

**6-Lines, 1-Vcc, Uni-directional, Ultra-low Capacitance Transient Voltage Suppressors**

**Descriptions**

The ESD5307H 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 ESD5307H incorporates six lines of ultra- low capacitance TVS diodes and one separate TVS diode plus for VBUS.

The ESD5307H 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.

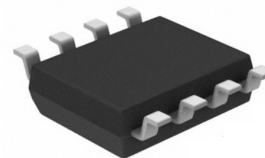
The ESD5307H is available in MSOP-8 package. Standard products are Pb-free and Halogen-free.

**Features**

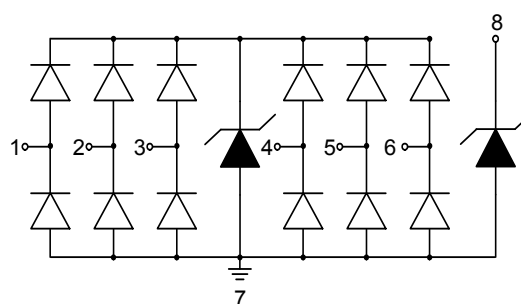
- Stand-off voltage: 5V max.
- Transient protection for each line according to IEC61000-4-2 (ESD): ±20kV (contact discharge)  
IEC61000-4-4 (EFT): 40A (5/50ns)  
IEC61000-4-5 (surge): 4A (8/20µs)
- Ultra-low capacitance:  $C_J = 0.4\text{pF typ.}$
- Ultra-low leakage current:  $I_R < 1\text{nA typ.}$
- Low clamping voltage:  $V_{CL} = 19\text{V @ } I_{PP} = 16\text{A(TLP)}$

**Applications**

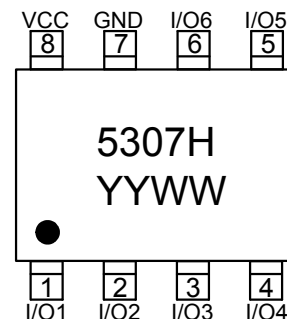
- USB 2.0 and USB 3.0
- HDMI 1.3 and HDMI 1.4
- SATA and eSATA
- DVI
- IEEE 1394
- PCI Express
- Portable Electronics and Notebooks



**MSOP-8L (Bottom View)**



**Circuit diagram**



ESD5307H = Device code  
YYMM = Data code

**Marking (Top View)**

**Order information**

Device	Package	Shipping
ESD5307H-8TR	MSOP-8L	3000/Tape&Reel

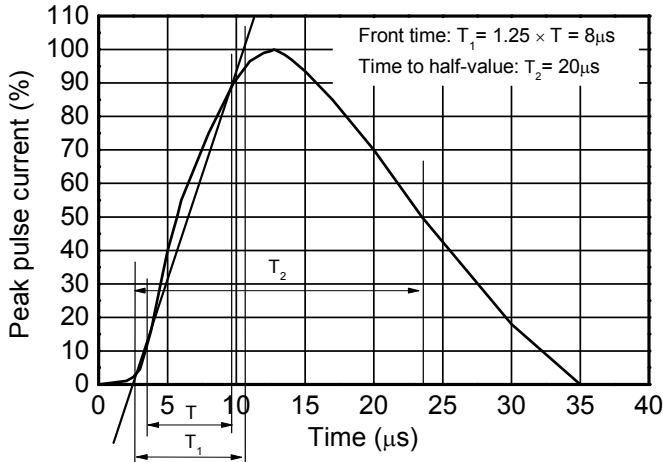
**Absolute maximum ratings**

Parameter	Symbol	Rating	Unit
Operation junction temperature	$T_J$	125	°C
Lead temperature	$T_L$	260	°C
Storage temperature	$T_{STG}$	-55~150	°C
<b>I/O to GND</b>			
ESD according to IEC61000-4-2 air discharge	$V_{ESD}$	±20	kV
ESD according to IEC61000-4-2 contact discharge		±20	
Peak pulse power ( $t_p = 8/20\mu s$ )	$P_{pk}$	60	W
Peak pulse current ( $t_p = 8/20\mu s$ )	$I_{PP}$	4	A
<b>VBUS to GND</b>			
ESD according to IEC61000-4-2 air discharge	$V_{ESD}$	±30	kV
ESD according to IEC61000-4-2 contact discharge		±30	
Peak pulse power ( $t_p = 8/20\mu s$ )	$P_{pk}$	144	W
Peak pulse current ( $t_p = 8/20\mu s$ )	$I_{PP}$	9	A

