

PROTECTION PRODUCTS

Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 8/20μs)	P _{pk}	75	Watts
Peak Pulse Current (tp = 8/20μs)	I _{pp}	5	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V _{ESD}	+/- 25 +/- 20	kV
Operating Temperature	T _J	-55 to +125	°C
Storage Temperature	T _{STG}	-55 to +150	°C

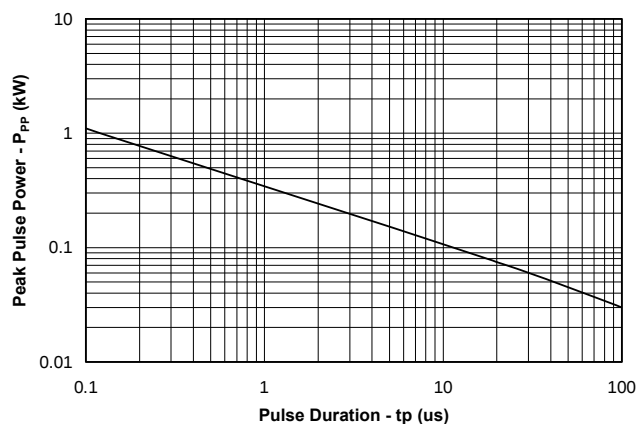
Electrical Characteristics (T=25°C)

Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	V _{RWM}	Any I/O to GND			5	V
Reverse Breakdown Voltage	V _{BR}	I _t = 1mA, Any I/O to GND	6.5	9	11	V
Reverse Leakage Current	I _R	V _{RWM} = 5.0V, Any I/O to GND		0.005	0.100	μA
Clamping Voltage	V _C	I _{pp} = 1A, tp = 8/20μs Any I/O to GND			12	V
Clamping Voltage	V _C	I _{pp} = 5A, tp = 8/20μs Any I/O to GND			15	V
Junction Capacitance	C _j	V _R = 0V, f = 1MHz, Any I/O to GND		0.50	0.60	pF
		V _R = 0V, f = 1MHz, Between I/O pins		0.25	0.4	pF

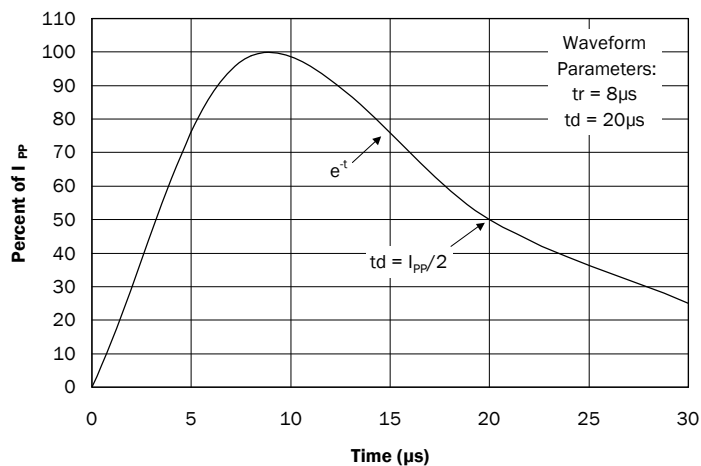
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Typical Characteristics

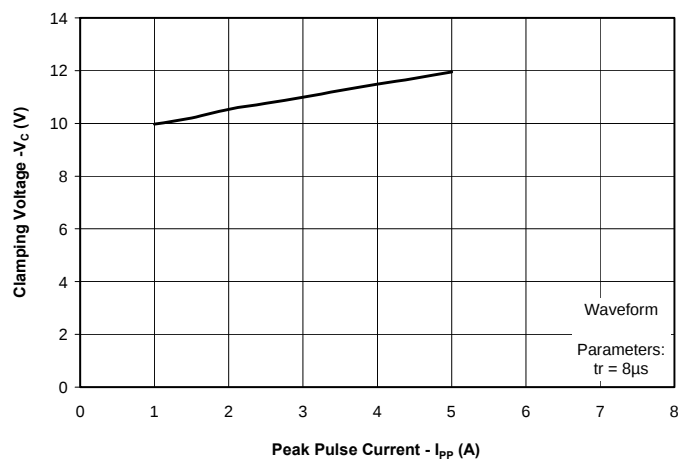
Non-Repetitive Peak Pulse Power vs. Pulse Time



