

Enhanced ESD Diode Arrays Series

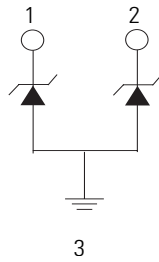


**Pinout**



Bottom View

**Functional Block Diagram**



**Description**

The Enhanced ESD Diode Arrays Series provides higher order ESD protection in signal-integrity-preserving unidirectional arrays for the world's most challenging high speed serial interfaces. The SOD-883 standard packages minimize trace layout complexity, saves significant PCB space, and improves reusability of the footprints. The nominal capacitance makes the components applicable to the worlds' fastest consumer serial interfaces.

**Features**

- 0.30pF TYP capacitance
- ESD, IEC 61000-4-2, ±22kV contact, ±22kV air
- Low clamping voltage of 13V @  $I_{pp}=2.2A$  ( $t_p=8/20\mu s$ )
- Low profile 0402 DFN array packages
- Facilitates excellent signal integrity
- AEC-Q101 Qualified
- ELV Compliant
- Halogen free, Lead free and RoHS compliant

**Applications**

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

### Absolute Maximum Ratings

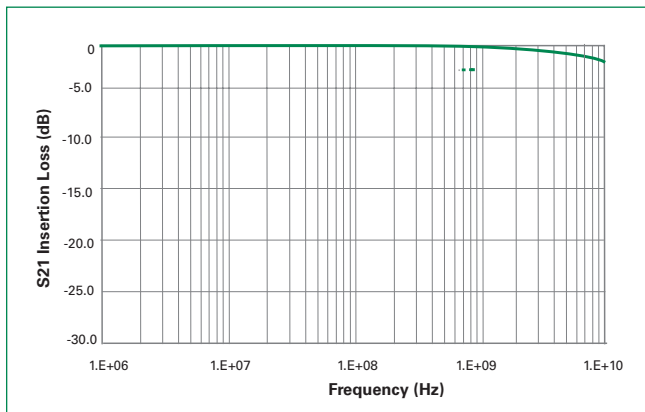
Symbol	Parameter	Value	Units
$I_{PP}$	Peak Current ( $t_p=8/20\mu s$ )	2.2	A
$T_{OP}$	Operating Temperature	-30 to 85	°C
$T_{STOR}$	Storage Temperature	-55 to 150	°C

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

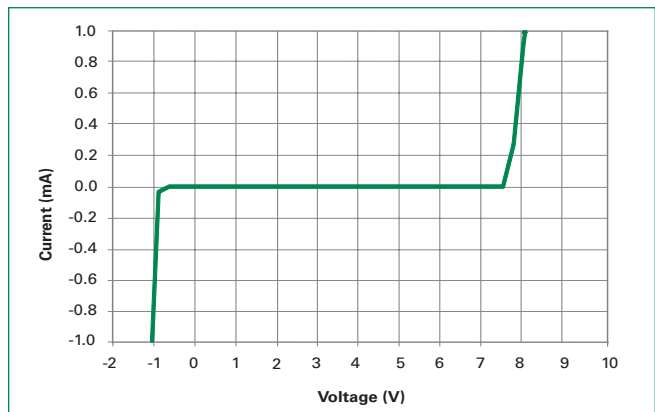
### Electrical Characteristics - ( $T_{OP}=25^\circ C$ )

Parameter	Test Conditions	Min	Typ	Max	Units
Input Capacitance	@ $V_R = 0V$ , $f = 3GHz$		0.30		pF
Breakdown Voltage	$V_{BR}$ @ $I_T=1mA$		8.80		V
Reverse Working Voltage				7.0	V
Reverse Leakage Current	$I_L$ @ $V_{RWM}=5.0V$		25		nA
Clamping Voltage	$V_{CL}$ @ $I_{PP}=2.2A$		13.0		V
ESD Withstand Voltage	IEC 61000-4-2 (Contact)	±22			kV
	IEC 61000-4-2 (Air)	±22			

