

Enhanced ESD Diode Arrays Series

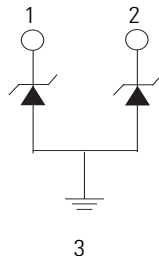


Pinout



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, $\pm 22\text{kV}$ contact, $\pm 22\text{kV}$ air
- Low clamping voltage of 13V @ $I_{pp}=2.2\text{A}$ ($t_p=8/20\mu\text{s}$)
- 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

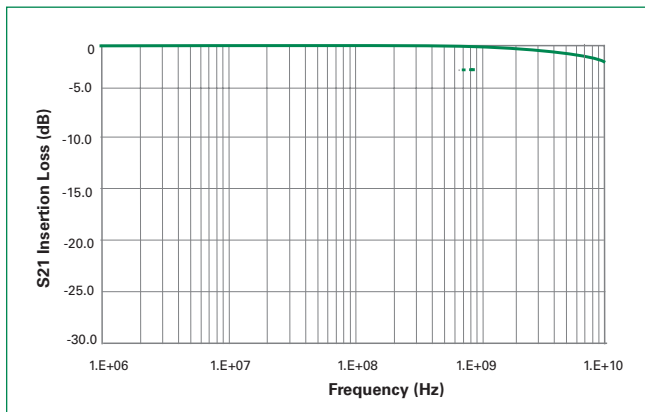
Symbol	Parameter	Value	Units
I_{PP}	Peak Current ($t_p=8/20\mu s$)	2.2	A
T_{OP}	Operating Temperature	-30 to 85	°C
T_{STOR}	Storage Temperature	-55 to 150	°C

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.

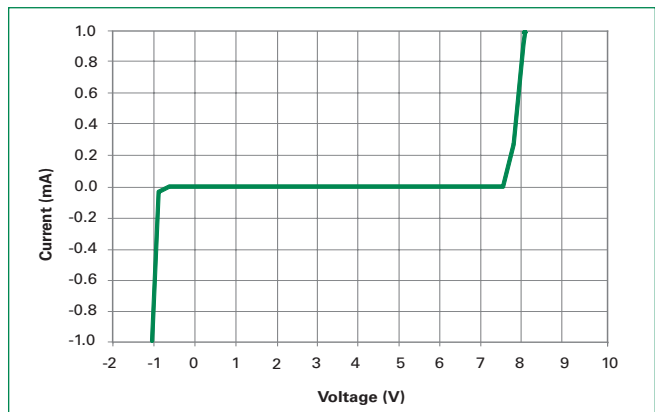
Electrical Characteristics - ($T_{OP}=25^\circ C$)

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

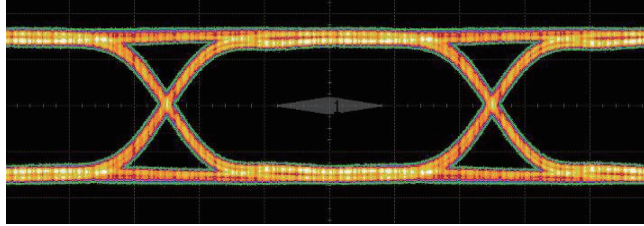


Component IV Curve

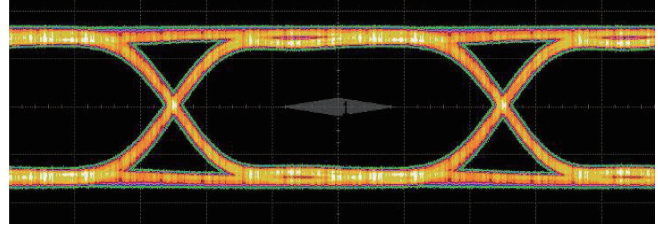


USB3.0 Eye Diagram

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



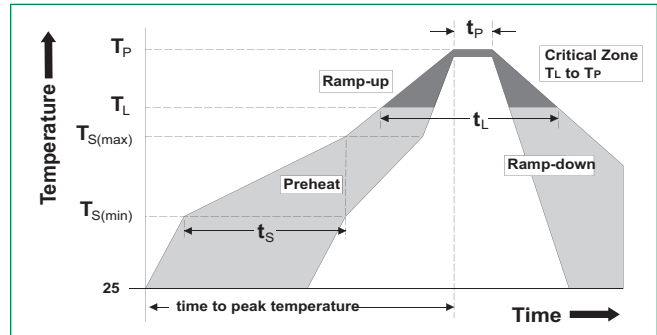
Without component



With component

Soldering Parameters

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_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
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



