µClamp3381P
High Power µClamp®
3.3V ESD & Surge Protection

PROTECTION PRODUCTS

Description

µClamp® TVS diodes are designed to protect sensitive electronics from damage or latch-up due to EOS, lightning, CDE, and ESD. They feature large cross-sectional area junctions for conducting high transient currents. These devices offer desirable characteristics for board level protection including fast response time, low operating and clamping voltage, and no device degradation.

µClamp®3381P features extremely good protection characteristics highlighted by high surge current capability (25A, tp=8/20us), low peak ESD clamping voltage, and high ESD withstand voltage (+/-30kV contact per IEC 61000-4-2). Typical dynamic resistance is among the industry's best at 0.025 Ohms. Each device will protect one data or power line operating at 3.3 Volts.

µClamp3381P is in a 2-pin SGP1006N2 package measuring 1.0 x 0.6 x 0.5mm. Leads are spaced at a pitch of 0.65mm and feature a lead-free finish. The combination of small size, low operating voltage, and high ESD surge capability makes them ideal for protection of voltage bus lines in optical modules, LCD televisions, and tablet computers.

Features

- Transient protection for VBus and data lines to
  - IEC 61000-4-2 (ESD) ±30kV (air), ±30kV (contact)
  - IEC 61000-4-4 (EFT) 40A (5/50ns)
  - IEC 61000-4-5 (Lightning) 25A (8/20µs)
- Protects one line
- Low ESD clamping voltage
- Working voltage: 3.3V
- Low leakage current
- Extremely low dynamic resistance: 0.025 Ohms (Typ)
- Solid-state silicon-avalanche technology

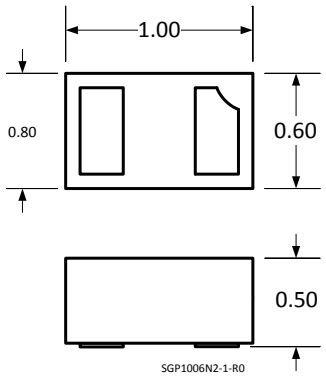
Mechanical Characteristics

- SGP1006N2 Package
- Pb-Free, Halogen Free, RoHS/WEEE Compliant
- Nominal Dimensions: 1.0 x 0.60 x 0.50 mm
- Lead Finish: NiPdAu
- Marking : Marking Code
- Packaging : Tape and Reel

Applications

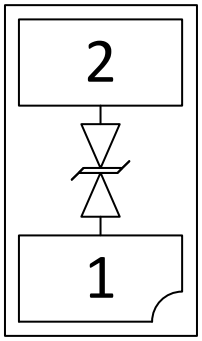
- Optical Modules
- 3.3V VBus Protection
- LCD TV
- Tablet PC
- Instrumentation
- CCTV Cameras

Nominal Dimensions



Nominal Dimensions in mm

Schematic and Pin Configuration



µClamp3381P (Bottom View)

Absolute Maximum Ratings

Rating	Symbol	Value	Units
Peak Pulse Power (t_p = 8/20µs)	P_{PK}	275	W
Peak Pulse Current (t_p = 8/20µs)	I_{PP}	25	A
ESD per IEC 61000-4-2 (Air)(1) ESD per IEC 61000-4-2 (Contact)(1)	V_{ESD}	±30 ±30	kV
Operating Temperature	T_J	-40 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

