

# LD4B-685-FP-20

## OVERVIEW

Laser diode coupled to an optical fiber and packaged into a hermetic case.

## MAIN FEATURES

- Wavelength: 685 nm
- Cavity type: Fabry-Perot
- Optical power in CW mode in single-mode fiber: 20 mW
- Package types: coaxial, coaxial with bracket, 14 pins DIL, 14 pins BTF
- Built-in monitor photodiode

## ORDERING INFORMATION

### LD4B-685-FP-20-X-X-X-X-X-X

#### Case type

**COAX:** compact coaxial (low duty cycle pulse mode only)

**COAXB:** compact coaxial with a bracket

**TH:** compact coaxial with a bracket compatible to Thorlabs mount

**DIL:** common 14-pins DIL for active thermal stabilization (TEC and thermistor)

**DILRAD:** 14-pins DIL for active thermal stabilization (TEC and thermistor) with wall radiator

**BTF:** 14-pins BTF type 1 (Pump) for active thermal stabilization (TEC and thermistor)

#### Pinout code

3: see more details on page 5

#### Fiber type

**SM04:** SM, [Coherent 630-HP](#), furcation tubing Ø0.9 mm

**SMP04:** PM, [Coherent PM630-HP](#), furcation tubing Ø0.9 mm

**MM5:** MM, [50/125. OM3](#), furcation tubing Ø0.9 mm

**MM6:** MM, [62.5/125. OM1](#), furcation tubing Ø0.9 mm

Other type on request

#### Connector type

**FU:** FC/UPC (SM04, SMP04)

**FA:** FC/APC (SM04, SMP04)

**N:** no connector (scissors cut)

Other type: on request

#### Test measurements

**CW:** CW mode (electro-optical parameters at T=25+/-5 C and spectrum)

**P:** Pulse mode (pulse duration 5 us, duty cycle 1%, at T=25+/-5 C)

**CWP:** both CW and pulse mode

#### Fiber length

**0.5:** 500+/-50 mm

**1.0:** 1000+/-100 mm

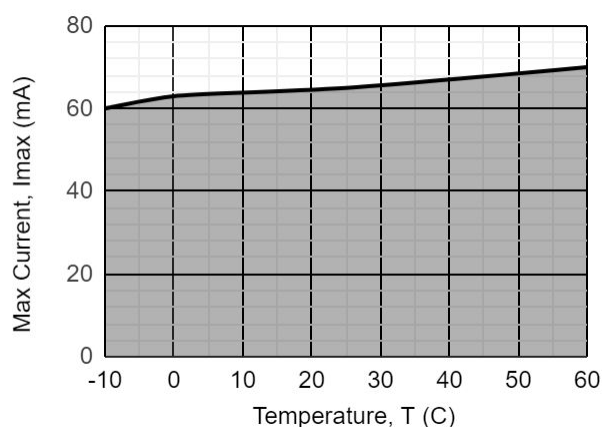
Other length on request

# LD4B-685-FP-20

## ABSOLUTE MAXIMUM RATINGS

| Parameter                    |            | Value     | Unit               | Conditions                                                       |
|------------------------------|------------|-----------|--------------------|------------------------------------------------------------------|
| Laser diode forward current* | $I_{max}$  | 70        | mA                 | CW, $T = 25^{\circ}\text{C}$                                     |
| Laser diode forward current* | $I_{pmax}$ | 110       | mA                 | Pulse, 5 $\mu\text{s}$ , duty cycle 1%, $T = 25^{\circ}\text{C}$ |
| Laser diode reverse voltage  | $V_{RL}$   | 2         | V                  |                                                                  |
| Photodiode reverse voltage   | $V_{RP}$   | 30        | V                  |                                                                  |
| Operating temperature**      | $T_{OP}$   | -10 - +60 | $^{\circ}\text{C}$ | Coaxial package                                                  |
| Operating temperature**      | $T_{OP}$   | -40 - +60 | $^{\circ}\text{C}$ | DIL, BTF ( $T_{st} = 25^{\circ}\text{C}$ )                       |
| Storage temperature          | $T_{stg}$  | -20 - +60 | $^{\circ}\text{C}$ |                                                                  |
| Soldering temperature        | $T_{sld}$  | 260       | $^{\circ}\text{C}$ | Max. 5 seconds                                                   |

\*Maximal laser diode forward current depends on the operating temperature. Please, refer to the figure below.



\*\*Operating temperature is defined by the case temperature. It is recommended to ensure sufficient heat dissipation so that the module's maximum operating temperature is not exceeded.

