

**HIGH HEAT LOAD (HHL) PACKAGE**

**OVERVIEW**

- Thermo-electrically cooled. External heat sink still required.
- Sealed in a nitrogen-purged atmosphere.
- Package dimensions (approx): **45 x 32 x 18 mm (excluding pins).**

**HHL SPECIFICATIONS**

Model No		HHL – xx – xx	HHL –xx – xxHP	Units
TEC Parameters (25 °C)	Max. Heat Capacity	65.0	100.0	W
	Max. Current	7.9	4.9	A
	Max. Voltage	14.4	34.0	V
	Typ. Resistance	3.0	6.0	$\Omega$
Temperature Sensor	Type	10.0 k $\Omega$ Thermistor	RTD 100	----
	Constant	A = 1.12924 e-3 B = 2.34108 e-4 C = 0.87755 e-7	A = 3.9848 e-3 B = -0.5870 e-6 C = 4.0000 e-12	----
Window	Material	ZnSe		----
	Thickness	1		mm
	Diameter	12.7		mm
	Transmission	> 95		%
Lens	Type	Aspheric		----
	Spectral Range	MWIR		----
Weight (approx.)		110.0		g

**LASER SPECIFICATIONS**

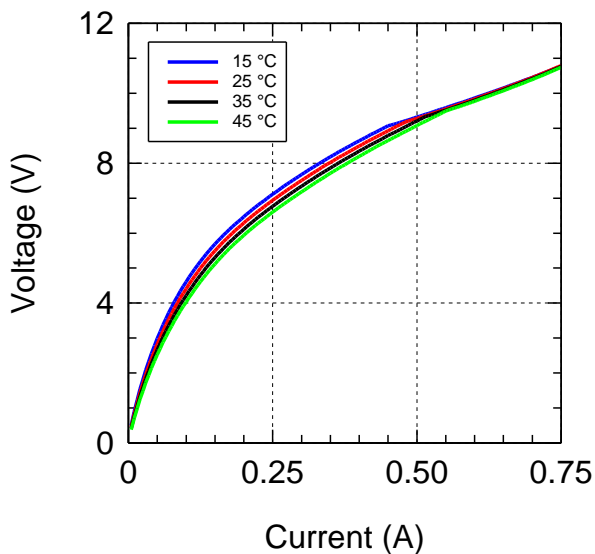
		Specs	Units
Process		DFB	----
Cavity Dimensions	Emitter Width	8	$\mu\text{m}$
	Cavity Length	2	mm
Typ. Thermal Resistance		10.0	K/W
Oper. Temperature		15 – 45	$^{\circ}\text{C}$
Facet Coating	Front	AR	----
	Back	HR	----



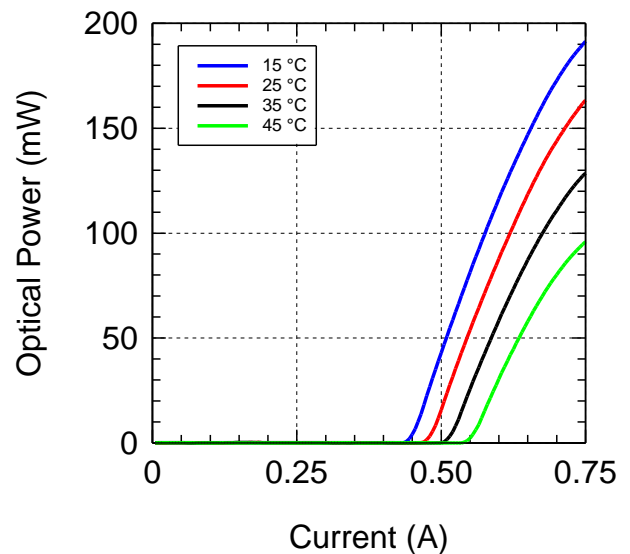
ELECTRO-OPTICAL CHARACTERIZATION <sup>(1)</sup>

