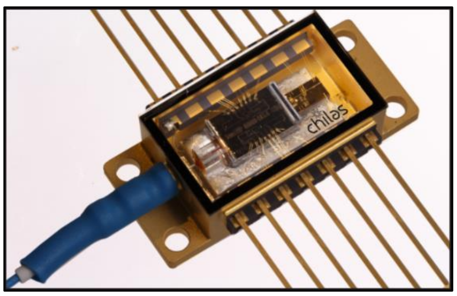
Product Specifications Sheet

Chilas CT3 nm ultra-narrow linewidth tunable laser

Wavelength range: 100 nm; Covering the complete C-band
Fiber type: PM
Connector type: FC/APC
Package: standard 14-pin butterfly
USA accession number: not yet available



Part Number: N/A
Serial Number laser: MAP0xxxxxxxx
Serial Number electronics: xxxxxxx
Model Number: LAX

This component complies with the applicable portions of
21 CFR 1002.10 / 21 CRF 1002.11 / 21 CRF 1002.12
21 CRF 1002.13 / 21 CRF 1002.30a / 21 CRF 1002.30b
21 CRF 1040.10 / 21 CRF 1010.2 / 21 CRF 1010.3
Since this is a component, it does not comply with all of the requirements contained in 21 CFR 1040.10 and 21 CFR 1040.11 for complete laser products.

1. Introduction

Chilas develops and commercializes semiconductor external cavity lasers based on a state-of-the-art hybrid integration technology. The laser comprises an InP reflective semiconductor optical amplifier (RSOA) as gain medium and a Si_3N_4 waveguide circuit as a tuneable external cavity. The RSOA is butt-coupled to the external cavity. The laser is housed in a compact, 14-pin butterfly package, enabling compatibility with any standard 14-pin laser diode mount. The single-frequency laser contains an integrated thermoelectric cooler (TEC), thermistor, and a polarization-maintaining output fibre with an FC/APC connector.

2. Operation of principle

The main concept of the laser is shown in the Figure 1. On the left-hand side, there is a gain section which is high-reflective on the left-hand side and anti-reflective on the right-hand side where it is connected to a TriPleX^{TM} Silicon Nitride external cavity waveguide chip. The external cavity has two coupled micro-ring resonators (MRRs) with slightly different FSR in the cavity to ensure stable single frequency operation by Vernier effect. On the SiN chip, there are 5 heaters positioned, one to control the phase of the light in the cavity, two to control the resonant wavelengths of the ring resonators Ring 1 and Ring 2, which in turn controls the output wavelength, and two control the optical power coupled out of the cavity. The laser's frequency can be tuned over a large range by MRR tuning.

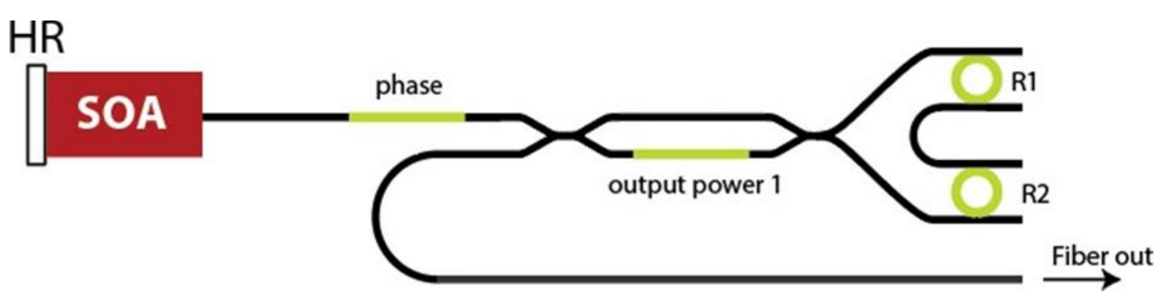


Figure 1: A schematic layout of the laser.

3. Optical isolation

Please note, there is no optical isolator added to the package. This laser type has an intrinsic optical isolation for the laser's wavelength (± 0.03 nm) of ~8-10 dB, while for wavelengths different from the laser's wavelength the intrinsic optical isolation is a lot higher.

