

The MPX2000 and MPZ2000 are phase modulators specially designed for phase modulation in the 2.0 μm wavelength band from low frequencies to 10 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  $V_{\pi}$
- 2 μm specific design

### APPLICATIONS

- LIDAR
- Gas sensing
- Spectral broadening
- Spectroscopy
- Seed source
- Research & development

### OPTIONS

- Lower Insertion Loss
- Low Residual Amplitude Modulation

### RELATED EQUIPMENTS

- MX2000 Amplitude modulator
- 2 MHz to 500 MHz amplifiers
- Matched RF amplifiers
- Spectral Broadening ModBox

### MPX2000-LN-0.1 Performance Highlights

Parameter	Min	Typ	Max	Unit
Operating wavelength	1900	2000	2200	nm
Electro-optical bandwidth	100	150	-	MHz
$V_{\pi}$ 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	2050	2200	nm
Electro-optical bandwidth	10	12	-	GHz
$V_{\pi}$ RF @50 kHz	-	6.5	-	V
Insertion loss	-	3	4	dB

Specifications given at 25 °C, 2050 nm

## MPX2000-LN-0.1 150 MHz Phase Modulator

### Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optic bandwidth	$S_{21}$	-	100	150	-	MHz
$V_{\pi}$ RF @50 kHz	$V_{\pi}$ RF <sub>50 kHz</sub>	-	-	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	$\lambda$	-	1900	2000	2200	nm
Insertion loss	IL	Without connectors	-	3	5	dB
Optical return loss	ORL	-	-40	-45	-	dB

All specifications given at 25 °C, 2050 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

## MPZ2000-LN-10 10 GHz Phase Modulator

### Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optic bandwidth	$S_{21}$	-	10	12	-	GHz
Ripple $S_{21}$	$\Delta S_{21}$	-	-	0.5	1	dB
Electrical return loss	$S_{11}$	-	-	-12	-10	dB
$V_{\pi}$ RF @ 50 kHz	$V_{\pi RF_{50\text{ kHz}}}$	-	-	6.5	7.5	V
Impedance matching	$Z_{in-RF}$	-	-	50	-	$\Omega$

### Optical Characteristics

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

All specifications given at 25 °C, 2050 nm, unless differently specified

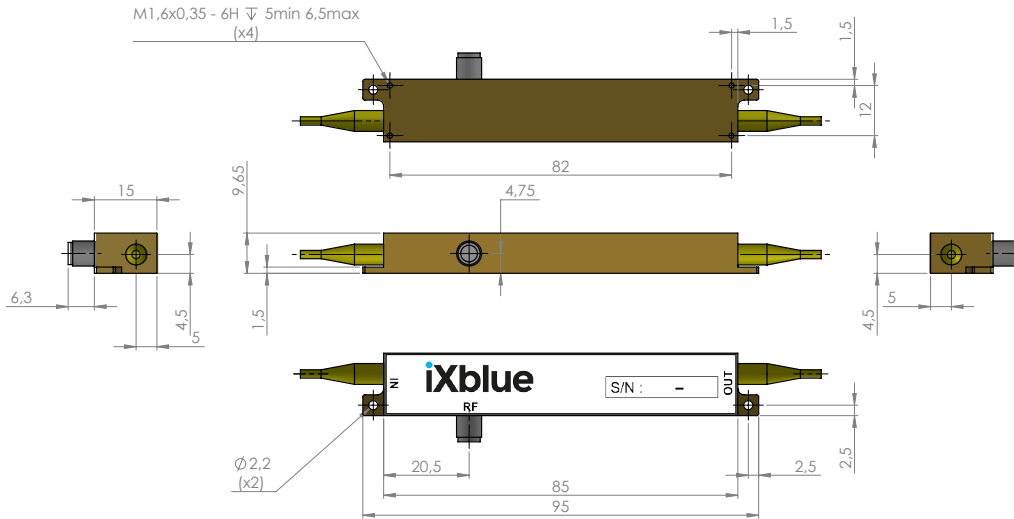
### Absolute Maximum Ratings

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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

**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	Wiltron female K (SMA compatible)

**Ordering information**

MPX2000-LN-0.1-00-P-P-AB-CD / MPZ2000-LN-10-00-P-P-AB-CD-HEP

- P = Single Mode and Polarization Maintaining fiber
- P = Single Mode and Polarization Maintaining fiber
- AB = Input connector: 00 bare fiber FA FC/APC FC FC/SPC
- CD = Output connector: 00 bare fiber FA FC/APC FC FC/SPC
- HEP = High Electrical Power option for the MPZ2000-LN-10 only
- Note : optical connectors are Senko with narrow key or equivalent

**About us**

ixblue Photonics includes ixblue iXfiber brand that produces specialty optical fibers and Bragg gratings based fiber optics components and ixblue Photline brand that provides optical modulation solutions based on the company lithium niobate (LiNbO<sub>3</sub>) 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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