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# uClamp0545T

## Ultra Small $\mu$ Clamp<sup>®</sup>

### 5-Line ESD Protection

#### PROTECTION PRODUCTS - MicroClamp<sup>®</sup>

#### Description

$\mu$ Clamp<sup>®</sup> TVS diodes are designed to protect sensitive electronics from damage or latch-up due to ESD. They are designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and other portable electronics. They feature large cross-sectional area junctions for conducting high transient currents. This device offers desirable characteristics for board level protection including fast response time, low operating and clamping voltage, and no device degradation.

The  $\mu$ Clamp<sup>®</sup>0545T is in a 6-pin SLP1007N6T package. It measures 1.0 x 0.7 mm with a nominal height of only 0.4mm. The leads are finished with lead-free NiPdAu. Each device will protect five lines operating at 5 volts. It gives the designer the flexibility to protect single lines in applications where arrays are not practical. They may be used to meet the ESD immunity requirements of IEC 61000-4-2. The combination of small size and high ESD surge capability makes them ideal for use in portable applications such as cellular phones, digital cameras, and MP3 players.

#### Features

- ◆ High ESD withstand Voltage: +/-**12kV** (Contact) per **IEC 61000-4-2**
- ◆ Very small PCB area: 0.7mm<sup>2</sup>
- ◆ Protects up to five data lines
- ◆ Low reverse current: <10nA typical (VR=5V)
- ◆ Working voltage: +/- 5V
- ◆ Low capacitance: 4pF typical
- ◆ Low dynamic resistance: 0.70 Ohms (Typ)
- ◆ Solid-state silicon-avalanche technology

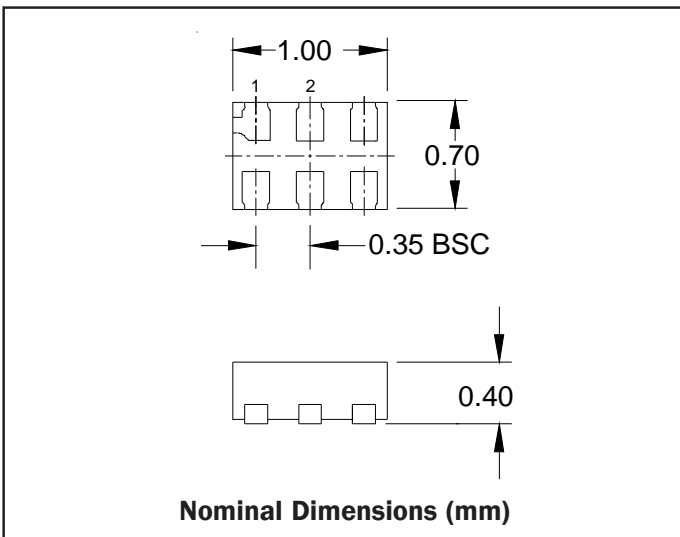
#### Mechanical Characteristics

- ◆ SLP1007N6T package
- ◆ Pb-Free, Halogen Free, RoHS/WEEE Compliant
- ◆ Nominal Dimensions: 1.0 x 0.7 x 0.40 mm
- ◆ Lead Pitch: 0.35mm
- ◆ Lead Finish: NiPdAu
- ◆ Molding compound flammability rating: UL 94V-0
- ◆ Marking : Marking code + dot matrix date code
- ◆ Packaging : Tape and Reel

