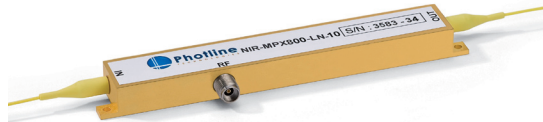


## NIR-MPX800 series

800 nm band Phase Modulators

### Modulator



#### Features

- High optical power handling
- High Bandwidth (> 10 GHz)
- High stability
- Low  $V_{\pi}$
- Low insertion loss

#### Applications

- Interferometric based sensors
- Quantum optics
- Frequency shifting

#### Options

- Hermetic sealing
- 20 GHz version
- 1060 nm, 1300 nm band versions

#### Related equipments

- RF amplifiers
- NIR-MX800-LN intensity modulators

The NIR-MPX800 series are phase modulators especially designed to operate in the 800 nm wavelength band. They are available with various modulation bandwidth, from low frequency to 10 GHz and beyond.

Like all Photline Technologies Near InfraRed (NIR) modulators, the NIR-MPX800 series use a proton exchanged based waveguide process that confers them an unparalleled stability and a high photo-refractive threshold.

#### NIR-MPX800-LN-0.1 series Performance Highlights

| Parameter                 | Min | Typ | Max | Unit |
|---------------------------|-----|-----|-----|------|
| Operating wavelength      | 780 | 850 | 890 | nm   |
| Electro-optical bandwidth | -   | 150 | -   | MHz  |
| $V_{\pi}$ RF @50 kHz      | -   | 2   | -   | V    |
| Insertion loss            | -   | 4   | -   | dB   |

Specifications given at 25 °C, 850 nm

#### NIR-MPX800-LN-05 series Performance Highlights

| Parameter                 | Min | Typ | Max | Unit |
|---------------------------|-----|-----|-----|------|
| Operating wavelength      | 780 | 850 | 890 | nm   |
| Electro-optical bandwidth | -   | 5   | -   | GHz  |
| $V_{\pi}$ RF @50 kHz      | -   | 5   | -   | V    |
| Insertion loss            | -   | 4   | -   | dB   |

Specifications given at 25 °C, 850 nm

#### NIR-MPX800-LN-10 series Performance Highlights

| Parameter                 | Min | Typ | Max | Unit |
|---------------------------|-----|-----|-----|------|
| Operating wavelength      | 780 | 850 | 890 | nm   |
| Electro-optical bandwidth | -   | 12  | -   | GHz  |
| $V_{\pi}$ RF @50 kHz      | -   | 7   | -   | V    |
| Insertion loss            | -   | 4   | -   | dB   |

Specifications given at 25 °C, 850 nm

## NIR-MPX800 series

### 800 nm band Phase Modulators



Delivering Modulation Solutions

**Modulator**

## NIR-MPX-800-LN-0.1

### 150 MHz Phase modulator

### Electrical Characteristics

| Parameter               | Symbol                         | Condition     | Min | Typ    | Max | Unit     |
|-------------------------|--------------------------------|---------------|-----|--------|-----|----------|
| Electro-optic bandwidth | $S_{21}$                       | RF electrodes | -   | 150    | -   | MHz      |
| $V_{\pi}$ RF @50 kHz    | $V_{\pi}$ RF <sub>50 kHz</sub> | RF electrodes | -   | 2      | 3   | V        |
| RF input impedance      | $Z_{in-RF}$                    | -             | -   | 10 000 | -   | $\Omega$ |

### Optical Characteristics All specifications given at 25 °C, 850 nm, unless differently specified

| Parameter            | Symbol | Condition          | Min                          | Typ | Max | Unit |
|----------------------|--------|--------------------|------------------------------|-----|-----|------|
| Crystal              | -      | -                  | Lithium Niobate X-Cut Y-Prop |     |     |      |
| Waveguide process    | -      | -                  | Proton exchange              |     |     |      |
| Operating wavelength |        | -                  | 780                          | 850 | 890 | nm   |
| Insertion loss       | IL     | Without connectors | -                            | 4   | 5   | dB   |
| Optical return loss  | ORL    | -                  | -40                          | -45 | -   | dB   |

### Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

| Parameter                | Symbol    | Min | Max | Unit |
|--------------------------|-----------|-----|-----|------|
| Modulation voltage range | $EV_{in}$ | -20 | 20  | V    |
| Optical input power      | $OP_{in}$ | -   | 13  | dBm  |
| Operating temperature    | OT        | 0   | +70 | °C   |
| Storage temperature      | ST        | -40 | +85 | °C   |

## NIR-MPX800 series 800 nm band Phase Modulators



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**Modulator**

## NIR-MPX-800-LN-05 5 GHz Phase modulator

### Electrical Characteristics

| Parameter               | Symbol                         | Condition                 | Min | Typ | Max | Unit     |
|-------------------------|--------------------------------|---------------------------|-----|-----|-----|----------|
| Electro-optic bandwidth | $S_{21}$                       | RF electrodes, from 2 GHz | 4   | 5   | -   | GHz      |
| Ripple $S_{21}$         | $S_{21}$                       | RF electrodes             | -   | 0.5 | 1   | dB       |
| Electrical return loss  | $ES_{11}$                      | RF electrodes             | -   | -12 | -10 | dB       |
| $V_{\pi}$ RF @50 kHz    | $V_{\pi}$ RF <sub>50 kHz</sub> | RF electrodes             | -   | 5   | 6   | V        |
| RF input impedance      | $Z_{in-RF}$                    | -                         | -   | 40  | -   | $\Omega$ |

### Optical Characteristics All specifications given at 25 °C, 850 nm, unless differently specified

| Parameter            | Symbol | Condition          | Min                          | Typ | Max | Unit |
|----------------------|--------|--------------------|------------------------------|-----|-----|------|
| Crystal              | -      | -                  | Lithium Niobate X-Cut Y-Prop |     |     |      |
| Waveguide process    | -      | -                  | Proton exchange              |     |     |      |
| Operating wavelength |        | -                  | 780                          | 850 | 890 | nm   |
| Insertion loss       | IL     | Without connectors | -                            | 4   | 5   | dB   |
| Optical return loss  | ORL    | -                  | -40                          | -45 | -   | dB   |

### Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

| Parameter             | Symbol    | Min | Max | Unit |
|-----------------------|-----------|-----|-----|------|
| RF input power        | $EP_{in}$ | -   | 28  | dBm  |
| Optical input power   | $OP_{in}$ | -   | 13  | dBm  |
| Operating temperature | OT        | 0   | +70 | °C   |
| Storage temperature   | ST        | -40 | +85 | °C   |

## NIR-MPX800 series 800 nm band Phase Modulators



Delivering Modulation Solutions

**Modulator**

## NIR-MPX-800-LN-10 10 GHz Phase modulator

### Electrical Characteristics

| Parameter               | Symbol                         | Condition                 | Min | Typ | Max | Unit     |
|-------------------------|--------------------------------|---------------------------|-----|-----|-----|----------|
| Electro-optic bandwidth | $S_{21}$                       | RF electrodes, from 2 GHz | 10  | 12  | -   | GHz      |
| Ripple $S_{21}$         | $S_{21}$                       | RF electrodes             | -   | 0.5 | 1   | dB       |
| Electrical return loss  | $ES_{11}$                      | RF electrodes             | -   | -12 | -10 | dB       |
| $V_{\pi}$ RF @50 kHz    | $V_{\pi}$ RF <sub>50 kHz</sub> | RF electrodes             | -   | 7   | 8   | V        |
| RF input impedance      | $Z_{in-RF}$                    | -                         | -   | 40  | -   | $\Omega$ |

