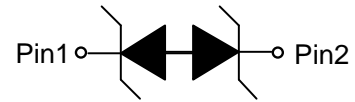


**ESD56131W**
**1-Line, Bi-directional, Transient Voltage Suppressor**
<http://www.sh-willsemi.com>
**Descriptions**

The ESD56131W is a Bi-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 ESD56131W may be used to provide ESD protection up to  $\pm 30\text{kV}$  (contact and air discharge) according to IEC61000-4-2, and with high surge capability used to protect USB voltage bus pin according to IEC61000-4-5.

The ESD56131W is available in SOD-323F package. Standard products are Pb-free and Halogen-free.


**SOD-323F (Bottom View)**

**Circuit diagram**
**Features**

- Reverse stand-off voltage:  $\pm 4.6\text{V}$
- Transient protection 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): 100A (8/20 $\mu\text{s}$ )
- Capacitance:  $C_J = 250\text{pF}$  typ.
- Low clamping voltage
- Solid-state silicon technology



TH = Device code

\* = Month code

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

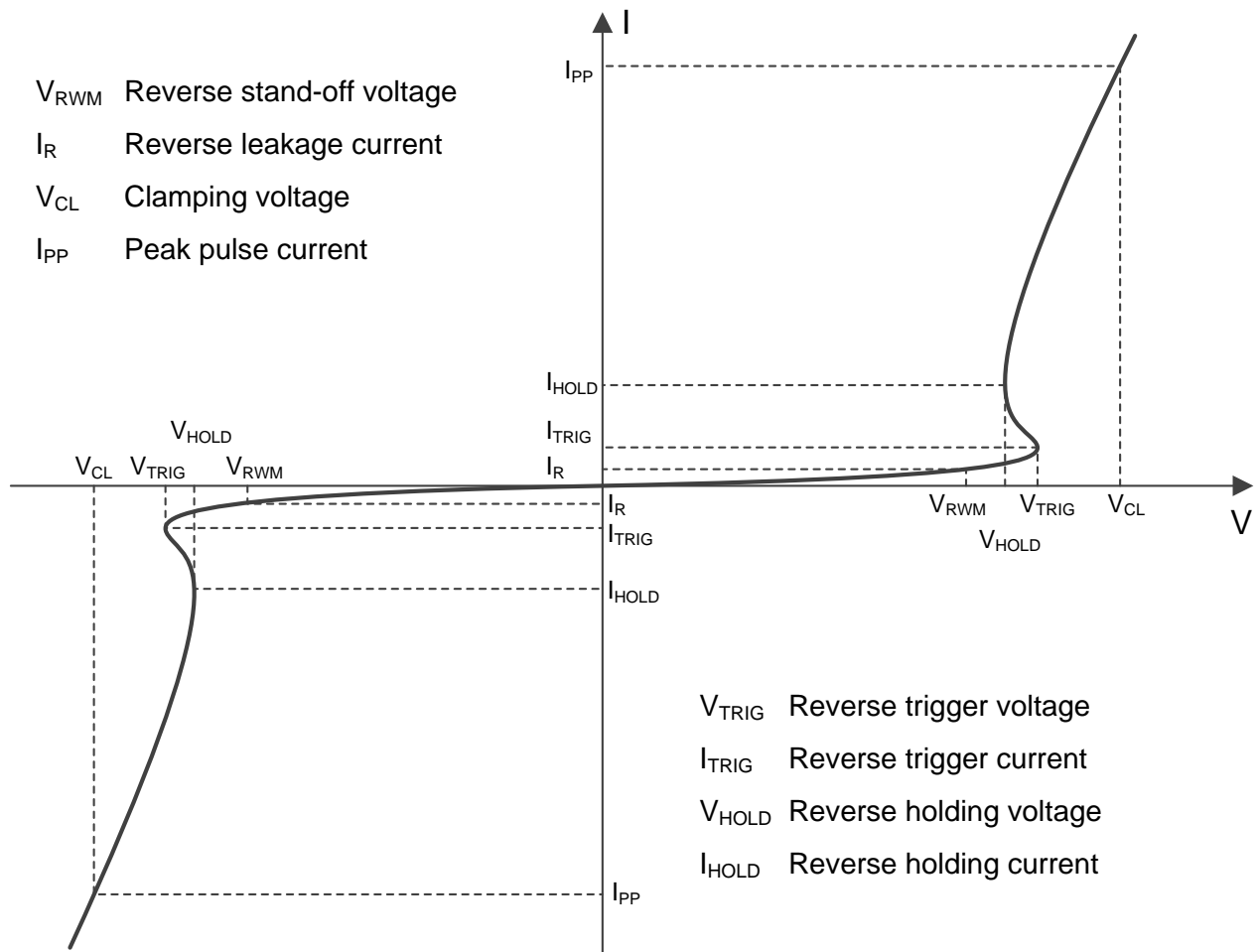
- Power supply protection
- Power management

