

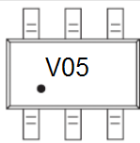
## SS05-4R – Uni-Direction ESD Protection Array

### Description

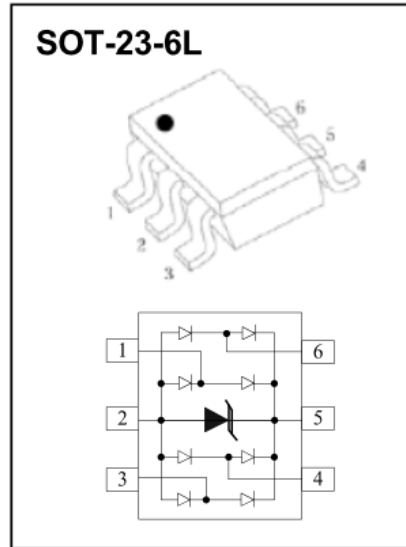
Design to protect voltage sensitive electronic components from ESD and other transients. Excellent clamping capability, low leakage, low capacitance and fast response time provide best in class protection on designs that are exposed to ESD.

The combination of small size, low capacitance and high level of ESD protection makes them a flexible solution for applications such as HDMI, Display Port™ and MDDI interfaces. It is designed to replace multilayer varistors (MLV) in consumer equipment applications such as mobile phone, notebook, PAD, STB, LCD TV etc.

### Marking



V05: Device code  
Solid Dot: Pin 1 indicator



### Features

- IEC61000-4-2 (ESD) ±20kV (Air), ±12kV (Contact)
- IEC61000-4-4 (EFT) Level 3, 55A (5/50ns)
- IEC61000-4-5 (Surge): 4A (8/20μs)
- Solid-state silicon-avalanche and active circuit triggering technology
- Back-drive protection for power-down mode
- Ultra low capacitance: 0.5pF
- Low operatin voltage: 5V

### Applications

- Video/Graphics card
- Digital Visual Interface (DVI)
- USB2.0 power and data line protection
- Notebook and PC computers
- Monitors and Flat Panel Display

### Maximum Rating

| Parameter   | Symbol                          | Limit   | Unit |
|---|---------------------------------|---------|------|
| IEC61000-4-2 ESD Voltage – Air Mode                   | V <sub>ESD</sub> <sup>(1)</sup> | ±20     | kV   |
| IEC61000-4-2 ESD Voltage – Contact Mode               |                                 | ±12     |      |
| Peak Pulse Power                                      | P <sub>PP</sub> <sup>(2)</sup>  | 60      | W    |
| Peak Pulse Current                                    | I <sub>PP</sub> <sup>(2)</sup>  | 4       | A    |
| Maximum Lead Solder Temperature (10 seconds duration) | T <sub>L</sub>                  | 260     | °C   |
| Operating Temperature                                 | T <sub>J</sub>                  | -55~85  | °C   |
| Storage Temperature Range                             | T <sub>stg</sub>                | -55~150 | °C   |

Note:

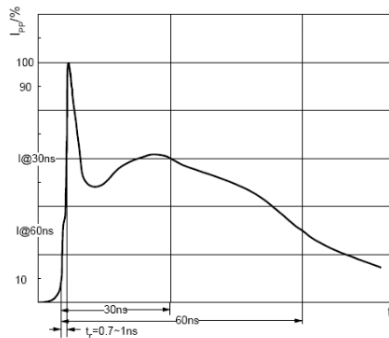
1. Device stressed with ten non-repetitive ESD pulses, per channel (I/O to GND).
2. Non-repetitive current pulse 8/20μs exponential decay waveform according to IEC61000-4-5.
3. All ratings are measured at environmental temperature of T<sub>A</sub> = 25°C unless otherwise noted.

