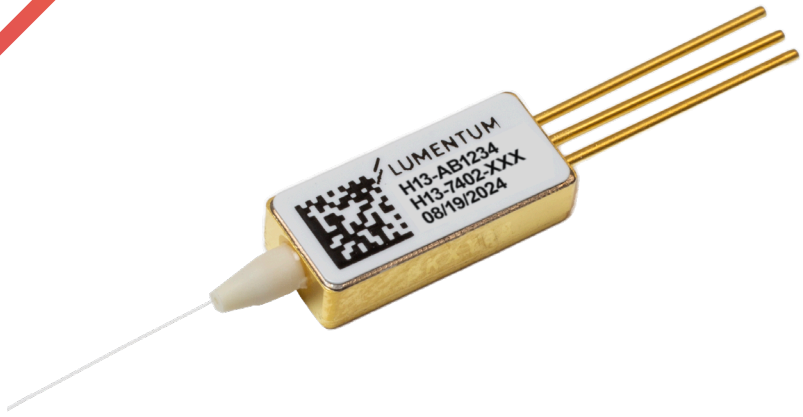
LUMENTUM

Up to 520 mW Uncooled 980 nm Pump Modules

H13 Series



The Lumentum uncooled 3-pin low-profile planar package pump laser – H13's revolutionary chip and packaging design significantly reduce the size and power consumption of 980 nm pumps. It meets the telecommunications industry's stringent requirements, including Telcordia GR-468-CORE for hermetic 980 nm pump modules.

The H13 Series pump modules employ Lumentum's disruptive 980 nm Distributed Feedback Laser chip, which integrates a high-power 980 nm laser and grating into a single high-reliability laser die. It provides a noise-free, narrowband spectrum, even under variations in temperature, drive current, and optical feedback.

Key Features

- Operating power up to 520 mW
- 0°C to 80°C operating temperature (case)
- Ultra-small form factor: 13.0x4.4x2.4 mm
- Low power consumption
- Excellent low-power stability
- Small fiber bending radius
- Reduced fiber length

Applications

- Small-form-factor and pluggable EDFAs
- High-bit-rate, low channel-count EDFAs
- CATV distribution
- Integrated amplification within high bit-rate transceiver modules - CFP2/4, QSFP-DD

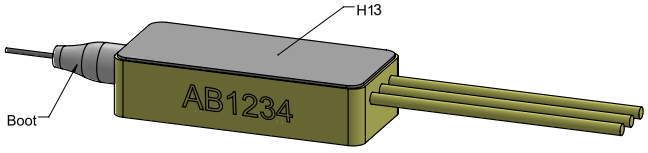
Compliance

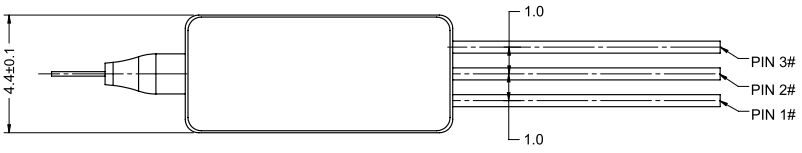
- Telcordia GR-468-CORE

Dimensions Diagram and Pin Assignment

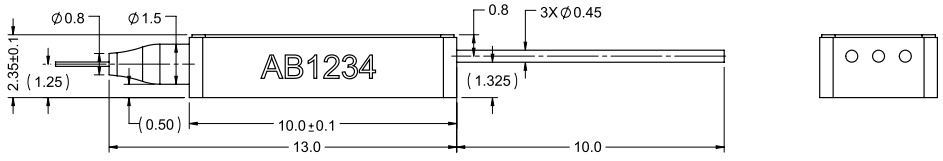
Package dimensions:

- Length (including boot and excluding pins): 13 mm
  - Pin length: 10 mm
  - Pin diameter: 0.45 mm
- Width: 4.4 mm
- Height: 2.35 mm
- Fiber Length: 0.8 m typical





