

## Description

The ST0561D2 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 data lines. The ST0561D2 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  $0.6 \times 0.3 \times 0.3\text{mm}$  lead-free DFN package. The small size, and high ESD surge protection make ST0561D2 an ideal choice to protect cell phone, digital video interfaces.

## Features

- ◆ Ultra small package:  $0.6 \times 0.3 \times 0.3\text{mm}$
- ◆ Ultra low leakage: nA level
- ◆ Low operating voltage:  $5\text{V}$
- ◆ Low clamping voltage
- ◆ 2-pin leadless package
- ◆ Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test
    - Air discharge:  $\pm 30\text{kV}$
    - Contact discharge:  $\pm 30\text{kV}$
  - IEC61000-4-4 (EFT)  $40\text{A}$  ( $5/50\text{ns}$ )
  - IEC61000-4-5 (Lightning)  $7\text{A}$  ( $8/20\mu\text{s}$ )
- ◆ RoHS Compliant

## Mechanical Characteristics

- ◆ Package: DFN0603-2
- ◆ Lead Finish: NiPdAu
- ◆ Case Material: “Green” Molding Compound.
- ◆ UL Flammability Classification Rating  $94\text{V}-0$
- ◆ Moisture Sensitivity: Level 3 per J-STD-020
- ◆ Terminal Connections: See Diagram Below
- ◆ Marking Information: See Below

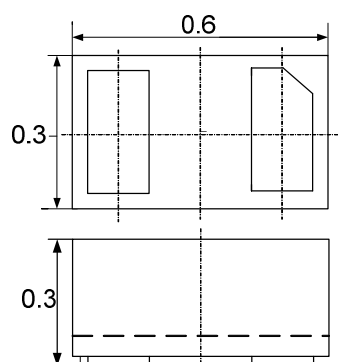
## Applications

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

## Ordering Information

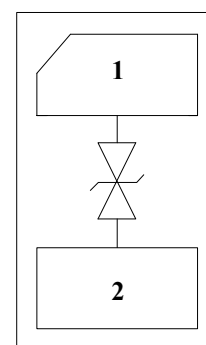
Part Number	Packaging	Reel Size
ST0561D2	15000/Tape & Reel	7 inch

## Dimensions



Maximum Dimensions (mm)

