

# ESD05D6BU

## Ultra Low Capacitance ESD Protection Diode

### DESCRIPTION

ESD05D6BU is a low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 0.25pF, ESD05D6BU 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.

ESD05D6BU uses ultra-small DFN0603 package. Each ESD05D6BU device can protect one high-speed data line. It offers system designers flexibility to protect single data line where space is a premium concern. The combined features of low capacitance, ultra-small size and high ESD robustness make ESD05D6BU ideal for high-speed data port and high-frequency line applications, such as cellular phones and HD visual devices.

### FEATURES

- ✧ Transient protection for high-speed data lines
  - IEC 61000-4-2 (ESD)  $\pm 15\text{kV}$  (Air)
  - $\pm 8\text{kV}$  (Contact)
  - IEC 61000-4-4 (EFT) 40A (5/50 ns)
  - Cable Discharge Event (CDE)
- ✧ Package optimized for high-speed lines
- ✧ Ultra-small package (0.6mm $\times$ 0.3mm $\times$ 0.3mm)
- ✧ Protects one data, control line
- ✧ Low capacitance: 0.25pF (Typical)
- ✧ Low leakage current
- ✧ Low clamping voltage

### MACHANICAL DATA

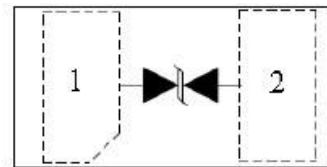
- ✧ DFN0603 package
- ✧ Flammability Rating: UL 94V-0
- ✧ Packaging: Tape and Reel
- ✧ High temperature soldering guaranteed:  $260^{\circ}\text{C}/10\text{s}$
- ✧ Reel size: 7 inch

### PACKAGE OUTLINE



DFN0603

### CIRCUIT DIAGRAM



### PIN CONFIGURATION

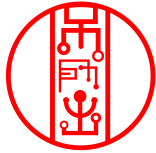


### ORDERING INFORMATION

- ✧ Device: ESD05D6BU
- ✧ Package: DFN0603
- ✧ Marking: 5BU
- ✧ Material: Halogen free
- ✧ Packing: Tape & Reel
- ✧ Quantity per reel: 15,000pcs

### APPLICATIONS

- ✧ Serial ATA
- ✧ Desktops, Servers and Notebooks
- ✧ Cellular Phones
- ✧ MDDI Ports
- ✧ USB Data Line Protection
- ✧ Display Ports
- ✧ Digital Visual Interfaces (DVI)



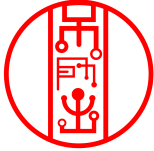
# ESD05D6BU

## ABSOLUTE MAXIMUM RATING

| Symbol    | Parameter                                                      | Value                | Units |
|-----------|----------------------------------------------------------------|----------------------|-------|
| $V_{ESD}$ | ESD per IEC 61000-4-2 (Air)<br>ESD per IEC 61000-4-2 (Contact) | $\pm 20$<br>$\pm 20$ | kV    |
| $P_{PP}$  | Peak Pulse Power (8/20 $\mu$ s)                                | 100                  | W     |
| $T_{OPT}$ | Operating Temperature                                          | -55~125              | °C    |
| $T_{STG}$ | Storage Temperature                                            | -55~150              | °C    |

## ELECTRICAL CHARACTERISTICS ( $T_{amb}=25^{\circ}C$ )

| Symbol    | Parameter                 | Test Condition                 | Min | Typ  | Max | Units |
|-----------|---------------------------|--------------------------------|-----|------|-----|-------|
| $V_{RWM}$ | Reverse Working Voltage   |                                |     |      | 5.0 | V     |
| $V_{BR}$  | Reverse Breakdown Voltage | $I_T = 1mA$                    | 6.0 |      |     | V     |
| $I_R$     | Reverse Leakage Current   | $V_{RWM} = 5V$                 |     |      | 100 | nA    |
| $V_C$     | Clamping Voltage          | $I_{PP} = 1A, t_p = 8/20\mu s$ |     |      | 13  | V     |
|           |                           | $I_{PP} = 4A, t_p = 8/20\mu s$ |     |      | 25  | V     |
| $C_J$     | Junction Capacitance      | $V_R = 0V, f = 1MHz$           |     | 0.25 |     | pF    |



