

## ESD4V5D8BP5

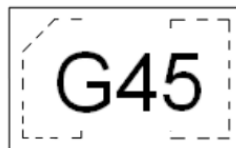
### Description

The ESD4V5D8BP5 is a bi-directional TVS diode, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive data and power line. The ESD4V5D8BP5 complies with the IEC 61000-4-2 (ESD) with  $\pm 15$  kV air and  $\pm 8$  kV contact discharge. It is assembled into an ultra-small 1.0x0.6x0.5mm lead-free DFN package. The small size and high ESD surge protection make ESD4V5D8BP5 an ideal choice to protect cell phone, digital cameras, audio players and many other portable applications.

### Features

- Ultra small package: 1.0x0.6x0.5mm
- Ultra low capacitance: 100pF typical
- Ultra low leakage: nA level
- Low operating voltage: 4.5V
- Low clamping voltage
- 2-Pin leadless package
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test
  - Air discharge:  $\pm 30$ kV
  - Contact discharge:  $\pm 30$ kV
  - IEC61000-4-5 (Lightning) 50A (8/20 $\mu$ s)
- RoHS Compliant

### Package Outline



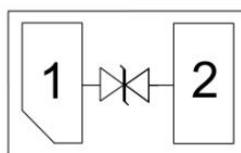
Transparent top view

G45:Device Marking Code

### Applications

- Cellular Handsets and Accessories
- Personal Digital Assistants
- Notebooks and Handhelds
- Portable Instrumentation
- Digital Cameras
- Peripherals
- Audio Players
- Keypads, Side Keys, LCD Displays

### Circuit Diagram



### Absolute Maximum Ratings (TA=25°C unless otherwise specified)

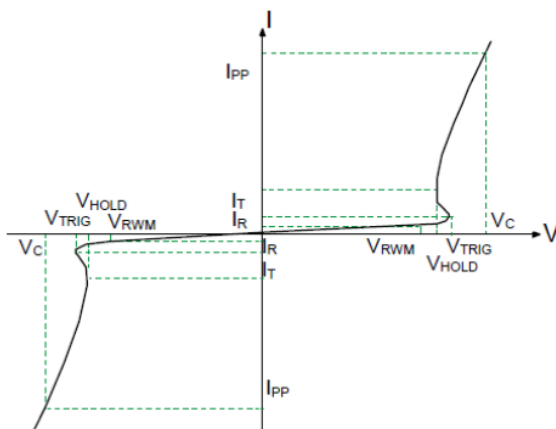
| Parameter                         | Symbol           | Value       | Unit |
|-----------------------------------|------------------|-------------|------|
| Peak Pulse Power (8/20 $\mu$ s)   | P <sub>pk</sub>  | 500         | W    |
| Peak Pulse Current (8/20 $\mu$ s) | I <sub>pp</sub>  | 50          | A    |
| ESD per IEC 61000-4-2 (Air)       | V <sub>ESD</sub> | $\pm 30$    | KV   |
| ESD per IEC 61000-4-2 (Contact)   |                  | $\pm 30$    |      |
| Operating Temperature Range       | T <sub>J</sub>   | -55 to +125 | °C   |
| Storage Temperature Range         | T <sub>stg</sub> | -55 to +150 | °C   |

