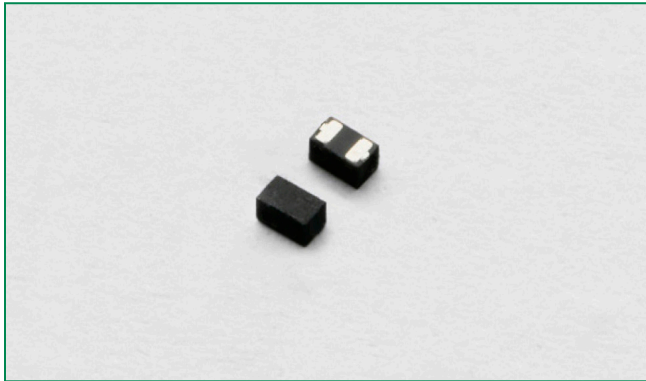


# SP3205 0.3pF 4A Unidirectional Diode Array

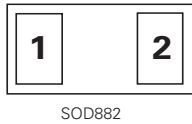


### Description

The SP3205 provides low capacitance, unidirectional and a high level of protection for electronic equipment that may experience destructive electrostatic discharges (ESD). The typical capacitance of 0.3pF helps ensure excellent signal integrity on the most challenging consumer electronics interfaces, such as USB 3.1, HDMI, DisplayPort, Thunderbolt and V-by-One®.

It can safely absorb repetitive ESD strikes at  $\pm 30\text{kV}$  (contact discharge, IEC 61000-4-2) without performance degradation and safely dissipate 4A of 8/20 $\mu\text{s}$  surge current (IEC 61000-4-5 2<sup>nd</sup> edition).

### Pinout



### Features

- ESD, IEC 61000-4-2,  $\pm 30\text{kV}$  contact,  $\pm 30\text{kV}$  air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 4A (8/20 $\mu\text{s}$  as defined in IEC 61000-4-5 2<sup>nd</sup> edition)
- Low capacitance of 0.3pF (TYP @  $V_R=0\text{V}$ )
- Low leakage current of 1nA (TYP) at 3.3V
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)
- AEC-Q101 Qualified

### Functional Block Diagram



### Applications

- USB 3.1
- HDMI
- DisplayPort
- S-ATA
- NFC

Life Support Note:

**Not Intended for Use in Life Support or Life Saving Applications**

The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated.

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Revision: 01/13/20

### Absolute Maximum Ratings

Symbol	Parameter	Value	Units
$I_{PP}$	Peak Current ( $t_p=8/20\mu s$ )	4	A
$T_{OP}$	Operating Temperature	-40 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 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 ( $T_{OP}=25^\circ C$ )

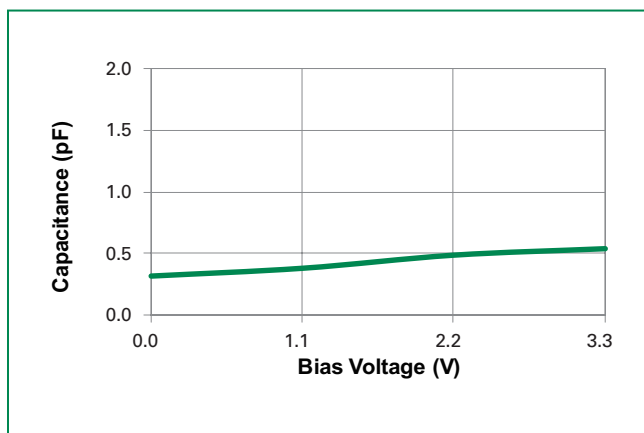
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$	$I_R=1\mu A$			3.3	V
Breakdown Voltage	$V_{BR}$	$I_R=1mA$	3.6	5.5		V
Reverse Leakage Current	$I_{LEAK}$	$V_R=3.3V$		1	100	nA
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP}=1A, t_p=8/20\mu s$		7.5	9	V
		$I_{PP}=4A, t_p=8/20\mu s$		9.5	12	V
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p=100ns$		0.3		$\Omega$
ESD Withstand Voltage <sup>1</sup>	$V_{ESD}$	IEC 61000-4-2 (Contact Discharge)	$\pm 30$			kV
		IEC 61000-4-2 (Air Discharge)	$\pm 30$			kV
Diode Capacitance <sup>1</sup>	$C_{IO-GND}$	Reverse Bias=0V, $f=1MHz$		0.3	0.5	pF

