

## DESCRIPTION

JULC0521P is a low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 0.45pF only, JULC0521P is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC 61000-4-2 (ESD), Level 4 ( $\pm 15\text{kV}$  air,  $\pm 8\text{kV}$  contact discharge), IEC 61000-4-4 (electrical fast transient - EFT) (40A, 5/50 ns), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc.

JULC0521P uses ultra-small uDFN-2L package or FBP1006. Each JULC0521P device can protect one high-speed data line. It offers system designers flexibility to protect single data line where space is a premium concern. The combined features of low capacitance, ultra-small size and high ESD robustness make JULC0521P ideal for high-speed data port and high-frequency line (e.g., USB 2.0 & antenna line) applications, such as cellular phones and HD visual devices.

## APPLICATIONS

- ✧ Serial ATA.
- ✧ Desktops, Servers and Notebooks.
- ✧ Cellular Phones.
- ✧ MDDI Ports.
- ✧ USB2.0 Power and Data Line Protection.
- ✧ Display Ports  
Digital Visual Interfaces (DVI).

## FEATURES

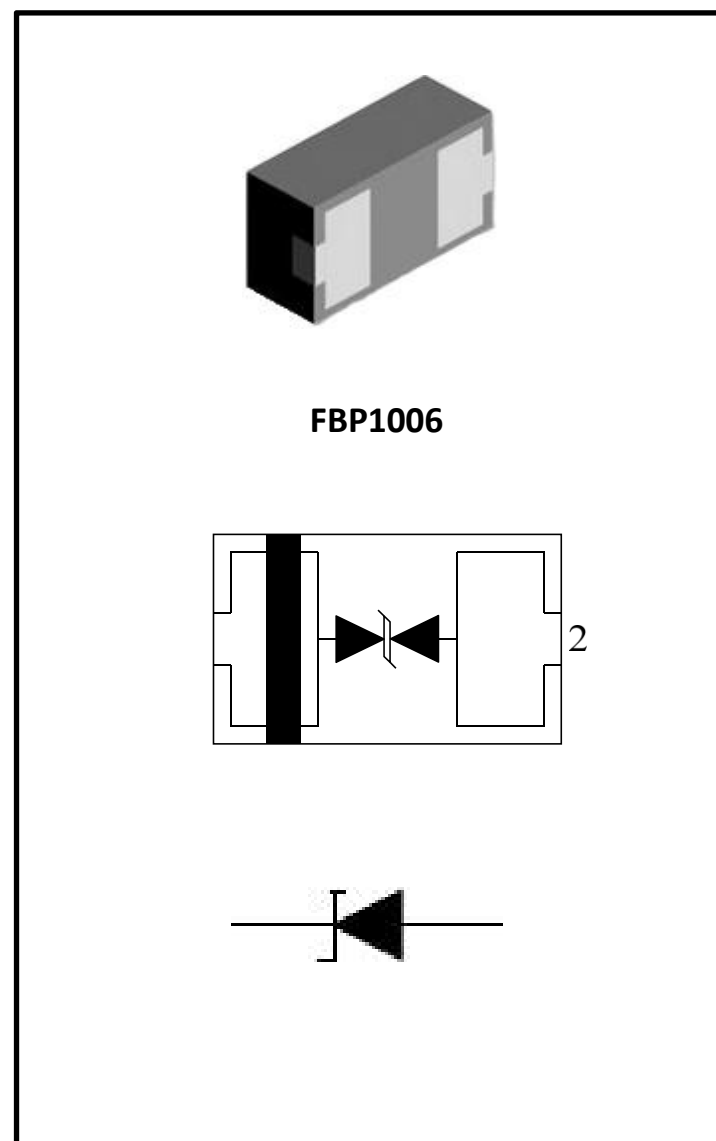
- ✧ Transient protection for high-speed datalines IEC 61000-4-2 (ESD)  $\pm 15\text{kV}$  (Air)  
 $\pm 8\text{kV}$  (Contact) IEC 61000-4-4 (EFT) 40A (5/50 ns)  
Cable Discharge Event (CDE).
- ✧ Package optimized for high-speed lines.
- ✧ Ultra-small package (1.0mm $\times$ 0.6mm $\times$ 0.4mm).
- ✧ Protects one data, control or power line.
- ✧ Low capacitance: 0.45pF (Typical).
- ✧ Low leakage current: 10nA @ VRWM (Typical)  
Low clamping voltage.

