

EYP-DFB-0855-00150-1500-TOC03-000x

Version 0.91

2009-10-09

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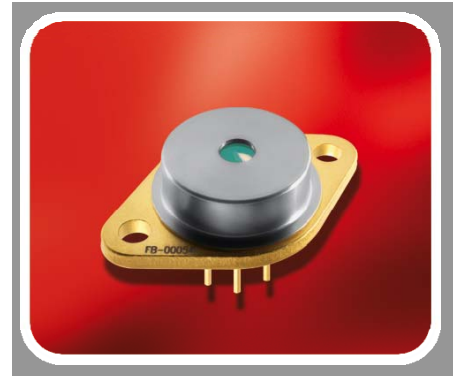
DISTRIBUTED FEEDBACK LASER

GaAs Semiconductor Laser Diode
with integrated grating structure



General Product Information

| Product | Application |
|---|----------------|
| 855 nm DFB Laser with hermetic TO Housing | Spectroscopy |
| Monitor Diode, Thermoelectric Cooler and Thermistor | Metrology |
| | THz Generation |



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 | | | 220 |
| Reverse Voltage | V_R | V | | | 0 |
| 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 | | | 200 |
| Output Power | P_{opt} | mW | 20 | | 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 | λ_c | nm | 854 | 855 | 856 |
| 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 @ $I_F = 200\text{ mA}$ | P_{opt} | mW | 150 | | |
| Slope Efficiency | S | W / A | 0.6 | 0.8 | 1.0 |

Measurement Conditions / Comments

see images on page 4

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RWE/RWL



BAL



DFB/DBR



TPL/TPA

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) | Θ_{\perp} | ° | | 21 | |
| Sidemode Suppression Ratio | SMSR | dB | 30 | 45 | |
| Mode-hop free Temperature Range (SMSR > 30 dB) | | | | | |
| ▶ Variant 0 | T_{LD} | °C | | 25 | |
| ▶ Variant 1 | T_{LD} | °C | | 25 | |
| ▶ Variant 2 | T_{LD} | °C | 15 | | 40 |
| Mode-hop free Power Range (SMSR > 30 dB) | | | | | |
| ▶ Variant 0 | P_{opt} | mW | | 150 | |
| ▶ Variant 1 | P_{opt} | mW | 20 | | 150 |
| ▶ Variant 2 | P_{opt} | mW | 20 | | 150 |
| Polarization Extinction Ratio | PER | dB | | 20 | |
| Spatial Mode (transversal) | | | | TEM ₀₀ | |

Measurement Conditions / Comments

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

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

see below

Temperature at Laser Chip

see order code scheme on p. 5

SMSR > 30 dB

see order code scheme on p. 5

$P_{opt} = 150$ mW; E field parallel to short axis of housing
fundamental mode

Monitor Diode

| Parameter | Symbol | Unit | min | typ | max |
|-------------------------------|---------------------|---------|-----|-----|-----|
| Monitor Detector Responsivity | I_{mon} / P_{opt} | μA / mW | 0.5 | | 10 |
| Reverse Voltage Monitor Diode | U_{RMD} | V | 3 | | 5 |

Measurement Conditions / Comments $U_R = 5$ V, target values**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 | ΔT | 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 | β | | | 3892 | |

Measurement Conditions / Comments

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Package Dimensions

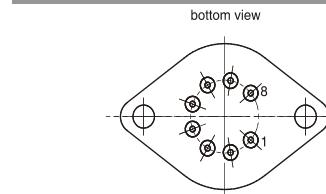
| Parameter | Symbol | Unit | min | typ | max |
|-------------------------------------|-----------------------|-----------------|------|-------------------|-----|
| Height of Laser Output above Header | H_L | mm | | 5.1 | |
| Housing Dimension | $l \times w \times h$ | mm ³ | | 38.9 x 25.4 x 9.3 | |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

