

# CML96Z\*\*\*-7\*

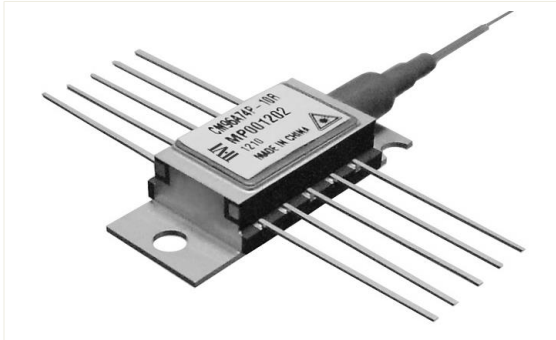
## Low Power Consumption Cooled 10pin butterfly 980nm Pump Laser Module

### Features

- High output power, up to 600mW kink free
- Low power consumption
- Single-mode fiber pigtail
- Fiber Bragg grating stabilization for wavelength locking over the entire operating conditions
- Small form factor, hermetically sealed 10 pin mini-butterfly package
- Pin-out compatibility with 14 pin BTF 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



### Product Overview

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 high output powers that are very stable with both time and temperature.

The CML96Z\*\*\*-7\* 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, temperature and optical feedback changes.

The CML96Z\*\*\*-7\* series pump module operate at significantly reduced TEC and overall power consumption.

Devices are available with kink free output powers to 600mW.

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## Optical Characteristics

Product Code	Minimum Kink-Free Power P <sub>kink</sub> (mW)	Maximum Operating Power P <sub>op</sub> (mW)	Maximum Operating Current I <sub>op</sub> (mA)
CML96Z200-7*	200	180	375
CML96Z210-7*	210	190	395
CML96Z220-7*	220	200	410
CML96Z230-7*	230	210	430
CML96Z240-7*	240	220	450
CML96Z250-7*	250	225	460
CML96Z260-7*	260	235	475
CML96Z270-7*	270	245	495
CML96Z280-7*	280	255	510
CML96Z290-7*	290	265	530
CML96Z300-7*	300	275	545
CML96Z310-7*	310	280	555
CML96Z320-7*	320	290	575
CML96Z330-7*	330	300	595
CML96Z340-7*	340	310	610
CML96Z350-7*	350	320	630
CML96Z360-7*	360	325	640
CML96Z370-7*	370	335	655
CML96Z380-7*	380	345	675
CML96Z390-7*	390	355	695
CML96Z400-7*	400	365	710
CML96Z410-7*	410	375	730
CML96Z420-7*	420	380	740
CML96Z430-7*	430	390	755
CML96Z440-7*	440	400	775
CML96Z450-7*	450	410	795
CML96Z460-7*	460	420	810
CML96Z470-7*	470	425	820
CML96Z480-7*	480	435	840
CML96Z490-7*	490	445	855
CML96Z500-7*	500	455	875
CML96Z510-7*	510	465	895
CML96Z520-7*	520	475	910
CML96Z530-7*	530	480	920
CML96Z540-7*	540	490	940
CML96Z550-7*	550	500	955
CML96Z560-7*	560	510	975
CML96Z570-7*	570	520	995
CML96Z580-7*	580	525	1000
CML96Z590-7*	590	535	1000
CML96Z600-7*	600	545	1000

**Notes:**

1. 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
CML96Z***-74	$\lambda_c$	973	974	975	nm	Air reference. FBG temperatures is @ 25°C.
CML96Z***-76		975	976	977	nm	

## Product Specification

Parameter		Min.	Typ.	Max.	Units	Condition
Threshold current	$I_{th}$		60	85	mA	
Operating forward voltage	$V_{op}$		1.7	2.0	V	
Spectral width	$\Delta\lambda$		0.2	1.0	nm	RMS at -13dB
Signal to noise ratio	SNR	20			dB	
Temperature dependence of peak wavelength	$\Delta\lambda/T$		0.008	0.01	nm/°C	FBG temperature dependency
Monitor detector responsivity	$R_m$	1	5	10	$\mu A/mW$	
Monitor dark current	$I_{dark}$			50	nA	-5V bias voltage
Fiber power stability >30mW 20 – 30mW 10 – 20mW 5 – 10mW	$\Delta P_{f\_t}$			0.08	dB	Peak-to-peak Time = 60sec DC to 50kHz
				0.08		
				0.10		
				0.15		
Return loss	RL	35			dB	1500nm – 1600nm
Thermistor BETA value	$\beta$	3500		4100	K	
Thermistor resistance	$R_{th}$	9.5	10.0	10.5	k $\Omega$	At submount temperature of 40°C
Heat pump current	$I_{TEC}$			1.3	A	T <sub>case</sub> = 75°C, I <sub>F</sub> = 1100mA
Heat pump voltage	$V_{TEC}$			2.1	V	
Heat pump power	$P_{TEC}$			2.7	W	
Total module power consumption	$P_{Total}$			4.9	W	

### Notes;

1. Conditions unless otherwise stated: Case temperature -20 to 75°C, Monitor diode bias -5V, CW operation

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## 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 0.024kg of water per 1.0kg of dry air
Operating relative humidity	$RH_{op}$	5		85	%	
Pigtail axial pull force				10.0	N	3x10 seconds
Pigtail side pull force				5.0	N	3x10 seconds
Fiber bend radius		13			mm	
Lead soldering temperature				350	°C	10 sec
Laser diode forward current	$I_{f\_max}$			1100	mA	CW
Laser diode current transient				1200	mA	Time = 1000ns max
Laser diode reverse current	$I_r$			10	µA	
Laser diode reverse voltage	$V_r$			2.0	V	
Heat pump current	$I_{TEC}$	-2.2		2.2	A	Thermistor and TEC must be in closed control loop at all times
Heat pump voltage	$V_{TEC}$	-3.0		3.0	V	

