

## PROTECTION PRODUCTS

### Description

RailClamp® TVS diodes are 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 RClamp2431TQ has a typical capacitance of only 0.35pF. This allows it to be used on Wi-Fi, RFID, and other circuits operating in excess of 3GHz without signal attenuation. It may be used to meet the ESD immunity requirements of IEC 61000-4-2.

The RClamp2431TQ 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 up to 24 volts. It gives the designer the flexibility to protect single lines in applications where arrays are not practical.

The RClamp2431TQ is qualified to AEC-Q100 Grade1 for use in automotive environments.

### Features

- Transient protection for data lines to IEC 61000-4-2 (ESD)  $\pm 15\text{kV}$  (air),  $\pm 15\text{kV}$  (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: 0.35pF (Typical)
- Low clamping voltage
- Working Voltage: 24V
- Solid-state silicon-avalanche technology
- Qualified for AEC-Q100 Grade 1

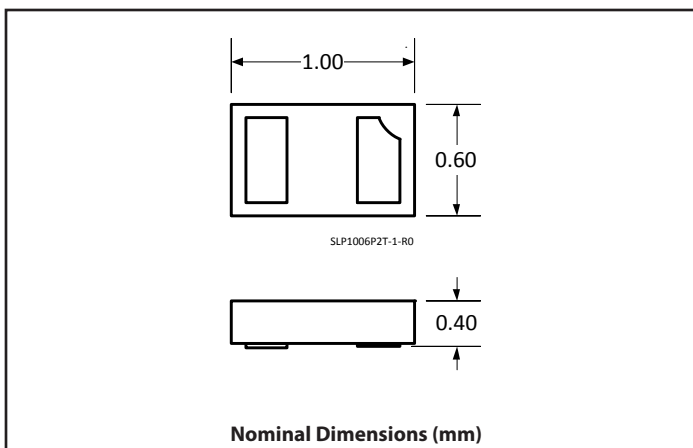
### Mechanical Characteristics

- 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

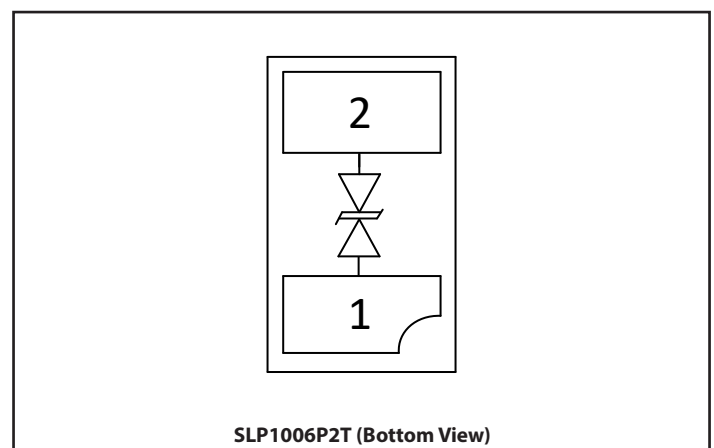
### Applications

- Automobile Antenna
- CAN Bus Ports
- Wi-Fi Interfaces
- RFID

### Package Dimension



### Schematic & Pin Configuration



## Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ( $t_p = 8/20\mu s$ )	$P_{PK}$	100	W
Peak Pulse Current ( $t_p = 8/20\mu s$ )	$I_{PP}$	2	A
ESD per IEC 61000-4-2 (Air) <sup>(1)(2)</sup> ESD per IEC 61000-4-2 (Contact) <sup>(1)(2)</sup>	$V_{ESD}$	$\pm 15$ $\pm 15$	kV
Operating Temperature	$T_J$	-40 to +125	$^{\circ}C$
Storage Temperature	$T_{STG}$	-55 to +150	$^{\circ}C$

