EYP-RWS-0633-00010-2000-BFW01-0000

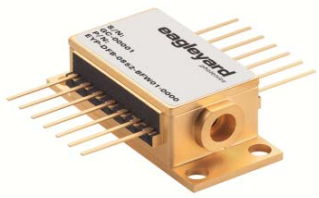
Revision 0.71

2017-07-05

SINGLE FREQUENCY LASER DIODES
Stabilized Ridge Waveguide Laser

General Product Information

Product	Application
633 nm RWS Laser	HeNe Laser Replacement
with hermetic 14-Pin Butterfly Housing (RoHS compliant)	Spectroscopy, Metrology, Sensing
including Monitor Diode, Thermoelectric Cooler and Thermistor	
Collimated beam	



Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Storage Temperature	T_S	°C	-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	-20		75	
Operational Temperature at Laser Chip	T_{LD}	°C	-5		25	
Forward Current	I_F	mA			180	
Reverse Voltage	V_R	V			2	
Output Power	P_{opt}	mW			12	
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	0		50	
Operational Temperature at Laser Chip	T_{LD}	°C	10		18	measured by integrated Thermistor
Forward Current	I_F	mA		100	160	
Output Power	P_{opt}	mW			10	

Characteristics at T_{LD} = 15° at BOL

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Center Wavelength	λ_C	nm	632	633	634	
Selectable Linewidth	$\Delta\lambda$	pm			0.1	single mode operation (see p. 4)
Overall Linewidth	$\Delta\lambda$	nm			0.2	multi mode operation (see p. 4)
Temperature Coefficient of Wavelength	$d\lambda / dT$	nm / K		0.045		
Current Coefficient of Wavelength	$d\lambda / dI$	nm / mA		0.001		
Sidemode Supression Ratio	SMSR	dB	30			P_{opt} = 10 mW

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Characteristics at T_{LD} = 15° at BOL cont'd

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Laser Current @ P_{opt} = 10 mW	I_{LD}	mA			160	
Slope Efficiency	η	W / A	0.1	0.4	0.7	
Threshold Current	I_{th}	mA		80	120	Ith drift may occur, no violation of the max. value
Divergence parallel (FWHM)	$\Theta_{\parallel}$	°		0.1		parallel to the base plate of the housing (see p. 3)
Divergence perpendicular (FWHM)	$\Theta_{\perp}$	°		0.1		perpendicular to base plate of the housing (see p. 3)
Beam Diameter horizontal	$d_{\parallel}$	mm		0.7	1.0	parallel to the base plate of the housing (see p. 3)
Beam Diameter vertical	$d_{\perp}$	mm		0.6	1.0	perpendicular to base plate of the housing (see p. 3)

Monitor Diode

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Monitor Detector Responsivity	I_{mon} / P_{opt}	µA/mW	10		400	U_R = 5 V

Thermoelectric Cooler

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Current	I_{TEC}	A		0.7	1.1	P_{opt} = 10 mW, ΔT = 40 K
Voltage	U_{TEC}	V		1.7	2.8	P_{opt} = 10 mW, ΔT = 40 K
Power Dissipation (total loss at case)	P_{loss}	W		0.4	0.5	P_{opt} = 10 mW, ΔT = 40 K
Temperature Difference	ΔT	K			60	P_{opt} = 10 mW, ΔT = |Tcase - TLD|

Thermistor (Standard NTC Type)

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Resistance	R	kΩ		10		T_{LD} = 25° C
Beta Coefficient	β			3892		$R_1 / R_2 = e^{\beta (1/T_1 - 1/T_2)}$ at T_{LD} = 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 Ohm

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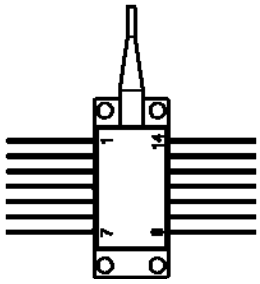
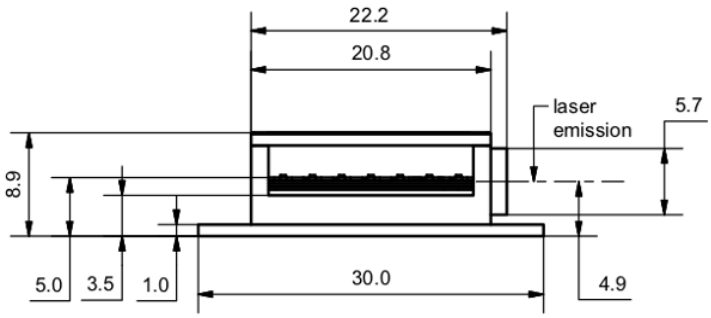
Pin Assignment

