

## SuperESD - BSD5C051L-ES

## 1. Description

The BSD5C051L-ES is an low capacitance TVS designed to protect high speed data interface. It has been specifically designed to protect sensitive electronic components which are connected to data and transmission lines from over-stress caused by ESD. The BSD5C051L-ES incorporates one pair of low capacitance steering diodes plus a TVS diode.

## 2. Features

- IEC 61000-4-2 Level 4 ESD Protection
  - $\pm 25\text{kV}$  Contact Discharge
  - $\pm 25\text{kV}$  Air Discharge
- 75W Peak pulse Power (8/20us)
- Low clamping voltage
- Working voltage: 5V
- Low leakage current
- RoHS compliant
- Protecting one bi-directional line
- Ultra-low capacitance: 4.5pF Typ.

## 3. Applications

- USB 2.0 and USB 3.0
- SATA and eSATA
- Notebooks & handhelds
- HDMI 1.3 and HDMI 1.4
- PCI Express
- Peripherals

## 4. Ordering Information

| Part Number  | Package | Marking | Material     | Packing     | Quantity per reel | Flammability Rating | Reel Size |
|--------------|---------|---------|--------------|-------------|-------------------|---------------------|-----------|
| BSD5C051L-ES | SOD-523 | LB      | Halogen free | Tape & Reel | 3,000 PCS         | UL 94V-0            | 7 inches  |

Table-1 Ordering information

## 5. Pin Configuration and Functions

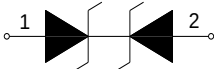
| Pin | Name | Description   | Outline                                                                                    | Circuit Diagram                                                                     |
|-----|------|---------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | IO1  | Connect to IO | Note1<br> |  |
| 2   | IO2  | Connect to IO |                                                                                            |                                                                                     |

Table-2 Pin configuration

Note1: This diagram is only an electrical schematic, and the actual pin size is based on POD.

## 6. Specification

### 6.1. Absolute Maximum rating

Over operating free-air temperature range (unless otherwise noted)

| Parameters                                 | Symbol           | Min. | Max. | Unit |
|--------------------------------------------|------------------|------|------|------|
| Peak pulse power (tp=8/20us)@25°C          | P <sub>pk</sub>  | -    | 75   | W    |
| Peak pulse current (tp=8/20us)@25°C        | I <sub>PP</sub>  |      | 5    | A    |
| ESD (IEC61000-4-2 air discharge) @25°C     | V <sub>ESD</sub> | -    | ± 25 | kV   |
| ESD (IEC61000-4-2 contact discharge) @25°C | V <sub>ESD</sub> | -    | ± 25 | kV   |
| Junction temperature                       | T <sub>J</sub>   | -    | 150  | °C   |
| Operating temperature                      | T <sub>OP</sub>  | -40  | 125  | °C   |
| Storage temperature                        | T <sub>STG</sub> | -55  | 150  | °C   |
| Lead temperature                           | T <sub>L</sub>   | -    | 260  | °C   |