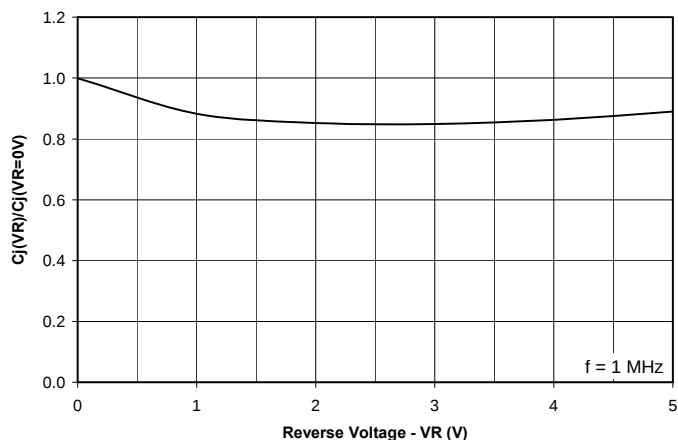
Pulse Waveform



**Clamping Voltage vs. Peak Pulse Current
(Between any I/O and Ground)**



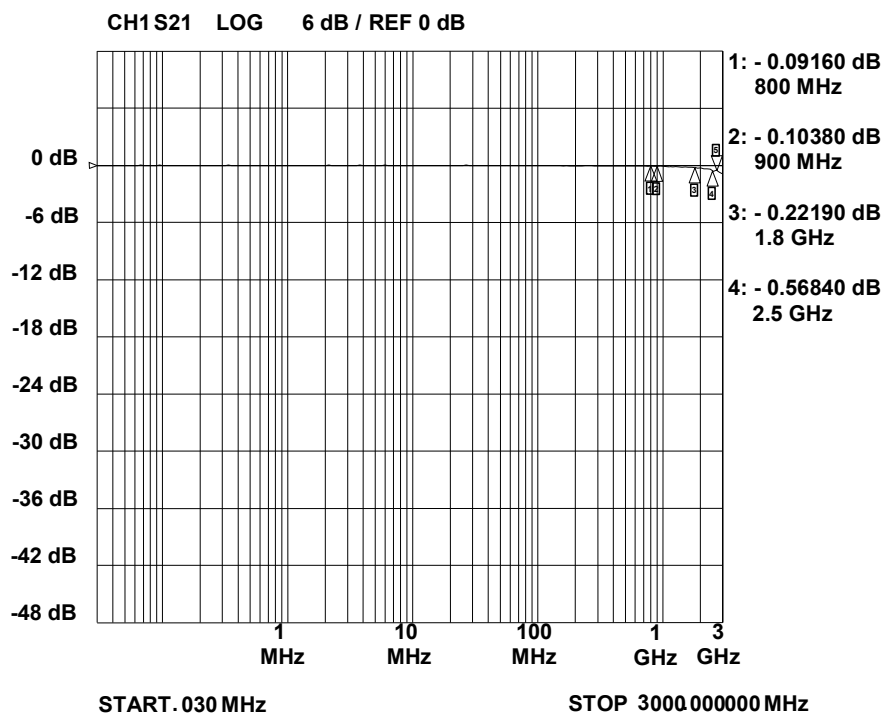
Normalized Capacitance vs. Reverse Voltage



