

ESD5682E12
2-Line, Uni-directional, Transient Voltage Suppressors
<http://www.sh-willsemi.com>
Descriptions

The ESD5682E12 is a transient voltage suppressor designed to protect power interfaces. It is suitable to replace multiple discrete components in portable electronics.

The ESD5682E12 is specifically designed to protect USB port. TVS diode with higher surge capability is used to protect USB voltage bus pin.

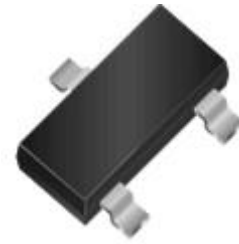
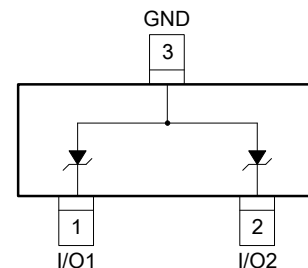
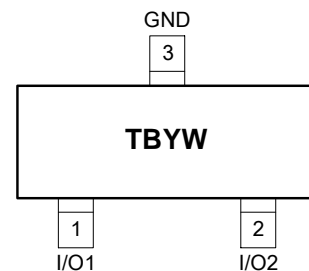
The ESD5682E12 is available in SOT-23 package. Standard products are Pb-free and Halogen-free.

Features

- Reverse stand-off voltage: 12V max
- Surge protection according to IEC61000-4-5
8/20μs waveform: 18A
- ESD protection according to IEC61000-4-2
Contact & Air discharge: ±30kV
- Low clamping voltage
- Solid-state silicon technology

Applications

- Power supply protection
- Power management


SOT-23 (Top View)

