iXblue PHOTONICS

LASER COMPONENTS®

MODULATOR

MPX2000 / MPZ2000 series

2 µm band low frequencies to 16 GHz Phase Modulators

The MPX2000 and MPZ2000 are phase modulators especially designed for phase modulation in the 2.0 µm wavelength band from low frequencies to 16 GHz and above. The MPX/MPZ2000 incorporate 2.0 µm specific waveguides and are pigtailed with 2.0 µm polarization maintaining fibers.

Features

- Low insertion loss
- Low Vπ
- 2.0 µm specific design

Applications

- LIDAR
- Gas sensing
- Spectral broadening
- Beam combining
- Spectroscopy
- Seed source
- Research & development
- Pound-Drever-Hall locking (PDH)

Options

- Low insertion loss
- Low Residual Amplitude modulation
- High electrical input power capability
- Space grade version

Related Equipements

- MX2000 Intensity modulator
- Matched RF amplifiers
- Spectral broadening ModBox
- Coherent Beam Combining ModBox CBC

MPX2000-LN-0.1 Performance Highlights*

Parameter	Min	Typ	Max	Unit
Operating wavelength	1900	2000	2200	nm
Usable electro-optical bandwidth	–	300	–	MHz
Vπ RF @50 kHz	–	5	–	V
Insertion loss	–	3	–	dB

*Specifications given at 25 °C, 2050 nm

MPZ2000-LN-10 Performance Highlights*

Parameter	Min	Typ	Max	Unit
Operating wavelength	1900	2000	2200	nm
Usable electro-optical bandwidth	–	16	–	GHz
Vπ RF @50 kHz	–	6.5	–	V
Insertion loss	–	3	4	dB

*Specifications given at 25 °C, 2050 nm

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MODULATOR | **MPX2000** / **MPZ2000 SERIES** | 2/4
MPX2000-LN-0.1
300 MHz Phase Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optical bandwidth	S_{21}	RF electrodes	100	150	–	MHz
Usable electro-optical bandwidth	S_{21}	RF electrodes	–	300	–	MHz
Vπ RF @50 kHz	$V\pi_{RF\ 50\ kHz}$	RF electrodes	–	3.5	–	V
RF input impedance	Z_{in-RF}	–	–	10	–	kΩ

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	–	–	Lithium Niobate X-Cut Y-Prop			
Waveguide process	–	–	Ti diffusion			
Operating wavelength	λ	–	1900	2000	2200	nm
Insertion loss	IL	Without optical connectors*	–	3	5	dB
Optical return loss	ORL	–	–40	–45	–	dB

All specifications given at 25 °C, 2050 nm, unless differently specified.
(*) 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

MODULATOR | **MPX2000 / MPZ2000 SERIES** | 3/4
MPZ2000-LN-10
16 GHz Phase Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optical bandwidth	S_{21}	–	10	12	–	GHz
Usable electro-optical bandwidth	S_{21}	–	–	16	–	GHz
Ripple S_{21}	ΔS_{21}	–	–	0.5	1	dB
Electrical return loss	S_{11}	–	–	–12	–10	dB
Vπ RF @50 kHz	$V\pi_{RF\ 50\ kHz}$	–	–	6.5	7.5	V
Impedance matching	Z_{in-RF}	–	–	50	–	Ω

50 Ω RF input

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	–	–	Lithium Niobate Z-Cut Y-Prop			
Waveguide process	–	–	Ti diffusion			
Operating wavelength	λ	–	1900	2000	2200	nm
Insertion loss	IL	Without optical connectors*	–	3	4	dB
Optical return loss	ORL	–	–40	–45	–	dB

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[*] Consider an extra-loss up to 0.25 dB for each FC/APC optical connector

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Parameter	Symbol	Min	Max	Unit
RF input power	EP_{in}	–	28	dBm
High electrical input power option	HEP_{in}	–	33	dBm
Optical input power	OP_{in}	–	20	dBm
Operating temperature	OT	0	+70	°C
Storage temperature	ST	–40	+85	°C

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MODULATOR | **MPX2000** / **MPZ2000 SERIES** | 4/4

Mechanical Diagram and Pinout

All measurements in mm
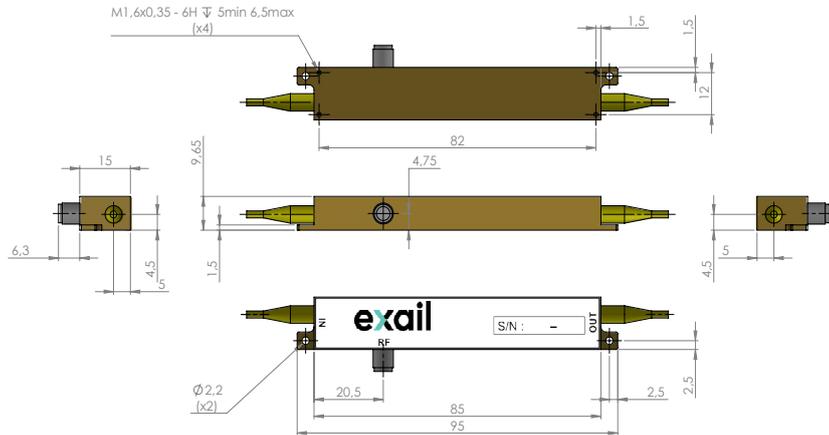
Port	Function	Note
IN	Optical input port	2000 nm Polarization maintaining fiber Nufern PM1950 Length: 1.5 meter
OUT	Optical output port	2000 nm Polarization maintaining fiber Nufern PM1950 Length: 1.5 meter
RF	RF input port	Female K (SMA comptatible)

Ordering Information

Bandwidth : **01** (150 MHz), **10** (10 GHz)

Input fiber: P Polarization maintaining

Output fiber: P Polarization maintaining

Input connector: **00** (bare fiber), **FA** (FC/APC)

Output connector: **00** (bare fiber), **FA** (FC/APC)

HEP (High Electrical Power) for MPZ2000-LN-10 only
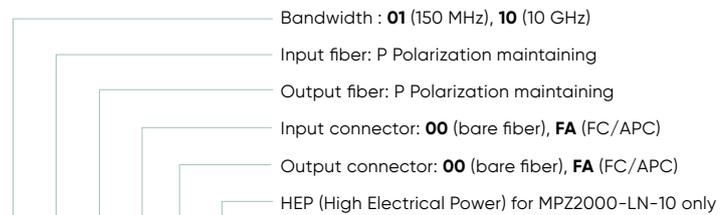
MPX/MPZ2000-LN-☐-☐-☐-☐-☐-☐

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.