Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 8/20µs)	P_{pk}	100	Watts
Peak Pulse Current (tp = 8/20µs)	I_{PP}	3	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	±15 ±8	kV
Operating Temperature	T_J	-55 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	°C

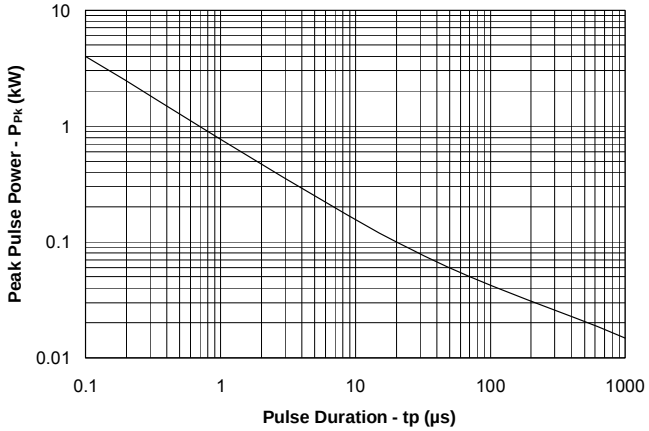
Electrical Characteristics (T = 25°C)

RClamp0502N

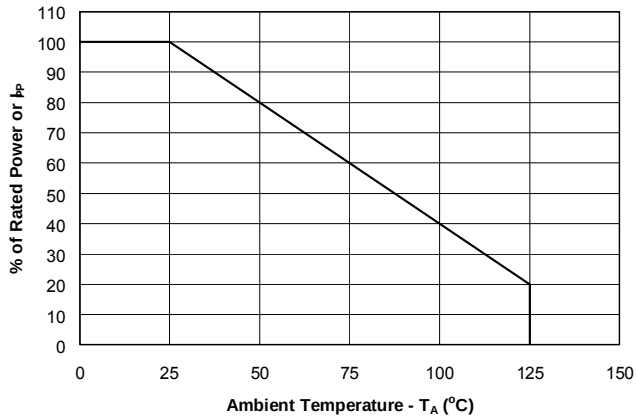
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}	Pin 6 to GND			6.5	V
Reverse Breakdown Voltage	V_{BR}	I_t = 1mA Pin 6 to GND	7	9.5	12	V
Reverse Leakage Current	I_R	V_{RWM} = 6.5V, T=25°C Pin 6 to GND			1	µA
Forward Voltage	V_F	I_f = 15mA Any I/O to pin 6		0.9	1.2	V
Clamping Voltage	V_C	I_{PP} = 1A, tp = 8/20µs Any I/O pin to Ground			16.5	V
Clamping Voltage	V_C	I_{PP} = 3A, tp = 8/20µs Any I/O pin to Ground			30	V
Junction Capacitance	C_j	V_R = 0V, f = 1MHz Any I/O pin to Ground		0.3	0.5	pF
		V_R = 0V, f = 1MHz Between I/O pins		0.3	0.5	pF

Typical Characteristics

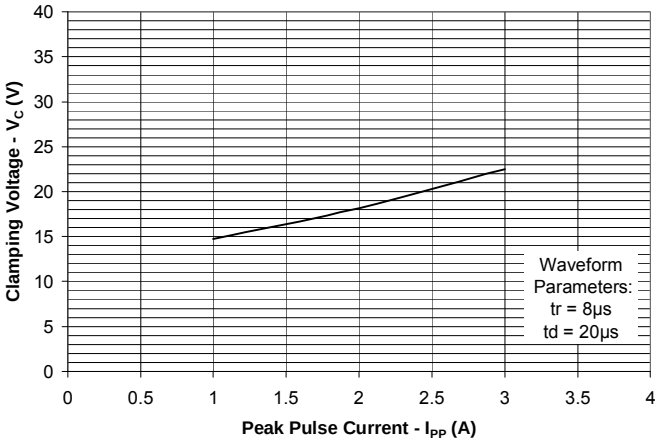
Non-Repetitive Peak Pulse Power vs. Pulse Time



