



# IMP-XXX-10-PM

## XXXnm, 10 GHz Intensity Modulator, PM Output

### 785nm, 10 GHz Intensity Modulator, PM Output

- この変調器は、10GHz LiNbO3 (785nm, 850nm, 1064nm) モジュレーターです。
- XXXは波長で、785nm, 850nm, 1064nm, 1310nm, 1550nmを取り揃えております。  
また、10GHz, 20GHz, 40GHzもごさいます。
- 変調器は、低い駆動電圧で位相変調する事が出来ます。
- 低い挿入電圧を最大の送信電圧に変換します。



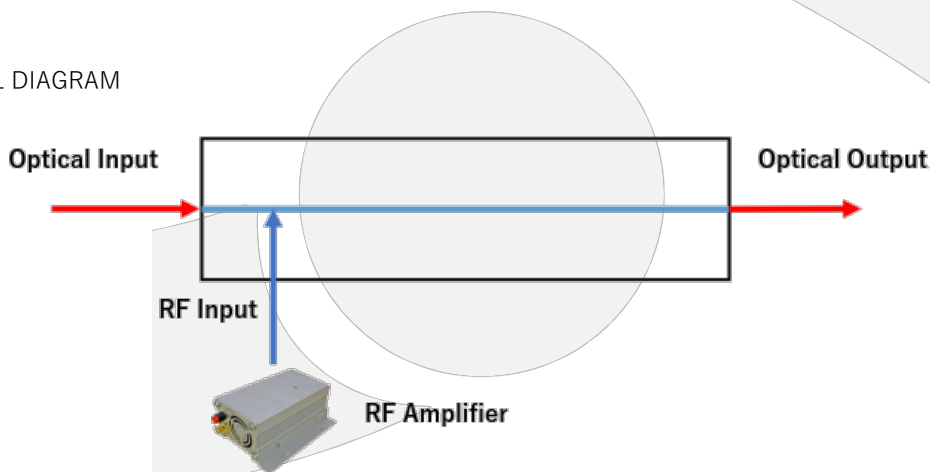
#### FEATURES

- Up to 10 GHz Bandwidth
- Low Optical Loss
- 785 nm operating wavelength
- Low Drive Voltage
- Minimal Back Reflections
- Polarization Maintaining

#### USE IN

- Coherent Communications
- Optical Chirping
- Optical Sensing
- FM Spectroscopy
- Frequency Shifting
- Laser Linewidth Broadening

#### FUNCTIONAL DIAGRAM



#### GENERAL

|                          |                                       |
|--------------------------|---------------------------------------|
| Input Optical Power      | 20 mW max.                            |
| Operating Wavelength     | 785 ± 20 nm                           |
| Insertion Loss           | 3.0 dB typ., 3.5 dB max.              |
| Extinction Ratio         | ≥ 20 dB min                           |
| Optical Return Loss      | ≤ 30 dB                               |
| S21 Bandwidth (RF Port)  | 7 GHz min, 10 GHz typical @ -3 dB     |
| S11 Return Loss          | ≤ -10 dB @ 10 GHz                     |
| V <sub>π</sub> (RF Port) | 6.8 V typ. @ 1 GHz; 10V typ. @ 10 GHz |
| RF Input Power           | +27 dBm max.                          |
| Impedance                | 50 Ω typ.                             |