# ESD05D6BU

## ELECTRICAL CHARACTERISTICS CURVE

Fig 1 Power Derating Curve

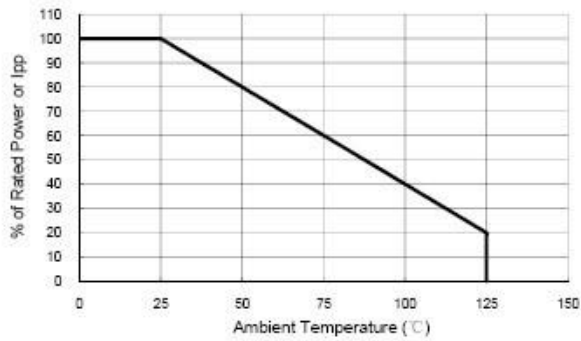


Fig 2 Clamping Voltage vs Peak Pulse Current

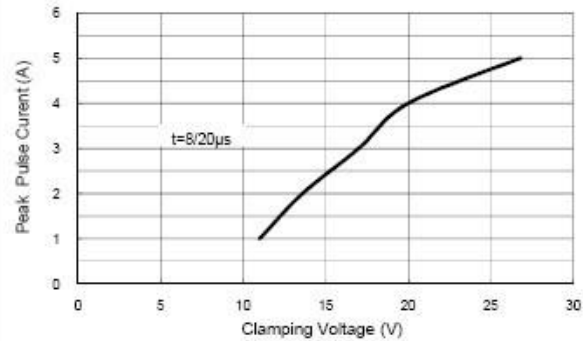


Fig 3 Voltage Sweeping

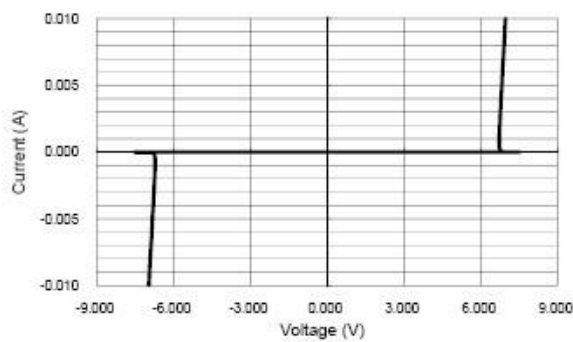


Fig 4 Voltage vs Capacitance

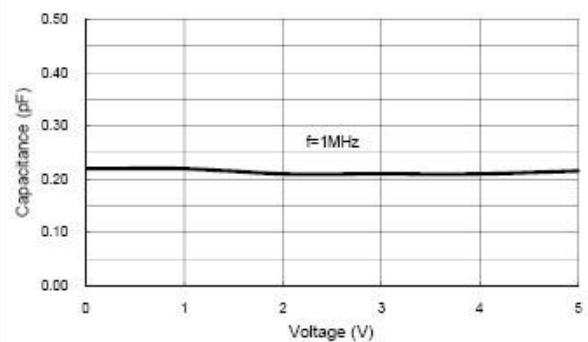


Fig 5 ESD Clamping  
(+8kV Contact per IEC 61000-4-2)

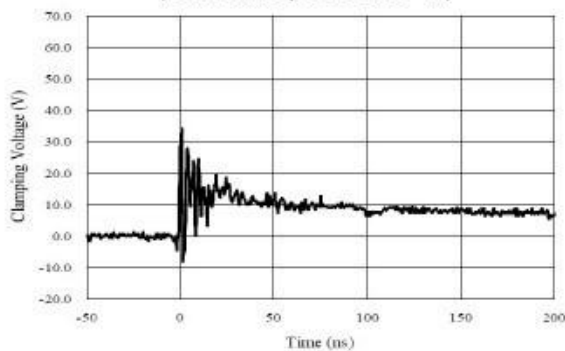
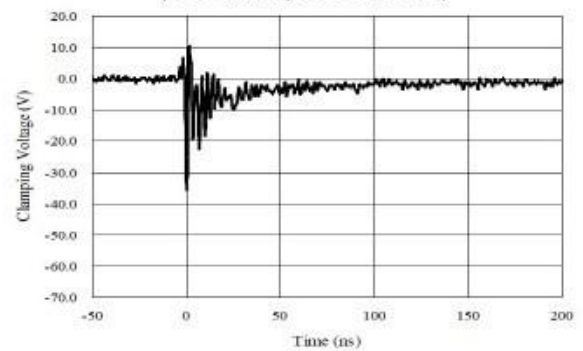


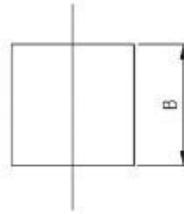
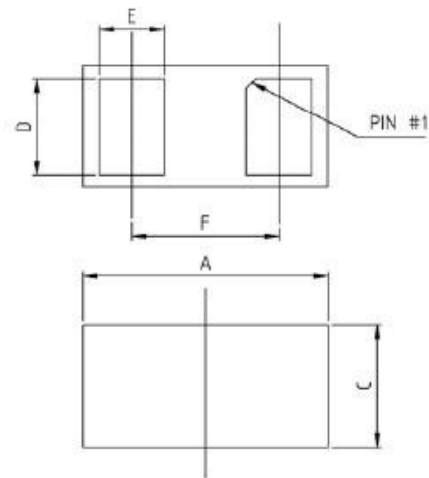
Fig 6 ESD Clamping  
(-8kV Contact per IEC 61000-4-2)





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## DFN0603 PACKAGE OUTLINE DIMENSIONS



Dimensions In  
Millimeterer

| Symbol | MIN  | TYP  | MAX  |
|--------|------|------|------|
| A      | 0.58 | 0.60 | 0.65 |
| B      | 0.28 | 0.30 | 0.35 |
| C      | 0.28 | 0.30 | 0.34 |
| D      | 0.20 | 0.24 | 0.26 |
| E      | 0.13 | 0.16 | 0.19 |
| F      | -    | 0.36 | -    |