ESD5471S

1-Line, Bi-directional, Transient Voltage Suppressor

http//:www.sh-willsemi.com

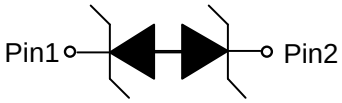
Descriptions

The ESD5471S is a bi-directional TVS (Transient Voltage Suppressor). It is specifically designed to protect sensitive electronic components which are connected to low speed data lines and control lines from over-stress caused by ESD (Electrostatic Discharge), EFT (Electrical Fast Transients) and Lightning.

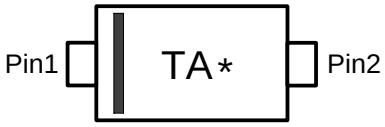
The ESD5471S may be used to provide ESD protection up to ±30kV (contact and air discharge) according to IEC61000-4-2, and withstand peak pulse current up to 6A (8/20μs) according to IEC61000-4-5.

The ESD5471S is available in SOD-523 package. Standard products are Pb-free and Halogen-free.

SOD-523 (Top View)



Circuit diagram



TA = Device code

* = Month code (A~Z)

Marking (Top View)

Features

- Reverse stand-off voltage: ±5V Max
- Transient protection for each line according to
  IEC61000-4-2 (ESD): ±30kV (contact and air discharge)
  IEC61000-4-4 (EFT): 40A (5/50ns)
  IEC61000-4-5 (surge): 6A (8/20μs)
- Capacitance: C_J = 9pF typ.
- Low leakage current
- Low clamping voltage: V_{CL} = 12V typ. @ I_{PP} = 16A (TLP)
- Solid-state silicon technology

Applications

- Cellular handsets
- Tablets
- Laptops
- Other portable devices
- Network communication devices