## Electrical Characteristics (TA=25°C unless otherwise specified)

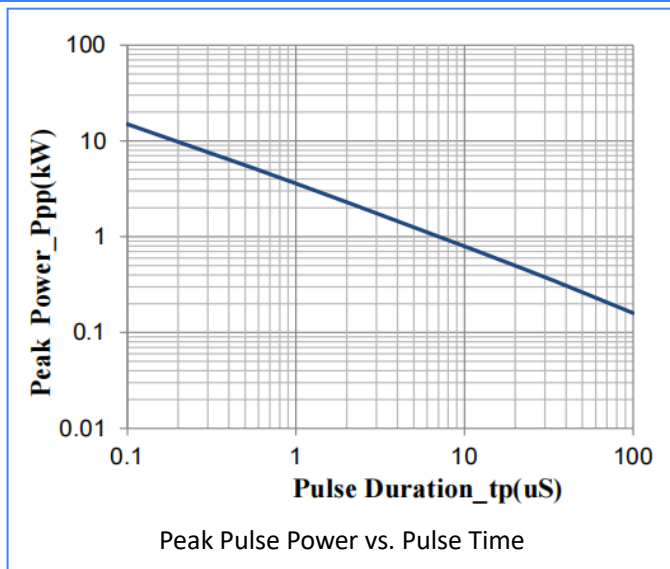
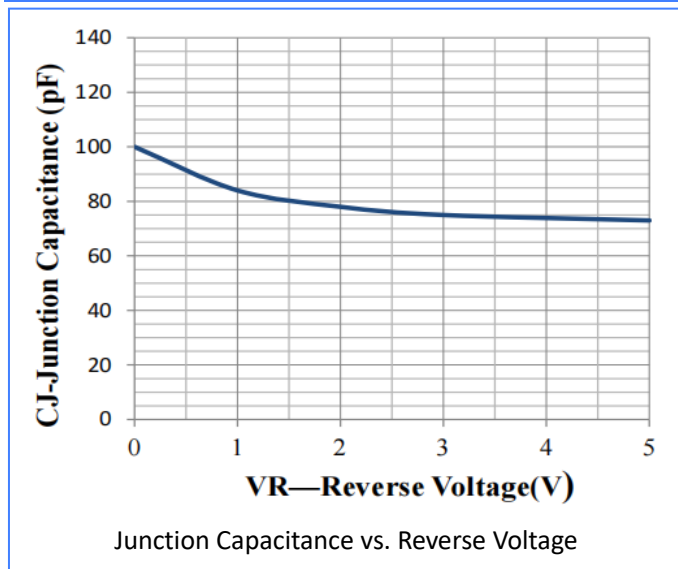
| Parameter               | Symbol    | Min | Typ | Max | Unit          | Test Condition                                     |
|-------------------------|-----------|-----|-----|-----|---------------|----------------------------------------------------|
| Reverse Working Voltage | $V_{RWM}$ |     |     | 4.5 | V             |                                                    |
| Breakdown Voltage       | $V_{BR}$  | 4.9 | 5.3 |     | V             | $I_T = 1\text{mA}$                                 |
| Reverse Leakage Current | $I_R$     |     |     | 0.5 | $\mu\text{A}$ | $V_{RWM} = 4.5\text{V}$                            |
| Clamping Voltage        | $V_C$     |     | 6.0 | 8.0 | V             | $I_{PP} = 1\text{A}$ (8 x 20 $\mu\text{s}$ pulse)  |
| Clamping Voltage        | $V_C$     |     | 9.5 | 13  | V             | $I_{PP} = 50\text{A}$ (8 x 20 $\mu\text{s}$ pulse) |
| Junction Capacitance    | $C_J$     |     | 100 | 150 | pF            | $V_R = 0\text{V}$ , $f = 1\text{MHz}$              |

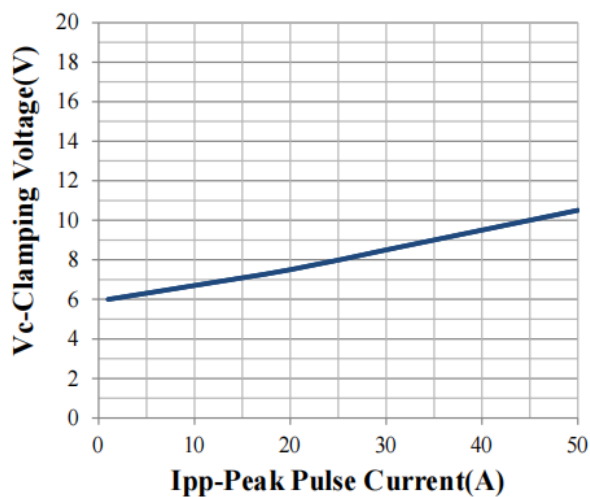
## Portion Electronics Parameter

| Symbol   | Parameter                          |
|----------|------------------------------------|
| $I_T$    | Test Current                       |
| $I_{PP}$ | Maximum Reverse Peak Pulse Current |
| $V_C$    | Clamping Voltage @ $I_C$           |

