

Description

The ST0561D4 is a bi-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 ST0561D4 complies with the IEC 61000-4-2 (ESD) standard with $\pm 15\text{kV}$ air and $\pm 8\text{kV}$ contact discharge. It is assembled into an ultra-small $1.0 \times 0.6 \times 0.5\text{mm}$ lead-free DFN package. The small size, ultra-low capacitance and high ESD surge protection make ST0561D4 an ideal choice to protect cell phone, digital video interfaces.

Features

- ◆ Ultra small package: $1.0 \times 0.6 \times 0.5\text{mm}$
- ◆ Low leakage: nA level
- ◆ Low operating voltage: 5V
- ◆ Low clamping voltage
- ◆ 2-pin leadless package
- ◆ Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 25\text{kV}$
 - Contact discharge: $\pm 22\text{kV}$
 - IEC61000-4-4 (EFT) 40A (5/50ns)
 - IEC61000-4-5 (Lightning) 7A (8/20 μs)
- ◆ RoHS Compliant

Mechanical Characteristics

- ◆ Package: DFN1006-2
- ◆ Lead Finish: NiPdAu
- ◆ Case Material: “Green” Molding Compound.
- ◆ UL Flammability Classification Rating 94V-0
- ◆ Moisture Sensitivity: Level 3 per J-STD-020
- ◆ Terminal Connections: See Diagram Below

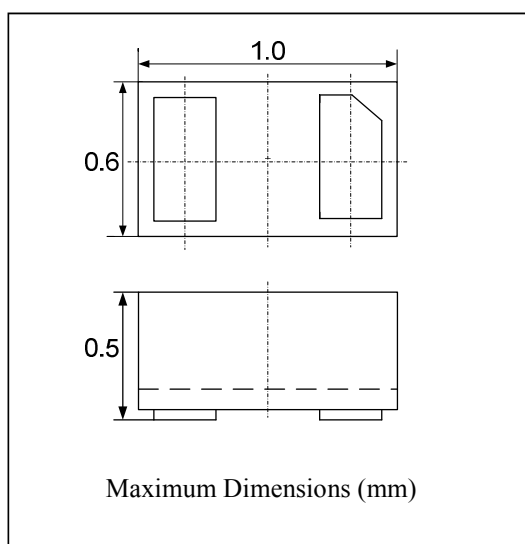
Applications

- ◆ Personal Digital Assistants
- ◆ Peripherals
- ◆ Audio Players
- ◆ Notebooks and Handhelds
- ◆ Portable Instrumentation
- ◆ Keypads, Side Keys, LCD Displays

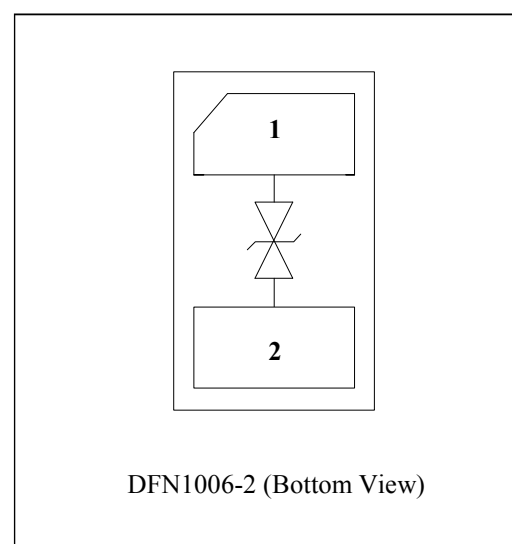
Ordering Information

Part Number	Packaging	Reel Size
ST0561D4	10000/Tape & Reel	7 inch

Dimensions



Schematic and PIN Configuration



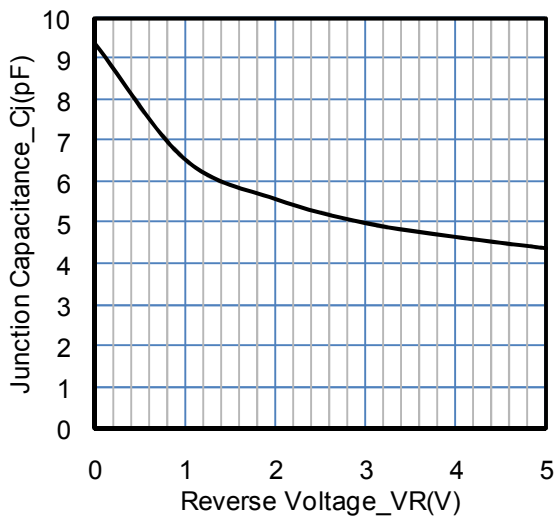
Absolute Maximum Ratings (TA=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	Ppk	105	W
Peak Pulse Current (8/20μs)	I _{PP}	7	A
ESD per IEC 61000-4-2 (Air)	VESD	±25	kV
ESD per IEC 61000-4-2 (Contact)		±22	
Operating Temperature Range	T _J	-55 to +125	°C
Storage Temperature Range	T _{stg}	-55 to +150	°C