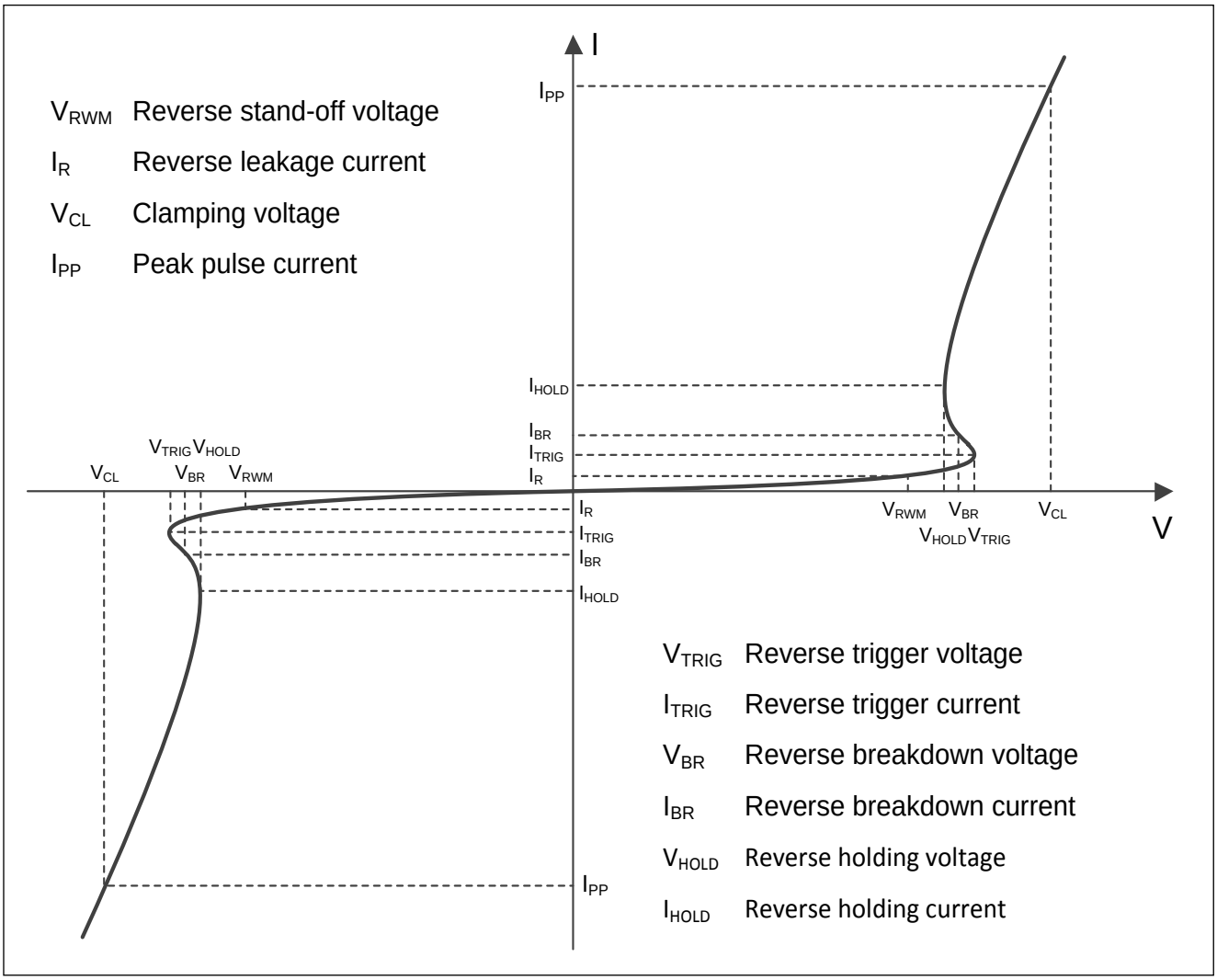
Order information

Device	Package	Shipping
ESD5471S-2/TR	SOD-523	3000/Tape&Reel

Absolute maximum ratings

Parameter	Symbol	Rating	Unit
Peak pulse power (t_p = 8/20μs)	P_{pk}	72	W
Peak pulse current (t_p = 8/20μs)	I_{PP}	6	A
ESD according to IEC61000-4-2 air discharge	V_{ESD}	±30	kV
ESD according to IEC61000-4-2 contact discharge		±30	
Junction temperature	T_J	125	°C
Operating temperature	T_{OP}	-40~85	°C
Lead temperature	T_L	260	°C
Storage temperature	T_{STG}	-55~150	°C

Electrical characteristics (T_A=25°C, unless otherwise noted)



Definitions of electrical characteristics

Electrical characteristics (T_A=25 °C, unless otherwise noted)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				±5	V
Reverse leakage current	I_R	V_{RWM} = 5V			1	μA
Reverse breakdown voltage	V_{BR}	I_{BR} = 1mA	5.1			V
Reverse holding voltage	V_{HOLD}	I_{HOLD} = 50mA	5.1			V
Clamping voltage 1)	V_{CL}	I_{PP} = 16A, t_p = 100ns		12		V
Clamping voltage 2)	V_{CL}	V_{ESD} = 8kV		12		V
Clamping voltage 3)	V_{CL}	I_{PP} = 1A, t_p = 8/20μs			8	V
		I_{PP} = 6A, t_p = 8/20μs			12	V
Dynamic resistance 1)	R_{DYN}			0.28		Ω
Junction capacitance	C_J	V_R = 0V, f = 1MHz		9	12	pF
		V_R = 5V, f = 1MHz		6	8	pF

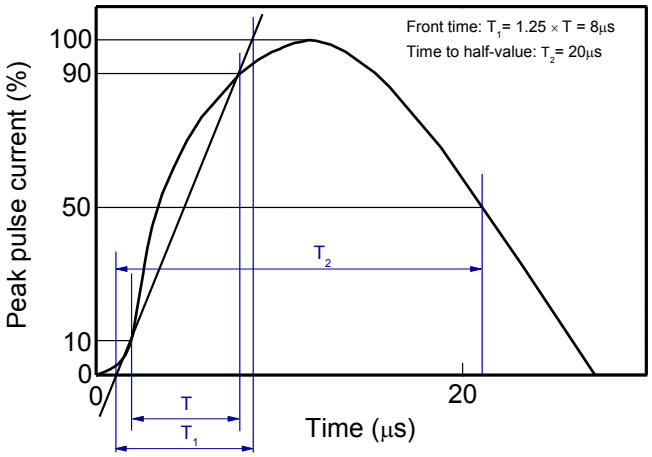
Notes:

1) TLP parameter: Z_0 = 50Ω , t_p = 100ns, t_r = 2ns, averaging window from 60ns to 80ns. R_{DYN} is calculated from 4A to 16A.

