

PROTECTION PRODUCTS

Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu s$)	P_{pk}	150	Watts
Peak Pulse Current ($t_p = 8/20\mu s$)	I_{pp}	6	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)

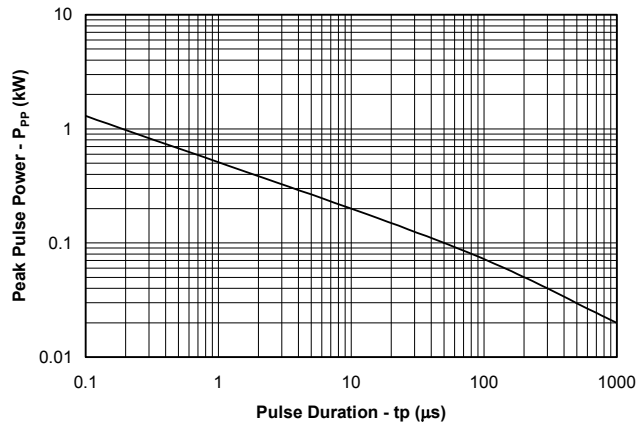
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V_{RWM}	Pin 5 to GND			5	V
Reverse Breakdown Voltage	V_{BR}	$I_t = 1mA$ Pin 5 to GND	6			V
Reverse Leakage Current	I_R	$V_{RWM} = 5V$, $T=25^\circ C$ Pin 5 to GND			3	μA
Clamping Voltage	V_C	$I_{pp} = 1A$, $t_p = 8/20\mu s$ Any I/O pin to GND			15	V
Clamping Voltage	V_C	$I_{pp} = 6A$, $t_p = 8/20\mu s$ Any I/O pin to GND			25	V
Clamping Voltage	V_C	$I_{pp} = 6A$, $t_p = 8/20\mu s$ Pin 5 to GND			18	V
Junction Capacitance	C_j	$V_R = 0V$, $f = 1MHz$ Any I/O pin to GND		1.9	3	pF
		$V_R = 0V$, $f = 1MHz$ Between I/O pins		0.80	1	pF

Note 1: I/O pins are pin 1, 3, 4, and 6

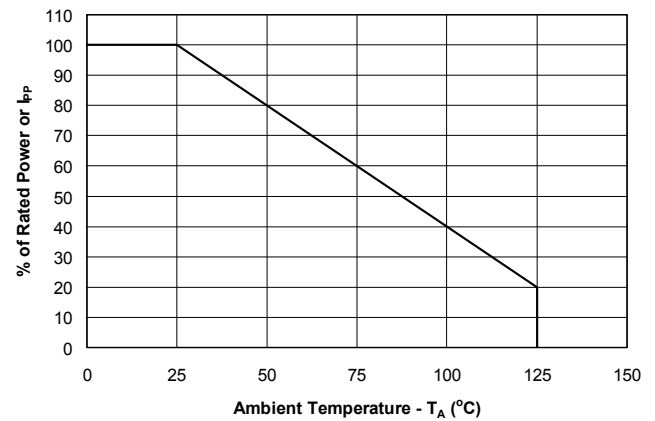
PROTECTION PRODUCTS

Typical Characteristics

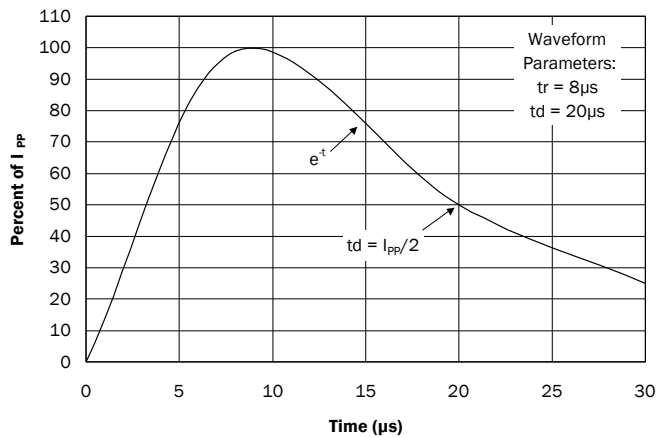
Non-Repetitive Peak Pulse Power vs. Pulse Time



