DLT-FT-1550

Ultra-narrow linewidth frequency-agile laser @ 1550 nm

Product datasheet / Ver 1.1

Ultra-narrow linewidth laser

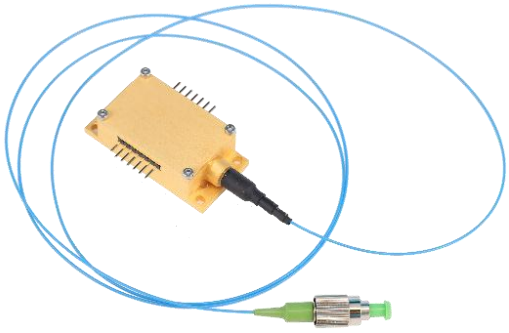
- Ultra-narrow linewidth <100 Hz
- Technology based on photonic integrated circuits
- Compact form factor

Frequency-agile

- Frequency actuation BW >2 MHz
- RMS nonlinearity <0.5 %

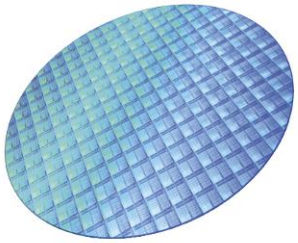
Applications

- Distributed fiber optic sensing
- FMCW Lidar
- AMO physics
- Coherent communication
- Photonic computing
- Test & Measurement, metrology

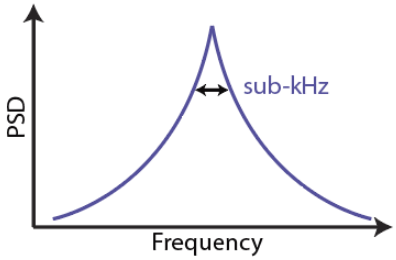


Deeplight's leading product is an ultra-narrow linewidth and frequency-agile laser at 1550 nm in a compact form factor. This next-generation laser is designed for applications in **coherent sensing** (such as Distributed Fiber Optic Sensing). Our technology is based on Silicon Nitride Photonic Integrated Circuits. The laser provides best-in-class frequency noise and high stability in an incredibly small form factor.

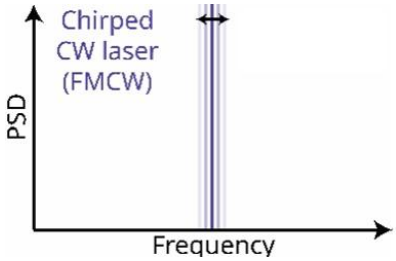
The key feature of our laser is a fast, linear, and hysteresis-free frequency tuning response with a range of up to >1 GHz and a bandwidth of >2 MHz. This performance is enabled by the core technology of Deeplight: monolithically integrated piezoelectric actuators on photonic chips based on industry-proven MEMS technology. The performance of actuators allows **linearization-free FMCW operation with rms nonlinearity <0.5%**.



Wafer-scale production:
high-volume manufacture



Excellent spectral purity:
high signal-to-noise ratio



Frequency-agility:
high-speed applications

Explore the future of photonics with Deeplight. Contact us!

Website: deeplight.ai
Email: Info@deeplight.ai

DLT-FT-1550 - Product datasheet / Ver 1.1

The following performance parameters are given for a typical DLT-FT-1550 device and may vary from device to device.

Parameters	Min.	Typ.	Max.	Units	Comments
Output Interface		FC/APC			PM Panda fiber
Wavelength	1530	1550	1565	nm	Optional: ITU grid channels upon request
Output Power	1	5	10	mW	
Operation Current	100	200	300	mA	
Optical Side Mode Suppression Ratio	45	50	60	dB	
Intrinsic Linewidth	<10	<50	<100	Hz	Lorentzian; instantaneous
Integrated Linewidth	<3	<5	<10	kHz	100ms integration time
Coarse Wavelength Tuning	0.5	0.75	1	nm	BW < 1kHz
Laser frequency modulation range	1	1.5	2	GHz	>1 GHz on request
Laser Frequency Actuation Bandwidth	>1	>2	>5	MHz	Flat frequency actuation response, starts at DC.
Actuation efficiency	18	20	25	MHz/V	
Chirp nonlinearity	<0.1	<0.3	<0.5	%	@10-100 kHz sweep rates;

The laser is available in a custom 14-pin butterfly unit. This unit can be shipped inside a laser head for easy connection to temperature and current controllers.

Figure 1. *Laser head with external connection to temperature and current controllers. PM FC/APC output connector*

