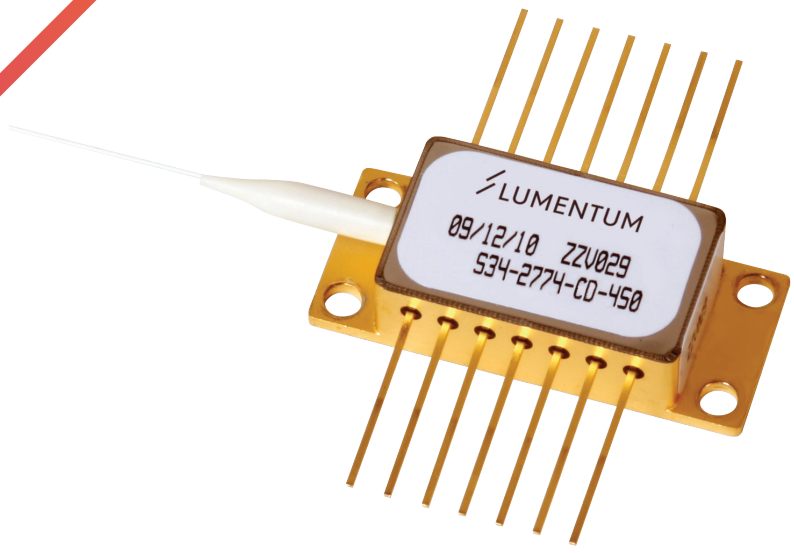
LUMENTUM

Up to 450mW Fiber Bragg Grating Stabilized 14xx nm Pump Modules

S34 Series



The Lumentum S34 series 14xx nm diode laser is wavelength selected at 1420 to 1510 nm using grating-stabilized, polarization-maintaining (PM) fiber. It is housed in an industry-standard, 14-pin butterfly package.

The S34 series lasers are ideal for distributed or discrete Raman amplification applications (1420 to 1510 nm for C- and L-band coverage) and provide up to 450 mW of power and high thermal efficiency to enable longer links and spans, lower bit error rate (BER), and greater wavelength coverage for high-speed and ultra-long haul (ULH) systems.

Key Features

- Up to 450 mW (1420 to 1465 nm)
- Up to 430 mW (1466 to 1495 nm)
- Up to 320 mW (1496 to 1510 nm)
- Fiber Bragg grating stabilization
- High thermal efficiency
- Integrated thermoelectric cooler, thermistor, and monitor diode
- Robust high-power operation (0 to 70°C)