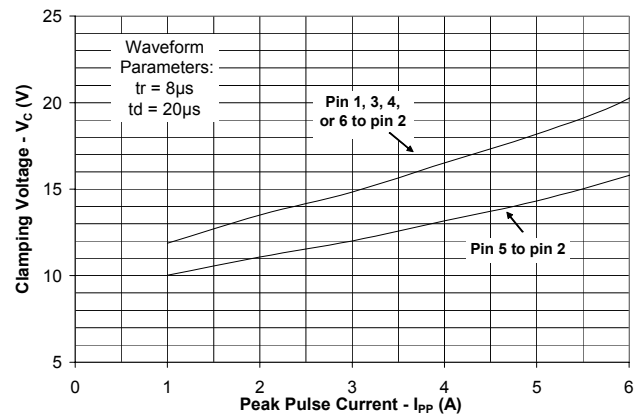
Power Derating Curve



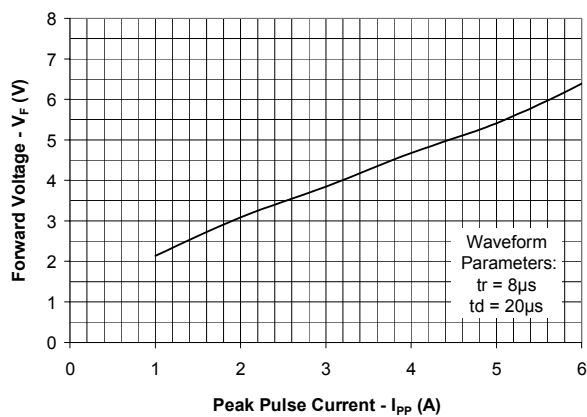
Pulse Waveform



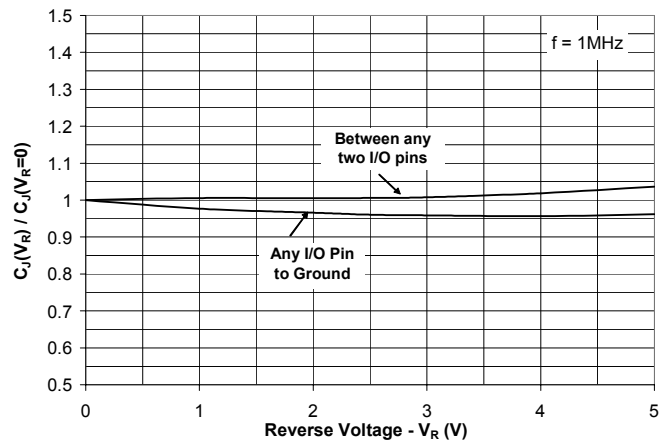
Clamping Voltage vs. Peak Pulse Current



Forward Voltage vs. Peak Pulse Current



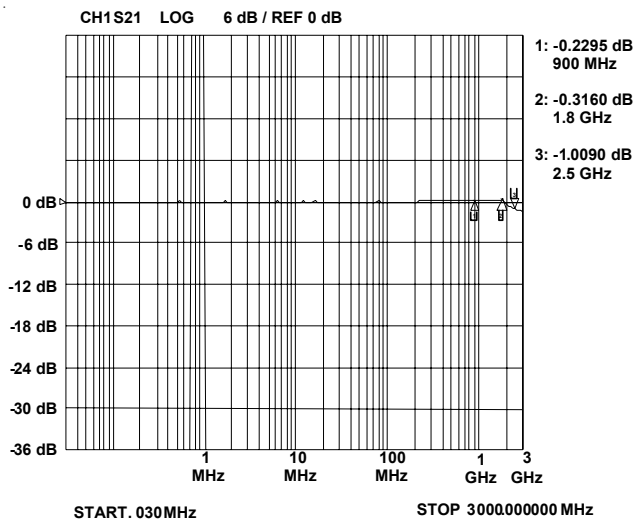
Normalized Capacitance vs. Reverse Voltage