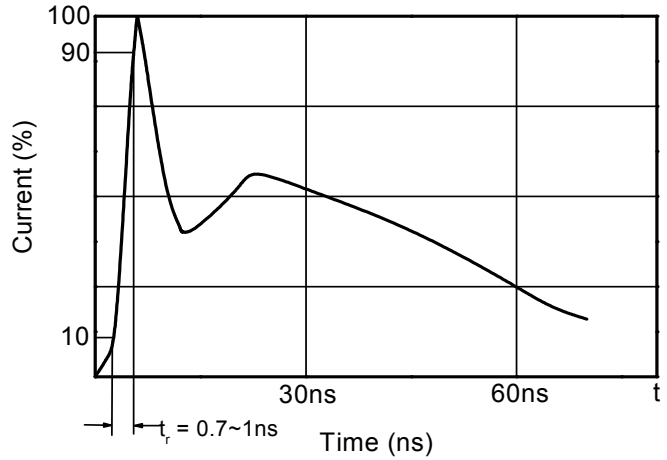
**Electrical characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
<b>I/O to GND</b>						
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	$V_{CL}$	$I_{PP} = 16A, t_p = 100ns$		19		V
Dynamic resistance	$R_{DYN}$			0.65		$\Omega$
Clamping voltage	$V_{CL}$	$I_{PP} = 1A, t_p = 8/20\mu s$			11	V
		$I_{PP} = 4A, t_p = 8/20\mu s$			15	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
<b>VBUS to GND</b>						
Reverse maximum working voltage	$V_{RWM}$				7	V
Reverse leakage current	$I_R$	$V_{RWM} = 7V$		<1	100	nA
Reverse breakdown voltage	$V_{BR}$	$I_T = 1mA$	7.5		8.8	V
Forward voltage	$V_F$	$I_T = 10mA$	0.4		1.5	V
Clamping voltage	$V_{CL}$	$I_{PP} = 1A, t_p = 8/20\mu s$			9	V
		$I_{PP} = 9A, t_p = 8/20\mu s$			16	V
Junction capacitance	$C_J$	$V_R = 0V, f = 1MHz$ VBUS to GND		52		pF

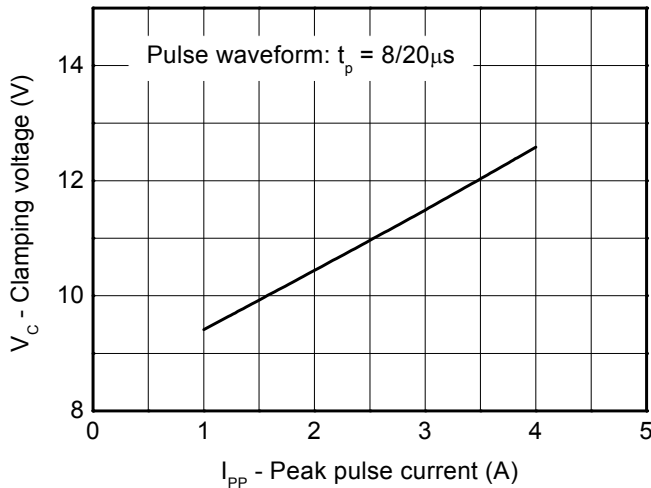
Typical characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)



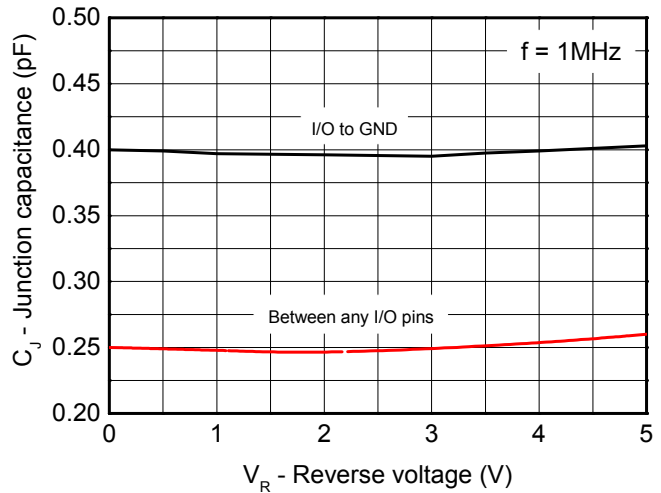
8/20 $\mu\text{s}$  waveform per IEC61000-4-5