Circuit diagram


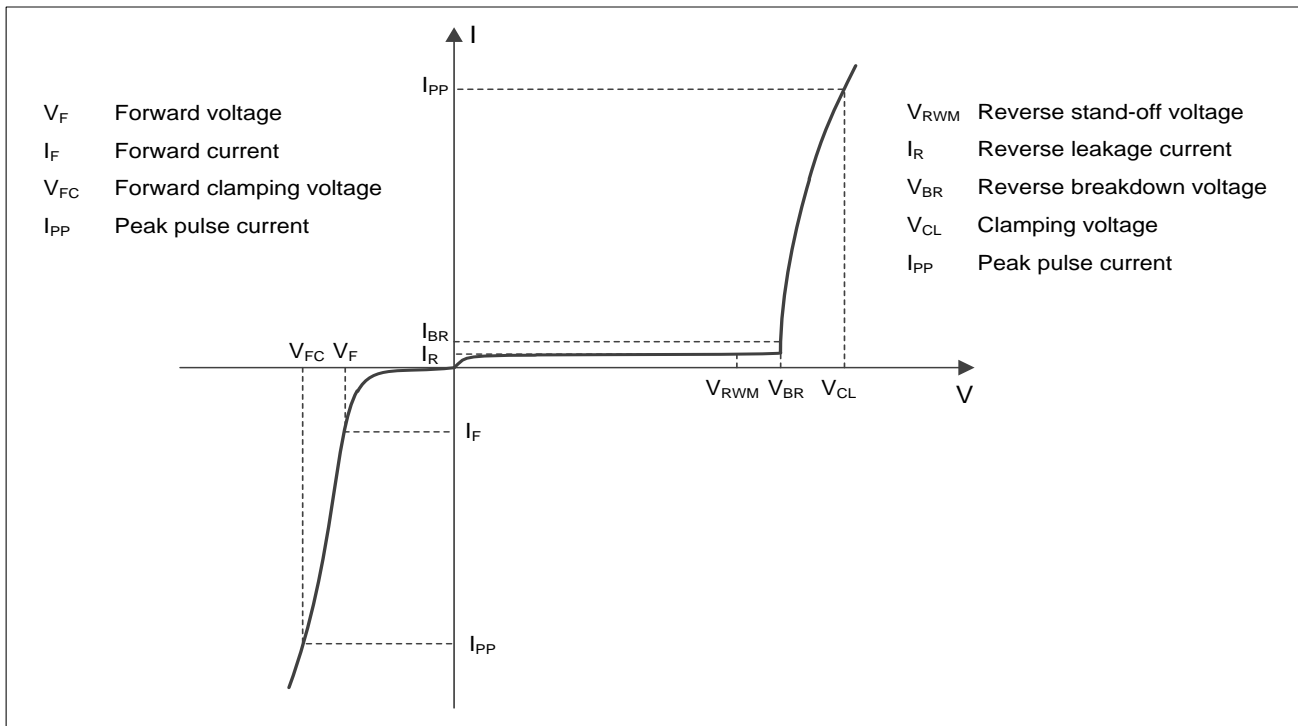
TB = Device code
YW = Data code

Marking (Top View)
Order information

Device	Package	Shipping
ESD5682E12-2/TR	SOT-23	3000/Tape&Reel

Absolute maximum ratings

Parameter	Symbol	Rating	Unit
Peak pulse power ($t_p=8/20\mu s$)	Ppk	450	W
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	$^{\circ}C$
Operating temperature	T_{OP}	-40~85	$^{\circ}C$
Lead temperature	T_L	260	$^{\circ}C$
Storage temperature	T_{STG}	-55~150	$^{\circ}C$