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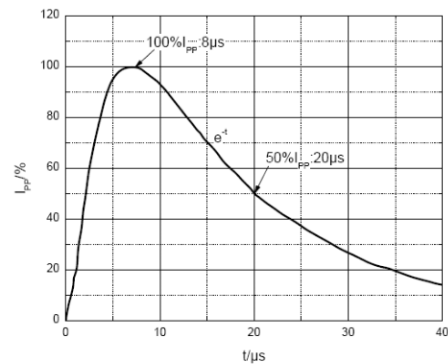
### ESD Standards Compliance

| IEC61000-4-2 Standard |                   |               |                   |
|-----------------------|-------------------|---------------|-------------------|
| Contact Discharge     |                   | Air Discharge |                   |
| Level                 | Test Voltage (kV) | Level         | Test Voltage (kV) |
| 1                     | 2                 | 1             | 2                 |
| 2                     | 4                 | 2             | 4                 |
| 3                     | 6                 | 3             | 8                 |
| 4                     | 8                 | 4             | 15                |

| JESD22-A114-B Standard |                                  |
|------------------------|----------------------------------|
| ESD Class              | Human Body Discharge Voltage (V) |
| 0                      | 0~249                            |
| 1A                     | 250~499                          |
| 1B                     | 500~999                          |
| 1C                     | 1000~1999                        |
| 2                      | 2000~3999                        |
| 3A                     | 4000~7999                        |
| 3B                     | 8000~15999                       |



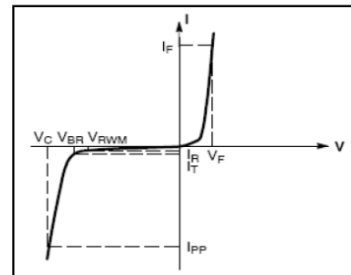
ESD pulse waveform according to IEC61000-4-2



8/20µs pulse waveform according to IEC 61000-4-5

### Electrical Parameters

| Symbol           | Parameter                                  |
|------------------|--|
| V <sub>C</sub>   | Clamping Voltage @ I <sub>PP</sub>         |
| I <sub>PP</sub>  | Peak Pulse Current                         |
| V <sub>BR</sub>  | Breakdown Voltage @ I <sub>T</sub>         |
| I <sub>T</sub>   | Test Current                               |
| I <sub>R</sub>   | Reverse Leakage Current @ V <sub>RWM</sub> |
| V <sub>RWM</sub> | Reverse Stand-off Voltage                  |
| V <sub>F</sub>   | Forward Voltage @ I <sub>F</sub>           |
| I <sub>F</sub>   | Forward Current                            |



V-I characteristics for a uni-directional TVS

### Electrical Characteristics

| Parameter                 | Symbol                          | Test Conditions                                | Min | Typ | Max | Unit |
|---------------------------|---------------------------------|--|-----|-----|-----|------|
| Reverse Stand-off Voltage | V <sub>RWM</sub> <sup>(1)</sup> | Pin 5 to pin 2                                 |     |     | 5.0 | V    |
| Breakdown Voltage         | V <sub>BR</sub>                 | I <sub>T</sub> = 1mA (Pin 5 to pin 2)          | 6.0 |     |     | V    |
| Reverse Leakage Current   | I <sub>R</sub>                  | V <sub>RWM</sub> = 5V (Pin 5 to pin 2)         |     |     | 5.0 | µA   |
| Forward Voltage           | V <sub>F</sub>                  | I <sub>T</sub> = 10mA                          |     | 0.8 | 1.0 | V    |
| Clamping Voltage          | V <sub>C</sub> <sup>(2)</sup>   | I <sub>PP</sub> = 4A (I/O pin to GND)          |     | 12  | 15  | V    |
| Junction Capacitance      | C <sub>J</sub>                  | V <sub>R</sub> = 0V, f = 1MHz (I/O pin to GND) |     | 1.0 |     | pF   |
|                           |                                 | V <sub>R</sub> = 0V, f = 1MHz (I/O to I/O)     |     | 0.5 |     | pF   |

Note:

- Other voltages available upon request.
- Non-repetitive current pulse 8/20µs exponential decay waveform according to IEC61000-4-5.
- All ratings are measured at environmental temperature of T<sub>A</sub> = 25°C unless otherwise noted.

