Photline TECHNOLOGIES

Delivering Modulation Solutions

MX2000-LN-01

2000 nm band 1 GHz Intensity Modulator
Preliminary data-sheet

Modulator

The MX2000-LN-01 is an intensity modulator especially designed for operation in the 2.0 µm wavelength band at frequencies up to 1 GHz.

This Mach-Zehnder modulator offers engineers working at 2.0 µm the intrinsic and unparalleled benefits of $LiNb0_3$ external modulation : high bandwidth, high contrast, ease of use. The MX2000-LN-01 is based a X-cut design that confers it an unparalleled stability. It incorporates 2.0 µm specific waveguides and is pigtailed with 2.0 µm polarization maintaining fibers.

FEATURES

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

APPLICATIONS

- LIDAR
- Gas sensing
- Mid-IR wavelength generation
- Spectroscopy
- Seed source
- Research & development

OPTIONS

- Hermetic sealing
- Higher modulation bandwidths

RELATED EQUIPMENTS

- Choice of RF drivers
- MBC-DG Automatic Bias Controllers

Performance Highlights

Parameter	Min	Typ	Max	Unit
Operating wavelength	1900	-	2200	nm
Insertion loss	-	4	-	dB
Electro-optical bandwidth	1	2	-	GHz
Vπ RF @50 kHz	-	5.5	-	V

Specifications given at 25 °C, 50 Ω, 2050 nm

Electrical Characteristics **50 Ω RF input**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optic bandwidth	S_{21}	RF electrodes, from 500 MHz	1	2	-	GHz
Ripple S21	ΔS21	RF electrodes, f < 2 GHz	-	0.5	1	dB
Electrical return loss	ES_{11}	RF electrodes, f < 2 GHz	-	-12	-10	dB
Vπ RF @50 kHz	$V\pi RF_{50\ kHz}$	RF electrodes	-	5.5	6.5	V
Vπ DC electrodes	VπDC	DC electrodes	-	11.5	13	V
RF input impedance	$Z_{in\text{-}RF}$	-	-	40	-	Ω
DC input impedance	$Z_{in\text{-}DC}$	-	-	1	-	MΩ

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

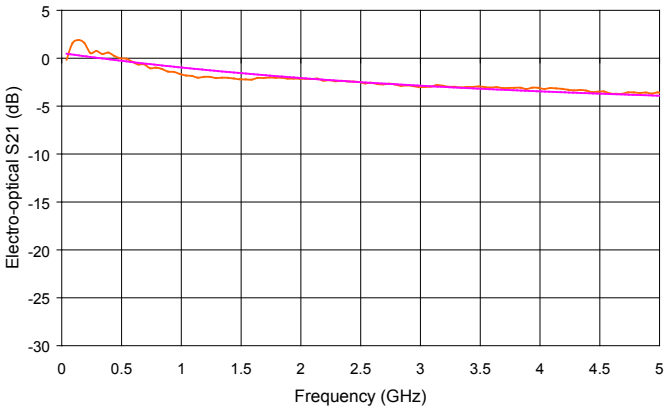
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Operating wavelength	λ	-	1900	2050	2200	nm
Insertion loss	IL	Without connectors	-	4	5.5	dB
DC extinction ratio	ER	Measured with narrow source linewidth < 200 MHz	20	22	-	dB
Optical return loss	ORL	-	-40	-45	-	dB
Chirp	α	-	-0.1	0	0.1	–

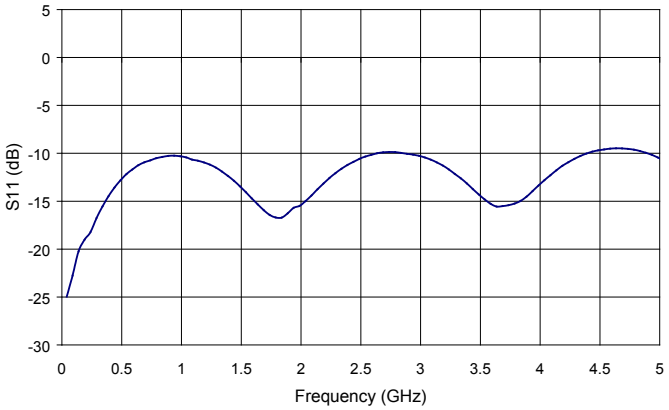
Absolute Maximum Ratings

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
Bias voltage	V_{bias}	-20	+20	V
Optical input power	OP_{in}	-	20	dBm
Operating temperature	OT	0	+70	°C
Storage temperature	ST	-40	+85	°C