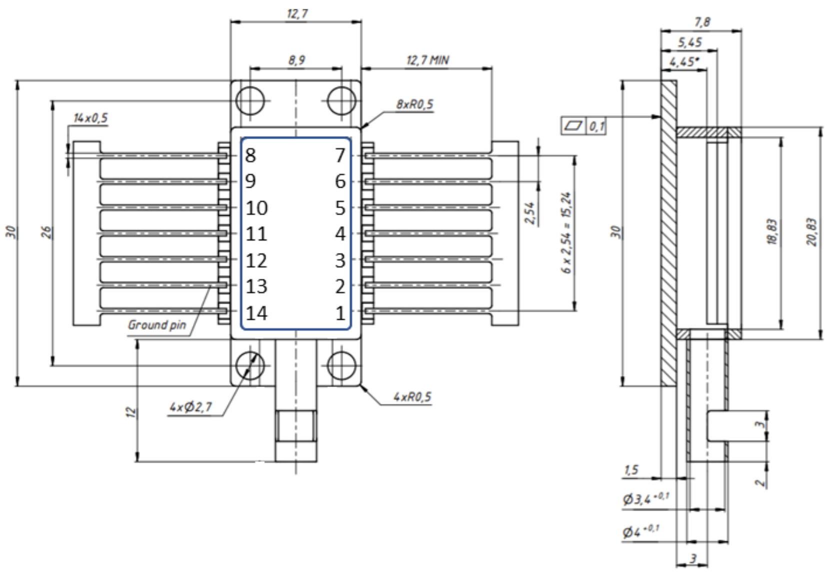
4. Performance and specifications

	Parameter	Specified values
Optical	Operating wavelength	1550 nm
	Wavelength tuning range	1490 nm-1580nm
	Fiber-coupled output power @250 mA	≥ 10 dBm
	Intrinsic linewidth	≤ 10 kHz
	Side-mode suppression ratio	≥ 50dB
	Polarization extinction ratio	≥ 20 dB

Electronic specifications		
Peltier element	ΔT_{max}	71 K
	Q_{max}	6.8 W
	I_{max}	1.8 A
	U_{max}	6.3 V
	R_t	0.06 K/W
NTC	B_{value}	3935 K
	Resistance @ 25˚C	10 kΩ
Gain section	I_{max}	250 mA
	I_{typ}	150 mA
External cavity	*Heater* V_{max}	12 V
	Number of heaters	3
	Voltage for 2.pi phase shift $V_{2\pi}$	11 V
	Heater resistance R	~ 250 Ω

Mechanical specifications		
	Parameters	**Values**
Package	Gold box	14-pin, butterfly-style package.
	TEC	1ML06-050-09 from RMT Ltd.
	Pigtail fiber	50cm PM fiber with 900µm loose blue tubing, FC/APC connector, slow-axis alignment.

5. Mechanical structure and Pinout



Pin-out			
1	Peltier +	8	LD Anode
2	Heater ring 2	9	LD Cathode
3	Heater ring 1	10	Not connected
4	Heater phase	11	Not connected
5	Not connected	12	Not connected
6	NTC-	13	Heater ground
7	NYC+	14	Peltier -

6. Typical results

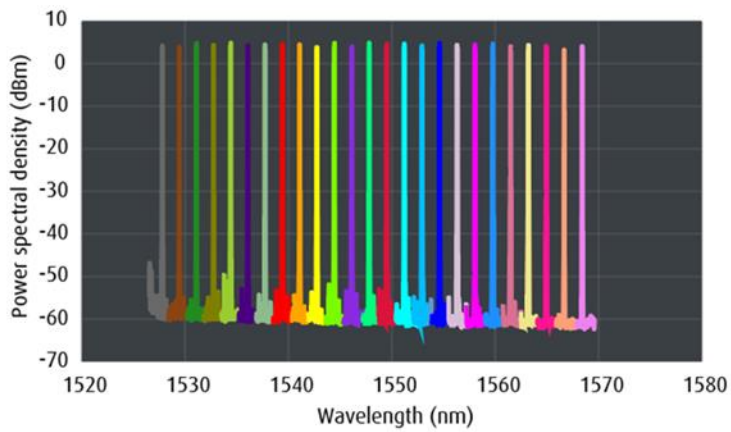


Figure 1: Tuning range covering C-band (measurement limited by range of OSA).

