

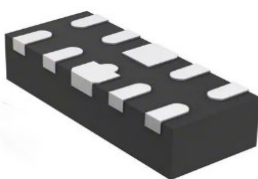
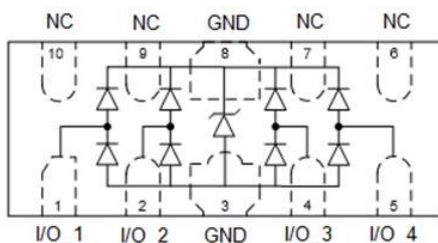
Features

- ◆ Ultra low capacitance: 0.6pF typical
- ◆ Ultra low leakage: nA level
- ◆ Low operating voltage: 5V
- ◆ Low clamping voltage
- ◆ Up to 4 lines protects
- ◆ Leadless flow-through package
- ◆ Complies with following standards:
 - ◆ – IEC 61000-4-2 (ESD) immunity test
 - ◆ Air discharge: $\pm 20\text{kV}$
 - ◆ Contact discharge: $\pm 15\text{kV}$
 - ◆ – IEC61000-4-5 (Lightning) 4A (8/20 μs)
- ◆ RoHS Compliant
- ◆ Package: DFN2510-10 (2.5 \times 1.0 \times 0.5mm)

Description

The ESDA5U0R0D4 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. ESDA5U0R0D4 has an ultra-low capacitance with a typical value at 0.6pF, and complies with the IEC 61000-4-2 (ESD) standard with $\pm 15\text{kV}$ air and $\pm 8\text{kV}$ contact discharge. It is assembled into a 10-pin 2.5x1.0x0.5mm lead-free DFN package. The flow through style package allows for easy PCB layout and matched trace lengths necessary to maintain consistent impedance between high speed differential lines such as USB 3.0 and HDMI. The small size, ultra-low capacitance and high ESD surge protection make ESDA5U0R0D4 an ideal choice to protect HDMI, MDDI, USB 3.0 and other high speed ports.

Circuit Diagram



Applications

- ◆ HDMI 1.4& 2.0, USB 2.0 & 3.0 and MDDI ports
- ◆ Monitors and flat panel displays
- ◆ Set-top box and Digital TV
- ◆ Video graphics cards
- ◆ Digital Video Interface (DVI)
- ◆ Notebook Computers
- ◆ PCI Express and Serial SATA Ports

Absolute Maximum Ratings : ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

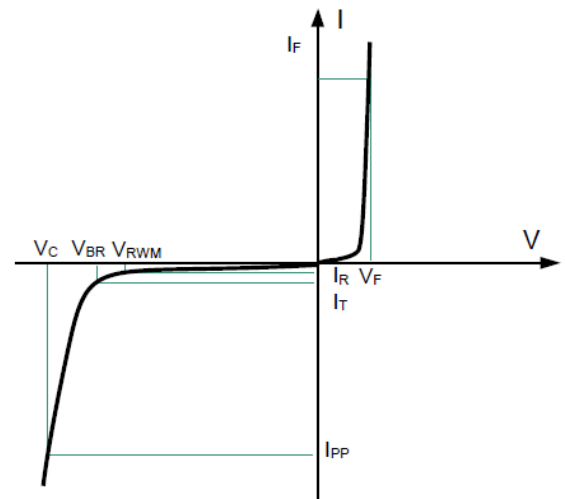
Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 μs)	Ppk	60	W
Peak Pulse Current (8/20 μs)	IPP	4	A
ESD per IEC 61000-4-2 (Air)	VESD	± 20	kV
ESD per IEC 61000-4-2 (Contact)		± 15	
Operating Temperature Range	TJ	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}\text{C}$

Electrical Characteristics : ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

