# ESD5344D

4-Lines, Uni-directional, Ultra-low Capacitance Transient Voltage Suppressors

Descriptions

The ESD5344D is an ultra-low capacitance TVS (Transient Voltage Suppressor) array designed to protect high speed data interfaces. It has been specifically designed to protect sensitive electronic components which are connected to data and transmission lines from over-stress caused by ESD (Electrostatic Discharge).

The ESD5344D incorporates four pairs of ultra- low capacitance steering diodes plus a TVS diode.

The ESD5344D may be used to provide ESD protection up to ±20kV (contact discharge) according to IEC61000-4-2, and withstand peak pulse current up to 4A (8/20µs) according to IEC61000-4-5.

The ESD5344D is available in DFN2510-10L package. Standard products are Pb-free and Halogen-free.
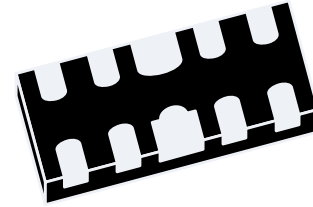
DFN2510-10L (Bottom view)
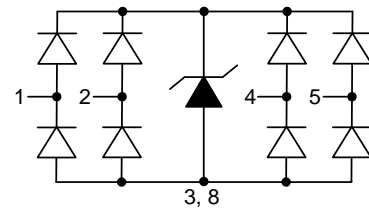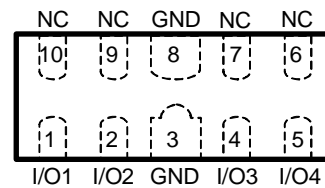
Pin configuration (Top view)

Features

- Stand-off voltage: 5V max.
- Transient protection for each line according to
  IEC61000-4-2 (ESD): ±20kV (contact discharge)
  IEC61000-4-4 (EFT): 40A (5/50ns)
  IEC61000-4-5 (surge): 4A (8/20µs)
- Ultra-low capacitance: C_J = 0.4pF typ.
- Ultra-low leakage current: I_R <1nA typ.
- Low clamping voltage: V_{CL} = 14V typ. @ I_{PP} = 16A (TLP)
- Solid-state silicon technology
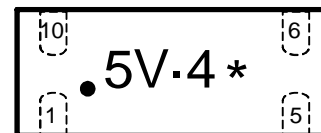
5V·4 = Device code
* = Month code (A~Z)
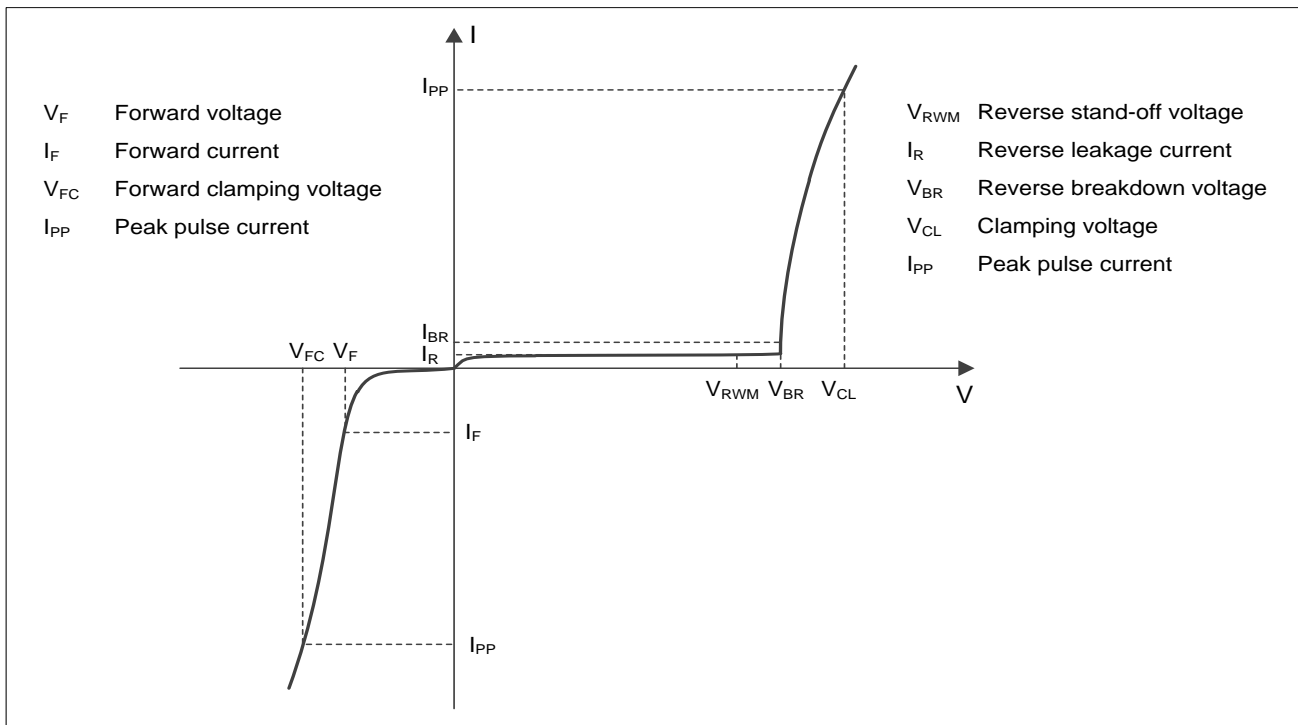**Marking**

