µClamp5501ZV

µClamp®

1-Line ESD & Surge Protection

PROTECTION PRODUCTS

Description

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

The µClamp5501ZV features robust surge capability (60A, tp = 8/20µs), low clamping voltage, and low dynamic resistance (0.03Ω typical). They may be used to meet the ESD immunity requirements of IEC 61000-4-2 (±30kV air, ±30kV contact discharge). Each device will protect one unidirectional line operating at 5.5 volts.

µClamp5501ZV is in a DFN 1.0 x 0.6 x 0.25mm 2 Lead package, measuring1.0 x 0.6 x 0.25mm. Leads are spaced at a pitch of 0.65mm and are finished with lead-free NiAu. The combination of small size and high ESD and surge capability makes them ideal for use in applications such as cellular phones, battery protection, and VBUS protection.

Features

- High ESD withstand Voltage: ±30kV (Contact) and ±30kV (Air) per IEC 61000-4-2
- High peak pulse current capability: 60A (tp = 8/20µs)
- Ultra-small package(1.0 x 0.6 x 0.25mm)
- Protects one unidirectional I/O or power line
- Low ESD clamping voltage
- Low dynamic resistance: 0.03Ω Typical
- Working voltage: +5.5V
- Solid-state silicon-avalanche technology

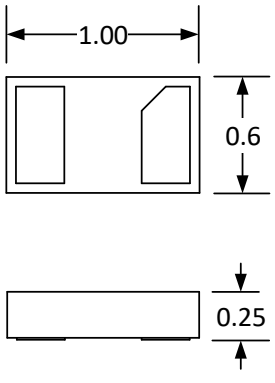
Mechanical Characteristics

- Package: DFN 1.0 x 0.6 x 0.25mm 2 Lead
- Pb-Free, Halogen Free, RoHS/WEEE Compliant
- Molding compound flammability rating: UL 94V-0
- Lead Finish: NiAu
- Marking: Marking code
- Packaging: Tape and Reel

Applications

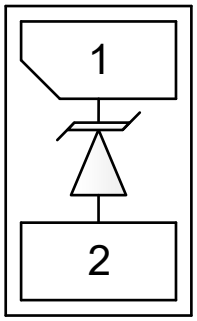
- Cellular Handsets & Accessories
- Battery Protection
- Notebooks & Handhelds
- USB VBus
- Digital Lines

Package Dimension



Nominal Dimensions (mm)

Schematic & Pin Configuration



(Bottom View)

Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power (t_p = 8/20µs)	P_{PK}	600	W
Peak Pulse Current (t_p = 8/20µs)	I_{PP}	60	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_{OP}	-55 to +85	^{O}C
Storage Temperature	T_{STG}	-55 to +150	^{O}C

Electrical Characteristics (T=25^{O}C unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Units
Reverse Stand-Off Voltage	V_{RWM}	Pin 1 to 2				5.5	V
Reverse Breakdown Voltage	V_{BR}	I_t = 1mA, Pin 1 to 2		5.8	6.4	7.5	V
Reverse Leakage Current	I_R	V_{RWM} = 5.5 V, Pin 1 to 2			50	500	nA
Clamping Voltage	V_C	t_p = 8/20µs, Pin 1 to 2	I_{PP}=10A		7.2	8	V
			I_{PP}=40A		8.4	9.5	
			I_{PP}=60A		8.8	10	
Forward Voltage	V_F	t_p = 8/20µs, Pin 2 to 1	I_{PP}=10A		1.2	2	V
			I_{PP}=40A		2	2.5	
			I_{PP}=60A		2.5	3	
ESD Clamping Voltage[2]	V_C	tp=0.2/100ns, Pin 1 to 2	I = 4A		6.7		V
			I = 16A		7.1		
Dynamic Resistance[2,3]	R_{DYN}	tp = 0.2/100ns, Pin 1 to 2			0.03		Ω
Junction Capacitance	C_J	V_R = 0V, f = 1MHz			445	500	pF

Notes:

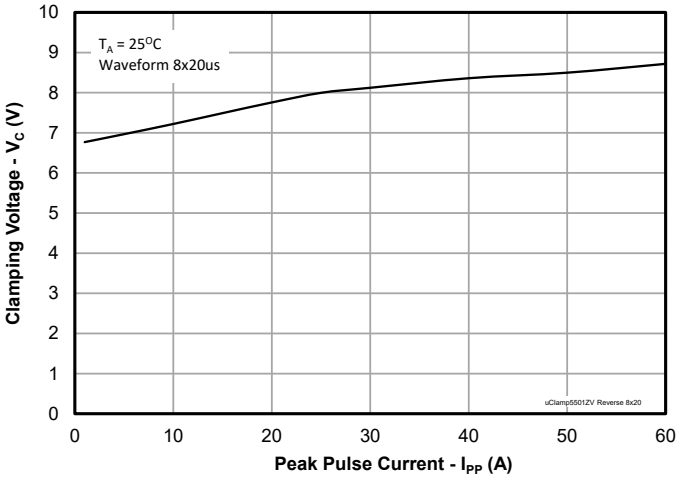
1) ESD gun return path connected to ESD ground plane.

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

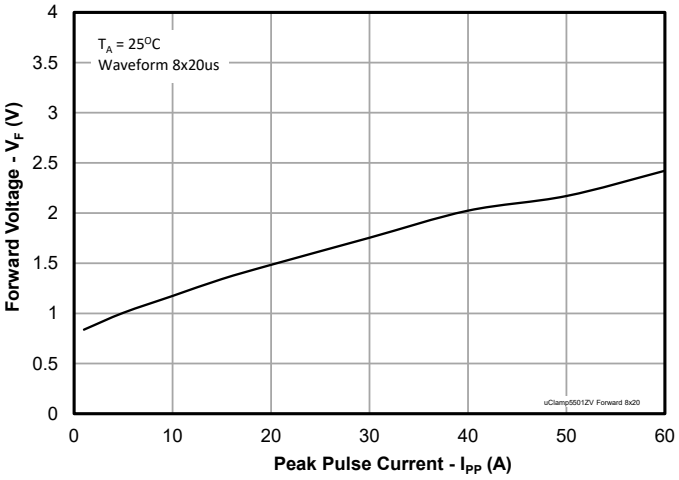
3) Dynamic resistance calculated from I_{TLP} = 4A to I_{TLP} = 16A

Typical Characteristics

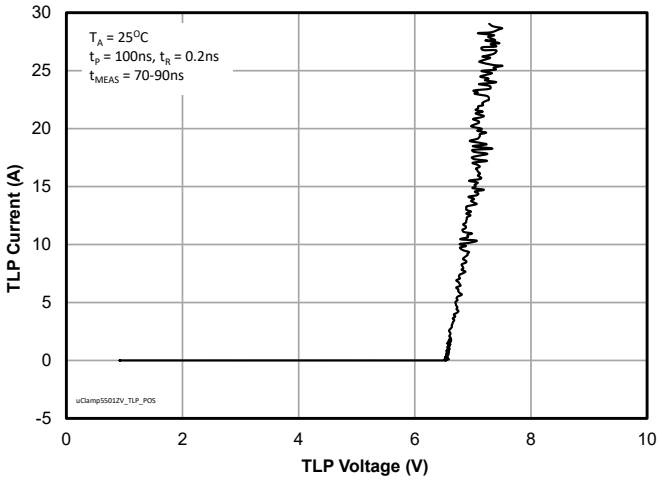
Clamping Voltage vs. Peak Pulse Current (t_p=8/20µs)