### Insertion Loss Diagram

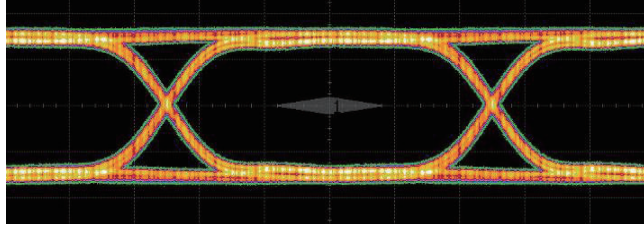


### Component IV Curve

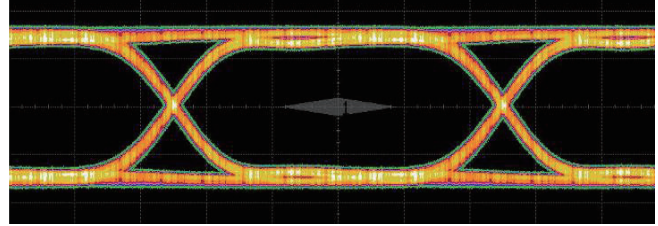


### USB3.0 Eye Diagram

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



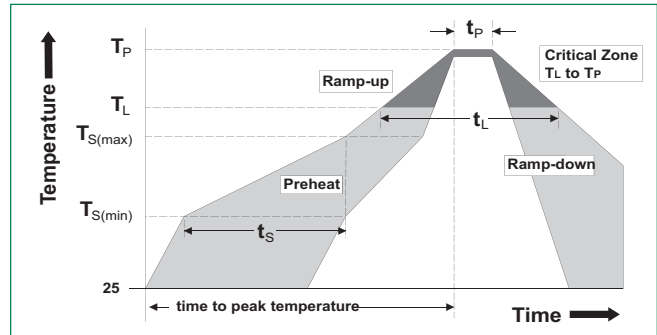
Without component



With component

### 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) ( $t_p$ )	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
<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



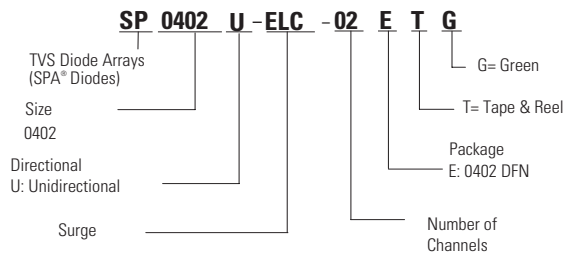
### Product Characteristics

<b>Lead Plating</b>	Pre-Plated Frame
<b>Lead Material</b>	Copper Alloy
<b>Lead Coplanarity</b>	0.004 inches(0.102mm)
<b>Substrate material</b>	Silicon
<b>Body Material</b>	Molded Compound
<b>Flammability</b>	UL Recognized compound meeting flammability rating V-0

**Notes :**

1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.

