



SEMTECH®

Description

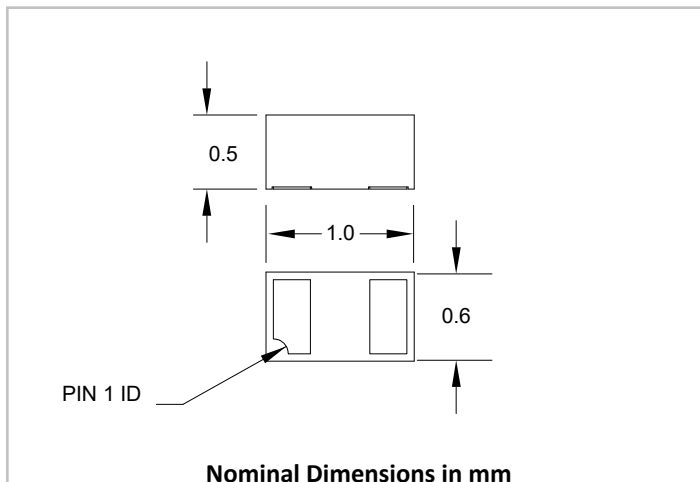
μClamp® series of TVS diodes are designed to protect sensitive electronics from damage or latch-up due to EOS, lightning, CDE and ESD. They feature large cross-sectional area junctions for conducting high transient currents. These devices offer desirable characteristics for board level protection including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

uClamp5581P is in a DFN 1.0x0.6x0.50mm 2-Lead package. Each device may be used to meet the ESD immunity requirements of IEC 61000-4-2 ($\pm 20\text{kV}$ air, $\pm 20\text{kV}$ contact discharge). uClamp5581P also provides high surge current capability (20A, $t_p=8/20\mu\text{s}$). The combination of small size and high ESD and surge capability makes them ideal for use in applications such as portables, wearables and various industrial equipment.

Applications

- 5.5V VBus Protection
- Tablets
- Personal Computers
- Instrumentation
- CCTV Cameras

Nominal Dimensions



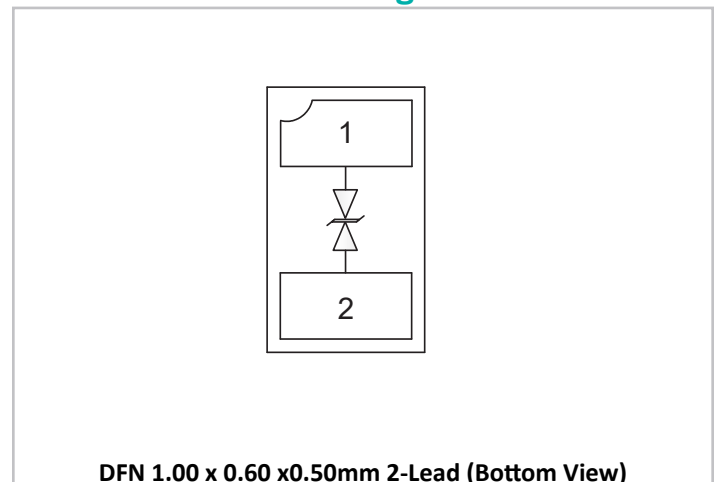
Features

- Transient protection for VBus and data lines to
 - IEC 61000-4-2 (ESD): 20kV (contact), 20kV (air)
 - IEC 61000-4-5 (Lightning): 20A (8/20 μs)
- Protects one line
- Low ESD clamping voltage
- Working voltage: 5.5V
- Low reverse leakage current
- Solid-state silicon-avalanche technology

Mechanical Characteristics

- Package: DFN 1.0x0.6x0.50mm 2-Lead
- Pb-Free, Halogen Free, RoHS/WEEE Compliant
- Molding compound flammability rating: UL 94V-0
- Lead Finish: NiPdAu
- Marking: Marking code
- Packaging: Tape and Reel