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

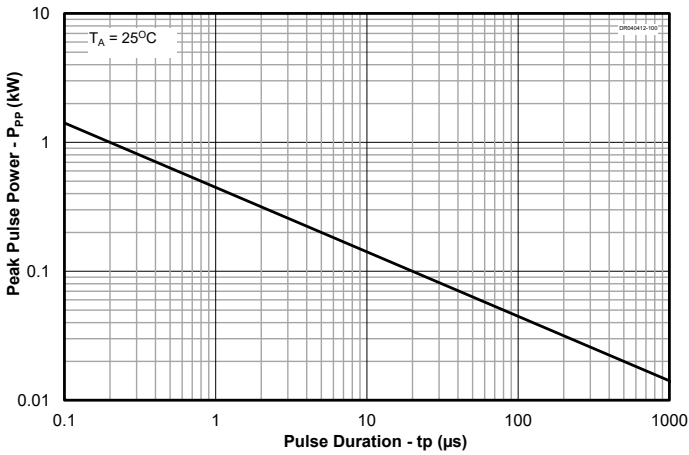
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reverse Stand-Off Voltage	$V_{RWM}$				24	V
Reverse Breakdown Voltage	$V_{BR}$	$I_{BR} = 1 \text{ mA}$	26.7		36	V
Reverse Leakage Current	$I_R$	$V_{RWM} = 24V$	T=25 $^{\circ}C$	5	50	nA
			T=125 $^{\circ}C$		500	
Clamping Voltage	$V_C$	$t_p = 8/20\mu s$	$I_{PP} = 1A$		45	V
			$I_{PP} = 2A$		50	
Junction Capacitance	$C_J$	$V_R = 0V, f = 1MHz$	T=25 $^{\circ}C$	0.35	0.5	pF
			T=125 $^{\circ}C$		1.0	

Notes:

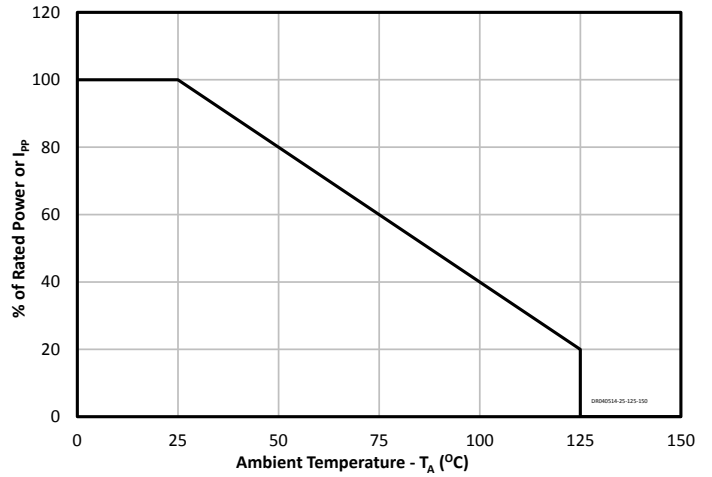
- 1) ESD gun return path connected to ESD ground plane.
- 2) In-system ESD withstand voltage

# Typical Characteristics

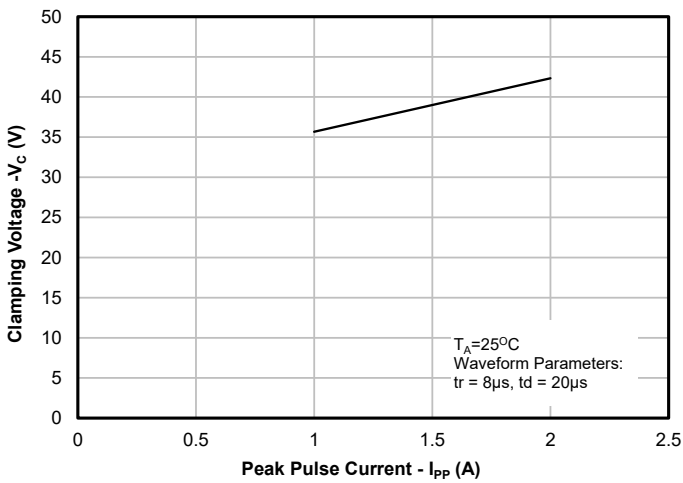
### Non-Repetitive Peak Pulse Power vs. Pulse Time



