uClamp5591P

µClamp ®

5.5V ESD & Surge Protection

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.

uClamp5591P 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 (±20kV air, ±20kV contact discharge). uClamp5591P also provides high surge current capability (20A, tp=8/20µs). 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.

Features

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

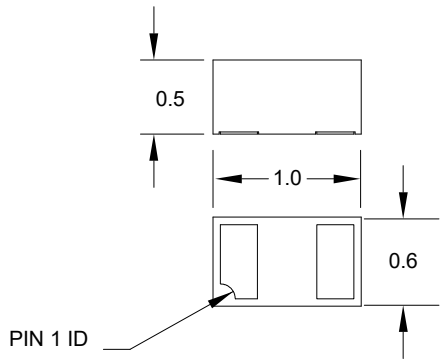
Applications

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

Mechanical Characteristics

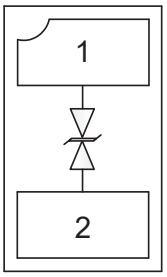
- Package: DFN 1.0x0.6x0.50mm 2-Lead
- Pb-Free, Halogen Free, RoHS/WEEE Compliant
- Molding compound flammability rating: UL 94V-0
- Lead Finish: Pb-Free
- Marking: Marking code
- Packaging: Tape and Reel

Nominal Dimensions



Nominal Dimensions in mm

Schematic and Pin Configuration



DFN 1.00 x 0.60 x0.50mm 2-Lead (Bottom View)

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_{OP}	-40 to +125	°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

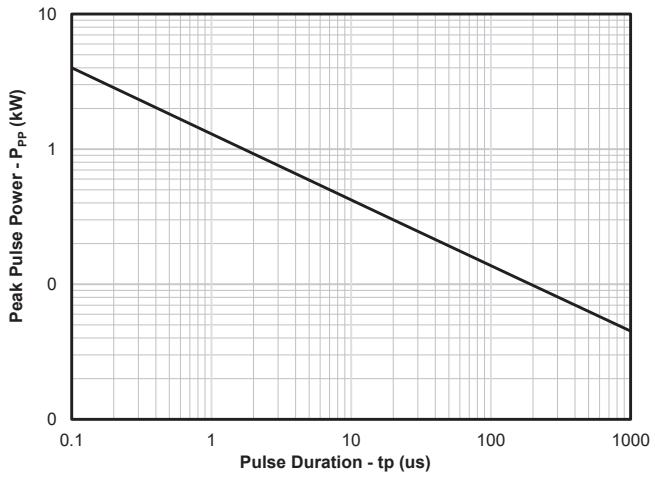
Notes:

(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

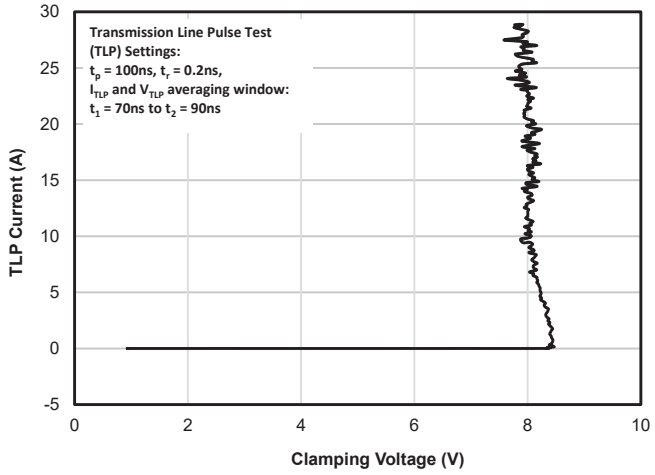
Typical Characteristics

Non-Repetitive Peak Pulse Power vs. Pulse Time

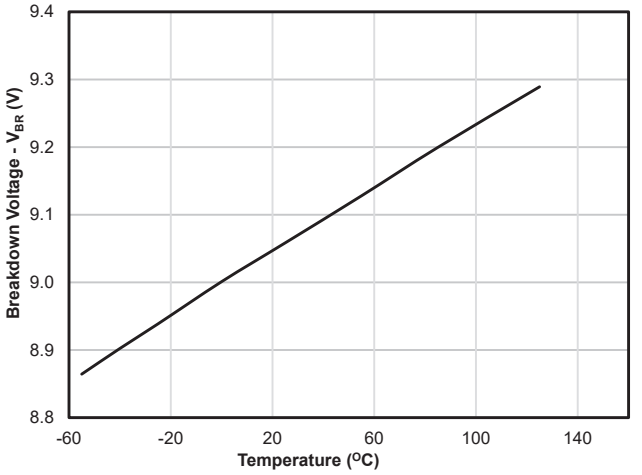


Clamping Voltage vs. Peak Pulse Current (tp=8/20µs)

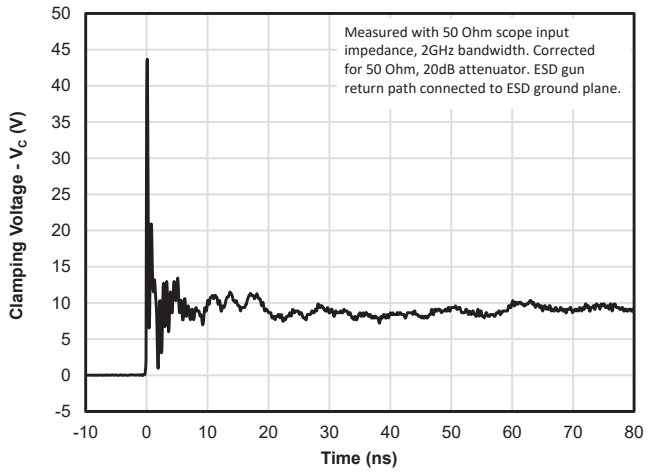
TLP Charateristic



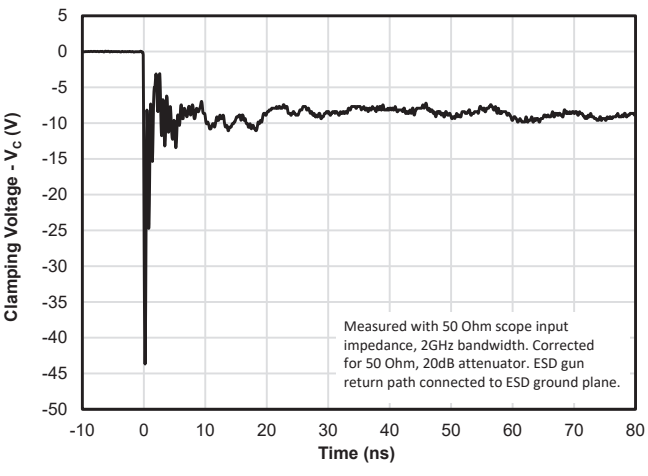
Typical Breakdown Voltage vs. Temperature



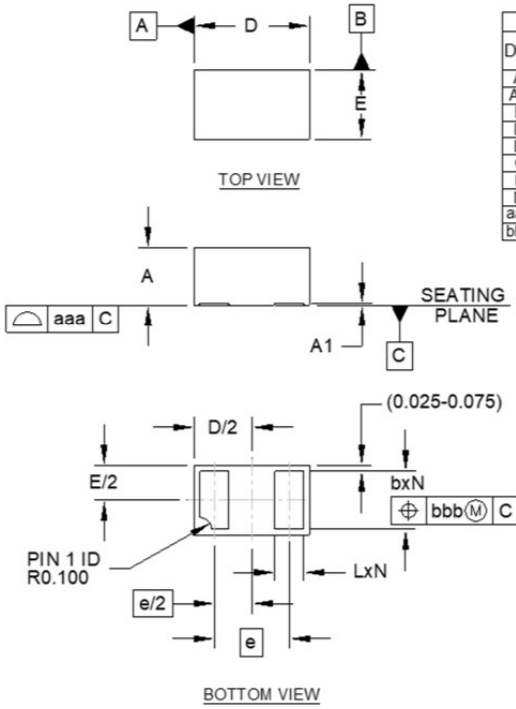
ESD Clamping (+8kV Contact per IEC 61000-4-2)



