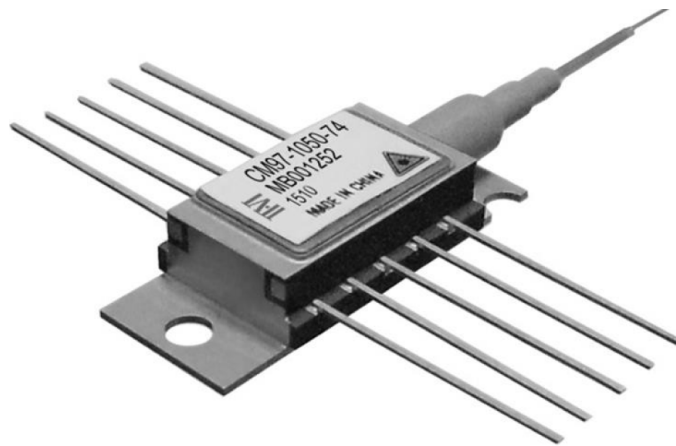



# COOLED 980 nm PUMP LASER MODULE

## CM97-xxx-7x

These lasers are designed as pump sources for erbium doped fiber amplifier (EDFA) applications. Processes and techniques of coupling the fiber to the laser allow very high output powers that are stable with both time and temperature. The CM97-series pump module utilizes a fiber Bragg grating design for enhanced wavelength and power stability performance. This product has been designed to ensure superior wavelength locking over drive current and case temperature. Devices are available with kink free output powers to >1.0 W.



## FEATURES

- High output power, >1.0 W kink free
- Fiber Bragg grating stabilization for wavelength locking over the entire operating conditions
- Hermetically sealed 10 pin mini-butterfly package
- Internal thermoelectric heatpump and monitor photodiode
- Telcordia GR-468-CORE compliant
- Field-proven high reliability
- RoHS compliant 

## APPLICATIONS

- Low noise EDFAs
- Dense wavelength division multiplexing (DWDM) EDFAs
- CATV Applications

# COOLED 980 nm PUMP LASER MODULE

## Optical Characteristics

| Product Code | Kink-Free Power<br>P <sub>kink</sub> (mW) | Operating Power<br>P <sub>op</sub> (mW) | Maximum Operating Current<br>I <sub>op</sub> (mA) |
|--------------|---|---|---|
| CM97-610-7*  | 610                                       | 555                                     | 855   |
| CM97-630-7*  | 630                                       | 570                                     | 885   |
| CM97-650-7*  | 650                                       | 590                                     | 915   |
| CM97-670-7*  | 670                                       | 610                                     | 940   |
| CM97-690-7*  | 690                                       | 625                                     | 970   |
| CM97-710-7*  | 710                                       | 645                                     | 995   |
| CM97-730-7*  | 730                                       | 665                                     | 1030  |
| CM97-750-7*  | 750                                       | 680                                     | 1050  |
| CM97-770-7*  | 770                                       | 700                                     | 1080  |
| CM97-790-7*  | 790                                       | 720                                     | 1105  |
| CM97-810-7*  | 810                                       | 735                                     | 1135  |
| CM97-830-7*  | 830                                       | 755                                     | 1165  |
| CM97-850-7*  | 850                                       | 775                                     | 1190  |
| CM97-870-7*  | 870                                       | 790                                     | 1215  |
| CM97-890-7*  | 890                                       | 810                                     | 1245  |
| CM97-910-7*  | 910                                       | 830                                     | 1275  |
| CM97-930-7*  | 930                                       | 845                                     | 1300  |
| CM97-950-7*  | 950                                       | 865                                     | 1330  |
| CM97-970-7*  | 970                                       | 880                                     | 1360  |
| CM97-990-7*  | 990                                       | 900                                     | 1360  |
| CM97-1010-7* | 1010                                      | 920                                     | 1360  |
| CM97-1030-7* | 1030                                      | 935                                     | 1360  |
| CM97-1050-7* | 1050                                      | 955                                     | 1360  |

