

9500 nm Quantum Cascade Laser, 100 mW

QD9500HHLH



Description

The QD9500HHLH 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 QD9500HHLH 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 ($T_{\text{chip}} = 20^{\circ}\text{C}$, 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 $^{\circ}\text{C}^{\text{b}}$
Storage Temperature	-40 to 85 $^{\circ}\text{C}^{\text{b}}$



- The absolute maximum current is determined on a device-by-device basis and is listed on the device's data sheet.
- Non-condensing environment. Single mode performance is tested and guaranteed at 20 $^{\circ}\text{C}$.

Thermistor Characteristics ($T_{\text{case}} = 25^{\circ}\text{C}$)				
	Symbol	Min	Typical	Max
Thermistor Resistance ^c	R_{th}	-	10 k Ω	-
Steinhart-Hart Coefficients ($T_{\text{case}} = 25^{\circ}\text{C}$)	A	-	$1.129 \times 10^{-3} \text{ K}^{-1}$	-
	B	-	$2.341 \times 10^{-4} \text{ K}^{-1}$	-
	C	-	$0.878 \times 10^{-7} \text{ K}^{-1}$	-

- Thermistor resistance follows the Steinhart-Hart equation:

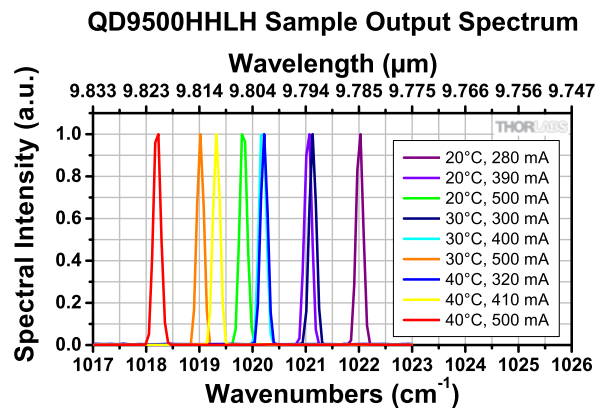
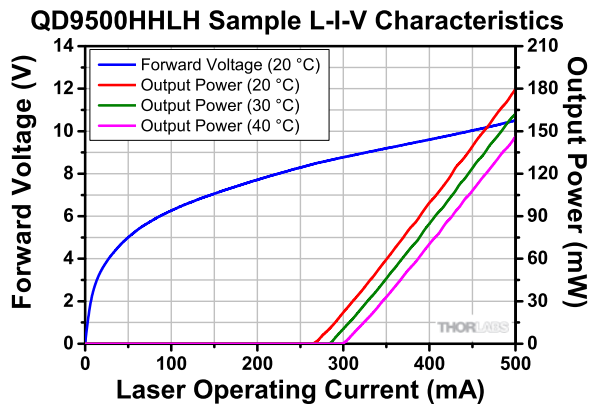
$$\frac{1}{T} = A + B(\ln R_{\text{th}}) + C(\ln R_{\text{th}})^3$$

Specifications (Cont.)

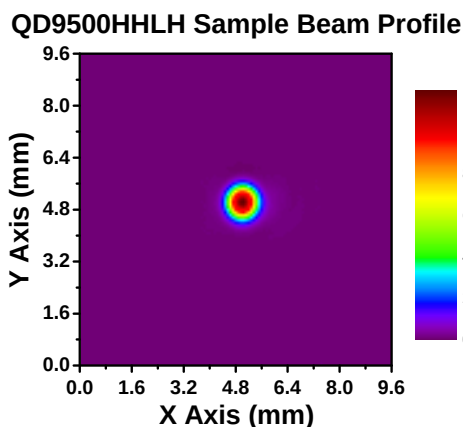
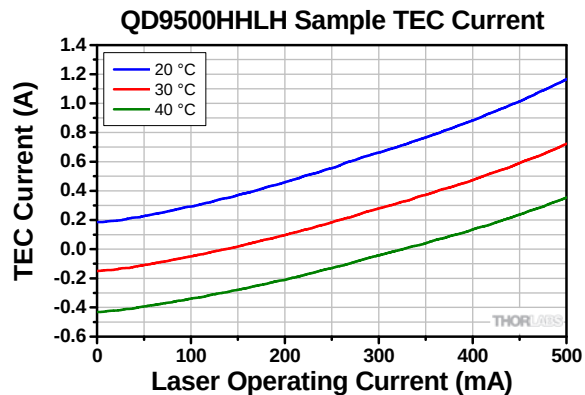
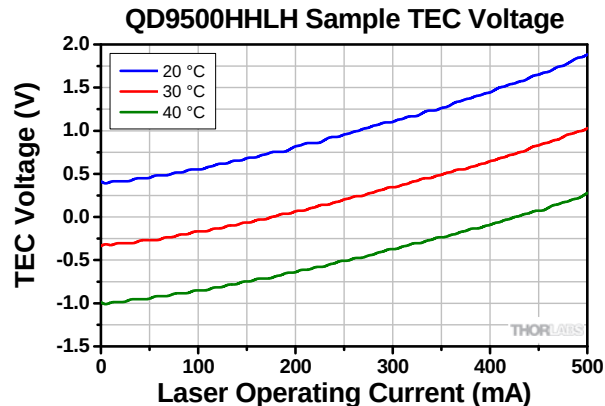
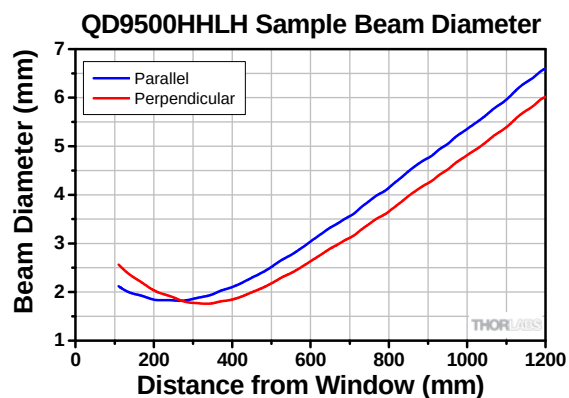
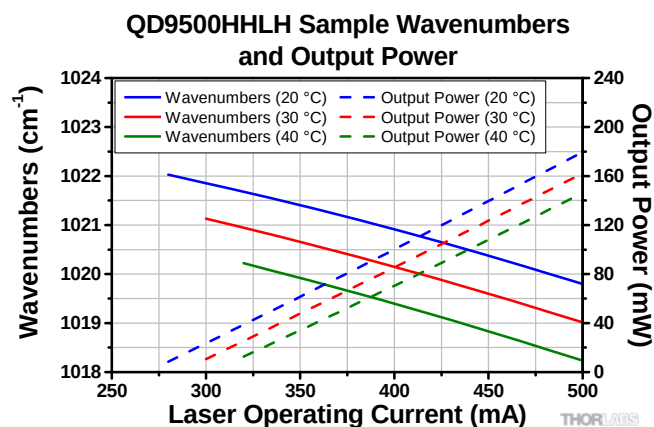
Optical Electrical Characteristics ($T_{\text{chip}} = 20\text{ }^{\circ}\text{C}$, CW Operation)					
	Symbol	Min	Typical	Max	
Center Wavelength	λ	9.00 μm	-	10.00 μm	
Temperature Tuning	$\Delta\bar{\nu}/\Delta T$	-	-0.1 $\text{cm}^{-1}/^{\circ}\text{C}$	-	
Side Mode Suppression	SMSR	20 dB	-	-	
Optical 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 $^{\circ}$	0 $^{\circ}$	+1.5 $^{\circ}$
	Perpendicular ^d	-	-3.5 $^{\circ}$	-2.0 $^{\circ}$	-0.5 $^{\circ}$
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 (D4 σ 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.

