RClamp04022S

RailClamp ®

2-Line ESD & Surge Protection

Description

RClamp® TVS diodes are designed to protect sensitive electronics from damage or latch-up due to ESD. and EOS. 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.

RClamp04022S is in a SOT23-3 Lead package. The Leads are finished with lead-free matte tin. They may be used to meet the ESD immunity requirements of IEC 61000-4-2 (±30kV air, ±30kV contact discharge). Low maximum capacitance (0.75pF at V_R=0V) minimizes loading on sensitive circuits. Each device will protect two high speed data lines operating at 4 volts.

Features

- High ESD withstand voltage
  - IEC 61000-4-2 (ESD): ±30kV (contact), ±30kV (air)
  - IEC 61000-4-5 (Lightining): 18A (8/20µs)
  - IEC 61000-4-4 (EFT): 4kV, 80A
- Low capacitance: 0.75pF Max
- Protects two high speed data lines
- Working voltage: 4V
- Low ESD clamping voltage
- Low dynamic resistance: 0.12Ω typical
- Low reverse leakage current
- Solid-state silicon-avalanche technology

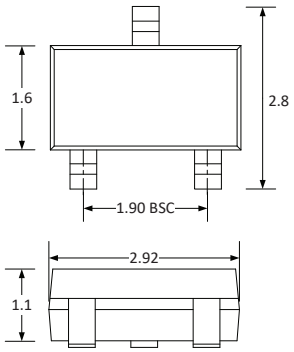
Applications

- USB 2.0
- LVDS
- GPIO
- Analog Video
- USB Type-C
- Keypad

Mechanical Characteristics

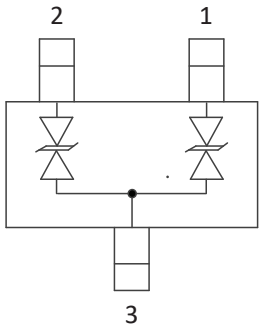
- Package: SOT23 3L
- Pb-Free, Halogen Free, RoHS/WEEE Compliant
- Molding compound flammability rating: UL 94V-0
- Lead Finish: Pb-Free
- Marking: Marking code + Date Code
- Packaging: Tape and Reel

Nominal Dimensions



Nominal Dimensions in mm

Schematic and Pin Configuration



SOT23 3L

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}	18	A
ESD per IEC 61000-4-2 (Contact)(1)	V_{ESD}	±30	kV
ESD per IEC 61000-4-2 (Air)(1)		±30	
Operating Temperature	T_J	-40 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Characteristics

T=25°C unless otherwise specified

All measurements from Pin 1 to Pin 3 or Pin 2 to Pin 3

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse Stand-Off Voltage	V_{RWM}				4	V
Reverse Breakdown Voltage	V_{BR}	I_t = 1mA	6	7.6	10	V
Reverse Leakage Current	I_R	V_{RWM} = 4V		<10	50	nA
Clamping Voltage(2)	V_C	t_p = 1.2/50µs (Voltage), 8/20us (Current) Combination waveform, Rs = 2 Ω, I_{PP} = 18A		4.6	5.6	V
ESD Clamping Voltage(3)	V_C	I_{TLP}=4A, t_p=0.2/100ns (TLP)		3.0		V
		I_{TLP}=16A, t_p=0.2/100ns (TLP)		4.4		
Dynamic Resistance(3),(4)	R_{DYN}	t_p = 0.2/100ns (TLP)		0.12		Ω
Junction Capacitance	C_J	V_R = 0V, f = 1MHz		0.44	0.75	pF

Notes:

(1): ESD gun return path connected to Ground Reference Plane (GRP)

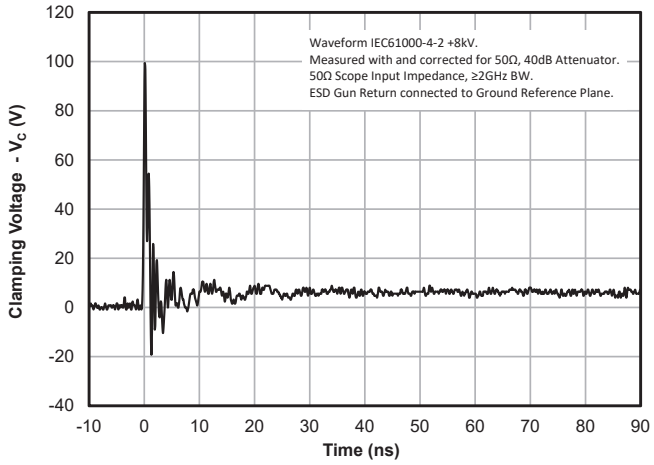
(2) Measured using a 1.2/50µs voltage, 8/20µs current combination waveform, RS = 2 Ohms. Clamping is defined as the clamping voltage after the device snaps back to a conducting state.

