ESDA5U0R0T4

2-Line Uni-directional TVS Diode

Features

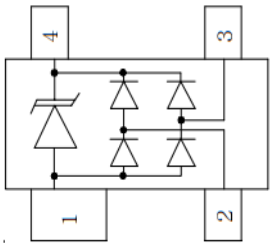
- Ultra low capacitance: 0. 6pF typical
- Ultra low leakage: nA level
- Low operating voltage: 5.0V
- Up to 2 data lines and one power line protects
- Low clamping voltage
- Complies with following standards:
- – IEC 61000-4-2 (ESD) immunity test

  Air : ±20kV; discharge: ±15kV
- – IEC61000-4-5 (Lightning) 4A (8/20μs)
- SOT-143Package
- RoHS Compliant

Description

The ESDA5U0R0T4 is an ultra low capacitance TVS array, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines.ESDA5U0R0T4 has an ultra-low capacitance with a typical value at 0.6pF, and complies with the IEC 61000-4-2 (ESD) standard with ±30kV air and ±30kV contact discharge. It is assembled into a 6-pin lead-free SOT-143package. The combination of small size, ultra low capacitance, and high ESD surge capability make it ideal for use in applications such as multimedia, and other high speed ports.

Circuit Diagram



Applications

- USB 2.0
- Set-top box and Digital TV
- Video graphics cards
- Digital Video Interface (DVI)
- Notebook Computers
- PCI Express and Serial SATA Ports

Limiting Values(T_A = 25 °C, unless otherwise specified)

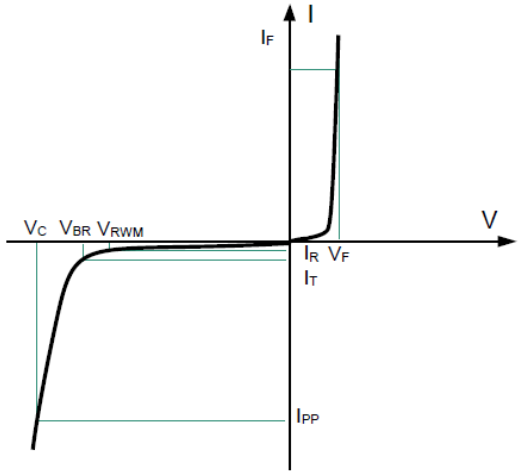
Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs,I/O-GND)	Ppk	60	W
Peak Pulse Power (8/20μs,Vcc-GND)	Ppk	270	W
Peak Pulse Current (8/20μs,I/O-GND)	IPP	4.0	A
Peak Pulse Current (8/20μs,Vcc-GND)	IPP	15.0	A
ESD per IEC 61000−4−2 (Air) ESD per IEC 61000−4−2 (Contact)	$V_{ESD,VDD}$ $V_{ESD,I/O}$	±20 ±15	kV
Operating Temperature Range	TJ	−55 to +125	°C
Storage Temperature Range	Tstg	−55 to +150	°C

Electrical Characteristics(T_A = 25 °C)

