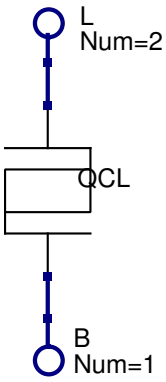



# CW Single Mode Laser

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 10 $cm^{-1}$; there exists a variety of modulation schemes which can be used for different purposes.

## Specifications

| QUANTITY | MIN | TYP | MAX | UNIT | NOTE |
|---|---|---|---|---|---|
| Wavelength Range | 4.25 | – | 12.5 | µm | 1 |
| Frequency Range | 2350 | – | 800 | $cm^{-1}$ | 2 |
| Operation Temperature | -30 | +20 | +50 | °C | 3 |
| Linewidth | – | 3 | – | MHz | 4 |
| Threshold Current | 30 | 200 | 800 | mA | |
| Operation Current | – | 400 | 1200 | mA | |
| Average Output Power | 1 | 20 | 150 | mW | 5 |
| Tuning Range | 4 | 6 | 10 | $cm^{-1}$ | 6 |

## Key Features

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

## Key Applications

- Gas Spectroscopy
- Photoacoustic Sensing
- Metrology

**These specifications may be changed without further notice.**

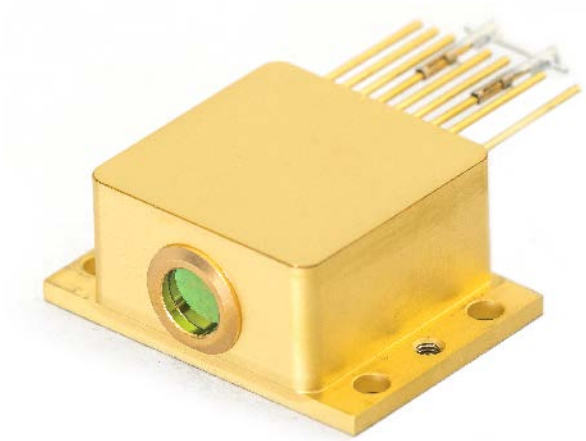
1. Each laser is specified with a single wavelength within the available range.
2. Each laser is specified with a single frequency within the available range.
3. For lasers in a LLH, HHL or TO3 housing, the chip operation temperature is guaranteed to be reachable with the housing at room temperature (+20°C). For lasers delivered as CoC a method of temperature control is required to operate the laser.
4. 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.
5. Lasers with output power lower than 20 mW are less expensive.
6. Lasers tune with the operation temperature and current. A minimum tuning range can be specified.

Quantum Cascade Lasers are mid-infrared light sources covering the mid-infrared (4 to 20 µm) and terahertz waves (1 to 6 THz).

Unlike the standard bipolar laser diodes, the wavelength emitted by QCL depends on the geometry of a heterostructure and not on band structure properties of the semiconductor material. This allows a precise tailoring of the wavelength emitted by the design of the band structure.

In a Distributed Feedback Laser, a grating is etched into the active region to force the operation of the laser at very specific wavelength determined by the grating periodicity. As a result, the laser emits on a single spectral setting which may be adjusted slightly by changing the temperature of the active region.

HHL package suitable for higher dissipation CW-DFB



TO3 package suitable for lower dissipation CW-DFB


LLH Box suitable for any CW-DFB and providing
the possibility of exchanging the laser by the customer.

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