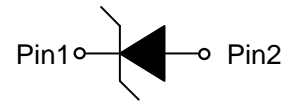


ESD5681NXX
1-Line, Uni-directional, Transient Voltage Suppressor
<http://www.sh-willsemi.com>
Descriptions

The ESD5681NXX is a transient voltage suppressor designed to protect power interfaces. It is suitable to replace multiple discrete components in portable electronics.

The ESD5681NXX is specifically designed to protect USB port. TVS diode with higher surge capability is used to protect USB voltage bus pin.

The ESD5681NXX is available in DFN1006-2L package. Standard products are Pb-free and Halogen-free.


DFN1006-2L (Bottom View)

Circuit diagram
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

Applications

- Power supply protection
- Power management



X = Device code (I,J,W)

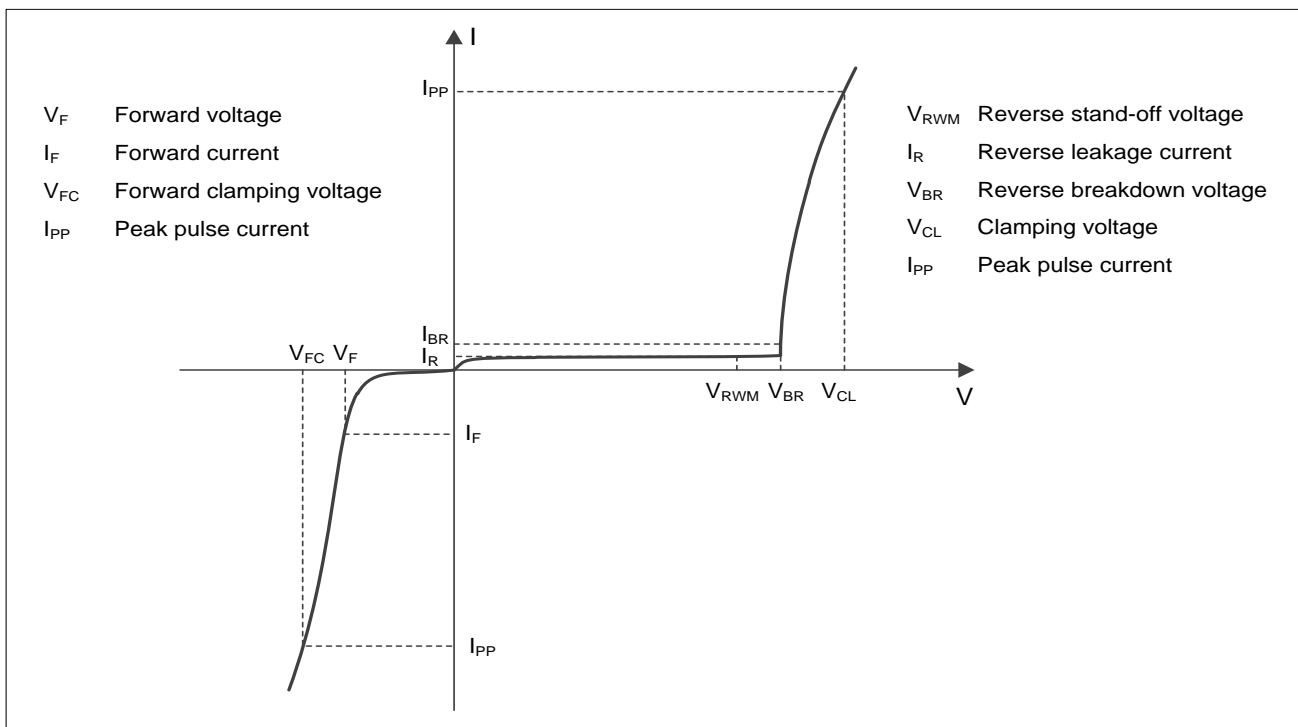
* = Month code

Marking (Top View)
Order information
Table 1.

Device	Package	Shipping	Marking
ESD5681N07-2/TR	DFN1006-2L	10000/Tape&Reel	I*
ESD5681N12-2/TR	DFN1006-2L	10000/Tape&Reel	J*
ESD5681N15-2/TR	DFN1006-2L	10000/Tape&Reel	W*

Absolute maximum ratings
Table 2.

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)
Table 3.

