



## 840-nm ultra-high power and wide spectrum Master Source Power Amplifier (MSPA) light sources

### Features

- Record high output optical power, up to 100 mW
- Low coherence
- Low sensitivity to optical feedback
- Two models, 12-nm and 40-nm spectrum width at -3dB
- $RIN < -145$  dB/Hz
- Stable polarized output
- Compact design
- USB control interface
- Output control by TTL pulses (turning on/off)
- Easy integration into the customer's equipment



### Applications

- Spectroscopy and interferometry of various types
- Testing of optical components
- High brightness incoherent illumination



## 1. Description

Master Source Power Amplifier (MSPA) devices are small-sized wide-spectrum light sources that utilize concepts similar to those used in the well-known Master Oscillator Power Amplifier (MOPA) configuration – the radiation of a highly stable low-power light source is boosted by a power amplifier, thus obtaining very high optical powers. The difference is that in the MSPA the master source is a superluminescent diode (SLD). The power amplifier is an optical booster spectrally matched to the master SLD. The main advantages of this design are that the optical power can be increased to the levels not achievable by a single-SLD source, and that the sensitivity to optical feedback (inherent to all high-power ASE sources, including SLDs) can be reduced. Both the master SLD and the booster operate at lower drive currents compared to single-SLD sources, which significantly increases the lifetime and makes the MSPA sources more reliable. Another important advantage is that the MSPA design does not result in an increase in RIN compared to a single-SLD source.

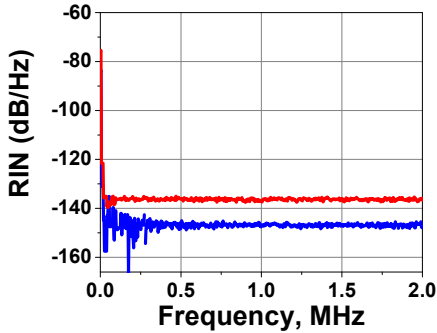
The following models of MSPA sources are available:

- **MSPA840.40-50** is a model with the widest optical spectrum (up to 40 nm) and an output optical power of 50 mW.
- **MSPA850.12-100** is suitable for applications requiring the highest possible optical power (up to 100 mW). Spectrum FWHM is around 12 nm in this case.

*Devices at other wavelengths are available upon request. Please contact [enquiries@sldsources.com](mailto:enquiries@sldsources.com) for more details.*

When choosing a product, consider the following distinctive features of the devices:

- The emission spectrum of **MSPA840.40-50** has a two-hump shape with a “saddle” in the region of 840 nm (see examples). The RIN is about  $-135$  dB/Hz.
- **MSPA850.12-100** has a "bell-shaped" optical spectrum and lower RIN (typically  $-145$  dB/Hz), which is comparable to the noise of single-frequency diode lasers.



**Fig. 1.** Examples of RIN spectra (MSPA840.40-50 – red, MSPA850.12-100 – blue)

MSPA devices are highly polarized. The fiber used inside is PANDA PMF. All MSPAs are supplied with a 1 m long PM optical cable terminated by FC/APC connectors. Main polarization is aligned to the slow fiber mode, and to the key in FC/APC connectors.

MSPA devices are Class 3B Lasers. They are designed for integration into customers’ equipment but may be used as stand-alone light sources. All MSPA sources have the INTERLOCK function which can be activated/deactivated by the software supplied with the device. Users must ensure all safety measures required by laser safety standards are in place when MSPA is used as a stand-alone light source.

## 2. Specifications of 840-nm MSPA light sources

### Optical specifications

Parameter	Units	MSPA840.40-50	MSPA850.12-100
Central wavelength	nm	840	850
Spectrum width (FWHM)	nm	40	12
Output optical power	mW	50	100
Output PER <sup>1</sup>	dB	15 (typ.)	15 (typ.)
RIN, 0.009-2MHz	dB/Hz	-135	-145
Long-term optical power stability <sup>2</sup>	%	< 1	< 1
Fiber type	-	PANDA PM850	PANDA PM850
Output optical connector	-	FC/APC with narrow key	FC/APC with narrow key
PC connection port	-	USB	USB

<sup>1</sup> Measured at the output of the supplied optical cable

<sup>2</sup> After a 30-minute warm-up period

### Electrical, environmental, and mechanical specifications

Parameter	Units	MSPA840.40-50 and MSPA850.12-100
Operating voltage/current	V/A	+12/1.5
Operating temperature range	°C	-5...+50
Storage temperature range	°C	-40...+85
Relative humidity, non-condensing	%	< 90
Dimensions (W × H × D)	mm	110 × 41 × 190
Weight	kg	1.5

