

Multi-Channel Silicon ESD Protector Overvoltage Protection Device

PRODUCT: SESD1004Q4UG-0020-090

DOCUMENT: SCD28424
REV LETTER: A
REV DATE: NOVEMBER 6, 2012
PAGE NO.: PAGE 1 OF 6

Specification Status: RELEASED

BENEFITS

- Industry-leading lowest capacitance; provides lowest insertion loss for high speed data signals
- Industry's smallest footprint and lowest profile multi-channel ESD array helps to optimize board space
- Flow-through and single connection design helps routing PCB matched impedance high speed data lines
- 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 / -0.8V (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 array package 0.38mm height (typ)

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 DFN packages

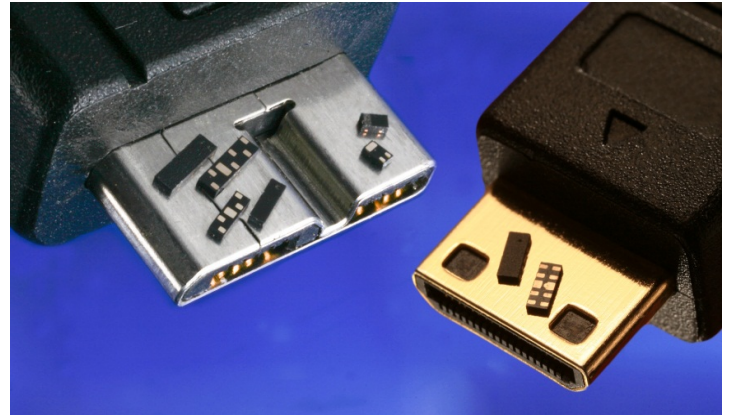
AEC-Q101 QUALIFIED

MATERIALS INFORMATION

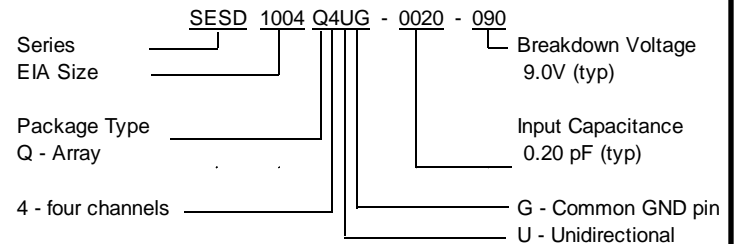
RoHS Compliant ELV Compliant Halogen Free * Lead Free

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

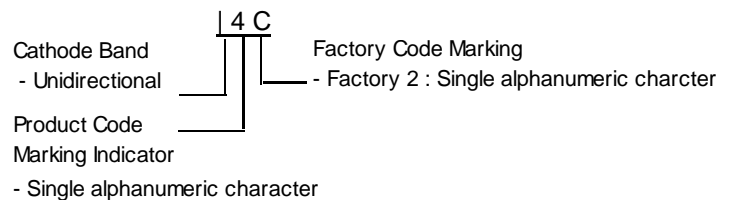
* Halogen Free refers to: Br≤900ppm, Cl≤900ppm, Br+Cl≤1500ppm
SESD devices meet MSL-1 Requirements
DFN case epoxy meets UL 94 V-0



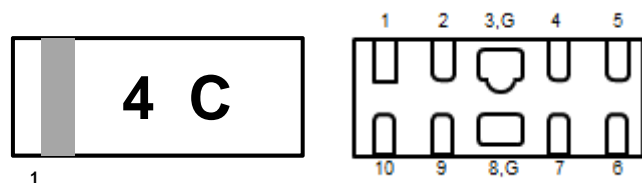
PART NUMBERING



PART MARKING

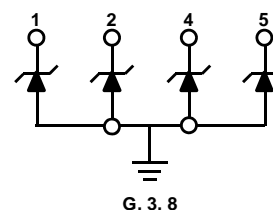


PIN CONFIGURATION AND SCHEMATIC



Top View

Bottom View



* Drawing not to scale

Multi-Channel Silicon ESD Protector Overvoltage Protection Device

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)	I _{pp} (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)

