7900 nm Fabry-Perot Quantum Cascade Laser, 500 mW (Min)

QF7900HB

Description

The QF7900HB is a single spatial mode, multi longitudinal mode, Fabry-Perot quantum cascade laser contained in a high heat load (HHL) package, designed and manufactured by Thorlabs. This laser operates in continuous wave (CW) mode at room temperature.

The QF7900HB has a collimated output and offers a standard HHL pinout for electrical and temperature control. Its package is sealed, although the seal is not hermetic. There is no monitor photodiode.

Specifications

Absolute Maximum Ratings (T_{chip} = 25 °C, CW Operation)	
Absolute Max Operating Current	Varies Between Devices[a]
Absolute Max Output Power	1.0 W
LD Reverse Voltage (Max)	1 V
PD Reverse Voltage (Max)	N/A
TEC Current (Max)	8 A
TEC Voltage (Max)	14 V
Operating Temperature	25 to 40 °C[b]
Storage Temperature	-40 to 85 °C[b]

a. The absolute maximum current is determined on a device-by-device basis and is listed on the device's data sheet.
b. Non-condensing environment. Single spatial mode performance is tested and guaranteed at 25 °C.

Thermistor Characteristics (T_{case} = 25 °C)				
	Symbol	**Min**	**Typical**	**Max**
Thermistor Resistance[a]	R_{th}	-	10 kΩ	-
Steinhart-Hart Coefficients (T_{case} = 25 °C)	A	-	1.129×10^{-3} K^{-1}	-
	B	-	2.341×10^{-4} K^{-1}	-
	C	-	0.878×10^{-7} K^{-1}	-

a. Thermistor resistance follows the Steinhart-Hart equation:

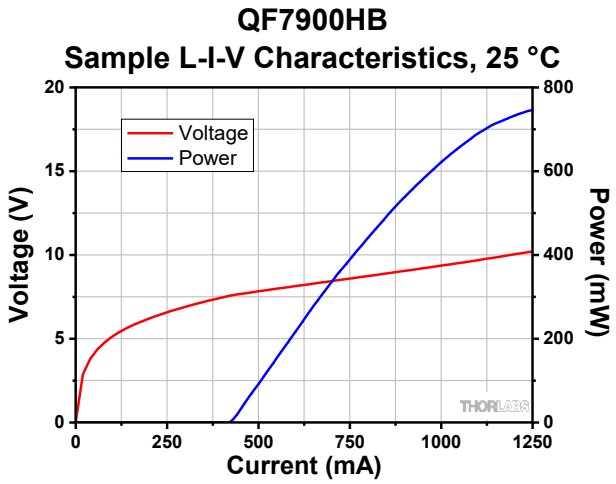
$$\frac{1}{T} = A + B(\ln R_{th}) + C(\ln R_{th})^3$$

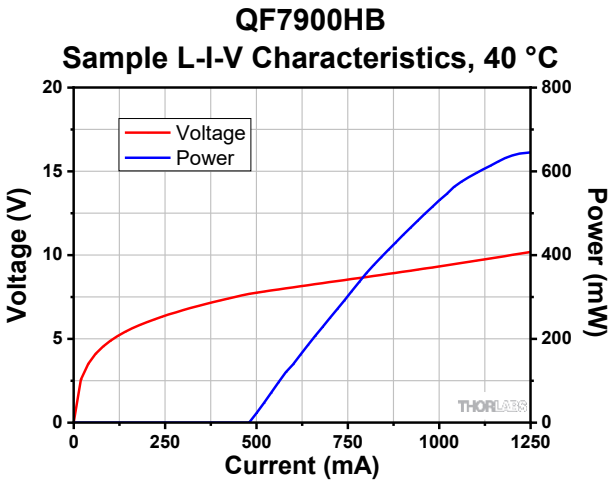
Specifications (Cont.)

