

# LU96Z\*\*\*-7\*

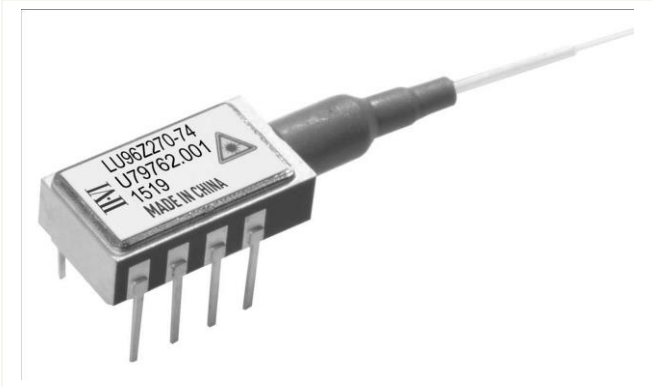
## Uncooled mini-DIL 980nm Pump Laser Module

### Features

- Up to 500mW kink-free power over full operating temperature range
- Operating temperature range from -5°C to +75°C
- Polarization maintaining (PM) fiber
- Low power dissipation
- Small form factor mini-DIL package
- Wavelength stabilized by fiber Bragg grating over entire operating range
- Centre wavelength at 974 and 976nm
- Telcordia GR-468-CORE compliant
- RoHS compliant

### Applications

- Low noise EDFA requiring higher optical power with low power consumption and small form-factor package
- Single or multi-stage EDFA applications including Single-channel and DWDM designs



### Product Overview

The LU96Z-series uncooled pump laser module in an 8-pin mini-DIL package is II-VI's third-generation uncooled pump module providing low power consumption for highly reliable metro, cross-connect, SFF single and multi-channel amplifier designs plus high bit-rate, per-channel amplification.

The LU96Z-series is designed for uncooled operation at high temperature and power levels. Qualification of the enhanced G08 chip ensures high reliability even at high operating power, 75°C. External Fiber Bragg Grating (FBG) stabilization provides excellent wavelength and power stability over the entire operating temperature range.

# LU96Z-Series

## Operating Parameter

| Product Code | Minimum Kink-Free Power P <sub>kink</sub> (mW) | Maximum Operating Power Pop (mW) | Typical Operating Current I <sub>op</sub> (mA) | Maximum Operating Current I <sub>op</sub> (mA) |
|--------------|--|----------------------------------|--|--|
| LU96Z100-7*  | 110  | 100                              | 240  | 270  |
| LU96Z110-7*  | 120  | 110                              | 255  | 290  |
| LU96Z120-7*  | 135  | 120                              | 275  | 310  |
| LU96Z130-7*  | 145  | 130                              | 295  | 330  |
| LU96Z140-7*  | 155  | 140                              | 310  | 350  |
| LU96Z150-7*  | 165  | 150                              | 330  | 370  |
| LU96Z160-7*  | 175  | 160                              | 345  | 390  |
| LU96Z170-7*  | 190  | 170                              | 360  | 410  |
| LU96Z180-7*  | 200  | 180                              | 380  | 430  |
| LU96Z190-7*  | 210  | 190                              | 395  | 450  |
| LU96Z200-7*  | 220  | 200                              | 415  | 470  |
| LU96Z210-7*  | 230  | 210                              | 430  | 490  |
| LU96Z220-7*  | 245  | 220                              | 450  | 510  |
| LU96Z230-7*  | 255  | 230                              | 470  | 530  |
| LU96Z240-7*  | 265  | 240                              | 485  | 550  |
| LU96Z250-7*  | 275  | 250                              | 505  | 575  |
| LU96Z260-7*  | 285  | 260                              | 525  | 595  |
| LU96Z270-7*  | 300  | 270                              | 545  | 615  |
| LU96Z280-7*  | 310  | 280                              | 560  | 635  |
| LU96Z290-7*  | 320  | 290                              | 585  | 660  |
| LU96Z300-7*  | 330  | 300                              | 600  | 680  |
| LU96Z310-7*  | 340  | 310                              | 615  | 695  |
| LU96Z320-7*  | 350  | 320                              | 630  | 715  |
| LU96Z330-7*  | 365  | 330                              | 655  | 740  |
| LU96Z340-7*  | 375  | 340                              | 670  | 760  |
| LU96Z350-7*  | 385  | 350                              | 690  | 785  |
| LU96Z360-7*  | 395  | 360                              | 710  | 805  |
| LU96Z370-7*  | 405  | 370                              | 730  | 830  |
| LU96Z380-7*  | 420  | 380                              | 745  | 845  |
| LU96Z390-7*  | 430  | 390                              | 765  | 865  |
| LU96Z400-7*  | 440  | 400                              | 780  | 885  |
| LU96Z410-7*  | 450  | 410                              | 805  | 915  |
| LU96Z420-7*  | 460  | 420                              | 820  | 930  |
| LU96Z430-7*  | 475  | 430                              | 840  | 950  |
| LU96Z440-7*  | 485  | 440                              | 855  | 970  |
| LU96Z450-7*  | 495  | 450                              | 875  | 985  |
| LU96Z460-7*  | 505  | 460                              | 895  | 1000   |

