

PROTECTION PRODUCTS

Description

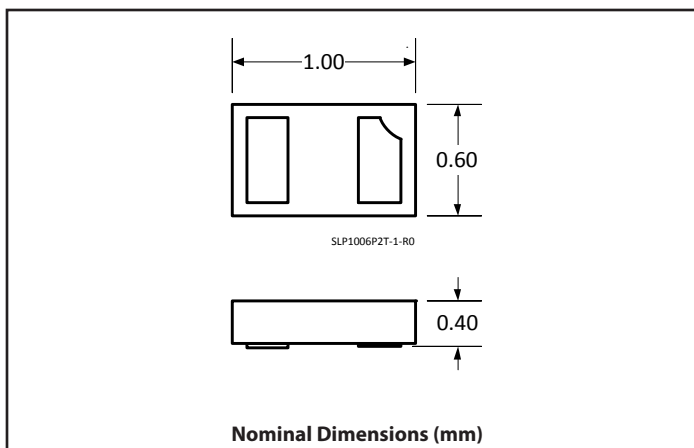
RailClamp is an ultra low capacitance Transient Voltage Suppressor (TVS) designed to protect high speed data interfaces. This device has been specifically designed to protect sensitive components which are connected to high-speed data and transmission lines from overvoltage caused by ESD (electrostatic discharge), CDE (Cable Discharge Events), and EFT (electrical fast transients).

The RClamp™0531TQ has a maximum capacitance of only 0.80pF. This allows it to be used on circuits operating in excess of 2.5GHz without signal attenuation. They may be used to meet the ESD immunity requirements of IEC 61000-4-2.

The RClamp0531TQ is in a 2-pin SLP1006P2T package measuring 1.0 x 0.6 x 0.4mm. The leads are spaced at a pitch of 0.65mm and feature a lead-free finish. Each device will protect one high-speed 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, low capacitance, and high ESD surge capability makes them ideal for use in applications such as cellular phones and digital video interfaces.

The RClamp0531TQ is AEC-Q100 Grade 1 qualified for Automotive use.

Package Dimension



Features

- Transient protection for data lines to
IEC 61000-4-2 (ESD) $\pm 20\text{kV}$ (air), $\pm 12\text{kV}$ (contact)
IEC 61000-4-4 (EFT) 40A (tp = 5/50ns)
Cable Discharge Event (CDE)
- Ultra-small package (1.0 x 0.6 x 0.4mm)
- Protects one I/O line
- Low capacitance: 0.8pF
- Low clamping voltage
- Solid-state silicon-avalanche technology
- AEC-Q100 Grade 1 qualified

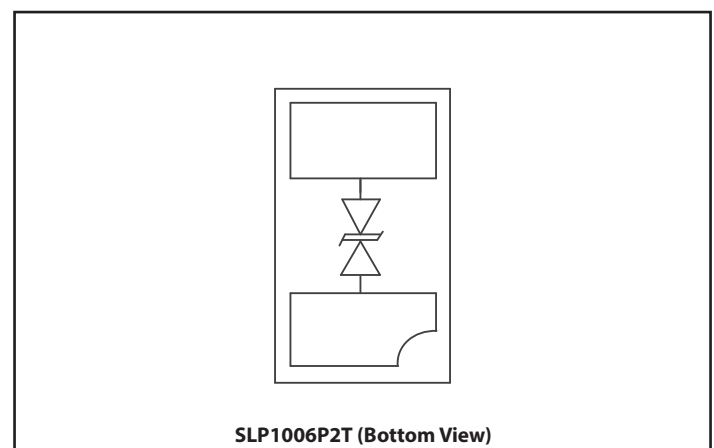
Mechanical Characteristics

- SLP1006P2T package
- Molding compound flammability rating: UL 94V-0
- Marking: Marking code + date code
- Packaging : Tape and Reel
- Lead Finish: NiPdAu
- Pb-Free, Halogen Free, RoHS/WEEE Compliant