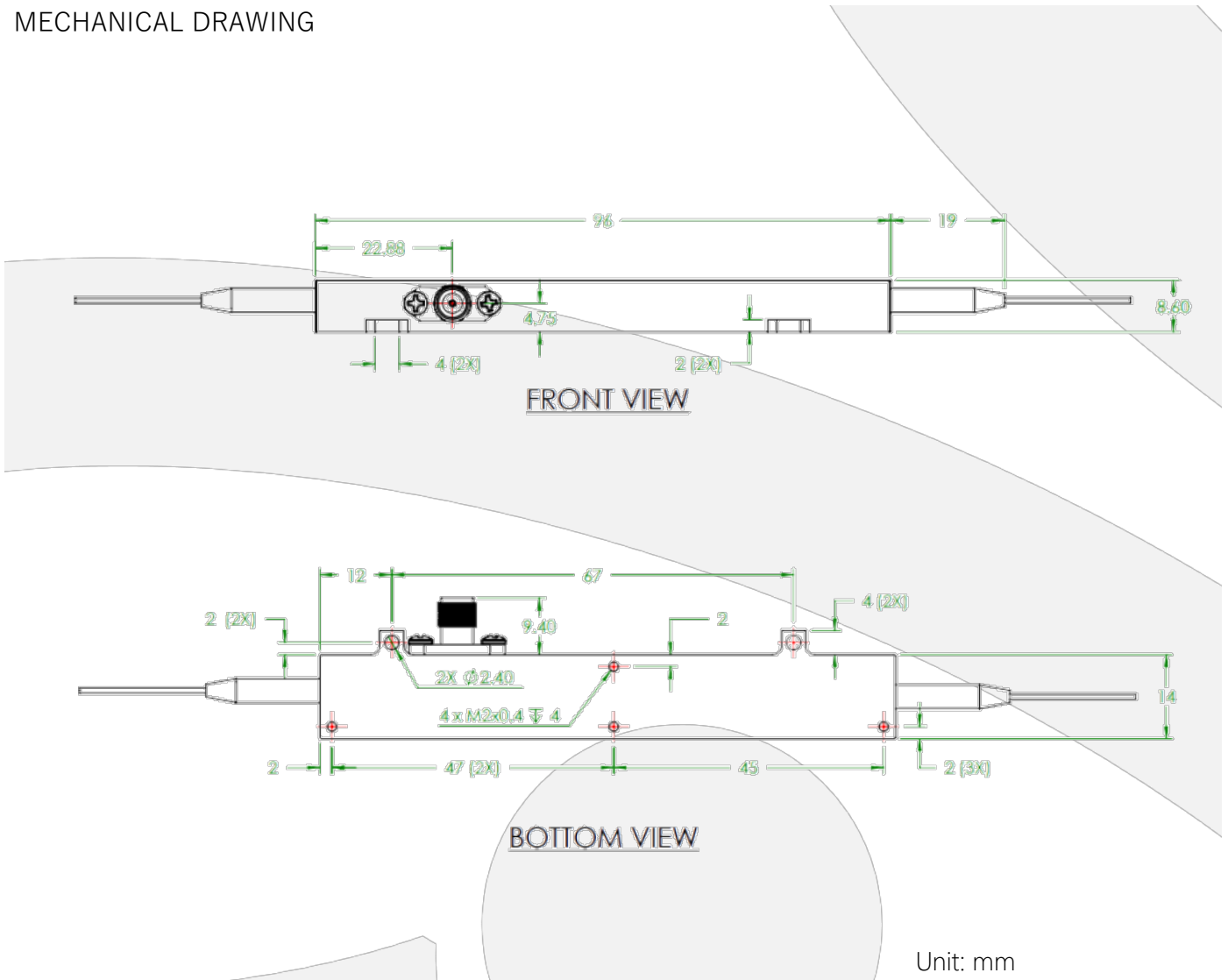
#### MECHANICAL

|                                  |                               |
|----------------------------------|-------------------------------|
| Operating Temperature (Standard) | -55 °C to +75 °C              |
| Storage Temperature              | -60 °C to +90 °C              |
| Operating Humidity               | 0% to 90% Relative Humidity   |
| Input/Output Fiber Type          | Corning PM85-U400             |
| Input/Output Connector           | PM FC/APC, request for others |
| Material                         | LiNbO3                        |
| RF Port Connectors               | K Connector                   |
| Cabling                          | 900 μm tubing                 |
| Dimensions                       | 3.783" x 0.981" x 0.640"      |



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MECHANICAL DRAWING





## 850nm, 10 GHz Intensity Modulator, PM Output

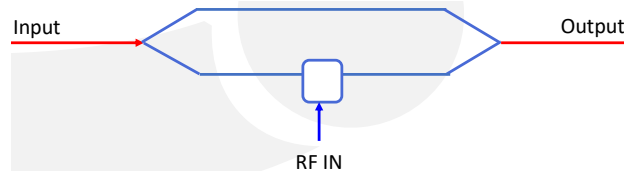
### FEATURES

- 10 GHz Bandwidth
- Polarization Maintaining output
- 850 nm operating wavelength
- Low insertion loss, low V<sub>pi</sub>
- High input power handling capability
- Push-Pull Electrode design

### USE IN

- Analog Modulation
- Pulse Generation
- Research & Development
- Quantum Photonics
- Active Mode Locking Laser

