

# EYP-DFB-1060-00040-1500-BFY02-0002

Revision 0.70

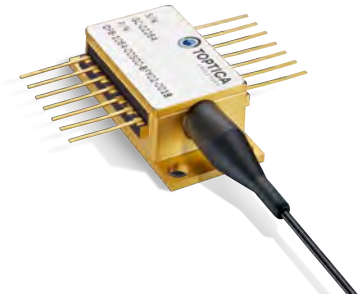
20.11.2015

## SINGLE FREQUENCY LASER DIODES

### Distributed Feedback Laser

#### General Product Information

Product	Application
1060 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

	Symbol	Unit	min	typ	max
Storage Temperature	$T_S$	°C	-40		85
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

#### Measurement Conditions / Comments

Stress in excess of one of the Absolute Maximum Ratings can cause permanent damage to the device.

#### Recommended Operational Conditions

	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_C$	°C	-20		65
Operational Temperature at Laser Chip	$T_{LD}$	°C	15		40
Forward Current	$I_F$	mA			170
Output Power	$P_{opt}$	mW	10		40

#### Measurement Conditions / Comments

measured with integrated thermistor

#### Characteristics at $T_{LD} = 25\text{ °C}$ at Begin Of Life

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_c$	nm	1059	1060	1061
Tuning Range by Temperature	$\Delta\lambda_T$	nm		1.5	
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 @ $I_F = 170\text{ mA}$	$P_{opt}$	mW	40		

#### Measurement Conditions / Comments

The laser allows wavelength tuning by temperature or current variation; in case of external backreflections small mode-hops of 100 MHz or less may appear; the use of a BFW01 or TOC03 package variants and effective optical isolation is recommended for spectroscopic application requiring absolutely mode-hop-free tuning

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### Characteristics at $T_{amb} = 25^\circ C$ at Begin Of Life cont'd

Parameter	Symbol	Unit	min	typ	max
Slope Efficiency	$\eta$	W / A	0.2	0.4	0.7
Threshold Current	$I_{th}$	mA			70
Sidemode Suppression Ratio	SMSR	dB	30	50	
Polarization Extinction Ratio	PER	dB		20	

#### Measurement Conditions / Comments

$P_{opt} = 10 \text{ mW} \dots 40 \text{ mW}$  ;  $T_{LD} = 15^\circ C \dots 40^\circ C$   
 $P_{opt} = 40 \text{ mW}$

### Monitor Diode

Parameter	Symbol	Unit	min	typ	max
Monitor Detector Responsivity	$I_{mon}/P_{opt}$	$\mu A/mW$	1		20

#### Measurement Conditions / Comments

Reverse Voltage  $U_{R,MD} = 5 \text{ V}$

### Thermoelectric Cooler

Parameter	Symbol	Unit	min	typ	max
Current	$I_{TEC}$	A		0.4	
Voltage	$U_{TEC}$	V		0.8	
Power Dissipation (total loss at case)	$P_{loss}$	W		0.4	
Temperature Difference	$\Delta T$	K			50

#### Measurement Conditions / Comments

$P_{opt} = 40 \text{ mW}$ ,  $\Delta T = 20 \text{ K}$   
 $P_{opt} = 40 \text{ mW}$ ,  $\Delta T = 20 \text{ K}$   
 $P_{opt} = 40 \text{ mW}$ ,  $\Delta T = 20 \text{ K}$   
 $P_{opt} = 40 \text{ mW}$ ,  $\Delta T = |T_{case} - T_{LD}|$

### Thermistor (Standard NTC Type)

Parameter	Symbol	Unit	min	typ	max
Resistance	R	k $\Omega$		10	
Beta Coefficient	$\beta$			3892	
Steinhart & Hart Coefficient	A			$1.1293 \times 10^{-3}$	
Steinhart & Hart Coefficient	B			$2.3410 \times 10^{-4}$	
Steinhart & Hart Coefficient	C			$8.7755 \times 10^{-8}$	

#### Measurement Conditions / Comments

$T = 25^\circ C$   
 $R_1 / R_2 = e^{\beta(1/T_1 - 1/T_2)}$  at  $T = 0^\circ \dots 50^\circ C$   
 $1/T = A + B(\ln R) + C(\ln R)^3$   
 T: temperature in Kelvin  
 R: resistance at T in Ohm

