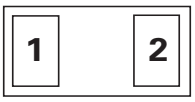
SP1043 Series 8pF 12kV Unidirectional Discrete TVS

HF RoHS Pb GREEN

Description

Zener diodes fabricated in a proprietary silicon avalanche technology protect each I/O pin to provide a high level of protection for electronic equipment that may experience destructive electrostatic discharges (ESD). These robust diodes can safely absorb repetitive ESD strikes at ±12kV (contact discharge, IEC 61000-4-2) without performance degradation.

Pinout



Note: Drawing not to scale

Features

- ESD, IEC 61000-4-2, ±12kV contact, ±15kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, IEC 61000-4-5,2nd edition, 1A (t_P=8/20μs)
- Low capacitance of 8pF (@ V_R=0V)
- Low leakage current of 0.1μA at 5V
- Industries smallest ESD footprint available (01005)
- Halogen free, Lead free and RoHS compliant

Functional Block Diagram

Applications

- Mobile Phones
- Smart Phones
- Camcorders
- Portable Medical
- Digital Cameras
- Wearable Technology
- Portable Navigation Devices
- Tablets
- Point of Sale Terminals

Revision: 12/07/16

TVS Diode Arrays (SPA® Diodes)

General Purpose ESD Protection - SP1043 Series

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p=8/20µs)	1.0 [1]	A
T_{OP}	Operating Temperature	-40 to 125	°C
T_{STOR}	Storage Temperature	-55 to 150	°C

Notes:

1. 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)

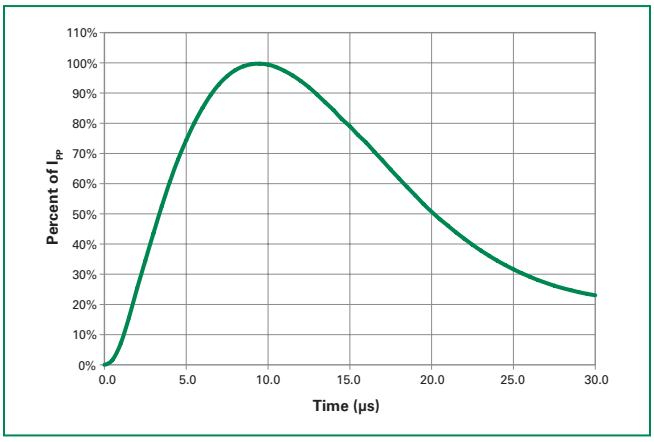
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}				6.0	V
Leakage Current	I_{LEAK}	V_R=5V with 1 pin at GND		0.1	0.5	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd		9.0		V
Dynamic Resistance[2]	R_{DYN}	TLP, t_P=100ns, I/O to GND		0.45		Ω
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±12			kV
		IEC 61000-4-2 (Air Discharge)	±15			kV
Diode Capacitance[1]	C_D	Reverse Bias=0V		8	10	pF

Note:

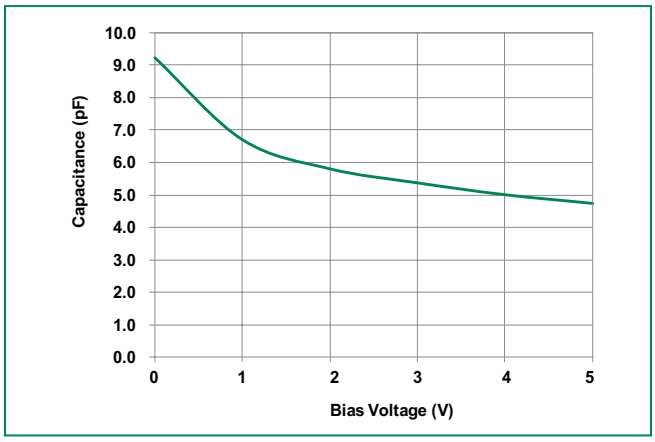
1 Parameter is guaranteed by design and/or device characterization.

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

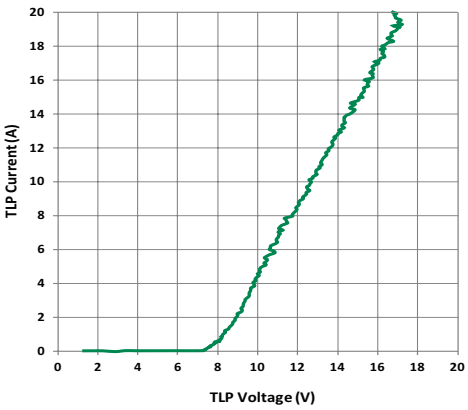


Revision: 12/07/16

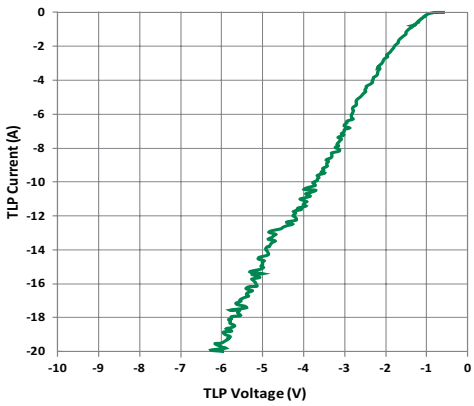
TVS Diode Arrays (SPA® Diodes)

