

Description

μClamp® TVS diodes are designed to protect sensitive electronics from damage or latch-up due to ESD and EOS. This device offers desirable characteristics for board level protection including fast response time, low operating and clamping voltage, and no device degradation.

μClamp®03351PW features extremely good protection characteristics highlighted by low dynamic resistance (0.12Ω typical), low peak ESD clamping voltage, and high surge capability (6A for 8/20μs surge per IEC 61000-4-5). Each device will protect one data or power line operating at 3.3 Volts.

μClamp03351PW is in a DFN 1.0 x 0.6 x 0.55mm 2-Lead package. The small package gives the designer the flexibility to protect single lines in applications where arrays are not practical. The combination of small size and high ESD and surge capability makes them ideal for use in portable applications such as cellular phones, digital cameras, and tablet PC's.

Features

- High ESD withstand voltage: +/-20kV (contact) and +/-30kV (air) per IEC 61000-4-2
- High lightning surge capability: 6A (8/20μs) per IEC 61000-4-5
- Low ESD clamping voltage
- Working voltage: 3.3 V
- Low leakage current
- Low dynamic resistance: 0.12 Ohms Typical
- Solid-state silicon-avalanche technology

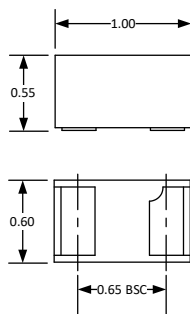
Mechanical Characteristics

- Package: DFN 1.0 x 0.6 x 0.55mm 2-Lead
- Pb-Free, Halogen Free, RoHS/WEEE compliant
- Lead Finish: Pb-Free
- Marking: Marking code
- Packaging: Tape and Reel

Applications

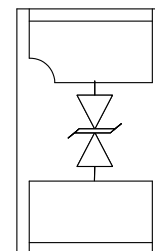
- SIM card
- Cellular Handsets & Accessories
- Peripherals
- Notebook Computers
- Tablet PC

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 ($t_p = 8/20\mu s$)	P_{PK}	40	W
Peak Pulse Current ($t_p = 8/20\mu s$)	I_{PP}	6	A
ESD per IEC 61000-4-2 (Contact) ⁽¹⁾ ESD per IEC 61000-4-2 (Air) ⁽¹⁾	V_{ESD}	± 20 ± 30	kV
Operating Temperature	T_J	-40 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Characteristics ($T=25^\circ C$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reverse Stand-Off Voltage	V_{RWM}				3.3	V
Reverse Breakdown Voltage	V_{BR}	$I_{BR} = 50\mu A$	3.8	5.0	6.0	V
Reverse Leakage Current	I_R	$V_{RWM} = 3.3V$		<5	50	nA
Clamping Voltage	V_C	$I_{PP} = 6A$, $t_p = 1.2/50\mu s$ (Voltage), $8/20\mu s$ (Current) Combination Waveform, $R_S = 2\Omega$		4.5	6.5	V
ESD Clamping Voltage ⁽²⁾	V_C	$t_p = 0.2/100ns$	$I_{TLP} = 4A$	4.1		V
			$I_{TLP} = 16A$	5.6		
Dynamic Resistance ^{(2),(3)}	R_{DYN}	$t_p = 0.2/100ns$		0.12		Ω
Junction Capacitance	C_J	$V_R = 0V$, $f = 1MHz$		4.7	7	pF

Notes:

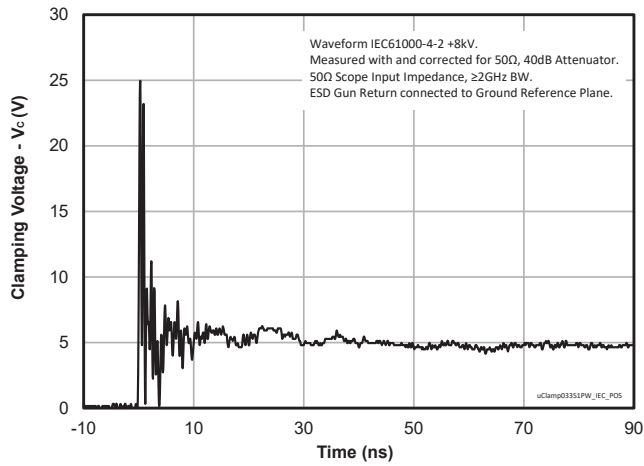
1) ESD gun return path connected to ESD ground plane.

