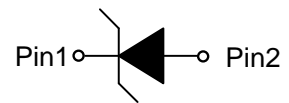


**ESD5661DXX**
<http://www.sh-willsemi.com>
**1-Line, Uni-directional, Transient Voltage Suppressor**
**Descriptions**

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)**

**Features**

- Reverse stand-off voltage: 7V ~ 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

**Circuit diagram**


X = Device code ( B C T )  
 \* = Month code

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

- Power supply protection
- Power management

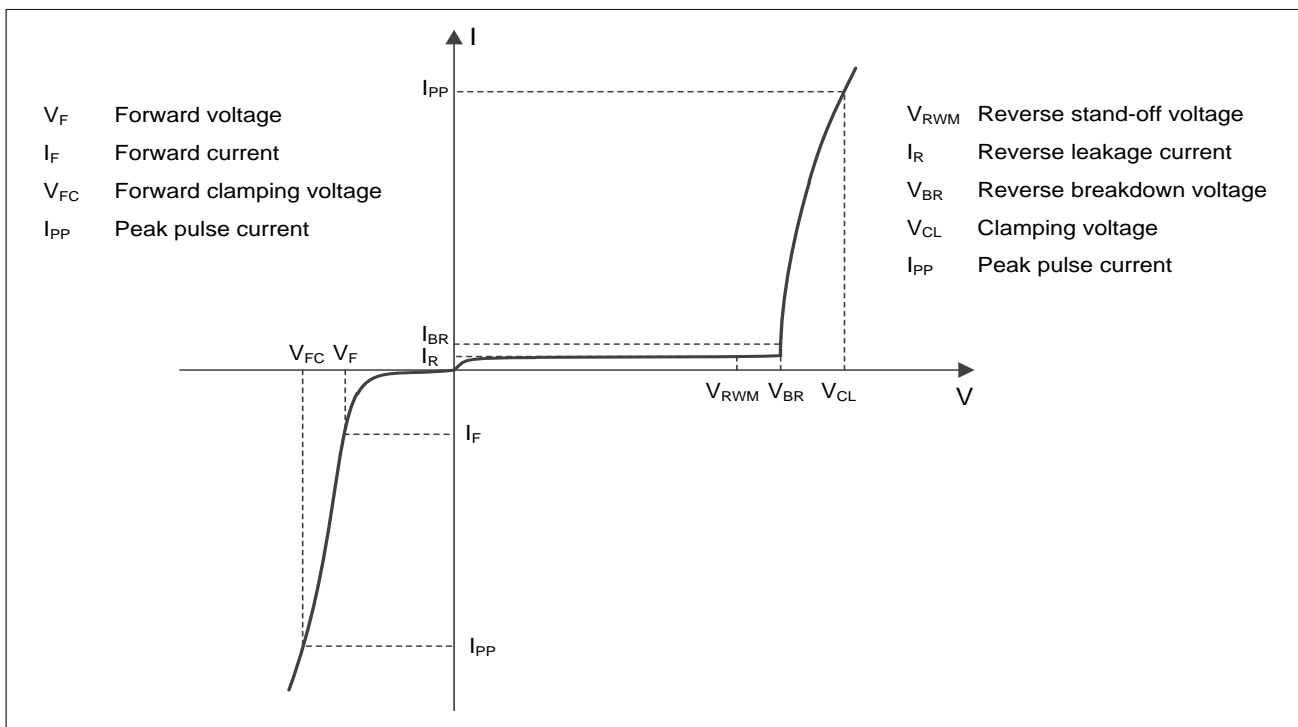
**Order information**

Table 1.

Device	Package	Shipping	Marking
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	$V_{ESD}$	$\pm 30$	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)**
**Table 3.**