Note:

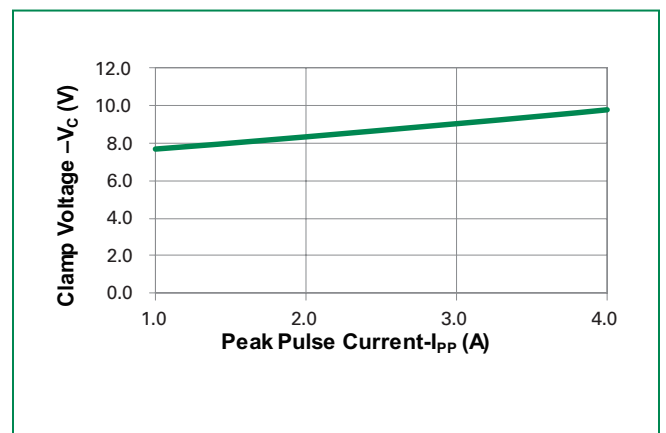
1. Parameter is guaranteed by design and/or component characterization.

2. Transmission Line Pulse (TLP) with 100ns width, 0.2ns rise time, and average window  $t_1=70ns$  to  $t_2=90ns$

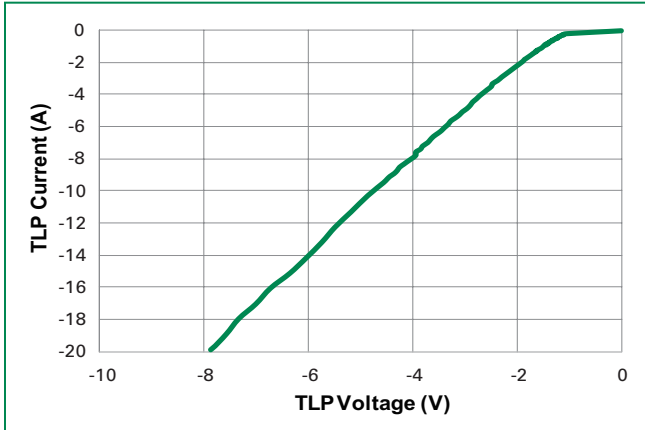
### Capacitance vs. Reverse Bias



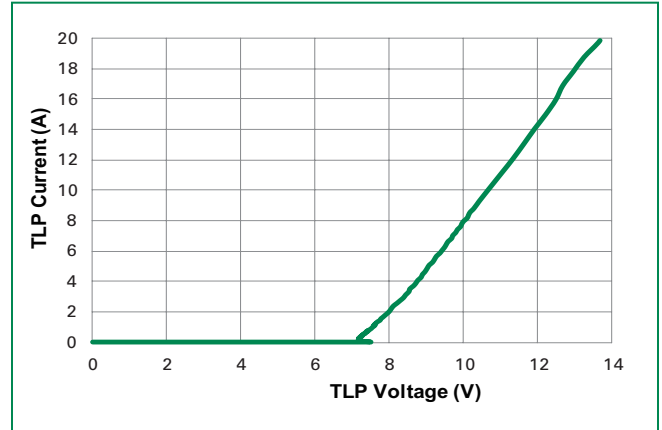
### Clamping voltage vs. $I_{PP}$ for 8/20 $\mu s$ waveshape



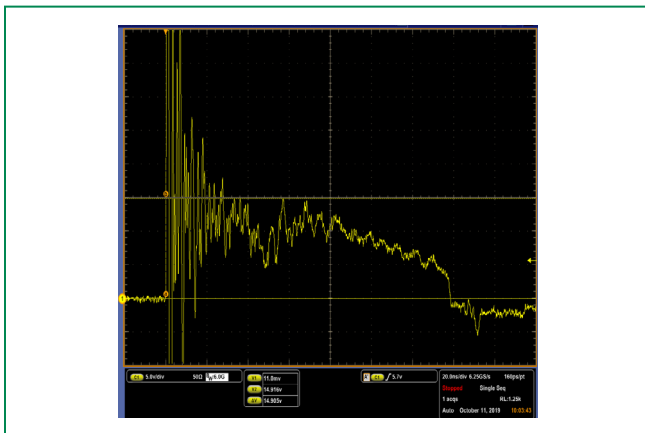
**Negative Transmission Line Pulsing (TLP) Plot**



