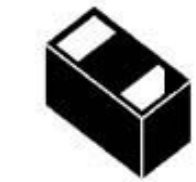
SZCJ Shenzhen Changji Semiconductor Co., LTD.

# DFN1610-2L Plastic-Encapsulate Diodes

## ESDBT4V5FD1 Bi-direction Transient Voltage Suppressor

**DFN1610-2L**





### 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.

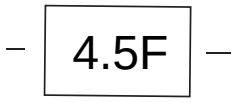
### FEATURES

- 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×0.66mm
- 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: $I_{PPM}$ 140A

### APPLICATIONS

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

### MARKING




Front side

4.5F = Device code

## MAXIMUM RATINGS ( $T_a$=25℃ unless otherwise noted )

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

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

(2).Non-repetitive current pulse 8/20μs exponential decay waveform according to IEC61000-4-5.

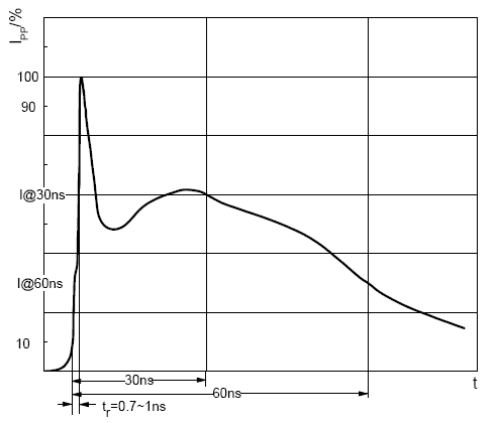
## ESD standards compliance

### IEC61000-4-2 Standard

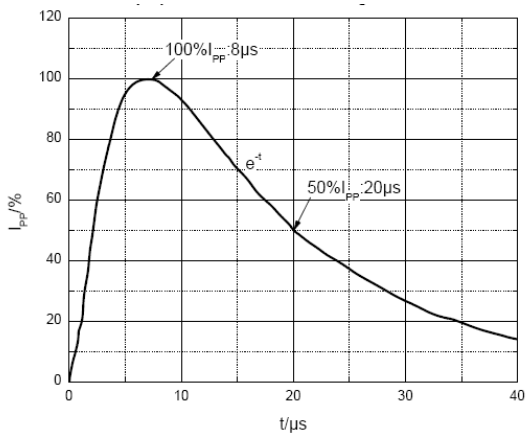
| Contact Discharge | | Air Discharge | |
|---|---|---|---|
| Level | Test Voltage kV | Level | Test Voltage kV |
| 1 | 2 | 1 | 2 |
| 2 | 4 | 2 | 4 |
| 3 | 6 | 3 | 8 |
| 4 | 8 | 4 | 15 |