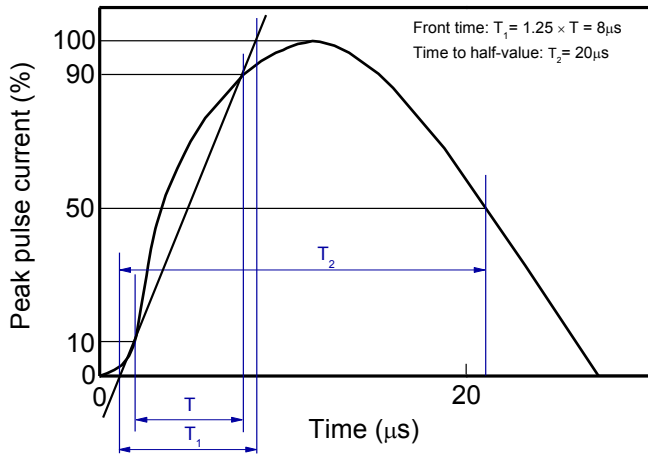
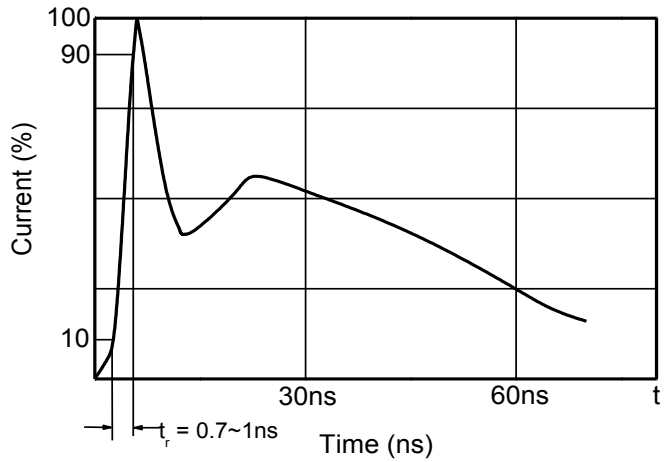
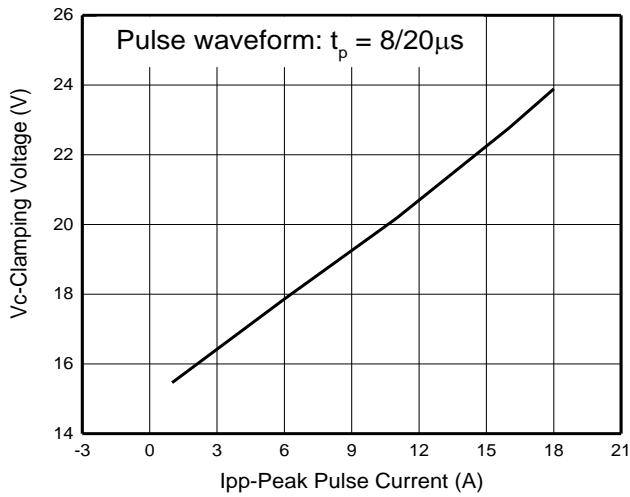
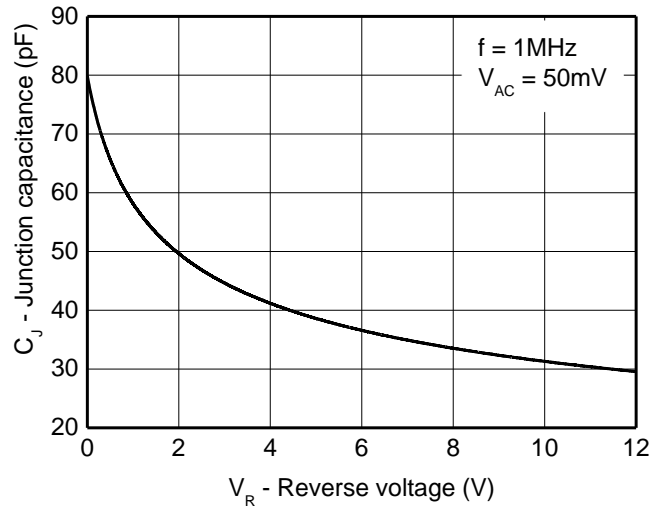
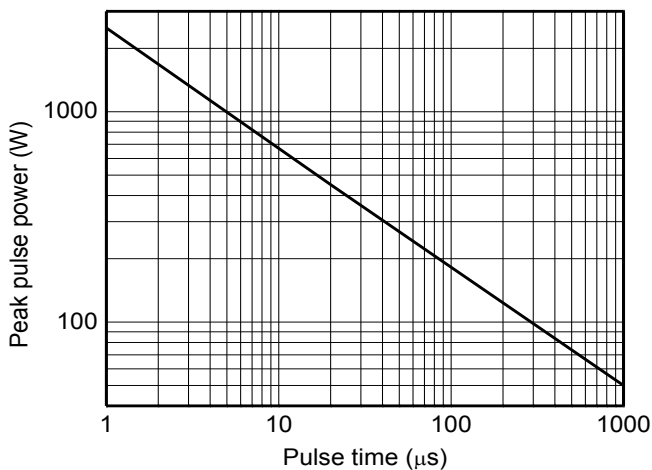
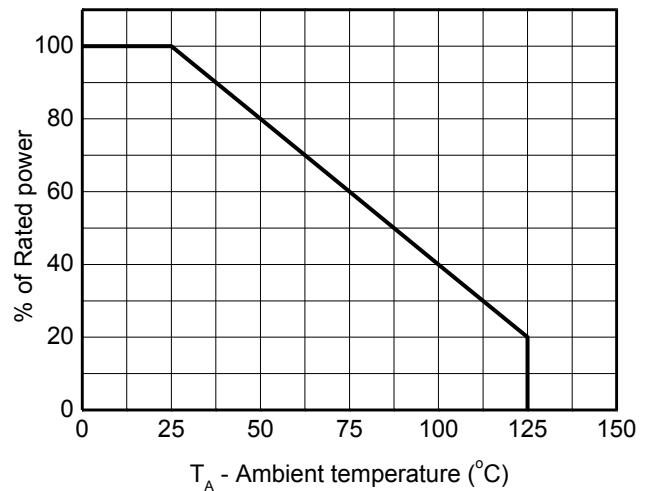
Electrical characteristics ($T_A = 25^{\circ}C$, unless otherwise noted)

