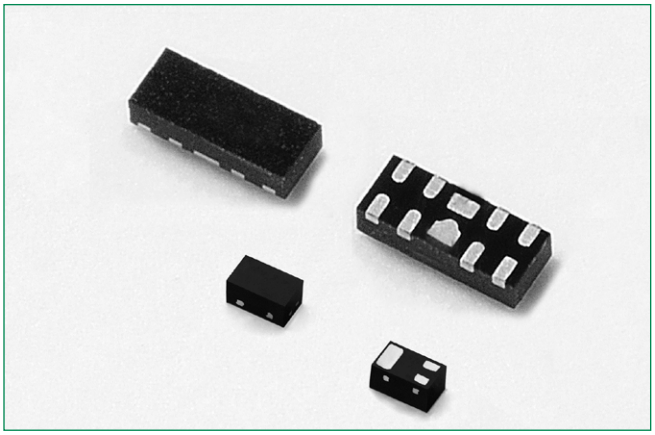
SESD Series Enhanced ESD Diode Arrays

AUTOMOTIVE GRADE · RoHS · Pb · GREEN · ELV

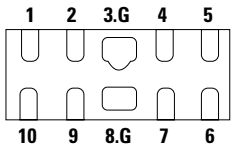


Description

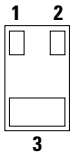
The SESD Series Enhanced ESD Diode Arrays provides higher order ESD protection in signal-integrity-preserving unidirectional arrays for the world's most challenging high speed serial interfaces. Compelling packaging options include the standard 2.5mmx1.0mm and the SOD-883. Standard packages minimize trace layout complexity, save significant PCB space, and improve reusability of the footprints. The nominal capacitance makes the devices applicable to the worlds' fastest consumer serial interfaces.

Pinout

1004 DFN array



0402 DFN array

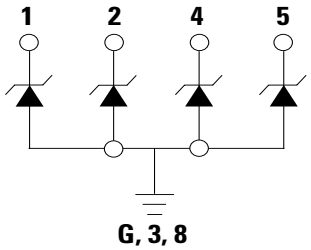


Bottom View

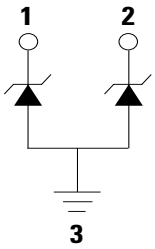
Features

- 0.30pF TYP capacitance
- ESD, IEC61000-4-2, ±22kV contact, ±22kV air
- Low clamping voltage of 13V @ I_{PP}=2.2A (t_P=8/20µs)
- Low profile 1004 and 0402 DFN array packages
- Facilitates the preservation of signal integrity
- ELV Compliant
- RoHS Compliant and Lead Free
- Moisture Sensitivity Level (MSL Level-1)
- AEC-Q101 qualified
- PPAP capable

Functional Block Diagram



1004 DFN array



0402 DFN array

Applications

- Ultra-high speed data lines
- USB 3.1, 3.0, 2.0
- HDMI 2.0, 1.4a, 1.3
- DisplayPort(TM)
- V-by-One®
- Thunderbolt
- Consumer, mobile and portable electronics
- Tablet PC and external storage with high speed interfaces
- Applications requiring high ESD performance in small packages

Additional Information

Datasheet | **Resources** | **Samples**

Revised: 10/22/19

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p=8/20µs)	2.2	A
T_{OP}	Operating Temperature	-55 to 125	°C
T_{STOR}	Storage Temperature	-55 to 150	°C