### JESD22-A114-B Standard

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

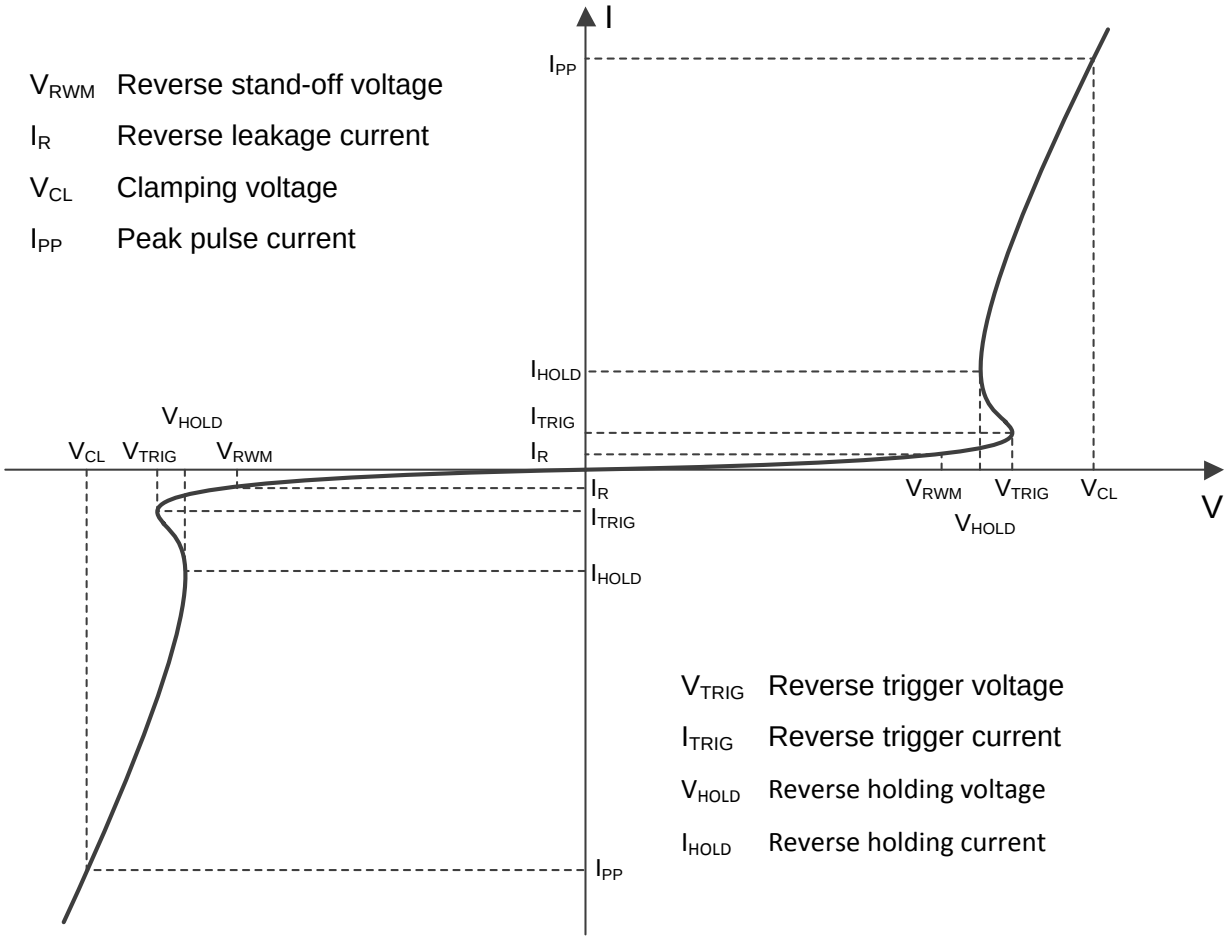



**ESD pulse waveform according to IEC61000-4-2**




**8/20μs 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℃ unless otherwise specified)

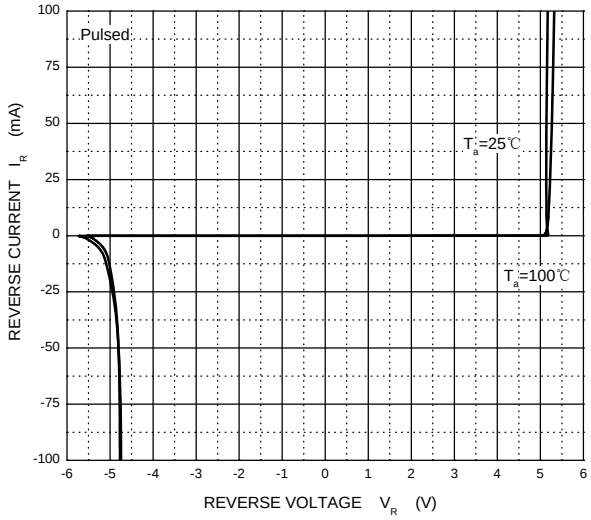
| Parameter | Symbol | Test conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Reverse stand off voltage | $V_{RWM}$ (1) | | | | 4.5 | V |
| Reverse leakage current | $I_R$ | $V_{RWM}$=4.5 V | | | 1 | μA |
| Reverse trigger voltage | $V_{TRIG}$ | $I_T$=1mA | 4.8 | | | V |
| Reverse holding voltage | $V_{HOLD}$ | $I_T$=100mA | 4.6 | | | V |
| Clamping voltage | $V_C$ (2) | $I_{PP}$=120A | | | 11.5 | V |
| Junction capacitance | $C_J$ | $V_R$=0V,f=1MHz | | | 360 | pF |

