MODULATOR

MPX1300 and MPZ1300 series

Low frequencies to 20 GHz Phase Modulators

The Exail MPX1300 and MPZ1300 series are lithium niobate ($LiNbO_3$) phase modulators specially designed for operation in the 1310 nm wavelength band. Thanks to their O-Band optimized optical waveguides design and their 1310 nm selected fibers, the MPX1300 and MPZ1300 can be claimed genuine 1310 nm phase modulators.

- The MPZ1300-LN-10 is ideally suited for wide bandwidth operation up to 20 GHz.
- The MPX1300-LN-0.1 has a high impedance input optimized for modulation frequencies up to 300 MHz.



Designed using state-of-the-art and proven lithium niobate technology, MPX1300 and MPZ1300 series phase modulators are easy to operate and to integrate. These modulators come with a comprehensive range of options (DC Coupled, High Electric Power) to offer the highest performance for a wide range of applications from laboratory experiments to demanding industrial systems.

Features

- · Low and wide EO bandwidth
- · Full O-Band operation
- Low Vπ
- Low insertion loss

Applications

- · Side bands generation
- · Laser Combining
- · Interferometric sensing
- · Frequency shifting / broadening
- · Quantum Key Distribution (QKD)
- Pound-Drever-Hall locking (PDH)
- · High data rate telecommunications

Options

- DC coupled
- · Low residual intensity modulation
- · High electrical input power capability
- Optical E and S bands version

Related Equipments

- Matched RF amplifiers
- · MX, MXAN, MXER intensity modulators
- · Short optical pulse ModBox

MPX1300-LN-0.1 Phase Modulators Highlights

Parameter

Operating wavelength	1270 nm - 1360 nm
Usable Electro-optical bandwidth	300 MHz
Vπ RF @50 kHz	3 V
Insertion loss	3 dB

MPZ1300-LN-10 Phase Modulators Highlights

Parameter

Operating wavelength	1270 nm - 1360 nm
Usable electro-optical bandwidth	20 GHz
Vπ RF @50 kHz	4 V
Insertion loss	3.3 dB



MPX1300-LN-0.1

Up to 300 MHz Phase Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Тур	Max	Unit	
Electro-optical bandwidth	S ₂₁	-	-	150	-	MHz	
Usabe electro-optical bandwidth	S ₂₁	-	-	300	-	MHz	
- Vπ RF @50 kHz	Vπ _{RF 50 kHz}	-	-	3	3.5	V	
RF Input Impedance	Z _{in-RF}	-	-	10 000	-	Ω	

Optical Characteristics

Parameter	Symbol	Condition	Min	Тур	Max	Unit
Crystal	-	-	Lithium Niobo	ite X-Cut Y-Pro	р	
Waveguide process	-	-	Ti diffusion			
Operating wavelength	λ	-	1270	1310	1360	nm
Insertion loss	IL	Without optical connectors	* -	3	4	dB
Optical return loss	ORL	-	-40	-45	-	dB

All specifications given at 25 °C, 1310 nm, unless differently specified. $^{(1)}$ Consider an extra-loss up to 0.25 dB for each FC/APC optical connector

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	



MPZ1300-LN-10

Up to 20 GHz Phase Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Тур	Max	Unit
Electro-optical bandwidth	S ₂₁	-	10	12	-	GHz
Usable electro-optical bandwidth	S ₂₁	-	_	20	-	GHz
Ripple S ₂₁	ΔS_{21}	-	_	0.5	1	dB
Electrical return loss	C	-	_	-17	-13	dB
	S ₁₁	HEP option	-	-14	-10	dB
Vπ RF @50 kHz	Vπ _{RF 50 kHz}	-	_	3.3	4	V
	Vπ _{RF 10 GHz}	-	-	4.5	5.5	V
RF impedance matching	Z _{in-RF}	-	_	50	-	Ω
Vπ DC electrodes	Vπ _{DC}	DCC option, housing #B	-	3.3	6	V
DC port impedance matching	Z _{in-DC}	DCC option, housing #B	1	-	-	ΜΩ
DC port impedance matching	Z _{in-DC}	DCC option only	1	-	-	ΜΩ

