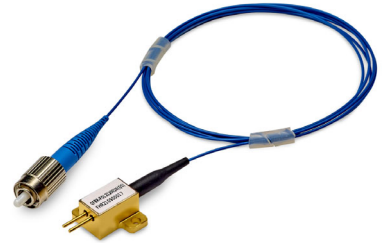


# AFBR-POL2120

## 808-nm High-Power 2W Laser Module



### Overview

The Broadcom<sup>®</sup> AFBR-POL2120 is a high-power laser module (HPLM) specifically designed to be used with the Broadcom optical power converter, AFBR-POC20xL.

The AFBR-POL2120 is equipped with a pigtail fiber and an FC/PC optical connector. It consists of a laser chip, operating typically at 808 nm wavelength at a case temperature of 25°C. The hermetically sealed package protects the laser chip from any harsh environment.

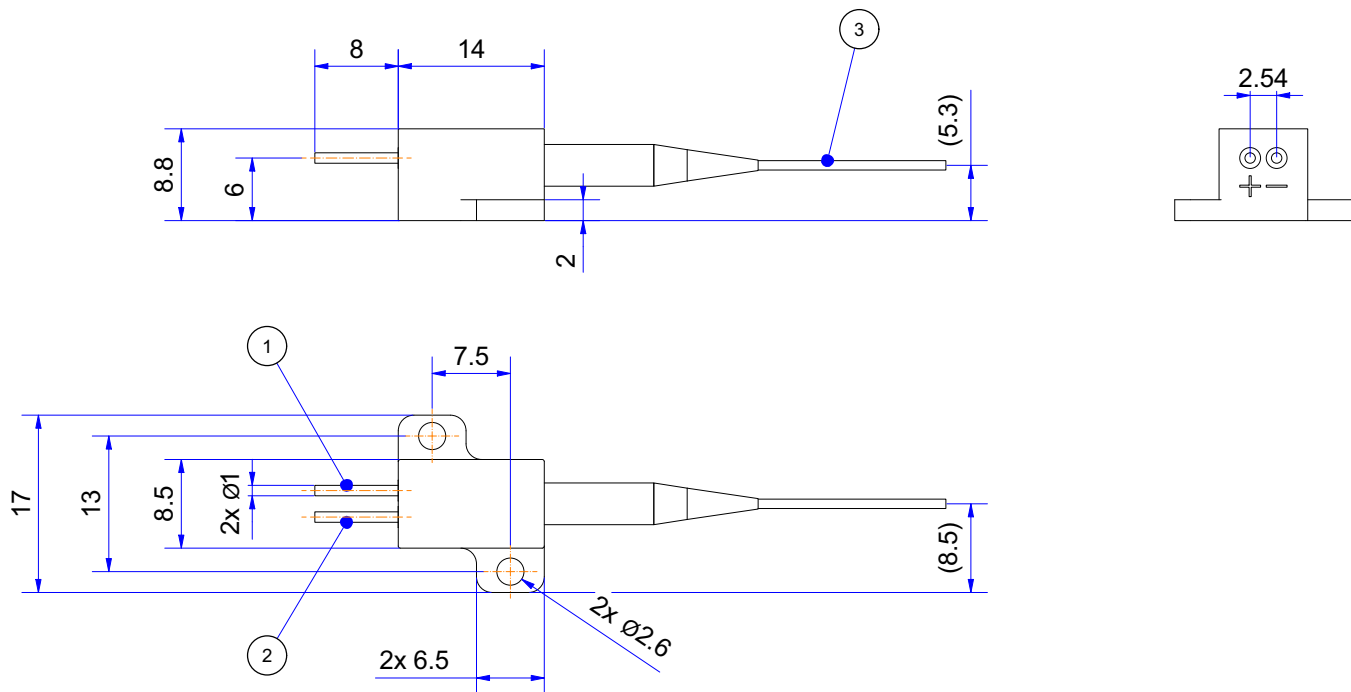
### Features

- Hermetically sealed package
- Average optical output power of 2W at room temperature
- FC/PC port with a pigtailed 0.22 NA fiber
- Designed for Broadcom optical power converter products for Power over Fiber (PoF) applications
- Small footprint board mounting package
- 2 electrical pins (anode and cathode)
- RoHS-compliant

