

PROTECTION PRODUCTS - MicroClamp™

Description

The μClamp™ series of TVS arrays are designed to protect sensitive electronics from damage or latch-up due to ESD. They are designed for use in applications where board space is at a premium. Each device requires less than 2.9mm² of PCB area and will protect up to four lines. They are unidirectional devices and may be used on lines where the signal polarities are above ground.

TVS diodes are solid-state devices designed specifically for transient suppression. 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 uClamp™0504A may be used to meet the immunity requirements of IEC 61000-4-2, level 4. The small SC-89 package makes them ideal for use in portable electronics such as cell phones, PDA's, notebook computers, and digital cameras. These devices feature a lead-free, matte tin lead finish. They are compatible with both lead free and SnPb assembly techniques.

Features

- ◆ Transient protection for data lines to **IEC 61000-4-2 (ESD) 15kV (air), 8kV (contact)**
IEC 61000-4-4 (EFT) 40A (5/50ns)
- ◆ Protects four I/O lines
- ◆ Ultra-small SC-89 package (**1.7 x 1.7 x 0.6mm**) requires less than 2.9mm² of PCB area
- ◆ Working voltage: 5V
- ◆ Low leakage current
- ◆ Low operating and clamping voltages
- ◆ Solid-state silicon-avalanche technology

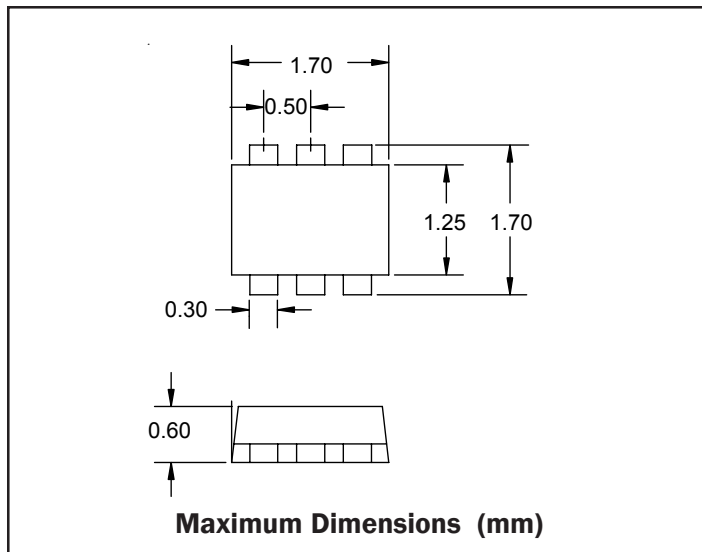
Mechanical Characteristics

- ◆ SC-89 (SOT-666) package
- ◆ Molding compound flammability rating: UL 94V-0
- ◆ Marking : Marking Code
- ◆ Weight: 2.9mg (typical)
- ◆ Lead Finish: Matte Tin
- ◆ Packaging : Tape and Reel per EIA 481