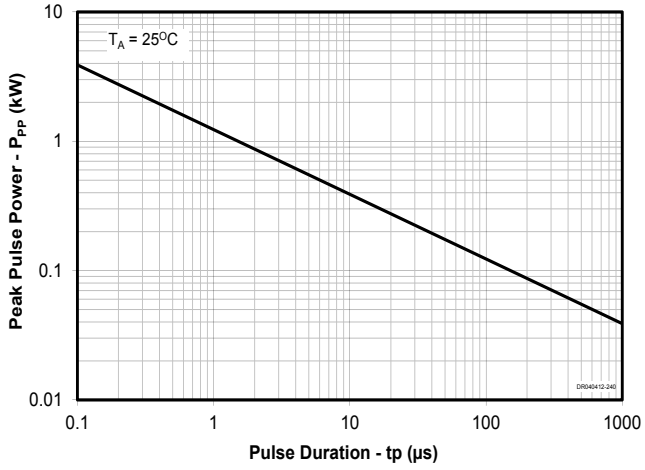
Electrical Characteristics (T=25°C unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Units
Reverse Stand-Off Voltage	V_{RWM}	Pin 1 to 2 or Pin 2 to 1				3.3	V
Reverse Breakdown Voltage	V_{BR}	I_{BR} = 1mA, Pin 1 to 2 or Pin2 to 1		4.5	8.5	10	V
Reverse Leakage Current	I_R	V_{RWM} = 3.3V			1	100	nA
Clamping Voltage	V_C	I_{PP} = 25A, t_p = 8/20µs,				11.5	V
ESD Clamping Voltage[2]	V_C	I_{PP} = 4A, t_p = 0.2/100ns (TLP)			8.3		V
ESD Clamping Voltage[2]	V_C	I_{PP} = 16A, t_p = 0.2/100ns (TLP)			8		V
Dynamic Resistance[2, 3]	R_{DYN}	t_p = 0.2/100ns (TLP)			0.025		Ohms
Junction Capacitance	C_J	V_R = 0V, f = 1MHz	T = 25°C		30	35	pF

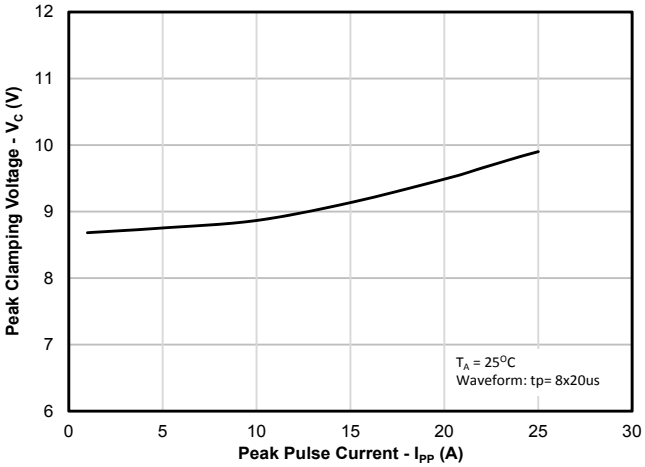
Notes:
(1): Measured with a 20dB attenuator, 50 Ohm scope input impedance, 2GHz bandwidth. ESD gun return path connected to Ground Reference Plane (GRP)
(2): Transmission Line Pulse Test (TLP) Settings: tp = 100ns, tr = 0.2ns, I_{TLP} and V_{TLP} averaging window: t_1 = 70ns to t_2 = 90ns.
(3): Dynamic resistance calculated from I_{TLP} = 4A to I_{TLP} = 16A

Typical Characteristics

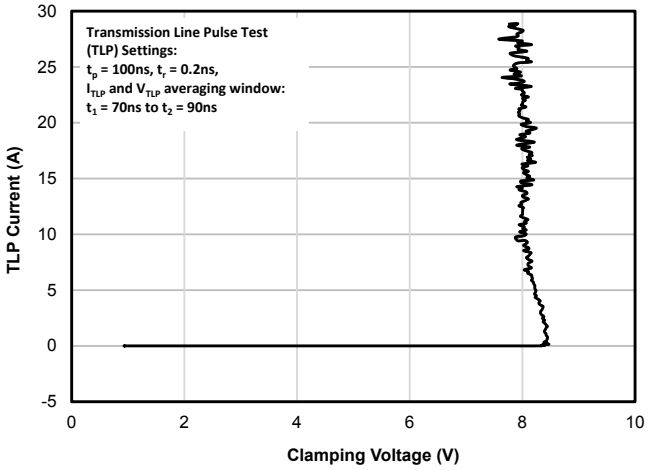
Non-Repetitive Peak Pulse Power vs. Pulse Time



