SP3118 Series

0.3pF 10 kV Bidirectional Discrete TVS

HF RoHS Pb GREEN

Description

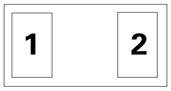
The SP3118 includes back-to-back TVS diodes fabricated in a proprietary silicon avalanche technology to provide protection for electronic equipment that may experience destructive electrostatic discharges (ESD). These robust diodes can safely absorb repetitive ESD strikes up to the maximum level specified in the IEC 61000-4-2 international standard without performance degradation. The back-to-back configuration provides symmetrical ESD protection.

Features & Benefits

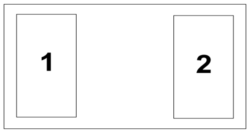
- ESD protection of ±10kV contact discharge, ±15kV air discharge, (IEC 61000-4-2)
- EFT protection, IEC 61000-4-4, 40A (tp=5/50ns)
- Lightning, 2A (8/20μs as defined in IEC 61000-4-5 2nd edition)
- Low capacitance of 0.3pF @ V_R=0V
- Low leakage current of 50nA (max) at 18V
- Space efficient 0201 and SOD882 footprint
- Halogen free, Lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)
- AEC-Q101 qualified (SOD882)

Pinout

0201 Flipchip



SOD882



Applications

- Tablets
- Ultrabook
- eReader
- Smart Phones
- Digital Cameras
- MP3/ PMP
- Set Top Boxes
- Portable Medical
- NFC and FeliCa

Functional Block Diagram

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Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p=8/20μs)	2.0	A
T_{OP}	Operating Temperature	-40 to 125	°C
T_{STOR}	Storage Temperature	-55 to 150	°C

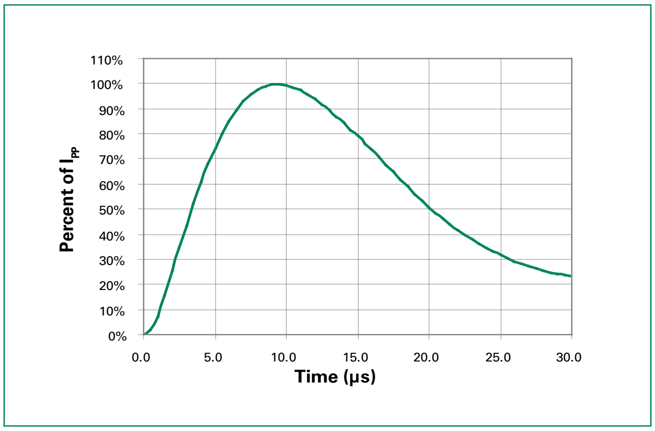
Caution: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Electrical Characteristics (T_{OP}=25°C)

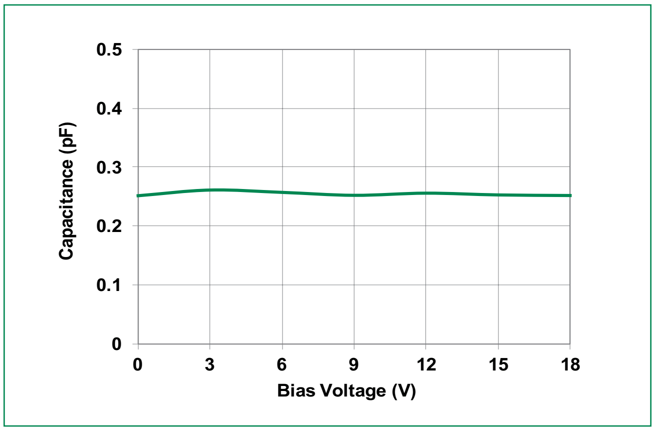
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}				18	V
Reverse Leakage Current	I_{LEAK}	V_R=18V		10	50	nA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20μs, Fwd		31	35	V
		I_{PP}=2A, t_p=8/20μs, Fwd		34	38	V
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact)	±10			kV
		IEC 61000-4-2 (Air)	±15			kV
Dynamic Resistance[2]	R_{DYN}	TLP, t_p=100ns, I/O to GND		0.75		Ω
Diode Capacitance[1]	$C_{I/O-I/O}$	Reverse Bias=0V, f=1 MHz		0.3	0.45	pF

Note: 1. Parameter is guaranteed by design and/or component characterization.
2. Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window t1=70ns to t2= 90ns