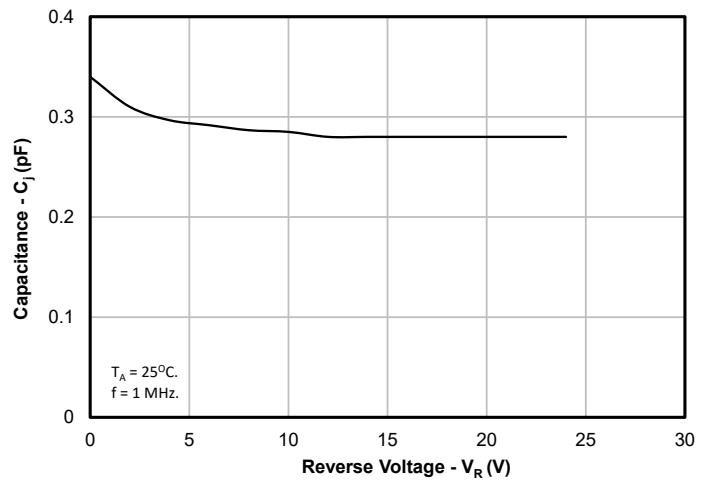
### Power Derating Curve



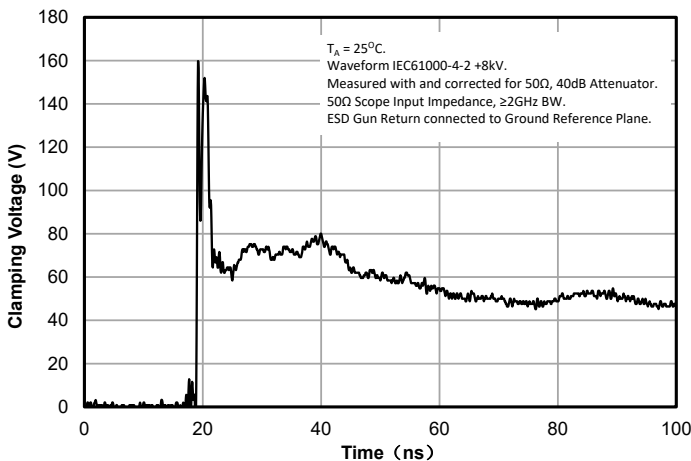
### Clamping Voltage vs. Peak Pulse Current



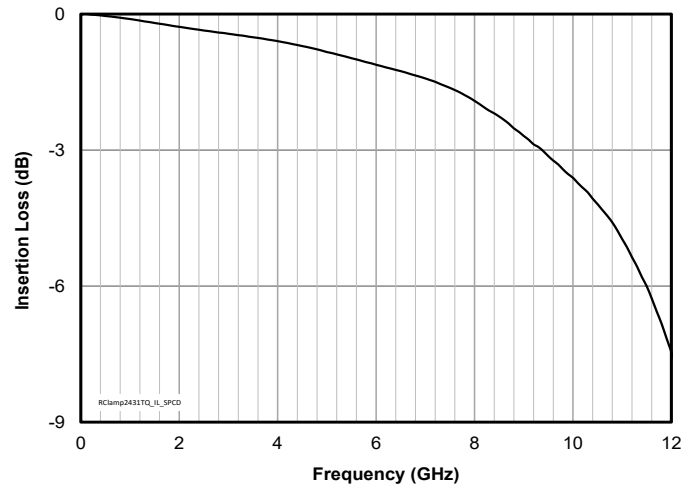
### Junction Capacitance vs. Reverse Voltage