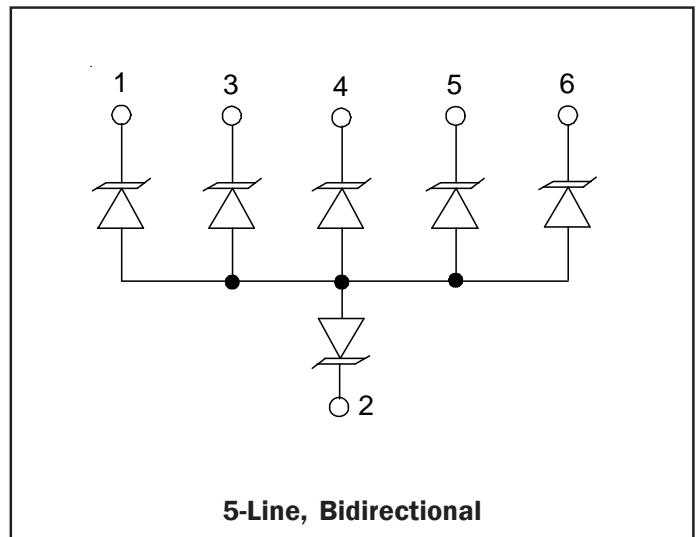
#### Applications

- ◆ Cellular Handsets & Accessories
- ◆ Keypads, Side Keys, Audio Ports
- ◆ LCD Connectors
- ◆ Digital Lines
- ◆ Analog Video

#### Dimensions



#### Schematic & PIN Configuration



## PROTECTION PRODUCTS

### Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 8/20μs)	$P_{pk}$	12	Watts
Maximum Peak Pulse Current (tp = 8/20μs)	$I_{pp}$	1	Amps
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	$V_{ESD}$	+/- 15 +/- 12	kV
Operating Temperature	$T_J$	-55 to +125	°C
Storage Temperature	$T_{STG}$	-55 to +150	°C

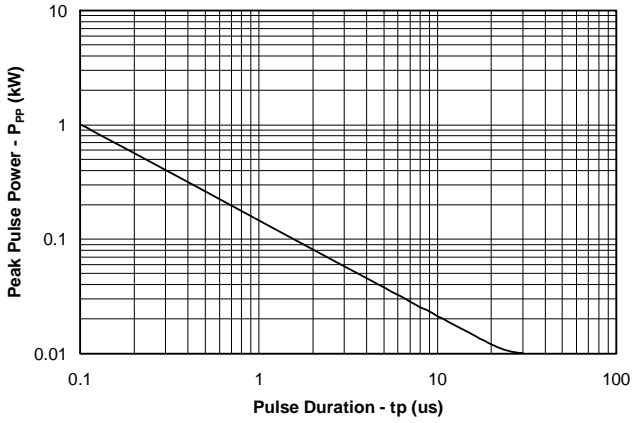
### Electrical Characteristics (T=25°C)

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	$V_{RWM}$	Any I/O Pin to GND			5	V
Reverse Breakdown Voltage	$V_{BR}$	$I_t = 1mA$ Any I/O Pin to GND	6	8.2	9.5	V
Reverse Leakage Current	$I_R$	$V_{RWM} = 5V, T=25°C$ Any I/O Pin to GND		3	50	nA
Clamping Voltage	$V_C$	$I_{pp} = 1A, tp = 8/20μs$ Any I/O Pin to GND			12	V
ESD Clamping Voltage	$V_C$	IPP = 16A, t1p = 0.2/100ns		19		V
Dynamic Resistance	$R_{Dyn}$	tp = 100ns		0.70		Ohms
Junction Capacitance	$C_J$	$V_R = 0V, f = 1MHz$ Any I/O Pin to GND		4.5	9	pF

