

**ESD56101DXX**
<http://www.sh-willsemi.com>
**1-Line, Uni-directional, Transient Voltage Suppressor**
**Descriptions**

The ESD56101DXX is a transient voltage suppressor designed to protect power interfaces. It is suitable to replace multiple discrete components in portable electronics.

The ESD56101DXX is specifically designed to protect power lines.

The ESD56101DXX is available in DFN1610-2L package. Standard products are Pb-free and Halogen-free.

**Features**

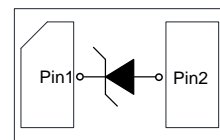
- Reverse stand-off voltage: 5V ~ 15V
- Surge protection according to IEC61000-4-5 see [Table 4](#)
- ESD protection according to IEC61000-4-2 ±30kV (contact and air discharge)
- Low clamping voltage
- Solid-state silicon technology

**Applications**

- Power supply protection
- Power management

**Order information**
**Table 1.**

Device	Package	Shipping	Marking
ESD56101D05-2/TR	DFN1610-2L	10000/Tape&Reel	B*
ESD56101D10-2/TR	DFN1610-2L	10000/Tape&Reel	C*
ESD56101D12-2/TR	DFN1610-2L	10000/Tape&Reel	F*
ESD56101D15-2/TR	DFN1610-2L	10000/Tape&Reel	G*


**DFN1610-2L (Bottom View)**

**Circuit diagram**

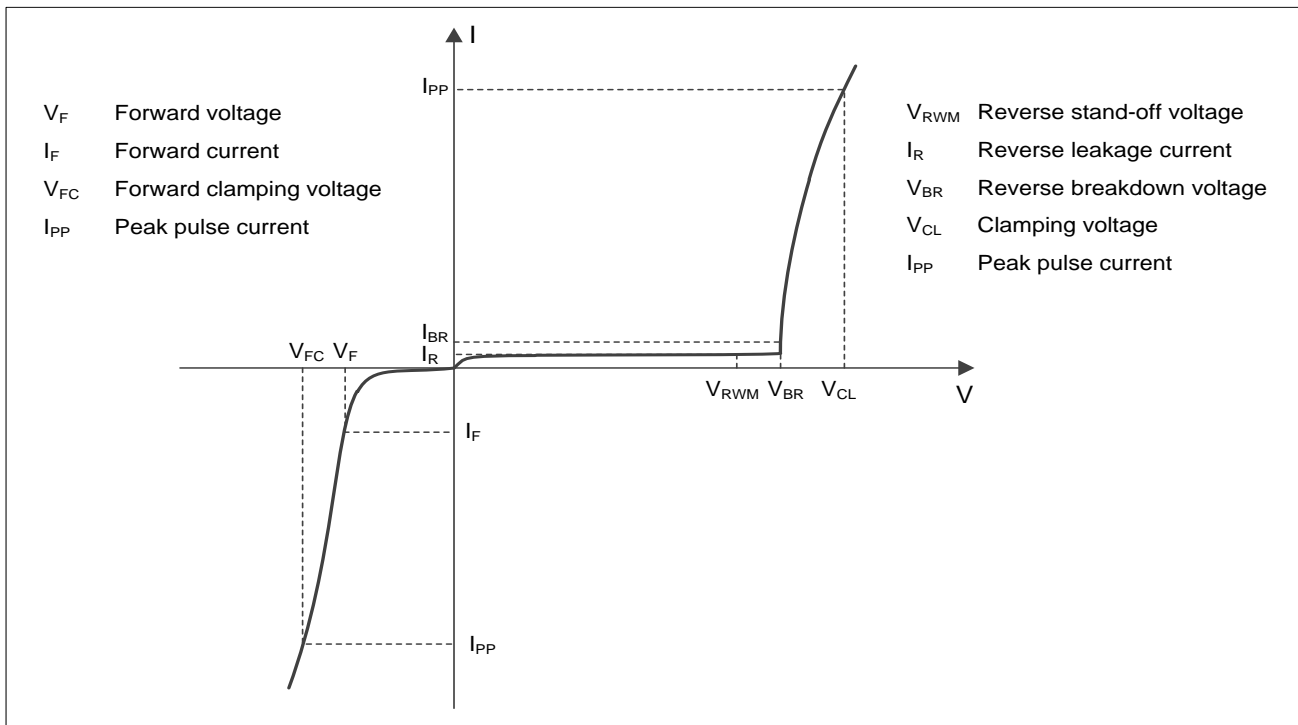

X = Device code (B C F G)

