

Description

μClamp® TVS diodes are designed to protect sensitive electronics from damage or latch-up due to ESD. It is designed to replace 0201 size multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and other portable electronics. It features large cross-sectional area junctions for conducting high transient currents. This device offers desirable characteristics for board level protection including fast response time, low operating and clamping voltage, and no device degradation.

The μClamp®0511Z is in a 2-pin SLP0603P2X3 package. It measures 0.6 x 0.3 mm with a nominal height of only 0.25mm. The leads are finished with lead-free NiAu. Each device will protect one line operating at 5 volts. It gives the designer the flexibility to protect single lines in applications where arrays are not practical. The combination of small size and high ESD surge capability makes them ideal for use in portable applications such as cellular phones, digital cameras, and MP3 players.

Features

- ◆ High ESD withstand Voltage: **±15kV (air), ±8kV (contact)** per **IEC 61000-4-2**
- ◆ Able to withstand over 1000 ESD strikes per IEC 61000-4-2 Level 4
- ◆ Ultra-small **0201 package**
- ◆ Protects one data or power line
- ◆ Low reverse current: <10nA typical (VR=5V)
- ◆ Working voltage: +/- 5V
- ◆ Low capacitance: 4pF typical
- ◆ Solid-state silicon-avalanche technology

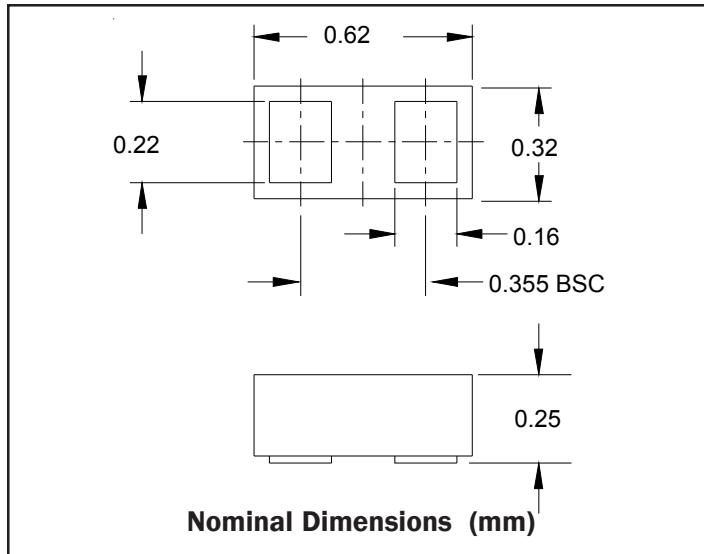
Mechanical Characteristics

- ◆ SLP0603P2X3 package
- ◆ Pb-Free, Halogen Free, RoHS/WEEE Compliant
- ◆ Nominal Dimensions: 0.6 x 0.3 x 0.25 mm
- ◆ Lead Finish: NiAu
- ◆ Molding compound flammability rating: UL 94V-0
- ◆ Marking : Marking code + dot matrix date code
- ◆ Packaging : Tape and Reel

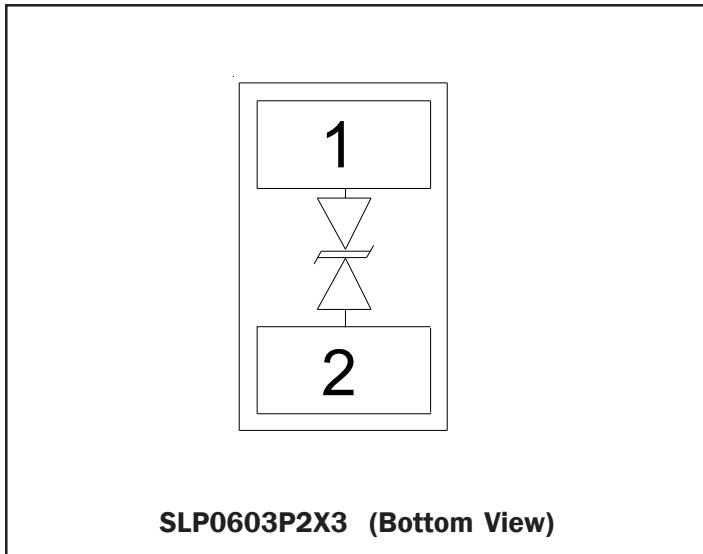
Applications

- ◆ Cellular Handsets & Accessories
- ◆ Keypads, Side Keys, Audio Ports
- ◆ Portable Instrumentation
- ◆ Digital Lines
- ◆ MP3 Players