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

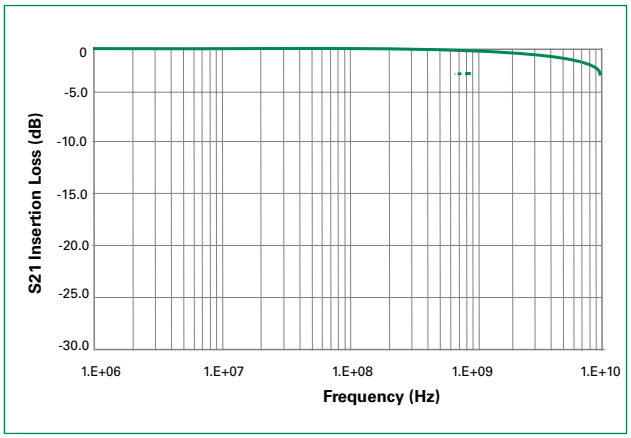
1004 DFN Array Electrical Characteristics - (T_{OP}=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Input Capacitance	$C_{I/O-GND}$	Reverse Bias=0V, f=3GHz		0.30		pF
Breakdown Voltage	V_{BR}	I_R=1mA		8.80		V
Reverse Working Voltage	V_{RWM}				7.0	V
Reverse Leakage Current	I_{LEAK}	V_R=5V, Any I/O to GND		25		nA
Clamping Voltage	V_C	I_{PP}=2.2A, t_p=8/20us, Fwd		13.0		V
ESD Withstand Voltage	V_{ESD}	IEC 61000-4-2 (Contact)	±22			kV
		IEC 61000-4-2 (Air)	±22			

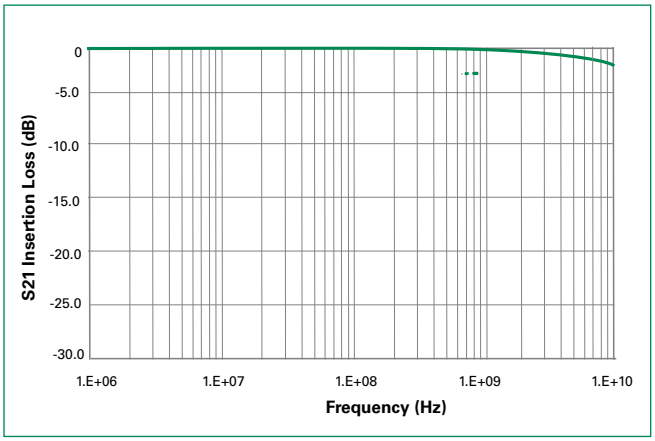
0402 DFN Array Electrical Characteristics - (T_{OP}=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Input Capacitance	$C_{I/O-GND}$	Reverse Bias=0V, f=3 GHz		0.30		pF
Breakdown Voltage	V_{BR}	I_R=1mA		8.80		V
Reverse Working Voltage	V_{RWM}				7.0	V
Reverse Leakage Current	I_{LEAK}	V_R=5V, Any I/O to GND		25		nA
Clamping Voltage	V_C	I_{PP}=2.2A, t_p=8/20us, Fwd		13.0		V
ESD Withstand Voltage	V_{ESD}	IEC61000-4-2 (Contact)	±22			kV
		IEC61000-4-2 (Air)	±22			

