

### Description

The ST0581D6 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 and power line. The ST0581D6 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 1.6x1.0x0.5mm lead-free DFN package. The small size and high ESD surge protection make ST0581D6 an ideal choice to protect cell phone, digital cameras, audio players and many other portable applications.

### Mechanical Characteristics

- ◆ Package: DFN1610-2
- ◆ 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
- ◆ Marking Information: See Below

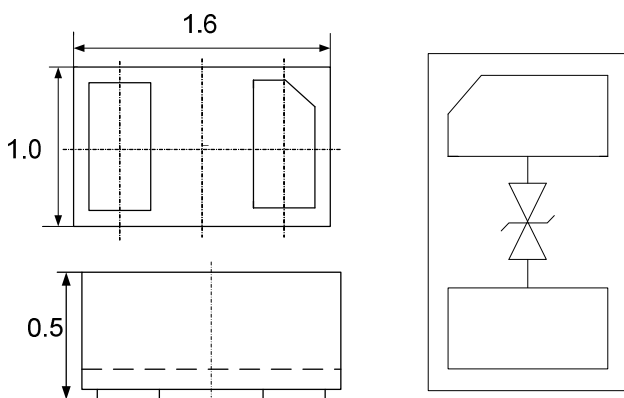
### Features

- ◆ Ultra small package: 1.6x1.0x0.5mm
- ◆ Protects one data or power line
- ◆ Ultra 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:  $\pm 30\text{kV}$   
Contact discharge:  $\pm 30\text{kV}$
  - IEC61000-4-4 (EFT) 80A (5/50ns)
  - IEC61000-4-5 (Lightning) 80A (8/20 $\mu\text{s}$ )
- ◆ RoHS Compliant

### Applications

- ◆ Mobile Phones
- ◆ Battery Protection
- ◆ Power Line Protection
- ◆ Vbat pin for Mobile Devices
- ◆ Hand Held Portable Applications

### Dimensions and PIN Configuration



Package Dimensions

Circuit and Pin Schematic

### Ordering Information

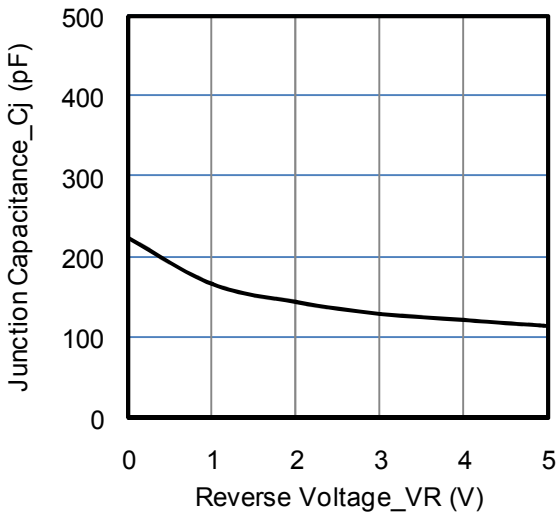
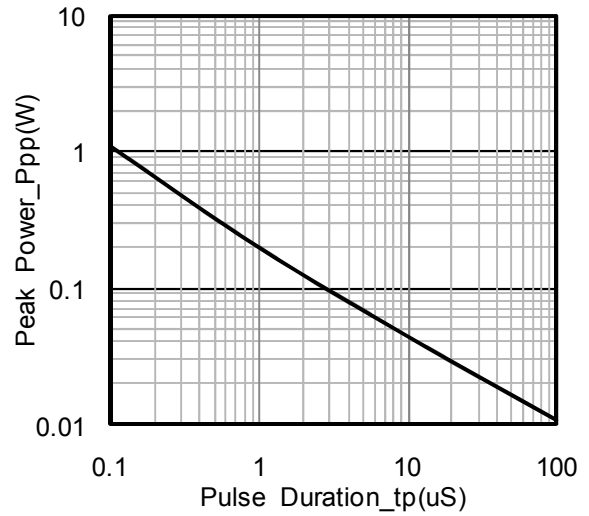
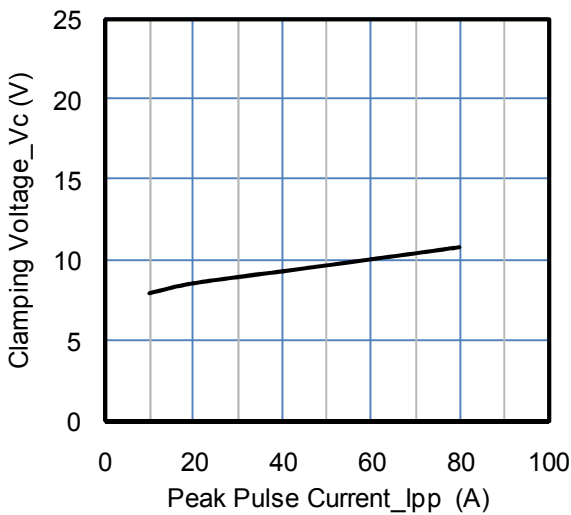
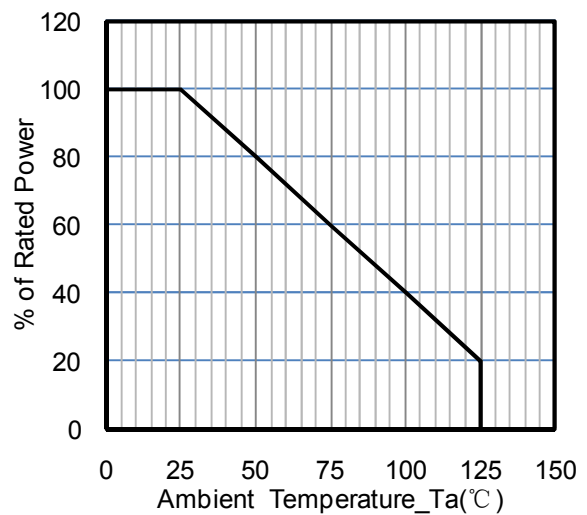
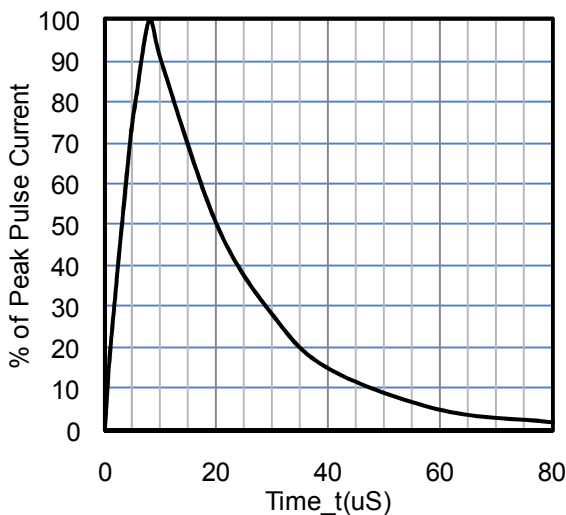
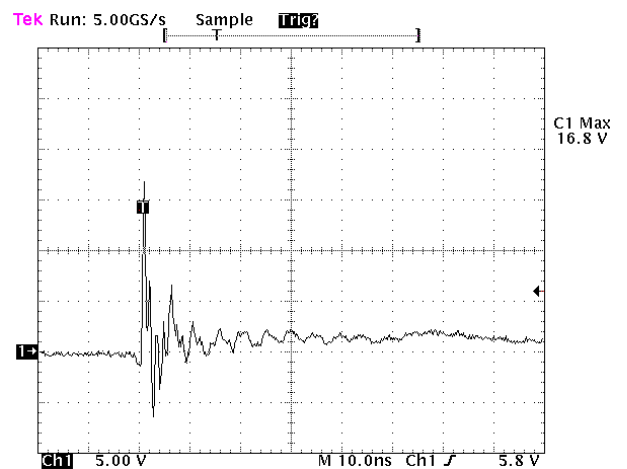
Part Number	Packaging	Reel Size
ST0581D6	3000/Tape & Reel	7 inch

