

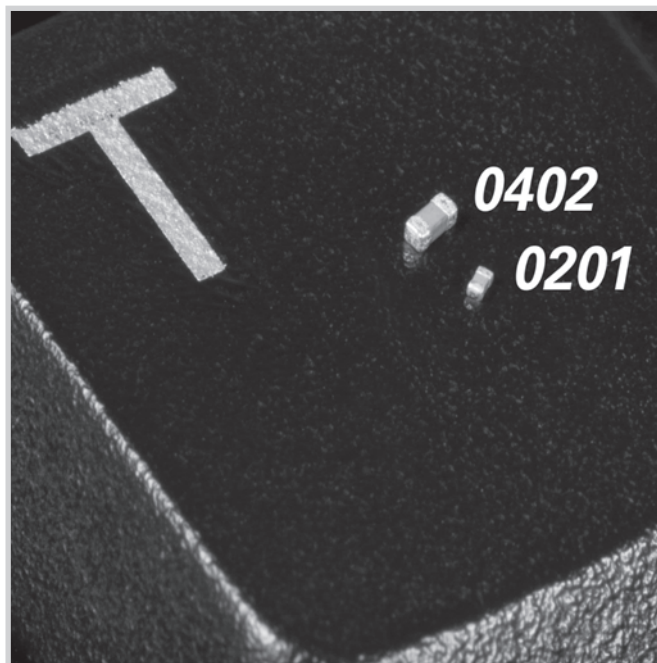
## ChipSESD Devices

TE Circuit Protection's ChipSESD family of Silicon ESD devices, available in EIA-0201 and EIA-0602 sized rectangular SMT passive component packages, can help protect electronic circuits against damage from electrostatic discharge (ESD) events.

The SESD0201P1BN-0400-090, 0201-sized ChipSESD device's miniature footprint (0.6mm x 0.3mm x 0.3mm) is approximately 70% smaller than prior-generation devices. This offers designers flexibility in space-constrained applications.

The ChipSESD devices are high-capacitance, bi-directional devices that can be used for low-speed generic interfaces such as keypads, power buttons, speakers and microphone ports in a portable electronics. The bi-directional operation eliminates orientation constraints and the need for polarity inspections. The surface mount technology (SMT) passive component package allows the devices to be easily installed onto the printed circuit board using the standard PCB assembly process. Once soldered onto the boards, the ChipSESD's solder fillets at the end terminals can easily be visually inspected.

The ChipSESD devices offer 10kV contact and 16kV air discharge protection per the IEC61000-4-2, level 4 standard with a surge rating of 2A under 8x20 $\mu$ s pulse.



### Benefits

- Silicon ESD devices in an EIA-0201 and EIA-0402 sized rectangular SMT passive component package
- Bi-directional operation eliminates orientation constraints
- Standard PCB assembly and rework process
- ESD protection in space-constrained portable electronics and mobile handsets
- Helps protect electronic circuits against damage from ESD
- Assists equipment to pass IEC61000-4-2, level 4 testing

### Applications

- Mobile phones and portable electronics
- Digital cameras and camcorders
- Notebooks, set top boxes, motherboards

### Features

- Input capacitance - 4.5pF (typ)
- Low leakage current - 1.0 $\mu$ A (max)
- Low working reverse voltage - 6.0V (max)
- Capable of withstanding numerous ESD strikes
- RoHS compliant
- Halogen free  
(refers to: Br $\leq$ 900ppm, Cl $\leq$ 900ppm, Br+Cl $\leq$ 1500ppm)

- USB 2.0 and computer I/O ports
- Applications requiring high ESD performance in a small package

**Table CE1 Maximum Ratings for ChipSESD Devices**

Part Number	IEC61000-4-2, level 4 (ESD Withstand)		Temperature	
	Contact (kV)	Air (kV)	Operating (°C)	Storage (°C)
SESD0201P1BN-0400-090	±10*	±16	-40 to +125	-40 to +125
SESD0402P1BN-0450-090	±10*	±16	-40 to +125	-40 to +125

