


Cooled Mini-DIL 980nm Pump Laser Module

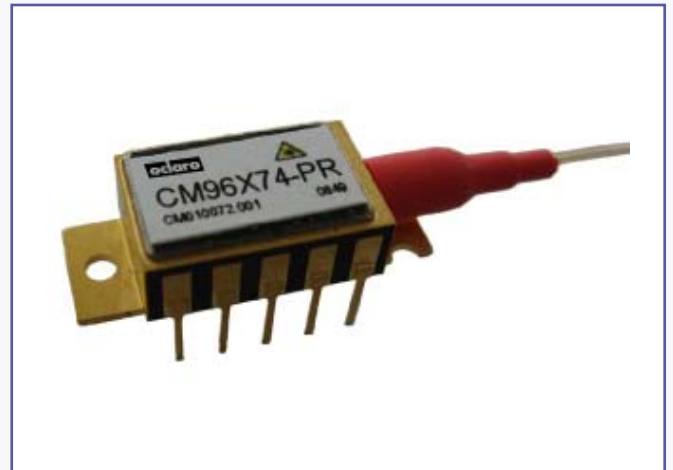
CM96

Features:

- High fiber output power, up to 600mW
- Fiber Bragg grating stabilization for wavelength locking over the entire operating conditions
- Small form factor (mini-DIL) package
- Internal thermoelectric cooler for submount temperature control
- Internal monitor photodiode
- Telcordia GR-468-CORE compliant
- Field-proven high reliability chip
- Low power consumption
- RoHS compliant 

Applications:

- Low noise EDFA
- Dense wavelength division multiplexing EDFA
- CATV



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 grating is located in the pigtail to stabilize the wavelength. Oclaro laser diode chips incorporate E2 front mirror passivation that prevents Catastrophic Optical Damage (COD) to the laser diode facet. Processes and techniques of coupling the fiber to the laser chip allow high output powers that are very stable with both time and temperature.

Devices are available with fiber output power up to 600mW.

Operating Characteristics

Conditions unless otherwise stated:

Case temperature -20 to 75°C
 Submount temperature 25°C
 Monitor diode bias -5V
 CW operation

Kink-free Power	Operating Power	974nm Code	976nm Code	Kink-free Power	Operating Power	974nm Code	976nm Code
400mW	360mW	CM96A74-PR	CM96A76-PR	500mW	450mW	CM96L74-PR	CM96L76-PR
410mW	370mW	CM96B74-PR	CM96B76-PR	510mW	460mW	CM96M74-PR	CM96M76-PR
420mW	380mW	CM96C74-PR	CM96C76-PR	520mW	470mW	CM96N74-PR	CM96N76-PR
430mW	390mW	CM96D74-PR	CM96D76-PR	530mW	480mW	CM96P74-PR	CM96P76-PR
440mW	400mW	CM96E74-PR	CM96E76-PR	540mW	490mW	CM96R74-PR	CM96R76-PR
450mW	405mW	CM96F74-PR	CM96F76-PR	550mW	495mW	CM96S74-PR	CM96S76-PR
460mW	415mW	CM96G74-PR	CM96G76-PR	560mW	505mW	CM96T74-PR	CM96T76-PR
470mW	425mW	CM96H74-PR	CM96H76-PR	570mW	515mW	CM96U74-PR	CM96U76-PR
480mW	435mW	CM96J74-PR	CM96J76-PR	580mW	520mW	CM96V74-PR	CM96V76-PR
490mW	440mW	CM96K74-PR	CM96K76-PR	590mW	530mW	CM96W74-PR	CM96W76-PR
				600mW	540mW	CM96X74-PR	CM96X76-PR

Operating powers shown above with 10% margin applied: Operating power = 0.9 x kink-free power

Parameter	Symbol	Measurement Conditions	Min	Typ	Max	Unit
Threshold current	I_{th}	Thermistor @ 10kΩ		40	55	mA
Operating current	I_{op}	360mW		560	620	mA
		370mW		575	635	
		380mW		590	655	
		390mW		600	670	
		400mW		615	685	
		405mW		625	695	
		415mW		640	710	
		425mW		655	725	
		435mW		670	745	
		440mW		680	755	
		450mW		690	770	
		460mW		705	785	
		470mW		720	800	
		480mW		735	820	
		490mW		750	835	
		495mW		755	840	
Operating forward voltage	V_{op}			1.8	2.0	V
Center wavelength	λ_c	974nm series 976nm series	973 975	974 976	975 977	nm
Spectral width at -13dB	$\Delta\lambda$			0.2	1.0	nm

Parameter	Symbol	Measurement Conditions	Min	Typ	Max	Unit
Signal to noise ratio	SNR		20			dB
Temperature dependence of peak wavelength	$d\lambda/dT$			0.02		nm/°C
Monitor diode responsivity	R_{mon}		1		10	$\mu A/mA$
Photodiode dark current	I_{dark}	-5V bias			50	nA
Fiber power stability 10 - 20mW 20 - 30mW >30mW		Peak-to-peak Time = 60sec DC to 50kHz			0.50 0.25 0.15	dB
Thermistor BETA value		$\pm 1\%$	3539	3575	3611	K
Thermistor resistance	R_{th}	At T_{case} set to 25°C	9.5	10.0	10.5	k Ω
Heat pump current	I_{tec}	$T_{case} = 75^\circ C, I_f = 1000mA$		1.4	1.5	A
Heat pump voltage	V_{tec}	$T_{case} = 75^\circ C, I_f = 1000mA$		2.7	3.0	V