### FUNCTIONAL DIAGRAM



### SPECIFICATIONS

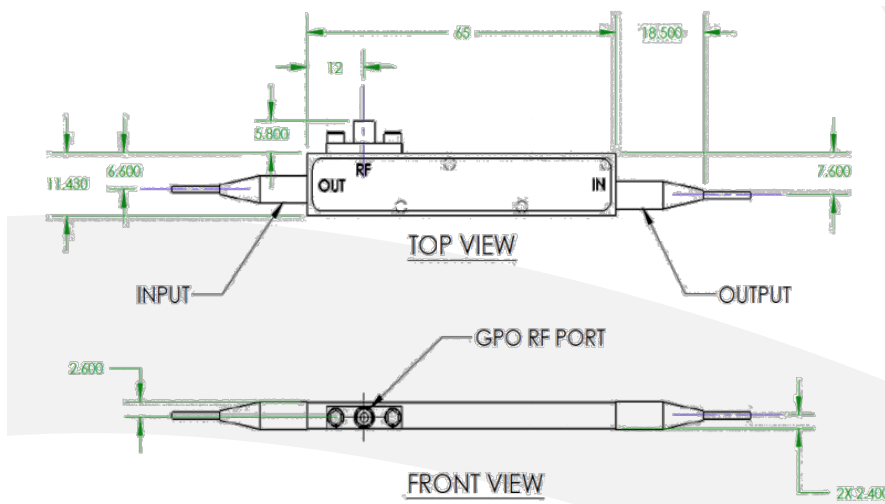
|                          |   |
|--------------------------|---|
| Material                 | LiNbO <sub>3</sub>                      |
| Crystal Orientation      | X-cut, Y-propagating                    |
| Waveguide Process        | Annealed Proton Exchange                |
| Input Optical Power      | 20 mW max.                              |
| Operating Wavelength     | 850 +/- 20 nm                           |
| S21 Bandwidth, 3 dB drop | 7 GHz min.                              |
| Chirp Value              | < ± 0.2 (zero chirp design)             |
| Insertion Loss           | 4.2 dB typ., 5 dB max.                  |
| Extinction Ratio         | ≥ 20 dB min. (≥ 30 dB min. HER version) |
| Optical Return Loss      | ≤ -45 dB                                |
| V <sub>π</sub> (RF Port) | 5.0 V typ., 5.5 V max. @ 1 GHz          |

### GENERAL

|                                  |                             |
|----------------------------------|-----------------------------|
| Operating Temperature (Standard) | -10 °C to +55 °C            |
| Storage Temperature              | -30 °C to +80 °C            |
| Operating Humidity               | 0% to 90% Relative Humidity |
| Input/Output Fiber Type          | Corning PM85-U40D           |
| RF Port Connectors               | 1.85 mm female (V)          |
| Cabling                          | 900 μm loose tube           |
| Input/Output Connector           | FC/APC                      |
| Dimensions                       | 87mm x 14.5 mm x 10 mm      |

### MECHANICAL

### MECHANICAL DRAWING



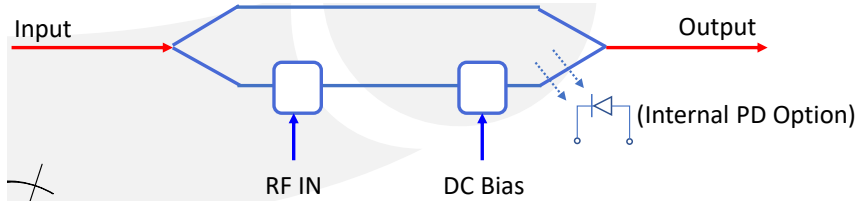
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## 1064nm, 10 GHz Intensity Modulator, PM Output

- |          |   |  |
|----------|---|--|
| FEATURES | <ul style="list-style-type: none"> <li>• 1030-1090 nm wavelength</li> <li>• Low Drive Voltage</li> <li>• 3 dB bandwidth up to 10 GHz</li> </ul> | <ul style="list-style-type: none"> <li>• PM input and output</li> <li>• High extinction ratio</li> <li>• Internal PD option</li> </ul> |
| USE IN   | <ul style="list-style-type: none"> <li>• Pulse generation for YDFA</li> <li>• Up to 12.5 Gb/s Data Rate</li> <li>• Satellite Link</li> </ul>    | <ul style="list-style-type: none"> <li>• Active mode locked laser</li> <li>• Research and development</li> </ul>                       |

### FUNCTIONAL DIAGRAM



### SPECIFICATIONS

|                                  |  |
|----------------------------------|--|
| Input Optical Power              | 100 mW max.                                    |
| Operating Wavelength             | 1030 to 1090 nm                                |
| Chirp Value                      | $< \pm 0.2$                                    |
| Insertion Loss                   | 5.0 dB max., 4.5 dB typ.                       |
| Extinction Ratio                 | 20 dB min.                                     |
| Optical Return Loss              | 45 dB min.                                     |
| S21 Bandwidth (RF Port)          | 7 GHz min., 10 GHz typ.                        |
| S11 Return Loss (RF Port)        | $\leq -10$ dB @ 10 GHz                         |
| $V_{\pi}$ (RF Port)              | 4.3 V typ., 5.2 V max.                         |
| RF Input Power                   | 26 dBm Maximum                                 |
| Impedance (RF Port)              | $50 \pm 5 \Omega$                              |
| $V_{\pi}$ (Bias Port)            | 4 V typ., 5 V max.                             |
| Impedance (Bias Port)            | $> 1 M\Omega$                                  |
| Operating Temperature (Standard) | $-30^{\circ}\text{C}$ to $+75^{\circ}\text{C}$ |
| Storage Temperature              | $-60^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ |
| Operating Humidity               | 0% to 90% Relative Humidity                    |
| Input/Output Fiber Type          | PM 980 - 400                                   |
| Input/Output Connector           | FC/APC, key aligned to slow axis               |
| Material                         | LiNbO <sub>3</sub>                             |
| Crystal Orientation              | X-cut, Y-propagating                           |
| RF Port Connectors               | K type female                                  |
| Cabling                          | 900 $\mu\text{m}$ tubing                       |
| Dimensions                       | 3.783" x 0.981" x 0.640"                       |