(3): Transmission Line Pulse Test (TLP) Settings: tp = 100ns, tr = 0.2ns, I_{TLP} and V_{TLP} averaging window: t_1 = 70ns to t_2 = 90ns

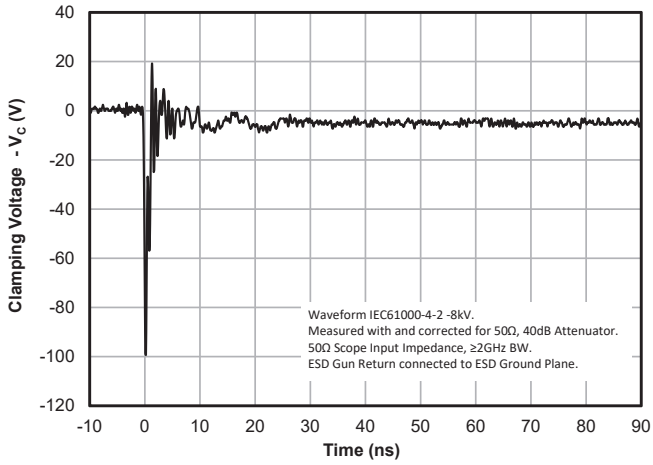
(4): Dynamic resistance calculated from I_{TLP} = 4A to I_{TLP} = 16A

Typical Characteristics

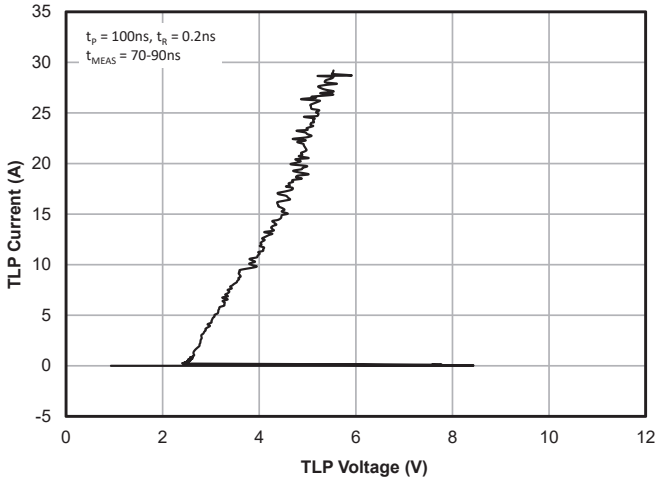
ESD Clamping (8kV Contact per IEC 61000-4-2)



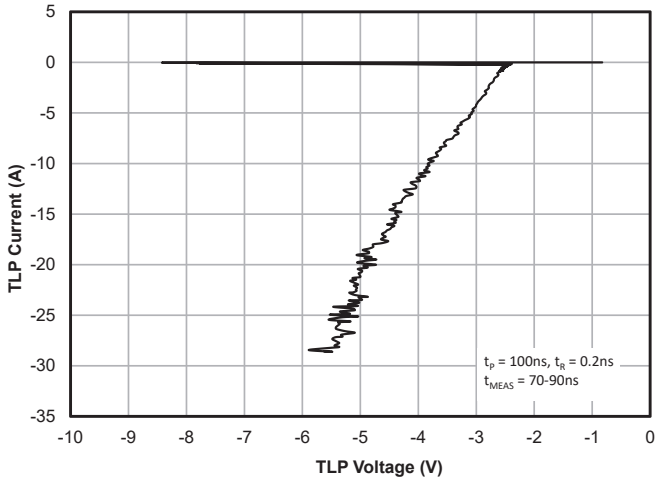
ESD Clamping (-8kV Contact per IEC 61000-4-2)



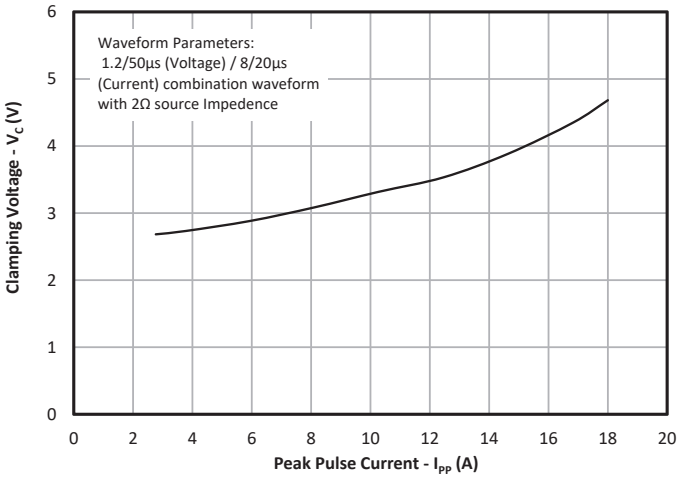
TLP Characteristics (Positive Pulse)