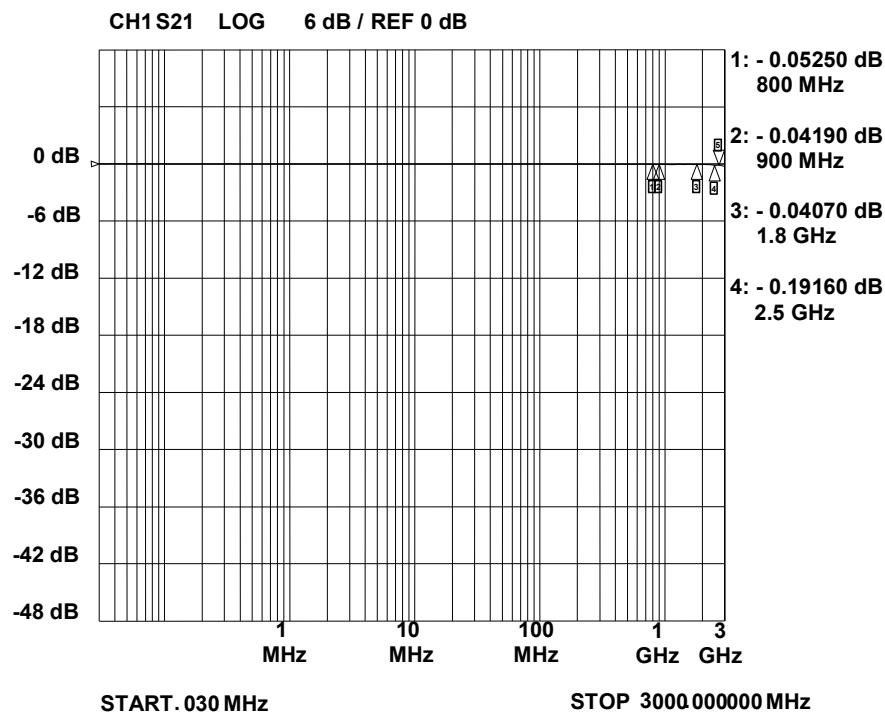
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Typical Characteristics (Con't)

