



## DFN1610-2L Plastic-Encapsulate Diodes

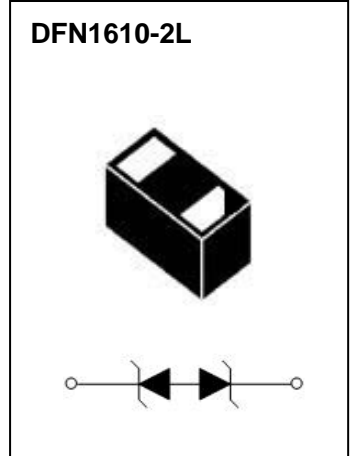
### ESDBT4V5FD1 Bi-direction Transient Voltage Suppressor

#### DESCRIPTION

Designed to protect voltage sensitive electronic components from ESD and other transients. Excellent clamping capability, low leakage, and fast response time provide best in class protection on designs that are exposed to ESD.

The combination of small size, high level of ESD protection makes them a flexible solution for applications such as Digital cameras,cellular phones.

It is designed to replace multiplayer varistors (MLV) in consumer equipments applications such as mobile phone, notebook, PAD, STB, LCD TV etc.



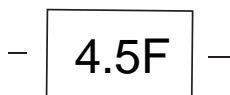
#### FEATURES

- Bi-directional ESD protection of one line
- Reverse stand-off voltage: 4.5V
- Low reverse clamping voltage
- Low leakage current
- Excellent package:1.60mm×1.00mm×0.58mm
- Peak pulse power: 1610W (IEC61000-4-5 8/20μs)
- Fast response time
- JESD22-A114-B ESD Rating of class 3B per human body model
- IEC 61000-4-2 Level 4 ESD protection
- Surge protection according to IEC61000-4-5 8/20μs waveform: I<sub>PPM</sub> 140A

#### APPLICATIONS

- Computers and peripherals
- Power lines
- Audio and video equipment
- Cellular handsets and accessories
- Portable electronics
- Tablets
- Other electronics equipments communication systems

#### MARKING



Front side

4.5F = Device code

**MAXIMUM RATINGS (  $T_a=25^{\circ}\text{C}$  unless otherwise noted )**

Parameter	Symbol	Limit	Unit
IEC 61000-4-2 ESD Voltage	Air Model	$\pm 30$	kV
	Contact Model	$\pm 30$	
	Per Human Body Model	$\pm 20$	
	Machine Model	$\pm 0.4$	
JESD22-A114-B ESD Voltage	$V_{\text{ESD}}^{(1)}$		
ESD Voltage			
Peak Pulse Power	$P_{\text{PP}}^{(2)}$	1610	W
Peak Pulse Current	$I_{\text{PP}}^{(2)}$	140	A
Lead Solder Temperature – Maximum (10 Second Duration)	$T_L$	260	$^{\circ}\text{C}$
Operation Junction and Storage Temperature Range	$T_J, T_{\text{stg}}$	-55 ~ +150	$^{\circ}\text{C}$

(1).Device stressed with ten non-repetitive ESD pulses.

(2).Non-repetitive current pulse 8/20 $\mu\text{s}$  exponential decay waveform according to IEC61000-4-5.

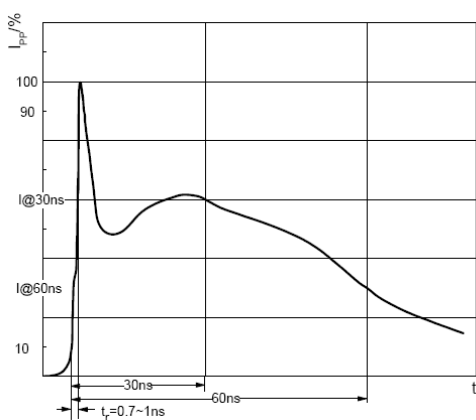
**ESD standards compliance**

**IEC61000-4-2 Standard**

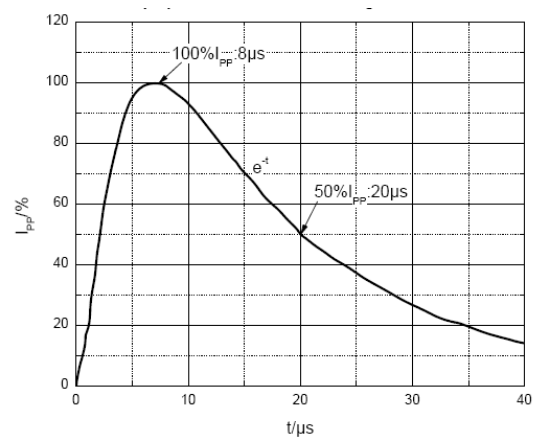
Contact Discharge		Air Discharge	
Level	Test Voltage kV	Level	Test Voltage kV
1	2	1	2
2	4	2	4
3	6	3	8
4	8	4	15

