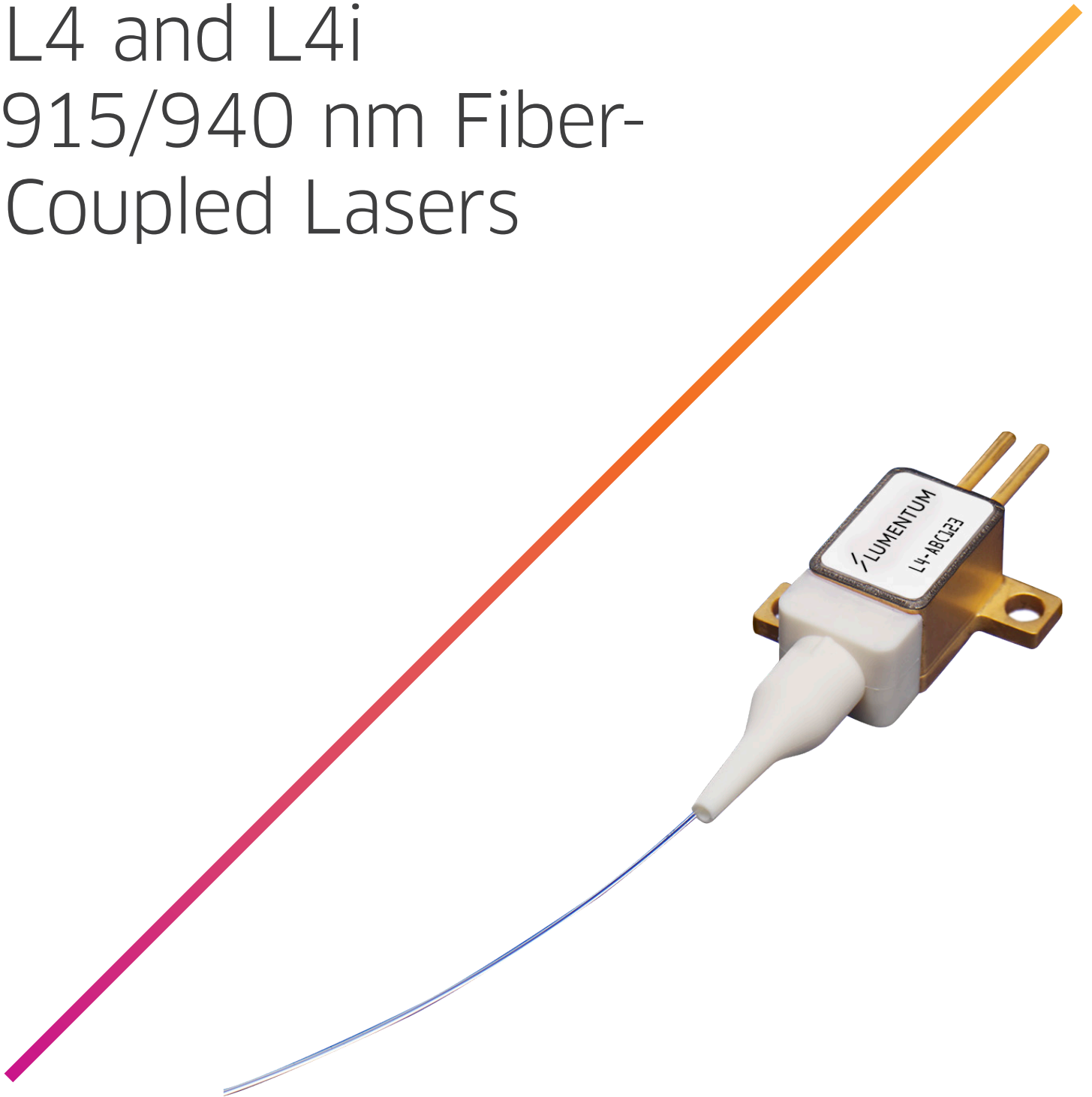


L4 and L4i 915/940 nm Fiber- Coupled Lasers



Lumentum L4-series diode lasers offer up to 10 W of power from a 105 μm fiber. The L4 is a revolutionary platform based on a long history of existing fiber-coupled L2 and L3 packages, incorporating a highly reliable design into a scalable commercial product.

