

LC96Z***-7*

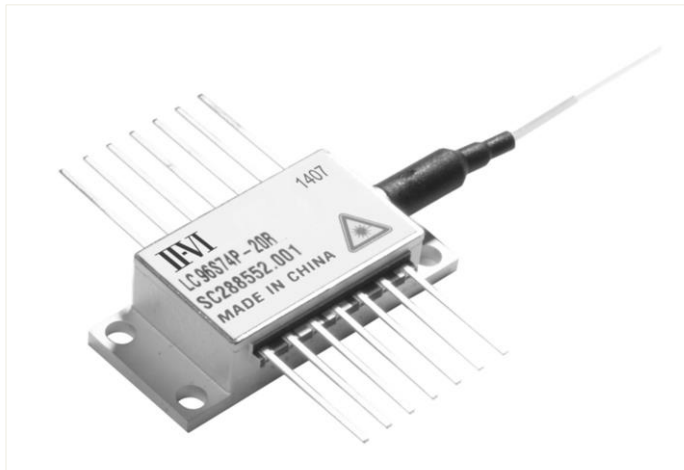
Cooled 14pin butterfly 980nm Pump Laser Module

Features

- High output power, up to 600mW kink free
- Single-mode fiber pigtail
- Fiber Bragg grating stabilization for wavelength locking over the entire operating conditions
- Hermetically sealed 14 pin butterfly 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 LC96Z***-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.

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

LC96Z***-7*

Optical Characteristics

Product Code	Minimum Kink-Free Power Pkink (mW)	Maximum Operating Power Pop (mW)	Maximum Operating Current Iop (mA)
LC96Z200-7*	200	180	375
LC96Z210-7*	210	190	395
LC96Z220-7*	220	200	410
LC96Z230-7*	230	210	430
LC96Z240-7*	240	220	450
LC96Z250-7*	250	225	460
LC96Z260-7*	260	235	475
LC96Z270-7*	270	245	495
LC96Z280-7*	280	255	510
LC96Z290-7*	290	265	530
LC96Z300-7*	300	275	545
LC96Z310-7*	310	280	555
LC96Z320-7*	320	290	575
LC96Z330-7*	330	300	595
LC96Z340-7*	340	310	610
LC96Z350-7*	350	320	630
LC96Z360-7*	360	325	640
LC96Z370-7*	370	335	655
LC96Z380-7*	380	345	675
LC96Z390-7*	390	355	695
LC96Z400-7*	400	365	710
LC96Z410-7*	410	375	730
LC96Z420-7*	420	380	740
LC96Z430-7*	430	390	755
LC96Z440-7*	440	400	775
LC96Z450-7*	450	410	795
LC96Z460-7*	460	420	810
LC96Z470-7*	470	425	820
LC96Z480-7*	480	435	840
LC96Z490-7*	490	445	855
LC96Z500-7*	500	455	875
LC96Z510-7*	510	465	895
LC96Z520-7*	520	475	910
LC96Z530-7*	530	480	920
LC96Z540-7*	540	490	940
LC96Z550-7*	550	500	955
LC96Z560-7*	560	510	975
LC96Z570-7*	570	520	995
LC96Z580-7*	580	525	1000
LC96Z590-7*	590	535	1000
LC96Z600-7*	600	545	1000

Notes:

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

LC96Z***-7*

Wavelength Specification

Product Code		Min.	Typ.	Max.	Units	Condition
LC96Z***-74	λ_c	973	974	975	nm	Air reference. FBG temperatures is @ 25°C.
LC96Z***-76		975	976	977	nm	

Product Specification

Parameter		Min.	Typ.	Max.	Units	Condition
Threshold current	I_{th}		50	70	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	ΔP_{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	β	3500		4100	K	
Thermistor resistance	R_{th}	9.5	10.0	10.5	k Ω	At submount temperature of 25°C
Heat pump current	I_{TEC}			2.0	A	T _{case} = 75°C, IF= 1100mA
Heat pump voltage	V_{TEC}			3.0	V	
Heat pump power	P_{TEC}			6.0	W	
Total module power consumption	P_{Total}			8.2	W	

Notes;

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

LC96Z***-7*

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				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	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}	-2.4		2.4	A	Thermistor and TEC must be in closed control loop at all times

