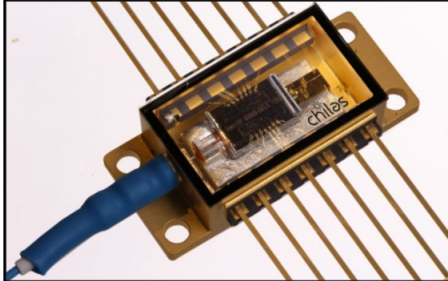


Chilas CF3 nm ultra-narrow linewidth laser



Wavelength: 1550 ± 5 nm
Fiber type: PM
Connector type: FC/APC
Package: 14 pins, temperature stabilized, butterfly
USA accession number: 2420422-000



CAUTION: Observe precautions for handling electrostatic discharge sensitive devices

*This component complies with the applicable portions of
21 CFR 1002.10 / 21 CFR 1002.11 / 21 CFR 1002.12
21 CFR 1002.13 / 21 CFR 1002.30a / 21 CFR 1002.30b
21 CFR 1040.10 / 21 CFR 1010.2 / 21 CFR 1010.3
Since this is a component, it does not comply with all 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 Si₃N₄ waveguide circuit as an 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 Figure 1. The gain chip, which contains the SOA, has a high-reflective (HR) coating on the left-hand side and an anti-reflective interface on the right-hand side where it is connected to a TriPleX™ silicon nitride waveguide chip. The waveguide circuit contains two micro-ring resonators (MRRs), indicated as R1 and R2 with slightly different free-spectral ranges (FSRs) to ensure stable single frequency operation by using the Vernier effect. There are three heaters positioned, one to control the phase of the light in the cavity and two to control the resonant wavelengths of the ring resonators R1 and R2. The laser's frequency can be tuned over a large range by tuning the MRRs.

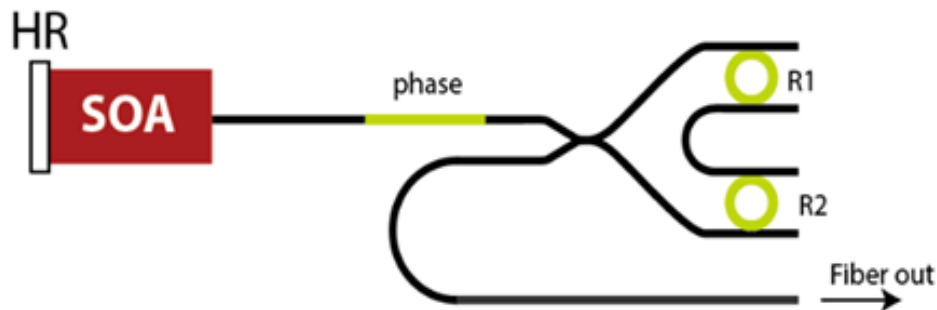


Figure 1 Schematic layout of the laser

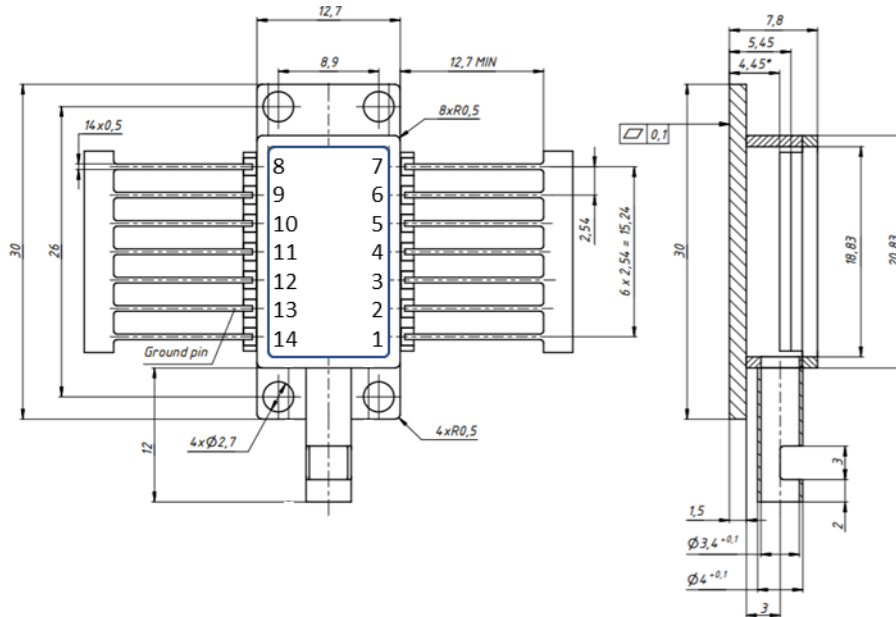
3. Optical isolation

Please note, there is no optical isolator added to the package. To avoid affecting the laser performance due to undesired feedback, it is advisable to connect a fiber-optic isolator directly to the output fiber. The isolator should be suitable for the laser's operating wavelength range and should have matching FC/APC connectors.