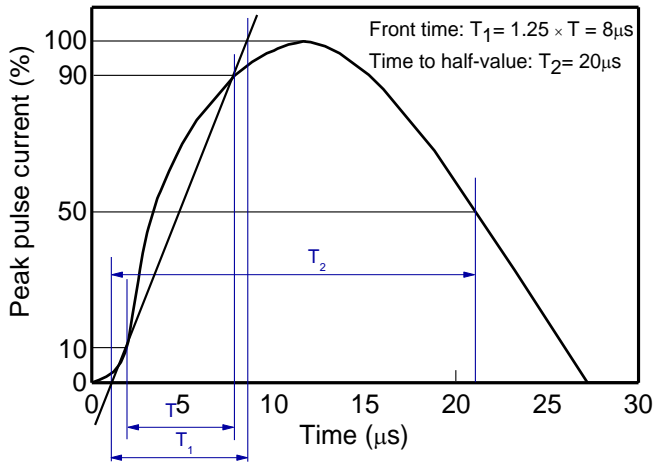
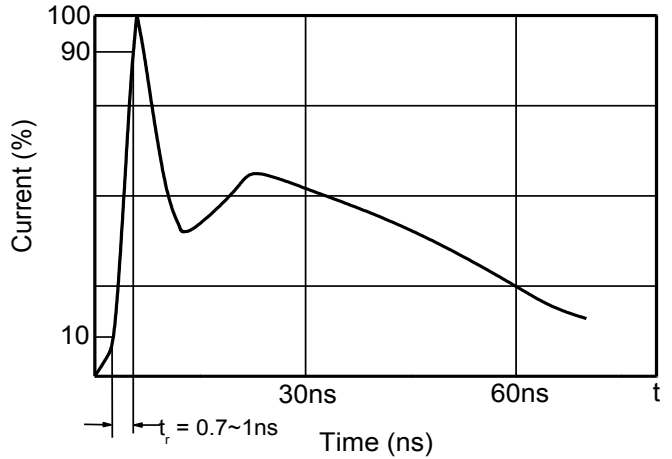
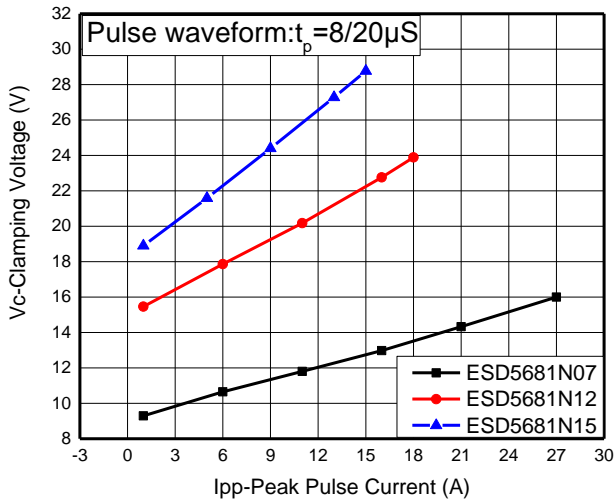
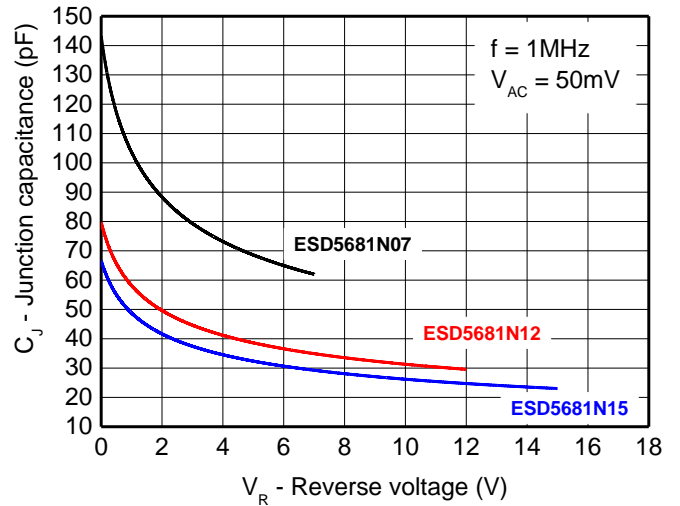
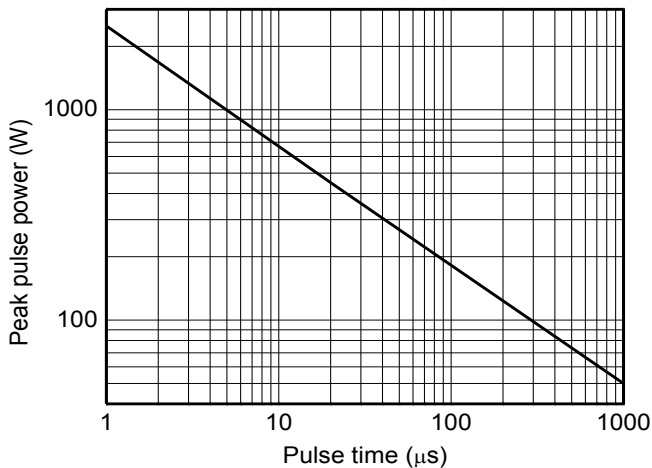
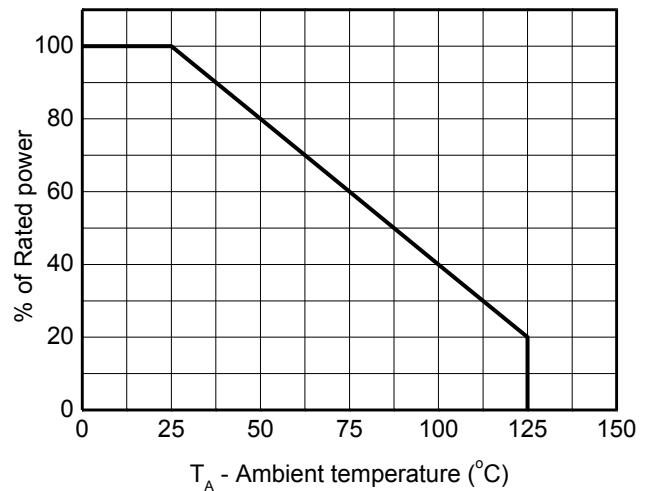
Type number	Reverse Stand off Voltage V_{RWM} (V)	Breakdown voltage V_{BR} (V) $I_{BR} = 1\text{mA}$			Reverse leakage current I_{RM} (nA) at V_{RWM}		Forward voltage V_F (V) $I_F = 20\text{mA}$		Junction capacitance $F=1\text{MHz}$, $V_R=0\text{V}$ (pF)	
	Max.	Min.	Typ.	Max.	Typ.	Max.	Min.	Max.	Typ.	Max.
ESD5681N07	7	8.0	9.0	10.0	10	1000	0.45	1.25	140	210
ESD5681N12	12	13.0	15.0	17.0	1	100	0.45	1.25	80	120
ESD5681N15	15	16.0	18.0	20.0	0.5	50	0.45	1.25	65	100

