FP4209 InstaTune
Fast Random-Access Tunable Laser

FREEDOM PHOTONICS
a Luminar company

Product Brief

FEATURES

- Rapid arbitrary wavelength switching as fast as 2us/step
- User configurable look-up table (10k points across full tuning range)
- Available in C, O, and U bands
- Compact, fully self-contained module
- Interfaced via USB or fast (25MHz) SPI
- Logic output for synchronizing to sweep
- Programmable logic output for synchronizing to each wavelength step (sample window)

APPLICATIONS

- Test and Measurement
- Fiber Sensing
- Atmospheric Gas Sensing

Notes

1. Gap-free continuous wavelength tuning range centered about nominal wavelength
2. Case temperature kept at 25 ℃
3. Power variation across all wavelengths

OVERVIEW

The FP4209 Fast Random-Access Tunable Laser (InstaTune) is a compact, self-contained tunable laser module capable of emitting any wavelength within the specified range and resolution available for a given band. Wavelength switching from any wavelength to any wavelength in as little as two microseconds while fully meeting specifications is supported. The module can be operated in scenarios where a host system is commanding wavelength changes as well as stand-alone where the module deterministically self-steps through a user defined sequence of wavelengths, thus generating an arbitrary waveform. Alternatively, the module can emit a programmable static wavelength. USB and SPI interfaces are provided for configuration and control. An evaluation board is also available.

SPECIFICATIONS

General Parameter	Value	Unit
Center Wavelength		
FP4209-O1	1280	nm
FP4209-O2	1310	nm
FP4209-O3	1340	nm
FP4209-C1	1550	nm
FP4209-L1	1590	nm
FP4209-U1	1650	nm
FP4209-U2	1690	nm
Tuning Range[1]		
FP4209-OX	35	nm
FP4209-CX	40	nm
FP4209-LX	40	nm
FP4209-UX	45	nm
Absolute Wavelength Accuracy	±15	pm
Wavelength Stability(24hr)[2]	±5	pm
Output Power	≥5	mW
Output Power Flatness[3]	±0.25	dB
Tuning Resolution	Tuning Range / 10k points	nm
SMSR	>30	dB
Wavelength Settling Time	<200	ns
Laser Linewidth	<50	MHz
Case Temperature Operating Range	10 ℃ - 55 ℃	Non-condensing
Case Temperature Storage Range	-10 ℃ - 70 ℃	Non-condensing

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Notes Continued:

4. Maximum step rate when auto stepping, can dwell on any wavelength indefinitely
5. Portion of step period required for wavelength settling
6. Can be programmed in 10ns steps with the maximum width equal to the step period
7. Varies with case temperature (<100mA at 25°C)
8. Time to set new wavelength when in direct wavelength access mode using USB interface
9. Time to set new wavelength when in direct wavelength access mode using Host SPI interface
10. Time to set new wavelength when in direct wavelength access mode using DAC SPI interface

Sweeping Parameter	Value	Unit
Number Wavelength Steps (min)	1	
Number Wavelength Steps (max)	10000	
Wavelength Step Period (min)	2	us
Wavelength Step Period (max)[4]	655.35	us
Wavelength Settling Time[5]	<200	ns
SweepSync Timing	Active-low pulse generated at the beginning of the specified wavelength sequence	
StepSync Timing[6]	Active-low pulse generated every laser wavelength step.	

Electrical Parameter	Value	Unit
Power		
3.3V Supply Current	200	mA
3.8V Supply Current	1000	mA
5.0V Supply Current[7]	1500	mA
Communication		
Host USB Command[8]	≤1	ms
Host SPI Command[9]	<4	us
DAC SPI Command[10]	<4	us