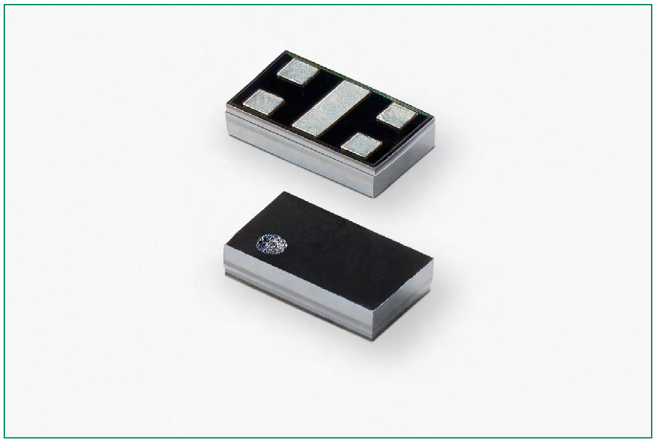
SP1015 Series

5pF, 20kV Bidirectional TVS Array

RoHS Pb GREEN



Description

The miniature 4 channel bidirectional TVS array provides protection for data lines that may experience destructive electrostatic discharges (ESD). These robust diodes can safely absorb repetitive ESD strikes well above the maximum level specified in the IEC 61000-4-2 international standard without performance degradation. The bidirectional configuration provides symmetrical ESD protection for data lines when AC signals are present.

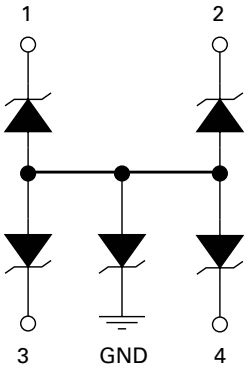
Features & Benefits

- RoHS compliant, Halogen-free and Lead-free
- ESD, IEC 61000-4-2, ±20kV contact, ±30kV air
- EFT, IEC 61000-4-4,40A (5/50ns)
- Lightning protection, IEC 61000-4-5 2nd Edition, 2.0A (tp=8/20µs)
- High density TVS Array available today
- 4 channels of protection in a 0.95x0.55mm footprint
- Touch screen and I²C interfaces

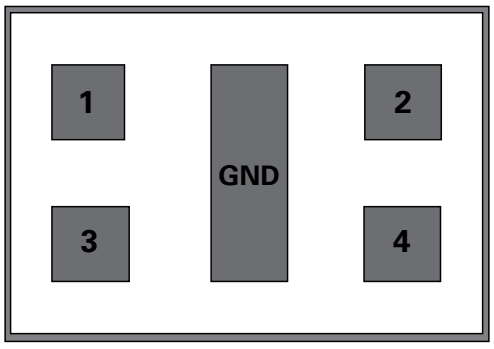
Applications

- Mobile Phones
- Wearable Technology
- Smart Phones
- eReaders/eBooks
- Tablets

Functional Block Diagram



Pinout



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=8/20µs)	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 device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Thermal Information

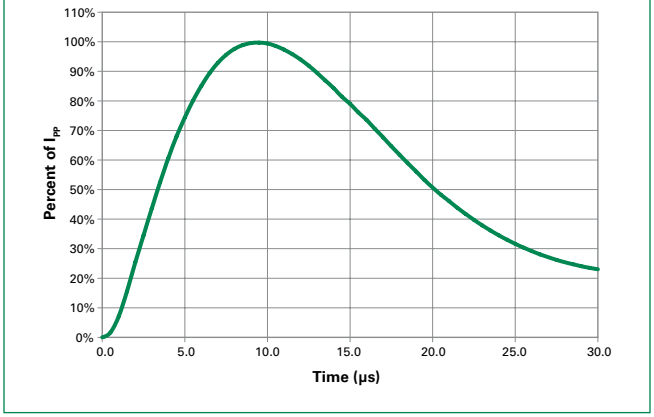
Parameter	Rating	Units
Storage Temperature Range	-55 to 150	°C
Maximum Junction Temperature	150	°C
Maximum Lead Temperature (Soldering 20-40s)	260	°C

