

5500 nm DFB Quantum Cascade Laser, 150 mW

QD5500HHLH



Description

The QD5500HHLH 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 QD5500HHLH 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

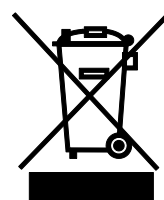
Absolute Maximum Ratings ($T_{\text{chip}} = 20\text{ }^{\circ}\text{C}$, CW Operation)	
Absolute Max Operating Current	Varies Between Devices ^a
Absolute Max Output Power	400 mW
LD Reverse Voltage (Max)	1 V
PD Reverse Voltage (Max)	N/A
TEC Current (Max)	4.5 A
TEC Voltage (Max)	6.5 V
Operating Temperature	20 to 40 $^{\circ}\text{C}$ ^b
Storage Temperature	0 to 85 $^{\circ}\text{C}$ ^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 - 40 $^{\circ}\text{C}$.

Thermistor Characteristics ($T_{\text{case}} = 25\text{ }^{\circ}\text{C}$)				
	Symbol	Min	Typical	Max
Thermistor Resistance ^a	R_{th}	-	10 k Ω	-
Steinhart-Hart Coefficients ($T_{\text{case}} = 25\text{ }^{\circ}\text{C}$)	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:

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



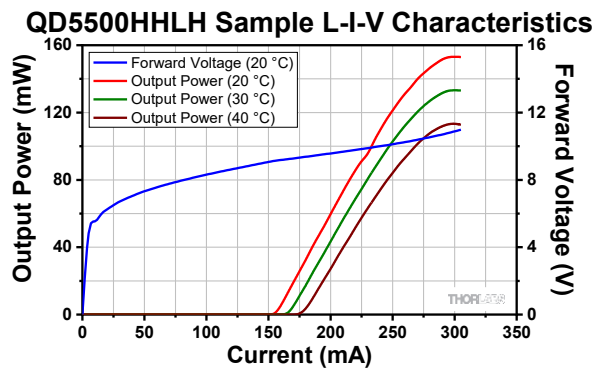
Specifications (Cont.)

Optical Electrical Characteristics ($T_{\text{chip}} = 20\text{ }^{\circ}\text{C}$, CW Operation)				
	Symbol	Min	Typical	Max
Center Wavelength	λ	5.00 μm	-	6.00 μm
Tuning Range	$\Delta\bar{\nu}$	-	3 cm^{-1}	-
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	150 mW	-
Operating Current	I_{op}	-	300 mA	500 mA
Threshold Current	I_{th}	-	150 mA	-
Forward Voltage	V_F	-	11 V	14 V
Beam Pointing	Parallel ^a	-	-0.75 $^{\circ}$	0 $^{\circ}$
	Perpendicular ^a	-	-2.75 $^{\circ}$	-1.25 $^{\circ}$
Beam Divergence Angle (FWHM)	Parallel ^a	$\theta_{\parallel}$	3 mrad	6 mrad
	Perpendicular ^a	$\theta_{\perp}$	3 mrad	6 mrad
M^2	Parallel ^a	$M^2_{\parallel}$	1.0	1.1
	Perpendicular ^a	$M^2_{\perp}$	1.0	1.1
Minimum Beam Diameter (D4 σ Method) ^b	D	0.5 mm	1.5 mm	2.5 mm

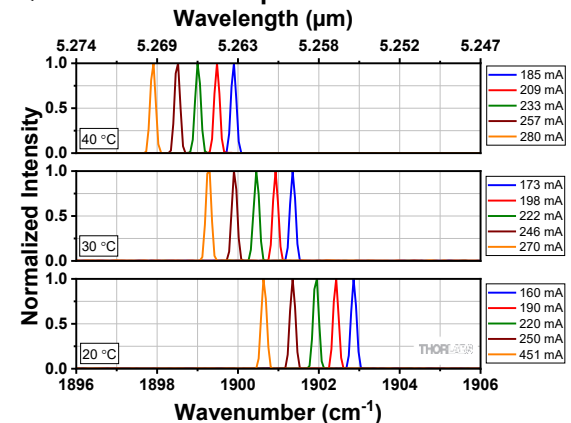
a. For this laser, these terms are defined with respect to the plane of the base plate.

b. Obtained Using a Mid-IR Beam Profiling Camera

Sample Performance Plots

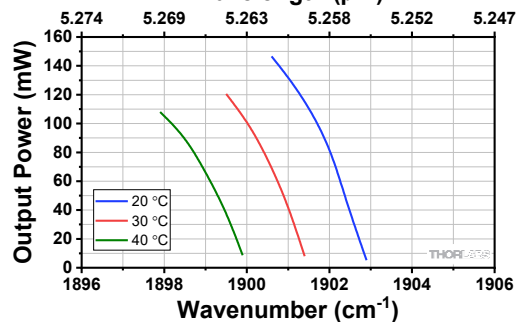


QD5500HHLH CW Spectral Characteristics

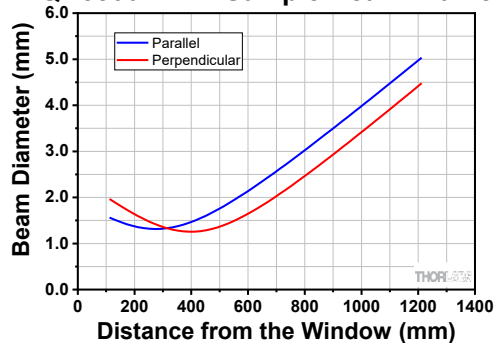


Sample Performance Plots (Cont.)

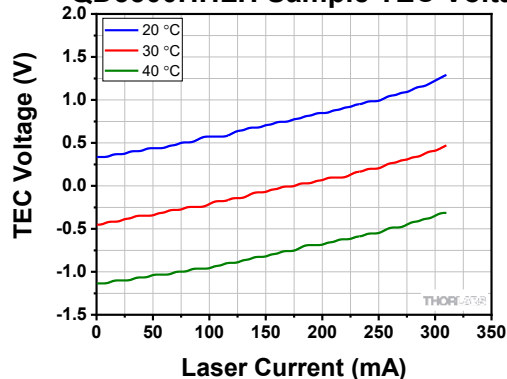
QD5500HHLH Output Power vs. Wavelength



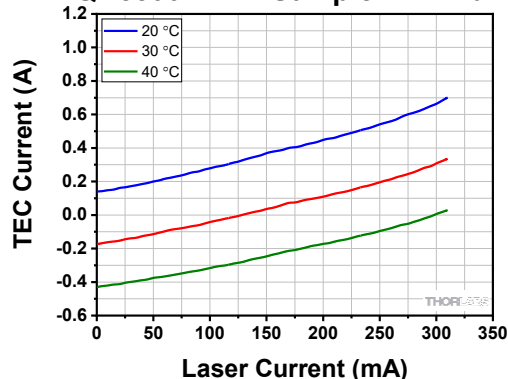
QD5500HHLH Sample Beam Diameter



QD5500HHLH Sample TEC Voltage



QD5500HHLH Sample TEC Current



QD5500HHLH Sample Beam Profile