## Wavelength Specification

| Product Code | Min. | Typ. | Max. | Units | Condition                                     |
|--------------|------|------|------|-------|---|
| CM97-xxx-74  | 973  | 974  | 975  | nm    | Air reference.<br>FBG temperatures is @ 25°C. |
| CM97-xxx-76  | 975  | 976  | 977  |       |   |

- Notes:
- Conditions unless otherwise stated: Case temperature -20 to 75°C, Submount temperature 25°C (at any given case temperature), Monitor diode bias -5 V, CW operation
  - Operating power assumes a 10% ageing margin: Operating Power = Kink-Free Power/1.1

# COOLED 980 nm PUMP LASER MODULE

## Product Specification

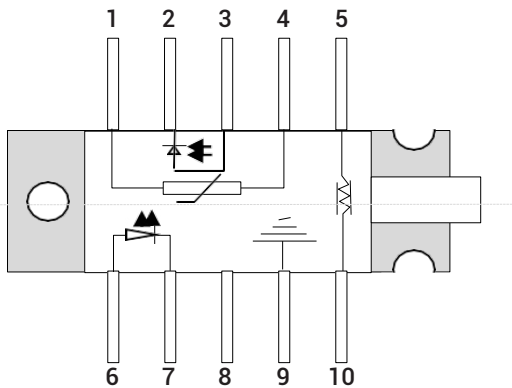
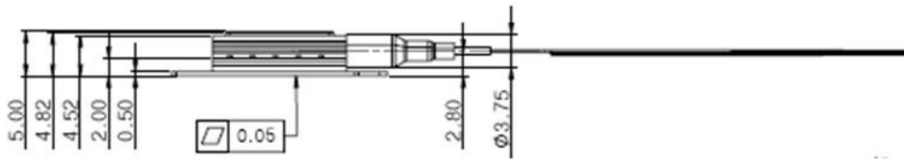
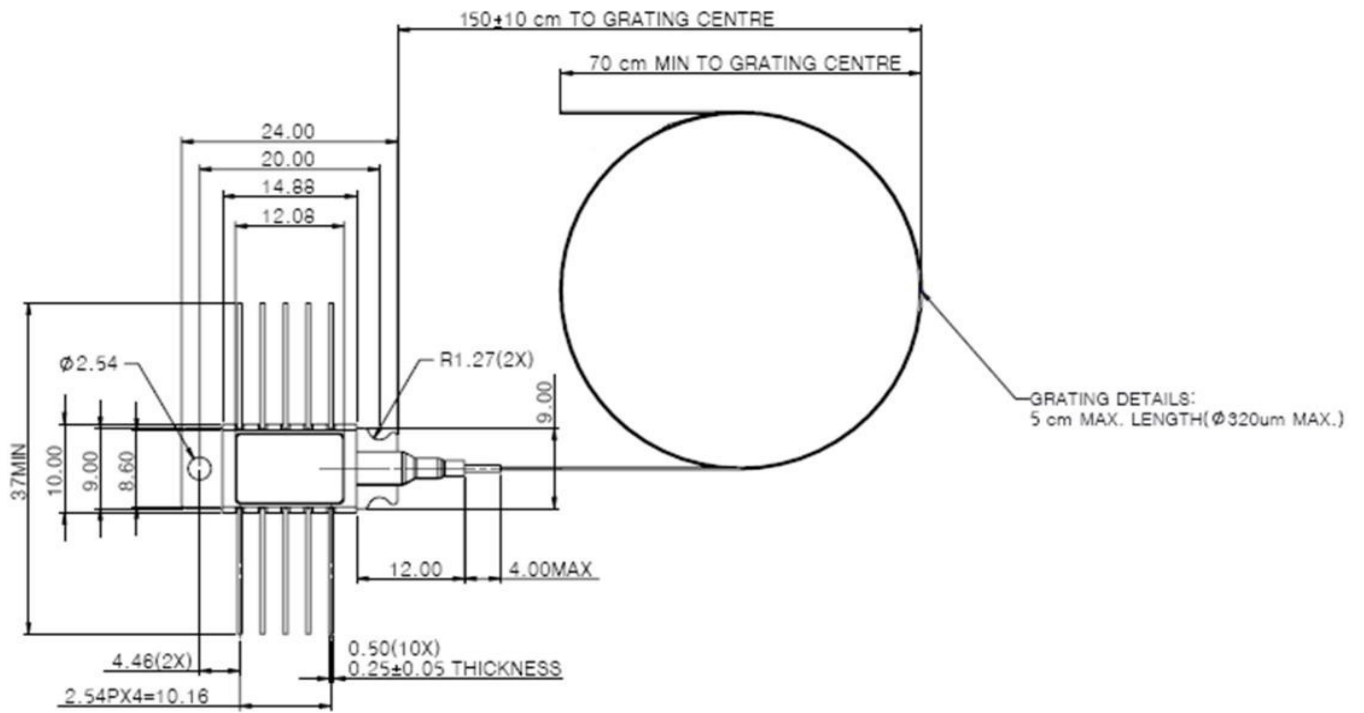
| Parameter   |                          | Min. | Typ.  | Max.                 | Units      | Condition                                     |
|---|--------------------------|------|-------|----------------------|------------|---|
| Threshold Current   | $I_{th}$                 |      | 60    | 80                   | mA         |   |
| Maximum Kink Free Current                                   | $I_{kink} @ P_{kink}$    |      |       | 1500                 | mA         |   |
| Operating Forward Voltage                                   | $V_{op}$                 |      | 2.0   | 2.2                  | V          |   |
| Spectral Width  | $\Delta\lambda$          |      | 0.2   | 1.0                  | nm         | RMS at -13 dB                                 |