## ORDERING INFORMATION

- ✧ Device: JULC0521P
- ✧ Package: uDFN-2L or FBP1006
- ✧ Marking: S
- ✧ Material: Halogen free
- ✧ Packing: Tape & Reel
- ✧ Quantity per reel: 5,000pcs or 10,000pcs

## MACHANICAL DATA

- ✧ uDFN-2L package or FBP1006
- ✧ Flammability Rating: UL 94V-0
- ✧ Packaging: Tape and Reel
- ✧ High temperature soldering guaranteed:  $260^{\circ}\text{C}/10\text{s}$   
Reel size: 7 inch

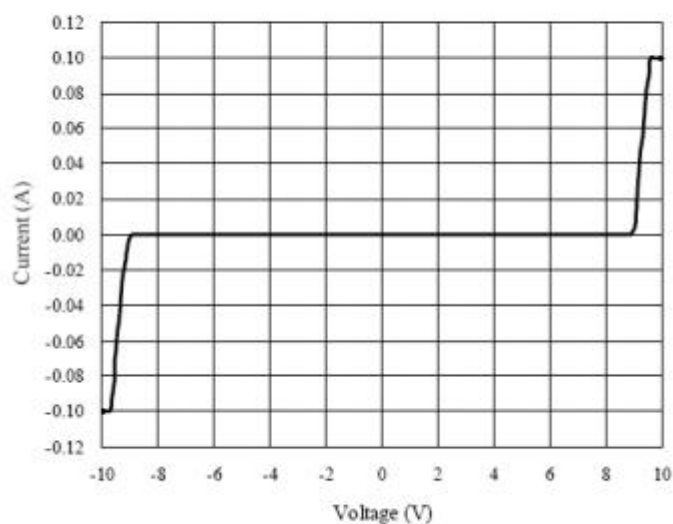
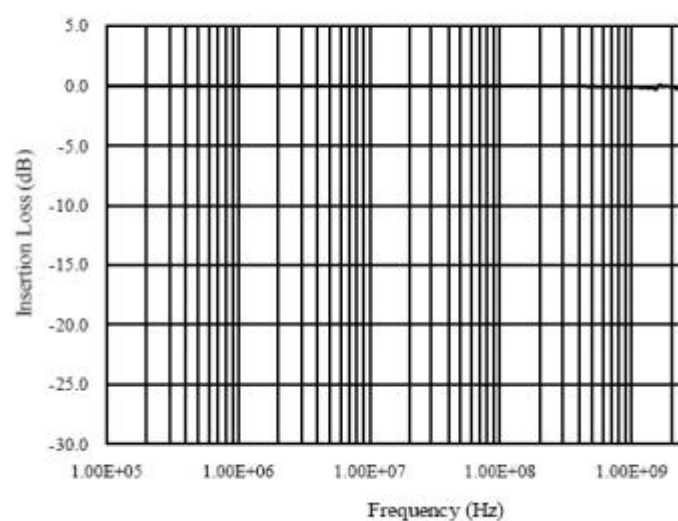


**DEVICE CHARACTERISTICS**

ABSOLUTE MAXIMUM RATING			
Symbol	Parameter	Value	Units
$V_{ESD}$	ESD per IEC 61000-4-2 (Air)	$\pm 17$	kV
	ESD per IEC 61000-4-2 (Contact)	$\pm 12$	
$T_{OPT}$	Operating Temperature	-55/+125	°C
$T_{STG}$	Storage Temperature	-55/+150	°C

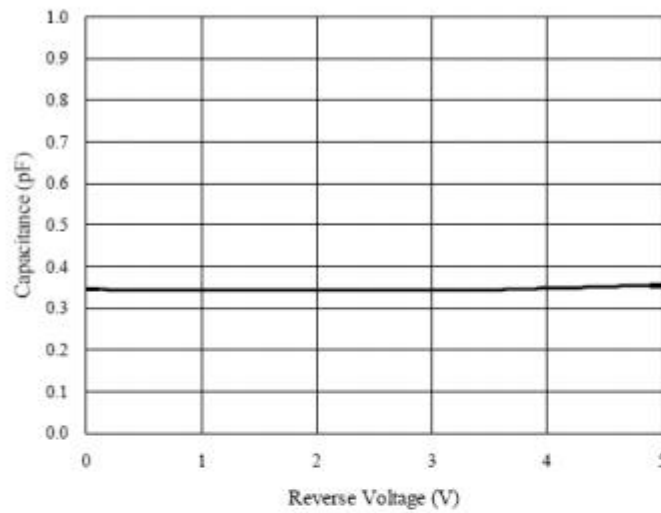
**ELECTRICAL CHARACTERISTICS ( $T_A=25^{\circ}\text{C}$ )**

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
$V_{RWM}$	Reverse Working Voltage				5.0	V
$V_{BR}$	Reverse Breakdown Voltage	$I_T = 1\text{mA}$	6.0		7.8	V
$I_R$	Reverse Leakage Current	$V_{RWM} = 5\text{V}$		0.01	1.0	$\mu\text{A}$
$V_{C1}$	Clamping Voltage 1	$I_{PP} = 1\text{A}$ , $t_p = 8/20\mu\text{s}$			12	V
$V_{C2}$	Clamping Voltage 2	$I_{PP} = 2\text{A}$ , $t_p = 8/20\mu\text{s}$			14	V
$C_J$	Junction Capacitance	$V_R = 0\text{V}$ , $f = 1\text{MHz}$		0.45	0.65	pF