Applications

- USB 2.0 and USB 3.0
- HDMI 1.3, HDMI 1.4 and HDMI 2.0
- SATA and eSATA
- DVI
- IEEE 1394
- PCI Express
- Portable Electronics and Notebooks

Order information

Device	Package	Shipping
ESD5344D-10/TR	DFN2510-10L	3000/Tape&Reel

Absolute maximum ratings

Parameter	Symbol	Rating	Unit
Peak pulse power (t_p = 8/20μs)	P_{pk}	50	W
Peak pulse current (t_p = 8/20μs)	I_{PP}	4	A
ESD according to IEC61000-4-2 air discharge	V_{ESD}	±20	kV
ESD according to IEC61000-4-2 contact discharge		±20	
Junction temperature	T_J	125	^{o}C
Operating temperature	T_{OP}	-40~85	^{o}C
Lead temperature	T_L	260	^{o}C
Storage temperature	T_{STG}	-55~150	^{o}C

Electrical characteristics (T_A=25 ^{o}C, unless otherwise noted)

V_F	Forward voltage
I_F	Forward current
V_{FC}	Forward clamping voltage
I_{PP}	Peak pulse current

| V_{RWM}	Reverse stand-off voltage
I_R	Reverse leakage current
V_{BR}	Reverse breakdown voltage
V_{CL}	Clamping voltage
I_{PP}	Peak pulse current

Definitions of electrical characteristics

Electrical characteristics (T$_A$ = 25 ^{o}C, unless otherwise noted)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse maximum working voltage	V$_{RWM}$				5.0	V
Reverse leakage current	I$_R$	V$_{RWM}$ = 5V		<1	100	nA
Reverse breakdown voltage	V$_{BR}$	I$_T$ = 1mA	7.0	8.0	9.0	V
Forward voltage	V$_F$	I$_T$ = 10mA	0.6	0.9	1.2	V
Clamping voltage [1]	V$_{CL}$	I$_{PP}$ = 16A, t$_p$ = 100ns		14.0		V
Dynamic resistance [1]	R$_{DYN}$			0.33		Ω
Clamping voltage [2]	V$_{CL}$	I$_{PP}$ = 1A, t$_p$ = 8/20μs			10	V
		I$_{PP}$ = 4A, t$_p$ = 8/20μs			12	V
Junction capacitance	C$_J$	V$_R$ = 0V, f = 1MHz Any I/O pin to GND		0.40	0.65	pF
		V$_R$ = 0V, f = 1MHz Between any I/O pin		0.25	0.40	pF

Notes:

1) *TLP parameter: Z$_0$ = 50 Ω , t$_p$ = 100ns, t$_r$ = 2ns, averaging window from 60ns to 80ns. R$_{DYN}$ is calculated from 4A to 16A.*

