

## LuOcean P2

### LU0785C and LU0808C Diode Laser Up to 110 W c.w. Operating Power @ 785 nm or 808 nm



#### Description:

The LuOcean™ P2 Diode Laser series offers OEM integrators an excellent product to manufacture state-of-the-art end user laser systems. The easy integration and safe use of these laser components give the chance to be cost-efficient in development and manufacturing. Equipped with several accessories and features the Lumics diode lasers comply with CE & ROHS requirements. Lumics warranties highest reliability single emitter technology through careful design, extensive burn-in, long life-time & thermal testing.

#### Features & Functions:

- Wavelength 785 nm or 808 nm
- Fiber: 105, 200, 400 or 600 μm
- SMA905
- Sealed housing
- Temperature sensor

#### Options:

- Power monitor
- Fiber sensor
- Red or green pilot laser
- Water cooling plate
- Backreflection filter

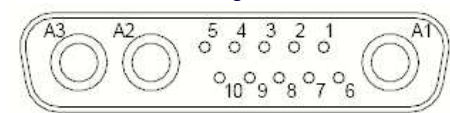
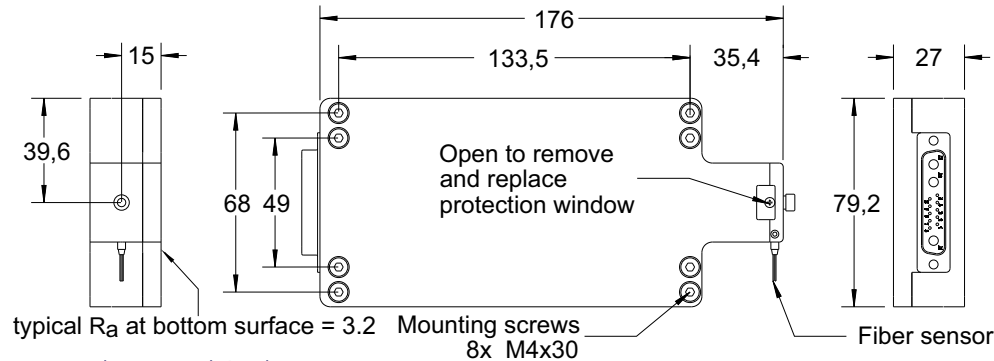
#### Benefits:

- Life Time > 10.000 h
- Cost effective
- High efficiency
- Low current (single emitter)
- msec hard pulse operation

#### Applications:

- Pumping
- Illumination
- Medical treatment

#### Module Drawing (Dimensions in mm)

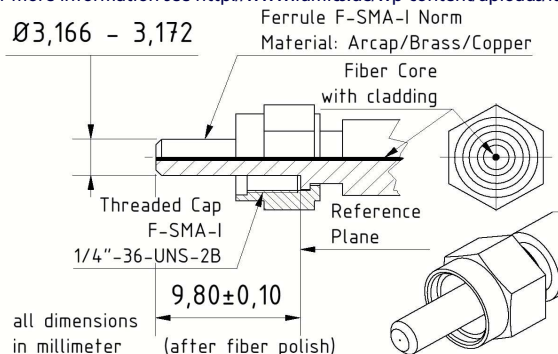


Pin	Configuration
1	2nd LM35 signal or NTC or PT100/1000 * or pilot power control (0-5)V *
2	2nd LM35 5V or NTC or PT100/1000 * or signal internal fiber sensor
3	Monitor diode cathode or internal fiber sensor 12V *
4	1st and 2nd LM35 (GND1) Monitor diode (GND1) Internal fiber sensor (GND1)
5	1st LM35 signal or NTC or PT100/1000 *
6	Monitor diode signal 2 *
7	Monitor diode signal 1 *
8	Pilot laser (GND2)
9	1st LM35 5V or NTC or PT100/1000
10	Pilot laser 8 V (green) or 5 V (red) *
A1	Laser diode (+)
A2	Laser diode cathode (-)
A3	N.C.

\* Optional

#### Fiber Connector

- Lumics laser diode fiber coupling technology ensures loss into the fiber cladding of <2% of the total power if the fiber centricity is below 10μm and ferrule diameter and distance of the fiber end facet to the reference plane complies with shown technical drawing. Use a fiber microscope to check for dust free fiber end facet and fiber centricity.
- Free standing fibers suffer from higher risk of fiber damage to the fiber tip due to mechanical stress by handling and the fiber end facet can not be polished as simple as for not free standing fibers.
- For more information see [http://www.lumics.de/wp-content/uploads/lu\\_fiber\\_patchcords.pdf](http://www.lumics.de/wp-content/uploads/lu_fiber_patchcords.pdf)



