

ESD5661DXX

1-Line, Uni-directional, Transient Voltage Suppressor

<http://www.sh-willsemi.com>

Descriptions

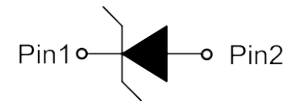
The ESD5661DXX is a transient voltage suppressor designed to protect power interfaces. It is suitable to replace multiple discrete components in portable electronics.

The ESD5661DXX is specifically designed to protect USB port. TVS diode with higher surge capability is used to protect USB voltage bus pin.

The ESD5661DXX is available in FBP1608-2L package. Standard products are Pb-free and Halogen-free.



FBP1608-2L (Bottom View)



Circuit diagram



X = Device code(A B C T)

* = Month code

Marking (Top View)

Features

- Reverse stand-off voltage: 5V ~ 15V
- Surge protection according to IEC61000-4-5 see [Table 4](#)
- ESD protection according to IEC61000-4-2 ±30kV (contact and air discharge)
- Low clamping voltage
- Solid-state silicon technology

Applications

- Power supply protection
- Power management

Order information

Table 1.

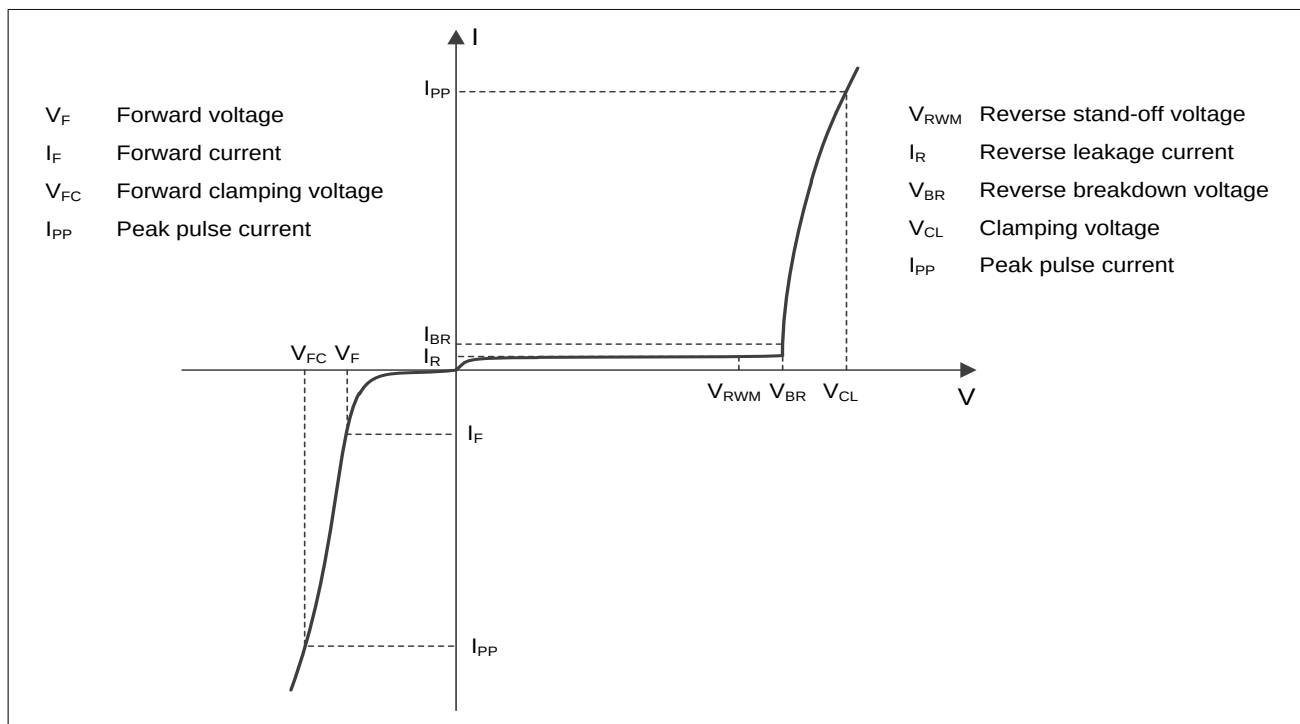
Device	Package	Shipping	Marking
ESD5661D05-2/TR	FBP1608-2L	10000/Tape&Reel	A*
ESD5661D07-2/TR	FBP1608-2L	10000/Tape&Reel	B*
ESD5661D12-2/TR	FBP1608-2L	10000/Tape&Reel	C*
ESD5661D15-2/TR	FBP1608-2L	10000/Tape&Reel	T*

Absolute maximum ratings

Table 2.

