LUMENTUM

40 W/60 W Fiber-Coupled Uncooled Multimode Pump Laser Module

49M Series

Lumentum's 49M Series diode lasers offer 40 W/60 W of power through a 105µm fiber. The 49M is a new platform that leverages the well-established and reliable designs of Lumentum's ST Series fiber-coupled diode lasers and the 4900 Series pump lasers.

The 49M multimode pump modules offer high brightness, a compact footprint, and simplified thermal management through the distribution of diodes (heat sources). This allows for the implementation of air- or water-cooled architectures with predictably high reliability. The 49M provides an ideal solution for the vacuum/space EDFA pumping market, offering all the necessary technical attributes within a single platform.

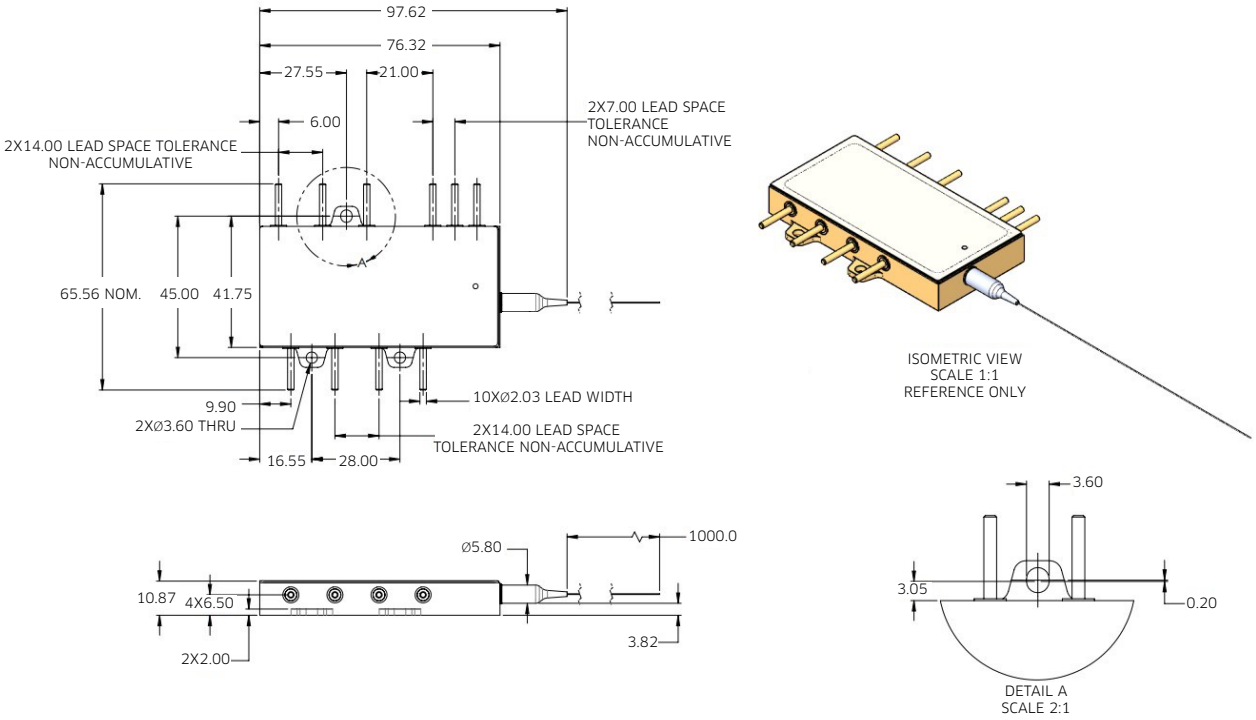
Key Features

- 40 W/60 W output power
- High reliability
- 105 µm aperture
- 0.22 NA
- Isolated electrical contacts

Applications

- EDFA pumping

Dimensions Diagram

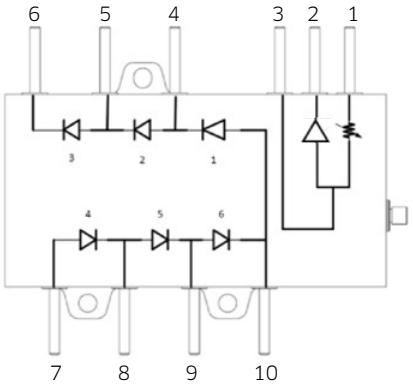


6E Pin assignment

CASE 1: ALL LASER DIODES FUNCTIONING			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	CATHODE (-) OF THERMISTOR	6	LASER DIODE CATHODE (-)
2	CATHODE (-) OF MPD	7	LASER DIODE ANODE (-)
3	ANODE (+) OF THERMISTOR AND MPD	8	OPEN
4	OPEN	9	OPEN
5	OPEN	10	OPEN