Schematic and Pin Configuration



Absolute Maximum Rating

RATING	SYMBOL	VALUE	UNITS
Peak Pulse Power (tp = 8/20μs)	P_{PK}	270	W
Peak Pulse Current (tp = 8/20μs)	I_{PP}	20	A
ESD per IEC 61000-4-2 (Contact) ⁽¹⁾	V_{ESD}	±20	kV
ESD per IEC 61000-4-2 (Air) ⁽¹⁾		±20	
Operating Temperature	T_J	-40 to +85	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Characteristics

T=25°C unless otherwise specified

All data taken from Pin 1 to 2 unless otherwise specified

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse Stand-Off Voltage	V_{RWM}				5.5	V
Reverse Breakdown Voltage	V_{BR}	$I_t = 1mA$	6.0	8.5	10	V
Reverse Leakage Current	I_R	$V_{RWM} = 5.5V$			800	nA
Clamping Voltage	V_C	$t_p = 8/20us, I_{PP} = 20A$			11.5	V
ESD Clamping Voltage ⁽²⁾	V_C	$I_{TLP} = 16A, t_p = 0.2/100ns$ (TLP)		9.0		V
Junction Capacitance	C_J	$V_R = 0V, f = 1MHz$			40	pF

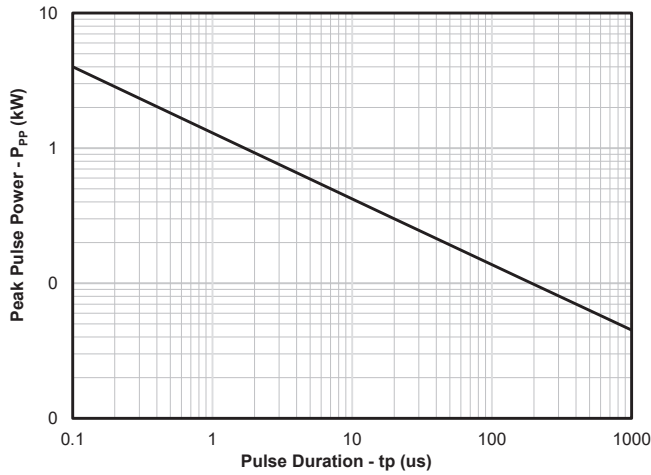
Notes:

(1): ESD gun return path connected to Ground Reference Plane (GRP)

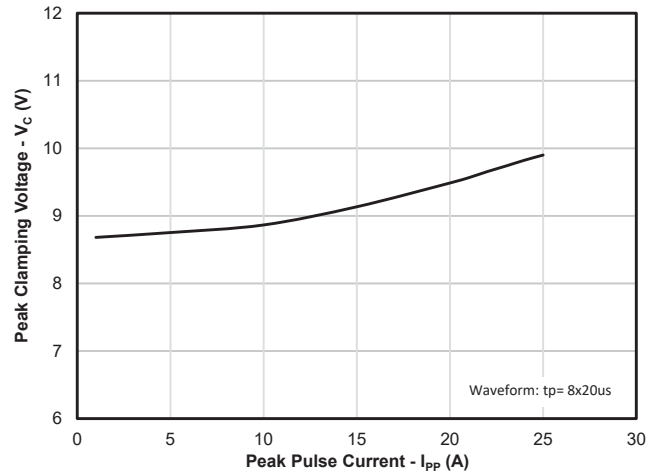
(2): Transmission Line Pulse Test (TLP) Settings: tp = 100ns, tr = 0.2ns, I_{TLP} and V_{TLP} , averaging window: $t_1 = 70ns$ to $t_2 = 90ns$

Typical Characteristics

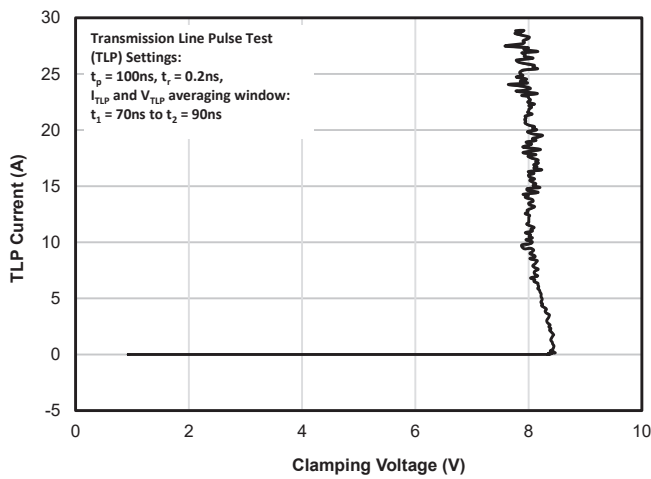
Non-Repetitive Peak Pulse Power vs. Pulse Time