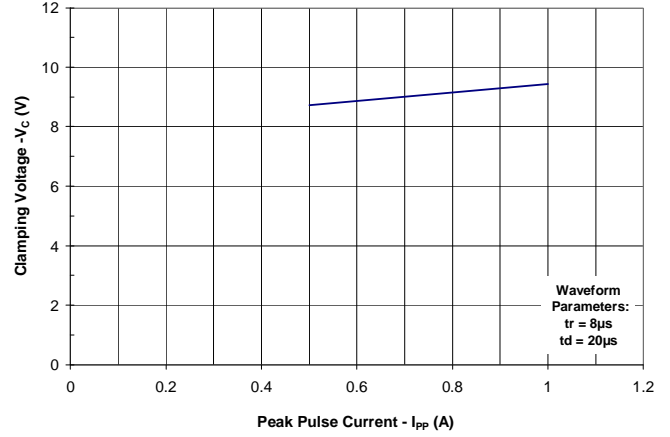
**PROTECTION PRODUCTS**

**Typical Characteristics**

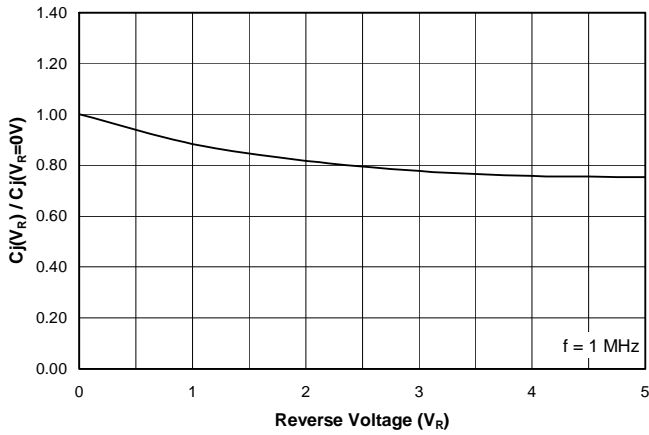
**Non-Repetitive Peak Pulse Power vs. Pulse Time**



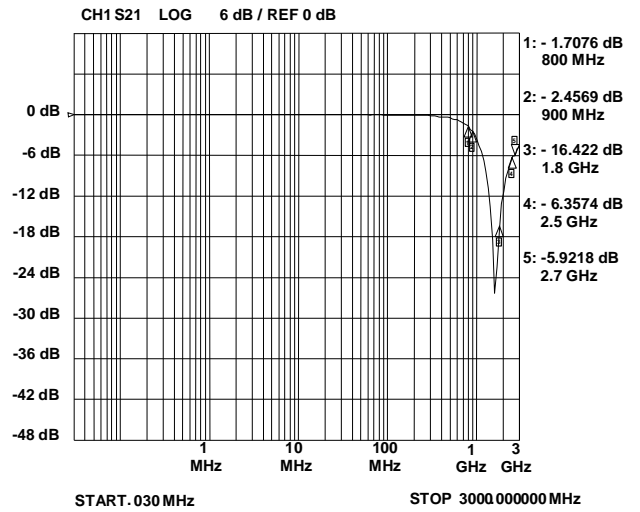
**Clamping Voltage vs. Peak Pulse Current (tp=8/20us)**



**Normalized Junction Capacitance vs. Reverse Voltage**



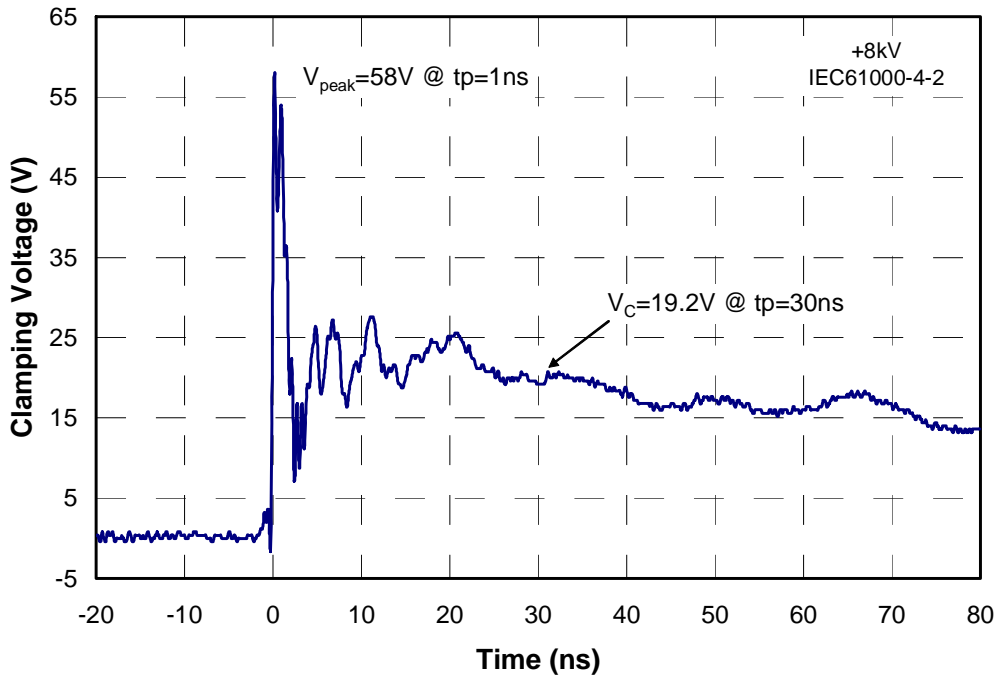
**Typical Insertion Loss (S21)  
30KHz to 3GHz**



