

Single Channel Silicon ESD Protector Overvoltage Protection Device

DOCUMENT: SCD28657
REV LETTER: B
REV DATE: MARCH 17, 2014
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308 Constitution Drive
Menlo Park, CA USA
www.circuitprotection.com

Specification Status: RELEASED

BENEFITS

- Low capacitance; provides low insertion loss for high speed data signals
- Small size ESD protection diodes for high speed data signals (0402 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: 0.15 pF (typ)
- Low leakage current: 25nA @ 5V (typ)
- Low clamping voltage: +14.0 (typ) @ (tp=8x20µs, Ipp=2.5A)
- ESD maximum rating per IEC61000-4-2 standard:
 - ±22kV contact discharge
 - ±22kV air discharge
- Surge: 2.5A (max) @ (tp=8x20µs) per IEC61000-4-5
- Small size and low profile: XDFN packages
- Bi-directional operation

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, V-by-One HS, and LVDS interfaces
- Applications requiring high ESD performance in small packages

MATERIALS INFORMATION

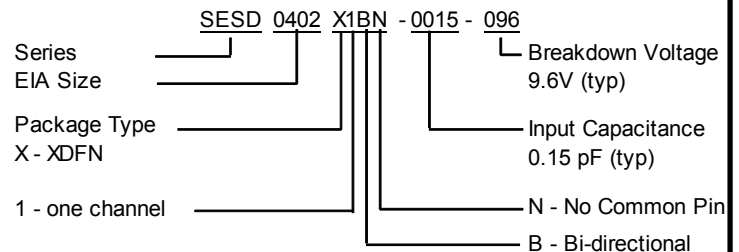
RoHS Compliant
ELV Compliant
Halogen Free * Lead Free

Directive 2000/53/EC Compliant
Directive 2002/95/EC Compliant
HF
Pb

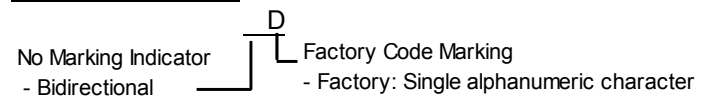
* Halogen Free refers to: Br≤900ppm, Cl≤900ppm, Br+Cl≤1500ppm
SESD devices meet MSL-1 Requirements
DFN case epoxy meets UL 94 V-0



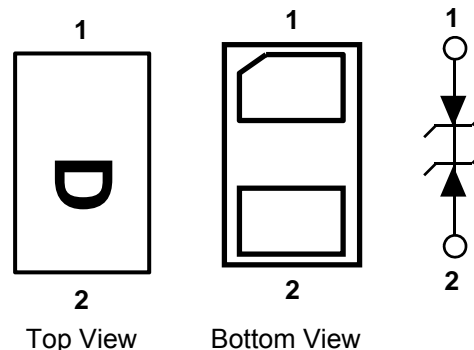
PART NUMBERING



PART MARKING



PIN CONFIGURATION AND SCHEMATIC



* Drawing not to scale

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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)
± 22	± 22	-55 to +125	-55 to +150	2.5

⁽¹⁾ 22kV @10 pulses; 20kV @ 100 pulses; 8kV @ 1,000 pulses (under IEC6100-4-2)