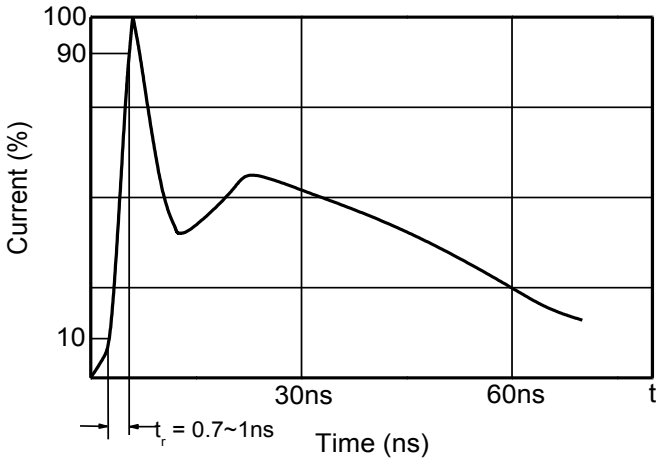
2) Contact discharge mode, according to IEC61000-4-2.

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

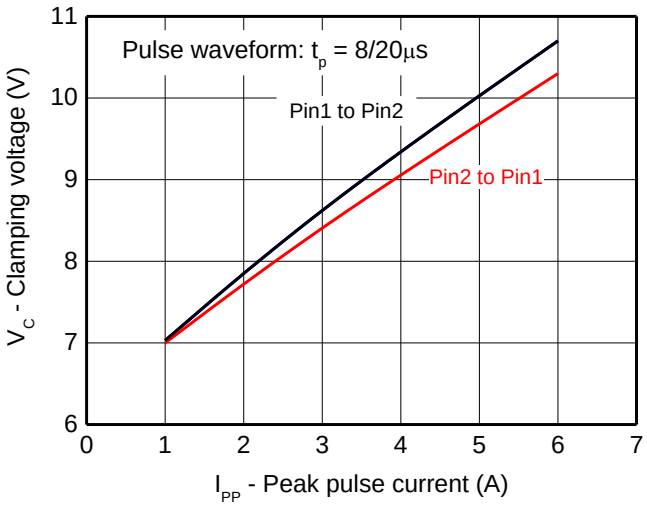
Typical characteristics (T_A=25°C, unless otherwise noted)



