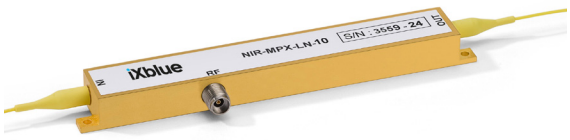
iXblue PHOTONICS

NIR-MPX-LN series

1000 nm band Phase Modulators

MODULATOR



The NIR-MPX series are phase modulators especially designed to operate in the 1000 nm wavelength band. They are available with various modulation bandwidths, from low frequency to 20 GHz and beyond.

Like all iXBlue Near InfraRed (NIR) modulators, the NIR-MPX series use a proton exchanged based waveguide process that confers them an unparalleled stability even when operating at high optical power. The NIR-MPX phase modulators come with high PER and low IL options.

FEATURES

- High optical power: 100 mW
- High Bandwidth version > 20 GHz
- High stability
- Low Vπ
- Low insertion loss

APPLICATIONS

- Interferometric based sensor
- Spectral broadening
- Frequency shifting
- Laser combining
- Pound-Drever-Hall locking (PDH)

OPTIONS

- 20 GHz version
- Hermetic sealing
- 800 nm, 950 nm versions
- High PER
- Lower Insertion Loss

RELATED EQUIPMENTS

- Matched RF amplifiers
- NIR-MX-LN intensity modulators

NIR-MPX-LN-0.1 Performance Highlights

Parameter	Min	Typ	Max	Unit
Operating wavelength	980	-	1150	nm
Electro-optical bandwidth	-	150	-	MHz
Vπ RF @50 kHz	-	2	-	V
Insertion loss (option LIL)	-	-	3	dB

Specifications given at 25 °C, 1060 nm

NIR-MPX-LN-02 Performance Highlights

Parameter	Min	Typ	Max	Unit
Operating wavelength	980	-	1150	nm
Electro-optical bandwidth	2	-	-	GHz
Vπ RF @50 kHz	-	3	-	V
Insertion loss (option LIL)	-	-	3	dB

Specifications given at 25 °C, 1060 nm

NIR-MPX-LN-05 Performance Highlights

Parameter	Min	Typ	Max	Unit
Operating wavelength	980	-	1150	nm
Electro-optical bandwidth	5	-	-	GHz
Vπ RF @50 kHz	-	4	-	V
Insertion loss (option LIL)	-	-	3	dB

Specifications given at 25 °C, 1060 nm

NIR-MPX-LN-10 and NIR-MPX-LN-20 Performance Highlights

Parameter	Min	Typ	Max	Unit
Operating wavelength	980	-	1150	nm
Electro-optical bandwidth	-	12 / 20	-	GHz
Vπ RF @50 kHz	-	5	-	V
Insertion loss (option LIL)	-	-	3	dB

Specifications given at 25 °C, 1060 nm

NIR-MPX-LN-0.1
150 MHz Phase Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optic bandwidth	S_{21}	RF electrodes, from 2 GHz	-	150	-	MHz
Vπ RF @50 kHz	$V\pi RF_{50\,kHz}$	RF electrodes	-	2	2.5	V
RF input impedance	$Z_{in\text{-}RF}$	-	-	10 000	-	Ω

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Waveguide process	-	-	Proton exchange			
Operating wavelength	λ	-	980	1060	1150	nm
Insertion loss	IL	Without connectors	-	3	4	dB
Low insertion loss option	LIL	Without connectors	-	-	3	dB
Polarization Extinction Ratio	PER	Standard, without connectors	20	-	-	dB
		Optional, w/ or w/o connectors	25	30	-	dB
Optical return loss	ORL	-	-40	-45	-	dB

All specifications given at 25°C, 1060 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	EV_{in}	-20	20	V
Optical input power	OP_{in}	-	20	dBm
Operating temperature	OT	0	+70	°C
Storage temperature	ST	-40	+85	°C