**Order information**

Device	Package	Shipping
ESD56131W-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 ( $t_p = 8/20\mu s$ )	$I_{PP}$	100	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	$^{\circ}C$

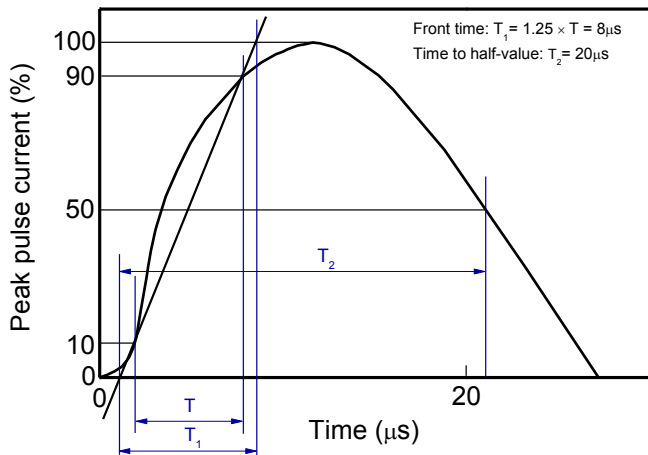
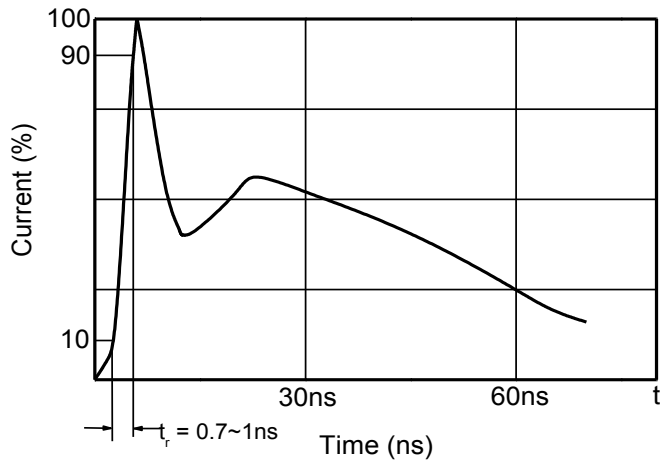
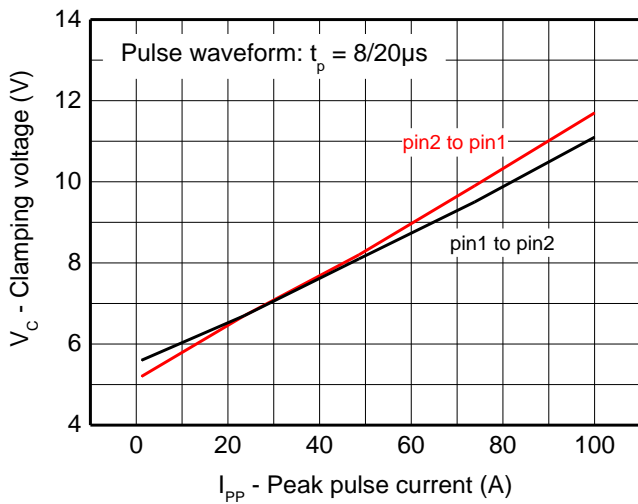
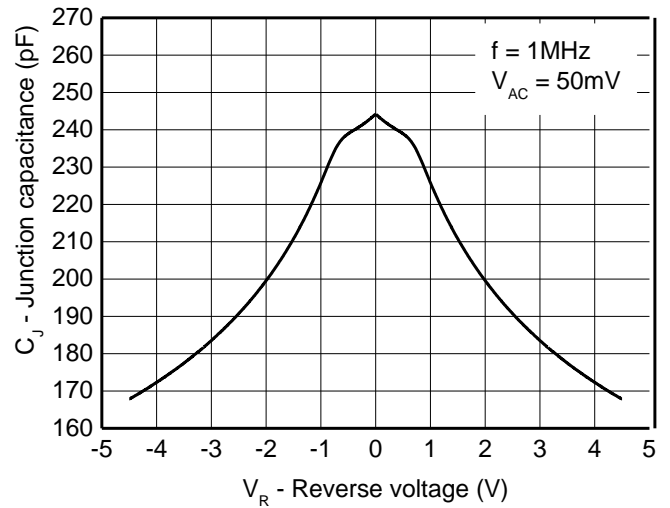
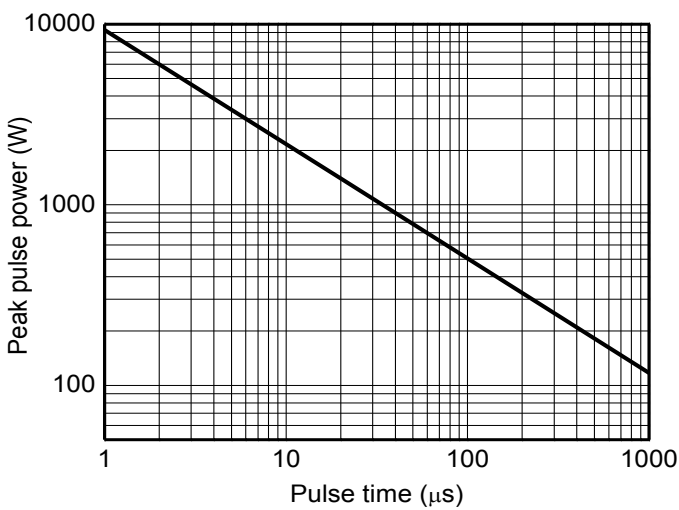
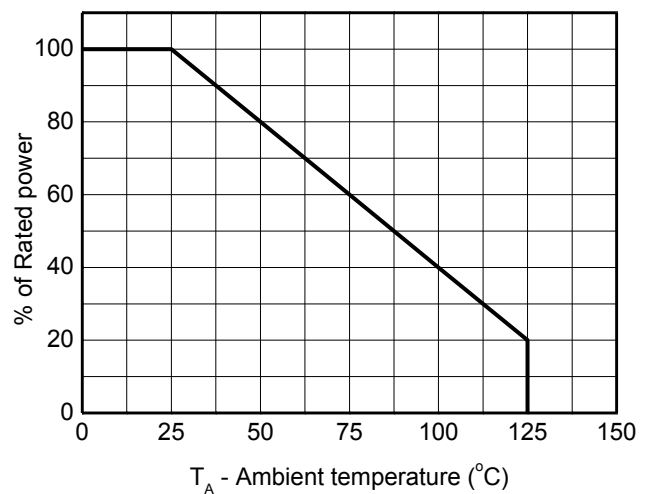
**Electrical characteristics ( $T_A = 25^{\circ}C$ , unless otherwise noted)**