Insertion Loss S21 - I/O to GND



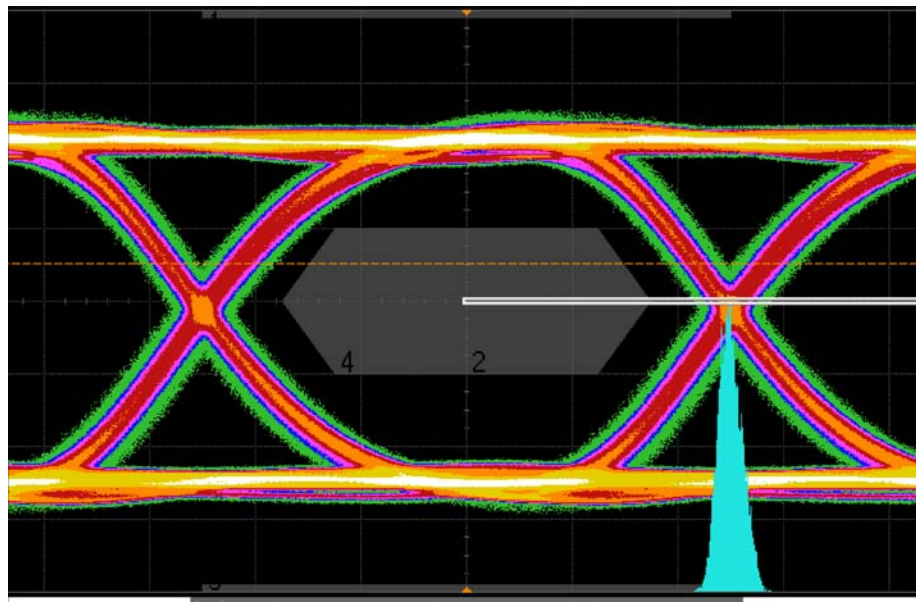
Insertion Loss S21 - I/O to I/O



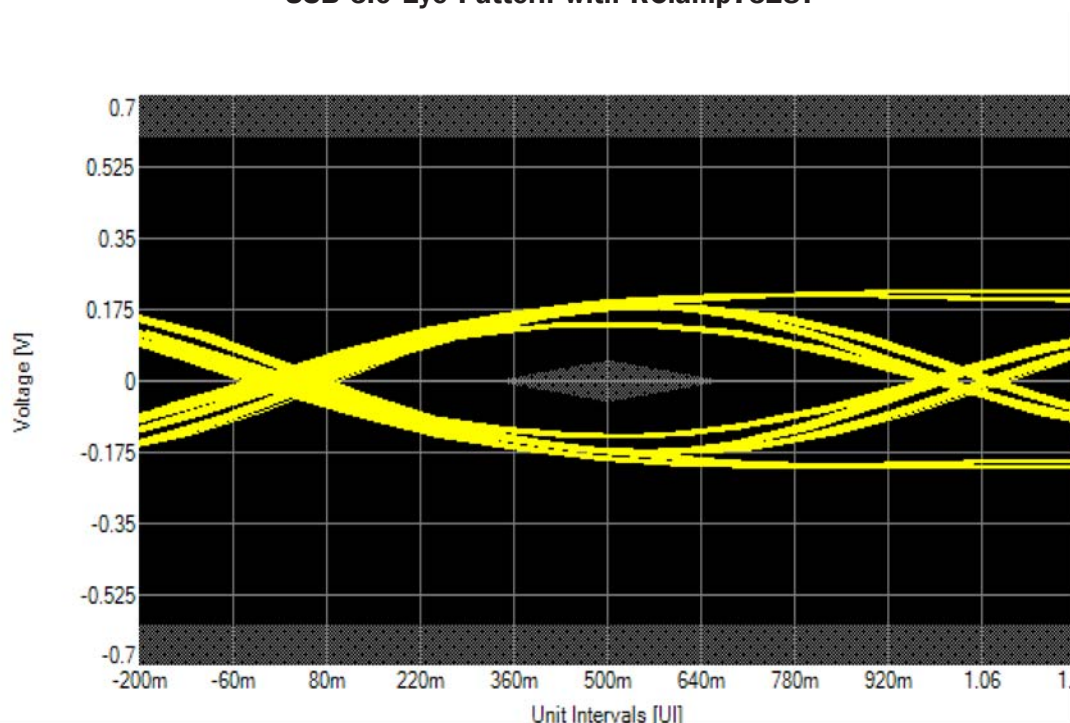
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Typical Characteristics (Con't)