## SS05-4R – Uni-Direction ESD Protection Array

### Typical Characteristics

Figure 1: Peak Pulse Power vs. Pulse Time

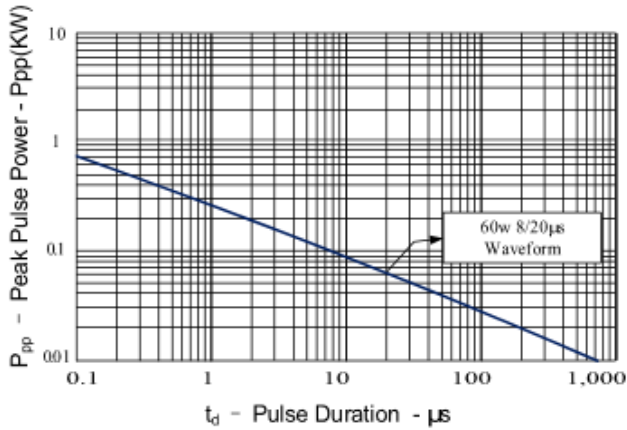


Figure 2: Power Derating Curve

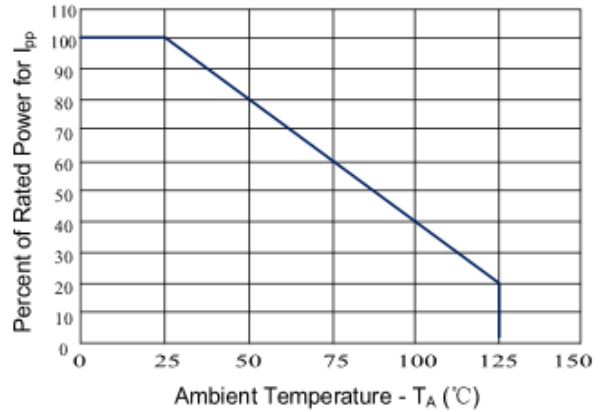


Figure 3: Pulse Waveform

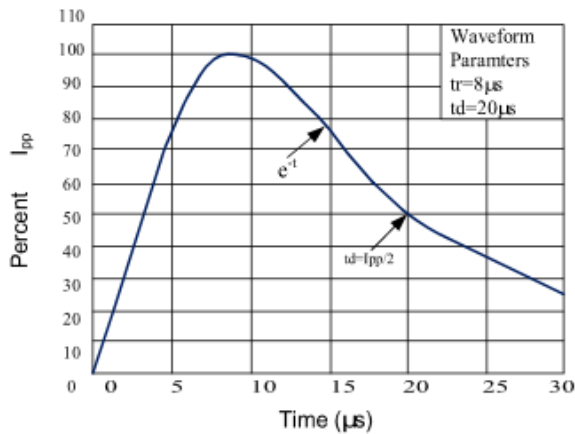


Figure 4: Clamping Voltage vs. Peak Pulse Current

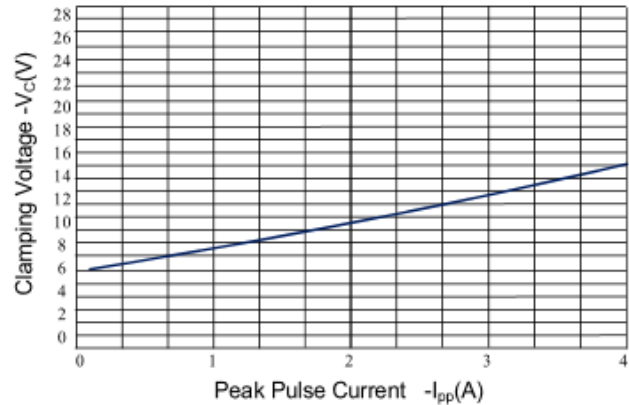


Figure 5: Capacitance vs. Reverse Voltage

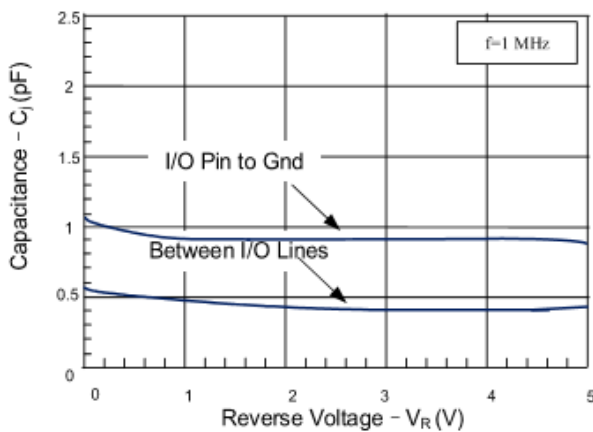
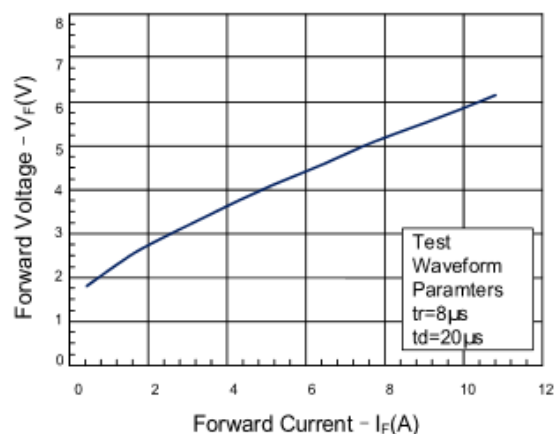
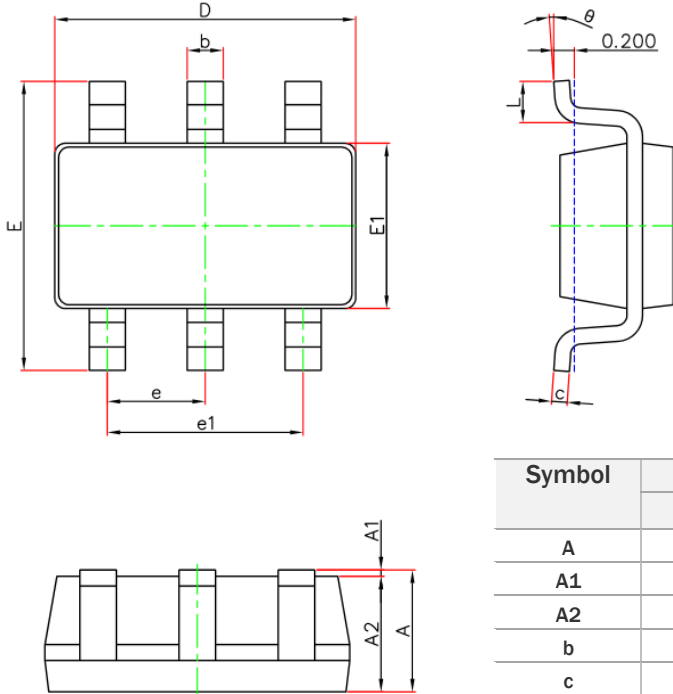


Figure 6: Forward Voltage vs. Forward Current



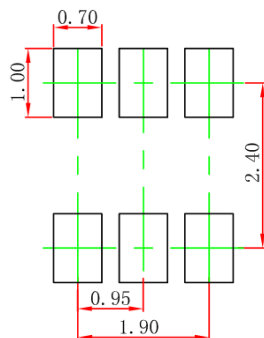
## SS05-4R – Uni-Direction ESD Protection Array

### SOT-23-6L Package Outline Dimensions



| Symbol | Dimensions (mm) |       | Dimensions (inch) |       |
|--------|-----------------|-------|-------------------|-------|
|        | Min             | Max   | Min               | Max   |
| A      | 1.050           | 1.250 | 0.041             | 0.049 |
| A1     | 0.000           | 0.100 | 0.000             | 0.004 |
| A2     | 1.050           | 1.150 | 0.041             | 0.045 |
| b      | 0.300           | 0.500 | 0.012             | 0.020 |
| c      | 0.100           | 0.200 | 0.004             | 0.008 |
| D      | 2.820           | 3.020 | 0.111             | 0.119 |
| E1     | 1.500           | 1.700 | 0.059             | 0.067 |
| E      | 2.650           | 2.950 | 0.104             | 0.116 |
| e      | 0.950 (BSC)     |       | 0.037 (BSC)       |       |
| e1     | 1.800           | 2.000 | 0.071             | 0.079 |
| L      | 0.300           | 0.600 | 0.012             | 0.024 |
| θ      | 0°              | 8°    | 0°                | 8°    |