4. Performance and specifications

	Parameter	Specified values
Optical	Center wavelength	1550 nm ± 5 nm
	Wavelength range	≥ 60 nm
	Fiber- coupled output power	≥ 13 dBm
	Intrinsic linewidth	≤ 1 kHz
	RIN	≤ -150 dBc/Hz @ 1 MHz
	Side-mode suppression ratio	≥ 50 dB
	Polarization extinction ratio	≥ 20 dB
	Modulation depth @ 10 kHz	2 GHz
	Modulation depth @ 100 kHz	1.4 GHz

Peltier	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
Gain section	I_{max}	300 mA
	I_{typ}	250 mA
NTC	B_{value}	3935 K
	Resistance @ 25 °C	10 kΩ
External Cavity	Heater V_{max}	14 V
	Number of heaters	3
	Voltage for 2.π phase shift $V_{2\pi}$	~7 V
	Heater resistance Large Ring heater	~150 Ω
	Heater resistance Small Ring heater	~150 Ω
	Heater resistance Phase heater	~200 Ω

5. Mechanical structure and Pinout


Pin-out	1	Peltier +	8	LD Anode
	2	Heater Large Ring	9	LD Cathode
	3	Heater Small Ring	10	Not connected
	4	Heater Phase	11	Not connected
	5	Heater ground	12	Not connected
	6	NTC-	13	Housing
	7	NTC+	14	Peltier -

Mechanical specifications	Gold box	14-pin, butterfly-style package.
	TEC	$Q_{max} = 7.4 W$ $I_{max} = 1.8 A$ $U_{max} = 6.3 V$ $ACR = 2.49 V$
	Pigtail fiber	50 cm PM fiber with 900 μm loose blue tubing, FC/APC connector, slow-axis alignment.

6. Typical measurements

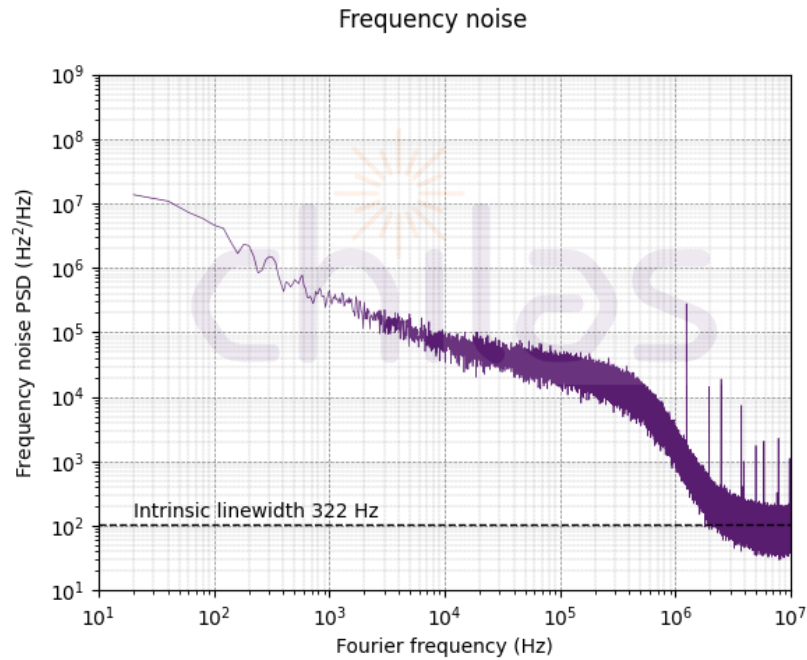


Figure 2 Frequency noise density as a function of frequency.