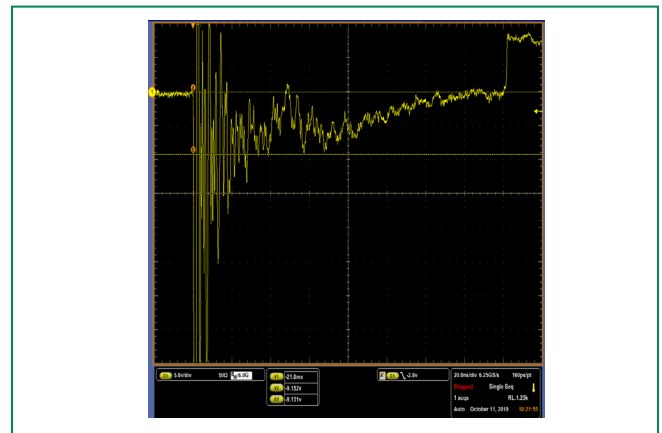
**Positive Transmission Line Pulsing (TLP) Plot**



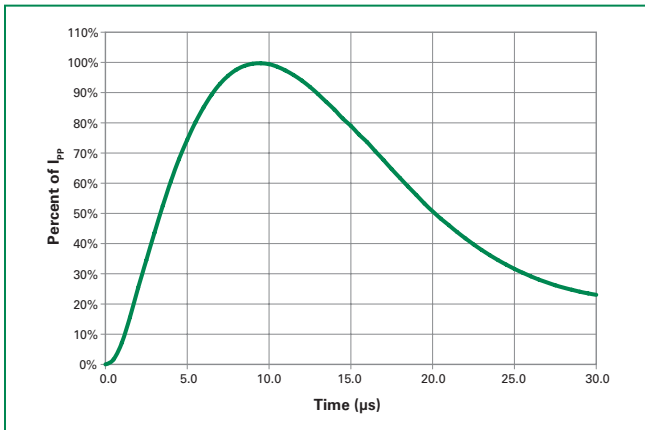
**IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage**



**IEC 61000-4-2 -8 kV Contact ESD Clamping Voltage**

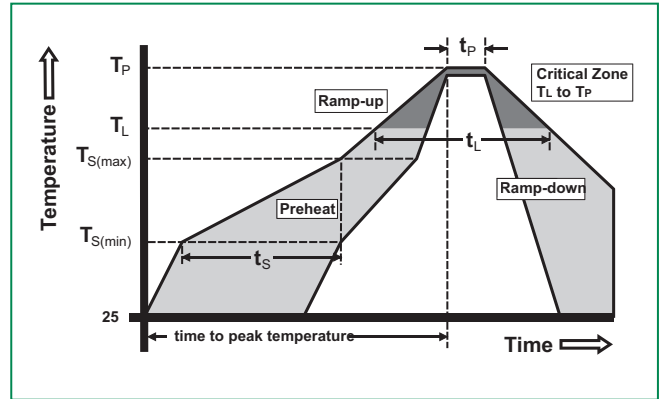


**8/20µs Pulse Waveform**



**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 <sup>+0/-5</sup> °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**

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

**Ordering Information**

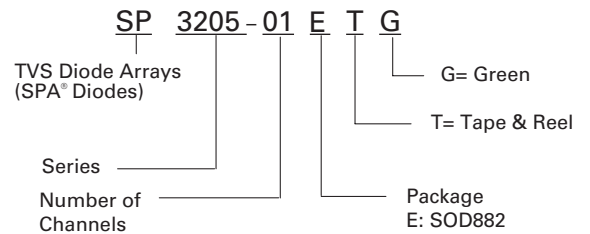
Part Number	Package	Min. Order Qty.
SP3205-01ETG	SOD882	10,000