### Part Numbering System



### Part Marking System

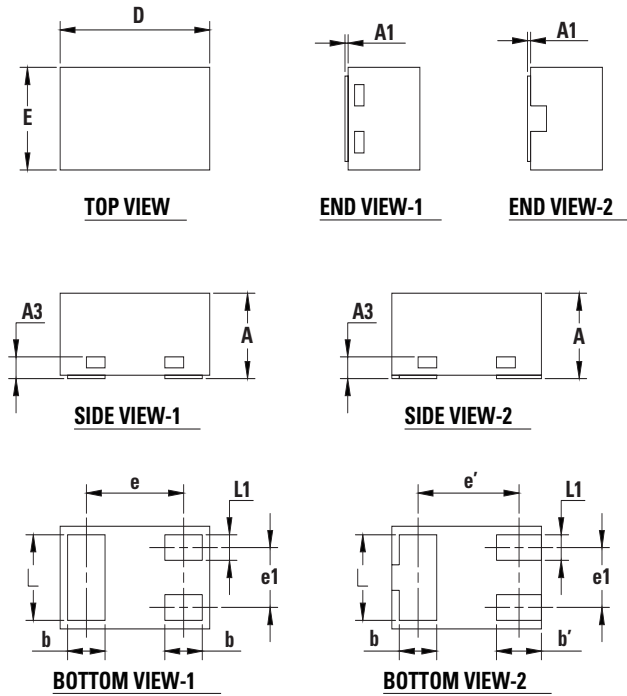


0402

### Ordering Information

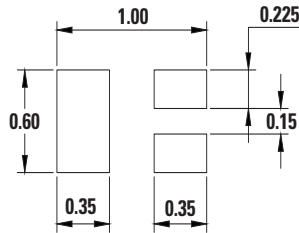
Part Number	Package	Marking	Reel Quantity
SP0402U-ELC-02ETG	0402 DFN Array	I D	10000

### Package Dimensions — 0402 DFN Array

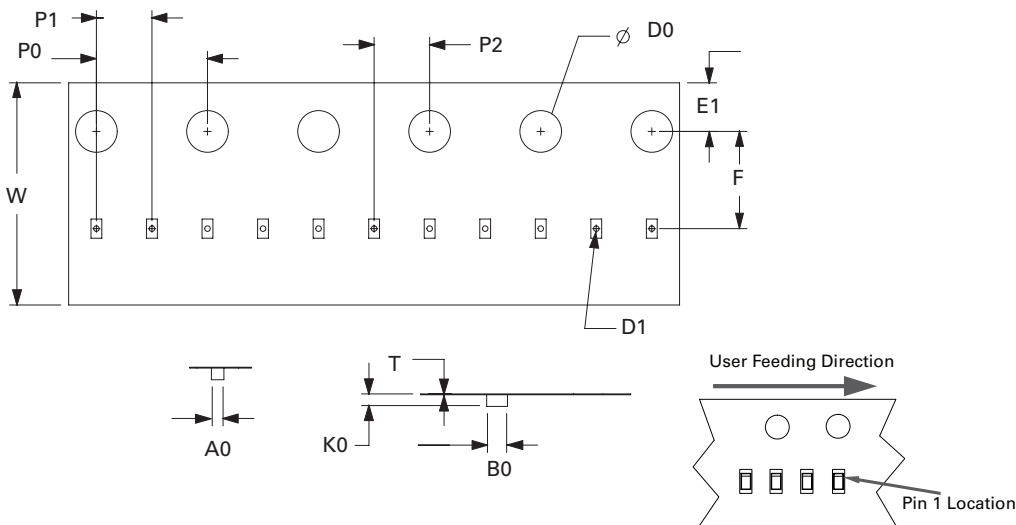


Symbol	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
A	0.33	-	0.55	0.013	0.015	0.022
A1	0	-	0.05	0	-	0.002
A3	0.13REF			0.005REF		
b	0.20	0.25	0.30	0.008	0.010	0.012
b'	0.20	0.30	0.40	0.008	0.012	0.016
D	0.95	1.00	1.05	0.037	0.039	0.041
E	0.55	0.60	0.65	0.022	0.024	0.026
e	0.65BSC			0.026BSC		
e'	0.675BSC			0.027BSC		
L	0.40	0.50	0.60	0.016	0.020	0.024
L1	0.10	0.15	0.20	0.004	0.006	0.008

### SOLDERING PATTERN



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



Symbol	Millimeters
A0	0.70+/-0.05
B0	1.15+/-0.05
D0	∅ 1.50+/-0.10
D1	∅ 0.40 +/-0.10
E1	1.75+/-0.10
F	3.50+/-0.10
K0	0.55+/-0.05
P0	4.00+/-0.10
P1	2.00+/-0.10
P2	2.00+/-0.05
W	8.00+0.30/-0.10
T	0.20+/-0.05

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