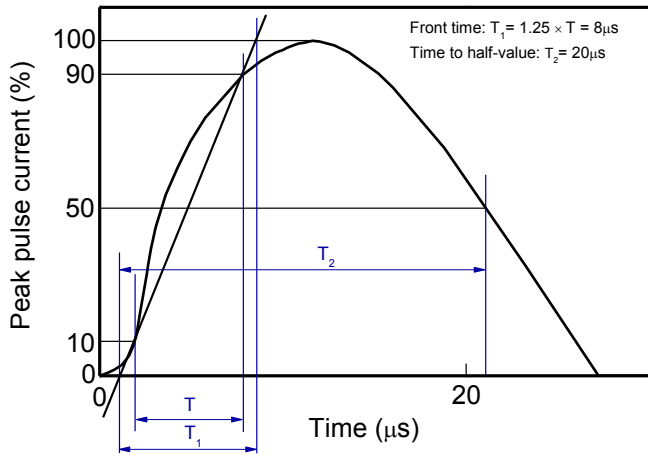
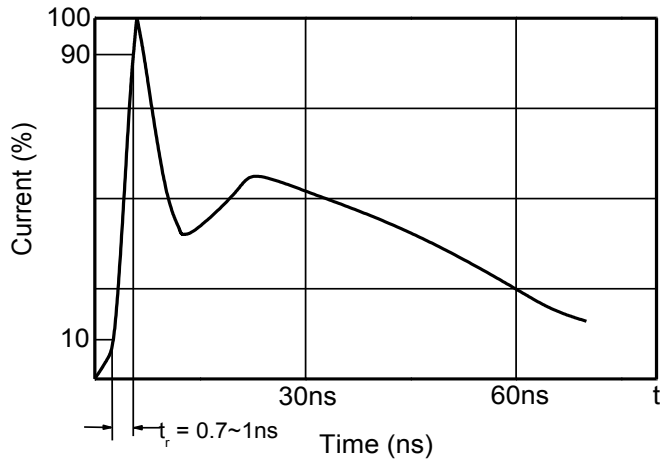
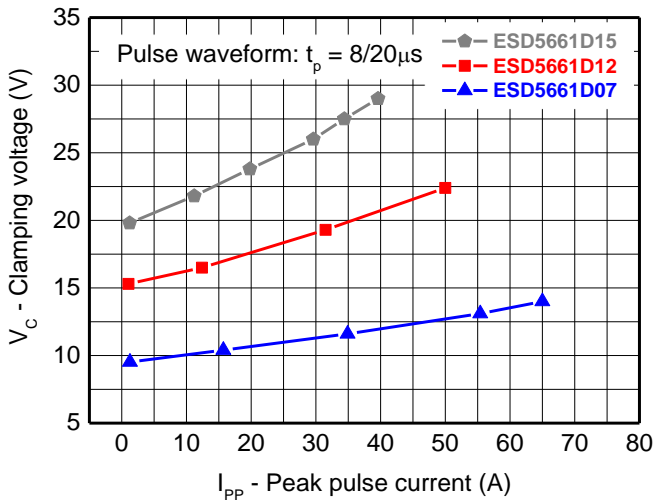
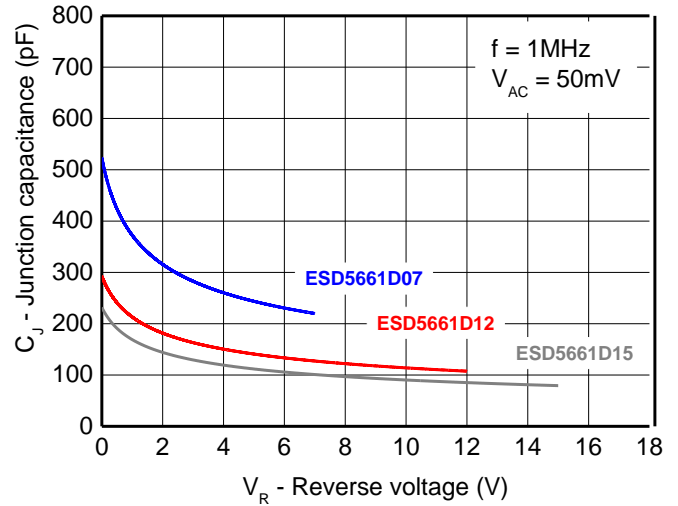
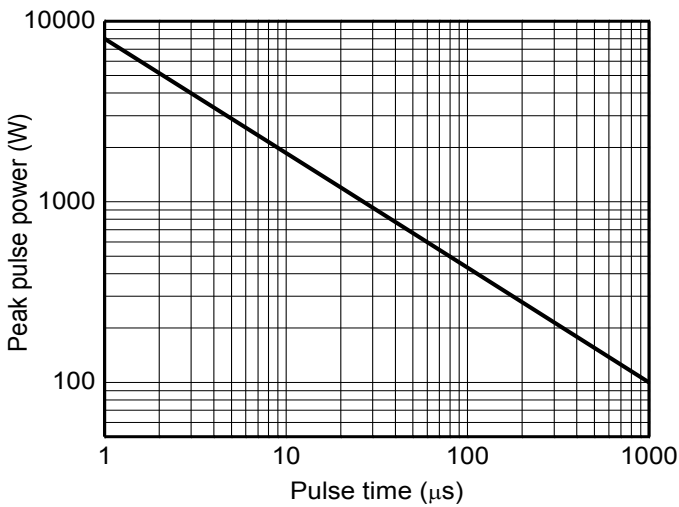
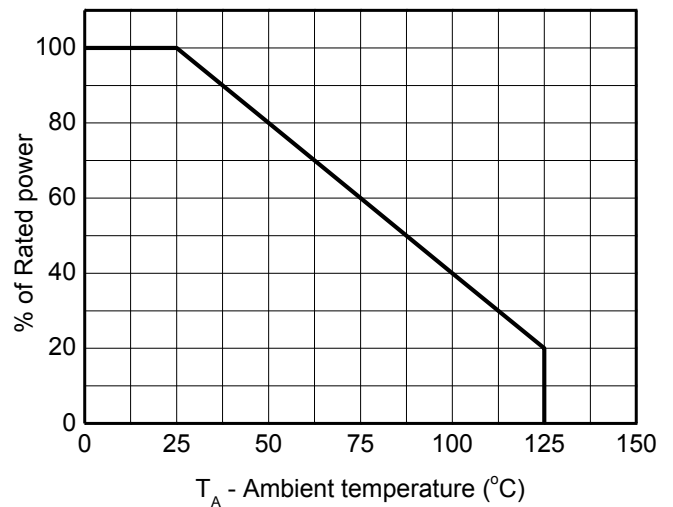
Type number	Reverse Standoff Voltage $V_{RWM}$ (V)	Breakdown voltage $V_{BR}$ (V) $I_{BR} = 1\text{mA}$			Reverse leakage current $I_{RM}$ (nA) at $V_{RWM}$		Forward voltage $V_F$ (V) $I_F = 20\text{mA}$		Junction capacitance $F = 1\text{MHz}$ , $V_R=0\text{V}$ (pF)	
	Max.	Min.	Typ.	Max.	Typ.	Max.	Min.	Max.	Typ.	Max.
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