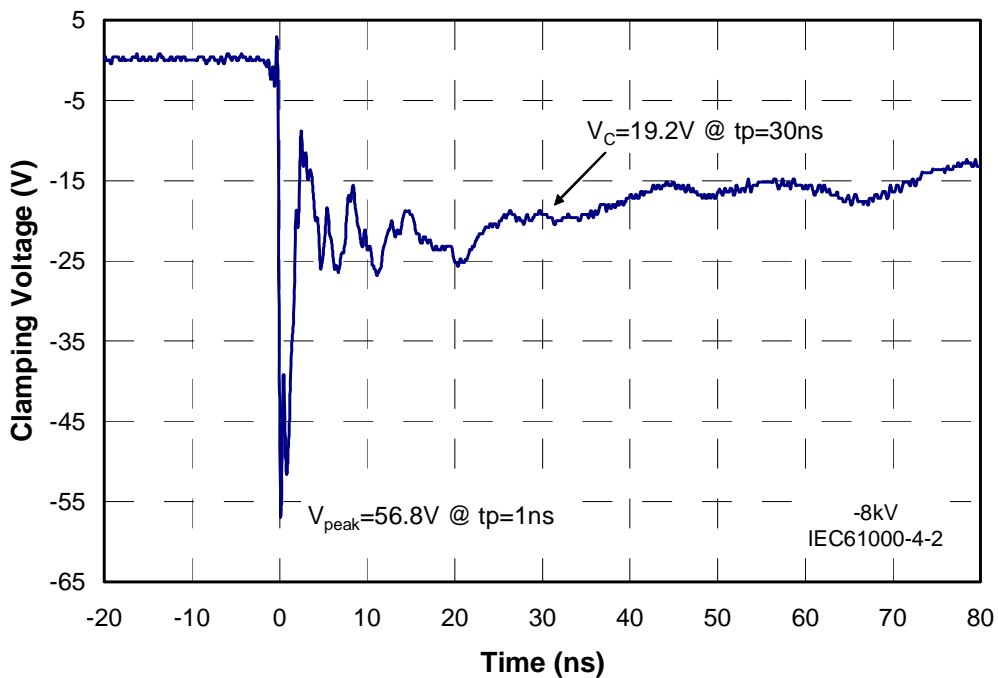
**PROTECTION PRODUCTS**

**Typical Characteristics (Con't)**

**ESD Clamping (+8kV Contact per IEC 61000-4-2)**



