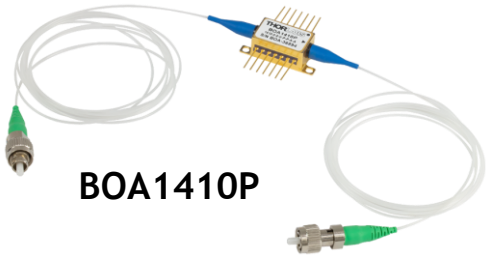
# 1410 nm Booster Optical Amplifier, PM Fiber



BOA1410P

## Description

Thorlabs' BOA1410P Booster Optical Amplifier (BOA) is designed to amplify polarized optical signals in the E-band. The semiconductor device is housed in a standard 14-pin butterfly package with FC/APC connectors. Polarization-maintaining fiber is used on both input and output sides. An integrated TEC and thermistor provide temperature control to stabilize the gain and optical spectrum.

## Specifications

**CW; $T_{CHIP}$ = 25 °C; $T_{CASE}$ = 0 - 70 °C**

| BOA1410P Specifications | | | | |
|---|---|---|---|---|
| | **Symbol** | **Min** | **Typical** | **Max** |
| **Center Wavelength[a]** | $\lambda_C$ | 1390 nm | 1410 nm | 1430 nm |
| **Operating Current** | $I_{OP}$ | - | 600 mA | 700 mA |
| **Optical 3 dB Bandwidth** | BW | 87 nm | 95 nm | - |
| **Small Signal Gain @ $P_{IN}$ = -20 dBm[b,c]** | G | 24 dB | 28 dB | - |
| **Saturation Output Power (@ -3 dB)[b,c]** | $P_{SAT}$ | 14 dBm | 16 dBm | - |
| **Gain Ripple (RMS)[b,d]** | δG | - | - | 0.3 dB |
| **Noise Figure[b,c]** | NF | - | 7.0 dB | 10 dB |
| **Forward Voltage[b]** | $V_F$ | - | 1.7 V | 2.0 V |
| **TEC Operation (Typical/Max @ $T_{CASE}$ = 25 °C / 70 °C)** | | | | |
| **TEC Current** | $I_{TEC}$ | - | 0.4 A | 1.5 A |
| **TEC Voltage** | $V_{TEC}$ | - | 0.5 V | 4.0 V |
| **Thermistor Resistance** | $R_{TH}$ | - | 10 kΩ | - |

a. This is the center wavelength of the amplified spontaneous emission (ASE). An operating wavelength of 1411 nm was selected for testing to yield the specified saturated output power ($P_{SAT}$).
b. At $I_{OP}$.
c. At 1411 nm
d. Water absorption dips in the spectrum contribute to ripple. RMS ripple is used instead of peak-to-peak ripple in order to reduce the effect of water absorption on the accuracy of this calculation. Actual ripple may be smaller if water absorption is excluded.

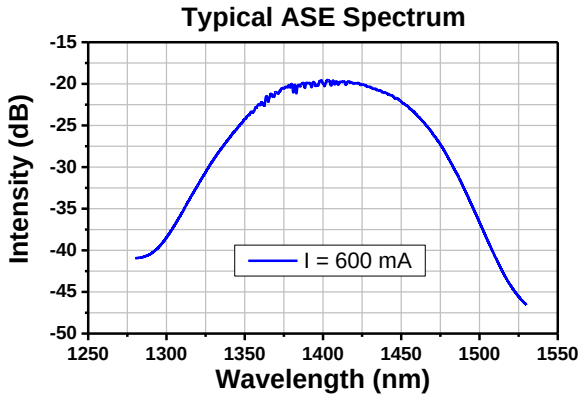
| BOA1410P Absolute Maximum Ratings[a] | | | |
|---|---|---|---|
| | **Symbol** | **Min** | **Max** |
| **Operating Current** | $I_{OP}$ | - | 700 mA |
| **Optical Output Power, CW** | $P_{Out}$ | - | 130 mW |
| **Chip Temperature (TEC)** | $T_{Chip}$ | 10 °C | 30 °C |
| **Case Temperature** | $T_{Case}$ | 0 °C | 70 °C |

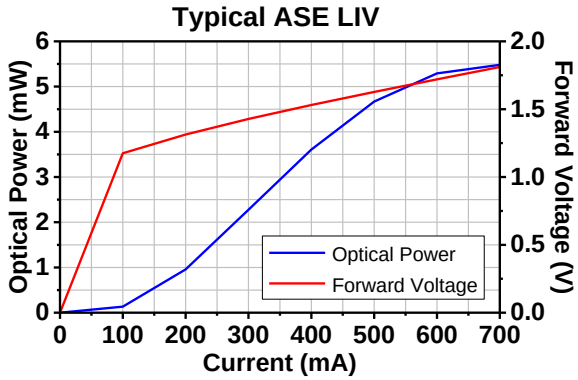
a. Absolute maximum rating specifications should never be exceeded. Operating at or beyond these conditions can permanently damage the amplifier.

