

## Specification Status: Released

### BENEFITS

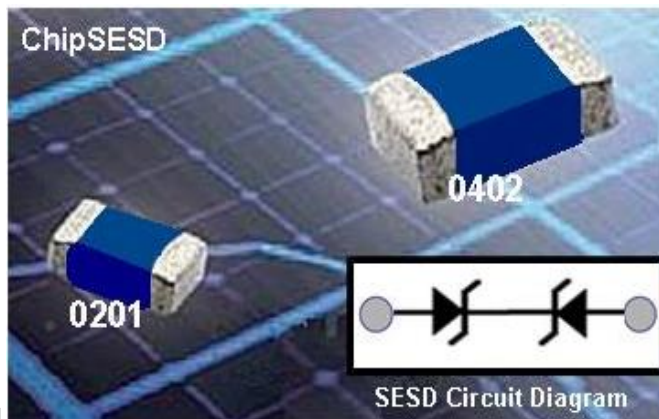
- Silicon ESD device in an EIA-0402 size rectangular passive component SMT package
- Standard PCB assembly and rework processes
- Bi-directional operation allows placement on PCB without orientation constraint
- Appropriate for ESD protection in space-constrained portable electronics and mobile handsets
- Suitable for +5V operating voltage applications
- Helps protect electronic circuits against damage from Electrostatic Discharge (ESD) events
- Assist equipment to pass IEC61000-4-2, level 4 testing
- RoHS compliant and Halogen Free

### FEATURES

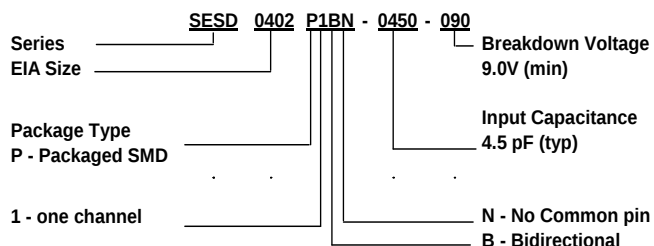
- Input capacitance – 4.5pF (typ)
- Low leakage current – 1.0μA (max)
- Low working reverse voltage – 6.0V (max)
- ESD maximum rating per IEC61000-4-2 standard
  - ±10kV contact discharge<sup>(1)</sup>
  - ±16kV air discharge
- Capable of withstanding numerous ESD strikes
- Small package size: 1.10mm x 0.50mm (typ)
- Low package height: 0.50mm (typ)

### APPLICATIONS

- Cellular phones and portable electronics
- Digital cameras and camcorders
- USB 2.0 and computer I/O ports
- Notebooks, set top boxes, motherboards
- Applications requiring high ESD performance



### PART NUMBERING



### MATERIALS INFORMATION

RoHS Compliant ELV Compliant Halogen Free \*

Directive 2000/53/EC Compliant

Directive 2002/95/EC Compliant

**HF**

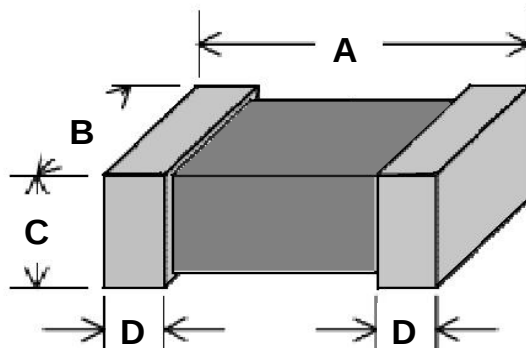
\* Halogen Free refers to: Br≤900ppm, Cl≤900ppm, Br+Cl≤1500ppm  
Terminal finish: 100% Matte Tin (Sn)

| Device Characteristics @ T = 25°C                              | Min         | Typ   | Max   | Unit |
|----------------------------------------------------------------|-------------|-------|-------|------|
| Input Capacitance @ $V_i = 0V$ , $f = 1MHz$                    | --          | 4.5   | 5.5   | pF   |
| Working Reverse Voltage (peak) - $V_{RWM}$                     | --          | --    | 6.0   | V    |
| Breakdown Voltage - $V_{br}$ @ $I_t = 1mA^{(2)}$               | 9.0         | 11.0  | --    | V    |
| Leakage current @ $V_{RWM} = 6.0V$                             | --          | --    | 1.0   | μA   |
| Clamping Voltage @ $I_{pp}=2A$ , $t_p=(8/20\mu s)$             | --          | ±10.0 | ±12.0 | V    |
| ESD contact discharge per IEC61000-4-2 standard <sup>(1)</sup> | --          | --    | ±10   | kV   |
| ESD air discharge per IEC61000-4-2 standard                    | --          | --    | ±16   | kV   |
| Operating ( $T_{junction}$ ) and Storage Temperature Range     | -40 to +125 |       |       | °C   |

