



## DFN1610-2L-A Plastic-Encapsulate Diodes

### ESDUNH30VF1 Uni-direction Transient Voltage Suppressor

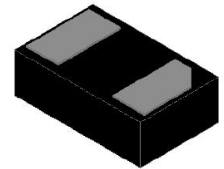
#### DESCRIPTION

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.

DFN1610-2L-A



#### FEATURES

- Uni-directional ESD protection of one line
- Reverse stand-off voltage: 30V
- Low reverse clamping voltage
- Low leakage current
- Excellent package: 1.60mm × 1.00mm × 0.55mm
- Peak pulse power: 3150 W (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: IPPM 70A

#### 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

30P = Device code

The marking bar indicates the cathode

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

| Parameter                                              | Symbol                 | Limit           | Unit               |
|--------------------------------------------------------|------------------------|-----------------|--------------------|
| IEC 61000-4-2 ESD Voltage                              | $V_{\text{ESD}}^{(1)}$ | $\pm 25$        | kV                 |
| Air Model                                              |                        |                 |                    |
| Contact Model                                          |                        | $\pm 25$        |                    |
| JESD22-A114-B ESD Voltage                              |                        | $\pm 16$        |                    |
| ESD Voltage                                            | Machine Model          | $\pm 0.4$       |                    |
| Peak Pulse Power                                       | $P_{\text{PP}}^{(2)}$  | 3150            | W                  |
| Peak Pulse Current                                     | $I_{\text{PP}}^{(2)}$  | 70              | A                  |
| Lead Solder Temperature – Maximum (10 Second Duration) | $T_L$                  | 260             | $^{\circ}\text{C}$ |
| Operation Junction Temperature Range                   | $T_J$                  | $-55 \sim +125$ | $^{\circ}\text{C}$ |
| Storage Temperature Range                              | $T_{\text{stg}}$       | $-55 \sim +150$ | $^{\circ}\text{C}$ |

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

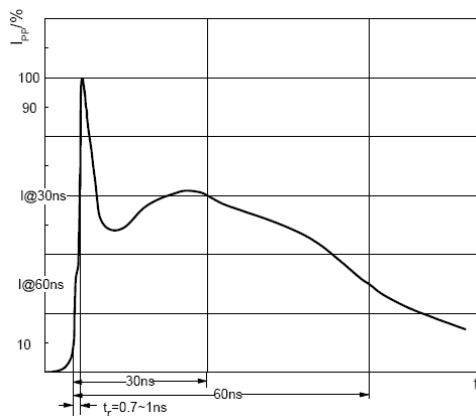
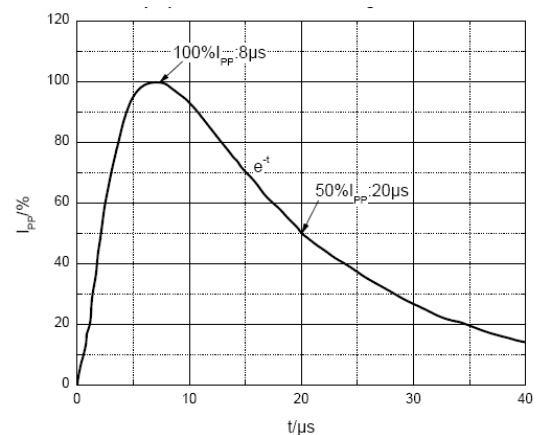
(2).Non-repetitive current pulse 8/20 $\mu\text{s}$  exponential decay waveform according to IEC61000-4-5.

