

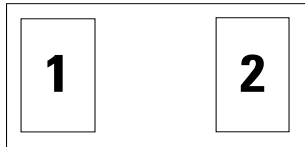
**SP3042 Series 0.35pF 30kV Bidirectional Discrete TVS**



**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 ( $\pm 30\text{kV}$  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  $\pm 30\text{kV}$  contact discharge,  $\pm 30\text{kV}$  air discharge, (IEC 61000-4-2)
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, IEC 61000-4-5 2nd edition, 2A ( $t_p=8/20\mu\text{s}$ )
- Low capacitance of  $0.35\text{pF}$  @  $V_R=0\text{V}$  (TYP)
- Low leakage current of  $100\text{nA}$  at  $5.3\text{V}$  (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.

### Absolute Maximum Ratings

Symbol	Parameter	Value	Units
$P_{PK}$	Peak Pulse Power ( $t_p=8/20\mu s$ )	20	W
$I_{PP}$	Peak Current ( $t_p=8/20\mu s$ )	2.0	A
$T_{OP}$	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.

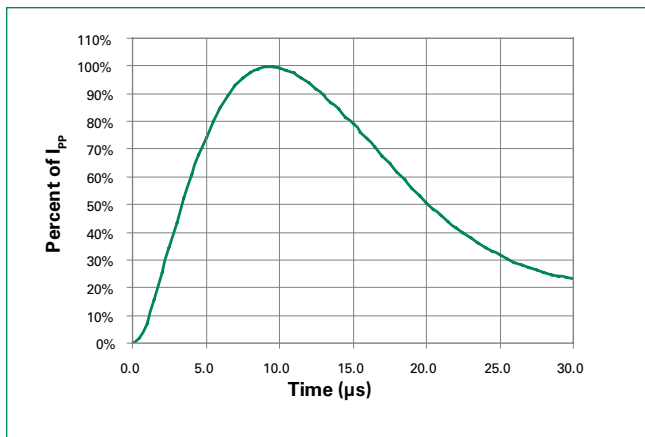
### Electrical Characteristics ( $T_{OP}=25^\circ C$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$	-	-	-	5.3	V
Breakdown Voltage	$V_{BR}$	$I_R=1mA$	-	7.8	-	V
Reverse Leakage Current	$I_{LEAK}$	$V_R=5.3V$	-	-	100	nA
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP}=1A, t_p=8/20\mu s, Fwd$	-	12.5	-	V
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p=100ns, I/O$ to GND	-	0.5	-	$\Omega$
ESD Withstand Voltage <sup>1</sup>	$V_{ESD}$	IEC 61000-4-2 (Contact)	$\pm 30$	-	-	kV
		IEC 61000-4-2 (Air)	$\pm 30$	-	-	kV
Diode Capacitance <sup>1</sup>	$C_D$	Reverse Bias=0V	-	0.35	0.5	pF

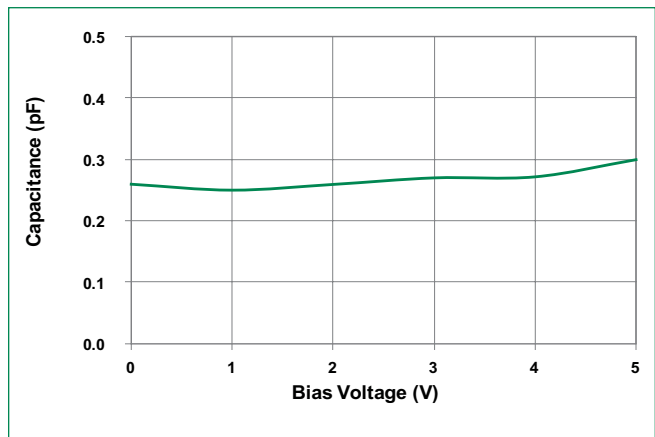
**Note:**

- Parameter is guaranteed by design and/or component characterization.
- Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window  $t_1=70ns$  to  $t_2=90ns$