CASE 2: INDIVIDUAL LASER DIODES TESTING			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	CATHODE (-) OF THERMISTOR	6	LASER DIODE CATHODE (-)
2	CATHODE (-) OF MPD	7	LASER DIODE ANODE (-)
3	ANODE (+) OF THERMISTOR AND MPD	8	LD4 CATHODE (-), LD5 ANODE (+)
4	LD1 CATHODE (-), LD2 ANODE (+)	9	LD5 CATHODE (-), LD6 ANODE (+)
5	LD2 CATHODE (-), LD3 ANODE (+)	10	LD6 CATHODE (-), LD1 ANODE (+)

6E PIN CONFIGURATION

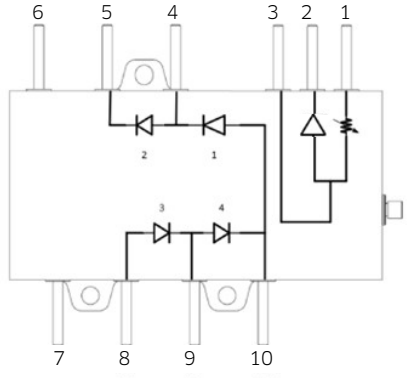


4E Pin assignment

CASE 1: ALL LASER DIODES FUNCTIONING			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	CATHODE (-) OF THERMISTOR	6	OPEN
2	CATHODE (-) OF MPD	7	OPEN
3	ANODE (+) OF THERMISTOR AND MPD	8	LASER DIODE ANODE (+)
4	OPEN	9	OPEN
5	LASER DIODE CATHODE (-)	10	OPEN

CASE 2: INDIVIDUAL LASER DIODES TESTING			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	CATHODE (-) OF THERMISTOR	6	OPEN
2	CATHODE (-) OF MPD	7	OPEN
3	ANODE (+) OF THERMISTOR AND MPD	8	LASER DIODE 3 ANODE (+)
4	LD1 CATHODE (-), LD2 ANODE (+)	9	LD3 CATHODE (-), LD4 ANODE (+)
5	LASER DIODE 2 CATHODE (-)	10	LD4 CATHODE (-), LD1 ANODE (+)

4E PIN CONFIGURATION



Operating Parameters (data under collecting, preliminary)

CW output power (fiber), Pop	Parameter	Symbol	Minimum	Typical	Maximum
40 W (4E)	Operating current (BOL) 25°C	Iop	–	11.5 A	12.9 A
	Operating current (EOL) 25°C	Iop		12.8 A	14.5 A
	Operating current (BOL) 75°C, 33 W	Iop		13.5 A	16.5 A
	Forward voltage (BOL) 25°C	Vf	–	7.3 V	8.0 V
60 W (6E)	Operating current (BOL) 25°C	Iop	–	11.5 A	12.9 A
	Operating current (EOL) 25°C	Iop		12.8 A	14.5 A
	Operating current (BOL) 75°C, 50 W	Iop		13.5 A	16.5 A
	Forward voltage (BOL) 25°C	Vf	–	10.4 V	11.5 V

Specifications[1]

Parameter	Symbol	Minimum	Typical	Maximum
Laser Characteristics				
Mean wavelength, 25°C [2]	λp	929 nm	938 nm	951 nm
Threshold current 25°C	Ith	–	700 mA	950 mA
Series resistance	Rs	–	0.04 Ω	–
Monitor diode response at -5V, Po	IBF		75 µA/W	175 µA/W
Thermistor resistance, 25°C	Rth	9.5 kΩ	10.0 kΩ	10.5 kΩ
Thermistor constant	B	3700 K		4100 K
Recommended case temperature	Tc	-5°C	25°C	75°C
Wavelength tuning vs. temperature[3]	Δλ/ΔT	–	0.35 nm/°C	0.5 nm/°C
Wavelength tuning vs. current	Δλ/ΔIop	–	0.6 nm/A	0.7 nm/A
Back reflection isolation 1060-1100 nm		-30 dB		
Back reflection isolation 1030-1150 nm		-25 dB		
NA for 90% power	NA		0.13	0.17
Hermeticity - He Leak Rate, atm-cc/s				2.7 x 10-8
Fiber Characteristics [4]				
Fiber core diameter	dc	105 µm	106.5 µm	108 µm
Fiber numerical aperture	NA	0.20	0.22	0.24
Fiber cladding	dcl	124 µm	125 µm	126 µm
Fiber buffer	db	230 µm	245 µm	260 µm
Fiber length	lf	0.9 m	1.0 m	–