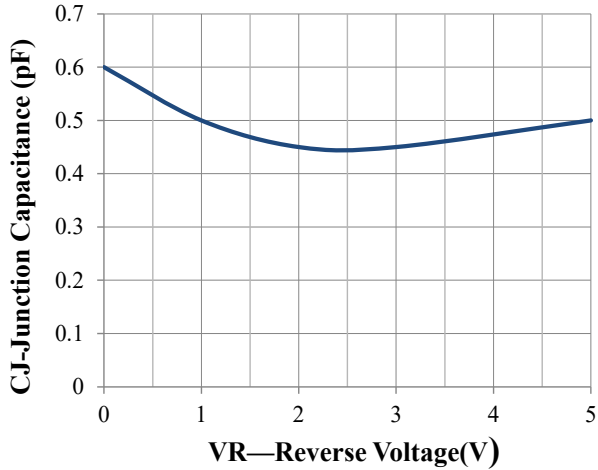
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				5.0	V
Breakdown Voltage	V_{BR}	$I_T = 1\text{mA}$ I/O-GND	6.5	7.4	8.0	V
Breakdown Voltage	V_{BR}	$I_T = 1\text{mA}$ I/O-I/O	7.0	8.3	9.0	V
Reverse Leakage Current	I_R	$V_{RWM} = 5.0\text{V}$		5	50	nA
Clamping Voltage	V_C	$I_{PP} = 1\text{A}$ I/O-GND(8 / 20 μs pulse)			12	V
Clamping Voltage	V_C	$I_{PP} = 4\text{A}$ I/O-GND(8 / 20 μs pulse)			15	V
Clamping Voltage	V_C	$I_{PP} = 1\text{A}$ I/O-I/O(8 / 20 μs pulse)			12	V
Clamping Voltage	V_C	$I_{PP} = 4\text{A}$ I/O-I/O(8 / 20 μs pulse)			18	V
Junction Capacitance	C_J	$V_R = 0\text{V}$, $f = 1\text{MHz}$, I/O-GND		0.6	0.8	pF
Junction Capacitance	C_J	$V_R = 0\text{V}$, $f = 1\text{MHz}$, I/O-I/O		0.3	0.4	pF

Portion Electronics Parameter

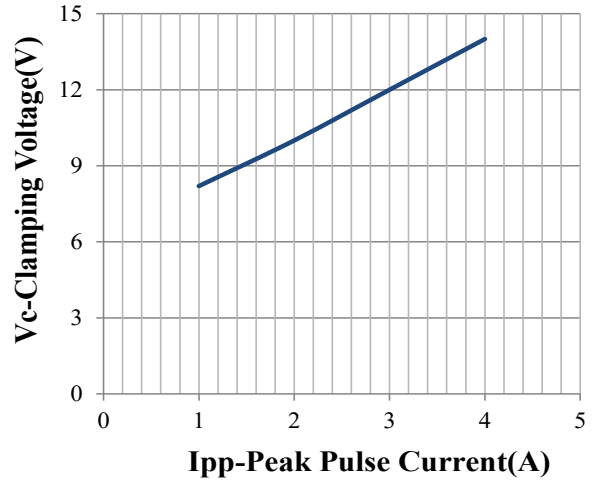
Symbol	Parameter
V_{RWM}	Peak Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_F	Forward Voltage @ I_F



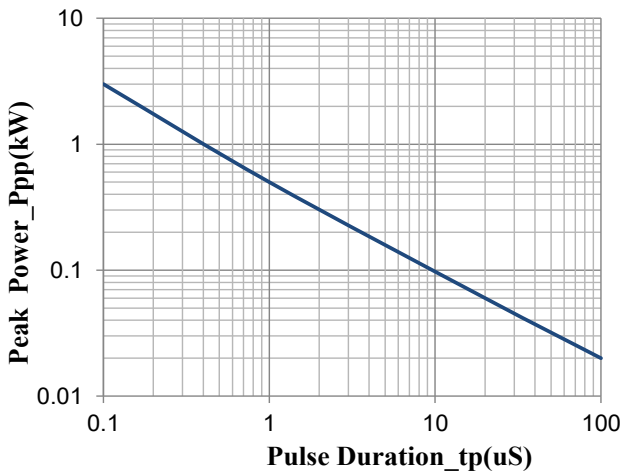
Typical Characteristics: ($T_C=25^{\circ}C$ unless otherwise noted)