Applications

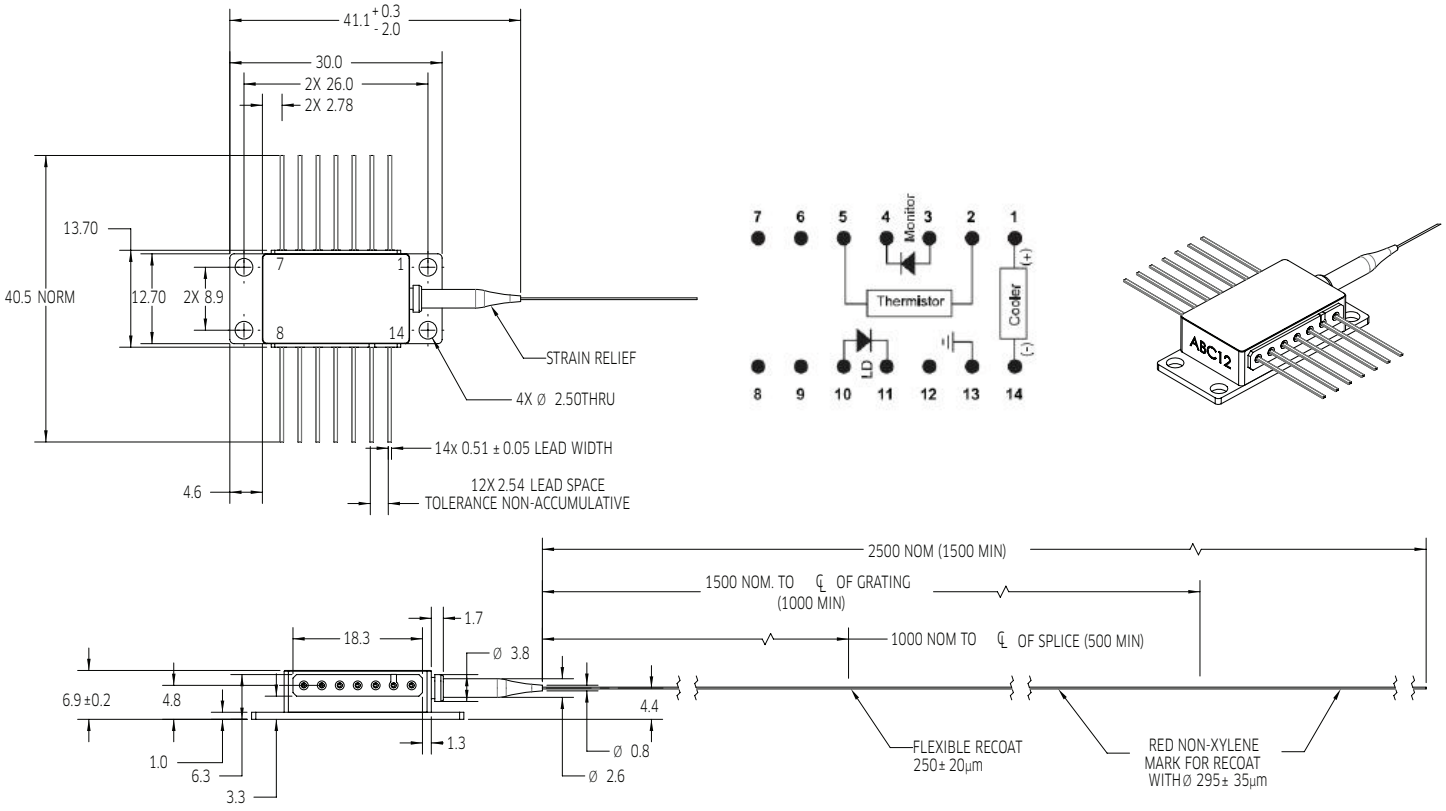
- High-speed and ultra-long haul systems
- Distributed or discrete Raman amplification

Compliance

- Telcordia GR-468-CORE

Dimensions Diagram

(Specifications are in mm unless otherwise noted; tolerance = x. ±0.3, x.x ±0.25.)



Pinout

Pin	Description
1	Cooler (+)
2	Thermistor
3	Monitor PD anode
4	Monitor PD cathode
5	Thermistor
6	N/C
7	N/C
8	N/C
9	N/C
10	Laser anode
11	Laser cathode
12	N/C
13	Case ground
14	Cooler (–)

