

### DFN1006 Plastic-Encapsulate ESD Protection Diodes

## DESCRIPTION

ESD0801PB is a low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for data, control or power lines. With maximum capacitance of 15pF, ESD0801PB is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC 61000-4-2 (ESD), Level 4 ( $\pm 15\text{kV}$  air,  $\pm 8\text{kV}$  contact discharge), IEC 61000-4-4 (electrical fast transient - EFT) (40A, 5/50 ns), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

ESD0801PB uses ultra-small DFN1006 package. Each ESD0801PB device can protect one data line. It offers system designers flexibility to protect single data line where space is a premium concern.

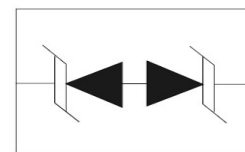
## Features

- ◆ Transient protection for high-speed data lines
- ◆ IEC61000-4-2 (ESD)  $\pm 15\text{kV}$  (air),  $\pm 8\text{kV}$  (contact)
- ◆ IEC61000-4-4 (EFT) 40A (5/50ns)
- ◆ Cable Discharge Event (CDE)
- ◆ Package optimized for high-speed lines
- ◆ Low clamping voltage
- ◆ Low Capacitance
- ◆ Low leakage current
- ◆ Each I/O pin can withstand over 1000 ESD strikes for  $\pm 8\text{kV}$  contact discharge

## Pin Configuration



## Circuit Diagram



## Applications

- ◆ Portable Electronics
- ◆ Desktops, Servers and Notebooks
- ◆ Cellular Phones
- ◆ MP3 Ports
- ◆ Subscriber Identity Module (SIM) card
- ◆ Digital Ports

## Mechanical Characteristics

- ◆ Package: DFN1006
- ◆ Flammability Rating: UL 94V-0
- ◆ Packaging: Tape and Reel
- ◆ High temperature soldering guaranteed:  $260^\circ\text{C}/10\text{s}$
- ◆ Marking: PB
- ◆ MSL3

## Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise specified)

| Parameter  | Symbol    | Value        | Unit             |
|--|-----------|--------------|------------------|
| ESD per IEC 61000-4-2 (Air)                            | VESD      | $\pm 30$     | kV               |
| ESD per IEC 61000-4-2 (Contact)                        |           | $\pm 30$     |                  |
| Peak Pulse Power( $t_p=8/20\mu\text{s}$ waveform)      | PPP       | 68           | W                |
| Operating Temperature                                  | $T_J$     | -55 to +125  | $^\circ\text{C}$ |
| Storage Temperature Range                              | $T_{STG}$ | -55 to +150  | $^\circ\text{C}$ |
| Lead Solder Temperature – Maximum (10 Second Duration) | $T_L$     | 260(10 sec.) | $^\circ\text{C}$ |

The above data are for reference only.

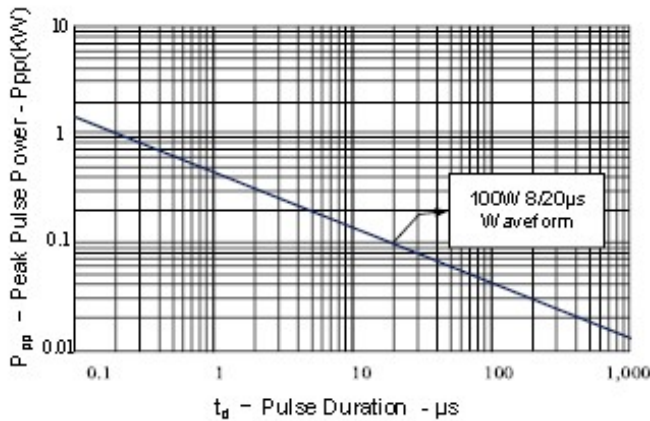
**Electrical Characteristics** ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)