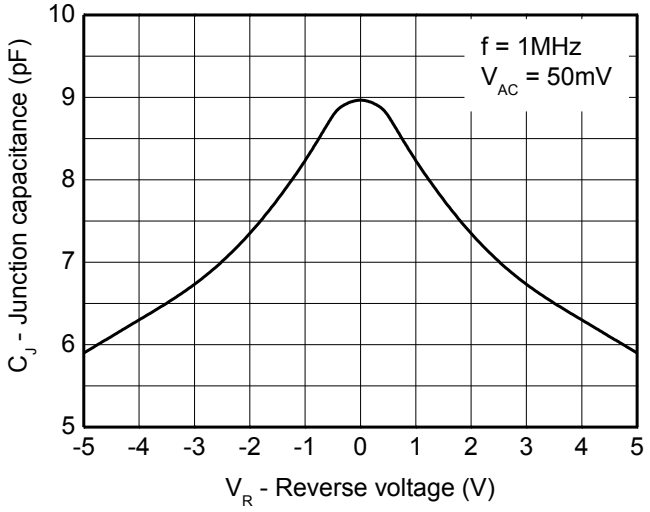
8/20μs waveform per IEC61000-4-5



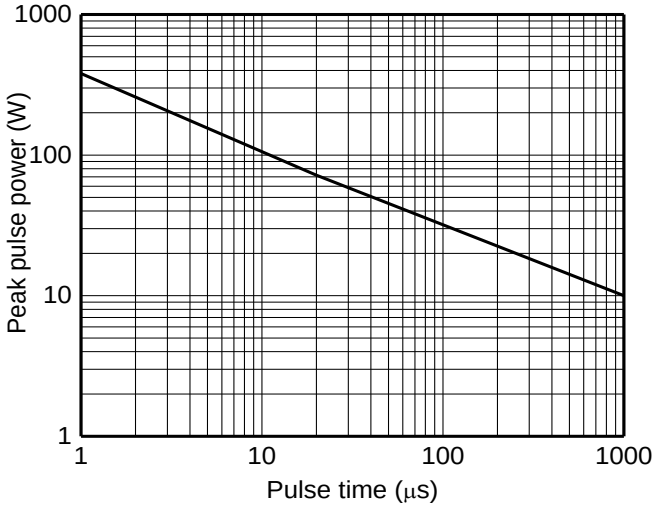
Contact discharge current waveform per IEC61000-4-2



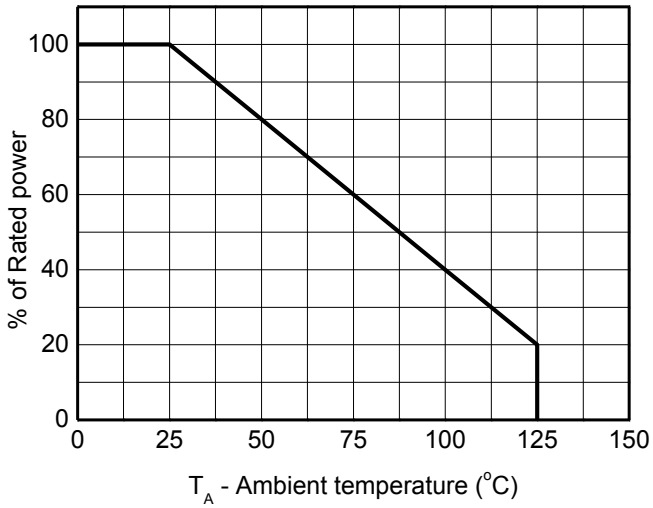
Clamping voltage vs. Peak pulse current



Capacitance vs. Reverse voltage

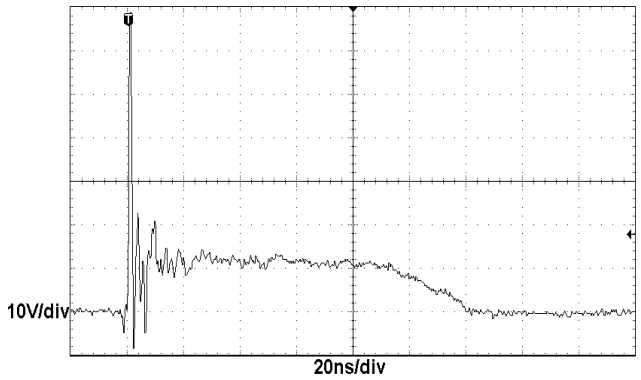


Non-repetitive peak pulse power vs. Pulse time

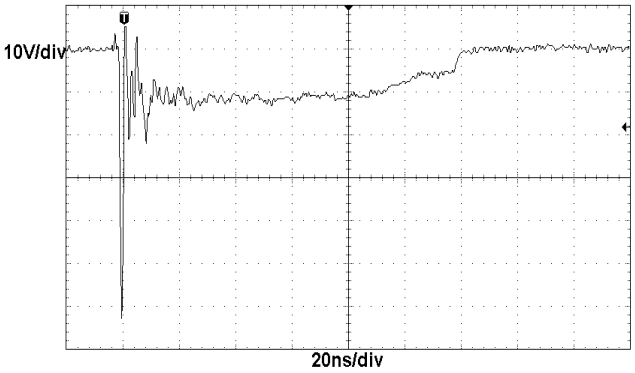


Power derating vs. Ambient temperature

Typical characteristics (T_A=25°C, unless otherwise noted)



