

### DFN1006-3L Plastic-Encapsulate ESD Protection Diodes

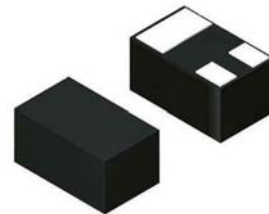
## DESCRIPTION

ESD0502L is an ultra-low-capacitance Transient Voltage Suppressor (TVS) designed to provide electrostatic discharge (ESD) protection For high-speed data interfaces. With typical capacitance of 0.2pF (I/O to I/O) only, ESD0502L 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. ESD0502L uses ultra-small DFN1006-3L package. Each ESD0502L device can protect two high-speed data lines. The combined features of low capacitance, small size and high ESD robustness make ESD0502L ideal for high-speed data port and high-frequency line applications, The low clamping voltage of the ESD0502L guarantees a minimum stress on the protected IC.

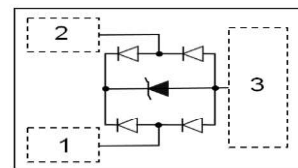
## Features

- ◆ Peak Power Dissipation : 60W (8/20 $\mu\text{s}$ )
- ◆ Transient protection for high speed data lines
- ◆ IEC61000-4-2 (ESD)  $\pm 15\text{kV}$  (air),  $\pm 8\text{kV}$  (contact)
- ◆ IEC61000-4-4 (EFT) 40A (5/50ns)  
Cable Discharge Event (CDE)
- ◆ Small package (1.0mm $\times$ 0.6mm $\times$ 0.5mm)
- ◆ Protect two data lines
- ◆ Low clamping voltage
- ◆ Low Capacitance :0.2pF Typical (I/O - I/O)
- ◆ Low leakage current

## Pin Configuration



## Circuit Diagram



## Applications

- ◆ Serial ATA
- ◆ Desktops, Servers and Notebooks
- ◆ PCI Express
- ◆ MDDI Ports
- ◆ USB Data Line Protection
- ◆ Display Ports
- ◆ Digital Visual Interfacs (DVI)

## Mechanical Characteristics

- ◆ Package: DFN1006-3L
- ◆ Flammability Rating: UL 94V-0
- ◆ Packaging: Tape and Reel
- ◆ Terminals: Gold plated, solderable per MIL-STD-750, method 2026
- ◆ Marking: 52L

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

Parameter	Symbol	Value	Unit
ESD per IEC 61000-4-2 (Air)	VESD	$\pm 20$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 20$	
Peak Pulse Power( $t_p=8/20\mu\text{s}$ waveform)	PPP	60	W
Operating Temperature	$T_{\text{OPT}}$	-55 to +125	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{STG}}$	-55 to +150	$^\circ\text{C}$

The above data are for reference only.

