



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
- Four models in the spectral range of 790 – 970 nm
- Low RIN of $-135 \dots -145$ dB/Hz
- Stable polarized output
- Compact design
- USB control interface
- Output control by TTL pulses (turning on/off)
- Easy integration into customer 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. This design has a number of advantages over a light source based solely on an SLD. The main advantages are that the optical power can be increased to the levels not achievable with a sole SLD, and that the sensitivity to optical feedback (inherent to all high-power ASE sources, including SLDs) can be reduced. Besides, both the master SLD and the booster operate at lower drive currents, which significantly increases the lifetime and makes MSPA sources more reliable. Another important advantage is that the MSPA design does not result in an increase in relative intensity noise (RIN). The level of RIN for an MSPA source is comparable to that of single-frequency diode lasers and ranges from -135 to -145 dB/Hz.

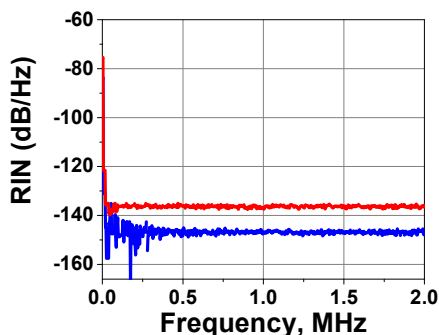


Fig. 1. Examples of RIN spectra (MSPA840.40-50 – red, MSPA850.12-100 – blue)

MSPA devices are highly polarized. The fiber used inside is PANDA PMF. All MSPA sources 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 customer equipment, but can also be used as stand-alone light sources. All MSPA sources have an INTERLOCK feature which can be enabled/disabled by the software that comes with the devices. Users must ensure that all safety features required by laser safety regulations are incorporated when MSPA is used as a stand-alone light source.

2. Specifications of MSPA light sources

Optical specifications

Parameter	Units	MSPA800.10-40	MSPA840.40-50	MSPA850.12-100	MSPA970.15-70
Central wavelength	nm	800	840	850	970
Spectrum width (FWHM)	nm	10	40	12	15
Output optical power	mW	40	50	100	70
Output PER ¹	dB	15 (typ.)	15 (typ.)	15 (typ.)	15 (typ.)
RIN, 0.009-2MHz	dB/Hz	-135	-135	-145	-135
Long-term optical power stability ²	%	< 1	< 1	< 1	< 1
Fiber type	-	PANDA PM 850			
Output optical connector	-	FC/APC with narrow key			
PC connection port	-	USB	USB	USB	USB

¹ Measured at the output of the supplied optical cable

² After a 30-minute warm-up period

Electrical, environmental, and mechanical specifications

Parameter	Units	
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

3.1. Model MSPA800.10-40

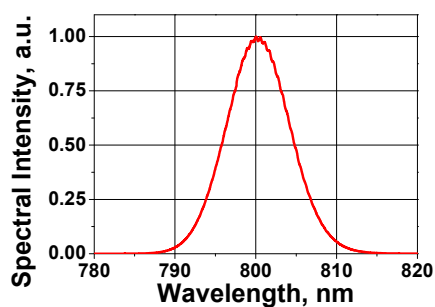


Fig. 3.1.1. Emission spectrum in linear scale

3.2. Model MSPA840.40-50

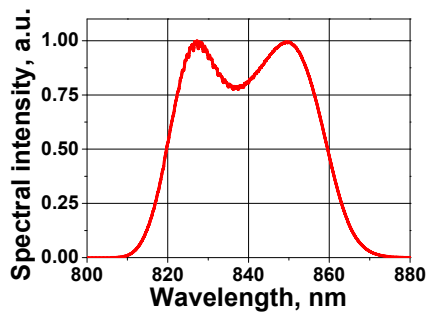


Fig. 3.2.1. Emission spectrum in linear scale

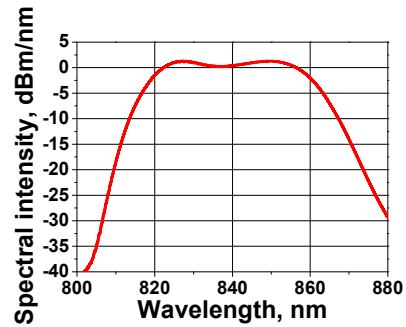


Fig. 3.2.2. Emission spectrum in log scale

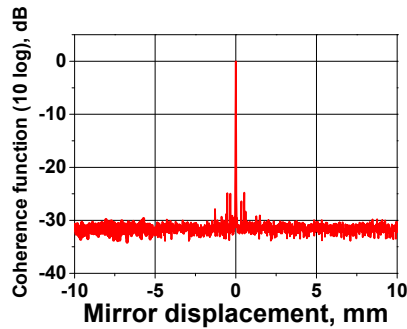


Fig. 3.2.3. Coherence function (extended)

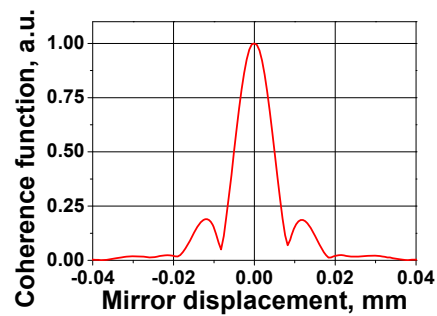


Fig. 3.2.4. Coherence function (central peak)

3.3. Model MSPA850.12-100

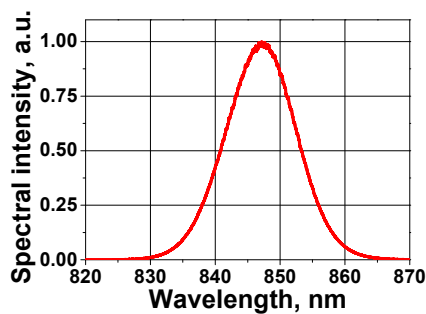


Fig. 3.3.1. Emission spectrum in linear scale

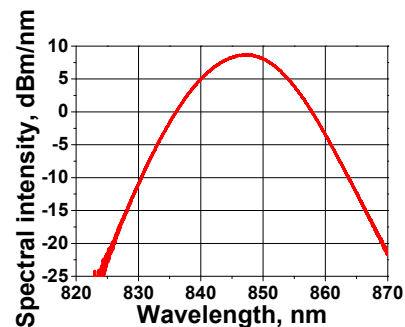


Fig. 3.3.2. Emission spectrum in log scale

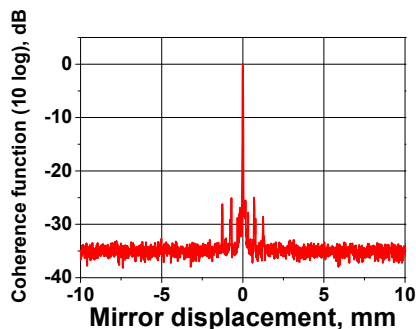


Fig. 3.3.3. Coherence function (extended)

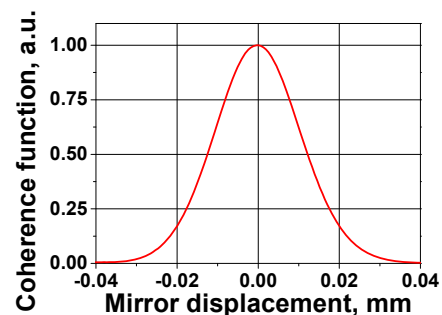


Fig. 3.3.4. Coherence function (central peak)