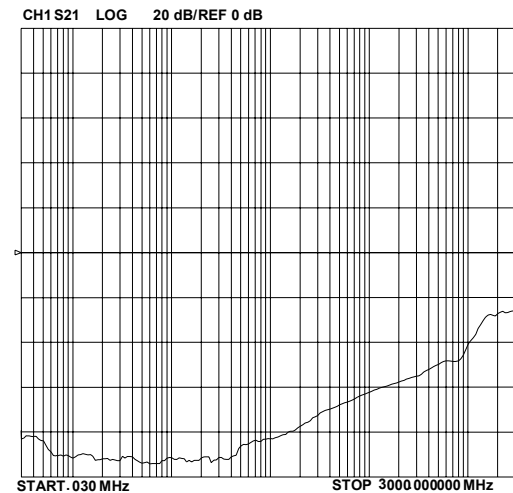
PROTECTION PRODUCTS

Typical Characteristics

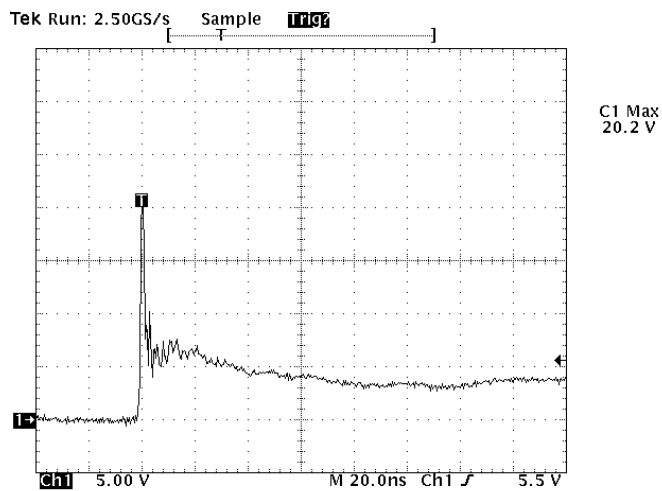
Insertion Loss S21 (I/O to Gnd)



Analog Crosstalk



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



Note: Data is taken with a 10x attenuator

PROTECTION PRODUCTS

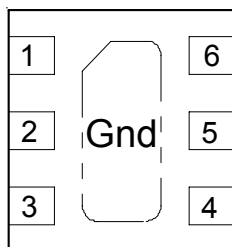
Applications Information

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

This device is designed to protect data lines by clamping them to a fixed reference. When the voltage on the protected line exceeds the reference voltage the steering diodes are forward biased, conducting the transient current away from the sensitive circuitry. Data lines are connected at pins 1, 3, 4 and 6. The center pin should be connected directly to a ground plane. The path length is kept as short as possible to minimize parasitic inductance. Pin 2 is not connected. The positive reference is connected at pin 5. The options for connecting the positive reference are as follows:

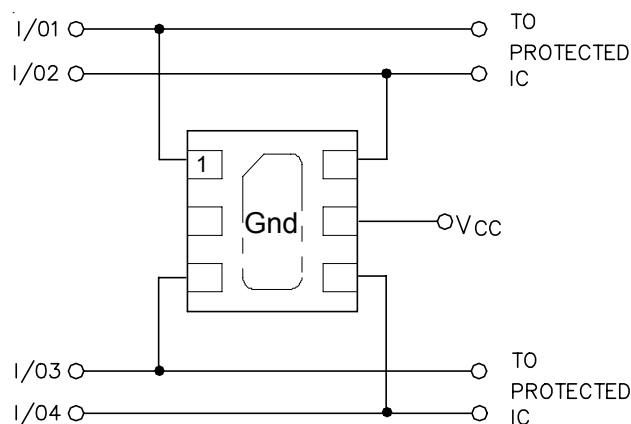
1. To protect data lines and the power line, connect pin 5 directly to the positive supply rail (V_{CC}). In this configuration the data lines are referenced to the supply voltage. The internal TVS diode prevents over-voltage on the supply rail.
2. In applications where the supply rail does not exit the system, the internal TVS may be used as the reference. In this case, pin 5 is not connected. The steering diodes will begin to conduct when the voltage on the protected line exceeds the working voltage of the TVS (plus one diode drop).