### Optical Characteristics All specifications given at 25 °C, 850 nm, unless differently specified

| Parameter            | Symbol | Condition          | Min                          | Typ | Max | Unit |
|----------------------|--------|--------------------|------------------------------|-----|-----|------|
| Crystal              | -      | -                  | Lithium Niobate X-Cut Y-Prop |     |     |      |
| Waveguide process    | -      | -                  | Proton exchange              |     |     |      |
| Operating wavelength |        | -                  | 780                          | 850 | 890 | nm   |
| Insertion loss       | IL     | Without connectors | -                            | 4   | 5   | dB   |
| Optical return loss  | ORL    | -                  | -40                          | -45 | -   | dB   |

### Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

| Parameter             | Symbol    | Min | Max | Unit |
|-----------------------|-----------|-----|-----|------|
| RF input power        | $EP_{in}$ | -   | 28  | dBm  |
| Optical input power   | $OP_{in}$ | -   | 13  | dBm  |
| Operating temperature | OT        | 0   | +70 | °C   |
| Storage temperature   | ST        | -40 | +85 | °C   |

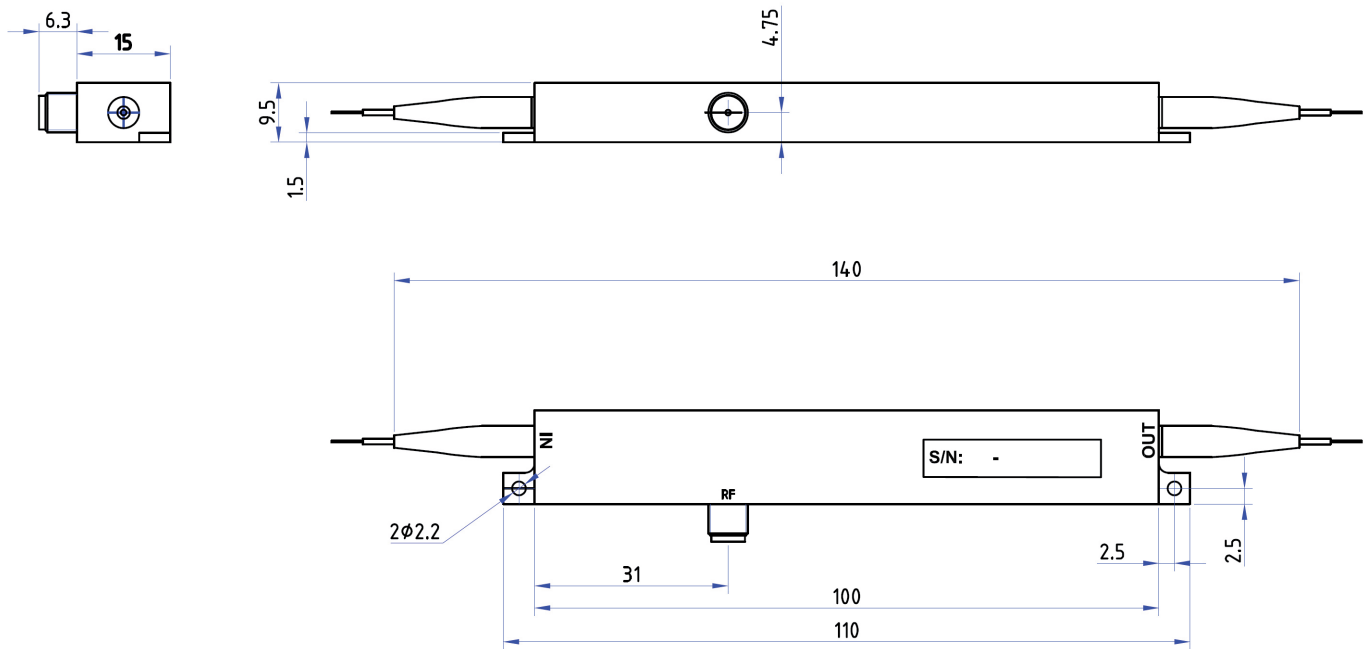
**NIR-MPX800 series**  
800 nm band Phase Modulators



