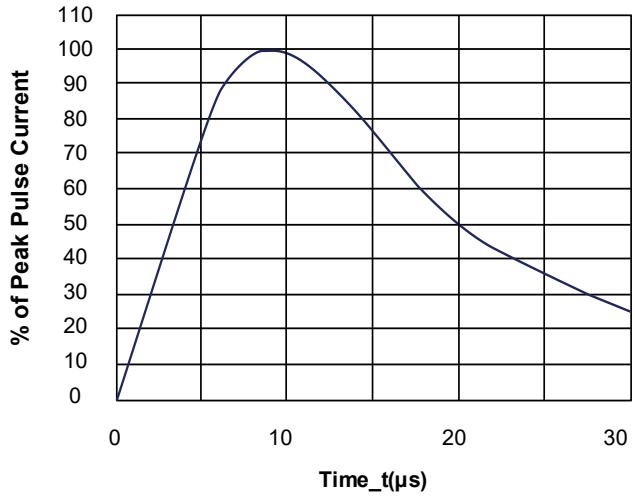
Peak Pulse Power vs. Pulse Time



Clamping Voltage vs. Peak Pulse Current



Power Derating Curve



8/20μs Pulse Waveform

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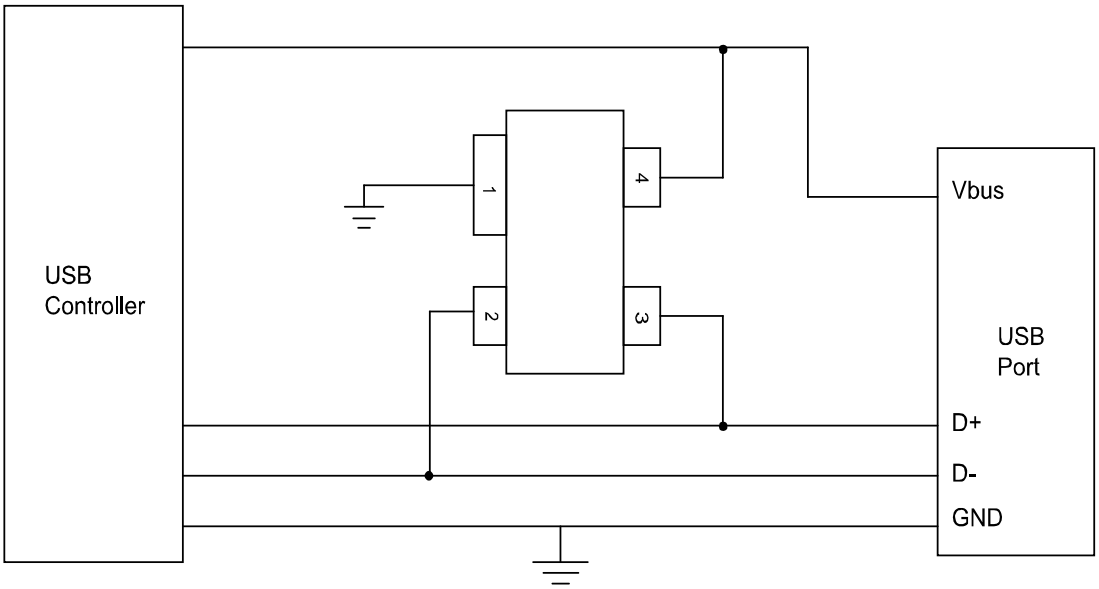
SESDM5V0T143 on USB Port Application

The SESDM5V0T143 can be used to protect the USB port on the monitors, computers, peripherals or portable systems. The ESD protection scheme for single USB ports is shown below figure, the voltage bus (V_{BUS}) of USB port is connected to the power pin (pin4) of SESDM5V0T143. Each data line (D+/D-) of USB port is connected to the ESD protection pin (pin2/pin3) of SESDM5V0T143. When ESD voltage pulse appears on the data line, the ESD pulse current will be conducted by SESDM5V0T143 away from the USB controller chip. In addition, the ESD pulse current also can be conducted by SESDM5V0T143 away from the USB controller chip when the ESD voltage pulse appears on the voltage bus (VBUS) of USB port. Therefore, the data lines (D+/D-) and voltage bus (V_{BUS}) of two USB ports are complementally protected with one SESDM5V0T143.



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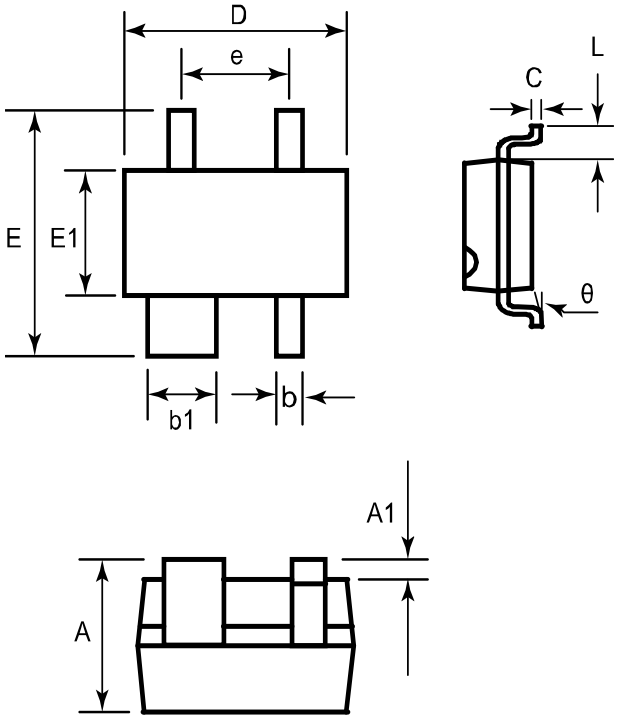
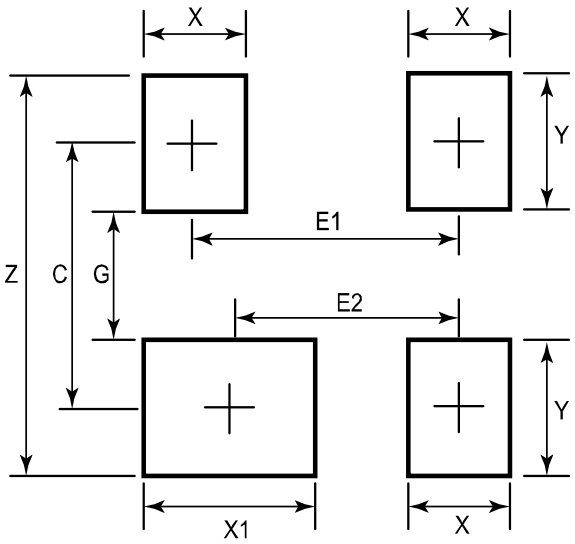
SOT-143 Package Outline Drawing



SYM	DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80		1.22	0.031		0.048
A1	0.013		0.15	0.00		0.006
b	0.30		0.51	0.011		0.020
b1	0.76		0.94	0.029		0.037
C	0.08		0.20	0.003		0.008
D	2.80	2.90	3.04	0.110	0.114	0.120
E	2.10	2.37	2.64	0.082	0.093	0.104
E1	1.20	1.30	1.40	0.047	0.051	0.055
e	1.92 BSC			0.075BSC		
L	0.54 BSC			0.021BSC		
θ	0°		8°	0°		8°

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
C	2.20	0.087
E1	1.92	0.076
E2	1.72	0.068
G	0.80	0.031
X	1.00	0.039
X1	1.20	0.047
Y	1.40	0.055
Z	3.60	0.141

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