Figure 1. Pin Configuration (Top Side View)

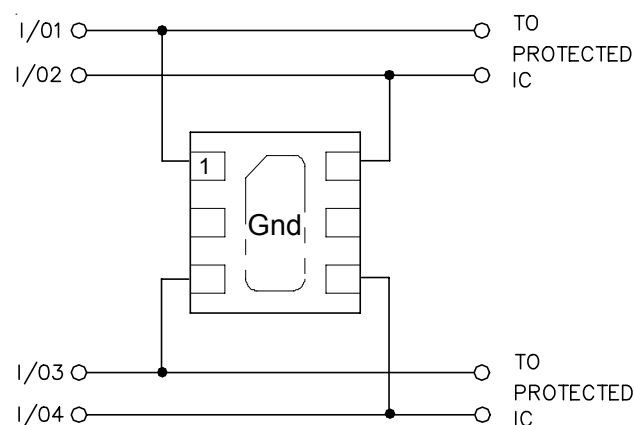


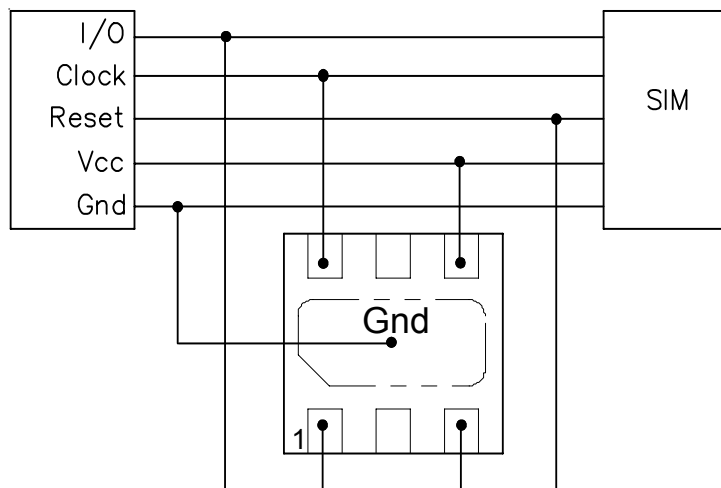
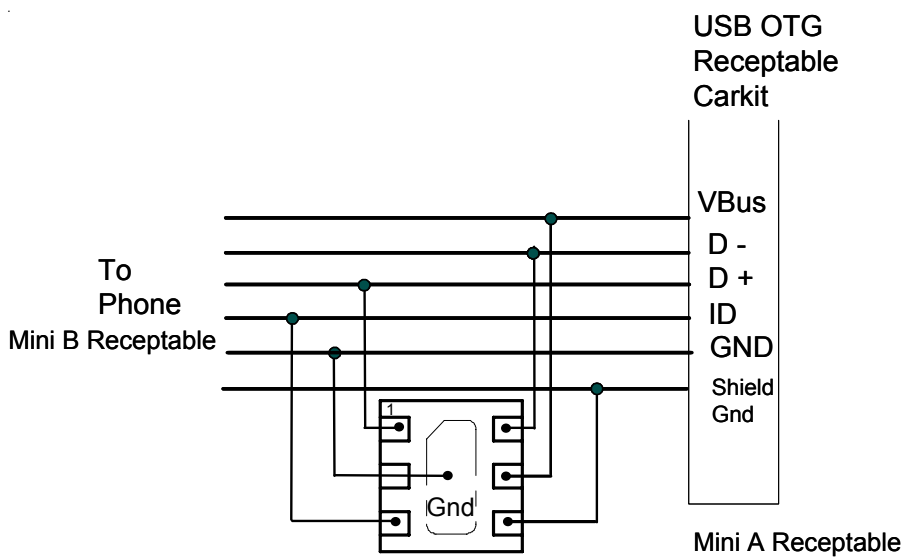
Pin	Identification
1, 3, 4, 6	Input/Output Lines
2	Not Connected
5	5V (Optional) or N/C
Center Tab	Ground