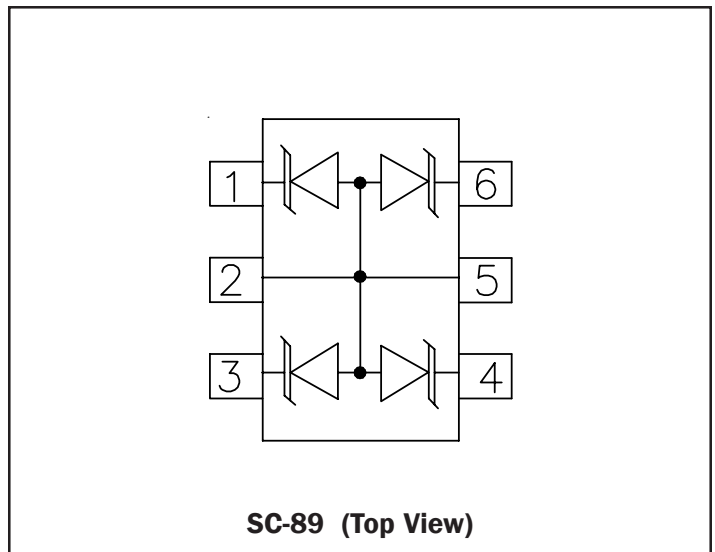
Applications

- ◆ Cellular Handsets & Accessories
- ◆ Cordless Phones
- ◆ Personal Digital Assistants (PDA's)
- ◆ Notebooks & Handhelds
- ◆ Portable Instrumentation
- ◆ Digital Cameras
- ◆ Peripherals
- ◆ MP3 Players

Dimensions



Schematic & PIN Configuration



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Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 8/20μs)	P_{pk}	100	Watts
Maximum Peak Pulse Current (tp = 8/20μs)	I_{pp}	7	Amps
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{pp}	+/- 20 +/- 12	kV
Lead Soldering Temperature	T_L	260 (10 sec.)	°C
Operating Temperature	T_J	-55 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

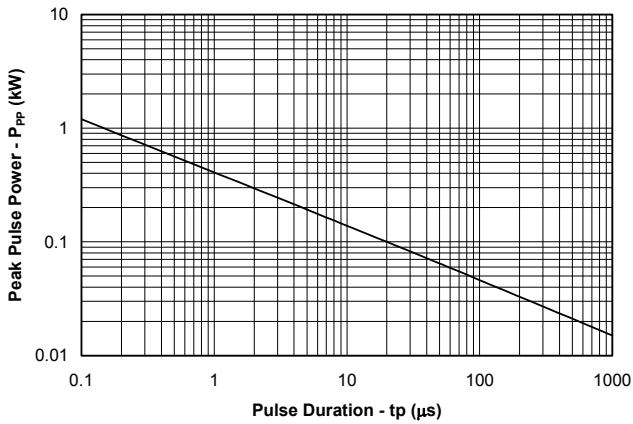
Electrical Characteristics (T=25°C)

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}				5	V
Reverse Breakdown Voltage	V_{BR}	$I_t = 1mA$	6			V
Reverse Leakage Current	I_R	$V_{RWM} = 5V, T=25°C$			1	μA
Reverse Leakage Current	I_R	$V_{RWM} = 3V, T=25°C$			0.500	μA
Forward Voltage	V_F	$I_F = 10mA$		0.80		V
Clamping Voltage	V_C	$I_{pp} = 1A, t_p = 8/20μs$			9	V
Clamping Voltage	V_C	$I_{pp} = 7A, t_p = 8/20μs$			12	V
Junction Capacitance	C_j	Between I/O Pins and Gnd $V_R = 0V, f = 1MHz$		60	75	pF

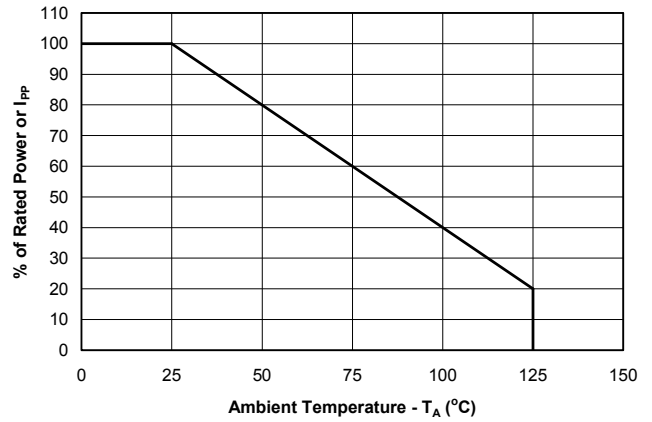
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Typical Characteristics

