

FEATURES

- High optical power handling
- Wide bandwidth
- High stability
- Low V_{π}
- Low insertion loss

APPLICATIONS

- Interferometric based sensors
- Quantum optics
- Frequency shifting
- Pound-Drever-Hall locking (PDH)

OPTIONS

- Hermetic sealing
- 850 nm and 1060 nm versions

RELATED EQUIPMENTS

- RF amplifiers
- NIR-MX950 intensity modulators

The NIR-MPX950 series are phase modulators especially designed to operate in the 900 nm wavelength band. They are available with various modulation bandwidth, from low frequency to 20 GHz and beyond.

Like all ixblue Near InfraRed (NIR) modulators, the NIR-MPX950 series use a proton exchanged based waveguide process that confers them an unparalleled stability and a high photo-refractive threshold.

NIR-MPX950-LN-0.1 series Performance Highlights

| Parameter | Min | Typ | Max | Unit |
|---------------------------|-----|-----|-----|------|
| Operating wavelength | 850 | 900 | 950 | nm |
| Electro-optical bandwidth | 100 | 150 | - | MHz |
| V_{π} RF @50 kHz | - | 2.2 | - | V |
| Insertion loss | - | 3.5 | - | dB |

Specifications given at 25 °C, 950 nm.

NIR-MPX950-LN-05 series Performance Highlights

| Parameter | Min | Typ | Max | Unit |
|---------------------------|-----|-----|-----|------|
| Operating wavelength | 850 | 900 | 950 | nm |
| Electro-optical bandwidth | 5 | - | - | GHz |
| V_{π} RF @50 kHz | - | 3.5 | - | V |
| Insertion loss | - | 3.5 | - | dB |

Specifications given at 25 °C, 950 nm.

NIR-MPX950-LN-10 series Performance Highlights

| Parameter | Min | Typ | Max | Unit |
|---------------------------|-----|-----|-----|------|
| Operating wavelength | 850 | 900 | 950 | nm |
| Electro-optical bandwidth | 10 | 12 | - | GHz |
| V_{π} RF @50 kHz | - | 4.5 | - | V |
| Insertion loss | - | 3.5 | - | dB |

Specifications given at 25 °C, 950 nm.

NIR-MPX950-LN-20 series Performance Highlights

| Parameter | Min | Typ | Max | Unit |
|---------------------------|-----|-----|-----|------|
| Operating wavelength | 850 | 900 | 950 | nm |
| Electro-optical bandwidth | 16 | 20 | - | GHz |
| V_{π} RF @50 kHz | - | 4.5 | - | V |
| Insertion loss | - | 3.5 | - | dB |

Specifications given at 25 °C, 950 nm.

NIR-MPX950-LN-0.1 150 MHz Phase Modulator

Electrical Characteristics

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|--------------------------------|--------------------------------------|-----------|-----|--------|-----|----------|
| Electro-optic bandwidth @-3 dB | S_{21} | - | 100 | 150 | - | MHz |
| V_{π} RF @50 kHz | $V_{\pi \text{ RF } 50 \text{ kHz}}$ | - | - | 2.2 | 3.2 | V |
| RF input impedance | Z_{in-RF} | - | - | 10 000 | - | Ω |

Optical Characteristics

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|----------------------|-----------|----------------------------|---|-----|-----|------|
| Crystal | - | - | Lithium Niobate X-Cut Y-Prop, MgO doped | | | |
| Waveguide process | - | - | Proton exchange | | | |
| Operating wavelength | λ | - | 850 | 900 | 950 | nm |
| Insertion loss | IL | Without optical connectors | - | 3.5 | 5.5 | dB |
| Optical return loss | ORL | - | -40 | -45 | - | dB |

All specifications given at 25 °C, 944 nm, unless differently specified.

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 | $E_{V_{in}}$ | -20 | 20 | V |
| Optical input power (CW mode) | OP_{in} | - | +14 | dBm |
| Operating temperature | OT | 0 | +70 | °C |
| Storage temperature | ST | -40 | +85 | °C |

NIR-MPX950-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 | 5 | - | - | GHz |
| Ripple S_{21} | ΔS_{21} | - | - | 0.5 | 1 | dB |
| Electrical return loss | S_{11} | - | - | -12 | -10 | dB |
| V_{π} RF @ 50 kHz | $V_{\pi RF_{50\text{ kHz}}}$ | - | - | 3.5 | 4.5 | V |
| RF input impedance | Z_{in-RF} | - | - | 50 | - | Ω |

Optical Characteristics

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|----------------------|-----------|----------------------------|---|-----|-----|------|
| Crystal | - | - | Lithium Niobate X-Cut Y-Prop, MgO doped | | | |
| Waveguide process | - | - | Proton exchange | | | |
| Operating wavelength | λ | - | 850 | 900 | 950 | nm |
| Insertion loss | IL | Without optical connectors | - | 3.5 | 5.5 | dB |
| Optical return loss | ORL | - | -40 | -45 | - | dB |

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| Parameter | Symbol | Min | Max | Unit |
|-------------------------------|-----------|-----|-----|------|
| RF input power (CW mode) | EP_{in} | - | +28 | dBm |
| Optical input power (CW mode) | OP_{in} | - | +14 | dBm |
| Operating temperature | OT | 0 | +70 | °C |
| Storage temperature | ST | -40 | +85 | °C |

NIR-MPX950-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} | ΔS_{21} | - | - | 0.5 | 1 | dB |
| Electrical return loss | S_{11} | - | - | -12 | -10 | dB |
| V_{π} RF @50 kHz | V_{π} RF @50 kHz | - | - | 4.5 | 5.5 | V |
| RF input impedance | Z_{in-RF} | - | - | 50 | - | Ω |

Optical Characteristics

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|----------------------|-----------|--------------------|---|-----|-----|------|
| Crystal | - | - | Lithium Niobate X-Cut Y-Prop, MgO doped | | | |
| Waveguide process | - | - | Proton exchange | | | |
| Operating wavelength | λ | - | 850 | 900 | 950 | nm |
| Insertion loss | IL | Without connectors | - | 3.5 | 5.5 | dB |
| Optical return loss | ORL | - | -40 | -45 | - | dB |

All specifications given at 25 °C, 944 nm, unless differently specified.

