

1.Description

The RCLAMP3321P provides ESD protection for USB3.0, HDMI1.3/1.4, and other high-speed ports. It may be used to meet the ESD immunity requirements of IEC 61000-4-2. The RCLAMP3321P is designed to minimize both the ESD peak clamping and the TLP clamping. The dynamic resistance is minimized (0.47 Ohms typical) for optimum protection of sensitive circuits.

3.Features

- Transient protection for data lines to
- IEC 61000-4-2 (ESD) $\pm 17\text{kV}$ (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 0.5mm)

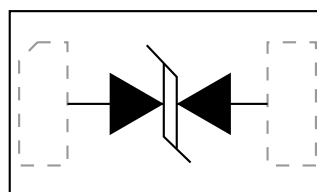
Protects one data or I/O line

2.Applications

- USB 3.0
- HDMI 1.3/1.4
- V-By-One
- Display Port
- MHL / MDDI
- LVDS Interfaces
- eSATA Interfaces

- Low capacitance: 0.35pF
- Dynamic Resistance: 0.47 Ohms Typical
- Low ESD clamping voltage
- Operating voltage: 3.3V
- Solid-state silicon-avalanche technology

4.Pinning information



SLP1006P2



5. Absolute Maximum Rating

Parameter	Symbol	Value	Units
Peak Pulse Power ($t_p=8/20\mu s$)	P_{PK}	25	W
Maximum Peak Pulse Current ($t_p=8/20\mu s$)	I_{PP}	3	A
ESD per IEC 61000-4-2(Air)	V_{ESD}	± 17	kV
ESD per IEC 61000-4-2(Contact)		± 12	kV
Junction Temperature	T_J	-55 to 125	$^{\circ}C$
Storage Temperature	T_{STG}	-55 to 150	$^{\circ}C$

6. Electrical Characteristics ($T_A=25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Reverse Stand-Off Voltage	V_{RWM}				3.3	V
Breakdown Voltage	V_{BR}	$I_{BR}=1mA$	5.5	7	8.5	V
Reverse Leakage Current	I_R	$V_{RWM}=3.3V$		10	50	nA
Clamping Voltage	V_C	$I_{PP}=1A$ ($t_p=8/20\mu s$)		9.5	10	V
Clamping Voltage	V_C	$I_{PP}=4A$ ($t_p=8/20\mu s$)		10.5	13	V
ESD Clamping Voltage ²	V_C	$I_{PP}=4A$, $t_{lp}=0.2/100ns$		8.8		V
ESD Clamping Voltage ²	V_C	$I_{PP}=16A$, $t_{lp}=0.2/100ns$		14.5		V
Trigger Voltage ²	V_{TRIG}	$t_{lp}=0.2/100ns$		8		V
Dynamic Resistance ^{2, 3}	R_{DYN}	$t_{lp}=0.2/100ns$		0.47		Ω
Junction Capacitance	C_J	$V_R=0V$, $f=1MHz$		0.22	0.35	pF

Notes:

- 1) ESD gun return path connected to ESD ground reference plane.
- 2) TLP Settings: $t_p=100ns$, $t_r=0.2ns$, I_{TLP} and V_{TLP} sample window: $t_1=70ns$ to $t_2=90ns$.
- 3) Dynamic resistance calculated from $I_{PP}=4A$ to $I_{PP}=16A$ using "Best Fit".
- 4) Device is electrically symmetrical.