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



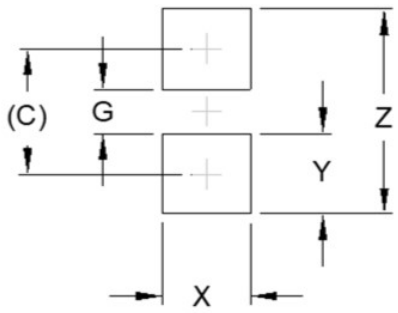
Outline Drawing - DFN 1.00 x 0.60 x 0.50mm 2-Lead



DIMENSIONS			
DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.45	0.50	0.55
A1	0.00	0.015	0.05
b	0.45	0.50	0.55
D	0.95	1.00	1.075
E	0.55	0.60	0.675
e	0.65 BSC		
L	0.20	0.25	0.30
N	2		
aaa	0.08		
bbb	0.10		

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

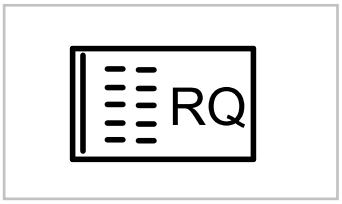
Landing Pattern - DFN 1.00 x 0.60 x 0.50mm 2-Lead



DIMENSIONS	
DIM	MILLIMETERS
(C)	0.85
G	0.30
X	0.60
Y	0.55
Z	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



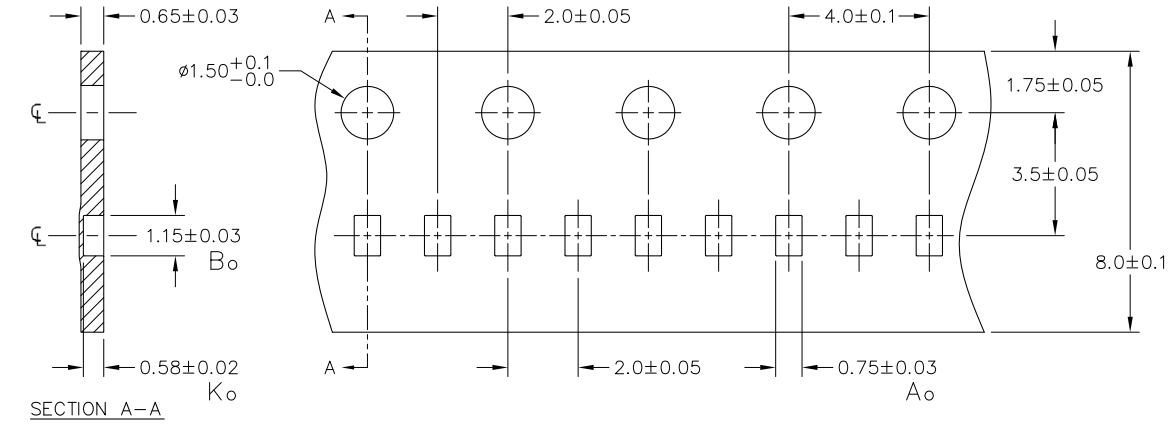
Notes:

(1) Device is electrically symmetrical.

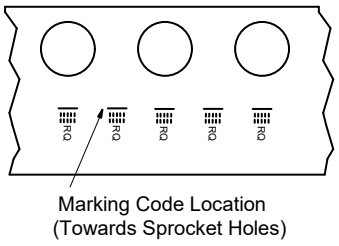
(2) Marking will also include line matrix date code.

(3) Bar indicates Pin 1 location.

Tape and Reel Specification



NOTES: ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.



Marking Code Location
(Towards Sprocket Holes)

Order Information

PART NUMBER	QTY PER REEL	REEL SIZE
uClamp5591P.F	15,000	7"

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