Applications

- Cellular Handsets & Accessories
- Digital Visual Interface (DVI)
- FM Antenna
- MDDI Ports
- USB Ports
- PCI Express
- Serial ATA
- Automotive Applications

Schematic & Pin Configuration



Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu s$)	P_{PK}	80	W
Peak Pulse Current ($t_p = 8/20\mu s$)	I_{PP}	4	A
ESD per IEC 61000-4-2 (Air) ⁽¹⁾ ESD per IEC 61000-4-2 (Contact) ⁽¹⁾	V_{ESD}	± 20 ± 12	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)

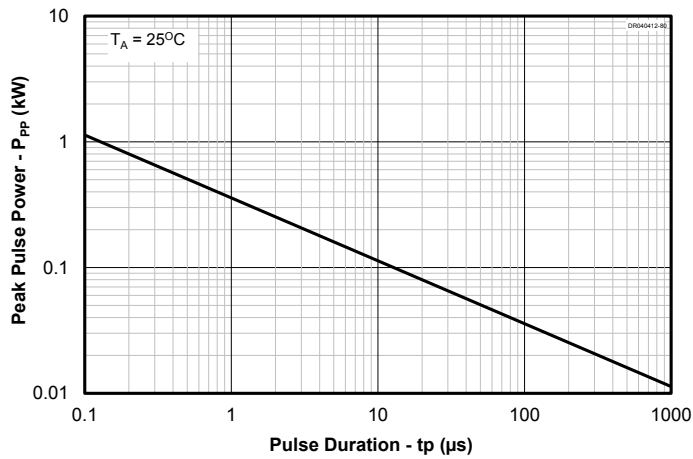
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reverse Stand-Off Voltage	V_{RWM}				5	V
Reverse Breakdown Voltage	V_{BR}	$I_{BR} = 1 \text{ mA}$	6	9.3	11	V
Reverse Leakage Current	I_R	$V_{RWM} = 5V, T = 25^\circ C$		0.010	0.100	μA
		$V_{RWM} = 5V, T = 125^\circ C$		0.020	0.200	
Clamping Voltage	V_C	$t_p = 8/20\mu s$	$I_{PP} = 1A$		12	V
			$I_{PP} = 4A$		20	
Junction Capacitance	C_J	$V_R = 0V \text{ to } 5V, f = 1MHz, T = 25^\circ C$		0.50	0.80	pF
		$V_R = 0V \text{ to } 5V, f = 1GHz, T = 125^\circ C$		0.85	1.5	

Notes

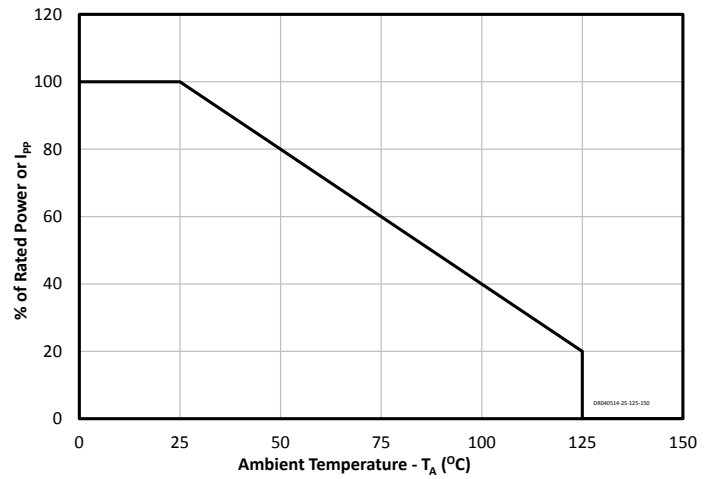
1) ESD gun return path connected to ESD ground plane.

