DATA SHEET

EYP-DFB-1059-00040-1500-BFY02-0000

Revision 0.50

21.04.2016

SINGLE FREQUENCY LASER DIODES
Distributed Feedback Laser

General Product Information

Product	Application
1059 nm DFB Laser with hermetic Butterfly Housing	Spectroscopy
Monitor Diode, Thermoelectric Cooler and Thermistor	Metrology
PM Fiber with angle-polished Connector	THz Generation
ROHS compliant	

Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Storage Temperature	T_S	°C	-40		85	Stress in excess of one the Absolute Maximum Ratings can cause permanent damage to the device.
Operational Temperature at Case	T_C	°C	-40		85	
Operational Temperature at Laser Chip	T_{LD}	°C	10		50	
Forward Current	I_F	mA			180	
Reverse Voltage	V_R	V			2	
Output Power	P_{opt}	mW			50	
TEC Current	I_{TEC}	A			1.8	
TEC Voltage	V_{TEC}	V			3.2	

Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Operational Temperature at Case	T_C	°C	-20		65	
Operational Temperature at Laser Chip	T_{LD}	°C	15		40	measured with integrated thermistor
Forward Current	I_F	mA			170	
Output Power	P_{opt}	mW	10		40	

Characteristics at T_{LD} = 25 °C at Begin Of Life

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Center Wavelength	λ_C	nm	1058	1059	1060	
Spectral Width (FWHM)	$\Delta\nu$	MHz		2		
Temperature Coefficient of Wavelength	$d\lambda / dT$	nm / K		0.06		
Current Coefficient of Wavelength	$d\lambda / dI$	nm / mA		0.003		
Output Power @ I_F : 170 mA	P_{opt}	mW	40			

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Characteristics at T_{amb} 25 °C at Begin Of Life cont'd

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Slope Efficiency	η	W / A	0.2	0.4	0.7	
Threshold Current	I_{th}	mA			70	
Sidemode Supression Ratio	SMSR	dB	30	50		P_{opt} = 40 mW
Polarization Extinction Ratio	PER	dB		15		P_{opt} = 40 mW

Monitor Diode

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Monitor Detector Responsivity	I_{mon}/P_{opt}	µA/mW	1		20	Reverse Voltage $U_{R\ MD}$ = 5 V

Thermoelectric Cooler

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Current	I_{TEC}	A		0.4		P_{opt} = 40 mW, ΔT = 20 K
Voltage	U_{TEC}	V		0.8		P_{opt} = 40 mW, ΔT = 20 K
Power Dissipation (total loss at case)	P_{loss}	W		0.4		P_{opt} = 40 mW, ΔT = 20 K
Temperature Difference	ΔT	K			50	P_{opt} = 40 mW, $\Delta T = I\ T_{case} - T_{LD}\ I$

Thermistor (Standard NTC Type)

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

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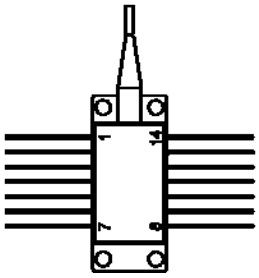
Fiber and Connector Type

		Measurement Conditions / Comments
PM Fiber	900 / 125 / 5.5 µm, UV/Polyester-elastomer Coating (l = 1 +/-0.1 m)	
Connector	FC/APC (narrow key / 2mm)	

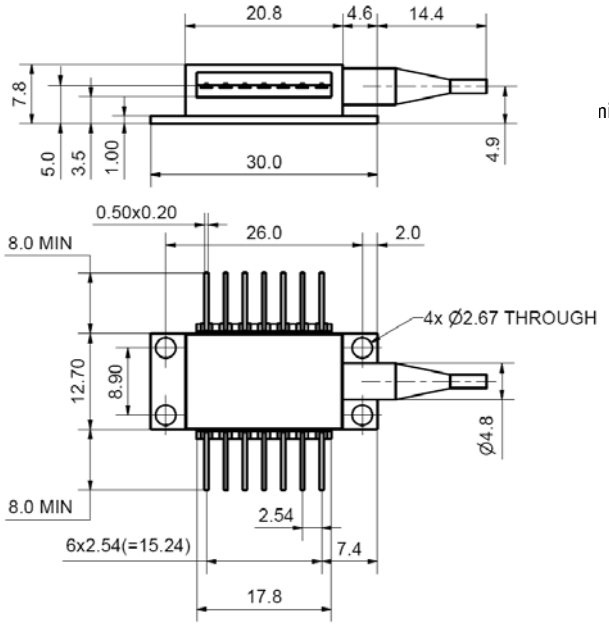
Package Pinout

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



top view

Package Drawings



recommended
nin. bending radius: 30 mm

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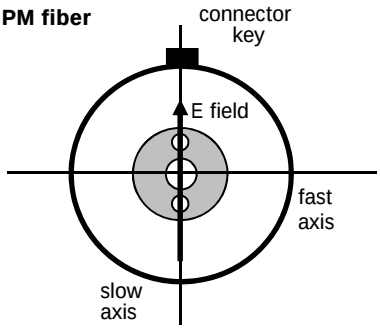

slow axis of the PM fiber aligned to connector key

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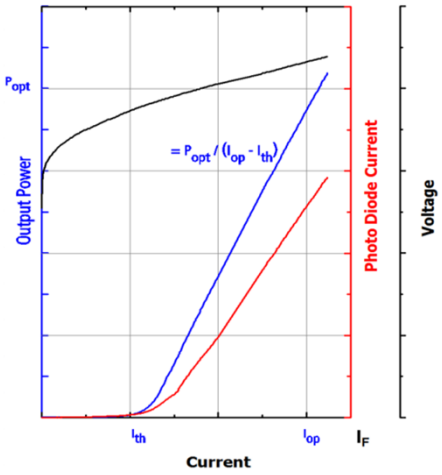
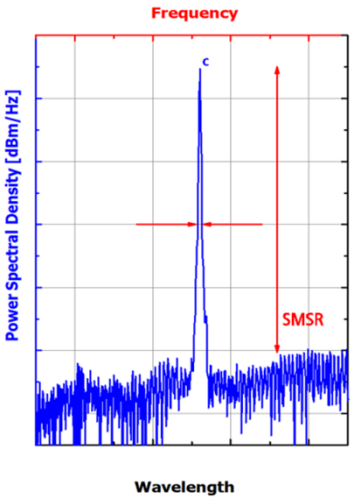
Typical Measurement Results

Output Power vs. Current



Spectra at Specified Optical Output Power



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.

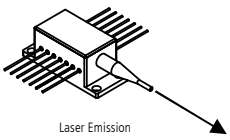
Unpacking, Installation and Laser Safety

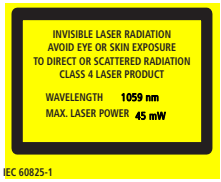
Unpacking the laser diodes should only be done at electrostatic safe workstations (EPA). Though protection against electro static discharge (ESD) is implemented in the laser package, charges may occur at surfaces. Please store this product in its original package at a dry, clean place until final use.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

The DFB diode type is known to be sensitive against optical feedback, so an optical isolator may be required in some cases. Operating at moderate temperatures on a proper metal heat sinks will contribute to stable operation and a long lifetime of the diode.

The laser emission from this diode is close to the invisible infrared region of the electromagnetic spectrum. Avoid direct and/or indirect exposure to the free running beam. Collimating 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

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