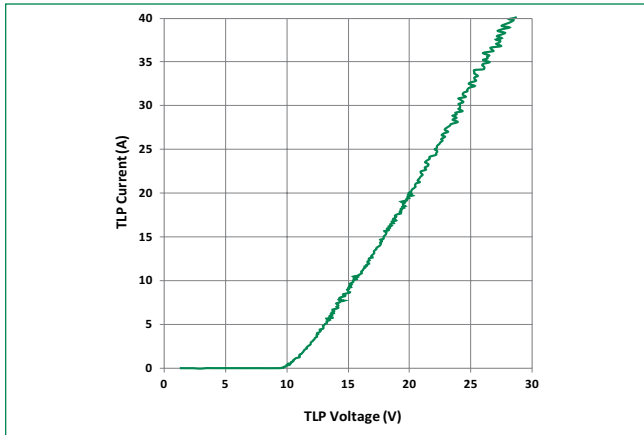
### 8/20 $\mu s$ Pulse Waveform



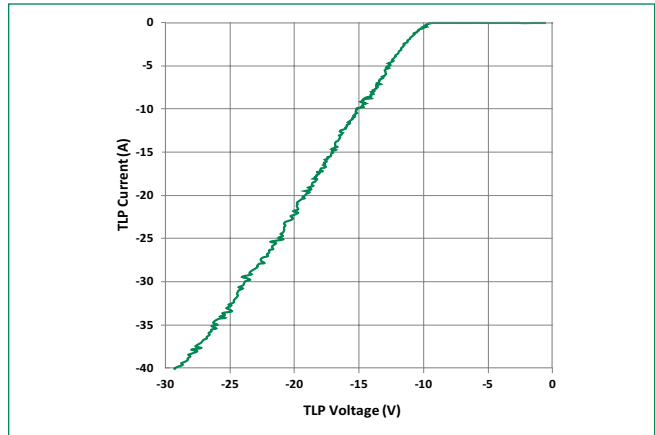
### Capacitance vs Reverse Bias



### Positive Transmission Line Pulsing (TLP) Plot

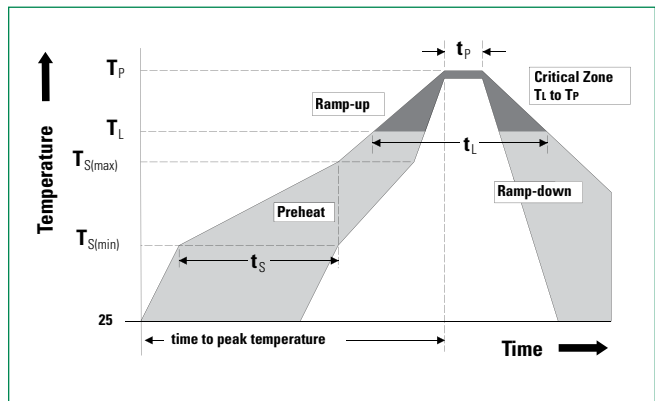


### Negative Transmission Line Pulsing (TLP) Plot



### Soldering Parameters

<b>Reflow Condition</b>		Pb - Free assembly
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 - 180 secs
<b>Average ramp up rate (Liquidus) Temp (<math>T_L</math>) to peak</b>		3°C/second max
<b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>		3°C/second max
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Temperature ( $t_l$ )	60 - 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>		260 <sup>+0/-5</sup> °C
<b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>		20 - 40 seconds
<b>Ramp-down Rate</b>		6°C/second max
<b>Time 25°C to peak Temperature (<math>T_p</math>)</b>		8 minutes Max.
<b>Do not exceed</b>		260°C



### Product Characteristics of 01005 Flipchip

<b>Lead Plating</b>	Sn
<b>Lead Material</b>	Copper
<b>Lead Coplanarity</b>	6µm(max)
<b>Substrate material</b>	Silicon
<b>Body Material</b>	Silicon

