Offered by
LASER LAB SOURCE

manufactured by AeroDIODE

Semiconductor Optical Amplifier (SOA)
Ultra-Fast PULSE and CW Control Electronics and Mounting Module

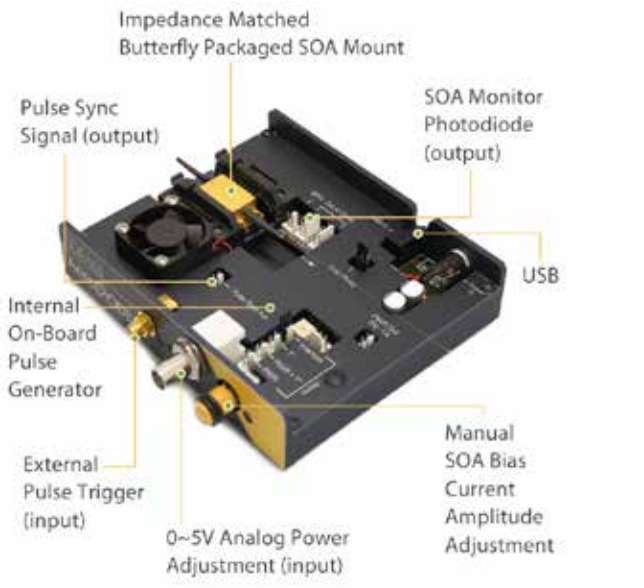
SOA-STD / Control and Mount Module

The SOA pulse driver allows the user to employ a semiconductor optical amplifier (SOA) to create a high speed, high dynamic range fiber optic modulator. It is a high performance alternative to an AOM or an EOM fiber modulator.

HOW IT WORKS: A CW laser diode source (customer supplied) is used as the input to the SOA. The SOA (customer supplied) is mounted in the SOA-PULSE unit. When the bias current driving the SOA is switched ON/OFF in a high repetition rate pulsed mode, the result is a fiber optic modulator which offers multiple advantages over traditional modulator technologies.

USING AN SOA-STD UNIT TO CREATE A HIGH PERFORMANCE FIBER OPTIC MODULATOR

The SOA-STD driver allows the user to employ a semiconductor optical amplifier to create a high speed, high dynamic range fiber optic modulator. It is a high performance alternative to an AOM or an EOM fiber modulator.



A CW laser diode is used as the input to the SOA. When the bias current driving the SOA is switched ON/OFF in a pulsed mode (with adjustable speed up to > 1 GHz), the result is a fiber optic modulator which offers multiple advantages over traditional modulator technologies. These units can be configured for wavelengths from 750 nm to 1700 nm. It is a lossless, high extinction ratio and highly polarized modulator solution.

THE SEMICONDUCTOR OPTICAL MODULATOR

When configured with a CW laser diode input and with and an SOA installed in the pulser, the user creates an “SOM”. SOM stands for semiconductor optical modulator. Here are a few of the many advantages an SOM offers relative to an AOM, EOM or directly pulsed laser diode solution:

- The dynamic range of an SOM is higher than that of an EOM or an AOM. An AOM / EOM is typically limited to < 30 dB, and often less since there is a strong polarization dependency. An SOM offers a higher dynamic range, typically > 48 dB with a high extinction ratio > ~ 50 dB
- An SOM has no polarization rotation dependencies, whereas both an EOM and an AOM typically are highly susceptible to polarization dependencies
- The spectrum of an SOM remains the same along the entire pulse, whereas when directly pulsing a laser diode, the user must consider the undesirable spectral effects which can occur from coupling of the frequency/phase spectrum and intensity profile
- The SOM is the only commercially available solution which also functions as an optical isolator for the laser input source

TYPE-1 STANDARD SOA PIN CONFIGURATION

The SOA-STD can be ordered for any butterfly package pin configuration. Because most SOA devices are offered in Type-1 packages, SOA-STD is pre-configured for this package type. Impedance matching is a critical factor in delivering clean high speed pulse performance. This is why the SOA-STD unit is pre-set for your SOA's pin configuration. Please refer to the image carousel above to view available pin settings.