\* = Month code

**Marking (Top View)**

**Absolute maximum ratings**
**Table 2.**

Parameter	Symbol	Rating	Unit
Peak pulse power (tp = 8/20μs)	P <sub>pk</sub>	1250	W
ESD according to IEC61000-4-2 air discharge	V <sub>ESD</sub>	±30	kV
ESD according to IEC61000-4-2 contact discharge		±30	
Junction temperature	T <sub>J</sub>	125	°C
Operating temperature	T <sub>OP</sub>	-40~85	°C
Lead temperature	T <sub>L</sub>	260	°C
Storage temperature	T <sub>STG</sub>	-55~150	°C

**Electrical characteristics (T<sub>A</sub> = 25°C, unless otherwise noted)**

**Definitions of electrical characteristics**

**Electrical characteristics ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)**
**Table 3.**

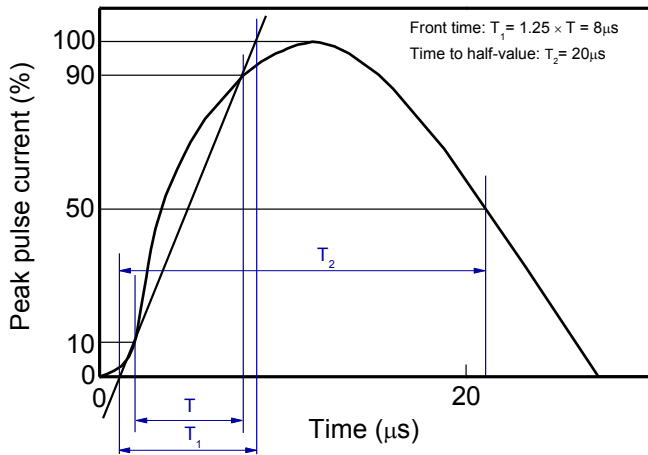
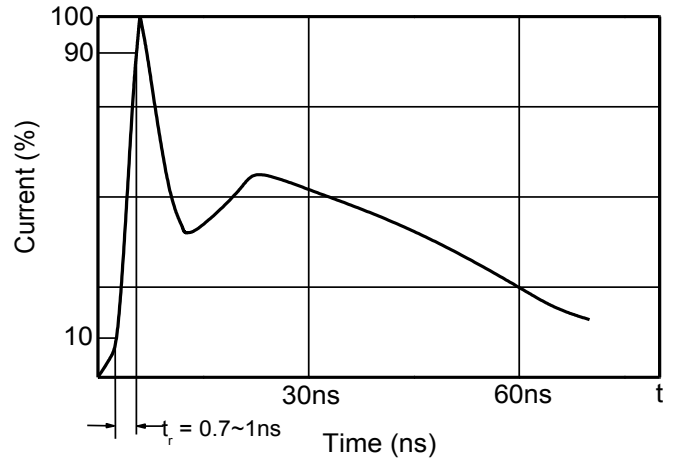
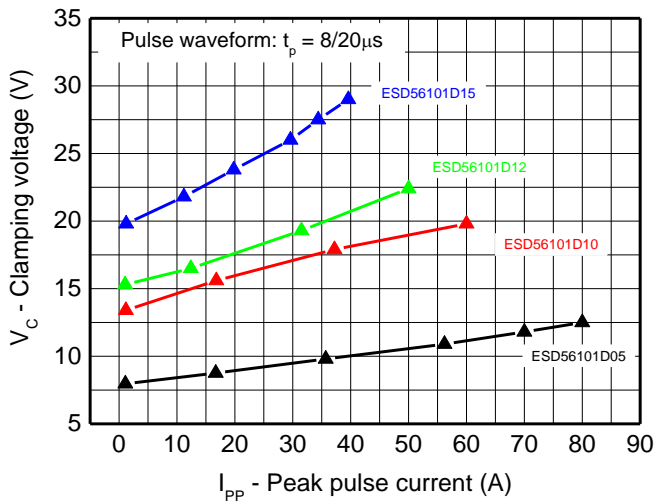
