308 Constitution Drive
Menlo Park, CA USA
www.circuitprotection.com

Single Channel
Silicon ESD Protector
Overvoltage Protection Device

PRODUCT: SESD0402X1UN-0030-088

DOCUMENT: SCD28656
REV LETTER: B
REV DATE: MARCH 17, 2014
PAGE NO.: 1 OF 6

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: 0.30 pF (typ)
- Low leakage current : 25nA @ 5V (typ)
- Low clamping voltage: +13.0V(typ)
  @ (tp=8x20µs, Ipp=2.5A)
- ESD maximum rating per IEC61000-4-2 standard:
  - ±22kV contact discharge
  - ±22kV air discharge
- Low clamping voltage under 8kV ESD event, 20V typ @ 30ns
- Surge: 2.5A (max) @ (tp=8x20µs) per IEC61000-4-5
- Small size and low profile: XDFN packages

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

SESD 0402 X1UN - 0030 - 088

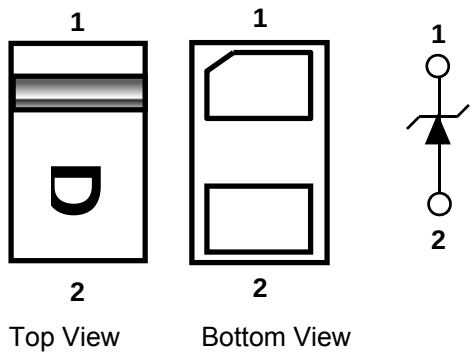
- SESD — Series
- 0402 — EIA Size
- X1UN — Package Type: X - XDFN; 1 - one channel; N - No Common pin; U - Uni-directional
- 0030 — Input Capacitance: 0.30 pF (typ)
- 088 — Breakdown Voltage: 8.8V (typ)

PART MARKING

D — Factory Code Marking
- Factory: Single alphanumeric character

Cathode Band
- Unidirectional

PIN CONFIGURATION AND SCHEMATIC



Top View Bottom View

* 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 = 25ºC, 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
0.30	+8.80 / -0.80	7.00	25.0	+13.0