### Applications

- Sensor applications: Provide isolated power for various sensors
- Electric Power Utilities: Deliver isolated power to protect sensor devices
- Lightning: Protect key circuits
- RF Power electronics circuits: Reduce capacitive coupling and interference
- Oil & Gas Industry: Eliminate the risk of sparks
- Chemical Plants: Use PoF in corrosive areas where metal wires can be attacked
- Aerospace: Reduce weight, EMI and the risk of sparks
- Medical instrumentation: Magnetic Resonance Imaging (MRI)
- Security: Trigger and power sources unaffected by EMI-RFI

## Mechanical Dimensions



**NOTE:** All dimensions in mm.

Item	Function/Description	Notes
1	Laser diode anode	Isolated from housing
2	Laser diode cathode	Isolated from housing
3	Fiber protection tube	Hytrel (0.9 mm)

## Regulatory Compliance

Feature	Test Method	Performance
Electrostatic Discharge (ESD) to the Electrical Pins Human Body Model	JS-001-2017	Class 1B (>500V, <1kV)
Eye Safety <sup>a</sup>	IEC 60825-1:2014, 3, Class 4	

a. Invisible laser light from this device can be very harmful to the human eye. Use dedicated Laser class 4 safety eye protection glasses during operation.

## Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature <sup>a</sup>	$T_C$	+15	—	+45	°C
Operating Current	$I_{OP}$	—	2.4	—	A

a. Measured on top of the module housing.

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Notes
Operating Current	$I_{OP}$	—	2.7	A	a
Reverse Voltage	$V_R$	—	2	V	b
Storage Temperature	$T_S$	-30	+70	°C	a
Operating Case Temperature	$T_C$	+15	+50	°C	a
Fiber Axial Pull Force, 15 seconds	—	—	5	N	c
Fiber Side Pull Force, 15 seconds	—	—	3	N	c

- a. Conditions exceeding the absolute maximum ratings can cause damage to the device and affect its reliability.
- b. Reverse bias current shall not exceed 5 mA.
- c. Verified at 25°C. No external forces should be applied to the fiber during operation.

## Process Compatibility

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Solder Environment	$T_{SOLD}$	—	—	260	°C	a b c
	$t_{SOLD}$	—	—	10	s	d

- a. Maximum temperature refers to peak temperature.
- b. Solder surface to be at least 3 mm from housing wall.
- c. Moisture sensitive level 1.
- d. Maximum time refers to time spent at peak temperature.

## Electrical and Optical Characteristics

$T_C = +25^\circ\text{C}$

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
CW Output Power	$P_{OUT}$	—	2	—	W	a b
Centroid Wavelength	$\lambda_C$	798	808	818	nm	a
Threshold Current	$I_{TH}$	—	350	—	mA	a
Operating Current	$I_O$	—	2.4	2.7	A	a
Forward Voltage	$V_F$	—	1.85	—	V	a
Wavelength Shift vs. Temp.	$\lambda_C/T_C$	—	0.3	—	nm/°C	—
Wavelength Shift vs. Current	$\lambda_C/I_O$	—	0.8	—	nm/A	—

- a. All the characteristics are measured at case temperature  $T_C = +25^\circ\text{C}$ .
- b. Measured with a large area detector at the end of the pigtail fiber at 808 nm.

## Fiber Specifications

Parameter	Symbol	Min.	Typical	Max.	Unit
Fiber Core Diameter	$d_C$	—	60	—	$\mu\text{m}$
Fiber Numerical Aperture	NA	—	0.22	—	—
Fiber Clad Diameter	$d_D$	—	125	—	$\mu\text{m}$
Fiber Length	L	—	1	—	m
Long-term Bending Radius	—	20	—	—	mm