(1).Other voltages available upon request.

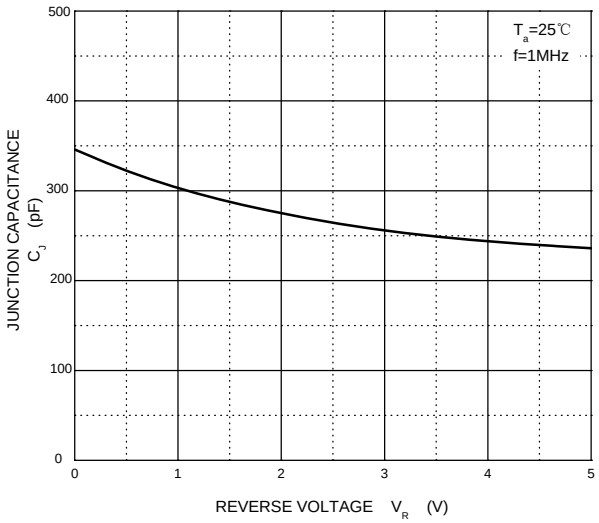
(2).Non-repetitive current pulse 8/20μs exponential decay waveform according to IEC61000-4-5

## TYPICAL CHARACTERISTICS

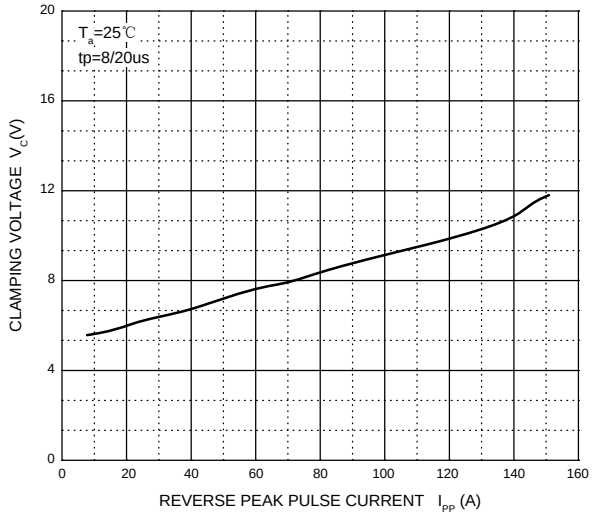
**Reverse Characteristics**




**Capacitance Characteristics**

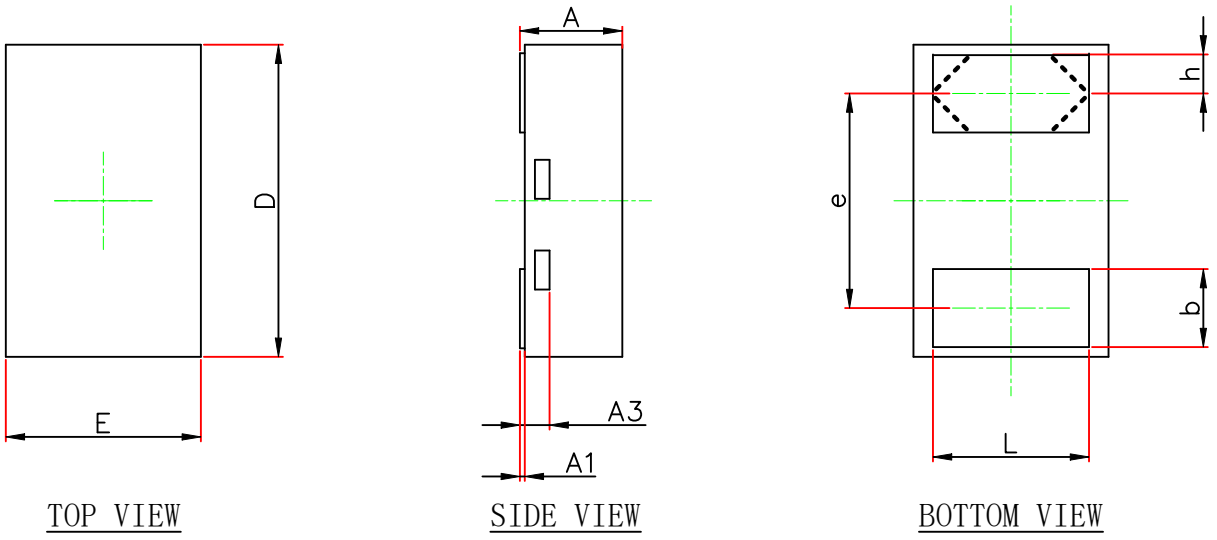



**$V_C$ —— $I_{PP}$**



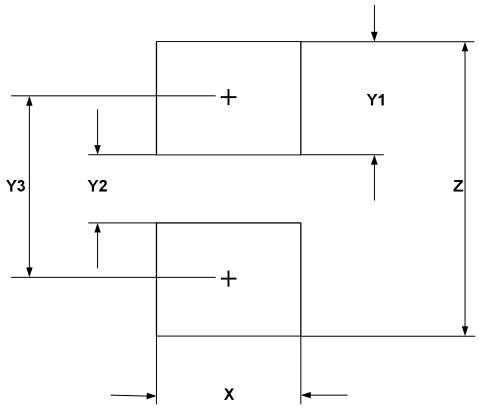
## PACKAGE OUTLINE AND PAD LAYOUT INFORMATION

### DFNWB1610-2L Package Outline Drawing




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 0.450 | 0.550 | 0.018 | 0.022 |
| A1 | 0.000 | 0.050 | 0.000 | 0.002 |
| A3 | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 1.550 | 1.650 | 0.061 | 0.065 |