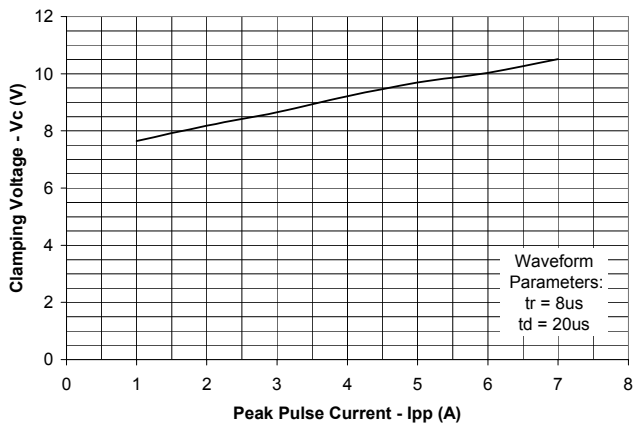
Non-Repetitive Peak Pulse Power vs. Pulse Time



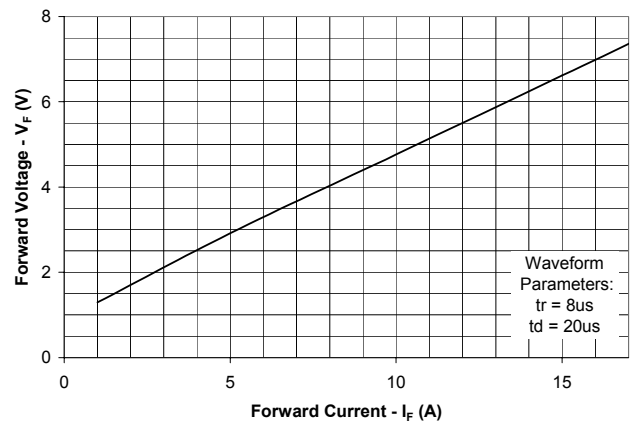
Power Derating Curve



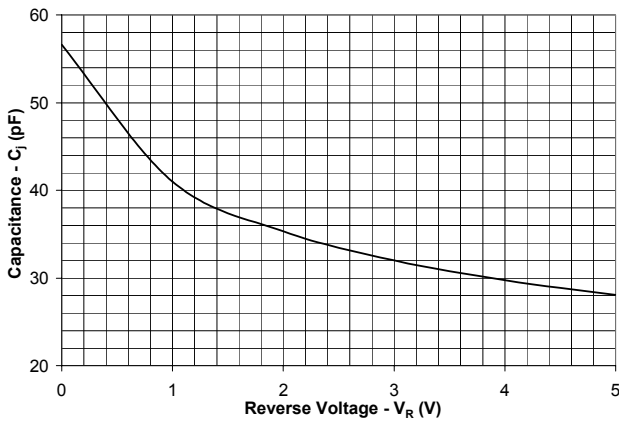
Clamping Voltage vs. Peak Pulse Current



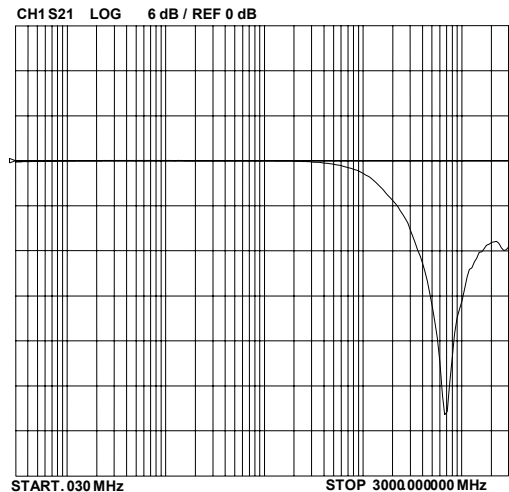
Forward Voltage vs. Forward Current