HDMI 1.4 Eye Pattern with RClamp7528T



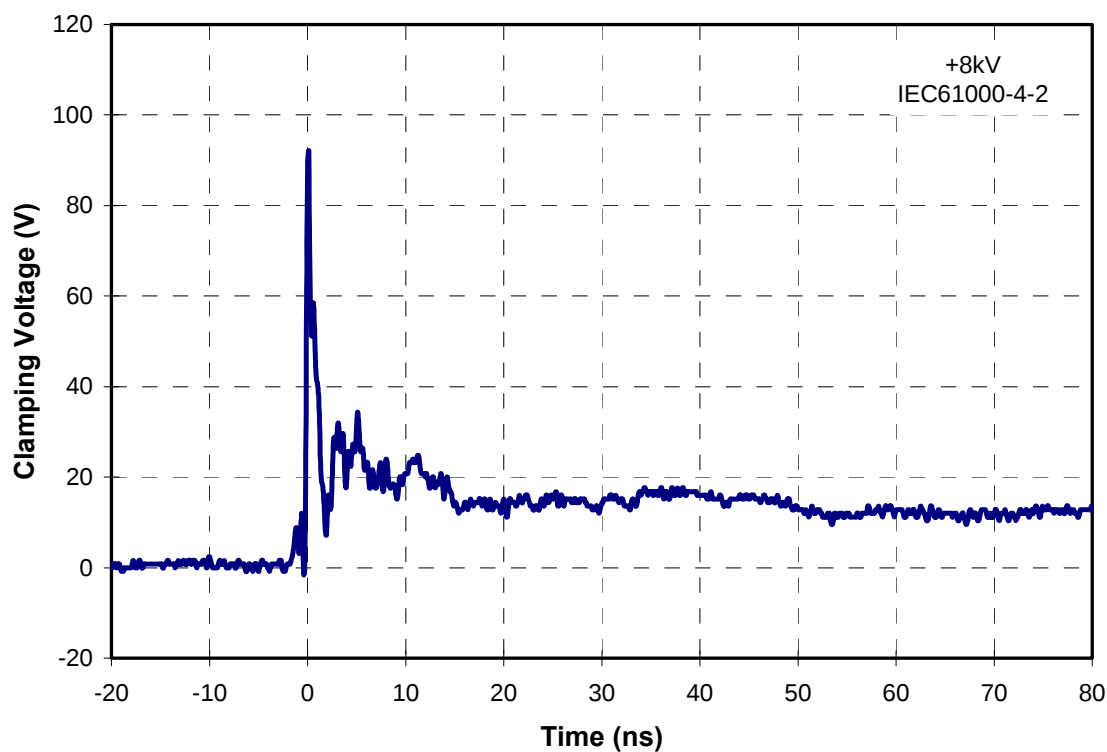
USB 3.0 Eye Pattern with RClamp7528T



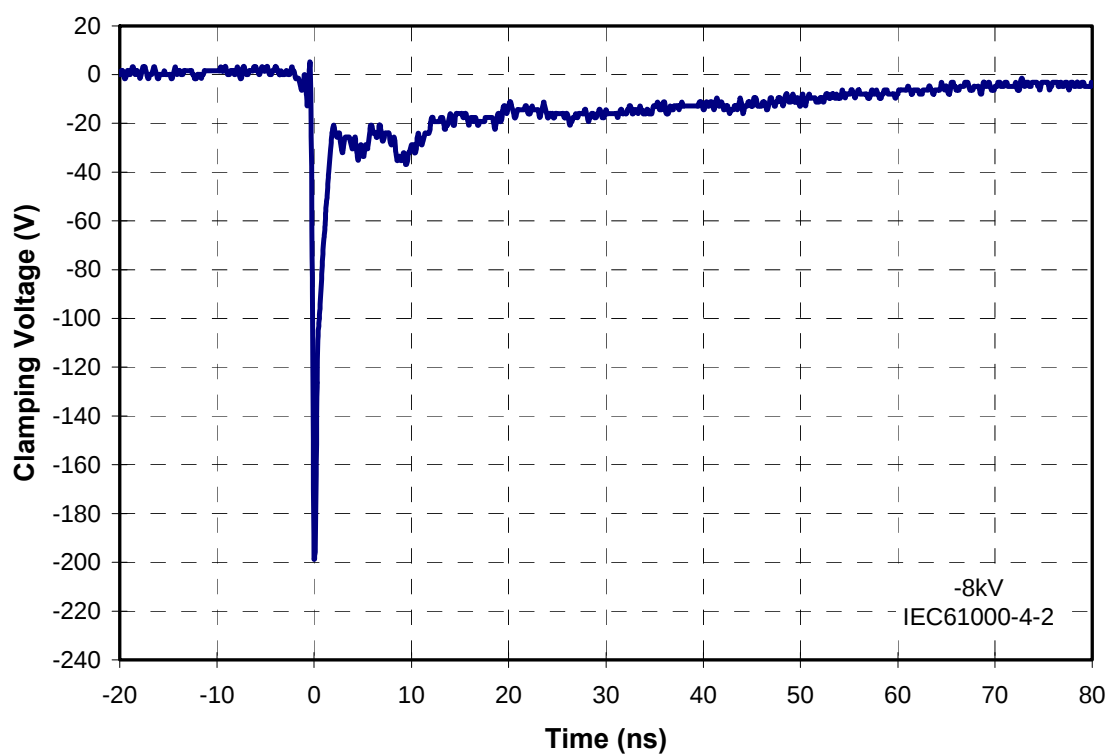
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Typical Characteristics (Con't)

