

Single Channel Silicon ESD Protector Overvoltage Protection Device

DOCUMENT: SCD28184
REV LETTER: B
REV DATE: FEBRUARY 6, 2012
PAGE NO.: PAGE 1 of 6

308 Constitution Drive
Menlo Park, CA 94025-1164
www.circuitprotection.com

Specification Status: RELEASED

BENEFITS

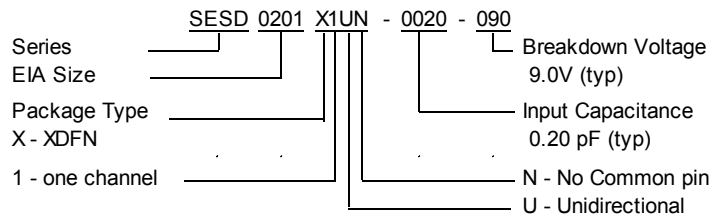
- Industry-leading lowest capacitance; provides lowest insertion loss for high speed data signals
- Small size ESD protection diodes for high speed data signals (0201 size devices)
- Helps protect electronic circuits against damage from Electrostatic Discharge (ESD), surge and cable discharge events
- Assists equipment to pass IEC61000-4-2, level 4 testing



FEATURES

- Low capacitance: 0.20 pF (200fF) (typ)
- Low leakage current: 25nA @ 5V (typ)
- Low clamping voltage: +9.20 / -0.80V (typ) @ (tp=8x20µs, Ipp=2A)
- ESD maximum rating per IEC61000-4-2 standard:
 - 20kV contact discharge
 - 20kV air discharge
- Surge : 2A (max) @ (tp=8x20µs) per IEC61000-4-5
- Small size and low profile: XDFN packages

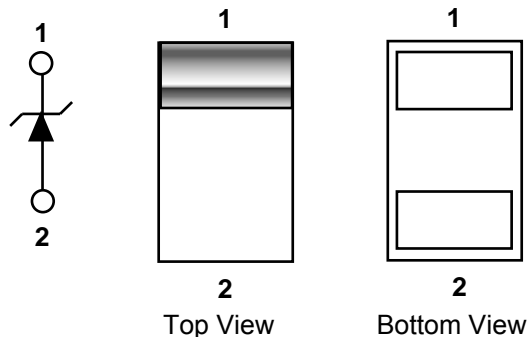
PART NUMBERING



APPLICATIONS

- Consumer, mobile and portable electronics
- Tablet PC and external storage with high speed interfaces
- Ultra-high speed data lines
- USB 3.0/2.0, HDMI 1.3/1.4, DisplayPort, Thunderbolt (Light Peak), V-by-One HS, and LVDS interfaces
- Applications requiring high ESD performance in small packages

SCHEMATIC AND PIN CONFIGURATION



MATERIALS INFORMATION

RoHS Compliant ELV Compliant Halogen Free * Lead Free



* Halogen Free refers to: Br≤900ppm, Cl≤900ppm, Br+Cl≤1500ppm
SESD devices meet MSL-1 Requirements
DFN case epoxy meets UL 94 V-0

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DEVICE MAXIMUM RATING

ESD Withstand ⁽¹⁾ (IEC 61000-4-2, level 4)		Temperature		Peak Current (tp=8x20µs)
Contact (kV)	Air (kV)	Operating (°C)	Storage (°C)	Ipp (A)
20	20	-55 to +125	-55 to +150	2.0

⁽¹⁾ 20kV @ 1 pulse; 10kV @ 100 pulses; 8kV @ 1,000 pulses (under IEC6100-4-2)

