

SUPERLUM

**MOPA SLD System
Technical Product Specification**

Master Oscillator Power Amplifier SLD System

MOPA-SLD-850

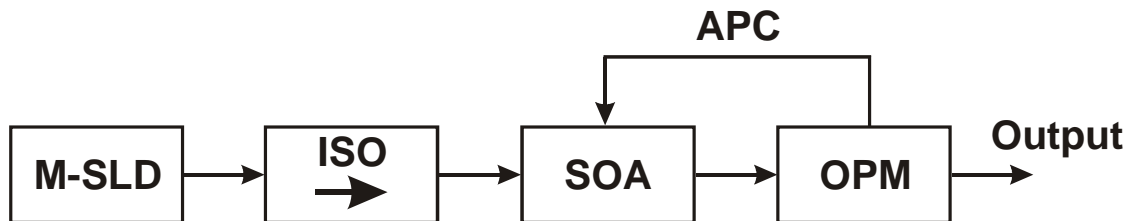




1. Product Description

The Superlum MOPA-SLD-850 is an ultra-high power SLD-based light source that features an extremely weak sensitivity to optical feedback at high power levels of tens milliwatts. This has been obtained due to the use of a special optical scheme called MOPA (Master Oscillator Power Amplifier). A simplified block diagram of the MOPA scheme is shown in the figure below. A medium-power SLD operating as a master source provides optical power of 6 – 10 mW with a relatively broad spectrum of 10-20 nm centered at 850 nm. After passing through an appropriate optical isolator with isolation of better than –25 dB, this power is elevated to a high level of 100 mW by a spectrally matched Semiconductor Optical Amplifier (SOA). The key advantage of such an optical configuration is its weak sensitivity to optical feedback, because the input power of 6-10 mW makes it possible for the SOA to reach a deep saturation level. In this situation, there is no need to install an optical isolator at the output of the SOA for protection from optical feedback. In addition, this allows eliminating any unwanted power drop related to insertion loss inside the isolator, which can frequently reach 2 dB. Another advantage of the MOPA scheme is that it uses a polarization maintaining optical fiber – no one SM fiber-coupled component is implemented. Most of the used fiber-optic components are built on the fast-axis-blocked technology that guarantees high values of the PER (Polarization Extinction Ratio) at the MOPA output (> 16 dB).

For further information on the MOPA design, go to: <http://www.superlumdiodes.com/pdf/Ultra-High-Power-MOPA-SLD-Sources.pdf>



Block Diagram of the MOPA Optical Scheme (Simplified)

- M-SLD** – Master SLD
- ISO** – Isolator
- SOA** – Semiconductor Optical Amplifier
- OPM** – Optical Power Monitor
- APC** – Automatic Power Control



The MOPA system is offered in a compact Schroff case which is best suitable for using on a lab bench or in a rack. The device is built on a modular design that incorporates several plug-in modules (power supplies, optical unit, current and temperature controllers, CPU etc.) into one single mainframe. Each MOPA system is equipped with a high-precision PM FC/APC optical socket for easy coupling of 2.0-mm narrow-key connectors. The device is supplied with a PM optical patch cable of 1 m long. Other lengths of the patch cable are available upon request.

The Superlum drive electronics includes two independent, high-precision, low-noise, constant-power current & temperature control drivers. The electronics provides safe current and temperature operation of the master SLD and the SOA. All the necessary SLD protective measures are implemented. Among the measures, the most important ones are the "soft" start, turn-on transient suppression, over-temperature protection, open-circuit protection and pumping current limit.

For added safety, the system is designed to meet 3B laser class requirements. To this end, the instrument is equipped with laser safety measures specified in ICE 60825-1 Ed. 2 2007-03, namely: the master key control, remote interlock connection, visual/audible alarm, informational warning stickers etc.



Informational labels about laser hazard meet the requirements of ICE 60825-1 Ed. 2 2007-03.

The MOPA-SLD-850 can be controlled locally – with the front panel, or remotely – from a computer via RS-232. It contains minimum front-panel features needed for operation. No adjustments are required to run the device because it is completely pre-set at the factory. The rear panel of the instrument has a digital input to allow the drive current of the SOA to be pulse modulated – switched on or off. The maximum frequency of modulation is 50 kHz.