L4 multimode pump modules offer high brightness, a small footprint, and simplified thermal management by distributing the diodes (heat sources), allowing the use of either air- or water-cooled architectures with predictable high reliability.

Lumentum leverages existing manufacturing facilities around the world to offer a cost-effective solution with all the necessary and ideal attributes for the laser pump market.

Key Features

- 10 W output power
- High reliability
- 105 μm aperture
- 0.22 or 0.15 NA
- Isolated electrical contacts
- L4i full-fiber feedback protection

Applications

- Fiber laser pumping
- Material processing
- Graphic arts
- Medical
- Remote power generation
- Pyrotechnic ignition

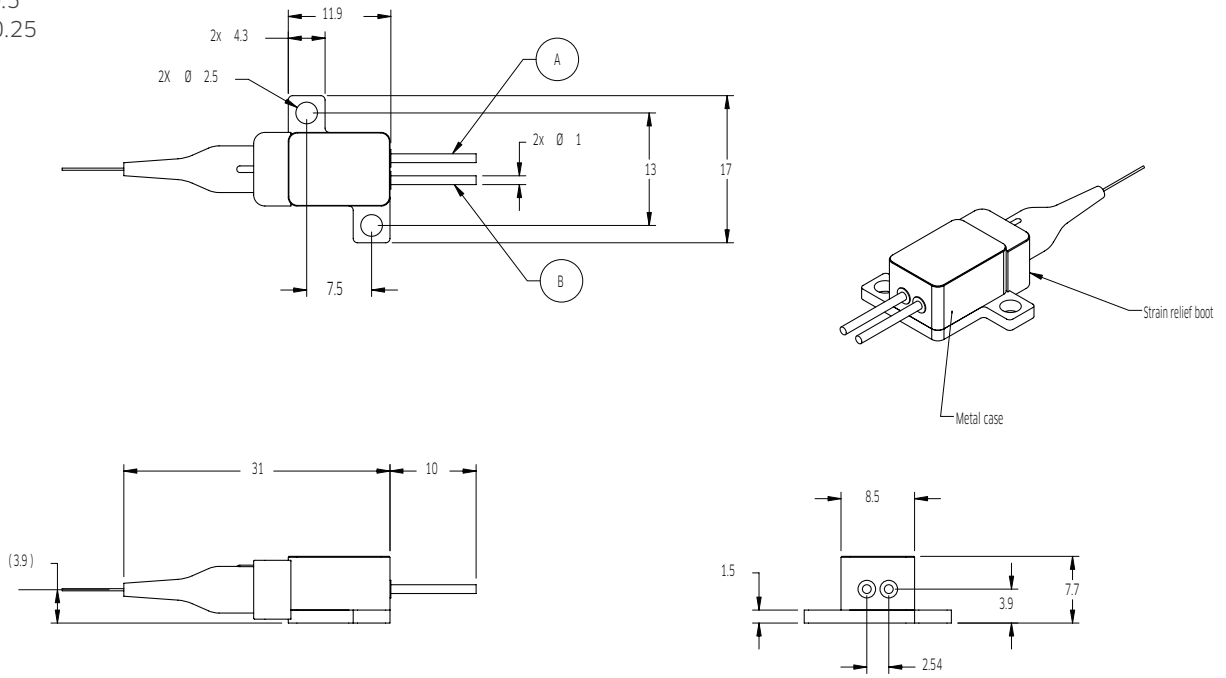
Dimensions Diagram

(Specifications in mm unless otherwise noted.)