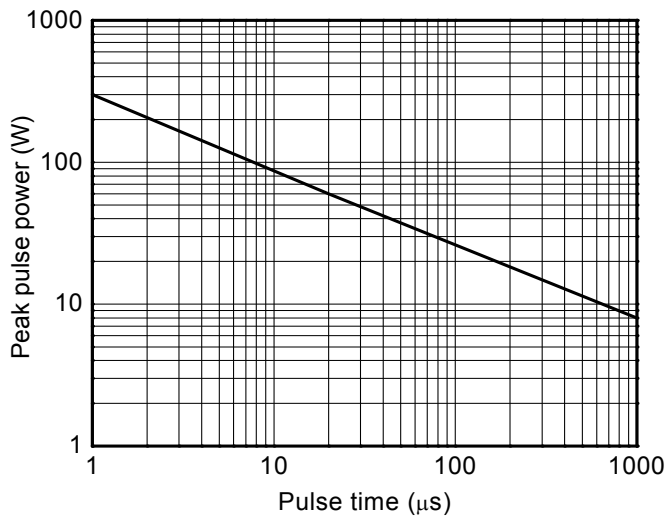
Contact discharge current waveform per IEC61000-4-2



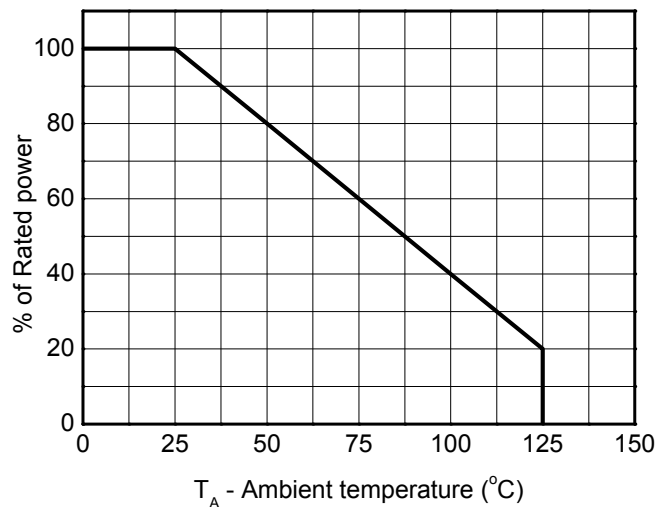
Clamping voltage vs. Peak pulse current  
I/O to GND