Definitions of electrical characteristics

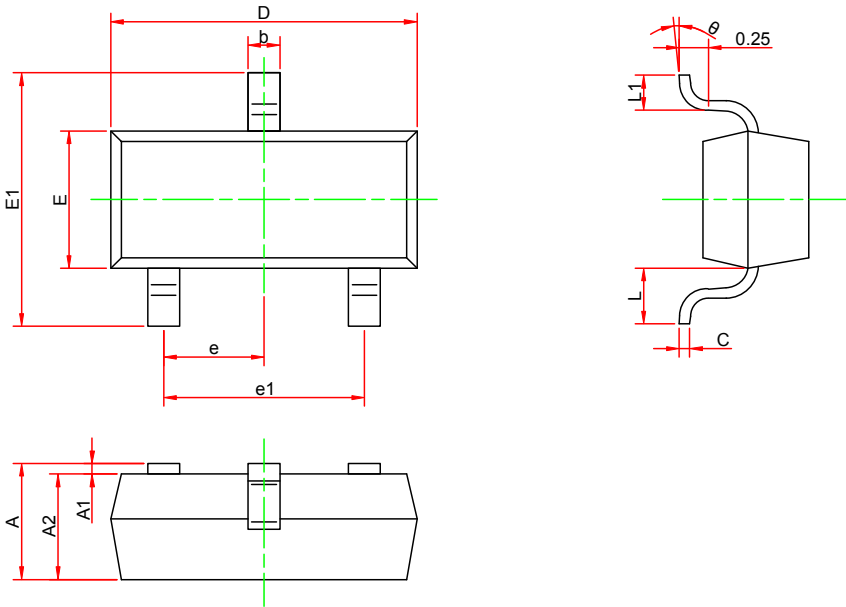
Electrical characteristics ($T_A = 25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				12.0	V
Reverse leakage current	I_R	$V_{RWM} = 12\text{V}$		1	100	nA
Reverse breakdown voltage	V_{BR}	$I_{BR} = 1\text{mA}$	13.0	15.0	17.0	V
Forward voltage	V_F	$I_F = 20\text{mA}$	0.45		1.25	V
Clamping voltage ¹⁾	V_{CL}	$I_{PP} = 16\text{A}$, $t_p = 100\text{ns}$		18		V
Clamping voltage ²⁾	V_{CL}	$V_{ESD} = 8\text{kV}$		19		V
Clamping voltage ³⁾	V_{CL}	$I_{PP} = 1\text{A}$, $t_p = 8/20\mu\text{s}$			17.5	V
		$I_{PP} = 18\text{A}$, $t_p = 8/20\mu\text{s}$			26.0	V
Dynamic resistance ¹⁾	R_{DYN}			0.20		Ω
Junction capacitance	C_J	$F=1\text{MHz}$, $V_R=0\text{V}$ Any I/O pin to GND		80	120	pF
		$F=1\text{MHz}$, $V_R=0\text{V}$ Between I/O pins		40	60	pF

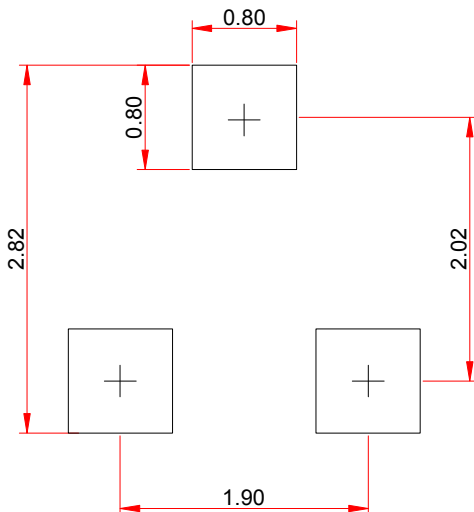
Notes:

- 1) TLP parameter: $Z_0 = 50\Omega$, $t_p = 100\text{ns}$, $t_r = 2\text{ns}$, 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 ($T_A = 25^\circ\text{C}$, unless otherwise noted)

8/20 μs 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

Package outline dimensions
SOT-23


Symbol	Dimensions in millimeters		
	Min.	Typ.	Max.
A	0.900	-	1.150
A1	0.000	-	0.100
A2	0.900	-	1.050
b	0.300	-	0.500
c	0.080	-	0.150
D	2.800	-	3.000
E	1.200	-	1.400
E1	2.250	-	2.550
e	0.950TYP		
e1	1.800	-	2.000
L	0.550REF		
L1	0.300	-	0.500
θ	0°	-	8°

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.