NIR-MPX-LN-02
2 GHz Phase Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optic bandwidth	S_{21}	-	2	-	-	GHz
Ripple S_{21}	ΔS_{21}	-	-	0.5	1	dB
Electrical return loss	S_{11}	-	-	-12	-10	dB
Vπ RF @50 kHz	$V\pi RF_{50\ kHz}$	-	-	3	4	V
RF input impedance	$Z_{in\text{-}RF}$	-	-	50	-	Ω

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Waveguide process	-	-	Proton exchange			
Operating wavelength	λ	-	980	1060	1150	nm
Insertion loss	IL	Without connectors	-	3	4	dB
Low insertion loss option	LIL	Without connectors	-	-	3	dB
Polarization Extinction Ratio	PER	Standard, without connectors	20	-	-	dB
		Optional, w/ or w/o connectors	25	30	-	dB
Optical return loss	ORL	-	-40	-45	-	dB

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Parameter	Symbol	Min	Max	Unit
RF input power	EP_{in}	-	33	dBm
Optical input power	OP_{in}	-	20	dBm
Operating temperature	OT	0	+70	°C
Storage temperature	ST	-40	+85	°C

NIR-MPX-LN-05
5 GHz Phase Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optic bandwidth	S_{21}	-	5	-	-	GHz
Ripple S_{21}	ΔS_{21}	-	-	0.5	1	dB
Electrical return loss	S_{11}	-	-	-12	-10	dB
Vπ RF @50 kHz	$V\pi RF_{50\ kHz}$	-	-	4	5	V
RF input impedance	$Z_{in\text{-}RF}$	-	-	50	-	Ω

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Waveguide process	-	-	Proton exchange			
Operating wavelength	λ	-	980	1060	1150	nm
Insertion loss	IL	Without connectors	-	3	4	dB
Low insertion loss option	LIL	Without connectors	-	-	3	dB
Polarization Extinction Ratio	PER	Standard, without connectors	20	-	-	dB
		Optional, w/ or w/o connectors	25	30	-	dB
Optical return loss	ORL	-	-40	-45	-	dB

All specifications given at 25°C, 1060 nm, unless differently specified

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Parameter	Symbol	Min	Max	Unit
RF input power	EP_{in}	-	33	dBm
Optical input power	OP_{in}	-	20	dBm
Operating temperature	OT	0	+70	°C
Storage temperature	ST	-40	+85	°C

NIR-MPX-LN-10
10 GHz Phase Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optic bandwidth	S_{21}	-	10	12	-	GHz
Ripple S_{21}	ΔS_{21}	-	-	0.5	1	dB
Electrical return loss	S_{11}	-	-	-12	-10	dB
Vπ RF @50 kHz	$V\pi RF_{50\ kHz}$	-	-	5	6	V
RF input impedance	$Z_{in\text{-}RF}$	-	-	50	-	Ω

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Waveguide process	-	-	Proton exchange			
Operating wavelength	λ	-	980	1060	1150	nm
Insertion loss	IL	Without connectors	-	3	4	dB
Low insertion loss option	LIL	Without connectors	-	-	3	dB
Polarization Extinction Ratio	PER	Standard, without connectors	20	-	-	dB
		Optional, w/ or w/o connectors	25	30	-	dB
Optical return loss	ORL	-	-40	-45	-	dB

All specifications given at 25°C, 1060 nm, unless differently specified

Absolute Maximum Ratings

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Parameter	Symbol	Min	Max	Unit
RF input power	EP_{in}	-	33	dBm
Optical input power	OP_{in}	-	20	dBm
Operating temperature	OT	0	+70	°C
Storage temperature	ST	-40	+85	°C