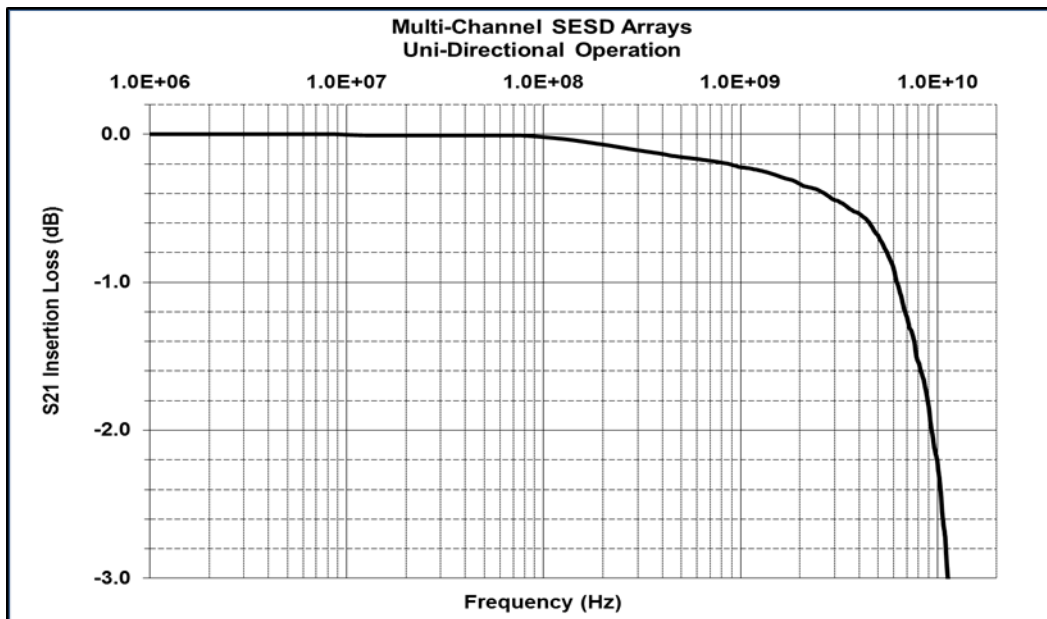
- Maximum leakage current post 15kV & 20kV pulses is less than 1 μA
- Device maximum rating @ T = 25°C, unless otherwise specified
- Caution: Stress exceeding Device Maximum Ratings may damage the device
Prolonged exposure to stresses above the Recommended Operating Conditions may affect device reliability

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} @ I _{pp} =2.0A (V)
Typ	Maximum	Typ	Min	Max	Typ	Max	Typ
0.20	0.25	+9.00 / -0.80	0	+7.00	25.0	50.0	+9.20 / -0.80