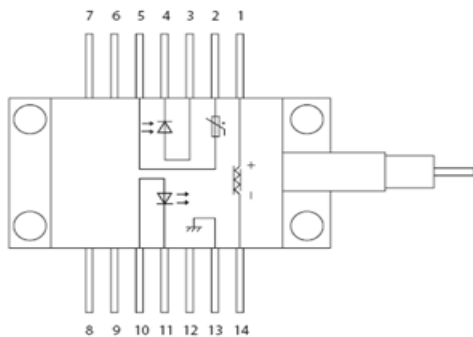
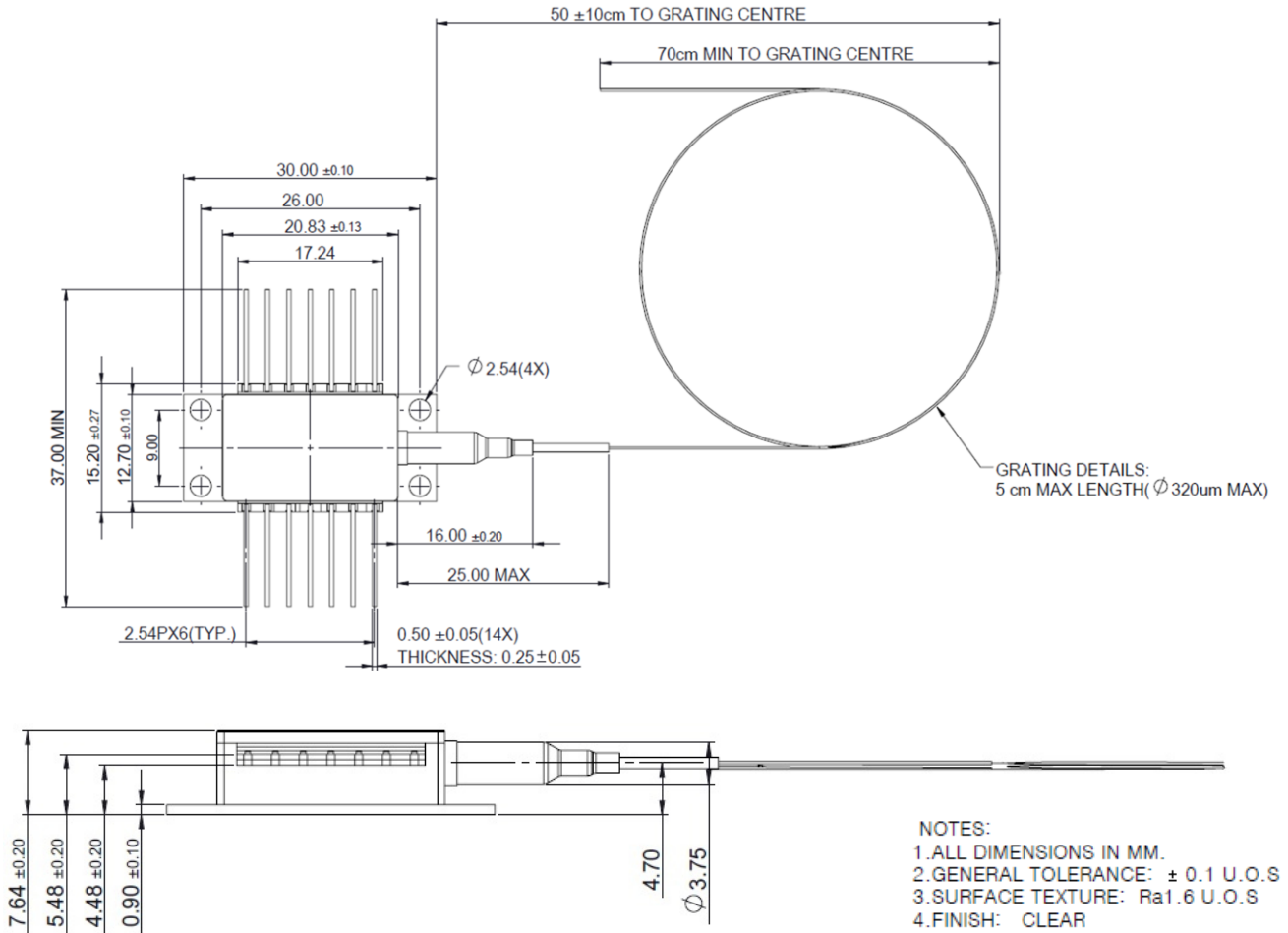
Fiber Specification

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

LC96Z***-7*

Module Outline Drawing and Pin Connections



Pin	Description	Pin	Description
1	Peltier cooler (+)	8	Not connected
2	Thermistor	9	Not connected
3	Monitor anode (-)	10	Laser anode (+)
4	Monitor cathode (+)	11	Laser cathode (-)
5	Thermistor	12	Not connected
6	Not connected	13	Case ground
7	Not connected	14	Peltier cooler (-)

LC96Z***-7*

Ordering Information

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

Example: LC96Z200-74 is a 200mW Kink Free Power, 974nm product.

LC96Z***-7*

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 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 II-VI photonics before they become applicable to any particular order or contract. In accordance with the II-VI Photonics policy of continuous improvement specifications may change without notice. Further details are available from any II-VI photonics sales representative.