Table-3 Absolute Maximum rating

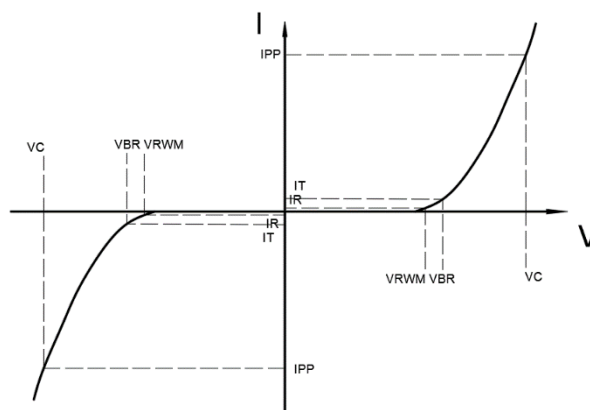
## 6.2. Electrical Characteristics

At TA = 25°C unless otherwise noted

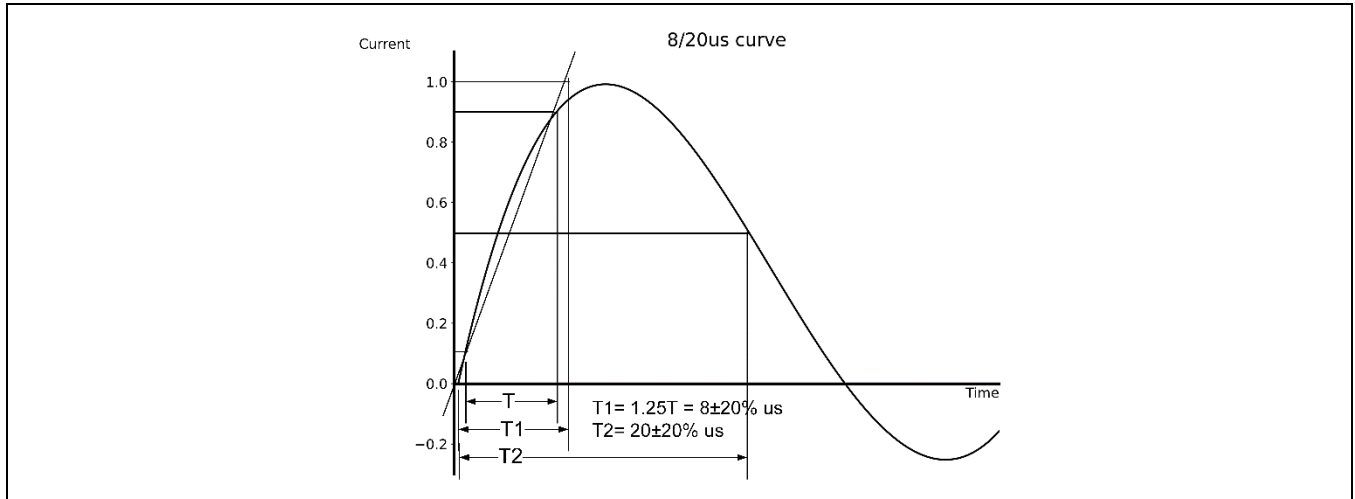
| Parameter                 | Symbol    | Conditions                      | Min. | Typ. | Max. | Units   |
|---------------------------|-----------|---------------------------------|------|------|------|---------|
| Reverse Stand-off Voltage | $V_{RWM}$ |                                 |      |      | 5.0  | V       |
| Reverse Breakdown Voltage | $V_{BR}$  | $I_T=1mA$                       | 6.0  |      |      | V       |
| Reverse Leakage Current   | $I_R$     | $V_{RWM}=5V$                    |      |      | 1.0  | $\mu A$ |
| Clamping Voltage          | $V_C$     | $I_{PP}=1A$ ; $t_p=8/20\mu s$   |      | 9.0  | 12.0 | V       |
| Clamping Voltage          | $V_C$     | $I_{PP}=5A$ ; $t_p=8/20\mu s$   |      | 13.5 | 15.0 | V       |
| Junction Capacitance      | $C_J$     | I/O to GND; $V_R=0V$ ; $f=1MHz$ |      | 4.5  | 7.0  | pF      |

Table-4 Electrical Characteristics

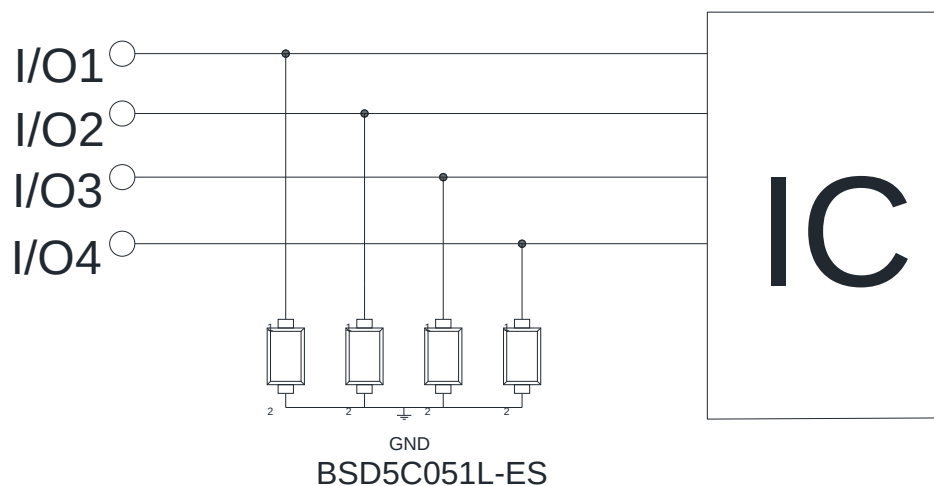
| Symbol    | Parameters                          |
|-----------|-------------------------------------|
| $V_{RWM}$ | Peak Reverse Working Voltage        |
| $I_R$     | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$  | Breakdown Voltage @ $I_T$           |
| $I_T$     | Test Current                        |
| $I_{PP}$  | Maximum Reverse Peak Pulse Current  |
| $V_C$     | Clamping Voltage @ $I_{PP}$         |