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

FIGURE 1. INSERTION LOSS DIAGRAM

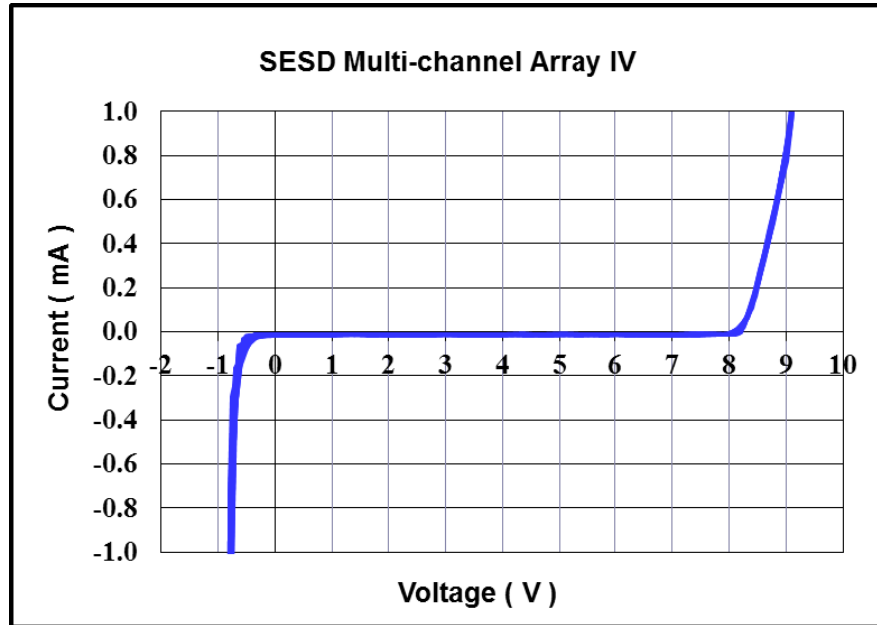


Application	Bit Rate (Gbps)	@Freq (GHz)	Ins. Loss (dB)
HDMI 1.4 (1080P)	2.25	1.13	-0.23
DisplayPort	2.70	1.35	-0.26
HDMI 1.4 (4K / QuadHD)*	3.40	1.70	-0.30
USB3.0	5.00	2.50	-0.38
eSATA	6.00	3.00	-0.44
Thunderbolt	10.0	5.00	-0.69

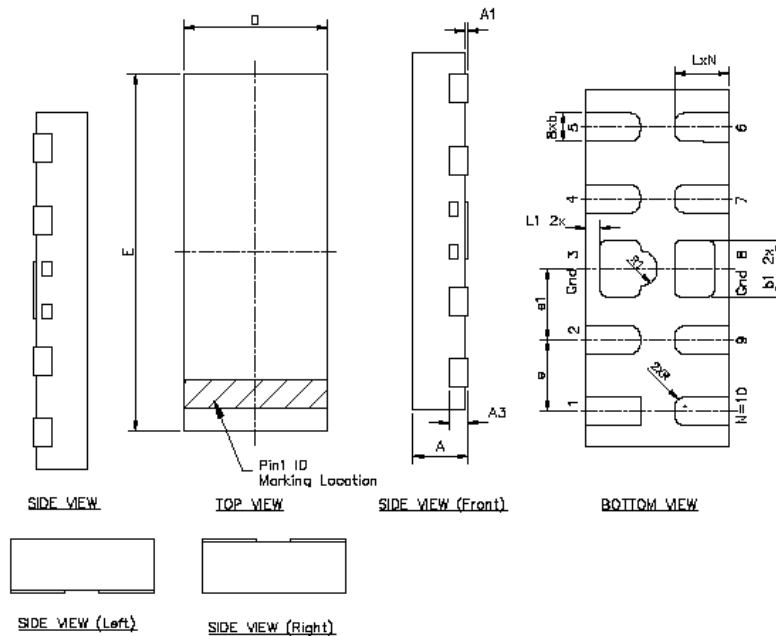
*HDMI 4K / QuadHD resolutions (4096 x 2160) ready

**Multi-Channel
Silicon ESD Protector
Overvoltage Protection Device**

FIGURE 2. DEVICE IV CURVE



DEVICE DIMENSIONS



SESD1004Q4UG-0020-090						
Dim	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A	0.33	0.38	0.43	0.013	0.015	0.017
A1	0.00	--	0.05	0	--	0.002
A3	0.10 ref.			0.004 ref.		
D	0.90	1.00	1.10	0.035	0.039	0.043
E	2.40	2.50	2.60	0.094	0.098	0.102
b	0.15	0.20	0.25	0.006	0.008	0.010
b1	0.35	0.40	0.45	0.014	0.016	0.018
L	0.30	0.38	0.43	0.012	0.015	0.017
L1	0.00	0.10	0.15	0.000	0.004	0.006
e	0.50 BSC			0.020 BSC		
e1	0.50 BSC			0.020 BSC		
N	10			10		
R	0.08 BSC			0.003 BSC		
R1	0.13 BSC			0.005 BSC		