Junction Capacitance vs. Reverse Voltage

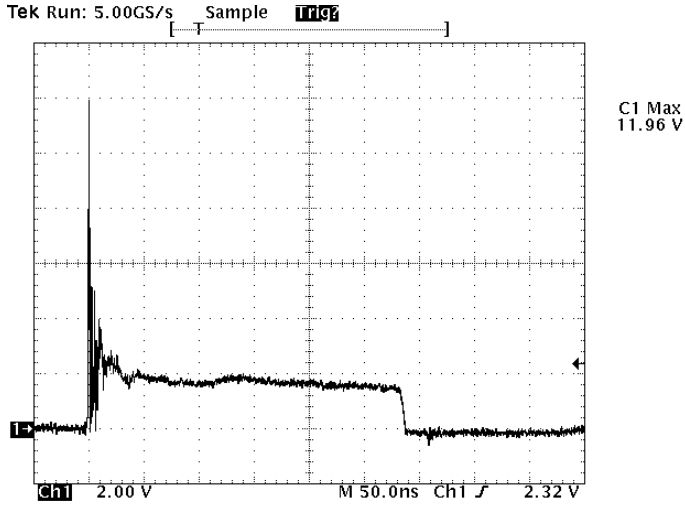


Insertion Loss S21

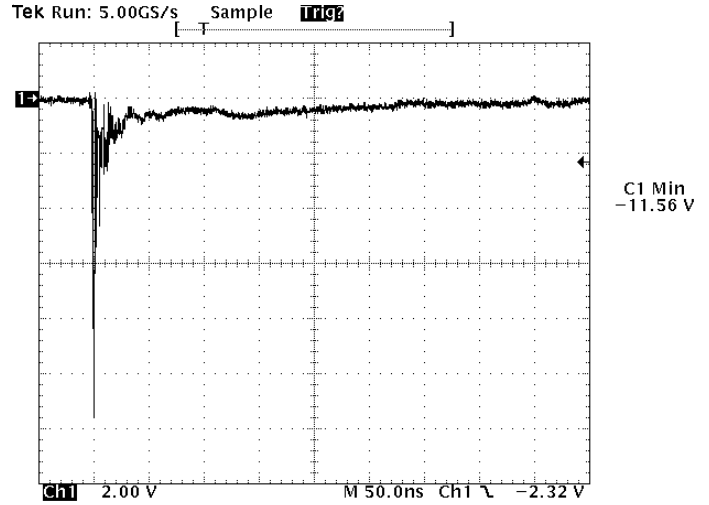


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Typical Characteristics (Con't.)

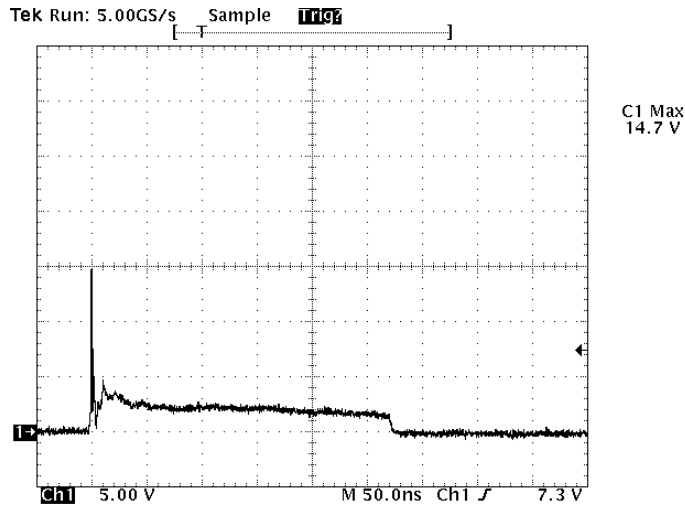
**ESD Clamping
(8kV Contact per IEC 61000-4-2)**