Parameter	Symbol	Rating	Unit
Peak pulse power ($t_p = 8/20\mu s$)	Ppk	1200	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)
Table 3.

Type number	Reverse Standoff Voltage V_{RWM} (V)	Breakdown voltage $V_{BR}(V)$ $I_{BR} = 1\text{mA}$			Reverse leakage current $I_{RM}(nA)$ at V_{RWM}		Forward voltage $V_F(V)$ $I_F = 20\text{mA}$		Junction capacitance $F = 1\text{MHz}$, $V_R=0V$ (pF)	
	Max	Min	Typ	Max	Typ	Max	Min	Max	Typ	Max
ESD5661D05	5	6.5	7.5	8.5	50	1000	0.45	1.25	710	1060
ESD5661D07	7	8.0	9.0	10.0	10	1000	0.45	1.25	520	780
ESD5661D12	12	13.0	15.0	17.0	5	100	0.45	1.25	290	440
ESD5661D15	15	16.0	18.0	20.0	3	100	0.45	1.25	240	350

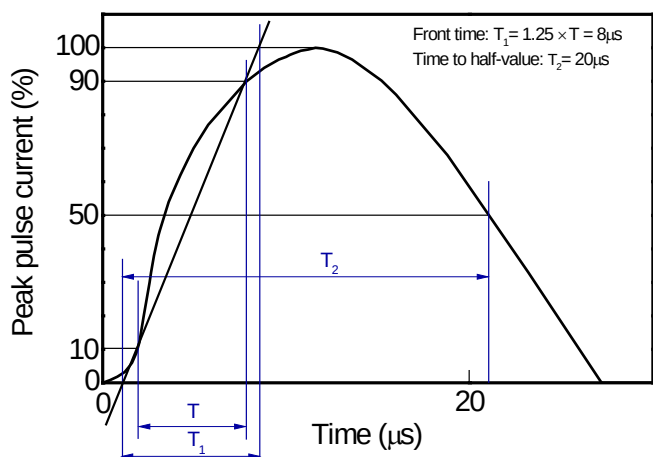
Table 4.

Type number	Rated peak pulse current I_{PP} (A) ¹⁾³⁾	Clamping voltage $V_{CL}(V)$ at $I_{PP}(A)$ ¹⁾³⁾	Clamping voltage $V_{CL}(V)$ at $I_{PP} = 16A$, $t_p = 100ns$ ²⁾³⁾	Clamping voltage $V_{CL}(V)$ at $V_{ESD} = 8kV$ ²⁾³⁾
ESD5661D05	70	14	8	9
ESD5661D07	65	16	10	11
ESD5661D12	50	25	15	16
ESD5661D15	40	31	20	21

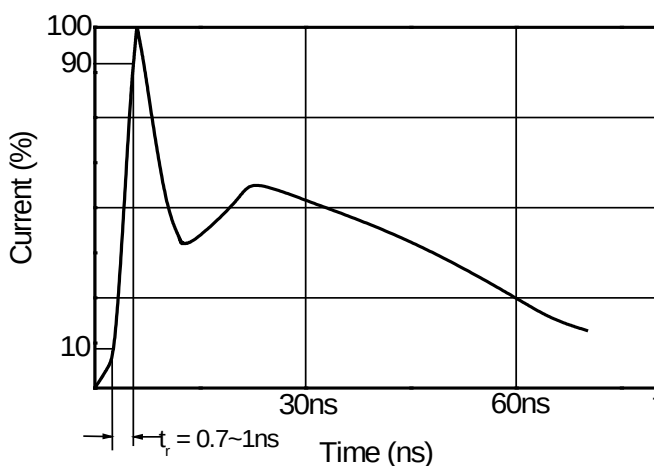
Notes:

- 1) Non-repetitive current pulse, according to IEC61000-4-5. (8/20us current waveform)
- 2) Non-repetitive current pulse, according to IEC61000-4-2.
- 3) Measured from pin 1 to pin 2.