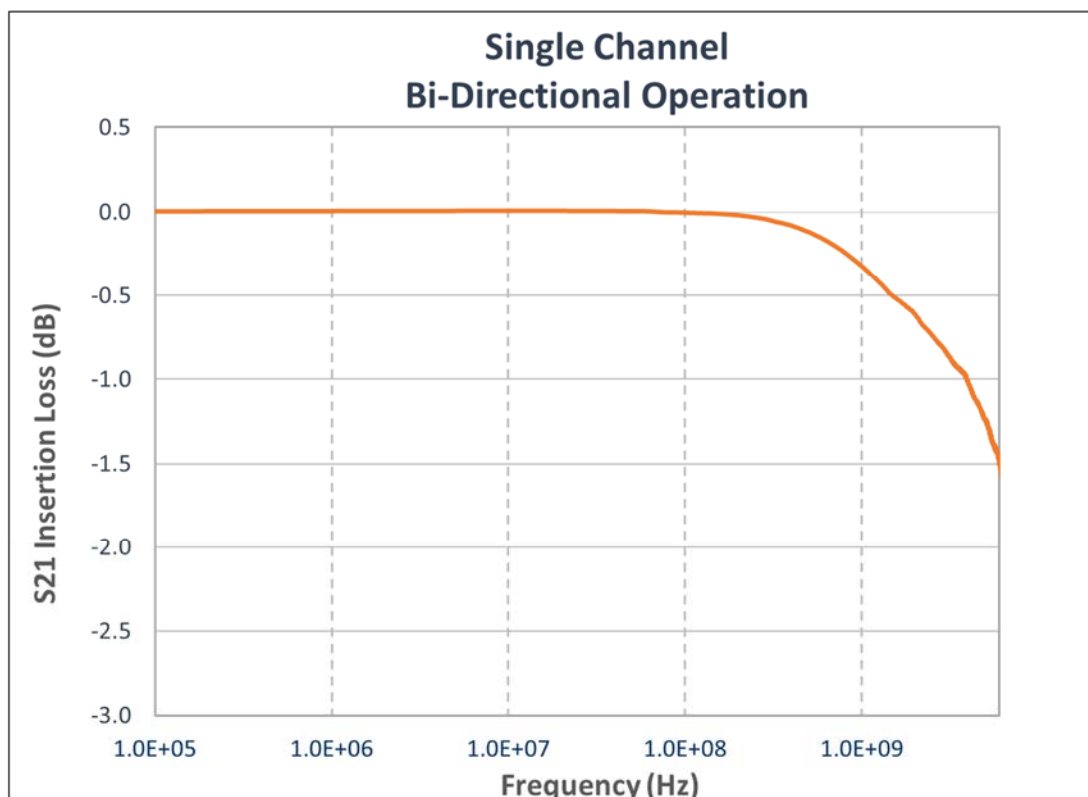
- Device maximum rating @ T = 25°C, unless otherwise specified
- Caution: Stress exceeding Device Maximum Ratings may damage the device
Prolonged exposure to stresses above the recommended operating conditions may affect device reliability

DEVICE ELECTRICAL CHARACTERISTICS

Input Capacitance @ V _R = 0V, f = 3GHz (pF)	Breakdown Voltage (V) V _{BR} @ I _T =1mA (V)	Reverse Working Voltage (V)	Reverse Leakage Current (A) I _L @ V _{RWM} =5.0V (nA)	Clamping Voltage V _{CL} @ Ipp=2.5A (V)
Typ	Typ	Typ	Typ	Typ
0.15	+9.60 / -9.60	7.00	25.0	+14.0