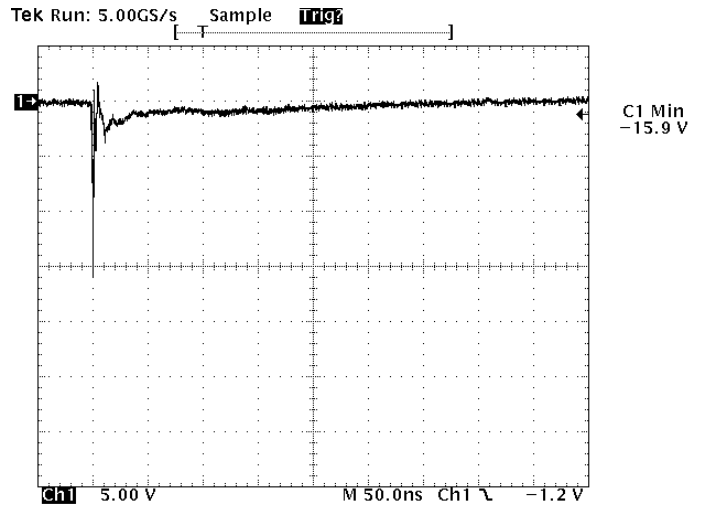
**ESD Clamping
(-8kV Contact per IEC 61000-4-2)**



**ESD Clamping
(15kV air per IEC 61000-4-2)**



**ESD Clamping
(-15kV air per IEC 61000-4-2)**



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Applications Information

Device Connection for Protection of Four Data Lines

These devices are designed to protect up to four unidirectional data lines. The device is connected as follows:

1. Unidirectional protection of four I/O lines is achieved by connecting pins 1, 3, 4, and 6 to the data lines. Pins 2 and 5 are connected to ground. The ground connection should be made directly to the ground plane for best results. The path length is kept as short as possible to reduce the effects of parasitic inductance in the board traces.

Circuit Board Layout Recommendations for Suppression of ESD.

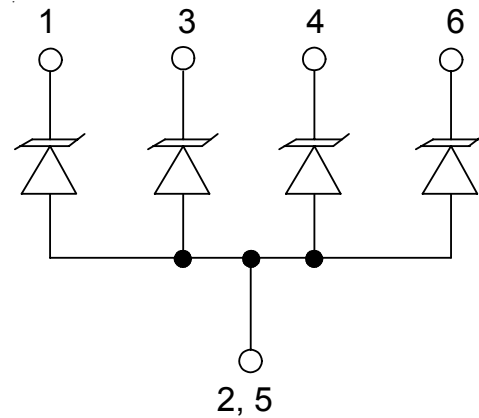
Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

- Place the TVS near the input terminals or connectors to restrict transient coupling.
- Minimize the path length between the TVS and the protected line.
- Minimize all conductive loops including power and ground loops.
- The ESD transient return path to ground should be kept as short as possible.
- Never run critical signals near board edges.
- Use ground planes whenever possible.

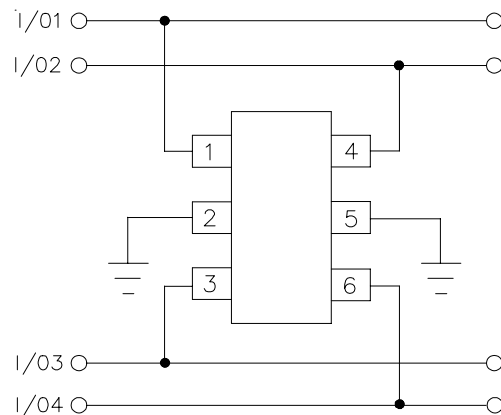
Matte Tin Lead Finish

Matte tin has become the industry standard lead-free replacement for SnPb lead finishes. A matte tin finish is composed of 100% tin solder with large grains. Since the solder volume on the leads is small compared to the solder paste volume that is placed on the land pattern of the PCB, the reflow profile will be determined by the requirements of the solder paste. Therefore, these devices are compatible with both lead-free and SnPb assembly techniques. In addition, unlike other lead-free compositions, matte tin does not have any added alloys that can cause degradation of the solder joint.