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

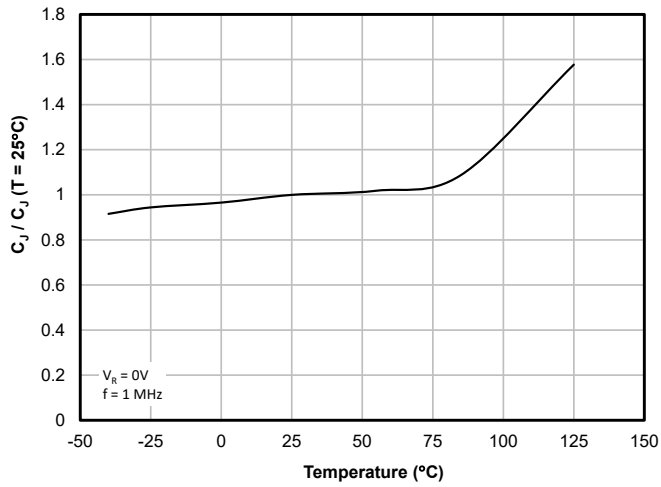


### Insertion Loss (S21)

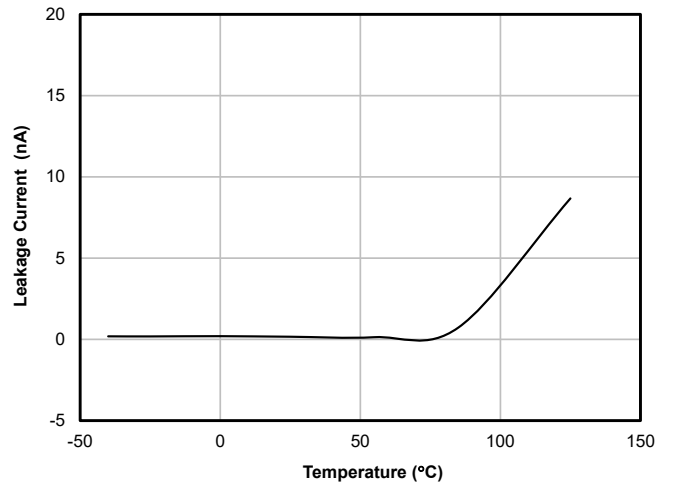


# Typical Characteristics

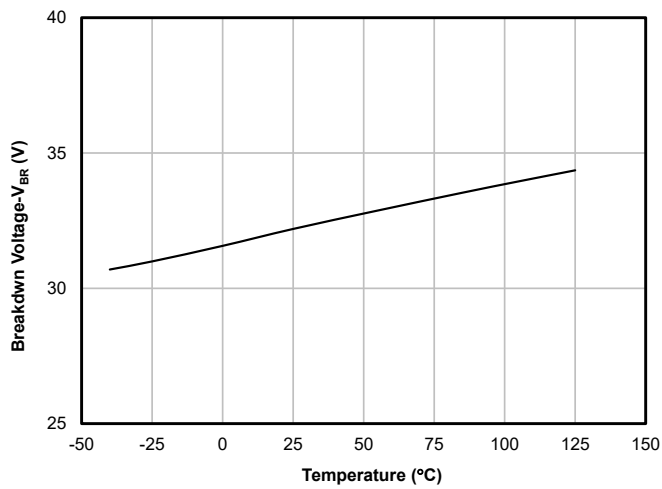
### Normalized Capacitance vs. Temperature



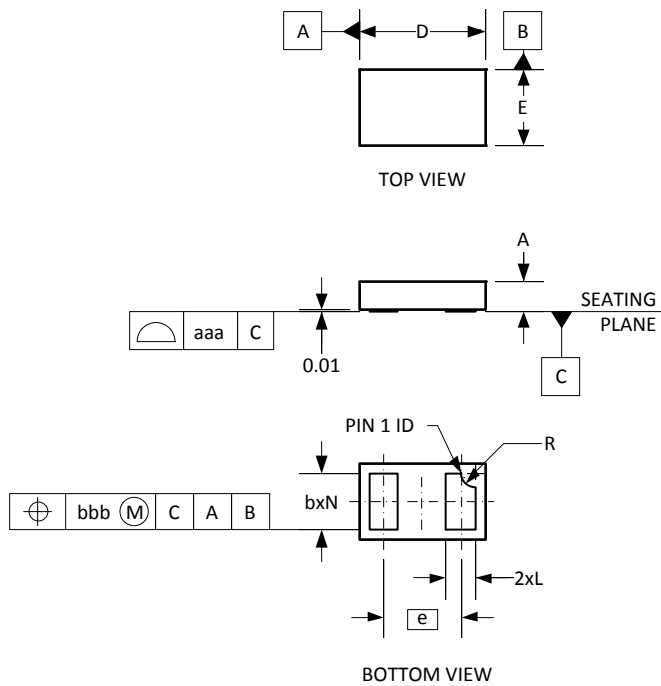
### Typical Reverse Leakage Current vs. Temperature



### Typical Breakdown Voltage vs. Temperature



# Outline Drawing - SLP1006P2T



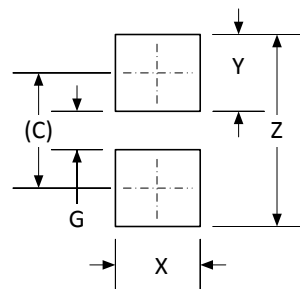
DIM	DIMENSIONS					
	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.015	.016	.017	0.37	0.40	0.43
A1	.000	.001	.002	0.00	0.03	0.05
b	.018	.020	.022	0.45	0.50	0.55
D	.035	.039	.043	0.90	1.00	1.10
E	.020	.024	.028	0.50	0.60	0.70
e	.026 BSC			0.65 BSC		
L	.008	.010	.012	0.20	0.25	0.30
R	.002	.004	.006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



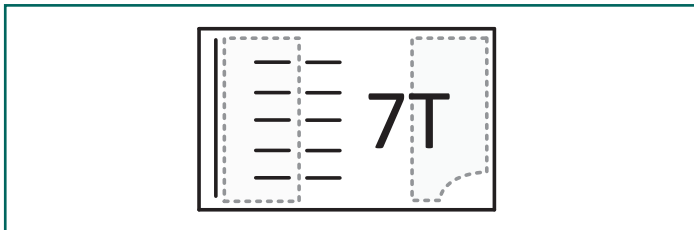
DIM	DIMENSIONS	
	INCHES	MILLIMETERS
C	(.033)	(0.85)
G	.012	0.30
X	.024	0.60
Y	.022	0.55
Z	.055	1.40

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.