## 7. Typical Characteristic



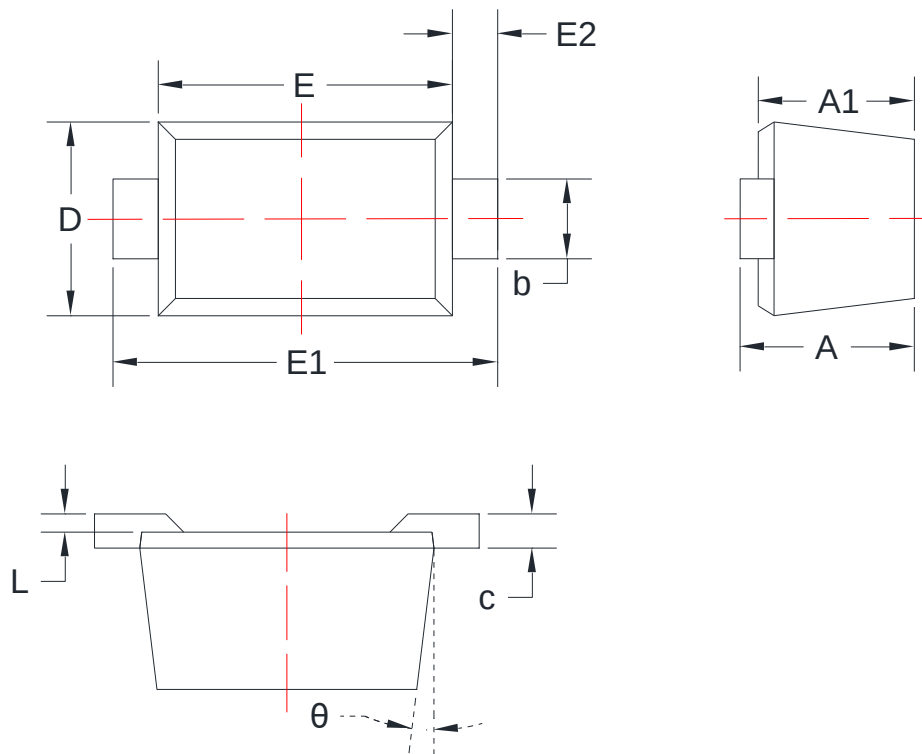
## 8. Typical Application



Typical Interface Application

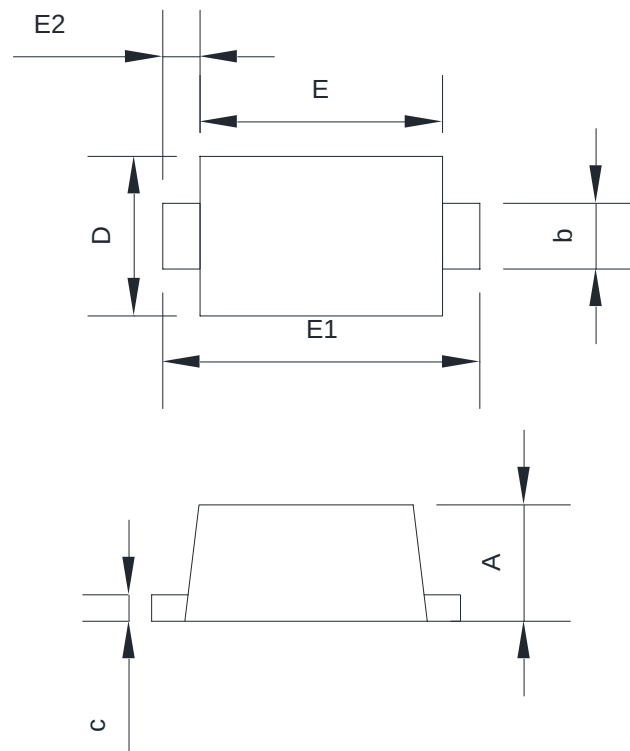
## 9. Dimension (SOD-523)