**JESD22-A114-B Standard**

ESD Class	Human Body Discharge V
0	0~249
1A	250~499
1B	500~999
1C	1000~1999
2	2000~3999
3A	4000~7999
3B	8000~15999



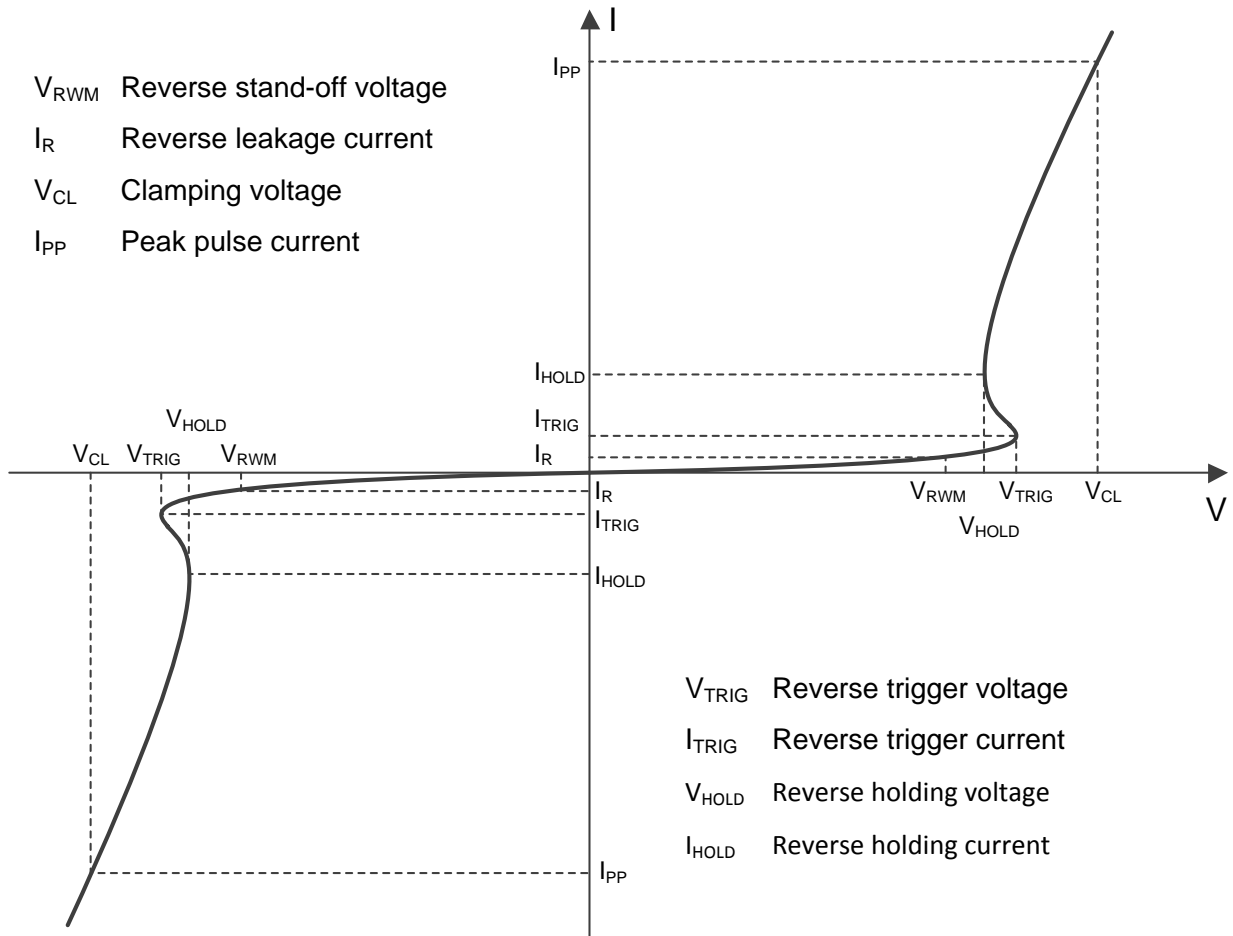
ESD pulse waveform according to IEC61000-4-2