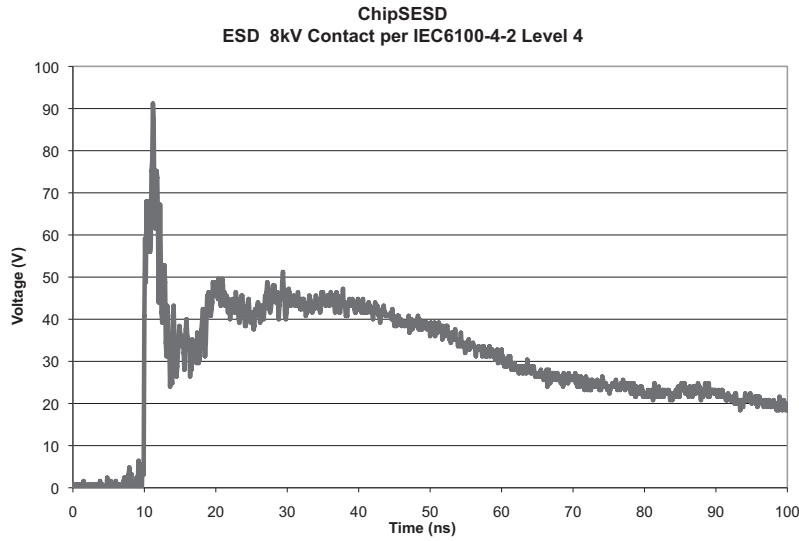
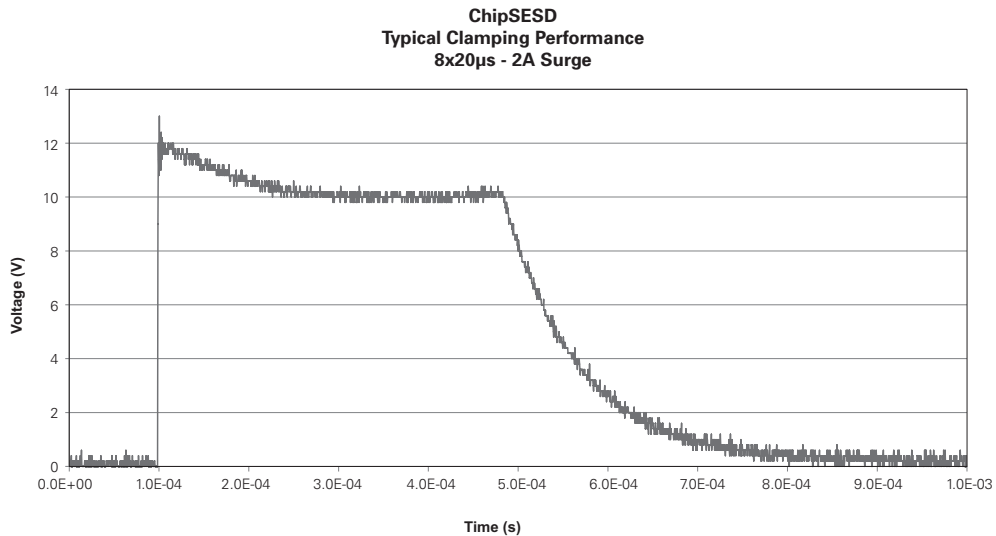
\*10kV @ 50 ± pulses under IEC61000-4-2; 8kV @ 1,000 pulses under IEC61000-4-2

**Table CE2 Electrical Characteristics @T=25°C for ChipSESD Devices**

Part Number	Input Capacitance*			Breakdown Voltage (min) $V_{br} @ I_T^\dagger = 1mA (V)$	Working Reverse Voltage $V_{RWM} @ peak (V)$	Clamping Voltage (typ) $V_{CL} @ I_{pp}=2A, tp=(8/20\mu s) (V)^*$
	Typ (pF)	Max (pF)	Leakage Current (max) $I_L @ V_{RWM} = 6.0V (\mu A)$			
SESD0201P1BN-0400-090	4.0	5.0	1.0	9.0	6.0	+10.0
SESD0402P1BN-0450-090	4.5	5.5	1.0	9.0	6.0	+10.0