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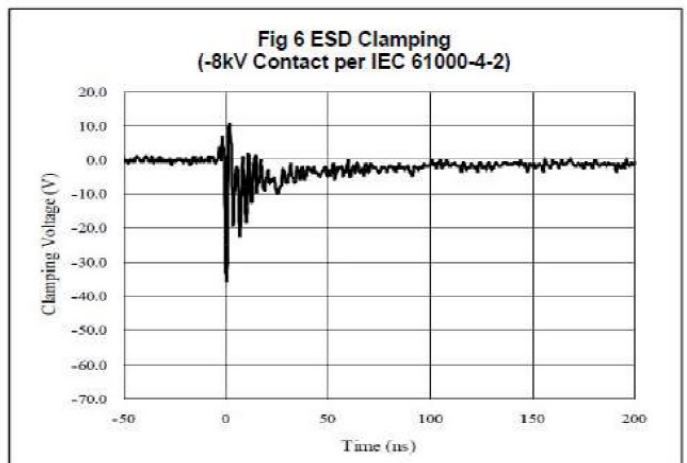
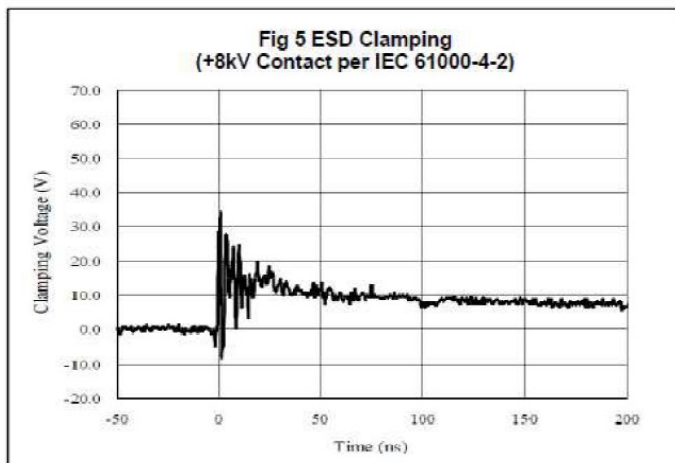
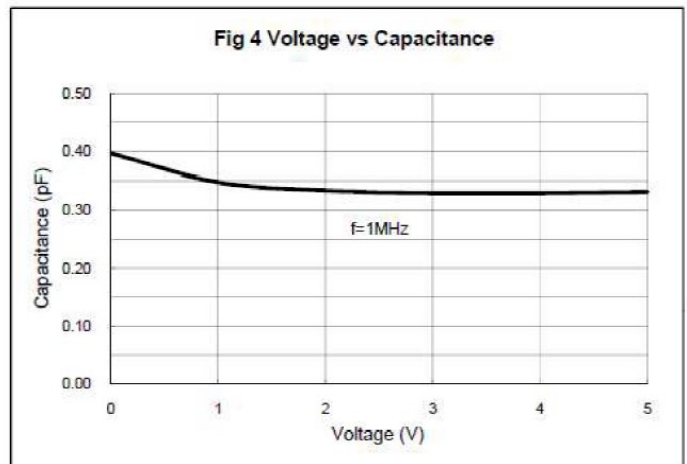
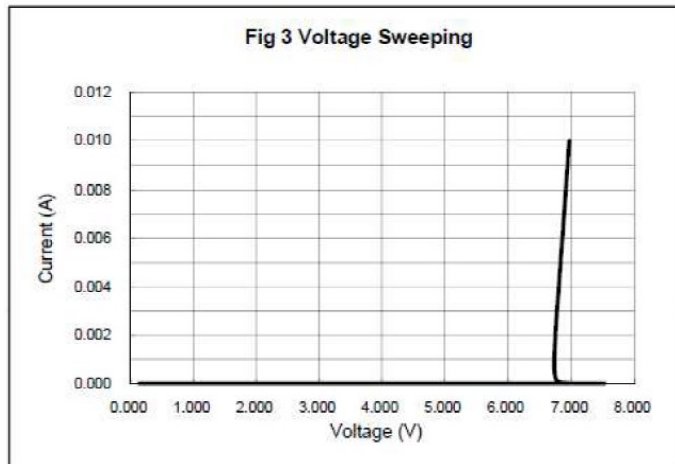
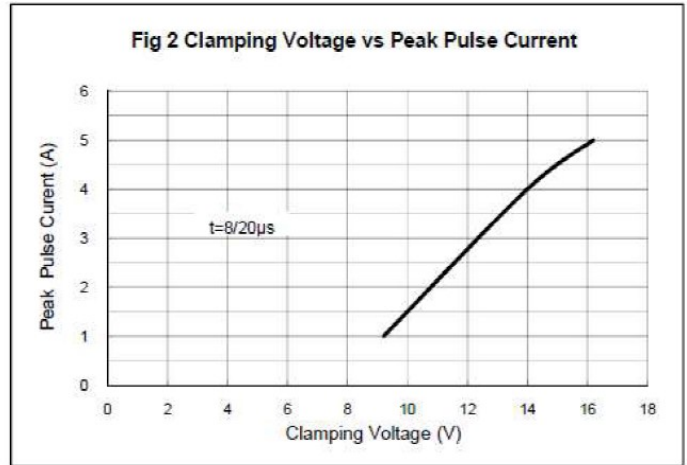
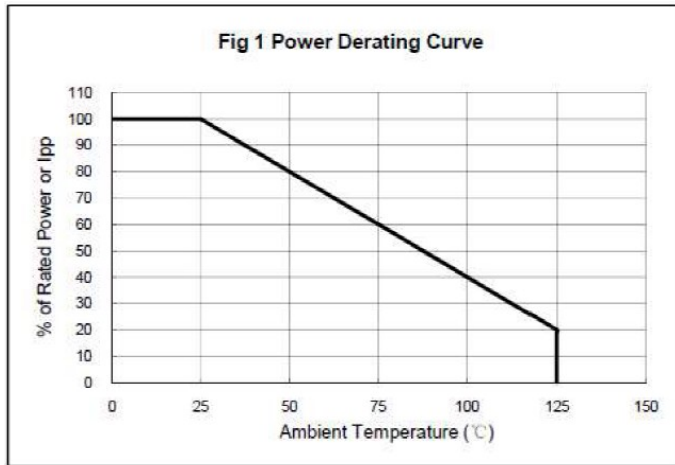
**Electrical Characteristics** ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
$V_{RWM}$	Reverse Working Voltage	I/O to GND			5.0	V
$V_{BR}$	Reverse Breakdown Voltage	$I_T = 1\text{mA}$ Between I/O and GND	6.0			V
$I_R$	Reverse Leakage Current	$V_{RWM} = 5\text{V}$ Between I/O and GND			100	nA
$V_C$	Clamping Voltage	$I_{PP} = 1\text{A}$ , $t_p = 8/20\mu\text{s}$ Between I/O and GND			10	V
		$I_{PP} = 4\text{A}$ , $t_p = 8/20\mu\text{s}$ Between I/O and GND			15	V
$V_F$	Forward Voltage	$I_T = 10\text{mA}$ Between I/O and GND			1.2	V
$C_T$	Total Capacitance	$V_R = 0\text{V}$ , $f = 1\text{MHz}$ Between I/O and GND		0.4	0.6	pF
		$V_R = 0\text{V}$ , $f = 1\text{MHz}$ Between I/O and I/O		0.2	0.3	pF