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

FIGURE 1. INSERTION LOSS DIAGRAM

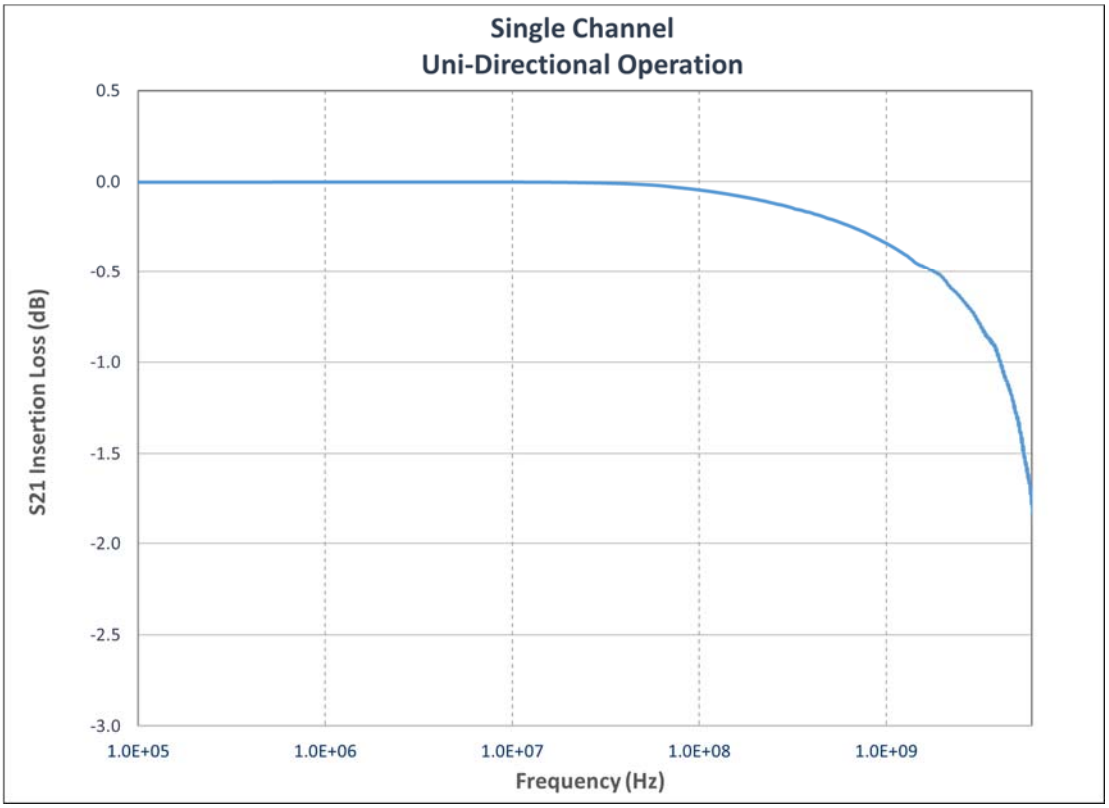

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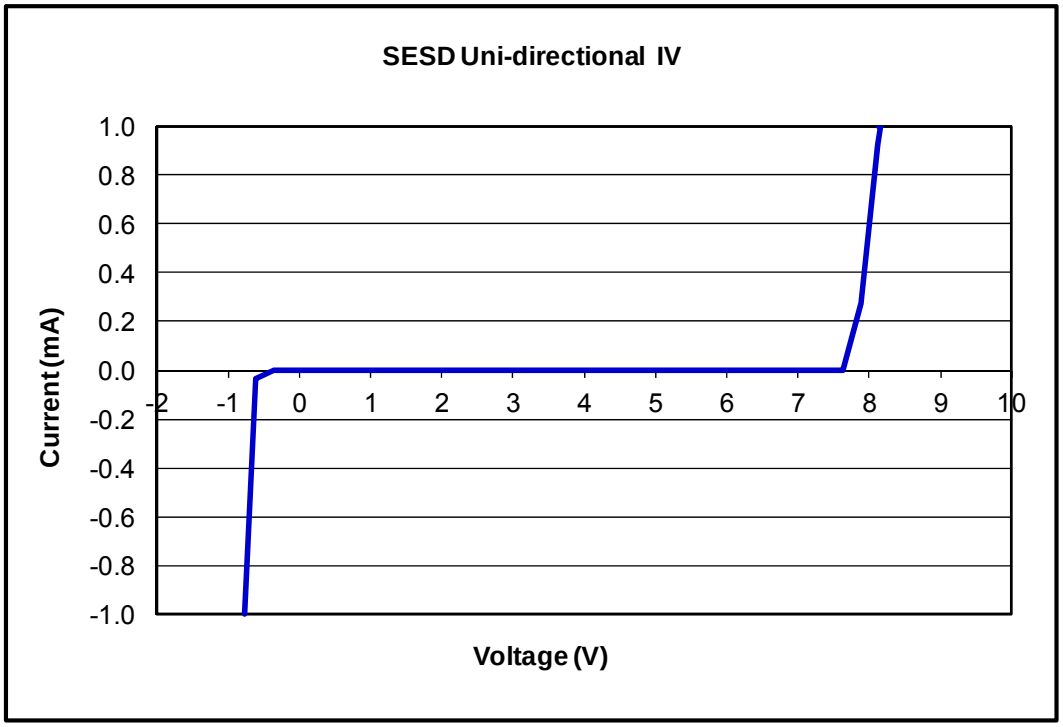
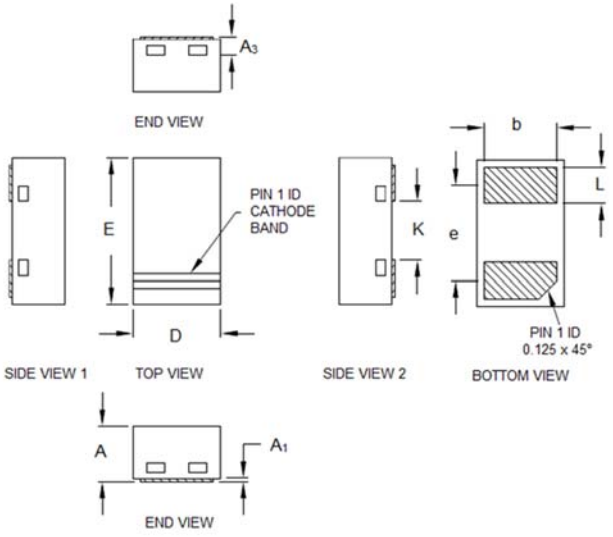
FIGURE 2. DEVICE IV CURVE



