



FEATURES

- **Single Power Supply Requirement:** The device is designed to operate with just one 12V15A power supply, which makes it incredibly user-friendly and easy to set up.
- **Adjustable Peak Output Current:** Users can set the output current peak value linearly from 2A to 120A, giving them the ability to tailor the laser to their specific desired output power.
- **Laser Current Real-Time Monitoring:** The device provides a real-time laser current monitor signal, enabling users to monitor the laser's actual current in real-time and make necessary adjustments for optimal performance. The algorithm takes the changes of ambient and laser temperatures into account.
- **Laser Current Peak Value Indication:** The device indicates the peak value of the laser current, which enables users to ensure that the laser is operating safely and within safe limits.
- **Over-Temperature Protection:** The device features over-temperature protection to prevent damage to the components and system in case of high temperatures, ensuring the longevity of the device and the safety of the user.

APPLICATIONS

- Material Processing
- Medical Procedures
- Scientific Research
- Laser Range Finding
- Fiber Optic Temperature Sensing

DESCRIPTION

This Pulse Mode Laser Driver, ATLP2R5US120A301, generates a 2.5us pulse current of up to 120A. It is designed to drive a laser diode to generate a laser

beam pulse down to 2.5 microseconds, with an adjustable pulse current up to 120A. It is capable to output a pulse voltage up to 10V, thus peak electric output power is 1200W. At this high peak power, the maximum repeating rate can be as high as 40kHz, making it a one of the best pulse mode laser driver on the market.

OPERATION PRINCIPLE

The pulse mode laser driver turns a high current switch on for a short time to apply a constant high voltage across the laser diode to generate a short pulse current. Because the time is short, usually in microseconds, the current can be as high as tens or hundreds of amps, usually heat-sink is needed.

Since the pulse is so short, there is no way to have a close-loop control of the high voltage applied to the laser diode during the on period when the switch is turned on, regulating the high voltage is done at a much lower speed, therefore, the output value in the control loop is by using the peak value of the output current, as opposed to the real-time actual output current. The changing speed on the desired peak current is usual slow, the close-loop control for following the desired peak value can be implemented by either a pure analog circuit or a digital software based control loop. ATLP2R5US120A301 uses the latter.

For digital loop based pulse laser drivers, they can preset the value of the high voltage for driving the laser diode according to the current setting value, even before receiving the trigger signal. Thus, the laser driver can drive the laser with the correct peak value for all the current pulses generated. ATLP2R5US120A301 is the only pulse mode laser driver on the market having this advantage.



SPECIFICATIONS

Table 1. D-Sub Pin Function Descriptions

Pin #	Name	Type	Description
1	PGOOD	Digital Output	Input power good indication. When the power supply voltage is 12V, $V_{PGOOD}=5V$.
2	EN	Digital Input	A high voltage level turns on the laser driver, while a low voltage level shuts down the laser driver. It is in low voltage level by default. When $V_{EN}>2V$, the laser driver is turned on. When $V_{EN}<2V$, the laser driver is turned off.
3	ENO	Digital Output	High voltage level (5V): laser-enabled. Low voltage level (0V): laser-disabled.
4 & 5		Digital Output	Feedback on the laser peak power control.
6	LDTMO	Analog Output	LD temperature indication. When LD temperature exceeds 65°C, the laser driver shuts down. 0V to 3V indicates the temperature from 15°C to 65°C linearly.
7	TMO	Analog Output	Laser driver temperature indication. $T = 192.7 - 90.31 \times V_{TMO} (^{\circ}C)$.
8	LDTMOP	Digital Output	LD temperature protection indication pin. When the temperature exceeds 65°C, it outputs low voltage level 0V. Otherwise, it outputs high voltage level 5V.
9	TMOP	Digital Output	Laser driver protection indication pin. When the temperature of the laser driver exceeds 120°C, it outputs low voltage level 0V. Otherwise, it outputs high voltage level 5V.
10 & 11		Digital Input	Control on the laser current. It is sufficient to provide interface to set the laser peak current to 100%, 75%, 50%, 25%
12	GND	Ground	Signal ground.
13	GND	Ground	Signal ground.
14	NC	Power Input	No connection.
15	NC	Power Ground	No connection.

Table 2. TB1 Pin Function Descriptions

Pin #	Name	Type	Description
1	VPS	Power input	Positive power supply rail. The value is 12V..
2	PGND	Power ground	Power ground for connecting to the power supply, internally connected with d-sub pin 12 and pin 13.

Table 3. TB2 Pin Function Descriptions

Pin #	Name	Type	Description
1	NTC	Analog Input	Connect to the NTC for sensing the LD temperature.
2	GND	Ground	Signal ground, internally connected to GND. Can be used for connecting the NTC.
3	PD+	Input	Connect the positive end of PD.
4	PD-	Input	Connect the negative end of PD.