Capacitance vs. Reverse voltage  
I/O to GND

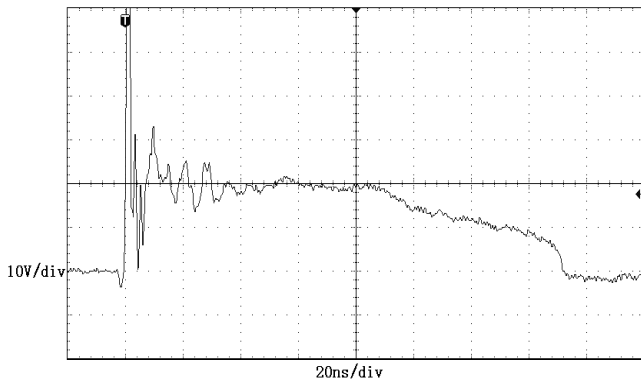


Non-repetitive peak pulse power vs. Pulse time  
I/O to GND

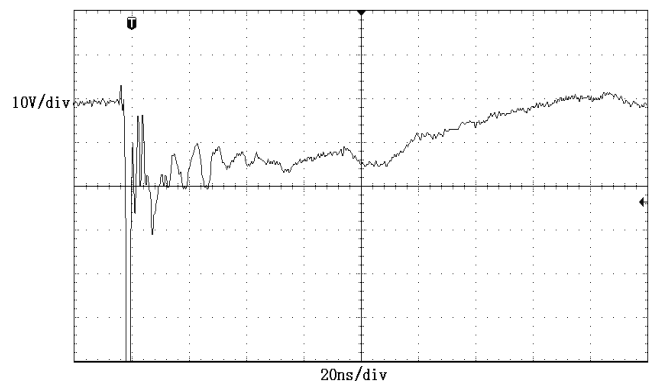


Power derating vs. Ambient temperature  
I/O to GND

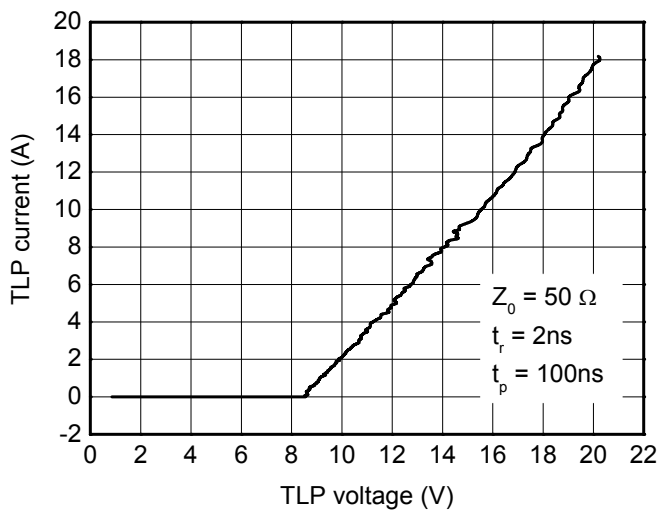
Typical characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)



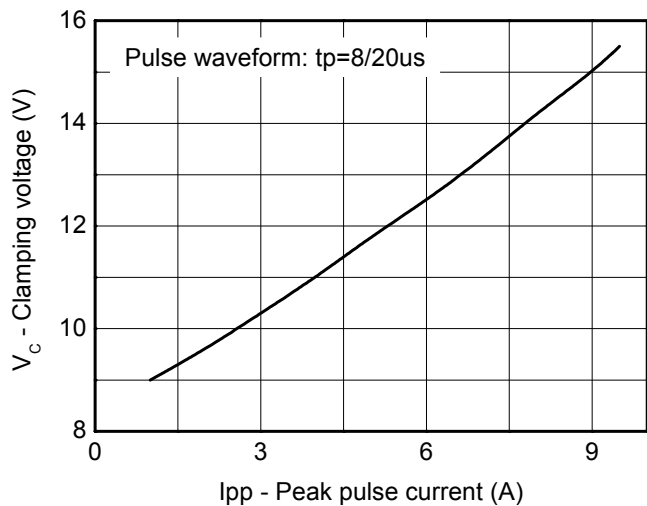
**ESD clamping**  
 (+8kV contact discharge per IEC61000-4-2)  
 I/O to GND



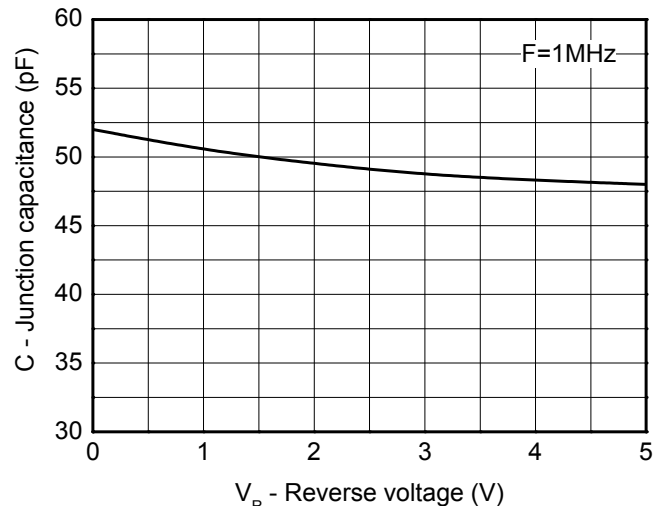
**ESD clamping**  
 (-8kV contact discharge per IEC61000-4-2)  
 I/O to GND