### GENERAL

### MECHANICAL

### ORDERING OPTIONS

**IMP-1064-10-PM-XX**  
XX PD: Internal PD

- **BCB-4**



The Optilab BCB-4 is a compact bias control board designed for IMP-1064-10-PM modulator

Available Accessories

- **YDFA-PA-MSA**



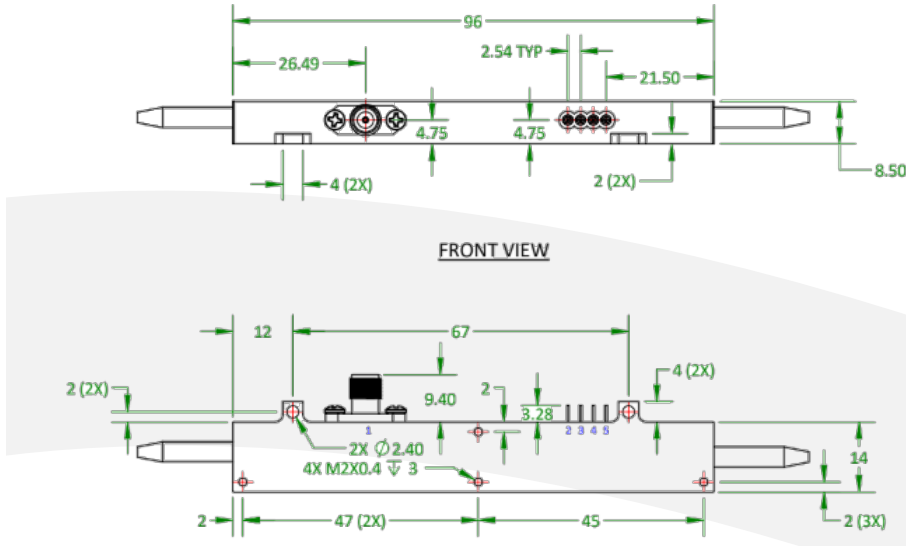
The Optilab YDFA-PA-MSA is a high-gain Dual Stage Pre-amplifier module in a multiple source agreement footprint housing.



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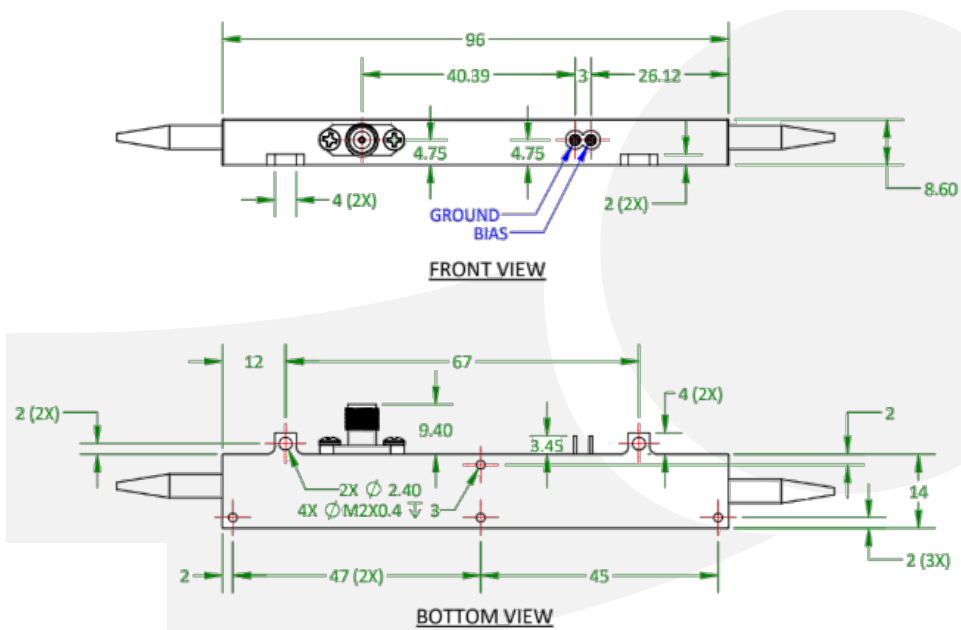
MECHANICAL DRAWING