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| Parameter | Symbol | Min | Max | Unit |
|-------------------------------|-----------|-----|-----|------|
| RF input power (CW mode) | EP_{in} | - | +28 | dBm |
| Optical input power (CW mode) | OP_{in} | - | +14 | dBm |
| Operating temperature | OT | 0 | +70 | °C |
| Storage temperature | ST | -40 | +85 | °C |

NIR-MPX950-LN-20

20 GHz Phase modulator

Electrical Characteristics

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|-------------------------|--------------------------------|---------------------------|-----|-----|-----|----------|
| Electro-optic bandwidth | S_{21} | RF electrodes, from 2 GHz | 16 | 20 | - | GHz |
| Ripple S_{21} | ΔS_{21} | - | - | 0.5 | 1 | dB |
| Electrical return loss | S_{11} | - | - | -12 | -10 | dB |
| V_{π} RF @50 kHz | V_{π} RF _{50 kHz} | - | - | 4.5 | 5.5 | V |
| RF input impedance | Z_{in-RF} | - | - | 50 | - | Ω |

Optical Characteristics

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|----------------------|-----------|--------------------|---|-----|-----|------|
| Crystal | - | - | Lithium Niobate X-Cut Y-Prop, MgO doped | | | |
| Waveguide process | - | - | Proton exchange | | | |
| Operating wavelength | λ | - | 850 | 900 | 950 | nm |
| Insertion loss | IL | Without connectors | - | 3.5 | 5.5 | dB |
| Optical return loss | ORL | - | -40 | -45 | - | dB |

All specifications given at 25 °C, 944 nm, unless differently specified.

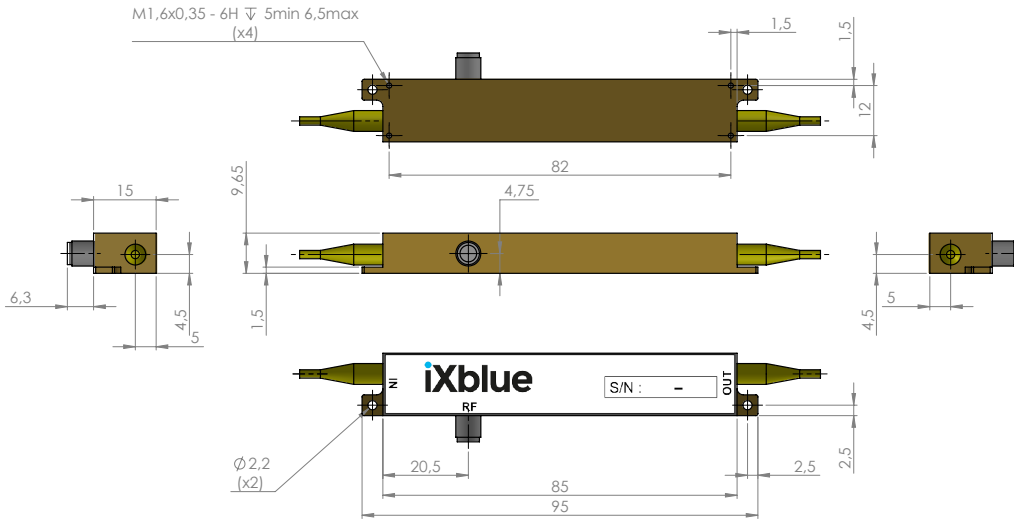
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| Operating temperature | OT | 0 | +70 | °C |
| Storage temperature | ST | -40 | +85 | °C |

Mechanical Diagram and Pinout

All measurements in mm



| Port | Function | Note |
|------|---------------------|---|
| IN | Optical input port | Polarization maintaining 800 nm Corning 85-U25D length : 1.5 meter, buffer diameter : 900 um |
| OUT | Optical output port | Polarization maintaining 800nm Corning 85-U25D length : 1.5 meter, buffer diameter : 900 um |
| RF | RF input port | Wiltron female K |

Ordering information

NIR-MPX950-LN-XX-00-P-P-AB-CD

XX = Bandwidth : 0.1 150 MHz 05 5 GHz 10 10 GHz 20 20 GHz
 P = Input fiber : P Polarisation maintaining
 P = Input fiber : P Polarisation maintaining
 AB = Output connector : 00 bare fiber FA FC/APC FC FC/SPC
 CD = Output connector : 00 bare fiber FA FC/APC FC FC/SPC

About us

ixblue Photonics produces specialty optical fibers and Bragg gratings based fiber optics components and provides optical modulation solutions based on the company lithium niobate (LiNbO₃) modulators and RF electronic modules.

ixblue Photonics serves a wide range of industries: sensing and instruments, defense, telecommunications, space and fiber lasers as well as research laboratories all over the world.