**Notes;**

1. Typical and maximum operating currents at 75°C
2. Operating power assumes a 10% ageing margin: Operating Power = Kink Free Power / 1.1

# LU96Z-Series

## Wavelength Specification

| Product Code | Min. | Typ. | Max. | Units | Condition                                     |
|--------------|------|------|------|-------|---|
| LU96Z***-74  | 973  | 974  | 975  | nm    | Air reference.<br>FBG temperatures is @ 25°C. |
| LU96Z***-76  | 975  | 976  | 977  |       |   |

## Product Specification

| Parameter  |                          | Min.     | Typ.  | Max.                         | Units            | Condition                                      |
|--|--------------------------|----------|-------|------------------------------|------------------|--|
| Threshold current  | I <sub>th</sub>          |          | 55    | 100                          | mA               |  |
| Operating forward voltage  | V <sub>op</sub>          |          | 1.65  | 2.0                          | V                |  |
| Spectral width   | $\Delta\lambda$          |          | 0.2   | 1.0                          | nm               | RMS at -13dB                                   |
| Power in band ratio<br>>100mW<br>50mW to 100mW                       | PIB                      | 90<br>75 |       |                              | %                | $\lambda_c \pm 1.5\text{nm}$ ,<br>-5°C to 75°C |
| Temperature dependence of<br>peak wavelength                         | $\Delta\lambda/\Delta T$ |          | 0.008 | 0.01                         | nm/°C            | FBG temperature<br>dependency                  |
| Monitor detector responsivity  | R <sub>m</sub>           | 0.3      | 6     | 15                           | $\mu\text{A/mW}$ |  |
| Monitor dark current   | I <sub>dark</sub>        |          |       | 60                           | nA               | -5V bias voltage                               |
| Fiber power stability<br>>30mW<br>20 – 30mW<br>10 – 20mW<br>5 – 10mW | $\Delta P_{f\_t}$        |          |       | 0.10<br>0.10<br>0.15<br>0.20 | dB               | Peak-to-peak<br>Time = 60sec<br>DC to 50kHz    |
| Return loss  | RL                       | 35       |       |                              | dB               | 1500nm – 1600nm                                |
| Thermistor BETA value  | $\beta$                  | 3500     |       | 4100                         |                  |  |
| Thermistor resistance  | R <sub>th</sub>          | 9.5      | 10.0  | 10.5                         | k $\Omega$       | At submount<br>temperature of 25°C             |
| Thermal power dissipation  | P <sub>thermal</sub>     |          | 1.35  | 1.75                         | W                | T <sub>case</sub> = 75°C,<br>460mW             |
| Total electrical power<br>consumption                                | P <sub>total</sub>       |          | 1.8   | 2.2                          | W                |  |