DEVICE DIMENSIONS



	SESD0402					
	Milmeters (mm)			Inches (in)		
Dim	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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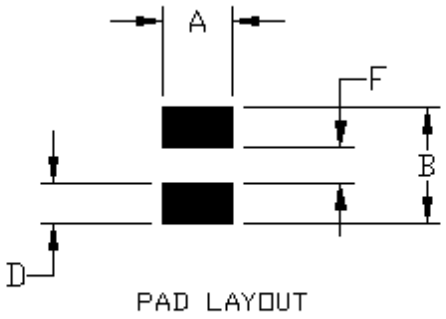
RECOMMENDED LANDING PATTERN:

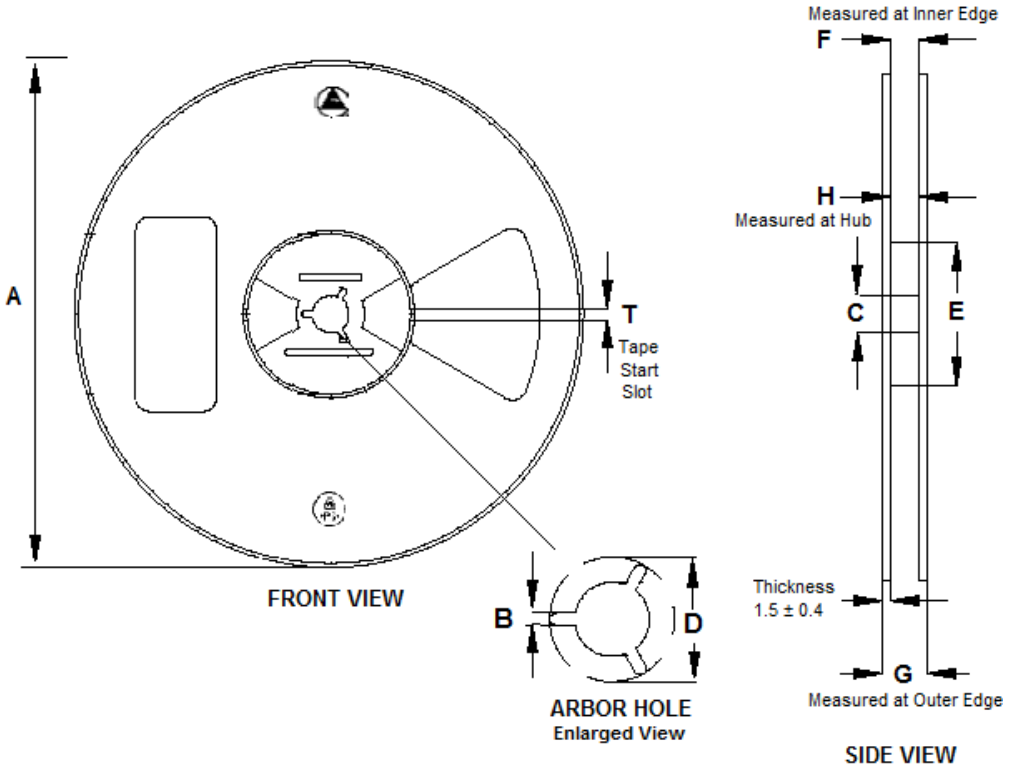


SESD Landing Pad Layout 0402 Package		
Symbol	**Milimeters (mm)**	**Inches (in)**
A	0.60	0.024
B	1.00	0.039
D	0.35	0.014
F	0.30	0.012