Dimensions



Schematic & PIN Configuration



PROTECTION PRODUCTS

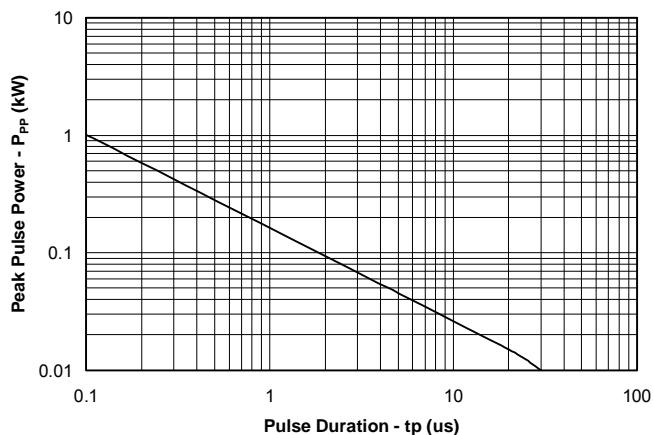
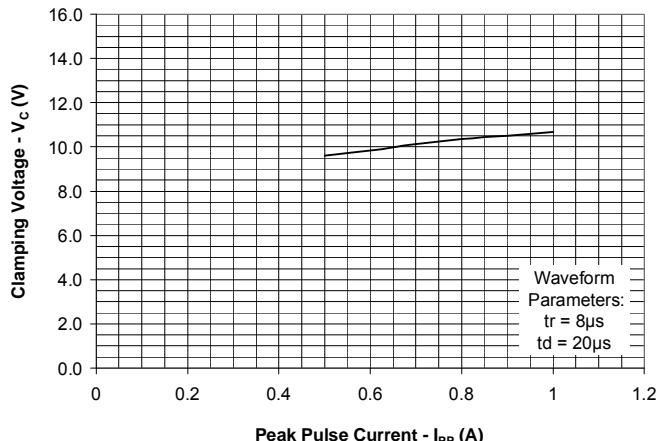
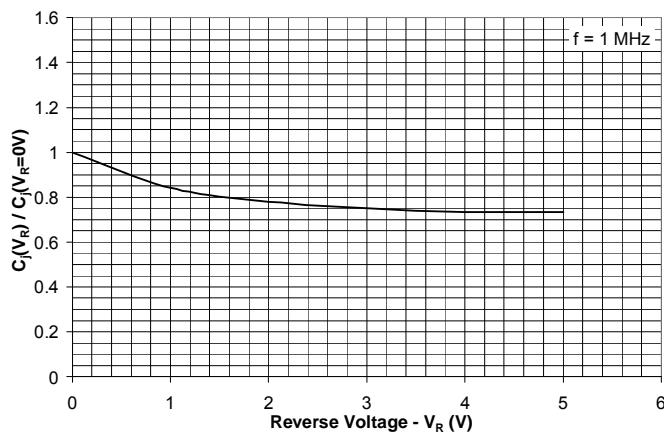
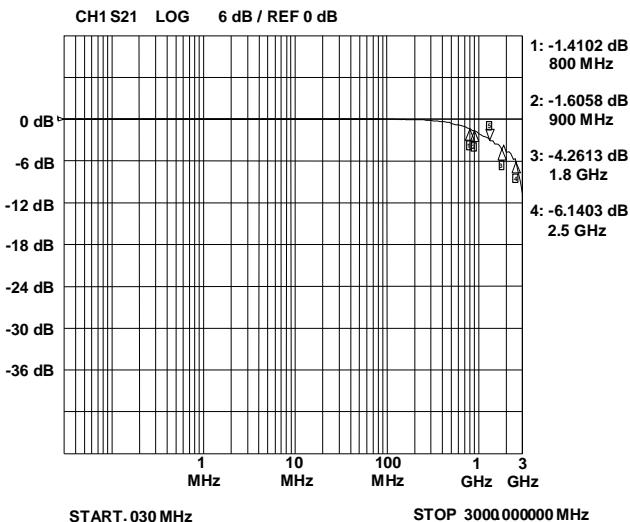
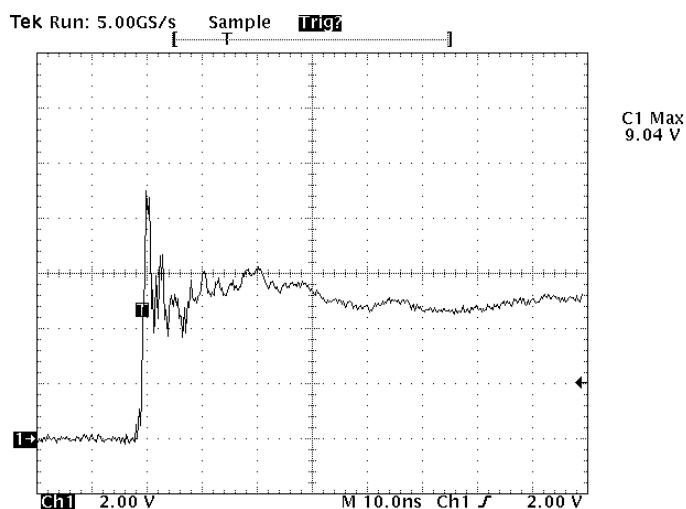
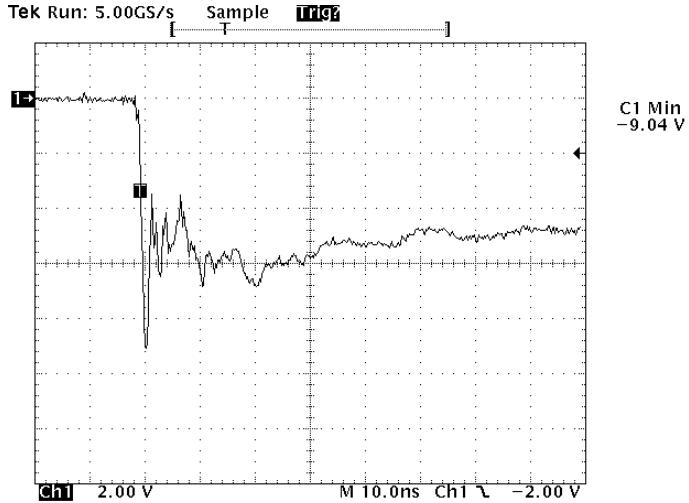
Absolute Maximum Rating

