

## SuperESD - SP0504BAHTG-ES

## 1. Description

The SP0504BAHTG-ES is designed to protect voltage sensitive components from ESD and transient voltage events. Excellent clamping capability, low leakage, and fast response time, make these parts ideal for ESD protection on designs where board space is at a premium.

## 2. Features

- IEC 61000-4-2 Level 4 ESD Protection
  - $\pm 30\text{kV}$  Contact Discharge
  - $\pm 30\text{kV}$  Air Discharge
- 150W Peak pulse Power (8/20us)
- Low clamping voltage
- Working voltage: 5V
- Low leakage current
- RoHS compliant
- Protecting 4 unidirectional lines
- Junction Capacitance: 90pF Typ.

## 3. Applications

- Computers
- Communication systems
- Wireline and wireless telephone sets
- Printers
- Cellular phones handsets and accessories
- Set top boxes

## 4. Ordering Information

| Part Number    | Package   | Marking | Material     | Packing     | Quantity per reel | Flammability Rating | Reel Size |
|----------------|-----------|---------|--------------|-------------|-------------------|---------------------|-----------|
| SP0504BAHTG-ES | SOT-23-5L | .F05    | Halogen free | Tape & Reel | 3,000 PCS         | UL 94V-0            | 7 inches  |

Table-1 Ordering information

## 5. Pin Configuration and Functions

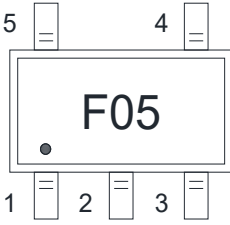
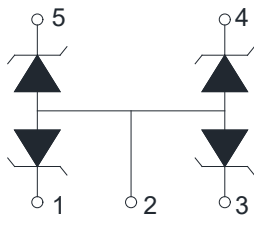
| Pin | Name | Description    | Outline                                                                            | Circuit Diagram                                                                     |
|-----|------|----------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | IO1  | Connect to I/O |  |  |
| 2   | GND  | Connect to GND |                                                                                    |                                                                                     |
| 3   | IO2  | Connect to I/O |                                                                                    |                                                                                     |
| 4   | IO3  | Connect to I/O |                                                                                    |                                                                                     |
| 5   | IO4  | Connect to I/O |                                                                                    |                                                                                     |

Table-2 Pin configuration

## 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>  | -    | 150  | W    |
| Peak pulse current (tp=8/20us)@25°C        | I <sub>PP</sub>  |      | 12   | A    |
| ESD (IEC61000-4-2 air discharge) @25°C     | V <sub>ESD</sub> | -    | ±30  | kV   |
| ESD (IEC61000-4-2 contact discharge) @25°C | V <sub>ESD</sub> | -    | ±30  | 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