General Purpose ESD Protection - SP1043 Series

Positive Transmission Line Pulsing (TLP) Plot

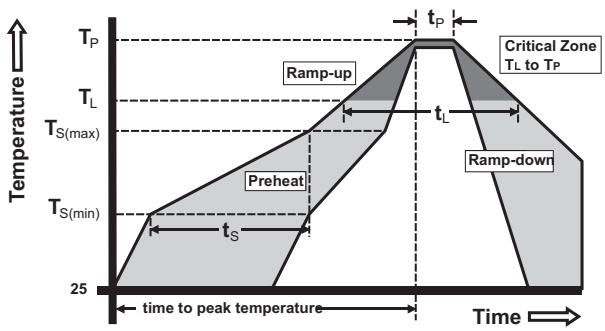


Negative Transmission Line Pulsing (TLP) Plot

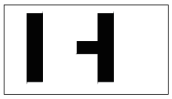


Soldering Parameters

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)		$260^{+0/-5}$ °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



Part Marking System



Part Numbering System

SP 1043 - 01 W T G

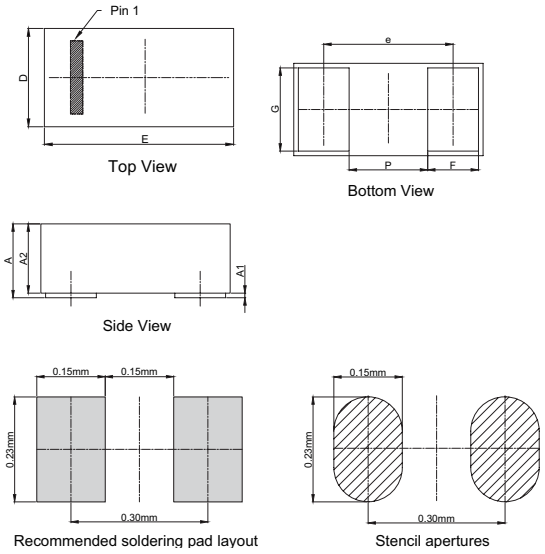
- SP: TVS Diode Arrays (SPA® Diodes)
- 1043: Series
- 01: Number of Channels
- W: Package — W: 01005 Flipchip
- T: T= Tape & Reel
- G: G= Green

Ordering Information

Part Number	Package	Min. Order Qty.
SP1043-01WTG	01005 Flipchip	15000

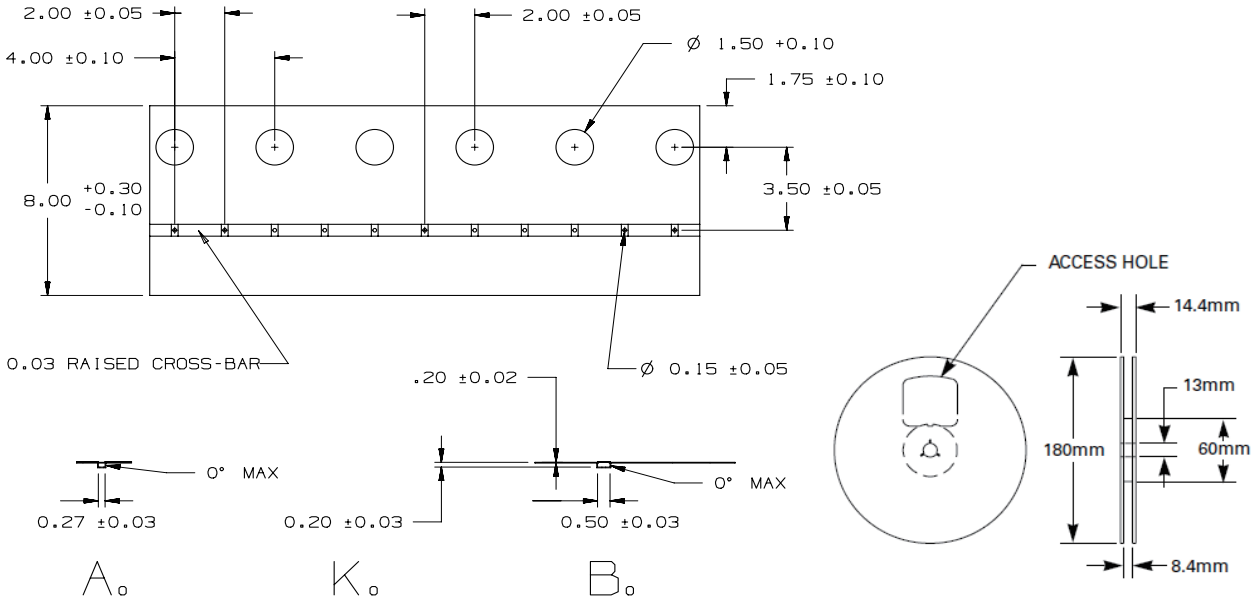
Revision: 12/07/16

Package Dimensions — 01005 Flipchip



Symbol	01005 Flipchip					
	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
A	0.168	0.181	0.194	0.007	0.007	0.008
A1	0.008	0.011	0.014	0.000	0.000	0.001
A2	0.160	0.170	0.180	0.006	0.007	0.007
e	0.280 BSC			0.011 BSC		
D	0.200	0.230	0.260	0.008	0.009	0.010
E	0.400	0.430	0.460	0.016	0.017	0.018
F	0.110	0.130	0.150	0.004	0.005	0.006
G	0.180	0.200	0.220	0.007	0.008	0.009
P	0.130	0.150	0.170	0.005	0.006	0.007

Embossed Carrier Tape & Reel Specification — 01005 Flipchip



Revision: 12/07/16