TOPTICA EAGLEYARD

EYP-ECL-0770-00080-1500-BFW01-0005

Revision 0.71

2023-10-25

SINGLE FREQUENCY LASER
External Cavity Diode Laser

General Product Information

Product	Application
770 nm mini-ECL	Spectroscopy (K D1 line)
with hermetic 14-Pin Butterfly Housing (RoHS compliant)	Metrology
including Monitor Diode, Thermoelectric Cooler and Thermistor	Quantum Technology
with integrated Beam Collimation	

Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Storage Temperature	T_S		-40		85	Stress in excess of one of the Absolute Maximum Ratings may damage the laser. Please note that a damaging optical power level may occur although the maximum current is not reached. These are stress ratings only, and functional operation at these or any other conditions beyond those indicated under Recommended Operational Conditions is not implied.
Operational Temperature at Case	T_C	°C	-40		85	
Operational Temperature at Chip	T_{chip}	°C	-5		50	
Forward Current	I_F	mA			200	
Reverse Voltage	V_R	V			2	
Output Power	P_{opt}	mW			100	
TEC Current	I_{TEC}	A			1.1	
TEC Voltage	V_{TEC}	V			2.8	

Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Operational Temperature at Case	T_{case}	°C	-20		65	
Operational Temperature at Chip	T_{chip}	°C	0		40	measured by integrated Thermistor
Forward Current	I_F	mA			180	
Output Power	P_{opt}	mW	20		80	

Characteristics = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Center Wavelength	λ_C	nm	769	770	771	
Target Wavelength	λ_T	nm		770.1		reached within TLD = 0° C … 45° C
Linewidth	$\Delta\lambda$	MHz		0.1	0.3	measured in the time scale of 1 ms
Mode-hop free Tuning Range	$\Delta\lambda_{tune}$	pm		15		By current tuning, at target wavelength
Output Power	P_{opt}	mW			80	
Sidemode Suppression Ratio	SMSR	dB	30	50		Popt = 80 mW
Temp. Coefficient of Wavelength	$d\lambda / dT$	nm/K		0.008		
Current Coefficient of Wavelength	$d\lambda / dI$	nm/mA		0.001		

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Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Laser Current	I_{LD}	mA			180	
Slope Efficiency	η	mW/mA	0.6	0.8	1	
Threshold Current	I_{th}	mA			90	
Divergence parallel	$\Theta_{\parallel}$	mrad		2		1/e² (full angle)
Divergence perpendicular	$\Theta_{\perp}$	mrad		2		1/e² (full angle)
Beam Diameter horizontal	$d_{\parallel}$	mm		1	1.2	1/e² ,parallel to the base plate of the housing (see p. 3)
Beam Diameter vertical	$d_{\perp}$	mm		0.8	1.2	perpendicular to base plate of the housing (see p. 3)
Degree of Polarization	DOP	%		90		Popt = 80 mW; E field perpendicular to the base plate

Monitor Diode

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Monitor Detector Responsivity	I_{mon} / P_{opt}	µA/mW	0.5		100	5 V

Thermoelectric Cooler

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Current	I_{TEC}	A		0.4		Popt = 80 mW, ΔT = 20 K
Voltage	U_{TEC}	V		1.3		Popt = 80 mW, ΔT = 20 K
Power Dissipation (total loss at case)	P_{loss}	W		0.5		Popt = 80 mW, ΔT = 20 K
Temperature Difference	ΔT	K			50	Popt = 80 mW, ΔT = |Tcase - TLD|

Thermistor (Standard NTC Type)

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Resistance	R	kΩ		10		Tchip = 25° C
Beta Coefficient	β			3892		R_1/R_2 = e^β(1/T_1 - 1/T_2) at Tchip = 0° … 50° C
Steinhart & Hart Coefficient A	A			1.1293×10^{-3}		1/T = A + B(ln R) +C(ln R)³
Steinhart & Hart Coefficient B	B			2.3410×10^{-4}		T: Temperature in Kelvin
Steinhart & Hart Coefficient C	C			8.7755×10^{-8}		R: resistance at T in Ω