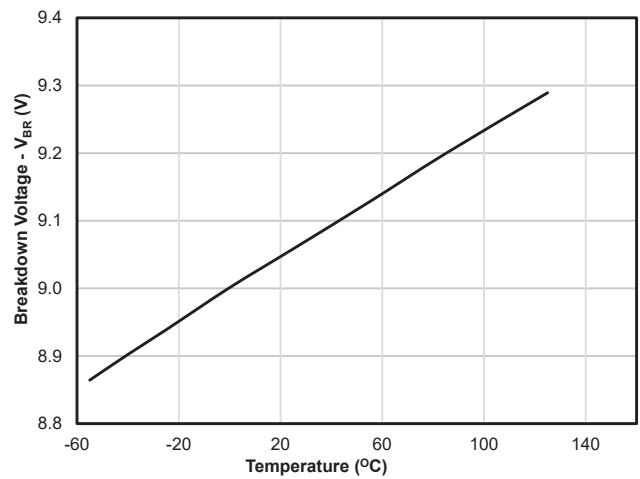
Clamping Voltage vs. Peak Pulse Current (tp=8/20μs)



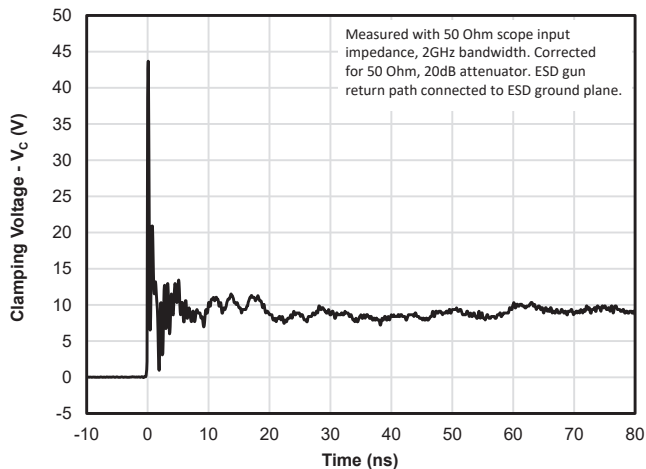
TLP Characteristic



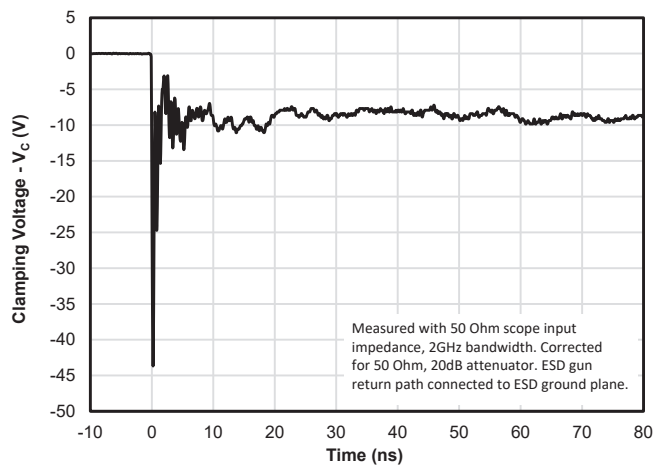
Typical Breakdown Voltage vs. Temperature



