

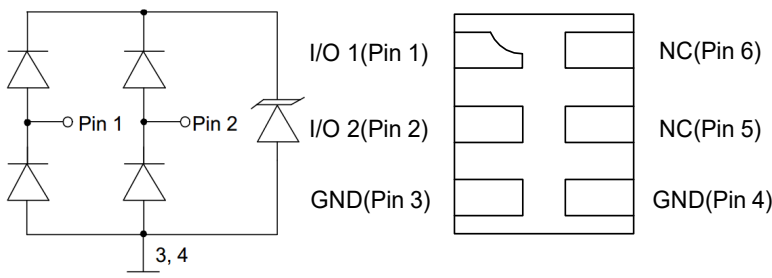
## Description

The DL0502P6-SB is an uni-directional TVS diode array, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive high-speed data lines. The DL0502P6-SB has an ultra-low capacitance with a typical value at 0.6pF, and complies with the IEC 61000-4-2 (ESD) standard with  $\pm 20\text{kV}$  air and  $\pm 20\text{kV}$  contact discharge. It is assembled into an ultra-small 1.6x1.0x0.50mm lead-free DFN package. The small size, ultra-low capacitance and high ESD surge protection make DL0502P6-SB an ideal choice to protect cell phone, digital video interfaces and other high speed ports.

## Mechanical Characteristics

- ◆ Package: DFN1610-6
- ◆ Case Material: "Green" Molding Compound.
- ◆ Moisture Sensitivity: Level 3 per J-STD-020
- ◆ Terminal Connections: See Diagram Below
- ◆ Marking Information: See Below

## Dimensions and Pin Configuration



Circuit Schematic

PIN Schematic

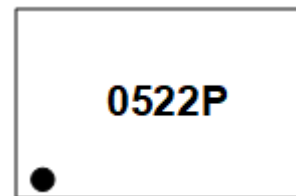
## Features

- ◆ Ultra small package: 1.6 x1.0 x0.50mm
- ◆ Ultra low capacitance: 1.0pF typical
- ◆ Ultra low leakage: nA level
- ◆ Operating voltage: 5V
- ◆ Low clamping voltage
- ◆ 6-pin leadless package
- ◆ Protects two lines
- ◆ Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test
    - Air discharge:  $\pm 20\text{kV}$
    - Contact discharge:  $\pm 20\text{kV}$
  - IEC 61000-4-5 (Lightning) 6A (8/20 $\mu\text{s}$ )
- ◆ RoHS Compliant

## Applications

- ◆ Cellular Handsets and Accessories
- ◆ USB Ports
- ◆ Video Interface
- ◆ MDDI Ports

## Marking Information



0522P = Device Marking Code

Dot denotes Pin1

## Ordering Information

Part Number	Marking	Packaging	Reel Size
DL0502P6-SB	0522P	3000/Tape & Reel	7 inch

