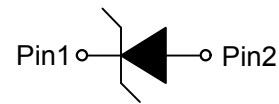


**ESD5601W**
**1 Lines, Uni-directional, Transient Voltage Suppressors**
<http://www.sh-willsemi.com>
**Descriptions**

The ESD5601W is a uni-directional TVS (Transient Voltage Suppressor). It is specifically designed to protect sensitive electronic components which are connected to power lines, from over-stress caused by ESD (Electrostatic Discharge), EFT (Electrical Fast Transients) and Lightning.

The ESD5601W may be used to provide ESD protection up to  $\pm 30\text{kV}$  (contact and air discharge) according to IEC61000-4-2, and withstand peak pulse current up to 80A (8/20 $\mu\text{s}$ ) according to IEC61000-4-5.

The ESD5601W is available in SOD-323F package. Standard products are Pb-free and Halogen-free.


**SOD-323F**

**Circuit diagram**
**Features**

- Reverse stand-off voltage: 7V Max
- Transient protection for each line according to IEC61000-4-2 (ESD):  $\pm 30\text{kV}$  (contact and air discharge)  
IEC61000-4-4 (EFT): 80A (5/50ns)  
IEC61000-4-5 (surge): 80A (8/20 $\mu\text{s}$ )
- Capacitance:  $C_J = 300\text{pF}$  typ.
- Low leakage current
- Low clamping voltage:  $V_{CL} = 17.5\text{V}$  typ. @  $I_{PP} = 80\text{A}$  (Surge)
- Solid-state silicon technology



P= Device code

\* = Month code ( A~Z)

**Marking (Top View)**
**Applications**

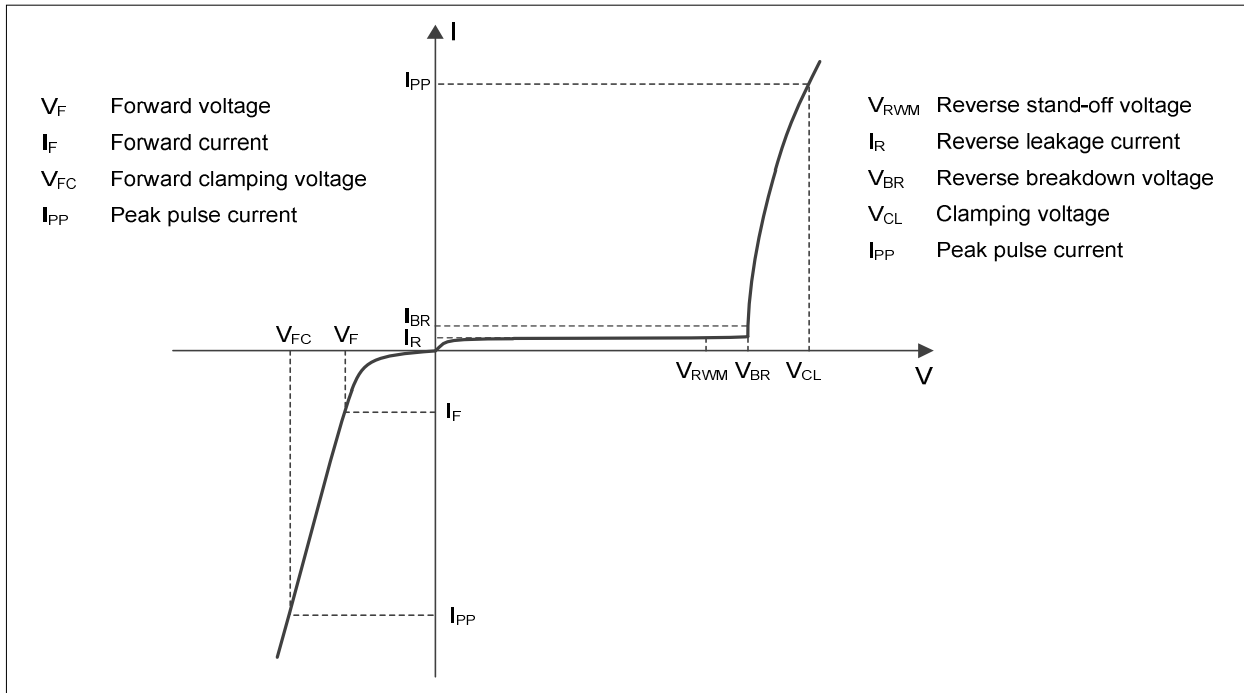
- Power lines
- Cellular handsets
- Tablets
- Microprocessors
- Portable Electronics