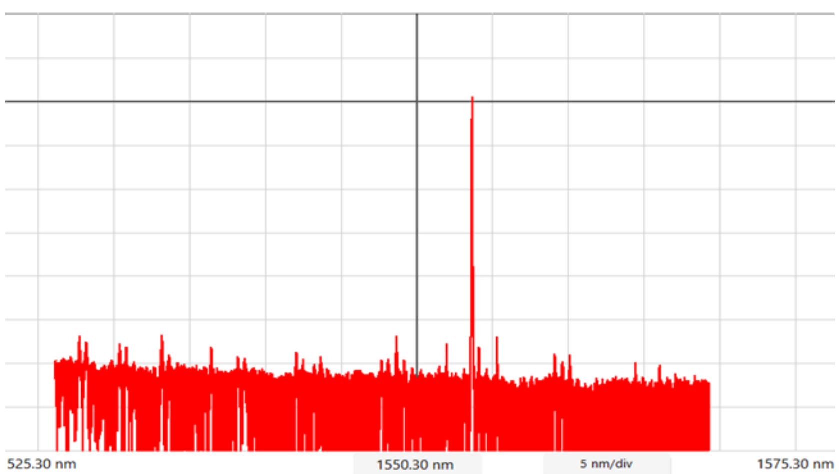


Figure 2: Measured SMSR > 50 dB. Note that the y-axis shows power spectral density, measured by an optical spectrum analyzer. It therefore does not show absolute optical power.

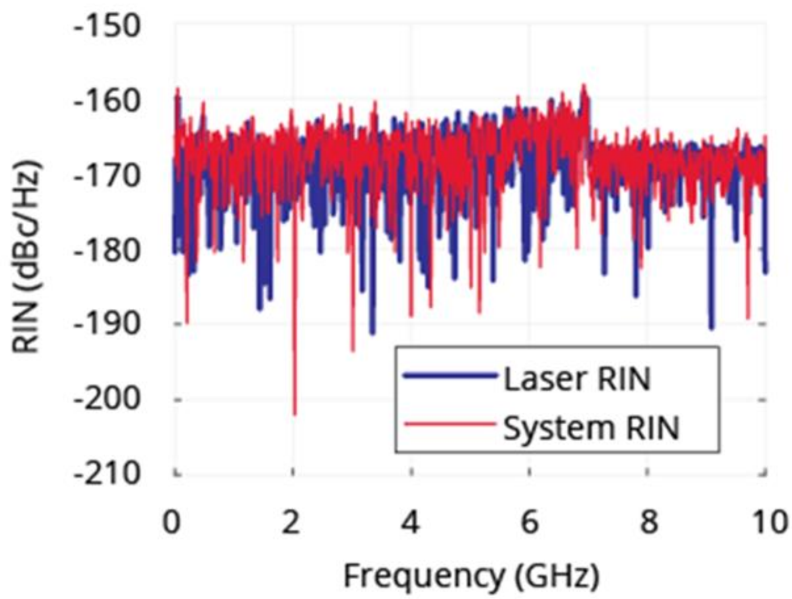


Figure 3: Typical RIN of the laser, compared to the RIN of the measurement system.

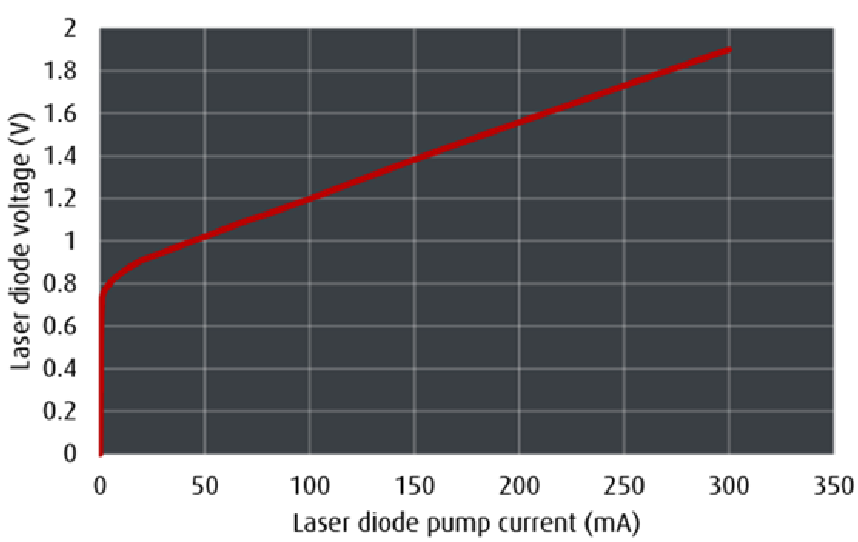


Figure 4: Typical V-I curve of the gain section.