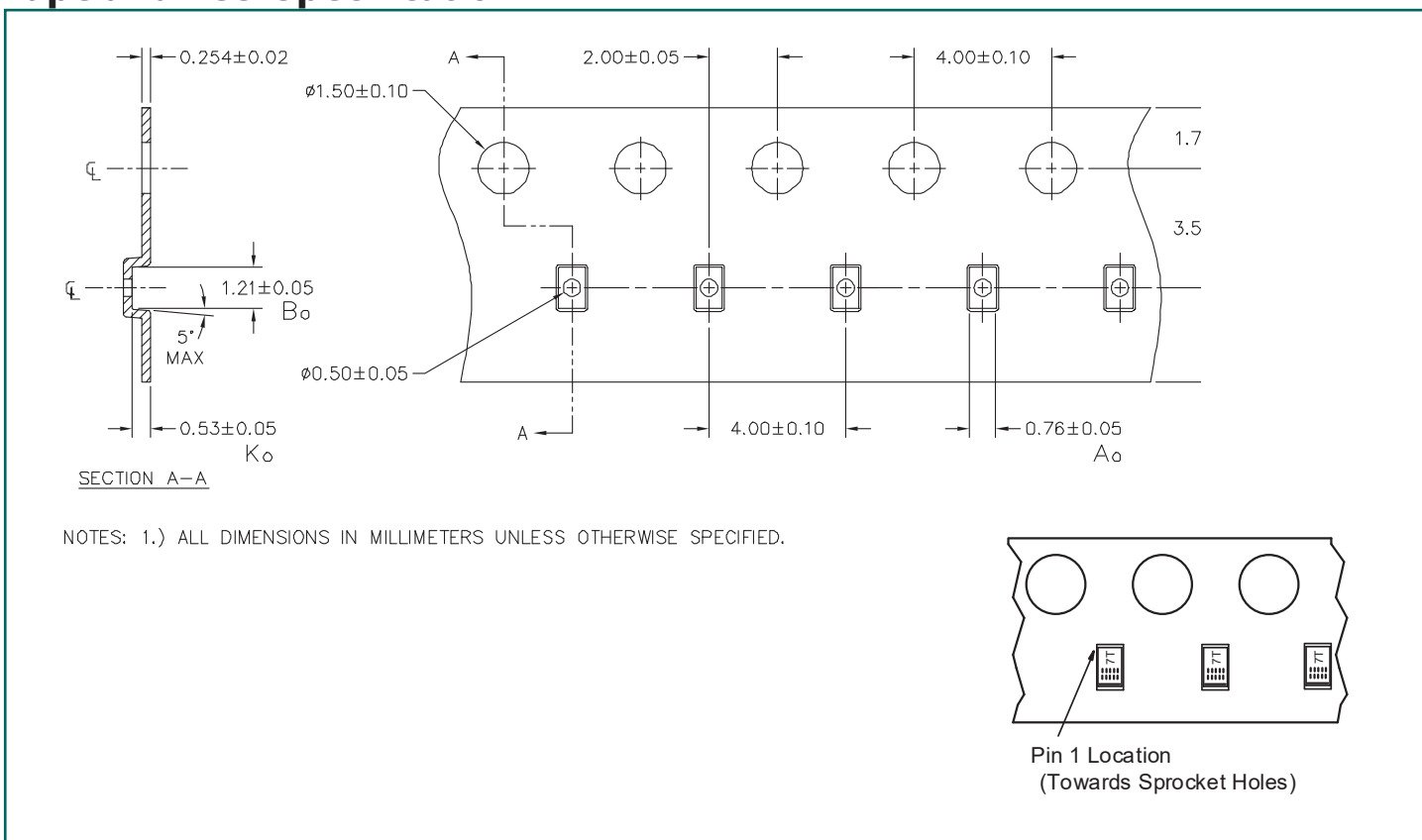
## Marking Code



Notes:

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

## Tape and Reel Specification



## Ordering Information

Part Number	Qty per Reel	Reel Size
RClamp2431TQCT	3,000	7"



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