**Order information**

Device	Package	Shipping
ESD5601W-2/TR	SOD-323F	3000/Tape&Reel

**Absolute maximum ratings**

Parameter	Symbol	Rating	Unit
Peak pulse power ( $t_p = 8/20\mu s$ )	$P_{pk}$	1400	W
Peak pulse current ( $t_p = 8/20\mu s$ )	$I_{PP}$	80	A
ESD according to IEC61000-4-2 air discharge	$V_{ESD}$	$\pm 30$	kV
ESD according to IEC61000-4-2 contact discharge		$\pm 30$	
Junction temperature	$T_J$	125	$^{\circ}C$
Operating temperature	$T_{OP}$	-40~85	$^{\circ}C$
Lead temperature	$T_L$	260	$^{\circ}C$
Storage temperature	$T_{STG}$	-55~150	$^{\circ}C$

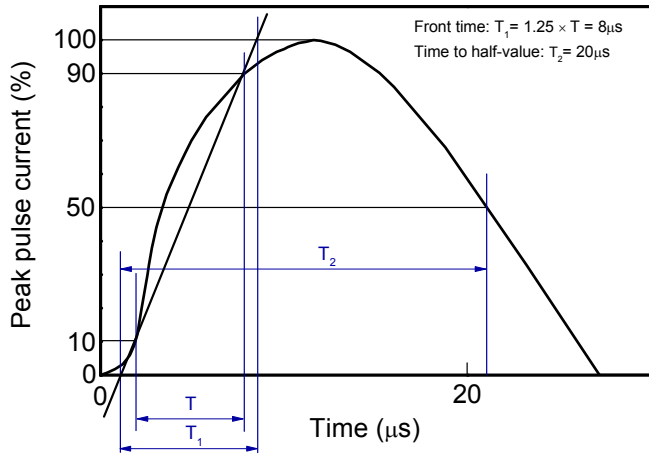
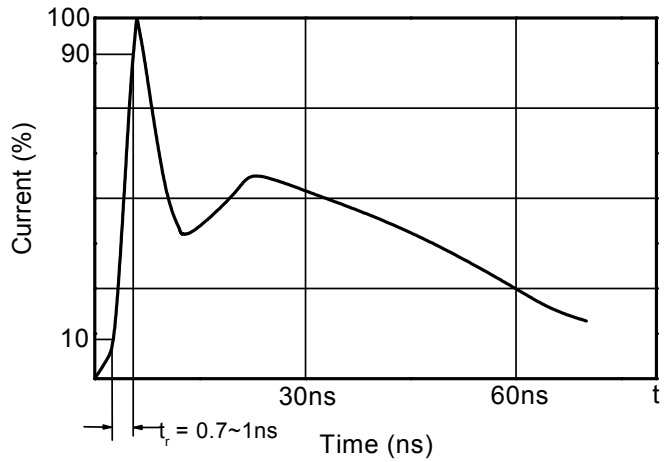
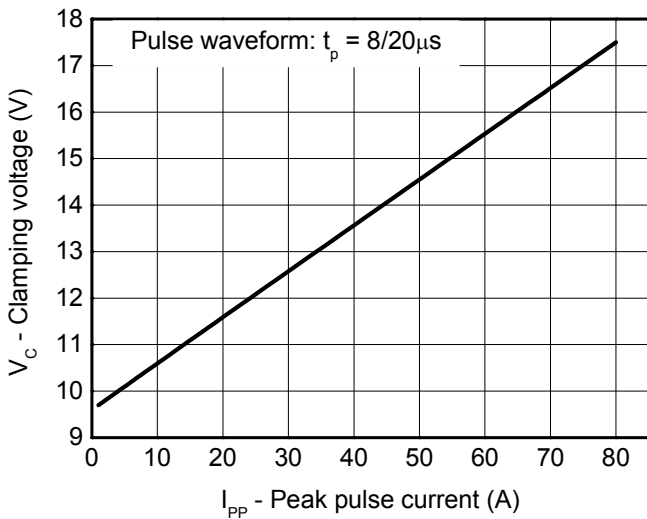
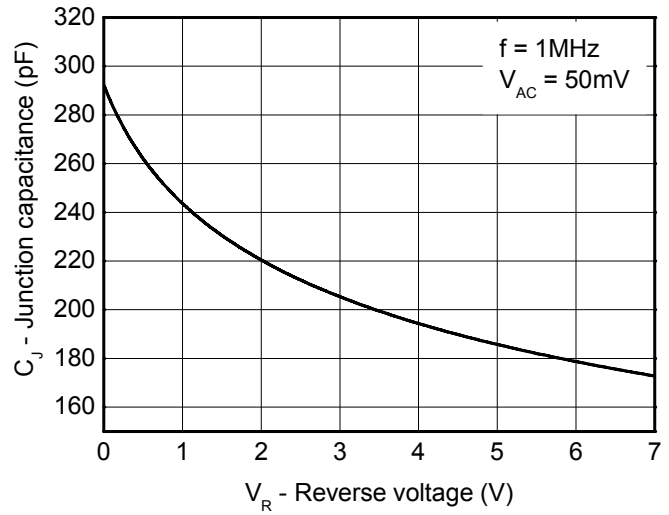
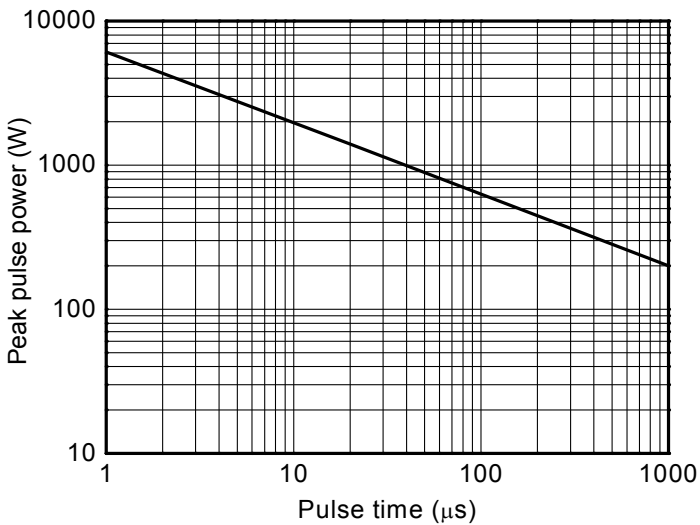
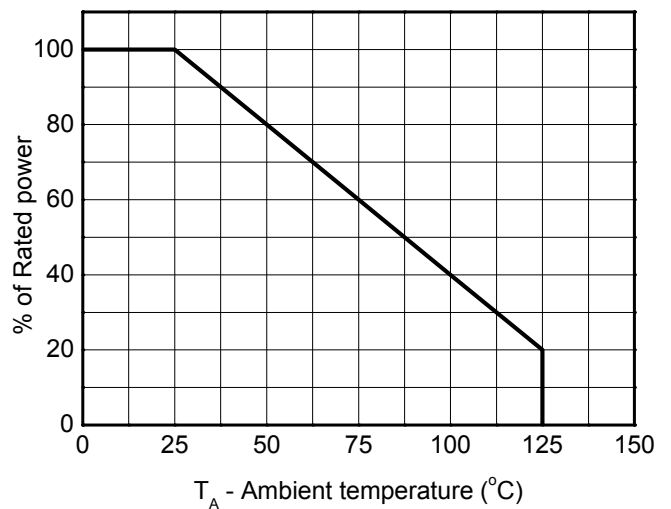
**Electrical characteristics ( $T_A = 25^{\circ}C$ , unless otherwise noted)**