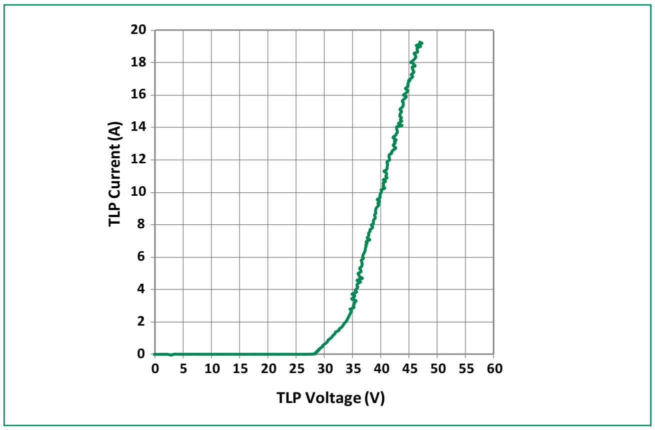
8/20μS Pulse Waveform



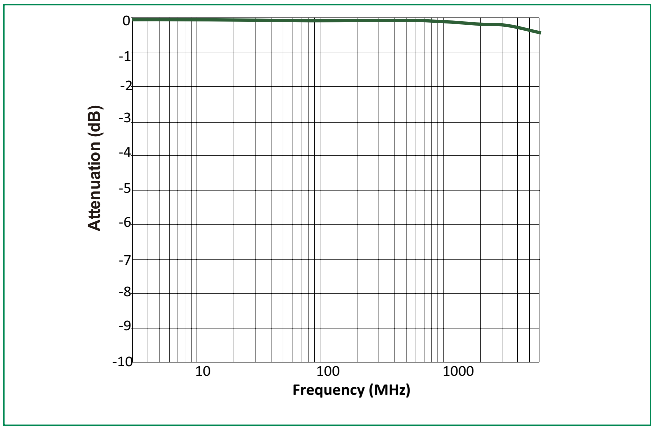
Capacitance vs. Reverse Bias



Transmission Line Pulsing (TLP) Plot



Insertion Loss (S21)



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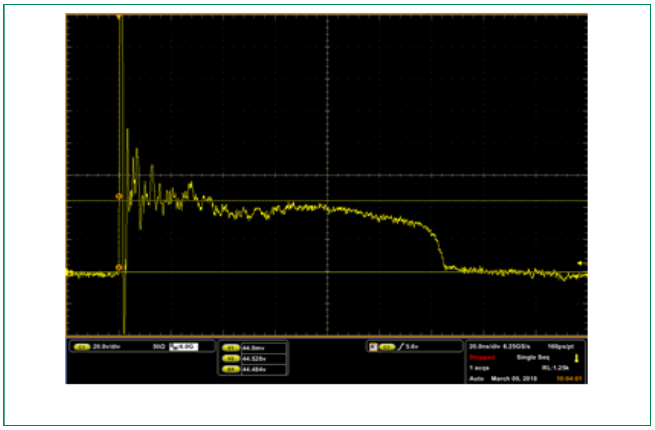
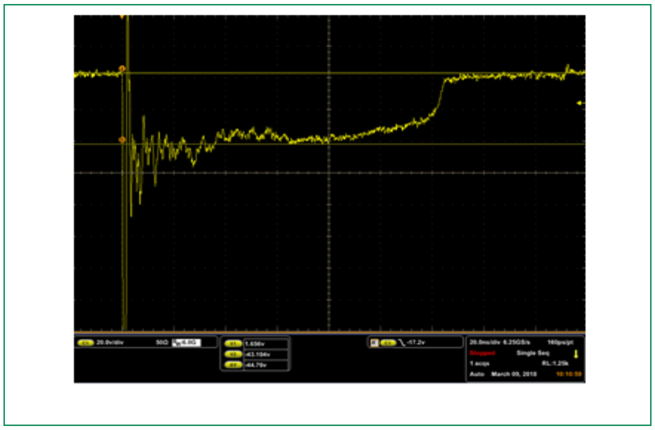
IEC 61000-4-2 +8kV Contact ESD Clamping Voltage