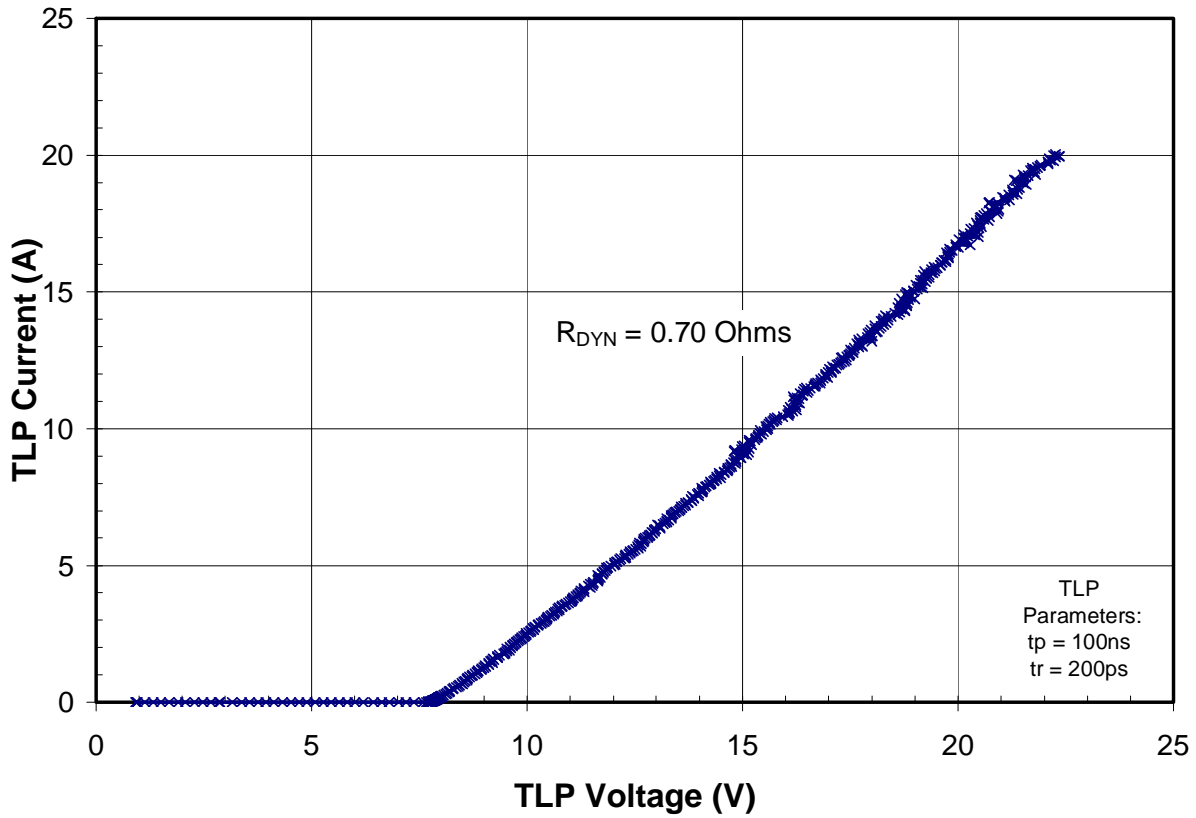
**ESD Clamping (-8kV Contact per IEC 61000-4-2)**



PROTECTION PRODUCTS

Typical Characteristics (Con't)

