µClamp03321PQ

µClamp®

1-Line ESD & Surge Protection

Description

µClamp®series 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.

µClamp03321PQ is in a DFN 1.0 x 0.6 x 0.55mm 2-Lead package. Each device will protect one bi-directional line operating at ±3.3 volts. µClamp03321PQ features extremely good protection characteristics highlighted by high surge current capability (50A, tp = 8/20µs), low peak ESD clamping voltage, and high ESD withstand voltage (± 30kV per IEC 61000-4-2).

µClamp03321PQ is qualified to AEC-Q100 (Grade 1) and AEC-Q101 for automotive and industrial applications.

Features

- High ESD withstand Voltage: ±30kV (Contact) and ±30kV (Air) per IEC 61000-4-2
- High peak pulse current capability: 50A (tp = 8/20µs)
- Protects one I/O or power line
- Qualified to AEC-Q100(Grade 1) and AEC-Q101
- Low ESD clamping voltage
- Working voltage: ± 3.3V
- Solid-state silicon-avalanche technology

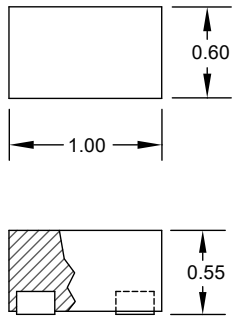
Mechanical Characteristics

- Package: DFN 1.0 x 0.6 x 0.55mm 2-Lead
- Pb-Free, Halogen Free, RoHS/WEEE Compliant
- Molding compound flammability rating: UL 94V-0
- Lead Finish: Lead free
- Marking: Marking code + Date code
- Packaging: Tape and Reel

Applications

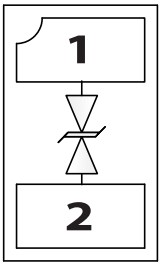
- Automotive Applications
- Cellular Handsets & Accessories
- Battery Protection
- Notebooks & Handhelds
- USB Voltage Bus
- Audio lines

Package Dimension



Nominal Dimensions (mm)

Schematic & Pin Configuration



DFN 1.0 x 0.6 x 0.55mm 2-Lead (Bottom View)

Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power (t_p = 8/20µs)	P_{PK}	525	W
Peak Pulse Current (t_p = 8/20µs)	I_{PP}	50	A
ESD per IEC 61000-4-2 (Air)(1) ESD per IEC 61000-4-2 (Contact)(1)	V_{ESD}	±30 ±30	kV
ESD per ISO-10605 (Air)(2) ESD per ISO-10605 (Contact)(2)	V_{ESD}	±30 ±30	kV
Operating Temperature	T_{OP}	-40 to +125	^{O}C
Junction Temperature and Storage Temperature	T_J & 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}					3.3	V
Reverse Breakdown Voltage	V_{BR}	I_{BR}= 1mA		3.8	4.8	6.0	V
Reverse Leakage Current	I_R	V_{RWM} = 3.3 V			<20	100	nA
Clamping Voltage	V_C	t_p = 8/20µs	I_{PP}=10A		4.8	6.1	V
			I_{PP}=30A		6.9	8.2	
			I_{PP}=50A		9.2	10.5	
ESD Clamping Voltage(3)	V_C	t_p=0.2/100ns	I = 4A		4.33		V
			I = 16A		4.31		
Dynamic Resistance(3),(4)	R_{DYN}	t_p = 0.2/100ns			<0.01		Ω
Junction Capacitance	C_J	V_R = 0V, f = 1MHz			83	100	pF

Notes:

1) ESD gun return path connected to ESD ground plane

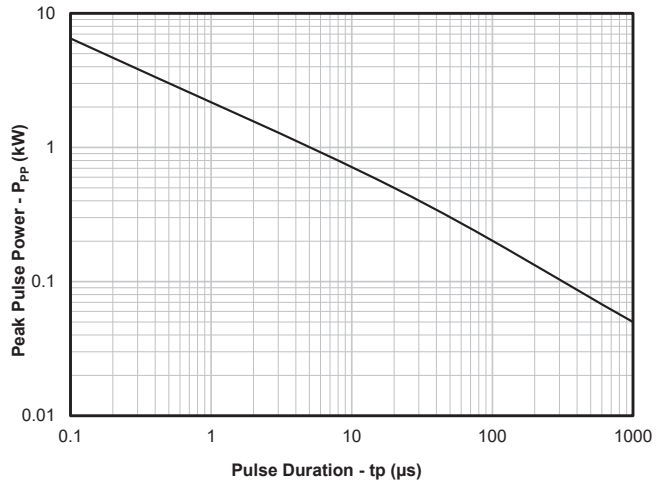
2) ESD gun return path to Horizontal Coupling Plane (HCP); Test conditions: a) 150pF/330pF, 330Ω; b) 150pF/330pF, 2kΩ

3) 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

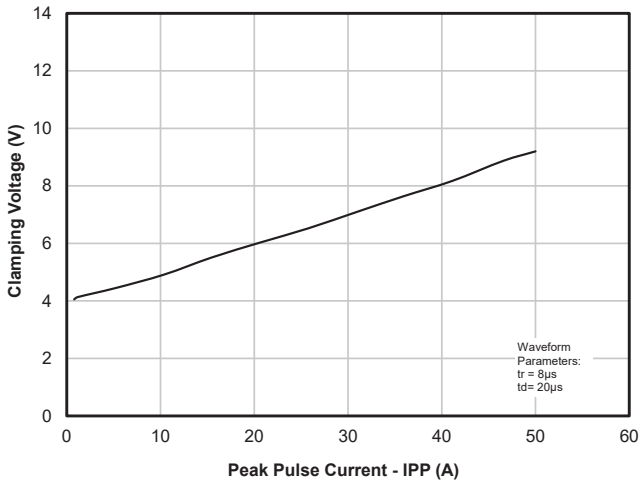
4) Dynamic resistance calculated from I_{TLP} = 4A to I_{TLP} = 16A

Typical Characteristics

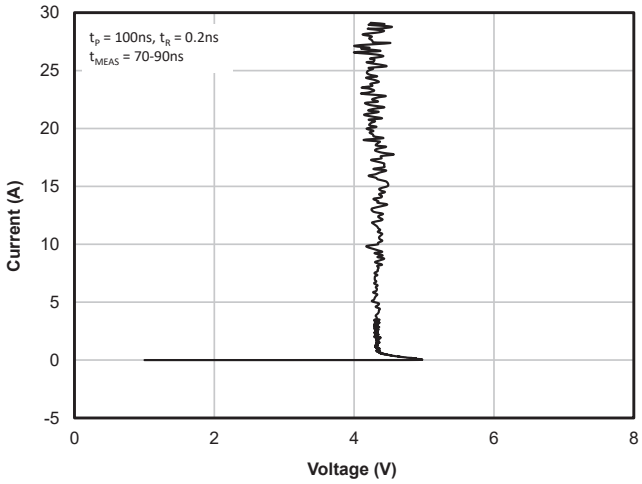
Non-Repetitive Peak Pulse Power vs. Pulse Time



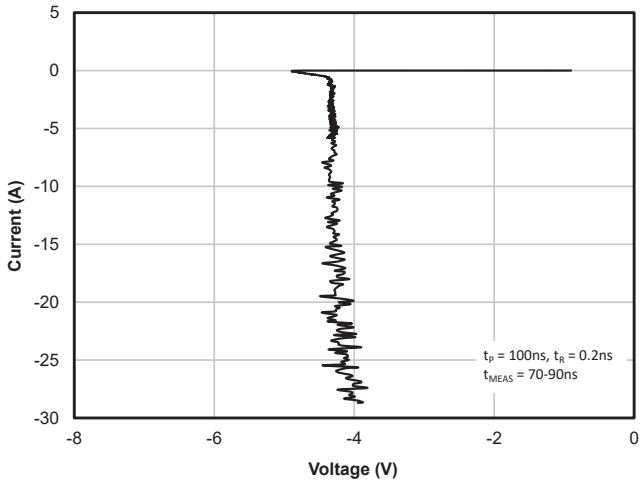
Clamping Voltage vs. Peak Pulse Current (t_p=8/20µs)