7.1 Typical characteristic

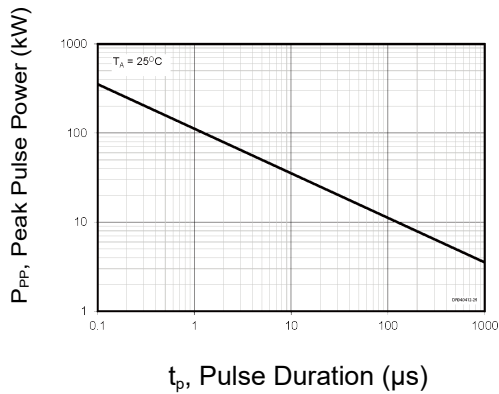


Figure 1: Non-Repetitive Peak Pulse Power vs. Pulse Time

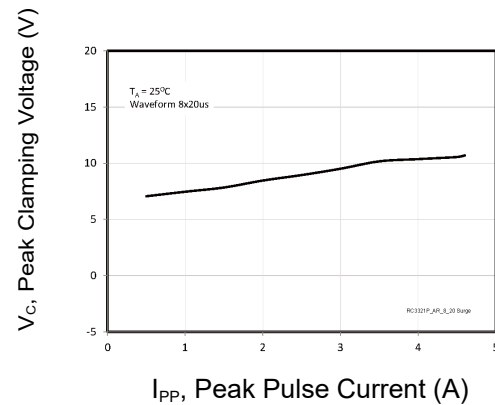


Figure 2: 8x20us Peak Clamping Voltage vs Peak Current

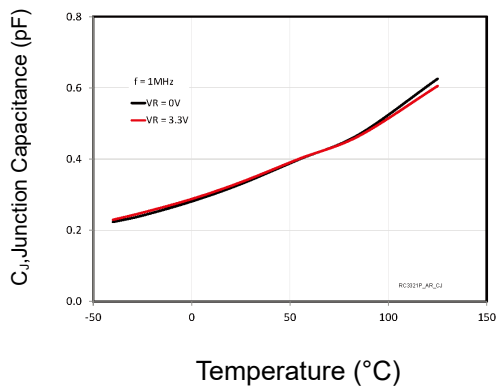


Figure 3: capacitance vs. Temperature vs. Bias Voltage

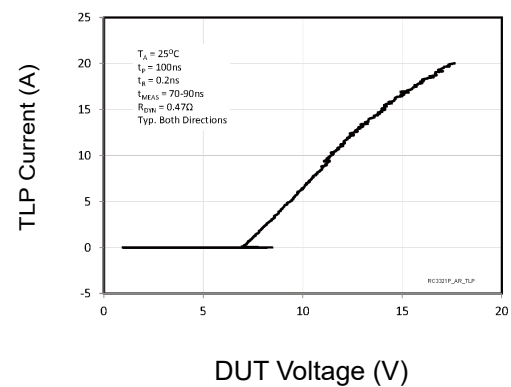


Figure 4: TLP Characteristic

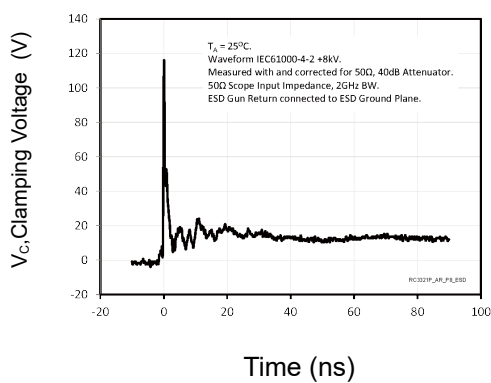


Figure 5: ESD Clamping
(+8kV Contact per IEC 61000-4-2)

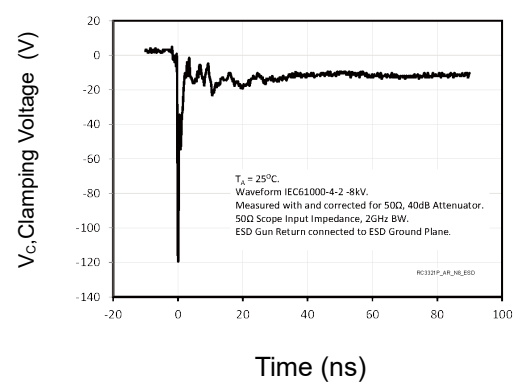
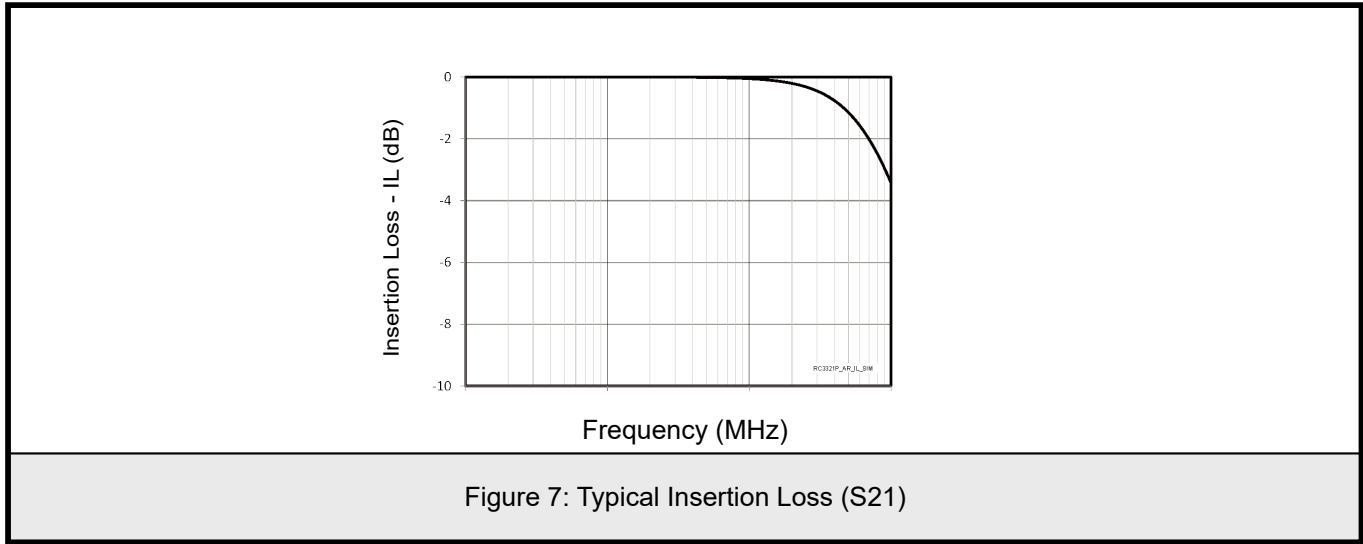


