Description

The DL0502P1S is an uni-directional TVS diode, 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 DL0502P1S has an ultra-low capacitance with a typical value at 0.6pF, and complies with the IEC 61000-4-2 (ESD) standard with ±30kV air and ±30kV contact discharge. It is assembled into an ultra-small 1.0 x 0.6 x 0.5mm lead-free DFN package. The small size, ultra-low capacitance and high ESD surge protection make DL0502P1S an ideal choice to protect cell phone, digital video interfaces and other high speed ports.

Features

- Ultra small package: 1.0 x0.6 x0.5mm
- Ultra low capacitance: 0.6pF typical
- Ultra low leakage：nA level
- Operating voltage：5V
- Low clamping voltage
- 3-pin leadless package
- Up to 2-line protects
- Complies with following standards:
  - – IEC 61000-4-2 (ESD) immunity test
    Air discharge: ±30kV
    Contact discharge: ±30kV
  - – IEC61000-4-5 (Lightning) 5A (8/20μs)
- RoHS Compliant

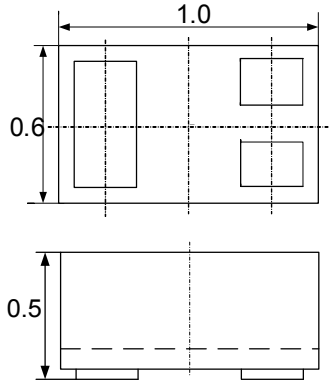
Mechanical Characteristics

- Package: DFN1006-3 (1.0 x0.6 x0.5mm)
- Lead Finish: NiPdAu
- Case Material: “Green” Molding Compound.
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Below

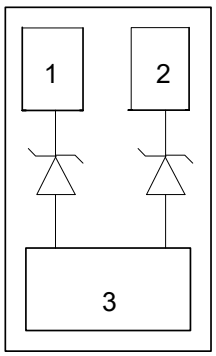
Applications

- Cellular Handsets and Accessories
- Display Ports
- MDDI Ports
- USB 2.0 and 3.0 Ports
- HDMI 1.3 and 1.4
- Digital Visual Interface(DVI)
- PCI Express and Serial SATA Ports
- Notebook Computer
- IEEE 1394

Dimensions and Pin Configuration

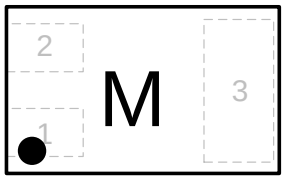


Package Dimensions



Circuit and Pin Schematic

Marking Information



M = Device code

* = Month code (A~Z)

Ordering Information

Part Number	Marking	Packaging	Reel Size
DL0502P1S	M	10000/Tape & Reel	7 inch

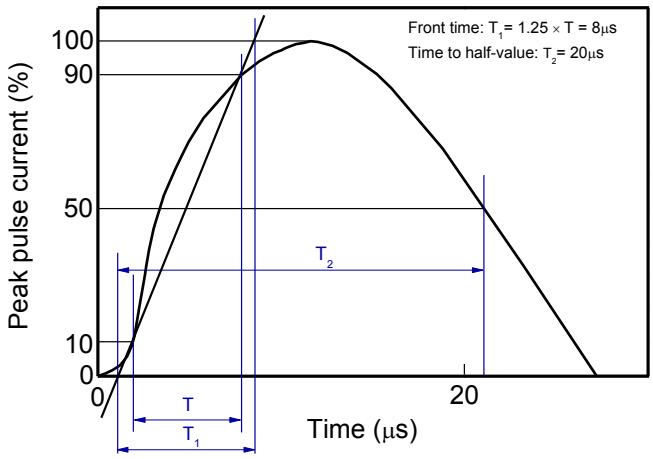
Absolute Maximum Ratings (T_A=25°C unless otherwise specified)

Parameter	Symbol	Rating	Unit
Peak pulse power (t_p = 8/20μs)	P_{pk}	40	W
Peak pulse current (t_p = 8/20μs)	I_{PP}	10	A
ESD according to IEC61000-4-2 air discharge	V_{ESD}	±30	kV
ESD according to IEC61000-4-2 contact discharge		±30	
Junction temperature	T_J	125	°C
Operating temperature	T_{OP}	-40~85	°C
Lead temperature	T_L	260	°C
Storage temperature	T_{STG}	-55~150	°C