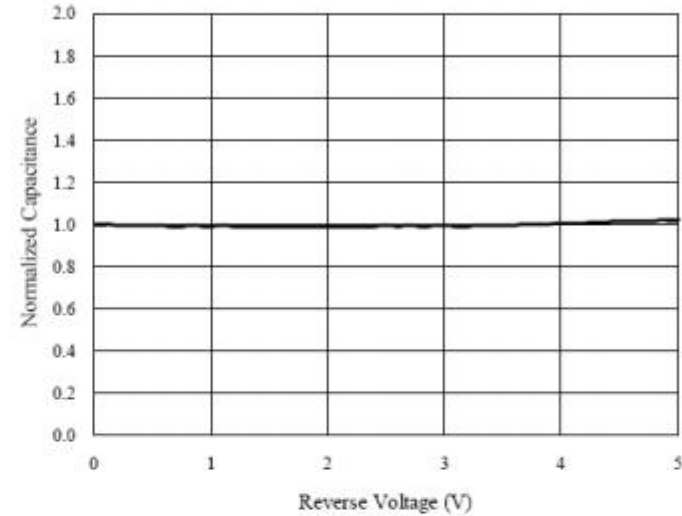
**Voltage Sweeping of I/O to I/O**

**Insertion Loss S21 of I/O to I/O**


### Capacitance vs. Voltage of I/O to I/O (f = 1MHz)

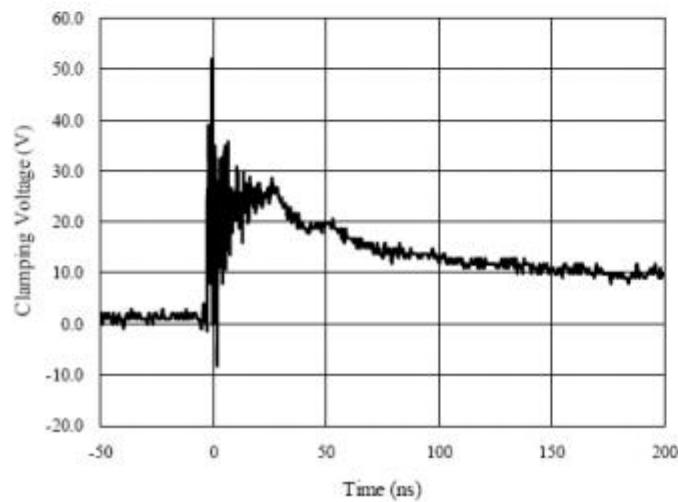
Capacitance vs. Reverse Voltage



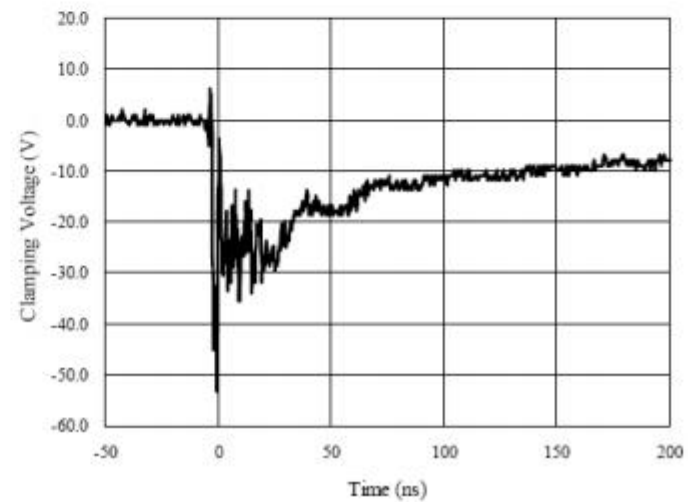
Normalized Capacitance vs. Reverse Voltage