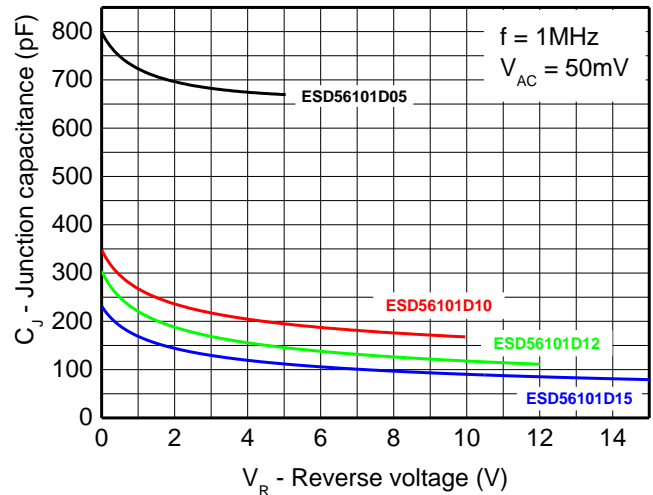
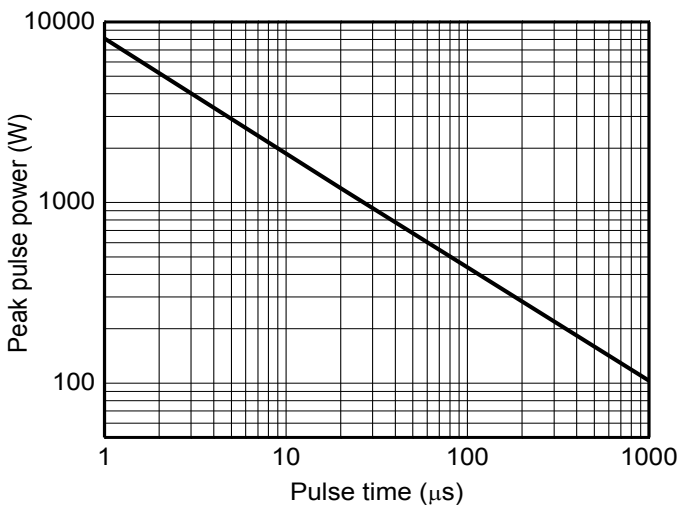
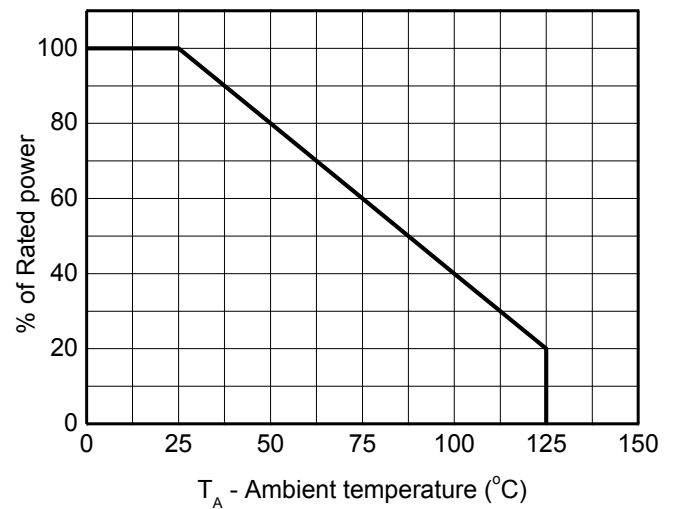
Type number	Reverse Stand-off Voltage $V_{RWM}$ (V)	Breakdown voltage $V_{BR}$ (V) $I_{BR} = 1\text{mA}$			Reverse leakage current $I_{RM}$ ( $\mu\text{A}$ ) at $V_{RWM}$		Forward voltage $V_F$ (V) $I_F = 20\text{mA}$		Junction capacitance $F = 1\text{MHz}$ , $V_R=0\text{V}$ (pF)	
	Max.	Min.	Typ.	Max.	Typ.	Max.	Min.	Max.	Typ.	Max.
ESD56101D05	5.0	6.5	7.5	8.5	-	1.0	0.45	1.25	800	1200
ESD56101D10	10.0	11.5	13.2	15.0	-	0.1	0.45	1.25	350	500
ESD56101D12	12.0	13.0	15.0	17.0	-	0.1	0.45	1.25	300	440
ESD56101D15	15.0	16.0	18.0	20.0	-	0.1	0.45	1.25	240	350

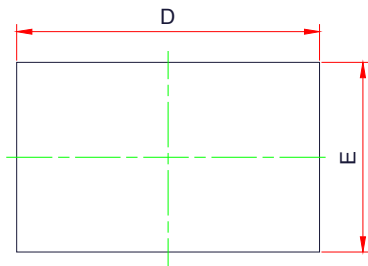
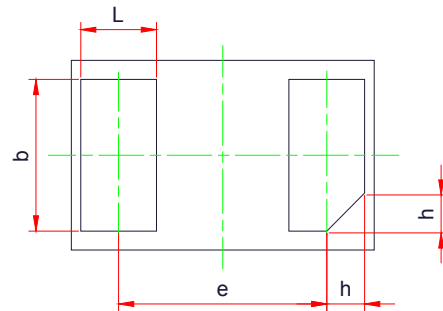
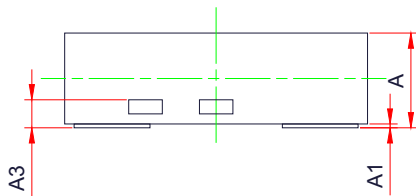
**Table 4.**

