

# EYP-DFB-0852-00150-1500-TOC03-000x

Revision 0.99

27.01.2014

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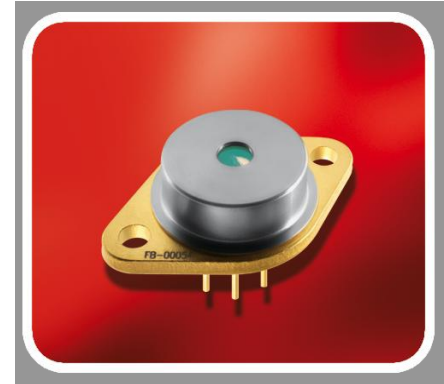
## DISTRIBUTED FEEDBACK LASER

GaAs Semiconductor Laser Diode with integrated grating structure



### General Product Information

Product	Application
852 nm DFB Laser with hermetic Butterfly Housing	Spectroscopy
Monitor Diode, Thermoelectric Cooler and Thermistor	Metrology
	THz Generation
	Cs 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	10		50
Forward Current	$I_F$	mA			250
Reverse Voltage	$V_R$	V			2
Output Power	$P_{opt}$	mW			160
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	15		40
Forward Current	$I_F$	mA			230
Output Power	$P_{opt}$	mW	30		150

#### 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	851	852	853
Spectral Width (FWHM)	$\Delta\nu$	MHz		2	
Temperature Coefficient of Wavelength	$d\lambda / dT$	nm / K		0.06	
Current Coefficient of Wavelength	$d\lambda / dI$	nm / mA		0.003	
Output Power @ $I_F = 230\text{ mA}$	$P_{opt}$	mW	150		
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	24	25	26
	$P_{opt}$	mW	135		150
▶ Variant 1	$T_{LD}$	° C	24	25	26
	$P_{opt}$	mW	30		150
▶ Variant 2	$T_{LD}$	° C	15		45
	$P_{opt}$	mW	30		150
▶ Variant 5	$\lambda_C$	nm		852.347	
	$P_{opt}$	mW	135		150

#### Measurement Conditions / Comments

parallel to short axis of the housing (see p. 3)  
parallel to long axis of the housing (see p. 3)  
 $P_{opt} = 150$  mW; E field parallel to short axis of housing  
 $P_{opt} = 150$  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	0.5		10

#### Measurement Conditions / Comments

Reverse Voltage  $U_{R,MD} = 5$  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

$P_{opt} = 150$  mW,  $\Delta T = 20$  K  
 $P_{opt} = 150$  mW,  $\Delta T = 20$  K  
 $P_{opt} = 150$  mW,  $\Delta T = 20$  K  
 $P_{opt} = 150$  mW,  $\Delta T = |T_{case} - T_{LD}|$

### Thermistor (Standard NTC Type)

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

#### Measurement Conditions / Comments

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### Package Dimensions

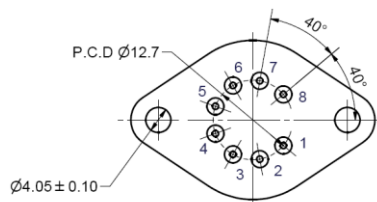
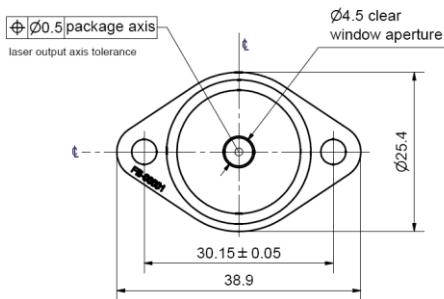
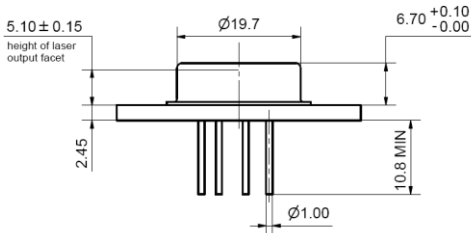
Parameter	Symbol	Unit	min	typ	max
Height of Laser Output above Header	$H_L$	mm		5.1	
Housing Dimension	$l \times w \times h$	mm <sup>3</sup>		38.9 x 25.4 x 9.3	
Pin Length	L	mm	10.8		

### Measurement Conditions / Comments

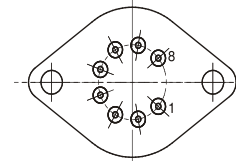
### Package Pinout

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 (-)

### Package Drawings

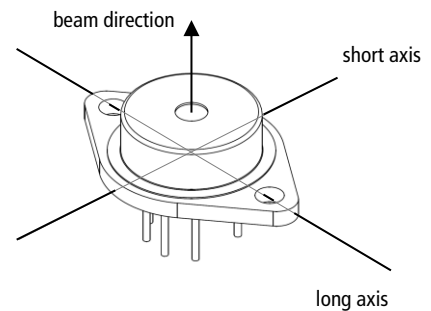


bottom view



### Polarization:

E field parallel to short axis of housing



### hermetically sealed Package:

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

acc. MIL-STD-883E

Z11-SPEC-TOC03-DFB-0000

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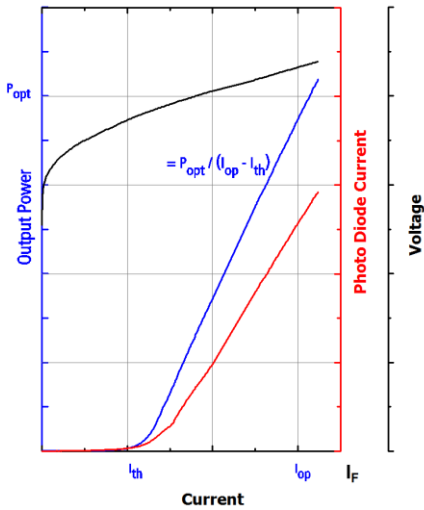
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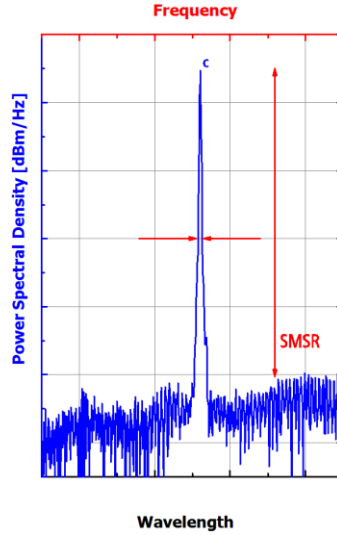


### Typical Measurement Results

Output Power vs. Current



Spectra at Specified Optical Output Power



Performance figures, data and any illustrative material provided in this specification are typical and must be specifically confirmed in writing by eagleyard Photonics before they become applicable to any particular order or contract. In accordance with the eagleyard Photonics policy of continuous improvement specifications may change without notice.

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### Order Code Scheme

Mode-hop free Operating Range (Minimum Side Mode Suppression Ratio > 30 dB)

$P_{opt} = 135 \dots 150 \text{ mW}; T_{LD} = 25^\circ$	(Variant 0)
$P_{opt} = 30 \dots 150 \text{ mW}; T_{LD} = 25^\circ$	(Variant 1)
$P_{opt} = 30 \dots 150 \text{ mW}; T_{LD} = 15^\circ \dots 45^\circ \text{ C}$	(Variant 2)
$P_{opt} = 135 \dots 150 \text{ mW}; \lambda_c = 852.347 \text{ nm}$	(Variant 5)

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0  
1  
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.

