

## EYP-DFB-0780-00080-1500-TOC03-000x

Revision 1.00

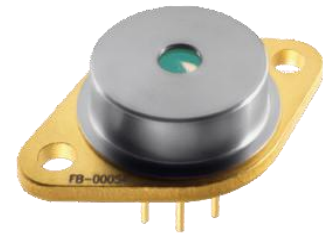
02.10.2015

## SINGLE FREQUENCY LASER DIODES

## Distributed Feedback Laser

## General Product Information

Product	Application
780 nm DFB Laser with hermetic TO Housing	Spectroscopy
Monitor Diode, Thermoelectric Cooler and Thermistor	Metrology
	THz Generation
	Rb Spectroscopy (Variant ...-0005)



## Absolute Maximum Ratings

	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			200
Reverse Voltage	$V_R$	V			2
Output Power	$P_{opt}$	mW			100
TEC Current	$I_{TEC}$	A			1.8
TEC Voltage	$V_{TEC}$	V			3.2

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

## Recommended Operational Conditions

	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_C$	°C	-20		65
Operational Temperature at Laser Chip	$T_{LD}$	°C	5		40
Forward Current	$I_F$	mA			180
Output Power	$P_{opt}$	mW	20		80

## Measurement Conditions / Comments

measured by integrated Thermistor

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

Parameter	Symbol	Unit	min	typ	max
Center Wavelength	$\lambda_C$	nm	779	780	781
Spectral Width (FWHM)	$\Delta\lambda$	MHz		2	
Temperature Coefficient of Wavelength	$d\lambda / dT$	nm / K		0.06	
Current Coefficient of Wavelength	$d\lambda / dI$	nm / mA		0.003	
Output Power @ $I_F = 180\text{ mA}$	$P_{opt}$	mW	80		
Slope Efficiency	$\eta$	W / A	0.6	0.8	1.0

## Measurement Conditions / Comments

see images on page 4

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

Parameter	Symbol	Unit	min	typ	max
Threshold Current	$I_{th}$	mA			70
Divergence parallel (FWHM)	$\Theta_{  }$	°		8	
Divergence perpendicular (FWHM)	$\Theta_{\perp}$	°		21	
Degree of Polarization	DOP	%		90	
Sidemode Supression Ratio	SMSR	dB	30	45	
Mode-hop free Operating Range (SMSR > 30 dB)					
▶ Variant 0	$T_{LD}$	°C		25	
	$P_{opt}$	mW		80	
▶ Variant 2	$T_{LD}$	°C	15		40
	$P_{opt}$	mW	20		80
▶ Variant 5	$\lambda_C$	nm		780.241	
	$P_{opt}$	mW		80	

## Measurement Conditions / Comments

parallel to short axis of the housing (see p. 3)

parallel to long axis of the housing (see p. 3)

 $P_{opt} = 80$  mW; E field parallel to long axis of housing $P_{opt} = 80$  mW

see order code scheme on p. 5

wavelength reached within  $T_{LD} = 15^\circ$  and  $40^\circ$  C

## Monitor Diode

Parameter	Symbol	Unit	min	typ	max
Monitor Detector Responsivity	$I_{mon}/P_{opt}$	$\mu A/mW$	1.0		20

## Measurement Conditions / Comments

Reverse Voltage  $U_{RMD} = 5$  V

## Thermoelectric Cooler

Parameter	Symbol	Unit	min	typ	max
Current	$I_{TEC}$	A		0.4	
Voltage	$U_{TEC}$	V		0.8	
Power Dissipation (total loss at case)	$P_{loss}$	W		0.5	
Temperature Difference	$\Delta T$	K			50

## Measurement Conditions / Comments

 $P_{opt} = 80$  mW,  $\Delta T = 20$  K $P_{opt} = 80$  mW,  $\Delta T = 20$  K $P_{opt} = 80$  mW,  $\Delta T = 20$  K $P_{opt} = 80$  mW,  $\Delta T = |T_{case} - T_{LD}|$ 

## Thermistor (Standard NTC Type)

Parameter	Symbol	Unit	min	typ	max
Resistance	R	k $\Omega$		10	
Beta Coefficient	$\beta$			3976	

## Measurement Conditions / Comments

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## SINGLE FREQUENCY LASER DIODES

## Distributed Feedback Laser

## Package Dimensions

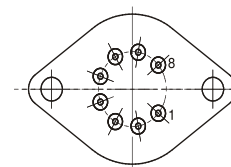
Parameter	Symbol	Unit	min	typ	max
Height of Laser Output above Header	$H_L$	mm		5.1	
Housing Dimension	$l \times w \times h$	mm <sup>3</sup>		38.9 x 25.4 x 9.3	
Pin Length	L	mm	10.8		