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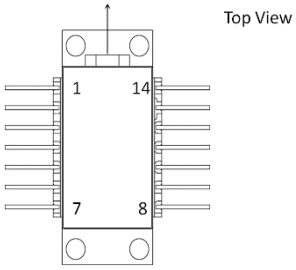
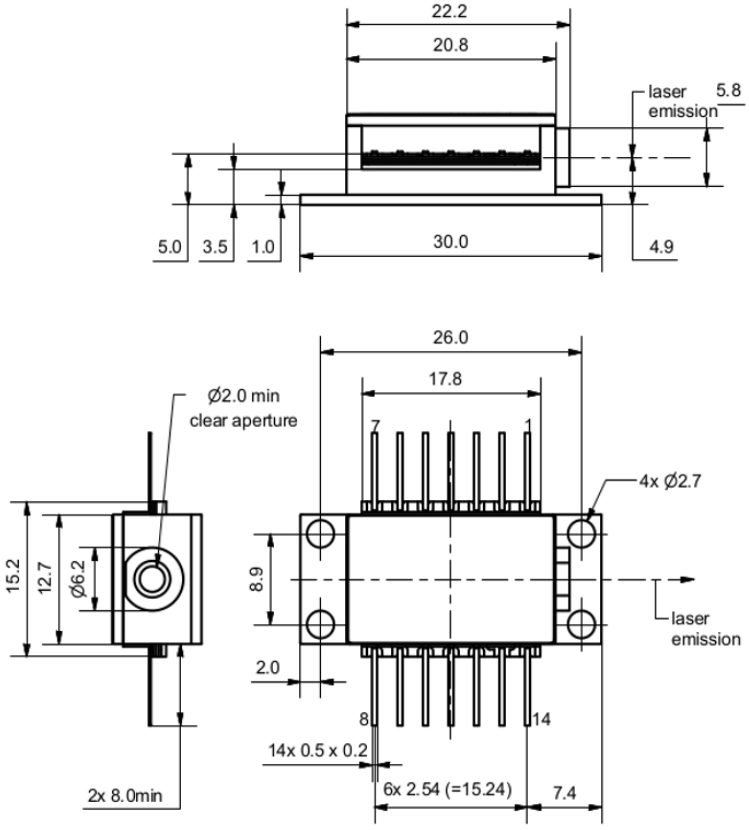
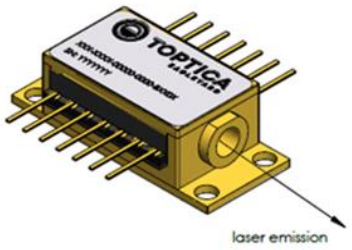
Pin Assignment

1	Thermoelectric Cooler (+)	14	Thermoelectric Cooler (-)
2	Thermistor	13	Case
3	Photo Diode Anode	12	not connected
4	Photo Diode Cathode	11	Laser Diode Cathode
5	Thermistor	10	Laser Diode Anode
6	not connected	9	not connected
7	not connected	8	not connected



Package Drawings





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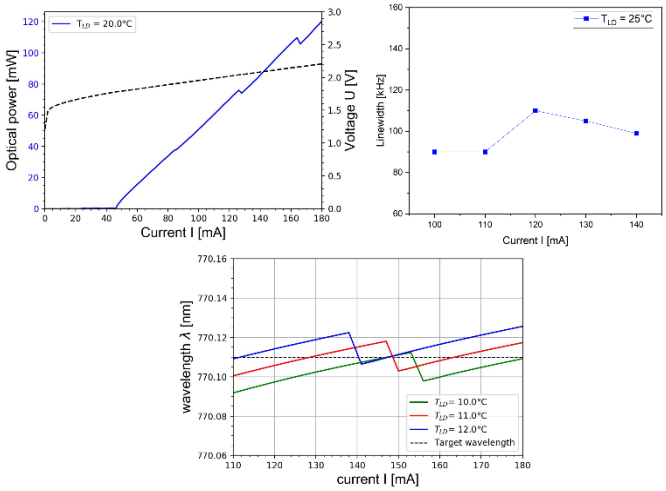
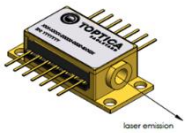
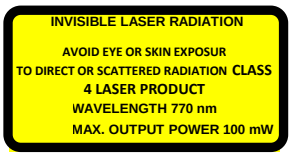
Typical Measurement Results



Unpacking, Installation and Laser Safety

Unpacking the laser diodes should only be done at electrostatic safe workstations (EPA). Though protection against electro static discharge (ESD) is implemented in the laser package, charges may occur at surfaces. Please store this product in its original package at a dry, clean place until final use. During device installation, ESD protection has to be maintained.





IEC-60825-1

A laser diode is sensitive against optical feedback, so an optical isolator may be required in order to avoid any disturbance of the emission spectrum. Operating at moderate temperatures on proper heat sinks will contribute to a long lifetime of the diode.

Avoid direct and/or indirect exposure to the free running beam. Collimating and focussing the free running beam with optics as common in optical instruments will increase threat to the human eye.

Each laser diode will come with an individual test protocol verifying the parameters given in this document.

Complies with 21 CFR 1040.10 and 1040.40

Performance figures, data and any illustrative material provided in this specification are typical and must be specifically confirmed in writing by eagleyard Photonics before they become applicable to any particular order or contract. In accordance with the eagleyard Photonics policy of continuous improvement specifications may change without notice.

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