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 $t_2 = 90ns$.

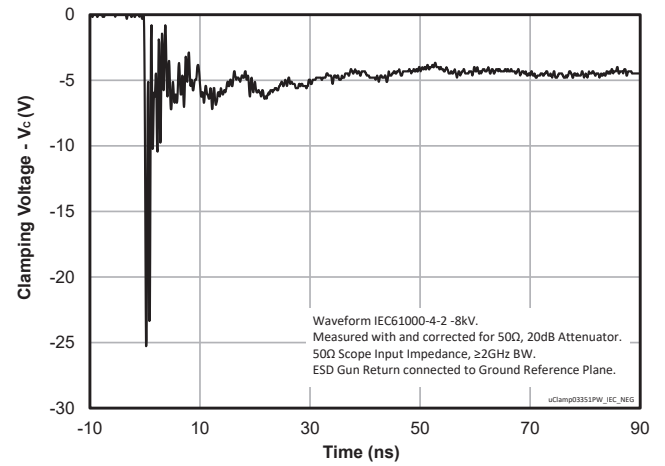
3) Dynamic resistance calculated from $I_{TLP} = 4A$ to $I_{TLP} = 16A$

Typical Characteristics

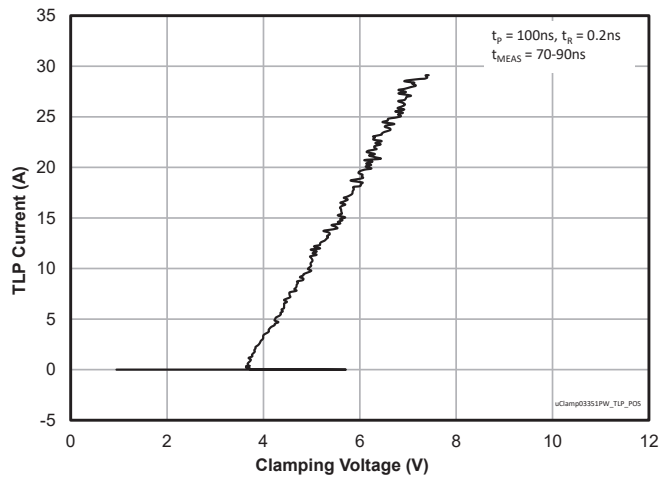
ESD Clamping (8kV Contact per IEC 61000-4-2)



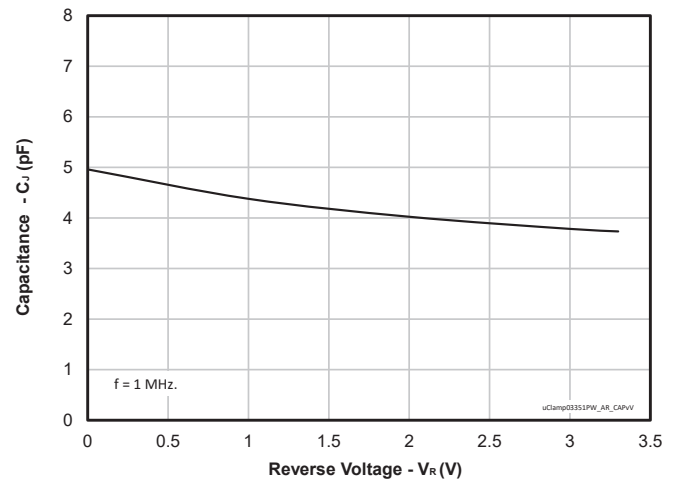
ESD Clamping (-8kV Contact per IEC 61000-4-2)



