

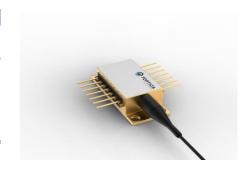
Revision 0.90 2023-05-25

## SINGLE FREQUENCY LASER DFB Laser



#### General Product Information

Product	Application
Tunable 760 nm DFB Laser	Spectroscopy
with hermetic 14-Pin Butterfly Housing (RoHS compliant)	Metrology
including Monitor Diode, Thermoelectric Cooler and Thermistor	Oxygen Detection
with PM Fiber, integrated μ-Isolator and Angled Physical Contact (APC)	



#### Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	Ts	° C	-40		85
Operational Temperature at Case	T <sub>C</sub>	° C	-15		70
Operational Temperature at Chip	$T_{chip}$	° C	10		50
Forward Current	I <sub>F</sub>	mA			180
Reverse Voltage	$V_R$	V			2
Output Power	$P_{opt}$	mW			14
TEC Current	I <sub>TEC</sub>	Α			1,4
TEC Voltage	$V_{TEC}$	V			4,8

#### Measurement Conditions / Comments

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.

#### Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	T <sub>case</sub>	°C	5		60
Operational Temperature at Chip	$T_{chip}$	° C	10		35
Forward Current	I <sub>F</sub>	mA			170
Output Power	$P_{\text{opt}}$	mW	4		12

Measurement Conditions / Comments	
	Т
ex fiber	

### Characteristics = 25° C at BOL

Symbol	Unit	min	typ	max
$\lambda_{C}$	nm	759,9	760,9	761,9
$\lambda_{\mathrm{T}}$	nm		760,9	
$\Delta \lambda_{tune}$	pm	40		
SMSR	dB	30	45	
$d\lambda/dT$	nm/K		0,06	
$d\lambda/dI$	nm/mA		0,002	
	$\lambda_{\text{C}}$ $\lambda_{\text{T}}$ $\Delta\lambda_{\text{tune}}$ SMSR $d\lambda / dT$	$\begin{array}{ccc} \lambda_{C} & \text{nm} \\ \lambda_{T} & \text{nm} \\ \Delta \lambda_{tune} & \text{pm} \\ \text{SMSR} & \text{dB} \\ \text{d} \lambda /  \text{dT} & \text{nm/K} \end{array}$	$\begin{array}{cccc} \lambda_{C} & \text{nm} & 759,9 \\ \lambda_{T} & \text{nm} & \\ \Delta\lambda_{tune} & \text{pm} & 40 \\ \text{SMSR} & \text{dB} & 30 \\ \text{d}\lambda/\text{dT} & \text{nm/K} \end{array}$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

Measurement Conditions / Comments	_
reached betweem 15° and 35° C at P = 12 mW	/
at target wawevelength	
Popt = 12 mW	







Revision 0.90 2023-05-25

# SINGLE FREQUENCY LASER DFB Laser



Characteristics	= 25° C at BOL	
Parameter	Symbol Unit	min typ max
Laser Current	I <sub>LD</sub> mA	170
Slope Efficiency	η mW/mA	0,1
Threshold Current	I <sub>th</sub> mA	70
Polarization Extinction Ratio	PER dB	20

Measurement Conditions / Comments
Popt = 12 mW
Popt = 12 mW

Monitor Diode				
Parameter	Symbol Unit	min	typ	max
Monitor Detector Responsivity	I <sub>mon</sub> / P <sub>op</sub> μΑ/mW	10		800

Measurement Conditio	ns / Comments
5 V	

Thermoelectric Coolei					
Parameter	Symbol	Unit	min	typ	max
Current	I <sub>TEC</sub>	Α		0,4	
Voltage	$U_{TEC}$	V		1,5	
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0,5	
Temperature Difference	ΔΤ	K			50

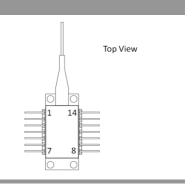
Measurement Conditions / Comments
Popt = 12 mW, ΔT = 30 K
Popt = 12 mW, ΔT = 30 K
Popt = 12 mW, ΔT = 30 K
Popt = 12 mW, ΔT =  Tcase - TLD

Parameter	Symbol	Unit	min	typ	max
Resistance	R	kW		10	
Beta Coefficient	b			3892	
Steinhart & Hart Coefficient A	Α		1.	.1293 x 10	. 3
Steinhart & Hart Coefficient B	В		2.	.3410 x 10	<b>-</b> 4
Steinhart & Hart Coefficient C	С		8.	.7755 x 10	-8

Thermistor (Standard NTC Type)

Measurement Conditions / Comments
25° C
0° 50° C

n 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



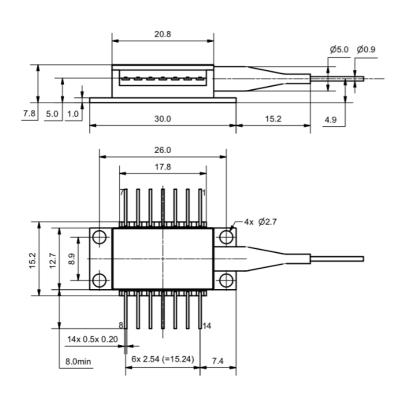


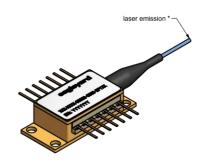
Revision 0.90 2023-05-25

# SINGLE FREQUENCY LASER DFB Laser



#### Package Drawings





#### AIZ-16-0222-1415

nector Type (Output)

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

Measurement Conditions / Comments



Revision 0.90 2023-05-25

## SINGLE FREQUENCY LASER DFB Laser



#### 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.



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.



INVISIBLE LASER RADIATION
TO DIRECT OR SCATTERED RADIATION CLASS 4
LASER REPOLUT
AVOID EYE OR SKIN EXPOSUR
WAVELENGTH 760 nm
MAX. OUTPUT POWER 14 mW

IEC-60825-1

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

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.





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.





Revision 0.94

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser



#### General Product Information

roduct	Application
unable 760 nm DFB Laser	Spectroscopy
ith hermetic 14 Pin Butterfly Housing (RoHS compliant)	Metrology
cluding Monitor Diode, Thermoelectric Cooler and Thermis	tor Oxygen Detection
ith integrated Beam Collimation	



#### Absolute Maximum Ratings

Parameter	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 <sub>F</sub>	mA			130
Reverse Voltage	$V_R$	V			2
Output Power	$P_{\text{opt}}$	mW			50
TEC Current	I <sub>TEC</sub>	А			1.1
TEC Voltage	$V_{TEC}$	V			2.8

#### Measurement Conditions / Comments

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.

#### Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	-20		65
Operational Temperature at Laser Chip	$T_{LD}$	°C	10		35
Forward Current	I <sub>F</sub>	mA			120
Output Power	$P_{\text{opt}}$	mW	10		40

Measurement Conditions / Comments
measured by integrated thermistor

#### Characteristics at T<sub>LD</sub> = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	759.9	760.9	761.9
Target Wavelength	$\lambda_{T}$	nm		760.9	
Linewidth (FWHM)	Δλ	MHz		2	
Mode-hop free Tuning Range	$\Delta \lambda_{\text{tune}}$	pm	40		
Sidemode Supression Ratio	SMSR	dB	30	50	

#### Measurement Conditions / Comments

reached within  $T_{LD}$  = 10° and 35° C at 40 mW  $P_{opt} = 40$  mW at target wawevelength  $P_{opt} = 40$  mW







Revision 0.94

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



Characteristics at T <sub>LD</sub> = 25° C	at BOL				cont'd
Parameter	Symbol	Unit	min	typ	max
Temperature Coefficient of Wavelength	dλ / dT	nm / K		0.06	
Current Coefficient of Wavelength	dλ / dl	nm / mA		0.002	
Laser Current @ P <sub>opt</sub> = 40 mW	$I_{LD}$	mA			120
Slope Efficiency	η	W/A	0.6	0.8	1.3
Threshold Current	I <sub>th</sub>	mA			70
Divergence parallel (FWHM)	$\Theta_{  }$	0		0.1	
Divergence perpendicular (FWHM)	$\Theta_{\perp}$	0		0.1	
Beam Diameter horizontal	d	mm		1.0	1.2
Beam Diameter vertical	$d_\perp$	mm		0.8	1.2
Degree of Polarization	DOP	%		90	

Measurement Conditions / Comments
parallel to the base plate of the housing (see p. 3)
perpendicular to base plate of the housing (see p. 3)
parallel to the base plate of the housing (see p. 3)
perpendicular to base plate of the housing (see p. 3)
$P_{opt} = 40$ mW; E field perpendicular to base plate

Monitor Diode					
Parameter	Symbol	Unit	min	typ	max
Monitor Detector Responsivity	I <sub>mon</sub> / P <sub>opt</sub>	μA/mW	3		60

Measi	urement Conditions / Comments
$U_R =$	5 V

Thermoelectric Cooler					
Parameter	Symbol	Unit	min	typ	max
Current	I <sub>TEC</sub>	А		0.4	
Voltage	$U_TEC$	V		1.3	
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0.4	
Temperature Difference	ΔΤ	K			50

Measu	rement (	Conditi	ions / C	Comme	nts	
P <sub>opt</sub> =	40 mW,	$\Delta T = 2$	20 K			
P <sub>opt</sub> =	40 mW,	$\Delta T = 2$	20 K			
$P_{opt} =$	40 mW,	$\Delta T = 2$	20 K			
P <sub>opt</sub> =	40 mW,	$\Delta T =  $	Tcase -	TLD		

)				
Symbol	Unit	min	typ	max
R	kΩ		10	
β			3892	
А		1.1293 x 10 <sup>-3</sup>		
В		2.3410 x 10 <sup>-4</sup>		
С			8.7755 x 10	-8
	R β A	Symbol Unit $\begin{matrix} R & k\Omega \\ \beta & \end{matrix}$		

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



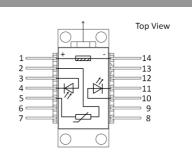
Revision 0.94

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**

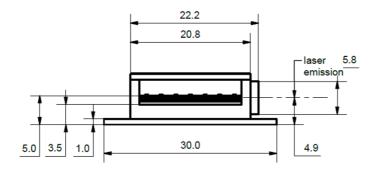


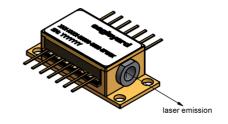
### Pin Assignment

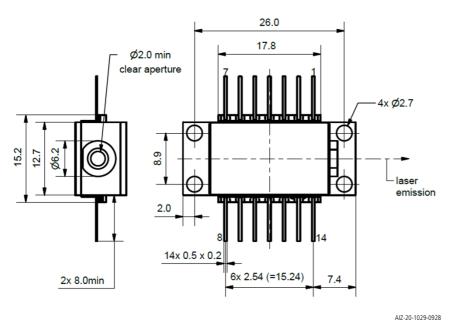
2 Thermistor 13 Case 3 Photodiode (Anode) 12 not connected	1 The	hermoelectric Cooler (+)	14	Thermoelectric Cooler (-)
	2 The	hermistor	13	Case
4 Photodiada (Cathoda) 11 Lacar Diada (Cathoda)	3 Ph	hotodiode (Anode)	12	not connected
4 Filotodiode (Catilode)	4 Ph	hotodiode (Cathode)	11	Laser Diode (Cathode)
5 Thermistor 10 Laser Diode (Anode)	5 The	hermistor	10	Laser Diode (Anode)
6 not connected 9 not connected	6 no	ot connected	9	not connected
7 not connected 8 not connected	7 no	ot connected	8	not connected



#### Package Drawings







Caution. Excessive mechanical stress on the package can lead to a damage of the laser.

See <u>instruction manual</u> on www.eagleyard.com



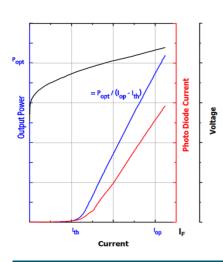
Revision 0.94

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser

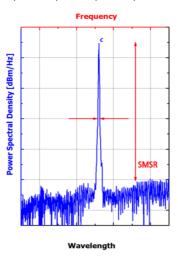


#### Typical Measurement Results

Output Power vs. Current



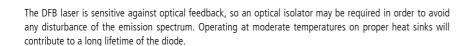
Spectra at Specified Optical Output Power



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.



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















Revision 1.08

2020-04-30

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



#### General Product Information

Application
Spectroscopy
Metrology
Oxygen Detection



#### Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	$T_S$	°C	-40		85
Operational Temperature at Case	$T_{C}$	°C	-20		75
Operational Temperature at Laser Chip	$T_{LD}$	°C	10		50
Forward Current	I <sub>F</sub>	mA			130
Reverse Voltage	$V_R$	V			2
Output Power	$P_{\text{opt}}$	mW			50
TEC Current	I <sub>TEC</sub>	А			1.8
TEC Voltage	$V_{TEC}$	V			3.2

#### Measurement Conditions / Comments

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.

#### Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	-20		65
Operational Temperature at Laser Chip	$T_LD$	°C	10		35
Forward Current	I <sub>F</sub>	mA			120
Output Power	$P_{\text{opt}}$	mW	10		40

weasurement Conditions / Comments	

measured by integrated thermistor

#### Characteristics at T<sub>LD</sub> = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	759.9	760.9	761.9
Target Wavelength	$\lambda_{\text{T}}$	nm		760.9	
Linewidth (FWHM)	$\Delta\lambda$	MHz		2	
Sidemode Supression Ratio	SMSR	dB	30	50	
Temperature Coefficient of Wavelength	$d\lambda/dT$	nm / K		0.06	
Current Coefficient of Wavelength	$d\lambda$ / $dI$	nm / mA		0.002	
Mode-hop free Tuning Range	$\Delta \lambda_{\text{tune}}$	pm	40		

#### Measurement Conditions / Comments

ivieasurement Conditions / Confinents
see images on page 4
reached within $T_{LD}$ = 10° and 35° C at 40 mW
$P_{opt} = 40 \text{ mW}$
$P_{opt} = 40 \text{ mW}$
at target wawevelength

Distributor



info@amstechnologies.com
www.amstechnologies-webshop.com

Contact us



Revision 1.08

## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**





Characteristics at T <sub>LD</sub> = 25° C at BOL						
Parameter	Symbol	Unit	min	typ	max	
Laser Current @ P <sub>opt</sub> = 40 mW	$I_{LD}$	mA			120	
Slope Efficiency	η	W/A	0.6	0.8	1.3	
Threshold Current	$I_{th}$	mA			70	
Divergence parallel (FWHM)	$\Theta_{  }$	0		8		
Divergence perpendicular (FWHM)	$\Theta_{\perp}$	0		21		
Degree of Polarization	DOP	%		90		

Measurement Conditions / Comments				
parallel to short axis of the housing (see p. 3)				
parallel to long axis of the housing (see p. 3)				
$P_{opt} = 40$ mW; E field parallel to long axis of housing				

Symbol	Unit	min	typ	max
mon / P <sub>opt</sub>	μA/mW	1.5		50
		Symbol Unit		-7

1eası	surement Conditions / Comments	
R =	5 V	

Symbol	Unit	min	typ	max
I <sub>TEC</sub>	А		0.4	
$U_TEC$	V		0.8	
P <sub>loss</sub>	W		0.5	
ΔΤ	K			50
	I <sub>TEC</sub> U <sub>TEC</sub> P <sub>loss</sub>	I <sub>TEC</sub> A U <sub>TEC</sub> V P <sub>loss</sub> W	I <sub>TEC</sub> A U <sub>TEC</sub> V P <sub>loss</sub> W	I <sub>TEC</sub> A 0.4 U <sub>TEC</sub> V 0.8 P <sub>loss</sub> W 0.5

Meas	urement	Condi	tions /	Comm	ents	
P <sub>opt</sub> =	40 mW	<b>Δ</b> T =	20 K			
P <sub>opt</sub> =	40 mW	<b>Δ</b> T =	20 K			
P <sub>opt</sub> =	40 mW	<b>Δ</b> T =	20 K			
P <sub>opt</sub> =	40 mW	<b>Δ</b> T =	Tcase	- TLD		

Parameter	Symbol	Unit	min	typ	max
Resistance	R	kΩ		10	
Beta Coefficient	β			3892	
Steinhart & Hart Coefficient A	А			1.1293 x 10	-3
Steinhart & Hart Coefficient B	В			2.3410 x 10	-4
Steinhart & Hart Coefficient C	C			8.7755 x 10	-8

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

Thermoelectric Cooler

Thermistor (Standard NTC Type)



Revision 1.08

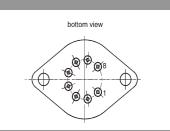
## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



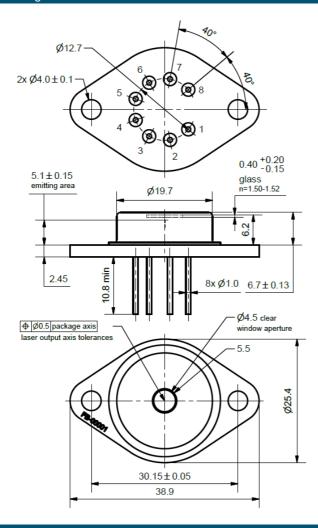


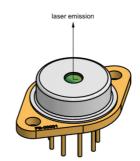
# Pin Assignment

1	Thermoelectric Cooler (+)	5	Laser Diode Anode
2	Thermistor	6	Monitor Diode Anode
3	Thermistor	7	Photo Diode Cathode
4	Laser Diode Cathode	8	Thermoelectric Cooler (-)
All	8 pins are isolated from case.		



#### Package Drawings





AIZ-16-311-1543-B



Revision 1.08

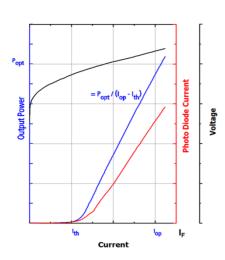
2020-04-30

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser

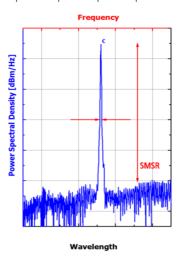


#### Typical Measurement Results

Output Power vs. Current



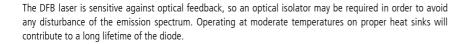
Spectra at Specified Optical Output Power



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

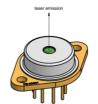
Unpacking the laser diodes should only be done at electrostatic safe workstations (EPA). Though protection against electro static discharge (ESD) is implemented in the laser package, charges may occur at surfaces. Please store this product in its original package at a dry, clean place until final use.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



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.









INVISIBLE LASER RADIATION
AVOID EYE OR SKIN EXPOSURE
TO DIRECT OR SCATTERED RADIATION
CLASS 4 LASER PRODUCT
WAVELENGTH 760 nm
MAX. OUTPUT POWER 50 mW





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Revision 0.82

## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**





#### General Product Information

Product	Application
760 nm DFB Laser	Oxygen Detection
with hermetic 8 Pin TO Package	
including Monitor Diode, Thermoelectric Cooler and Thermistor	



#### Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	$T_S$	°C	-40		85
Operational Temperature at Case	$T_{C}$	°C	-20		75
Operational Temperature at Laser Chip	$T_{LD}$	°C	10		50
Forward Current	I <sub>F</sub>	mA			130
Reverse Voltage	$V_R$	V			2
Output Power	$P_{\text{opt}}$	mW			60
TEC Current	I <sub>TEC</sub>	Α			1.0
TEC Voltage	$V_{TEC}$	V			1.0

#### **Measurement Conditions / Comments**

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.

#### Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	-20		65
Operational Temperature at Laser Chip	$T_LD$	°C	10		35
Forward Current	I <sub>F</sub>	mA			120
Output Power	P <sub>opt</sub>	mW	10		40

Measurement Conditions / Comments	
	J

measured by integrated thermistor

#### Characteristics at T<sub>LD</sub> = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	759.9	760.9	761.9
Target Wavelength	$\lambda_{\text{T}}$	nm		760.9	
Linewidth (FWHM)	Δλ	MHz		2	
Sidemode Supression Ratio	SMSR	dB	30	50	
Temperature Coefficient of Wavelength	dλ / dT	nm / K		0.06	
Current Coefficient of Wavelength	dλ / dl	nm / mA		0.002	

#### **Measurement Conditions / Comments**

see images on page 4
reached within T <sub>LD</sub> = 10° and 35° C at 40 mW
$P_{opt} = 40 \text{ mW}$
$P_{opt} = 40 \text{ mW}$

Distributor



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Revision 0.82

## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**





Characteristics at I <sub>LD</sub> = 25° C	at BOL				cont'd
Parameter	Symbol	Unit	min	typ	max
Mode-hop free Tuning Range	$\Delta \lambda_{\text{tune}}$	pm	40		
Laser Current @ $P_{opt} = 40 \text{ mW}$	$I_{LD}$	mA			120
Slope Efficiency	η	W/A	0.6	0.8	1.3
Threshold Current	I <sub>th</sub>	mA			70
Divergence parallel (FWHM)	$\Theta_{  }$	0		8	
Divergence perpendicular (FWHM)	$\Theta_{\perp}$	0		21	
Degree of Polarization	DOP	%		90	

Measurement Conditions / Comments
at target wawevelength
parallel to Pin 1 - Pin 6 plane (see p. 3)
perpendicular to Pin 1 - Pin 6 plane (see p. 3)
P <sub>opt</sub> = 40 mW; E field perpendicular to Pin 1 - 6 plane

Monitor Diode					
Parameter	Symbol	Unit	min	typ	max
Monitor Detector Responsivity	I <sub>mon</sub> / P <sub>opt</sub>	μA/mW		2	

Meası	urement Conditions / Comments
$U_R =$	5 V

Symbol	Unit	min	typ	max
I <sub>TEC</sub>	А		0.4	
$U_TEC$	V		0.4	
P <sub>loss</sub>	W		0.4	
ΔΤ	K			40
	I <sub>TEC</sub>	I <sub>TEC</sub> A V	I <sub>TEC</sub> A V	I <sub>TEC</sub> A 0.4 U <sub>TEC</sub> V 0.4

Measurement Conditions / Comments	
$P_{opt} = 40$ mW, $\Delta T = 20$ K	
$P_{opt} = 40$ mW, $\Delta T = 20$ K	
$P_{opt} = 40 \text{ mW}, \Delta T = 20 \text{ K}$	
$P_{opt} = 40 \text{ mW}, \Delta T =  T \text{case} - T \text{LD} $	

Parameter	Symbol	Unit	min	typ	max
Resistance	R	kΩ		10	
Beta Coefficient	β			3930	
Steinhart & Hart Coefficient A	А			1.029 x 10	-3
Steinhart & Hart Coefficient B	В			2.510 x 10	-4
Steinhart & Hart Coefficient C	C			1.051 x 10	-7

Measurement Conditions / Comments			
$T_{LD} = 25^{\circ} C$			
$R_1  /  R_2 = e^{\beta  (1/T_1  \cdot  1/T_2)} $ at $T_{LD} =$	0° 50° C		
$1/T = A + B(\ln R) + C(\ln R)^3$			
T: temperature in Kelvin			
R: resistance at T in Ohm			

Thermoelectric Cooler

Thermistor (Standard NTC Type)

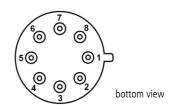


Revision 0.82

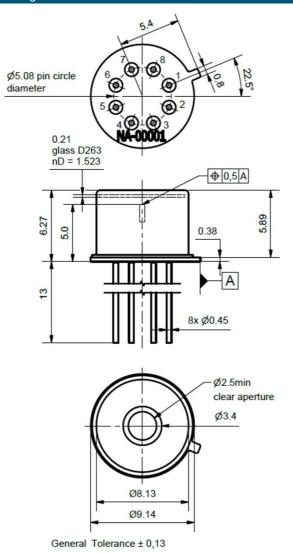
# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



ы	n Assignment		
1	Laser Diode Anode	5	Thermistor
2	Laser Diode Cathode	6	Thermistor
3	Thermoelectric Cooler (-)	7	Photo Diode Anode
4	Thermoelectric Cooler (+)	8	Photo Diode Cathode
All	8 pins are isolated from case.		



#### Package Drawings



AIZ-19-0129-1426B

Revision 0.82

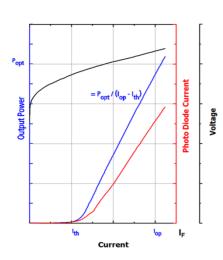
2020-04-30

### SINGLE FREQUENCY LASER DIODES **Distributed Feedback Laser**

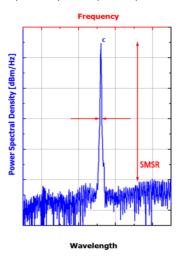


#### Typical Measurement Results

Output Power vs. Current



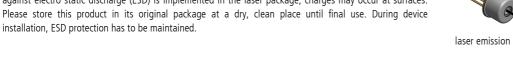
Spectra at Specified Optical Output Power



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



The DFB 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.





INVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE O DIRECT OR SCATTERED RADIATION **CLASS 4 LASER PRODUCT** WAVELENGTH 760 nm MAX. OUTPUT POWER 60 mV







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Revision 1.00



2022-12-20

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser



#### General Product Information

Product	Application
780 nm DFB Laser	Spectroscopy (Rb D2 line)
with hermetic 14-Pin Butterfly Housing (RoHS compliant)	Metrology
including Monitor Diode, Thermoelectric Cooler and Thermistor	THz Generation
with PM Fiber, integrated $\mu\text{-}Isolator$ and Angled Physical Contact (APC)	



#### Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	$T_S$	°C	-40		85
Operational Temperature at Case	$T_{C}$	°C	-15		70
Operational Temperature at Laser Chip	$T_LD$	°C	5		50
Forward Current	I <sub>F</sub>	mA			220
Reverse Voltage	$V_R$	V			2
Output Power	$P_{opt}$	mW			20
TEC Current	I <sub>TEC</sub>	А			1.8
TEC Voltage	$V_{TEC}$	V			3.2

#### Measurement Conditions / Comments

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.

#### Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	5		60
Operational Temperature at Laser Chip	$T_LD$	°C	5		45
Forward Current	I <sub>F</sub>	mA			200
Output Power	P <sub>opt</sub>	mW	5		20

Measurement Conditions / Comments				
measured by integrated Thermistor				

#### Characteristics at T<sub>LD</sub> = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	779	780	781
Target Wavelength	$\lambda_{\scriptscriptstyle T}$	nm		780.24	
Linewidth (FWHM)	Δλ	MHz		0.6	1
Mode-hop free Tuning Range	$\Delta \lambda_{\text{tune}}$	pm	20		
Sidemode Supression Ratio	SMSR	dB	30	45	

Measurement Conditions / Comments		
see images on page 4		
reached within $T_{LD} = 5  ^{\circ}   45 ^{\circ}  C$ at 20 mW		
$P_{opt} = 20 \text{ mW}$		
> 10 GHz, at target wavelength		
$P_{opt} = 20 \text{ mW}$		





Revision 1.00



2022-12-20

## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



Characteristics at T <sub>LD</sub> = 25° C at BOL							
Parameter	Symbol	Unit	min	typ	max		
Temperature Coefficient of Wavelength	dλ / dT	nm / K		0.06			
Current Coefficient of Wavelength	dλ / dI	nm / mA		0.003			
Laser Current @ P <sub>opt</sub> = 20 mW	$I_{LD}$	mA			200		
Slope Efficiency	η	W/A		0.2			
Threshold Current	I <sub>th</sub>	mA			70		
Polarization Extinction Ratio	PER	dB		20			

Measurement Conditions / Comments
exfiber
$P_{opt} = 20 \text{ mW}$

Monitor Diode					
Parameter	Symbol	Unit	min	typ	max
Monitor Detector Responsivity	I <sub>mon</sub> / P <sub>opt</sub>	μA/mW	5		100

Measi	urement Conditions / Comments
$U_R =$	5 V

Symbol	Unit	min	typ	max
I <sub>TEC</sub>	А		0.4	
$U_TEC$	V		1.5	
P <sub>loss</sub>	W		0.5	
ΔΤ	K			55
	I <sub>TEC</sub> U <sub>TEC</sub> P <sub>loss</sub>	I <sub>TEC</sub> A U <sub>TEC</sub> V P <sub>loss</sub> W	I <sub>TEC</sub> A U <sub>TEC</sub> V P <sub>loss</sub> W	I <sub>TEC</sub> A 0.4 U <sub>TEC</sub> V 1.5 P <sub>loss</sub> W 0.5

Measurement Conditions / Comments	
$P_{opt} = 20 \text{ mW}, \Delta T = 30 \text{ K}$	
$P_{opt} = 20 \text{ mW}, \Delta T = 30 \text{ K}$	
$P_{opt} = 20 \text{ mW}, \Delta T = 30 \text{ K}$	
$P_{opt} = 20 \text{ mW}, \Delta T =  Tcase - TLD $	

Thermistor (Standard NTC Type)					
Parameter	Symbol	Unit	min	typ	max
Resistance	R	kΩ		10	
Beta Coefficient	β			3892	
Steinhart & Hart Coefficient A	А			1.1293 x 10	) <del>-</del> 3
Steinhart & Hart Coefficient B	В			2.3410 x 10	) -4
Steinhart & Hart Coefficient C	C			8.7755 x 10	) -8
Steinhart & Hart Coefficient C	C			8.7755 x 10	) -8

Measurement Conditions / Com	nments
$T_{LD} = 25^{\circ} C$	
$R_1  /  R_2 = e^{\beta  (1/T_1  \cdot  1/T_2)} $ at $T_{LD} =$	0° 50° C
$1/T = A + B(\ln R) + C(\ln R)^3$	
T: temperature in Kelvin	
R: resistance at T in Ohm	

Revision 1.00

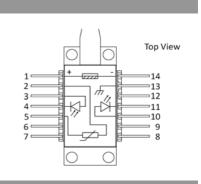


2022-12-20

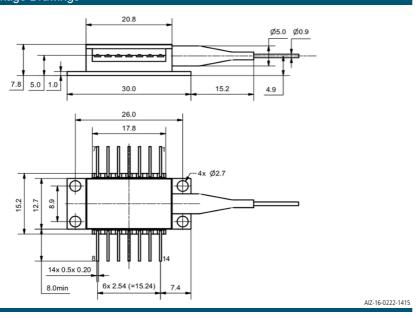
## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**

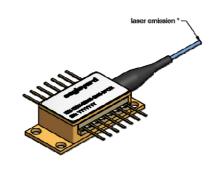


Pin	Assignment		
1	Thermoelectric Cooler (+)	14	Thermoelectric Cooler (-)
2	Thermistor	13	Case
3	Photodiode (Anode)	12	not connected
4	Photodiode (Cathode)	11	Laser Diode (Cathode)
5	Thermistor	10	Laser Diode (Anode)
6	not connected	9	not connected
7	not connected	8	not connected



#### Package Drawings





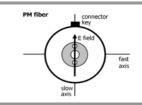
Caution. Excessive mechanical stress on the package can lead to a damage of the laser.

 $\underline{instruction \ manual} \ \ on \ www.eagleyard.com$ 

#### Fiber and Connector Type

PM Fiber	$900$ / $125$ / $5.5\mu m,UV/Polyester-elastomer$ Coating (I = 1 +/-0.1 m)
Connector	FC/APC (narrow key / 2mm)
	other types on request

#### **Measurement Conditions / Comments**



Revision 1.00



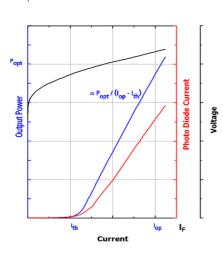
2022-12-20

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser

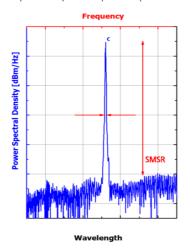


#### Typical Measurement Results

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

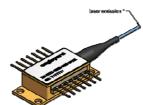
Unpacking the laser diodes should only be done at electrostatic safe workstations (EPA). Though protection against electro static discharge (ESD) is implemented in the laser package, charges may occur at surfaces. Please store this product in its original package at a dry, clean place until final use.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

The DFB 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.















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Revision 0.9

2022-01-19

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser



#### General Product Information

Product	Application
780 nm DFB Laser	Spectroscopy (Rb D2 line)
with hermetic 14-Pin Butterfly Housing (RoHS compliant)	Metrology
including Monitor Diode, Thermoelectric Cooler and Thermistor	THz Generation
with integrated $\boldsymbol{\mu}$ Isolator and Beam Collimation	



#### Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	T <sub>S</sub>	°C	-40		85
Operational Temperature at Case	$T_{C}$	°C	-40		85
Operational Temperature at Laser Chip	$T_{LD}$	°C	5		50
Forward Current	I <sub>F</sub>	mA			190
Reverse Voltage	$V_R$	V			2
Output Power	P <sub>opt</sub>	mW			50
TEC Current	I <sub>TEC</sub>	А			1.1
TEC Voltage	$V_{TEC}$	V			2.8

#### Measurement Conditions / Comments

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.

#### Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	-20		65
Operational Temperature at Laser Chip	$T_{LD}$	°C	5		45
Forward Current	l <sub>F</sub>	mA			180
Output Power	P <sub>opt</sub>	mW	10		40

Measurement Cond	ditions / Comments

measured by integrated Thermistor

#### Characteristics at T<sub>LD</sub> = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	779	780	781
Target Wavelength	$\lambda_{\text{T}}$	nm		780.24	
Linewidth (FWHM)	Δλ	MHz		0.6	1
Mode-hop free Tuning Range	$\Delta \lambda_{\text{tune}}$	pm	25		
Sidemode Supression Ratio	SMSR	dB	30	50	

#### Measurement Conditions / Comments

see images on page 4  $P_{opt} = 80 \text{ mW}$  > 10 GHz, at target wavelength  $P_{opt} = 40 \text{ mW}$ 







Revision

2022-01-19

## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



Characteristics at T <sub>LD</sub> = 25° C	at BOL				cont'd
Parameter	Symbol	Unit	min	typ	max
Temperature Coefficient of Wavelength	dλ / dT	nm / K		0.06	
Current Coefficient of Wavelength	$d\lambda/dI$	nm / mA		0.003	
Laser Current @ P <sub>opt</sub> = 40 mW	$I_{LD}$	mA			180
Slope Efficiency	η	W/A	0,3	0,4	0.6
Threshold Current	I <sub>th</sub>	mA			70
Divergence parallel (FWHM)	$\Theta_{  }$	0		0.1	
Divergence perpendicular (FWHM)	$\Theta_{\perp}$	0		0.1	
Beam Diameter horizontal	d	mm		1.0	1.2
Beam Diameter vertical	$d_\perp$	mm		0.8	1.2
Degree of Polarization	DOP	%		95	

Measurement Conditions / Comments
parallel to the base plate of the housing (see p. 3)
perpendicular to base plate of the housing (see p. 3)
parallel to the base plate of the housing (see p. 3)
perpendicular to base plate of the housing (see p. 3)
$P_{opt} = 40$ mW; slant polarization (45°), see p. 3

Monitor Diode					
Parameter	Symbol	Unit	min	typ	max
Monitor Detector Responsivity	I <sub>mon</sub> / P <sub>opt</sub>	μΑ/mW	2		40

Meası	urement Conditions / Comments
$U_R =$	5 V

Thermoelectric Cooler					
Parameter	Symbol	Unit	min	typ	max
Current	I <sub>TEC</sub>	А		0.4	
Voltage	$U_TEC$	V		1.3	
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0.5	
Temperature Difference	ΔΤ	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 =  Tcase - TLD $

Thermistor (Standard NTC Type)					
Parameter	Symbol	Unit	min	typ	max
Resistance	R	kΩ		10	
Beta Coefficient	β			3892	
Steinhart & Hart Coefficient A	А			1.1293 x 10	) <sup>-3</sup>
Steinhart & Hart Coefficient B	В			2.3410 x 10	) -4
Steinhart & Hart Coefficient C	C			8.7755 x 10	) -8

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



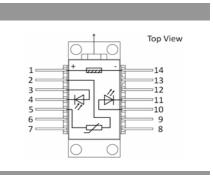
Revision

2022-01-19

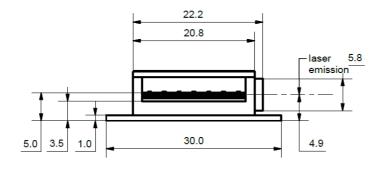
## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**

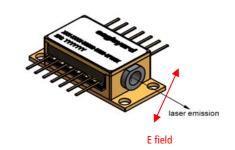


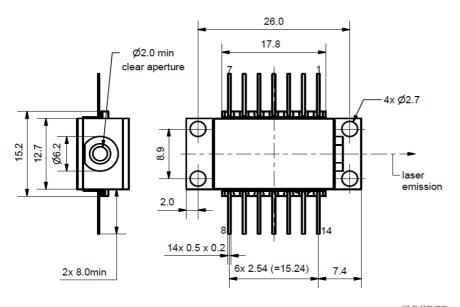
Pin	Assignment		
1	Thermoelectric Cooler (+)	14	Thermoelectric Cooler (-)
2	Thermistor	13	Case
3	Photodiode (Anode)	12	not connected
4	Photodiode (Cathode)	11	Laser Diode (Cathode)
5	Thermistor	10	Laser Diode (Anode)
6	not connected	9	not connected
7	not connected	8	not connected



#### Package Drawings







Caution. Excessive mechanical stress on the package can lead to a damage of the laser.

instruction manual on www.eagleyard.com



Revision 0.9

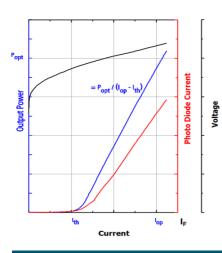
2022-01-19

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser

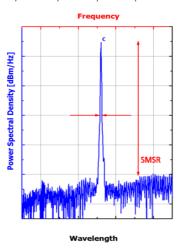


#### Typical Measurement Results

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

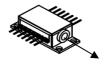
Unpacking the laser diodes should only be done at electrostatic safe workstations (EPA). Though protection against electro static discharge (ESD) is implemented in the laser package, charges may occur at surfaces. Please store this product in its original package at a dry, clean place until final use.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

The DFB 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







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Revision 1.01



2017-03-02

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser



#### General Product Information

Product	Application
780 nm DFB Laser	Spectroscopy
with hermetic 14-Pin Butterfly Housing (RoHS compliant)	Metrology
including Monitor Diode, Thermoelectric Cooler and Thermistor	
with PM Fiber and angle-polished Connector (APC)	



#### **Absolute Maximum Ratings**

Parameter	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 <sub>F</sub>	mA			160
Reverse Voltage	$V_R$	V			2
Output Power	$P_{opt}$	mW			50
TEC Current	I <sub>TEC</sub>	А			1.8
TEC Voltage	$V_{TEC}$	V			3.2

#### Measurement Conditions / Comments

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.