### Notes;

1. Conditions unless otherwise stated: Case temperature -5 to 75°C, Monitor diode bias -5V, CW operation

# LU96Z-Series

## Absolute Maximum Ratings

| Parameter                     |        | Min. | Typ. | Max. | Units | Condition   |
|-------------------------------|--------|------|------|------|-------|---|
| Operating case temperature    | Top    | -5   |      | 75   | °C    |   |
| Storage temperature           | Tstg   | -40  |      | 85   | °C    |   |
| Storage relative humidity     | RHstg  | 5    |      | 95   | %     | But not to exceed 0.024kg of water per 1.0kg of dry air |
| Operating relative humidity   | RHop   | 5    |      | 85   | %     |   |
| Pigtail axial pull force      |        |      |      | 0.5  | kg    | 1 minute  |
| Pigtail side pull force       |        |      |      | 0.25 | kg    | 90°, 4 directions, 5s                                   |
| Fiber bend radius             |        | 13   |      |      | mm    |   |
| Lead soldering temperature    |        |      |      | 350  | °C    | 10 sec  |
| Laser diode forward current   | If_max |      |      | 1100 | mA    | CW  |
| Laser diode current transient |        |      |      | 1200 | mA    | Time = 1000ns max.                                      |
| Laser diode reverse current   | Ir     |      |      | 10   | µA    |   |
| Laser diode reverse voltage   | Vr     |      |      | 2.0  | V     |   |
| Photodiode reverse voltage    |        |      |      | 20   | V     |   |
| Photodiode reverse current    |        |      |      | 5    | mA    |   |
| ESD threshold                 |        |      |      | 500  | V     | HBM, C=100pF, R=1.5kΩ                                   |