Typical Characteristics

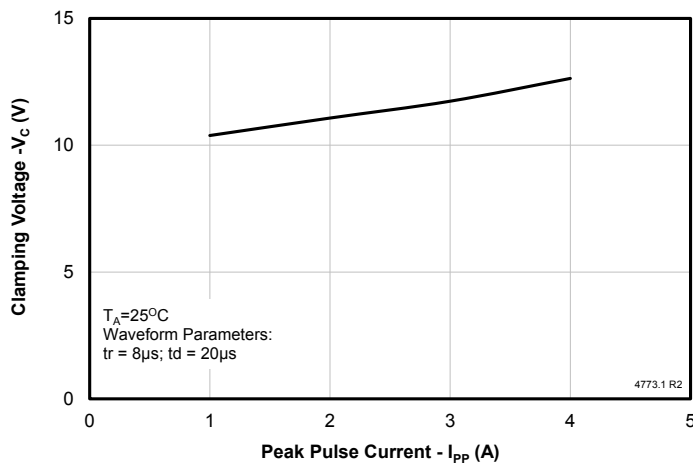
Non-Repetitive Peak Pulse Power vs. Pulse Time



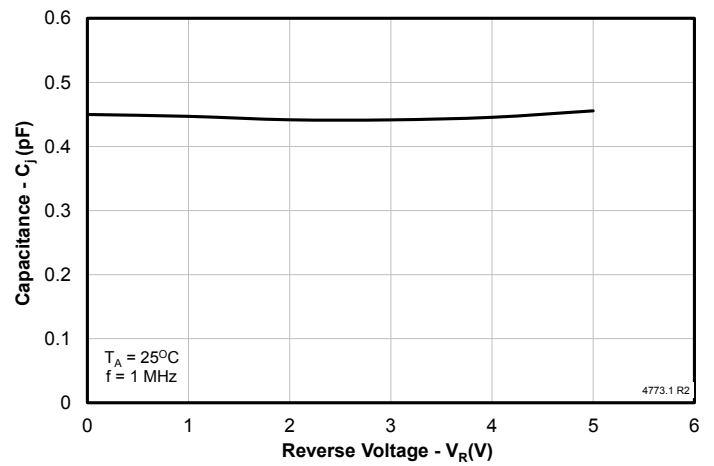
Power Derating Curve



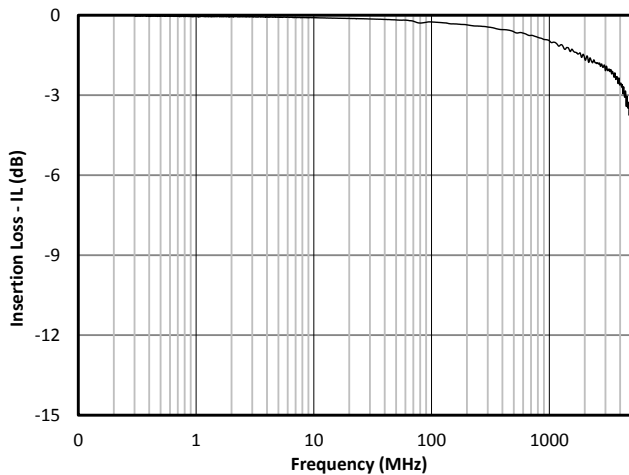
Clamping Voltage vs. Peak Pulse Current



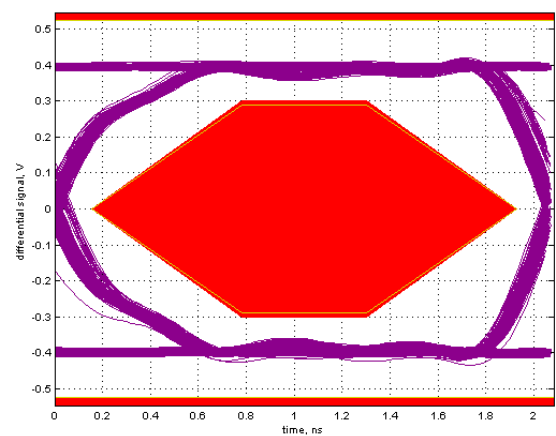
Junction Capacitance vs. Reverse Voltage