1. IMP-1064-10-PM-PD Housing, W/Internal PD



| PIN # | Symbol |
|-------|--------|
| 1     | RF     |
| 2     | GND    |
| 3     | B      |
| 4     | PD-A   |
| 5     | PD-C   |

2. IMP-1064-10-PM Housing, No Internal PD



| PIN # | Symbol  |
|-------|---------|
| G     | GND     |
| B     | DC BIAS |



## 1310nm, 10 GHz Intensity Modulator, w/PM Output

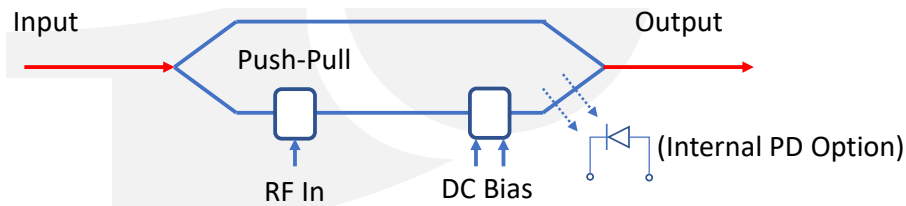
### FEATURES

- PM fiber output
- High input power
- Zero chirp design
- Internal PD option
- 1270-1330nm operating wavelength
- High Extinction Ratio (HER) Available
- Temperature range of -25°C to 70°C

### USE IN

- RF over fiber
- Pulse generation
- MOPA
- Analog modulation up to 10 GHz
- Active mode locked laser
- Satellite Link

### FUNCTIONAL DIAGRAM



### SPECIFICATIONS

|                          |                                |
|--------------------------|--------------------------------|
| Maximum Input Power      | 100 mW                         |
| Operating Wavelength     | 1270 nm to 1330 nm             |
| Chirp Value              | ± 0.1 max.                     |
| Insertion Loss           | 4 dB typ., 5.0 dB max.         |
| Extinction Ratio         | > 20 dB min                    |
| Optical Return Loss      | < -45 dB                       |
| S21 3 dB Bandwidth       | 10 GHz typ., 8 GHz min         |
| S11 Return Loss          | < -10 dB min up to 10 GHz      |
| $V_{\pi}$ (RF Port)      | < 6.6V typ @ 10 GHz.           |
| RF Input Power           | 27 dBm                         |
| Impedance (RF Port)      | 50 $\Omega$ typ.               |
| $V_{\pi}$ (DC Port)      | < 6 V @ DC                     |
| Impedance (Bias Port)    | 1 M $\Omega$ min.              |
| Internal PD Responsivity | > 10 mA/W                      |
| Operating Temperature    | -25 °C to +70 °C (standard)    |
| Storage Temperature      | -45 °C to +85 °C               |
| Operating Humidity       | 0% to 90% Relative Humidity    |
| Input/Output Fiber Type  | PANDA - PM 400um buffer        |
| Input Connector          | PM FC/APC                      |
| Output Connector         | PM FC/APC                      |
| Crystal Orientation      | X-cut, y-propagating           |
| Waveguide Process        | Annealed Proton Exchange (APE) |
| Bias Port Connector      | 2 Pins/4Pins Optional          |
| RF Port Connectors       | Anritsu K female               |
| Cabling                  | 900 um loose tubing            |
| Dimensions               | 66 mm x 22 mm x 9 mm           |

### GENERAL

### MECHANICAL

### ORDERING OPTIONS

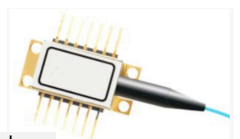
**IMP-1310-10-PM-XX**  
**XX** PD: Internal PD

- BCB-4



The Optilab BCB-4 is a compact bias control board designed for IMP-1310-10-PM modulator