Optical Characteristics

Parameter	Symbol	Condition	Min	Тур	Max	Unit
Crystal	-	-	Lithium Nioba	te Z-Cut Y-Prop)	
Waveguide process	-	-	Ti diffusion			
Operating wavelength	λ	-	1270	1310	1350	nm
Insertion loss	IL	Without optical connectors	* -	2.5	3.5	dB
Optical return loss	ORL	-	-40	-45	-	dB

All specifications given at 25 $^{\circ}\text{C}$, 1310 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	Condition	Min	Тур	Max	Unit
RF input power	EP_in	-	-	-	+28	dBm
High electrical input power option	HEP _{in}	HEP option	_	-	+33	dBm
Optical input power	OP _{in}	For optimal performance	-	-	+12	dBm
		Before failure	_	-	+20	dBm
Bias voltage range	V_{DCC}	DCC option, housing #B	-15	-	+15	V
Operating temperature	OT	=	0	-	+70	°C
Storage temperature	ST	_	-40	-	+85	°C

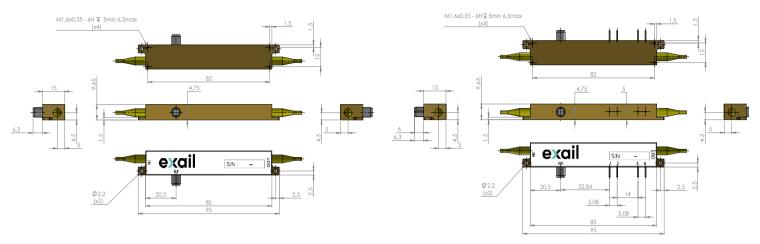


⁽¹⁾ Consider an extra-loss up to 0.25 dB for each FC/APC optical connector

MODULATOR | MPX1300-LN AND MPZ1300-LN SERIES | 4/4

Mechanical Diagram and Pinout

All measurements in mm

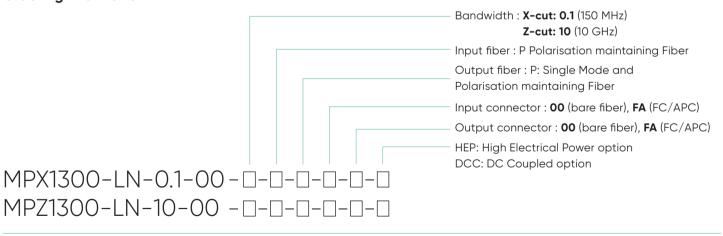


Housing #A: Standard Modulator housing

Housing #B: Modulator housing with DCC option

Port	Function	Housing	Note
IN	Optical input port	#A & #B	Polarization maintaining fiber 1310 nm, PM13-U25D, length: 1.5 meter, Buffer diameter: 900 µm
OUT	Optical output port	#A & #B	Polarization maintaining fiber 1310 nm, PM13-U25D, length: 1.5 meter, Buffer diameter: 900 µm
RF	RF input port	#A & #B	Female K (SMA comptatible)
PINS 1 / 2	Ground / DC	#B	Pin feed through diameter 1.0 mm
PINS 3 / 4	Not connected / Not connected	#B	Pin feed through diameter 1.0 mm

Ordering information



About us

Exail 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.

Exail 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.

Exail 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, Exail provides no warranty (whether express or implied or statutory) as to the description, sufficiency, accuracy or completeness, merchantability or fitness for a particular purpose of any information or specification detailed herein. No liability is assumed for any inaccuracies and/or as a result of use of the products. The user must validate all parameters for each application before any use and he shall assume all risks and responsibilities in connection with the use of the products.