Insertion Loss (S21)

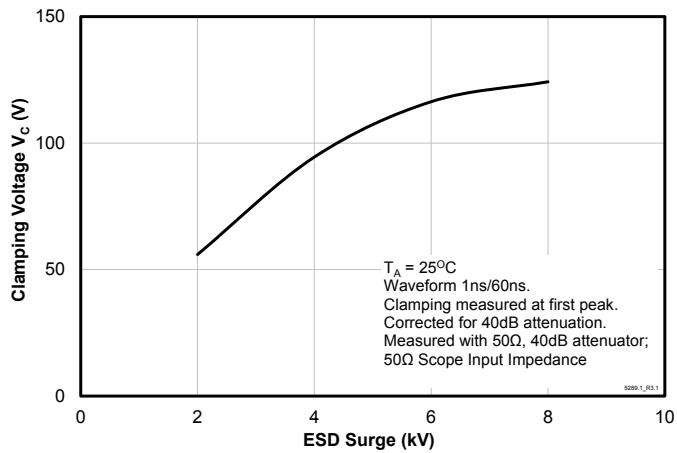


USB 2.0 Eye Pattern with RClamp0531TQ

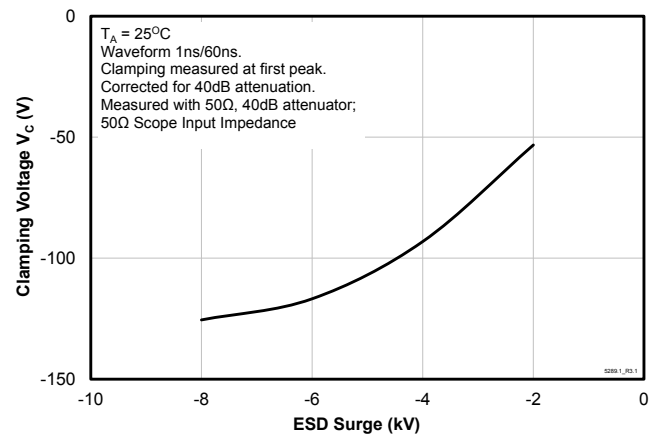


Typical Characteristics

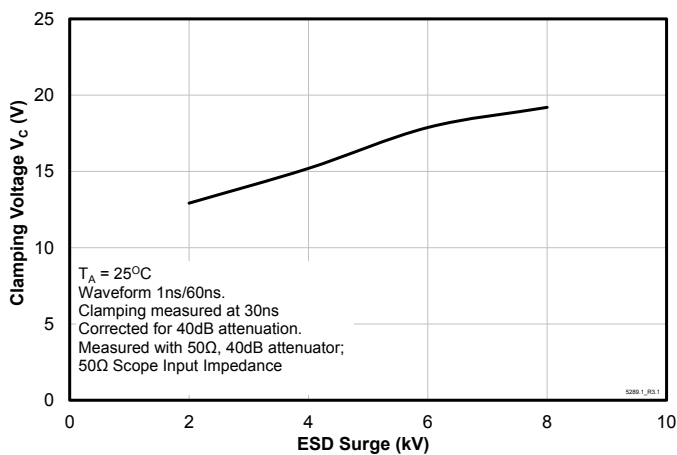
ESD Clamping per IEC61000-4-2
Positive clamping voltage at first peak