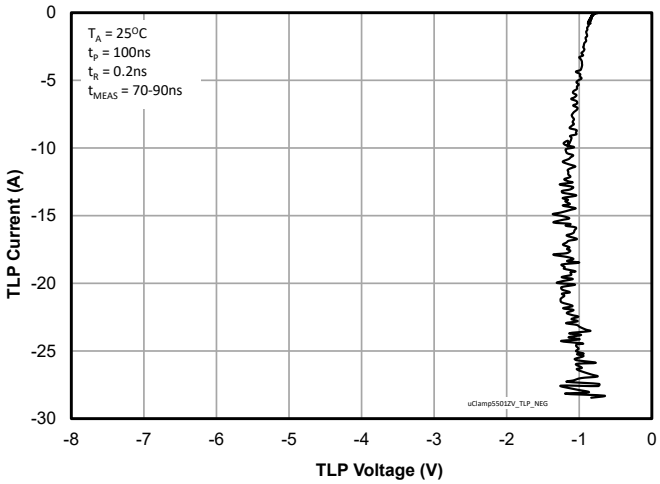
Forward Voltage vs. Peak Pulse Current (t_p=8/20µs)



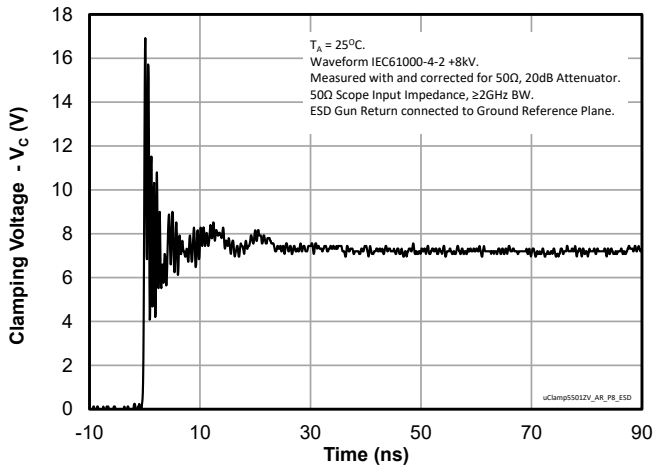
TLP Characteristic (Positive Pulse)



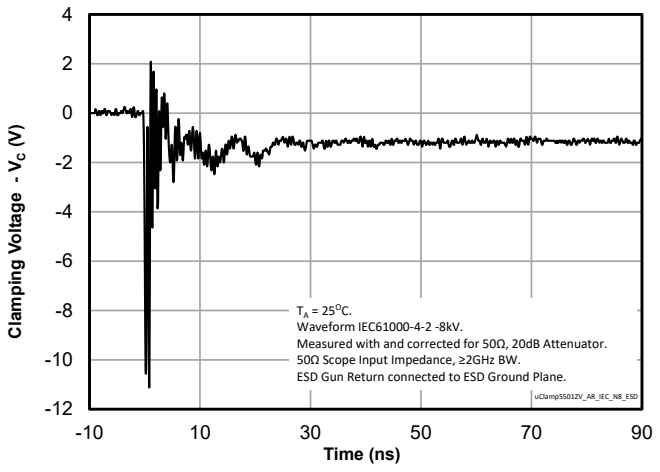
TLP Characteristic (Negative Pulse)



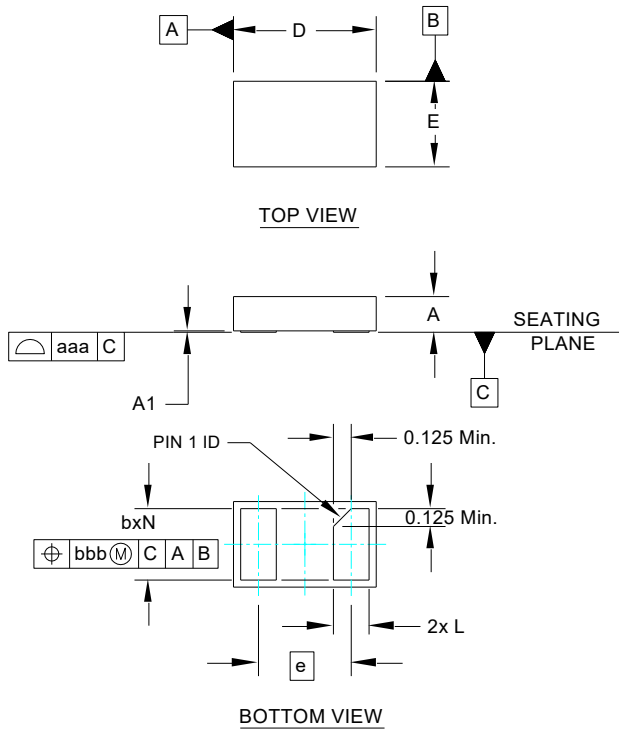
ESD Clamping (+8kV Contact per IEC 61000-4-2)