8/20 $\mu\text{s}$  pulse waveform according to IEC 61000-4-5

**ELECTRICAL PARAMETER**

- $V_{RWM}$  Reverse stand-off voltage
- $I_R$  Reverse leakage current
- $V_{CL}$  Clamping voltage
- $I_{PP}$  Peak pulse current



- $V_{TRIG}$  Reverse trigger voltage
- $I_{TRIG}$  Reverse trigger current
- $V_{HOLD}$  Reverse holding voltage
- $I_{HOLD}$  Reverse holding current

**ELECTRICAL CHARACTERISTICS( $T_a=25^\circ\text{C}$  unless otherwise specified)**

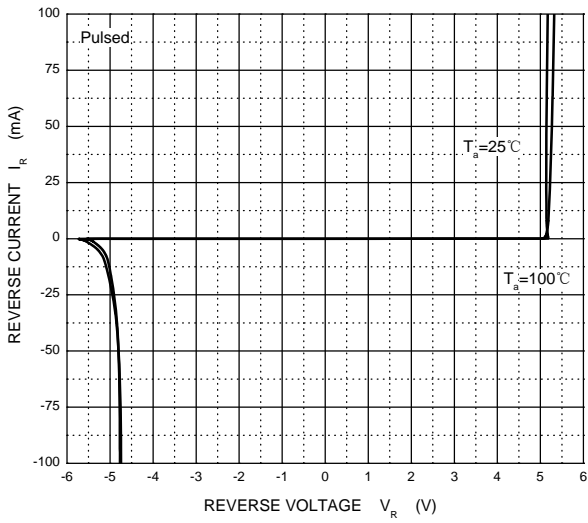
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Reverse stand off voltage	$V_{RWM}^{(1)}$				4.5	V
Reverse leakage current	$I_R$	$V_{RWM}=4.5\text{ V}$			1	$\mu\text{A}$
Reverse trigger voltage	$V_{TRIG}$	$I_T=1\text{mA}$	5.0			V
Reverse holding voltage	$V_{HOLD}$	$I_T=100\text{mA}$	4.6			V
Clamping voltage	$V_C^{(2)}$	$I_{PP}=120\text{A}$			11.5	V
Junction capacitance	$C_J$	$V_R=0\text{V}, f=1\text{MHz}$			360	pF

(1).Other voltages available upon request.

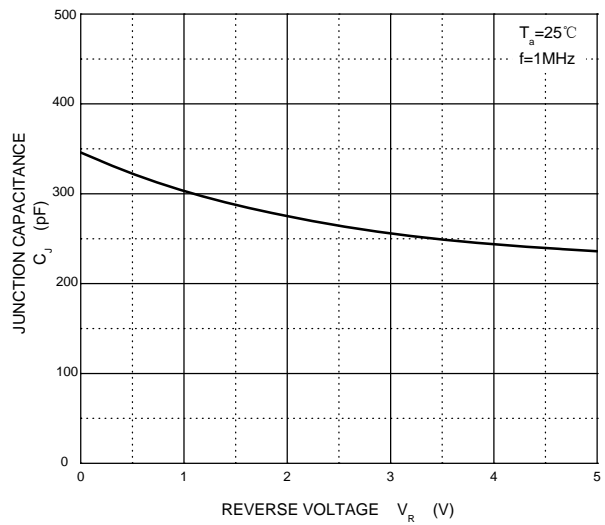
(2).Non-repetitive current pulse 8/20 $\mu\text{s}$  exponential decay waveform according to IEC61000-4-5