Operating temperature for the DIL, DILRAD and BTF 14-pins case T with TEC is defined for internal temperature stabilization at  $T_{st} = 25^{\circ}\text{C}$  that corresponds to thermistor resistance  $R_t = 10 \text{ k}\Omega$ .

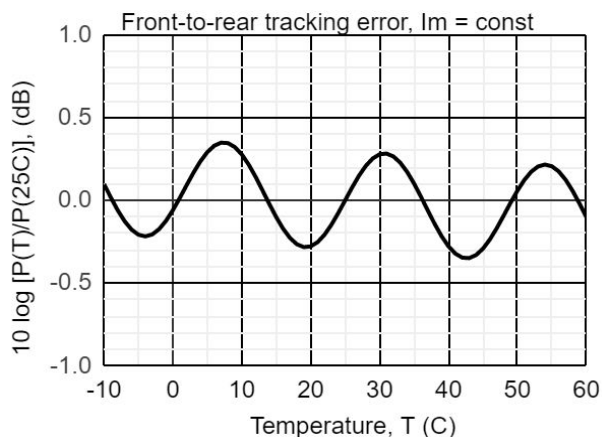
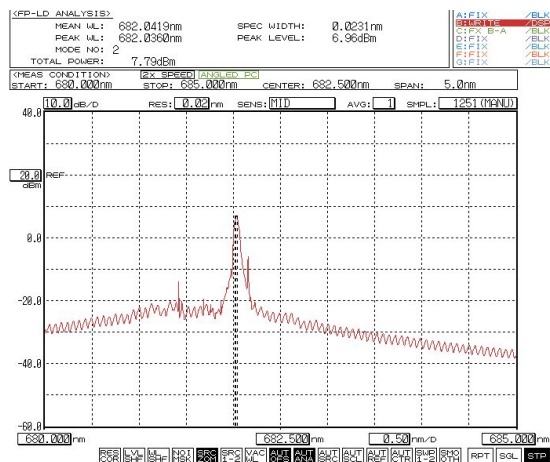
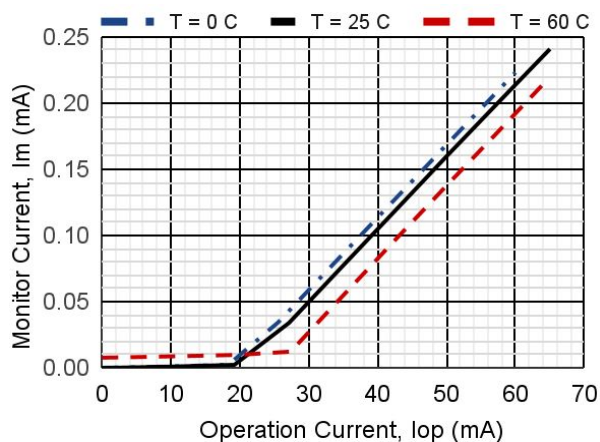
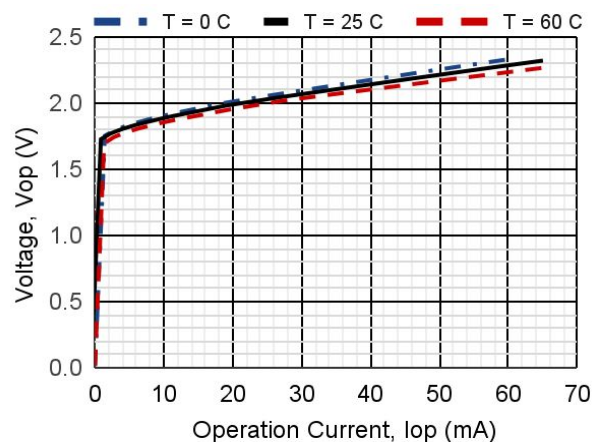
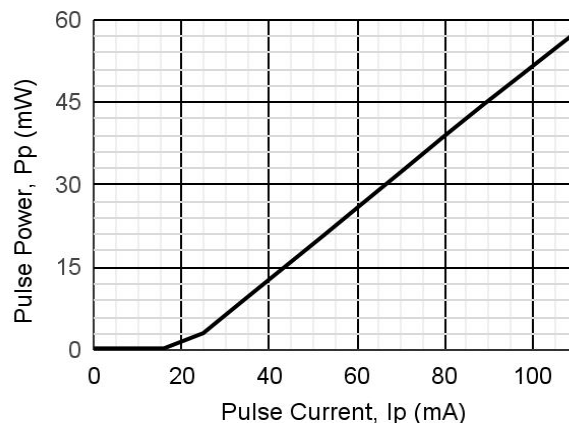
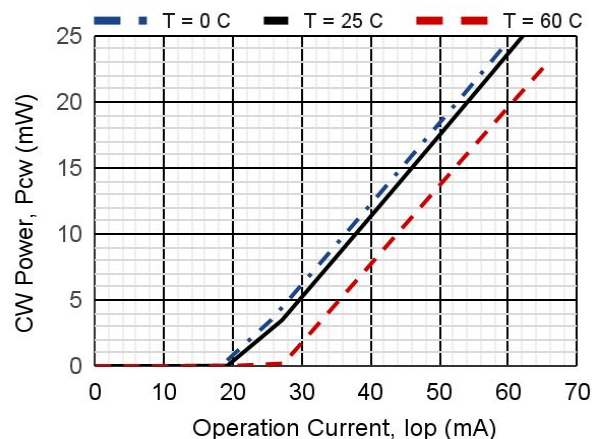
# LD4B-685-FP-20