Figure 6: ESD Clamping
(-8kV Contact per IEC 61000-4-2)

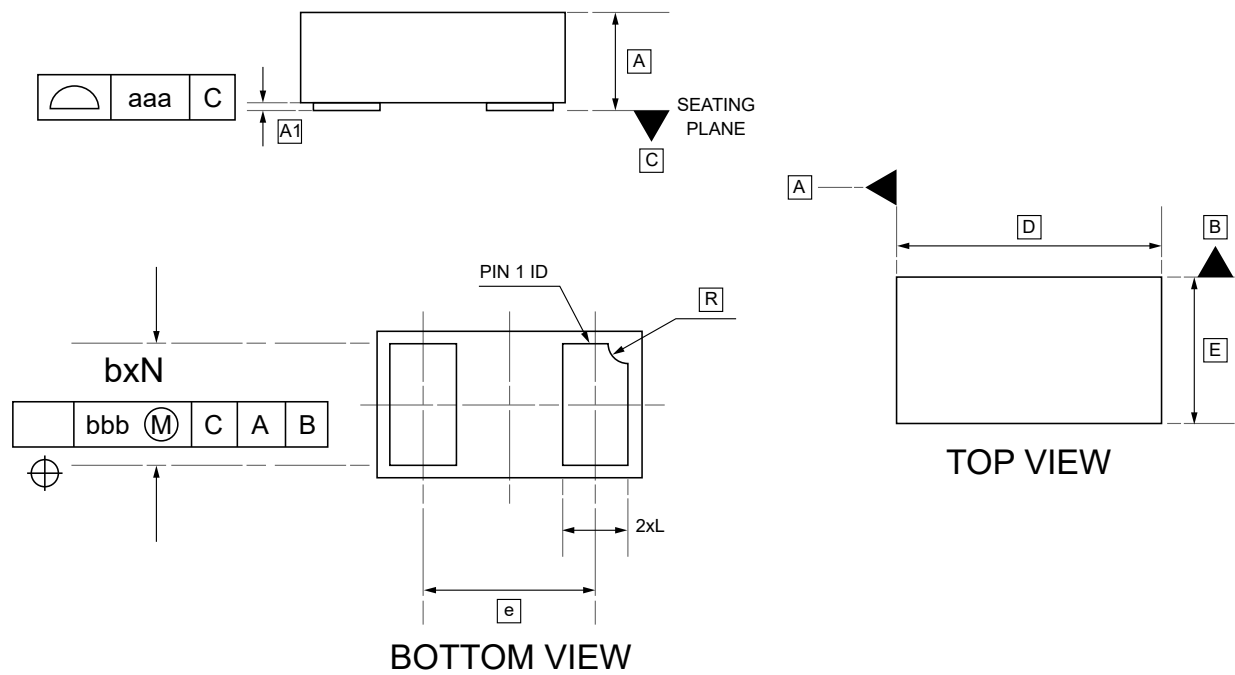


7.2Typical characteristic





8.SLP1006P2 Package Outline Dimensions



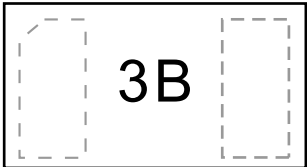
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	b	D	E	e	L	R	N	aaa	bbb
Min	0.37	0.00	0.45	0.90	0.50	0.65	0.20	0.05	2	0.08	0.10
Max	0.43	0.05	0.55	1.10	0.70	BSC	0.30	0.15			

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



9.Ordering information



Order Code	Package	Base QTY	Delivery Mode
UMW RCLAMP3321P	SLP1006P2	10000	Tape and reel



10.Disclaimer

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