

SP3042 Series 0.35pF 30kV Bidirectional Discrete TVS









Description

The SP3042 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 IEC 61000-4-2 international standard (±30kV contact discharge) without performance degradation. The back-to-back configuration provides symmetrical ESD protection for data lines when AC signals are present and the low loading capacitance makes it ideal for protecting high speed data lines such as HDMI, USB2.0, USB3.0 and eSATA.

Pinout



Features

- ESD protection of ±30kV contact discharge, ±30kV air discharge, (IEC 61000-4-2)
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, IEC 61000-4-5 2nd edition, 2A $(t_s = 8/20 \mu s)$
- · Low capacitance of $0.35pF @ V_{R} = 0V (TYP)$
- · Low leakage current of 100nA at 5.3V (MAX)
- Space efficient 01005 footprint
- Lead free and RoHS compliant

Functional Block Diagram



Applications

- USB 3.0/USB 2.0/MHL
- MIPI Camera and Display
- HDMI 2.0, DisplayPort 1.3, eSATA
- IoT Modules
- Smart Phones
- External Storage
- Ultrabooks, Notebooks
- Tablets, eReaders
- Security Modules

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

TVS Diode Arrays (SPA® Diodes) Low Capacitance ESD Protection - SP3042 Series

Absolute Maximum Ratings

Symbol	Parameter	Value	Units	
P _{PK}	Peak Pulse Power (t _p =8/20µs)	20	W	
I _{PP}	Peak Current (t _p =8/20µs)	2.0	А	
T _{OP}	Operating Temperature	-40 to 125	°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.

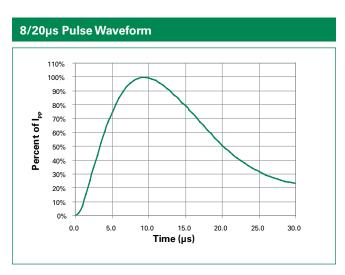
Electrical Characteristics (T_{OP}=25°C)

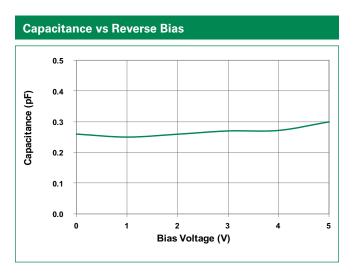
Parameter	Symbol	Test Conditions	Min	Тур	Max	Units
Reverse Standoff Voltage	V _{RWM}	-	-	-	5.3	V
Breakdown Voltage	V _{BR}	1 _R =1mA	-	7.8		V
Reverse Leakage Current	I _{LEAK}	V _R =5.3V	-	-	100	nA
Clamp Voltage ¹	V _c	$I_{pp}=1A, t_{p}=8/20\mu s, Fwd$	-	12.5	-	V
Dynamic Resistance ²	R _{DYN}	TLP, tp=100ns, I/O to GND	-	0.5	-	Ω
ESD Withstand Voltage ¹	V _{ESD}	IEC 61000-4-2 (Contact)	±30	-	-	kV
		IEC 61000-4-2 (Air)	±30	-	-	kV
Diode Capacitance ¹	C _D	Reverse Bias=0V	-	0.35	0.5	pF

Note:

 $\textbf{1.} \ \mathsf{Parameter} \ \mathsf{is} \ \mathsf{guaranteed} \ \mathsf{by} \ \mathsf{design} \ \mathsf{and/or} \ \mathsf{component} \ \mathsf{characterization}.$

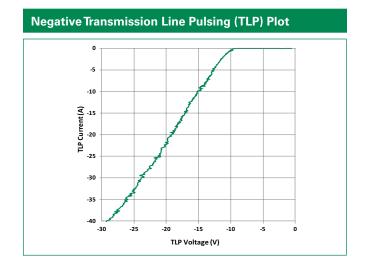
2. Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window t1=70ns to t2= 90ns





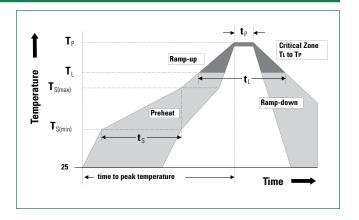


Positive Transmission Line Pulsing (TLP) Plot 35 30 TLP Current (A) 15 10 5 TLP Voltage (V)



Soldering Parameters

Reflow Cond	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 ram	3°C/second max		
T _{S(max)} to T _L -	3°C/second max		
Reflow	-Temperature (T _L) (Liquidus)	217°C	
	-Temperature (t _L)	60 – 150 seconds	
Peak Temper	260 ^{+0/-5} °C		
Time within	20 - 40 seconds		
Ramp-down	6°C/second max		
Time 25°C to	8 minutes Max.		
Do not exce	260°C		



Product Characteristics of 01005 Flipchip

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

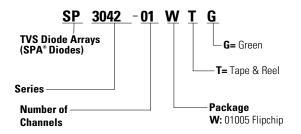
- 2. Dimensions include solder plating.
 3. Dimensions are exclusive of mold flash & metal burr.

Ordering Information

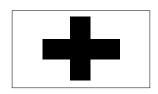
Part Number	Package	Marking	Min. Order Qty.	Packaging Option	P0/P1	Packaging Specification
SP3042-01WTG	01005 Flipchip	+	15000	Tape & Reel – 8mm tape/7" reel	4mm/2mm	EIA RS-481



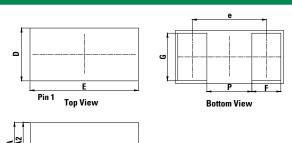
Part Numbering System



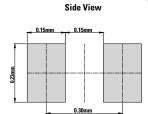
Part Marking System



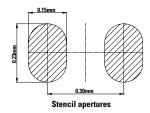
Package Dimensions — 01005 Flipchip



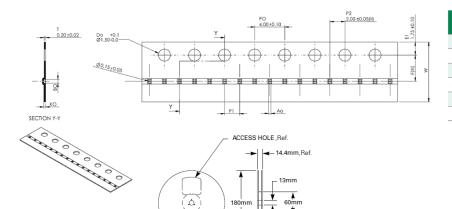
	01005 Filipenip						
Symbol	Millimeters		;	Inches			
	Min	Тур	Max	Min	Тур	Max	
Α	0.168	0.181	0.194	0.0066	0.0071	0.0076	
A1	0.008	0.011	0.014	0.0003	0.0004	0.0006	
A2	0.160	0.170	0.180	0.0063	0.0067	0.0071	
е	0.280 BSC			0.011 BSC			
D	0.200	0.230	0.260	0.0079	0.0091	0.0102	
E	0.400	0.430	0.460	0.0157	0.0169	0.0181	
F	0.110	0.130	0.150	0.0043	0.0051	0.0059	
G	0.180	0.200	0.220	0.0071	0.0079	0.0087	
P	0.130	0.150	0.170	0.0051	0.0059	0.0067	



Recommended soldering pad layout



Embossed Carrier Tape & Reel Specification — 01005 Flipchip



Symbol	Millimeters		
Α0	0.30+/-0.03		
В0	0.51+/-0.03		
K0	0.20 + 0.03		
F	3.50 +/- 0.05		
P1	2.00+/-0.10		
W	8.00+/-0.10		