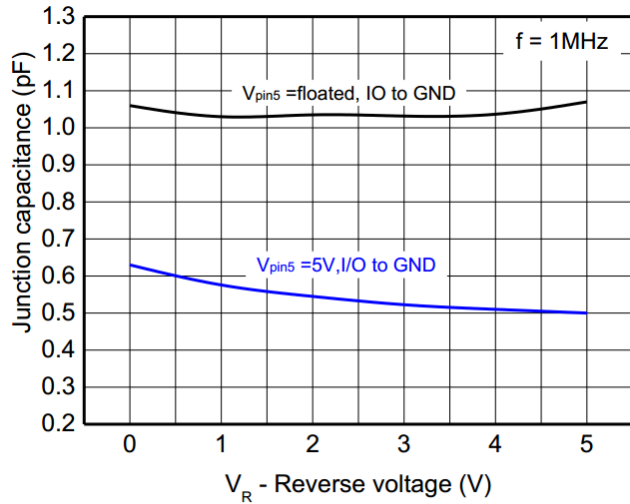
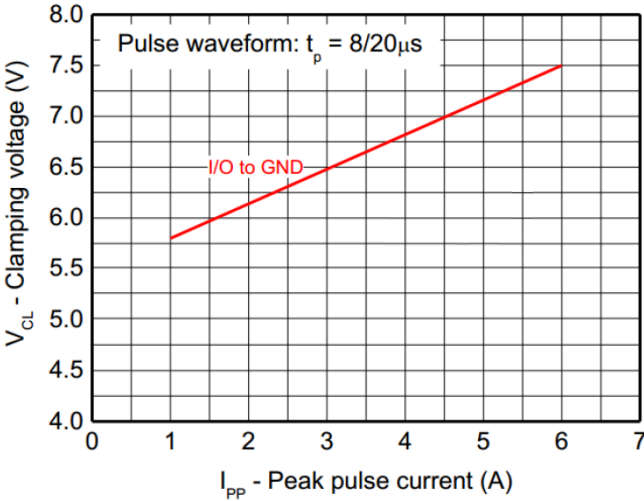
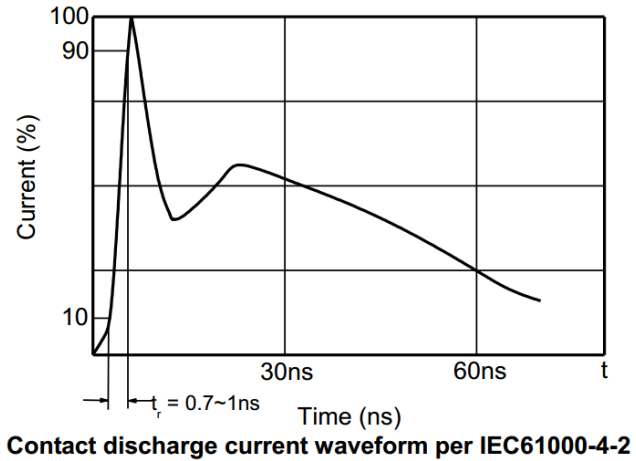
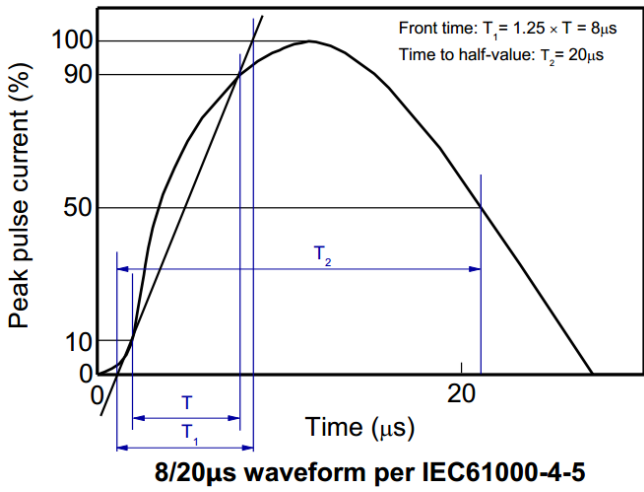
### Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power(8/20 $\mu\text{s}$ )	Ppk	50	W
Peak Pulse Current(8/20 $\mu\text{s}$ )	Ipp	6	A
ESD per IEC 61000-4-2 (Air)	VESD	$\pm 20$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 20$	
Operating Temperature Range	TJ	-55 to +125	$^\circ\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^\circ\text{C}$

