PROTECTION PRODUCTS - MicroClamp™

Description

The $\mu Clamp^{TM}$ series of TVS arrays are designed to protect sensitive electronics from damage or latch-up due to ESD. It is designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and PDAs. It features large cross-sectional area junctions for conducting high transient currents. It offers superior electrical characteristics such as lower clamping voltage and no device degradation when compared to MLVs. They offer desirable characteristics for board level protection including fast response time, low operating and clamping voltage, and no device degradation.

The $\mu\text{Clamp}^{\text{TM}}0501P$ is in a 2-pin, RoHS/WEEE compliant, SLP1006P2 package. It measures 1.0 x 0.6 x 0.5mm. The leads are spaced at a pitch of 0.65mm and are finished with lead-free NiPdAu. Each device will protect one line 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, Level 4 (± 15 kV air, ± 8 kV contact discharge). 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

- ◆ Transient protection for data lines to IEC 61000-4-2 (ESD) ±15kV (air), ±8kV (contact) IEC 61000-4-4 (EFT) 40A (tp = 5/50ns) Cable Discharge Event (CDE)
- Ultra-small package (1.0 x 0.6 x 0.5mm)
- ◆ Protects one I/O or power line
- Low clamping voltage
- Working voltage: 5V
- Low leakage current
- Solid-state silicon-avalanche technology

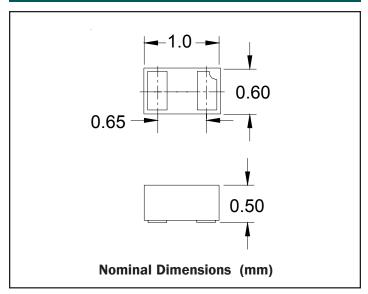
Mechanical Characteristics

- ◆ SLP1006P2 package
- ◆ RoHS/WEEE Compliant
- ◆ Nominal Dimensions: 1.0 x 0.6 x 0.5 mm
- Lead Finish: NiPdAu
- Molding compound flammability rating: UL 94V-0
- Marking: Marking code, cathode band
- ◆ Packaging: Tape and Reel

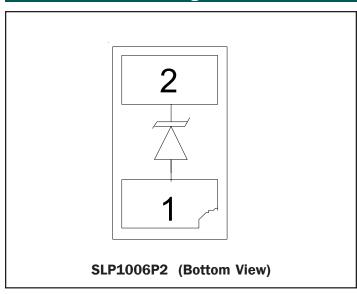
Applications

- Cellular Handsets & Accessories
- Personal Digital Assistants (PDAs)
- Notebooks & Handhelds
- Portable Instrumentation
- Digital Cameras
- Peripherals
- MP3 Players

Dimensions



Schematic & PIN Configuration





Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 8/20μs)	P _{pk}	200	Watts
Maximum Peak Pulse Current (tp = 8/20μs)	I _{pp}	16	Amps
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V _{ESD}	+/- 20 +/- 15	kV
Operating Temperature	T _J	-55 to +125	°C
Storage Temperature	T _{STG}	-55 to +150	°C

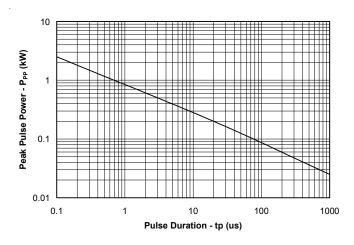
Electrical Characteristics (T=25°C)

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V _{RWM}				5	V
Reverse Breakdown Voltage	V _{BR}	I _t = 1mA	6			V
Reverse Leakage Current	I _R	V _{RWM} = 5V, T=25°C			5	μΑ
Forward Voltage	V _F	I _F = 10mA		0.80		V
Clamping Voltage	V _c	$I_{pp} = 5A, t_{p} = 8/20 \mu s$			9.8	V
Clamping Voltage	V _c	$I_{pp} = 16A, t_{p} = 8/20\mu s$			12.5	V
Junction Capacitance	C _j	V _R = OV, f = 1MHz			160	pF

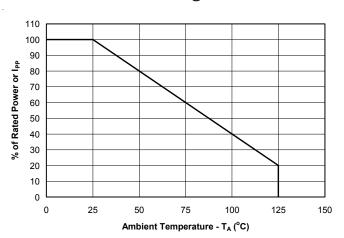


Typical Characteristics

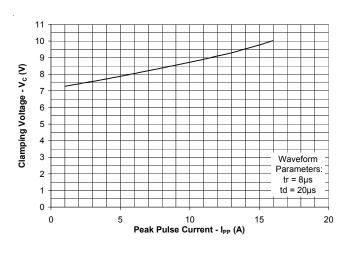
Non-Repetitive Peak Pulse Power vs. Pulse Time



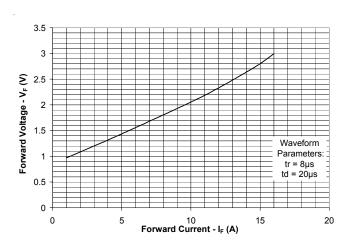
Power Derating Curve



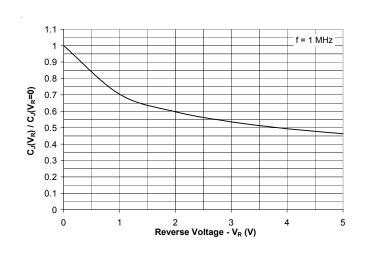
Clamping Voltage vs. Peak Pulse Current



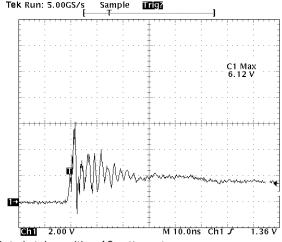
Forward Voltage vs. Forward Current



Normalized Junction Capacitance vs. Reverse Voltage



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



Note: Data is taken with a 10x attenuator



Applications Information

Device Connection Options

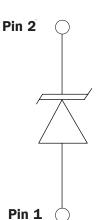
These TVS diodes are designed to protect one data, I/O, or power supply line. The device is unidirectional and may be used on lines where the signal polarity is above ground. The cathode band should be placed towards the line that is to be protected.