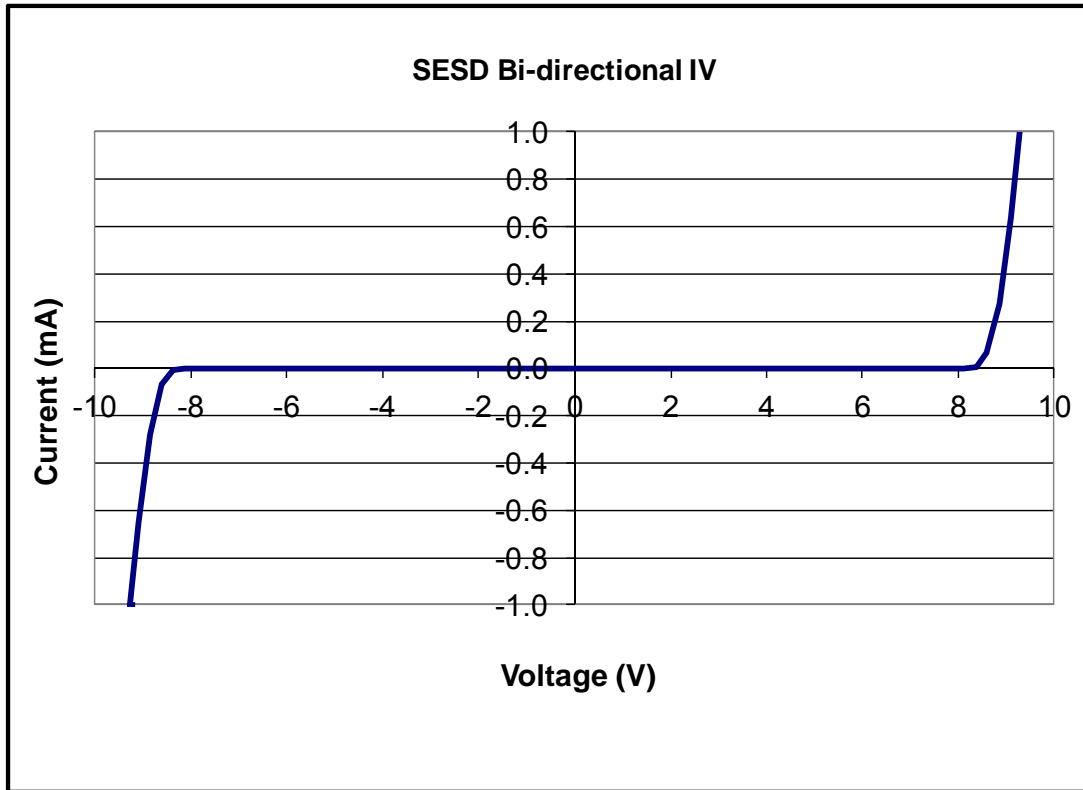
- All device electrical characteristics @ T = 25°C, unless otherwise specified

FIGURE 1. INSERTION LOSS DIAGRAM

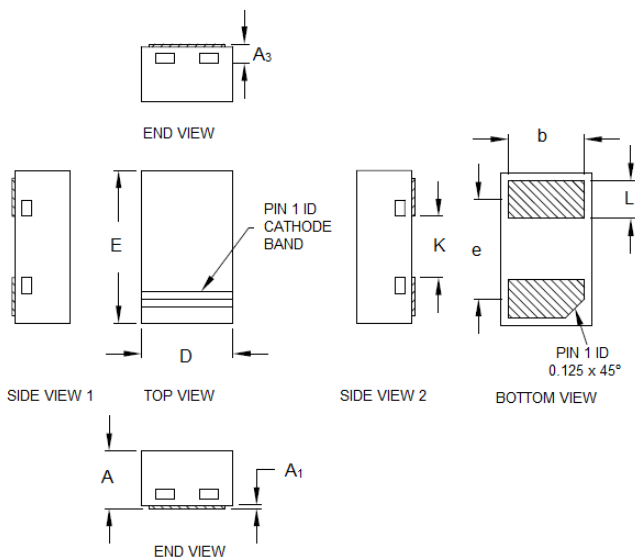


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FIGURE 2. DEVICE IV CURVE



DEVICE DIMENSIONS



Dim	SESD0402					
	Millimeters (mm)			Inches (in)		
	Min	Nom	Max	Min	Nom	Max
A	0.33	0.38	0.43	0.013	0.015	0.017
A ₁	0	-	0.05	0	-	0.002
A ₃	0.13 ref.			0.005 ref.		
D	0.55	0.60	0.65	0.022	0.024	0.026
E	0.95	1.00	1.05	0.037	0.039	0.041
K	0.35	0.40	0.45	0.014	0.016	0.018
b	0.45	0.50	0.55	0.018	0.020	0.022
L	0.20	0.25	0.30	0.008	0.010	0.012
e	0.65 BSC			0.026 BSC		

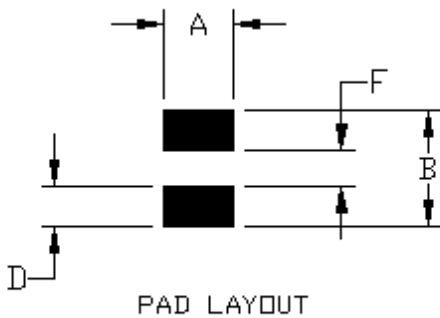
BSC – Basic Spacing between Centers

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RECOMMENDED LANDING PATTERN:

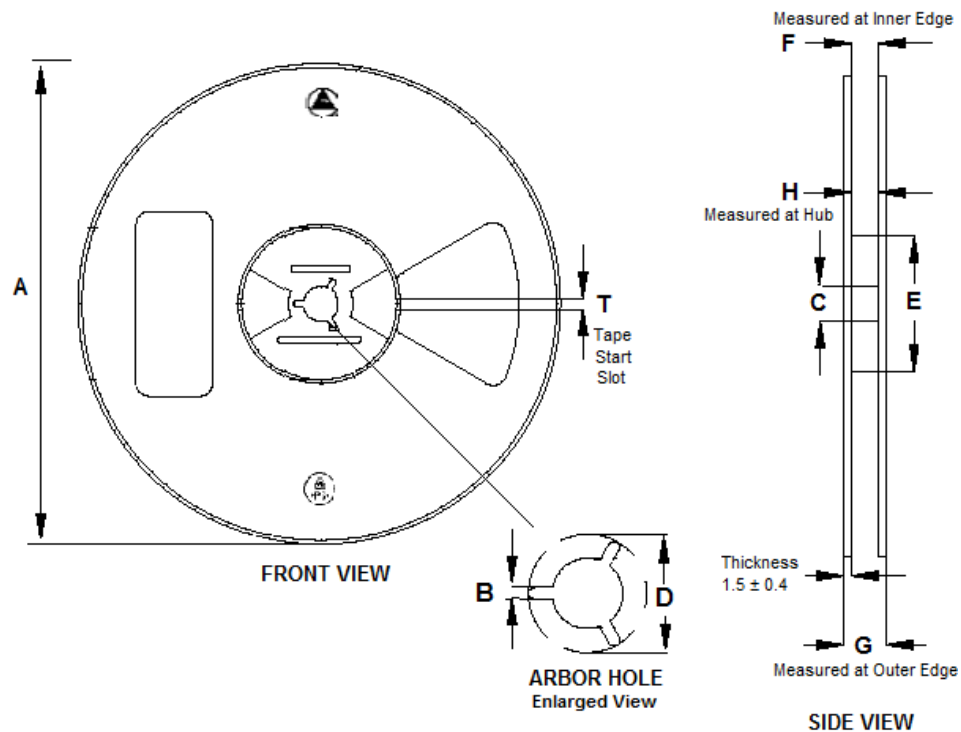


SESD Landing Pad Layout 0402 Package		
Symbol	Milimeters (mm)	Inches (in)
A	0.60	0.024
B	1.00	0.039
D	0.35	0.014
F	0.30	0.012