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



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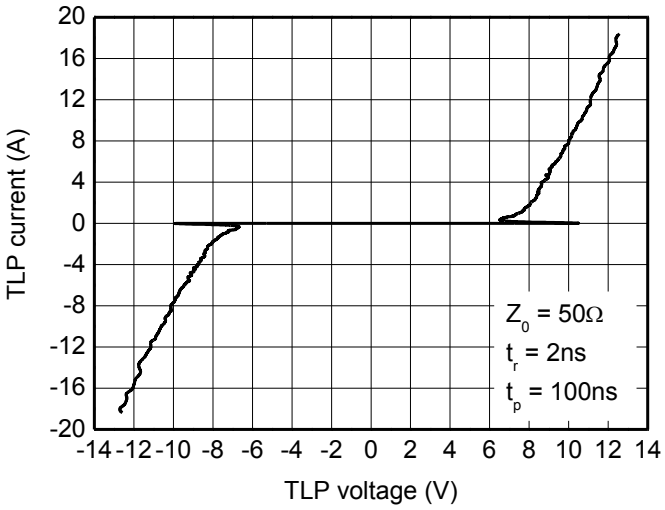
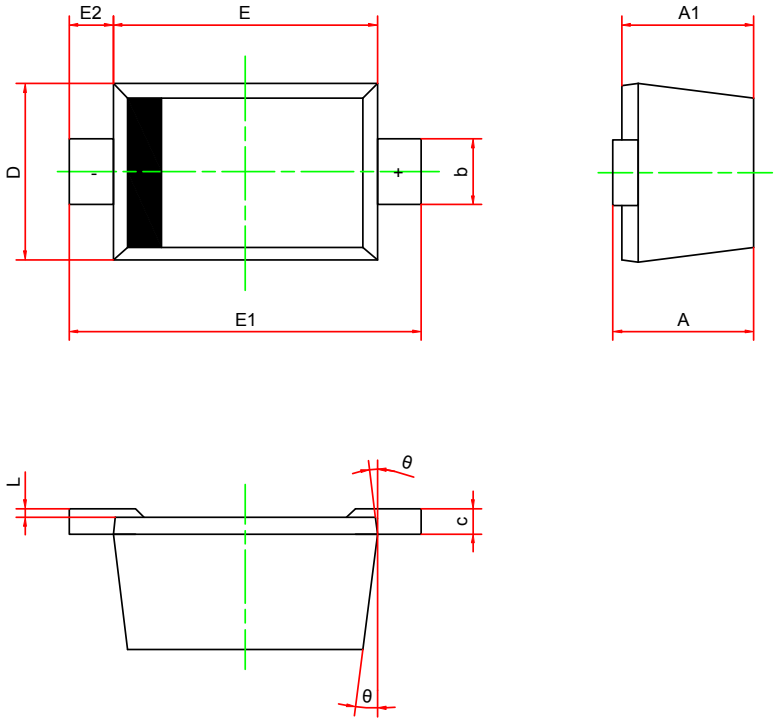
(-8kV contact discharge per IEC61000-4-2)



TLP Measurement

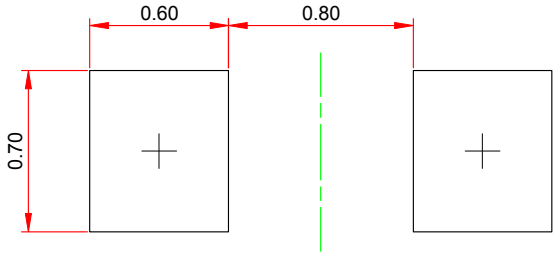
Package outline dimensions

SOD-523



Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	0.510	0.640	0.770
A1	0.500	0.600	0.700
b	0.250	0.300	0.350
c	0.080	0.115	0.150
D	0.750	0.800	0.850
E	1.100	1.200	1.300
E1	1.500	1.600	1.700
E2	0.200 Ref		
L	0.010	0.040	0.070
θ	7° Ref		

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.