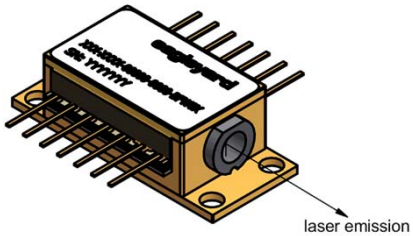
1	Thermoelectric Cooler (+)	14	Thermoelectric Cooler (-)
2	Thermistor	13	Case
3	Photodiode (Anode)	12	not connected
4	Photodiode (Cathode)	11	Laser Diode (Cathode)
5	Thermistor	10	Laser Diode (Anode)
6	not connected	9	not connected
7	not connected	8	not connected

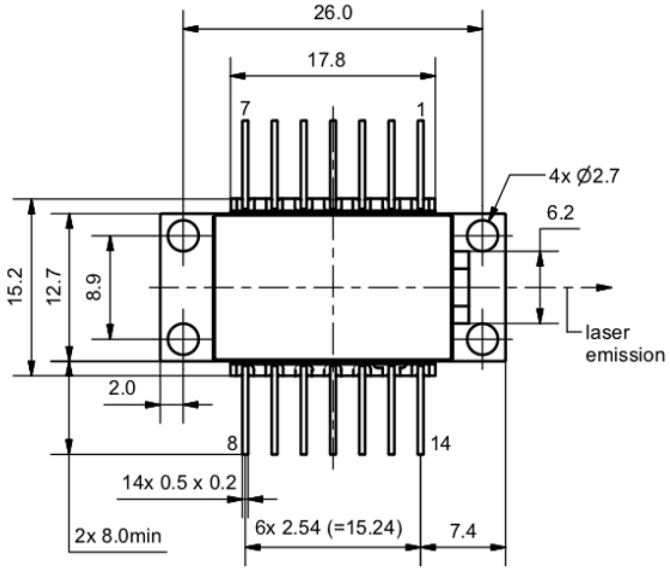
All 14 pins are isolated from case.



Package Drawings







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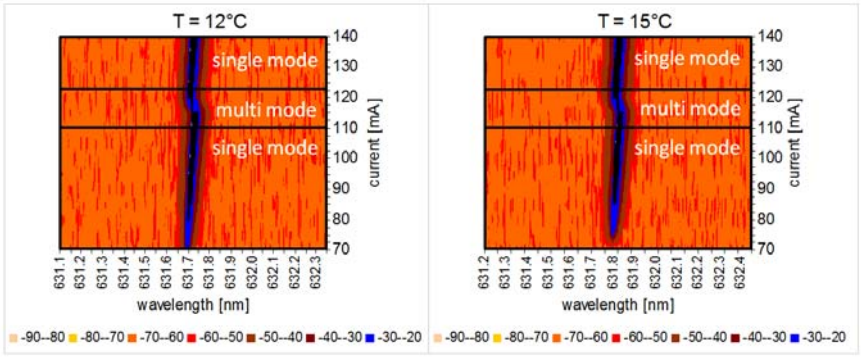
Typical Measurement Results

Spectral Maps at 12° C and 15°C



The spectral maps show the power spectral density at different operating modes. The graphs illustrate that the laser exhibits single and multi mode behavior under different operational conditions. The spectral maps may differ from part to part. Single mode operation can be achieved by selecting the appropriate laser current and temperature.

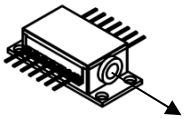
Unpacking, Installation and Laser Safety

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.

The RWS laser 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.

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.



Laser Emission

LASER RADIATION
AVOID EYE OR SKIN EXPOSURE
TO DIRECT OR SCATTERED RADIATION
CLASS 4 LASER PRODUCT
WAVELENGTH 633 nm
MAX. OUTPUT POWER 12 mW

IEC-60825-0

DANGER
LASER RADIATION
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION
GaAs SEMICONDUCTOR LASER DIODE
12 mW MAX OUTPUT AT 633 nm
CLASS IV LASER PRODUCT

Complies with 21 CFR 1040.10 and 1040.40

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