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

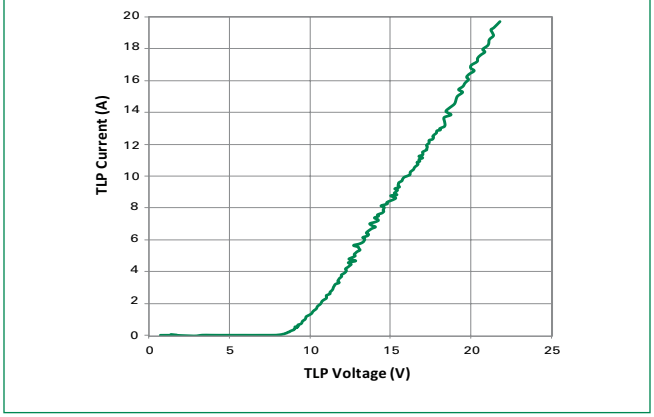
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}				5.0	V
Reverse Breakdown Voltage	V_{BD}	I_R=1mA	5.5			V
Leakage Current	I_R	V_R=3V			0.05	µA
		V_R=5V			0.1	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd		11		V
		I_{PP}=2A, t_p=8/20µs, Fwd		12		V
Dynamic Resistance [2]	R_{DYN}	TLP, t_p=100ns, I/O to GND		0.65		Ω
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±20			kV
		IEC 61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance[1]	C_D	Reverse Bias=0V (I/O to GND)		5		pF

Note:
[1] Parameter is guaranteed by design and/or device characterization.
[2] Transmission Line Pulse (TLP) with 100ns width and 200ps rise time.

Pulse Waveform



Transmission Line Pulse (TLP)



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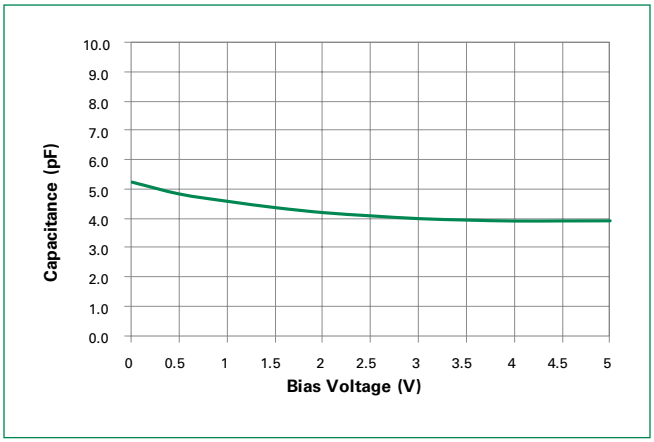
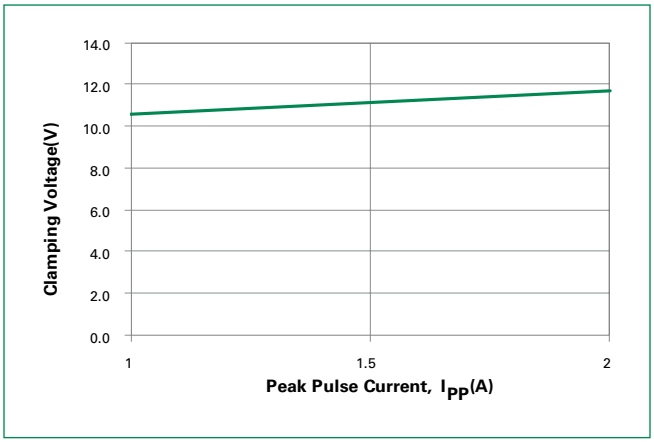
Capacitance vs. Reverse Bias

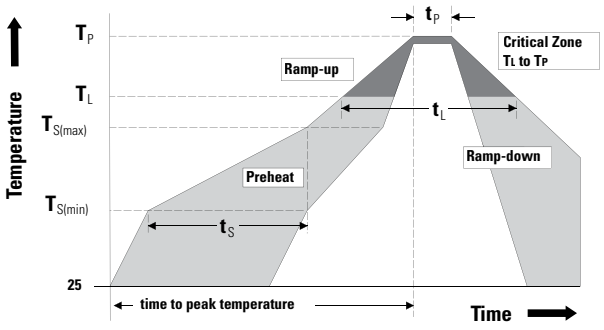


Clamping Voltage vs. IPP

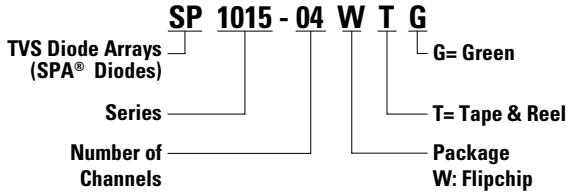


Soldering Parameters

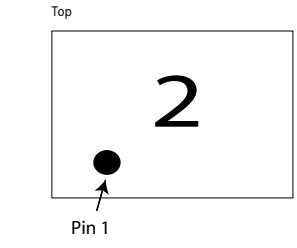
Reflow Condition		Pb – Free assembly
Pre Heat	**- Temperature Min ($T_{s(min)}$)**	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 120 secs
Average ramp up rate (Liquidus) Temp (T_L) to peak		3°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	**- Temperature (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

