8496 nm DFB Quantum Cascade Laser, 20 mW (Min)

QD8496HH

Description

The QD8496HH is a single spatial mode, single longitudinal mode, distributed feedback 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, and the lasing wavelength can be tuned across the wavelength of 8496 nm, making this laser ideal for Methane Isotopologue ($^{12}CH_3D$) sensing.

The QD8496HH 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} = 20 °C, CW Operation)	
Absolute Max Operating Current	Varies Between Devices[a]
Absolute Max Output Power	300 mW
LD Reverse Voltage (Max)	1 V
PD Reverse Voltage (Max)	N/A
TEC Current (Max)	4.5 A
TEC Voltage (Max)	6.5 V
Operating Temperature	15 to 45 °C[b]
Storage Temperature	0 to 85 °C

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 mode performance at the target wavelength is guaranteed within this range, with individual operating conditions listed on the device datasheet.

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

a. Thermistor resistance follows the Steinhart-Hart equation:

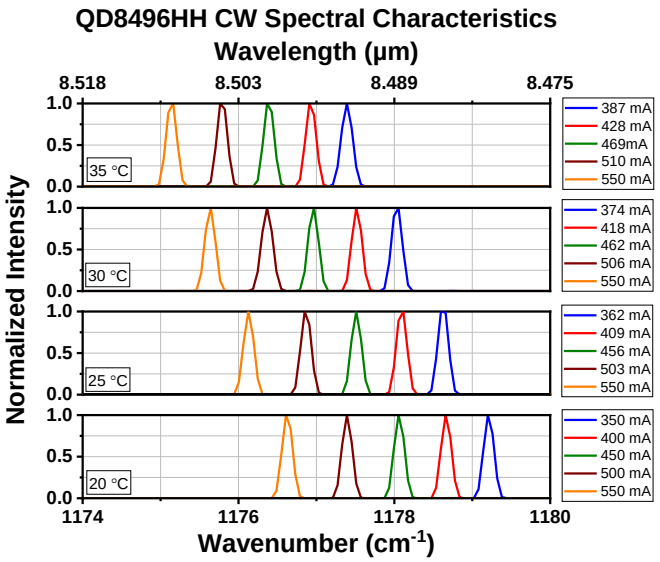
$$\frac{1}{T} = A + B(\ln R_{th}) + C(\ln R_{th})^3$$

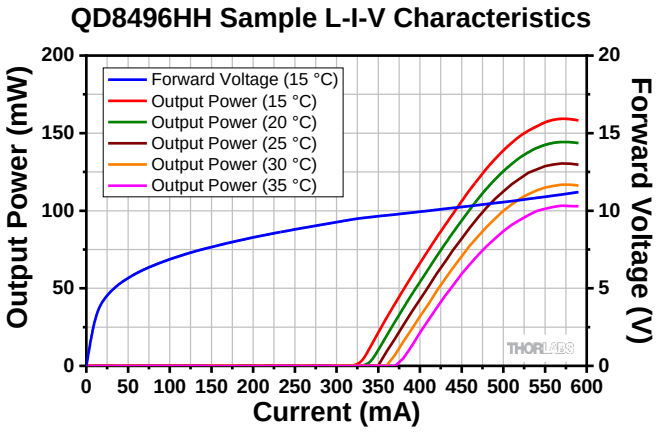
Specifications (Cont.)

Optical Electrical Characteristics (CW Operation)					
		Symbol	Min	Typical	Max
Center Wavelength		λ	-	8.496 µm	-
Operating Temperature		T_{op}	15 °C	-	45 °C
Tuning Range		$\Delta\bar{\nu}$	-	3 cm^{-1}	-
Temperature Tuning		$\Delta\bar{\nu}/\Delta T$	-	-0.1 $cm^{-1}/°C$	-
Side Mode Suppression		SMSR	20 dB	-	-
Optical Output Power		P_{out}	20 mW	100 mW	-
Operating Current		I_{op}	-	500 mA	800 mA
Threshold Current		I_{th}	-	350 mA	-
Forward Voltage		V_F	-	10 V	14 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

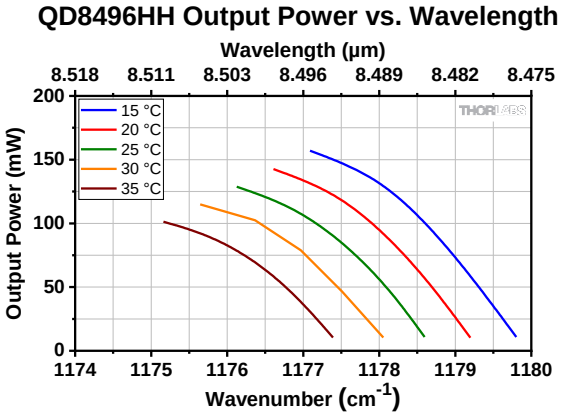
a. For this laser, these terms are defined with respect to the plane of the base plate.
b. Obtained by scanning a razor across the beam and measuring the points where 10% of the total beam intensity and 90% of the total beam intensity are observed.