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>
ESD56101D05	80	15.0	8.0	9.0
ESD56101D10	60	22.0	15.0	16.0
ESD56101D12	50	25.0	17.0	18.0
ESD56101D15	40	31.0	20.0	21.0

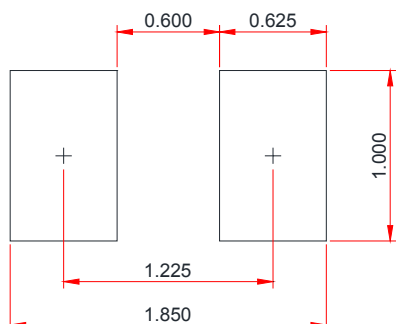
**Notes:**

- 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.

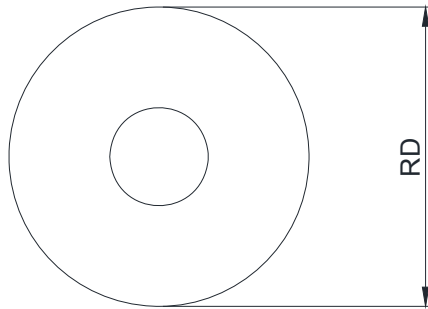
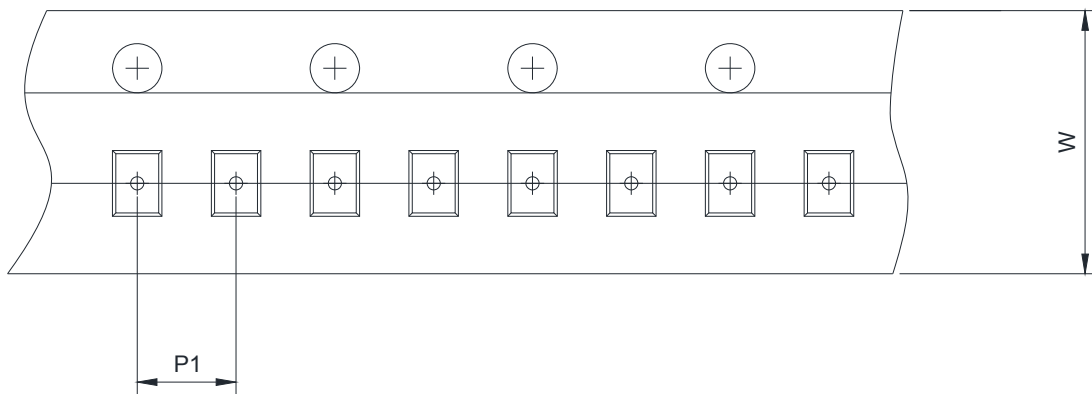
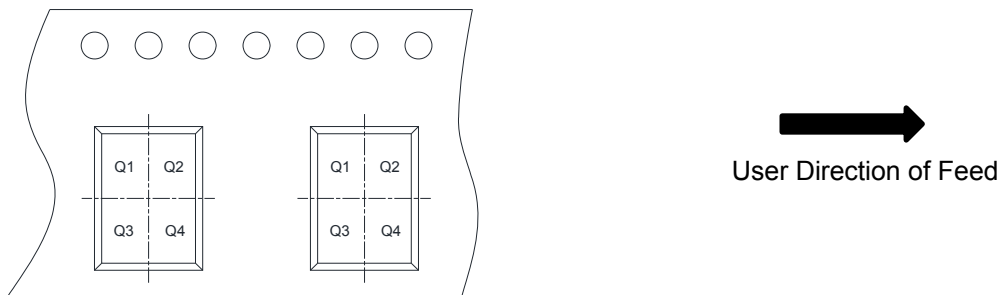
**Electrical characteristics ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)**

**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**
**DFN1610-2L**

**TOP VIEW**

**BOTTOM VIEW**

**SIDE VIEW**

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.45	0.50	0.55
A1	0.00	0.02	0.05
c	0.15 Ref.		
b	0.75	0.80	0.85
L	0.35	0.40	0.45
D	1.55	1.60	1.65
E	0.95	1.00	1.05
e	1.10 BSC		
h	0.20 Ref.		

**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	<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