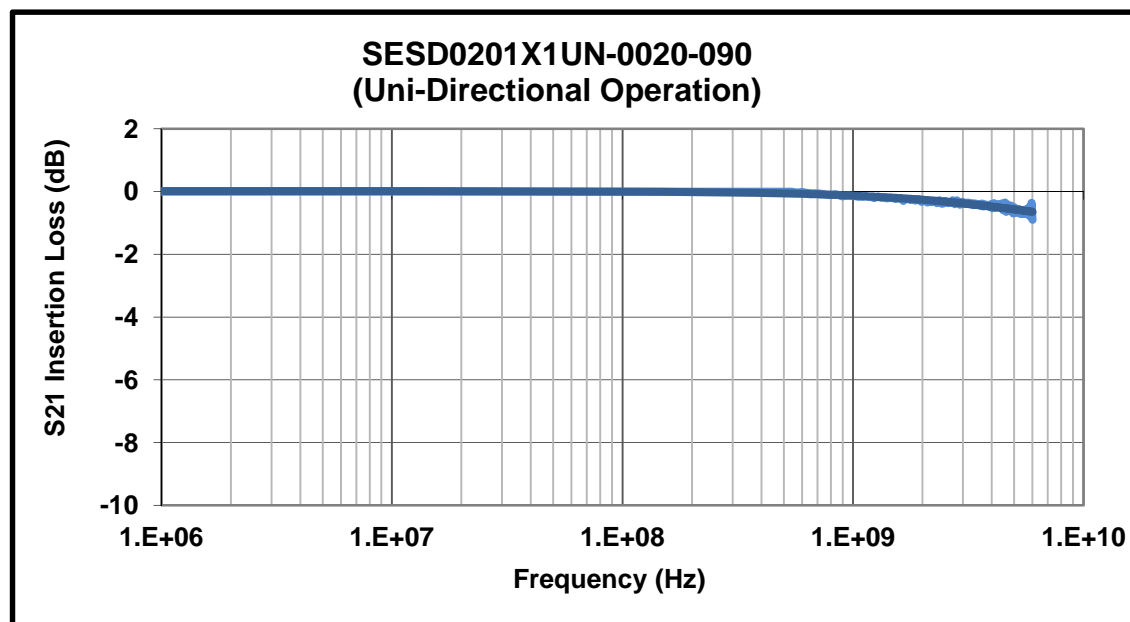
- Device maximum rating @ T = 25°C, unless otherwise specified
- Caution: Stress exceeding Device Maximum Ratings may damage the device
Prolonged exposure to stresses above the recommended operating conditions may affect device reliability

DEVICE ELECTRICAL CHARACTERISTICS

Input Capacitance @ V _R = 0V, f = 3GHz, I/O to GND (pF)		Breakdown Voltage V _{BR} @ I _T =1mA (V)	Reverse Working Voltage (V)		Reverse Leakage Current I _L @ V _{RWM} =5.0V (nA)		Clamping Voltage V _{CL} @ Ipp=2.0A (V)
Typ	Maximum	Typ	Min	Max	Typ	Max	Typ
0.20	0.22	+9.00 / -0.80	0	+8.00	25.0	50.0	+9.20 / -0.80

- All device electrical characteristics @ T = 25°C, unless otherwise specified

FIGURE 1. INSERTION LOSS DIAGRAM



Application	Bit Rate (Gbps)	@Freq (GHz)	Ins. Loss (dB)
HDMI 1.4 (1080P)	2.25	1.13	-0.15
DisplayPort	2.70	1.35	-0.20
HDMI 1.4 (4K / QuadHD)*	3.40	1.70	-0.23
USB3.0	5.00	2.50	-0.29
eSATA	6.00	3.00	-0.35
Thunderbolt	10.0	5.00	-0.50

*HDMI 4K / QuadHD resolutions (4096 x 2160) ready

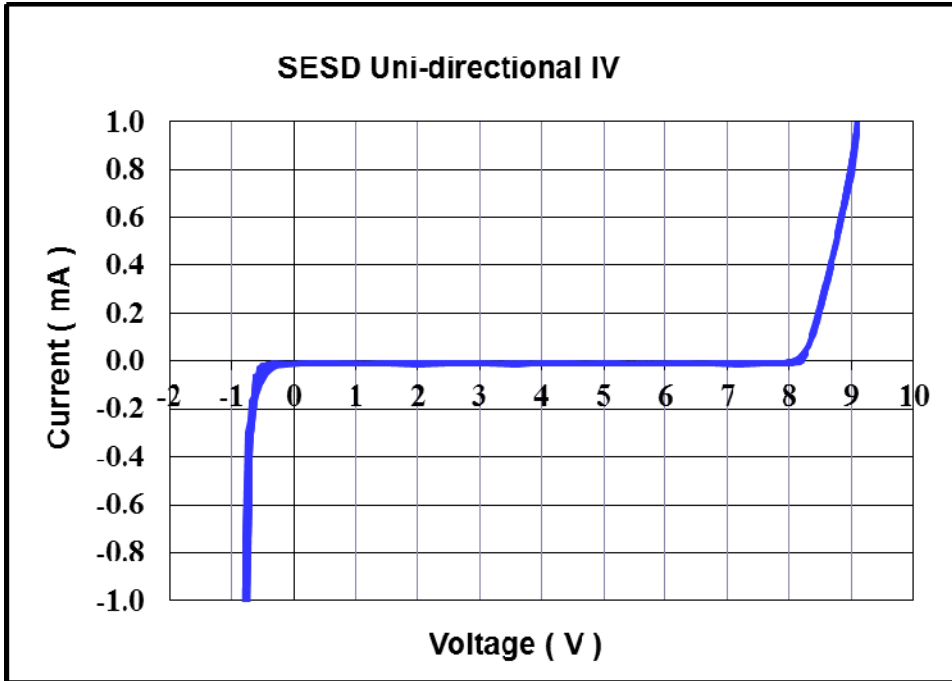
**Single Channel
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PRODUCT: SESD0201X1UN-0020-090