#### **Recommended Operational Conditions**

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	-20		65
Operational Temperature at Laser Chip	$T_LD$	°C		25	
Forward Current	I <sub>F</sub>	mA			140
Output Power	$P_{opt}$	mW		40	

Measurement Conditions / Comments	
	Ξ
measured by integrated Thermistor	

#### Characteristics at $T_{LD} = 25^{\circ}$ at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	779	780	781
Linewidth (FWHM)	$\Delta\lambda$	MHz		2	
Temperature Coefficient of Wavelength	dλ / dT	nm / K		0.06	
Current Coefficient of Wavelength	dλ / dl	nm / mA		0.003	
Sidemode Supression Ratio	SMSR	dB	30	45	

Measurement Conditions / Comments
see images on page 4
40 mW
$P_{opt} = 40 \text{ mW}$





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Revision 1.01

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



Characteristics at T <sub>LD</sub> = 25° at BOL					cont'c	
Parameter	Symbol	Unit	min	typ	max	
Laser Current @ P <sub>opt</sub> = mW	I <sub>LD</sub>	mA			140	
Slope Efficiency	η	W/A	0.15	0.5	0.8	
Threshold Current	I <sub>th</sub>	mA			70	
Polarization Extinction Ratio	PER	dB		15		

Measurement Conditions / Comments
ću.
ex fiber
$P_{opt} = 40 \text{ mW}$
- орг

Monitor Diode					
Parameter	Symbol	Unit	min	typ	max
Monitor Detector Responsivity	I <sub>mon</sub> / P <sub>opt</sub>	μA/mW	1		20

Meası	surement Conditions / Comments	
$U_R =$	5 V	

Thermoelectric Cooler					
Parameter	Symbol	Unit	min	typ	max
Current	I <sub>TEC</sub>	А		0.4	
Voltage	$U_TEC$	V		0.8	
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0.5	
Temperature Difference	ΔΤ	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 =  Tcase - TLD $

Parameter	Symbol	Unit	min	typ	max
Resistance	R	kΩ		10	
Beta Coefficient	β			3892	
Steinhart & Hart Coefficient A	А			1.1293 x 10	-3
Steinhart & Hart Coefficient B	В			2.3410 x 10	-4
Steinhart & Hart Coefficient C	C			8.7755 x 10	-8

Thermistor (Standard NTC Type)

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



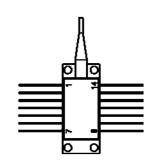
Revision 1.01

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**

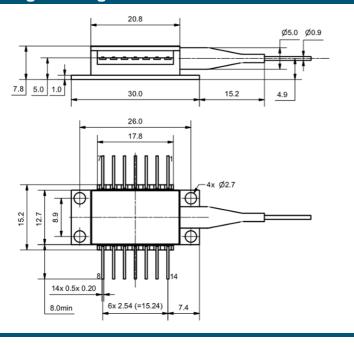


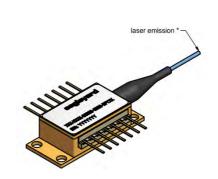
#### Pin Assignment

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 1	4 pins are isolated from case.		



#### Package Drawings

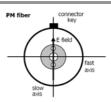




#### Fiber and Connector Type

PM Fiber	900 / 125 / 5.5 μm, UV/Polyester-elastomer Coating (l = 1 +/-0.1 m)
Connector	different variants available

#### **Measurement Conditions / Comments**



AIZ-16-0222-1415

Revision 1.01



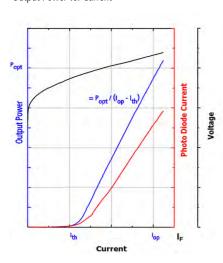
2017-03-02

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser

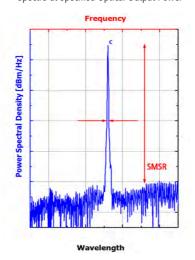


#### Typical Measurement Results

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

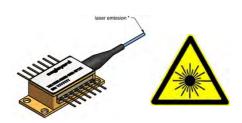
Unpacking the laser diodes should only be done at electrostatic safe workstations (EPA). Though protection against electro static discharge (ESD) is implemented in the laser package, charges may occur at surfaces. Please store this product in its original package at a dry, clean place until final use.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

The DFB 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.







INVISIBLE LASER RADIATION
AVOID EYE OR SKIN EXPOSURE
TO DIRECT OR SCAITERED RADIATION
CLASS 4 LASER PRODUCT
WAVELENGTH 780 nm
MAX. OUTPUT POWER 50 mW







Revision 0.91

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



#### General Product Information

Product	Application
Tunable 780 nm DFB Laser	Spectroscopy
with hermetic 14-Pin Butterfly Housing (RoHS compliant)	Metrology
including Monitor Diode, Thermoelectric Cooler and Thermistor	THz Generation
with integrated Beam Collimation	



#### Absolute Maximum Ratings

Parameter	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 <sub>F</sub>	mA			190
Reverse Voltage	$V_R$	V			2
Output Power	$P_{\text{opt}}$	mW			90
TEC Current	I <sub>TEC</sub>	Α			1.1
TEC Voltage	$V_{TEC}$	V			2.8

#### **Measurement Conditions / Comments**

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.

#### Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	-20		65
Operational Temperature at Laser Chip	$T_LD$	°C	15		45
Forward Current	I <sub>F</sub>	mA			180
Output Power	P <sub>opt</sub>	mW	20		80

Measurement Conditions / Comments
measured by integrated Thermistor

#### Characteristics at T<sub>LD</sub> = 25° C at BOL

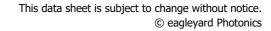
Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	779	780	781
Linewidth (FWHM)	Δλ	MHz		2	
Mode-hop free Tuning Range	$\Delta \lambda_{\text{tune}}$	pm		1500	
Sidemode Supression Ratio	SMSR	dB	30	50	
Temperature Coefficient of Wavelength	$d\lambda$ / $dT$	nm / K		0.06	
Current Coefficient of Wavelength	dλ / dl	nm / mA		0.003	

Measurement Conditions / Comments
see images on page 4
$P_{opt} = 80 \text{ mW}$
reached by temperature modulation
$P_{opt} = 80 \text{ mW}$



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Contact us





Revision 0.91

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



Characteristics at T <sub>LD</sub> = 25°	C at BOL				cont'd
Parameter	Symbol	Unit	min	typ	max
Mode-hop free Temperature Range	$T_{LD}$	° C	15		40
Mode-hop free Power Range	P <sub>opt</sub>	mW	20		80
Laser Current @ $P_{opt} = 80 \text{ mW}$	$I_{LD}$	mA			180
Slope Efficiency	η	W/A	0.6	0.8	1.1
Threshold Current	$I_{th}$	mA			70
Divergence parallel (FWHM)	$\Theta_{  }$	0		0.1	
Divergence perpendicular (FWHM)	$\Theta_{\perp}$	0		0.1	
Beam Diameter horizontal (1/e²)	d	mm		1.0	1.2
Beam Diameter vertical (1/e²)	$d_\perp$	mm		0.8	1.2

Measurement Conditions / Comments
Temperature at Laser Chip
parallel to the base plate of the housing (see p. 3)
perpendicular to base plate of the housing (see p. 3)
parallel to the base plate of the housing (see p. 3)
perpendicular to base plate of the housing (see p. 3)

Symbol	Unit	min	typ	max
I <sub>mon</sub> / P <sub>opt</sub>	μΑ/mW	1		20
		Symbol Unit		

Meas	urement Conditions / Comments
$J_R =$	5 V

Thermoelectric Cooler					
Parameter	Symbol	Unit	min	typ	max
Current	I <sub>TEC</sub>	А		0.4	
Voltage	$U_TEC$	V		1.3	
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0.5	
Temperature Difference	ΔΤ	K			50

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Thermistor (Standard NTC Type)					
Parameter	Symbol	Unit	min	typ	max
Resistance	R	kΩ		10	
Beta Coefficient	β			3892	
Steinhart & Hart Coefficient A	А		1.1293 x 10 <sup>-3</sup>		
Steinhart & Hart Coefficient B	В			2.3410 x 10	-4
Steinhart & Hart Coefficient C	C			8.7755 x 10	-8

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



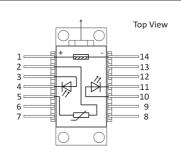
Revision 0.91

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**

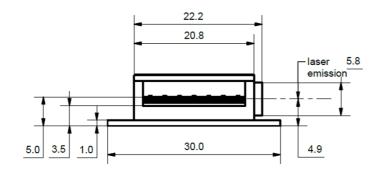


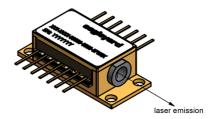
#### Pin Assignment

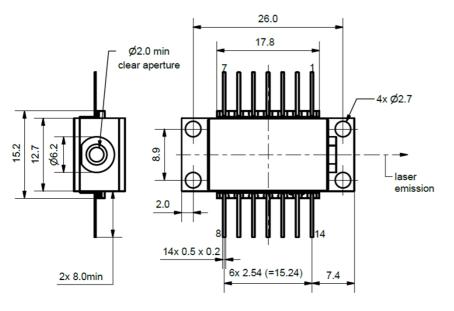
1	Thermoelectric Cooler (+)	14	Thermoelectric Cooler (-)
2	Thermistor	13	Case
3	Photodiode (Anode)	12	not connected
4	Photodiode (Cathode)	11	Laser Diode (Cathode)
5	Thermistor	10	Laser Diode (Anode)
6	not connected	9	not connected
7	not connected	8	not connected
Pins	are isolated from case unless noted otherwise.		



#### Package Drawings







Caution. Excessive mechanical stress on the package can lead to a damage of the laser.

See <u>instruction manual</u> on www.eagleyard.com

AIZ-20-1029-0928



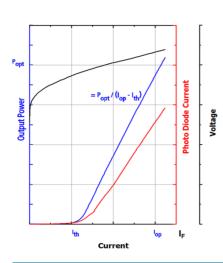
Revision 0.91

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser

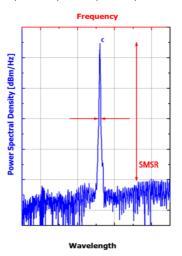


#### Typical Measurement Results

Output Power vs. Current



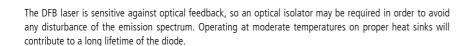
Spectra at Specified Optical Output Power



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.



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



INVISIBLE LASER RADIATION
AVOID EYE OR SKIN EXPOSURE
TO DIRECT OR SCATTERED RADIATION
CLASS 4 LASER PRODUCT
WAVELENGTH 780 nm
MAX. OUTPUT POWER 90 mW







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Revision

### **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**





#### General Product Information

Product	Application
780 nm DFB Laser	Spectroscopy (Rb D2 line)
with hermetic 14-Pin Butterfly Housing (RoHS compliant)	Metrology
including Monitor Diode, Thermoelectric Cooler and Thermistor	THz Generation
with integrated Beam Collimation	



#### Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	Ts	°C	-40		85
Operational Temperature at Case	$T_{C}$	°C	-40		85
Operational Temperature at Laser Chip	$T_LD$	°C	5		50
Forward Current	I <sub>F</sub>	mA			190
Reverse Voltage	$V_R$	V			2
Output Power	$P_{\text{opt}}$	mW			90
TEC Current	I <sub>TEC</sub>	Α			1.1
TEC Voltage	$V_{TEC}$	V			2.8

#### Measurement Conditions / Comments

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.

#### Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	-20		65
Operational Temperature at Laser Chip	$T_LD$	°C	5		45
Forward Current	I <sub>F</sub>	mA			180
Output Power	$P_{opt}$	mW	20		80

Measurement Conditions / Comments
measured by integrated Thermistor

#### Characteristics at T<sub>LD</sub> = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	779	780	781
Target Wavelength	$\lambda_{\text{T}}$	nm		780.24	
Linewidth (FWHM)	Δλ	MHz		0.6	1
Mode-hop free Tuning Range	$\Delta \lambda_{\text{tune}}$	pm	25		
Sidemode Supression Ratio	SMSR	dB	30	50	

Measurement Conditions / Comments
see images on page 4
reached within $T_{LD} = 5$ ° $45$ ° C at 80 mW
$P_{opt} = 80 \text{ mW}$
> 10 GHz, at target wavelength
$P_{opt} = 80 \text{ mW}$



0.92 Revision

2022-01-19

## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



at BOL				cont'd
Symbol	Unit	min	typ	max
dλ / dT	nm / K		0.06	
dλ / dl	nm / mA		0.003	
$I_{LD}$	mA			180
η	W/A	0.6	0.8	1.1
I <sub>th</sub>	mA			70
$\Theta_{  }$	0		0.1	
$\Theta_{\perp}$	0		0.1	
d	mm		1.0	1.2
$d_{\bot}$	mm		0.8	1.2
DOP	%		90	
	$\begin{array}{c} \text{Symbol} \\ \text{d}\lambda \ / \ \text{d}\text{T} \\ \text{d}\lambda \ / \ \text{d}\text{I} \\ \text{d}\lambda \ / \ \text{d}\text{I} \\ \text{I}_{\text{LD}} \\ \text{\eta} \\ \text{I}_{\text{th}} \\ \Theta_{\parallel} \\ \text{G}_{\perp} \\ \text{d}_{\parallel} \\ \text{I}_{\perp} \end{array}$	$ \begin{array}{c cccc} Symbol & Unit \\ \hline d\lambda  /  dT & nm  /  K \\ \hline d\lambda  /  dI & nm  /  mA \\ \hline l_{LD} & mA \\ \hline \eta & W  /  A \\ \hline l_{th} & mA \\ \hline \Theta_{  } & \circ \\ \hline \Theta_{\perp} & \circ \\ \hline d_{  } & mm \\ \hline d_{\perp} & mm \\ \hline \end{array} $	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

Measurement Conditions / Comments
parallel to the base plate of the housing (see p. 3)
perpendicular to base plate of the housing (see p. 3)
parallel to the base plate of the housing (see p. 3)
perpendicular to base plate of the housing (see p. 3)
$P_{opt} = 80$ mW; E field perpendicular to the base plate

