Semiconductor Optical Amplifier Laser Driver Controller

● Product Description

The SOA laser controller from Idealphotonics is based on an advanced microprocessor control system, combined with high-precision ATC and ACC (APC) control circuits to achieve stable laser output, while ensuring quick and intuitive operation of the light source. We can also provide corresponding communication interfaces and control software as per the user's requirements, enabling computer control. This light source features a one-click recovery function (Run/Stop button), which helps users effectively return to the previous working state. This is a highly integrated modular

system light source, utilizing PC-side software for intelligent control. Customers can set the operating temperature and current according to their needs. It is ideal for experimental scientific research and production testing. Additionally, for applications requiring laser modulation, we have provided two modulation ports, for high-frequency and low-frequency modulation, to better meet the customer's need for multifunctionality in one device.

● Product features

Supports one-click restore function (no need to reboot for preheating)、 Software remote control with intelligent control、 Stable output power, continuously adjustable 、 Compact and lightweight structure 、 High-precision ACC and ATC control circuits 、 Built-in high and low modulation bandwidth BNC interfaces

● Part Number

MP-LDR-SOA-500mA

● Application area

Laser sensing、 Mode-locked fiber laser、 High-speed optical switch、 Test and measurement

● Core parameters

Laser Driver Current	Laser Driver Voltage	TEC Current
0-500mA	2.5V	-1~1A

● General Parameters

Technical Parameters

Parameter	Min	Max	Unit	Remarks
Power supply voltage	100V	240	VAC	
Power	5	15	W	
Modulation low frequency	20	1000	KHz	
Modulation high frequency	100	1000	MHZ	
Laser driver current	0	500	mA	
Laser driver voltage	2.5		V	@80mA
NTC	9.7	10.3	Kohm	@25°C
TEC current	-1	1	A	
Temperature control range	0	50	oC	
Analog input (peak-to-peak)	0	5	V	AC coupled
Analog output	0	2.5	V	
Dimensions	22.5X15.0X6.5		mm^3	
Fiber interface	2-port FC/APC interface			

Low Freq: External current modulation input for SOA, supports frequency signals from 0 to 40 MHz, with a minimum pulse width of 10 ns.

USB: Communication interface with the computer.

AC 220V: Power supply cable.

Power: Device power switch.

Fiber Fix: Seed light input port.

Fiber Out: Modulated light output port.

Operation process

1.Connect the AC 220V power cable, connect the USB cable to the PC, and press Power to start the SOA driver.

2.Open the SOA driver program on the PC, press Connect to link the SOA driver device. When the device model appears in the top-right corner, the connection

is successful. Check if the LD Actual Temp temperature matches the LD Temp

Setpoint temperature, indicating that the temperature control is functioning

properly. You can modify the LD Temp Setpoint temperature by pressing Set

Temperature to adjust the SOA working temperature, though 25°C is typically

sufficient.

 As shown below:
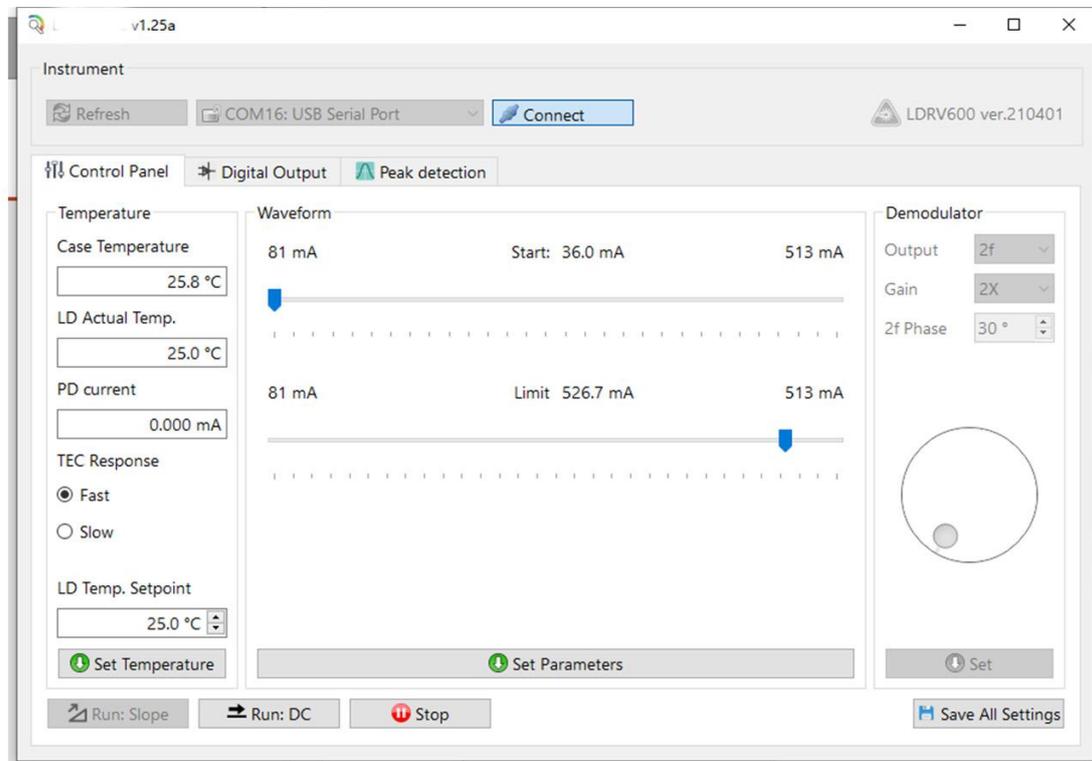
 3. Control the seed light input to around 1mW and insert it into Fiber Fix. Then,

use an optical fiber jumper to connect Fiber Out, with the other end connected

to the optical power meter. At this point, the SOA does not have any current, so

the seed light will not be amplified, but a faint seed light power may still be

observed on the power meter.

