

# UniMir DFB CW QCLs

## Perfect for **Xylene** and **Propane** monitoring

Wavelength:  $\sim 13.4 \mu\text{m}$   $\sim 746 \text{ cm}^{-1}$

Note:  $727 \text{ cm}^{-1}$ ,  $767 \text{ cm}^{-1}$  or  $795 \text{ cm}^{-1}$  are also available

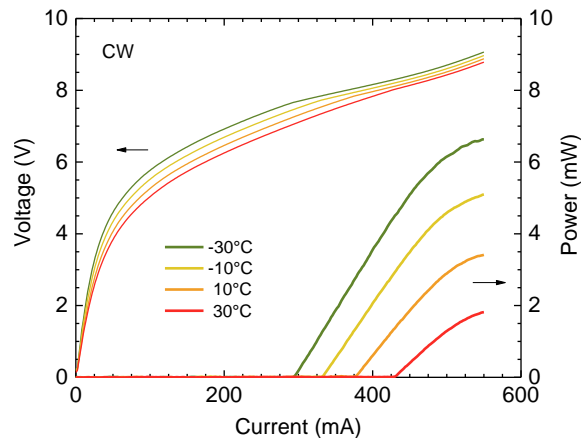


The UniMir products are Distributed Feedback (DFB) Quantum Cascade lasers (QCL) that emit CW (continuous wavelength) infrared light at room temperature. The laser is mounted on a thermoelectric cooler inside a sealed High Heat Load (HHL) package integrating a collimation lens and a thermistor to readout the laser chip temperature.

By controlling the chip's operating temperature through the Peltier element inside the laser's package, customers tune the emission wavelength without mode hopping while keeping a longitudinal single-mode operation.

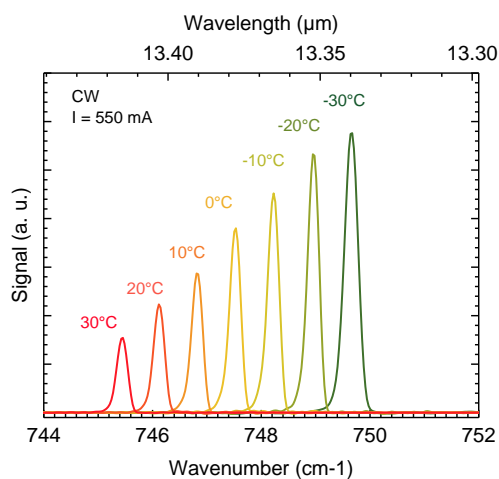


### Typical laser characteristics



*The curves on the left indicate the voltage of the laser as a function of the applied DC current and laser chip temperature.*

*The curves on the right indicate the output power as a function of the applied DC current and laser chip temperature.*



*Emission spectra as a function of the temperature of the laser chip.*

### Optical features

Laser type	QCL single mode DFB
Mode of operation	CW
Typical Optical Power at 746 cm <sup>-1(a)</sup>	5mW (with the base plate of the HHL-package at +20°C)
Full accessible wavelength range	~3 cm <sup>-1</sup>
Continuous tuning range	>1 cm <sup>-1</sup>
Side mode suppression ratio	SMSR > 25 dB
Linewidth (FWHM)	< 100 Mhz (free-running with suitable electronics)
Divergence	< 10mrad
Beam quality	TM00
Output beam diameter (window output)	Typically 4 mm
Polarization	Linear vertically polarized

<sup>(a)</sup> Please note that mirSense can also manufacture chips at 727cm<sup>-1</sup>, 767 cm<sup>-1</sup> or 795 cm<sup>-1</sup>

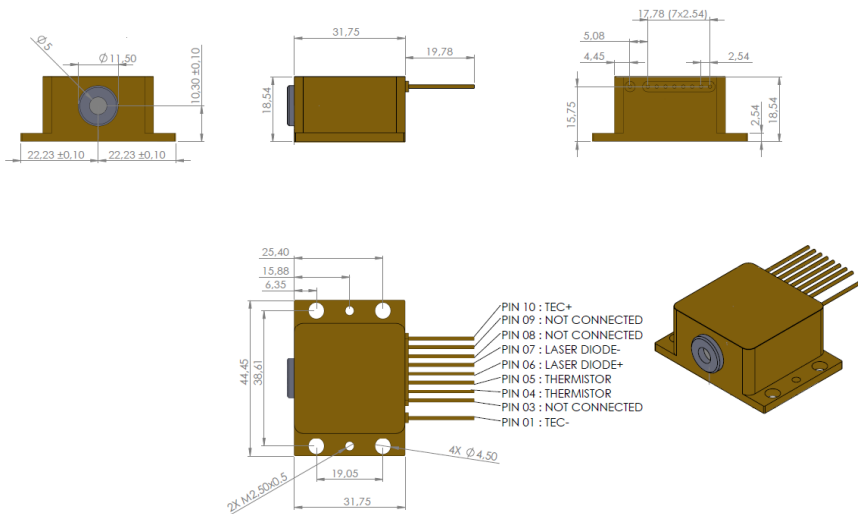
**Mechanical and electrical features**

Packaging	Sealed with nitrogen gas fill inside a High-Heat Load (HHL) package.
Operating temperature of the laser HHL casing	+10°C to +50°C <sup>(1)</sup>
Operating temperature of the QCL chip (for casing temperature < 20°C)	-20°C to +20°C <sup>(2)</sup>
Operating temperature of the QCL chip (for casing temperature equal to +45°C)	0°C to +20°C <sup>(2)</sup>
Storage temperature	+10°C to +50°C
Built-in temperature sensor	Thermistor $R_0 = 12 \text{ k}\Omega$ , @ 25°C, $\beta = 3740 \text{ K}^{-1}$

<sup>(1)</sup>Avoid water condensation

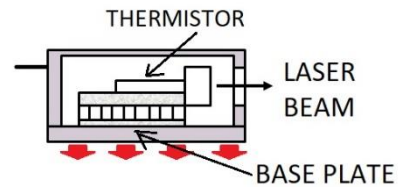
<sup>(2)</sup>The temperature of the QC-laser when operated is monitored by the built-in thermistor

**Drawings and pinout (dimensions in mm)**



**Electrical connections (pinout MPL):**

pin #	
1	TEC (-)
2	no pin
3	NC
4	Thermistor (12k $\Omega$ )
5	Thermistor (12k $\Omega$ )
6	QCL (+)
7	QCL (-)
8	NC
9	NC
10	TEC (+)



The above HHL-package diagram shows the built-in thermistor that indicates the laser chip temperature. The diagram also shows the base plate that dissipates the heat (because typically the built-in TEC will cool down the laser chip).