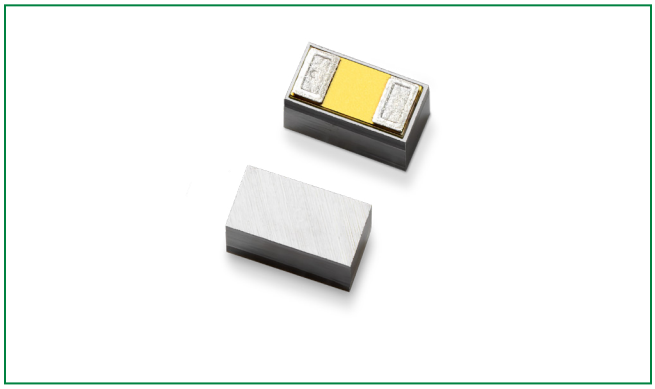
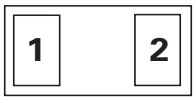
SP1120-01WTG

20 V, 50 pF, 5 A, Flipchip, Unidirecitonal Discrete TVS Diode, General Purpose ESD Protection

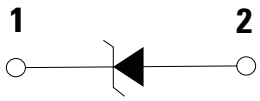
HF RoHS Pb



Pinout



Functional Block Diagram



Description

The SP1120-01WTG uni-directional TVS is fabricated in a proprietary silicon avalanche technology. These diodes provide a high ESD (electrostatic discharge) protection level for electronic equipment.

The SP1120-01WTG TVS can safely absorb repetitive ESD strikes of ±30 kV (contact and air discharge as defined in IEC 61000-4-2) without any performance degradation. In addition, it can safely dissipate a 5 A 8/20 µs surge event as defined in IEC 61000-4-5, 2nd edition.

Features

- ESD, IEC 61000-4-2, ±30 kV contact/air
- EFT, IEC 61000-4-4, 40 A (5/50 ns)
- Maximum surge tolerance, IEC 61000- 4-5 2nd edition, 5 A (8/20 µs)
- Low leakage current of 100 nA (Max) at 20 V
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level (MSL-1)

Applications

- CC/SBU for USB PD3.1
- LCD/PDP TVs
- Mobile Phones
- Set Top Boxes

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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Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p = 8/20 µs)	5	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.

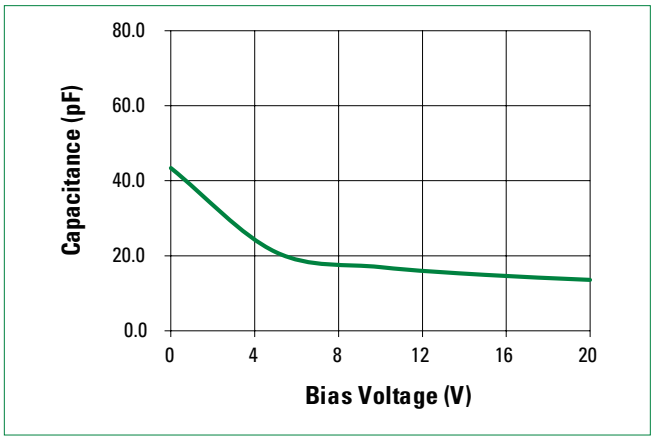
Electrical Characteristics (T_{OP} = 25 °C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}				20	V
Breakdown Voltage	V_{BR}	I_R = 1 mA	21.0	22.5	24.0	V
Reverse Leakage Current	I_{LEAK}	V_R = 20 V			100	nA
Clamp Voltage[1]	V_C	I_{PP} = 1 A, t_p = 8/20 µs, I/O to GND		22.0		V
		I_{PP} = 5 A, t_p = 8/20 µs, I/O to GND		32.0		V
Clamp Voltage[2]		8 kV(IEC), t_p=0.2/100 ns (TLP), I/O to GND			30.0	V
Dynamic Resistance[1,2]	R_{DYN}	TLP, t_p = 100 ns, I/O to GND		0.55		Ω
ESD Withstand Voltage[1,3]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±30			kV
		IEC 61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance[1]	C_{IO-GND}	Reverse Bias = 0 V , f = 1 MHz, I/O to GND			50	pF

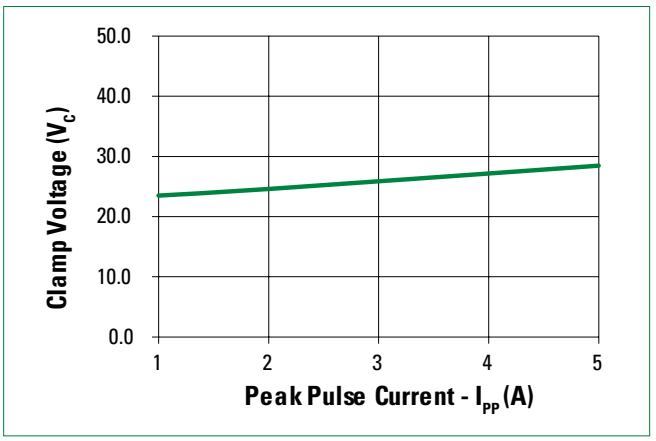
Note:

1. Parameter is guaranteed by design and/or component characterization
2. Transmission Line Pulse (TLP) with 100 ns width, 0.2 ns rise time, and average window t1 = 70 ns to t2 = 90 ns
3. Device stressed with ten non-repetitive ESD pulses according to IEC61000-4-2 (R = 330 Ω, C = 150 pF).