**Part Marking System**

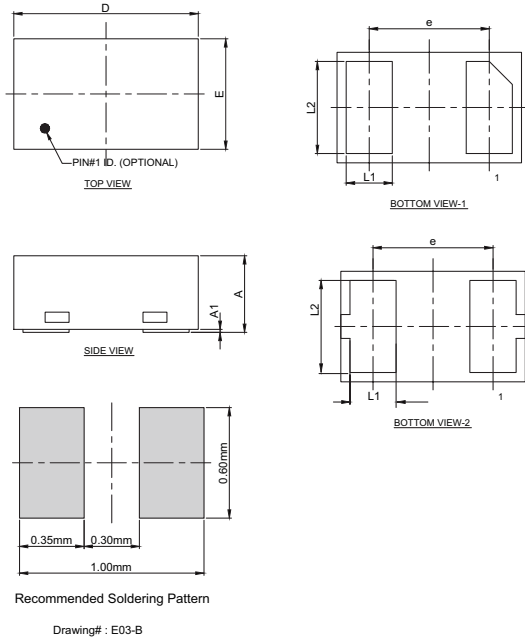


Y : Part code  
\* : Date code

**Part Numbering System**

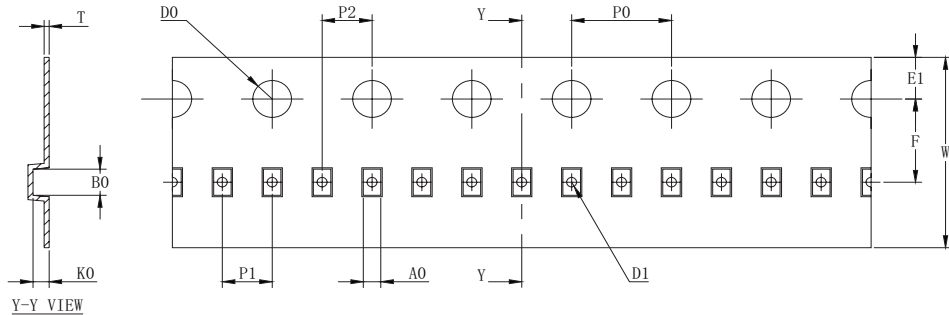


**Package Dimensions — SOD882**

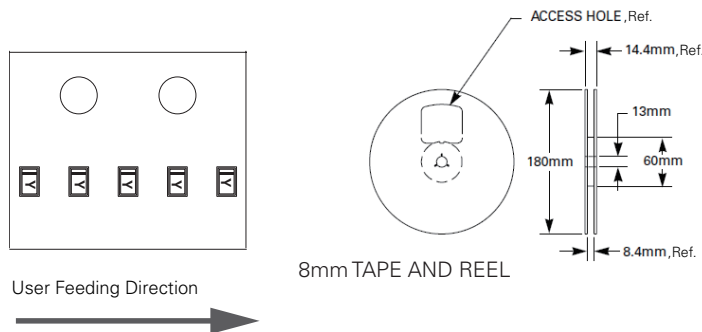


Symbol	SOD882					
	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
<b>A</b>	0.40	0.50	0.55	0.016	0.020	0.022
<b>A1</b>	0.00	0.02	0.05	0.000	0.001	0.002
<b>L1</b>	0.20	0.25	0.30	0.008	0.010	0.012
<b>L2</b>	0.45	0.50	0.55	0.018	0.020	0.022
<b>D</b>	0.95	1.00	1.05	0.037	0.039	0.041
<b>E</b>	0.55	0.60	0.65	0.022	0.024	0.026
<b>e</b>	0.65 BSC			0.026 BSC		

**Embossed Carrier Tape & Reel Specification — SOD882**



Symbol	Millimeters	
	Min	Max
<b>A0</b>	0.655	0.745
<b>B0</b>	1.055	1.145
<b>D0</b>	1.50	1.60
<b>D1</b>	0.35	0.45
<b>E1</b>	1.65	1.85
<b>F</b>	3.45	3.55
<b>K0</b>	0.695	0.605
<b>P0</b>	3.90	4.10
<b>P1</b>	1.90	2.10
<b>P2</b>	1.95	2.05
<b>T</b>	0.15	0.25
<b>W</b>	7.90	8.30



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