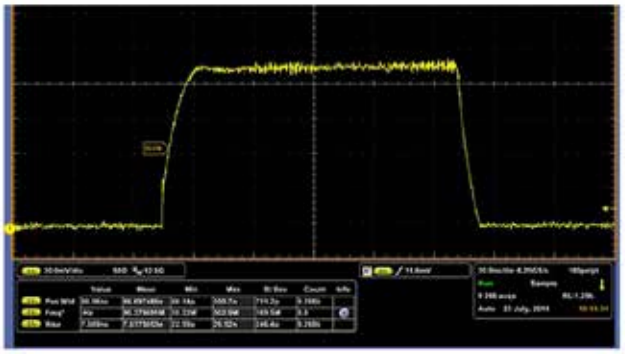
SOA-PULSE-T1
SEMICONDUCTOR OPTICAL AMPLIFIER
BUTTERFLY PACKAGE
PIN CONFIGURATION

Pin	
1	TEC(+)
2	NC
3	Thermistor
4	Thermistor
5	NC
6	NC
7	NC
8	NC
9	NC
10	SOA(+)
11	SOA(-)
12	NC
13	Case
14	TEC(-)

PRE-SET IMPEDANCE MATCHING IMPROVES YOUR SOA'S PULSE MODE PERFORMANCE

When the impedance from the pulsed current source PCB is not properly matched to the SOA butterfly package pins, significant pulse degradation can occur. This is often seen as distortion of the SOA output pulses and/or overshoot of the pulses. The SOA-STD unit is designed to reduce and/or eliminate this pulse degradation by matching the nominal impedance of the butterfly package with the pulse transmission line. Current sources inherently have a high output impedance and SOA's have very low impedance. The most important requirement of proper impedance matching is matching the impedance of the load to the impedance of the transmission line. The inductance of a butterfly packaged SOA ranges from a few nanohenries to tens of nanohenries. From inductance theory, *di/dt* is the rate of change in current over a specific period in amperes per second. The voltage increases with the inductance and with the rate of the change of the current. Energy stored in the inductor's magnetic fields during the pulse has to be released when the pulse ends. This creates a voltage, which in turn creates a new current, which in turn creates a new magnetic field on the transmission path. This creates a "loop" which manifests as "ringing" on the pulse waveform and on other distortions to the pulse shape. The SOA-STD current output transmission path has been carefully designed to match the current source impedance to the butterfly packaged SOA.

CCS IMPEDANCE MATCHING PROVIDES CLEAN PUSE PERFORMANCE



GRAPHICAL USER INTERFACE INCLUDED

Configuration and operation of the controller is streamlined and simplified by providing control over the critical operating parameters of the controller: peak pulse current, pulse width, frequency, triggering, and other driver parameters are available.

The GUI also provides control over laser diode temperature, and includes operational safety limits to help protect the laser diode from damage.

In addition to providing real-time control over the laser diode, the GUI displays real-time operating status of the controller and laser diode operating parameters.

GUI control software

SOA-STD / Control and Mount Module Performance Specifications

SOA PULSED DRIVER SPECIFICATIONS

- Pulsed Output Current Range: 0 - 1,500 mA
- CW Output Current CW (continuous) Mode: 0 - 800 mA
- User Ajustable Pulse-Width Range: 1 nanosecond to CW
- Output Voltage Maximum: 4.8 Volts
- Set-point Resolution @ 500 mA: 0.1mA
- Repetition Rate Range: 1 Hz to 10 MHz
- Jitter: <8 psec

PULSE GENERATION MECHANISMS (3 MODES)

- Internal Pulse Generator: On-board pulse generator
- External Trigger to Internal Pulse Generator: User supplied LVTTL signal triggers (on the rising edge) the internal generator to deliver the pulse. The pulse parameters are set in the internal pulse generator and the pulse is delivered from the internal generator.
- External Trigger Pulse Generator: Pulse duration is the same as the external trigger pulse duration

USER INTERFACE, POWER INPUT & DIMENSIONS

- USB with Control Software GUI Included
- DLL Library for C programming and Hexadecimal Protocol are available at no charge
- Analog (0-3.3V) Remote Signal Peak Power Adjustment and Front Panel Adjustment Knob
- Input Power Supply: 12VDC (220V/110V adapter included)
- Dimensions: 146mm (W) x 130mm (L) x 37mm(H)

PRODUCT SALES AND SERVICE:

Unlimited phone and email support is provided for products purchased through Laser Lab Source. Orders for this product are fulfilled by Laser Lab Source in North America and select international regions. It is manufactured by AeroDIODE, Talence, France.

PRODUCT WARRANTY:

This product is sold with a full one-year warranty. It is warrantied to be free from defects in material and/or workmanship for a period of one year from the date of shipment. The warranty does not cover damage to the to the product due to mishandling or use of the product outside of its specified maximum ratings.

Laser Lab Source, Inc
1820 W. Lincoln Street
Bozeman, MT 59715
contact@LaserDiodeSource.com
contact@LaserDiodeControl.com
800-877-5065

Rue François Mitterrand Institut d'Optique d'Aquitaine
33400 Talence
FRANCE