

FEATURES

- High Bandwidth > 32 GHz
- C & L bands
- Low insertion loss
- Low V_{π}

APPLICATIONS

- Side bands generation
- Interferometric sensing
- Frequency shifting / broadening
- Quantum key distribution
- High data rate telecommunication

OPTIONS

- Hermetic sealing
- 1310nm versions
- 800 nm, 1000 nm, 2.0 mm versions
- Low residual intensity modulation

RELATED EQUIPMENTS

- Matched RF amplifiers

The MPX-LN and MPZ-LN series make up the most comprehensive range of electro-optic phase modulators available on the market for the 1550 nm wavelength band.

- The MPZ-LN series are ideally suited for high bandwidth operation at 10 GHz, 20 GHz and up to 40 GHz.
- The MPX-LN-0.1 has a high impedance input optimized for modulation frequencies below 150 MHz.

Designed using state-of-the-art and proven lithium niobate technology, MPX-LN and MPZ-LN phase modulators are easy to operate and to integrate. They offer high performance for all state of the art applications.

MPX-LN-0.1 Performance Highlights

Parameter	MPX-LN-0.1
Operating wavelength	1530 nm
Electro-optical bandwidth	150 MHz
V_{π} RF @50 kHz	3.5
Insertion loss	3 dB

Specifications given at 25 °C, 1550 nm

MPZ-LN series Performance Highlights

Parameter	MPZ-LN-10	MPZ-LN-20	MPZ-LN-40
Operating wavelength	1530 nm - 1580 nm		
Electro-optical bandwidth	12 GHz	20 GHz	32 GHz
V_{π} RF @50 kHz	5 V	7 V	7 V
Insertion loss	2.5 dB	2.5 dB	2.5 dB

Specifications given at 25 °C, 1550 nm

Modulator

MPX-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 _{50 kHz}	RF electrodes	-	3.5	4	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			
Waveguide process	-	-	Ti diffusion			
Operating wavelength	λ	-	1530	1550	1580	nm
Insertion loss	IL	Without connectors	-	3	4	dB
Optical return loss	ORL	-	-40	-45	-	dB

All specifications given at 25 °C, 1550 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

Modulator

MPZ-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	18	20	-	GHz
Ripple S_{21}	ΔS_{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 _{50 kHz}	RF electrodes	-	7	8	V
$V\pi$ RF @20 kHz	$V\pi$ RF _{20 kHz}	RF electrodes	-	9	10	V
Impedance matching	Z_{in-RF}	-	-	50	-	Ω

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Waveguide process	-	-	Ti diffusion			
Operating wavelength	λ	-	1530	1550	1580	nm
Insertion loss	IL	Without connectors	-	2.5	3.5	dB
Optical return loss	ORL	-	-40	-45	-	dB

All specifications given at 25 °C, 1550 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
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

MPZ-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}	RF electrodes	-	0.5	1	dB
Electrical return loss	ES_{11}	RF electrodes	-	-12	-10	dB
$V\pi$ RF @50 kHz	$V\pi_{RF_{50\text{ kHz}}}$	RF electrodes	-	5	6	V
$V\pi$ RF @10 kHz	$V\pi_{RF_{10\text{ kHz}}}$	RF electrodes	-	7	8	V
Impedance matching	Z_{in-RF}	-	-	50	-	Ω

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Waveguide process	-	-	Ti diffusion			
Operating wavelength	λ	-	1530	1550	1580	nm
Insertion loss	IL	Without connectors	-	2.5	3.5	dB
Optical return loss	ORL	-	-40	-45	-	dB

All specifications given at 25 °C, 1550 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
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

Modulator

MPZ-LN-40
40 GHz Phase Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optic bandwidth	S_{21}	RF electrodes, from 2 GHz	30	32	-	GHz
Ripple S_{21}	ΔS_{21}	RF electrodes	-	0.5	1	dB
Electrical return loss (0-30GHz)	ES_{11}	RF electrodes	-	-12	-10	dB
V_{π} RF @50 kHz	V_{π} RF _{50 kHz}	RF electrodes	-	7	8	V
V_{π} RF @30 kHz	V_{π} RF _{30 kHz}	RF electrodes	-	10	11	V
Impedance matching	Z_{in-RF}	-	-	50	-	Ω

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Waveguide process	-	-	Ti diffusion			
Operating wavelength	λ	-	1530	1550	1580	nm
Insertion loss	IL	Without connectors	-	2.5	3.5	dB
Optical return loss	ORL	-	-40	-45	-	dB