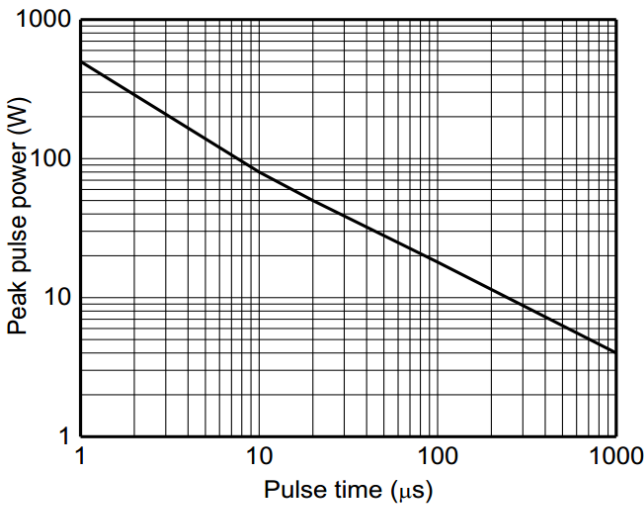
### Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
<b>I/O Pins</b>						
Reverse stand-off voltage	$V_{RWM}$				5.0	V
Reverse leakage current	$I_R$	$V_{RWM} = 5V$			1	$\mu\text{A}$
Reverse breakdown voltage	$V_{BR}$	$I_{BR} = 1\text{mA}$	6.0	7.8	9.0	V
Forward voltage	$V_F$	$I_F = 10\text{mA}$	0.6	0.9	1.2	V
Clamping voltage <sup>1)</sup>	$V_{CL}$	$I_{PP} = 16\text{A}, t_p = 100\text{ns}$		9.5		V
Dynamic resistance <sup>1)</sup>	$R_{DYN}$	$t_p = 100\text{ns}$		0.18		$\Omega$
Clamping voltage <sup>2)</sup>	$V_{CL}$	$V_{ESD} = 8\text{kV}$		9.5		V
Clamping voltage <sup>3)</sup>	$V_{CL}$	$I_{PP} = 1\text{A}, t_p = 8/20\mu\text{s}$			8.0	V
		$I_{PP} = 6\text{A}, t_p = 8/20\mu\text{s}$			8.5	V
Junction capacitance	$C_{I/O - GND}$	$V_R = 0V, f = 1\text{MHz}, V_{pin5} = \text{floated},$ any I/O to GND		1.0	1.4	pF
		$V_R = 2.5V, f = 1\text{MHz}, V_{pin5} = 5V,$ any I/O to GND		0.7	1.0	pF
	$C_{I/O - I/O}$	$V_R = 2.5V, f = 1\text{MHz}, V_{pin5} = 5V,$ $V_{pin2} = 0V,$ any I/O to I/O		0.1	0.2	pF

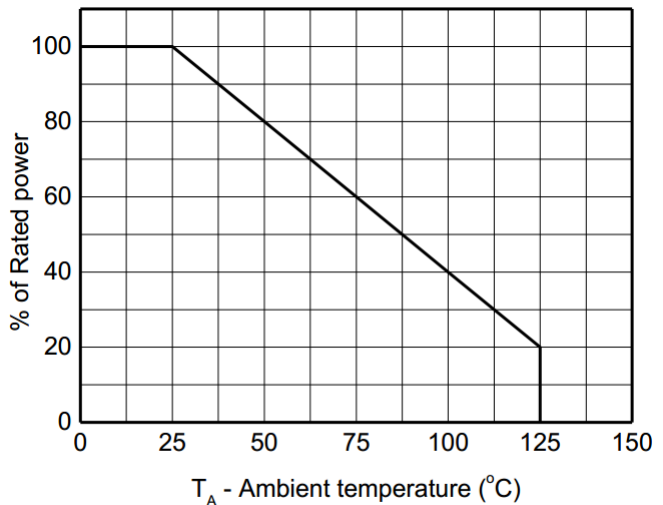
**Typical Performance Characteristics (TA=25°C unless otherwise Specified)**