Optical Electrical Characteristics (T_{chip} = 25 °C, CW Operation)					
		Symbol	Min	Typical	Max
Center Wavelength		λ	7.6 µm	7.9 µm	8.2 µm
Spectral Bandwidth (5 – 95% Integrated Power)		Δλ	400 nm	500 nm	-
Optical Output Power		P_{out}	500 mW	700 mW	1000 mW
Operating Current		I_{op}	-	0.9 A	1.6 A
Threshold Current		I_{th}	-	0.3 A	-
Forward Voltage		V_F	-	9 V	13 V
Beam Pointing	Parallel[a]	-	-0.75°	0°	+0.75°
	Perpendicular[a]	-	-2.75°	-2.0°	-1.25°
Beam Divergence Angle (FWHM)	Parallel[a]	$\theta_{\parallel}$	3 mrad	6 mrad	11 mrad
	Perpendicular[a]	$\theta_{\perp}$	3 mrad	6 mrad	11 mrad
M^2	Parallel[a]	$M^2_{\parallel}$	1.0	1.1	1.3
	Perpendicular[a]	$M^2_{\perp}$	1.0	1.1	1.3
Minimum Beam Diameter (D4σ Method)[b]		D	0.5 mm	1.5 mm	2.5 mm

a. For this laser, these terms are defined with respect to the plane of the base plate.
b. Obtained Using a Mid-IR Beam Profiling Camera

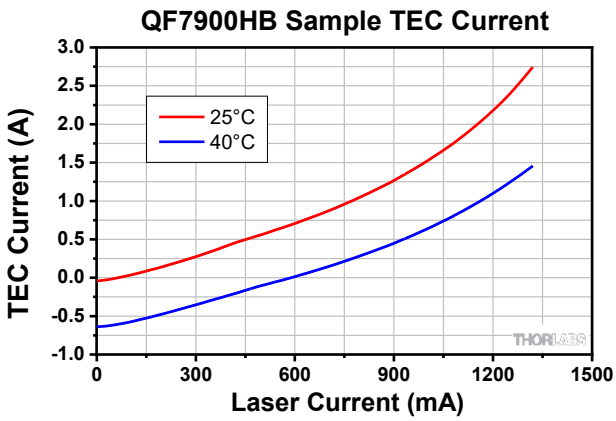
Sample Performance Plots

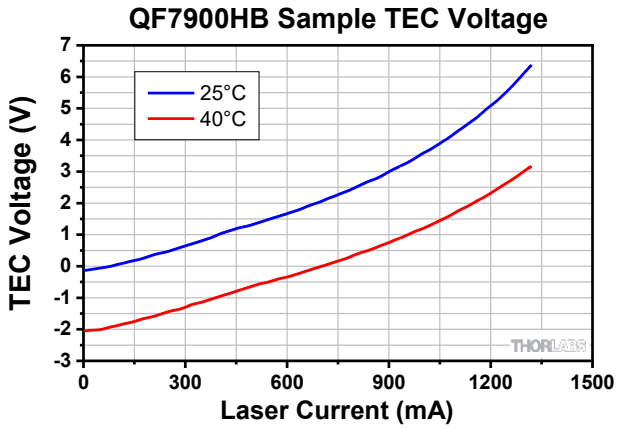




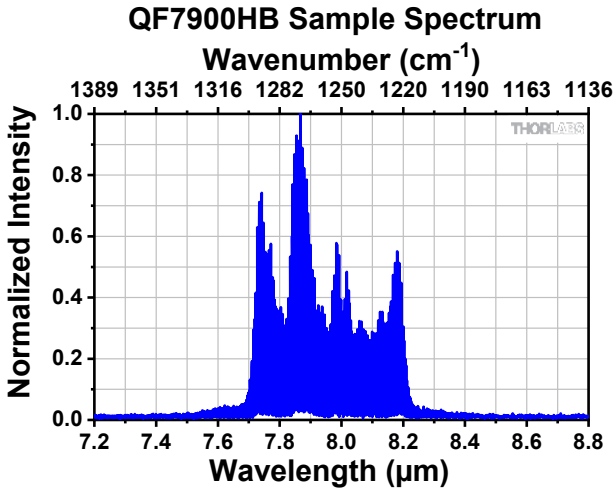
Temperature refers to that of the laser chip (T_{CHIP}).

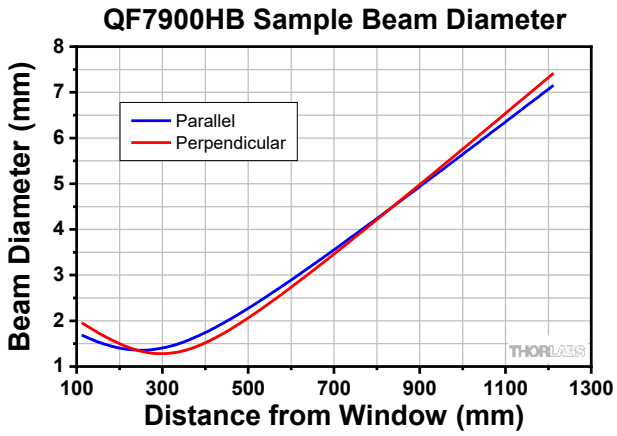
Sample Performance Plots (Cont.)