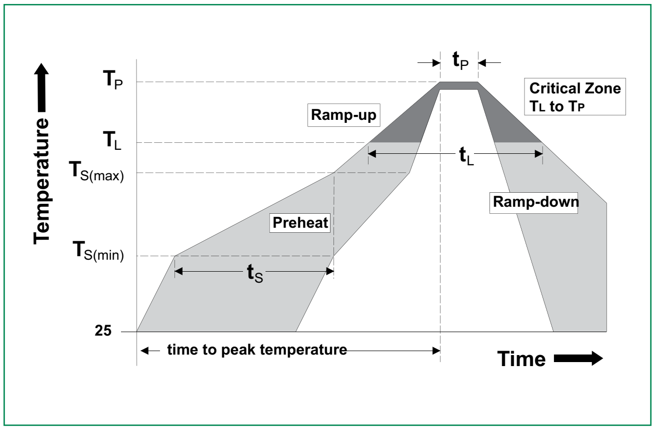


IEC 61000-4-2 -8kV Contact ESD Clamping Voltage

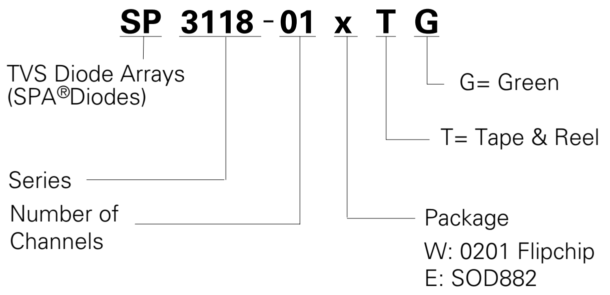


Soldering Parameters

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 – 120 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)		30 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		260°C

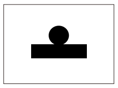


Part Numbering System

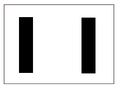


Part Marking System

SP3118-01WTG



SP3118-01ETG



Product Characteristics of 0201 Flipchip

Lead Plating	Sn
Lead Material	Copper
Lead Coplanarity	6µm(max)
Substrate material	Silicon
Body Material	Silicon

Product Characteristics of SOD882

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

Ordering Information

Part Number	Package	Min. Order Qty.
SP3118-01WTG	0201 Flipchip	10000
SP3118-01ETG	SOD882	10000

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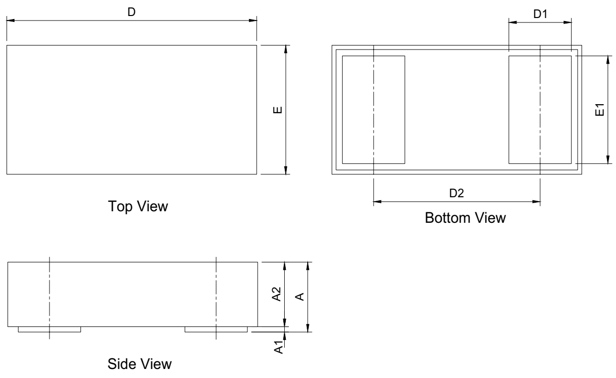
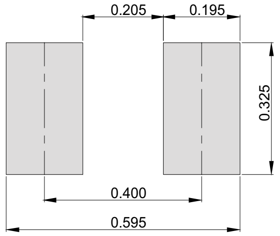
Package Dimensions — 0201 Flipchip

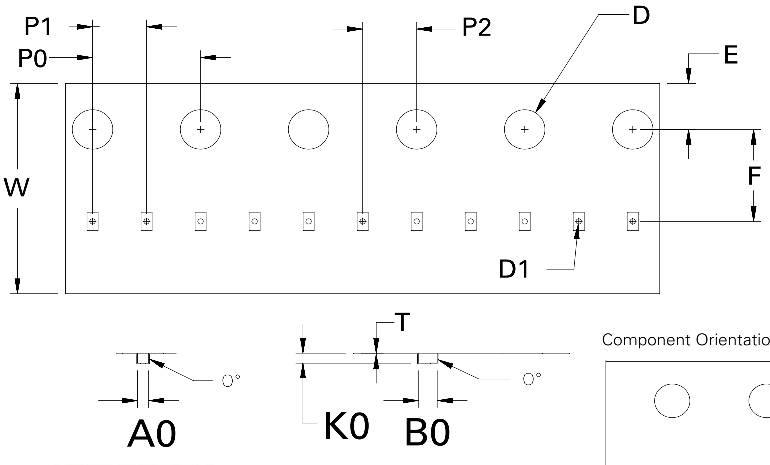


Symbol	0201 Flipchip			
	Millimeters		Inches	
	Min	Max	Min	Max
D	0.605	0.655	0.0238	0.0258
E	0.305	0.355	0.0120	0.0140
D1	0.145	0.155	0.0057	0.0061
E1	0.245	0.255	0.0096	0.0100
D2	0.400 BSC		0.0157 BSC	
A	0.273	0.329	0.0107	0.0130
A2	0.265	0.315	0.0104	0.0124
A1	0.008	0.014	0.0003	0.0006