Capacitance vs. Reverse Bias



Clamping Voltage vs I_{PP}



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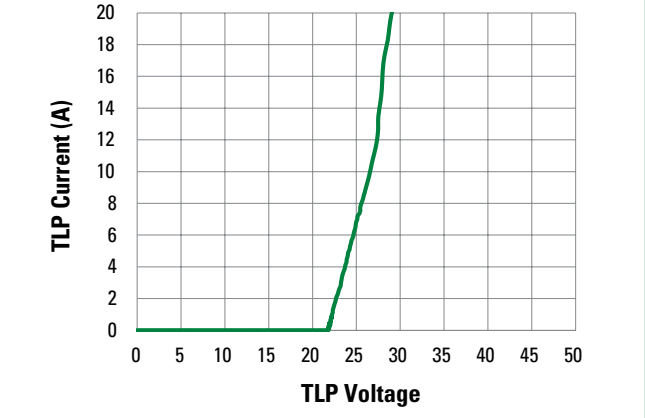
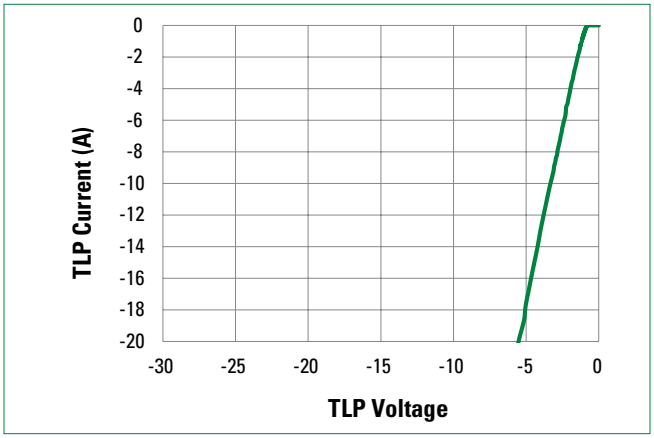
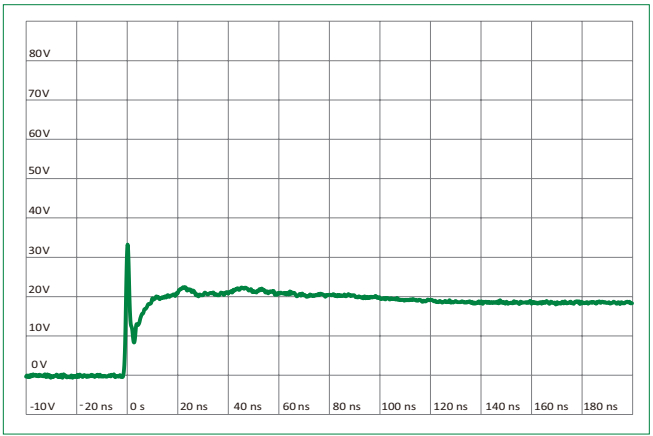
Positive Transmission Line Pulsing (TLP) Plot



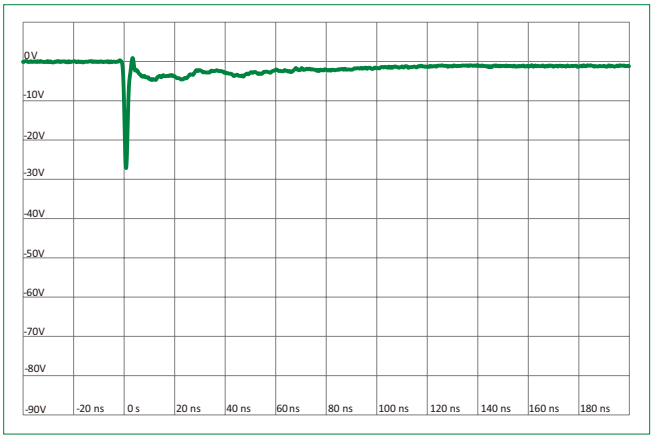
Negative Transmission Line Pulsing (TLP) Plot