<sup>(1)</sup> 10kV @ 50 ± pulses under IEC61000-4-2; 8kV @ 1,000 pulses under IEC61000-4-2

<sup>(2)</sup>  $V_{br}$  is measured at test current  $I_t$

## DEVICE DIMENSIONS

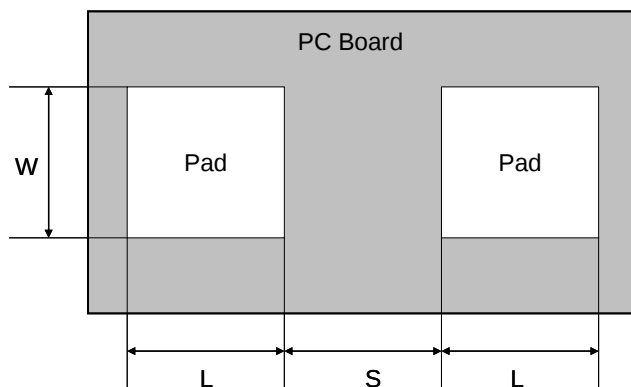


*Drawings Not To Scale*

| Typical | A               | B               | C               | D               |
|---------|-----------------|-----------------|-----------------|-----------------|
| mm      | $1.10 \pm 0.1$  | $0.50 \pm 0.1$  | $0.50 \pm 0.1$  | $0.25 \pm 0.15$ |
| mils*   | $43.31 \pm 4.0$ | $19.69 \pm 4.0$ | $19.69 \pm 4.0$ | $9.84 \pm 6.0$  |

\* Round off approximation

## RECOMMENDED LANDING PATTERN:



| Typical | L               | S               | W               |
|---------|-----------------|-----------------|-----------------|
| mm      | $0.61 \pm 0.05$ | $0.52 \pm 0.05$ | $0.50 \pm 0.05$ |
| mils*   | $24.0 \pm 2.0$  | $21.0 \pm 2.0$  | $20.0 \pm 2.0$  |

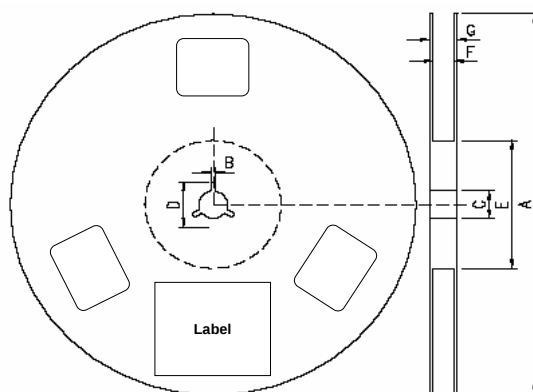
\* Round off approximation

- Recommended solder thickness: 150 to 200  $\mu\text{m}$
- Recommended rework procedure:
  - Soldering iron tip temperature should be less than 350°C
  - Apply iron tip to solder for less than 5 seconds
  - Do not apply solder iron tip to the body of this product directly

## PACKAGING

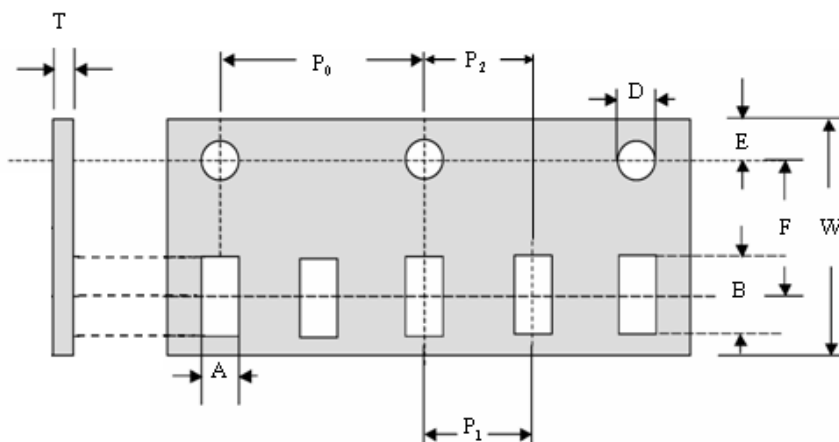
| Packaging             | Tape & Reel | Standard Box |
|-----------------------|-------------|--------------|
| SESD0402P1BN-0450-090 | 10,000      | 50,000       |

