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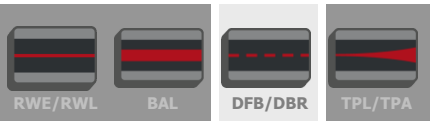
DISTRIBUTED FEEDBACK LASER

GaAs Semiconductor Laser Diode
with integrated grating structure



General Product Information

Product	Application
935 nm DFB Laser with hermetic TO Package	Spectroscopy
Monitor Diode, Thermoelectric Cooler and Thermistor	Metrology

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		45
Forward Current	I_F	mA			200
Reverse Voltage	V_R	V			2
Output Power	P_{opt}	mW			90
TEC Current	I_{TEC}	A			1.8
TEC Voltage	V_{TEC}	V			3.2

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

Recommended Operational Conditions

	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Operational Temperature at Case	T_C	°C	-20		65	
Operational Temperature at Laser Chip	T_{LD}	°C	15		40	measured by integrated Thermistor
Forward Current	I_F	mA			180	
Output Power	P_{opt}	mW	20		80	

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

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Center Wavelength	λ_C	nm	934	935	936	see images on page 4
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 = 180 mA	P_{opt}	mW	80			
Slope Efficiency	η	W / A	0.5	0.7	1.0	

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GL Systems Certification

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

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Threshold Current	I_{th}	mA			70	
Divergence parallel (FWHM)	$\Theta_{\|\|}$	°		8		parallel to short axis of the housing (see p. 3)
Divergence perpendicular (FWHM)	$\Theta_{\perp}$	°		21		parallel to long axis of the housing (see p. 3)
Degree of Polarization	DOP	%		90		P_{opt} = 80 mW; E field parallel to short axis of housing
Sidemode Supression Ratio	SMSR	dB	30	45		P_{opt} = 80 mW
Mode-hop free Operating Range (SMSR > 30 dB)						
▸ Variant 0	T_{LD}	° C		25		temperature measured by integrated themistor
	P_{opt}	mW		80		
▸ Variant 1	T_{LD}	° C		25		temperature measured by integrated themistor
	P_{opt}	mW	20		80	
▸ Variant 2	T_{LD}	° C	15		40	temperature measured by integrated themistor
	P_{opt}	mW	20		80	

Monitor Diode

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Monitor Detector Resonsivity	I_{mon} / P_{opt}	µA/mW	0.05		1	P_{opt} = 80 mW, $U_{R\ MD}$ = 5 V
Reverse Voltage Monitor Diode	$U_{R\ MD}$	V	3		5	

Thermoelectric Cooler

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Current	I_{TEC}	A		0.4		P_{opt} = 80 mW, ΔT = 20 K
Voltage	U_{TEC}	V		0.8		P_{opt} = 80 mW, ΔT = 20 K
Power Dissipation (total loss at case)	P_{loss}	W		0.5		P_{opt} = 80 mW, ΔT = 20 K
Temperature Difference	ΔT	K			50	P_{opt} = 80 mW, $\Delta T = \| T_{case} - T_{LD} \|$

Thermistor (Standard NTC Type)

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Resistance	R	kΩ		10		
Beta Coefficient	β			3976		

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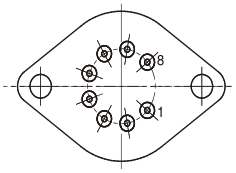
Package Dimensions

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Height of Laser Output above Header	H_L	mm		5.1		
Housing Dimension	l x w x h	mm^3		38.9 x 25.4 x 9.3		
Pin Length	L	mm	10.8			

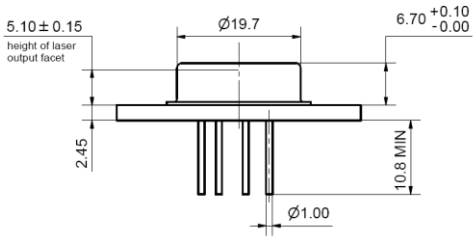
Package Pinout

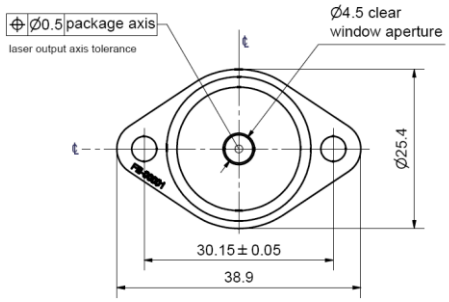
1	Thermoelectric Cooler (+)	5	Laser Diode (Anode)
2	Thermistor	6	Photo Diode (Anode)
3	Thermistor	7	Photo Diode (Cathode)
4	Laser Diode (Cathode)	8	Thernoelectric Cooler (-)