**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              |

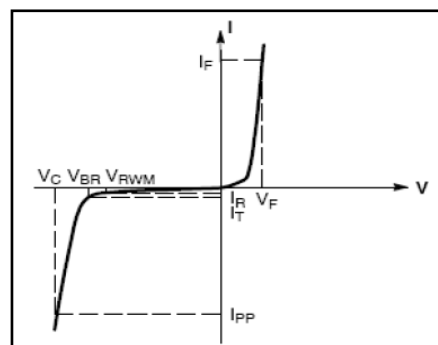
**JESD22-A114-B Standard**

| 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**

| Symbol    | Parameter                           |
|-----------|-------------------------------------|
| $V_C$     | Clamping Voltage @ $I_{PP}$         |
| $I_{PP}$  | Peak Pulse Current                  |
| $V_{BR}$  | Breakdown Voltage @ $I_T$           |
| $I_T$     | Test Current                        |
| $I_R$     | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{RWM}$ | Reverse Standoff Voltage            |
| $V_F$     | Forward Voltage@ $I_F$              |
| $I_F$     | Forward Current                     |

**V-I characteristics for a uni-directional TVS****ELECTRICAL CHARACTERISTICS( $T_a=25^{\circ}\text{C}$  unless otherwise specified)**

| Parameter                 | Symbol          | Test conditions                          | Min | Typ  | Max | Unit          |
|---------------------------|-----------------|------------------------------------------|-----|------|-----|---------------|
| Reverse stand off voltage | $V_{RWM}^{(1)}$ |                                          |     |      | 30  | V             |
| Reverse leakage current   | $I_R$           | $V_{RWM}=30\text{V}$                     |     |      | 1   | $\mu\text{A}$ |
| Breakdown voltage         | $V_{(BR)}$      | $I_T=1\text{mA}$                         | 31  |      |     | V             |
| Forward voltage           | $V_F$           | $I_F=10\text{mA}$                        |     |      | 1.2 | V             |
| Clamping voltage          | $V_C^{(2)}$     | $I_{PP}=10\text{A}$                      |     | 30   | 35  | V             |
|                           |                 | $I_{PP}=70\text{A}$                      |     | 40   | 45  | V             |
| TLP clamping voltage      | $V_C$           | $I_{TLP}=8\text{A}$ , Pulse Width=100ns  |     | 34.5 |     | V             |
|                           |                 | $I_{TLP}=16\text{A}$ , Pulse Width=100ns |     | 34.7 |     | V             |
| Dynamic resistance        | $R_{DYN}^{(3)}$ | Pulse Width=100ns                        |     | 0.17 |     | $\Omega$      |
| Junction capacitance      | $C_J$           | $V_R=0\text{V}$ , $f=1\text{MHz}$        |     | 150  | 225 | pF            |

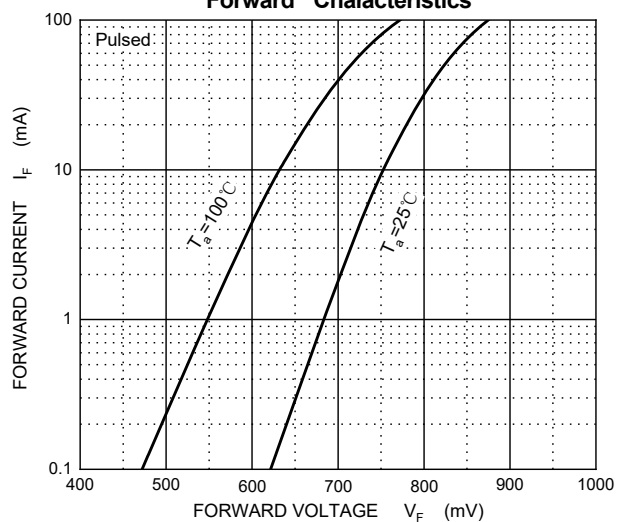
(1).Other voltages available upon request.