1. All performance data measured at Pop, 25°C, Beginning of Life (BOL).

2. Weighted average "center of mass" spectral point at 25°C at PO

3. Change in Δ λ mean with case temperature over Top

4. Nufern FUD-4130 (Revision A, MM-S106.5/125-22A-HTA) or equivalent

Absolute Maximum Ratings

Parameter	Symbol	Minimum	Typical	Maximum
Operating current	Iop			17 A
Monitor reverse voltage	Vpd			20 V
Monitor forward current	Ipf			10 mA
Case operating temperature[5]	Top	-10°C	–	80°C
Storage temperature[6]	Tstg	-40°C	–	85°C
Lead soldering temperature, 10 s max	Tls	–	–	300°C
Relative humidity, non-condensing, ambient < 45°C	RH	–	–	85%
Electrostatic discharge (ESD)[7]	Vesd	–	–	500 V
Fiber bend radius (long term deployment)[8]		30 mm		–
Fiber axial pull force, 15 s		–	–	5 N
Fiber side pull force, 15 s		–	–	2.5 N

5. Non-condensing, maximum

6. Non-condensing, 2000 hours

7. C = 100pF, R = 1.5kΩ, human body model, shown to be not damaging to its LI characteristics or its reliability, I-V curves may change in this ESD environment

8. Minimum bend radius of 30mm is for long term mechanical fiber reliability.

Fiber Pigtail Properties

Wavelength range (nm)	Isolation (dB)	Reflectivity (%)
1060-1100	>30	>99.9%
1040-1150	>25	>99.7%

Ordering Information

For more information on this or other products and their availability, please contact your local Lumentum account manager or Lumentum directly at customer.service@lumentum.com.

Product Code	Description
49M-3840-40000-BI-4E	929 to 951 nm, 40 W
49M-3840-60000-BI-6E	929 to 951 nm, 60 W

User Safety

Safety and Operating Considerations

The laser light emitted from this laser diode is invisible and may be harmful to the human eye. Avoid looking directly into the laser diode or into the collimated beam along its optical axis when the device is in operation.

CAUTION: THE USE OF OPTICAL INSTRUMENTS WITH THIS PRODUCT WILL INCREASE EYE HAZARD.

Operating the laser diode outside of its maximum ratings may cause device failure or a safety hazard. Power supplies used with the component must be employed such that the maximum peak optical power cannot be exceeded. CW laser diodes may be damaged by excessive drive current or switching transients.

When power supplies are used, the laser diode should be connected with the main power on and the output voltage at zero. The current should be increased slowly while the laser diode output power and the drive current are monitored.

Device degradation accelerates with increased temperature, and therefore careful attention to minimizing the case temperature is advised. For example, life expectancy will decrease by a factor of four if the case is operated at 50°C rather than 30°C.

A proper heatsink for the laser diode on a thermal radiator will greatly enhance laser life. Firmly mount the laser on a radiator with a thermal impedance of less than 0.5°C/W for increased reliability.

ESD PROTECTION - Electrostatic discharge is the primary cause of unexpected laser diode failure. Take extreme precaution to prevent ESD. Use wrist straps, grounded work surfaces, and rigorous antistatic techniques when handling laser diodes.

Labeling

Note: This component requires provisions of drive and control electronics before emitting laser radiation.

Laser classification depends on the system control circuit and laser safety features provided.

This diode-pumped laser module is not 21CFR 1040.10 or IEC 60825- 1:2014 certified. It is a component intended for system integration. Compliance with 21CFR 1040.10 and/or IEC 60825-1:2014 will need to be determined at the system level.

Output Power Danger

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North America
Toll Free: 844 810 LITE (5483)

Outside North America
Toll Free: 800 000 LITE (5483)

China
Toll Free: 400 120 LITE (5483)