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



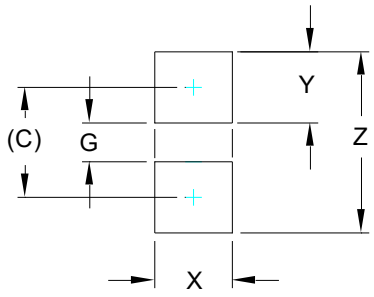
Outline Drawing - DFN 1.0 x 0.6 x 0.25mm 2 Lead



DIMENSIONS			
DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.235	0.250	0.265
A1	0.00	0.010	0.050
b	0.45	0.50	0.55
D	0.95	1.00	1.05
E	0.55	0.60	0.65
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).

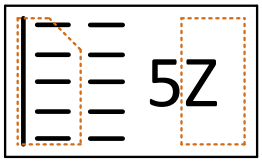
Land Pattern - DFN 1.0 x 0.6 x 0.25mm 2 Lead



DIMENSIONS	
DIM	MILLIMETERS
C	(0.85)
G	0.30
X	0.60
Y	0.55
Z	1.40

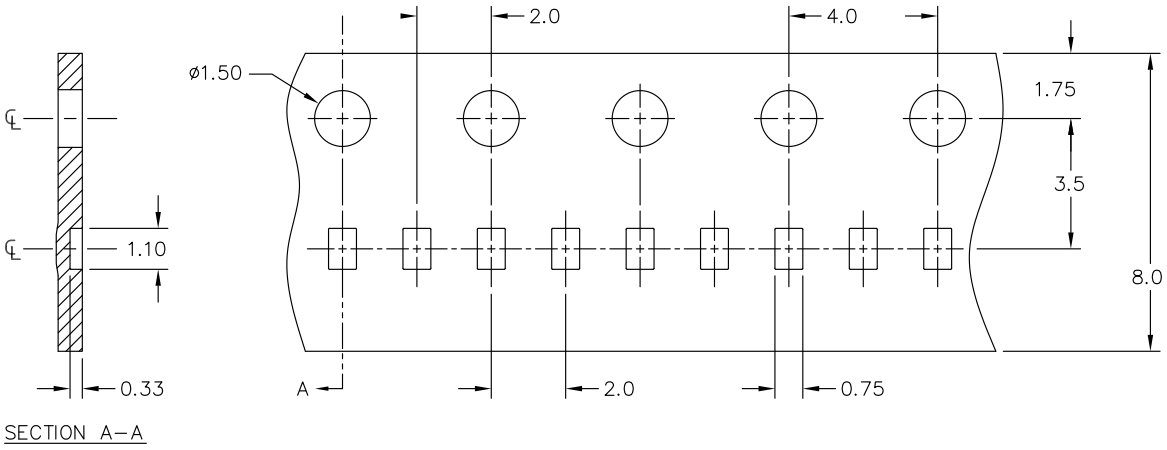
NOTES:
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY. CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR COMPANY'S MANUFACTURING GUIDELINES ARE MET.

Marking Code

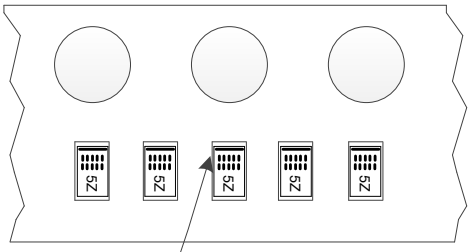


Notes:
1. Marking will also include line matrix date code.
2. Bar indicates Pin 1 location.

Tape and Reel Specification



Note: All dimensions are nominal dimensions in mm.



Marking Code Location
(Bar Towards Sprocket Holes)

Ordering Information

Part Number	Qty per Reel	Reel Size
µClamp5501ZVTFT	15,000	7″

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