**Definitions of electrical characteristics**

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

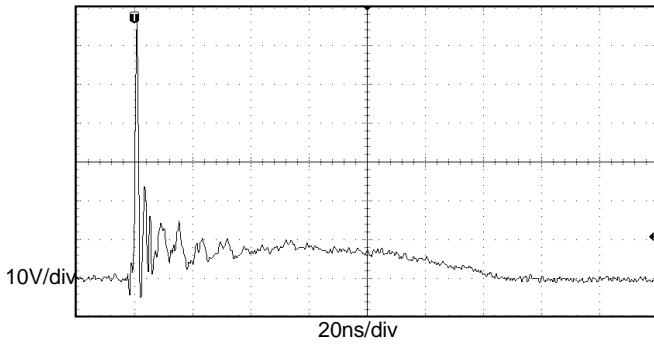
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse maximum working voltage	$V_{RWM}$				$\pm 4.6$	V
Reverse leakage current	$I_R$	$V_{RWM} = 4.6\text{V}$			1	$\mu\text{A}$
Reverse breakdown voltage	$V_{BR}$	$I_{BR} = 1\text{mA}$	4.8			V
Reverse holding voltage	$V_{HOLD}$	$I_{HOLD} = 50\text{mA}$	4.8			V
Clamping voltage <sup>1)</sup>	$V_{CL}$	$V_{ESD} = 8\text{kV}$		8.0		V
Clamping voltage <sup>2)</sup>	$V_{CL}$	$I_{PP} = 1\text{A}, t_p = 8/20\mu\text{s}$			6	V
		$I_{PP} = 50\text{A}, t_p = 8/20\mu\text{s}$			10	V
		$I_{PP} = 100\text{A}, t_p = 8/20\mu\text{s}$			14	V
Junction capacitance	$C_J$	$V_R = 0\text{V}, f = 1\text{MHz}$		250	300	pF