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### Fiber and Connector Type

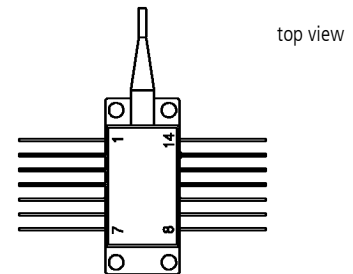
PM Fiber	900 / 125 / 5.5 μm, UV/Polyester-elastomer Coating (l = 1 +/-0.1 m)
Connector	FC/APC (narrow key / 2mm)

### Measurement Conditions / Comments

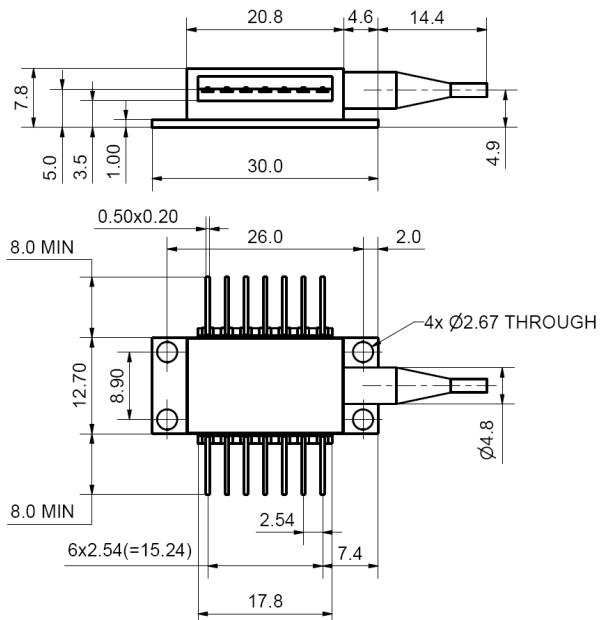
other connectors on request

### Package Pinout

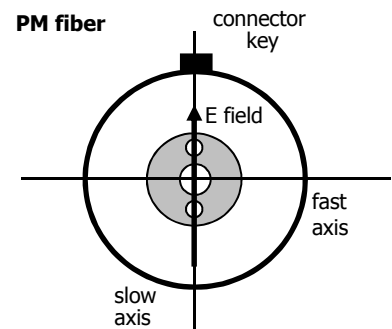
1	Thermoelectric Cooler (+)	14	Thermoelectric Cooler (-)
2	Thermistor	13	Case
3	Photodiode (Anode)	12	not connected
4	Photodiode (Cathode)	11	Laser Diode (Cathode)
5	Thermistor	10	Laser Diode (Anode)
6	not connected	9	not connected
7	not connected	8	not connected



### Package Drawings



recommended  
min. bending radius: 30 mm



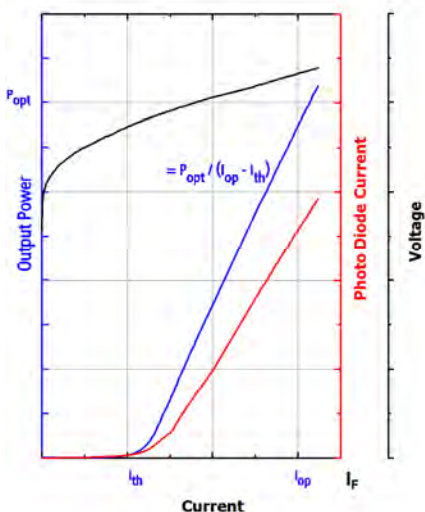
slow axis of the PM fiber aligned to connector key

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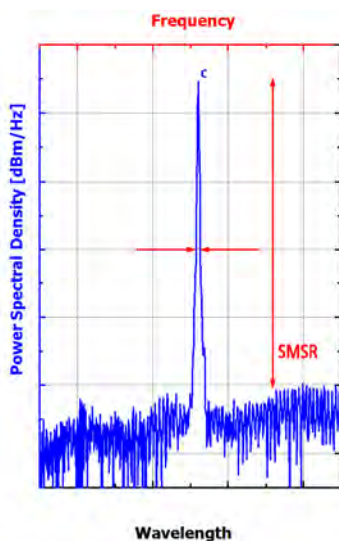
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### Typical Measurement Results

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.