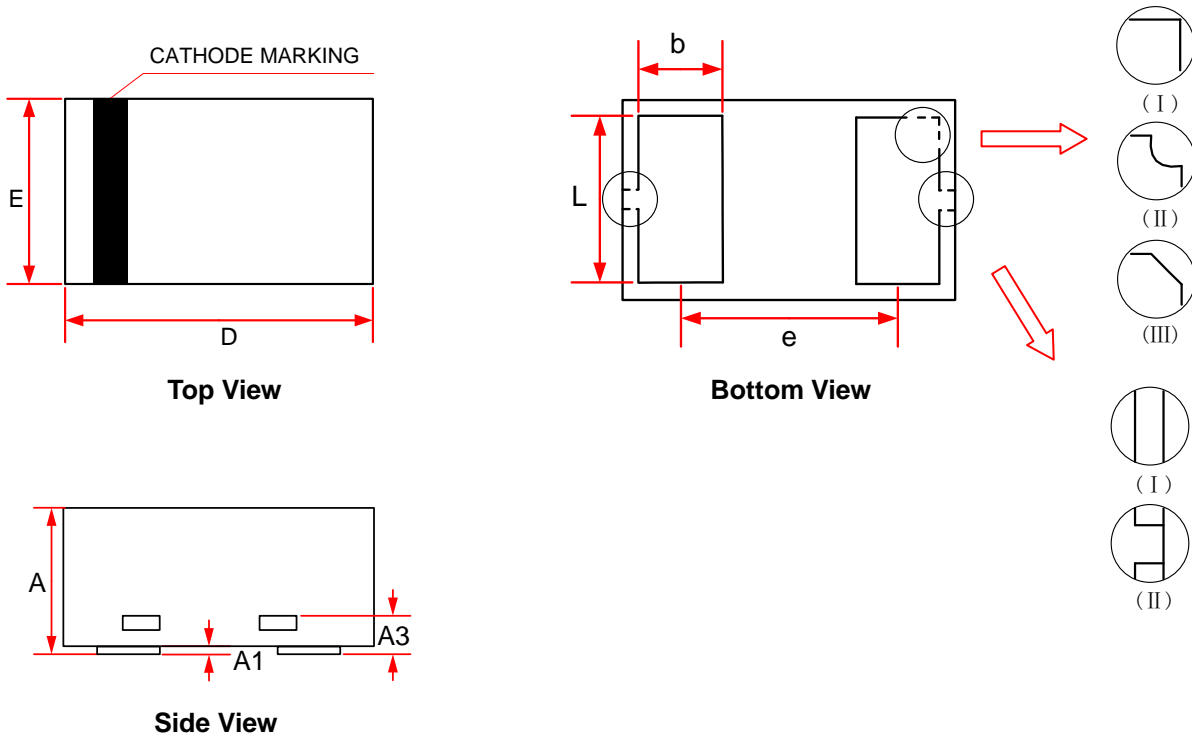
Table 4.