| Signal to Noise Ratio                                       | SNR                      | 20   |       |                      | dB         |   |
| Temperature Dependence of Peak Wavelength                   | $\Delta\lambda/\Delta T$ |      | 0.008 | 0.01                 | nm/°C      | FBG temperature dependency                    |
| Monitor Detector Responsivity                               | $R_m$                    | 1    |       | 10                   | $\mu A/mW$ | @ -5 V bias voltage                           |
| Monitor Dark Current  | $I_{dark}$               |      |       | 50                   | nA         |   |
| Fibre Power Stability<br>>50 mW<br>30 – 50 mW<br>10 – 30 mW | $\Delta P_{f-t}$         |      |       | 0.05<br>0.15<br>0.35 | dB         | Peak-to-peak<br>Time = 60 sec<br>DC to 50 kHz |
| Return Loss   | RL                       | 8    |       |                      | dB         | 1500 nm – 1600 nm                             |
| Thermistor BETA Value                                       | $\beta$                  | 3500 | 3575  | 4100                 |            | $\pm 1\%$ temperature variation               |
| Thermistor Resistance                                       | $R_{th}$                 | 9.5  | 10.0  | 10.5                 | k $\Omega$ | At submount temperature of 25°C               |
| Heat Pump Current   | $I_{TEC}$                |      |       | 2.0                  | A          | Tcase = 75°C, IF = 1500 mA                    |
| Heat Pump Voltage   | $V_{TEC}$                |      |       | 3.0                  | V          |   |

