8500 nm Quantum Cascade Laser, 100 mW

QD8500HHLH

Description

The QD8500HHLH 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.

The QD8500HHLH 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	250 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 50 °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 mode performance is tested and guaranteed at 20° C.

Thermistor Characteristics (T_{case} = 25 °C)				
	Symbol	**Min**	**Typical**	**Max**
Thermistor Resistance[c]	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}	-

c. Thermistor resistance follows the Steinhart-Hart equation:

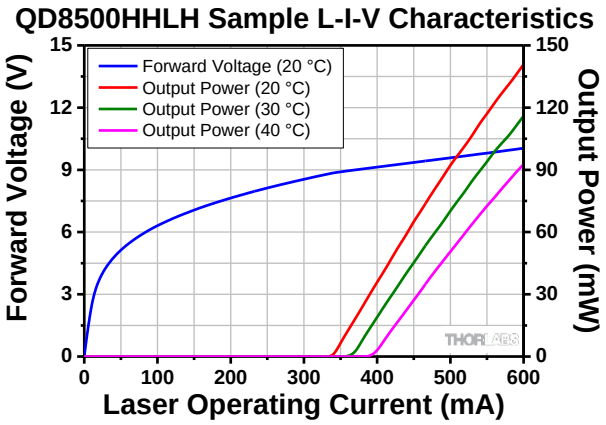
$$\frac{1}{T} = A + B(\ln R_{th}) + C(\ln R_{th})^3$$

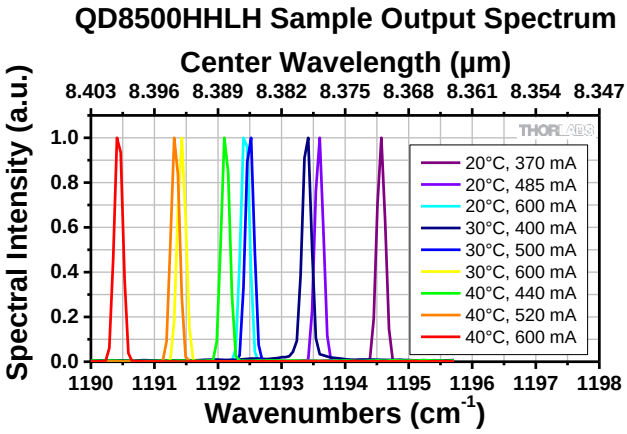
Specifications (Cont.)

Optical Electrical Characteristics (T_{chip} = 20 °C, CW Operation)					
		Symbol	Min	Typical	Max
Center Wavelength		λ	8.00 µm	-	9.00 µm
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}	-	-	600 mA
Threshold Current		I_{th}	-	380 mA	450 mA
Forward Voltage		V_F	-	10.2 V	14.0 V
Beam Pointing	Parallel[d]	-	-1.5°	0°	+1.5°
	Perpendicular[d]	-	-3.5°	-2.0°	-0.5°
Beam Divergence Angle (FWHM)	Parallel[d]	$\theta_{\parallel}$	3 mrad	6 mrad	10.5 mrad
	Perpendicular[d]	$\theta_{\perp}$	3 mrad	6 mrad	10.5 mrad
M^2	Parallel[d]	$M^2_{\parallel}$	1.0	1.1	1.3
	Perpendicular[d]	$M^2_{\perp}$	1.0	1.1	1.3
Minimum Beam Diameter (D4σ Method)		D	1.0 mm	1.4 mm	2.5 mm

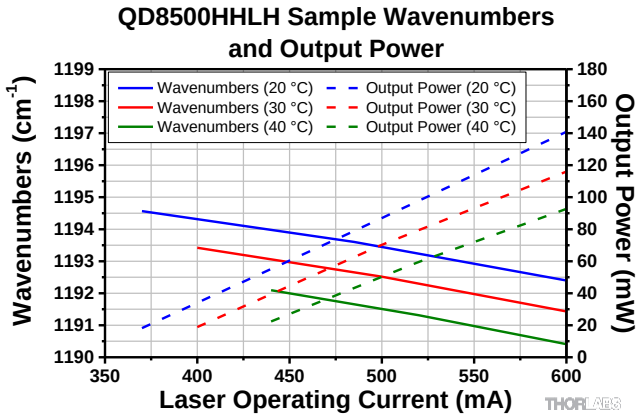
d. For this laser, these terms are defined with respect to the plane of the base plate.