| E | 0.950 | 1.050 | 0.037 | 0.041 |
| b | 0.350 | 0.450 | 0.014 | 0.018 |
| e | 1.100TYP. | | 0.043TYP. | |
| L | 0.750 | 0.850 | 0.030 | 0.033 |
| h | 0.150 | 0.250 | 0.006 | 0.010 |

### Suggested Land Pattern



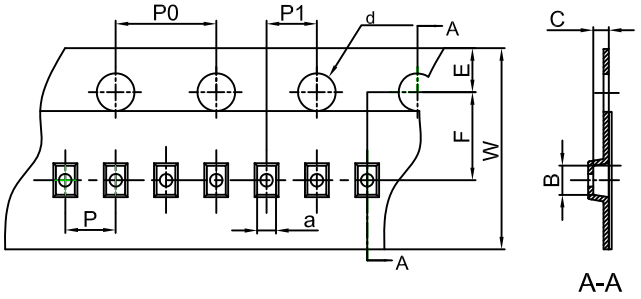

| SYM | DIMENSIONS | |
|---|---|---|
| | MILLIMETERS | INCHES |
| X | 1.00 | 0.040 |
| Y1 | 0.62 | 0.025 |
| Y2 | 0.60 | 0.024 |
| Y3 | 1.22 | 0.049 |
| Z | 1.85 | 0.074 |

NOTICE

SZCJ reserve the right to make modifications,enhan ts,improvements,corrections or other c s without turther notice to any product herein. SZCJ oes not assume any liability arising out of the application or use of any product described .