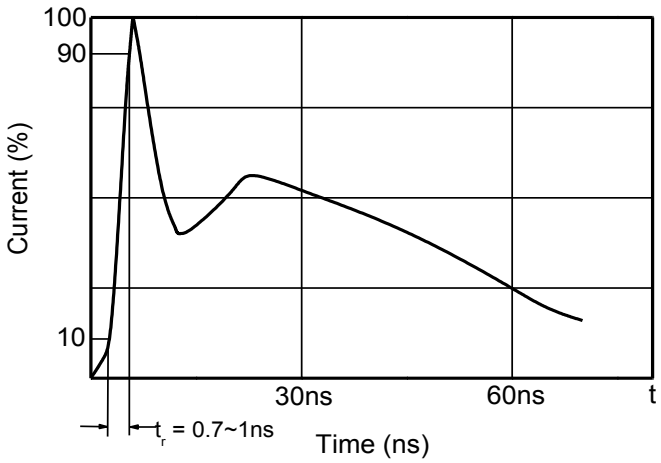
Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse maximum working voltage	V_{RWM}				5.0	V
Reverse leakage current	I_R	V_{RWM} = 5V			100	nA
Reverse breakdown voltage	V_{BR}	I_T = 1mA	6.0			V
Forward voltage	V_F	I_T = 10mA	0.65	0.85	1.2	V
Clamping voltage	V_{CL}	I_{PP} = 16A, t_p = 100ns		4.3		V
Dynamic resistance	R_{DYN}			0.13		Ω
Clamping voltage	V_{CL}	V_{ESD} = 8kV		5.5		V
Clamping voltage	V_{CL}	I_{PP} = 4A, t_p = 8/20μs			3.5	V
		I_{PP} = 10A, t_p = 8/20μs			4.5	V
Junction capacitance	C_J	V_R = 0V, f = 1MHz Pin1 or 2 to Pin3		1.6	2.0	pF
		V_R = 0V, f = 1MHz Between Pin1 and Pin2		0.85	1.1	pF

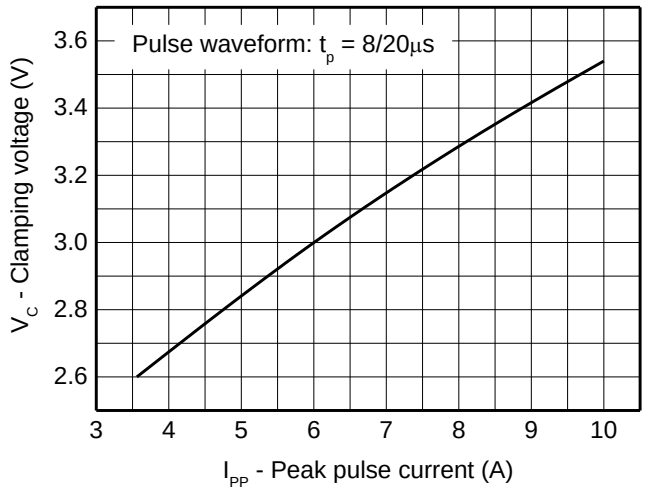
Typical characteristics (T_A = 25°C, unless otherwise noted)