## Fiber Specification

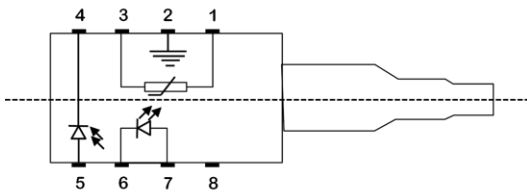
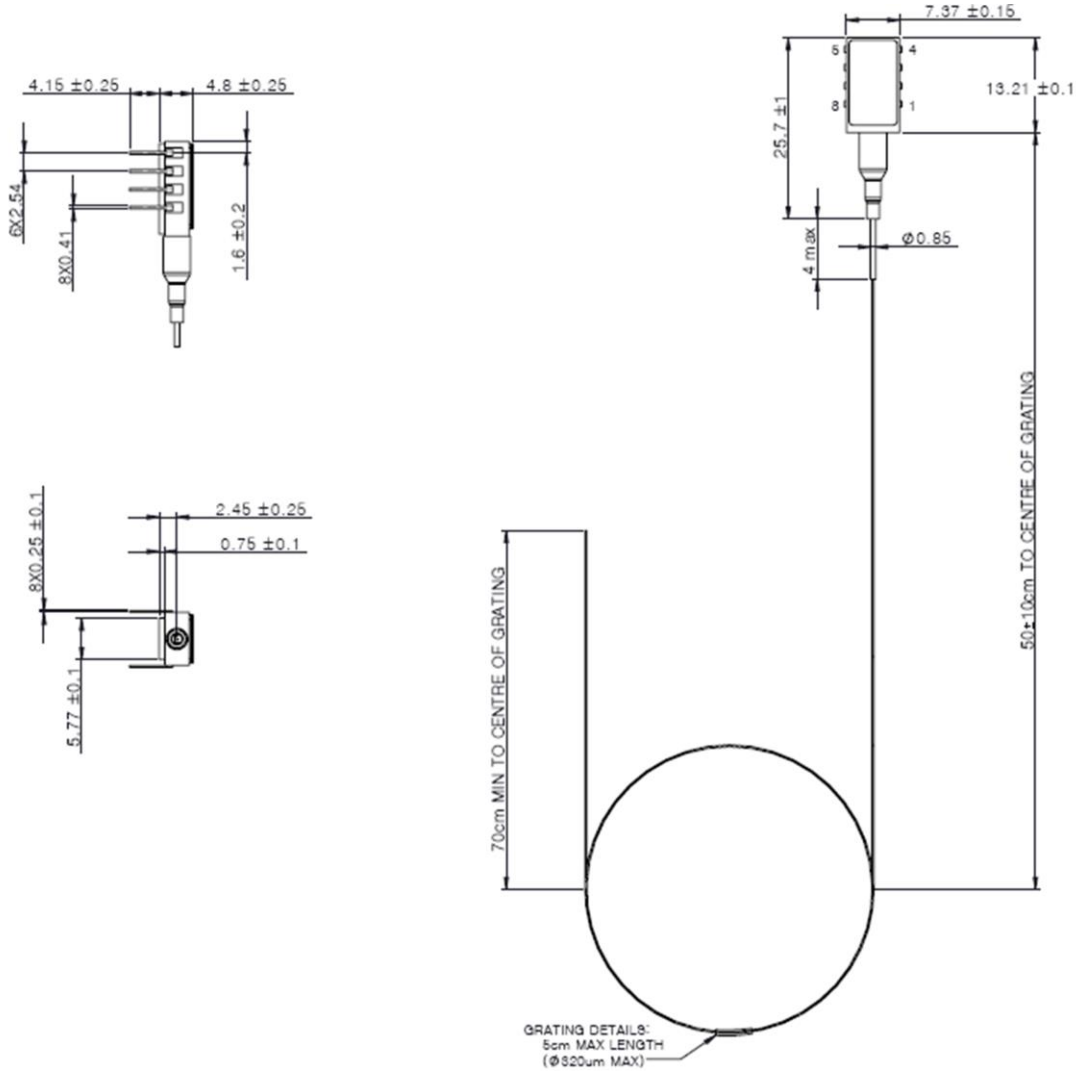
| Parameter                      | Min.  | Typ. | Max. | Units | Condition                                  |
|--------------------------------|-------|------|------|-------|--|
| Fiber type                     | PM980 |      |      |       |  |
| Cut-off wavelength             | 870   | 920  | 970  | nm    |  |
| Mode field diameter            | 6.1   | 6.6  | 7.1  | µm    | @ 980nm                                    |
| Cladding diameter              | 124   | 125  | 126  | µm    |  |
| Fiber coating diameter         | 230   | 245  | 260  | µm    | Acrylate material, mechanically strippable |
| Grating recoat diameter        | 260   | 290  | 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  |  |

### Notes;

1. Fiber termination; bare fiber with rough cleave.

# LU96Z-Series

## Module Outline Drawing and Pin Connections



| PIN | CONNECTION          |
|-----|---------------------|
| 1   | THERMISTOR          |
| 2   | PACKAGE GROUND      |
| 3   | THERMISTOR          |
| 4   | MONITOR PD CATHODE  |
| 5   | MONITOR PD ANODE    |
| 6   | LASER DIODE CATHODE |
| 7   | LASER DIODE ANODE   |
| 8   | N/C                 |

# LU96Z-Series

## Ordering Information

| LU           | 96Z       | xxx                     | - | 7x   |
|--------------|-----------|-------------------------|---|--|
| Product Type | Chip Type | LD Operating Power (mW) | - | Wavelength<br>74 for 974nm<br>76 for 976nm |

**Example: LU96Z210-74 is a 210mW Operating Power, 974nm product.**

# LU96Z-Series

## RoHS Compliance



II-VI Photonics 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

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