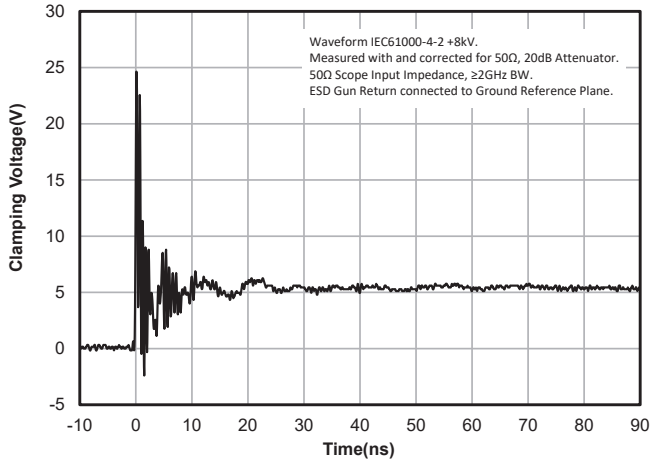
TLP Characteristic (Positive)



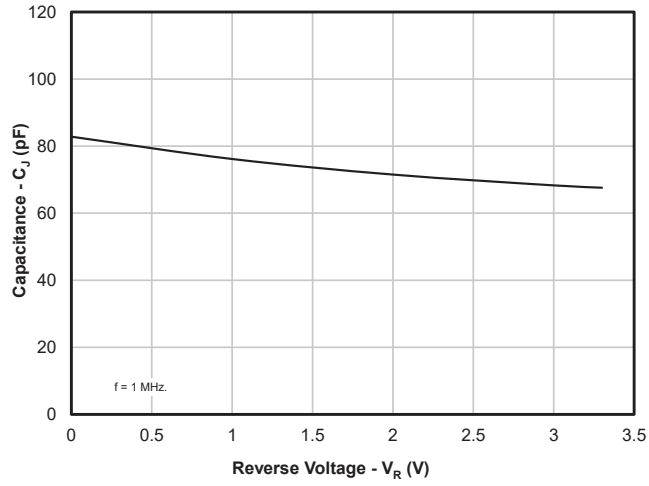
TLP Characteristic (Negative)



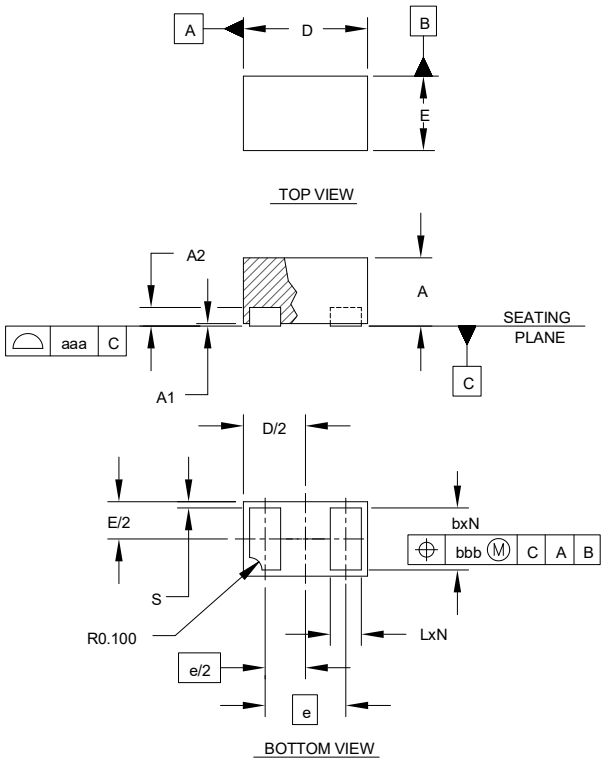
ESD Clamping (+8kV Contact per IEC 61000-4-2)



