4-Line Low Capacitance TVS Diode Array

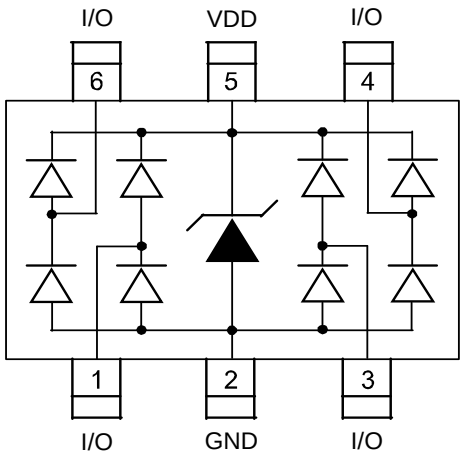
Description

The PESDR0554S2-35A is a low capacitance TVS 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 PESDR0554S2-35A has an ultra-low capacitance with a typical value at 2.0pF, 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-23-6 package. The low capacitance array make it ideal for four high speed data and transmission line. This device is optimized for ESD protection of portable electronics.

Features

- Low capacitance: 2.0pF typical (I/O to I/O)
- Ultra low leakage: nA level
- Low operating voltage: 5V
- Low clamping voltage
- Up to 4 lines and one power line protects
- Complies with following standards:
  - —IEC 61000-4-2 (ESD) immunity test
    - Air discharge: ±30kV
    - Contact discharge: ±30kV
  - —IEC61000-4-4 (EFT) 40A (5/50ns)
  - —IEC61000-4-5 (Lightning) 35A (8/20μs)
- RoHS Compliant

Dimensions and Pin Configuration



Circuit and Pin Schematic

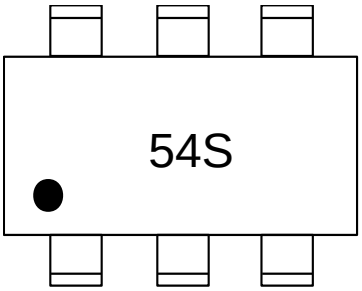
Mechanical Characteristics

- Package: SOT-23-6
- Lead Finish: Matte Tin
- Case Material: “Green” Molding Compound
- Moisture Sensitivity: Level 3 per J-STD-020
- Marking Information: See Below

Applications

- Video/Graphics Card
- Digital Visual Interface (DVI)
- USB2.0 Power and Data lines protection
- Notebook and PC Computers
- Monitors and Flat Panel Displays

Marking Information



54S = Device Marking Code

Dot denotes Pin1

Ordering Information

Part Number	Shipping	Reel Size
PESDR0554S2-35A	3000/Tape & Reel	7 inch

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

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	P_{PK}	870	W
Peak Pulse Current (8/20μs)	I_{PP}	35	A
ESD per IEC 61000−4−2 (Air)	V_{ESD}	±30	kV
ESD per IEC 61000−4−2 (Contact)		±30	
Operating Temperature Range	T_J	−55 to +125	°C
Storage Temperature Range	T_{stg}	−55 to +150	°C

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

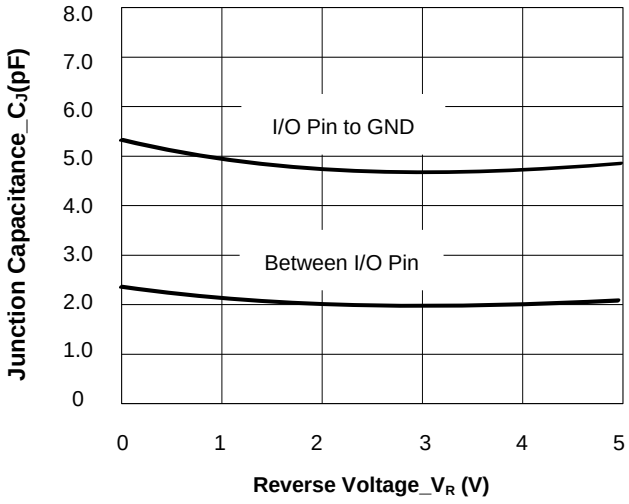
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			5.0	V	Any I/O pin to ground
Breakdown Voltage	V_{BR}	6.0			V	I_T = 1mA, any I/O pin to ground
Reverse Leakage Current	I_R			500	nA	V_{RWM} = 5V, any I/O pin to ground
Forward Voltage	V_F	0.5	1.0	1.0	V	I_T=10mA
Clamping Voltage	V_C			25	V	I_{PP} = 35A (8/20μs pulse), any I/O pin to ground
Dynamic Resistance[1,2]	R_{DYN}		0.09		Ω	T_{LP}=0.2/100ns
ESD Clamping Voltage [1]	V_C		8.5		V	I_{PP} = 4A, tp = 0.2/100ns (TLP)
ESD Clamping Voltage [1]	V_C		9.6		V	I_{PP} = 16A, tp = 0.2/100ns (TLP)
Junction Capacitance	C_J		2.0	2.5	pF	V_R = 0V, f = 1MHz, between I/O pins
Junction Capacitance	C_J		4.5	5.0	pF	V_R = 0V, f = 1MHz, any I/O pin to ground