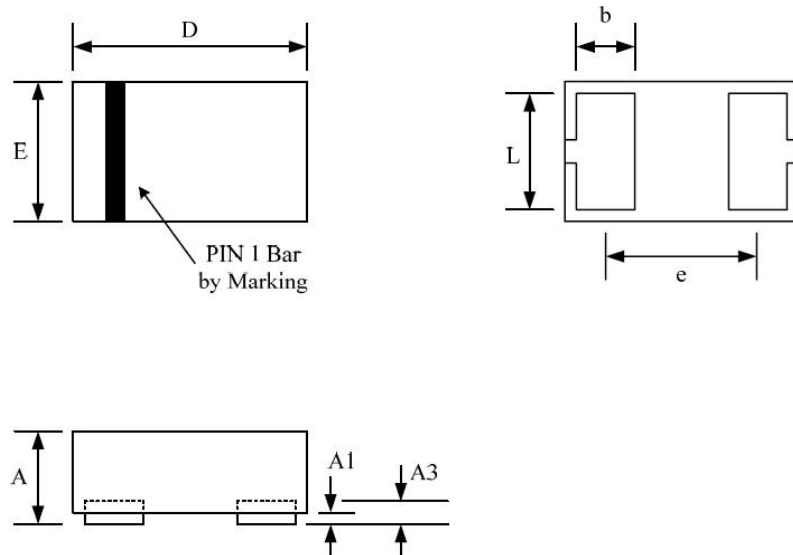
**ESD Clamping of I/O to I/O  
(+8kV Contact per IEC 61000-4-2)**



**ESD Clamping of I/O to I/O  
(-8kV Contact per IEC 61000-4-2)**

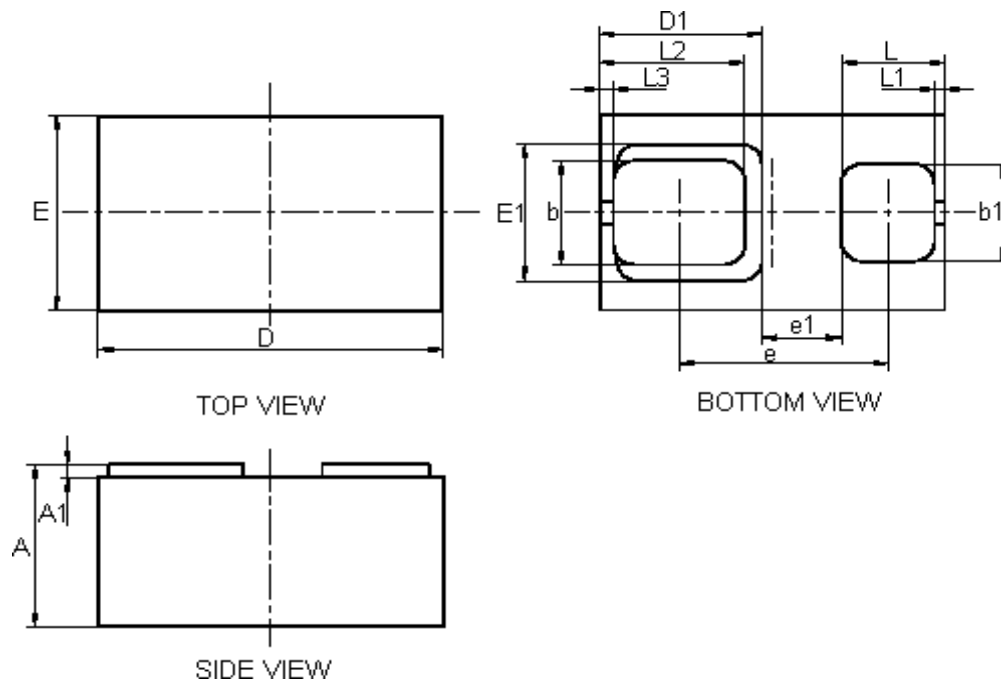


### uDFN-2L PACKAGE OUTLINE DIMENSIONS



Package Dimensions (Controlling dimensions are in millimeters)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Minimum	Maximum	Minimum	Maximum
A	0.400	0.550	0.016	0.022
A1	0.000	0.050	0.000	0.002
A3	0.125 REF		0.005 REF	
D	0.950	1.050	0.037	0.041
E	0.550	0.650	0.022	0.026
b	0.200	0.300	0.008	0.012
e	0.650 BSC		0.026 BSC	
L	0.450	0.550	0.018	0.022

**FBP1006 PACKAGE OUTLINE DIMENSIONS**


Symbol	Millimeters		Inches	
	Min	Max	Min	Max
<b>A</b>	0.450	0.550	0.018	0.022
<b>A1</b>	0.010	0.100	0.000	0.004
<b>D</b>	0.950	1.050	0.037	0.041
<b>E</b>	0.550	0.650	0.022	0.026
<b>D1</b>	0.470 REF		0.019 REF	
<b>E1</b>	0.420 REF		0.017 REF	
<b>b</b>	0.270	0.370	0.011	0.015
<b>b1</b>	0.250	0.350	0.010	0.014
<b>e</b>	0.555	0.655	0.022	0.026
<b>e1</b>	0.230 REF		0.009 REF	
<b>L</b>	0.250	0.350	0.010	0.014
<b>L1</b>	0.030 REF		0.001 REF	
<b>L2</b>	0.370	0.470	0.015	0.019
<b>L3</b>	0.040 REF		0.002 REF	

Website: <http://www.jksemi.com> For additional information,  
 please contact your local Sales Representative.

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