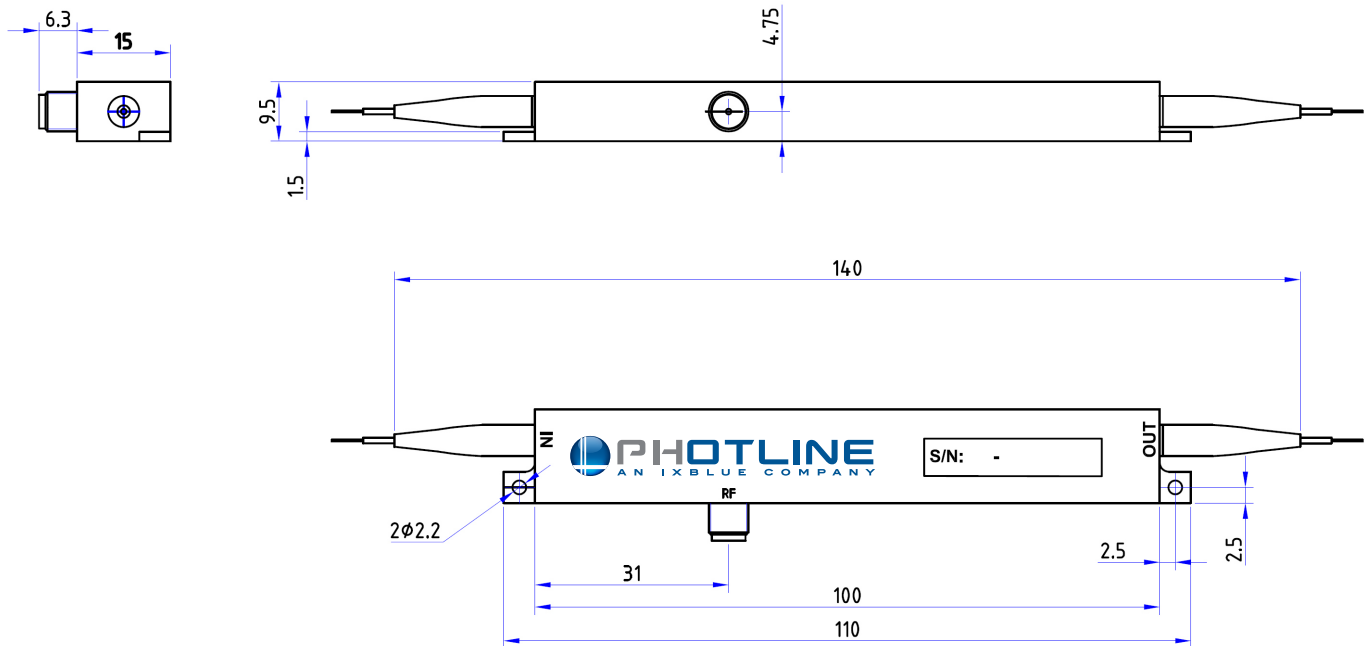
All specifications given at 25 °C, 1550 nm, unless differently specified

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
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 1550 nm, SM-15-P-8/125UV/UV400, Length 1.5 meter. Buffer diameter 900 mm
OUT	Optical output port	Polarization maintaining fiber 1550 nm, SM-15-P-8/125UV/UV400, Length 1.5 meter. Buffer diameter 900 mm
RF	RF input port	Wilton female K (V type for MPZ-LN-40)

Ordering information

MPX-LN-0.1-Y-Z-AB-CD MPZ-LN-WW-Y-Z-AB-CD

XX = X-cut Bandwidth : 0.1 150 MHz

WW = Z-cut Bandwidth : 10 10 GHz 20 20 GHz 40 40 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

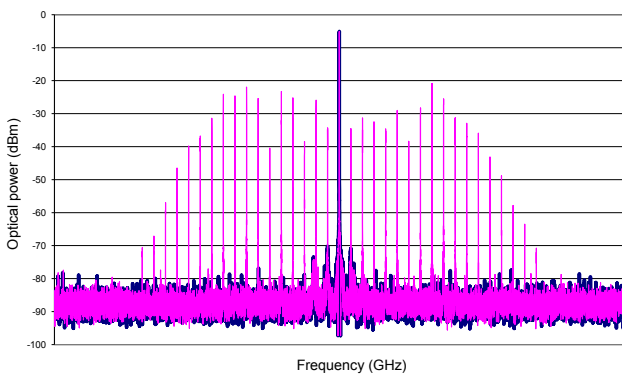
Note : optical connectors are Senko with narrow key or equivalent

Related equipments : Spectral Broadening ModBoxes

The spectral broadening of optical signals is a solution to suppress the Stimulated Brillouin Scattering (SBS) caused in optical fibers by high fluxes of highly coherent light.

The SBS degrades the signal integrity and prevents the proper transmission through the fiber. Under certain conditions, when amplification occurs for instance, the SBS can lead to the destruction of the fiber and the optical components along or forward the fiber. When the temporal coherence of the signal is destroyed, the SBS power threshold is significantly increased and thus its effects can be eliminated.

The Spectral Broadening ModBoxes achieve the spectral broadening of the optical signal by modulating its phase via the mean of a very efficient LiNbO₃ phase modulator and creating a number of lines over a spectral width that can reach several hundreds GHz.



The spectrally broadened optical signal



The spectral broadening ModBox

About us

Photline is a member of the **ixBlue** group of companies and 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, 2000 nm), RF drivers and modules, transmitters and modulation units.

ZI Les Tilleroyes - Trépillot
16, rue Auguste Jouchoux - 25 000 Besançon - FRANCE
Tel. : +33 (0) 381 853 180 - Fax : + 33 (0) 381 811 557

Photline reserves the right to change, at any time and without notice, the specifications, design, function or form of its products described herein. All statements, specification, technical information related to the products herein are given in good faith and based upon information believed to be reliable and accurate at the moment of printing. However the accuracy and completeness thereof is not guaranteed. No liability is assumed for any inaccuracies and as a result of use of the products. The user must validate all parameters for each application before use and he assumes all risks in connection with the use of the products