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



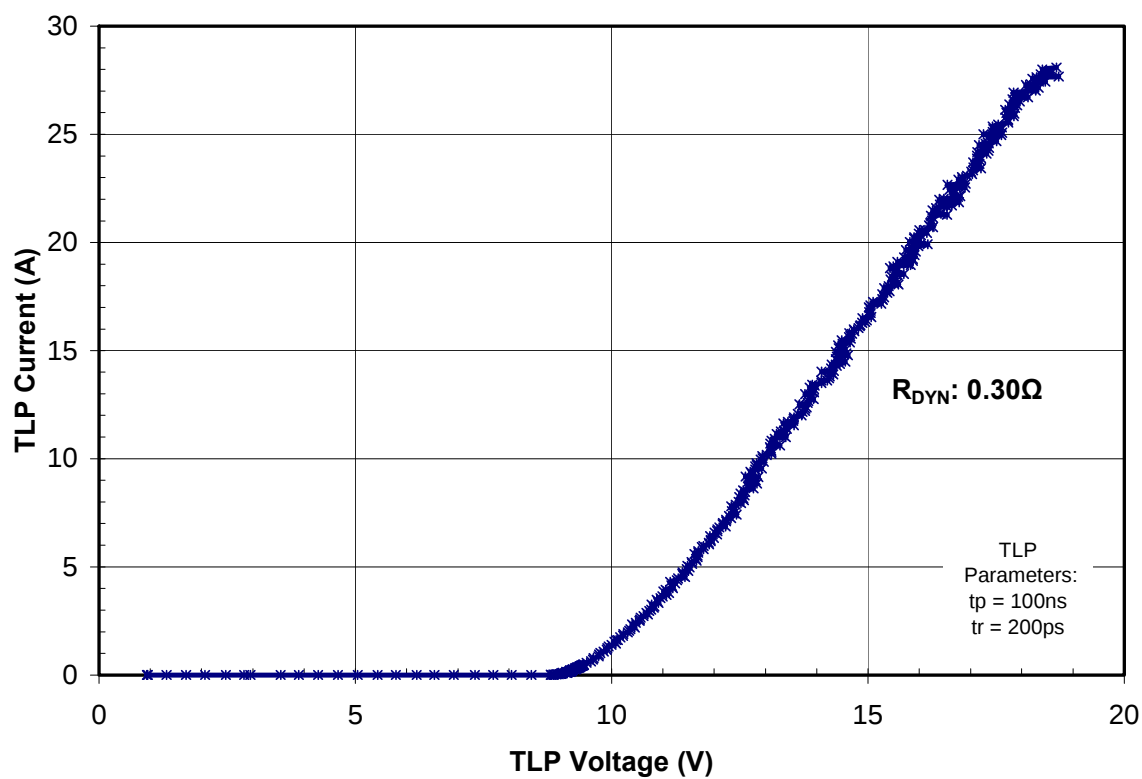
ESD Clamping (-8kV Contact per IEC 61000-4-2)



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Typical Characteristics (Con't)

TLP Characteristic



PROTECTION PRODUCTS

Applications Information

Design Recommendations for HDMI Protection

Adding external ESD protection to HDMI ports can be challenging. First, ESD protection devices have an inherent junction capacitance. Furthermore, adding even a small amount of capacitance will cause the impedance of the differential pair to drop. Second, large packages and land pattern requirements cause discontinuities that adversely affect signal integrity. The RClamp7528T is specifically designed for protection of high-speed interfaces such as HDMI. They present <0.25pF capacitance between the pairs while being rated to handle $\geq \pm 20\text{kV}$ ESD contact discharges ($\geq \pm 25\text{kV}$ air discharge) as outlined in IEC 61000-4-2. Each device is in a leadless SLP package that is nominally 1.1mm wide. They are designed such that the traces flow straight through the device. The narrow package and flow-through design reduces discontinuities and minimizes impact on signal integrity. This becomes even more critical as signal speeds increase.

Pin Configuration

Figure 2 is an example of how to route the high speed differential traces through the RClamp7528T. The PCB traces enter and exit each I/O pin. The package is designed such that the trace-to-trace spacing can be kept at 0.100mm minimum when using 0.100mm wide traces. Ground is connected at pin 3.

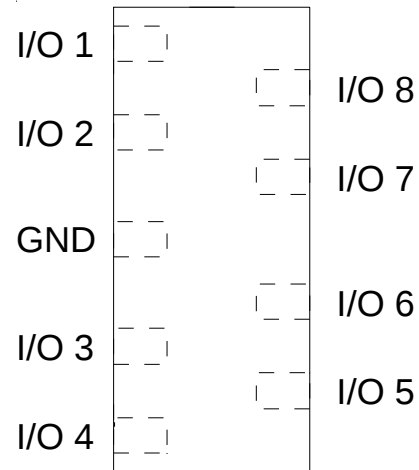


Figure 1 - Pin Configuration (Top View)