**Definitions of electrical characteristics**

**Electrical characteristics (T<sub>A</sub>=25 °C, unless otherwise noted)**

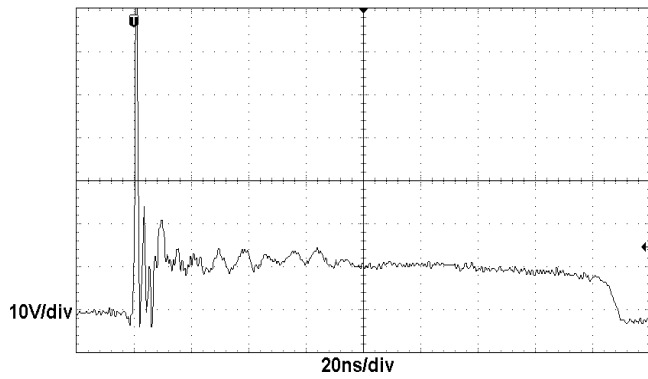
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V <sub>RWM</sub>				7	V
Reverse leakage current	I <sub>R</sub>	V <sub>RWM</sub> = 7V			1	μA
Reverse breakdown voltage	V <sub>BR</sub>	I <sub>BR</sub> = 1mA	7.5	8.6	10	V
Forward voltage	V <sub>F</sub>	I <sub>F</sub> = 10mA	0.6	0.8	1.2	V
Clamping voltage <sup>1)</sup>	V <sub>CL</sub>	V <sub>ESD</sub> = 8kV		11		V
Clamping voltage <sup>2)</sup>	V <sub>CL</sub>	I <sub>PP</sub> = 1A, t <sub>p</sub> = 8/20μs		9.7		V
		I <sub>PP</sub> = 20A, t <sub>p</sub> = 8/20μs		11.5		V
		I <sub>PP</sub> = 80A, t <sub>p</sub> = 8/20μs		17.5		V
Dynamic resistance <sup>3)</sup>	R <sub>DYN</sub>			0.09		Ω
Junction capacitance	C <sub>J</sub>	V <sub>R</sub> = 0V, f = 1MHz		300	400	pF
		V <sub>R</sub> = 7V, f = 1MHz		170	220	pF