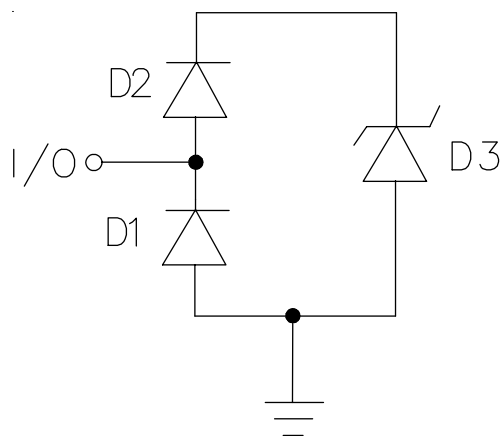
Protection of Four Data Lines and Power Supply Line



Protection of Four Data Lines Using Internal TVS Diode as Reference



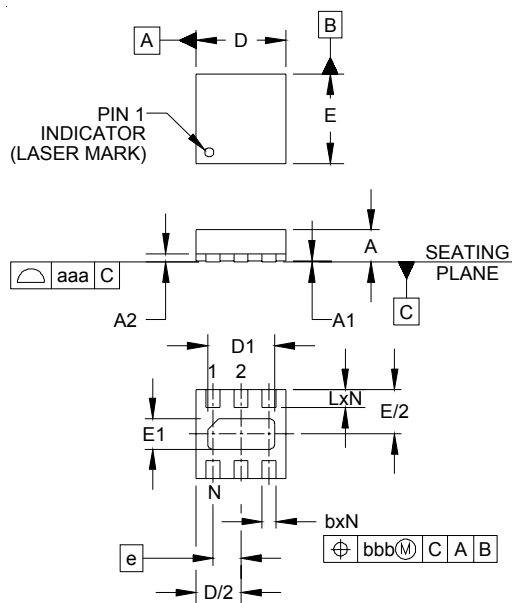
PROTECTION PRODUCTS
Typical Applications

SIM Port - Protection of Three Data Lines and VCC

USB OTG CarKit Protection

PROTECTION PRODUCTS
Applications Information - Spice Model

RClamp0504P Spice Model

RClamp0504P Spice Parameters				
Parameter	Unit	D1 (LCRD)	D2 (LCRD)	D3 (TVS)
IS	Amp	1E-20	1E-20	2.19E-12
BV	Volt	100	100	7.8
VJ	Volt	0.66	0.65	0.57
RS	Ohm	0.314	0.687	1.444
IBV	Amp	1E-3	1E-3	1E-3
CJO	Farad	1.5E-12	1.5E-12	121E-12
TT	sec	2.541E-9	2.541E-9	2.541E-9
M	--	0.01	0.01	0.236
N	--	1.1	1.1	1.1
EG	eV	1.11	1.11	1.11