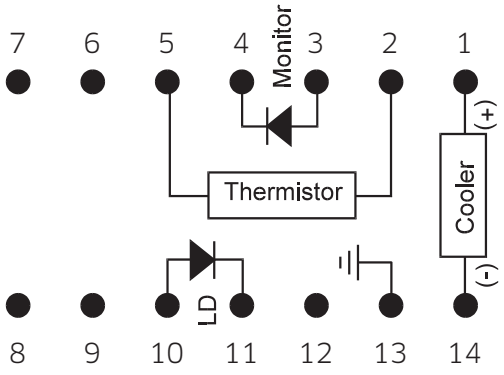


Table 1. Absolute Maximum Ratings

Parameter		Symbol	Test Conditions	Minimum	Maximum
Package					
Operating case temperature		T_c		–5°C	70°C
Storage temperature		T_{stg}		–40°C	75°C
Lead soldering temperature			Applied to pins for <10 seconds, T_{case}<75°C	—	300°C
Laser Diode					
Reverse voltage		V_r		—	2 V
Forward current	1420 to 1495 nm	I_{f_max}		—	2000 mA
	1496 to 1510 nm	I_{f_max}		—	1800 mA
Reverse current				—	10 µA
Electrostatic discharge (ESD)		$V_{ESD\,LD}$	C = 100 pF, R = 1.5 kΩ, HBM	—	500 V
Monitor Photodiode					
Reverse voltage		V_{rPD}		—	20 V
Forward current		I_{fPD}		—	10 mA
Thermoelectric Cooler					
Current		I_{TEC}		–1.0 A	4.0 A
Voltage	1420 to 1495 nm	V_{TEC}		—	5.0 V
	1496 to 1510 nm	V_{TEC}		—	4.5 V
Thermistor					
Forward current		I_{fTH}		—	5 mA
Fiber Pigtail					
Temperature				–40°C	85°C
Tensile stress				—	5.0 N
Bend radius				16 mm	—

Absolute maximum ratings are the maximum stresses that may be applied to the module for short periods of time without causing damage. Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Exposure to absolute maximum ratings for extended periods of time or exposure to more than one absolute maximum rating simultaneously may adversely affect device reliability. Specifications may not necessarily be met under these conditions.

Table 2. Fiber Pigtail

Parameter	Minimum	Typical	Maximum
Extinction ratio	—	30 dB/100 m	—
Cutoff wavelength	1290 nm	1400 nm	1450 nm
Mode field diameter	9.5 µm	10 µm	11.5 µm
Cladding diameter	122 µm	125 µm	128 µm
UV coating (buffer) diameter	230 µm	250 µm	270 µm
Recoat diameter	260 µm	295 µm	330 µm
Pigtail length	1.5 m	—	2.7 m
Fiber bend radius	25 mm	—	—
Bragg grating distance from package	1.0 m	1.5 m	2.2 m
Splice distance from package	0.3 m	—	—

Table 3. Power Consumption[1,2]

Wavelength (nm)	Power (mW)	Operating Current I_{op} BOL (mA)	Operating Voltage V_{op} BOL (V) / EOL (V)	TEC Current I_{TEC} EOL (A)	TEC Voltage V_{TEC} EOL (V)
1420–1465	180	870	2.36 / 2.51	2.20	3.00
	200	950	2.40 / 2.56	2.30	3.10
	220	1030	2.44 / 2.61	2.40	3.20
	240	1110	2.48 / 2.66	2.50	3.30
	260	1190	2.52 / 2.70	2.60	3.40
	280	1270	2.56 / 2.75	2.70	3.50
	300	1290	1.94 / 2.23	2.50	2.90
	320	1350	2.00 / 2.30	2.60	3.00
	340	1410	2.06 / 2.37	2.70	3.10
	360	1470	2.08 / 2.39	2.80	3.20
	380	1520	2.14 / 2.46	2.90	3.40
	400	1610	2.18 / 2.51	3.10	3.60
	420	1680	2.22 / 2.55	3.10	3.80
	440	1700	2.24 / 2.58	3.20	3.90
	450	1710	2.26 / 2.60	3.20	4.00
1466–1495	180	870	2.36 / 2.51	2.20	3.00
	200	950	2.40 / 2.56	2.30	3.10
	220	1030	2.44 / 2.61	2.40	3.20
	240	1110	2.48 / 2.66	2.50	3.30
	260	1190	2.52 / 2.70	2.60	3.40
	280	1270	2.56 / 2.75	2.70	3.50
	300	1290	1.94 / 2.23	2.50	2.90
	320	1360	2.00 / 2.30	2.60	3.00
	340	1430	2.06 / 2.37	2.70	3.20
	360	1500	2.08 / 2.39	2.80	3.40
	380	1580	2.14 / 2.46	2.90	3.60
	400	1650	2.18 / 2.51	3.10	3.80
	420	1690	2.22 / 2.55	3.20	4.00
	430	1710	2.26 / 2.60	3.20	4.00
1496–1510	180	870	2.36 / 2.51	2.20	3.00
	200	950	2.40 / 2.56	2.30	3.10
	220	1040	2.45 / 2.62	2.50	3.20
	240	1140	2.50 / 2.68	2.60	3.30
	260	1240	2.55 / 2.75	2.70	3.40
	280	1350	2.60 / 2.80	2.80	3.50
	300	1400	2.64 / 2.85	3.00	3.80
	320	1460	2.68 / 2.90	3.20	4.00