**TLP Measurement**  
 I/O to GND

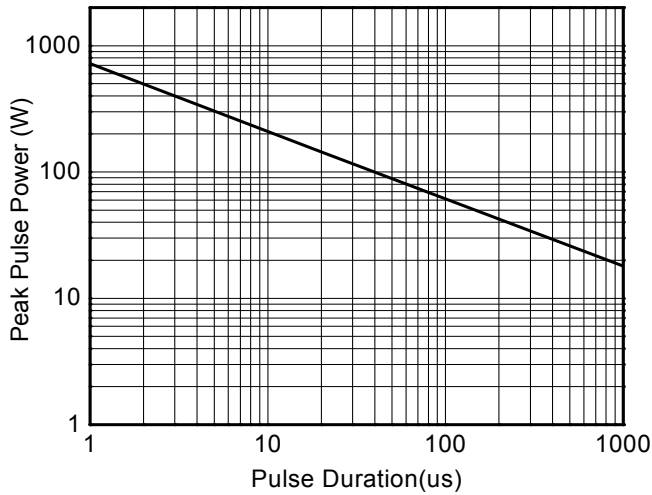


**Clamping voltage vs. Peak pulse current**  
 VBUS to GND

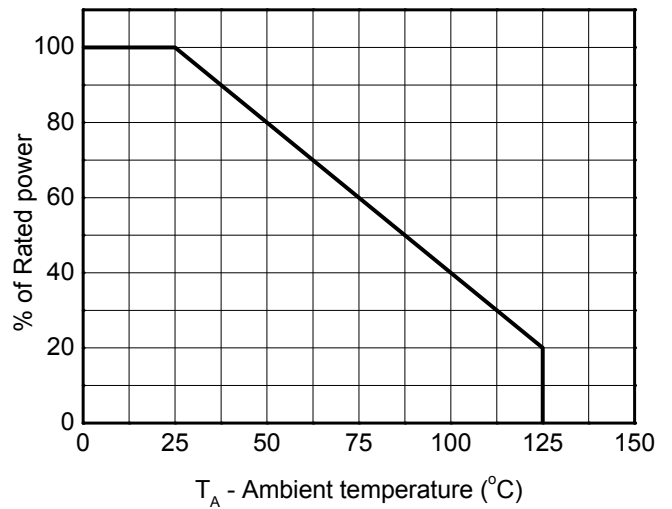


**Capacitance vs. Reverse voltage**  
 VBUS to GND

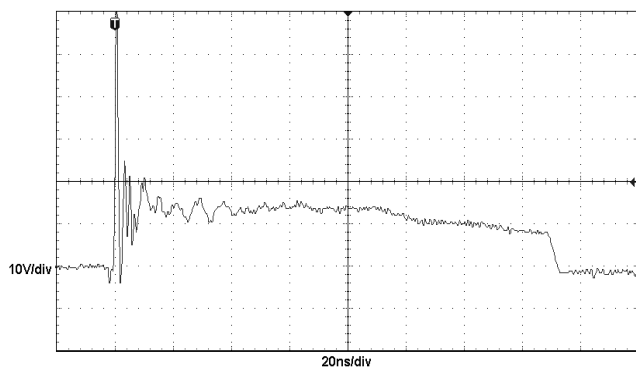
**Typical characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)**



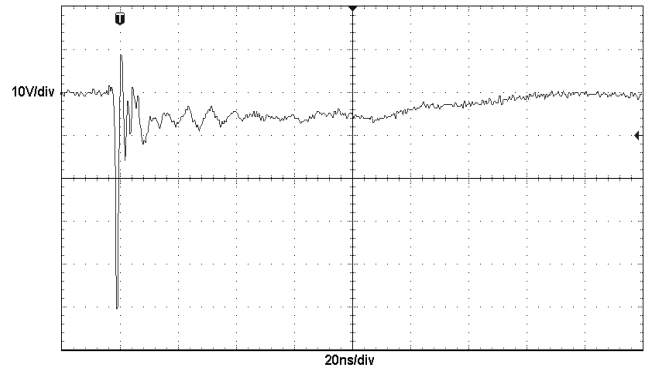
**Non-repetitive peak pulse power vs. Pulse time  
VBUS to GND**



**Power derating vs. Temperature  
VBUS to GND**



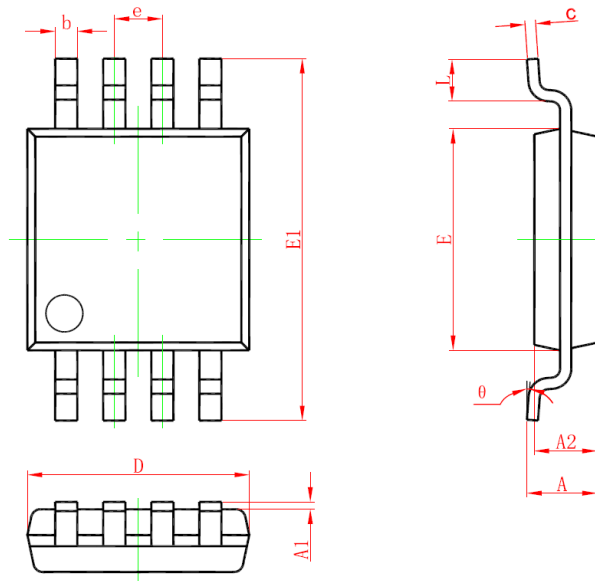
**ESD clamping  
(+8kV contact discharge per IEC61000-4-2)  
VBUS to GND**



**ESD clamping  
(-8kV contact discharge per IEC61000-4-2)  
VBUS to GND**

Package outline dimensions

MSOP-8L



Symbol	Dimensions in millimeters		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.650 (BSC)		0.026 (BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°