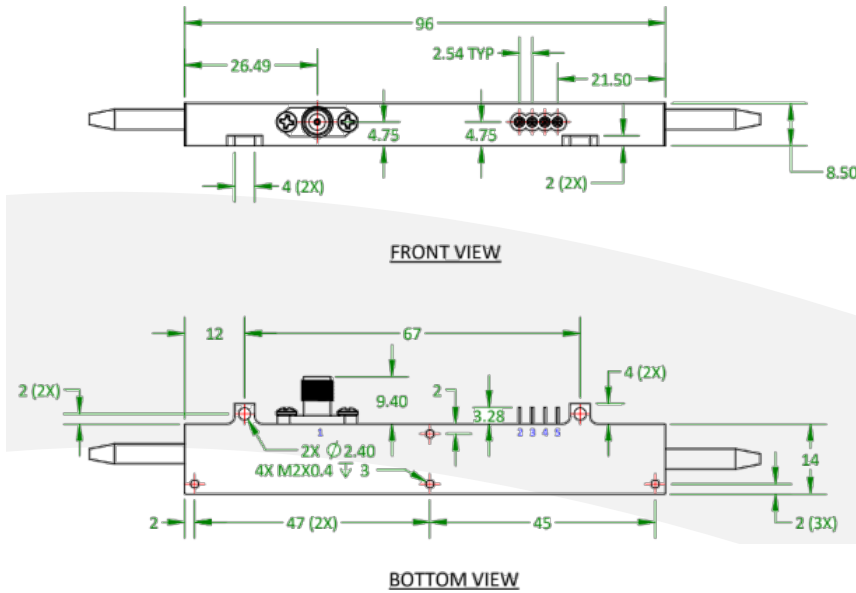
- **DFB Laser Source**



DFB-1310H-PM-100 laser has polarization maintaining high output power up to 100mW

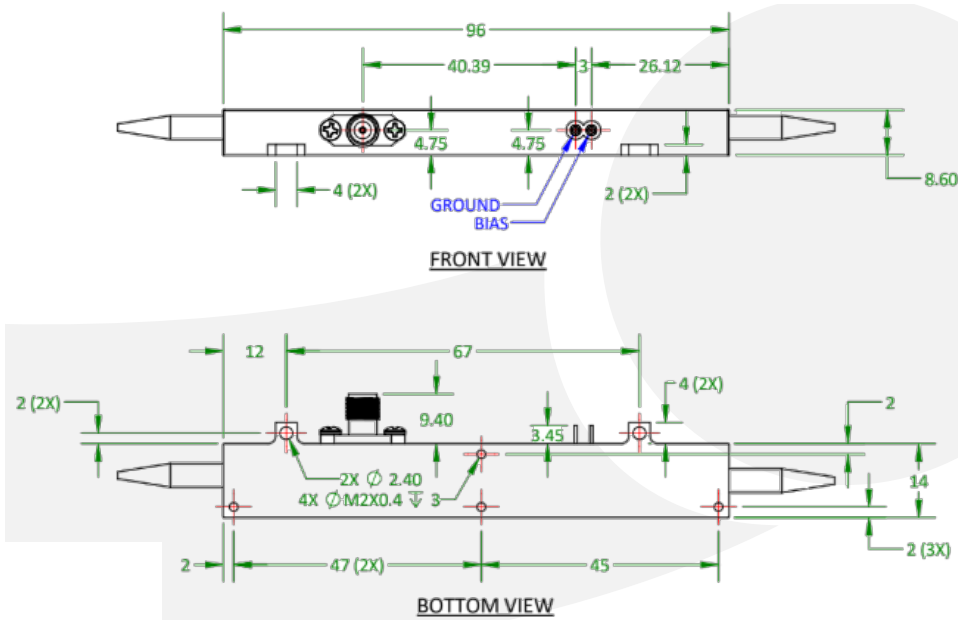
MECHANICAL DRAWING

1. IMP-1310-10-PM-PD Housing, W/Internal PD



| PIN # | Symbol |
|-------|--------|
| 1     | RF     |
| 2     | GND    |
| 3     | B      |
| 4     | PD-A   |
| 5     | PD-C   |

2. IMP-1310-10-PM Housing, No Internal PD



| PIN # | Symbol  |
|-------|---------|
| G     | GND     |
| B     | DC BIAS |



## 1550nm, 10 GHz Intensity Modulator, w/PM Output

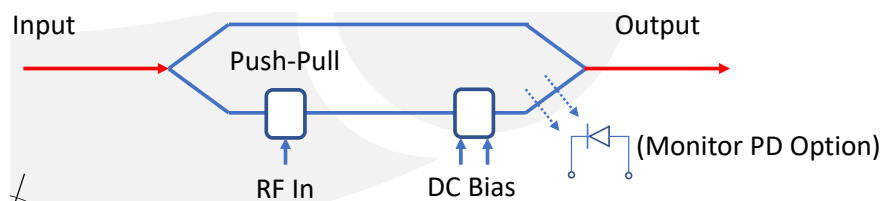
### FEATURES

- PM fiber output
- High input power
- Zero chirp design
- Internal PD option
- 1525-1605nm operating wavelength
- High Extinction Ratio (HER) Available
- Temperature range of -30°C to 70°C

### USE IN

- RF over fiber
- Pulse generation
- MOPA
- Analog modulation up to 10 GHz
- Active mode locked laser
- Satellite Link