| Symbol    | Param                     | Test Condition                              | Min | Typ | Max | Units         |
|-----------|---------------------------|---|-----|-----|-----|---------------|
| $V_{RWM}$ | Reverse Working Voltage   |   |     |     | 5.0 | V             |
| $V_{BR}$  | Reverse Breakdown Voltage | $I_T = 1\text{mA}$                          | 6   |     |     | V             |
| $I_R$     | Reverse Leakage Current   | $V_{RWM} = 5\text{V}$                       |     |     | 1   | $\mu\text{A}$ |
| $I_{PP}$  | Peak Pulse Current        | $t_P = 8/20\mu\text{s}$                     |     |     | 4   | A             |
| $V_C$     | Clamping Voltage          | $I_{PP} = 1\text{A}, t_p = 8/20\mu\text{s}$ |     |     | 9.5 | V             |
|           |                           | $I_{PP} = 4\text{A}, t_p = 8/20\mu\text{s}$ |     |     | 17  | V             |
| $C_J$     | Junction Capacitance      | $V_R = 0\text{V}, f = 1\text{MHz}$          |     | 8   | 15  | pF            |

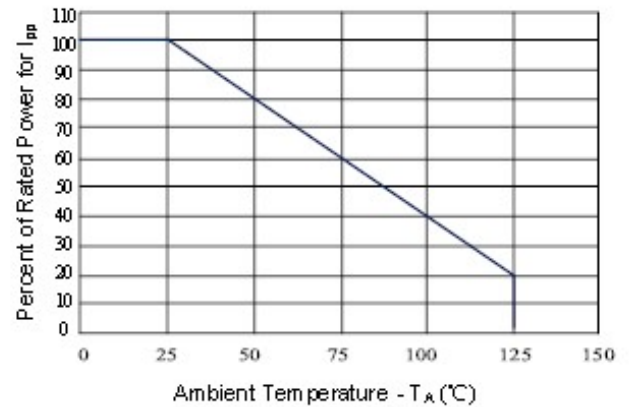
The above data are for reference only.

### ELECTRICAL CHARACTERISTICS CURVE

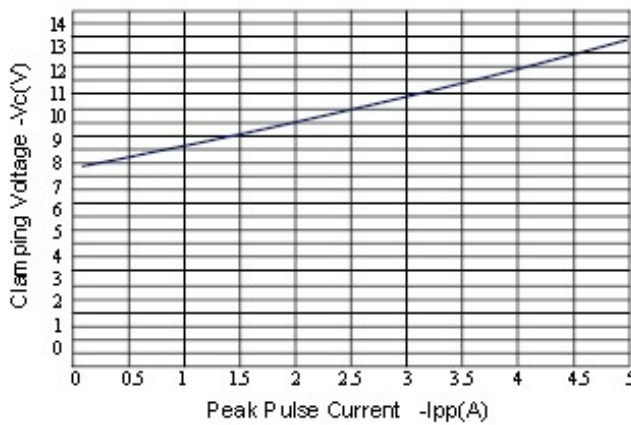
**Figure 1: Peak Pulse Power Vs Pulse Time**



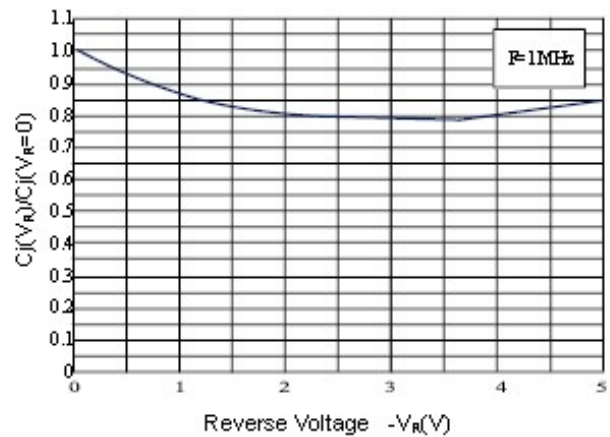
**Figure 2: Power Derating Curve**



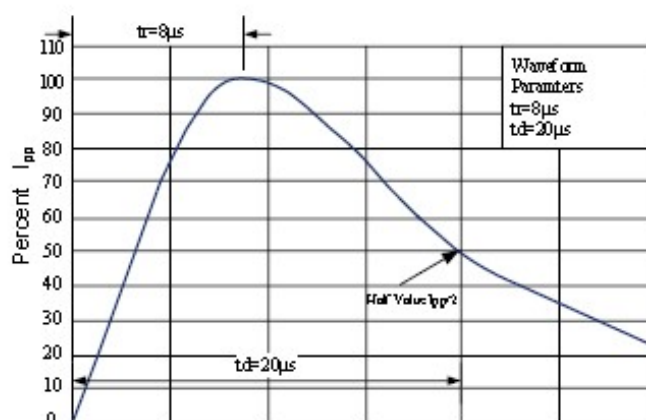
**Figure 3: Clamping Voltage vs. Peak Pulse Current**



