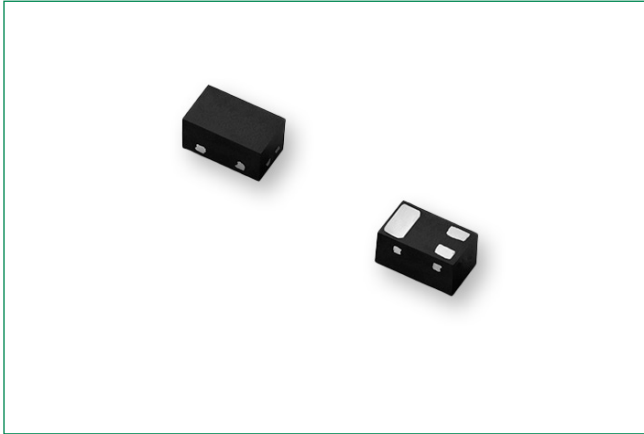


# SESD Series

## Enhanced ESD Diode Arrays

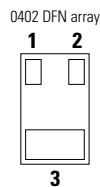


### Web Resources



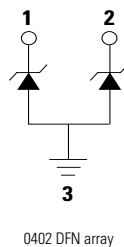
Download ECAD models, order samples, and find technical resources at [www.littelfuse.com](http://www.littelfuse.com)

### Pinout



Bottom View

### Functional Block Diagram



### 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.

### Features & Benefits

- 0.30pFTYP capacitance
- ESD, IEC61000-4-2, ±22kV contact, ±22kV air
- Low clamping voltage of 13V @ IPP=2.2A (tP=8/20µs)
- Low profile 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

### 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

# SESD Series

## Enhanced ESD Diode Arrays

### Absolute Maximum Ratings

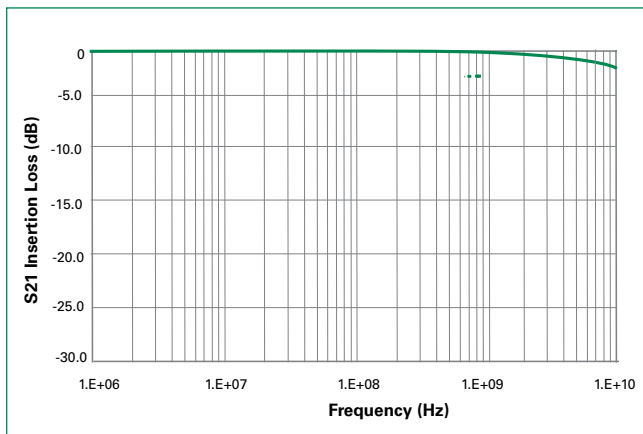
Symbol	Parameter	Value	Units
$I_{PP}$	Peak Current ( $t_p=8/20\mu s$ )	2.2	A
$T_{OP}$	Operating Temperature	-55 to 125	°C
$T_{STOR}$	Storage Temperature	-55 to 150	°C

**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.

### 0402 DFN Array Electrical Characteristics - ( $T_{OP}=25^\circ C$ )

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	$V_C$	$I_{PP}=2.2A$ , $t_p=8/20\mu s$ , Fwd		13.0		V
ESD Withstand Voltage	$V_{ESD}$	IEC61000-4-2 (Contact)	$\pm 22$			kV
		IEC61000-4-2 (Air)	$\pm 22$			

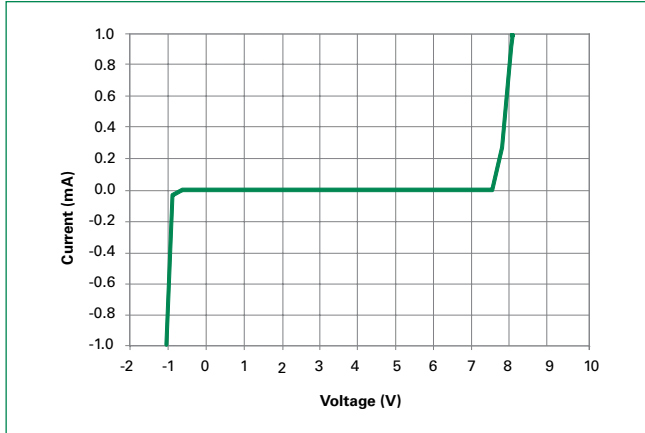
### Insertion Loss Diagram - SESD0402Q2UG-0030-088