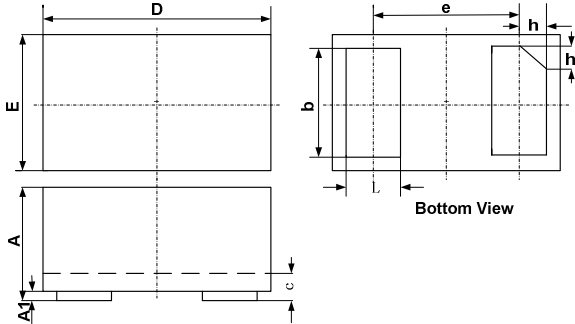
**Absolute Maximum Ratings (TA=25°C unless otherwise specified)**

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	Ppk	1000	W
Peak Pulse Current (8/20μs)	Ipp	80	A
ESD per IEC 61000-4-2 (Air)	VESD	±30	kV
ESD per IEC 61000-4-2 (Contact)		±30	
Operating Temperature Range	TJ	-55 to +125	°C
Storage Temperature Range	Tstg	-55 to +150	°C

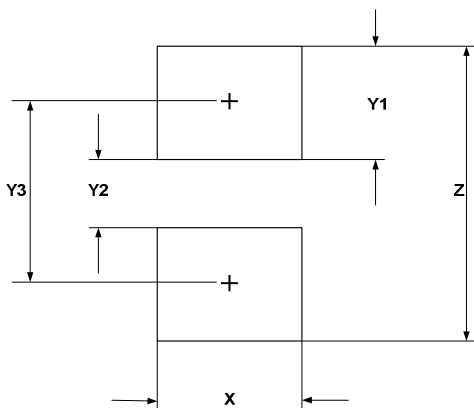
**Electrical Characteristics (TA=25°C unless otherwise specified)**

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			5	V	
Breakdown Voltage	VBR	6			V	IT = 1mA
Reverse Leakage Current	IR			1.0	uA	VRWM = 5V
Forward Voltage	VF		1.0	1.2	V	IF = 10mA
Clamping Voltage	VC			7.5	V	I <sub>PP</sub> = 1A (8 x 20μs pulse)
Clamping Voltage	VC			12.5	V	I <sub>PP</sub> = 80A (8 x 20μs pulse)
Junction Capacitance	CJ		220		pF	VR = 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**

**Power Derating Curve**

**8 X 20uS Pulse Waveform**

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

**DFN 1610-2 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	0.75	0.80	0.85	0.030	0.032	0.034
c	0.10	0.15	0.20	0.004	0.006	0.008
D	1.55	1.60	1.65	0.062	0.064	0.066
e	1.10 BSC			0.044 BSC		
E	0.95	1.00	1.05	0.038	0.040	0.042
L	0.35	0.40	0.45	0.014	0.016	0.018
h	0.15	0.20	0.25	0.006	0.008	0.010

**Suggested Land Pattern**


SYM	DIMENSIONS	
	MILLIMETERS	INCHES
X	1.00	0.040
Y1	0.62	0.025
Y2	0.60	0.024
Y3	1.22	0.049
Z	1.85	0.074

**Contact Information**

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