## Schematic and PIN Configuration



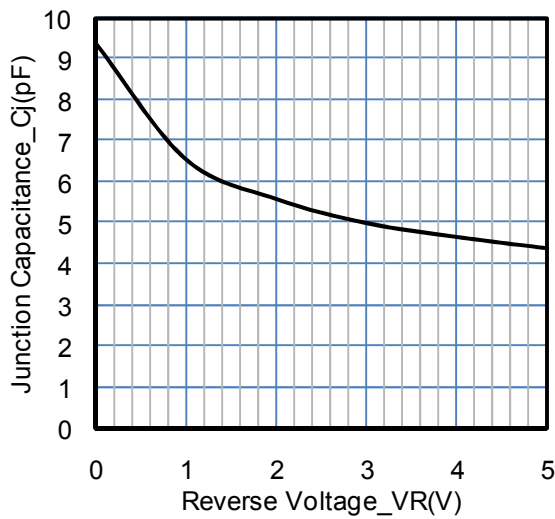
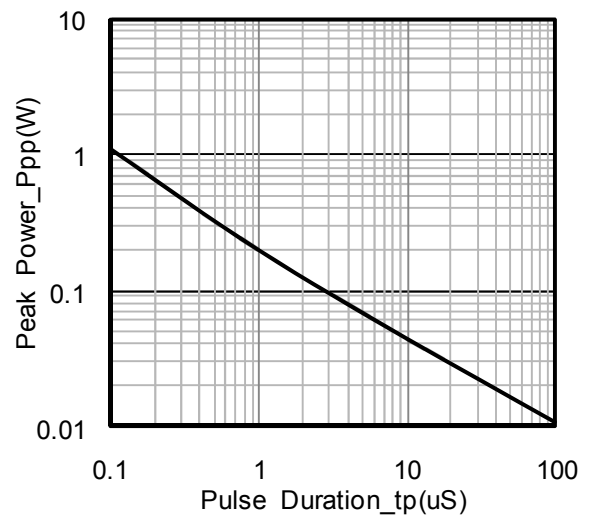
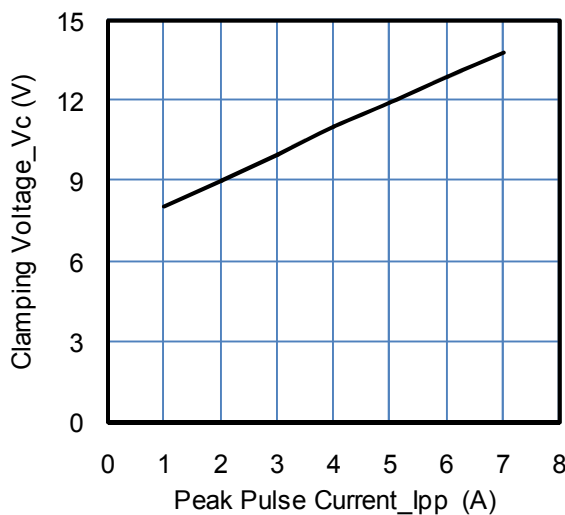
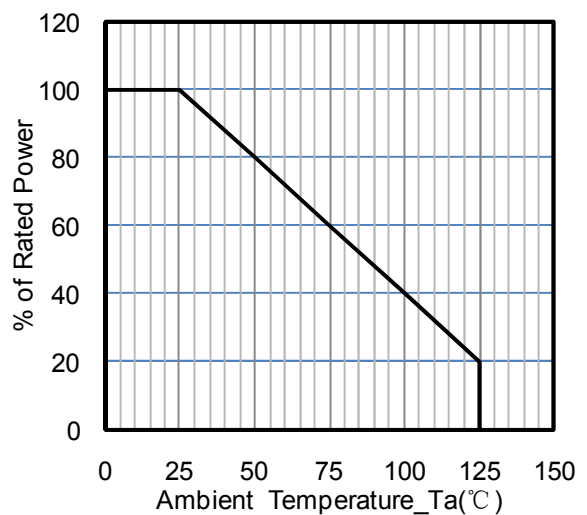
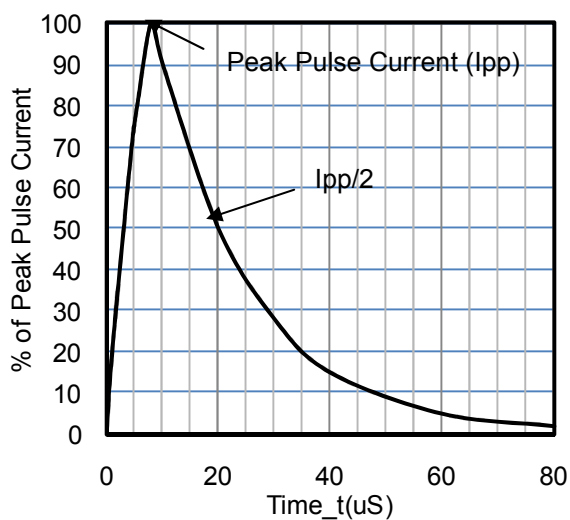
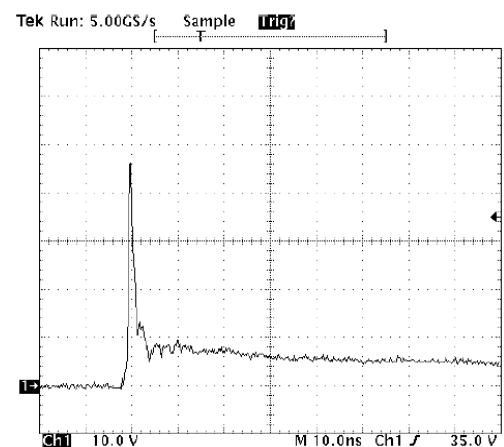
DFN0603-2 (Bottom View)

