RClamp2431TQ

Ultra-Low Capacitance RClamp®
1-Line, 24V ESD Protection

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) ±15kV (air), ±15kV (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

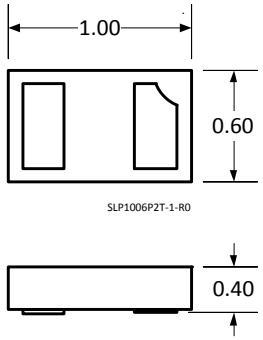
Mechanical Characteristics

- 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

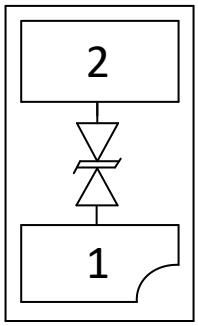
- Automobile Antenna
- CAN Bus Ports
- Wi-Fi Interfaces
- RFID

Package Dimension



Nominal Dimensions (mm)

Schematic & Pin Configuration



SLP1006P2T (Bottom View)

Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 8/20µs)	P_{PK}	100	W
Peak Pulse Current (tp = 8/20µs)	I_{PP}	2	A
ESD per IEC 61000-4-2 (Air) (1)(2) ESD per IEC 61000-4-2 (Contact) (1)(2)	V_{ESD}	±15 ±15	kV
Operating Temperature	T_J	-40 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Characteristics (T=25°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 mA		26.7		36	V
Reverse Leakage Current	I_R	V_{RWM} = 24V	T=25°C		5	50	nA
			T=125°C			500	
Clamping Voltage	V_C	tp = 8/20µs	I_{PP} = 1A			45	V
			I_{PP} = 2A			50	
Junction Capacitance	C_J	V_R = 0V, f = 1MHz	T=25°C		0.35	0.5	pF
			T=125°C			1.0	

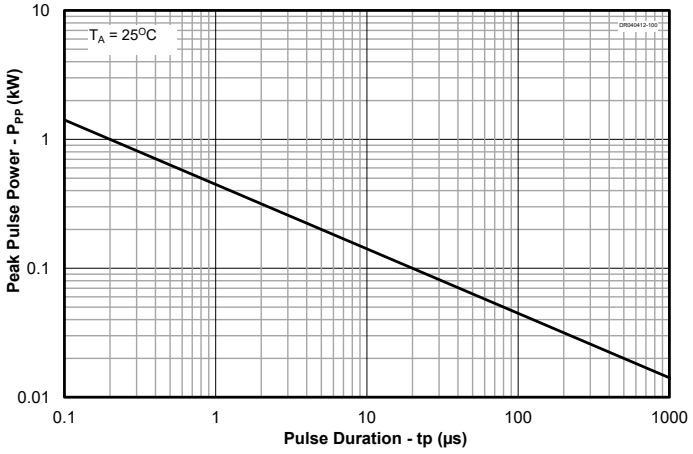
Notes:

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

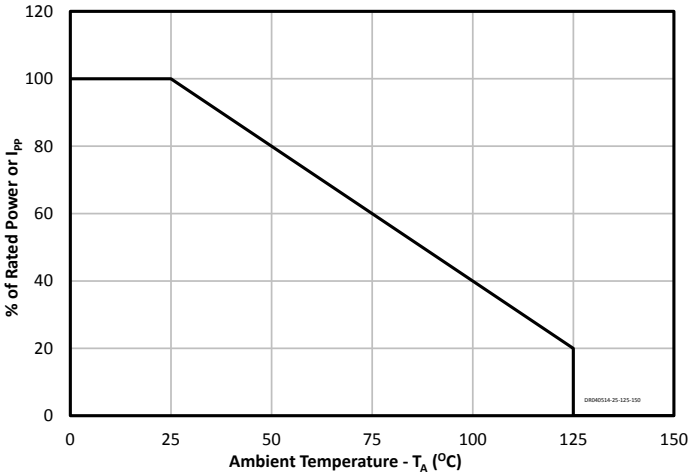
2) In-system ESD withstand voltage

Typical Characteristics

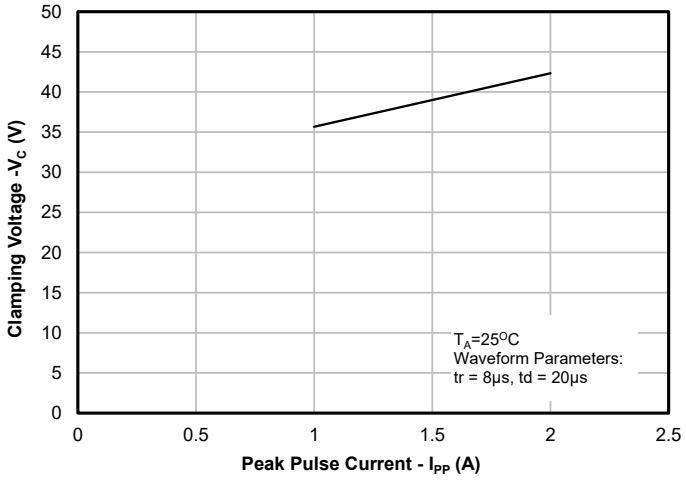
Non-Reptitive Peak Pulse Power vs. Pulse Time



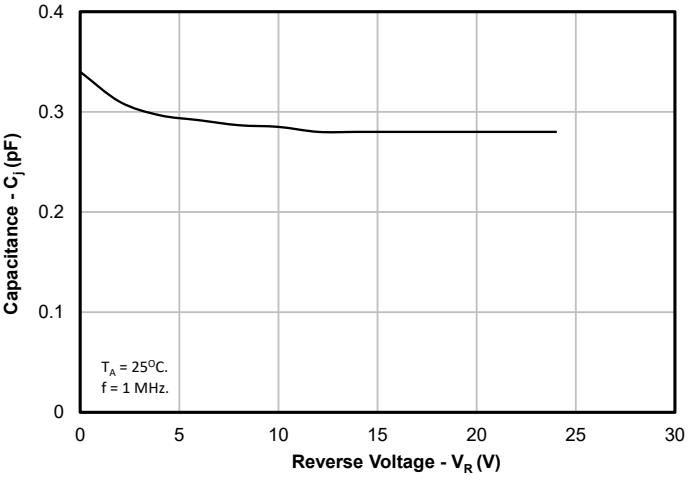
Power Derating Curve



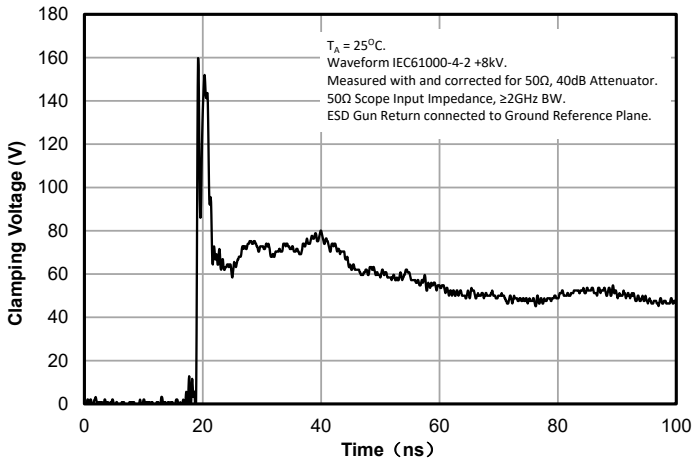
Clamping Voltage vs. Peak Pulse Current



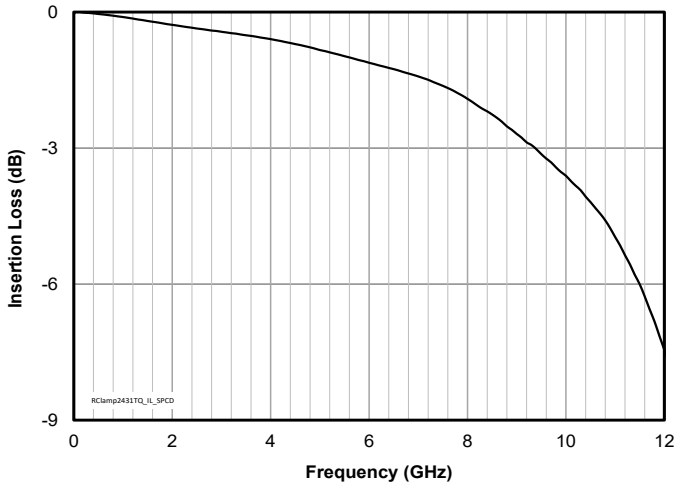
Junction Capacitance vs. Reverse Voltage