Circuit Diagram

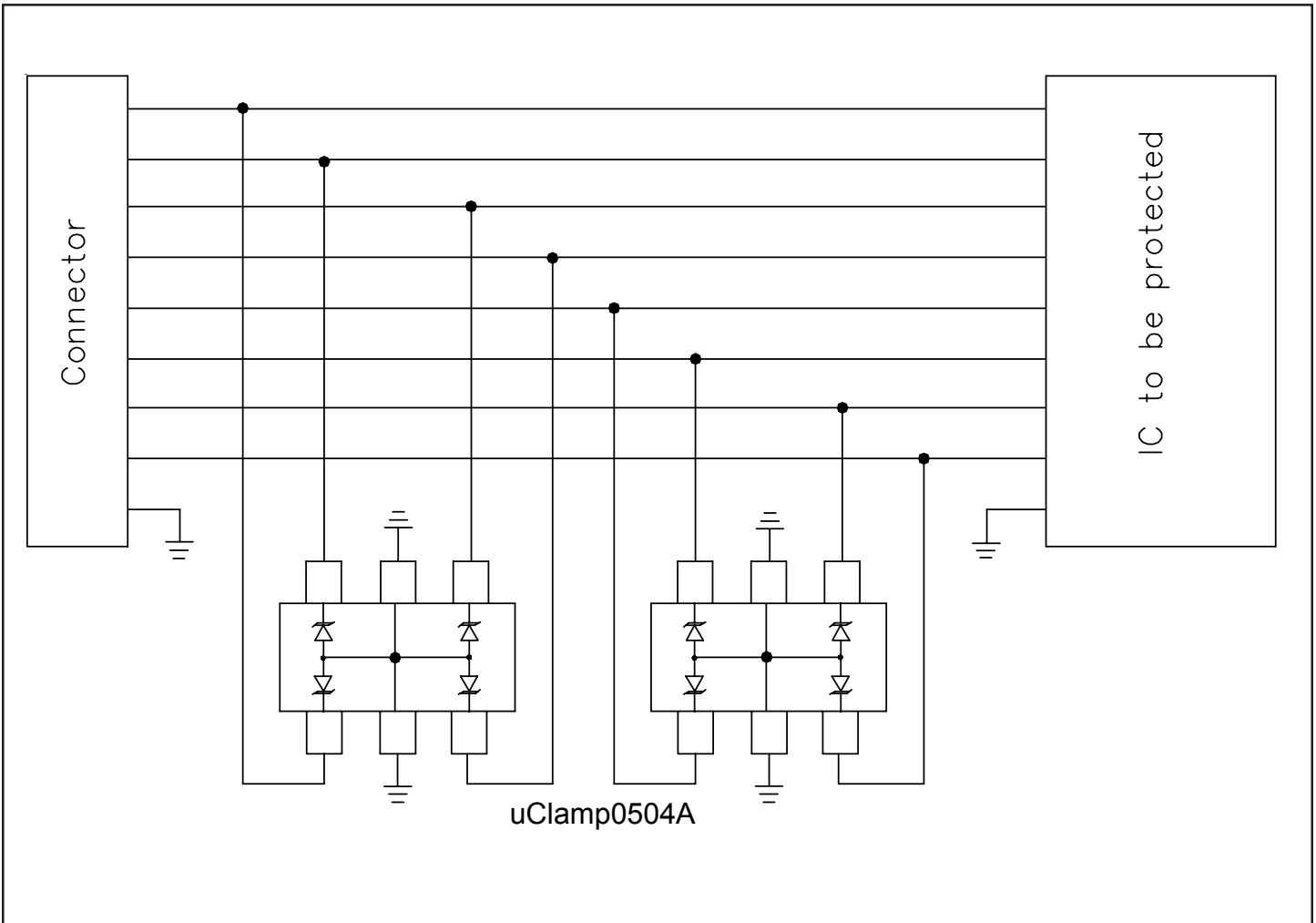


Protection of Four Unidirectional Lines



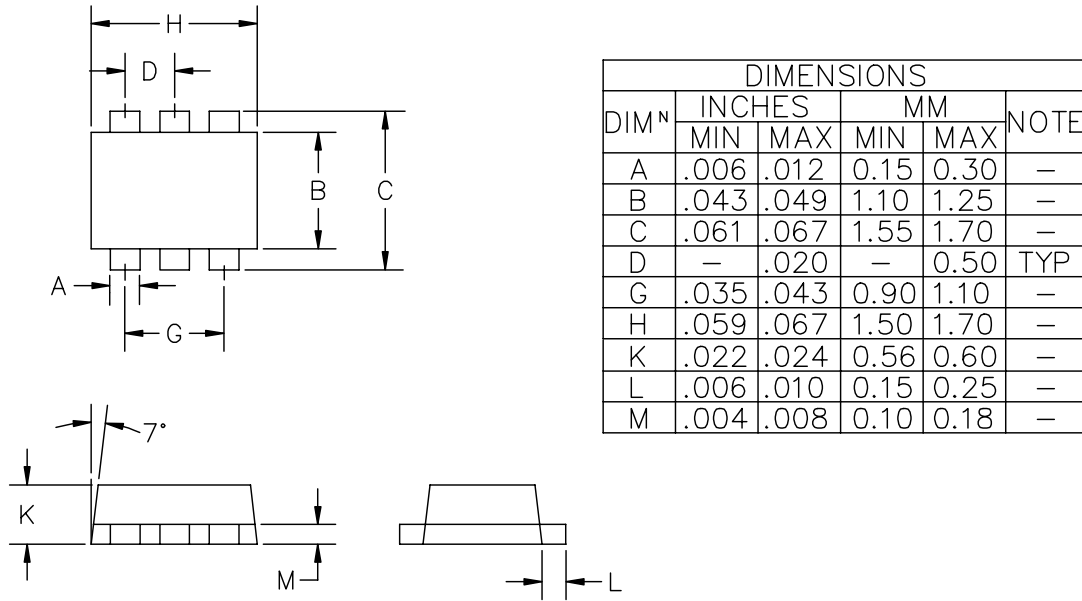
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Typical Applications