Symbol	Unit	min	typ	max
I <sub>mon</sub> / P <sub>opt</sub>	μΑ/mW	1		20
		-j		

Meası	urement Conditions / Comments
$U_R =$	5 V

Thermoelectric Cooler					
Parameter	Symbol	Unit	min	typ	max
Current	I <sub>TEC</sub>	А		0.4	
Voltage	$U_TEC$	V		1.3	
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0.5	
Temperature Difference	ΔΤ	K			50

Measurement Conditions / Comments		
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$		
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$		
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$		
$P_{opt} = 80 \text{ mW}, \Delta T =  Tcase - TLD $		

Parameter	Symbol	Unit	min	typ	max
Resistance	R	kΩ		10	
Beta Coefficient	β			3892	
Steinhart & Hart Coefficient A	А			1.1293 x 10	-3
Steinhart & Hart Coefficient B	В			2.3410 x 10	-4
Steinhart & Hart Coefficient C	С			8.7755 x 10	-8

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

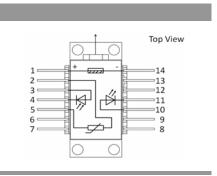


Revision

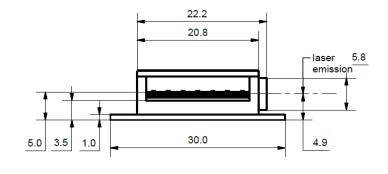
## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**

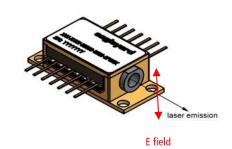


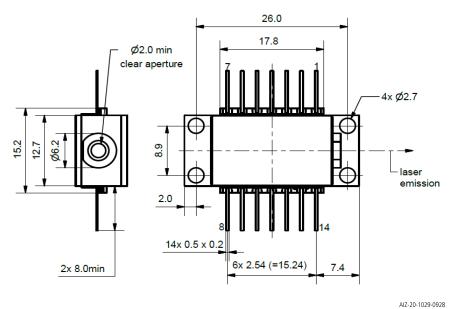
Pin	Pin Assignment					
1	Thermoelectric Cooler (+)	1.4	Thermoelectric Cooler (-)			
		14	memoelectric Cooler (-)			
2	Thermistor	13	Case			
3	Photodiode (Anode)	12	not connected			
4	Photodiode (Cathode)	11	Laser Diode (Cathode)			
5	Thermistor	10	Laser Diode (Anode)			
6	not connected	9	not connected			
7	not connected	8	not connected			



#### Package Drawings







Caution. Excessive mechanical stress on the package can lead to a damage of the laser.

 $\underline{instruction\ manual}\ on\ www.eagleyard.com$ 



Revision

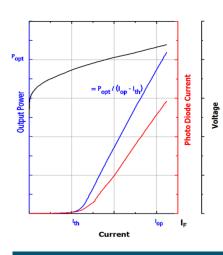
2022-01-19

### **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**

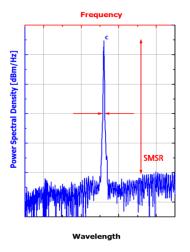


#### Typical Measurement Results

Output Power vs. Current



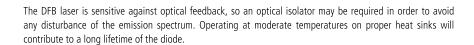
Spectra at Specified Optical Output Power



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.



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







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Revision 1.02

## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



## General Product Information

Product	Application
780 nm DFB Laser	Spectroscopy
with hermetic 8-Pin TO Package (RoHS compliant)	Metrology
including Monitor Diode, Thermoelectric Cooler and Thermistor	THz Generation



## Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	$T_S$	°C	-40		85
Operational Temperature at Case	$T_{C}$	°C	-20		75
Operational Temperature at Laser Chip	$T_{LD}$	°C	0		50
Forward Current	I <sub>F</sub>	mA			200
Reverse Voltage	$V_R$	V			2
Output Power	$P_{\text{opt}}$	mW			100
TEC Current	I <sub>TEC</sub>	А			1.8
TEC Voltage	$V_{TEC}$	V			3.2

#### **Measurement Conditions / Comments**

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.

## Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	-20		65
Operational Temperature at Laser Chip	$T_LD$	°C	5		40
Forward Current	I <sub>F</sub>	mA			180
Output Power	P <sub>opt</sub>	mW	20		80

#### Characteristics at T<sub>LD</sub> = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	779	780	781
Linewidth (FWHM)	Δλ	MHz		2	
Temperature Coefficient of Wavelength	dλ / dT	nm / K		0.06	
Current Coefficient of Wavelength	dλ / dl	nm / mA		0.003	
Sidemode Supression Ratio	SMSR	dB	30	45	

Measurement Conditions / Comments
see images on page 4
$P_{opt} = 80 \text{ mW}$

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## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**





Characteristics at T <sub>LD</sub>	= 25° C at BOL			cont'd	
Parameter	Symbol	Unit	min	typ	max
Laser Current @ P <sub>opt</sub> = 80 mW	$I_{LD}$	mA			180
Slope Efficiency	η	W/A	0.6	0.8	1.1
Threshold Current	$I_{th}$	mA			70
Divergence parallel (FWHM)	$\Theta_{  }$	0		8	
Divergence perpendicular (FWHM)	$\Theta_{\perp}$	0		21	
Degree of Polarization	DOP	%		90	

Measurement Conditions / Comments
parallel to short axis of the housing (see p. 3)
parallel to long axis of the housing (see p. 3)
80 mW; E field parallel to long axis of housing

Symbol	Unit	min	typ	max
I <sub>mon</sub> / P <sub>opt</sub>	μA/mW	1		20
		Symbol Unit		

Meası	urement Conditions / Comments
$U_R =$	5 V

Parameter	Symbol	Unit	min	typ	max
Current	I <sub>TEC</sub>	А		0.4	
Voltage	$U_TEC$	V		0.8	
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0.5	
Temperature Difference	ΔΤ	K			50

Measurement Conditions / Comments	
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$	
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$	
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$	
$P_{opt} = 80 \text{ mW}, \Delta T =  T \text{case} - T \text{LD} $	

Parameter	Symbol	Unit	min	typ	max	
Resistance	R	kΩ		10		
Beta Coefficient	β		3892			
Steinhart & Hart Coefficient A	А		1.1293 x 10 <sup>-3</sup>			
Steinhart & Hart Coefficient B	В		2.3410 x 10 <sup>-4</sup>			
Steinhart & Hart Coefficient C	C			8.7755 x 10	-8	

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

Thermistor (Standard NTC Type)

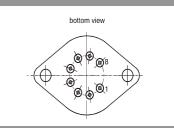


Revision 1.02

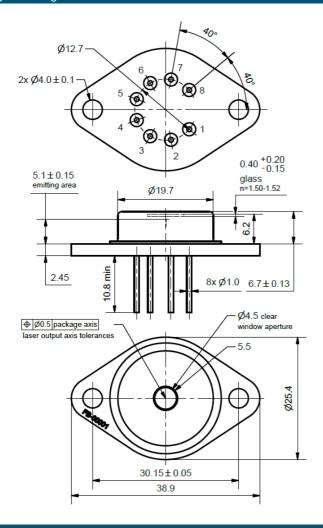
# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**

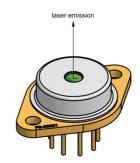


Pi	n Assignment		
1	Thermoelectric Cooler (+)	5	Laser Diode Anode
2	Thermistor	6	Monitor Diode Anode
3	Thermistor	7	Photo Diode Cathode
4	Laser Diode Cathode	8	Thermoelectric Cooler (-)
All	8 pins are isolated from case.		



## Package Drawings





AIZ-16-311-1543-B

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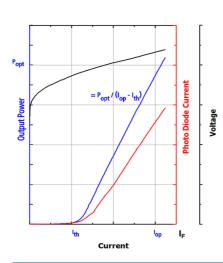
2018-03-21

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser

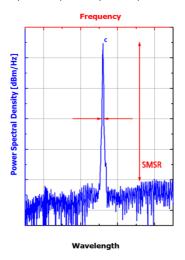


### Typical Measurement Results

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.

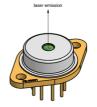
#### Unpacking, Installation and Laser Safety

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 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.







INVISIBLE LASER RADIATION
AVOID EYE OR SKIN EXPOSURE
TO DIRECT OR SCATTERED RADIATION
CLASS 4 LASER PRODUCT
WAVELENGTH 780 nm
MAX. OUTPUT POWER 100 mW









Revision 1.02

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



## General Product Information

Application
Spectroscopy
Metrology
THz Generation



## Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	$T_S$	°C	-40		85
Operational Temperature at Case	$T_{C}$	°C	-20		75
Operational Temperature at Laser Chip	$T_{LD}$	°C	0		50
Forward Current	I <sub>F</sub>	mA			200
Reverse Voltage	$V_R$	V			2
Output Power	$P_{\text{opt}}$	mW			100
TEC Current	I <sub>TEC</sub>	Α			1.8
TEC Voltage	$V_{TEC}$	V			3.2

#### **Measurement Conditions / Comments**

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.

## Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	-20		65
Operational Temperature at Laser Chip	$T_{LD}$	°C	5		40
Forward Current	I <sub>F</sub>	mA			180
Output Power	P <sub>opt</sub>	mW	20		80

## Characteristics at T<sub>LD</sub> = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	779	780	781
Linewidth (FWHM)	Δλ	MHz		2	
Mode-hop free Tuning Range	$\Delta \lambda_{\text{tune}}$	pm		1500	
Temperature Coefficient of Wavelength	dλ / dT	nm / K		0.06	
Current Coefficient of Wavelength	dλ / dl	nm / mA		0.003	
Sidemode Supression Ratio	SMSR	dB	30	45	



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## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**





Characteristics at T <sub>LD</sub>	= 25° C at BO	L			cont'd
Parameter	Symbol	Unit	min	typ	max
Mode-hop free Temperature Range	$T_LD$	° C	15		40
Mode-hop free Power Range	P <sub>opt</sub>	mW	20		80
Laser Current @ P <sub>opt</sub> = 80 mW	I <sub>LD</sub>	mA			180
Slope Efficiency	η	W/A	0.6	0.8	1.1
Threshold Current	I <sub>th</sub>	mA			70
Divergence parallel (FWHM)	$\Theta_{  }$	0		8	
Divergence perpendicular (FWHM)	$\Theta_{\perp}$	0		21	
Degree of Polarization	DOP	%		90	

Measurement Conditions / Comments
Temperature at Laser Chip
parallel to short axis of the housing (see p. 3)
parallel to long axis of the housing (see p. 3)
80 mW; E field parallel to long axis of housing

Monitor Diode					
Parameter	Symbol	Unit	min	typ	max
Monitor Detector Responsivity	I <sub>mon</sub> / P <sub>opt</sub>	μA/mW	1		20

Meası	urement Conditions / Comments
$U_R =$	5 V

Thermoelectric Cooler					
Parameter	Symbol	Unit	min	typ	max
Current	I <sub>TEC</sub>	А		0.4	
Voltage	$U_TEC$	V		0.8	
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0.5	
Temperature Difference	ΔΤ	K			50

Measurement Conditions / Comments
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$
$P_{opt} = 80 \text{ mW}, \Delta T =  T \text{case} - T \text{LD} $

Symbol	Unit	min	typ	max
R	kΩ		10	
β			3892	
А			1.1293 x 10	-3
В			2.3410 x 10	-4
C		;	3.7755 x 10	-8
	R β A	R kΩ β A	R kΩ β A B	R kΩ 10 β 3892 A 1.1293 x 10

Measurement Conditions / Con	nments
$T_{LD} = 25^{\circ} C$	
$R_1  /  R_2 = e^{\beta  (1/T_1  \cdot  1/T_2)} $ at $T_{LD} =$	0° 50° C
$1/T = A + B(\ln R) + C(\ln R)^3$	
T: temperature in Kelvin	
R: resistance at T in Ohm	

Thermistor (Standard NTC Type)

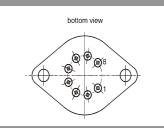


Revision 1.02

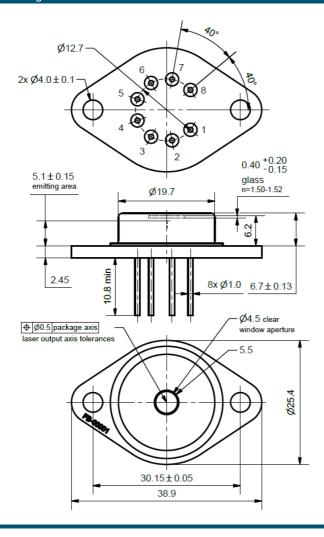
# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**

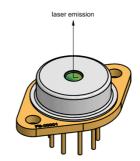


Pi	n Assignment		
1	Thermoelectric Cooler (+)	5	Laser Diode Anode
2	Thermistor	6	Monitor Diode Anode
3	Thermistor	7	Photo Diode Cathode
4	Laser Diode Cathode	8	Thermoelectric Cooler (-)
All	8 pins are isolated from case.		



## Package Drawings





AIZ-16-311-1543-B

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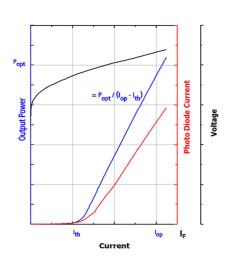
2018-03-21

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser

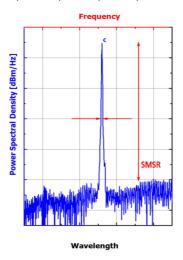


### Typical Measurement Results

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.

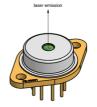
#### Unpacking, Installation and Laser Safety

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 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.