**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 <sub>PP</sub>	7	A
ESD per IEC 61000-4-2 (Air)	V <sub>ESD</sub>	±30	kV
ESD per IEC 61000-4-2 (Contact)		±30	
Operating Temperature Range	T <sub>J</sub>	-55 to +125	°C
Storage Temperature Range	T <sub>stg</sub>	-55 to +150	°C

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

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V <sub>RWM</sub>			5	V	
Breakdown Voltage	V <sub>BR</sub>	6	8	9	V	I <sub>T</sub> = 1mA
Reverse Leakage Current	I <sub>R</sub>			0.5	μA	V <sub>RWM</sub> = 5V
Clamping Voltage	V <sub>C</sub>			8	V	I <sub>PP</sub> = 1A (8 x 20μs pulse)
Clamping Voltage	V <sub>C</sub>			15	V	I <sub>PP</sub> = 7A (8 x 20μs pulse)
Junction Capacitance	C <sub>J</sub>		10	15	pF	V <sub>R</sub> = 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 $\mu$ s Pulse Waveform**

**ESD Clamping Voltage**
**8 kV Contact per IEC61000-4-2**

## Applications Information

### Device Connection Options

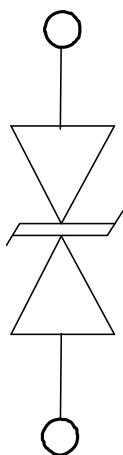
These low capacitance TVS diodes are designed to provide common mode protection for one high-speed line or differential protection for one line pair. The device is bidirectional and may be used on lines where the signal polarity is positive and negative.

### Circuit Board Layout Recommendations for Suppression of ESD

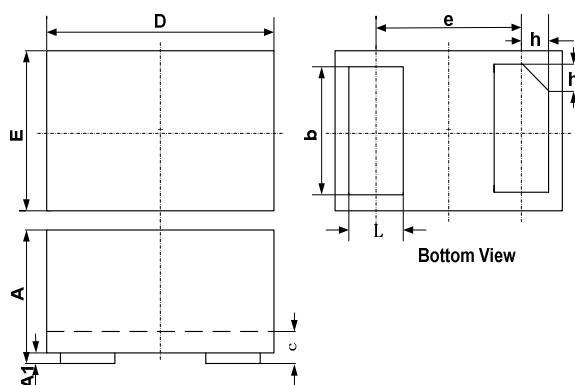
Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

- ◆ 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

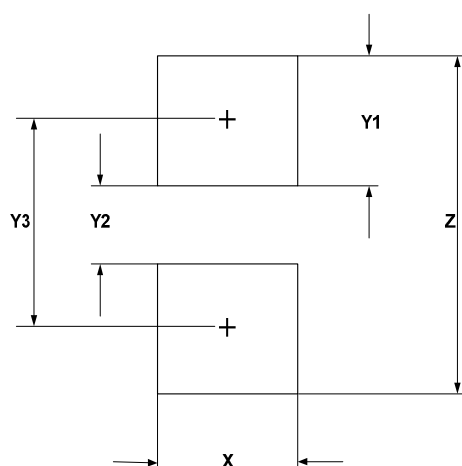


## DFN0603-2 Package Outline Drawing



SYM	DIMENSIONS		
	MILLIMETERS		
	MIN	NOM	MAX
A	0.230		0.330
A1	0.000	0.020	0.050
b	0.215	0.245	0.275
c	0.120	0.150	0.180
D	0.550	0.600	0.650
e	0.355 BSC		
E	0.250	0.300	0.350
L	0.160	0.190	0.220
h	0.079 BSC		

## Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
X	0.30	0.012
Y1	0.25	0.010
Y2	0.15	0.006
Y3	0.40	0.016
Z	0.65	0.026

## Contact Information

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