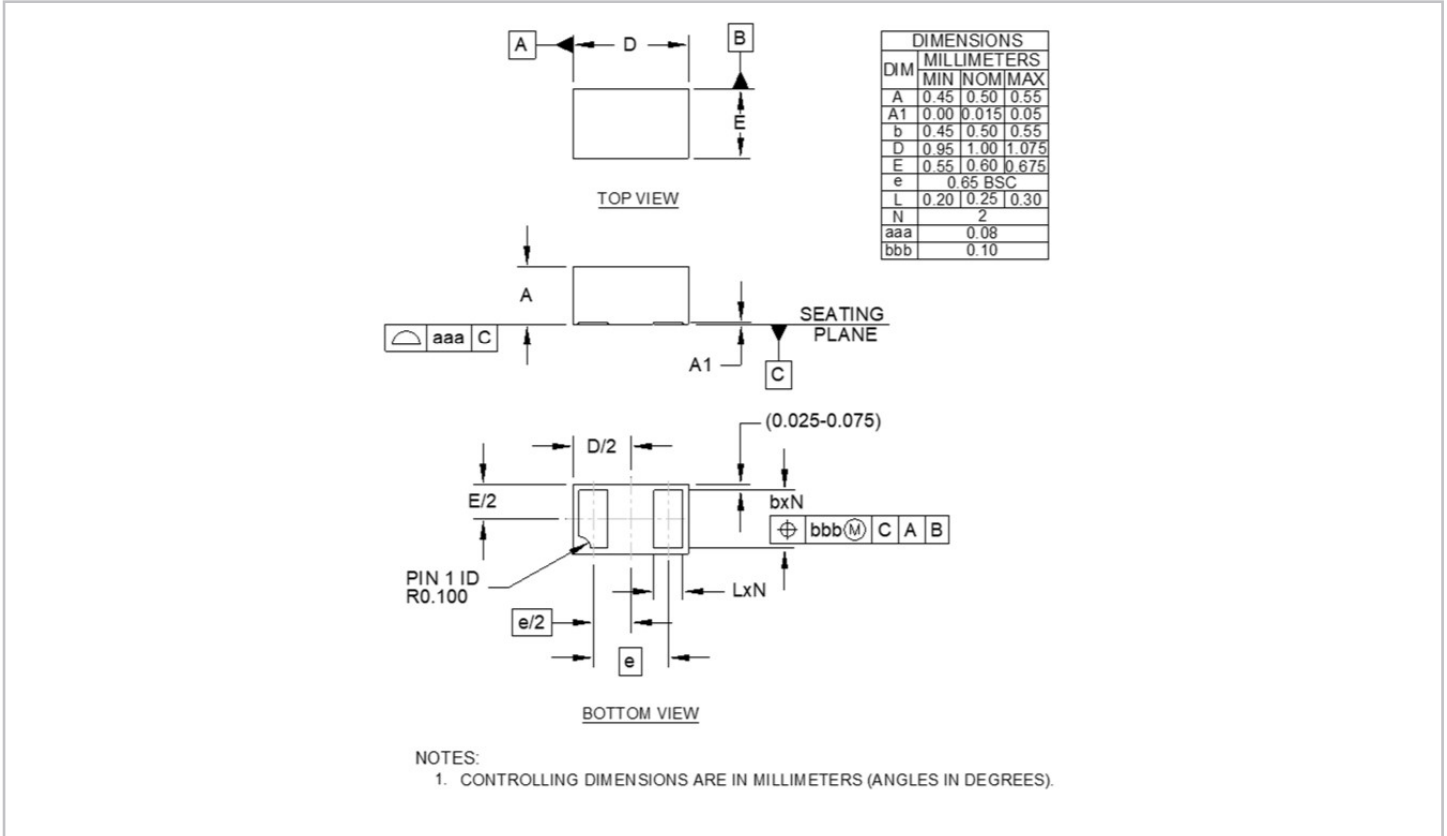
ESD Clamping (+8kV Contact per IEC 61000-4-2)