2) *Non-repetitive current pulse, according to IEC61000-4-5.*

Typical characteristics (T_A = 25 ^{o}C, unless otherwise noted)
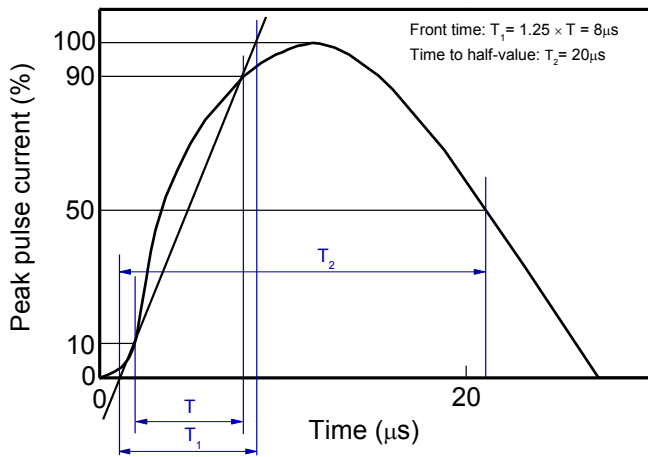
8/20μs waveform per IEC61000-4-5
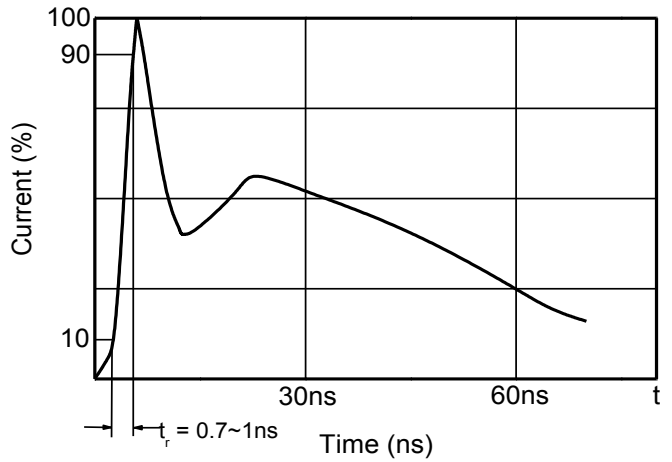
Contact discharge current waveform per IEC61000-4-2