Figure 2. *Custom 14-pin butterfly package with PM fiber output*

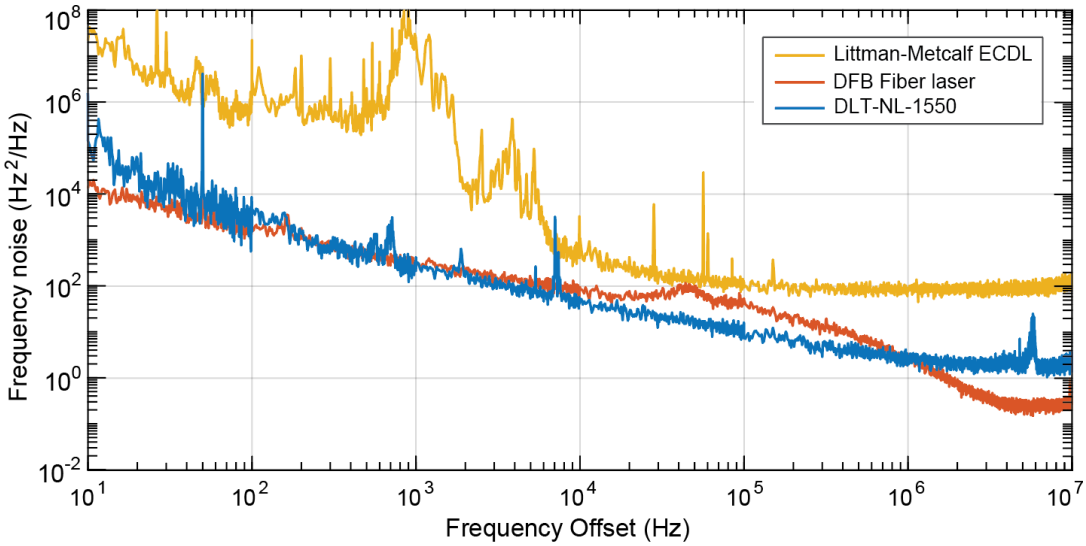


Figure 3. *Frequency noise spectrum of the laser, compared with standard External Cavity Diode Laser (ECDL) and Fiber Laser*

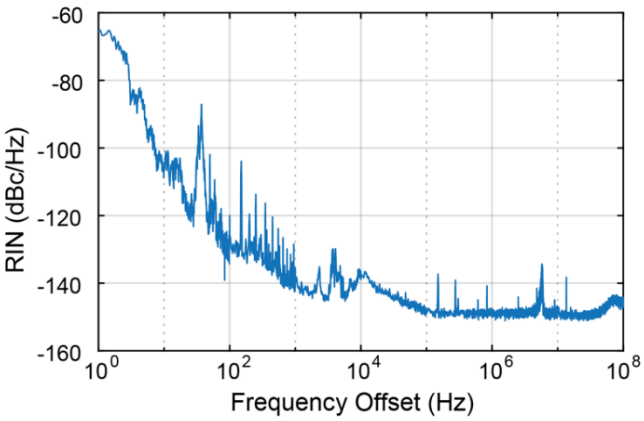


Figure 4. *Relative Intensity Noise (RIN) of the laser*

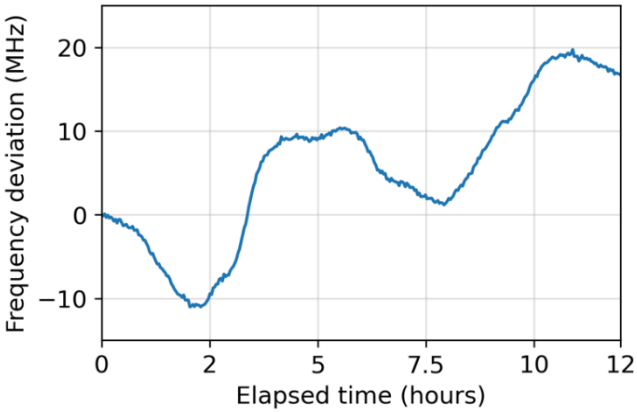


Figure 5. *Frequency stability of the free-running laser measured against a fully stabilized frequency comb*

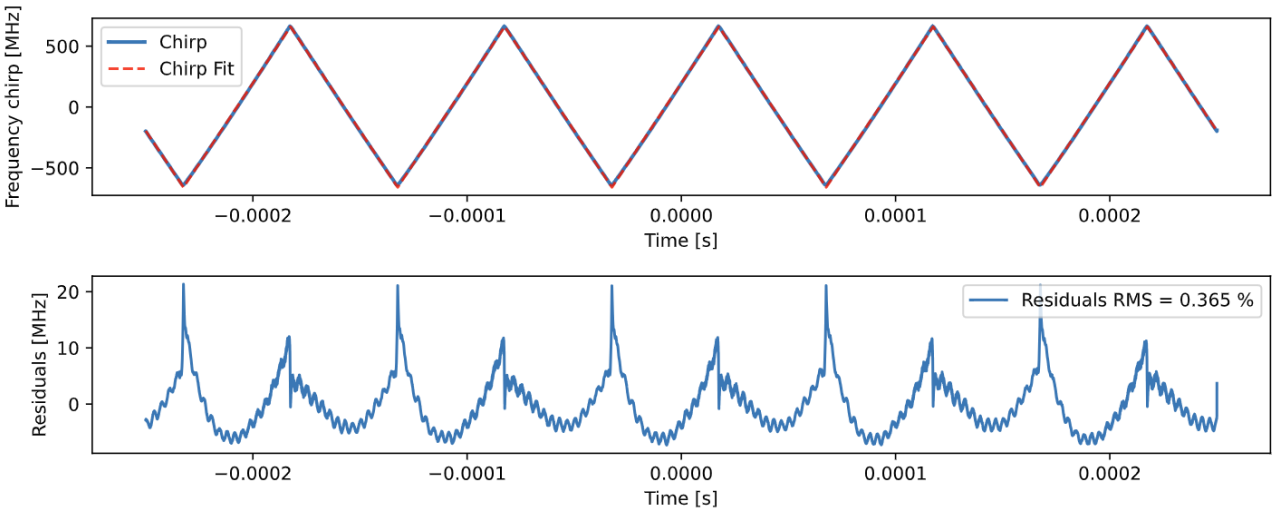


Figure 6. *FMCW optical signal generation at 10 kHz sweep rate at 50 V_{pp} applied voltage on piezoactuator*