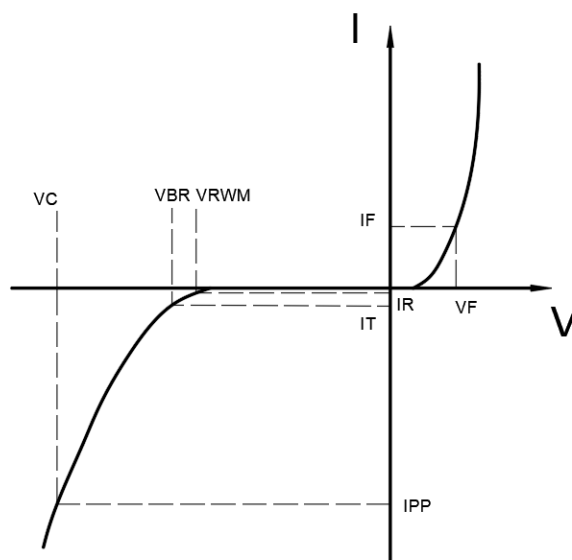
## 6.2. Electrical Characteristics

At TA = 25°C unless otherwise noted

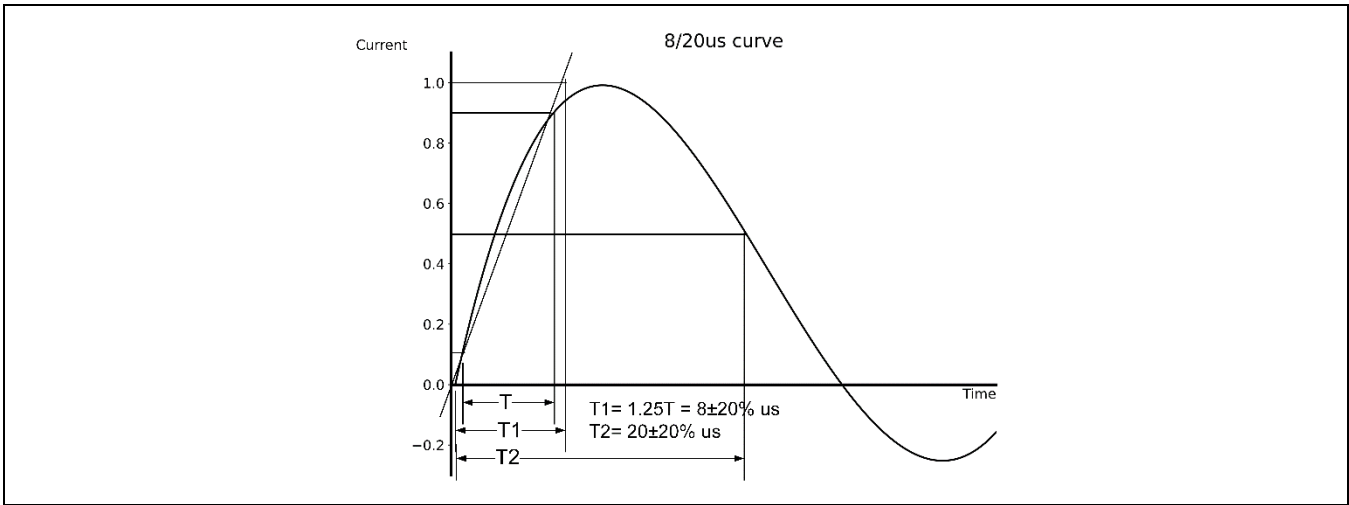
| Parameter                 | Symbol    | Conditions                      | Min. | Typ. | Max. | Units   |
|---------------------------|-----------|---------------------------------|------|------|------|---------|
| Reverse Stand-off Voltage | $V_{RWM}$ |                                 |      |      | 5    | V       |
| Reverse Breakdown Voltage | $V_{BR}$  | $I_T=1mA$                       | 6    |      |      | V       |
| Reverse Leakage Current   | $I_R$     | $V_{RWM}=5V$                    |      |      | 1    | $\mu A$ |
| Clamping Voltage          | $V_C$     | $I_{PP}=1A$ ; $t_p=8/20\mu s$   |      | 7.5  |      | V       |
| Clamping Voltage          | $V_C$     | $I_{PP}=12A$ ; $t_p=8/20\mu s$  |      | 10   |      | V       |
| Junction Capacitance      | $C_J$     | I/O to GND; $V_R=0V$ ; $f=1MHz$ |      | 90   |      | pF      |