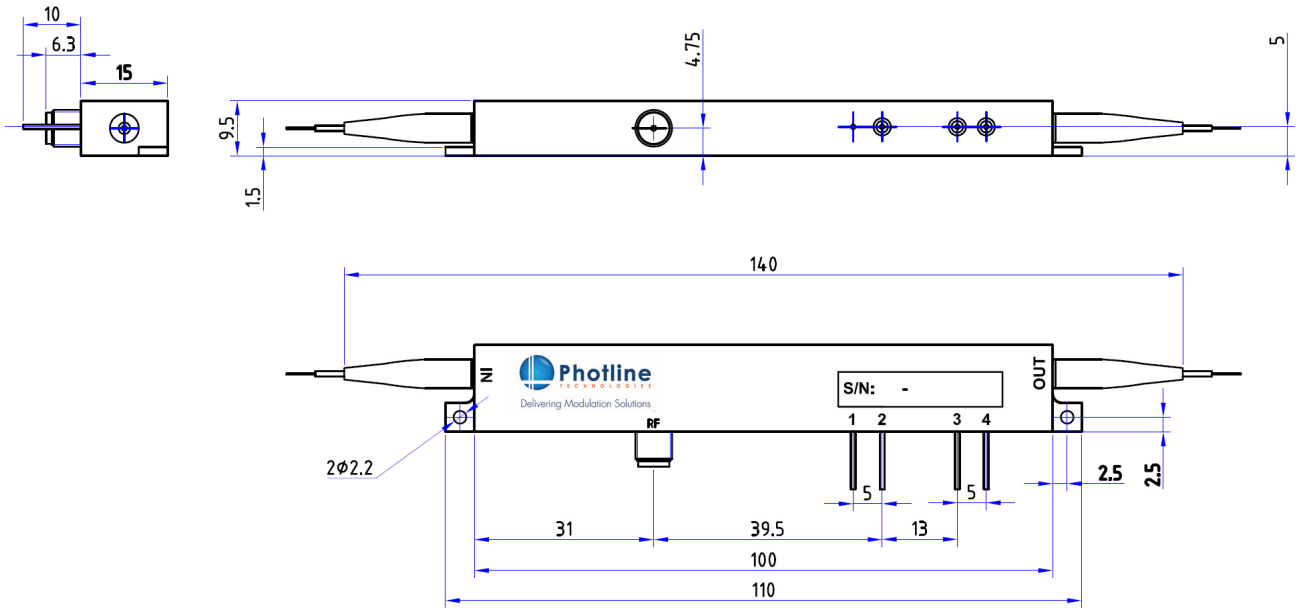
S21 & S11 Parameter Curves at RF input port





Mechanical Diagram and Pinout

All measurements in mm



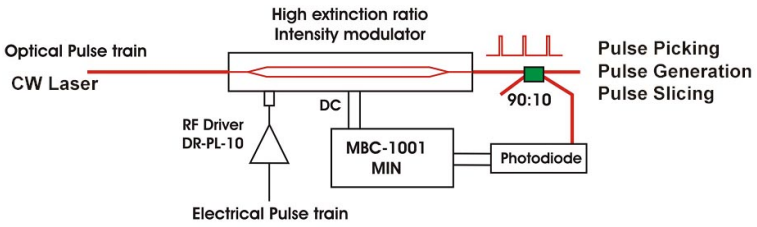
Port	Function	Note
IN	Optical input port	2000 nm Polarization maintaining fiber, Nufern PM1950 length : 1.5 meter
OUT	Optical output port	2000 nm Polarization maintaining fiber, Nufern PM1950 length : 1.5 meter
RF	RF input port	Wiltron female K (SMA compatible)
1	Ground	Pin feed through diameter 1.0 mm
2	DC	Pin feed through diameter 1.0 mm
3	Photodiode cathode	Pin feed through diameter 1.0 mm
4	Photodiode anode	Pin feed through diameter 1.0 mm

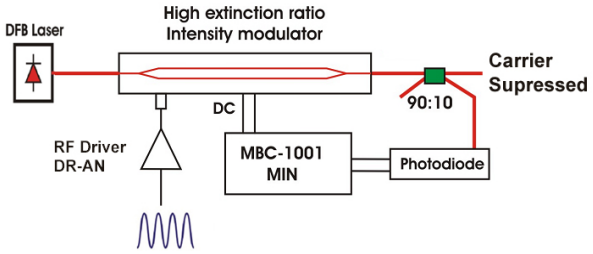
Ordering information

MX2000-LN-01-XX-Y-Z-AB-CD

XX = Internal photodiode : 00 Not integrated PD PD Integrated
Y = Input fiber : P Polarisation maintening S Standard single mode
Z = Input fiber : P Polarisation maintening 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 Seikoh-Giken with narrow key or equivalent

Related equipments





Pulse Generation / Picking / Slicing

DR-PL series amplifiers are designed to drive MX2000-LN-01 modulators so as to generate undistorted optical pulses.

MBC-DG-BT is an automatic bias controller that locks the operating point of the MX2000-LN-01 modulators. When paired with the proper modulator, MBC-DG-BT can achieve an extinction ratio up to 50 dB.

Carrier suppressed / Analog modulation

DR-AN series modules are wideband RF amplifiers designed to drive optical modulators at frequencies up to 40 GHz.

MBC-DG-BT is continuously tunable : it can lock on any point of the modulator transfer curve, and adapt to a variety of applications.

Pulse ModBoxes are turnkey optical transmitters and benchtop modulation units for pulse applications. They can be tailored to specific pulse applications : generation, picking, splicing.

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About us

Photline Technologies is a provider of Fiber Optics Modulation Solutions based on the company $LiNbO_3$ 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.

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