Rating	Symbol	Value	Units
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	+/- 15 +/- 8	kV
Operating Temperature	T_J	-55 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Characteristics (T=25°C)

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}	Pin 1 to 2 or 2 to 1			5	V
Reverse Breakdown Voltage	V_{BR}	$I_t = 1\text{mA}$ Pin 1 to 2 or 2 to 1	6	8.2	9.5	V
Reverse Leakage Current	I_R	$V_{RWM} = 5\text{V}$, $T=25^\circ\text{C}$ Pin 1 to 2 or 2 to 1		3	50	nA
Clamping Voltage	V_c	$I_{PP} = 1\text{A}$, $tp = 8/20\mu\text{s}$ Pin 1 to 2 or 2 to 1			15	V
Junction Capacitance	C_J	$V_R = 0\text{V}$, $f = 1\text{MHz}$		4	7	pF

Note: Device is electrically symmetrical

Non-Repetitive Peak Pulse Power vs. Pulse Time

Clamping Voltage vs. Peak Pulse Current

Normalized Junction Capacitance vs. Reverse Voltage

Typical Insertion Loss (S21)

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

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


Note: Data is taken with a 10x attenuator

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Applications Information

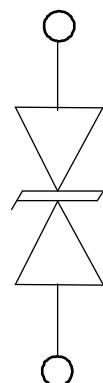
Device Connection Options

This device is designed to protect one data, I/O, or power supply line. The device is bidirectional and may be used on lines where the signal polarity can go above and below ground.