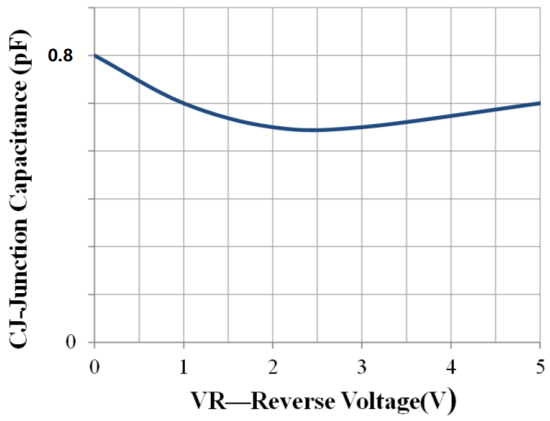
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}	Pin 5 to GND,I/O-GND			5. 0	V
Breakdown Voltage	V_{BR}	I_T = 1mA，I/O-GND	6.5	7.4	8.0	V
Breakdown Voltage	V_{BR}	I_T = 1mA，I/O-I/O	7.0	8.3	9.0	V
Breakdown Voltage	V_{BR}	I_T = 1mA，VCC-GND	6.0	7.0	8.0	V
Reverse Leakage Current	I_R	V_{RWM} = 5V			0.1	μA
Clamping Voltage	V_C	I_{PP} = 1A (8 / 20μs pulse)，I/O-GND		8.0	12.0	V
Clamping Voltage	V_C	I_{PP} = 4A (8 / 20μs pulse)，I/O-GND		11.0	15.0	V
Clamping Voltage	V_C	I_{PP} = 1A (8 / 20μs pulse)，I/O-I/O		10.0	12.0	V
Clamping Voltage	V_C	I_{PP} = 4A (8 / 20μs pulse)，I/O-I/O		19.0	21.0	V
Clamping Voltage	V_C	I_{PP} = 1A (8 / 20μs pulse)，VCC-GND		7.5	9.0	V
Clamping Voltage	V_C	I_{PP} = 15A (8 / 20μs pulse)，VCC-GND			18.0	V
Junction Capacitance	C_J	VR = 0V, f = 1MHz，I/O-GND		0.6	0.8	pF
Junction Capacitance	C_J	VR = 0V, f = 1MHz，I/O-I/O		0.3	0.4	pF

Portion Electronics Parameter

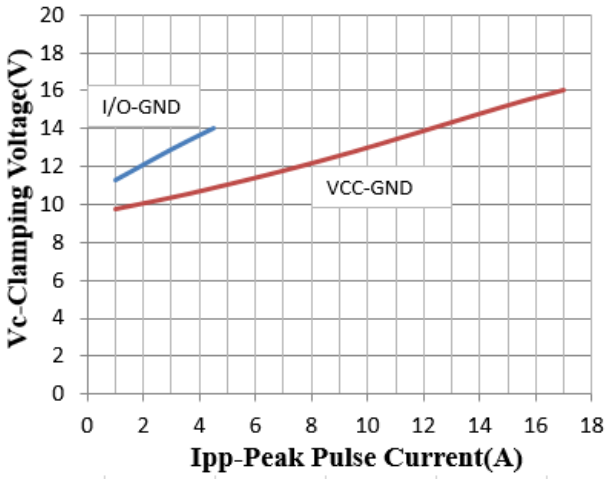
Symbol	Parameter
V_{RWM}	Peak Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @I_T
I_T	Test Current
I_{PP}	Maximum Reverse Peak Pulse Cur-
V_C	Clamping Voltage @I_{PP}
V_F	Forward Voltage @I_F