Standard tolerances

mm: x.x = ±0.5

x.xx = ±0.25



Pinout

Pin	Description
A	Laser cathode (-)
B	Laser anode (+)

Specifications for 0.22NA¹

Parameter	Symbol	Minimum	Typical	Maximum
Laser Characteristics				
CW output power	P_o	—	—	10 W
Mean wavelength ²	λ_p 915 nm λ_p 940 nm λ_p 975 nm	905 nm 928 nm 963 nm	917 nm 939 nm 974 nm	928 nm 950 nm 985 nm
Spectral width (FWHM)	$\Delta\lambda$	—	3 nm	6 nm
Slope efficiency	η_D 915 nm η_D 940 nm η_D 975 nm	— — —	0.93 W/A 0.92 W/A 0.90 W/A	— — —
Conversion efficiency	η	—	48%	—
Threshold current	I_{th}	—	700 mA	950 mA
Operating current (BOL)	I_{op} 915 nm I_{op} 940 nm I_{op} 975 nm	— — —	11.4 A 11.7 A 11.8 A	12.5 A 12.8 A 13.0 A
Forward voltage	V_f	—	1.89 V	2.2 V
Series resistance	R_s	—	0.04 Ω	—
Recommended case temperature	T_c	20°C	25°C	40°C
Wavelength tuning vs. temperature ³	$\Delta\lambda / \Delta T$	—	0.35 nm/°C	—
Wavelength tuning vs. output power	$\Delta\lambda / \Delta P$	—	1.0 nm/W	—
Fiber Characteristics				
Fiber core diameter	d_c	—	105 μm	—
Fiber numerical aperture	NA	0.20	0.22	0.24
Fiber cladding	d_{cl}	—	125 μm	—
Fiber buffer	d_b	—	250 μm	—
Fiber length	l_f	0.9 m	1 m	—

1. All performance data measured at 10 W, 25°C, beginning of life (BOL).

2. Weighted average “center of mass” spectral point at 25°C at P_o .

3. Change in $\Delta\lambda$ mean with case temperature over T_{op} .

Specifications for 0.15 NA¹

Parameter	Symbol	Minimum	Typical	Maximum
Laser Characteristics				
CW output power	P_o	—	—	10 W
Mean wavelength ²	λ_p 915 nm λ_p 940 nm λ_p 975 nm	905 nm 928 nm 963 nm	917 nm 939 nm 974 nm	928 nm 950 nm 985 nm
Spectral width (FWHM)	$\Delta\lambda$	—	3 nm	6 nm
Slope efficiency	η_D 915 nm η_D 940 nm η_D 975 nm	— — —	0.91 W/A 0.90 W/A 0.90 W/A	— — —
Conversion efficiency	η	—	48%	—
Threshold current	I_{th}	—	700 mA	950 mA
Operating current (BOL)	I_{op} 915 nm I_{op} 940 nm I_{op} 975 nm	— — —	12.0 A 12.2 A 12.3 A	13.0 A 13.5 A 13.5 A
Forward voltage	V_f	—	1.89 V	2.2 V
Series resistance	R_s	—	0.04 Ω	—
Recommended case temperature	T_c	20°C	25°C	40°C
Wavelength tuning vs. temperature ³	$\Delta\lambda / \Delta T$	—	0.35 nm/°C	—
Wavelength tuning vs. output power	$\Delta\lambda / \Delta P$	—	1.0 nm/W	—
Fiber Characteristics				
Fiber core diameter	d_c	—	105 μm	—
Fiber numerical aperture	NA	0.135	0.15	0.165
Fiber cladding	d_{cl}	—	125 μm	—
Fiber buffer	d_b	—	250 μm	—
Fiber length	l_f	0.9 m	1 m	—

1. All performance data measured at 10 W, 25°C, beginning of life (BOL).

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

3. Change in $\Delta\lambda$ mean with case temperature over T_{op} .

Fiber Laser Feedback Isolation Specifications

Wavelength range (nm)	Isolation (dB)	Reflectivity (%)
1060 – 1100	>30	>99.9%
1050 – 1150	>25	>99.7%