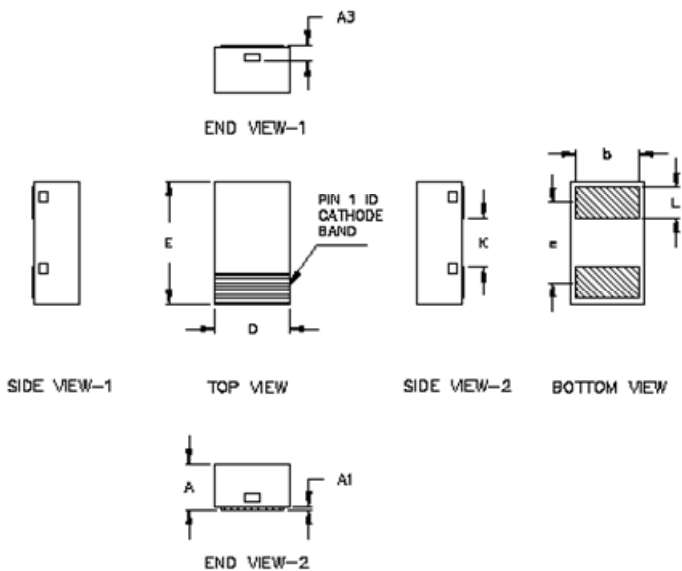
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REV LETTER: B
REV DATE: FEBRUARY 6, 2012
PAGE NO.: PAGE 3 of 6

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FIGURE 2. DEVICE IV CURVE



DEVICE DIMENSIONS



Dim	SESD0201X1BN-0010-098			SESD0201X1UN-0020-090		
	Millimeters (mm)			Inches (in)		
Dim	Min	Nom	Max	Min	Nom	Max
A	0.30	0.31	0.32	0.012	0.012	0.013
A1	0	-	0.05	0	-	0.002
A3	0.10 ref.			0.004 ref.		
D	0.29	0.32	0.36	0.011	0.012	0.014
E	0.59	0.62	0.66	0.023	0.024	0.024
K	0.13	0.16	0.18	0.005	0.006	0.007
b	0.24	0.26	0.29	0.008	0.010	0.011
L	0.18	0.20	0.23	0.007	0.008	0.009
e	0.356 BSC			0.014 BSC		

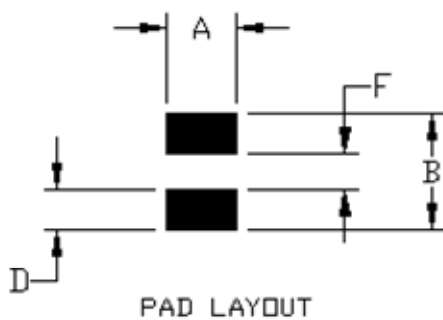
BSC – Basic Spacing between Centers

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PAGE NO.: PAGE 4 of 6

308 Constitution Drive
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RECOMMENDED LANDING PATTERN:

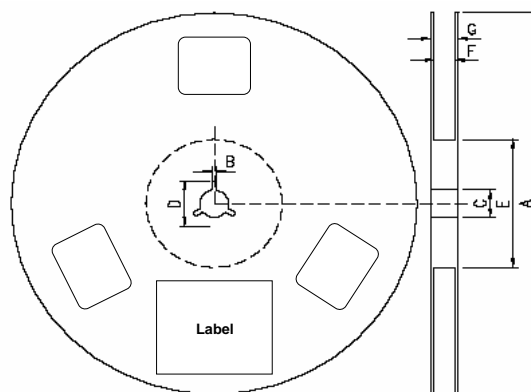


SESD Landing Pad Layout 0201 Package		
Symbol	Milimeters (mm)	Inches (in)
A	0.32	0.013
B	0.62	0.024
D	0.24	0.009
F	0.14	0.006