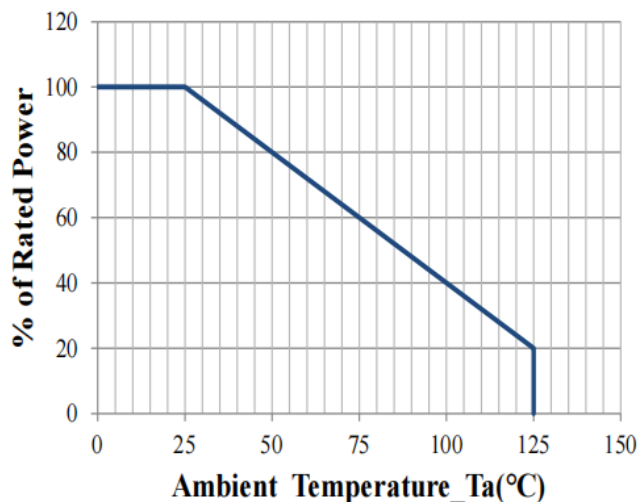


## Typical Characteristics

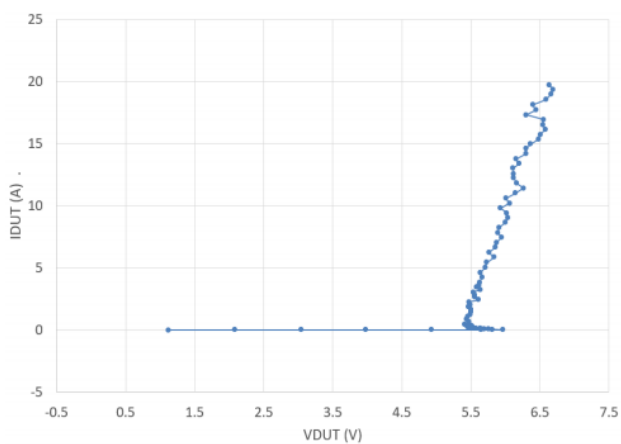




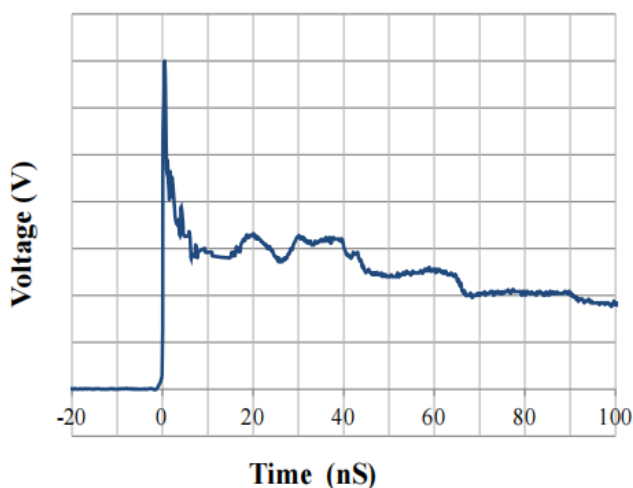
Clamping Voltage vs. Peak Pulse Current



Ambient Temperature Ta(°C)

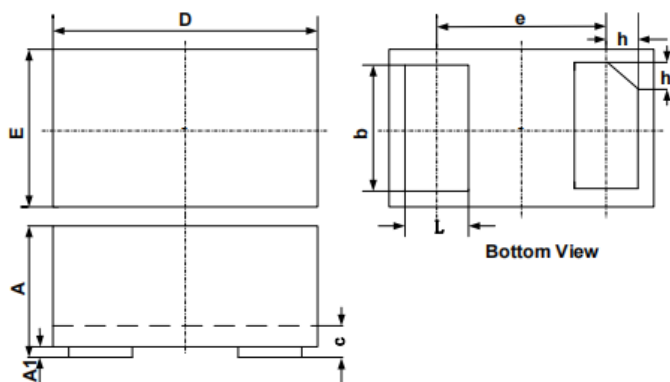


Transmission Line Pulsing (TLP) Voltage (V)



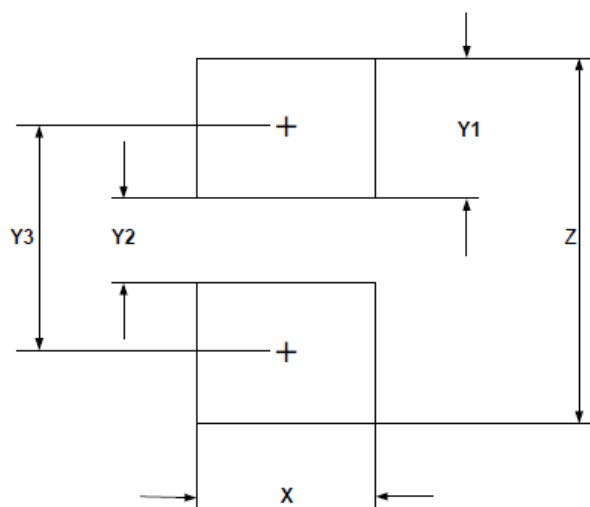
IEC61000-4-2 Pulse Waveform

## DFN1006-2 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   | 0.45        | 0.50 | 0.55 | 0.018     | 0.020 | 0.022 |
| c   | 0.12        | 0.15 | 0.18 | 0.005     | 0.006 | 0.007 |
| D   | 0.95        | 1.00 | 1.05 | 0.037     | 0.039 | 0.041 |
| e   | 0.65 BSC    |      |      | 0.026 BSC |       |       |
| E   | 0.55        | 0.60 | 0.65 | 0.022     | 0.024 | 0.026 |
| L   | 0.20        | 0.25 | 0.30 | 0.008     | 0.010 | 0.012 |
| L1  | 0.05REF     |      |      | 0.002REF  |       |       |
| h   | 0.07        | 0.12 | 0.17 | 0.003     | 0.005 | 0.007 |

## Suggested Land Pattern



| SYM | DIMENSIONS  |        |
|-----|-------------|--------|
|     | MILLIMETERS | INCHES |
| X   | 0.60        | 0.024  |
| Y1  | 0.50        | 0.020  |
| Y2  | 0.30        | 0.012  |
| Y3  | 0.80        | 0.032  |
| Z   | 1.30        | 0.052  |