PACKAGING

Packaging	Tape & Reel	Standard Box
SESD0402X1BN-0015-096	10,000	50,000

REEL DIMENSIONS



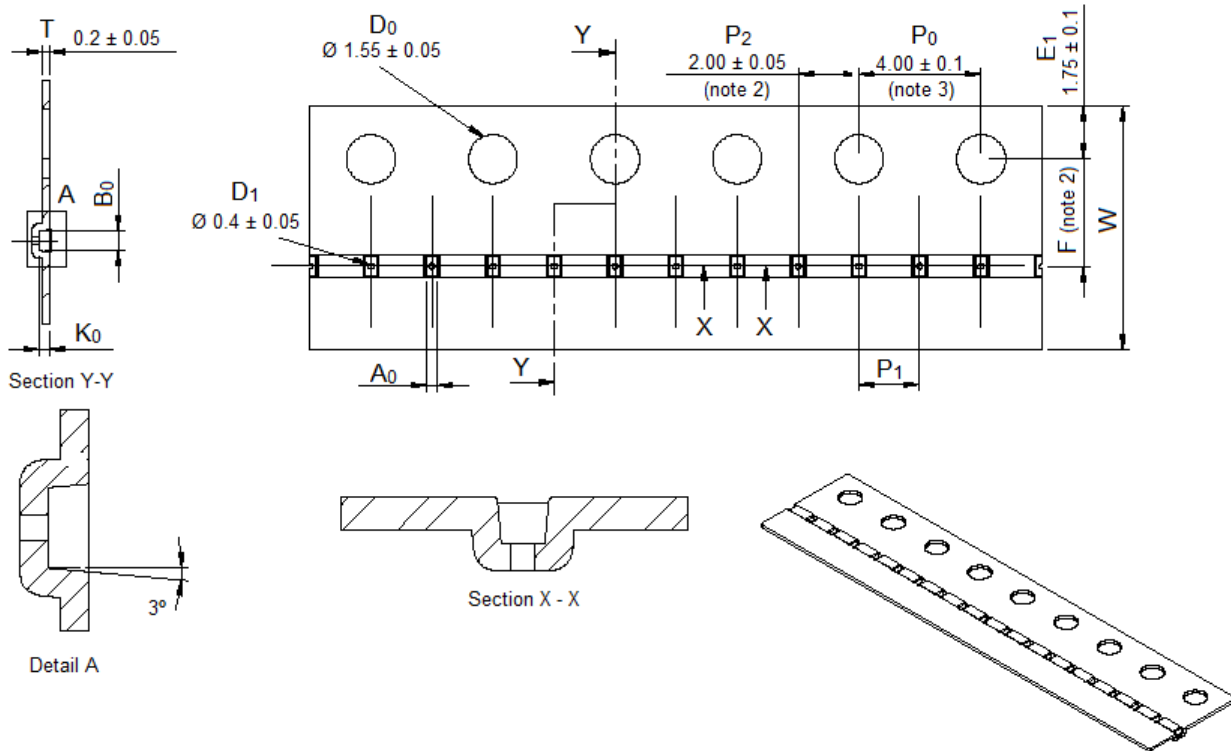
Dimensions	A	B	C	D	E	F	G	H
(mm)	180 ± 2.00	1.50 (min)	13.10 ± 0.20	20.20 (min)	60 ± 1.00	8.75 ± 1.00	11.6 ± 1.00	9.4 (max)

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CARRIER TAPE DIMENSIONS



A_0	0.70 ± 0.05
B_0	1.15 ± 0.05
K_0	0.47 ± 0.05
F	3.50 ± 0.05
P_1	2.00 ± 0.10
W	8.00 ± 0.10

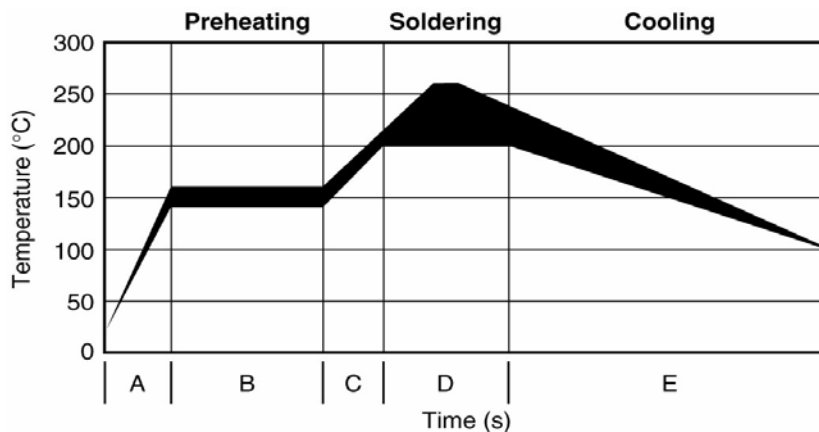
Note 1. All dimensions in mm
Note 2. Measured from centerline of pocket to centerline of sprocket hole
Note 3. Cumulative tolerance of 20 sprocket holes is ± 0.20
Note 4. Tolerances unless noted ± 0.20

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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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