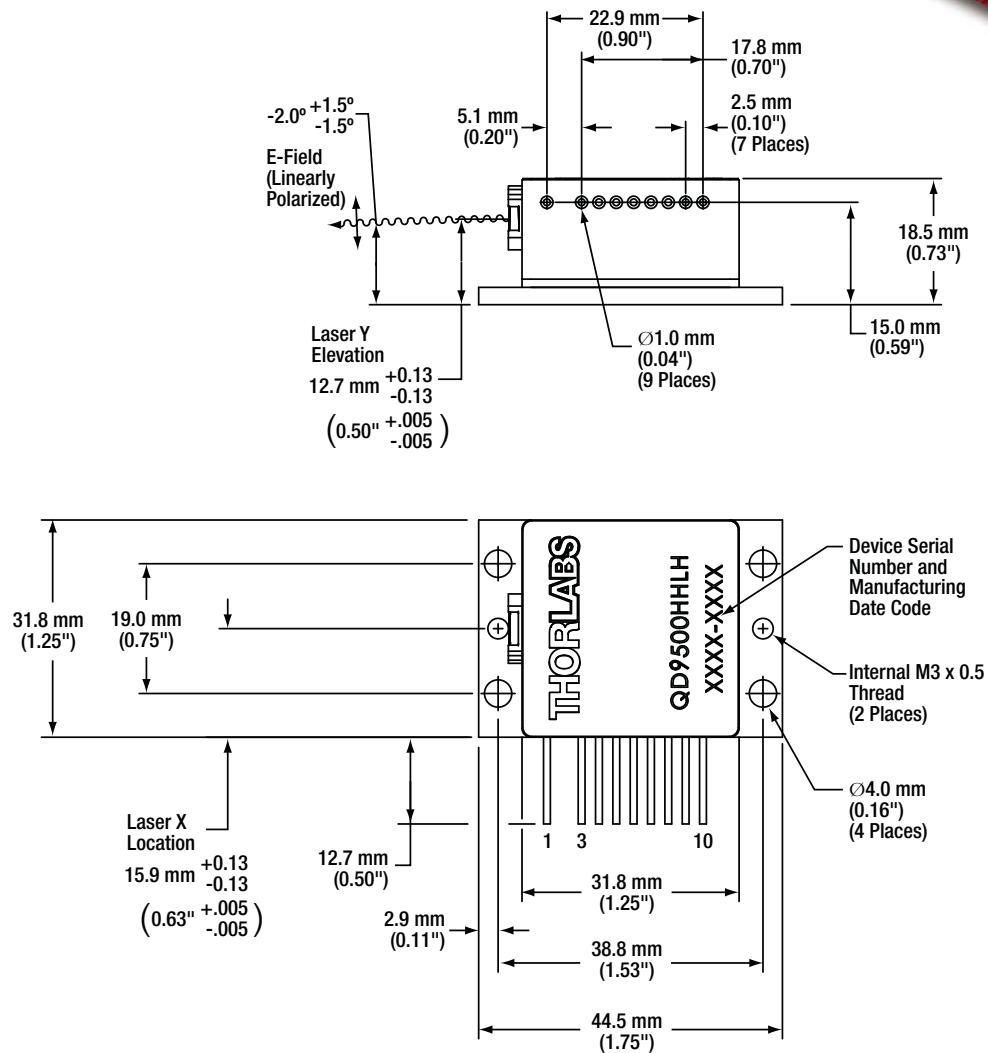
Sample Performance Plots



Sample Performance Plots (Cont.)



Drawings for QD9500HHLH



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 (+)