**Capacitance vs. Reverse voltage**

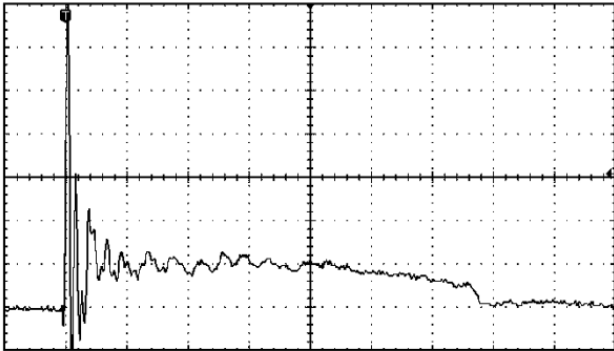


**Non-repetitive peak pulse power vs. Pulse time**

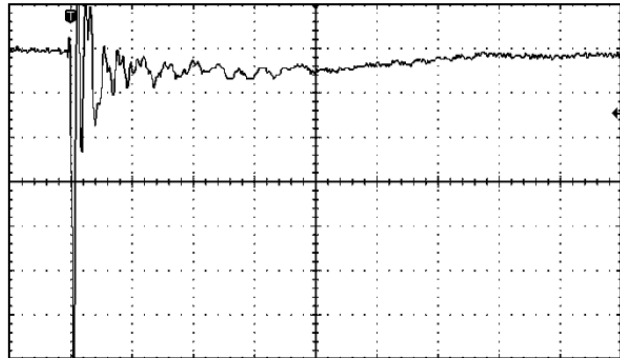


**Power derating vs. Ambient temperature**

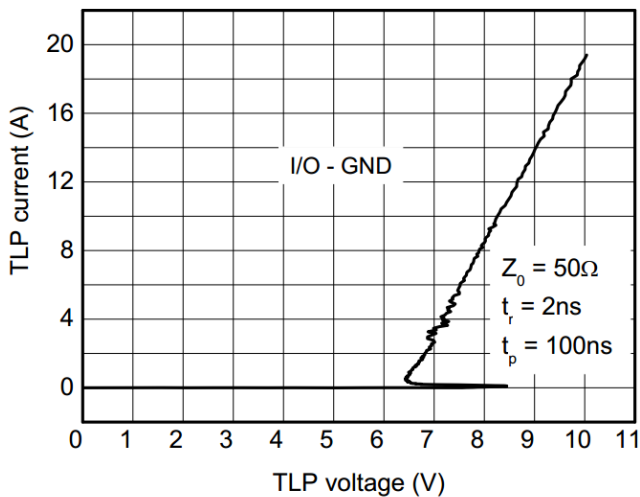
**Typical Performance Characteristics (TA=25°C unless otherwise Specified)**



**ESD clamping - I/O to GND**  
(+8kV contact discharge per IEC61000-4-2)

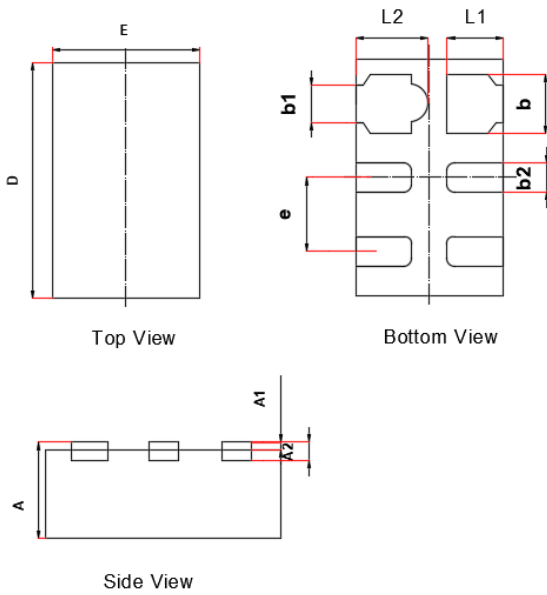


**ESD clamping - I/O to GND**  
(-8kV contact discharge per IEC61000-4-2)



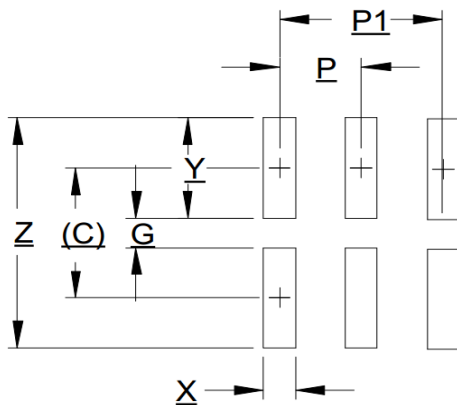
**TLP Measurement - I/O to GND**

### DFN1610-6 Package Outline Drawing



Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.45	0.50	0.55
A1	-	0.02	0.05
A2	0.12	0.15	0.20
D	1.55	1.60	1.65
E	0.95	1.00	1.05
b	0.35	0.40	0.45
b1	0.20	0.25	0.30
b2	0.15	0.20	0.25
e	0.5TYP.		
L1	0.33	0.38	0.43
L2	0.44	0.49	0.54

### Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
C	0.034	0.87
G	0.007	0.19
P	0.020	0.50
P1	0.039	1.00
X	0.008	0.20
Y	0.027	0.68
Z	0.061	1.55

### Contact Information

Changzhou D-first Electronics CO.,Ltd.

www.first-electronic.com

Email: xhf@first-electronic.cn

Phone: +86 (0519) 8817 1671