**We manufacture diode lasers.**

## Electrical and Optical Characteristics Typical Laser specifications at 25° C \*

Parameter	Cond.	Symbol	LU0xxx015	LU0xxx065	LU0xxx090	LU0xxx110	Unit
<b>LU0785C and LU0808C</b>							
Maximum output power (1)	c.w.	P <sub>op</sub>	15	65	90	110	W
Operating current (2)	c.w.	I <sub>op</sub>	3.8	6.8	10.5	13	A
Peak wavelength at lop (6)	LU0785C	λ	785 ± 5	785 ± 5	785 ± 5	785 ± 5	nm
	LU0808C	λ	808 ± 5	808 ± 5	808 ± 5	808 ± 5	nm
Spectral width (FWHM) at lop (7)		Δλ	2-6	2-6	2-6	2-6	nm
Threshold current		I <sub>th</sub>	<0.95	<1.8	<3.0	<3.8	A
Operating voltage (max.)		V <sub>f</sub>	11	26	24	25	V
Conversion efficiency			40	37	35	35	%
Wavelength tuning vs. temperature		λ / T	0.3	0.3	0.3	0.3	nm/K
Wavelength tuning vs. operating current		λ / I	1	1	1	0.7	nm/A
Weight		m	1200	1200	1200	1200	g
Thermal resistance (from bottom to internal temp. sensor)		R <sub>th</sub>	0.04	0.04	0.04	0.04	K/W
<b>Output fiber connector (SMA905)</b>							
Core diameter of output fiber		d <sub>core</sub>	105 **	200	400	600	μm
Fiber centricity			5	10	10	10	μm
Numerical aperture		NA	0.22	0.22	0.22	0.22	
Temperature sensor	LM35, NTC (10k) or PT100/1000 (please specify)						
Power monitor		PD	5-30	5-30	5-30	5-30	mV/W
<b>Options</b>							
<b>Option 1: Red pilot laser</b>							
C.w. output power min. value (4)		P <sub>pilot</sub>	1-3	1-3	1-3	1-3	mW
Peak wavelength		λ <sub>pilot</sub>	635 ± 10	635 ± 10	635 ± 10	635 ± 10	nm
Operating voltage			5	5	5	5	V
<b>Option 2: Green pilot laser</b>							
C.w. output power min. value (4)		P <sub>pilot</sub>	1-2	1-2	1-2	1-2	mW
Peak wavelength		λ <sub>pilot</sub>	520 ± 10	520 ± 10	520 ± 10	520 ± 10	nm
Operating voltage			8	8	8	8	V
Pilot power control		P <sub>pilot_contr</sub>	0-5	0-5	0-5	0-5	V
<b>Option 3: Water Cooling Base Plate</b>							
Water temperature		T	<18°	<18°	<18°	<18°	°C
Water quality	Industrial Water, no DI-water, filtered particle size <0.1mm						
Minimum water flux			0.3	0.5	0.6	1.5	l/min
Option 4: 1064nm back reflection filter (35dB on request) (5) (only available for 808 nm)			18	18	18	18	dB
<b>Option 5: Fiber sensor</b>							
Internal (resistive) fiber detection sensor signal voltage			12	12	12	12	V
A second fiber sensor is an external inductive sensor with three wire cable (Vcc=12V, GND, Signal 12/2V when fiber is plug/not plugged)							

Notes: \* taken at internal temperature sensor.

Avoid direct feedback from materials like mirrors, optics, processed material etc. back into laser module via the fiber cable by more than 10%.

(1) Power is measured ex fiber according to given fiber specifications including measures and tolerances of fiber and ferrules for uncoated fiber facets.

With AR coated (AR <0.7%) fiber end facet at the laser module side the power ex fiber can be increased by 20%. Avoid direct feedback from materials like mirrors, optics, processed material etc. back into laser module via the fiber cable by more than 10%. Given value is the maximum power level. For given max. power level operating current and voltage can deviate by max.10% from typical values and is lower than maximum values. Please choose your laser driver design accordingly.

(2) Do not exceed maximum forward current for rated power as given above by more than 5% and if given by maximum current otherwise the laser diode may be damaged

(3) Rule of thumb: Power ex fiber decreases up to 5% (<1100nm) and up to 7% (>1400nm) every 10 °C temperature increase at internal temperature sensor. Lifetime decreases by about factor of two every 10 °C.

(4) Red and green minimum pilot power is set at factory by customer request. Standard is 1 mW.

(5) Back reflection at 1064nm is considered as 10ns pulse with 5% d.c. max. Back reflection filter reduces power by 2% (18dB) or 4% (35dB).

(6) Narrower wavelength (+/- 3nm) on request.