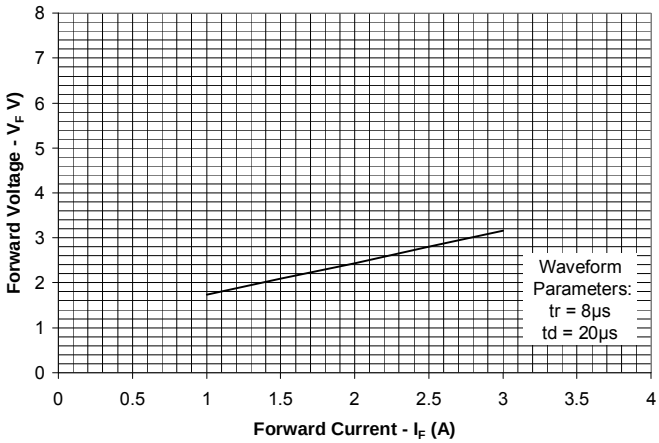
Power Derating Curve



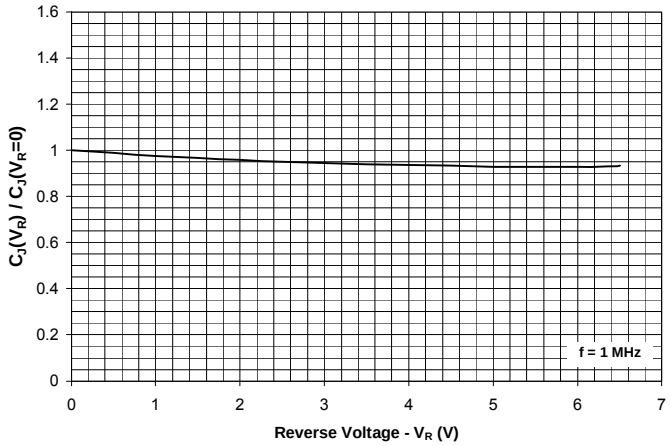
Clamping Voltage vs. Peak Pulse Current
I/O to Gnd - Pin 4, 5 to Pin 1



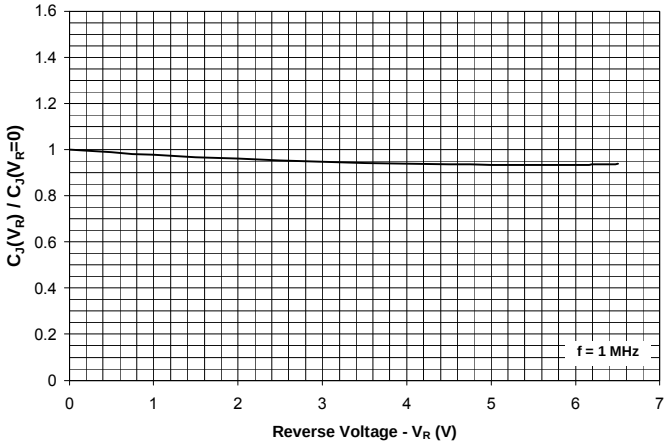
Foward Voltage vs. Forward Current
Pin 1 to Pin 4, 5



Normalize Capacitance vs. Reverse Voltage
I/O to Gnd - Pin 4, 5 to Pin 1



Normalize Capacitance vs. Reverse Voltage
I/O to I/O - Pin 4 to Pin 5



Applications Information

Device Connection Options for Protection of Two High-Speed Data Lines

Data line inputs are normally connected at pins 4 & 5 with the outputs connected at pins 2 & 3. Pin 1 is connected to ground. Note that the circuit at the ground pin is identical to the circuit at each data input/output pin. This is done to further reduce capacitance. The connection to ground should be made directly to a ground plane. The path length should also be kept as short as possible to minimize parasitic inductance. Pin 6 can be connected to Vcc biased or left not connected depending upon the application.

Protecting USB 2.0 Interfaces

The USB interface consists of Data (D- and D+) lines and a 5.25V voltage bus. Since these pins are part of the connector, they are vulnerable to ESD and cable discharge events. The RClamp0502N is designed to protect all four USB connections (VCC, D-, D+, and Gnd). Each device will protect one USB port. When the voltage on the data lines exceed the bus voltage (plus one diode drop), the internal rectifiers are forward biased conducting the transient current away from the protected controller chip. The TVS diode directs the surge to ground. The TVS diode also acts to suppress ESD strikes directly on the voltage bus. Thus, both power and data pins are protected with a single device.