Table 4. TB3 Pin Function Descriptions

Pin #	Name	Type	Description
1	LIO	Analog Output	Laser current output indication. 0.05V to 3V indicates the laser current from 2A to 120A linearly.
2	LPO	Analog Output	Optical power output pin.
3	LIOPLS	Digital Output	The waveform from 50% rising time of the laser current to the 50% falling time.
4	SIN	Digital Input	Pulse trigger pin.

Table 5. Characteristics. T_A = 25°C, unless otherwise noted.

Parameter	Symbol	Min.	Typ.	Max.	Unit/Note
Input Voltage (VCC)	V _{IN}	11	12	13	V
Input Current	I _{IN}			15	A
Input Trigger Logic Low Threshold(SIN)	V _{THL}	0.8			V
Input Trigger Logic High Threshold(SIN)	V _{THH}			1.8	V
Input Trigger DC Current(SIN)				1	nA
Input Trigger Maximum Voltage(SIN)			5		V
Output Peak Current(LIOPK)	I _{OUT_Peak}	1		120	A
Output Peak Voltage(LDA)	V _{OUT_Peak}	0		9	V
Output Pulse Width			2.5		µs
Pulse Rate	f		40		kHz
Pulse Trigger Voltage (SIN)	V _{PT}		5		V
Trigger Point		Rising-Edge			

NAMING PRINCIPLE

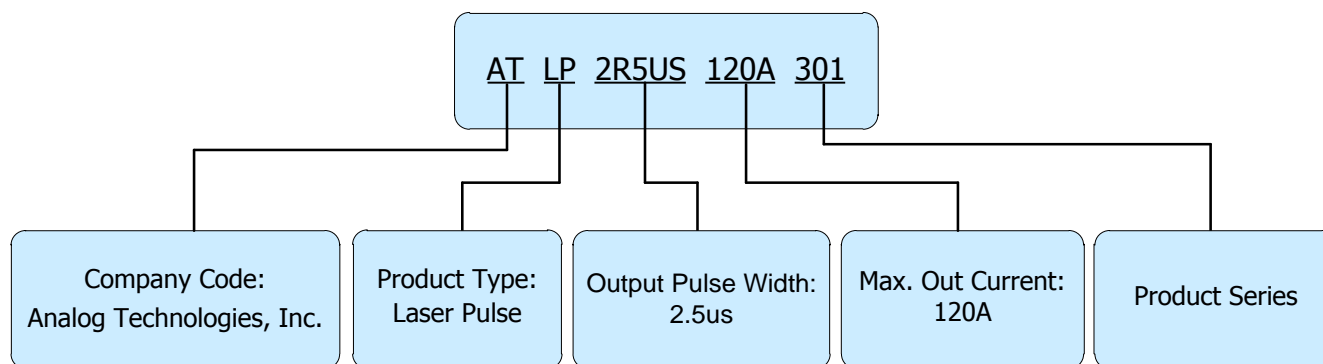


Figure 1. Naming Convention of ATLP2R5US120A301



NOTICE

1. It is important to carefully read and follow the warnings, cautions, and product-specific notes provided with electronic components. These instructions are designed to ensure the safe and proper use of the component and to prevent damage to the component or surrounding equipment. Failure to follow these instructions could result in malfunction or failure of the component, damage to surrounding equipment, or even injury or harm to individuals. Always take the necessary precautions and seek professional assistance if unsure about proper use or handling of electronic components.
2. Please note that the products and specifications described in this publication are subject to change without prior notice as we continuously improve our products. Therefore, we recommend checking the product descriptions and specifications before placing an order to ensure that they are still applicable. We also reserve the right to discontinue the production and delivery of certain products, which means that not all products named in this publication may always be available.
3. This means that while ATI may provide information about the typical requirements and applications of their products, they cannot guarantee that their products will be suitable for all customer applications. It is the responsibility of the customer to evaluate whether an ATI product with the specified properties is appropriate for their particular application.
4. ATI warrants its products to perform according to specifications for one year from the date of sale, except when damaged due to excessive abuse. If a product fails to meet specifications within one year of the sale, it can be exchanged free of charge.
5. ATI reserves the right to make changes or discontinue products or services without notice. Customers are advised to obtain the latest information before placing orders.
6. All products are sold subject to terms and conditions of sale, including those pertaining to warranty, patent infringement, and limitation of liability. Customers are responsible for their applications using ATI products, and ATI assumes no liability for applications assistance or customer product design.
7. ATI does not grant any license, either express or implied, under any patent right, copyright, mask work right, or other intellectual property right of ATI.
8. ATI's publication of information regarding third-party products or services does not constitute approval, warranty, or endorsement.
9. ATI retains ownership of all rights for special technologies, techniques, and designs for its products and projects, as well as any modifications, improvements, and inventions made by ATI.
10. Despite operating the electronic modules as specified, malfunctions or failures may occur before the end of their usual service life due to the current state of technology. Therefore, it is crucial for customer applications that require a high level of operational safety, especially in accident prevention or life-saving systems where the malfunction or failure of electronic modules could pose a risk to human life or health, to ensure that suitable measures are taken. The customer should design their application or implement protective circuitry or redundancy to prevent injury or damage to third parties in the event of an electronic module malfunction or failure.