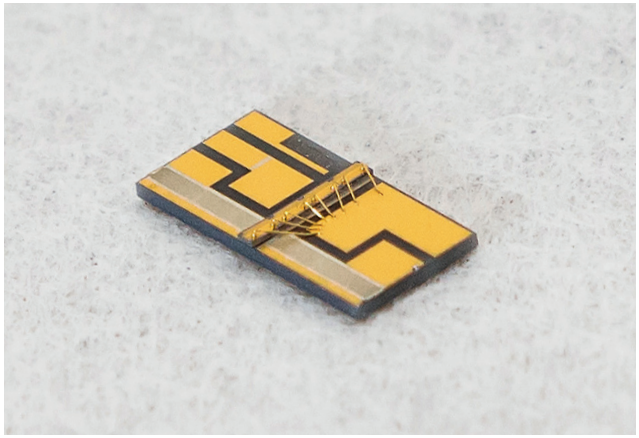
ALPES LASERS

pioneering photonics for a brighter future

CW Single Mode Laser

Alpes Lasers flagship product, the Continuous Wave, Distributed Feedback Grating Quantum Cascade Laser has been the most versatile mid-IR light source since 2005. These lasers are able to emit a single wavelength at a time. They can be tuned within a range that can reach up to 4 cm^{-1}; there exists a variety of modulation schemes which can be used for different purposes. These lasers are available as chips-on-submount or packaged in HHL or TO3 housing.



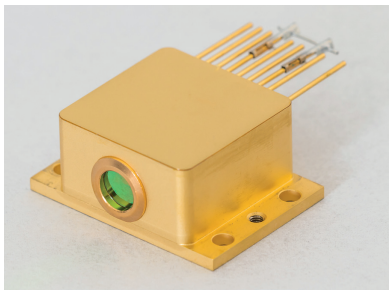
Key Features

- Continuous Wave
- Single-Mode Spectrum
- Tunable source
- Low Dissipation
- High Beam Quality
- Narrow Linewidth

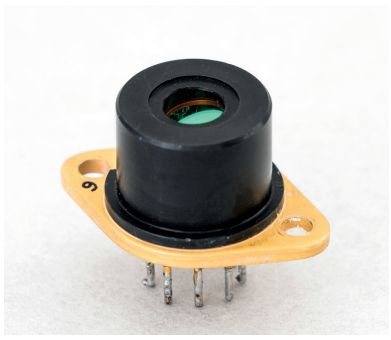
Key Applications

- Gas Spectroscopy
- Photoacoustic Sensing
- Metrology

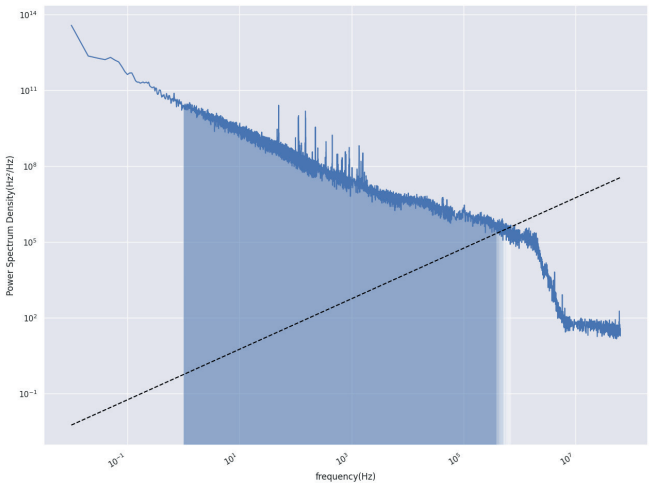
SWISS MADE



HHL package suitable for higher dissipation CW-DFB



TO3 package suitable for lower dissipation CW-DFB



This sample power spectrum density of a 2216.6 cm - 1 CW-DFB-QCL (measured with a N_2O reference gas cell) allows to extract the FWHM linewidth (from the blue area) of 2.01MHz over 1s integration time. The dashed black line is the beta-separation line which corresponds to the upper integration limit for the linewidth determination.

Quantum Cascade Lasers are mid-Infrared light sources which can cover a broad range of wavelengths. In a Distributed Feedback Grating (DFB) device, a grating is etched into the active region of the laser and forces the emission to occur at a very specific wavelength which is determined by the grating periodicity.

For this reason, DFB lasers are also known as Single Mode Lasers. The exact wavelength can be adjusted over a small Tuning Range by changing the operating current and/ or the temperature of operation; the exact wavelengths available from a given laser will be specified in an individual datasheet.

Specifications

PARAMETER NAME	MINIMUM VALUE	TYPICAL VALUE	MAXIMUM VALUE	UNIT	NOTE
Central Wavelength	4.25		12.5	µm	Each laser is specified with a single wavelength or a small range within the available range.
Central Frequency	800		2350	cm-1	
Operating Temperature	-20	20	50	°C	Potential values, only temperatures listed in data-sheet are reachable. For lasers in a LLH, HHL or TO3 housing, the chip operation temperature is guaranteed to be reachable with the housing at room temperature (+20°C). For lasers delivered as CoC a method of temperature control is required to operate the laser.
Beam Divergence (Vertical)	40	60	80	°	The beam diffracts strongly at the output facet of a chip-on-submount. Collimated beam output is possible with a proper packaging; see housing brochure for details.
Beam Divergence (Horizontal)	30	40	60	°	
Linewidth	1	1	30	MHz	In theory the instantaneous linewidth of a QCL can be extremely low, of the order of kHz. In practice however, the total noise of a system will almost always be given by the noise of the current driver and/or the temperature noise, and when that noise is much higher than the intrinsic noise you can consider the QCL as a perfect transducer and compute the effective amplitude or spectral noise from the datasheet. For typical commercial drivers the effective noise is on the order of MHz.
Output Power	2	20	200	mW	
Tuning Range	0.5	1	4	cm-1	Lasers tune with the operation temperature and current, tuning range availability depends on the central wavelength. A minimum tuning range can be specified.
Tuning Rate	0.05	0.1	0.2	%	As a percentage of the central wavelength
Storage Temperature	15	20	65	°C	Must be kept above the dew point at all times.

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