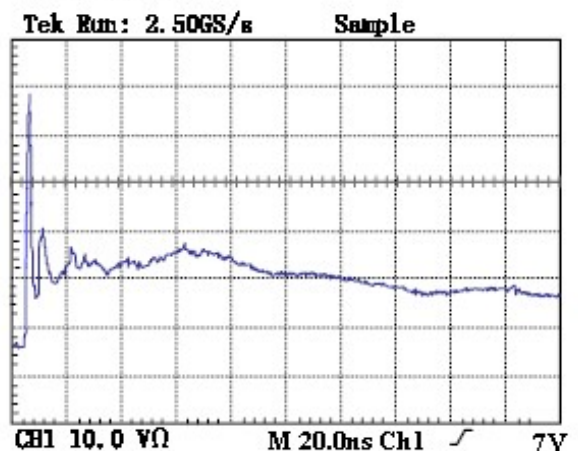
**Figure 4: Normalized Junction Capacitance vs. Reverse Voltage**



**Figure 5: Pulse Waveform**



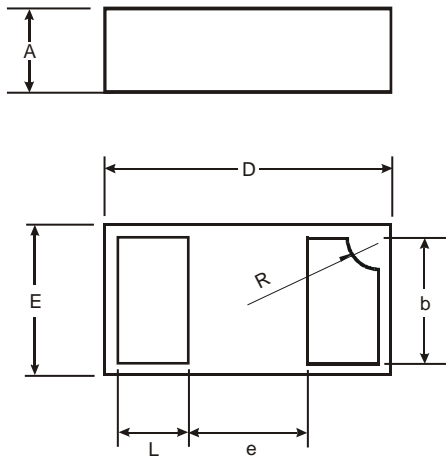
**Figure 6: ESD Clamping (8kV Contact per IEC 61000-4-2)**



The above data are for reference only.

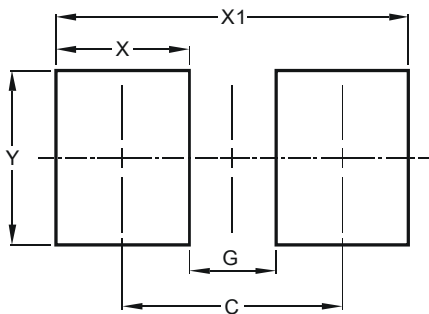
### Outlitne Drawing

DFN1006 Package Outline Dimensions



| DFN1006              |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 0.45 | 0.55 | 0.50 |
| b                    | 0.45 | 0.55 | 0.50 |
| D                    | 0.95 | 1.05 | 1.00 |
| E                    | 0.55 | 0.65 | 0.60 |
| e                    | -    | -    | 0.40 |
| L                    | 0.20 | 0.30 | 0.25 |
| R                    | 0.07 | 0.17 | 0.12 |
| All Dimensions in mm |      |      |      |

### Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.90          |
| G          | 0.40          |
| X          | 0.50          |
| X1         | 1.10          |
| Y          | 0.50          |

Note:

1. Controlling dimension: in/millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.

### PACKAGE SPECIFICATIONS

| Package | Reel Size | Reel DIA. (mm) | Q'TY/Reel (pcs) | Box Size (mm) | QTY/Box (pcs) | Carton Size (mm) | Q'TY/Carton (pcs) |
|---------|-----------|----------------|-----------------|---------------|---------------|------------------|-------------------|
| DFN1006 | 7'        | 178            | 10,000          | 210×210×205   | 100,000       | 445×445×230      | 400,000           |

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