**Notes:**

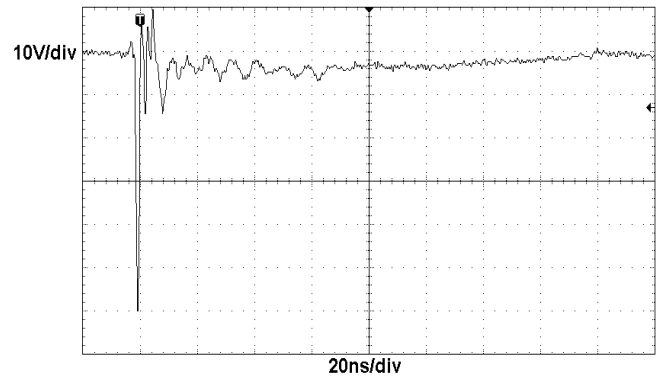
- 1) Contact discharge mode, according to IEC61000-4-2.
- 2) Non-repetitive current pulse, according to IEC61000-4-5.
- 3) Surge parameter: t<sub>p</sub> = 8/20μs, R<sub>DYN</sub> is calculated from 20A to 80A.

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

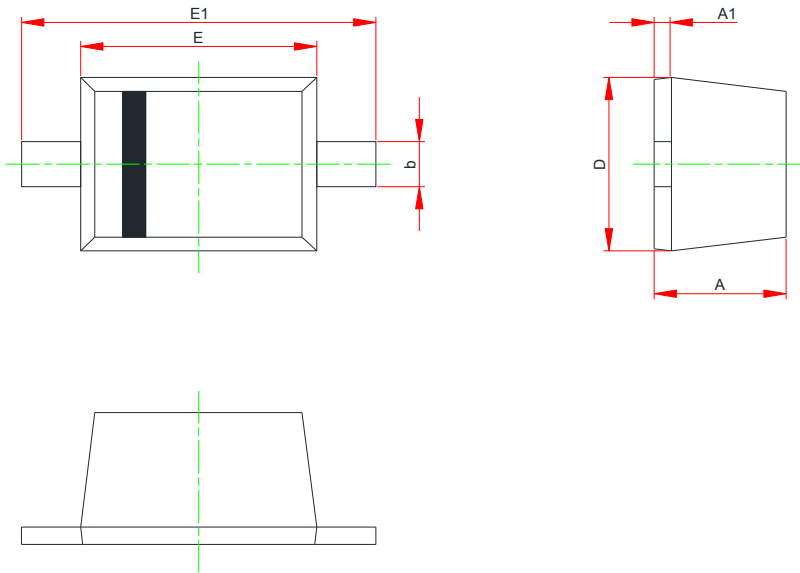
Typical characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)



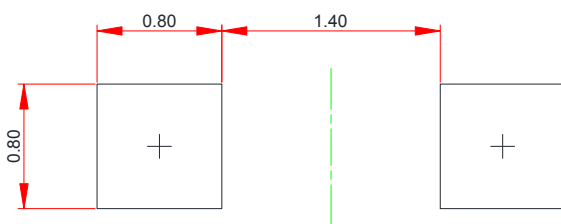
**ESD clamping**  
(+8kV contact discharge per IEC61000-4-2)



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

**Package outline dimensions**
**SOD-323F**


Symbol	Dimensions in millimeters		
	Min.	Typ.	Max.
<b>A</b>	0.800	-	1.100
<b>A1</b>	0.100	-	0.150
<b>b</b>	0.250	-	0.400
<b>D</b>	1.150	-	1.350
<b>E</b>	1.600	-	1.800
<b>E1</b>	2.300	-	2.800

**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.