Capacitance vs. Voltage



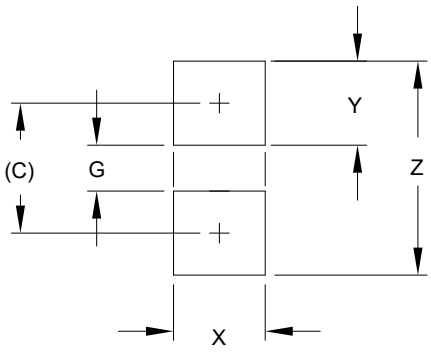
Outline Drawing - DFN 1.0 x 0.6 x 0.55mm 2-Lead



DIMENSIONS			
DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.50	0.55	0.60
A1	0.00	0.02	0.05
A2		(0.150)	
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
S		(0.05)	
N		2	
aaa		0.08	
bbb		0.10	

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

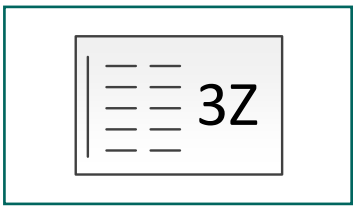
Land Pattern - DFN 1.0 x 0.6 x 0.55mm 2-Lead



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

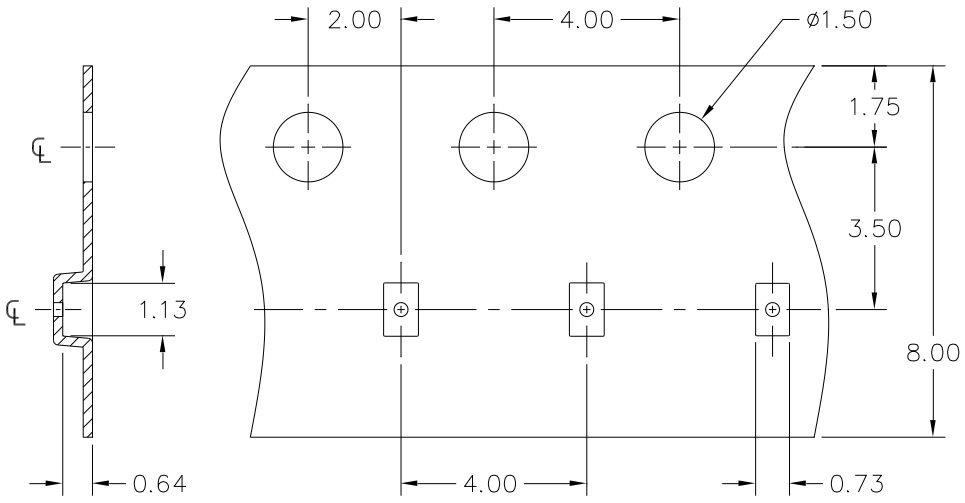
NOTES:
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY. CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR COMPANY'S MANUFACTURING GUIDELINES ARE MET.

Marking Code

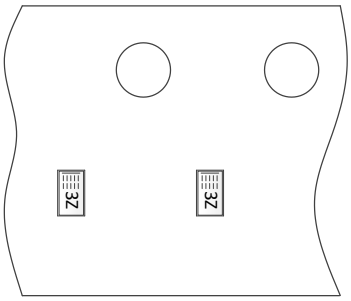


Notes:
1. Marking will also include line matrix date code.
2. Bar indicates Pin 1 location.

Tape and Reel Specification



Note: All dimensions are nominal dimensions in mm.



Ordering Information

Part Number	Qty per Reel	Reel Size
µClamp03321PQ.C	3,000	7″

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