PROTECTION PRODUCTS

Outline Drawing - SLP1616P6

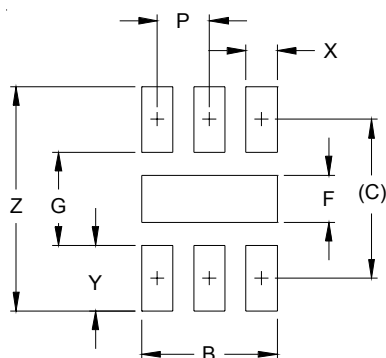


DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.020	.023	.026	0.50	0.58	0.65
A1	0.00	.001	.002	0.00	0.03	0.05
A2		(.006)			(0.15)	
b	.007	.010	.012	0.20	0.25	0.30
D	.059	.063	.067	1.50	1.60	1.70
D1	.041	.047	.051	1.05	1.20	1.30
E	.059	.063	.067	1.50	1.60	1.70
E1	.016	.022	.026	0.40	0.55	0.65
e		.020 BSC			0.50 BSC	
L	.013	.013	.016	0.25	0.33	0.40
N		6			6	
aaa		.004			0.09	
bbb		.004			0.09	

NOTES:

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

Land Pattern - SLP1616P6



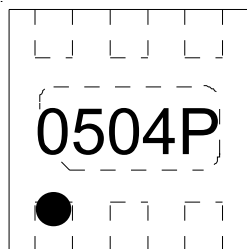
DIM	DIMENSIONS	
	INCHES	MILLIMETERS
B	.051	1.30
C	.060	1.52
P	.020	0.50
F	.018	0.45
G	.035	0.89
X	.012	0.30
Y	.025	0.63
Z	.085	2.15

NOTES:

1. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY.
CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR
COMPANY'S MANUFACTURING GUIDELINES ARE MET.

PROTECTION PRODUCTS

Marking

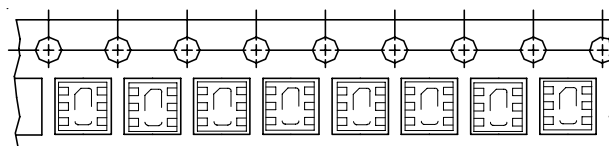
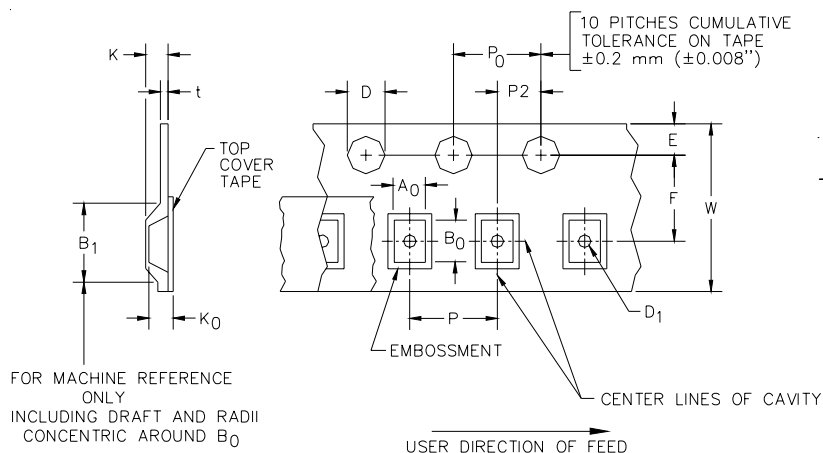


Ordering Information

Part Number	Lead Finish	Qty per Reel	Reel Size
RClamp0504P.TCT	Pb Free	3,000	7 Inch

RailClamp and RClamp are marks of Semtech Corporation

Tape and Reel Specification



Device Orientation in Tape
Pin 1 in upper left towards sprocket holes

A0	B0	K0
1.78 +/-0.10 mm	1.78 +/-0.10 mm	0.69 +/-0.10 mm

Tape Width	B, (Max)	D	D1	E	F	K (MAX)	P	P0	P2	T(MAX)	W
8 mm	4.2 mm	1.5 + 0.1 mm - 0.0 mm)	0.5 mm ±0.05	1.750±10 mm	3.5±0.05 mm	2.4 mm	4.0±0.1 mm	4.0±0.1 mm	2.0±0.05 mm	0.4 mm	8.0 mm + 0.3 mm - 0.1 mm

Contact Information

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