Figure 1: Typical Launched Optical Power vs. Drive Current<sup>1</sup>

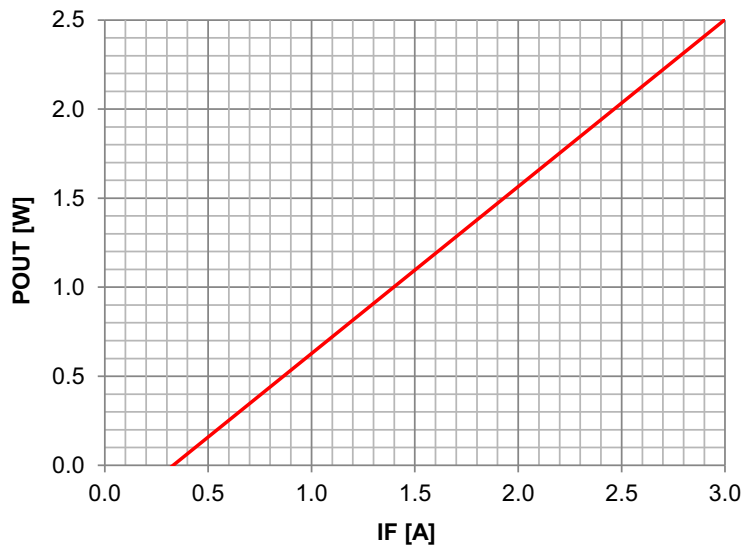
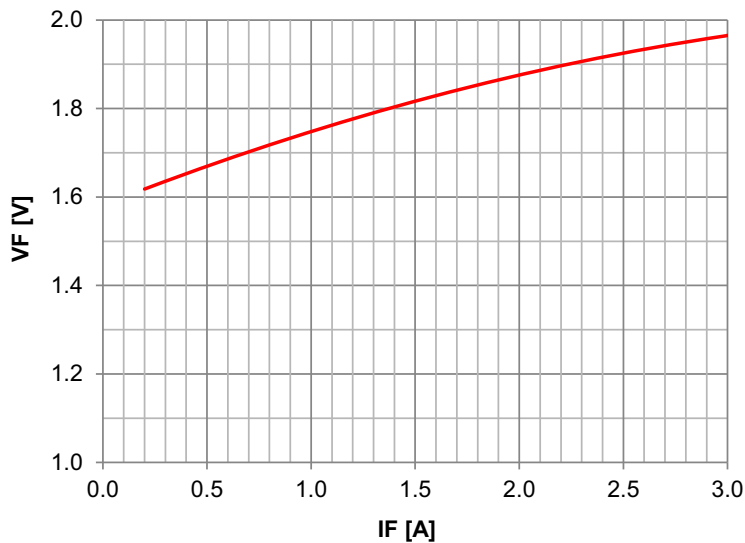


Figure 2: Typical Forward Voltage vs. Drive Current<sup>1</sup>



1. Measured at case temperature  $T_c = +25^\circ\text{C}$ .

## Configurations

Product number	Connector	Fiber length	Fiber protection
AFBR-POL2120	FC/PC	1m	0.9 mm Hytrel tube

## Ordering Information

For more information on this product and its availability, contact your local Broadcom account manager.

## Operational Device Safety Recommendations

1. Invisible Laser light from this device can be very harmful to the human eye. Use dedicated Laser class 4 safety eye protection glasses during operation.
2. Electrostatic discharge is a major cause of unexpected Laser diode failure. The use of wrist wraps, grounded work surfaces and ESD compliant tools is necessary. These include protecting the module electric pins using the ESD foam provided in the package.
3. Laser CW operation can be damaged by abrupt drive current spikes and switching transients. The use of transient protection circuits and/or low pass filtering circuits is highly recommended. Drive current shall be monitored and increased slowly from the zero level.  
Broadcom offers the AFBR-POMEK2204 Laser and driver evaluation kit which includes the necessary circuitry for stable switching operation.
4. A proper heat sink for thermal dissipation of the device is highly recommended and can greatly enhance the device lifetime. Heat dissipation mounts with thermal resistance of lower than 0.3°C/W are recommended.
5. Keep the fiber rubber ribbon in place during mounting and operation to avoid mechanical knicks or damage to the fiber jacket.

**INVISIBLE LASER RADIATION**  
AVOID EYE OR SKIN EXPOSURE  
TO DIRECT OR SCATTERED RADIATION

OUTPUT POWER    MAX 10W  
WAVELENGTH    750 – 950nm

**CLASS 4 LASER PRODUCT**  
IEC 60825-1 : 2014

**DANGER**

INVISIBLE LASER RADIATION  
AVOID EYE OR SKIN EXPOSURE  
TO DIRECT OR SCATTERED RADIATION

OUTPUT POWER    MAX 10W  
WAVELENGTH    750 – 950nm

**CLASS IV LASER PRODUCT**

Invisible laser radiation is emitted from a connectorized fiber.

ATTENTION

OBSERVE PRECAUTIONS  
FOR HANDLING  
ELECTROSTATIC  
SENSITIVE DEVICES

RoHS Compliant

2011/65/EU Annex II

MSL: 1

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