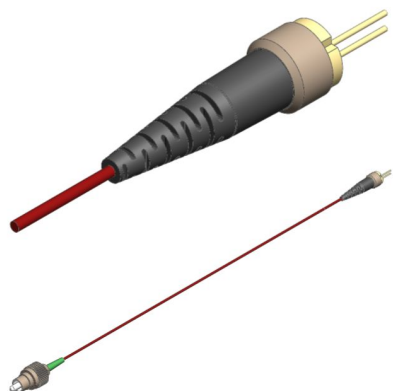
## ELECTRICAL-OPTICAL CHARACTERISTICS (T = 25 °C)

| Parameter                          |                 | MIN  | TYP  | MAX | Unit  | Conditions                                                                 |
|------------------------------------|-----------------|------|------|-----|-------|----------------------------------------------------------------------------|
| Optical power (CW)                 | P <sub>cw</sub> | 20   | 22   |     | mW    | CW, I <sub>op</sub> = 65 mA, SM04                                          |
| Optical power (pulse)              | P <sub>p</sub>  | 45   | 50   |     | mW    | Pulse, I <sub>p</sub> = 100 mA, duration 5 us, duty cycle 1%               |
| Mean wavelength                    | λ               | 675  | 685  | 695 | nm    | CW, I <sub>op</sub> = 65 mA                                                |
| Spectral width                     | Δλ              |      | 1    | 3   | nm    | CW, I <sub>op</sub> = 65 mA                                                |
| Wavelength-temperature coefficient | dλ/dT           |      | 0.18 |     | nm/°C | CW, I <sub>op</sub> = 65 mA                                                |
| Threshold current                  | I <sub>th</sub> |      | 25   | 45  | mA    |                                                                            |
| Slope efficiency                   | S <sub>e</sub>  | 0.44 | 0.50 |     | mW/mA | CW, SM04                                                                   |
| Operating voltage                  | V <sub>op</sub> |      | 2.3  | 3.0 | V     | CW, I <sub>op</sub> = 65 mA                                                |
| Monitor current                    | I <sub>m</sub>  | 0.1  | 0.5  | 2.5 | mA    | CW, I <sub>op</sub> = 65 mA, V <sub>r</sub> = 5 V                          |
| Polarization extinction ratio      | PER             | 17   |      |     |       | CW, I <sub>op</sub> = 65 mA, SMP04                                         |
| Tracking error                     | ER              |      | 0.4  | 0.8 | dB    | CW, I <sub>op</sub> (25C)=26 mA, I <sub>m</sub> = const<br>T = -10 ~ +50 C |

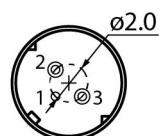
Tracking error ER = max |10 lg [P(T)/P(25C)]|, I<sub>m</sub> = const, T = T<sub>min</sub> ÷ T<sub>max</sub>

# LD4B-685-FP-20



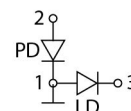
**LD4B-685-FP-20****COAX**

BACK VIEW



PINOUT

#3

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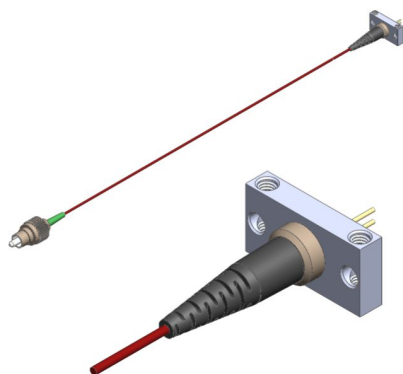
Drawing