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.

Circuit Diagram





Applications Information - Spice Model

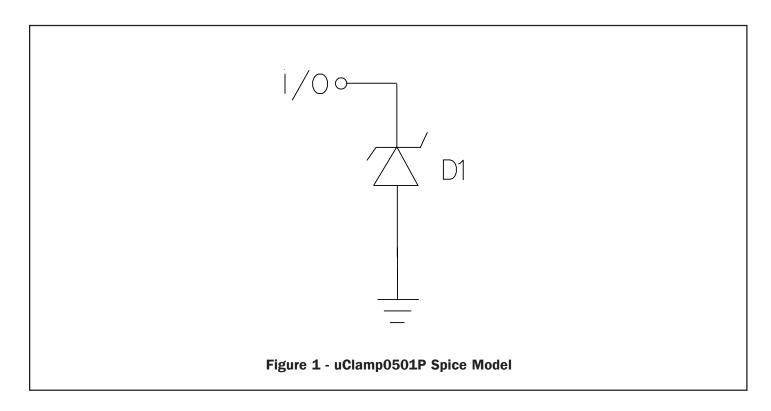
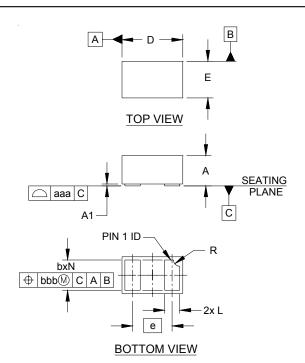


Table 1 - uClamp0501P Spice Parameters							
Parameter	Unit	D1 (TVS)					
IS	Amp	2.53e-12					
BV	Volt	7.08					
٧J	Volt	0.71					
RS	Ohm	0.129					
IBV	Amp	1.0E-3					
CJO	Farad	143.5e-12					
TT	sec	2.541E-9					
M		0.385					
N		1.1					
EG	eV	1.11					



Outline Drawing - SLP1006P2

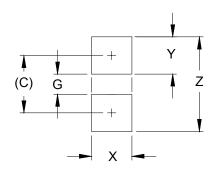


DIMENSIONS								
	11	NCHE	S	MILLIMETERS				
DIM	MIN	NOM	MAX	MIN	NOM	MAX		
Α	.016	.020	.022	0.40	0.50	0.55		
A1	.000	.001	.002	0.00	0.03	0.05		
b	.018	.020	.022	0.45	0.50	0.55		
D	.035	.039	.043	0.90	1.00	1.10		
E	.020	.024	.028	0.50	0.60	0.70		
е	.0	26 BS	SC	0.65 BSC				
L	.008	.010	.012	0.20	0.25	0.30		
R	.002	.004	.006	0.05	0.10	0.15		
N	2			2				
aaa		.003		0.08				
hhh		004			0.10			

NOTES:

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

Land Pattern - SLP1006P2



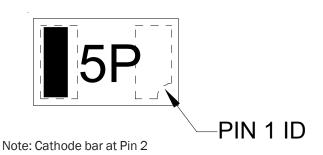
DIMENSIONS							
DIM	INCHES	MILLIMETERS					
С	(.033)	(0.85)					
G	.012	0.30					
X	.024	0.60					
Υ	.022	0.55					
Z	.055	1.40					

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.



Marking Code



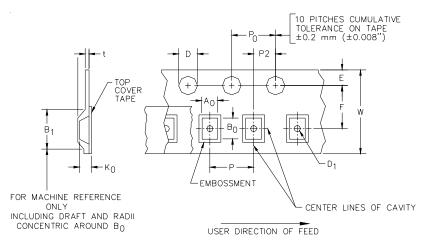
Ordering Information

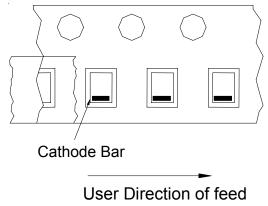
Part Number	Working	Qty per	Reel	
	Voltage	Reel	Size	
uClamp0501P.TCT	5V	3,000	7 Inch	

Notes:

1) This is a lead-free, RoHS/WEEE compliant product MicroClamp, uClamp and μClamp are marks of Semtech Corporation

Tape and Reel Specification





Device Orientation in Tape

A0	во	ко
0.69 +/-0.10 mm	1.19 +/-0.10 mm	0.66 +/-0.10 mm

Tape Width	B, (Max)	D	D1	E	F	Р	PO	P2	Т	W
8 mm	4.2 mm (.165)	1.5 + 0.1 mm - 0.0 mm (0.59 +.005 000)	0.4 mm ±0.25 (.031)	1.750±.10 mm (.069±.004)	3.5±0.05 mm (.138±.002)	4.0±0.10 mm (.157±.00- 4)	4.0±0.1 mm (.157±.00- 4)	2.0±0.05 mm (.079±.002)	0.254±0.02 mm (.016)	8.0 mm + 0.3 mm - 0.1 mm (.312±.012)

Contact Information

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