		Specs				Units
Driving Conditions	Operation Mode	CW				--
	Temperature	15	25	35	45	$^{\circ}\text{C}$
Electrical	Thresh. Current	0.43	0.47	0.50	0.54	A
	Max. Current	0.75	0.75	0.75	0.75	A
	Thresh. Voltage	8.9	9.1	9.2	9.4	V
	Max. Voltage	10.7	10.7	10.7	10.7	V
	Laser Efficiency <sup>(2)</sup>	2.4	2.0	1.6	1.2	%
Optical	Max. Power Output	191.4	163.3	128.6	95.9	mW
	Center Wavelength <sup>(3)</sup>	9.614	9.623	9.631	9.654	$\mu\text{m}$

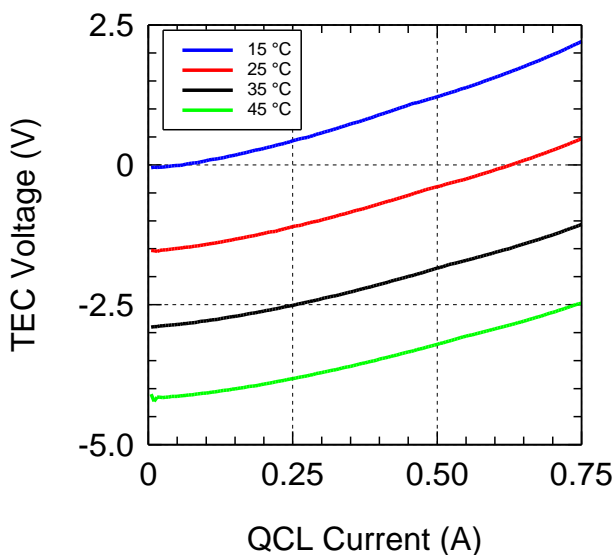