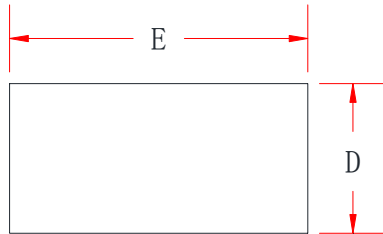
**Table 4.**

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

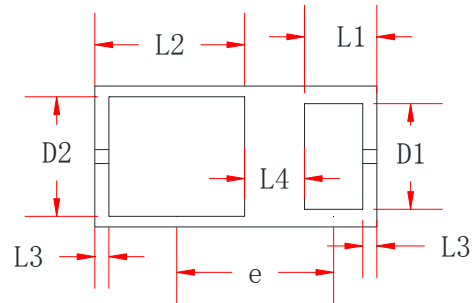
Notes:

- 1) Non-repetitive current pulse, according to IEC61000-4-5. (8/20 $\mu\text{s}$  current waveform)
- 2) Non-repetitive current pulse, according to IEC61000-4-2.
- 3) Measured from pin 1 to pin 2.

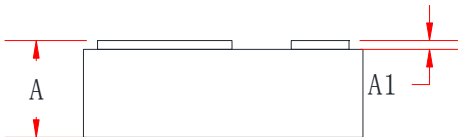
**Typical characteristics ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)**