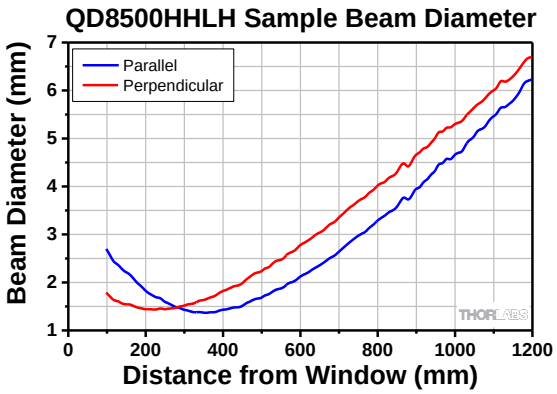
Sample Performance Plots

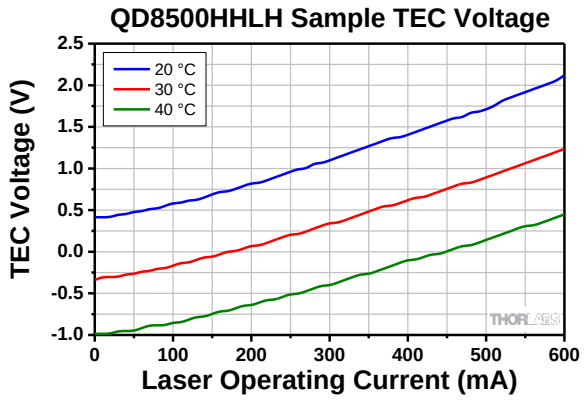


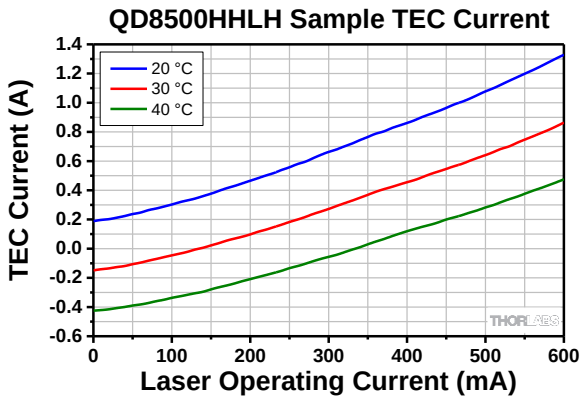


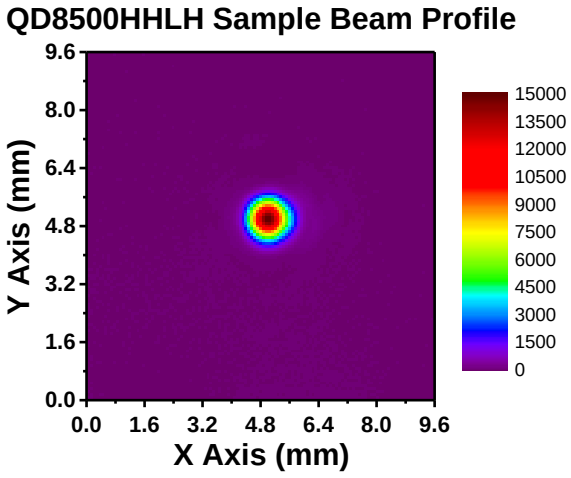
Sample Performance Plots (Cont.)



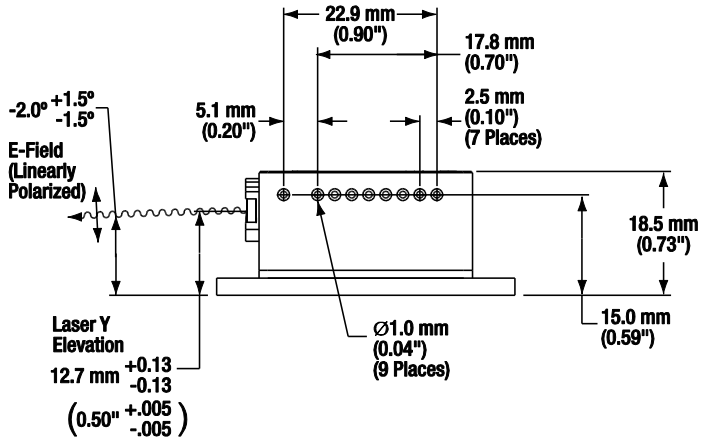


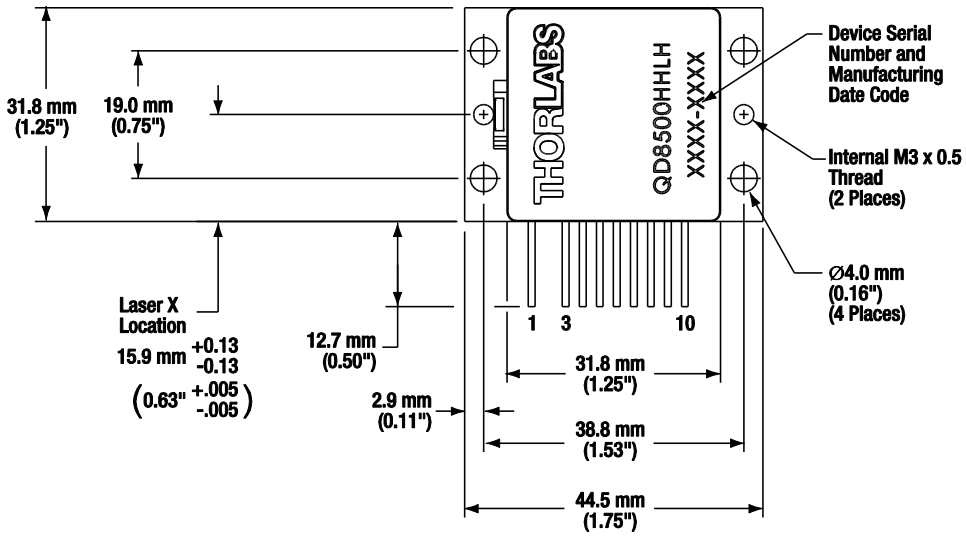






Drawings for QD8500HHLH





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	No Connection
9	No Connection
10	TEC (+)