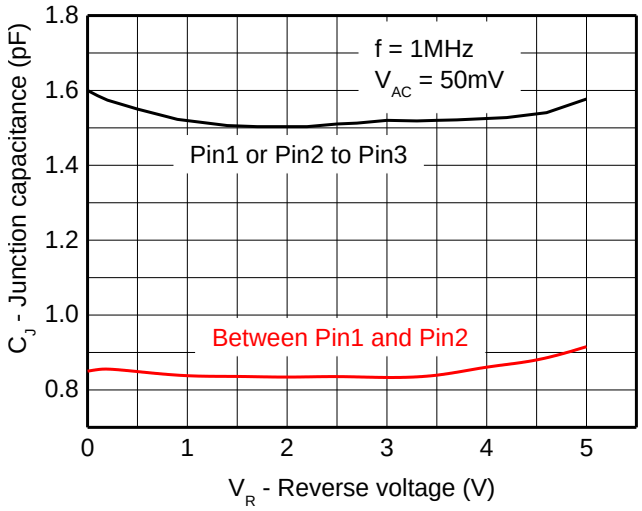
8/20μs waveform per IEC61000-4-5



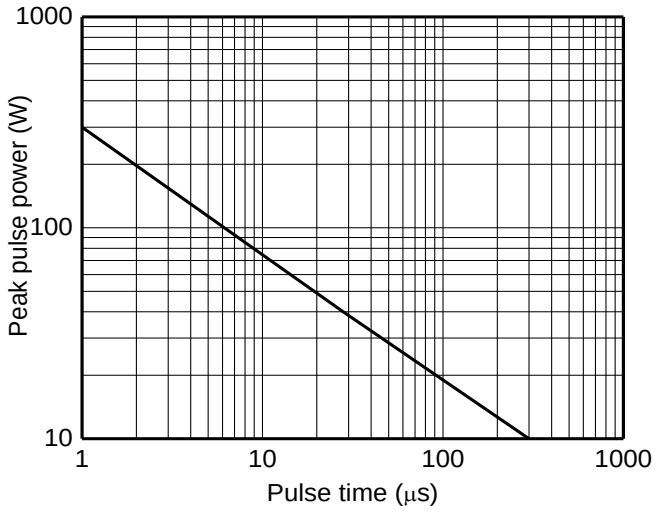
Contact discharge current waveform per IEC61000-4-2



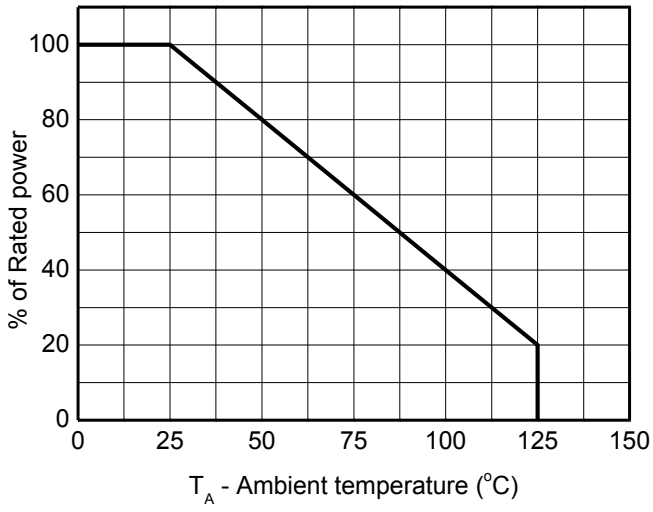
Clamping voltage vs. Peak pulse current



Capacitance vs. Reverse voltage

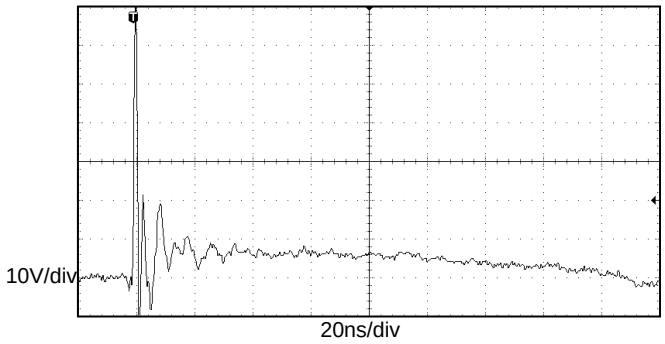


Non-repetitive peak pulse power vs. Pulse time

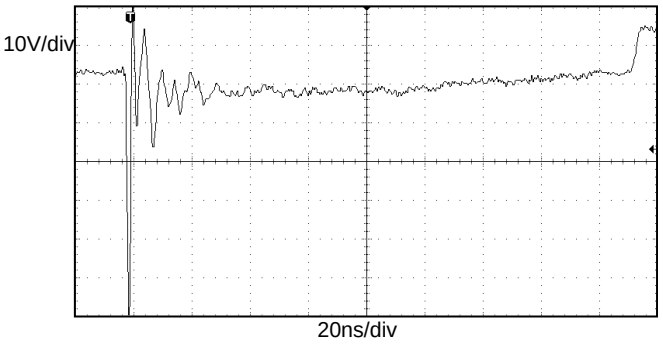


Power derating vs. Ambient temperature

Typical characteristics (T_A = 25 °C, unless otherwise noted)