*Notes:*

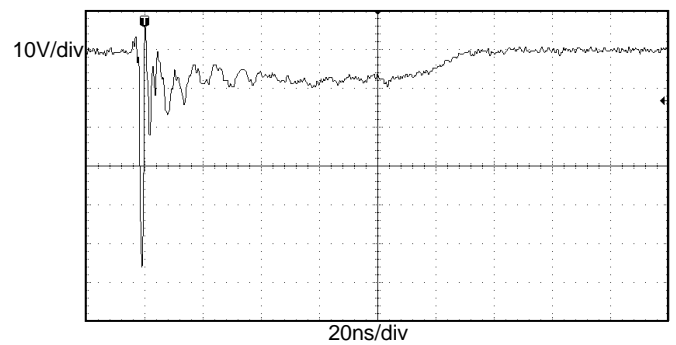
- 1) Contact discharge mode, according to IEC61000-4-2.
- 2) Non-repetitive current pulse, according to IEC61000-4-5.

**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**

**Capacitance vs. Reverse voltage**

**Non-repetitive peak pulse power vs. Pulse time**

**Power derating vs. Ambient temperature**

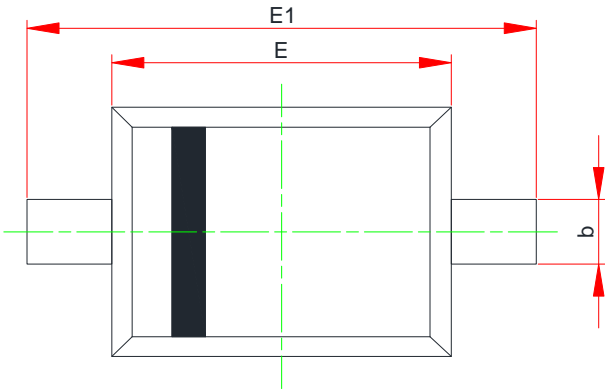
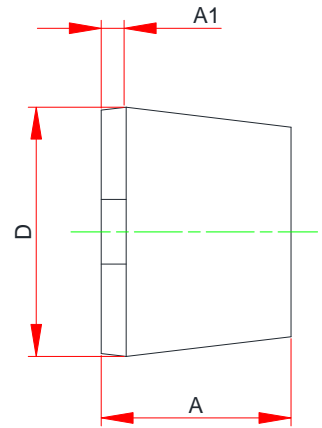
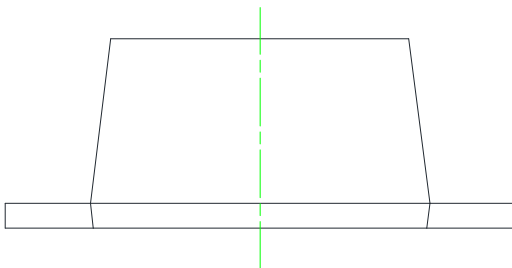
Typical characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)



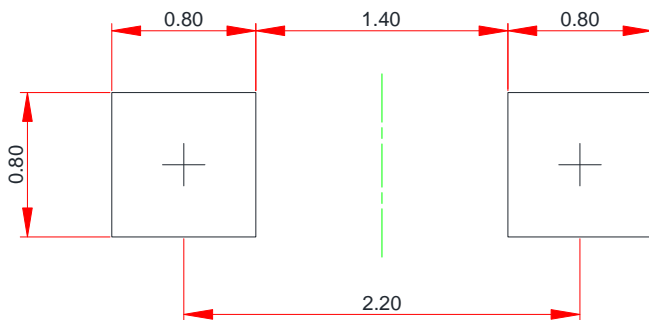
**ESD clamping**  
(+8kV contact discharge per IEC61000-4-2)



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

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

**Top View**

**Side View**

**Side View**

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.80	-	1.10
A1	0.10	-	0.15
D	1.15	-	1.35
E	1.60	-	1.80
E1	2.30	-	2.80
b	0.25	-	0.40

**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.

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