PIN 1#	LASER DIODE(-)
PIN 2#	PACKAGE GROUND
PIN 3#	LASER DIODE(+)



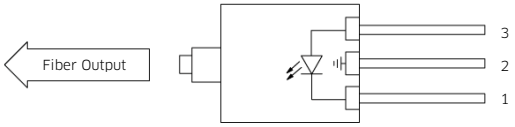


Table 1 Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units	Notes
Forward current	I_{f_max}		2.0	A	1 hour maximum cumulative
Reverse voltage	V_r		2	V	
Reverse current			10	μA	
ESD damage	$V_{ESD,LD}$		500	V	C=100pF, R=1.5kΩ, HBM
Operating temperature		0	80	°C	
Storage temperature		-40	85	°C	
Relative humidity	RH	5%	95%		Non-condensing
Lead soldering temperature			380	°C	T case < 105°C
Lead soldering time			10	s	
Fiber temperature		-40	80	°C	
Tensile stress			2	N	
Bend radius		7		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 Optical and Electrical Characteristics of H13 Pump (Case temperature T_{case} = 0°C to 80°C) for different Pop

Part Number	Maximum Operating Power P_{op} (mW)	Maximum Operating Current I_{op} (mA	Minimum Kink-Free Power P_{max} (mW)	Kink-Free Current I_{max} (mA)	Total Power Consumption P_{con} (W)
H13-7402-300	300	800	330	875	1.5
H13-7402-350	350	920	385	1010	1.8
H13-7402-400	400	1040	440	1135	2.1
H13-7402-450	450	1160	495	1270	2.4
H13-7402-500	500	1285	550	1420	2.8
H13-7402-520	520	1335	572	1470	2.9

Table 3 Optical and Electrical Characteristics
(BOL, Tcase = 0°C to 80°C, Pf range = 10 mW to Pmax, -50 dB reflection, unless otherwise noted)

Parameter	Symbol	Condition		Minimum	Maximum	Units
Center wavelength	λ_c	0-80°C, 10-520mW		970	980	nm
Power in band (λt±1.5 nm)	P_{band}	0-80°C	> 30mW 10-30mW	90 80		%
Spectral width	$\Delta\lambda_{RMS}$	0-80°C, P_{op}			2.0	nm
Spectral shift with temperature	Δλ/ΔT	I_{op}			0.1	nm/°C
Optical power stability	ΔPop/Δt	0-80°C, t = 60s, DC ~50kHz	>30mw		0.2	dBp-p
			20-30mW		0.3	
			10-20mW		0.5	
Threshold current	I_{th}	0-80°C			175	mA
Forward voltage	V_f	$I_f = I_{op}$			1.93	V

Table 4 RC HI 1060 Fiber Nominal Characteristics and Tolerances

Parameters	Specification
Cutoff wavelength	920 nm
Maximum attenuation at 980 nm	2.1 dB/km
Cladding outside diameter	80 ±1 μm
Coating outside diameter	165 ±10 μm
Core-cladding concentricity	≤0.5 μm
Mode field diameter	5.9 ±0.5 μm
Fiber pigtail length	Typical 800 mm

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 heat sinking and proper mounting of this device is required to ensure specified performance over its operating life. To maximize thermal transfer to the heat sink, the heat-sink mounting surface must be flat to within .001 inch 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.

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 label shown below.

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.

Lumentum has registered this laser with the FDA/CDRH as an OEM component. Please contact Lumentum for an FDA/CDRH accession number for this laser component.

Labeling

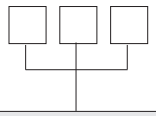
Laser radiation safety warning
Laser classification per IEC 60825-1:2014
Maximum output power 2 W

Module label

Box 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.

H13-7402 - 

Peak Wavelength	Code
300 mW	300
350 mW	350
400 mW	400
450 mW	450
500 mW	500
520 mW	520

LUMENTUM

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