LCL96Z***-7*

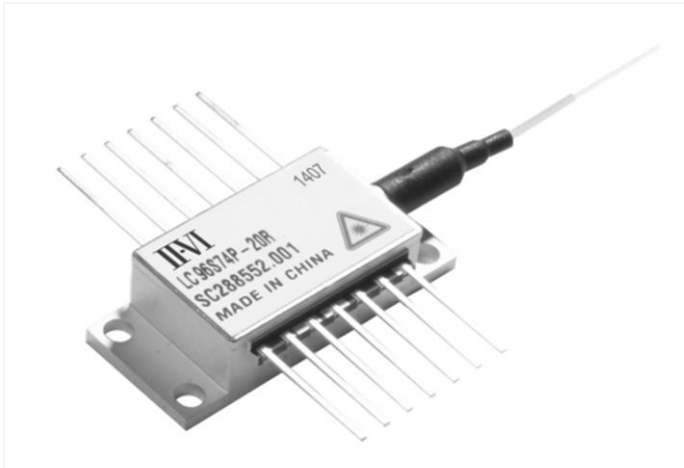
Low Power Consumption Cooled 14pin butterfly 980nm Pump Laser Module

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
- Hermetically sealed 14 pin butterfly 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 LCL96Z* series pump modules operate at significantly reduced TEC and overall power consumption.

The pump series 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.

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

LCL96Z***-7*

Optical Characteristics

Product Code	Minimum Kink-Free Power Pkink (mW)	Maximum Operating Power Pop (mW)	Maximum Operating Current Iop (mA)
LCL96Z200-7*	200	180	375
LCL96Z210-7*	210	190	395
LCL96Z220-7*	220	200	410
LCL96Z230-7*	230	210	430
LCL96Z240-7*	240	220	450
LCL96Z250-7*	250	225	460
LCL96Z260-7*	260	235	475
LCL96Z270-7*	270	245	495
LCL96Z280-7*	280	255	510
LCL96Z290-7*	290	265	530
LCL96Z300-7*	300	275	545
LCL96Z310-7*	310	280	555
LCL96Z320-7*	320	290	575
LCL96Z330-7*	330	300	595
LCL96Z340-7*	340	310	610
LCL96Z350-7*	350	320	630
LCL96Z360-7*	360	325	640
LCL96Z370-7*	370	335	655
LCL96Z380-7*	380	345	675
LCL96Z390-7*	390	355	695
LCL96Z400-7*	400	365	710
LCL96Z410-7*	410	375	730
LCL96Z420-7*	420	380	740
LCL96Z430-7*	430	390	755
LCL96Z440-7*	440	400	775
LCL96Z450-7*	450	410	795
LCL96Z460-7*	460	420	810
LCL96Z470-7*	470	425	820
LCL96Z480-7*	480	435	840
LCL96Z490-7*	490	445	855
LCL96Z500-7*	500	455	875
LCL96Z510-7*	510	465	895
LCL96Z520-7*	520	475	910
LCL96Z530-7*	530	480	920
LCL96Z540-7*	540	490	940
LCL96Z550-7*	550	500	955
LCL96Z560-7*	560	510	975
LCL96Z570-7*	570	520	995
LCL96Z580-7*	580	525	1000
LCL96Z590-7*	590	535	1000
LCL96Z600-7*	600	545	1000

Notes:

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

LCL96Z***-7*

Wavelength Specification

Product Code		Min.	Typ.	Max.	Units	Condition
LCL96Z***-74	λ_c	973	974	975	nm	Air reference. FBG temperatures is @ 25°C.
LCL96Z***-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	ΔP_{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	β	3500		4100	K	
Thermistor resistance	R_{th}	9.5	10.0	10.5	k Ω	At submount temperature of 40°C
Heat pump current	I_{TEC}			1.3	A	T _{case} = 75°C, IF= 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

LCL96Z***-7*

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				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	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}	-2.4		2.4	A	Thermistor and TEC must be in closed control loop at all times