## REEL DIMENSIONS



| Dimension | A               | B             | C              | D              | E              | F             | G              |
|-----------|-----------------|---------------|----------------|----------------|----------------|---------------|----------------|
| (mm)      | $178.0 \pm 2.0$ | $2.0 \pm 0.5$ | $13.0 \pm 0.5$ | $21.0 \pm 0.8$ | $62.0 \pm 1.5$ | $9.0 \pm 0.5$ | $13.0 \pm 1.0$ |

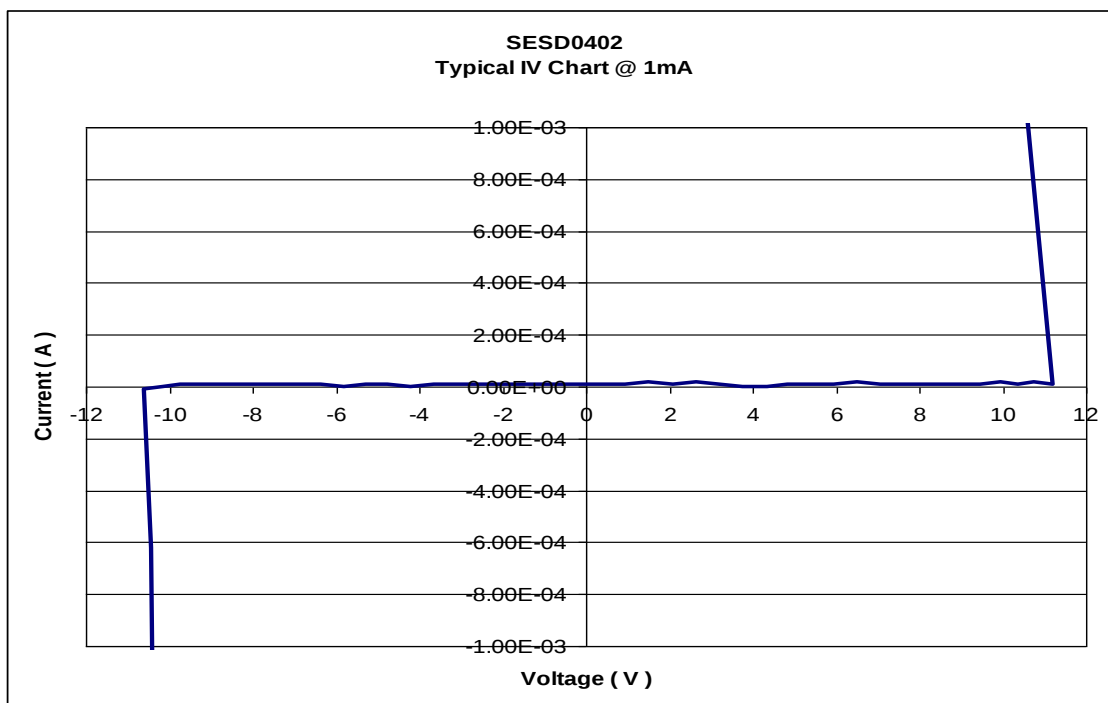
## CARRIER TAPE DIMENSIONS



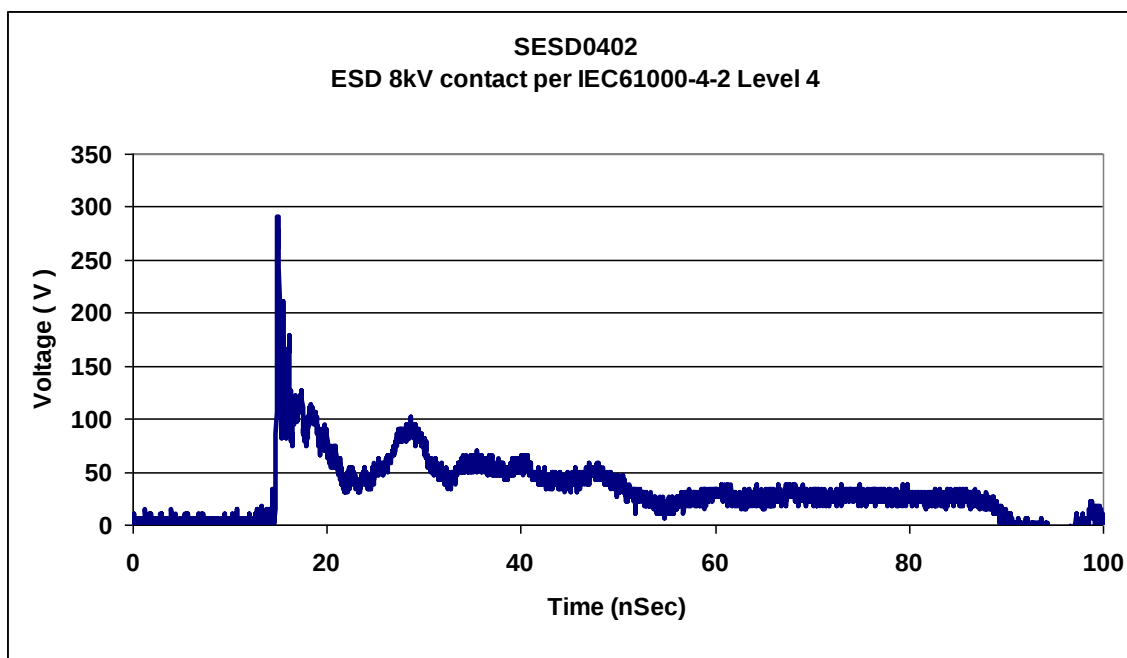
| Dimension | A               | B               | D               | E               | F              | W             |
|-----------|-----------------|-----------------|-----------------|-----------------|----------------|---------------|
| (mm)      | $0.58 \pm 0.03$ | $1.20 \pm 0.03$ | $1.55 \pm 0.05$ | $1.75 \pm 0.05$ | $3.5 \pm 0.05$ | $8.0 \pm 0.1$ |