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

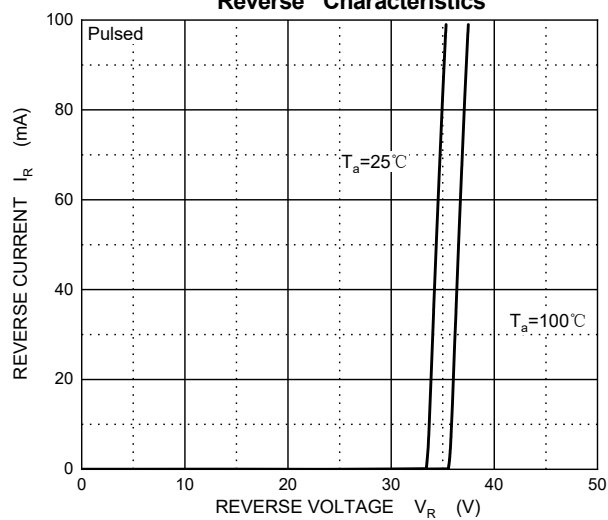
(3). $R_{DYN}$  is calculated from 4A to 10A.

## TYPICAL CHARACTERISTICS

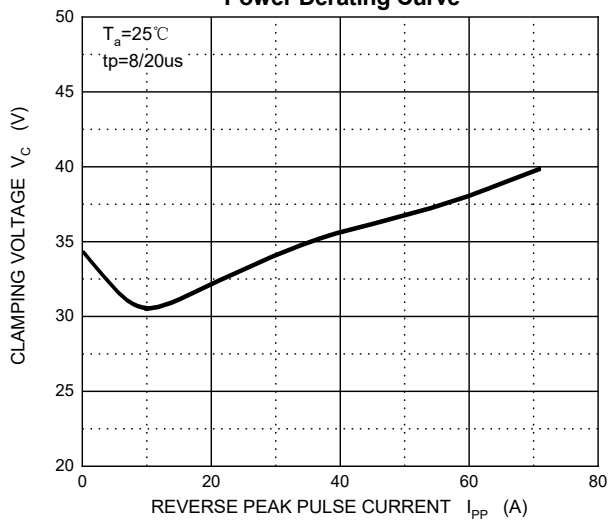
Forward Characteristics



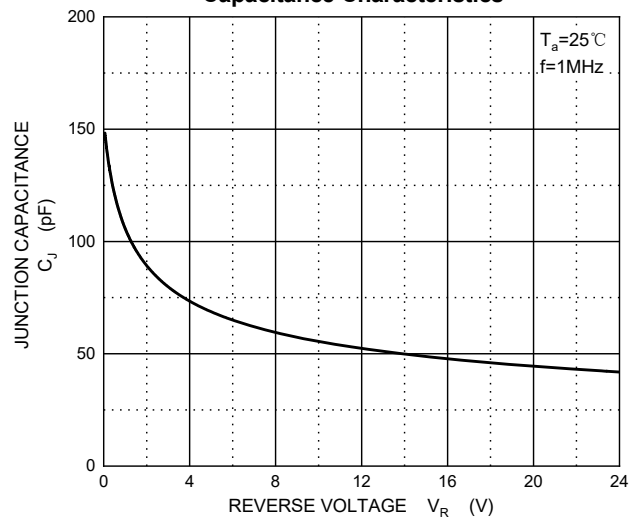
Reverse Characteristics



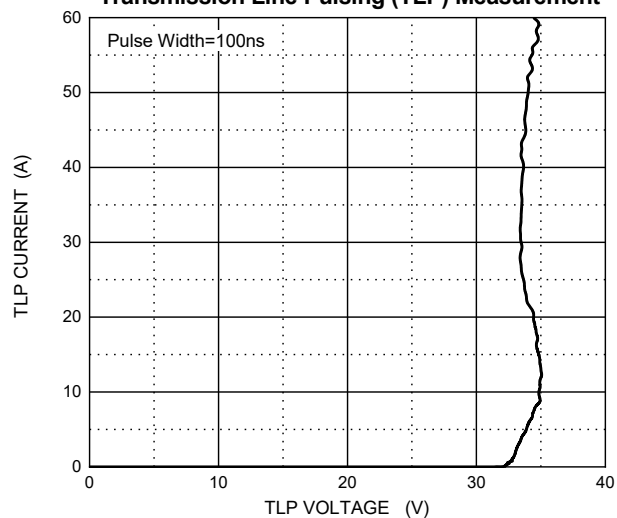
Power Derating Curve



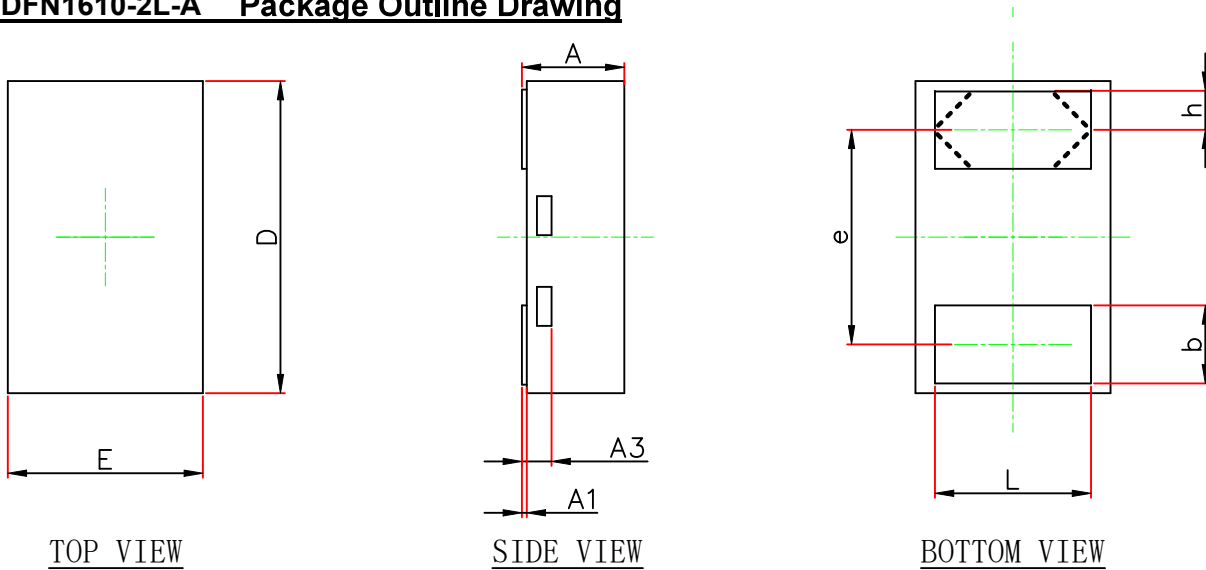
Capacitance Characteristics



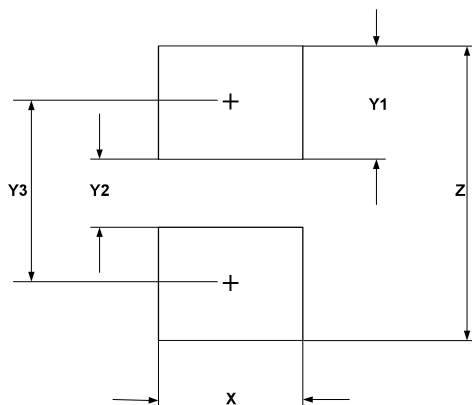
Transmission Line Pulsing (TLP) Measurement



## PACKAGE OUTLINE AND PAD LAYOUT INFORMATION

**DFN1610-2L-A Package Outline Drawing**

| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.450                     | 0.600 | 0.018                | 0.024 |
| 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**

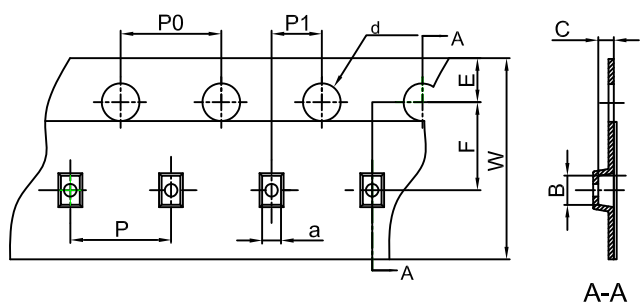
| SYM | DIMENSIONS  |        |
|-----|-------------|--------|
|     | MILLIMETERS | INCHES |
| X   | 1.00        | 0.040  |
| Y1  | 0.62        | 0.025  |
| Y2  | 0.60        | 0.024  |
| Y3  | 1.22        | 0.049  |
| Z   | 1.85        | 0.074  |