Calculation example of necessary water temperature for 100 W output power:

Thermal load = Output power \* (1/conversion efficiency - 1), Water temperature = internal temperature - thermal load \* Thermal resistance

Example: Output power: 100 W, Conversion efficiency: 0.4, Thermal resistance: 0.07 K/W, Internal temperature: 25 °C

Thermal load = 100 W \* (1/0.4 - 1) = 150 W, Water temperature = 25 °C - 150 W \* 0.07 K/W = 15 °C, (water flux must be adjusted accordingly)

\*\* LuOcean P2 in 105 μm fiber is supplied either in combination with water cooling base plate or with a copper base plate for cooled and uncooled operation

## Absolute Maximum Ratings / General Informations

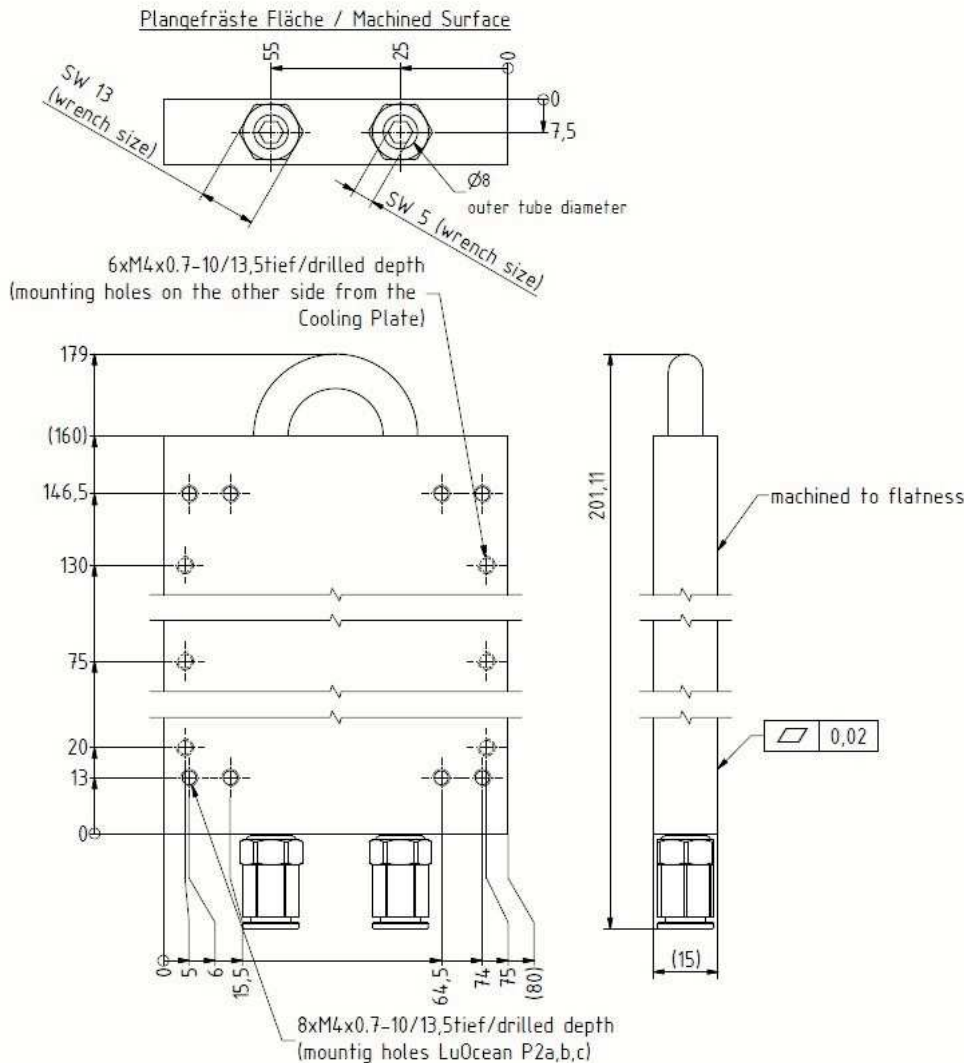
Parameter	Symbol	Min	Max	Unit
Storage temperature	$T_{max}$	0	+50	°C
Operating temp.* c.w.-operation **	$T_{op.c.w.}$	+15	+35	°C
Humidity / non condensing atmosphere			90	%
Recommended thermal heatsink resistance $R_{th}$			0.03	K/W
Max fiber flange temperature			45	°C
Max. back reflection of intrinsic pump wavelength output power			10	%
Max. back reflection any other than $\lambda$ of this diode laser			10	$\mu$ J
Compliance		CE, ROHS		
<b>Standard Accessories</b>				
Interface connector		13w3 Female		
Mounting screws / metric		8 x M4 x 12		mm
Remarks				

\* taken at internal temperature sensor

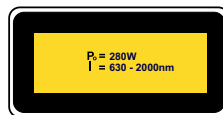
\*\* we recommend to operate the laser above dew point

### Option: P2 water cooling base plate with quick release water connectors and thermal resistance of 0.03 K/W.

Please note : Avoid to remove the water cooling plate from the P2 laser module because the optics is aligned with the water cooling plate attached to the P2 module. If it is removed the housing might relax mechanically which move the fiber coupling port/nose away from the focused light spot. Never change to a water cooling with a lower specifications regarding flatness



## User Safety



**Important Note** Read and carefully follow operating manual instructions. Especially, whenever power supply is switched on or off, always disconnect from laser module. See manual for details. Uncontrolled on / off switching may cause spikes and result in fatal device damage. This product is not certified by with IEC 60825-1 or 21CFR1040.10/21CFR1040.11 and and must comply with the applicable regulations by the Purchaser if sold as laser product.

**We manufacture diode lasers.**