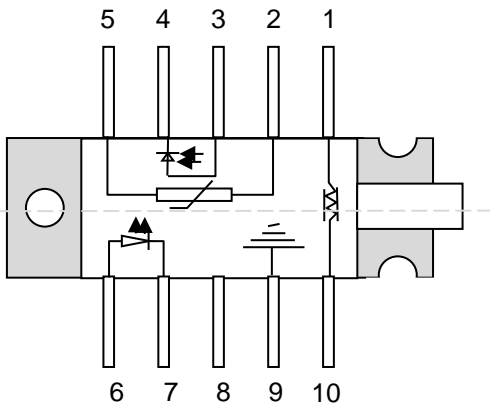
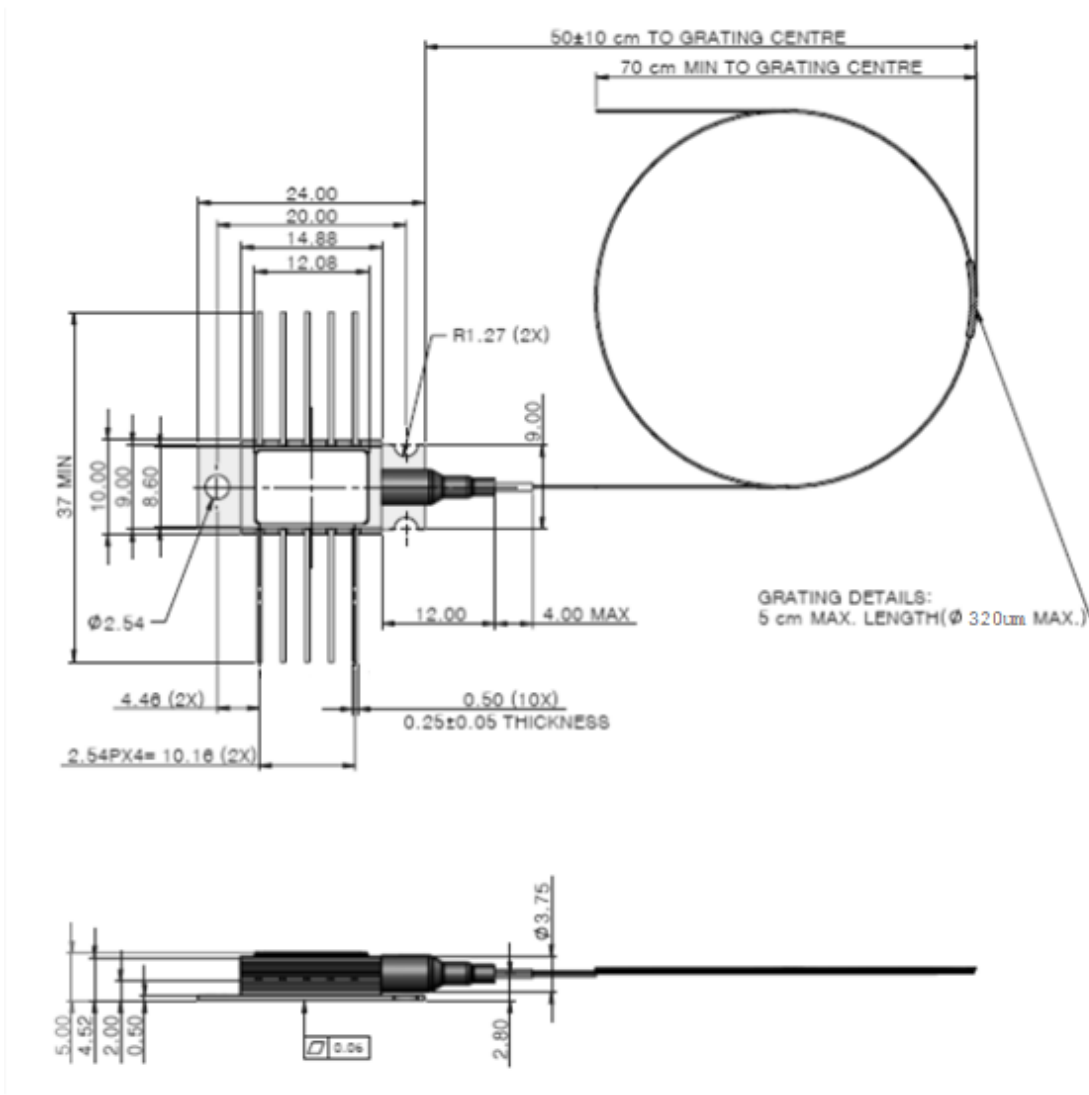
## Fiber Specification

Parameter	Min.	Typ.	Max.	Units	Condition
Fiber type	Corning HI1060 or equivalent				
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	235	245	255	µm	Acrylate material, mechanically strippable
Grating recoat diameter	260	290	320	µm	
Core/cladding concentricity			≤0.3	µm	
Fiber proof test	200			kpsi	
Fiber Bragg Grating proof test	150			kpsi	

1. Fiber termination: bare fiber with rough cleave

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## 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 (-)

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## Ordering Information

<b>CML</b>	<b>96</b>	<b>Z</b>	<b>***</b>	<b>-</b>	<b>7*</b>
Product Type	Chip Type	Product Design	LD Kink Free Power (mW)	-	Wavelength 74 for 974nm 76 for 976nm

**Example: CML96Z200-74 is a 200mW Kink Free Power, 974nm product.**

## Contact Information

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## 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



THIS PRODUCT COMPLIES WITH 21CFR 1040.10



REFERENCE IEC 60825-1 Edition 2.0



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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