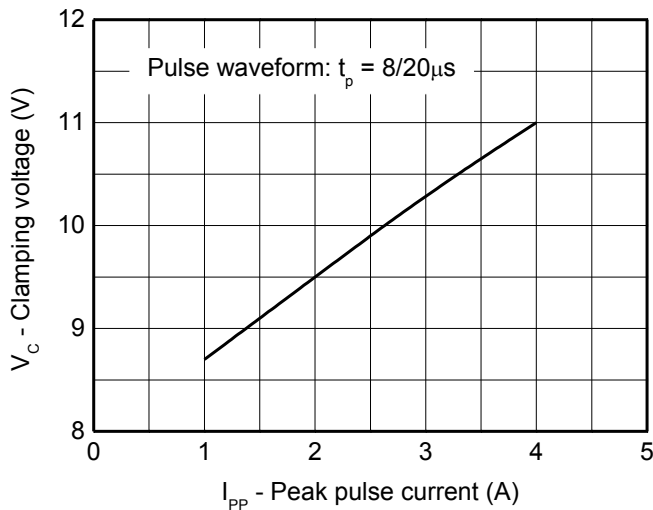
Clamping voltage vs. Peak pulse current
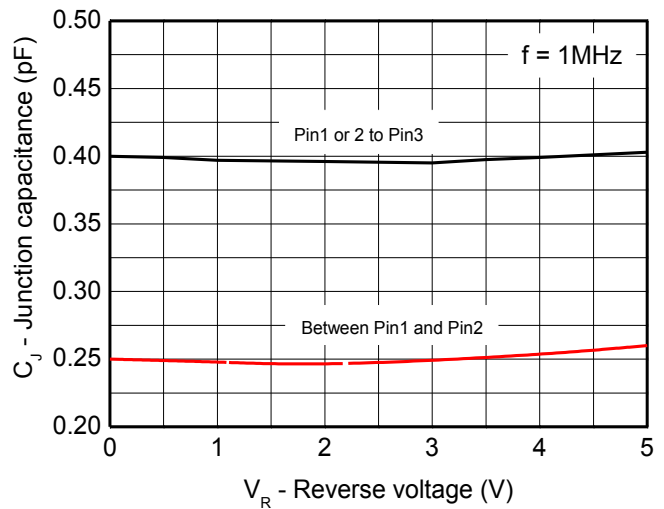
Capacitance vs. Reverse voltage
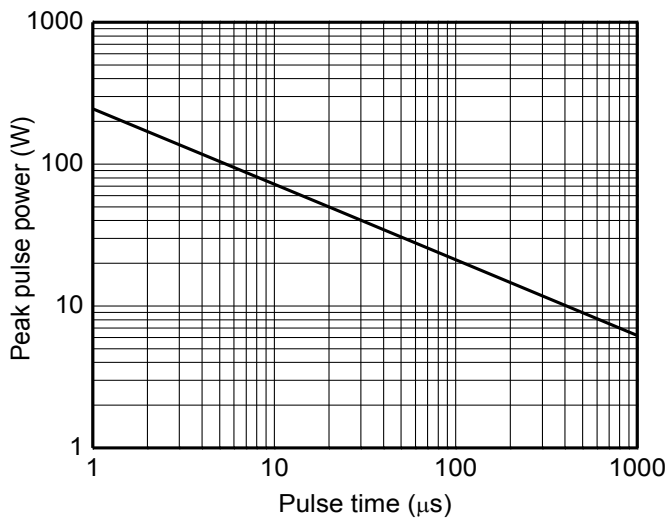
Non-repetitive peak pulse power vs. Pulse time
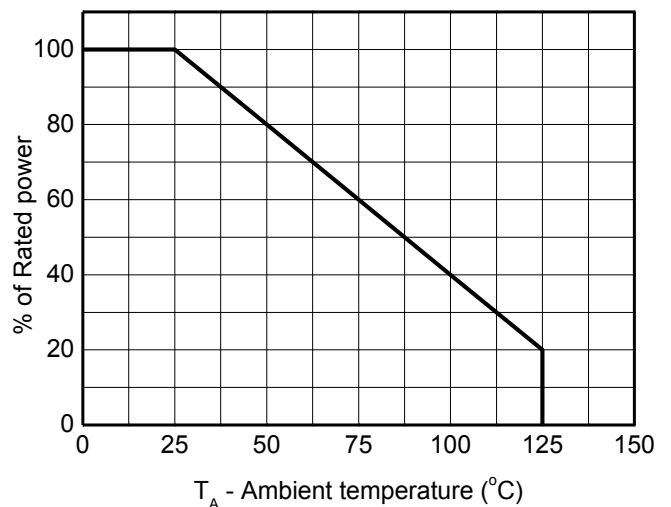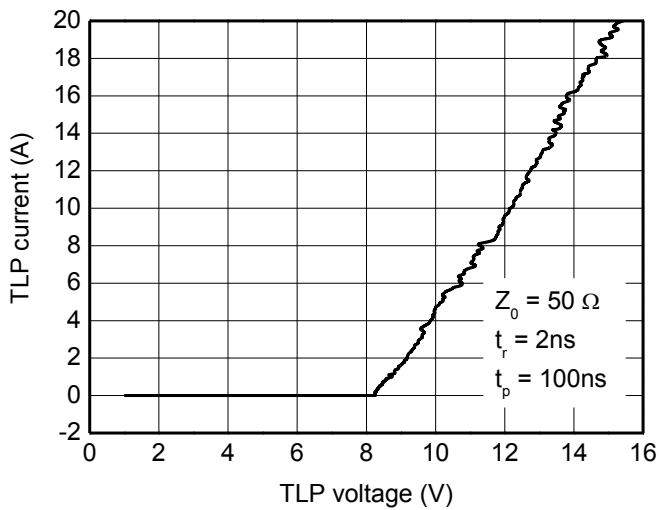