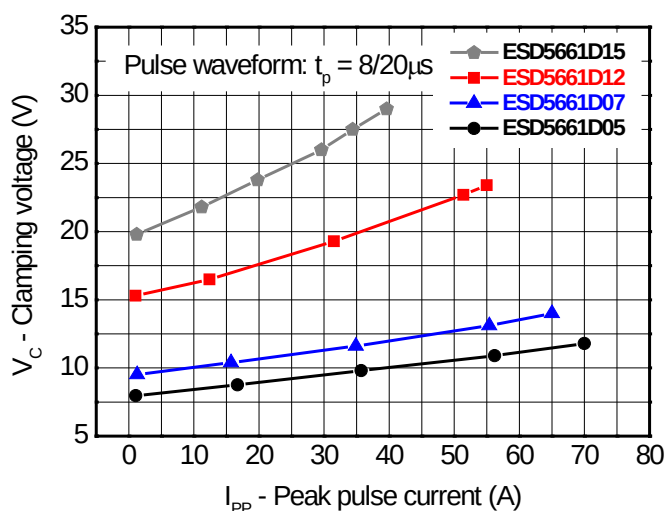
Typical characteristics ($T_A = 25^\circ\text{C}$, unless otherwise noted)



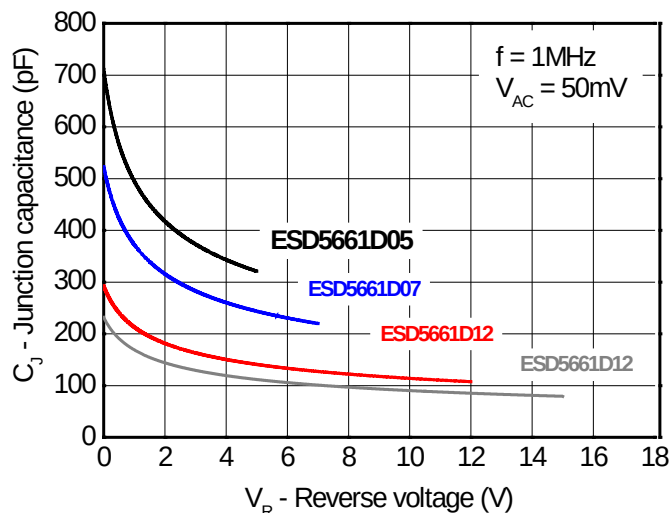
8/20 μs waveform per IEC61000-4-5



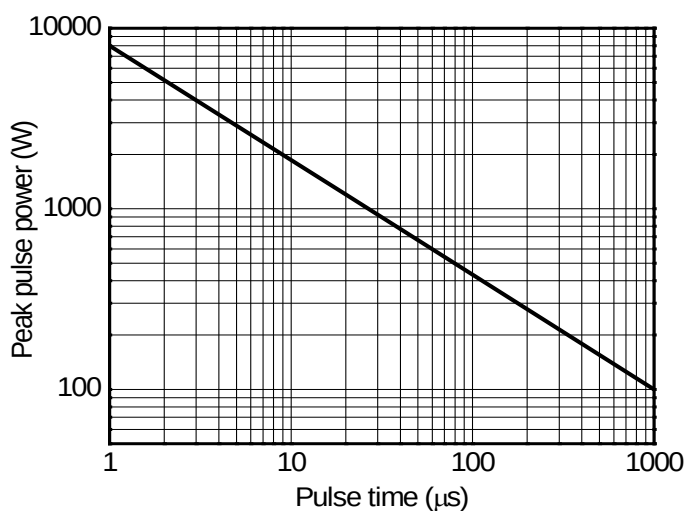
Contact discharge current waveform per IEC61000-4-2