NIR-MPX-LN-20
20 GHz Phase Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optic bandwidth	S_{21}	-	16	20	-	GHz
Ripple S_{21}	ΔS_{21}	-	-	0.5	1	dB
Electrical return loss	S_{11}	-	-	-12	-10	dB
Vπ RF @50 kHz	$V\pi RF_{50\ kHz}$	-	-	5.5	6.5	V
RF input impedance	$Z_{in\text{-}RF}$	-	-	50	-	Ω

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Waveguide process	-	-	Proton exchange			
Operating wavelength	λ	-	980	1060	1150	nm
Insertion loss	IL	Without connectors	-	3	4	dB
Low insertion loss option	LIL	Without connectors	-	-	3	dB
Polarization Extinction Ratio	PER	Standard, without connectors	20	-	-	dB
		Optional, w/ or w/o connectors	25	30	-	dB
Optical return loss	ORL	-	-40	-45	-	dB

All specifications given at 25°C, 1060 nm, unless differently specified

Absolute Maximum Ratings

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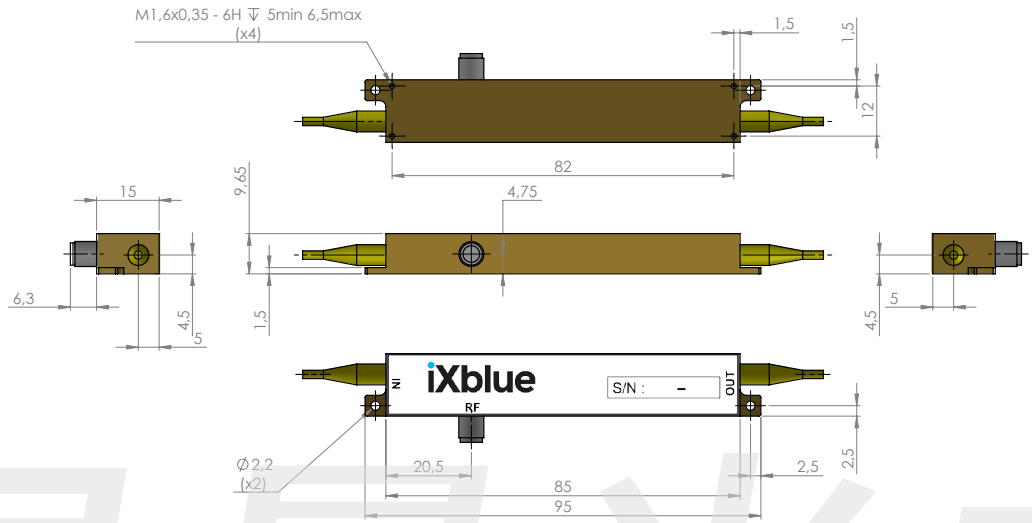
Parameter	Symbol	Min	Max	Unit
RF input power	EP_{in}	-	28	dBm
Optical input power	OP_{in}	-	20	dBm
Operating temperature	OT	0	+70	°C
Storage temperature	ST	-40	+85	°C

Mechanical Diagram and Pinout

All measurements in mm



Port	Function	Note
IN	Optical input port	Polarization maintaining fiber, Corning PM 98-U25D, Length 1.5 meter. Buffer diameter 900 µm
OUT	Optical output port	Polarization maintaining fiber, Corning PM 98-U25D, Length 1.5 meter. Buffer diameter 900 µm
RF	RF input port	Wiltron female K

Ordering information

NIR-MPX-LN-XX-Y-Z-AB-CD-LIL-PER

XX = Bandwidth : 0.1 150 MHz 02 2 GHz 05 5 GHz 10 10 GHz 20 20 GHz
Y = Input fiber : P Polarization maintaining S Standard single mode
Z = Output fiber : P Polarization maintaining S Standard single mode
AB = Input connector : 00 bare fiber FA FC/APC FC FC/SPC
CD = Output connector : 00 bare fiber FA FC/APC FC FC/SPC
LIL = Low Insertion Loss option
PER = High PER option

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 ($LiNbO_3$) 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.

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