4. In the software interface on the PC, first, drag the Start progress bar to the minimum (81mA), then set the Limit to 500mA (current limit for the SOA). Press Set Parameters and then press Run: DC to inject a minimum current of 81mA into the SOA. The value of Start represents the current injected into the SOA. Gradually increase the value of the Start progress bar. Each time you move it, you must press Set Parameters for the change to take effect. You will observe that the optical power on the power meter gradually increases, with the optical power around 30mW at 500mA. At this point, we have achieved the optical power amplification function of the SOA.
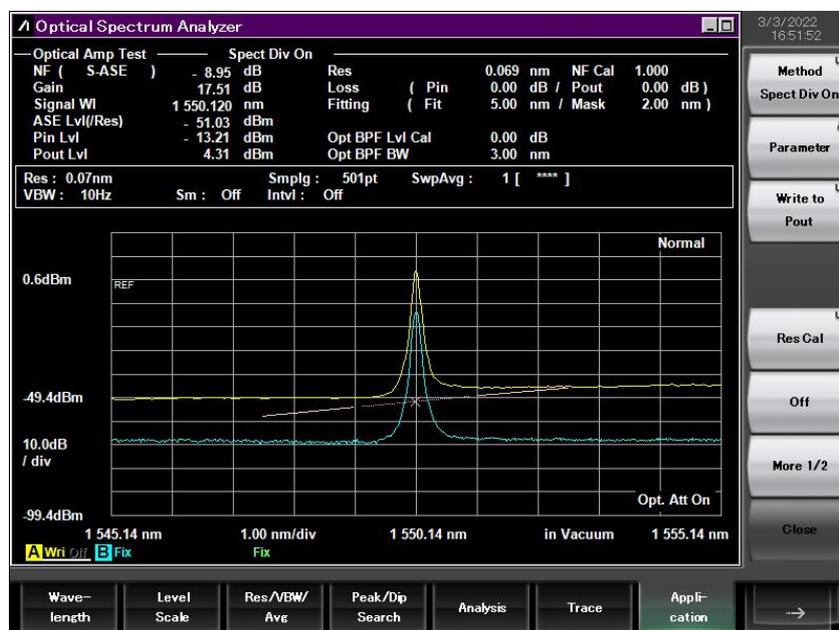
Spectral images of SOA before and after optical amplification.

Optical Modulation

The value of "Start" refers to the current injected into the SOA when there is no external signal input. When a voltage value (Vset) is input through the Low Freq port, the current in the SOA will be the value of "Start" plus Vset $\times$ 400. For example, if an external voltage of 1V (with a 50Ω impedance) is applied, the actual current value will be 400 $\times$ 1 + 81 = 481mA (there may be some deviation from the actual situation, so it is recommended to re-calibrate before modulation). Using this function, by inputting a modulation signal into the Low Freq port, we can perform amplitude modulation on the SOA, effectively acting as an optical switch.
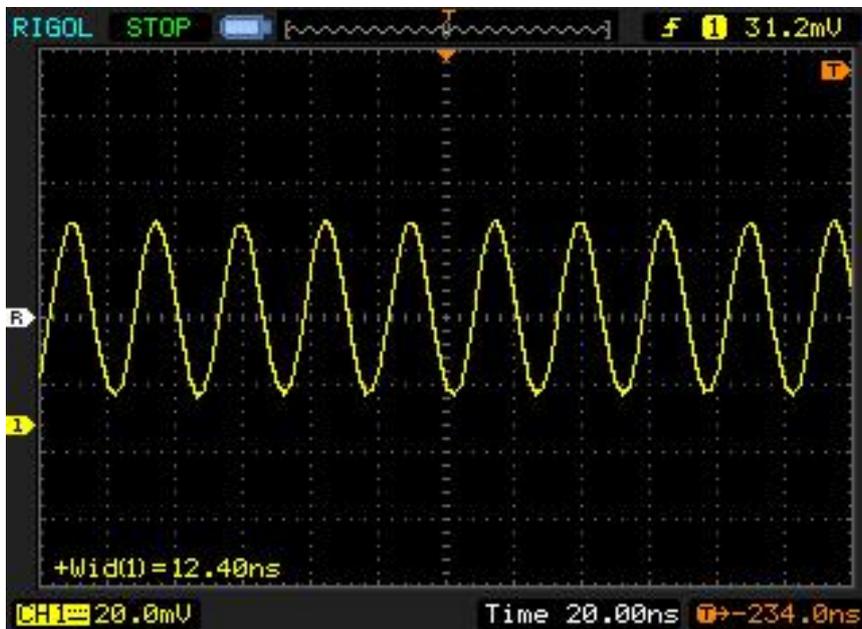
SOA modulation optical time-domain signal under a 40 MHz square wave modulation signal input