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Revision 1.03

2022-01-19

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser



## General Product Information

Product	Application
780 nm DFB Laser	Spectroscopy (Rb D2 line)
with hermetic 8-Pin TO Package (RoHS compliant)	Metrology
including Monitor Diode, Thermoelectric Cooler and Thermistor	THz Generation



## Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	T <sub>s</sub>	°C	-40		85
Operational Temperature at Case	$T_{C}$	°C	-20		75
Operational Temperature at Laser Chip	$T_LD$	°C	0		50
Forward Current	I <sub>F</sub>	mA			200
Reverse Voltage	$V_R$	V			2
Output Power	$P_{opt}$	mW			100
TEC Current	I <sub>TEC</sub>	А			1.8
TEC Voltage	$V_{TEC}$	V			3.2

#### Measurement Conditions / Comments

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.

### Recommended Operational Conditions

Symbol	Unit	min	typ	max
$T_{case}$	°C	-20		65
$T_LD$	°C	5		40
I <sub>F</sub>	mA			180
P <sub>opt</sub>	mW	20		80
	T <sub>case</sub> T <sub>LD</sub>	T <sub>case</sub> °C T <sub>LD</sub> °C I <sub>F</sub> mA	T <sub>case</sub> °C -20 T <sub>LD</sub> °C 5 I <sub>F</sub> mA	T <sub>case</sub> °C -20 T <sub>LD</sub> °C 5

Measurement Conditions / Comments	
measured by integrated Thermistor	

## Characteristics at T<sub>LD</sub> = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	779	780	781
Target Wavelength	$\lambda_{\text{T}}$	nm		780.24	
Linewidth (FWHM)	Δλ	MHz		0.6	1
Sidemode Supression Ratio	SMSR	dB	30	45	
Temperature Coefficient of Wavelength	$d\lambda/dT$	nm / K		0.06	
Current Coefficient of Wavelength	dλ / dl	nm / mA		0.003	
Mode-hop free Tuning Range	$\Delta \lambda_{\text{tune}}$	pm	25		

Measurement Conditions / Comments
see images on page 4
reached within $T_{LD} = 5$ ° $45$ ° C at 80 mW
$P_{opt} = 80 \text{ mW}$
$P_{opt} = 80 \text{ mW}$
> 10 GHz, at target wavelength







Revision 1.03

2022-01-19

## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



Characteristics at T <sub>LD</sub> = 25° (	C at BOL				cont'd
Parameter	Symbol	Unit	min	typ	max
Laser Current @ P <sub>opt</sub> = 80 mW	I <sub>LD</sub>	mA			180
Slope Efficiency	η	W/A	0.6	0.8	1.1
Threshold Current	I <sub>th</sub>	mA			70
Divergence parallel (FWHM)	$\Theta_{  }$	0		8	
Divergence perpendicular (FWHM)	$\Theta_{\perp}$	0		21	
Degree of Polarization	DOP	%		90	

Measurement Conditions / Comments
parallel to short axis of the housing (see p. 3)
parallel to long axis of the housing (see p. 3)
$P_{\rm opt} = 80$ mW; E field parallel to long axis of housing

Monitor Diode					
Parameter	Symbol	Unit	min	typ	max
Monitor Detector Responsivity	I <sub>mon</sub> / P <sub>opt</sub>	μA/mW	1		20

Measi	urement Conditions / Comments
$U_R =$	5 V

Symbol	Unit	min	typ	max
I <sub>TEC</sub>	А		0.4	
$U_TEC$	V		0.8	
P <sub>loss</sub>	W		0.5	
ΔΤ	K			50
	I <sub>TEC</sub> U <sub>TEC</sub> P <sub>loss</sub>	I <sub>TEC</sub> A U <sub>TEC</sub> V P <sub>loss</sub> W	I <sub>TEC</sub> A U <sub>TEC</sub> V P <sub>loss</sub> W	I <sub>TEC</sub> A 0.4 U <sub>TEC</sub> V 0.8 P <sub>loss</sub> W 0.5

Measurement Conditions / Comments
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$
$P_{opt} = 80 \text{ mW}, \Delta T =  Tcase - TLD $

Parameter	Symbol	Unit	min	typ	max
Resistance	R	kΩ		10	
Beta Coefficient	β			3892	
Steinhart & Hart Coefficient A	А			1.1293 x 10	-3
Steinhart & Hart Coefficient B	В			2.3410 x 10	-4
Steinhart & Hart Coefficient C	C			8.7755 x 10	-8

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

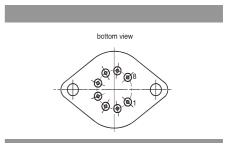


Revision 1.03

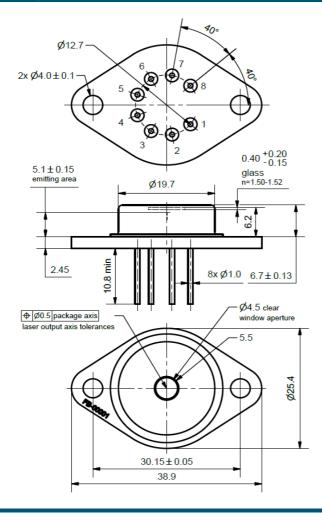
## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**

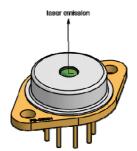


Pi	n Assignment		
1	Thermoelectric Cooler (+)	5	Laser Diode Anode
2	Thermistor	6	Monitor Diode Anode
3	Thermistor	7	Photo Diode Cathode
4	Laser Diode Cathode	8	Thermoelectric Cooler (-)
All	8 pins are isolated from case.		



## Package Drawings





AIZ-16-311-1543-B



Revision 1.03

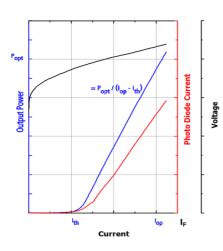
2022-01-19

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser

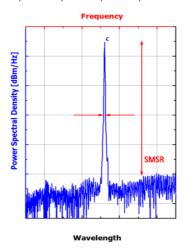


### Typical Measurement Results

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.

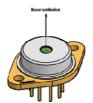
### Unpacking, Installation and Laser Safety

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 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.















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Revision 0.81

2022-01-19

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser



### General Product Information

Application
Spectroscopy (Rb D2 line)
Metrology
THz Generation



## Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	T <sub>S</sub>	°C	-40		85
Operational Temperature at Case	$T_{C}$	°C	-20		75
Operational Temperature at Laser Chip	$T_{LD}$	°C	0		50
Forward Current	I <sub>F</sub>	mA			200
Reverse Voltage	$V_R$	V			2
Output Power	$P_{opt}$	mW			100
TEC Current	I <sub>TEC</sub>	А			1.0
TEC Voltage	$V_{TEC}$	V			1.0

#### Measurement Conditions / Comments

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.

### Recommended Operational Conditions

65
45
180
80

Measurement Conditions / Comments
measured by integrated Thermistor

## Characteristics at T<sub>LD</sub> = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{\scriptscriptstyle C}$	nm	779	780	781
Target Wavelength	$\lambda_{\text{T}}$	nm		780.24	
Linewidth (FWHM)	Δλ	MHz		0.6	1
Sidemode Supression Ratio	SMSR	dB	30	45	
Temperature Coefficient of Wavelength	$d\lambda/dT$	nm / K		0.06	
Current Coefficient of Wavelength	$d\lambda/dI$	nm / mA		0.003	

Measurement Conditions / Comments				
see images on page 4				
reached within $T_{LD} = 5$ ° $45$ ° C at 80 mW				
$P_{opt} = 80 \text{ mW}$				
$P_{opt} = 80 \text{ mW}$				

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## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



Characteristics at T <sub>LD</sub> = 25° (	C at BOL				cont'd
Parameter	Symbol	Unit	min	typ	max
Mode-hop free Tuning Range	$\Delta \lambda_{\text{tune}}$	pm	25		
Laser Current @ $P_{opt} = 80 \text{ mW}$	$I_{LD}$	mA			180
Slope Efficiency	η	W/A	0.6	0.8	1.1
Threshold Current	$I_{th}$	mA			70
Divergence parallel (FWHM)	$\Theta_{  }$	0		8	
Divergence perpendicular (FWHM)	$\Theta_{\perp}$	0		21	
Degree of Polarization	DOP	%		90	

Symbol	Unit	min	typ	max
I <sub>mon</sub> / P <sub>opt</sub>	μA/mW		t.b.d.	
		-,	.,	77 11 11 11

Meas	urement Conditions / Comments
$U_R =$	5 V

Thermoelectric Cooler					
Parameter	Symbol	Unit	min	typ	max
Current	I <sub>TEC</sub>	А		0.4	
Voltage	$U_TEC$	V		0.4	
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0.4	
Temperature Difference	ΔΤ	K			40

Measurement Conditions / Comments				
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$				
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$				
$P_{opt} = 80 \text{ mW}, \Delta T = 20 \text{ K}$				
$P_{opt} = 80 \text{ mW}, \Delta T =  Tcase - TLD $				

Thermistor (Standard NTC Type)					
Parameter	Symbol	Unit	min	typ	max
Resistance	R	kΩ		10	
Beta Coefficient	β			3930	
Steinhart & Hart Coefficient A	А			1.029 x 10	-3
Steinhart & Hart Coefficient B	В			2.510 x 10	-4
Steinhart & Hart Coefficient C	C			1.051 x 10	-7

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



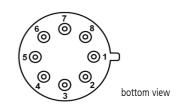
Revision 0.81

## 2022-01-19

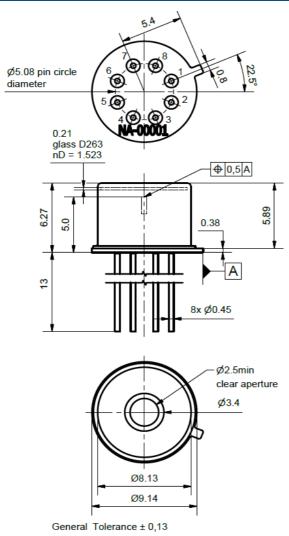
## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



Pi	Pin Assignment							
1	Laser Diode Anode	5	Thermistor					
2	Laser Diode Cathode	6	Thermistor					
3	Thermoelectric Cooler (-)	7	Photo Diode Anode					
4	Thermoelectric Cooler (+)	8	Photo Diode Cathode					
All	8 pins are isolated from case.							



## Package Drawings



AIZ-19-0129-1426B



Revision 0.81

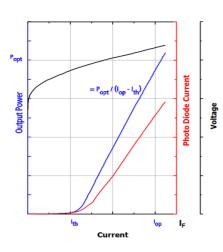
2022-01-19

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser

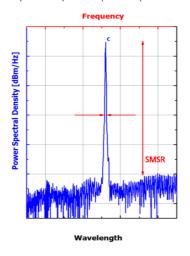


### Typical Measurement Results

Output Power vs. Current



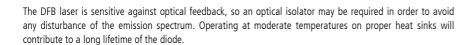
Spectra at Specified Optical Output Power



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.



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.

















Revision 0.94

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



## General Product Information

Product	Application
785 nm DFB Laser	Spectroscopy
with hermetic 14-Pin Butterfly Housing (RoHS compliant)	Metrology
including Monitor Diode, Thermoelectric Cooler and Thermistor	
with PM Fiber and Angled Physical Contact (APC)	



## Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	T <sub>S</sub>	°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 <sub>F</sub>	mA			170
Reverse Voltage	$V_R$	V			2
Output Power	$P_{opt}$	mW			45
TEC Current	$I_{TEC}$	А			1.8
TEC Voltage	$V_{TEC}$	V			3.2

#### **Measurement Conditions / Comments**

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.

## Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	-20		65
Operational Temperature at Laser Chip	$T_LD$	°C	15		45
Forward Current	I <sub>F</sub>	mA			150
Output Power	$P_{opt}$	mW	10		40

Measurement Conditions / Comments
measured by integrated Thermistor
ex fiber

## Characteristics at T<sub>LD</sub> = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	784	785	786
Linewidth (FWHM)	Δλ	MHz		2	
Temperature Coefficient of Wavelength	dλ / dT	nm / K		0.06	
Current Coefficient of Wavelength	dλ / dl	nm / mA		0.003	
Sidemode Supression Ratio	SMSR	dB		50	

Measurement Conditions / Comments
see images on page 4
$P_{opt} = 40 \text{ mW}$
$P_{opt} = 40 \text{ mW}$

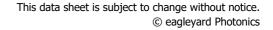


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## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



Characteristics at T <sub>LD</sub> = 25° C at BOL							
Parameter	Symbol	Unit	min	typ	max		
Mode-hop free Temperature Range	$T_{LD}$	° C					
Mode-hop free Power Range	P <sub>opt</sub>	mW					
Laser Current @ P <sub>opt</sub> = 40 mW	I <sub>LD</sub>	mA			150		
Slope Efficiency	η	W/A	0.2	0.4	0.7		
Threshold Current	I <sub>th</sub>	mA			70		
Polarization Extinction Ratio	PER	dB		15			

Measurement Conditions / Comments
$P_{opt} = 40 \text{ mW}$

Symbol	Unit	min	typ	max
I <sub>mon</sub> / P <sub>opt</sub>	μΑ/mW	1		20
		Symbol Unit		

Meası	urement Conditions / Comments
$U_R =$	5 V

Thermoelectric Cooler					
Parameter	Symbol	Unit	min	typ	max
Current	I <sub>TEC</sub>	Α		0.4	
Voltage	$U_TEC$	V		0.8	
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0.5	
Temperature Difference	ΔΤ	K			50

Meası	urement	Condi	tions /	/ Comi	ments	
P <sub>opt</sub> =	40 mW,	<b>Δ</b> T =	20 K			
P <sub>opt</sub> =	40 mW,	<b>Δ</b> T =	20 K			
P <sub>opt</sub> =	40 mW,	<b>Δ</b> T =	20 K			
P <sub>opt</sub> =	40 mW,	<b>Δ</b> T =	Tcase	- TLD	1	

•	, , , , , , , , , , , , , , , , , , ,					
Parameter	Sy	mbol	Unit	min	typ	max
Resistance		R	kΩ		10	
Beta Coefficient		β			3892	
Steinhart & Hart Coefficient A		Α			1.1293 x 10	-3
Steinhart & Hart Coefficient B		В			2.3410 x 10	-4
Steinhart & Hart Coefficient C		C			8.7755 x 10	-8

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

Thermistor (Standard NTC Type)



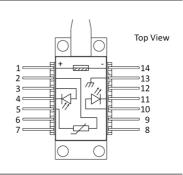
Revision 0.94

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**

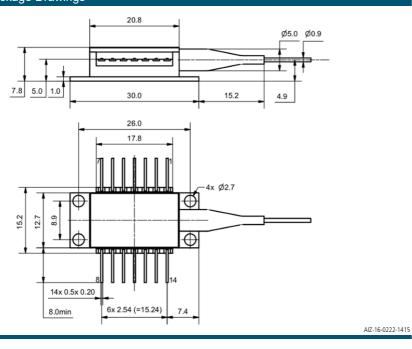


## Pin Assignment

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



## Package Drawings





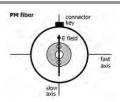
Caution. Excessive mechanical stress on the package can lead to a damage of the laser.

See <u>instruction manual</u> on www.eagleyard.com

## Fiber and Connector Type

PM Fiber	$900$ / $125$ / $5.5~\mu m$ , UV/Polyester-elastomer Coating (I = 1 +/-0.1 m)
Connector	FC/APC (narrow key / 2mm)

#### **Measurement Conditions / Comments**



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# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser



### Typical Measurement Results

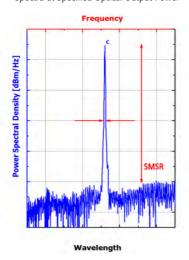
Output Power vs. Current

Photo Diode Current

Contract

Photo Diode 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 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.

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Revision 0.94

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



Genera	Product I	Information
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Product	Application
Tunable 785 nm DFB Laser	Spectroscopy
with hermetic 14-Pin Butterfly Housing (RoHS compliant)	Metrology
including Monitor Diode, Thermoelectric Cooler and Thermistor	
with PM Fiber and Angled Physical Contact (APC)	



## Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	Ts	°C	-40		85
Operational Temperature at Case	T <sub>C</sub>	°C	-40		85
Operational Temperature at Laser Chip	$T_{LD}$	°C	10		50
Forward Current	I <sub>F</sub>	mA			170
Reverse Voltage	$V_R$	V			2
Output Power	P <sub>opt</sub>	mW			45
TEC Current	I <sub>TEC</sub>	А			1.8
TEC Voltage	$V_{TEC}$	V			3.2

#### Measurement Conditions / Comments

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.

## Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	-20		65
Operational Temperature at Laser Chip	$T_{LD}$	°C	15		45
Forward Current	I <sub>F</sub>	mA			150
Output Power	P <sub>opt</sub>	mW	10		40

Measurement Conditions / Comments		
measured by integrated Thermistor		
ex fiber		

## Characteristics at T<sub>LD</sub> = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	784	785	786
Linewidth (FWHM)	Δλ	MHz		2	
Mode-hop free Tuning Range	$\Delta \lambda_{\text{tune}}$	pm		1500	
Temperature Coefficient of Wavelength	$d\lambda$ / $dT$	nm / K		0.06	
Current Coefficient of Wavelength	dλ / dl	nm / mA		0.003	
Sidemode Supression Ratio	SMSR	dB		50	

Measurement Conditions / Comments
see images on page 4
$P_{opt} = 40 \text{ mW}$
see note 1)
$P_{opt} = 40 \text{ mW}$







Revision 0.94

## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



Characteristics at T <sub>LD</sub> = 25° C at BOL					cont'd
Parameter	Symbol	Unit	min	typ	max
Mode-hop free Temperature Range	$T_{LD}$	° C	15		45
Mode-hop free Power Range	$P_{\text{opt}}$	mW	10		40
Laser Current @ $P_{opt} = 40 \text{ mW}$	$I_{LD}$	mA			150
Slope Efficiency	η	W/A	0.2	0.4	0.7
Threshold Current	$I_{th}$	mA			70
Polarization Extinction Ratio	PER	dB		15	

Measurement Conditions / Comments
Temperature at Laser Chip
remperature at Eastr Cmp
$P_{opt} = 40 \text{ mW}$

1) This variant 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. A butterfly package with integrated isolator (BFY1x or BFW1x) is also available for some lasers.

Symbol	Unit	min	typ	max
I <sub>mon</sub> / P <sub>opt</sub>	μΑ/mW	1		20
		Symbol Unit  I <sub>mon</sub> / P <sub>opt</sub> µA/mW		

Meası	urement Conditions / Comments
$U_R =$	5 V

Thermoelectric Cooler						
Parameter	Symbol	Unit	min	typ	max	
Current	I <sub>TEC</sub>	А		0.4		
Voltage	$U_TEC$	V		0.8		
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0.5		
Temperature Difference	ΔΤ	K			50	

Measurement Conditions / Comments
$P_{opt} = 40 \text{ mW}, \Delta T = 20 \text{ K}$
$P_{opt} = 40$ mW, $\Delta T = 20$ K
$P_{opt} = 40$ mW, $\Delta T = 20$ K
$P_{opt} = 40 \text{ mW}, \Delta T =  Tcase - TLD $

Thermistor (Standard NTC Typ	<del>(e)</del>				
Parameter	Symbol	Unit	min	typ	max
Resistance	R	kΩ		10	
Beta Coefficient	β			3892	
Steinhart & Hart Coefficient A	А			1.1293 x 10	) -3
Steinhart & Hart Coefficient B	В			2.3410 x 10	) -4
Steinhart & Hart Coefficient C	C			8.7755 x 10	) -8

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



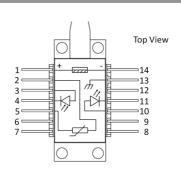
Revision 0.94

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**

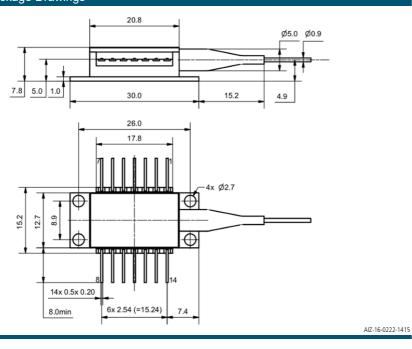


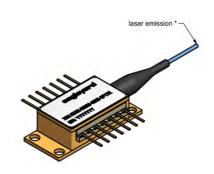
## Pin Assignment

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



## Package Drawings





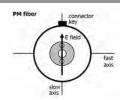
Caution. Excessive mechanical stress on the package can lead to a damage of the laser.

See <u>instruction manual</u> on www.eagleyard.com

## Fiber and Connector Type

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





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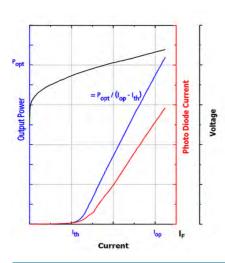
Revision 0.94

# SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser

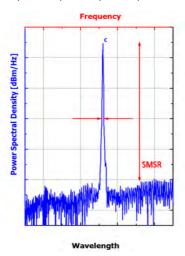


### Typical Measurement Results

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.

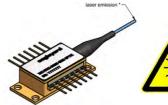
#### Unpacking, Installation and Laser Safety

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 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.







INVISIBLE LASER RADIATION
AVOID EYE OR SKIN EXPOSURE
TO DIRECT OR SCATTERED RADIATION
CLASS 4 LASER PRODUCT
WAVELENGTH 785 nm
MAX. OUTPUT POWER 45 mW











Revision 0.91

# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



## General Product Information

Product	Application
785 nm DFB Laser	Raman Spectroscopy
with hermetic TO Package (RoHS compliant)	Metrology
including Monitor Diode	Interferometry



## Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	$T_S$	°C	-40		85
Operational Temperature at Case	$T_{C}$	°C	-20		75
Operational Temperature at Laser Chip	$T_{LD}$	°C	0		50
Forward Current	$I_{F}$	mA			190
Reverse Voltage	$V_R$	V			2
Output Power	$P_{\text{opt}}$	mW			110
TEC Current	$I_{TEC}$	Α			1.0
TEC Voltage	$V_{TEC}$	V			1.0

#### **Measurement Conditions / Comments**

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.

## Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	-20		65
Operational Temperature at Laser Chip	$T_LD$	°C	15		40
Forward Current	I <sub>F</sub>	mA			170
Output Power	P <sub>opt</sub>	mW	20		100

measured with integrating sphere

## Characteristics at T<sub>LD</sub> = 25° C at BOL

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	784	785	786
Linewidth (FWHM)	Δλ	MHz		2	
Sidemode Supression Ratio	SMSR	dB		50	
Temperature Coefficient of Wavelength	dλ / dT	nm / K		0.06	
Current Coefficient of Wavelength	dλ / dI	nm / mA		0.003	

Measurement Conditions / Comments				
$P_{opt} = 100 \text{ mW}$				
$P_{opt} = 100 \text{ mW}$				

Distributor



info@amstechnologies.com www.amstechnologies-webshop.com





Revision 0.91

## **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



Characteristics at T <sub>LD</sub> = 25° C at BOL co					
Parameter	Symbol	Unit	min	typ	max
Laser Current @ P <sub>opt</sub> = 100 mW	I <sub>LD</sub>	mA			170
Slope Efficiency	η	W/A	0.6	0.8	1.4
Threshold Current	I <sub>th</sub>	mA			70
Divergence parallel (FWHM)	$\Theta_{  }$	0		5	
Divergence perpendicular (FWHM)	$\Theta_{\perp}$	0		18	
Degree of Polarization	DOP	%		80	

Measurement Conditions / Comments						
parallel to Pin 1 - Pin 6 plane (see p. 3)						
perpendicular to Pin 1 - Pin 6 plane (see p. 3)						
$P_{opt} = 100$ mW; E field perpendicular to Pin 1 - 6 plane						

Monitor Diode					
Parameter	Symbol	Unit	min	typ	max
Monitor Detector Responsivity	I <sub>mon</sub> / P <sub>opt</sub>	μΑ/mW	1	t.b.d.	100

∕leası	urement Conditions / Comments
$J_R =$	5 V

Thermoelectric Cooler					
Parameter	Symbol	Unit	min	typ	max
Current	I <sub>TEC</sub>	А		0.4	
Voltage	$U_TEC$	V		0.4	
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0.4	
Temperature Difference	ΔΤ	K			40

Measurement Conditions / Comments				
P <sub>opt</sub> =	100 mW, <b>Δ</b> T = 20 K			
P <sub>opt</sub> =	100 mW, <b>∆</b> T = 20 K			
P <sub>opt</sub> =	100 mW, <b>∆</b> T = 20 K			
P <sub>opt</sub> =	100 mW, $\Delta T =  Tcase - TLD $			

·					
Parameter	Symbol	Unit	min	typ	max
Resistance	R	kΩ		10	
Beta Coefficient	β			3930	
Steinhart & Hart Coefficient A	А			1.029 x 10	-3
Steinhart & Hart Coefficient B	В			2.510 x 10	-4
Steinhart & Hart Coefficient C	C			1.051 x 10	-7

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

Thermistor (Standard NTC Type)

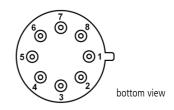


Revision 0.91

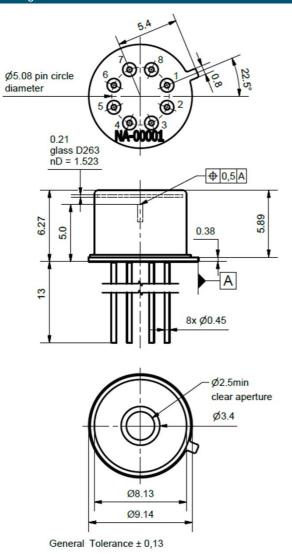
# **SINGLE FREQUENCY LASER DIODES Distributed Feedback Laser**



Pi	n Assignment		
1	Laser Diode Anode	5	Thermistor
2	Laser Diode Cathode	6	Thermistor
3	Thermoelectric Cooler (-)	7	Photo Diode Anode
4	Thermoelectric Cooler (+)	8	Photo Diode Cathode
All	8 pins are isolated from case.		