Table-4 Electrical Characteristics

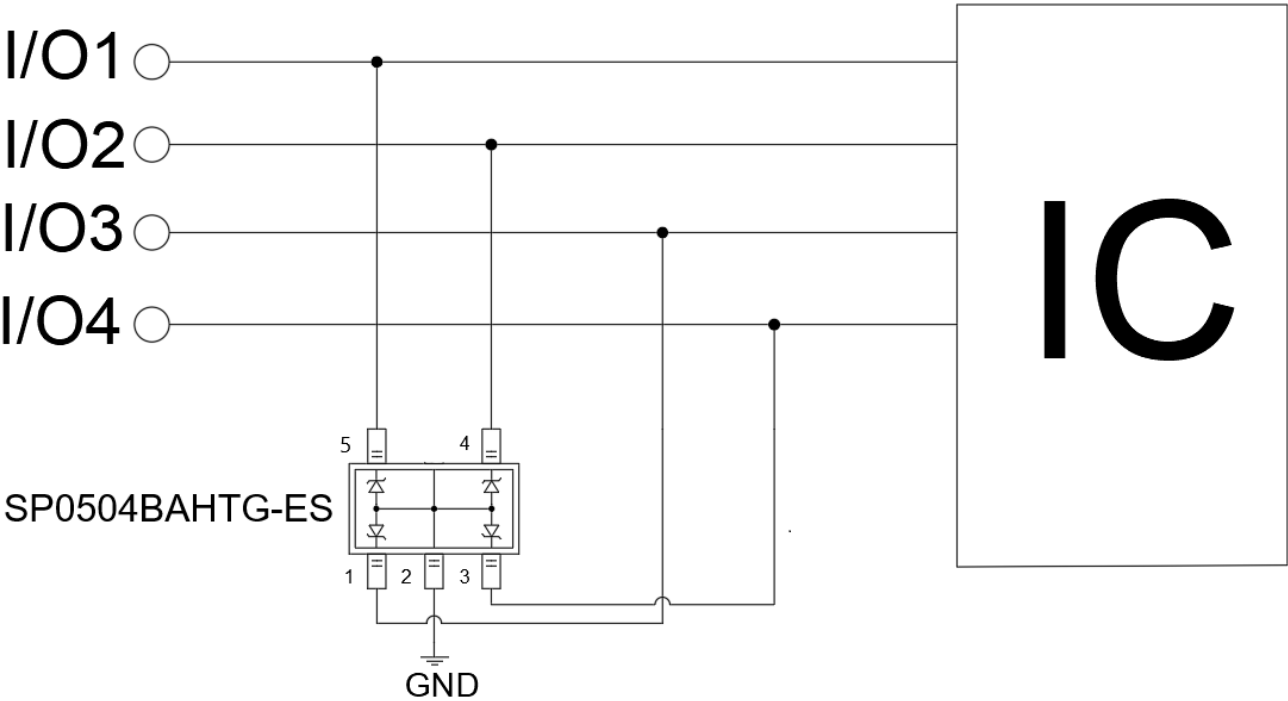
| Symbol    | Parameters                          |
|-----------|-------------------------------------|
| $V_{RWM}$ | Peak Reverse Working Voltage        |
| $I_R$     | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$  | Breakdown Voltage @ $I_T$           |
| $I_T$     | Test Current              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



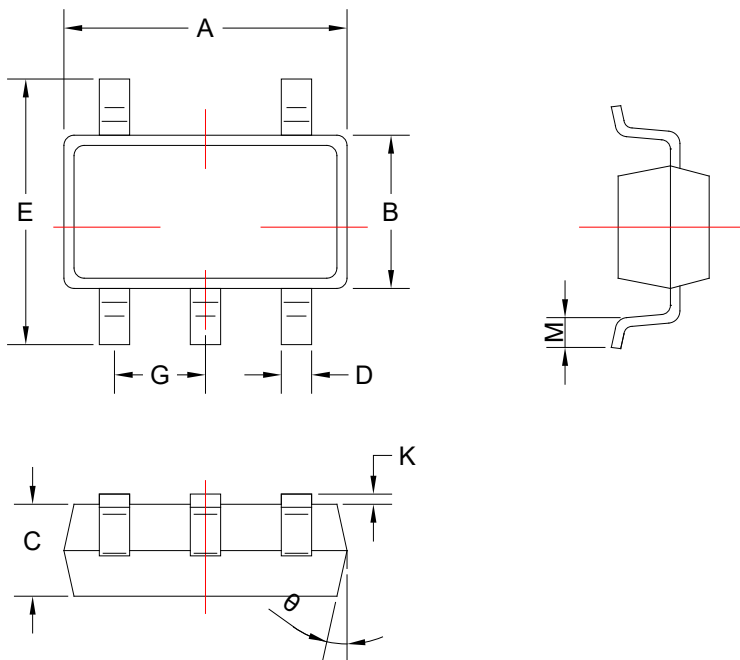
Typical Characteristic



7. Typical Application



Typical Interface Application

**8. Dimension (SOT23-5L)**

| COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER |      |      |        |          |      |
|---------------------------------------------|------|------|--------|----------|------|
| SYMBOL                                      | MIN  | MAX  | SYMBOL | MIN      | MAX  |
| A                                           | 2.82 | 3.02 | G      | 0.95 TYP |      |
| B                                           | 1.50 | 1.70 | K      | 0.00     | 0.10 |
| C                                           | 1.05 | 1.15 | M      | 0.20     | -    |
| D                                           | 0.30 | 0.50 | θ      | 7°       | 11°  |
| E                                           | 2.65 | 2.95 |        |          |      |

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