V – I curve under CW



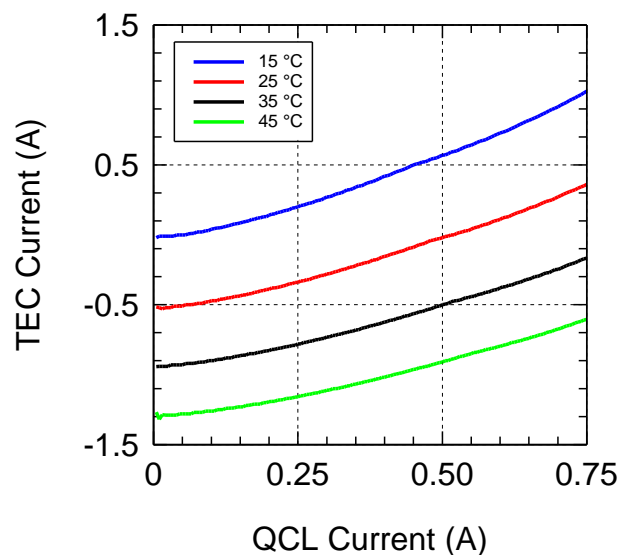
L – I curve under CW



TEC V – QCL I curve under CW<sup>(1)</sup>

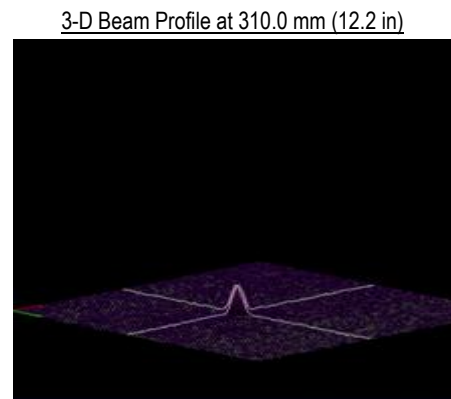
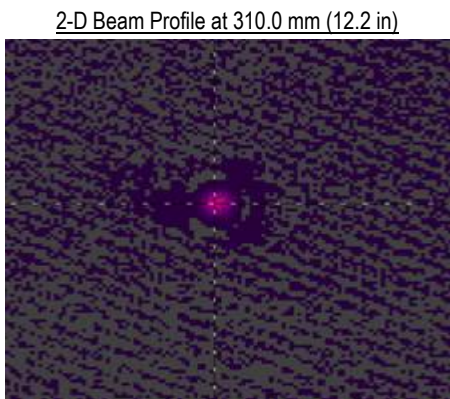
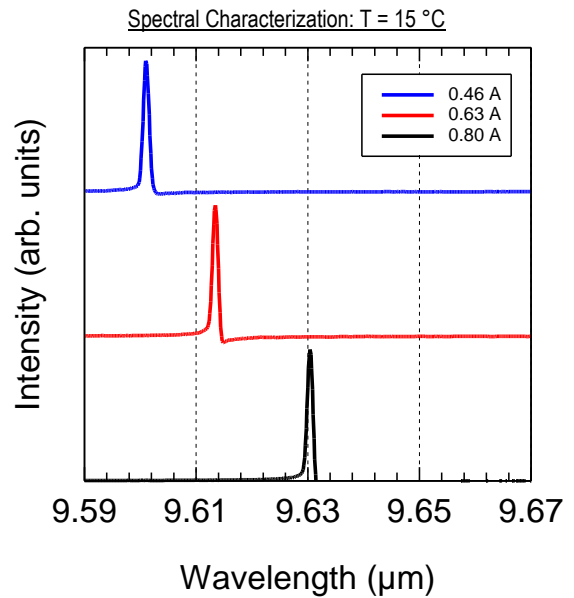
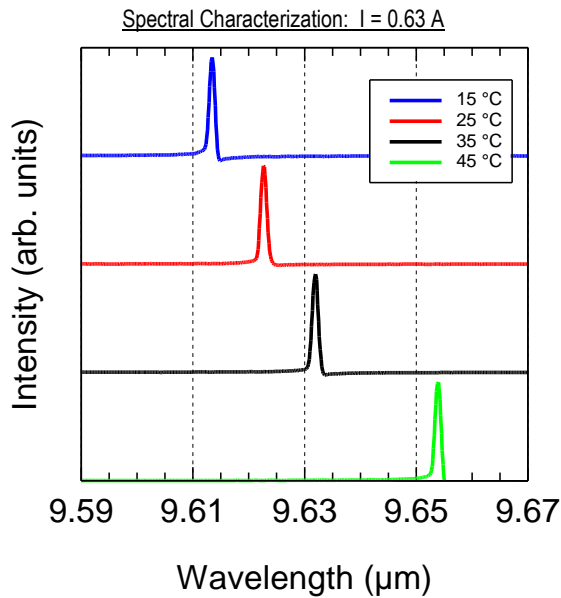


TEC I – QCL I curve under CW<sup>(1)</sup>



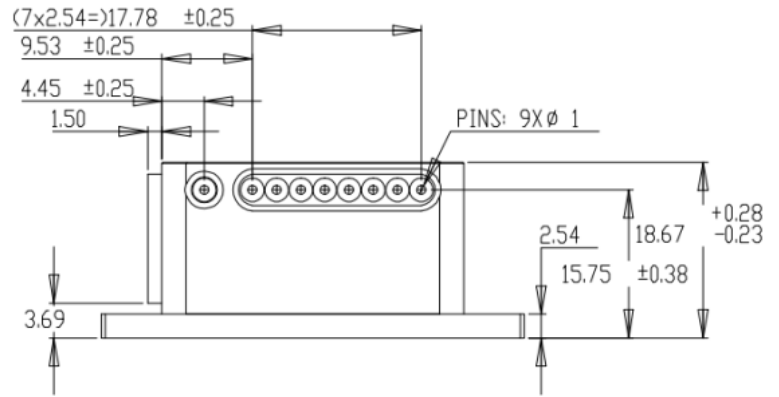
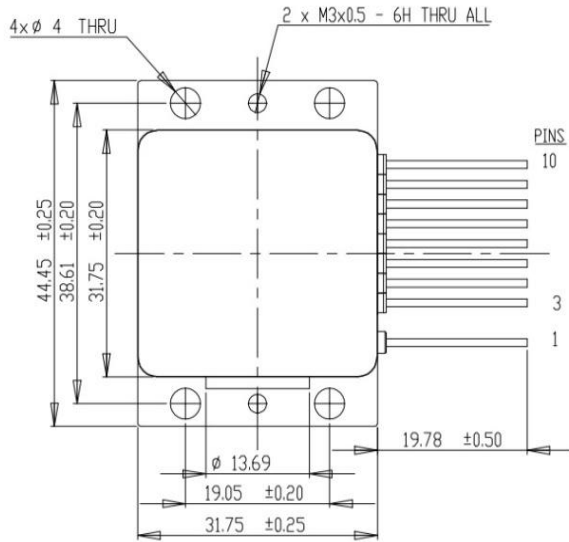
SPECTRAL CHARACTERIZATION AND BEAM QUALITY <sup>(1)</sup>