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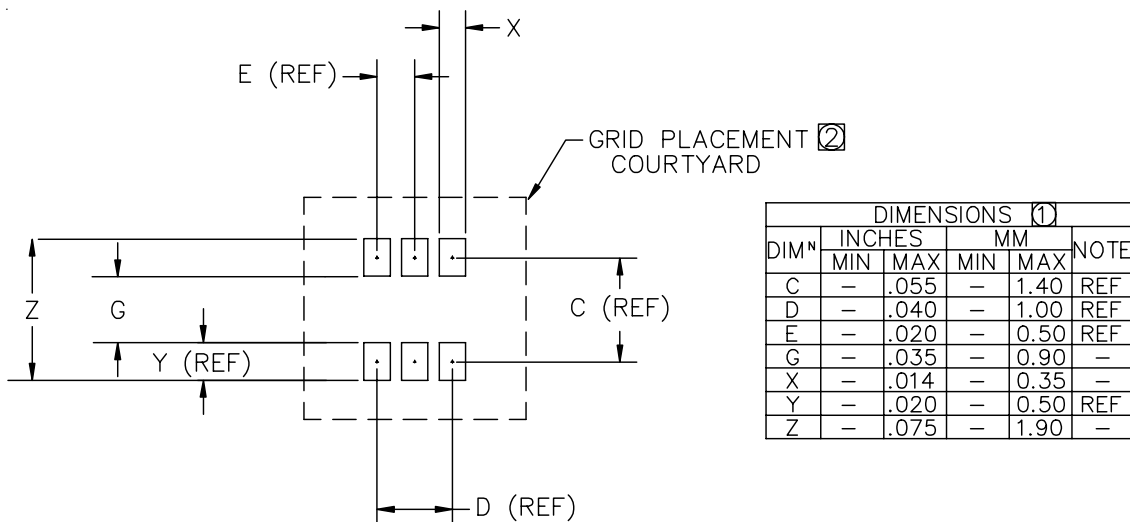
Outline Drawing



② PACKAGE OUTLINE EXCLUSIVE OF MOLD FLASH AND METAL BURR.