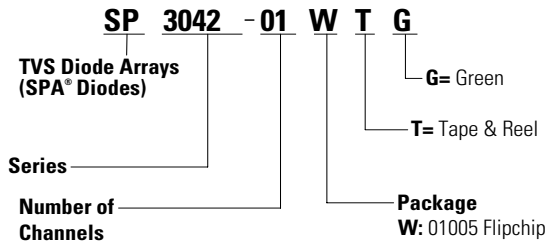
**Notes :**

1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.

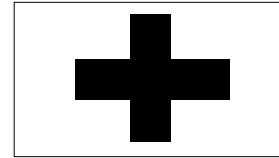
### Ordering Information

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

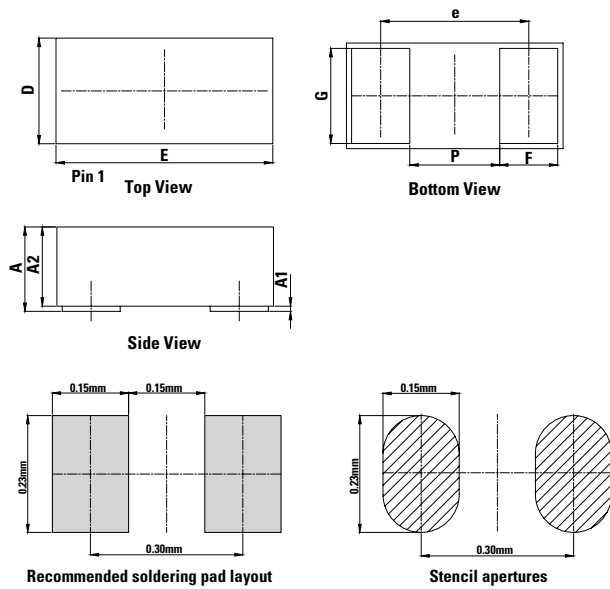
**Part Numbering System**



**Part Marking System**

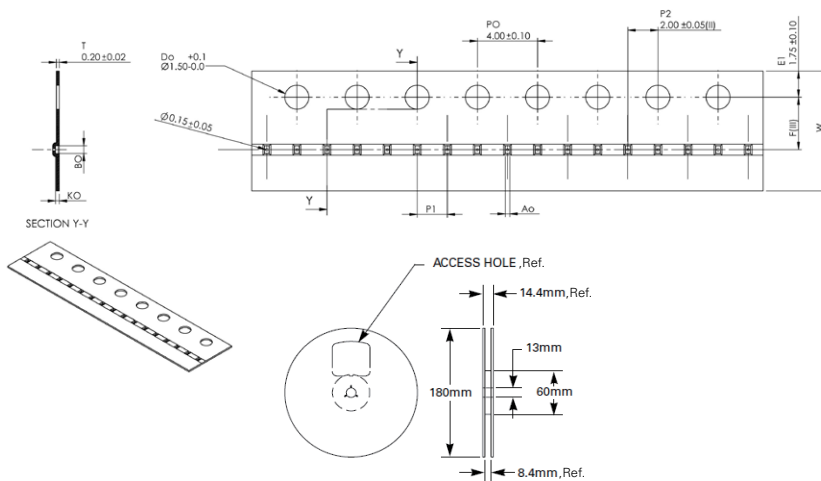


**Package Dimensions — 01005 Flipchip**



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

**Embossed Carrier Tape & Reel Specification — 01005 Flipchip**



Symbol	Millimeters
<b>A0</b>	0.30+/-0.03
<b>B0</b>	0.51+/-0.03
<b>K0</b>	0.20 + 0.03
<b>F</b>	3.50 +/- 0.05
<b>P1</b>	2.00+/-0.10
<b>W</b>	8.00+/-0.10

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