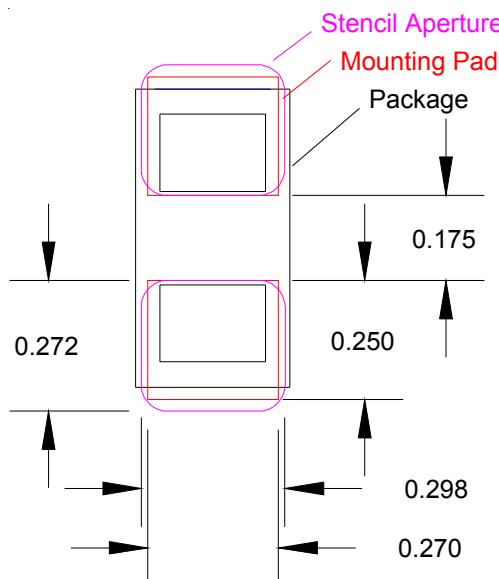
Assembly Guidelines

The small size of this device means that some care must be taken during the mounting process to insure reliable solder joint. The table below provides Semtech's recommended assembly guidelines for mounting this device. The figure at the right details Semtech's recommended aperture based on the below recommendations. Note that these are only recommendations and should serve only as a starting point for design since there are many factors that affect the assembly process. The exact manufacturing parameters will require some experimentation to get the desired solder application.

Circuit Diagram



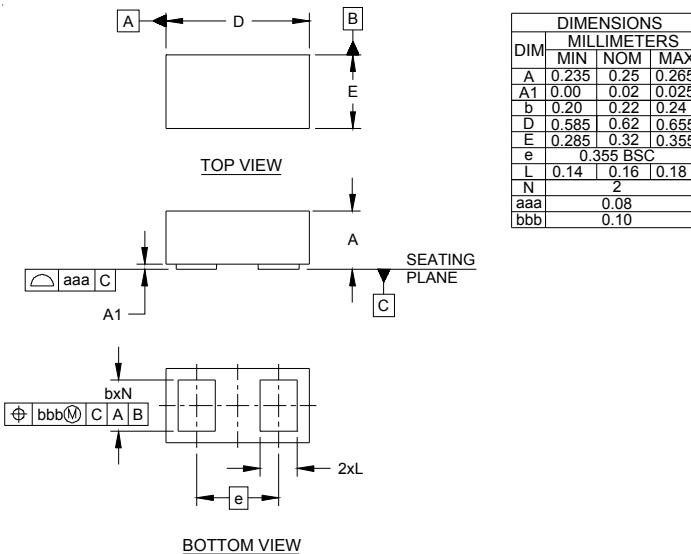
Recommended Mounting Pattern



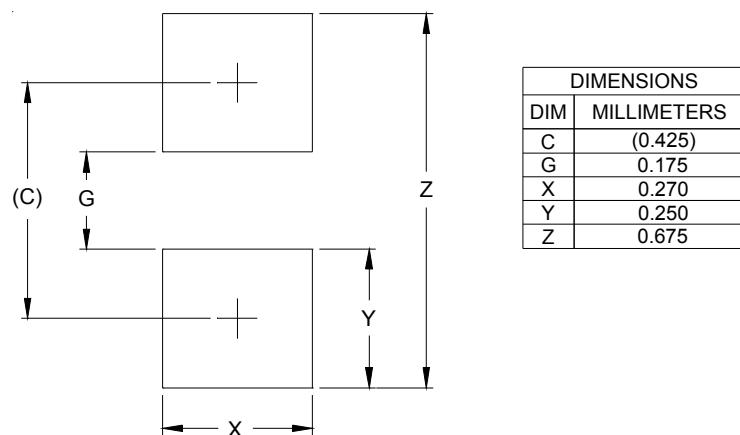
Assembly Parameter	Recommendation
Solder Stencil Design	Laser cut, Electro-polished
Aperture shape	Rectangular with rounded corners
Solder Stencil Thickness	0.100 mm (0.004")
Solder Paste Type	Type 4 size sphere or smaller
Solder Reflow Profile	Per JEDEC J-STD-020
PCB Solder Pad Design	Non-Solder mask defined
PCB Pad Finish	OSP OR NiAu