Note: 1、TLP Setting：tp=100ns, tr=0.2ns, ITLP and VTLP sample window: t1=70ns to t2=90ns.

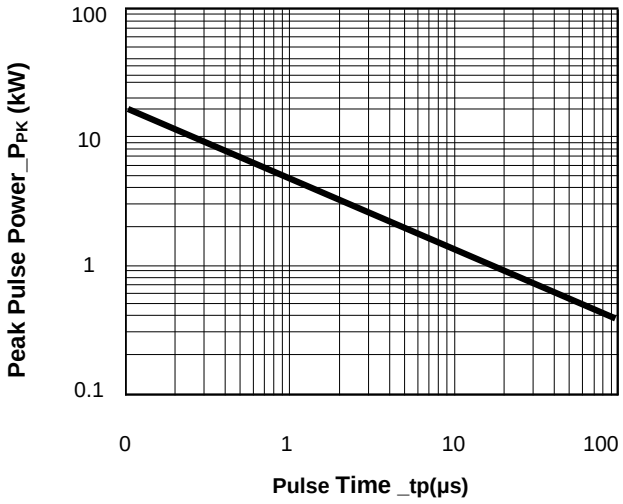
2、Dynamic resistance calculated from IPP=4A to IPP=16A using “Best Fit”.

3、I/O pins are Pin 1, 3, 4 and 6

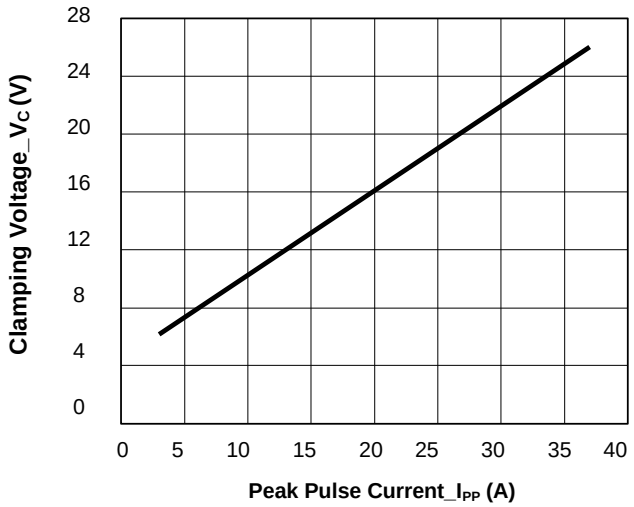
Typical Performance Characteristics (T_A=25°C unless otherwise Specified)



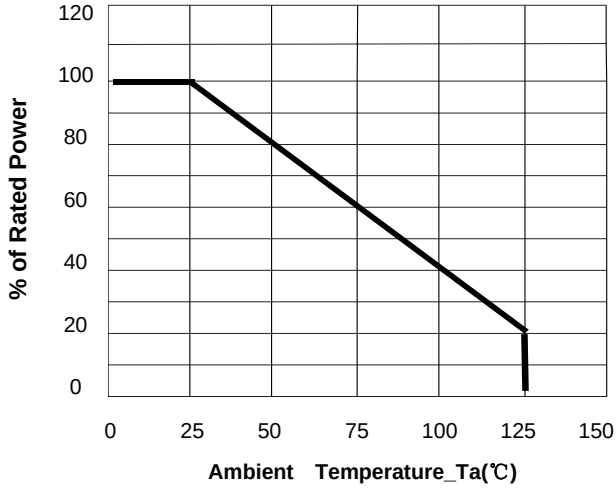
Junction Capacitance vs. Reverse Voltage