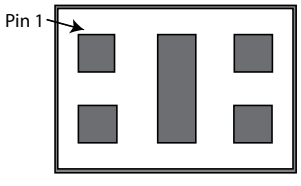


Part Numbering System



Part Marking System





Ordering Information

Part Number	Package	Marking	Min. Order Qty.	Packaging Option	P0/P1	Packaging Specification
SP1015-04WTG	0.95x0.55mm Flip Chip	2	5000	Tape & Reel – 8mm tape/7" reel	2mm/2mm	EIA RS-481

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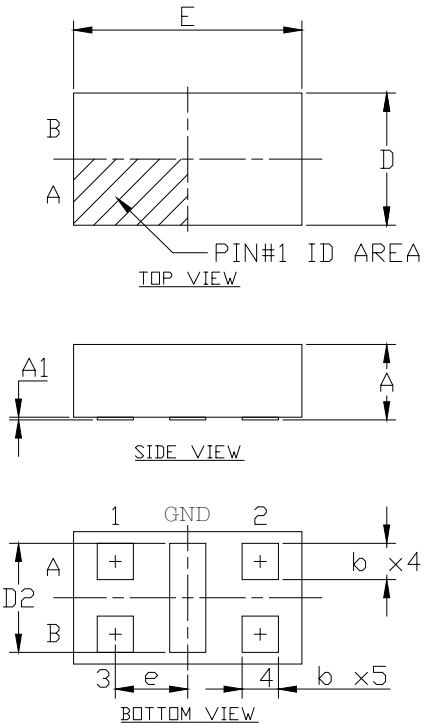
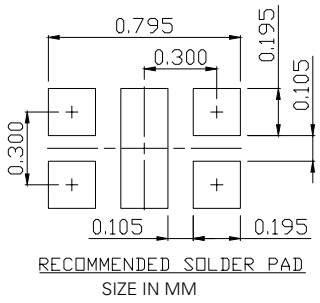
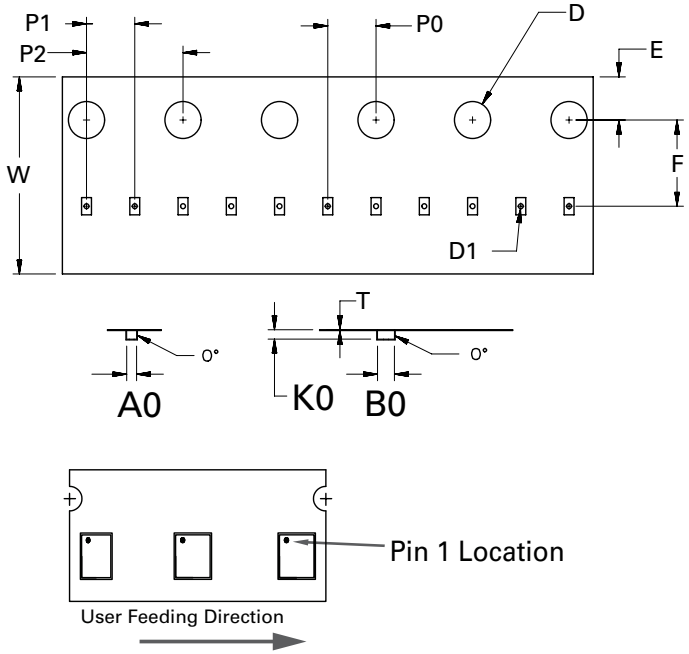
Package Dimensions



Symbol	0.95x0.55mm Flip Chip					
	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
A	0.294	0.311	0.328	0.0116	0.0122	0.0129
A1	0.009	0.011	0.013	0.0004	0.0004	0.0005
b	0.147	0.150	0.153	0.0058	0.0059	0.0060
D	0.525	0.545	0.565	0.0207	0.0215	0.0222
E	0.925	0.945	0.965	0.0364	0.0372	0.0380
D2	0.447	0.450	0.453	0.0176	0.0177	0.0178
e		0.300			0.0118	



Embossed Carrier Tape & Reel Specification



Symbol	Millimeters
A0	0.66+/-0.03
B0	1.06+/-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	0.39+/-0.03
P0	2.00+/-0.05
P1	2.00+/-0.05
P2	4.00+/-0.10
W	8.00 + 0.30 -0.10
T	0.20+/-0.02

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