Delivering Modulation Solutions

**Modulator**

**Mechanical Diagram and Pinout** All measurements in mm



| Port | Function            | Note   |
|------|---------------------|--|
| IN   | Optical input port  | Polarization maintaining fiber 800 nm, Corning 85-U25A, Length 1.5 meter. Buffer diameter 900 μm |
| OUT  | Optical output port | Polarization maintaining fiber 800 nm, Corning 85-U25A, Length 1.5 meter. Buffer diameter 900 μm |
| RF   | RF input port       | Wiltron female K   |

Ordering information

**NIR-MPX800-LN-XX-Y-Z-AB-CD**

**XX = Bandwidth :** 0.1 150 MHz 05 5 GHz 10 10 GHz

**Y = Input fiber :** P Polarisation maintaining S Standard single mode

**Z = Input fiber :** P Polarisation maintaining S Standard single mode

**AB = Output connector :** 00 bare fiber FA FC/APC FC FC/SPC

**CD = Output connector :** 00 bare fiber FA FC/APC FC FC/SPC

## NIR-MPX800 series 800 nm band Phase Modulators

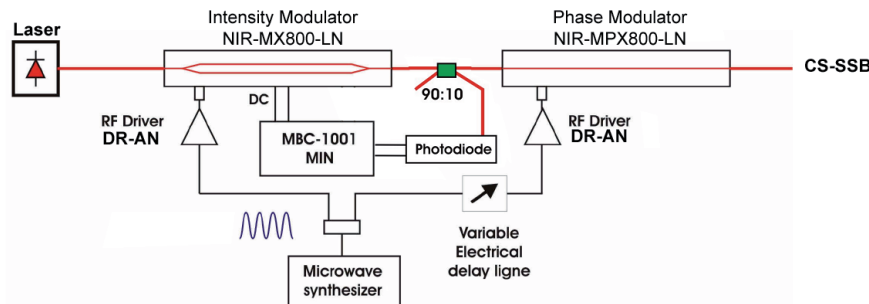


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**Modulator**

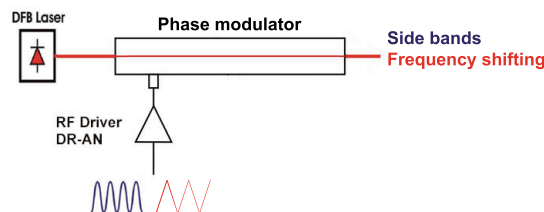
### Related equipments & Examples of application

#### Single Side Band with Carrier Supressed

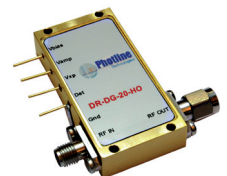


Efficient Single Side Band modulation and Carrier Suppression can be achieved by using a combination of Intensity and Phase modulators properly driven with DR-AN analog RF amplifiers.

#### Side Bands Generation / Frequency Shifting



DR-AN series amplifiers are high performance analog drivers for NIR-MPX800-LN-05 and NIR-MPX800-LN-10.



800 nm ModBoxes are custom designed Modulation Units and Transmitters. They incorporate a complete and dedicated modulation stage with power supply and control electronics and optional laser source and receiver. ModBoxes can be tailored to accommodate a broad variety of applications : pulse generation, pulse picking, spectral broadening, analog modulation, digital communication....

### ABOUT US

Photline Technologies is a provider of Fiber Optics Modulation Solutions based on the company LiNbO3 modulators and high-speed electronics modules. Photline Technologies offers high speed and high data rate modulation solutions for the telecommunication industry and the defense, aerospace, instruments and sensors markets. The products offered by the company include : comprehensive range of intensity and phase modulators (800 nm, 1060 nm, 1300 nm, 1550 nm), RF drivers and modules, transmitters and modulation units.

Photline Technologies  
phone : +33 (0) 381 853 180  
fax : +33 (0) 381 811 557  
16, rue Auguste Jouchoux  
F-25 000 Besançon

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