1. I_{op} EOL = 1.15 x I_{op} BOL
2. Values shown are maximum.

Table 4. Electro-Optical Performance[1]

Parameter		Symbol	Test Conditions	Minimum	Maximum
Spectrum					
Target wavelength[2] (in vacuum)		λ_t	I_{op}	1420 nm	1510 nm (1 nm steps)
Power in band (λ_t ±2 nm)		P_{band}	I(100 mW)≤ I≤ I_{op}	80%	—
Spectral bandwidth, RMS		$\Delta\lambda_{RMS}$	P_{op}, RMS	—	2.0 nm
Polarization extinction ratio		R_e		16 dB	—
Laser Diode					
Threshold current		I_{th}		—	150 mA BOL
End of lifetime operating current		I_{op}EOL		1.15 x I_{op}BOL mA	—
Monitor Photodiode					
Monitor current		I_{MPD}	I_{op}, V_{rPD}=5 V	0.5 µA/mW	5.0 µA/mW
Monitor dark current		I_d	V_{rPD}=5 V	—	100 nA
Monitor diode capacitance		C_{MPD}	V_{rPD}=5 V, 1 kHz	—	20 pF
Front-to-rear tracking ratio	1420 to 1495 nm	TR	I_m constant, 100 mW to P_{op}	0.85	1.15
	1496 to 1510nm	TR	I_m constant, 100 mW to 325 mW	0.92	1.08
Front-to-rear tracking error		TE	I_m constant	–8%	8%
Thermoelectric Cooler Operation					
Power consumption		P_{con}		—	13.5 W EOL
Thermistor resistance		R_{th}		9.5 kΩ	10.5 kΩ
Mean thermistor B constant		B_{avg}	T_C	3700 K	4100 K

1. Laser submount temperature T_c=25°C unless otherwise stated. Case temperature T_c=0 to 70°C unless otherwise stated (maximum ΔT=45°C). Fiber Bragg grating temperature T_{fbg}=25°C unless otherwise stated.
2. Customer specified.

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 fiber when the device is in operation.

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

Operating the laser diode outside of its maximum ratings may cause device failure or a safety hazard. Power supplies used with this component cannot exceed maximum peak optical power.

CW laser diodes may be damaged by excessive drive current or switching transients. When using power supplies, the laser diode should be connected with the main power on and the output voltage at zero. The current should be increased slowly while monitoring the laser diode output power and the drive current. Careful attention to heatsinking and proper mounting of this device is required to ensure specified performance over its operating life. To maximize thermal transfer to the heatsink, the heatsink mounting surface must be flat to within .001inch and the mounting screws must be torqued down to 1.5 in/lb.

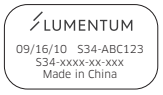
ESD PROTECTION—Electrostatic discharge (ESD) is the primary cause of unexpected laser diode failure. Take extreme precaution to prevent ESD. Use wrist straps, grounded work surfaces, and rigorous antistatic techniques when handling laser diodes.

Labeling

Laser Safety

The Lumentum pump laser module emits hazardous invisible laser radiation.

Due to the small size of the pump module, the box packaging is labeled with the laser radiation hazard symbol and safety warning labels shown below.



14-pin module label

Shipping box label

Output power and laser emission indicator label

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.

LUMENTUM

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Toll Free: 844 810 LITE (5483)

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