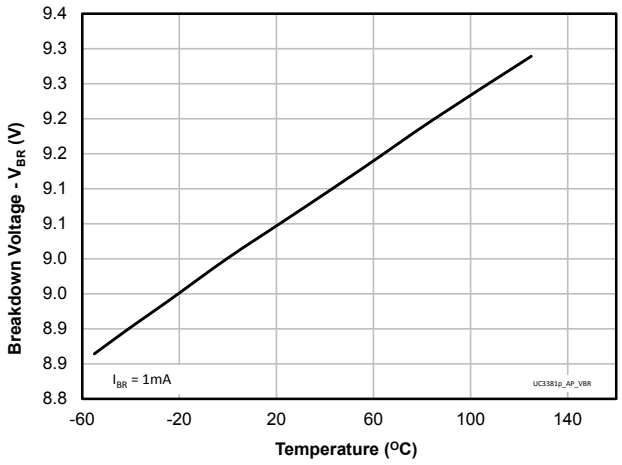
Clamping Voltage vs. Peak Pulse Current (tp=8/20µs)



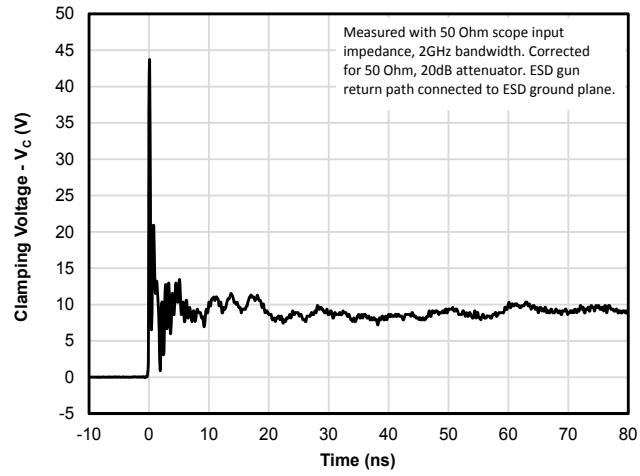
TLP Charateristic



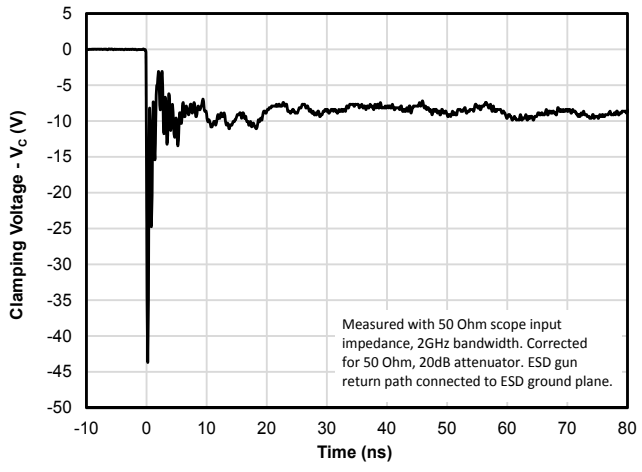
Typical Breakdown Voltage vs. Temperature



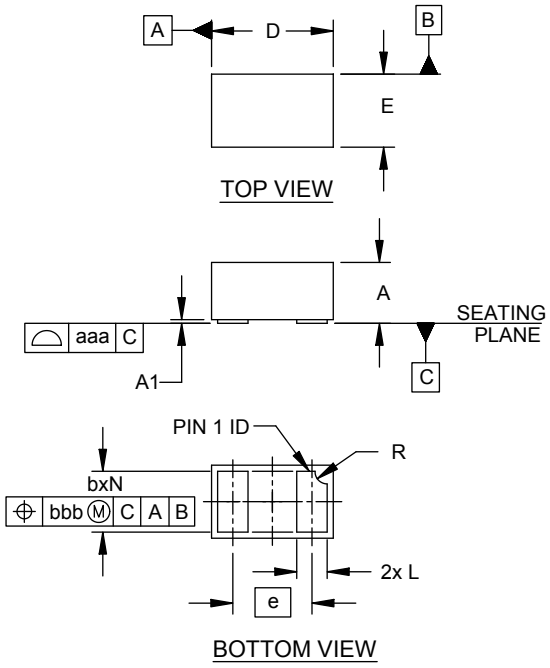
ESD Clamping (8kV Contact per IEC 61000-4-2)