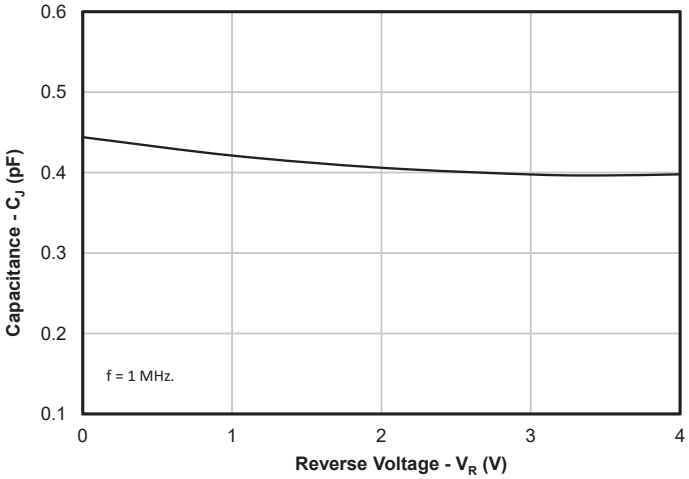
TLP Characteristics (Negative Pulse)



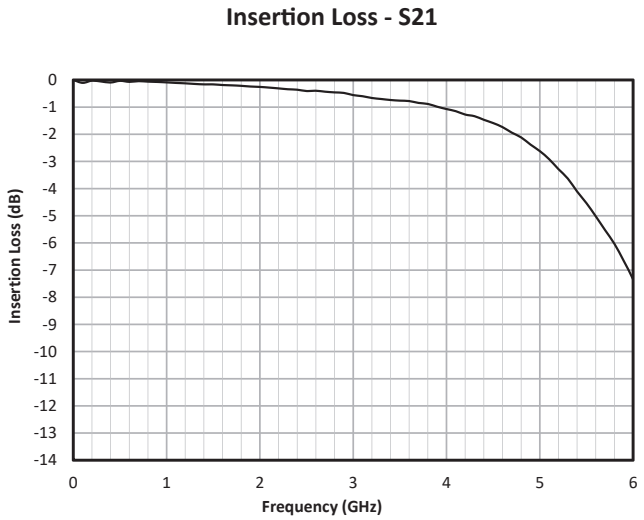
Clamping Voltage vs. Peak Pulse Current (t_p=1.2/50µs)