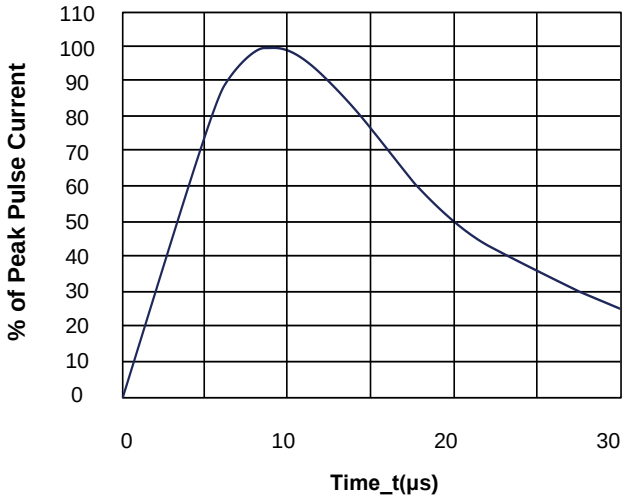
Peak Pulse Power vs. Pulse Time



Clamping Voltage vs. Peak Pulse Current



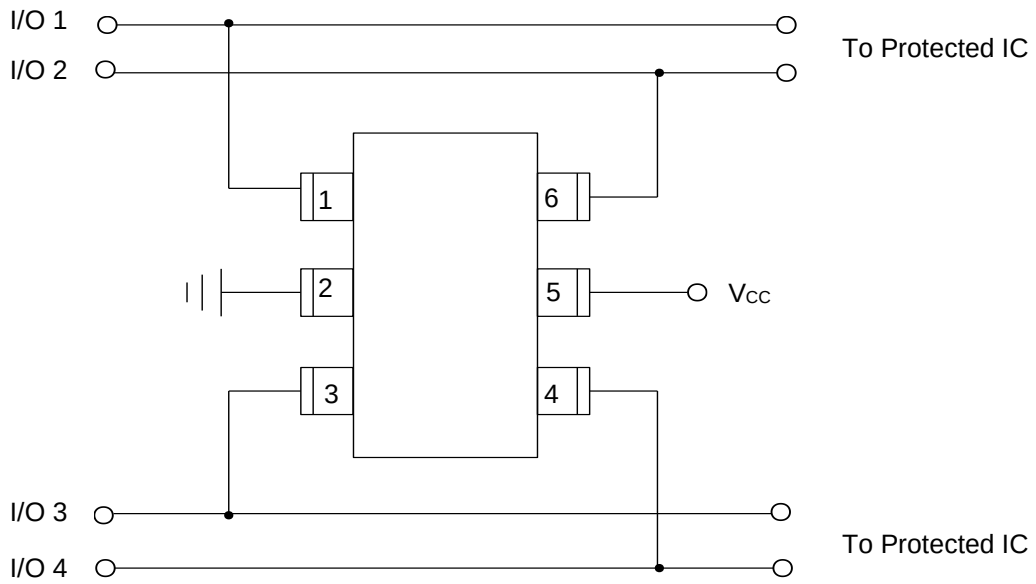
Power Derating Curve



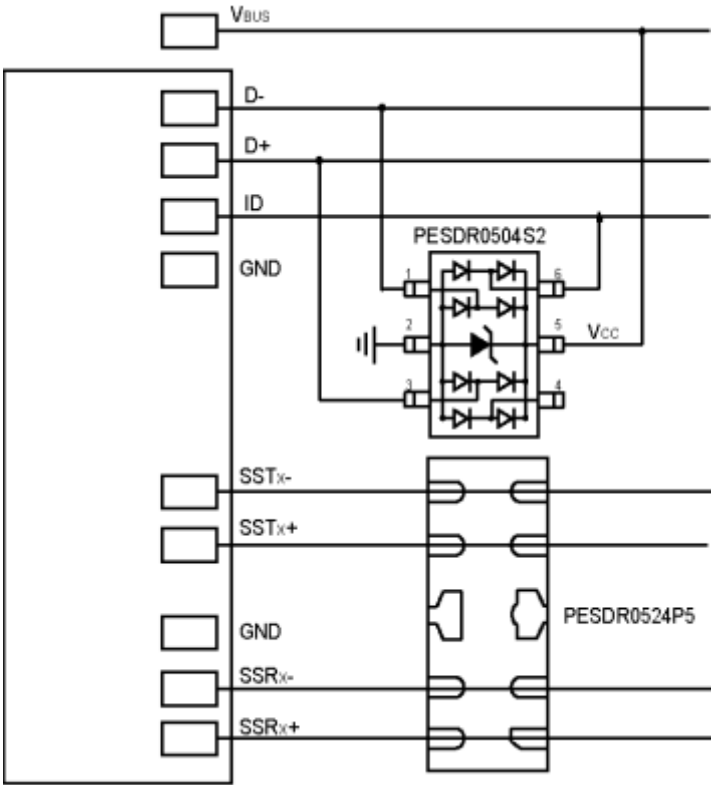
8/20μs Pulse Waveform

Typical Application

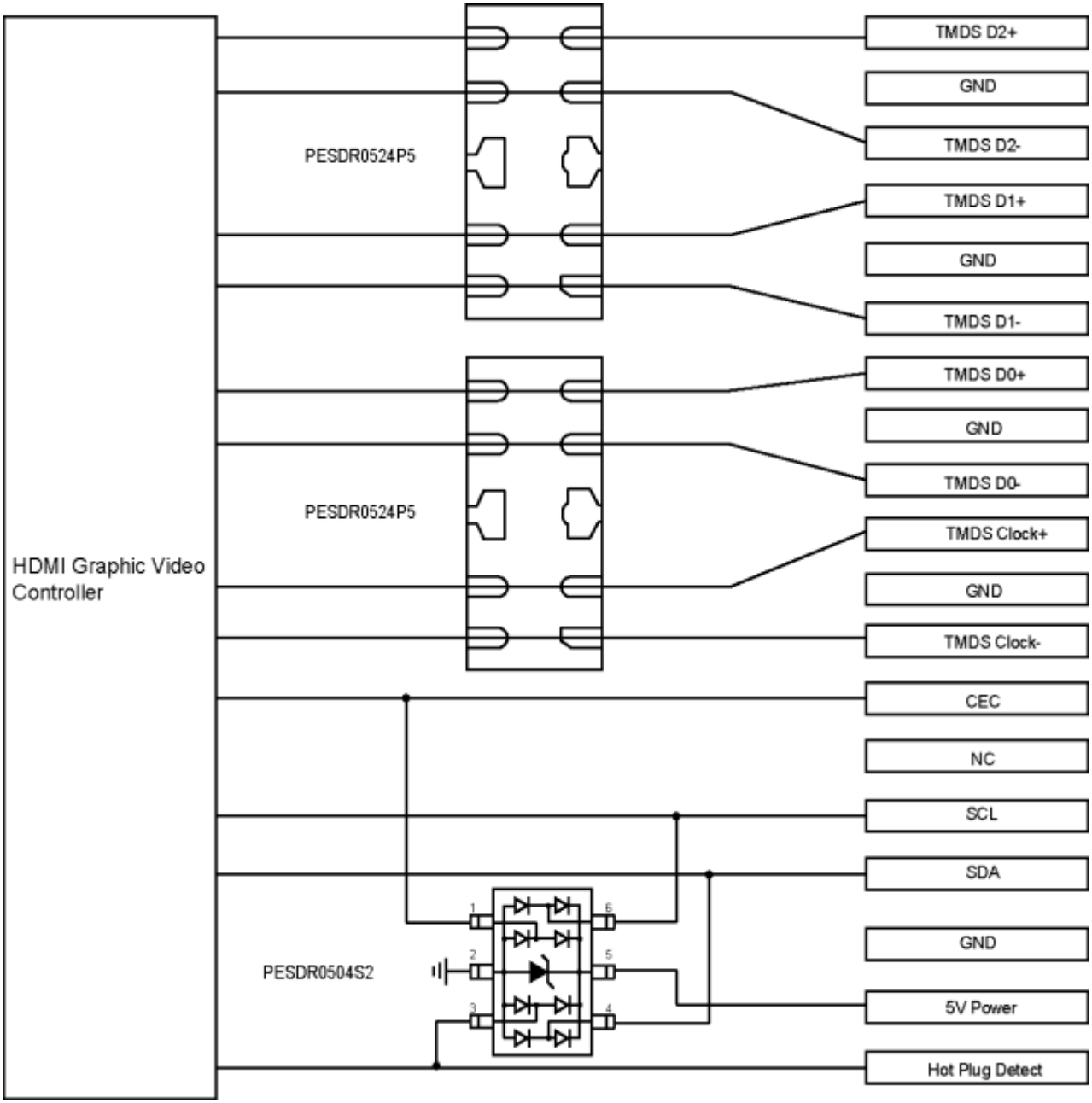
The PESDR0554S2-35A is designed to protect four data lines from transient over-voltages by clamping them to fixed reference. When the voltage on the protected line exceeds the reference voltage (plus diode V_F) the steering diodes are for ward biased, conducting the transient current away from the sensitive circuitry. Data lines are connected at pins 1, 3, 4 and 6. The negative reference (REF1) is connected at pin 2. This pin should be connected directly to a ground plane on the board for best results. The path length is kept as short as possible to minimize parasitic inductance. The positive reference (REF2) is connected at pin 5.