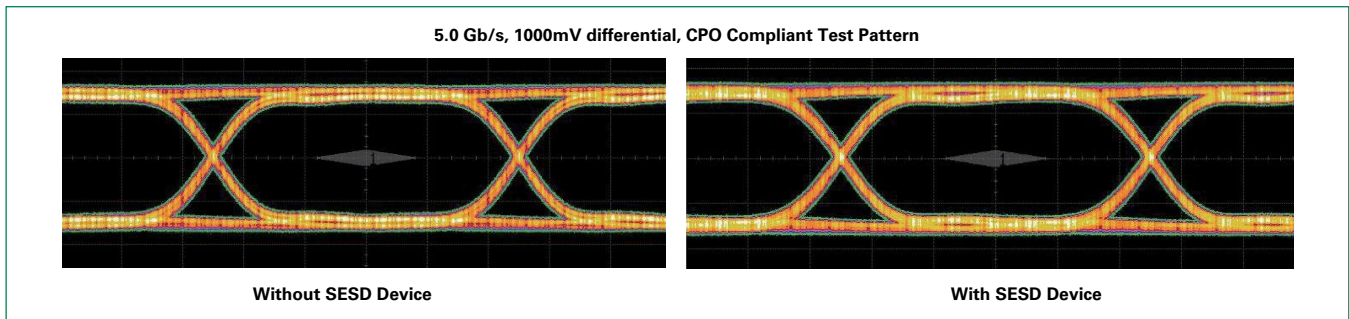
# SESD Series

## Enhanced ESD Diode Arrays

Device IV Curve

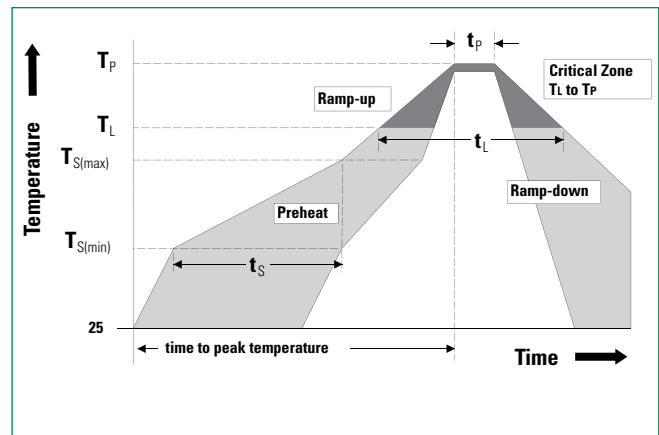


USB3.0 Eye Diagram



Soldering Parameters

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



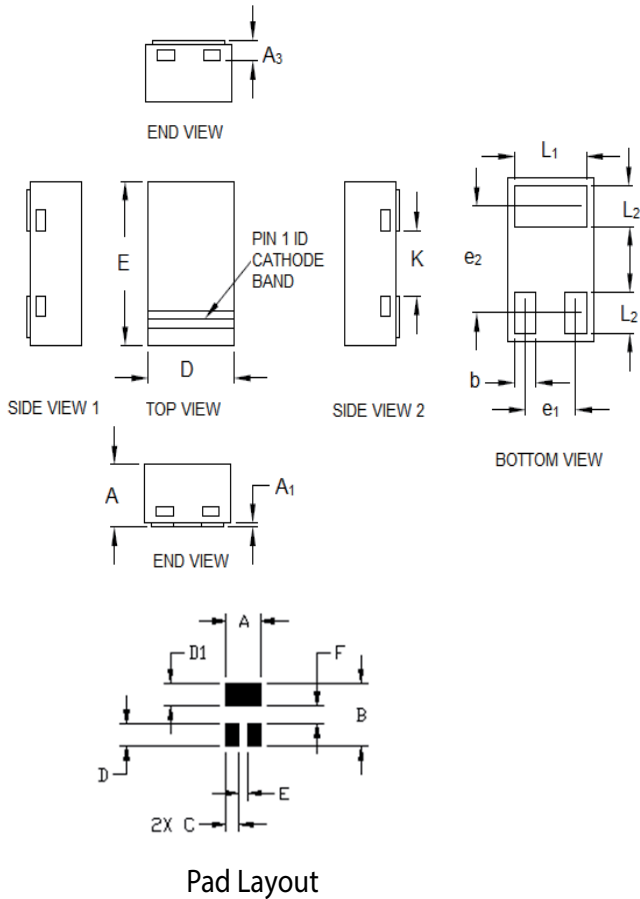
Product Characteristics of 0402 DFN Package

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

# SESD Series

## Enhanced ESD Diode Arrays

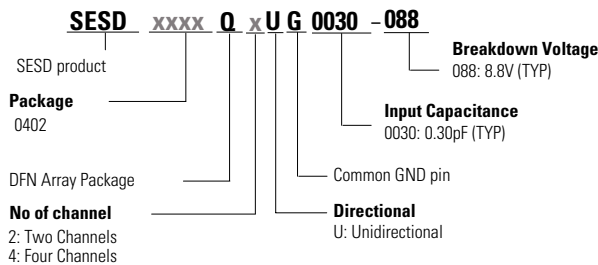
### Package Dimensions — 0402 DFN Array



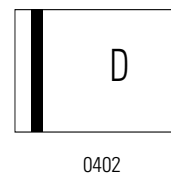
Symbol	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
A	0.33	0.38	0.43	0.013	0.015	0.017
A1	0	-	0.05	0	-	0.002
A3	0.13 ref.			0.005 ref.		
D	0.55	0.60	0.65	0.022	0.024	0.026
E	0.95	1.00	1.05	0.037	0.039	0.041
K	0.35	0.40	0.45	0.014	0.016	0.018
L1	0.45	0.50	0.55	0.018	0.020	0.022
L2	0.20	0.25	0.30	0.008	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



### Part Marking System



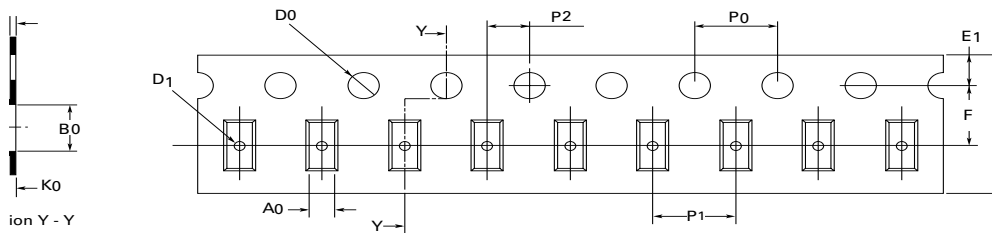
# SESD Series

## Enhanced ESD Diode Arrays

### Ordering Information

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

### Embossed Carrier Tape & Reel Specification – 0402 DFN Array



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

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