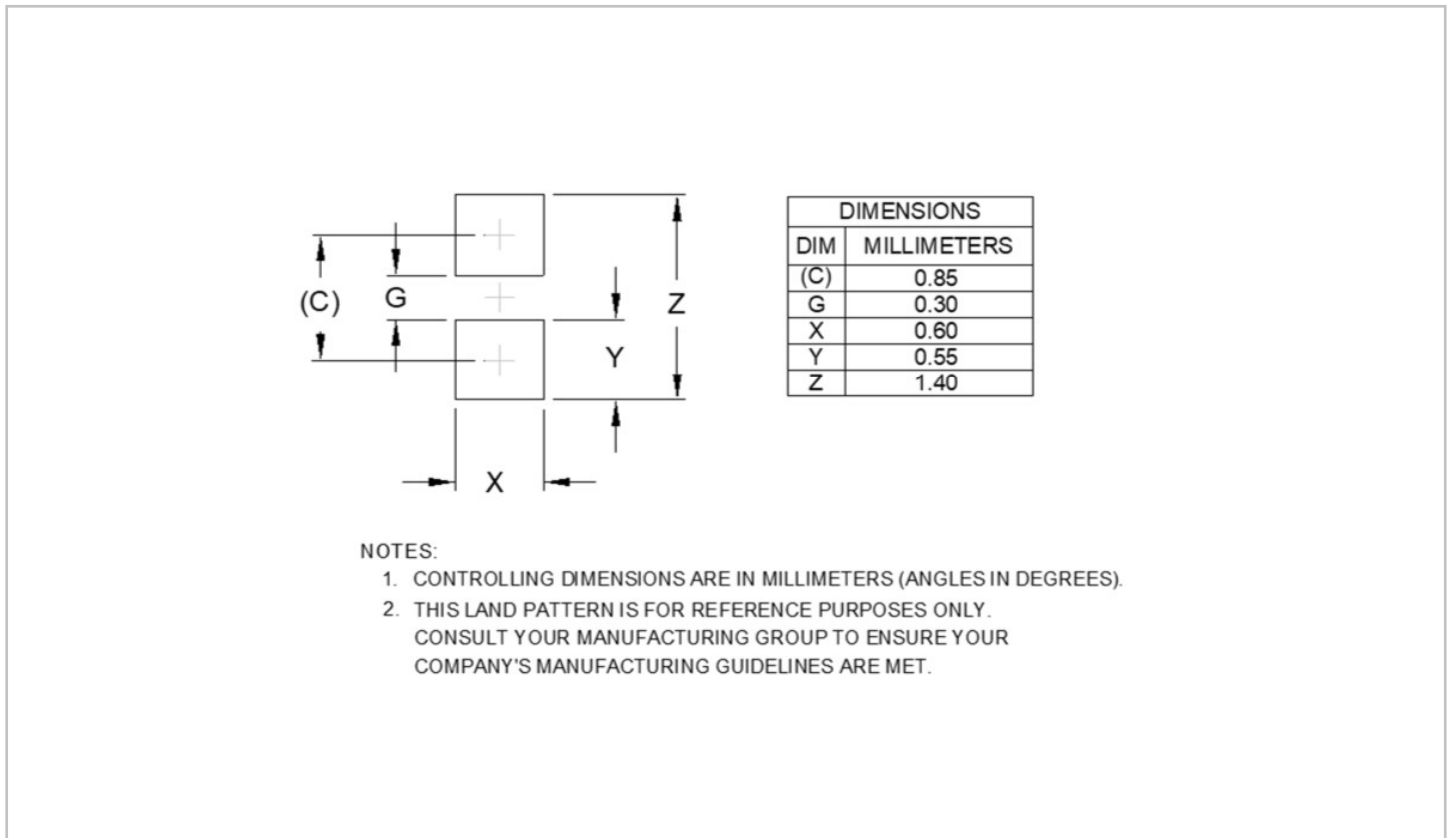
ESD Clamping (-8kV Contact per IEC 61000-4-2)



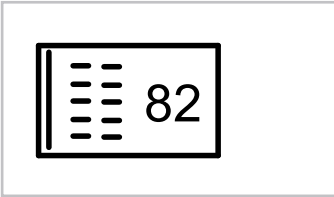
Outline Drawing - DFN 1.00 x 0.60 x 0.50mm 2-Lead