Insertion Loss Diagram - SESD 1004Q4UG-030-088

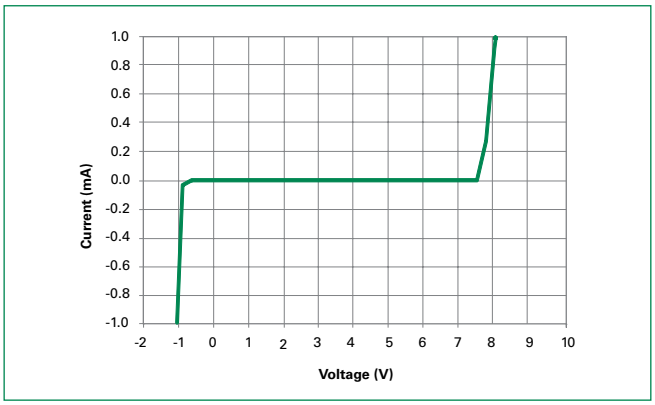


Insertion Loss Diagram - SESD0402Q2UG-0030-088



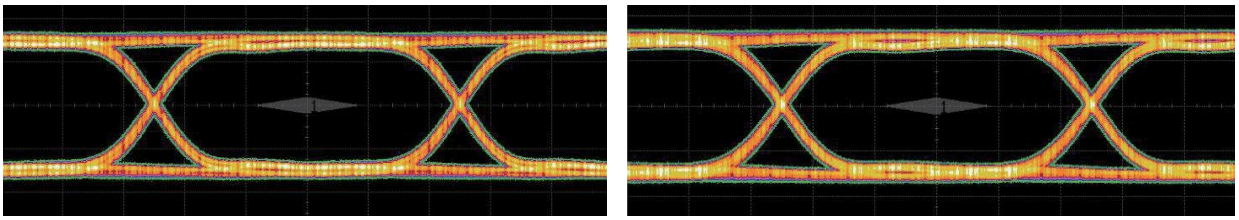
Revised: 10/22/19

Device IV Curve



USB3.0 Eye Diagram

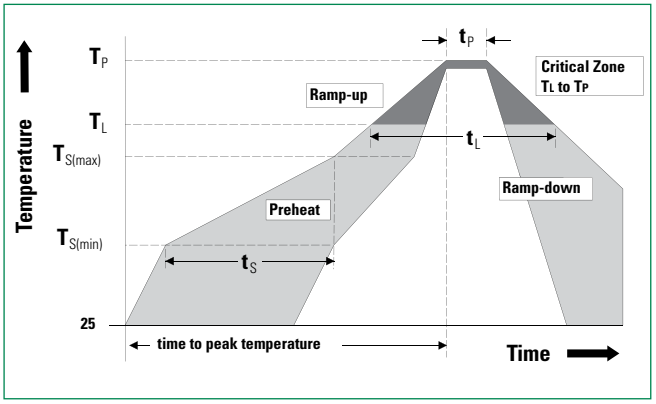
5.0 Gb/s, 1000mV differential, CPO Compliant Test Pattern



Without SESD Device | **With SESD Device**

Soldering Parameters

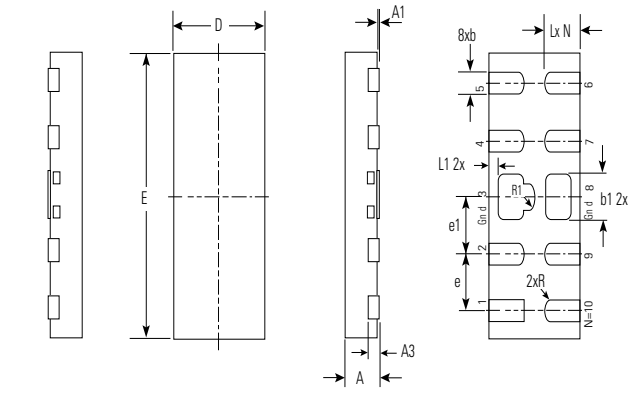
Reflow Condition		Pb – Free assembly
Pre Heat	**- Temperature Min ($T_{s(min)}$)**	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus) Temp (T_L) to peak		3°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	**- Temperature (T_L) (Liquidus)**	217°C
	- Temperature (t_L)	60 – 150 seconds
Peak Temperature (T_P)		$260^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		260°C



Product Characteristics of 0402 DFN Package

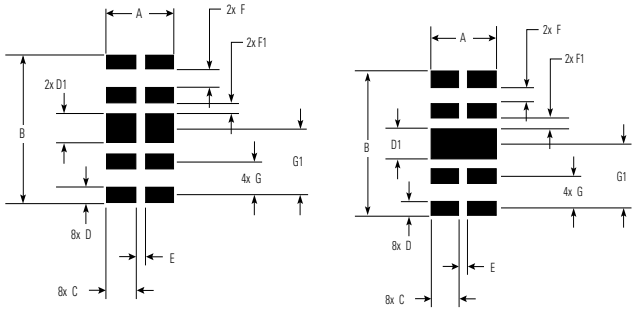
Lead Plating	Pre-Plated Frame
Lead Material	Copper Alloy
Substrate material	Silicon
Body Material	UL Recognized compound meeting flammability rating V-0.

