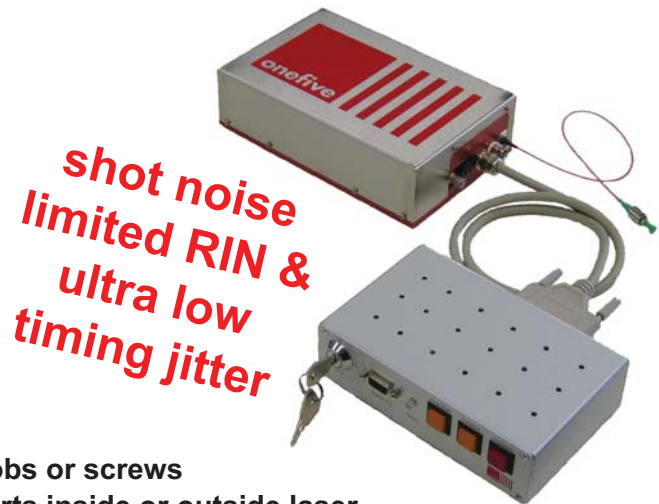


# Origami



Low-noise soliton femtosecond laser module designed for OEM and R&D applications

- Excellent pulse quality – pedestal-free transform-limited soliton pulses
- Clean sech<sup>2</sup>-shaped optical spectrum
- No Kelly-sidebands – no spectral ripple
- Diffraction-limited beam quality
- Very low amplitude and phase noise
- No amplifier built in – no ASE noise
- Internal optical isolation stage
- High repeatability and 24/7 operation
- Compact, dust-sealed OEM package
- Plug & play
- Passively air cooled – no water cooling
- Low power consumption
- Remote control
- One-button operation – no adjustment knobs or screws
- Maintenance free – no user-serviceable parts inside or outside laser



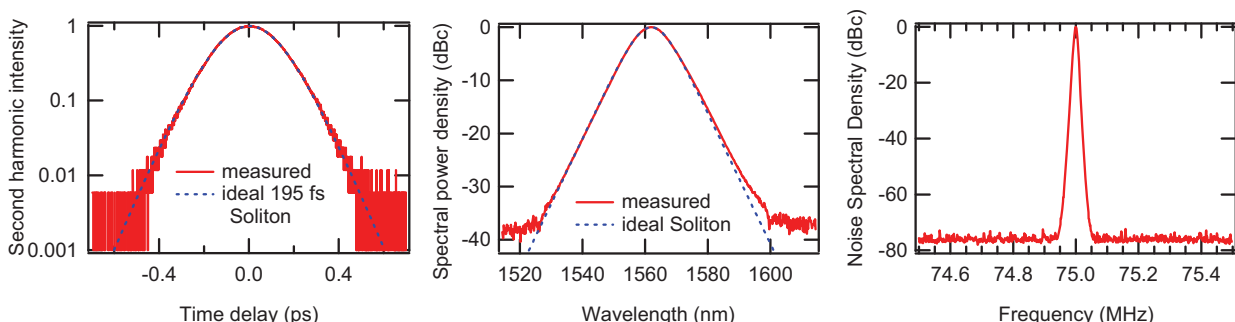
	Origami – 05	Origami – 08	Origami – 10	Origami – 15	Origami – 17
Center wavelength	513 – 535 nm	765 – 785 nm	1025 – 1070 nm	1530 – 1586 nm	1666 – 1672 nm
Pulse duration <sup>1,2</sup>	< 100 – 230 fs	< 130 – 200 fs	< 100 – 400 fs	< 100 – 500 fs	< 200 – 300 fs
Avg output power (up to) <sup>2</sup>	50 mW	30 mW	250 mW	90 mW	50 mW
Pulse repetition rate <sup>2</sup>	40 MHz – 1.25 GHz				
Pulse energy (up to) <sup>2</sup>	1.2 nJ	0.7 nJ	5 nJ	2 nJ	1 nJ
Peak power (up to)	10 kW	4.5 kW	30 kW	15 kW	3 kW
Spectral bandwidth	transform-limited ( $\tau_p \cdot \Delta\nu \sim 0.32$ )				> 18 nm
Output	collimated free space, $M^2 < 1.1$ (fiber output optional)				
PER	>23 dB				
Amplitude noise	< 0.2% rms, < 0.5% pk-pk (24h)				
Center wavelength drift	< 0.1 nm pk-pk (24h)				
Warm-up time	< 10 minutes				
Specs guaranteed	10 °C – 40 °C				
Storage temperature	–15 °C – 65 °C				
On/Off cycles	> 10'000				
Size laser head <sup>3</sup>	296 x 112 x 54 mm <sup>3</sup>				
Size std. controller	165 x 104 x 44 mm <sup>3</sup>				
Power consumption	< 15 W				
Power supply	90 – 264 VAC, 47 – 63 Hz				
Weight laser head <sup>3</sup>	2.5 kg				
Weight controller	0.65 kg				