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

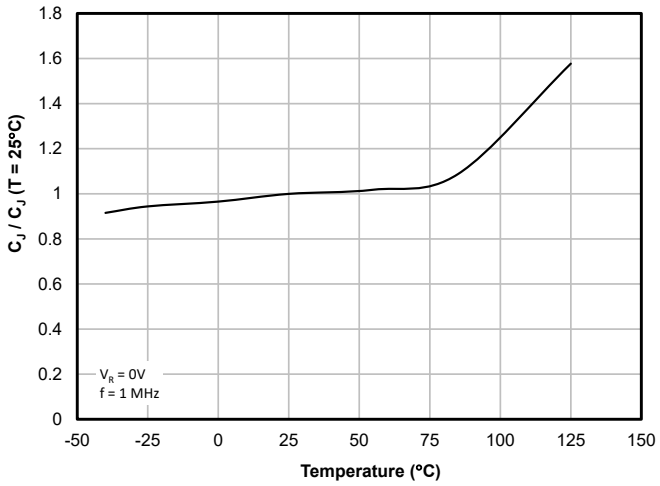


Insertion Loss (S21)

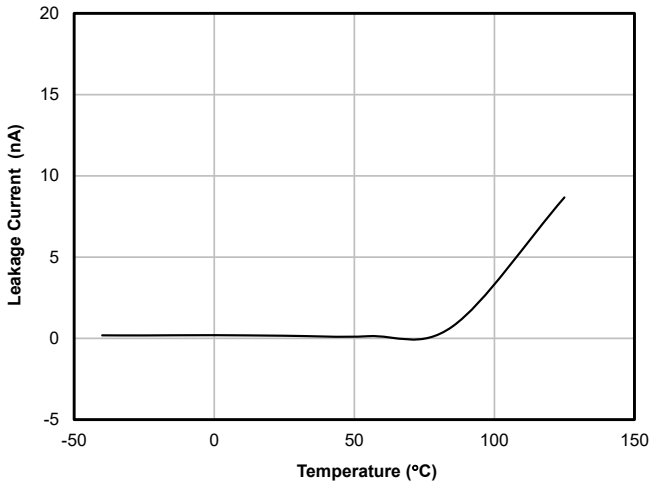


Typical Characteristics

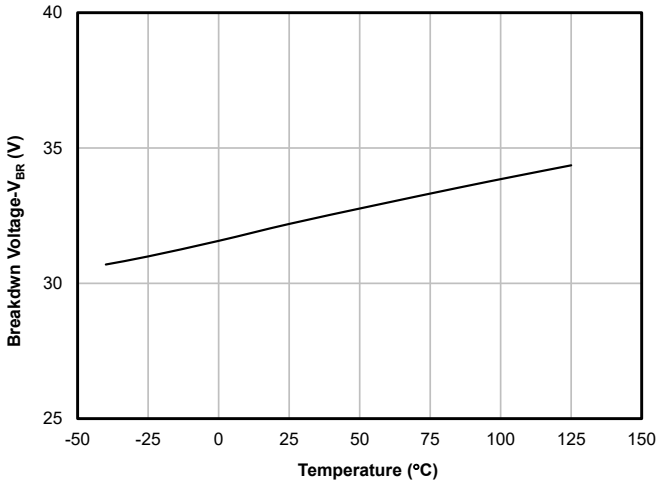
Normalized Capacitance vs. Temperature



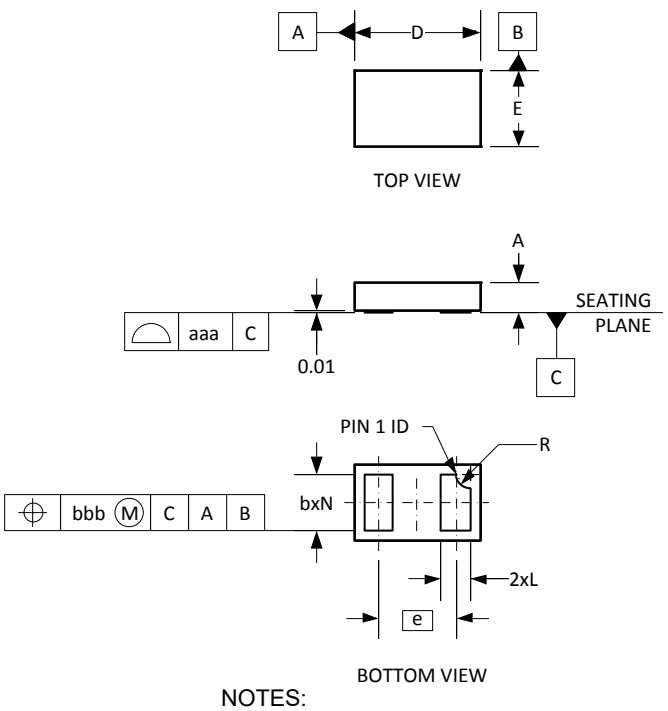
Typical Reverse Leakge Current vs. Temperature