### SOT-23-6L Recommended Pad Layout



**Note:**

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

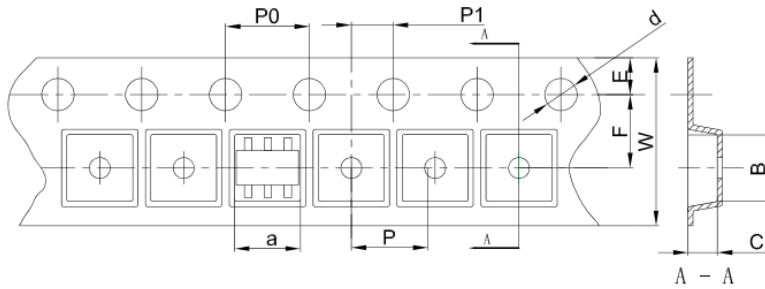
**Notice**

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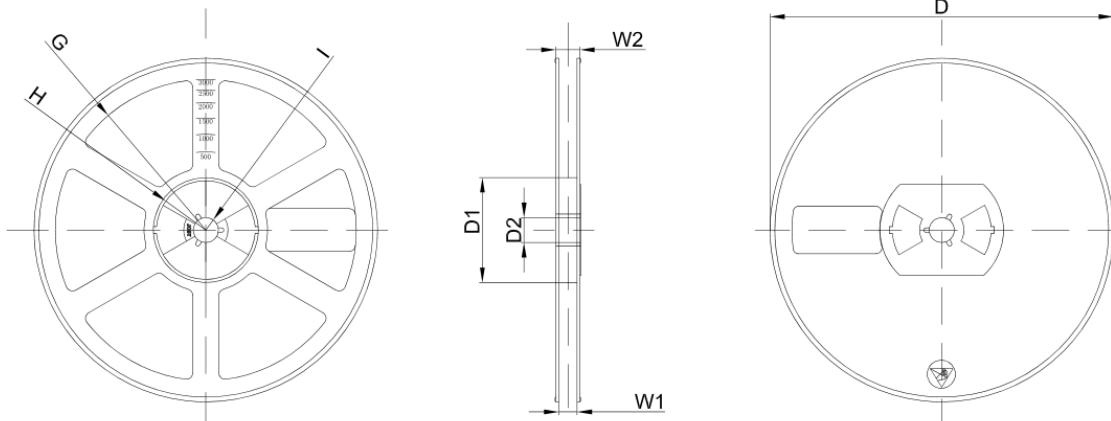
### Tape and Reel Specifications

#### SOT-23-6L Embossed Carrier Tape



| Package Type | a    | B    | C    | d     | E    | F    | P0   | P    | P1   | W    |
|--------------|------|------|------|-------|------|------|------|------|------|------|
| SOT-23-6L    | 3.17 | 3.23 | 1.37 | Φ1.55 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

#### SOT-23-6L Reel



| Reel Option | D      | D1   | D2   | G     | H     | I    | W1  | W2   |
|-------------|--------|------|------|-------|-------|------|-----|------|
| 7" Dia.     | Φ180.0 | 60.0 | 13.0 | R78.0 | R25.6 | R6.5 | 9.5 | 13.1 |

\*All Dimensions are in millimeters.

### Packaging Information

| Reel      | Reel Size | BOX | Box Size | Carton | Carton Size |
|-----------|-----------|-----|----------|--------|-------------|
| 3,000 pcs | 7 inch    | -   | -        | -      | -           |

\*All Dimensions are in millimeters.