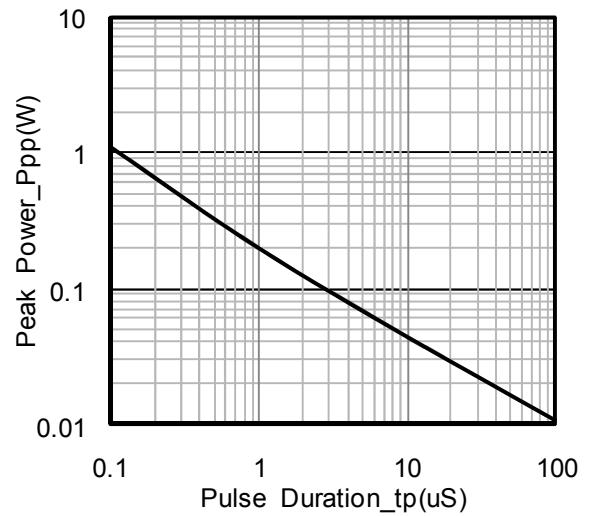
Electrical Characteristics (TA=25°C unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V _{RWM}			5	V	
Breakdown Voltage	V _{BR}	6	8	9	V	I _T = 1mA
Reverse Leakage Current	I _R			0.5	uA	V _{RWM} = 5V
Clamping Voltage	V _C			8	V	I _{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	V _C			15	V	I _{PP} = 7A (8 x 20μs pulse)
Junction Capacitance	C _J		10		pF	V _R = 0V, f = 1MHz

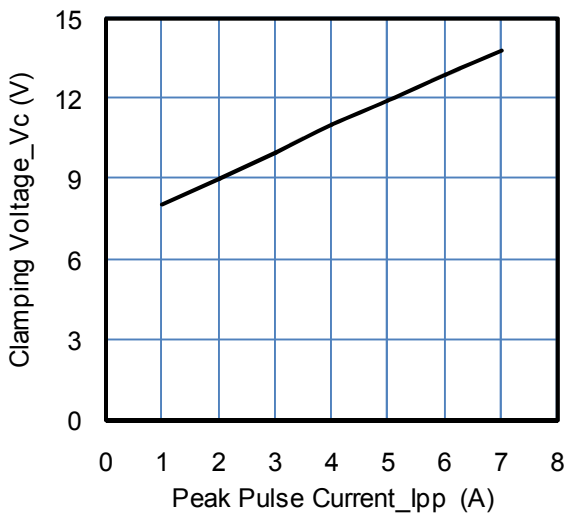
Typical Performance Characteristics (TA=25°C unless otherwise specified)



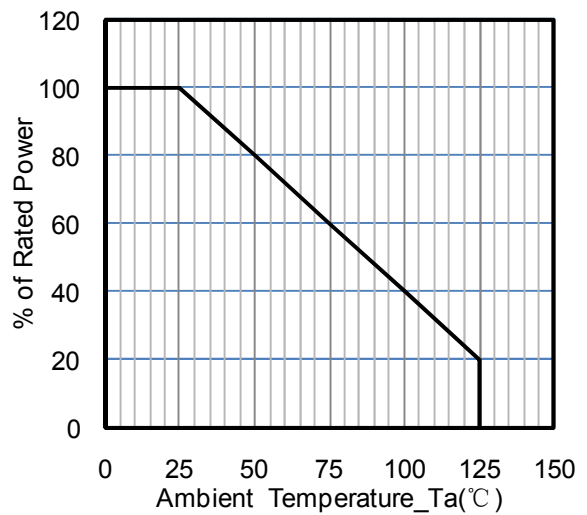
Junction Capacitance vs. Reverse Voltage