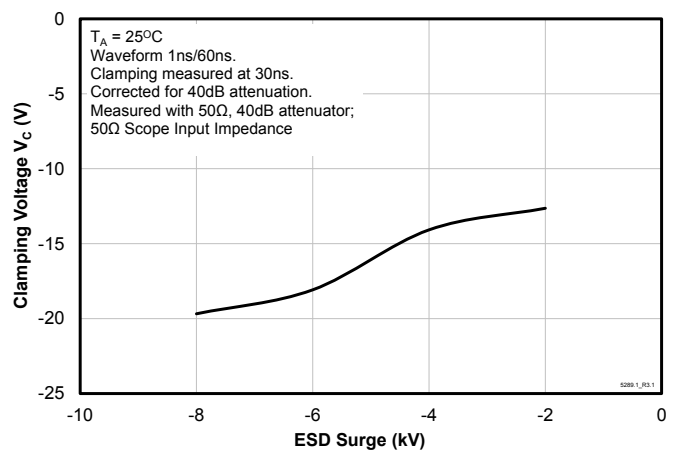
ESD Clamping per IEC61000-4-2
Negative clamping voltage at first peak



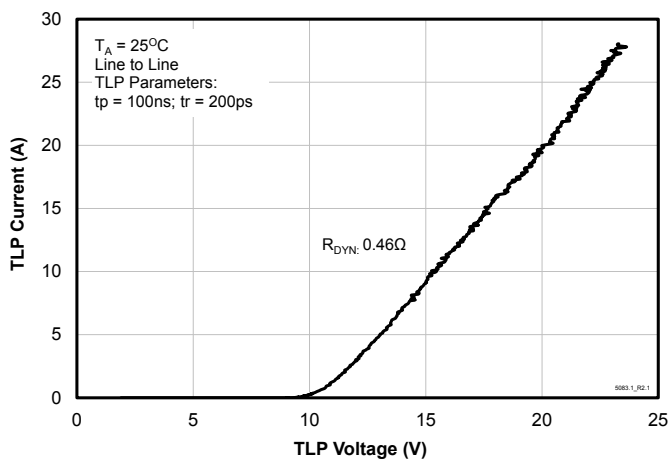
ESD Clamping per IEC61000-4-2
Positive clamping voltage at 30ns