**8/20 $\mu\text{s}$  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**

**PACKAGE OUTLINE DIMENSIONS**
**FBP1608-2L**


TOP VIEW

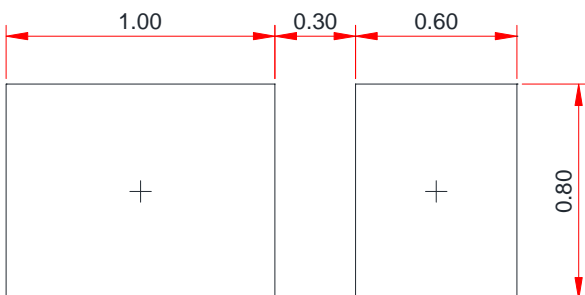


BOTTOM VIEW

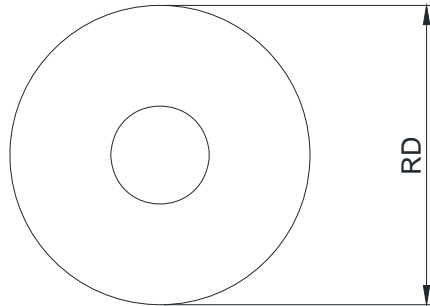
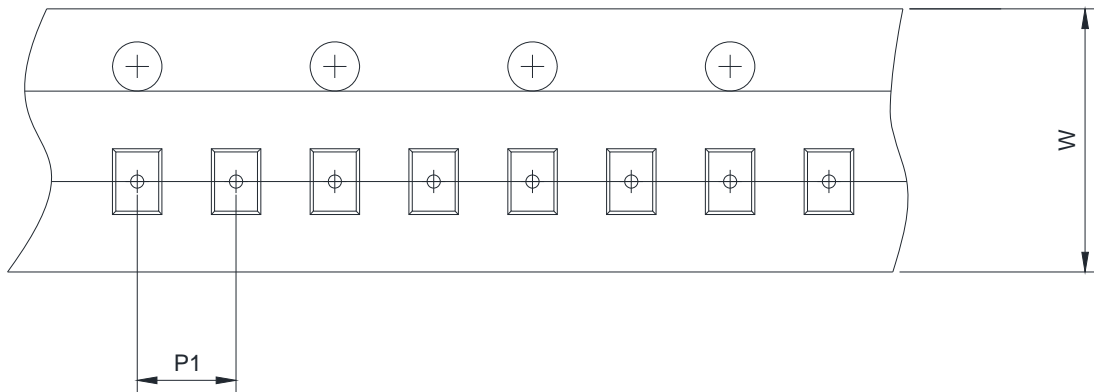
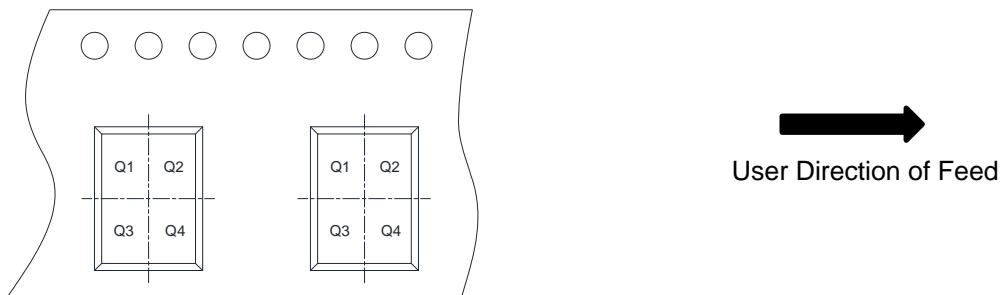


SIDE VIEW

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.45	0.50	0.55
A1	0.01	0.05	0.09
D	0.75	0.80	0.85
D1	0.52	0.60	0.68
D2	0.60	0.68	0.76
E	1.55	—	1.65
L1	0.41 Ref		
L2	0.85 Ref		
L3	0.08 Ref		
L4	0.34 Ref		
e	0.90	0.95	1.00

**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.

**TAPE AND REEL INFORMATION**
**Reel Dimensions**

**Tape Dimensions**

**Quadrant Assignments For PIN1 Orientation In Tape**


RD	Reel Dimension	<input checked="" type="checkbox"/> 7inch	<input type="checkbox"/> 13inch
W	Overall width of the carrier tape	<input checked="" type="checkbox"/> 8mm	<input type="checkbox"/> 12mm <input type="checkbox"/> 16mm
P1	Pitch between successive cavity centers	<input checked="" type="checkbox"/> 2mm	<input type="checkbox"/> 4mm <input type="checkbox"/> 8mm
Pin1	Pin1 Quadrant	<input checked="" type="checkbox"/> Q1	<input checked="" type="checkbox"/> Q2 <input type="checkbox"/> Q3 <input type="checkbox"/> Q4