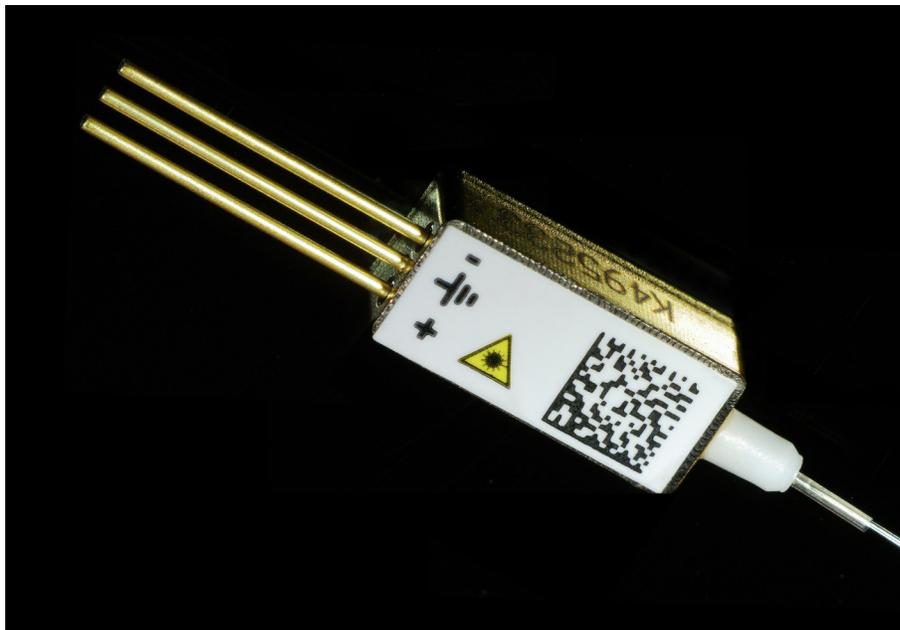


# MICRO-FORMAT UNCOOLED 980 nm PUMP LASER DIODE MODULE

## MLU96Z\*\*\*-7\*

The Coherent MLU96Z-series uncooled pump laser module represents continuing innovation in packaging technology to enable highly reliable pump laser sources for existing and emerging applications.



## FEATURES

- Ultra-small package footprint: 10 x 4.4 x 3.2 mm (LxWxH)
- Up to 400 mW operating power over full temperature range
- 80°C operating temperature range
- Low power consumption
- Low bend-loss, 80  $\mu$ m, PM fiber supporting 5 mm bend radius
- Wavelength stabilized by fiber Bragg grating over entire operating range
- Centre wavelength at 974 or 976 nm
- Telcordia GR-468-CORE compliant
- RoHS compliant 

## APPLICATIONS

- Integrated amplification within high bit-rate transceiver modules
- Low noise EDFA requiring higher optical power with low power consumption and small formfactor package
- Single or multi-stage EDFA applications including Single-channel and DWDM designs

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Housed within an ultra-compact 3-pin micro-format package with a volume of just 141 mm<sup>3</sup>, the laser module enables equivalent performance to the Coherent leading 8-pin uncooled mini-DIL products.

The MLU96Z-series provides designers of ultra-compact integrated amplifier systems with the tools to enable low-noise, high power optical amplification within package volumes previously unachievable.

Combining a small package volume, 1 mm fibre feedthrough, and low bend-loss 80 µm PM fibre, the module can enable integrated optical amplification within small form-factor platforms such as CFP2 and CFP4.

With <2 W maximum power consumption, and supporting an 80°C operating temperature range, the MLU96Z-series pump fits within tight power-consumption budgets and environmental requirements.

The MLU96Z-series houses the market-proven Coherent enhanced G08 laser for superior reliability and stability, and the package is qualified to the requirements of Telcordia GR-468-CORE.

### Optical Characteristics

Product Code	Minimum Kink-Free Power	Maximum Operating Power	Typical Operating Current @80	Maximum Operating Current@80	Total power consumption @ Max operating conditions
	P <sub>kink</sub> (mW)	P <sub>op</sub> (mW)	I <sub>op</sub> (mA)	I <sub>op</sub> (mA)	(W)
MLU96Z100-7*	110	100	260	330	0.46
MLU96Z110-7*	120	110	287	355	0.5
MLU96Z120-7*	135	120	308	385	0.54
MLU96Z130-7*	145	130	328	410	0.57
MLU96Z140-7*	155	140	348	440	0.61
MLU96Z150-7*	165	150	369	465	0.66
MLU96Z160-7*	175	160	382	490	0.7
MLU96Z170-7*	190	170	411	520	0.75
MLU96Z180-7*	200	180	432	545	0.79
MLU96Z190-7*	210	190	453	570	0.84
MLU96Z200-7*	220	200	474	600	0.89
MLU96Z210-7*	230	210	496	630	0.95
MLU96Z220-7*	245	220	517	655	1.00
MLU96Z230-7*	255	230	539	680	1.06
MLU96Z240-7*	265	240	561	725	1.12
MLU96Z250-7*	275	250	583	750	1.18
MLU96Z260-7*	285	260	605	780	1.25
MLU96Z270-7*	300	270	628	810	1.31
MLU96Z280-7*	310	280	646	840	1.35
MLU96Z290-7*	320	290	668	870	1.40
MLU96Z300-7*	330	300	689	900	1.45
MLU96Z310-7*	340	310	710	930	1.50
MLU96Z320-7*	350	320	732	960	1.55
MLU96Z330-7*	360	330	753	990	1.60
MLU96Z340-7*	375	340	774	1000	1.65
MLU96Z350-7*	385	350	796	1000	1.70
MLU96Z360-7*	395	360	817	1000	1.75
MLU96Z370-7*	405	370	839	1000	1.80
MLU96Z380-7*	420	380	860	1000	1.85
MLU96Z390-7*	430	390	881	1000	1.90
MLU96Z400-7*	440	400	903	1000	1.95