## Package Drawings



AIZ-19-0129-1426B



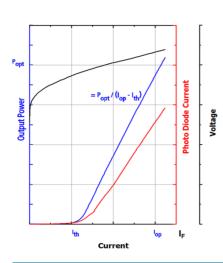
Revision 0.91

## SINGLE FREQUENCY LASER DIODES **Distributed Feedback Laser**

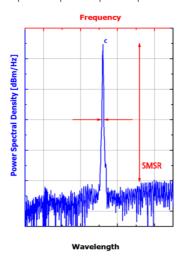


### Typical Measurement Results

Output Power vs. Current



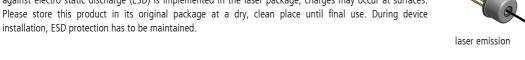
Spectra at Specified Optical Output Power



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



The DFB 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.







INVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION **CLASS 4 LASER PRODUCT** WAVELENGTH 785 nm MAX. OUTPUT POWER 110 mV







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## SINGLE FREQUENCY LASER **DFB Laser**

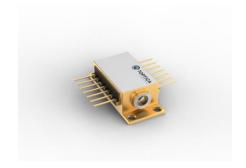






## **General Product Information**

Product	Application
795 nm DFB Laser	Spectroscopy (Rb D1 line)
with hermetic 14-Pin Butterfly Housing (RoHS compliant)	Metrology
including Monitor Diode, Thermoelectric Cooler and Thermistor	
with integrated $\mu$ -Isolator and Beam Collimation	



### Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max
Storage Temperature	Ts	° C	-40		85
Operational Temperature at Case	T <sub>C</sub>	°C	-40		85
Operational Temperature at Chip	$T_{chip}$	° C	5		50
Forward Current	I <sub>F</sub>	mA			170
Reverse Voltage	$V_R$	V			2
Output Power	$P_{opt}$	mW			45
TEC Current	I <sub>TEC</sub>	Α			1,4
TEC Voltage	$V_{TEC}$	V			4,8

#### Measurement Conditions / Comments

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.

## **Recommended Operational Conditions**

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	T <sub>case</sub>	°C	-20		60
Operational Temperature at Chip	$T_{chip}$	°C	10		45
Forward Current	I <sub>F</sub>	mA			160
Output Power	$P_{\text{opt}}$	mW	10		40

Measurement Conditions / Comments
measured by integrated Thermistor

#### Tchip = 25° at BOL Characteristics

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	794	795	796
Target Wavelength	$\lambda_{\mathrm{T}}$	nm		794.98	
Linewidth	Δλ	MHz		0,6	1
Mode-hop free Tuning Range	$\Delta \lambda_{tune}$	pm	25		
Sidemode Suppression Ratio	SMSR	dB	30	45	
Temp. Coefficient of Wavelength	$d\lambda/dT$	nm/K		0,06	
Current Coefficient of Wavelength	dλ / dl	nm/mA		0,003	

Measurement Conditions / Comments	_
Tchip = 10 ° 45° C at Popt = 40 mW	
FWHM, Popt = 80 mW	
> 10 GHz, at target wavelength	
Popt = 40 mW	



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# SINGLE FREQUENCY LASER DFB Laser



Parameter	Symbol	Unit	min	typ	max
Mode-hop free Temperature Range	$T_{chip}$	°C	0		0
Laser Current	$I_{LD}$	mA			160
Slope Efficiency	η	mW/mA		0,4	
Threshold Current	I <sub>th</sub>	mA			70
Divergence parallel	$\Theta$	0		0,1	
Divergence perpendicular	$\Theta_{\perp}$	o		0,1	
Beam Diameter horizontal	d <sub>  </sub>	mm		1	1,2
Beam Diameter vertical	$d_{\perp}$	mm		0,8	1,2
Degree of Polarization	DOP	%		99	

Measurement Conditions / Comments
Popt = 40 mW
parallel to the base plate of the housing
perpendicular to base plate of the housing
parallel to the base plate of the housing
perpendicular to base plate of the housing
Popt = 40 mW; slant polarization (45°)

Monitor Diode				
Parameter	Symbol Unit	min	typ	max
Monitor Detector Responsivity	I <sub>mon</sub> / P <sub>of</sub> μA/mW	/ 1		20

5 V	Measurement Conditions / Comments
J V	5 V

Thermoelectric Cooler					
Parameter	Symbol	Unit	min	typ	max
Current	I <sub>TEC</sub>	Α		0,4	
Voltage	$U_TEC$	V		1,3	
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0,4	
Temperature Difference	ΔΤ	K			50

Measurement Conditions / Comments
Popt = 40 mW, ΔT = 20 K
Popt = 40 mW, ΔT = 20 K
Popt = 40 mW, ΔT = 20 K
Popt = 40 mW, $\Delta T$ =  Tcase - TLD

Parameter	Symbol	Unit	min	typ	max
Resistance	R	kΩ		10	
Beta Coefficient	β		3892		
Steinhart & Hart Coefficient A	А		1.1293 x 10 <sup>-3</sup>		
Steinhart & Hart Coefficient B	В		2.3410 x 10 <sup>-4</sup>		
Steinhart & Hart Coefficient C	С		8.7755 x 10 <sup>-8</sup>		

Measurement Conditions / Comments
Tchip = 25° C
$R_1/R_2$ = $e^{A}\beta(1/T_1 - 1/T_2)$ at Tchip = $0^{\circ}$ $50^{\circ}$ C
$1/T = A + B(\ln R) + C(\ln R)^3$
T: Temperature in Kelvin
R: resistance at T in $\Omega$

Thermistor (Standard NTC Type)

fon 49.30.6392.4520



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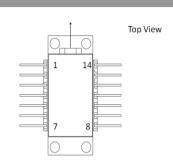
2024-05-03

# SINGLE FREQUENCY LASER DFB Laser

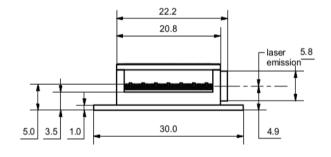


## Pin Assignment

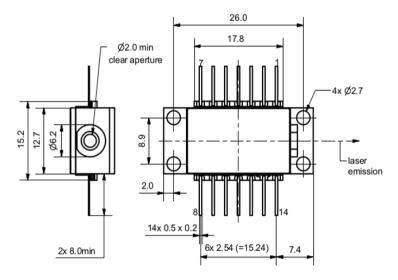
1 Thermoelectric Cooler (+)	14 Thermoelectric Cooler (-)
2 Thermistor	13 Case
3 Photo Diode Anode	12 not connected
4 Photo Diode Cathode	11 Laser Diode Cathode
5 Thermistor	10 Laser Diode Anode
6 not connected	9 not connected
7 not connected	8 not connected



### Package Drawings







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# SINGLE FREQUENCY LASER DFB Laser



#### 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.



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.



INVISIBLE LASER RADIATION

AVOID EYE OR SKIN EXPOSUR
TO DIRECT OR SCATTERED RADIATION CLASS

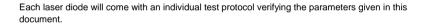
4 LASER PRODUCT

WAVELENGTH 795 nm

MAX. OUTPUT POWER 45 mW

IEC-60825-

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.







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.



fon 49.30.6392.4520



## SINGLE FREQUENCY LASER **DFB Laser**

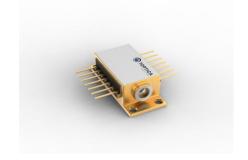


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## General Product Information

Product	Application
795 nm DFB Laser	Spectroscopy (Rb D1 line)
with hermetic 14-Pin Butterfly Housing (RoHS compliant)	Metrology
including Monitor Diode, Thermoelectric Cooler and Thermistor	
with integrated Beam Collimation	



### Absolute Maximum Ratings

Symbol	Unit	min	typ	max
Ts	° C	-40		85
T <sub>C</sub>	° C	-40		85
$T_{chip}$	° C	5		50
I <sub>F</sub>	mA			170
$V_R$	V			2
$P_{opt}$	mW			90
I <sub>TEC</sub>	Α			1,4
$V_{TEC}$	V			3,2
	T <sub>S</sub> T <sub>C</sub> T <sub>chip</sub> I <sub>F</sub> V <sub>R</sub> P <sub>opt</sub> I <sub>TEC</sub>	$\begin{array}{ccc} T_{S} & ^{\circ}C \\ T_{C} & ^{\circ}C \\ T_{chip} & ^{\circ}C \\ I_{F} & mA \\ V_{R} & V \\ P_{opt} & mW \\ I_{TEC} & A \\ \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

#### Measurement Conditions / Comments

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.

## **Recommended Operational Conditions**

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	T <sub>case</sub>	° C	-20		60
Operational Temperature at Chip	$T_{chip}$	° C	10		45
Forward Current	I <sub>F</sub>	mA			160
Output Power	P <sub>opt</sub>	mW	20		80

Measurement Conditions / Comments
measured by integrated Thermistor

#### Tchip = 25° at BOL Characteristics

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_{C}$	nm	794	795	796
Target Wavelength	$\lambda_{T}$	nm		794.98	
Linewidth	$\Delta\lambda$	MHz		0,6	1
Mode-hop free Tuning Range	$\Delta \lambda_{tune}$	pm	25		
Sidemode Suppression Ratio	SMSR	dB	30	45	
Temp. Coefficient of Wavelength	$d\lambda / dT$	nm/K		0,06	
Current Coefficient of Wavelength	dλ / dl	nm/mA		0,003	

Measurement Conditions / Comments
Tchip = 10 $^{\circ}$ 45 $^{\circ}$ C at Popt = 80 mW
FWHM, Popt = 80 mW
> 10 GHz, at target wavelength
Popt = 80 mW



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2024-05-03

# SINGLE FREQUENCY LASER DFB Laser



Characteristics	Tchip = 25° at BOL				
Parameter	Symbol	Unit	min	typ	max
Laser Current	I <sub>LD</sub>	mA			160
Slope Efficiency	η	mW/mA		0,8	
Threshold Current	$I_{th}$	mA			70
Divergence parallel	$\Theta$	0		0,1	
Divergence perpendicular	$\Theta_{\perp}$	0		0,1	
Beam Diameter horizontal	d <sub>  </sub>	mm		1	1,2
Beam Diameter vertical	$d_{\perp}$	mm		0,8	1,2
Degree of Polarization	DOP	%		90	
-3					

Measurement Conditions / Comments
Popt = 80 mW
parallel to the base plate of the housing
perpendicular to base plate of the housing
parallel to the base plate of the housing
perpendicular to base plate of the housing
Popt = 80 mW; vertical polarization

Monitor Diode				
Parameter	Symbol Unit	min	typ	max
Monitor Detector Responsivity	I <sub>mon</sub> / P <sub>or</sub> μA/mW	1		20

Measurement Conditions / Comments
5 V

Parameter	Symbol	Unit	min	typ	max
Current	I <sub>TEC</sub>	Α		0,4	
Voltage	U <sub>TEC</sub>	V		1,3	
Power Dissipation (total loss at case)	P <sub>loss</sub>	W		0,4	
Temperature Difference	ΔΤ	K			50

Measurement Conditions / Comments		
Popt = 80 mW, ΔT = 20 K		
Popt = 80 mW, ΔT = 20 K		
Popt = 80 mW, ΔT = 20 K		
Popt = 80 mW, ΔT =  Tcase - Tchip		

Parameter	Symbol	Unit	min	typ	max
Resistance	R	kΩ		10	
Beta Coefficient	β			3892	
Steinhart & Hart Coefficient A	А		1.1293 x 10 <sup>-3</sup>		
Steinhart & Hart Coefficient B	В		2.3410 x 10 <sup>-4</sup>		
Steinhart & Hart Coefficient C	С		8	.7755 x 10	-8

Measurement Conditions / Comments
Tchip = 25° C
$R_1/R_2 = e^{\beta}(1/T_1 - 1/T_2)$ at Tchip = 0° 50° C
$1/T = A + B(\ln R) + C(\ln R)^3$
T: Temperature in Kelvin
R: resistance at T in Ω

Thermistor (Standard NTC Type)

D-12489 Berlin

GERMANY



Revision 0.93

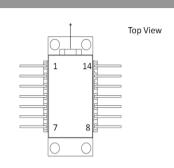
2024-05-03

# SINGLE FREQUENCY LASER DFB Laser

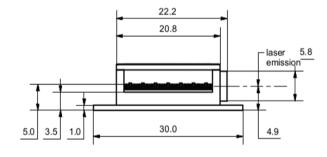


## Pin Assignment

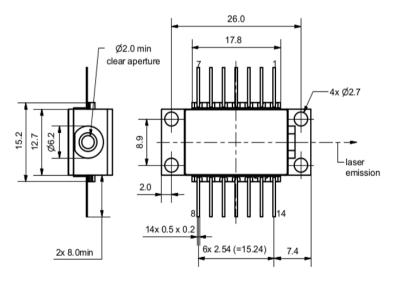
1 Thermoelectric Cooler (+)	14 Thermoelectric Cooler (-)
2 Thermistor	13 Case
3 Photo Diode Anode	12 not connected
4 Photo Diode Cathode	11 Laser Diode Cathode
5 Thermistor	10 Laser Diode Anode
6 not connected	9 not connected
7 not connected	8 not connected



### Package Drawings







AIZ-20-1029-0928

fon 49.30.6392.4520



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2024-05-03

# SINGLE FREQUENCY LASER DFB Laser



#### 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.



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.



INVISIBLE LASER RADIATION

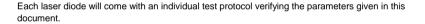
AVOID EYE OR SKIN EXPOSUR
TO DIRECT OR SCATTERED RADIATION CLASS
4 LASER PRODUCT

WAVELENGTH 795 nm

MAX. OUTPUT POWER 90 mW

IEC-60825-

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.







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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