Landing Pattern - DFN 1.00 x 0.60 x 0.50mm 2-Lead



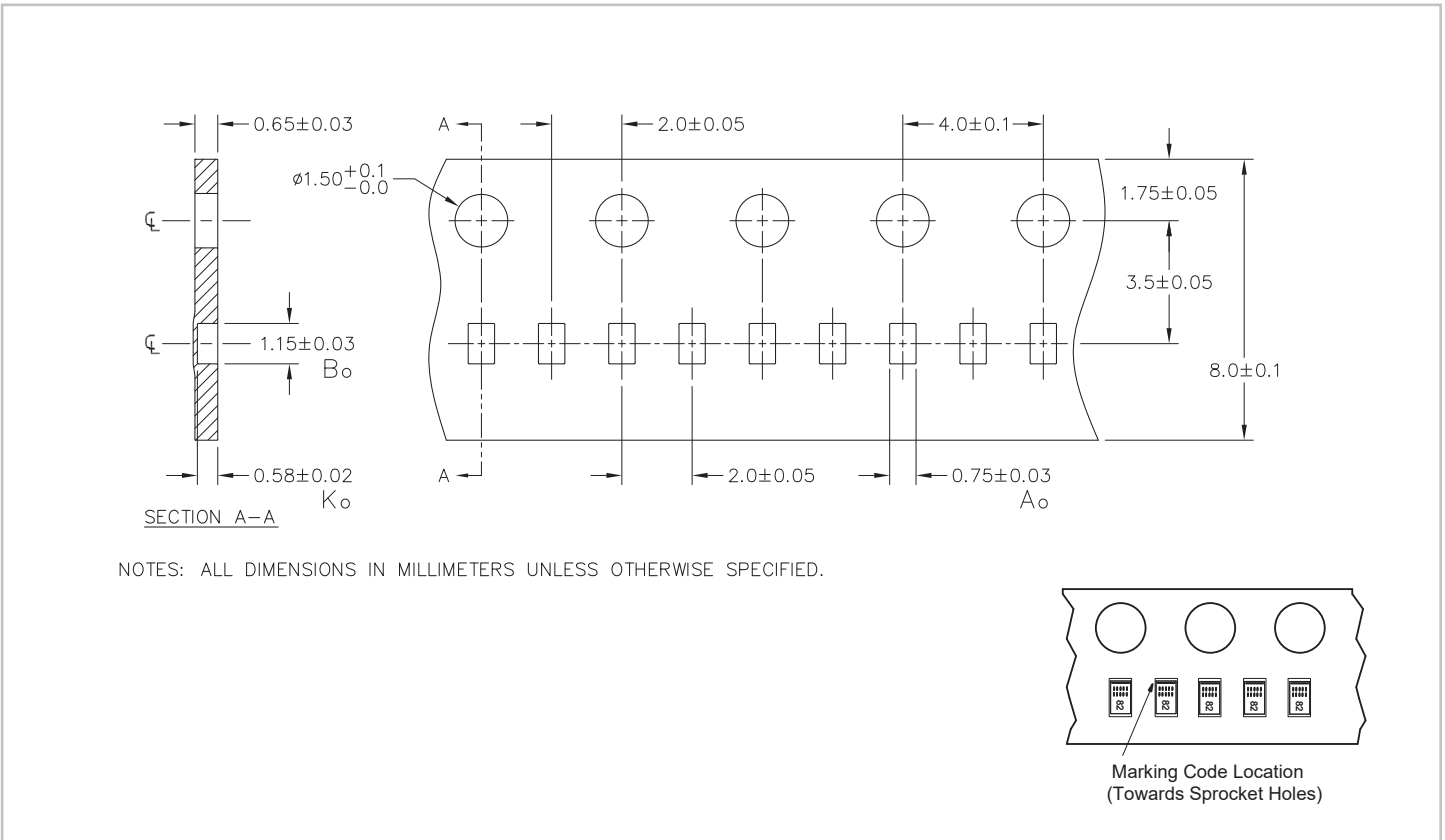
Marking Code



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



Order Information

PART NUMBER	QTY PER REEL	REEL SIZE
uClamp5581P.F	15,000	7"

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