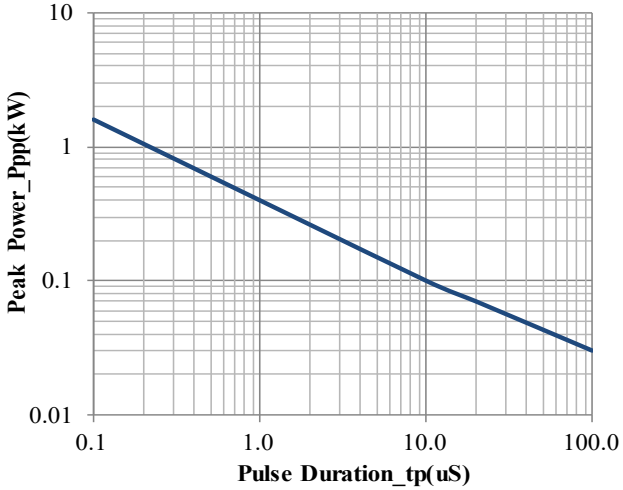
Typical Characteristics



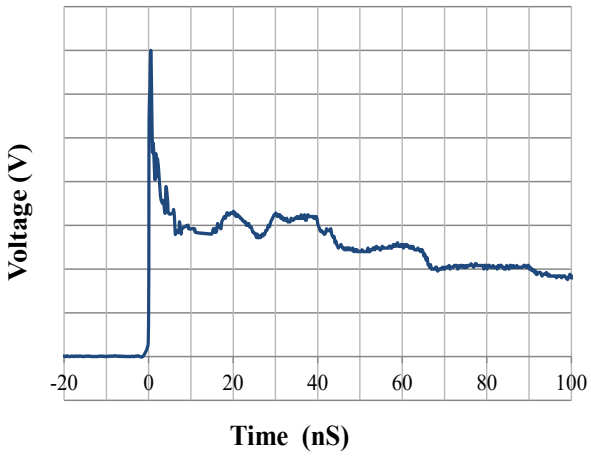
Junction Capacitance vs. Reverse Voltage