| Dimension | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | T               |
|-----------|----------------|----------------|----------------|-----------------|
| (mm)      | $4.0 \pm 0.1$  | $2.0 \pm 0.05$ | $2.0 \pm 0.05$ | $0.60 \pm 0.03$ |

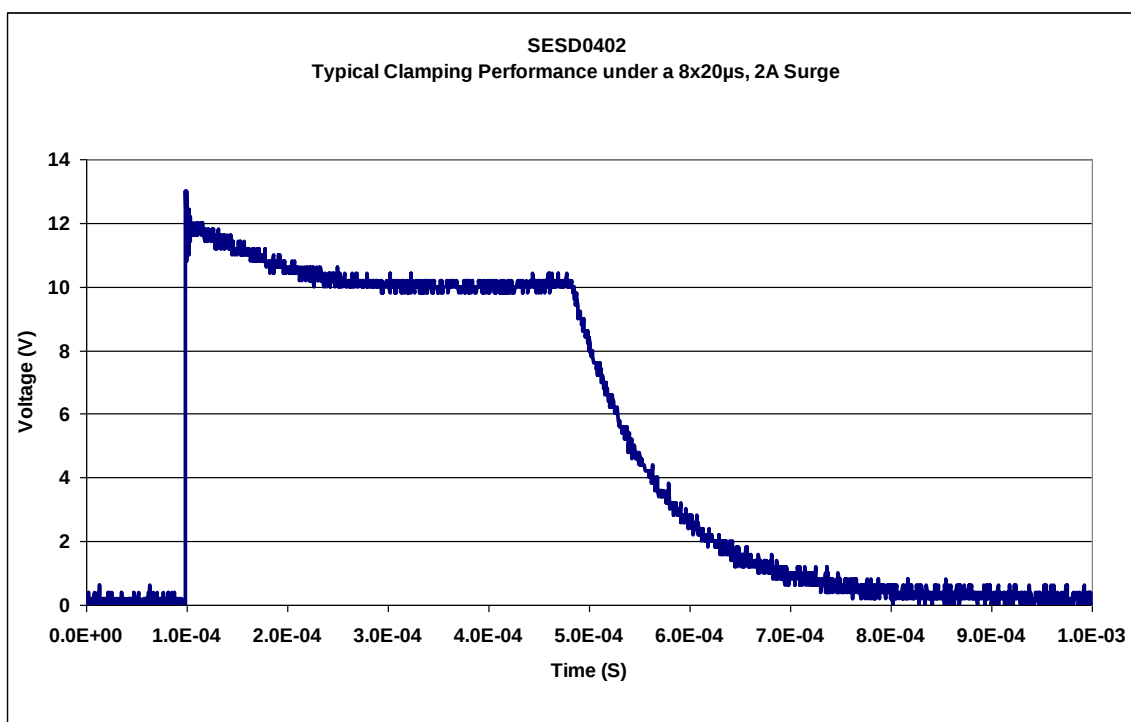
**FIGURE 1: TYPICAL IV CURVE**



**FIGURE 2: ESD CLAMPING VOLTAGE – 8kV Contact**



**FIGURE 3: ESD CLAMPING VOLTAGE – 8x20 $\mu$ s, 2A Surge**



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