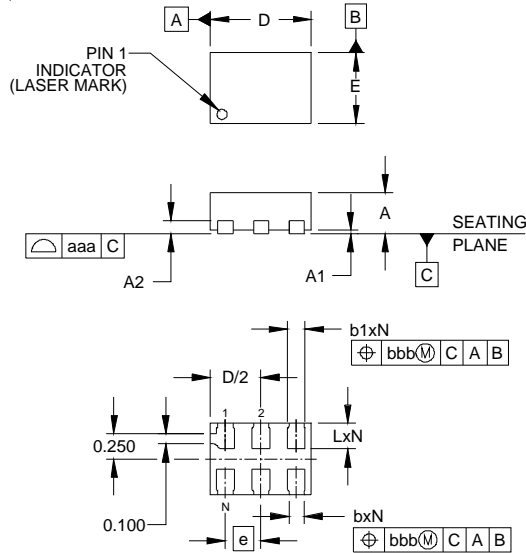
TLP Characteristic





**PROTECTION PRODUCTS**

**Outline Drawing - SLP1007N6T**

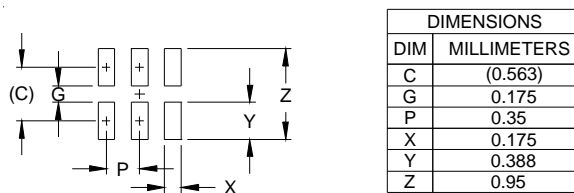


DIMENSIONS			
DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.37	0.40	0.43
A1	0.00	0.02	0.05
A2	(0.13)		
b	0.125	0.15	0.175
b1	0.15	0.175	0.20
D	0.90	1.00	1.10
E	0.60	0.70	0.80
e	0.35 BSC		
L	0.225	0.25	0.275
N	6		
aaa	0.08		
bbb	0.10		

**NOTES:**

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).

**Land Pattern - SLP1007N6T**



DIMENSIONS	
DIM	MILLIMETERS
C	(0.563)
G	0.175
P	0.35
X	0.175
Y	0.388
Z	0.95

**NOTES:**

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY. CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR COMPANY'S MANUFACTURING GUIDELINES ARE MET.



**PROTECTION PRODUCTS**

**Marking Code**



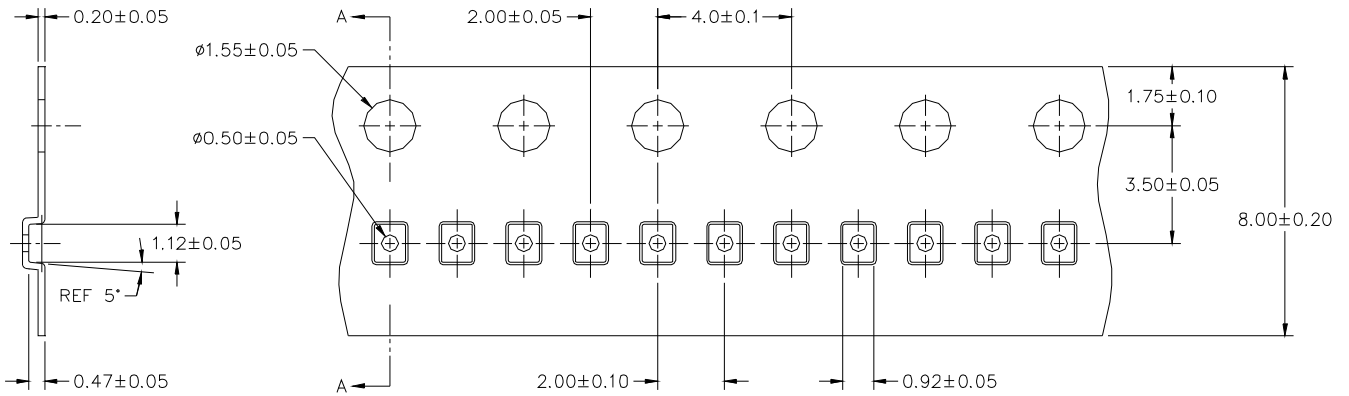
Notes:  
 Marking will also include line matrix date code

**Ordering Information**

Part Number	Qty per Reel	Reel Size
uClamp0545T.TNT	10,000	7 Inch

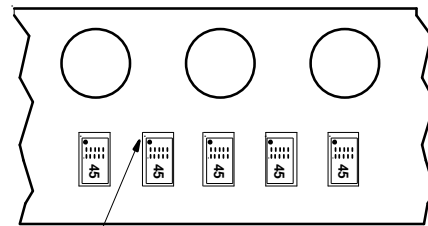
Notes:  
 MicroClamp, uClamp and  $\mu$ Clamp are trademarks of Semtech Corporation

**Carrier Tape Specification**



SECTION A-A

**Device Orientation in Tape**



Pin 1 Location  
 (Towards Sprocket Holes)

**Contact Information**

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 Phone: (805)498-2111 FAX (805)498-3804