## Measurement Conditions / Comments

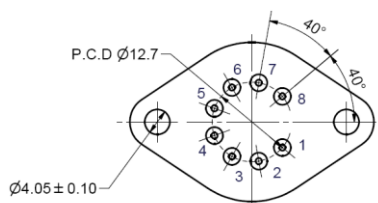
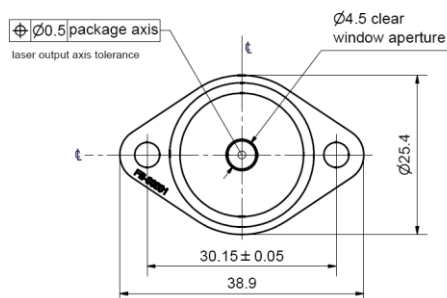
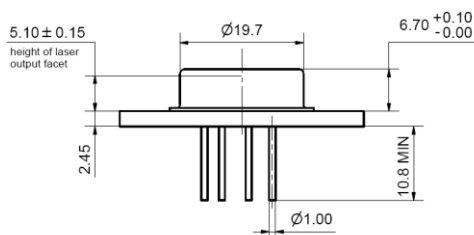
## Package Pinout

1	Thermoelectric Cooler (+)	5	Laser Diode (Anode)
2	Thermistor	6	Photo Diode (Anode)
3	Thermistor	7	Photo Diode (Cathode)
4	Laser Diode (Cathode)	8	Thermoelectric Cooler (-)

bottom view

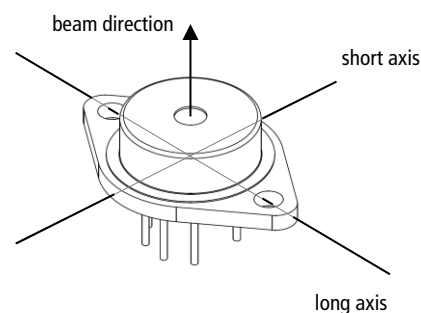


## Package Drawings



## Polarization:

E field parallel to long axis of housing



## hermetically sealed Package:

Leak Rate <  $5 \cdot 10^{-8}$  atm.cc./s

acc. MIL-STD-883E

Z11-SPEC-TOC03-DFB-0000

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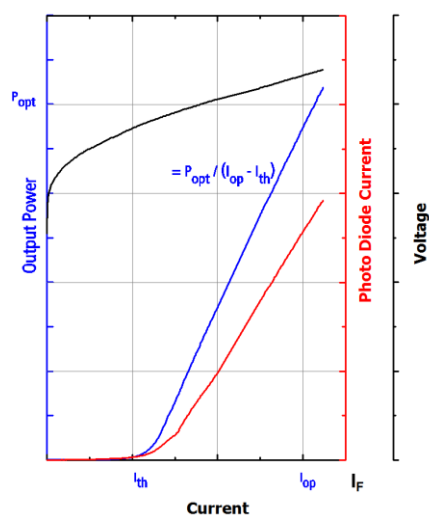
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## Distributed Feedback Laser

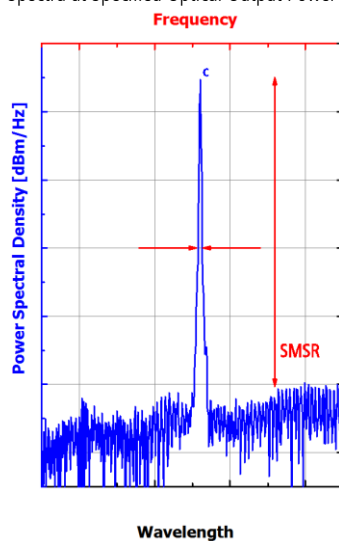


## Typical Measurement Results

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.

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## SINGLE FREQUENCY LASER DIODES

## Distributed Feedback Laser

## Order Code Scheme

Mode-hop free Operating Range (Minimum Side Mode Suppression Ratio &gt; 30 dB)

$P_{\text{opt}} = 80 \text{ mW};$	$T_{\text{LD}} = 25^\circ$	(Variant 0)
$P_{\text{opt}} = 20 \dots 80 \text{ mW};$	$T_{\text{LD}} = 15^\circ \dots 40^\circ \text{ C}$	(Variant 2)
$P_{\text{opt}} = 80 \text{ mW};$	$\lambda_c = 780.241 \text{ nm}$	(Variant 5)

EYP-DFB-0780-00080-1500-TOC03- 0 0 0 x

0

2

5

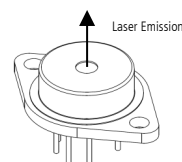
## Unpacking, Installation and Laser Safety

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

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

The laser emission from this diode is close to the invisible infrared region of the electromagnetic spectrum. Avoid direct and/or indirect exposure to the free running beam. Collimating the free running beam with optics as common in optical instruments will increase threat to the human eye.

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



## Ordering Information:



800 Village Walk #316  
Guilford, CT 06437  
Ph: 203-401-8093

Email orders to: [sales@xsoptix.com](mailto:sales@xsoptix.com)  
Fax orders to: 800-878-7282