① CONTROLLING DIMENSIONS: MILLIMETERS.

Land Pattern

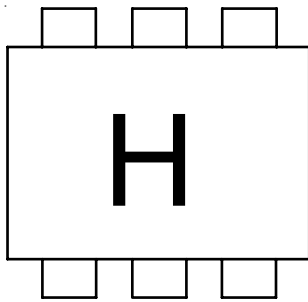


② GRID PLACEMENT COURTYARD IS 3 x 3 ELEMENTS (1.5 mm X 1.5 mm) IN ACCORDANCE WITH THE INTERNATIONAL GRID DETAILED IN IEC PUBLICATION 97.

① CONTROLLING DIMENSION: MILLIMETERS

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Marking Code



Ordering Information

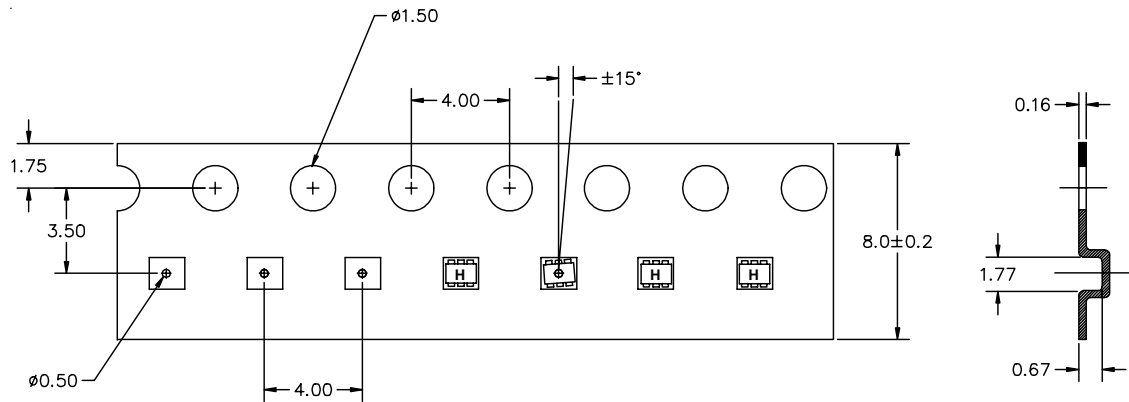
Part Number	Working Voltage	Device Marking	Qty per Reel	Reel Size
uClamp0504A.TCT	5V	H	3,000	7 Inch

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Note:

(1) Device is symmetrical so there is no pin 1 identifier.

Tape and Reel Specification



- ② DIMENSIONS ARE IN MILLIMETERS.
- ① SAME AS 3M US046041.

Tape Specification and Device Orientation

Contact Information

Semtech Corporation
 Protection Products Division
 200 Flynn Rd., Camarillo, CA 93012
 Phone: (805)498-2111 FAX (805)498-3804

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课程网址: <http://www.edatop.com/peixun/antenna/133.html>



WiFi 和蓝牙天线设计培训课程



该套课程是李明洋老师应邀给惠普 (HP)公司工程师讲授的 3 天员工内训课程录像,课程内容是李明洋老师十多年工作经验积累和总结,主要讲解了 WiFi 天线设计、HFSS 天线设计软件的使用,匹配电路设计调试、矢量网络分析仪的使用操作、WiFi 射频电路和 PCB Layout 知识,以及 EMC 问题的分析解决思路等内容。对于正在从事射频设计和天线设计领域工作的您,绝对值得拥有和学习! ...

课程网址: <http://www.edatop.com/peixun/antenna/134.html>

CST 学习培训课程套装

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- ※ 一直致力并专注于微波射频和天线设计工程师的培养,更了解该行业对人才的要求
- ※ 经验丰富的一线资深工程师讲授,结合实际工程案例,直观、实用、易学

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