Package Dimensions — 1004 DFN Array



SIDE VIEW 1 | TOP VIEW | SIDE VIEW 2 (Front) | BOTTOM VIEW

END VIEW 1 | END VIEW 2



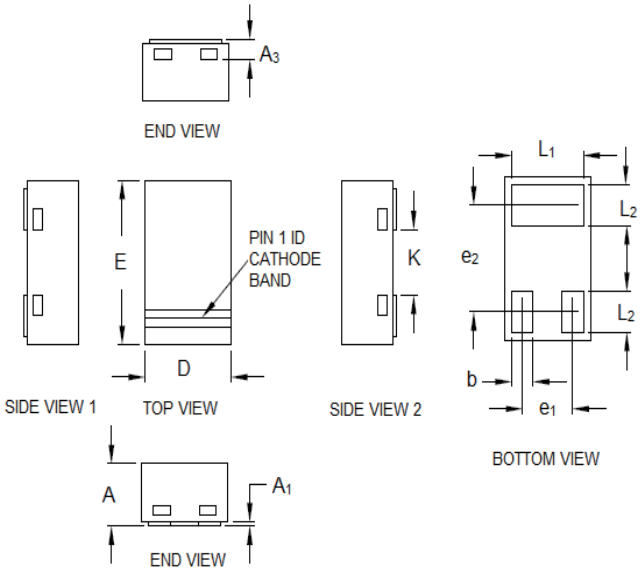
Recommended | Alternate

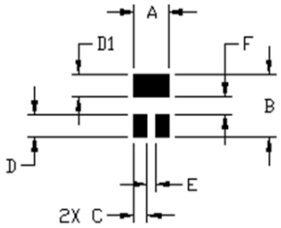
Pad Layout

Symbol	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
A	0.33	0.38	0.43	0.013	0.015	0.017
A1	0.00	0.02	0.05	0	–	0.002
A3		0.127 ref.			0.005 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	0.33	0.38	0.43	0.013	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	
R		0.08 BSC			0.003 BSC	
R1		0.13 BSC			0.005 BSC	
N		10			10	

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

Package Dimensions — 0402 DFN Array





Pad Layout

Symbol	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
A	0.33	0.38	0.43	0.013	0.015	0.017
A1	0	-	0.05	0	-	0.002
A3		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
L1	0.45	0.50	0.55	0.018	0.020	0.022
L2	0.20	0.25	0.30	0.008	0.010	0.012
b	0.14	0.19	0.24	0.006	0.007	0.009
e1		0.35 BSC			0.014 BSC	
e2		0.65 BSC			0.026 BSC	

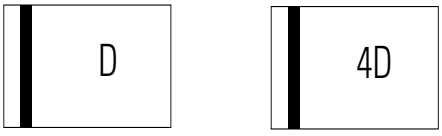
Symbol	Millimeters	Inches
A	0.60	0.024
B	1.00	0.039
C	0.23	0.009
D	0.35	0.014
D1	0.35	0.014
E	0.15	0.006
F	0.30	0.012

Part Numbering System

SESD xxxx **Q** x **U** **G** **0030** – **088**

- **SESD**: SESD product
- **Package**: 0402, 1004
- **Q**: DFN Array Package
- **x**: **No of channel** — 2: Two Channels, 4: Four Channels
- **U**: **Directional** — U: Unidirectional
- **G**: Common GND pin
- **0030**: **Input Capacitance** — 0030: 0.30pF (TYP)
- **088**: **Breakdown Voltage** — 088: 8.8V (TYP)

Part Marking System



0402 1004

Ordering Information

Part Number	Package	Ordering Part Number	Minimum Order Quantity
SESD0402Q2UG-0030-088	0402 DFN Array	RF3925-000	50,000
SESD1004Q4UG-0030-088	1004 DFN Array	RF3923-000	25,000