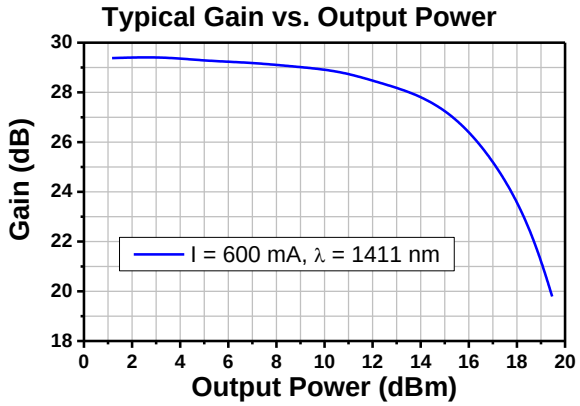
| Fiber Specifications | |
|---|---|
| | **Value** |
| **Fiber Type** | Corning PM13-U40A[a] |
| **Mode Field Diameter[b]** | 9.3 ± 0.5 µm at 1300 nm |
| **Numeric Aperture** | 0.12 |
| **Fiber Pigtail Length** | 1.5 m |
| **Connector** | FC/APC, 2.0 mm Narrow Key |

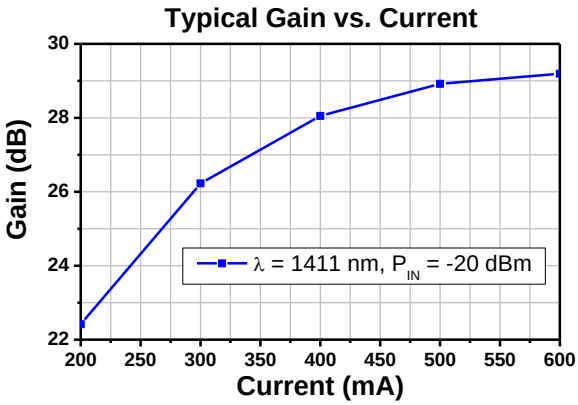
a. The fiber used in the BOA1410P optical amplifier is similar to our PM1300-XP fiber, but has a larger coating diameter of Ø400 µm.
b. Mode Field Diameter is specified as a nominal value.

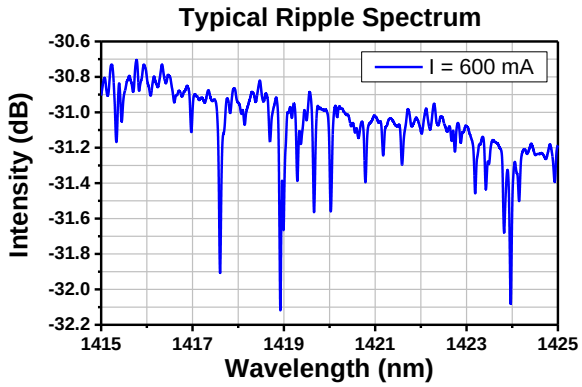
## Performance Plots



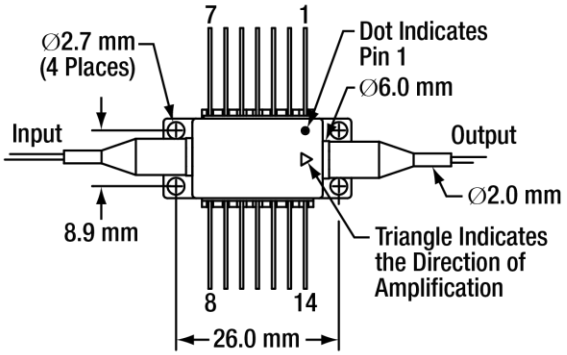




The sharp dips in the ripple spectrum are mostly caused by water absorption in the measurement setup.

## Drawings




Pin Identification

| | | | |
|---|---|---|---|
| 1. | TEC + | 14. | TEC - |
| 2. | Thermistor | 13. | Ground |
| 3. | Not Used | 12. | Not Used |
| 4. | Not Used | 11. | Device Cathode |
| 5. | Thermistor | 10. | Device Anode |
| 6. | Not Used | 9. | Not Used |
| 7. | Not Used | 8. | Not Used |

Recommended mounting torque
is 10 - 20 oz·in (0.07 - 0.14 N·m)