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



Outline Drawing - SGP1006N2

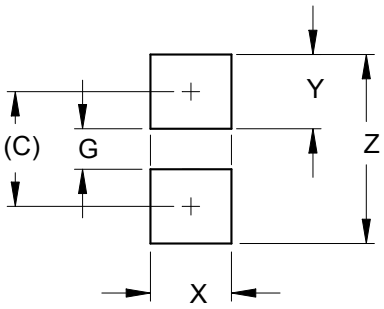


DIMENSIONS						
DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.016	.020	.022	0.40	0.50	0.55
A1	.000	.001	.002	0.00	0.03	0.05
b	.018	.020	.022	0.45	0.50	0.55
D	.035	.039	.043	0.90	1.00	1.10
E	.020	.024	.028	0.50	0.60	0.70
e	.026 BSC			0.65 BSC		
L	.008	.010	.012	0.20	0.25	0.30
R	.002	.004	.006	0.05	0.10	0.15
N	2			2		
aaa	.003			0.08		
bbb	.004			0.10		

SLP1006P2-1-R0

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

Land Pattern - SGP1006N2

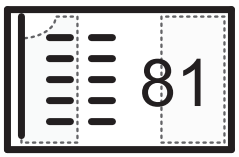


DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	(.033)	(0.85)
G	.012	0.30
X	.024	0.60
Y	.022	0.55
Z	.055	1.40

SLP1006P2-2-R0

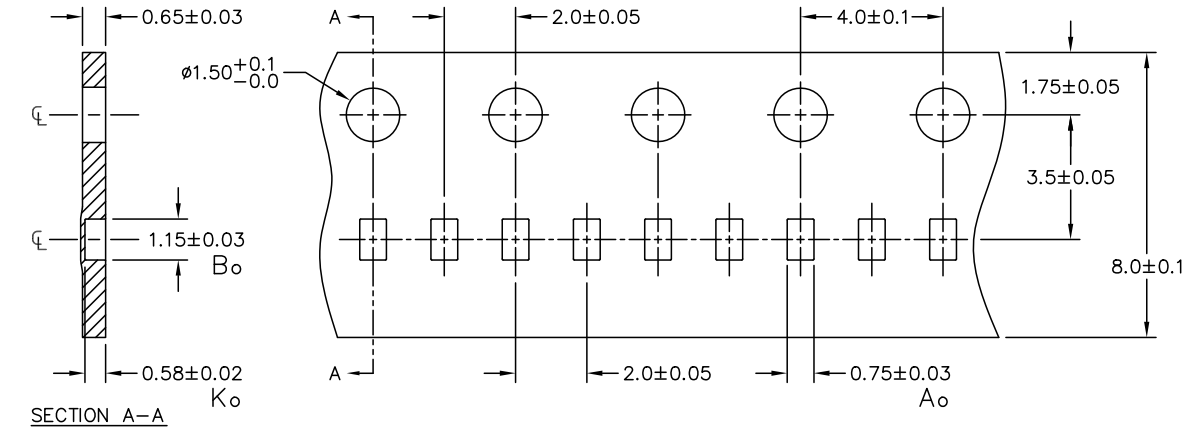
NOTES:
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY.CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR COMPANY'S MANUFACTURING GUIDELINES ARE MET.

Marking Code

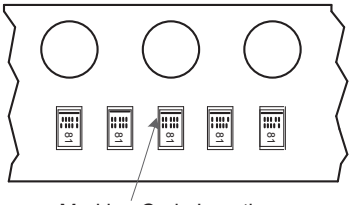


Notes:
1. Device is electrically symmetrical.
2. Marking will also include line matrix date code.
3. Bar indicates Pin 1 location.

Tape and Reel Specification



NOTES: ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.



Marking Code Location
(Bar Towards Sprocket Holes)

Ordering Information

Part Number	Qty per Reel	Reel Size
µClamp3381P.TFT	15,000	7 Inch

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Contact Information

Semtech Corporation
200 Flynn Road, Camarillo, CA 93012
Phone: (805) 498-2111, Fax: (805) 498-3804
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