PACKAGING

Packaging	Tape & Reel	Standard Box
SESD0402X1UN-0030-088	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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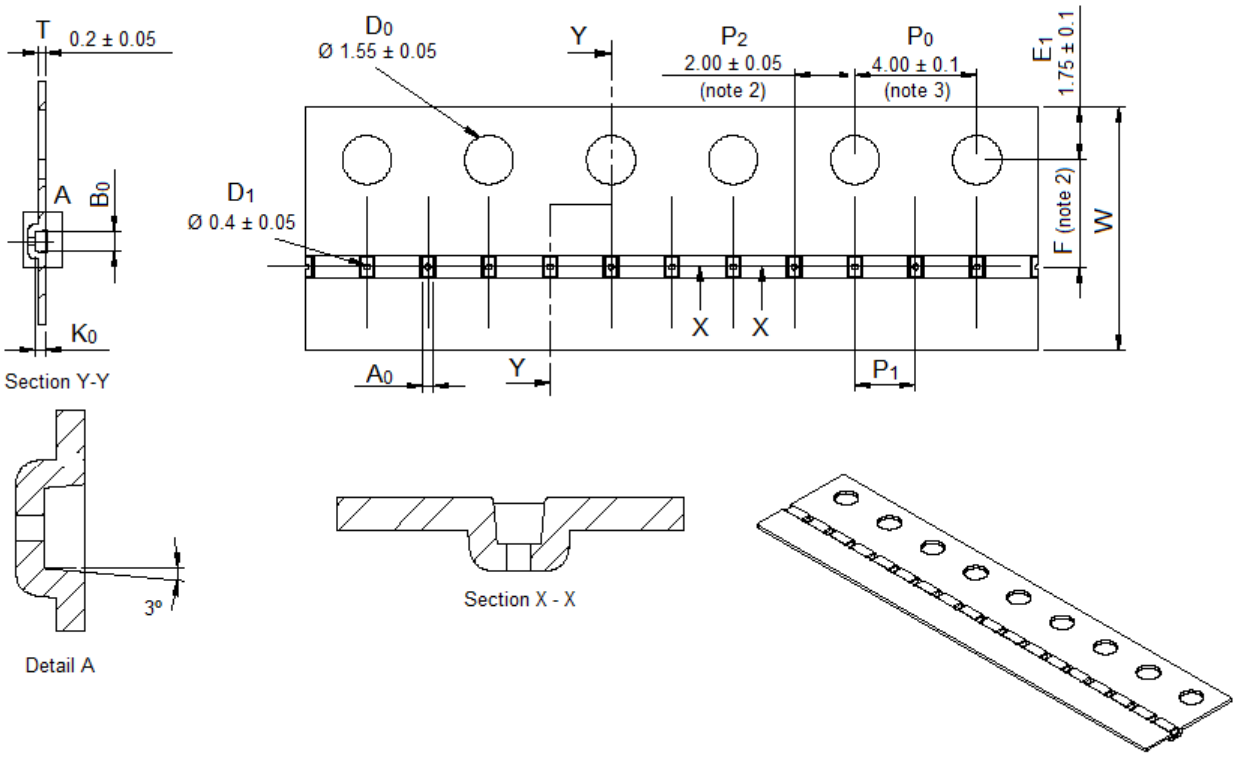
CARRIER TAPE DIMENSIONS



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