Figure 1- Pin Configuration & Circuit Diagram

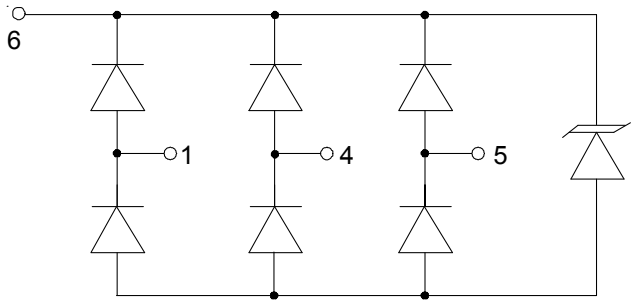
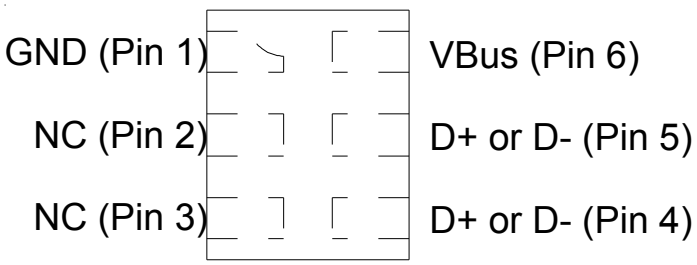
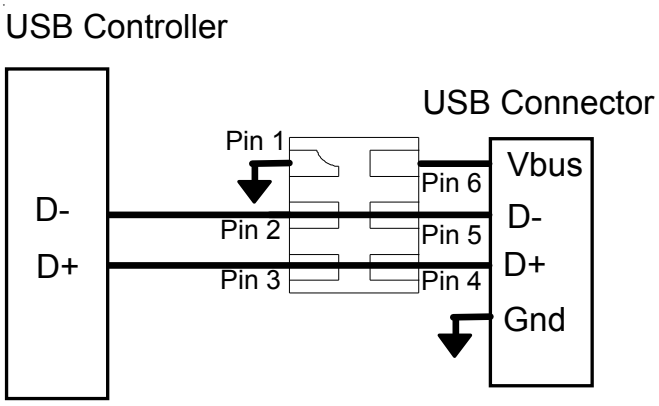


Figure 2 - USB 2.0 High Speed Protection





Applications Information - Spice Model

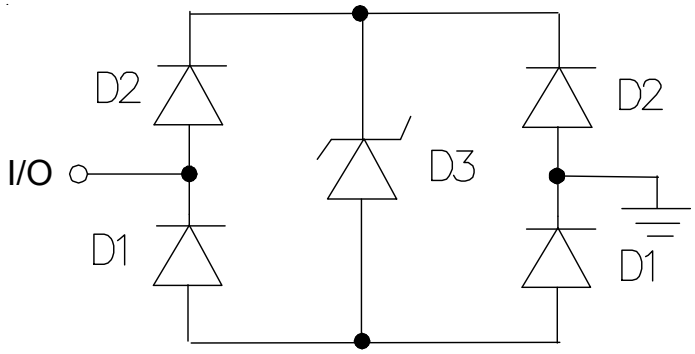
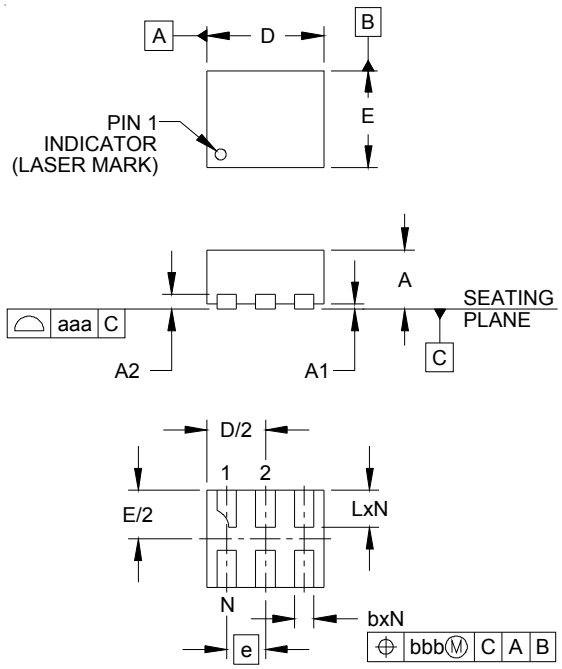


Figure 3 - RClamp0502N Spice Model

RClamp0502N Spice Parameters				
Parameter	**Unit**	**D1 (LCRD)**	**D2 (LCRD)**	**D3 (TVS)**
IS	Amp	1.0E-20	1.0E-20	2E-12
BV	Volt	100	100	9
VJ	Volt	0.7	0.7	0.6
RS	Ohm	0.458	1.0	2.6
IBV	Amp	1.0 E-3	1.0 E-3	1.0 E-3
CJO	Farad	0.4E-12	0.4E-12	56E-12
TT	sec	2.541E-9	2.541E-9	2.541E-9
M	--	0.058	0.058	0.23
N	--	1.1	1.1	1.1
EG	eV	1.11	1.11	1.11