## Absolute Maximum Ratings

| Parameter                     |              | Min. | Typ. | Max. | Units   | Condition  |
|-------------------------------|--------------|------|------|------|---------|--|
| Operating Case Temperature    | $T_{op}$     | -20  |      | 75   | °C      |  |
| Storage Temperature           | $T_{stg}$    | -40  |      | 85   | °C      |  |
| Storage Relative Humidity     | $RH_{stg}$   | 5    |      | 95   | %       | But not to exceed 0.024 kg of water per 1.0 kg of dry air      |
| Operating Relative Humidity   | $RH_{op}$    | 5    |      | 85   | %       |  |
| Pigtail Axial Pull Force      |              |      |      | 0.5  | kg      | 1 minute   |
| Pigtail Side Pull Force       |              |      |      | 0.25 | Kg      | 90°, 4 directions, 5 s   |
| Fiber Bend Radius             |              | 13   |      |      | mm      |  |
| Lead Soldering Temperature    |              |      |      | 350  | °C      | 10 sec   |
| Laser Diode Forward Current   | $I_{f\_max}$ |      |      | 1500 | mA      | CW   |
| Laser Diode Current Transient |              |      |      | 1500 | mA      | Time = 1000 ns max   |
| Laser Diode Reverse Current   | $I_r$        |      |      | 10   | $\mu A$ |  |
| Laser Diode Reverse Voltage   | $V_r$        |      |      | 2.0  | V       |  |
| Heat Pump Current             | $I_{TEC}$    | -2.5 |      | 2.2  | A       | Thermistor and TEC must be in closed control loop at all times |
| Heat Pump Voltage             | $V_{TEC}$    | -3.3 |      | 3.3  | V       |  |

# COOLED 980 nm PUMP LASER MODULE

## Module Outline Drawing and Pin Connections



| Pin | Description         | Pin | Description       |
|-----|---------------------|-----|-------------------|
| 1   | TEC (+)             | 6   | Laser anode (+)   |
| 2   | Thermistor          | 7   | Laser cathode (-) |
| 3   | Monitor anode (-)   | 8   | NC                |
| 4   | Monitor cathode (+) | 9   | Package ground    |
| 5   | Thermistor          | 10  | TEC (-)           |

# COOLED 980 nm PUMP LASER MODULE

## Fiber Specification

| Parameter                      | Min.   | Typ. | Max.  | Units | Condition                                  |
|--------------------------------|--------|------|-------|-------|--|
| Fiber Type                     | HI1060 |      |       |       |  |
| Cut-off Wavelength             | 870    | 920  | 970   | nm    |  |
| Mode Field Diameter            | 5.6    | 5.9  | 6.2   | μm    | @ 980nm                                    |
| Cladding Diameter              | 124.5  | 125  | 125.5 | μm    |  |
| Fiber Coating Diameter         | 230    | 245  | 260   | μm    | Acrylate material, mechanically strippable |
| Grating Recoat Diameter        | 260    | 280  | 320   | μm    |  |
| Core/cladding Concentricity    |        |      | <0.5  | μm    |  |
| Coating-clad offset            |        |      | ≤5    | μm    |  |
| Fiber Proof Test               | 200    |      |       | kpsi  |  |
| Fiber Bragg Grating Proof Test | 150    |      |       | kpsi  |  |

Note: Fibre termination; bare fibre with rough cleave.

## Ordering Information

| CM           | 97        | - | ***             | - | 7*   |
|--------------|-----------|---|-----------------|---|--|
| Product Type | Chip Type | - | Kink Free Power | - | Wavelength<br>74 for 974 nm<br>76 for 976 nm |

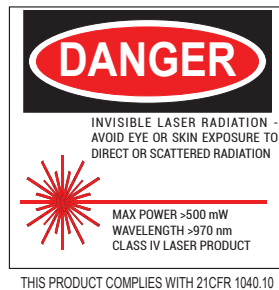
Example: CM97-550-74 is a 550mW KFP; 974nm product.

## RoHS Compliance

Coherent is fully committed to environment protection and sustainable development and has set in place a comprehensive program for removing polluting and hazardous substances from all of its products. The relevant evidence of RoHS compliance is held as part of our controlled documentation for each of our compliant products. RoHS compliance parts are available to order, please refer to the ordering information section for further details.

## User Safety

The laser light is invisible and maybe harmful to human eyes. ESD protection, it is important that devices are handled correctly during all stages of manufacture and use.



Caution - use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

## Important Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by Coherent before they become applicable to any particular order or contract. In accordance with the Coherent policy of continuous improvement specifications may change without notice. Further details are available from any Coherent sales representative.

This product is protected by patents and patent applications pending worldwide.