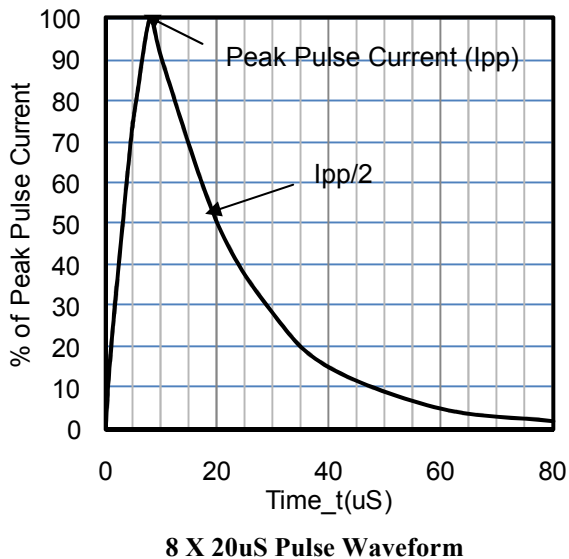
Peak Pulse Power vs. Pulse Time



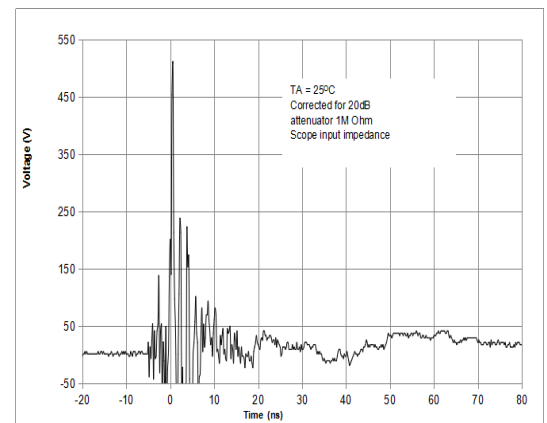
Clamping Voltage vs. Peak Pulse Current ($t_p = 8/20\mu$ s)



Power Derating Curve



8 X 20 μ s Pulse Waveform



ESD Clamping Voltage

30kV Contact per IEC6100-4-2

Applications Information

Device Connection Options

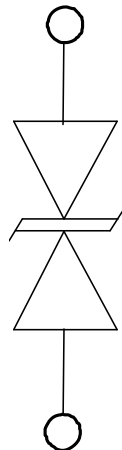
These low capacitance TVS diodes are designed to provide common mode protection for one high-speed line or differential protection for one line pair. The device is bidirectional and may be used on lines where the signal polarity is positive and negative.

Circuit Board Layout Recommendations for Suppression of ESD

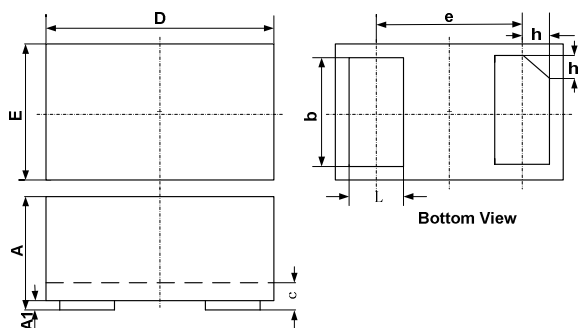
Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

- ◆ Place the TVS near the input terminals or connectors to restrict transient coupling.
- ◆ Minimize the path length between the TVS and the protected line.
- ◆ Minimize all conductive loops including power and ground loops.
- ◆ The ESD transient return path to ground should be kept as short as possible.
- ◆ Never run critical signals near board edges.
- ◆ Use ground planes whenever possible.

Equivalent Circuit Diagram

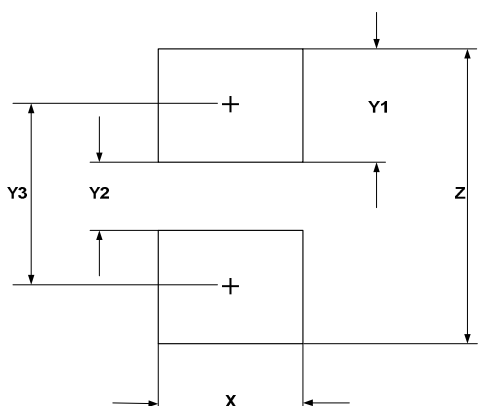


DFN1006-2 Package Outline Drawing



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
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
L	0.20	0.25	0.30	0.008	0.010	0.012
h	0.07	0.12	0.17	0.003	0.005	0.007

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
X	0.60	0.024
Y1	0.50	0.020
Y2	0.30	0.012
Y3	0.80	0.032
Z	1.30	0.052

Contact Information

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