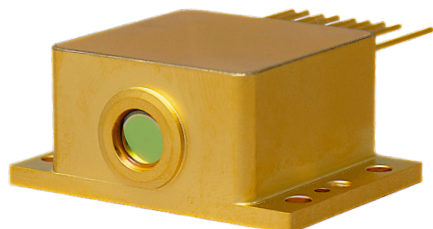


## High Heat Load Housing



Picture of a HHL with collimated beam output. The lens is inside the housing, protected by a tilted window with AR coating. HHL base to be attached on flat heatsink surface using M3 screws

The HHL housing is a sealed collimated housing for CW or pulsed lasers. It is ideal for short-run integration and use in difficult environments. The HHL housing is much smaller than the LLH and is completely sealed. The HHL contains a Peltier junction and a NTC temperature sensor (model 10K4CG), which can be controlled by the TC3 or your own temperature control system. Heat dissipation is

performed by thermal contact with its copper base; the heat dissipation capacity depends on the operation mode and environmental conditions.

There are three versions of the beam output:

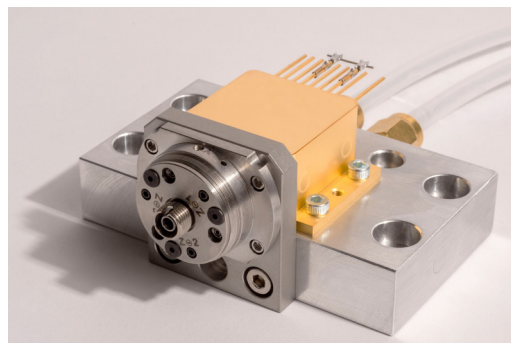
- In the standard version, the IR beam is collimated through a chalcogenide glass lens and goes through an AR-coated ZnSe window.
- In the uncollimated version, the lens is absent and the laser source is placed as close as possible from the ZnSe window for a divergent output
- In the pigtailed version a fiber port is added to the HHL and is provided with a ~1-m length of singlemode mid-IR optical fiber.

### Key Features

- Max Heat Load 13W
- Collimated output
- Fiber Pigtail connector available

### Key Applications

- Integration into industrial systems



Pigtailed HHL to be delivered with 1-m length of single-mode mid-IR optical fiber. The heatsink shown is also available separately with free-space HHL for easy water cooling.

### Specifications

PARAMETER NAME	PARAMETER VALUE				NOTE
	min	typical	max.	unit	
Size	44.5×31.7×19			mm <sup>3</sup>	This is the size of the free space HHL. The pigtailed HHL is installed on a fixed heatsink and contains an additional fiber port.
Max. Temperature Differential		30	45	°C	Max. Differential attainable at zero heat load.
Max. Heat Load		6	15	W	Max. heat load to keep chip at room temperature.
Temperature Sensor	NTC, 10 kOhm				
Beam Divergence (Free Space, X axis, < 4500 nm)	2	3,5	6	mrاد	Divergence, measured at 1/e <sup>2</sup> from the peak of the distribution. Uncollimated option also available.
Beam Divergence (Free Space, Y axis, < 4500 nm)	2	3	5	mrاد	Divergence, measured at 1/e <sup>2</sup> from the peak of the distribution. Uncollimated option also available.
Beam Divergence (Free Space, X axis, < 11000 nm)	4	5,5	11	mrاد	Divergence, measured at 1/e <sup>2</sup> from the peak of the distribution. Uncollimated option also available.
Beam Divergence (Free Space, Y axis, < 11000 nm)	3	4,5	8	mrاد	Divergence, measured at 1/e <sup>2</sup> from the peak of the distribution. Uncollimated option also available.
Pointing error		+/- 3		mrاد	Is defined as the FWHM along the fast axis. With respect to the package base reference plane given by pin openings.
ZnSe Window Coating	3-12			μm	The ZnSe window is tilted to avoid back-reflections
Beam Diameter (Free space)			4	mm	Diameter at window exit.
Beam Polarization (TM)	>98			%	Relative to package base plane
Package Sealing	<10 <sup>-6</sup>			cc He/sec	The QCL HHL package is hermetically sealed, the atmosphere inside the package is dry to prevent internal condensation, with <10 ppm H <sub>2</sub> O.
Fiber Connector (Pigtailed version)	FC/PC				
Fiber Coupling Efficiency (Pigtailed version)	5	15	50	%	The output power in a pigtailed housing will be lower than the output of the chip prior to encapsulation. The coupling is not adjustable, it is fixed and optimized for the expected temperature of operation.
Coupling Repeatability (Pigtailed version)		2,5		%	Repeatability with repeated fiber plugging/unplugging
Numerical Aperture (Pigtailed version)	0,3				
Fiber Length (Pigtailed version)	0,5	1		m	
Single Mode Fiber available			5	μm	Single-Mode Fluoride glass fiber is only available for wavelengths of 5 microns or shorter.
Storage Temperature	-10		63	°C	

These specifications apply for HHL housing with serial number above 2000.

If you have a housing from an older series please enquire for previous specifications.