ESD Clamping per IEC61000-4-2
Negative clamping voltage at 30ns

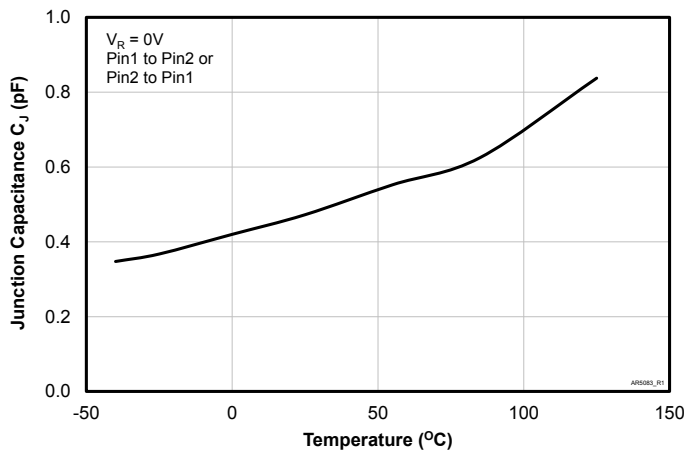


Typical TLP Characteristics

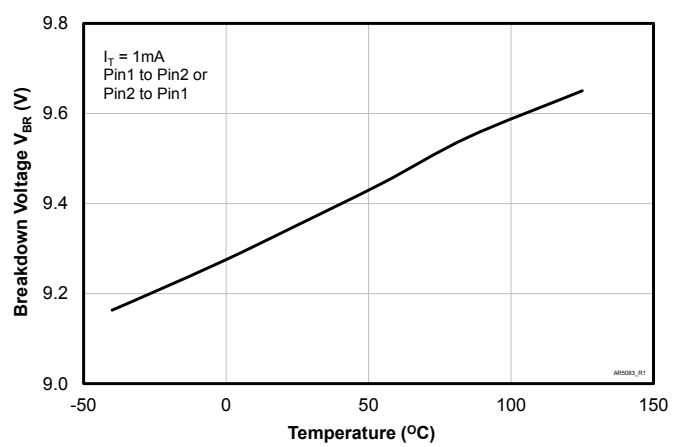


Typical Characteristics

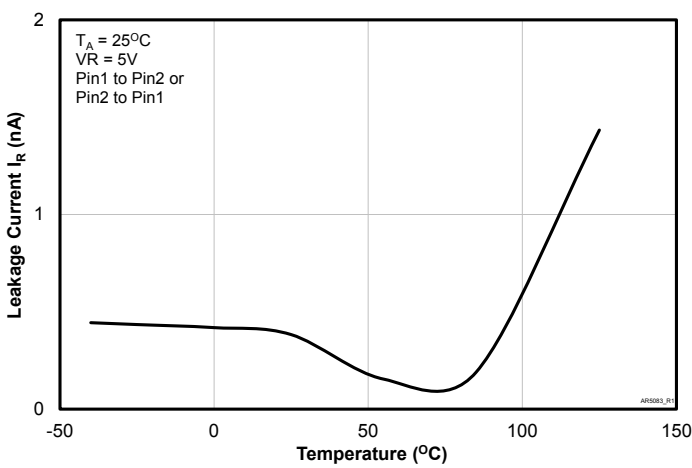
Typical Capacitance vs. Temperature



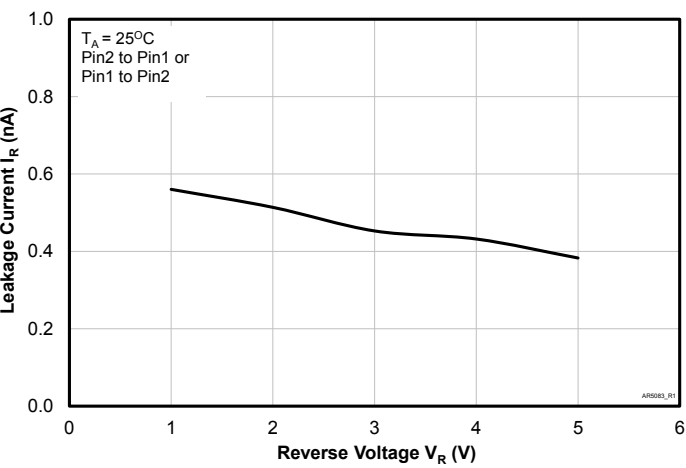
Typical Breakdown Voltage vs. Temperature