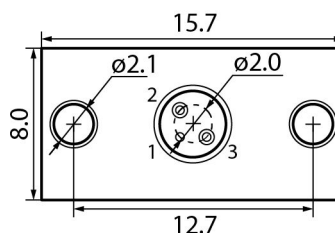
3D model



Application Notes

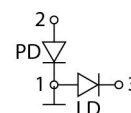
**COAXB**

BACK VIEW



PINOUT

#3

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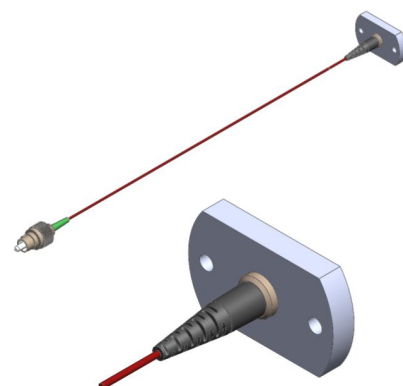
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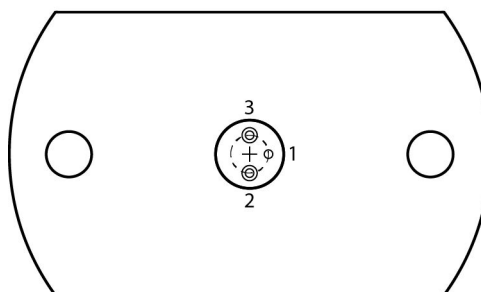
3D model



Application Notes

**PACKAGE TH**

BACK VIEW



PINOUT

#3

Thorlabs Pin Code A

Compatible to Thorlabs  
LDM9LP mountDownload more  
information

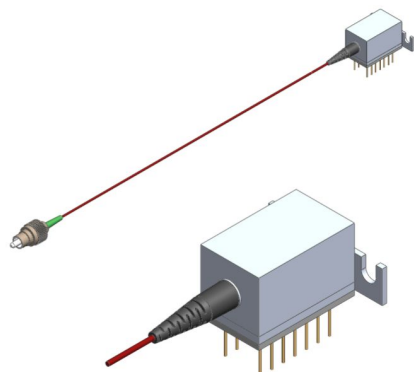
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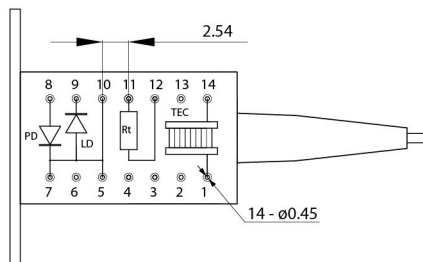
3D model



Application Notes

**LD4B-685-FP-20****DIL**

BOTTOM VIEW



PINOUT #2, #3

- 1.TEC Anode
- 2.-
- 3.-
- 4.-
- 5.LD Anode
- 6.-
- 7.PD Cathode, LD Anode
- 8.PD Anode
- 9.LD Cathode
- 10.LD Anode
- 11.Thermistor
- 12.Thermistor
- 13.-
- 14.TEC Cathode

TEC HP:  $I_{\max} = 1.4A$ ,  $U_{\max} = 3.9V$ ,  $Q_{\max} = 3.3W$ ,  
 $AC R = 2.0 \Omega$ ,  $\Delta T_{\max} = 69 K$

Thermistor:  
 $R_t = 10 \cdot \exp(3600 \cdot \{1/T[K] - 1/298\}) \text{ k}\Omega$

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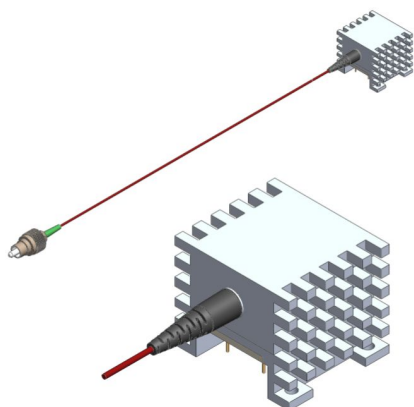
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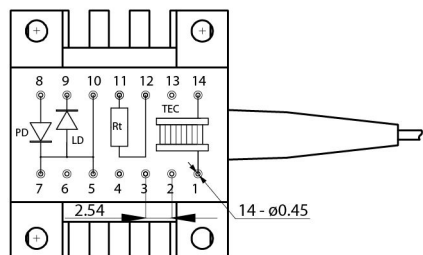
3D model