\* @  $V_r=0V, f=1MHz$

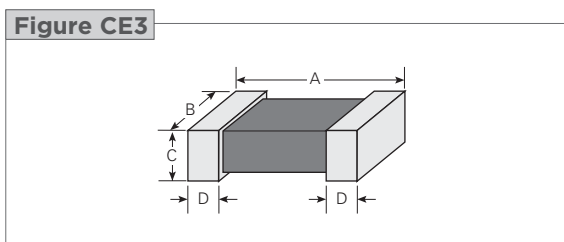
†  $V_{br}$  is measured at test current  $I_T$

**Figure CE1 ESD Clamping Voltage – 8kV Contact for ChipSESD Devices**

**Figure CE2 ESD Clamping Voltage – 8x20µs, 2A Surge for ChipSESD Devices**


**Table CE3 Dimensions for ChipSESD Devices in Millimeters and (Mils)\***

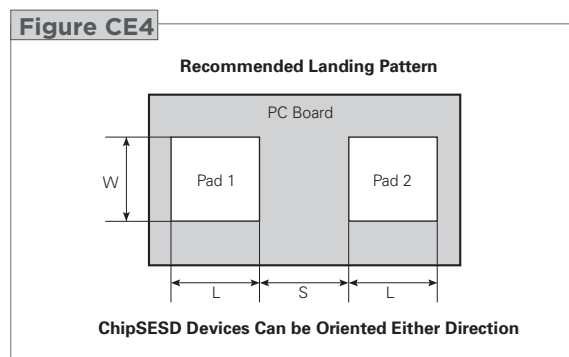
Part Number	A	B	C	D	Figure
SESD0201P	0.60 ± 0.05 (23.62 ± 2.00)	0.30 ± 0.05 (11.81 ± 2.00)	0.30 ± 0.05 (11.81 ± 2.00)	0.21 ± 0.07 (8.27 ± 2.80)	CE3
SESD0402P	1.10 ± 0.10 (43.31 ± 0.40)	0.50 ± 0.10 (19.69 ± 4.00)	0.50 ± 0.10 (19.69 ± 4.00)	0.25 ± 0.15 (9.84 ± 6.00)	CE3

\* Round off approximation


**Table CE4 PCB Pad Layout for ChipSESD Devices in Millimeters and (Mils)\***

Part Number	L	S	W	Figure
SESD0201P	0.28 ± 0.01 (11.00 ± 0.40)	0.19 ± 0.01 (7.50 ± 0.40)	0.30 ± 0.01 (11.80 ± 0.40)	CE4
SESD0402P	0.61 ± 0.05 (24.00 ± 2.00)	0.52 ± 0.05 (21.00 ± 2.00)	0.50 ± 0.05 (20.00 ± 2.00)	CE4