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Outline Drawing - SLP0603P2X3

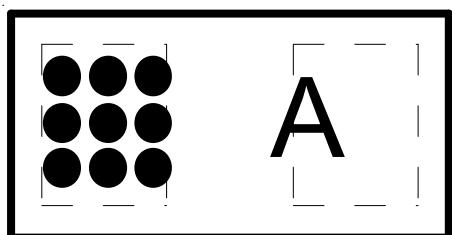


Land Pattern - SLP0603P2X3



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.

PROTECTION PRODUCTS
Marking Code

Ordering Information

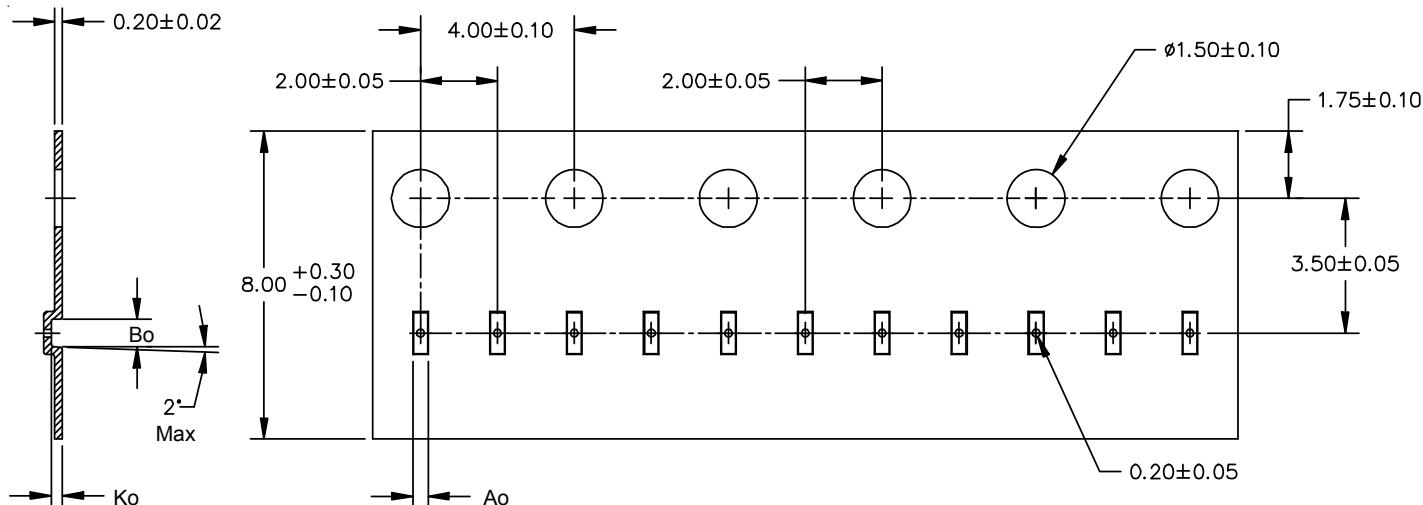
Part Number	Qty per Reel	Reel Size
uClamp0511Z.TNT	10,000	7 Inch

Notes:

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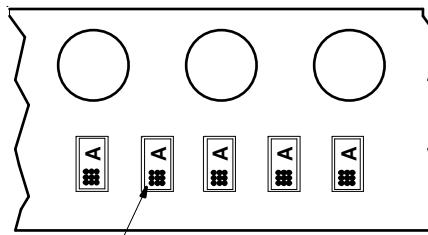
Notes:

1) Dots represent date code matrix

Carrier Tape Specification


A0	B0	K0
0.40 +/- 0.05 mm	0.71 +/- 0.05 mm	0.29 +/- 0.05 mm

Note: All dimensions in mm unless otherwise specified

Device Orientation in Tape


Date Code Location
(Away from Sprocket Holes)

Contact Information

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