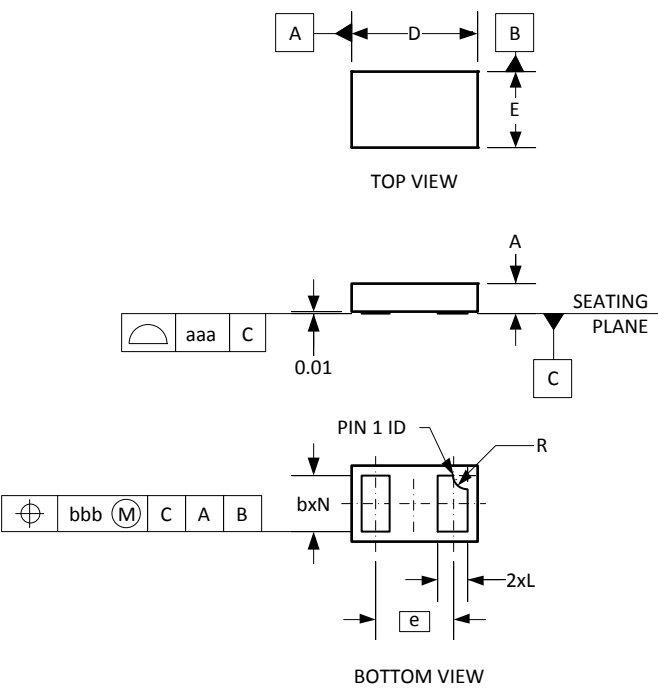
Typical Leakage Current vs. Temperature



Typical Leakage Current vs. Reverse Voltage



Outline Drawing - SLP1006P2T

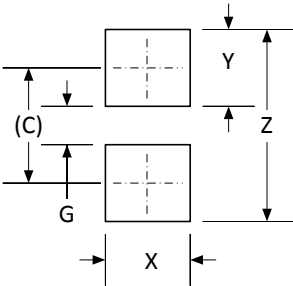


DIMENSIONS						
DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.015	.016	.017	0.37	0.40	0.43
A1	.000	.001	.002	0.00	0.03	0.05
b	.018	.020	.022	0.45	0.50	0.55
D	.035	.039	.043	0.90	1.00	1.10
E	.020	.024	.028	0.50	0.60	0.70
e	.026 BSC			0.65 BSC		
L	.008	.010	.012	0.20	0.25	0.30
R	.002	.004	.006	0.05	0.10	0.15
N	2			2		
aaa	.003			0.08		
bbb	.004			0.10		

SLP1006P2T-2-R0

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

Land Pattern - SLP1006P2T

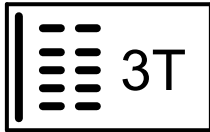


DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	(.033)	(0.85)
G	.012	0.30
X	.024	0.60
Y	.022	0.55
Z	.055	1.40

SLP1006P2T-3-R0

- 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.

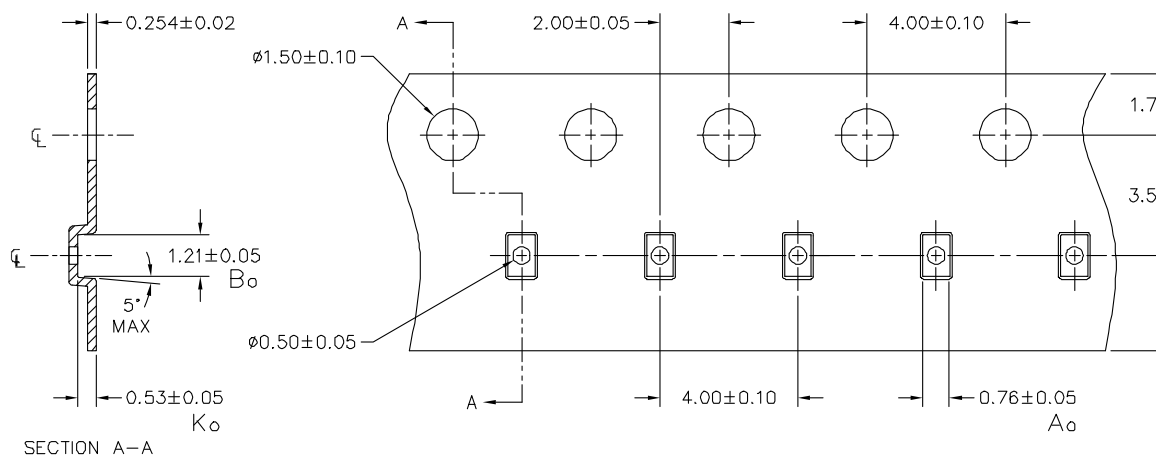
Marking Code



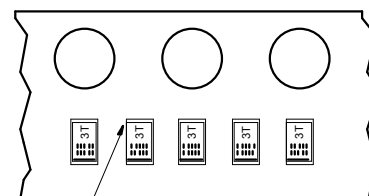
Notes:

1. Marking will also include line matrix date code.
2. Device is electrically symmetrical.

Tape and Reel Specification



NOTES: 1.) ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.



Pin 1 Location
(Towards Sprocket Holes)

Ordering Information

Part Number	Qty per Reel	Reel Size
RClamp0531TQTCT	3,000	7"



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 2015

Contact Information

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