PACKAGING

Packaging	Tape & Reel	Standard Box
SESD0201X1UN-0020-090	15,000	75,000

REEL DIMENSIONS



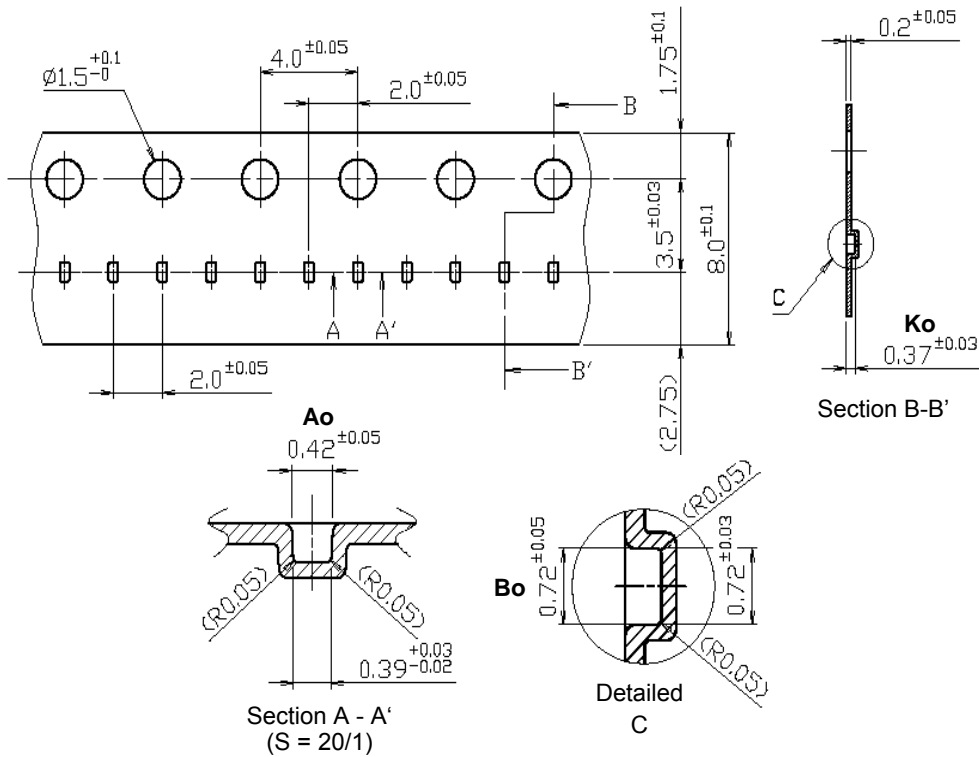
Dimensions	A	B	C	D	E	F	G
(mm)	180.0 ± 1.5	23.0 ± 0.2	13.0 + 0.5 / -0.2	17.3 ± 0.2	60.5 ± 1.5	8.4 +1.5/-0.0	14.4 (max)

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CARRIER TAPE DIMENSIONS



Ao	0.42 ± 0.05
Bo	0.72 ± 0.05
Ko	0.37 ± 0.05

Note 1. All dimensions in mm
Note 2. Cumulative tolerance is $200 \pm 0.3 / 50\text{MM}$ pitch
Note 3. Center point of hole tolerance is 2.0 ± 0.5
Note 4. Center point of hole tolerance is 3.5 ± 0.5

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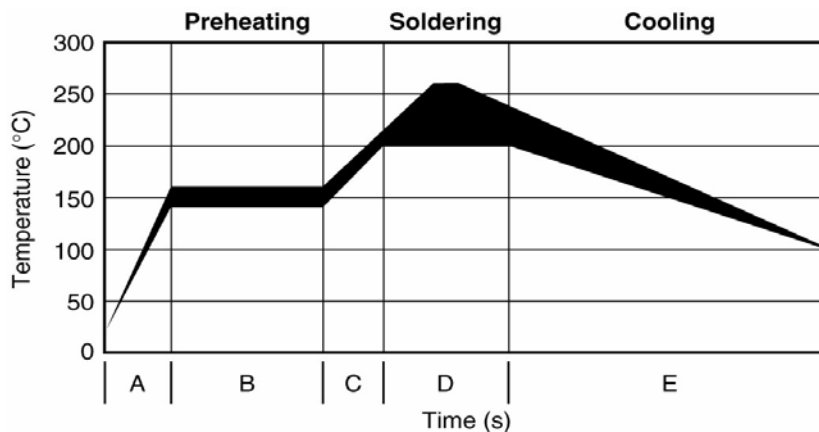
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SOLDER REFLOW RECOMMENDATION

A	Temperature ramp up 1	From ambient to Preheating temperature	30s to 60s
B	Preheating	140°C - 160°C	60s to 120s
C	Temperature ramp up 2	From Preheating to Main heating temperature	20s to 40s
D	Main heating	at 200°C at 220°C at 240°C at 260°C	60s ~ 70s 50s ~ 60s 30s ~ 40s 5s ~ 10s
E	Cooling	From main heating temperature to 100°C	4°C/s (max)

FIGURE 3. REFLOW PROFILE



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