ESD clamping
(+8kV contact discharge per IEC61000-4-2)



ESD clamping
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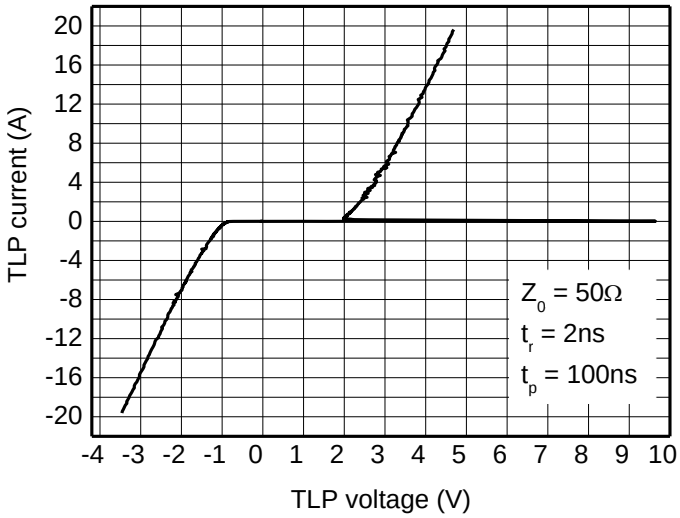
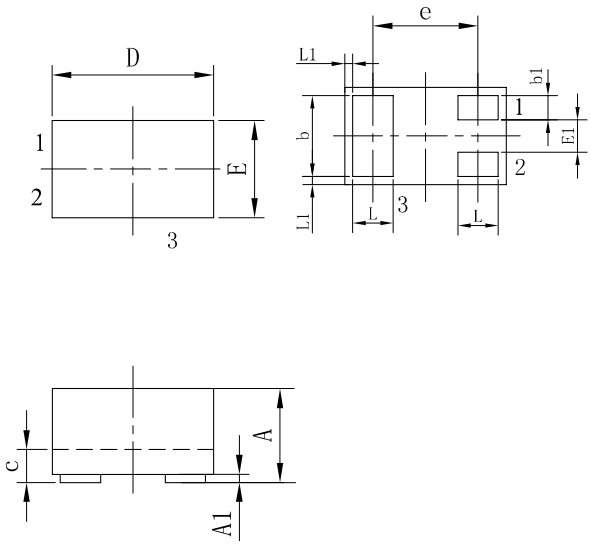


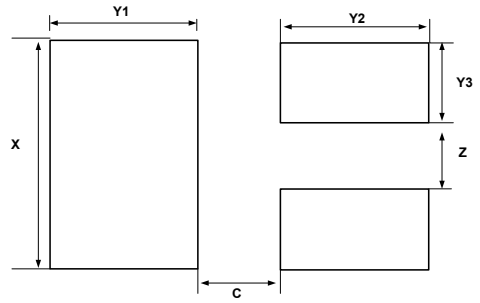
TLP Measurement

DFN1006-3 Package Outline Drawing



SYM	DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.45	0.50	0.55	0.018	0.020	0.022
A1	0.00	0.02	0.05	0.000	0.001	0.002
b	0.45	0.50	0.55	0.018	0.020	0.022
b1	0.10	0.15	0.20	0.004	0.006	0.008
c	0.12	0.15	0.18	0.005	0.006	0.007
D	0.95	1.00	1.05	0.037	0.039	0.041
e	0.65 BSC			0.026 BSC		
E	0.55	0.60	0.65	0.022	0.024	0.026
E1	0.15	0.20	0.25	0.006	0.008	0.010
L	0.20	0.25	0.30	0.008	0.010	0.012
L1	0.05 REF			0.0002 REF		

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
C	0.25	0.010
X	0.65	0.024
Y1	0.50	0.020
Y2	0.50	0.020
Y3	0.25	0.010
Z	0.20	0.008

Contact Information

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