**NOTICE**

JSCJ reserve 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

## DFN1610-2L-A Embossed Carrier Tape

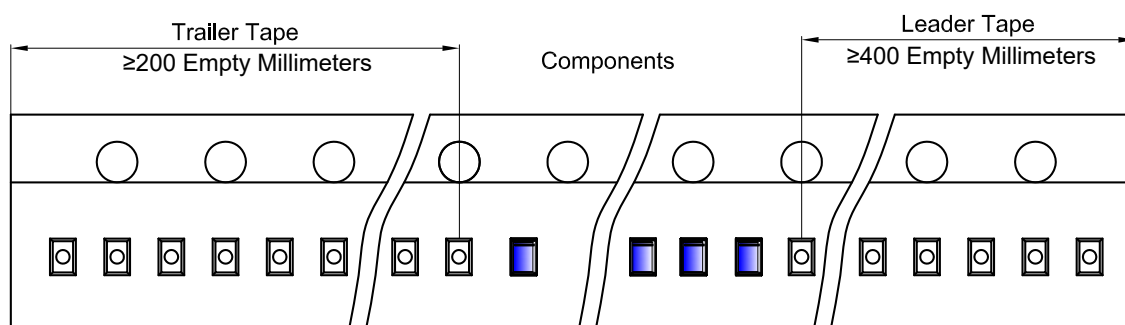


## Packaging Description:

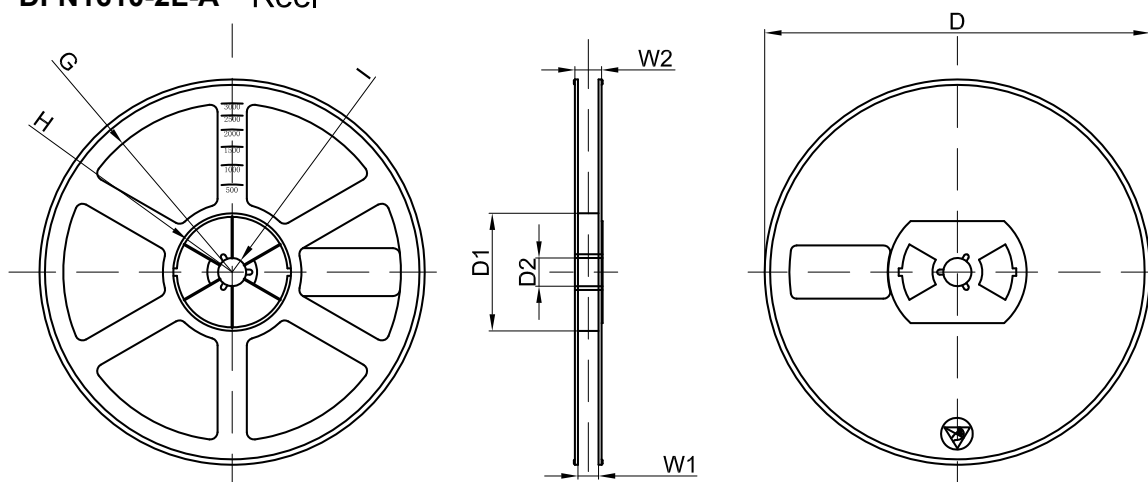
**DFN1610-2L-A** parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 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                   | 1.20 | 1.80 | 0.70 | Ø1.50 | 1.75 | 3.50 | 4.00 | 2.00 | 2.00 | 8.00 |

## DFN1610-2L-A Tape Leader and Trailer



## DFN1610-2L-A 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) |
|-----------|-----------|------------|--------------|-------------|-----------------|----------|
| 5,000 pcs | 7 inch    | 75,000 pcs | 210×208×205  | 300,000 pcs | 440×440×230     |          |