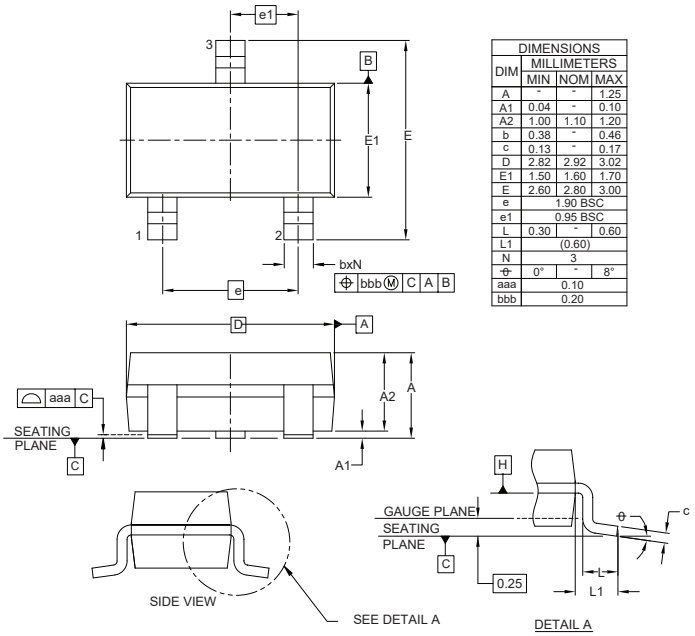
Capacitance vs. Reverse Voltage



Typical Characteristics



Outline Drawing - SOT23 3L

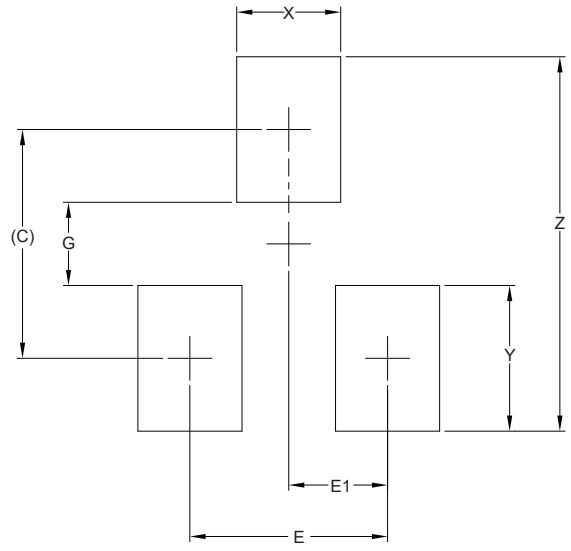


DIMENSIONS			
DIM	MILLIMETERS		
	MIN	NOM	MAX
A	-	-	1.25
A1	0.04	-	0.10
A2	1.00	1.10	1.20
b	0.38	-	0.46
c	0.13	-	0.17
D	2.82	2.92	3.02
E1	1.50	1.60	1.70
E	2.60	2.80	3.00
e	1.90 BSC		
e1	0.95 BSC		
L	0.30	-	0.60
L1	(0.60)		
N	3		
θ	0°	-	8°
aaa	0.10		
bbb	0.20		

NOTES:

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. DATUMS -A- AND -B- TO BE DETERMINED AT DATUM PLANE -H-
3. DIMENSIONS "E1" AND "D" DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

Landing Pattern - SOT23 3L

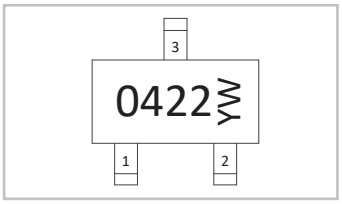


DIMENSIONS	
DIM	MILLIMETERS
C	(2.20)
G	0.80
E1	0.95
E	1.90
X	1.00
Y	1.40
Z	3.60

NOTES:

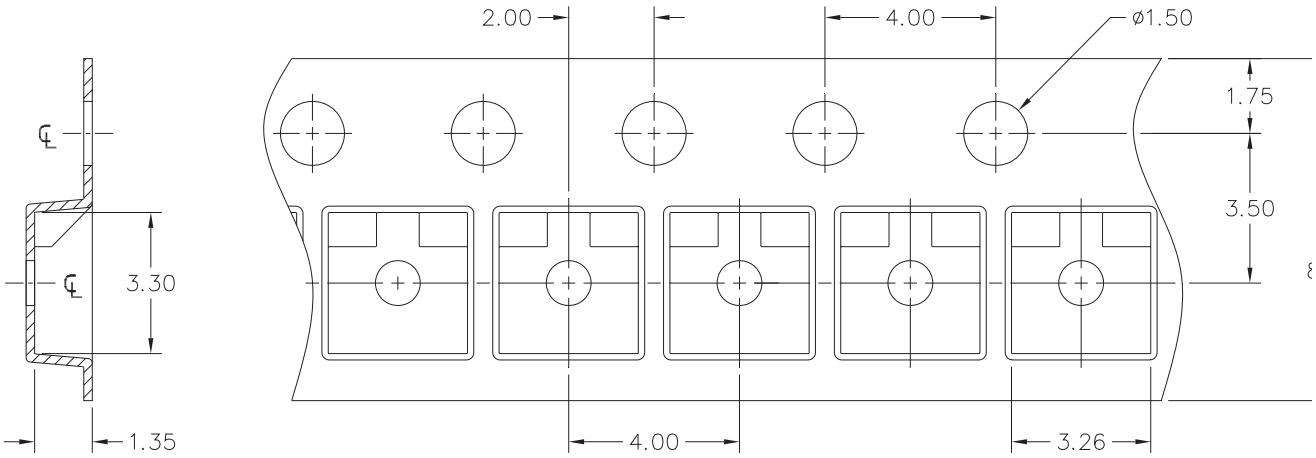
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY
   CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR
   COMPANY'S MANUFACTURING GUIDELINES ARE MET.
3. REFERENCE IPC-SM-782A.

Marking Code

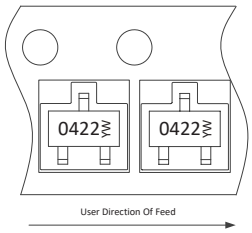


Note: YW = Date Code

Tape and Reel Specification



Note: All dimensions are nominal dimensions in mm.



Order Information

PART NUMBER	QTY PER REEL	REEL SIZE
RClamp04022S.C	3,000	7"

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