		Specs		Units
Driving Conditions	Operation Mode	CW		---
Wavelength Tuning <sup>(4)</sup>	Temperature	0.90		nm/K
	Current	80.0		nm/A
SMSR		30		dB
Beam Profile <sup>(5)</sup>	Optical Planes	Lateral	Vertical	---
	Full Beam Waist	0.66	0.52	mm
	Beam Waist Location	316.2	314.0	mm
	Divergence Angle	9.24	11.61	mrad
	M <sup>2</sup>	N/A	N/A	---



HHL DIMENSIONS

- Dimension: **mm**
- Linear Vertical Beam Polarization
- Device is not grounded

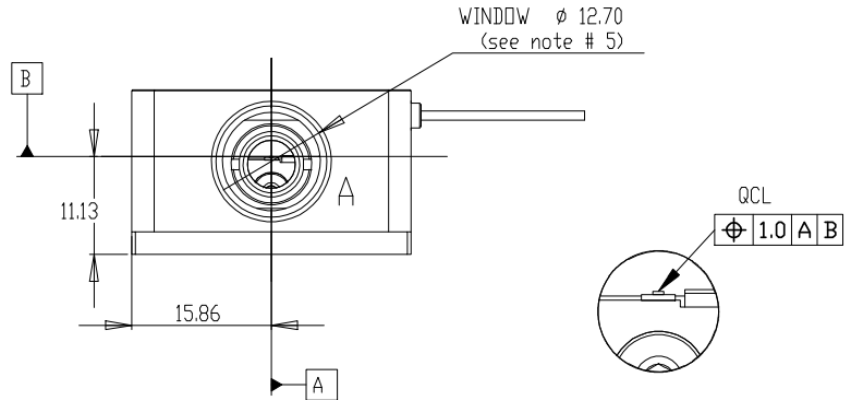


PIN LAYOUT

- |                       |                       |
|-----------------------|-----------------------|
| Pin 1: TEC (-)        | Pin 6: Thermal Sensor |
| Pin 2: Not Installed  | Pin 7: Laser (-)      |
| Pin 3:                | Pin 8:                |
| Pin 4: Laser (+)      | Pin 9: TEC (+)        |
| Pin 5: Thermal Sensor | Pin 10: TEC (+)       |

NOTES

- All Dimensions in Millimeters
- Tolerance: 0.13 mm (unless otherwise noted)
- TEC: Details Specs. Upon Request
- Thermal Sensor: RTD 100 or 10k Thermistor
- ZnSe Window:  
AR Coated: 3-7  $\mu\text{m}$  or 7-14  $\mu\text{m}$  (upon request)
- Collimating Lens Inside (upon request)



- Device was secured to a water-cooled external heat sink set to  $T = 15^\circ\text{C}$
- Not including TEC
- Driving Current  $I = 0.62\text{ A}$
- Temperature tuning measurement taken from  $T = 15^\circ\text{C} - 35^\circ\text{C}$ .  
Current tuning measurement taken from  $I = 0.46\text{ A} - 0.80\text{ A}$ .
- $I = 0.46\text{ A}$ ,  $V = 9.1\text{ V}$ ,  $T = 15^\circ\text{C}$ , Measured at  $1/e^2$