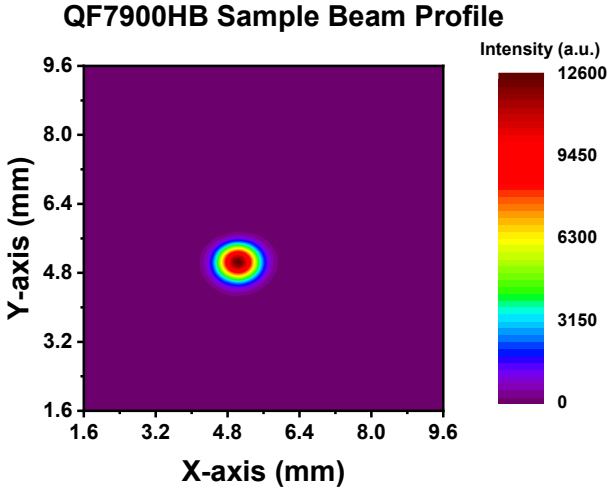




The data above is given at T_{CHIP}.

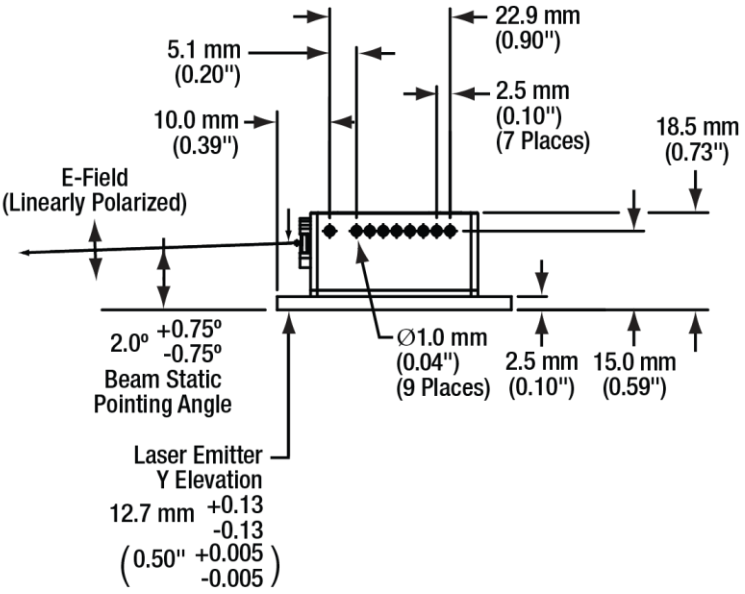


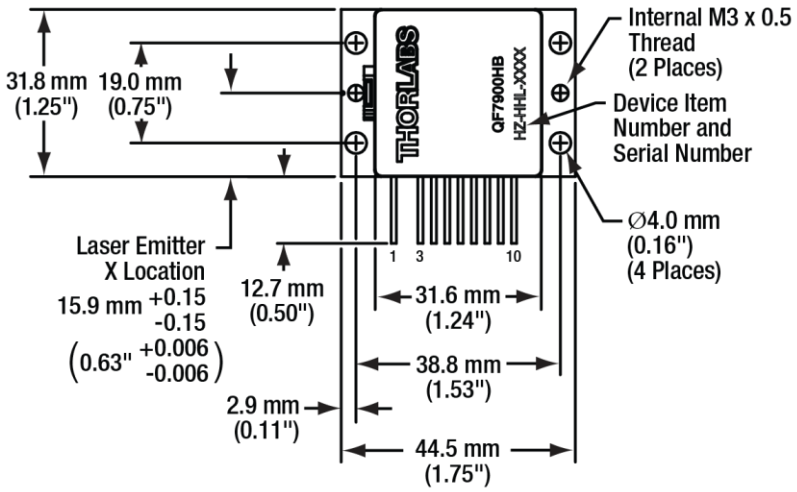




The beam profile was taken 310 mm from the sample.

Drawing for QF7900HB





Pin	Description
1	TEC (-)
2	Not Present
3	No Connection
4	Laser Anode (+)
5	TEC Control Thermistor, 10 kΩ
6	TEC Control Thermistor, 10 kΩ
7	Laser Cathode (-)
8	EEPROM (+)
9	EEPROM (-/Ground)
10	TEC (+)