### FUNCTIONAL DIAGRAM



### SPECIFICATIONS

|                               |                                |
|-------------------------------|--------------------------------|
| Maximum Input Power           | 100 mW                         |
| Operating Wavelength          | 1550 ± 30 nm                   |
| Chirp Value                   | ≤ 0.2 max.                     |
| Insertion Loss                | 4.5 dB typ., 5.0 dB max.       |
| Extinction Ratio              | Typ. 7 V, ≥ 23 dB.             |
| Optical Return Loss           | ≤ 40 dB                        |
| S21 3 dB Bandwidth            | ≥ 8 GHz typ.                   |
| Polarization Extinction Ratio | ≥ 17 dB, 20 dB typ.            |
| S11 Return Loss               | ≤ -10 dB DC to 7 GHz           |
| V <sub>π</sub> (RF Port)      | Typ. 7 V, 7.5 V max.           |
| RF Input Power                | 26 dBm max.                    |
| Impedance (RF Port)           | 50 Ω typ.                      |
| V <sub>π</sub> (DC Port)      | Typ. 7 V, 23 dB min.           |
| Impedance (Bias Port)         | 1 MΩ min.                      |
| Internal PD Responsivity      | > 10 mA/W                      |
| Operating Temperature         | -30 °C to +70 °C               |
| Storage Temperature           | -50 °C to +80 °C               |
| Operating Humidity            | 0% to 90% Relative Humidity    |
| Input/Output Fiber Type       | PANDA - PM 400um buffer        |
| Input Connector               | PM FC/APC                      |
| Output Connector              | PM FC/APC                      |
| Crystal Orientation           | X-cut, y-propagating           |
| Waveguide Process             | Annealed Proton Exchange (APE) |
| Bias Port Connector           | 2 Pins/4Pins Optional          |
| RF Port Connectors            | Anritsu K female               |
| Cabling                       | 900 um loose tubing            |
| Dimensions                    | 96 mm x 14 mm x 8.5 mm         |

### GENERAL

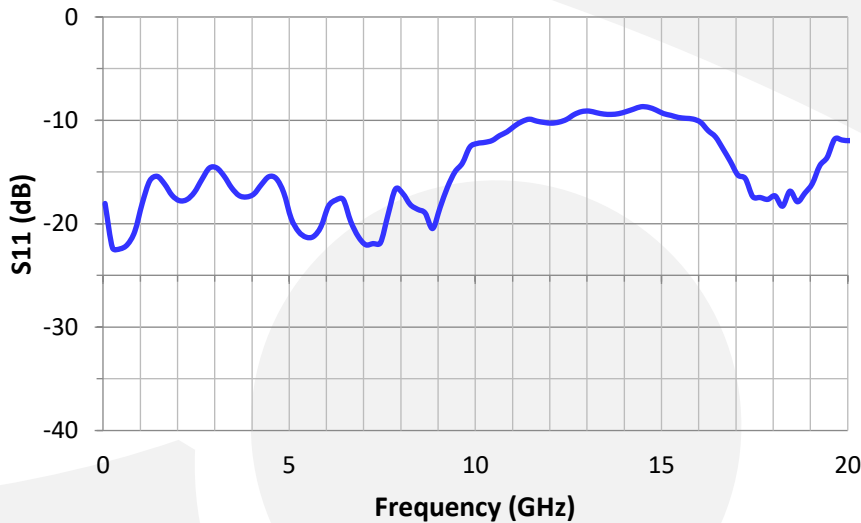
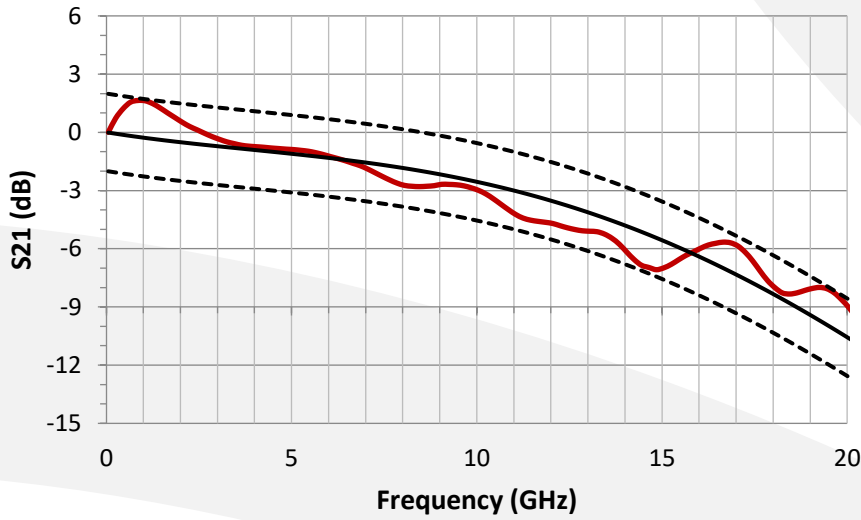
### MECHANICAL



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SAMPLE S21 AND S11 BANDWIDTH



ORDERING  
OPTIONS

**IMP-1550-10-PM-XX**  
**XX** PD: Monitor PD

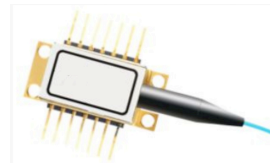
Available  
Automatic  
Bias Controller

- **BCB-4**



The Optilab BCB-4 is a compact bias control board designed for IMP-1550-10-PM modulator