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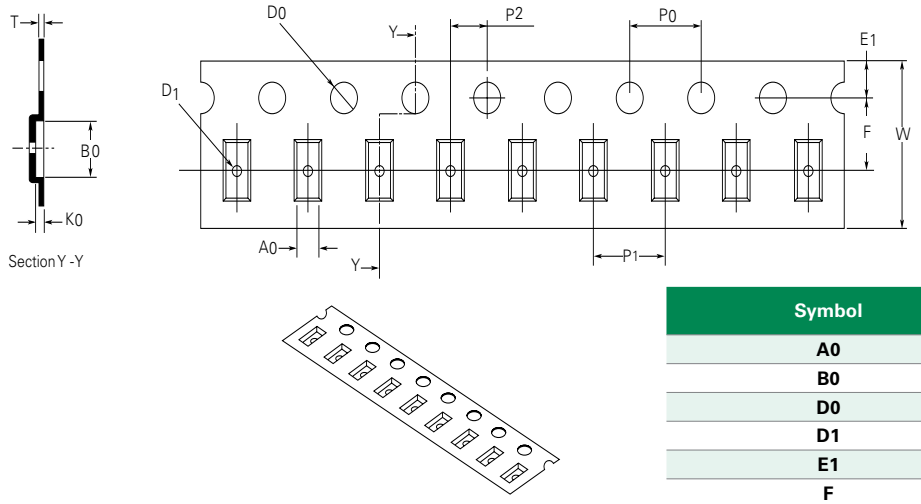
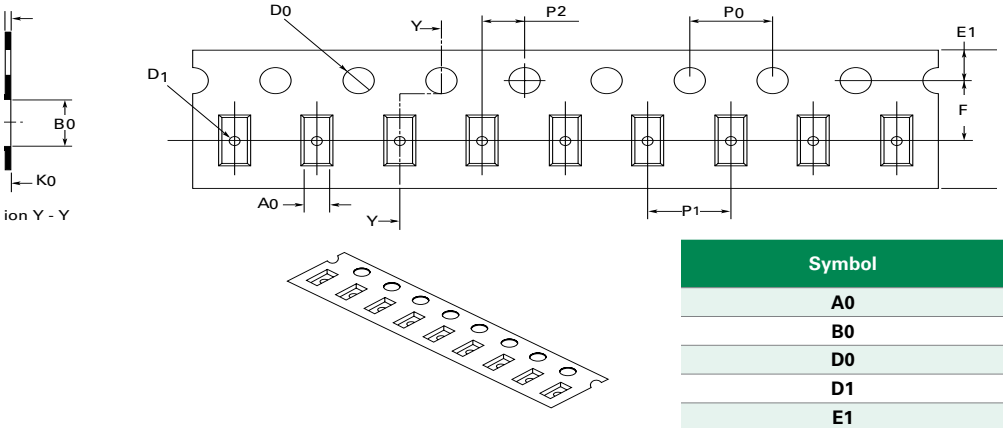
Embossed Carrier Tape & Reel Specification — 1004 DFN Array



Symbol	Millimeters
A0	1.20 ± 0.05
B0	2.70 ± 0.05
D0	ø 1.50 + 0.10/-0
D1	ø 0.50 min
E1	1.75 ± 0.10
F	3.50 ± 0.05
K0	0.51 ± 0.05
P0	4.00 ± 0.10
P1	4.00 ± 0.10
P2	2.00 ± 0.05
W	8.00 +0.03 / -0.10
T	0.25 ± 0.05

Embossed Carrier Tape & Reel Specification — 0402 DFN Array



Symbol	Millimeters
A0	0.70+/-0.05
B0	1.15+/-0.05
D0	ø 1.55+ 0.05
D1	ø 0.40+/- 0.05
E1	1.75+/-0.10
F	3.50+/-0.05
K0	0.47+/-0.05
P0	4.00+/-0.10
P1	2.00+/-0.10
P2	2.00+/-0.05
W	8.00+/-0.10
T	0.20+/-0.05

单击下面可查看定价，库存，交付和生命周期等信息

>>Littelfuse(美国力特)