Absolute Maximum Ratings

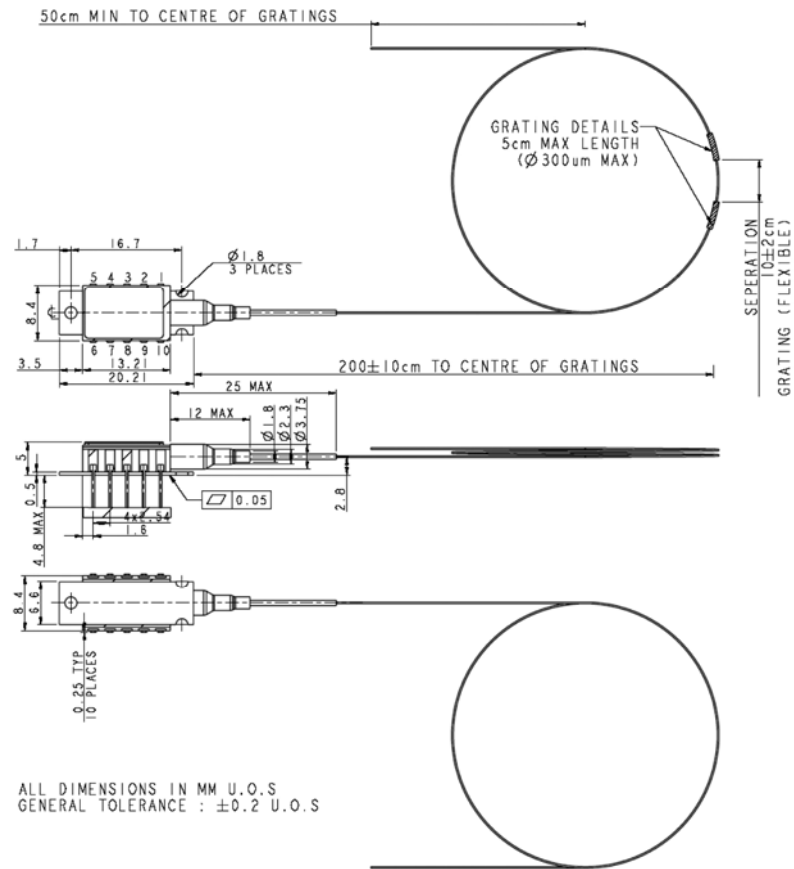
Parameter	Symbol	Measurement Conditions	Min	Max	Unit
Operating case temperature	T_{op}		-20	75	°C
Storage temperature	T_{stg}		-40	85	°C
Storage relative humidity	RH_{stg}	But not to exceed 0.024kg of water per 1.0kg of dry air		85	%RH
Operating relative humidity	RH_{op}		5	80	%RH
Pigtail axial pull force		3x10 seconds		10.0	N
Pigtail side pull force		3x10 seconds		5.0	N
Fiber bend radius			20		mm
Lead soldering temperature		10 sec		350	°C
Laser diode forward current	I_{fmax}	CW		1200	mA
Laser diode reverse Current	I_{rmax}	Reverse voltage <2V		10	μA
Laser diode current transient		$t = 1000ns$ max.		1400	mA
Laser diode reverse voltage	V_{revLD}			2	V

Fiber Specification

Parameter	Note	Min	Typ	Max	Unit
Fiber type	Nuferm PM980-HP				
Fiber termination	Bare fiber, rough cleave				
Operating wavelength			980		nm
Mode field diameter	@ 980nm	5.6	6.6	7.6	μm
Beat length	@ 980nm		3.3		mm
Cladding diameter		124	125	126	μm
Fiber coating diameter	Acrylate material, mechanically strippable	230	245	260	μm
Grating recoat diameter		260	280	300	μm
Core-Clad concentricity				<0.5	μm
Coating/Clad offset				<5	μm
Fiber proof test		150			kpsi

Package Outline Drawing

Pin	Function
1	Not connected
2	TEC +
3	Thermistor
4	Thermistor
5	Monitor photodiode cathode
6	Monitor photodiode anode
7	Laser cathode
8	Laser anode
9	TEC -
10	Not connected



RoHS Compliance



Oclaro 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.

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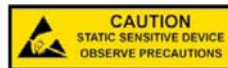
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Ordering Information

Kink-free Power	Operating power	Product Code
400mW	360mW	CM96Axx-PR
410mW	370mW	CM96Bxx-PR
420mW	380mW	CM96Cxx-PR
430mW	390mW	CM96Dxx-PR
440mW	400mW	CM96Exx-PR
450mW	405mW	CM96Fxx-PR
460mW	415mW	CM96Gxx-PR
470mW	425mW	CM96Hxx-PR
480mW	435mW	CM96Jxx-PR
490mW	440mW	CM96Kxx-PR
500mW	450mW	CM96Lxx-PR
510mW	460mW	CM96Mxx-PR
520mW	470mW	CM96Nxx-PR
530mW	480mW	CM96Pxx-PR
540mW	490mW	CM96Rxx-PR
550mW	495mW	CM96Sxx-PR
560mW	505mW	CM96Txx-PR
570mW	515mW	CM96Uxx-PR
580mW	520mW	CM96Vxx-PR
590mW	530mW	CM96Wxx-PR
600mW	540mW	CM96Xxx-PR

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