Notes:

1. Typical and maximum operating currents at 80°C

2. Operating power assumes a 10% ageing margin: Operating Power = Kink Free Power / 1.1

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## Wavelength Specification

Product Code	Min.	Typ.	Max.	Units	Condition
MLU96Z***-74	972	974	976	nm	Air reference. @ 0°C to 80°C case temperature.
MLU96Z***-76	974	976	978		

## Product Specification <sup>1</sup>

Parameter		Min.	Typ.	Max.	Units	Condition
Threshold Current	$I_{th}$		55	100	mA	
Operating Forward Voltage	$V_{op}$		1.65	2.0	V	
Spectral Width	$\Delta\lambda$		0.2	1.0	nm	RMS at -13 dB
Power in Band Ratio >100 mW 50 mW to 100 mW	PIB	90 75			%	$\lambda_c \pm 1.5$ nm, 0°C to 80°C
Fiber Power Stability >30 mW 20 – 30 mW 10 – 20 mW 5 – 10 mW	$\Delta P_{r,t}$			0.10 0.10 0.15 0.20	dB	Peak-to-peak Time = 60 sec DC to 50 kHz
Return Loss	RL	35			dB	1500 nm – 1600 nm

Note 1: All characteristics at <-40 dB back reflection

## Absolute Maximum Ratings

Parameter		Min.	Typ.	Max.	Units	Condition
Operating Case Temperature	$T_{op}$	0		80	°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				0.25	kg	1 minute
Fiber Bend Radius		5			mm	
Lead Soldering Temperature				350	°C	10 sec
Laser Diode Forward Current	$I_{f,max}$			1100	mA	
Laser Diode Current Transient				1200	mA	Time = 1000 ns max
Laser Diode Reverse Current	$I_r$			10	μA	
Laser Diode Reverse Voltage	$V_r$			2.0	V	
ESD Threshold				500	V	HBM, C = 100 pF, R = 1.5 kΩ

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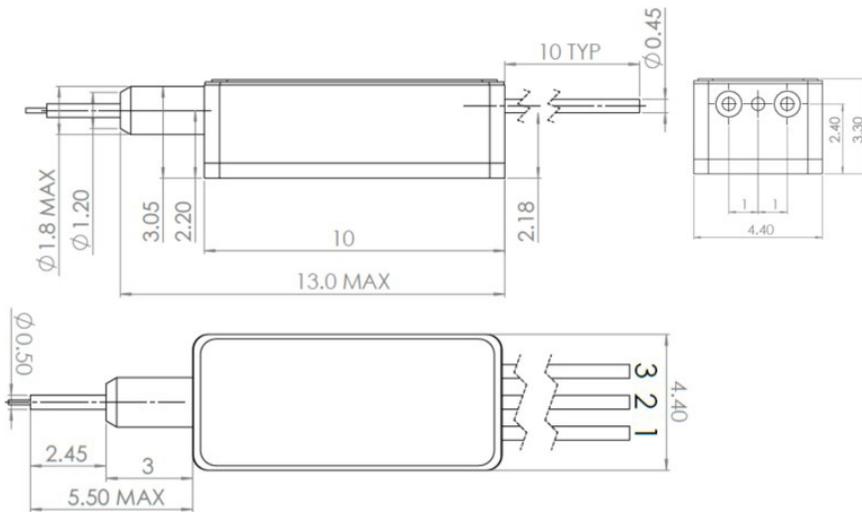
## Fiber Specification

Parameter	Min.	Typ.	Max.	Units	Condition
Fiber Type	Fujikura RCSM98-PS-U17C PANDA Fiber or Equivalent				
Cut-off Wavelength	870		950	nm	
Mode Field Diameter		6.0		μm	@ 980 nm
Cladding Diameter	79	80	81	μm	
Fiber Coating Diameter	155	165	175	μm	Acrylate material, mechanically strippable
Core/cladding Concentricity			<0.5	μm	
Fiber Proof Test	200			kpsi	
Fibre Length	750			mm	No re-coated region along length

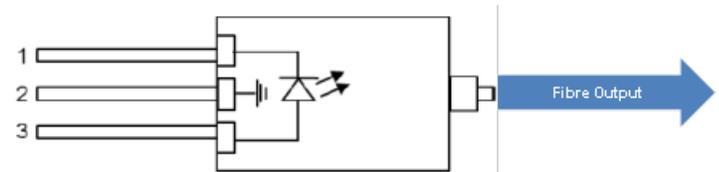
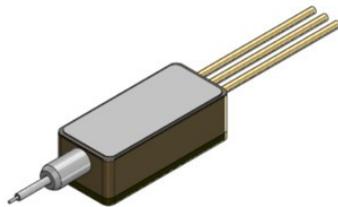
Notes:

1. Fiber termination; bare fiber with rough cleave.

## Module Outline Drawing and Pin Connections



Pin	Connection
1	Laser Diode Cathode (-)
2	Package Ground
3	Laser Diode Anode (+)



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## Ordering Information

MLU	96Z	***	-	7*
Product Type	Chip Type	LD Operating Power (mW)	-	Wavelength 74 for 974 nm 76 for 976 nm

Example: MLU96Z210-74 is a 210mW Operating Power, 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 & Product Safety

Invisible laser radiation. Avoid eye or skin exposure to direct or scattered radiation. Class 4 laser product. ESD protection. Caution. Static sensitive device. To be opened by authorised personnel only.



THIS PRODUCT COMPLIES WITH 21CFR 1040.10



REFERENCE IEC 60825-1 Ed 3.0



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.