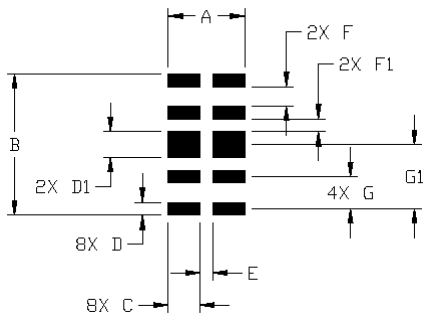
BSC – Basic Spacing between Centers

Multi-Channel Silicon ESD Protector Overvoltage Protection Device

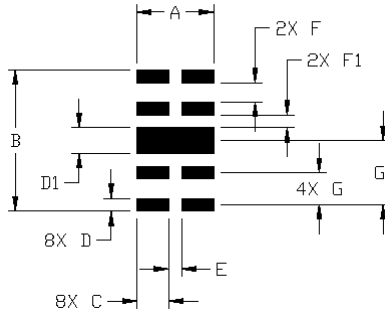
PRODUCT: SESD1004Q4UG-0020-090

DOCUMENT: SCD28424
REV LETTER: A
REV DATE: NOVEMBER 6, 2012
PAGE NO.: PAGE 4 OF 6

RECOMMENDED LANDING PATTERN:



Recommended



Alternate

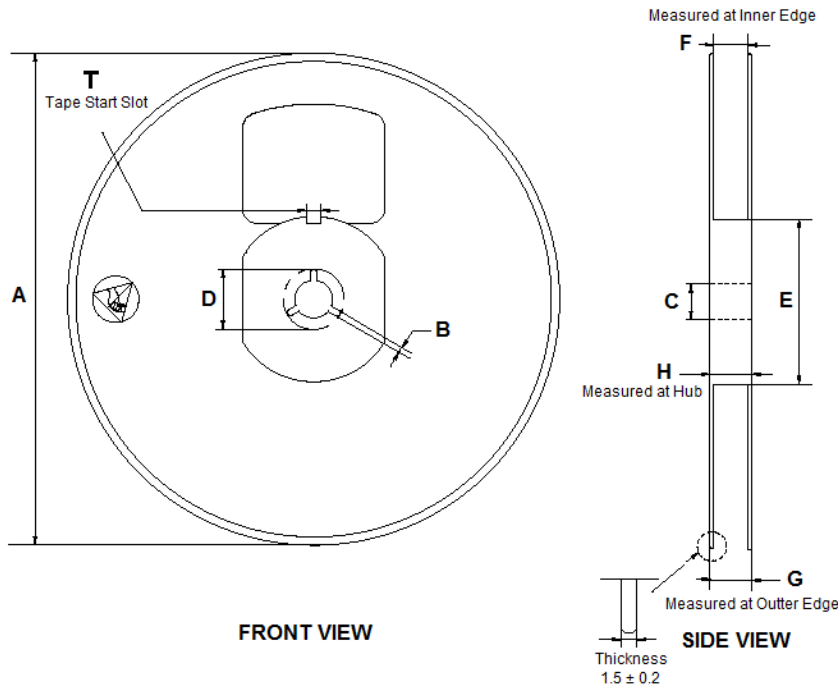
SESD Landing Pad Layout 10 Pin 4-ch Standard FT Array		
Symbol	Millimeters	Inches
A	1.20	0.047
B	2.20	0.087
C	0.50	0.020
D	0.20	0.008
D1	0.40	0.016
E	0.20	0.008
F	0.30	0.012
F1	0.20	0.008
G	0.50 BSC	0.020 BSC
G1	1.00 BSC	0.039 BSC