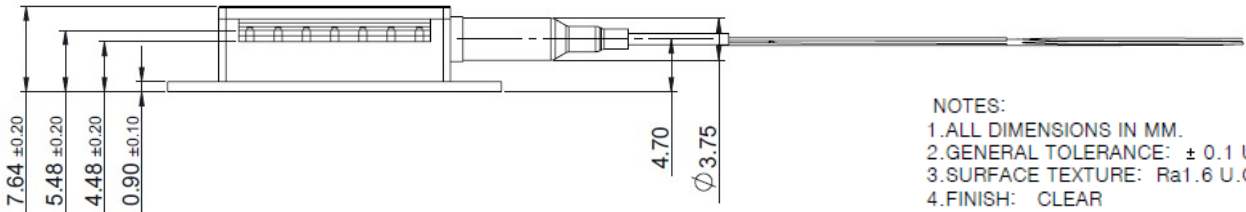
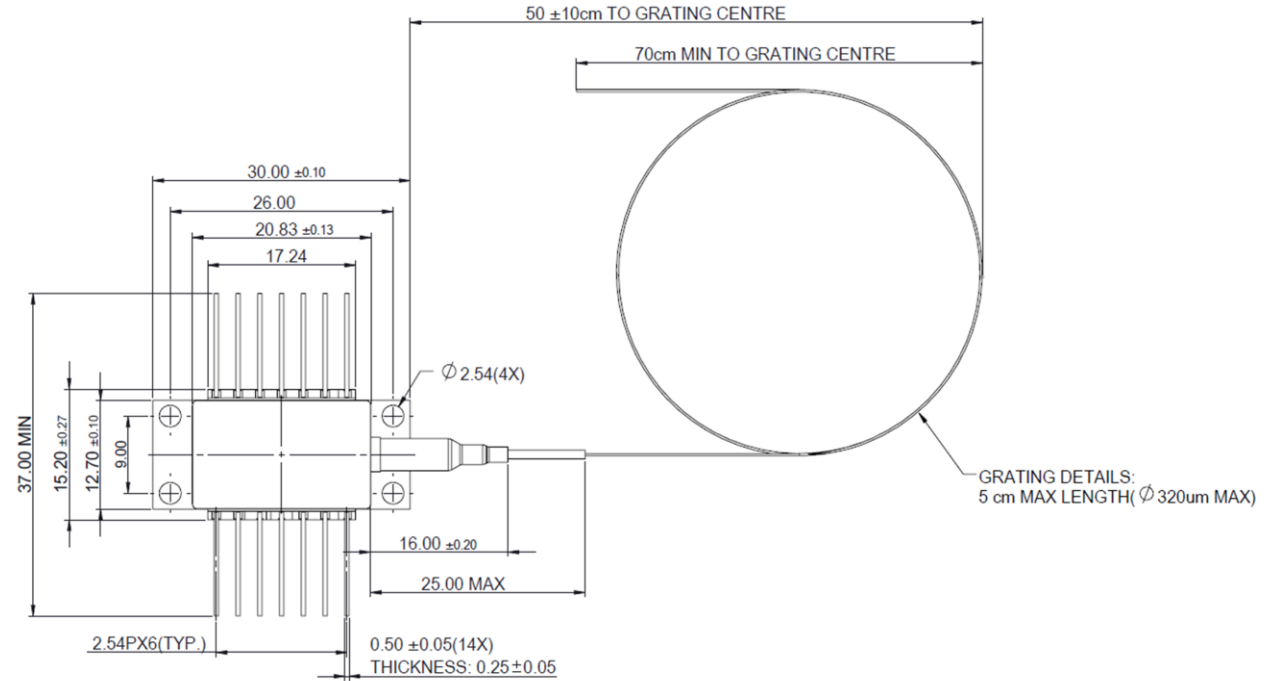
Fiber Specification

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	

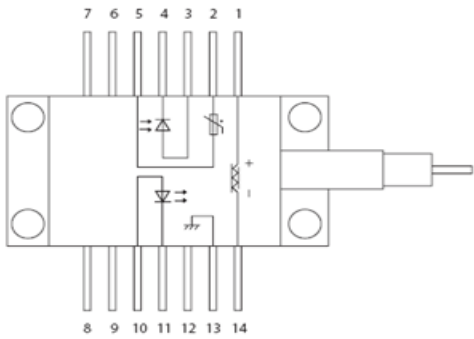
1. Fiber termination: bare fiber with rough cleave

LCL96Z***-7*

Module Outline Drawing and Pin Connections



- NOTES:
 1. ALL DIMENSIONS IN MM.
 2. GENERAL TOLERANCE: ± 0.1 U.O.S
 3. SURFACE TEXTURE: Ra1.6 U.O.S
 4. FINISH: CLEAR



Pin	Description	Pin	Description
1	Peltier cooler (+)	8	Not connected
2	Thermistor	9	Not connected
3	Monitor anode (-)	10	Laser anode (+)
4	Monitor cathode (+)	11	Laser cathode (-)
5	Thermistor	12	Not connected
6	Not connected	13	Case ground
7	Not connected	14	Peltier cooler (-)

LCL96Z***-7*

Ordering Information

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

Example: LCL96Z200-74 is a 200mW Kink Free Power, 974nm product.

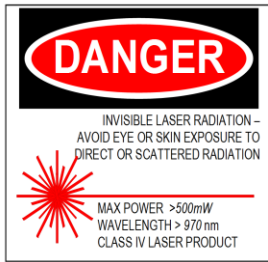
LCL96Z***-7*

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 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 II-VI photonics before they become applicable to any particular order or contract. In accordance with the II-VI Photonics policy of continuous improvement specifications may change without notice. Further details are available from any II-VI photonics sales representative.