TYPICAL CHARACTERISTICS

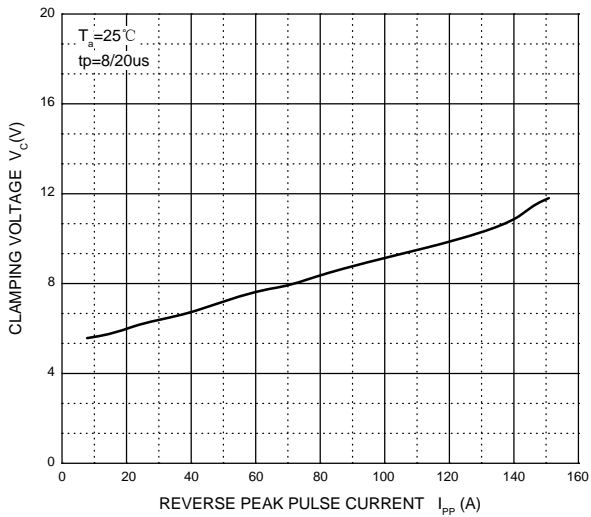
Reverse Characteristics



Capacitance Characteristics

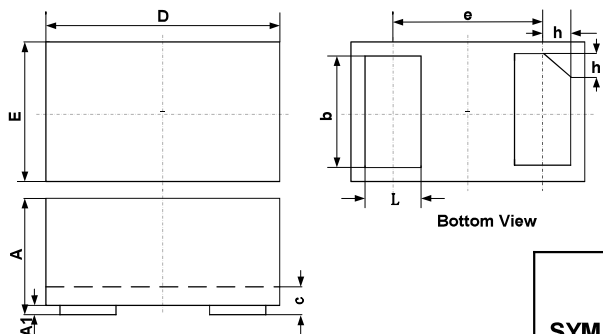


$V_C$  —  $I_{PP}$



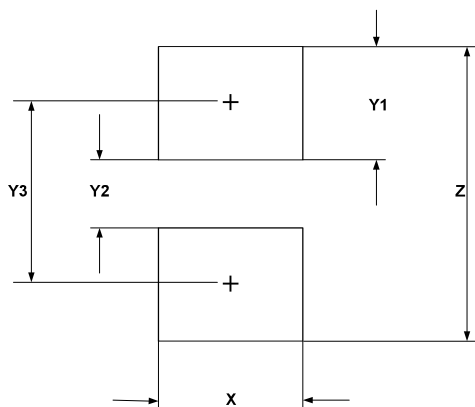
**PACKAGE OUTLINE AND PAD LAYOUT INFORMATION**

**DFNWB1610-2L Package Outline Drawing**



SYM	DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.45	0.50	0.55	0.018	0.020	0.022
A1	0.00	0.02	0.05	0.000	0.001	0.002
b	0.75	0.80	0.85	0.030	0.032	0.034
c	0.10	0.15	0.20	0.004	0.006	0.008
D	1.55	1.60	1.65	0.062	0.064	0.066
e	1.10 BSC			0.044 BSC		
E	0.95	1.00	1.05	0.038	0.040	0.042
L	0.35	0.40	0.45	0.014	0.016	0.018
h	0.15	0.20	0.25	0.006	0.008	0.010

**Suggested Land Pattern**



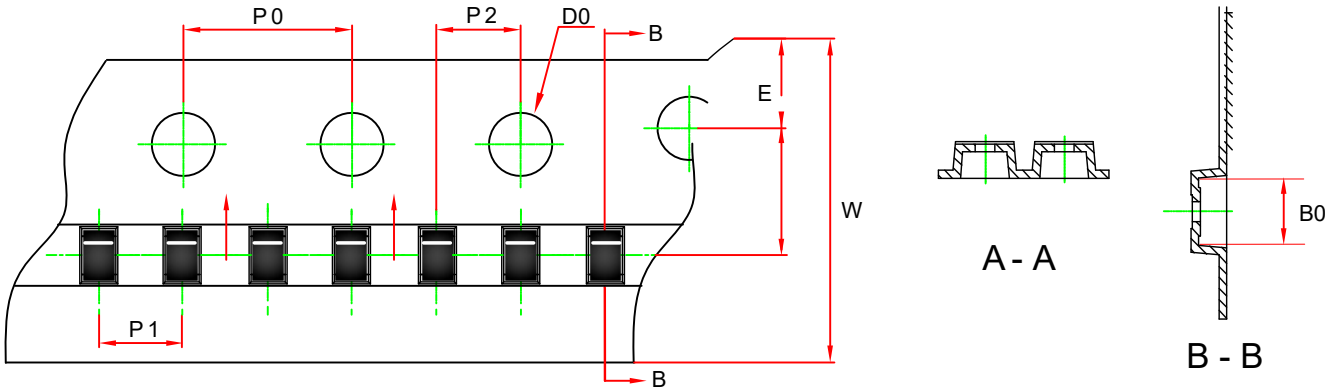
SYM	DIMENSIONS	
	MILLIMETERS	INCHES
X	1.00	0.040
Y1	0.62	0.025
Y2	0.60	0.024
Y3	1.22	0.049
Z	1.85	0.074

**NOTICE**

JSCJ reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. JSCJ does not assume any liability arising out of the application or use of any product described herein.