Typical Breakdown Voltage vs. Temperature



Outline Drawing - SLP1006P2T



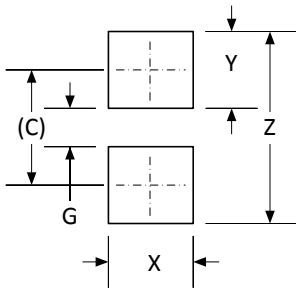
DIMENSIONS						
DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.015	.016	.017	0.37	0.40	0.43
A1	.000	.001	.002	0.00	0.03	0.05
b	.018	.020	.022	0.45	0.50	0.55
D	.035	.039	.043	0.90	1.00	1.10
E	.020	.024	.028	0.50	0.60	0.70
e	.026 BSC			0.65 BSC		
L	.008	.010	.012	0.20	0.25	0.30
R	.002	.004	.006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



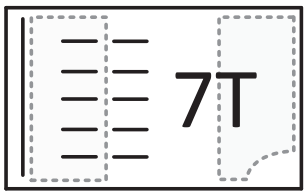
DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	(.033)	(0.85)
G	.012	0.30
X	.024	0.60
Y	.022	0.55
Z	.055	1.40

SLP1006P2T-3-R0

NOTES:

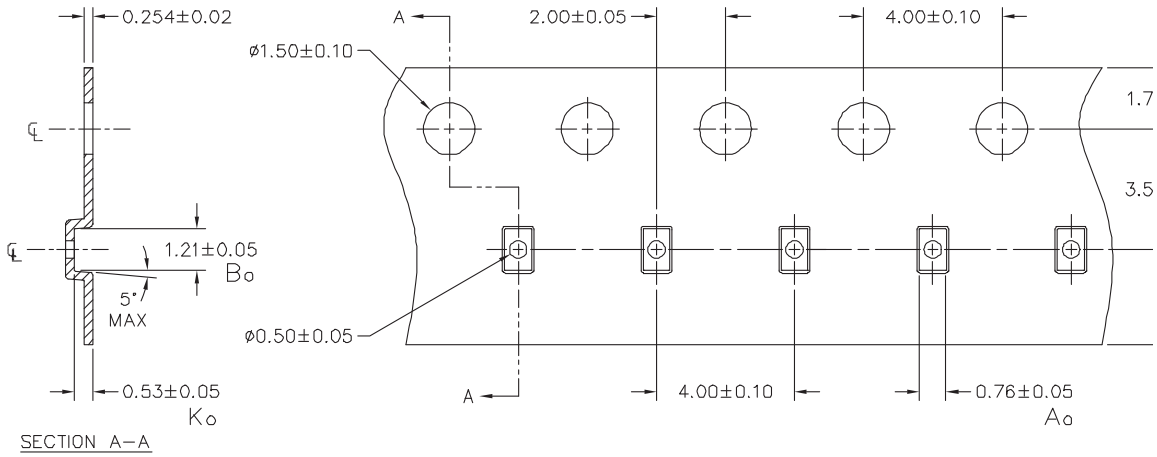
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY.CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR COMPANY'S MANUFACTURING GUIDELINES ARE MET.

Marking Code

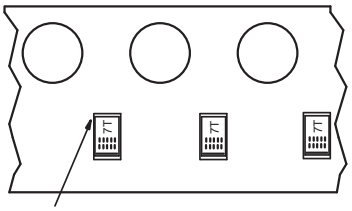


Notes:
1. Marking will also include line matrix date code.
2. Device is electrically symmetrical.

Tape and Reel Specification



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



Ordering Information

Part Number	Qty per Reel	Reel Size
RClamp2431TQTCT	3,000	7”



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