Power derating vs. Ambient temperature

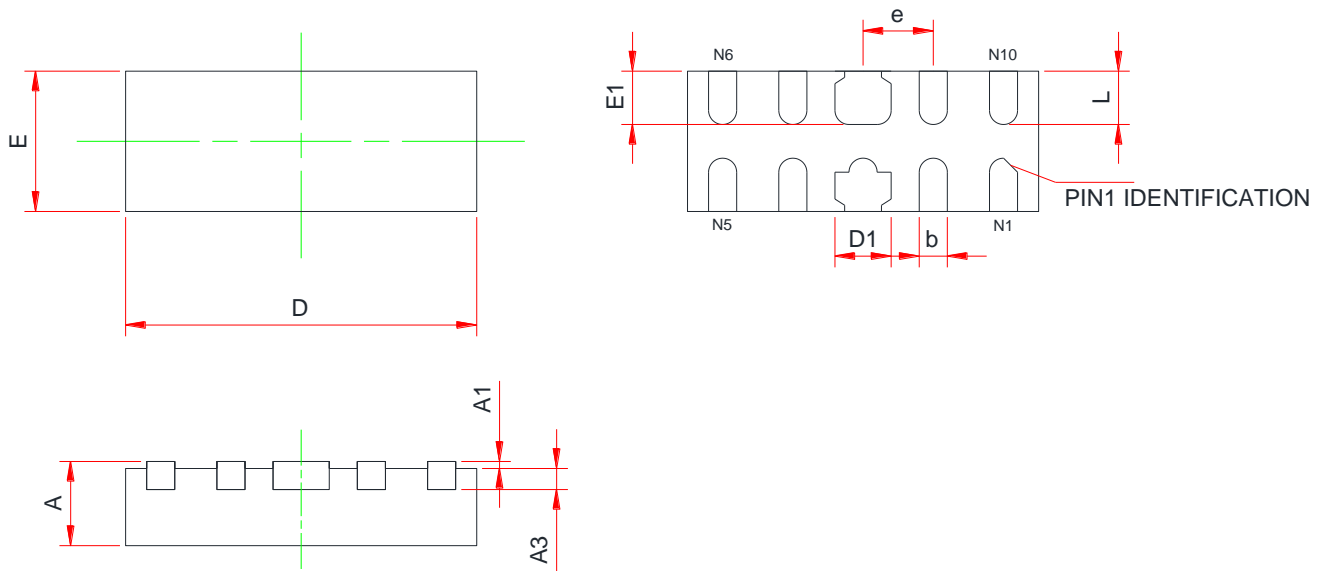## Typical characteristics (T$_A$ = 25 ^{o}C, unless otherwise noted)
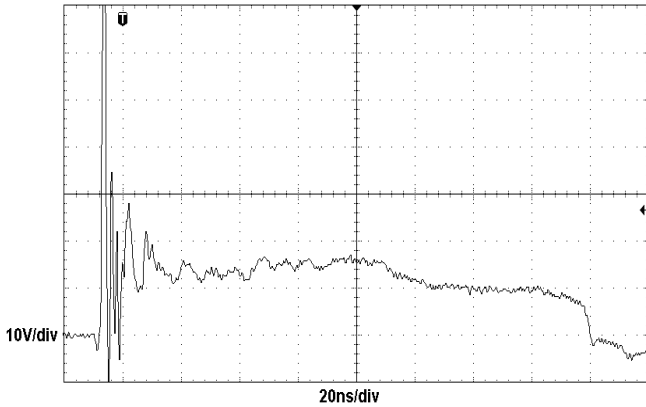
ESD clamping

(+8kV contact discharge per IEC61000-4-2)

ESD clamping

(-8kV contact discharge per IEC61000-4-2)

$Z_0 = 50\ \Omega$

$t_r = 2ns$

$t_p = 100ns$
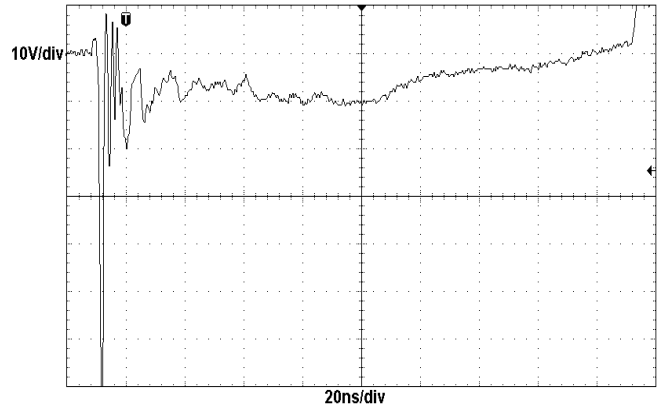
TLP Measurement

Package outline dimensions

DFN2510-10L

PIN1 IDENTIFICATION

Symbol	Dimensions in millimeter		
	Min.	**Typ.**	**Max.**
A	0.550	0.600	0.650
A1	0.000	-	0.050
A3	0.150 Ref.		
D	2.424	2.500	2.576
E	0.924	1.000	1.076
D1	0.300	0.400	0.500
E1	0.410	0.510	0.610
b	0.150	0.200	0.250
e	0.500 Typ.		
L	0.304	0.380	0.456

Recommend Land Pattern (Unit: mm)
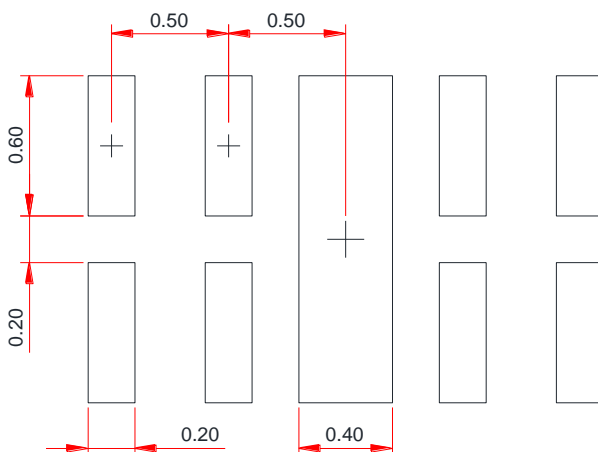
Notes:

This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met.