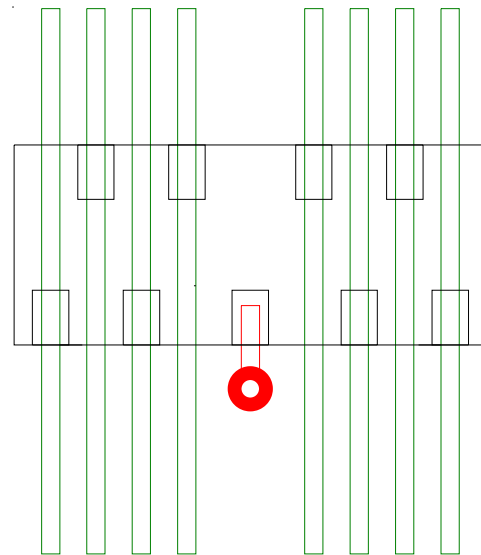


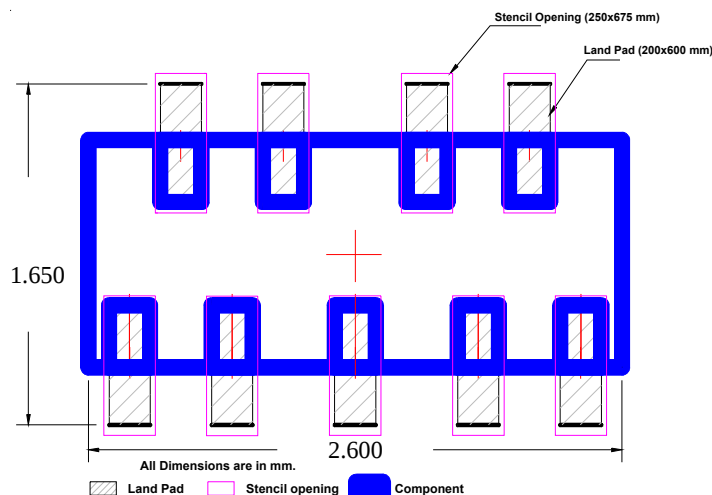
Figure 2 - Flow through Layout Using RClamp7528T

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Applications Information

Assembly Guidelines

The small size of this device means that some care must be taken during the mounting process to insure reliable solder joint. The table below provides Semtech's recommended assembly guidelines for mounting this device. The figure at the right details Semtech's recommended aperture based on the below recommendations. Note that these are only recommendations and should serve only as a starting point for design since there are many factors that affect the assembly process. The exact manufacturing parameters will require some experimentation to get the desired solder application.

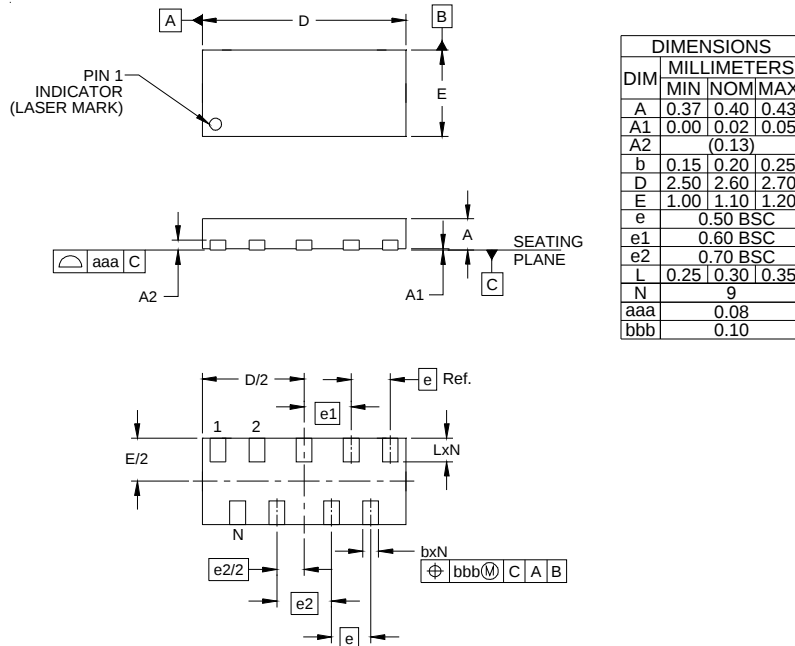


Recommended Mounting Pattern

Assembly Parameter	Recommendation
Solder Stencil Design	Laser cut, Electro-polished
Aperture shape	Rectangular
Solder Stencil Thickness	0.100 mm (0.004")
Solder Paste Type	Type 3 size sphere or smaller
Solder Reflow Profile	Per JEDEC J-STD-020
PCB Solder Pad Design	Non-Solder mask defined
PCB Pad Finish	OSP OR NiAu