Absolute Maximum Ratings

Parameter	Symbol	Minimum	Typical	Maximum
Operating current	I_{op}	—	—	14 A
Reverse voltage	V_{rvs}	—	—	2.0 V
Case operating temperature ¹	T_{op}	15°C	—	50°C
Storage temperature ²	T_{stg}	-30°C	—	70°C
Lead soldering temperature, 10 s max	T_{ls}	—	—	300°C
Relative humidity, noncondensing, ambient <45°C	RH	—	—	85%
Electrostatic discharge (ESD) ³	V_{esd}	—	—	500 V
Fiber bend radius (long-term deployment) ⁴		30 mm	—	—
Fiber axial pull force, 15 s		—	—	5 N
Fiber side pull force, 15 s		—	—	2.5 N

1. Noncondensing, maximum.

2. Noncondensing, 2000 hours.

3. C = 100 pF, R = 1.5 kΩ, human body model, does not damage its LI characteristics or its reliability, I-V curves may change in this ESD environment.

4. Minimum bend radius of 30 mm is for long-term mechanical fiber reliability; however for 0.15 NA some optical loss may occur and a minimum bend radius of 45 mm is recommended for layout with multiple fiber coils.

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.

Wavelength Range	Connector ¹	Fiber NA	Feedback Protection	Product Code
905-928 nm	No	0.22	No	L4-9891510-100B
905-928 nm	No	0.15	No	L4-9891510-100C
905-928 nm	SMA	0.22	No	L4-9891510-100M
905-928 nm	No	0.22	Yes	L4-9891510-100E
905-928 nm	No	0.15	Yes	L4-9891510-100F
928-950 nm	No	0.22	No	L4-9894010-100B
928-950 nm	No	0.15	No	L4-9894010-100C
928-950 nm	SMA	0.22	No	L4-9894010-100M
928-950 nm	No	0.22	Yes	L4-9894010-100E
928-950 nm	No	0.15	Yes	L4-9894010-100F
963-985 nm	No	0.22	No	L4-9897510-100B
963-985 nm	No	0.15	No	L4-9897510-100C
963-985 nm	SMA	0.22	No	L4-9897510-100M
963-985 nm	No	0.22	Yes	L4-9897510-100E
963-985 nm	No	0.15	Yes	L4-9897510-100F

1. If a connector option is selected, it is always connectorized. All performance data measured at 10 W, 25°C, beginning of life (BOL).

User Safety

Operating Considerations

Operating the diode laser outside of maximum ratings may cause device failure or a safety hazard. Power supplies used with the component must be employed such that they do not exceed the maximum peak optical power. Excessive drive current or switching transients can damage CW diode lasers. When using power supplies, connect the diode laser with the main power on and the output voltage set to zero. Increase the current slowly while monitoring the diode laser output power and the drive current.

Device degradation accelerates with increased temperature, and thus the case temperature should be minimized.

A proper heat sink for the diode laser on a thermal radiator will greatly enhance laser life. Refer to the product application note for more information regarding heat sinking and mounting the product.

Electrostatic Discharge (ESD) Protection

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

Laser Safety

DANGER

Invisible laser radiation. The laser beam emitted from this diode laser is invisible and can cause serious injury. Avoid looking directly into the diode laser or the collimated laser beam along its optical axis when the device is in operation.

Labeling

21 CFR 1040.10 Compliance

Because of the small size of these devices, each of the labels shown is attached to the individual shipping container. They are illustrated here to comply with 21 CFR 1040.10 as applicable under the Radiation Control for Health and Safety Act of 1968.

Serial Number Identification Label



Output Power Danger Label



North America
Toll Free: 844 810 LITE (5483)

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

China
Toll Free: 400 120 LITE (5483)

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