Application Notes

**DILRAD**

BOTTOM VIEW



PINOUT #2, #3

- 1.TEC Anode
- 2.-
- 3.-
- 4.-
- 5.LD Anode
- 6.-
- 7.PD Cathode, LD Anode
- 8.PD Anode
- 9.LD Cathode
- 10.LD Anode
- 11.Thermistor
- 12.Thermistor
- 13.-
- 14.TEC Cathode

TEC HP:  $I_{\max} = 1.4A$ ,  $U_{\max} = 3.9V$ ,  $Q_{\max} = 3.3W$ ,  
 $AC R = 2.0 \Omega$ ,  $\Delta T_{\max} = 69 K$

Thermistor:  
 $R_t = 10 \cdot \exp(3600 \cdot \{1/T[K] - 1/298\}) \text{ k}\Omega$

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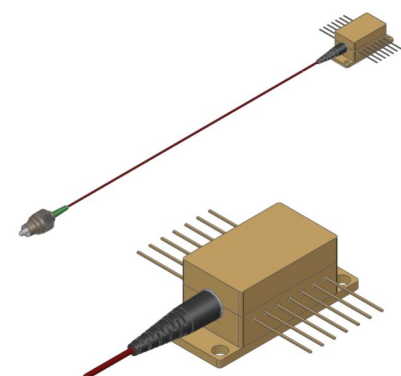
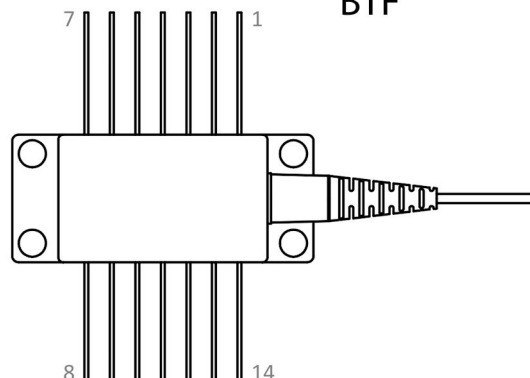
Drawing



3D model



Application Notes

**BTF**

1. TEC+
2. Thermistor
3. NC
4. NC
5. Thermistor
6. NC
7. NC
8. NC
9. NC
- 10 LD/SLD Anode
11. LD/SLD Cathode
12. NC
13. Case Ground
14. TEC -

TEC HP:  $I_{\max} = 1.4A$ ,  $U_{\max} = 3.9V$ ,  $Q_{\max} = 3.3W$ ,  
 $AC R = 2.0 \Omega$ ,  $\Delta T_{\max} = 69 K$

Thermistor:  
 $R_t = 10 \cdot \exp(3600 \cdot \{1/T[K] - 1/298\}) \text{ k}\Omega$

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information



Drawing



3D model



Application Notes

# LD4B-685-FP-20

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Characteristics, data, materials and structures specified in this datasheet are subject to change without notice. Please refer to the latest specification before use of the products.

### **Safety and handling cautions**

1. Avoid smashing and burning of the module. Avoid storing and using the module in conditions where water, organic solvents or aggressive acids or bases may contact the module or where there is a possibility of exposure to corrosive gases, explosive gases, dust, salinity or other harsh conditions. The module should be disposed as special industrial waste.
2. Exceeding absolute maximum ratings even for a short time can cause permanent damage of the module.
3. The module is sensitive to and can be broken by ESD (static electricity).

### **Conflict Minerals Policy Statement**

LD4B achieves business objectives and customer needs with social responsibility. We do not support or contribute to the violence and human rights violations associated with the mining of conflict minerals coming from Conflict Regions according to US "Dodd-Frank Act". When possible, our suppliers' conflict mineral statements are reviewed. We do not directly purchase Conflict Minerals from any source and do not knowingly procure any parts and products containing Conflict Minerals from Conflict Regions.

### **RoHS Compliance Statement**

Restriction of Hazardous Substances (RoHS) directive (Directive 2011/65/EC amended with Directive (EU) 2015/863) is the directive aimed at reducing the harmful environmental impact of waste electrical equipment by restricting the use of known dangerous substances. Based on information received from our supply sources, LD4B hereby states that the banned substances listed in the RoHS directive are not found in the parts and materials used above the threshold level listed other than exceptions approved by the European Commission.

### **REACH Compliance Statement**

Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) is a European Union regulation 1907/2006/EC that addresses the production and use of chemical substances, and their potential impacts on human health and the environment. Based on information received from our supply sources, LD4B hereby states compliance of the parts and materials used in manufacturing to REACH regulation. LD4B does not manufacture or import any substances or preparations as defined under REACH.