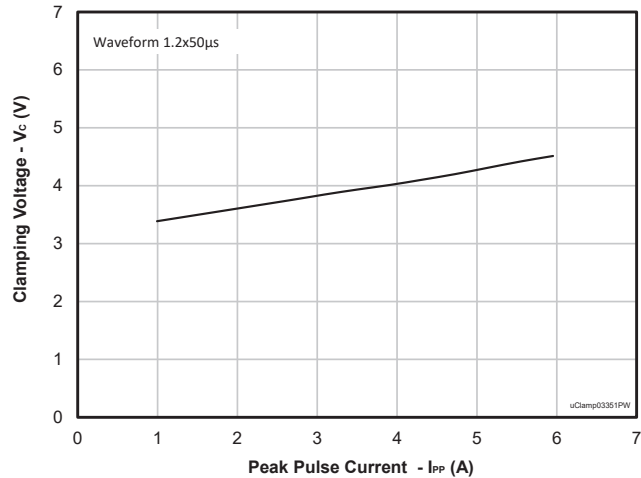
TLP Characteristic



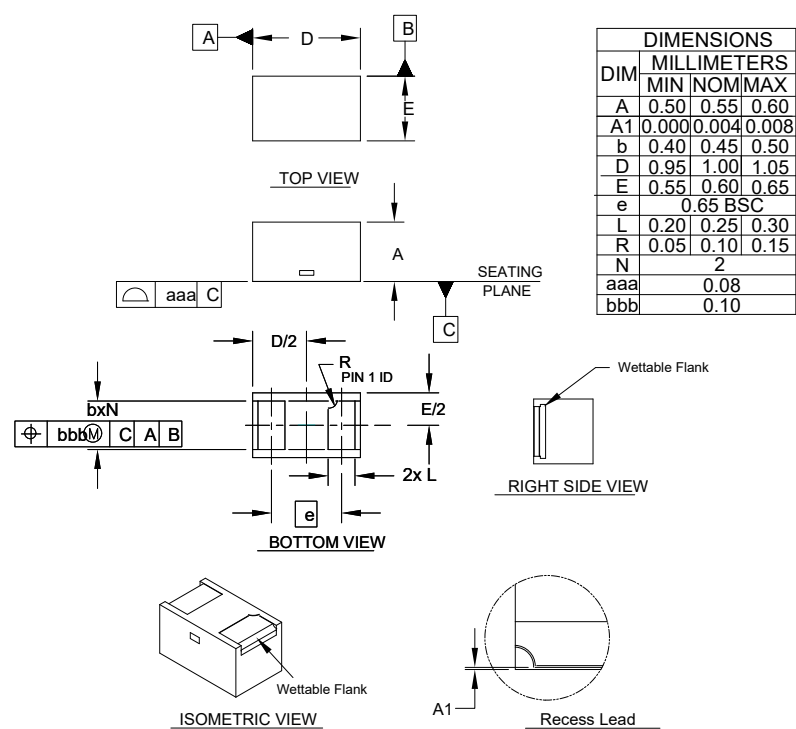
Junction Capacitance vs. Reverse Voltage



Clamping Voltage vs. Peak Pulse Current ($t_p = 1.2/50\mu\text{s}$)

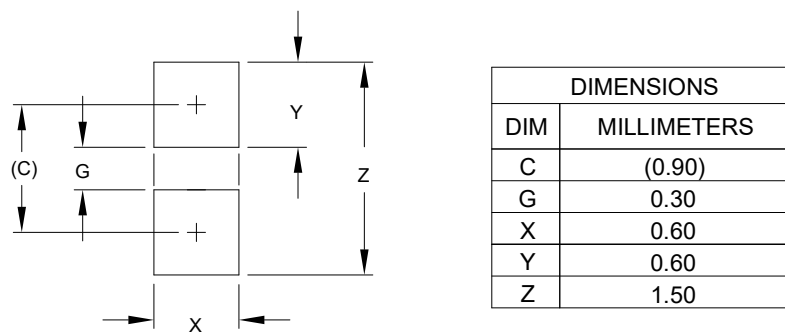


Outline Drawing - DFN 1.0 x 0.6 x 0.55mm 2-Lead



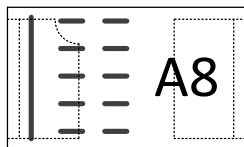
NOTES:
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).