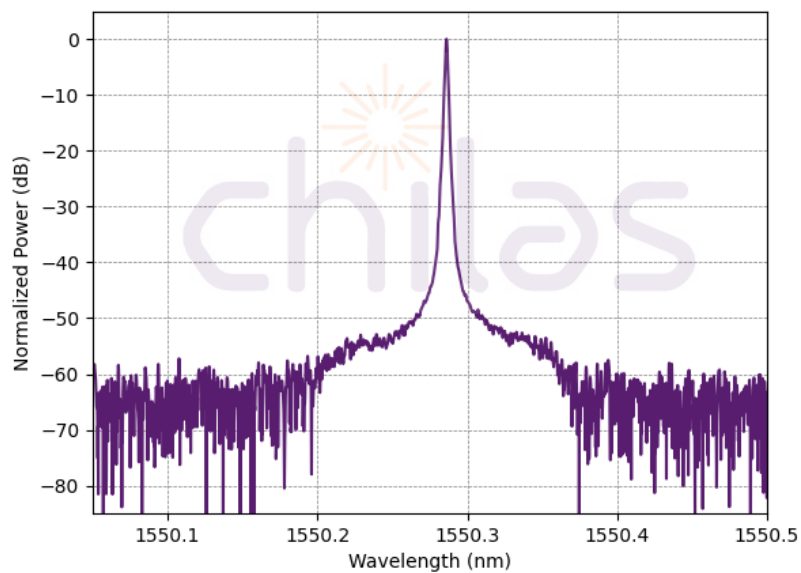


Figure 3 Side-mode suppression ratio

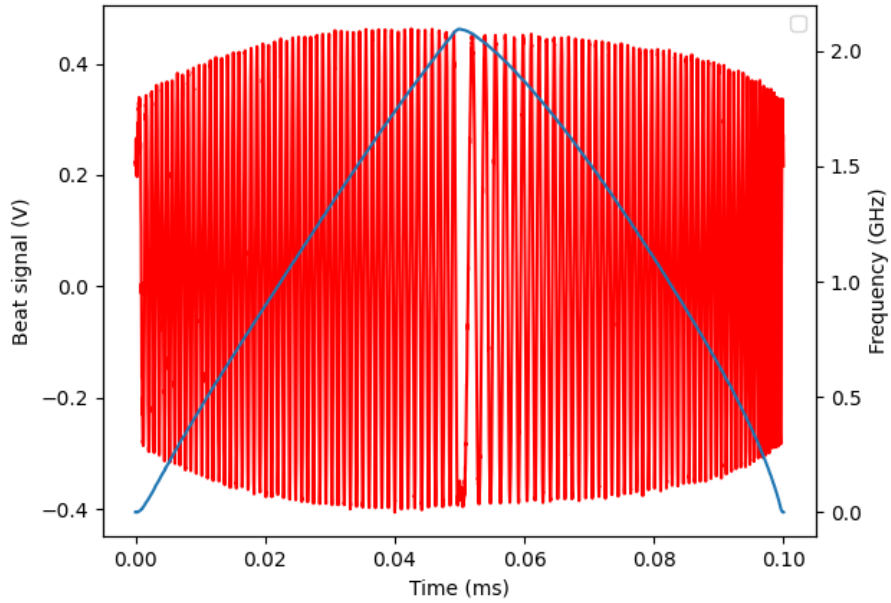


Figure 4 Modulation depth of 2 GHz at a bandwidth of 10 kHz.

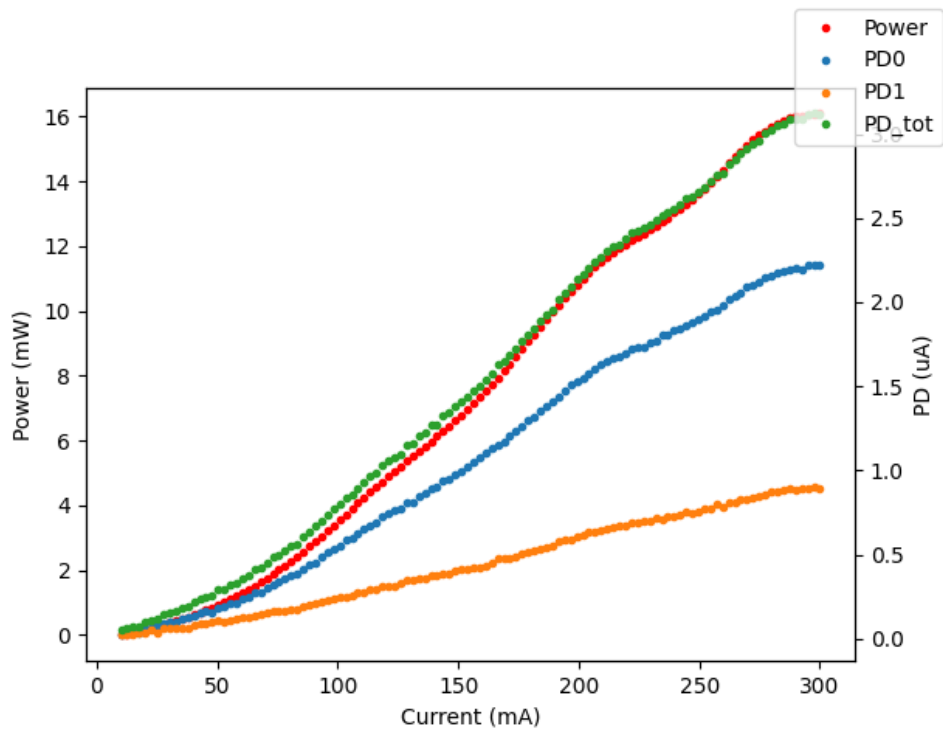


Figure 5 Typical output power and photodiode read-outs as a function of pumping current of the laser; please note that the output power is reduced by 3 dB due to the setup used.