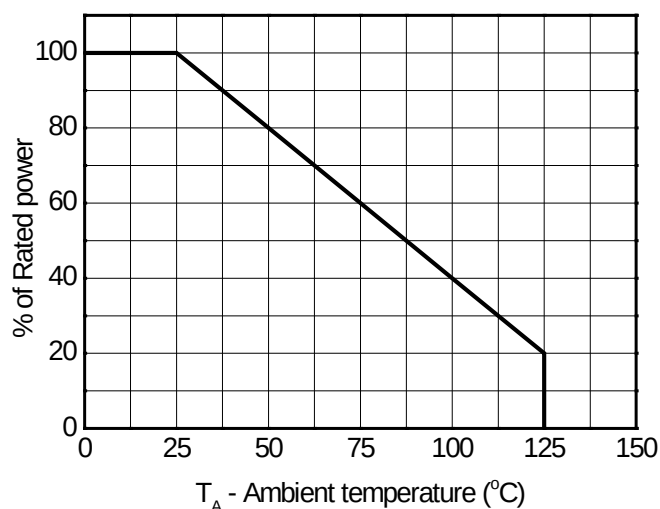
Clamping voltage vs. Peak pulse current



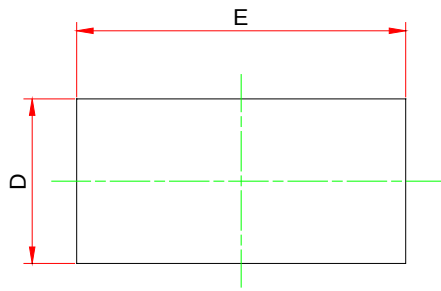
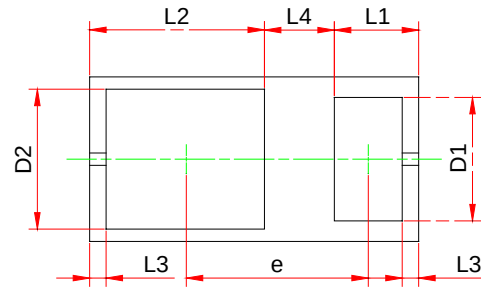
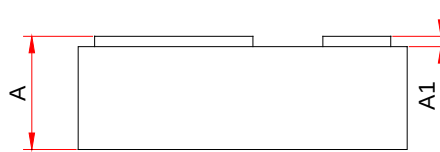
Capacitance vs. Reverse voltage



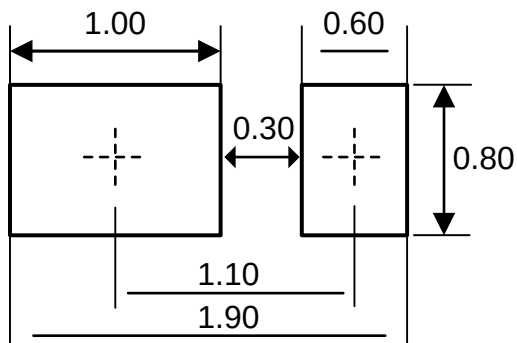
Non-repetitive peak pulse power vs. Pulse time



Power derating vs. Ambient temperature

Package outline dimensions
FBP1608-2L

Top View

Bottom View

Side View

Symbol	Dimensions in millimeter		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	0.450	0.550	0.018	0.022
A1	0.010	0.090	0.000	0.004
D	0.750	0.850	0.030	0.033
D1	0.520	0.680	0.020	0.027
D2	0.600	0.760	0.024	0.030
E	1.550	1.650	0.061	0.065
L1	0.410 REF		0.016 REF	
L2	0.850 REF		0.033 REF	
L3	0.080 REF		0.003 REF	
L4	0.340 REF		0.013 REF	
e	0.900	1.000	0.035	0.039

Recommended 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.