Measurement Conditions / Comments

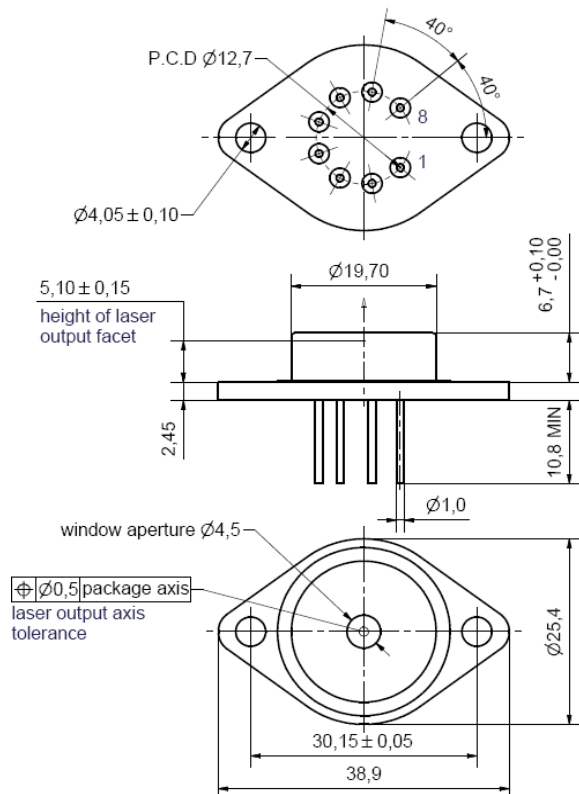
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Package Pinout

| | | | |
|---|---------------------------|---|---------------------------|
| 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 (-) |

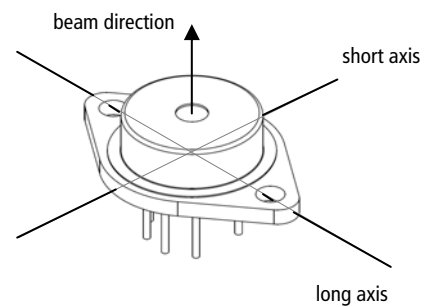


Package Drawings



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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We focus on power.

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RWE/RWL



BAL



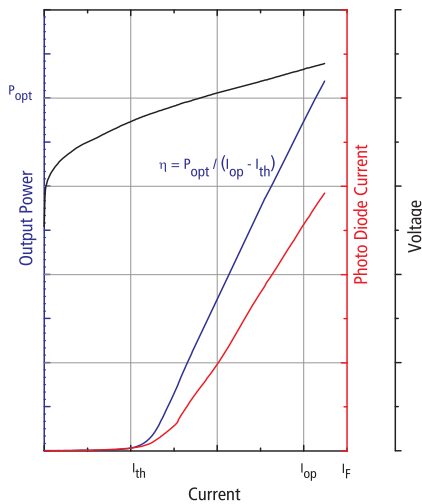
DFB/DBR



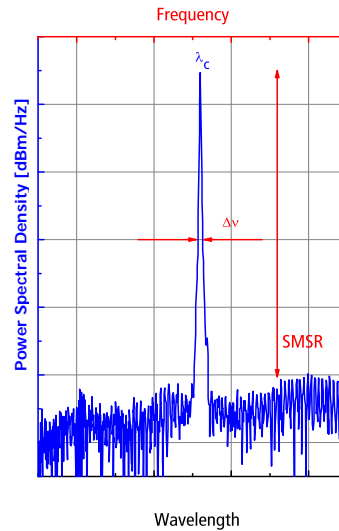
TPL/TPA

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.

Ordering Information:



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

Email orders to: sales@xsoptix.com
Fax orders to: 800-878-7282



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Order Code Scheme

EYP-DFB-0855-00150-1500-TOC03- 0 0 0 x

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

| | | |
|--------------------------------------|--|-------------|
| $P_{opt} = 150 \text{ mW};$ | $T_{LD} = 25^\circ$ | (Variant 0) |
| $P_{opt} = 20 \dots 150 \text{ mW};$ | $T_{LD} = 25^\circ$ | (Variant 1) |
| $P_{opt} = 20 \dots 150 \text{ mW};$ | $T_{LD} = 15^\circ \dots 40^\circ \text{ C}$ | (Variant 2) |

| |
|---|
| x |
| 0 |
| 1 |
| 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 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.