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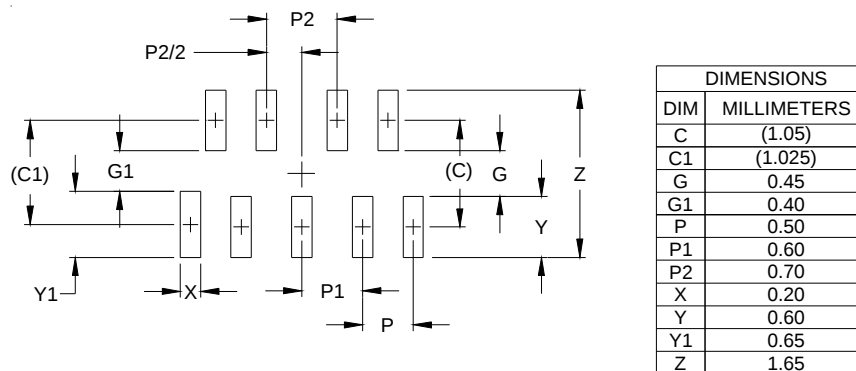
Outline Drawing - SLP2611N9T



NOTES:

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

Land Pattern - SLP2611N9T

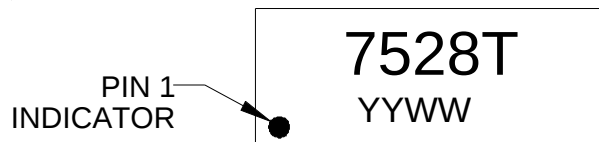


NOTES:

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.

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Marking Codes



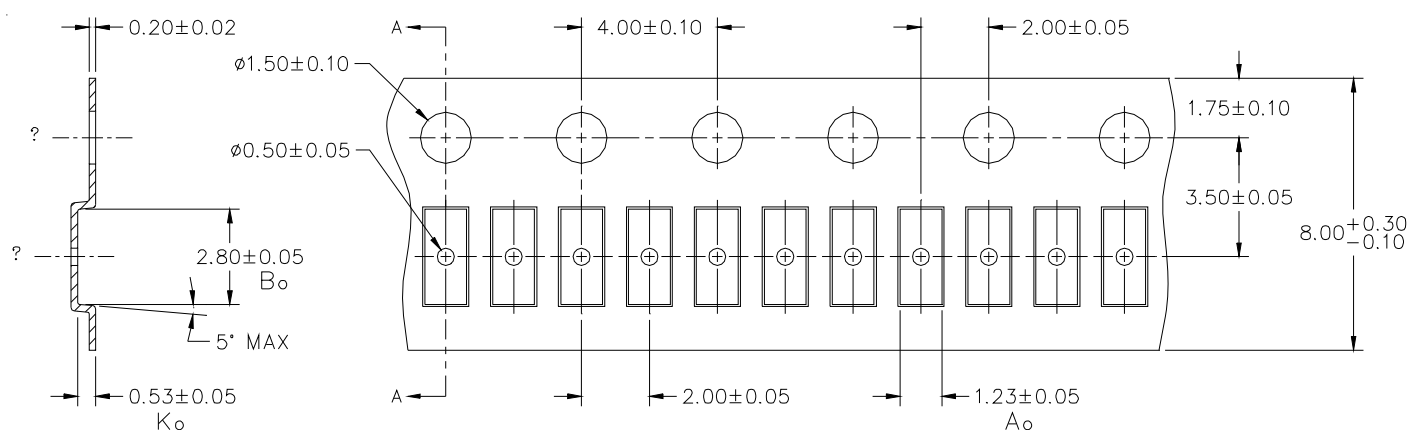
YYWW = Date Code

Ordering Information

Part Number	Qty per Reel	Reel Size
RClamp7528T.TNT	10,000	7 Inch

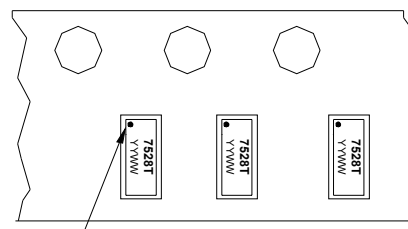
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Carrier Tape Specification



SECTION A-A

NOTES: ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.



Pin 1 Location (Towards Sprocket Holes)

→
User Direction of feed

Device Orientation in Tape

Contact Information for Semtech International AG

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