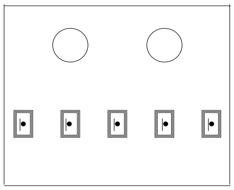
Recommended Soldering Pad Layout (mm)

Embossed Carrier Tape & Reel Specification — 0201 Flipchip

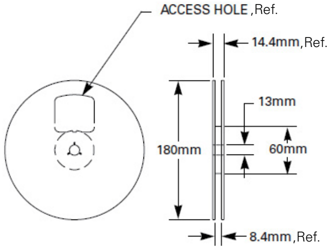


8mm TAPE AND REEL

Component Orientation in Tape



Symbol	Millimeters
A0	0.41+/-0.03
B0	0.70+/-0.03
D	ø 1.50 + 0.10
D1	ø 0.20 +/- 0.05
E	1.75+/-0.10
F	3.50+/-0.05
K0	0.38+/-0.03
P0	4.00+/-0.10
P1	2.00+/-0.05
P2	2.00+/-0.05
W	8.00+0.30/-0.10
T	0.23+/-0.02



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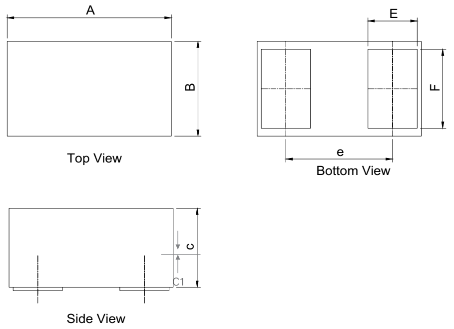
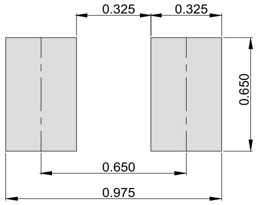
Package Dimensions — SOD882

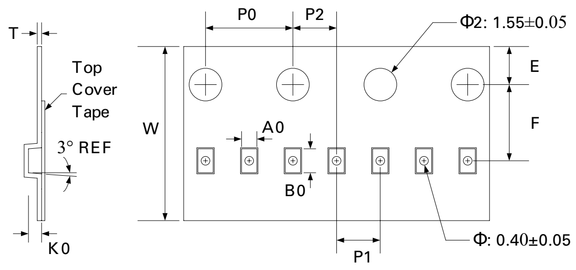


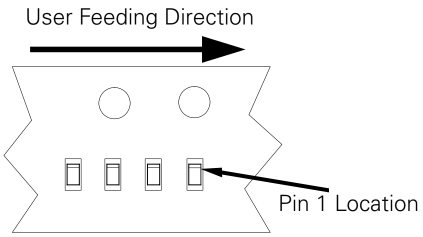


Recommended Soldering Pad Layout (mm)

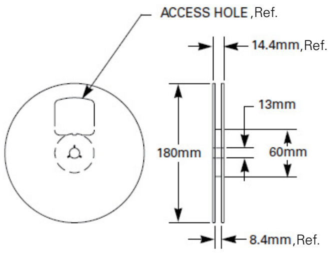
Symbol	Package	SOD882		
	JEDEC	MO-236		
	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.10	0.035	0.043
B	0.50	0.70	0.020	0.028
C	0.40	0.60	0.016	0.024
C1	0.00	0.05	0.000	0.002
E	0.20	0.35	0.008	0.014
F	0.45	0.55	0.018	0.022
e	0.65 BSC		0.026 BSC	

Embossed Carrier Tape & Reel Specification — SOD882





8mm TAPE AND REEL



Symbol	Tape Dimensions	
	Millimetres	
	Min	Max
A0	0.65	0.75
B0	1.10	1.20
K0	0.50	0.60
E	1.65	1.85
F	3.45	3.55
P0	3.90	4.10
P1	1.90	2.10
P2	1.95	2.05
T	1.95	2.05
W	7.90	8.10

Symbol	Reel Dimensions (Size Φ178)	
	Millimetres	
	Min	Max
M	177.0	179.0
N	59.0	61.0
W	11.0	12.0
W1	8.5	9.5
H	12.5	13.5
S	1.9	2.1
K	10.8	11.2
R	0.95	1.05

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