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



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



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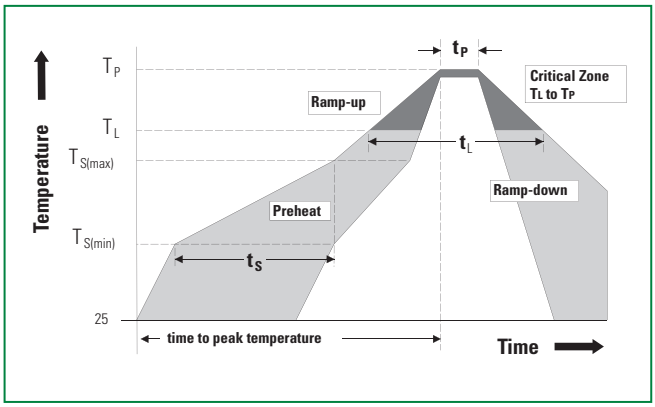
Soldering Parameters

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 seconds
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 max
Ramp-down Rate		6 °C/second max
Time 25 °C to Peak Temperature (T_P)		8 minutes max
Do Not Exceed		260 °C



Ordering Information

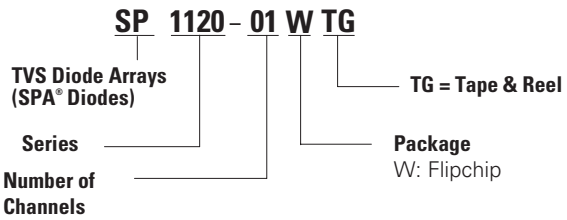
Part Number	Package	Min. Order Qty.
SP1120-01WTG	Flipchip	10000

Product Characteristics

Lead Plating	Tin plating
Lead Material	Copper bump
Flammability	UL recognized compound meeting flammability rating V-0

Part Marking System

Part Numbering System



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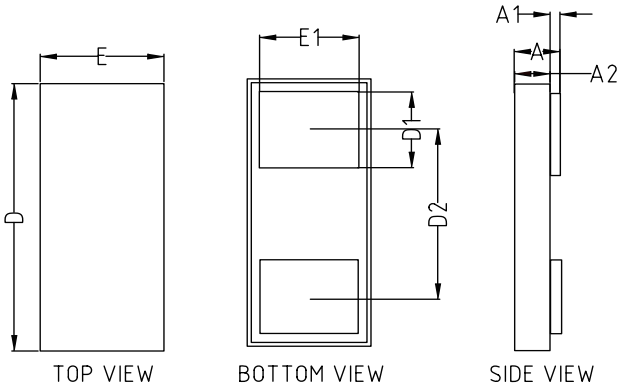
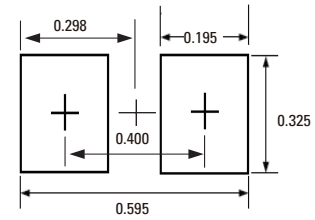
Package Dimensions — Flipchip

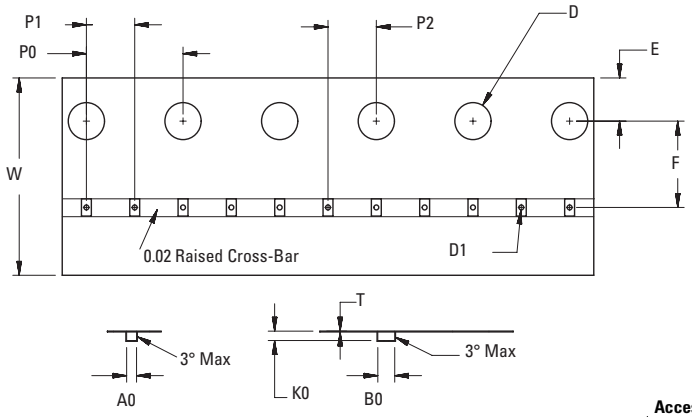


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
D	0.605	0.655	0.0238	0.0258
E	0.305	0.355	0.0120	0.0140
D1	0.145	0.155	0.0057	0.0061
E1	0.245	0.255	0.0096	0.0100
D2	0.400 BSC		0.0157 BSC	
A	0.273	0.329	0.0107	0.0130
A2	0.265	0.315	0.0104	0.0124
A1	0.008	0.014	0.0003	0.0006



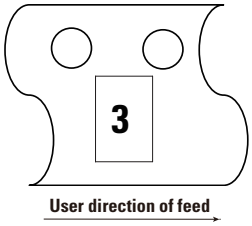
Recommended Soldering Pad Layout (mm)

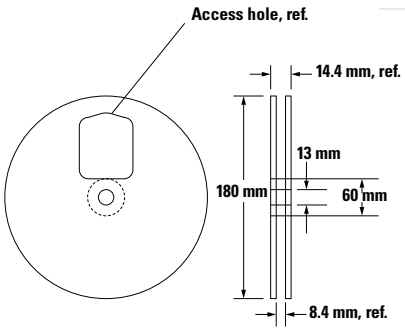
Embossed Carrier Tape & Reel Specification — Flipchip



Symbol	Millimeters
A0	0.39 +/-0.03
B0	0.69+/-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	0.35+/-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	0.20+/-0.02

Component Orientation in Tape





8 mm Tape and Reel

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