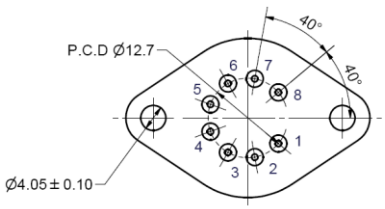
bottom view



Package Drawings







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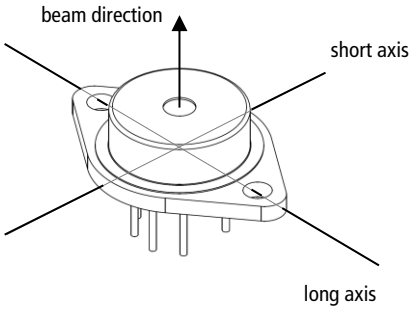
Polarization:
E field parallel to short axis of housing



hermetically sealed Package:
Leak Rate < $5 \cdot 10^{-8}$ atm.cc./s
acc. MIL-STD-883E

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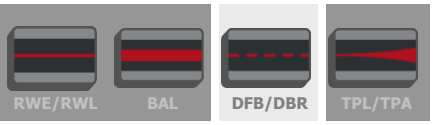
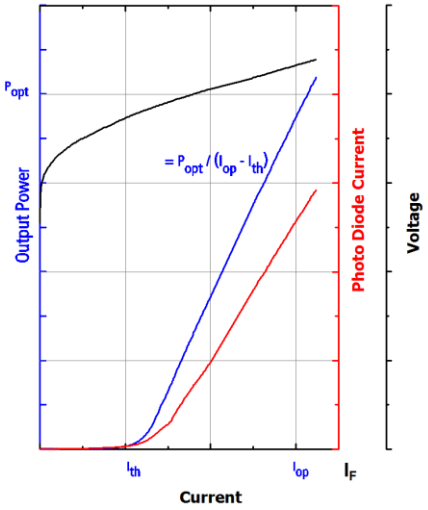
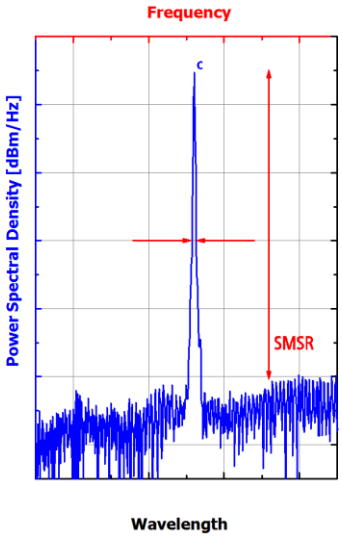


Typical Measurement Results

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

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

P_{opt} = 80 mW;	T_{LD} = 25°	Variant 0 — 0
P_{opt} = 20 … 80 mW;	T_{LD} = 25°	Variant 1 — 1
P_{opt} = 20 … 80 mW;	T_{LD} = 15° … 40° C	Variant 2 — 2

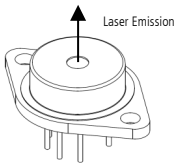
Unpacking, Installation and Laser Safety

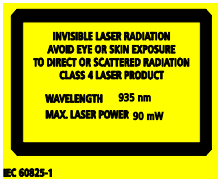
Unpacking the laser diodes should only be done at electrostatic safe workstations (EPA). Though protection against electro static discharge (ESD) is implemented in the laser package, charges may occur at surfaces. Please store this product in its original package at a dry, clean place until final use.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

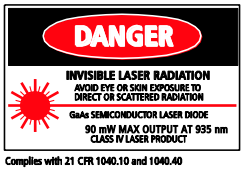
The DFB diode type is known to be sensitive against optical feedback, so an optical isolator may be required in some cases. Operating at moderate temperatures on proper heat sinks willl contribute to a long lifetime of the diode.

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.







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