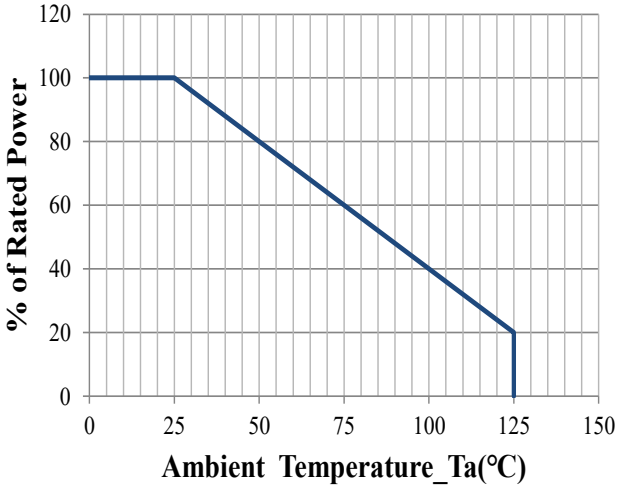
Clamping Voltage vs. Peak Pulse Current



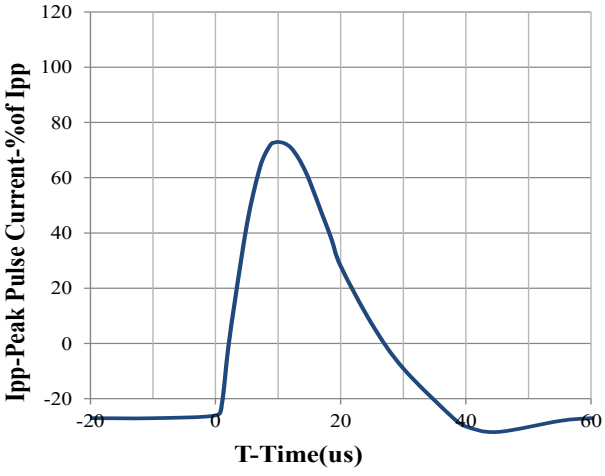
Peak Pulse Power vs. Pulse Time



IEC61000−4−2 Pulse Waveform



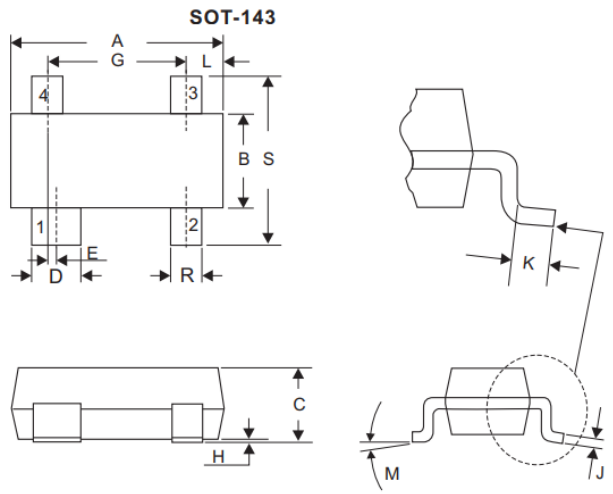
Power Derating Curve



8 / 20us Pulse Waveform

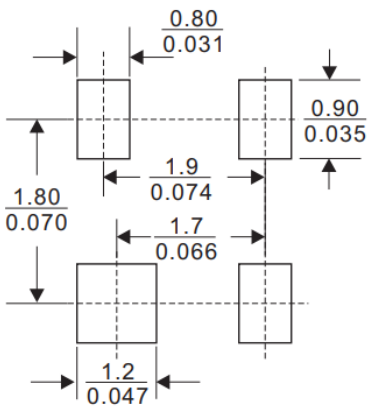
Package Dimension

SOT-143 Package Outline Drawing



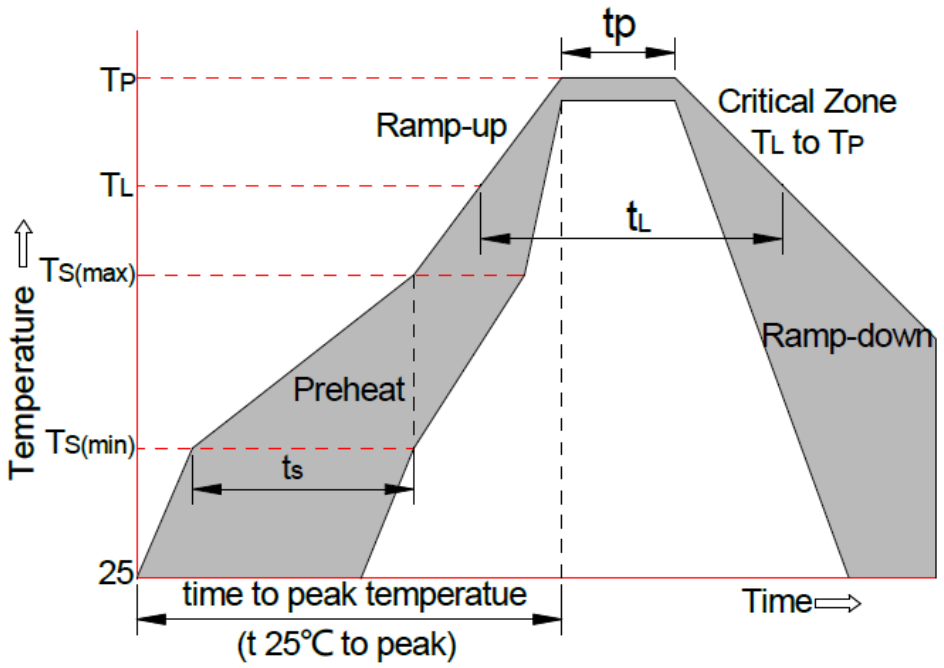
SYM	DIMENSIONS			
	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.667	3.048	0.105	0.120
B	1.194	1,397	0.047	0.055
C	0.787	1.194	0.031	0.047
D	0.762	0.965	0.03	0.038
G	1.803	2.007	0.071	0.079
H	0.025	0.127	0.001	0.005
J	0.086	0.152	0.0034	0.006
K	0.102	0.305	0.004	0.012
L	0.45	0.6	0.018	0.024
M	0°	10°	0°	10°
R	0.356	0.559	0.014	0.022
S	2.083	2.489	0.082	0.098
E	0.2BSC		0.008 BSC	

Suggested Land Pattern



Dimensions in (millimeters / inches)

Soldering Parameters



Reflow Condition		Pb-Free Assembly
Pre-heat	-Temperature Min ($T_{s\,(min)}$)	+150°C
	-Temperature Max ($T_{s\,(max)}$)	+200°C
	-Time (Min to Max) (ts)	60-180 secs
Average ramp up rate(Liquid us Temp (T_L) to peak)		3°C/sec. Max
$T_{s\,(max)}$ to T_L-Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature (T_L) (Liquid us)	+217°C
	-Temperature (t_L)	60-150 secs
Peak Temp (Tp)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (tp)		30 secs. Max
Ramp-down Rate		6 °C/secs. Max
xTime 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C