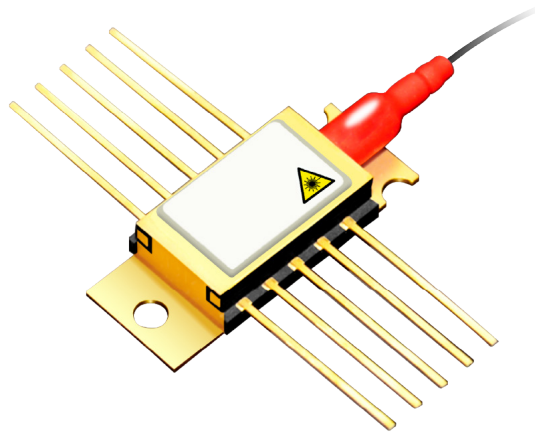


# COOLED 10-PIN 980 nm PUMP LASER MODULE

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

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.



## 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

## COOLED 10-PIN 980 nm PUMP LASER MODULE

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 600 mW.

### 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 -13 dB
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 >30 mW 20 – 30 mW 10 – 20 mW 5 – 10 mW	$\Delta P_{f,t}$			0.08 0.08 0.10 0.15	dB	Peak-to-peak Time = 60 sec DC to 50 kHz
Return Loss	RL	35			dB	1500 nm – 1600 nm
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 -5 V, CW operation

## COOLED 10-PIN 980 nm PUMP LASER MODULE

### 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

# COOLED 10-PIN 980 nm PUMP LASER MODULE

## 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	$I_{f_{max}}$			1100	mA	CW
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	
Heat Pump Current	$I_{TEC}$	-2.4		2.4	A	Thermistor and TEC must be in closed control c at all times
Heat Pump VOLTAGE	$V_{TEC}$	-3.0		3.0	V	

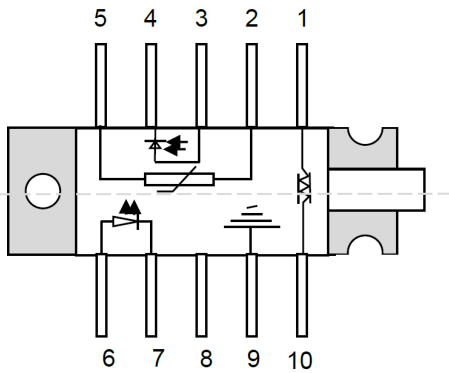
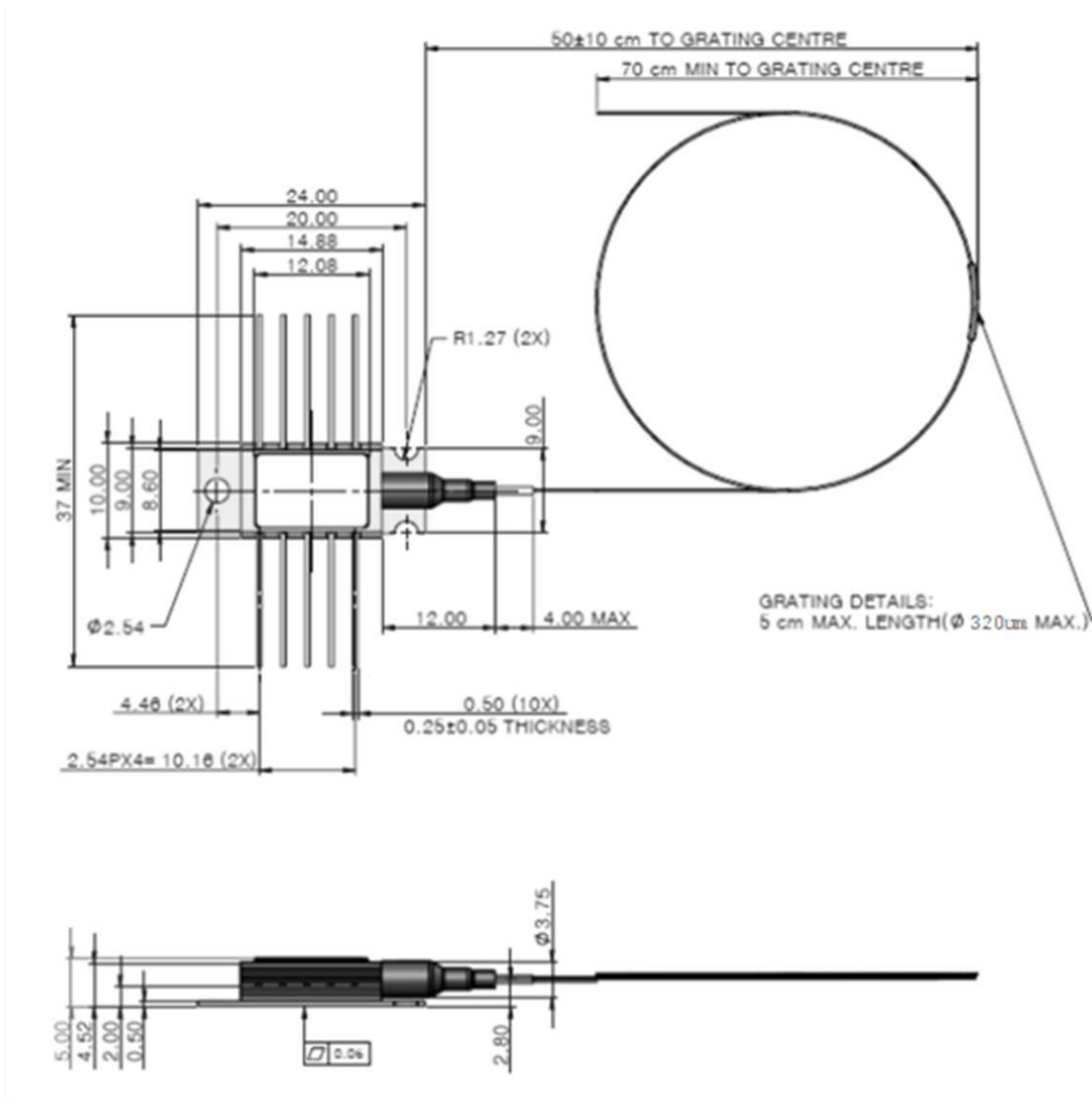
## Fiber Specification

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

# COOLED 10-PIN 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 10-PIN 980 nm PUMP LASER MODULE

## Ordering Information

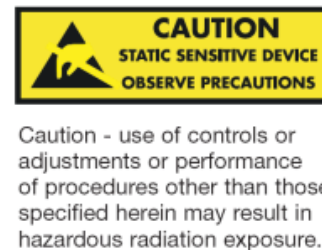
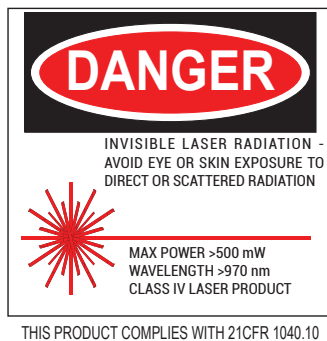
LC	96	Z	***	-	7*
Product Type	Chip Type	Product Design	LD Kink Free Power (mW)	-	Wavelength 74 for 974 nm 76 for 976 nm

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



## 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.