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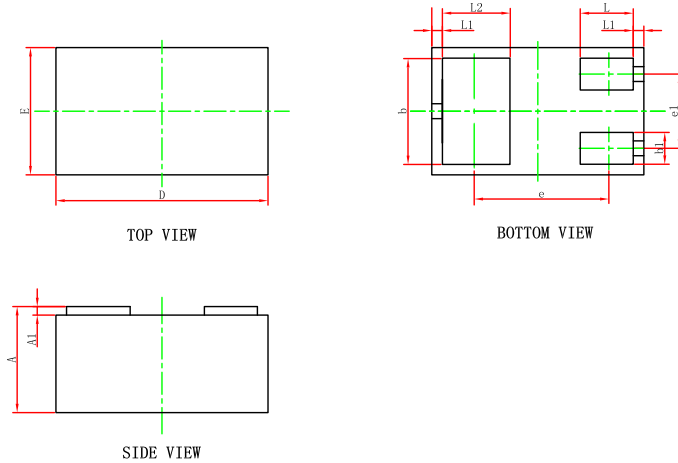
### ELECTRICAL CHARACTERISTICS CURVE



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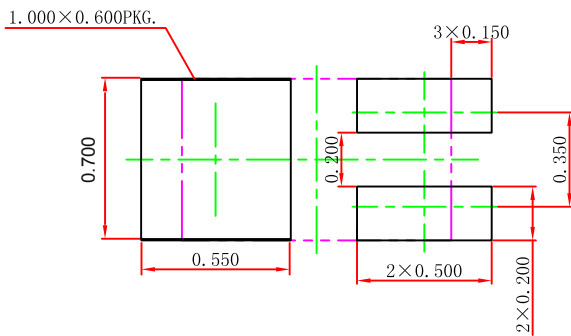
### Outline Drawing

#### DFN1006-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.450	0.550	0.018	0.022
A1	0.010	0.100	0.000	0.004
D	0.950	1.050	0.037	0.041
E	0.550	0.650	0.022	0.026
b	0.450REF.		0.018REF.	
b1	0.100	0.200	0.004	0.008
e	0.635REF.		0.025REF.	
e1	0.300	0.400	0.012	0.016
L	0.200	0.300	0.008	0.012
L1	0.050REF.		0.002REF.	
L2	0.200	0.300	0.008	0.012

### Suggested Pad Layout



Dimensions	Value (in mm)
C	0.90
G	0.40
X	0.50
X1	1.10
Y	0.50

Note:

1. Controlling dimension: in/millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.

### PACKAGE SPECIFICATIONS

Package	Reel Size	Reel DIA. (mm)	Q'TY/Reel (pcs)	Box Size (mm)	QTY/Box (pcs)	Carton Size (mm)	Q'TY/Carton (pcs)
DFN1006	7'	178	10,000	210×210×205	100,000	445×445×230	400,000