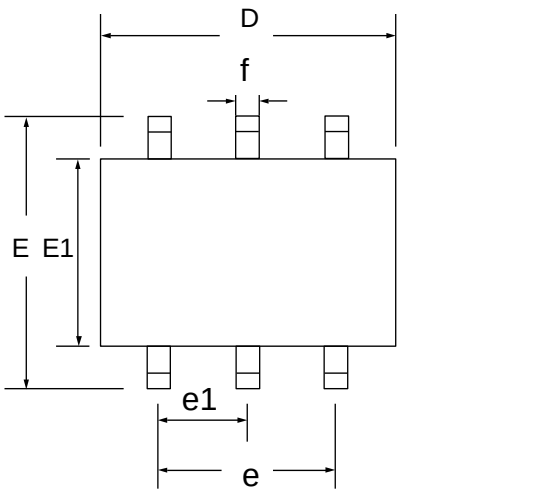
PESDR0554S2-35A on USB 3.0 Port Application

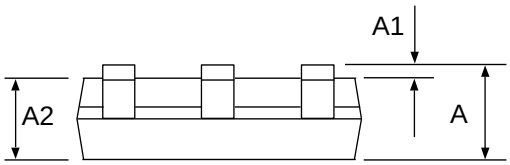


PESDR0554S2-35A on HDMI Port Application



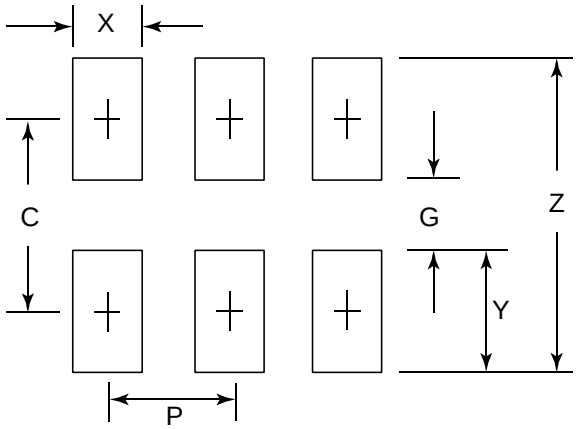
SOT-23-6 Package Outline Drawing





SYM	DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90		1.45	0.035		0.057
A1	0.00		0.15	0.000		0.006
A2	0.90	1.15	1.30	0.035	0.045	0.051
D	2.80	2.90	3.10	0.110	0.114	0.122
E	2.80 BSC			0.110 BSC		
E1	1.50	1.60	1.75	0.060	0.063	0.069
e	1.90 BSC			0.075 BSC		
e1	0.95 BSC			0.037 BSC		
f	0.30		0.50	0.012		0.020

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
C	2.50	0.098
G	1.40	0.055
P	0.95	0.037
X	0.60	0.024
Y	1.10	0.043
Z	3.60	0.141