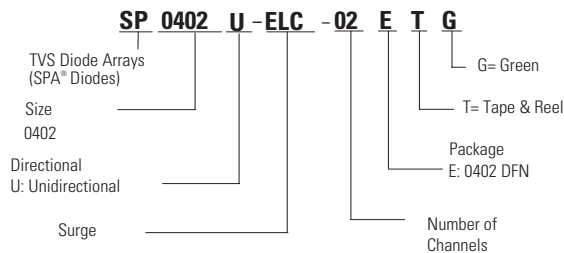
Product Characteristics

Lead Plating	Pre-Plated Frame
Lead Material	Copper Alloy
Lead Coplanarity	0.004 inches(0.102mm)
Substrate material	Silicon
Body Material	Molded Compound
Flammability	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

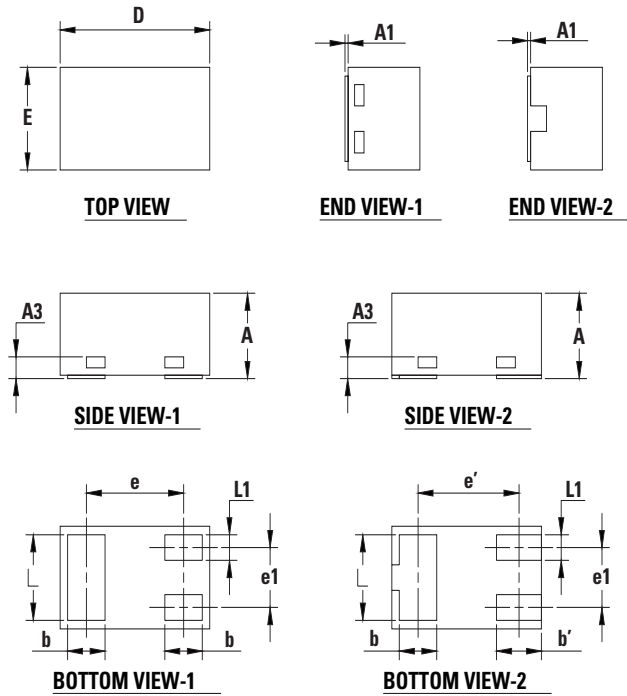


0402

Ordering Information

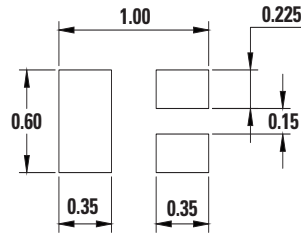
Part Number	Package	Marking	Reel Quantity
SP0402U-ELC-02ETG	0402 DFN Array	I D	10000

Package Dimensions — 0402 DFN Array

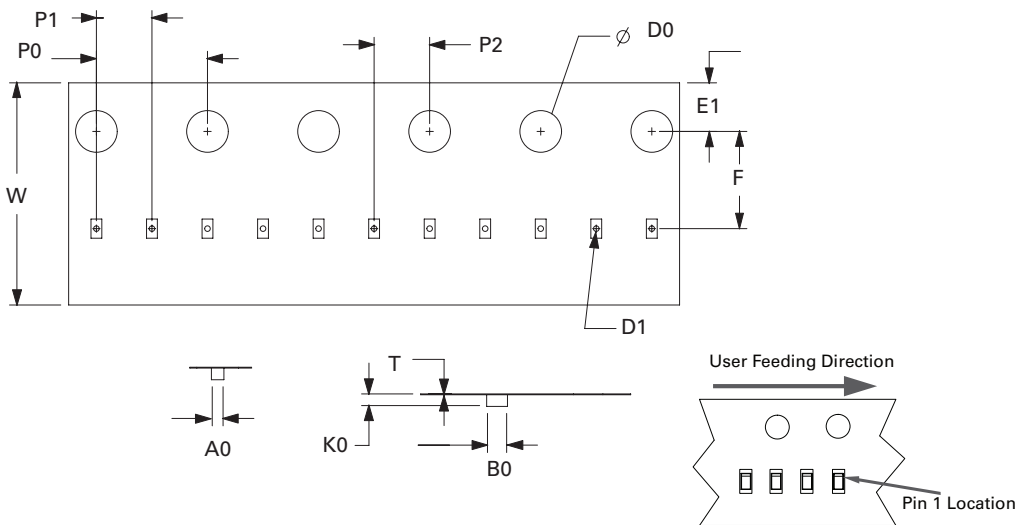


Symbol	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
A	0.33	-	0.55	0.013	0.015	0.022
A1	0	-	0.05	0	-	0.002
A3	0.13REF			0.005REF		
b	0.20	0.25	0.30	0.008	0.010	0.012
b'	0.20	0.30	0.40	0.008	0.012	0.016
D	0.95	1.00	1.05	0.037	0.039	0.041
E	0.55	0.60	0.65	0.022	0.024	0.026
e	0.65BSC			0.026BSC		
e'	0.675BSC			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	ø 1.50+/-0.10
D1	ø 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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