## POD A(SX)



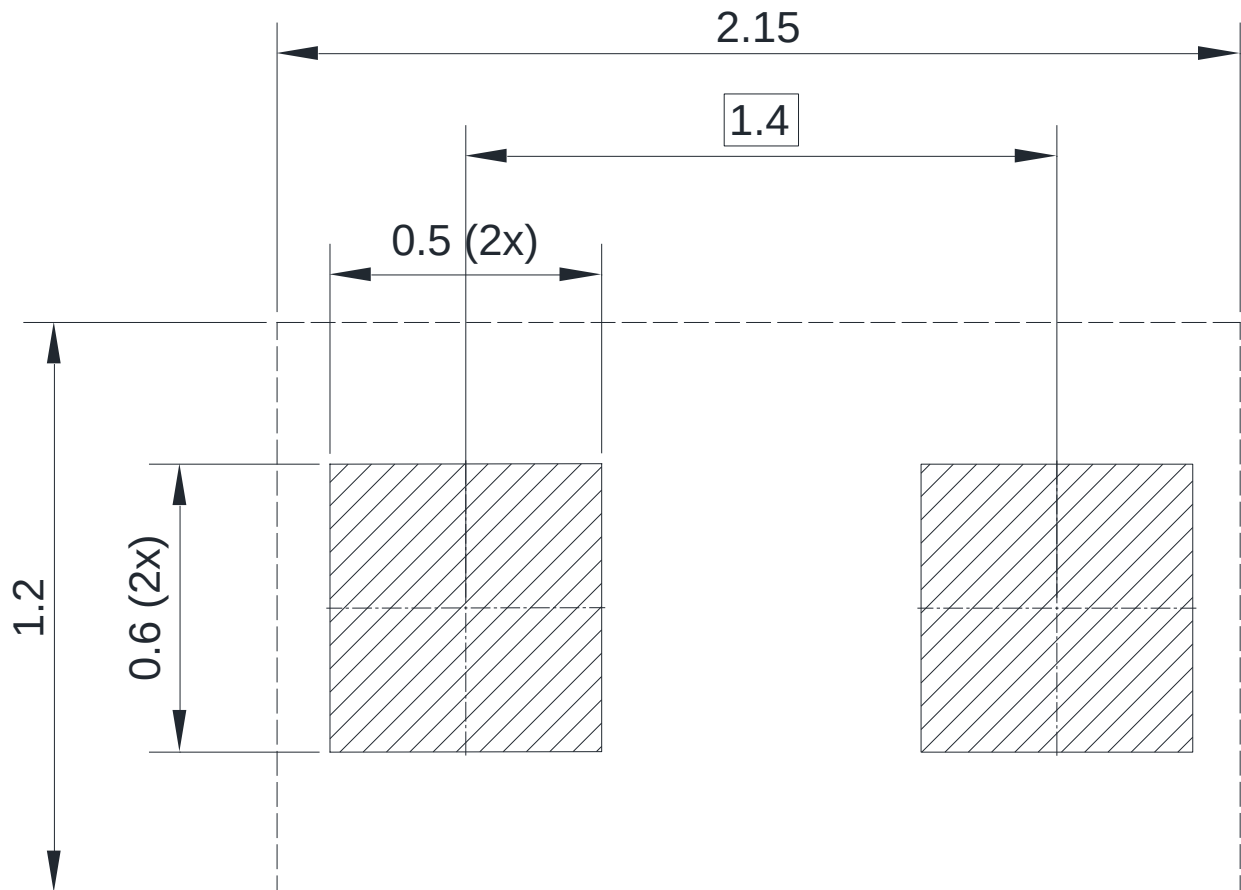
| Symbol   | Dimensions in Millimeters |      |
|----------|---------------------------|------|
|          | Min.                      | Max. |
| A        | 0.50                      | 0.73 |
| A1       | 0.45                      | 0.70 |
| b        | 0.25                      | 0.38 |
| c        | 0.08                      | 0.20 |
| D        | 0.70                      | 0.90 |
| E        | 1.10                      | 1.30 |
| E1       | 1.50                      | 1.70 |
| E2       | 0.10                      | 0.30 |
| L        | 0.00                      | 0.07 |
| $\theta$ | 7° REF                    |      |

## POD B(H)



| Symbol | Dimensions in Millimeters |      |
|--------|---------------------------|------|
|        | Min.                      | Max. |
| A      | 0.50                      | 0.70 |
| b      | 0.25                      | 0.35 |
| c      | 0.10                      | 0.20 |
| D      | 0.75                      | 0.85 |
| E      | 1.10                      | 1.30 |
| E1     | 1.50                      | 1.70 |
| E2     | 0.10                      | 0.30 |

## 10. Recommended Soldering Footprint



DIMENSIONS: MILLIMETERS

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