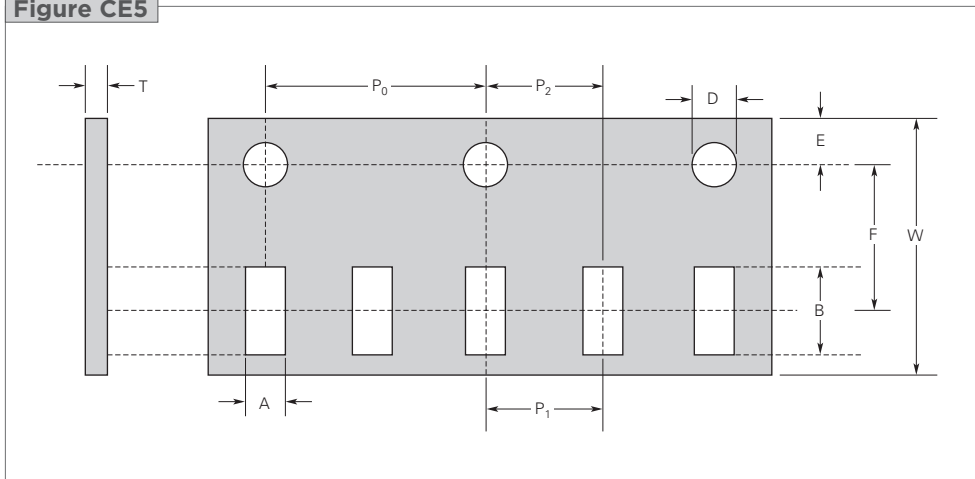
\* Round off approximation



### Table CE5 Tape Specifications for ChipSESD Devices

Tape Dimension	SESD0201P1BN-0400-090	SESD0402P1BN-0450-090
EIA Mark	Dimension (mm)	Dimension (mm)
A	$0.35 \pm 0.02$	$0.58 \pm 0.03$
B	$0.67 \pm 0.02$	$1.20 \pm 0.03$
D	$1.55 \pm 0.05$	$1.55 \pm 0.05$
E	$1.75 \pm 0.05$	$1.75 \pm 0.05$
F	$3.50 \pm 0.05$	$3.50 \pm 0.05$
W	$8.00 \pm 0.10$	$8.00 \pm 0.10$
P <sub>0</sub>	$4.00 \pm 0.10$	$4.00 \pm 0.10$
P <sub>1</sub>	$2.00 \pm 0.05$	$2.00 \pm 0.05$
P <sub>2</sub>	$2.00 \pm 0.05$	$2.00 \pm 0.05$
T	$0.42 \pm 0.03$	$0.60 \pm 0.03$

Figure CE5

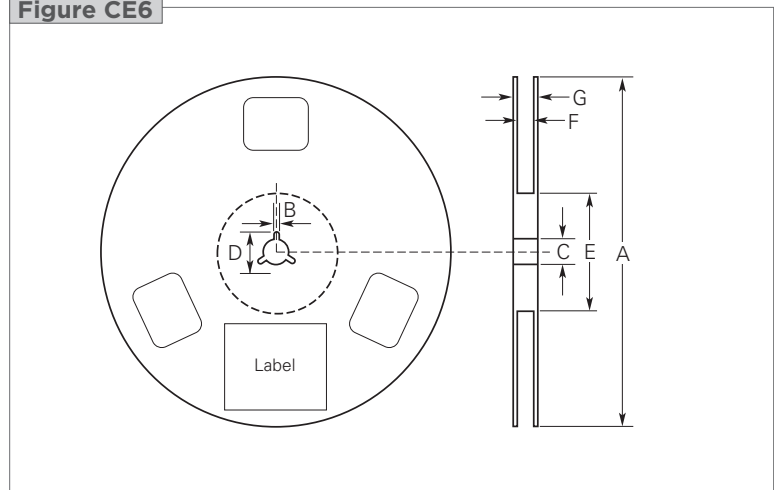


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### Table CE6 Reel Specifications for ChipSESD Devices

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

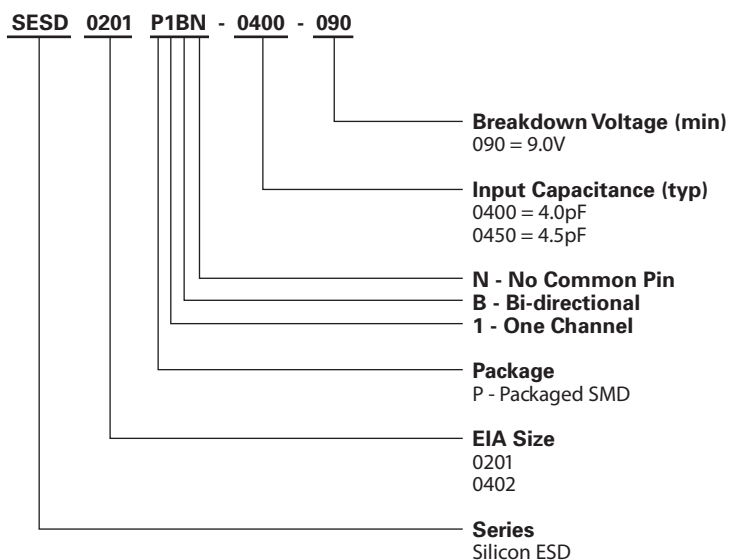
Figure CE6



## Definition of Terms for ChipSESD Devices

$I_L$	Reverse Leakage Current @ $V_{RWM}$
$V_{RWM}$	Working Peak Reverse Voltage
$V_{br}$	Breakdown Voltage @ $I_T$
$I_T$	Test Current
$V_{CL}$	Clamping Voltage

## Part Numbering System for ChipSESD Devices



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