The device includes a linear power supply capable to operate from a power source of either 220 VAC or 110 VAC. The required value of the line voltage is pre-set at the factory and should be specified by the customer before placing the order.

SLD-based light sources are excellent high-power speckle-free broadband light sources with a great potential for using in many practical applications such as OCT (Optical Coherence Tomography) Imaging Systems, FOG (Fiber Optic Gyroscopes), optical spectroscopy and the others.

Superlum offers product customization services. A number of the operating characteristics of the product (e.g. the output power level, spectral characteristics etc.) are available for modification according to your specific needs.

For further discussion of your personal requirements, please call +353 21 4533666 or email sales@superlum.ie.



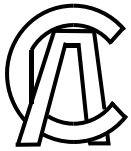
2. Technical Specification¹:

Optical Specifications	
Center Wavelength	850 ± 10 nm
Optical Bandwidth (FWHM)	10-15 nm
Spectral Ripple	< 2%
Output Power	100 mW (90 mW min.)
Maximum Allowed Feedback ²	-10 dB (corresponds to 10%-feedback)
Output Power Stability ³	< 0.5%
Polarization Extinction Ratio	> 16 dB (20 dB typ.)
Optical Fiber Type	Corning PANDA PM 850
Polarization Orientation in the Output Fiber	Slow axis, Aligned with the connector key
Output Optical Connector	FC/APC type with narrow precision key (2.0 mm)

Electrical Specifications	
Operating Mode, for SLD / SOA	Constant Power
Enable Control	1) Manual: from the front panel 2) Electronical via: a) TTL pulses, b) RS-232 port
Modulation Input ⁴	TTL, 0 – 5 V => Full Power – 0, R _{IN} =1 kOhm
Rise Time / Fall Time	2 μs / 0.5 μs
Modulation Input Connector	SMA-female (Referenced to Chassis)
I/O Interface ⁵	RS-232

Protective Measures	
SLD Protective Measures	Soft start of the SLD pumping current, clamping limit circuit for the SLD current, SLD operation in constant power mode, fast switch off of an SLD module in case of a driver error, effective suppression of electronic transients and spikes.
Built-in Laser Safety Measures	Key-operated master control, remote interlock connector, manual reset in case of remote interlock activation, visual indication of laser output activation, laser safety information labels.

General Specifications	
Power Requirements ⁶	220 VAC (110 VAC upon request), 50-60 Hz
Power Consumption	20 VA Max
Warm-up Time	10 min
Operating Temperature Range	+15 °C to + 30 °C
Storage Temperature Range	0 °C to +40 °C
Continuous Operation ⁷	16 hrs/day
Outline Dimensions (W × H × D)	257 × 170 × 325 mm
Approximate Weight	7 kg
Warranty	12 months



NOTES:

- ¹ ALL SPECIFICATIONS ARE QUOTED AFTER 1HR WARM-UP AND CALIBRATION AT 25 °C.
- ² THIS FEEDBACK APPLIED CAN CAUSE TEMPORAL DECREASE OF SOA PERFORMANCE WITH NO RISK FOR THE SOA TO BE FATALY DAMAGED.
- ³ DURING 3 HOURS.
- ⁴ DEPENDING ON THE SOA INSTALLED, IN THE "OFF" POSITION THE OUTPUT POWER MAY RISE UP TO 0.1 mW.
- ⁵ MALE CONNECTOR WITH DTE PIN FUNCTIONS.
- ⁶ PLEASE SPECIFY YOUR POWER REQUIREMENTS WHEN PLACING THE ORDER.
- ⁷ FOR THE VERSION WITH THE PROLONGED OPERATIONAL TIME (UP TO ROUND-THE-CLOCK OPERATION), PLEASE CONTACT SUPERLUM BEFORE PLACING THE ORDER.

3. Accessories Supplied

The table below is a list of accessories supplied with the instrument.

Item	Qty.
PM Fiber patch cable of 2.5 m long for the device's optical output	2 pcs.
Key for the device's master control	2 pcs.
Short-circuited remote interlock connector (inserted in the rear-panel socket of the device)	1 pc.
AC power cord	1 pc.
RS-232 null-modem cable	1 pc.
CD with the user's manual and Superlum's companion software	1 pc.
Acceptance test report (printed version)	1 pc.