BSC – Basic Spacing between Centers

PACKAGING

Packaging	Tape & Reel	Standard Box
SESD1004Q4UG-0020-090	5,000	25,000

REEL DIMENSIONS



FRONT VIEW

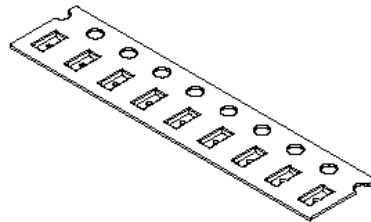
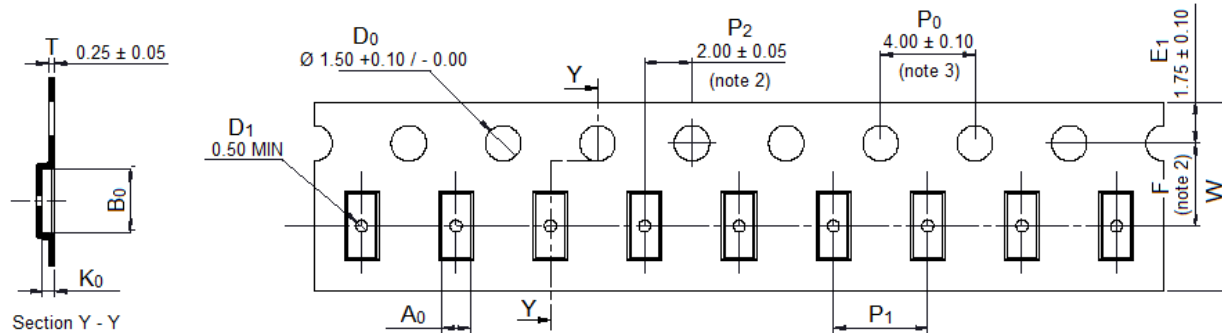
SIDE VIEW

Dimensions	A	B	C	D	E	F	G	H
(mm)	179 ± 1.00	1.50 (min)	13.0 ± 0.20	20.20 (min)	60 ± 0.50	9.2 +2.00 / -0.00	8.70 (min) 12.20 (max)	12.2 (max)

Multi-Channel Silicon ESD Protector Overvoltage Protection Device

DOCUMENT: SCD28424
REV LETTER: A
REV DATE: NOVEMBER 6, 2012
PAGE NO.: PAGE 5 OF 6

CARRIER TAPE DIMENSIONS



Ao	1.20 ± 0.05
Bo	2.70 ± 0.05
Ko	0.51 ± 0.05
F	3.50 ± 0.05
P1	4.00 ± 0.10
W	8.00 + 0.03 / -0.10

Note 1. All dimensions in mm

Note 2. 10 sprocket hole pitch cumulative tolerance ± 0.2

Note 3. Measured from centerline of pocket to centerline of sprocket hole

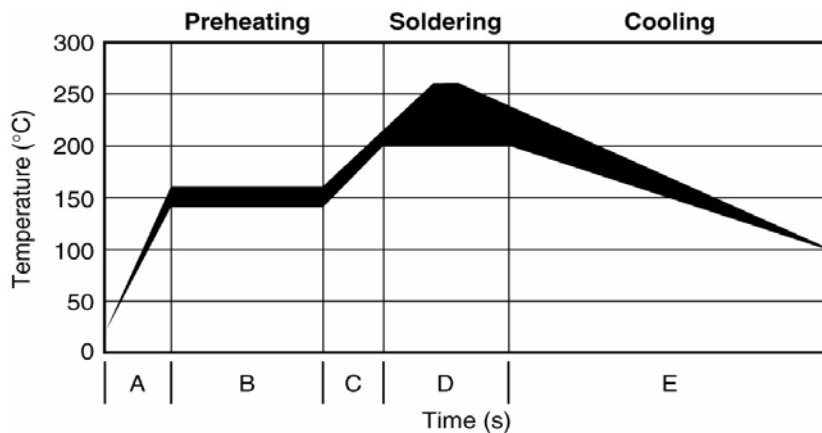
Note 4. Tolerances unless noted ± 0.20

Multi-Channel Silicon ESD Protector Overvoltage Protection Device

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



All information, including illustrations, is believed to be accurate and reliable. Users, however, should independently evaluate the suitability of and test each product selected for their application. Tyco Electronics Corporation and/or its Affiliates in the TE Connectivity Ltd. family of companies ("TE") makes no warranties as to the accuracy or completeness of the information, and disclaims any liability regarding its use. TE's only obligations are those in the TE Standard Terms and Conditions of Sale and in no case will TE be liable for any incidental, indirect, or consequential damages arising from the sale, resale, use, or misuse of its products. Specifications are subject to change without notice. In addition, TE reserves the right to make changes to materials or processing that do not affect compliance with any applicable specification without notification to Buyer. Without expressed written consent by an officer of TE, TE does not authorize the use of any of its products as components in nuclear facility applications, aerospace, or in critical life support devices or systems.

TE Connectivity, TE Connectivity (logo), and TE (logo) are trademarks.

Other logos, products and /or company names might be trademarks of their respective owners.