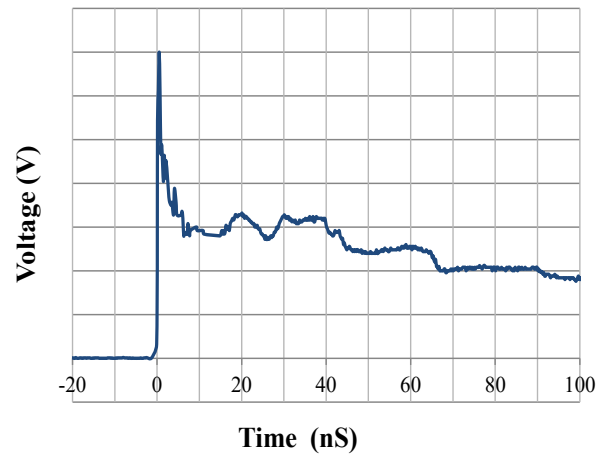
Junction Capacitance vs. Reverse Voltage



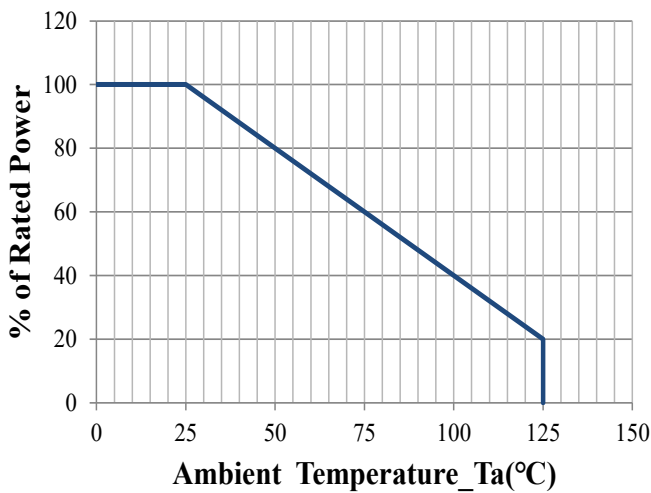
Clamping Voltage vs. Peak Pulse Current



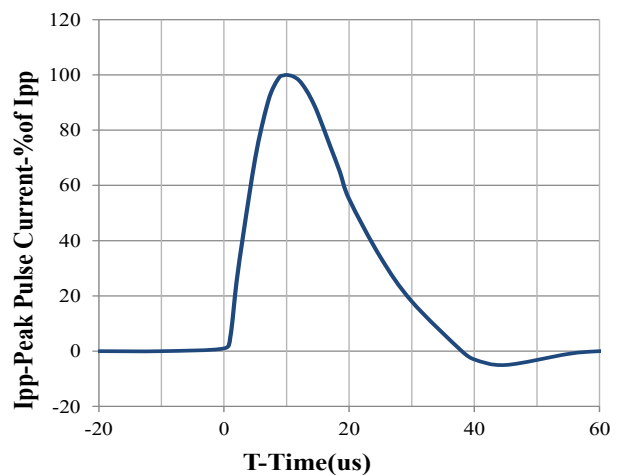
Peak Pulse Power vs. Pulse Time



IEC61000-4-2 Pulse Waveform

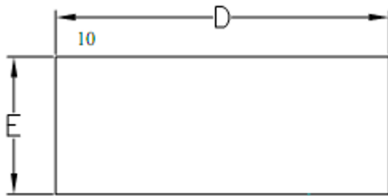


Power Derating Curve

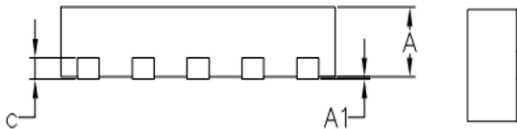


8 X 20us Pulse Waveform

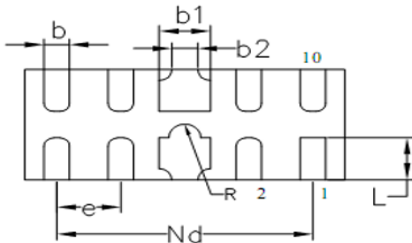
DFN2510-10 Package Outline Drawing



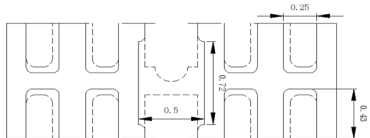
TOP VIEW



SIDE VIEW

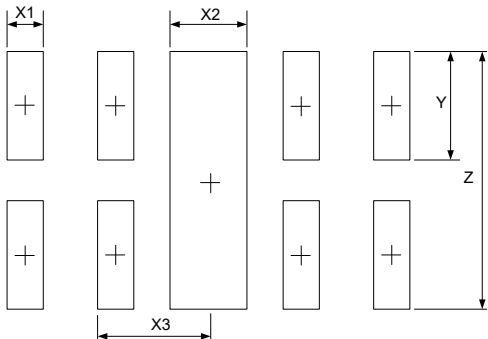


BOTTOM VIEW



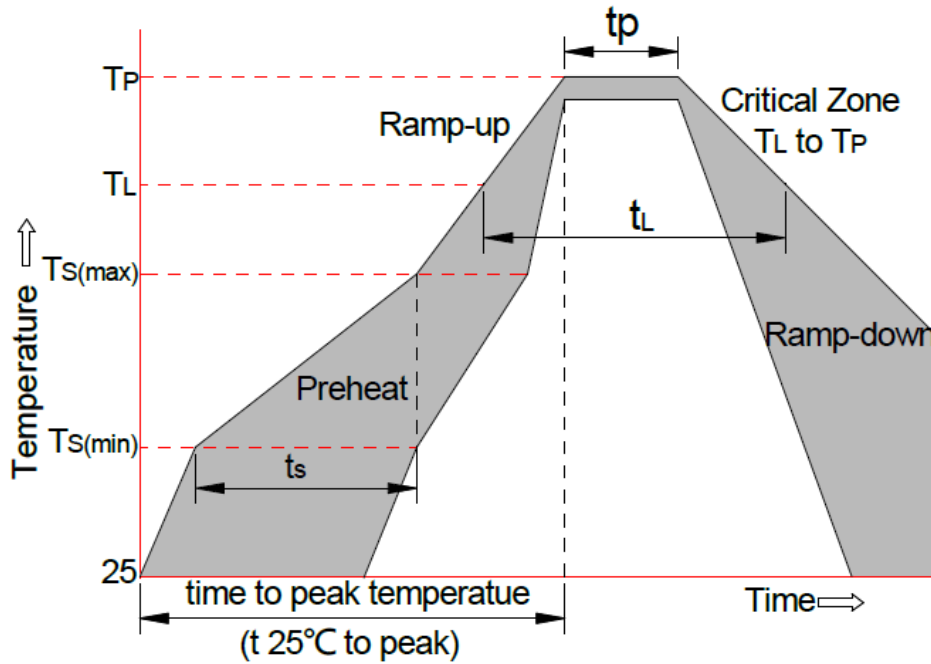
SYM	DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.45	0.50	0.55	0.018	0.020	0.022
A1	0.00	0.02	0.05	0.000	0.001	0.002
b	0.15	0.20	0.25	0.006	0.008	0.010
b1	0.35	0.40	0.45	0.014	0.016	0.018
b2	0.20REF			0.008REF		
c	0.15 REF			0.006 REF		
D	2.45	2.50	2.55	0.098	0.100	0.102
e	0.50BSC			0.020BSC		
Nd	2.00BSC			0.080BSC		
E	0.95	1.00	1.05	0.038	0.040	0.042
L	0.35	0.40	0.45	0.014	0.016	0.018

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
X1	0.200	0.008
X2	0.400	0.016
X3	0.500	0.020
Y	0.600	0.024
Z	1.400	0.056

Soldering Parameters



Reflow Condition		Pb-Free Assembly
Pre-heat	-Temperature Min (Ts (min))	+150°C
	-Temperature Max (Ts (max))	+200°C
	-Time (Min to Max) (ts)	60-180 secs
Average ramp up rate(Liquid us Temp (TL) to peak)		3°C/sec. Max
Ts (max) to TL-Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature (TL) (Liquid us)	+217°C
	-Temperature (tL)	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 (TP)		8 min. Max
Do not exceed		+260°C