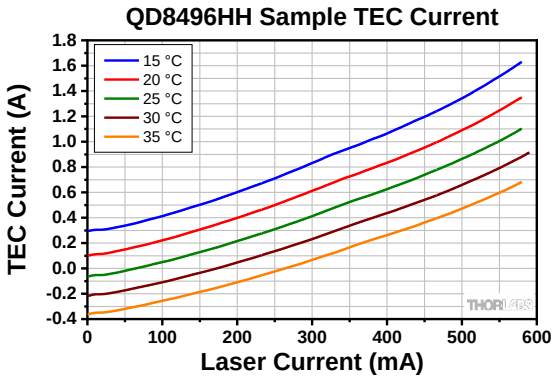
Sample Performance Plots

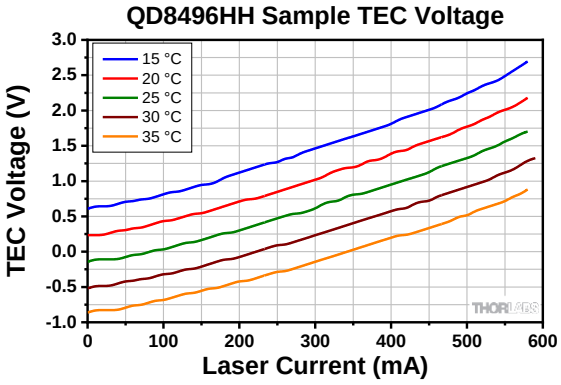


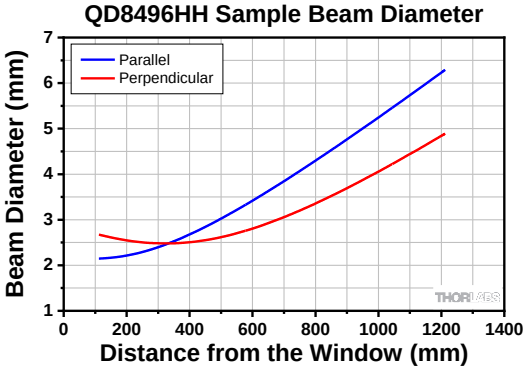


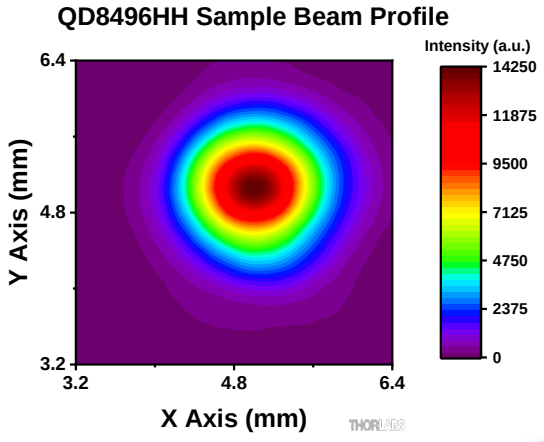
Sample Performance Plots (Cont.)



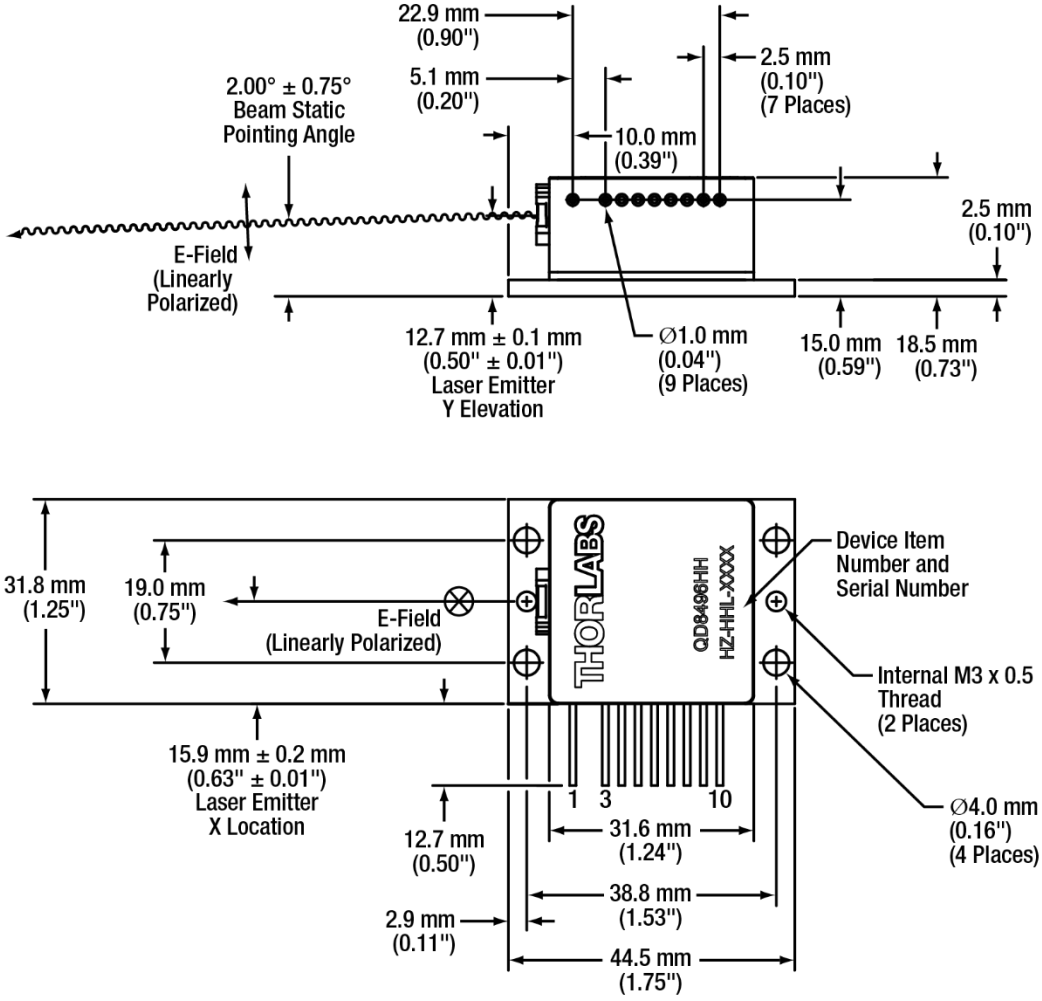








Drawings for QD8496HH



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