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



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.

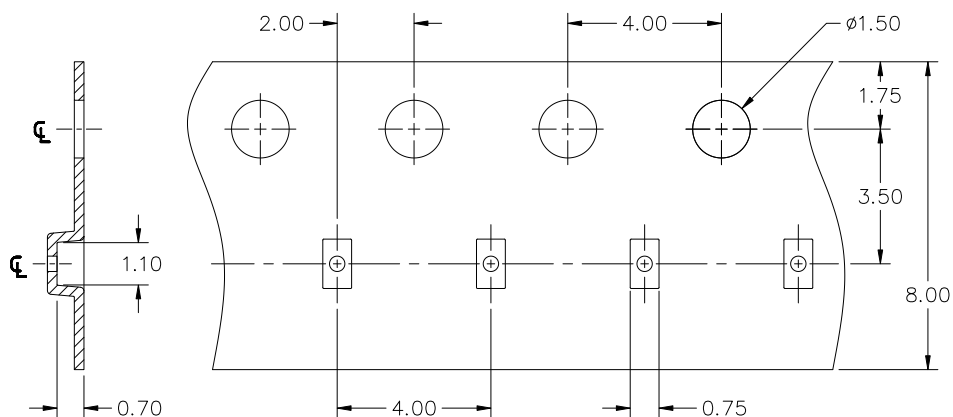
Marking Code



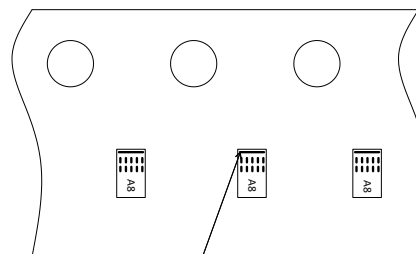
Notes:

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

Tape and Reel Specification



Note: All dimensions are nominal dimensions in mm.



Pin1 Location
(Bar Toward Sprocket Holes)

Ordering Information

Part Number	Qty per Reel	Reel Size
μClamp03351PW.C	3,000	7"
MicroClamp, uClamp and μClamp are registered trademarks of Semtech Corporation.		



Important Notice

Information relating to this product and the application or design described herein is believed to be reliable, however such information is provided as a guide only and Semtech assumes no liability for any errors in this document, or for the application or design described herein. Semtech reserves the right to make changes to the product or this document at any time without notice. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. Semtech warrants performance of its products to the specifications applicable at the time of sale, and all sales are made in accordance with Semtech's standard terms and conditions of sale.

SEMTECH PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS, OR IN NUCLEAR APPLICATIONS IN WHICH THE FAILURE COULD BE REASONABLY EXPECTED TO RESULT IN PERSONAL INJURY, LOSS OF LIFE OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. INCLUSION OF SEMTECH PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE UNDERTAKEN SOLELY AT THE CUSTOMER'S OWN RISK. Should a customer purchase or use Semtech products for any such unauthorized application, the customer shall indemnify and hold Semtech and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs damages and attorney fees which could arise.

The Semtech name and logo are registered trademarks of the Semtech Corporation. All other trademarks and trade names mentioned may be marks and names of Semtech or their respective companies. Semtech reserves the right to make changes to, or discontinue any products described in this document without further notice. Semtech makes no warranty, representation or guarantee, express or implied, regarding the suitability of its products for any particular purpose. All rights reserved.

© Semtech 2023

Contact Information

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