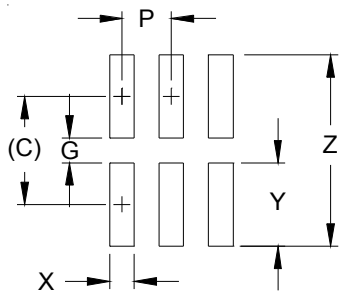
Outline Drawing -SLP1210N6



DIMENSIONS						
DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.020	.023	.026	0.50	0.58	0.65
A1	0.00	.001	.002	0.00	0.03	0.05
A2		(.005)			(0.13)	
b	.006	.008	.010	0.15	0.20	0.25
D	.043	.047	.051	1.10	1.20	1.30
E	.035	.039	.043	0.90	1.00	1.10
e		.016 BSC			0.40 BSC	
L	.012	.015	.017	0.30	0.38	0.425
N		6			6	
aaa		.003			0.08	
bbb		.004			0.10	

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

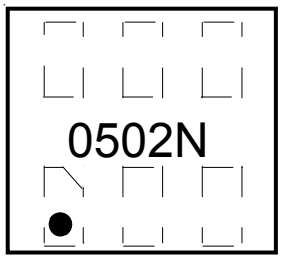
Land Pattern -SLP1210N6



DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	(.034)	(0.875)
G	.008	0.20
P	.016	0.40
X	.008	0.20
Y	.027	0.675
Z	.061	1.55

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 Codes

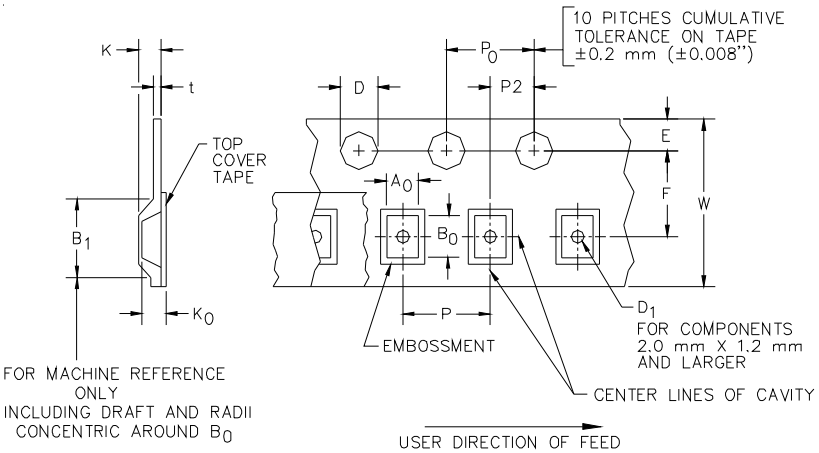


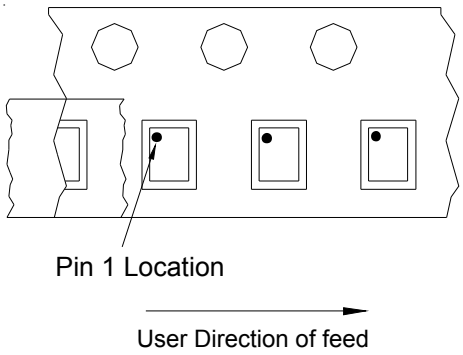
Ordering Information

Part Number	Qty per Reel	Reel Size
RClamp0502N.TCT	3,000	7 Inch

RailClamp and RClamp are marks of Semtech Corporation

Tape and Reel Specification





Device Orientation in Tape

A0	B0	K0
1.21 ±0.10 mm	1.41 ±0.10 mm	0.74 ±0.10 mm

Tape Width	B, (Max)	D	D1	E	F	K (MAX)	P	P0	P2	T(MAX)	W
8 mm	4.2 mm (.165)	1.5 + 0.1 mm - 0.0 mm (0.59 +.005 - .000)	0.8 mm ±0.05 (.031)	1.750±.10 mm (.069±.004)	3.5±0.05 mm (.138±.002)	2.4 mm (.094)	4.0±0.1 mm (.157±.00-4)	4.0±0.1 mm (.157±.00-4)	2.0±0.05m-m (.079±.002)	0.4 mm (.016)	8.0 mm + 0.3 mm - 0.1 mm (.312±.012-)

Contact Information

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