<sup>1</sup> tunable (requires external adjustable power supply)

<sup>2</sup> please inquire for possible combinations of pulse duration, average power, and repetition rate

<sup>3</sup> exact size and weight depend on pulse repetition rate

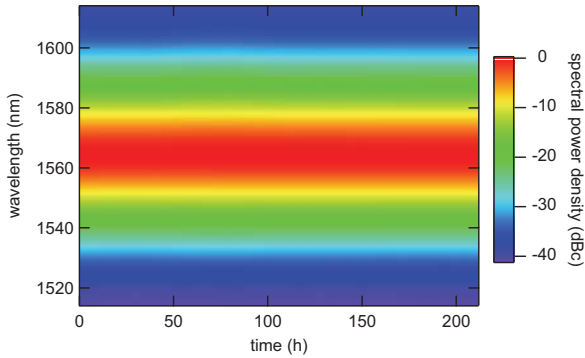
## Sample data Origami – 15



## Options

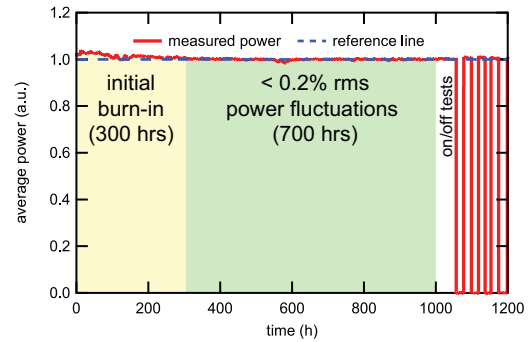
- Linear controller for ultra low noise & timing jitter
  - < 5 fs rms with low noise controller (1 kHz - 10 MHz)
  - < 25 fs rms with standard controller (1 kHz - 10 MHz)
- Synchronization to external clock
- Electrical interface for pump power control
- Fiber output (PM or SMF)
- UV generation
- Piezo controlled cavity length
- Repetition rate tunability
- Wavelength tunability
- Internal monitor PD
- Optical isolator

## Optical spectrum as a function of time

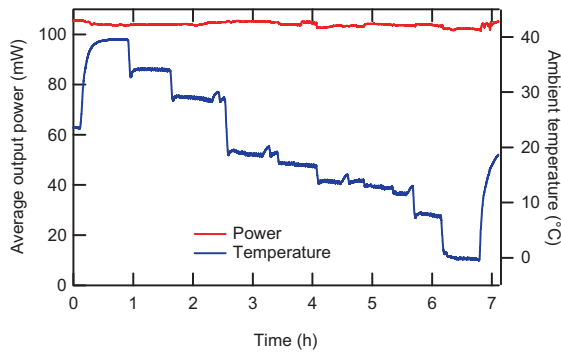


## Output power as a function of time

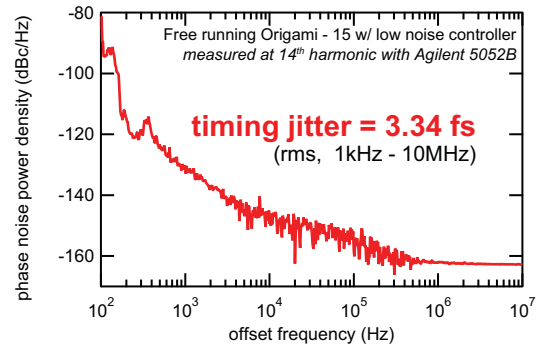
Origami - 08 in environment without climate control



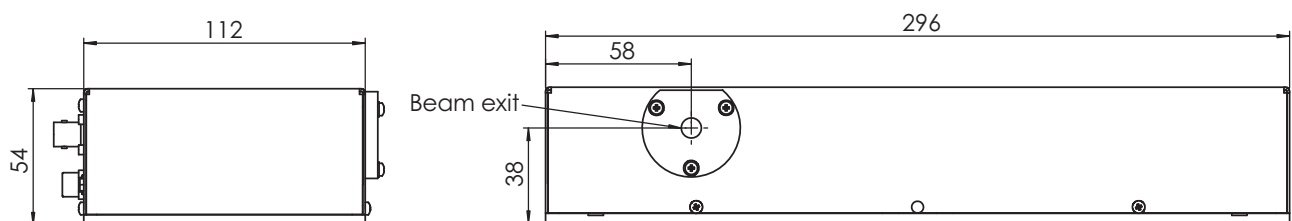
## Temperature cycling



## Phase noise / timing jitter



## Technical drawing of laser head (measures in mm, 80-MHz version):



## Technical drawing of standard laser controller (measures in mm):