## TAPE AND REEL INFORMATION

### DFN1610-2L Embossed Carrier Tape

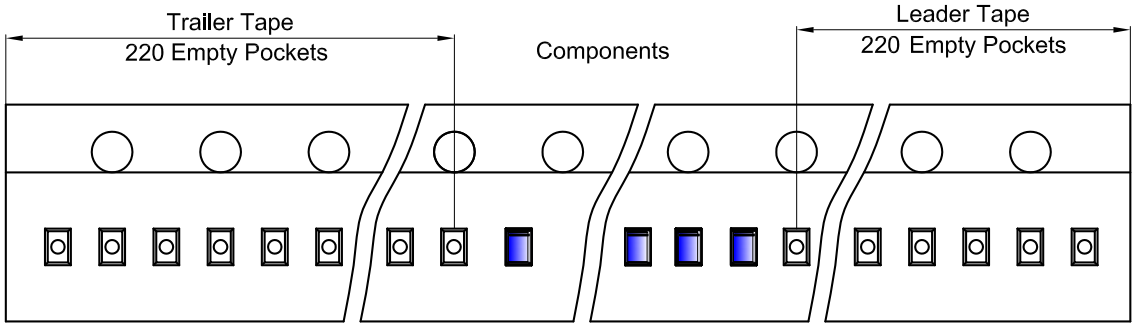



Packaging Description:

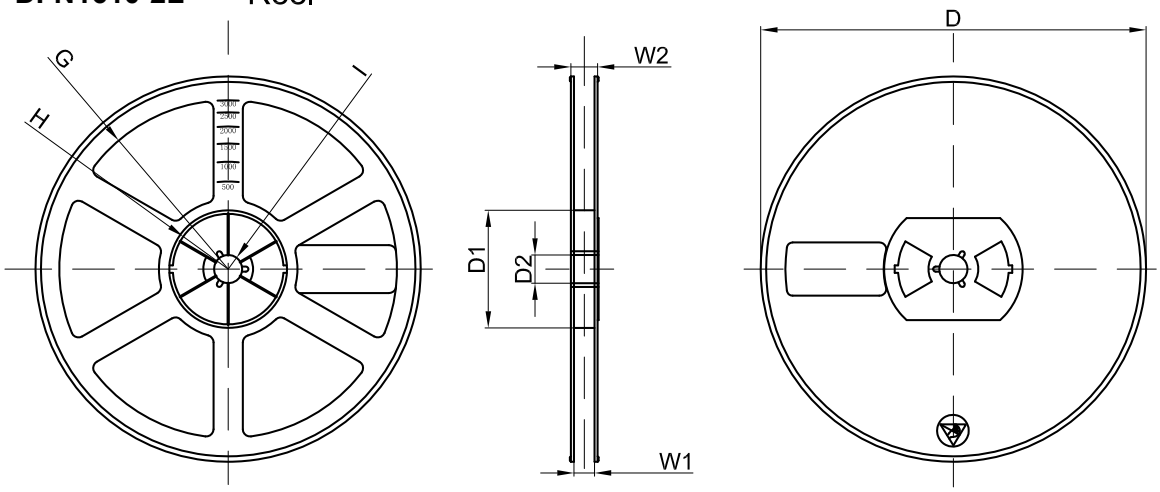
**DFN1610-2L** parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 5,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pkg type | a | B | C | d | E | F | P0 | P | P1 | W |
| DFN1610-2L | 1.15 | 1.75 | 0.68 | Ø1.50 | 1.75 | 3.50 | 4.00 | 2.00 | 2.00 | 8.00 |

### DFN1610-2L Tape Leader and Trailer




### DFN1610-2L 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 | 12.10 |

| REEL | Reel Size | Box | Box Size(mm) | Carton | Carton Size(mm) | G.W.(kg) |
|---|---|---|---|---|---|---|
| 5,000 pcs | 7 inch | 75,000 pcs | 210×208×205 | 300,000 pcs | 440×440×230 | |