- **DFB Laser Source**

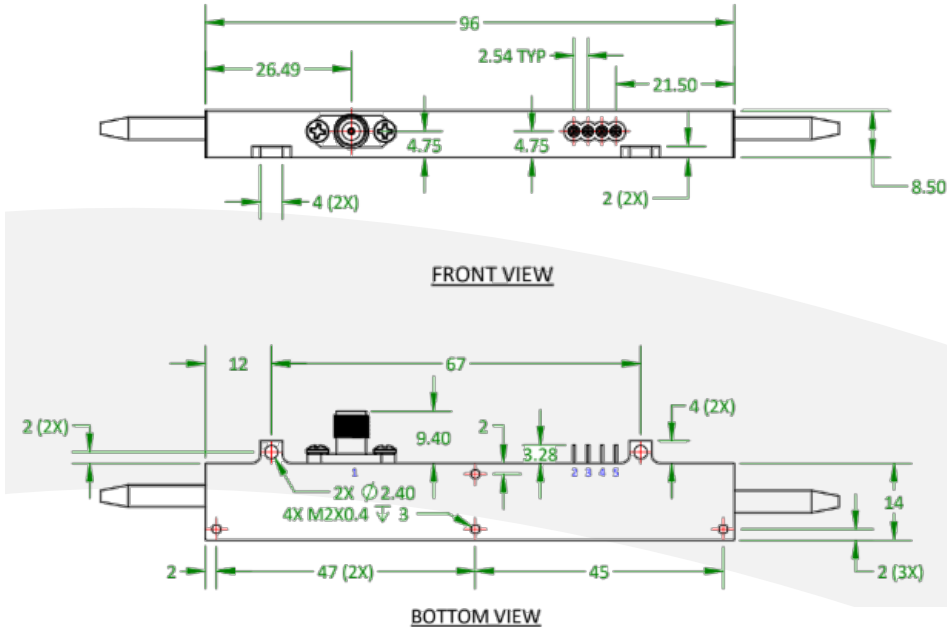


DFB-1550-PM-50 laser has polarization maintaining high output power up to 50mW



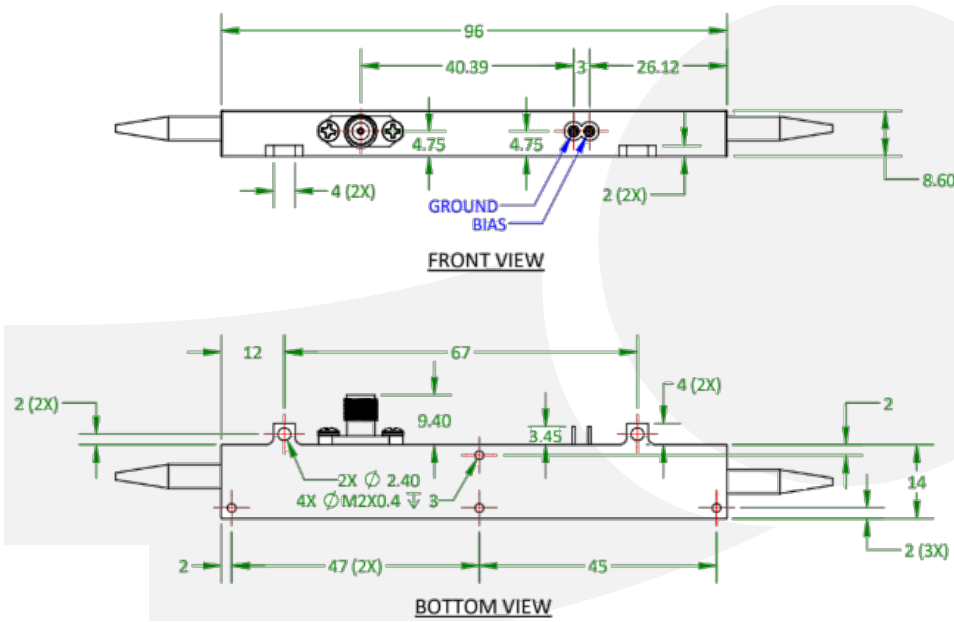
MECHANICAL DRAWING

1. IMP-1550-10-PM-PD Housing, w/Monitor PD



| PIN # | Symbol     |
|-------|------------|
| 1     | RF         |
| 2     | GND        |
| 3     | B          |
| 4     | PD-Anode   |
| 5     | PD-Cathode |

2. IMP-1550-10-PM Housing, No Monitor PD



| PIN # | Symbol  |
|-------|---------|
| G     | GND     |
| B     | DC BIAS |



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