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 $I_{PP} = 16\text{A}$, $t_p = 100\text{ns}$ ²⁾³⁾	Clamping voltage V_{CL} (V) at $V_{ESD} = 8\text{kV}$ ²⁾³⁾
ESD5681N07	27	16	11	11
ESD5681N12	18	24	19	19
ESD5681N15	15	29	22	24

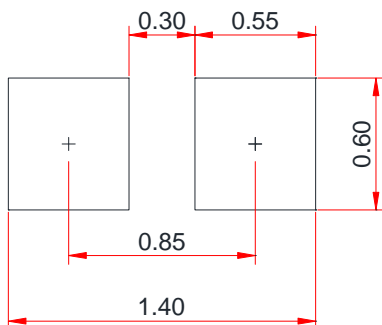
Notes:

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

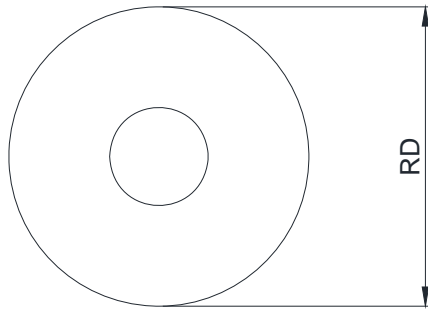
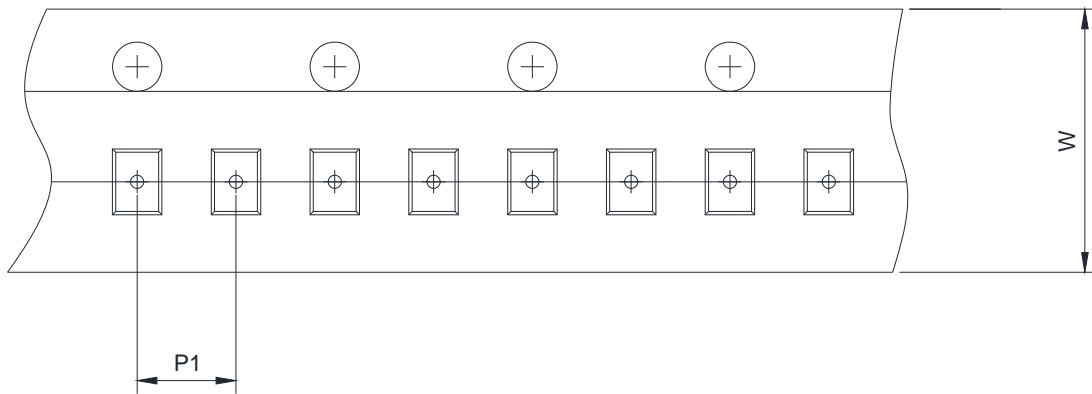
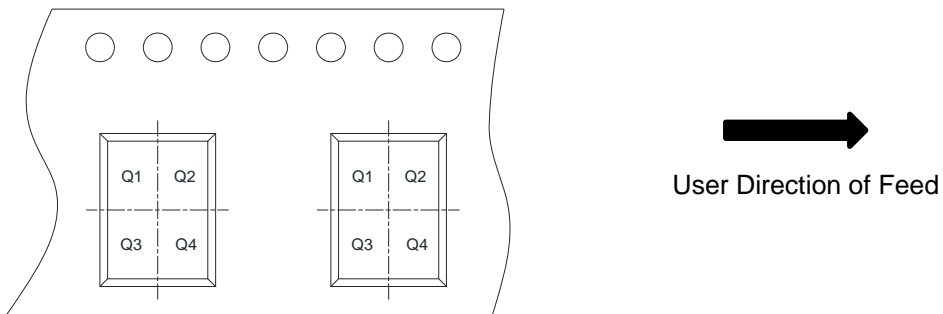
Typical characteristics ($T_A = 25^\circ\text{C}$, unless otherwise noted)

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
DFN1006-2L


Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.340	0.450	0.530
A1	0.000	0.020	0.050
A3	0.125 Ref.		
D	0.950	1.000	1.075
E	0.550	0.600	0.675
b	0.200	0.250	0.300
L	0.450	0.500	0.550
e	0.650 BSC		

Recommended PCB Layout (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	
P	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

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