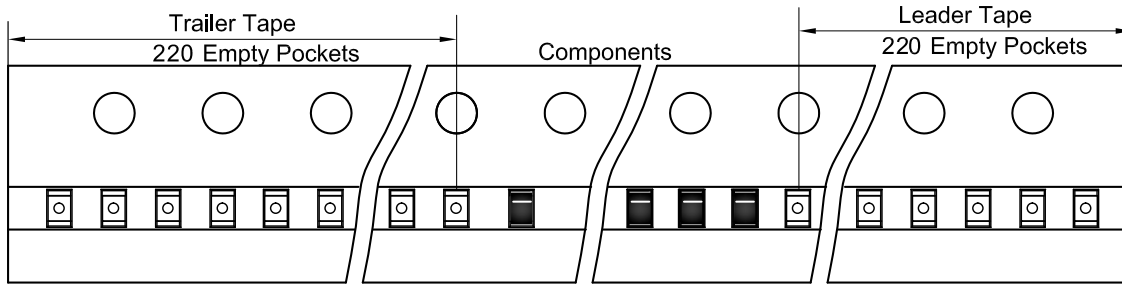
**TAPE AND REEL INFORMATION**

**DFN1610 (1.6×1.0×0.5) Embossed Carrier Tape**

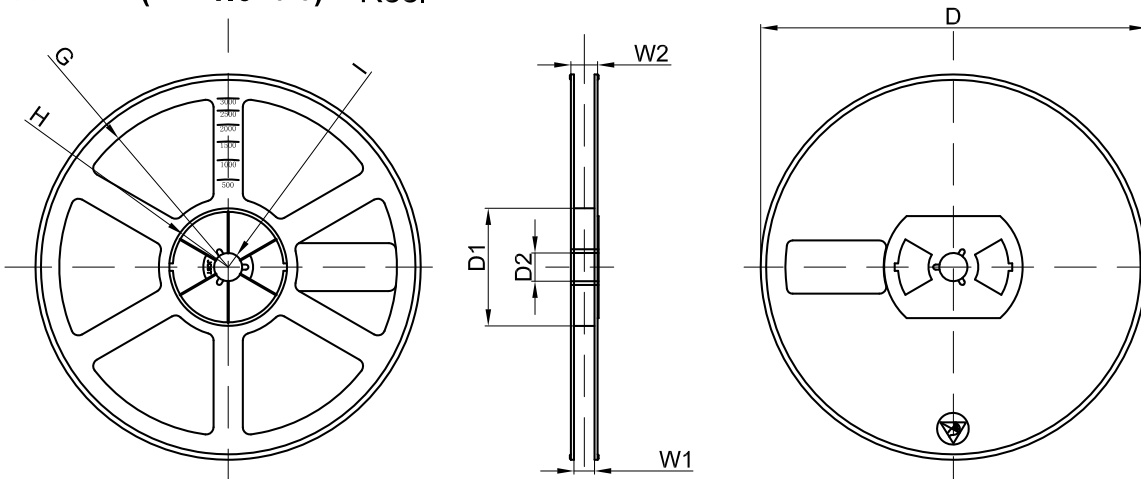


Dimensions In Millimeters (mm)								
Pkg type	B0	P0	P1	P2	E	F	W	D0
DFN1.6×1.0	1.72	4.00	2.00	2.00	1.75	3.50	8.00	1.50
Tolerance	+/-0.05	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.3	+/-0.1

**DFN1610 (1.6×1.0×0.5) Tape Leader and Trailer**



**DFN1610 (1.6×1.0×0.5) Reel**



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7" Dia	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
10000 pcs	7 inch	150,000 pcs	203×203×195	600,000 pcs	438×438×220	