### 3. Typical performance examples of 840-nm MSPA light sources

#### 3.1. Model MSPA840.40-50

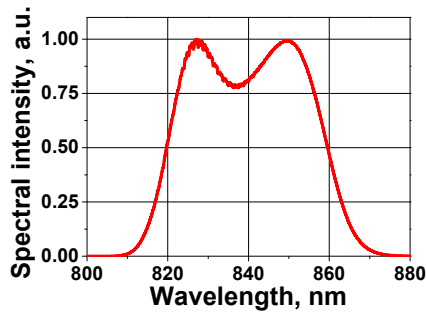


Fig. 3.1.1. Emission spectrum in linear scale

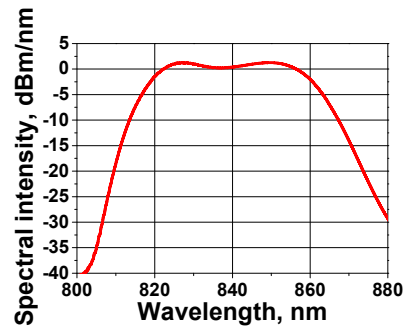


Fig. 3.1.2. Emission spectrum in log scale

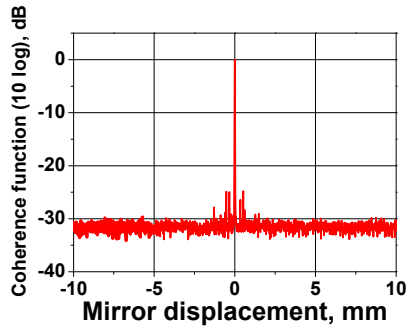


Fig. 3.1.3. Coherence function (extended)

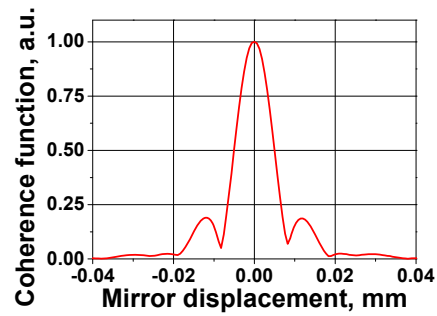


Fig. 3.1.4. Coherence function (central peak)

#### 3.2. Model MSPA850.12-100

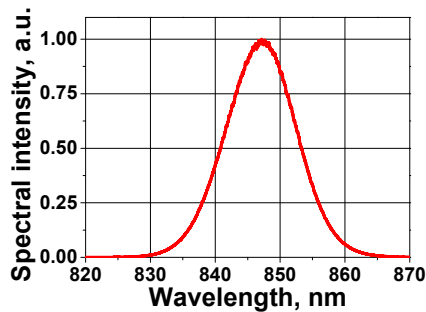


Fig. 3.2.1. Emission spectrum in linear scale

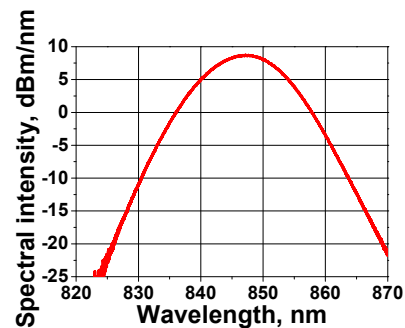


Fig. 3.2.2. Emission spectrum in log scale

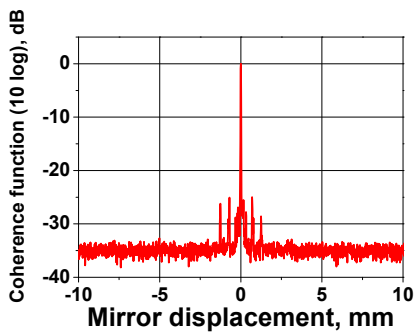


Fig. 3.2.3. Coherence function (extended)

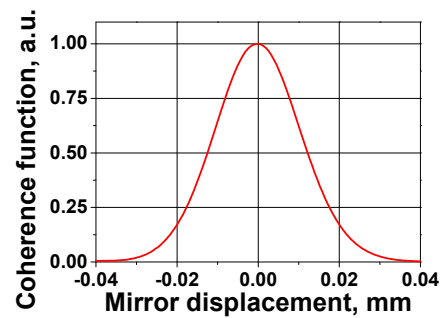


Fig. 3.2.4. Coherence function (central peak)