



FEATURES

- 1310 nm specific waveguides and fibers
- X-cut for high stability
- Low drive voltage
- Low insertion loss

APPLICATIONS

- 12.5 Gb/s digital communications
- General purpose intensity modulation
- Test and measurement

OPTIONS

- 20 Gb/s & 40 Gb/s versions
- Analog version
- 1060 nm, 850 nm band versions
- Hermetic sealing

RELATED EQUIPMENTS

- Choice of RF drivers
- MBC-DG Automatic Bias Controllers
- D-type Flip-Flop

The MX1300-LN-10 is a lithium niobate (LiNbO₃) intensity modulator specially designed for operation in the 1310 nm wavelength band. Thanks to its 1310 nm optimized optical waveguides and its 1310 nm selected fibers, the MX1300-LN-10 can be claimed a genuine 1310 nm intensity modulator.

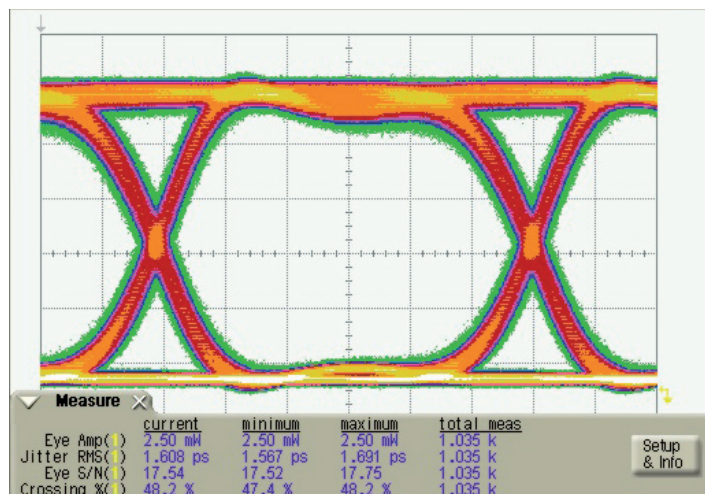
The X-cut design of this Mach-Zehnder modulator confers it an unmatched stability in a wide range of operational conditions, as well as a zero chirp performance. Photline Technologies proprietary waveguide design offers a low insertion loss combined with a high contrast. Thanks to its low V_{π} , the MX1300-LN-10 is ideally suited for 10-12.5 Gb/s optical transmission with NRZ, RZ, DPSK, Duo Binary modulation formats and is also a key device for a large variety of applications.

Performance Highlights

Parameter	Min	Typ	Max	Unit
Operating wavelength	1290	-	1330	nm
Insertion loss	-	3.5	-	dB
Electro-optical bandwidth	-	12	-	GHz
V_{π} RF @50 kHz	-	4.5	-	V

Specifications given at 25 °C, 50 Ω , 1310 nm

10 Gb/s NRZ Eye Diagram diagram



Electrical Characteristics 50 Ω RF input

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optic bandwidth	S_{21}	RF electrodes, -3dB from 2 GHz	10	12	-	GHz
Ripple S21	ΔS_{21}	RF electrodes	-	0.5	1	dB
Electrical return loss	ES_{11}	RF electrodes, $f < 10$ GHz	-	-12	-10	dB
V_{π} RF @50 kHz	$V_{\pi RF_{50\text{ kHz}}}$	RF electrodes	-	4.5	5.5	V
V_{π} RF @10 GHz PRBS	$V_{\pi RF_{10\text{ GHz}}}$	RF electrodes	-	6	7	V
V_{π} DC electrodes	$V_{\pi DC}$	DC electrodes	-	5.5	6.5	V
RF input impedance	Z_{in-RF}	-	-	40	-	Ω
DC input impedance	Z_{in-DC}	-	1	-	-	MΩ

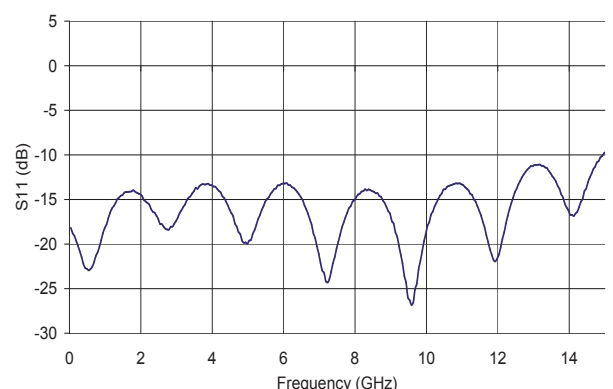
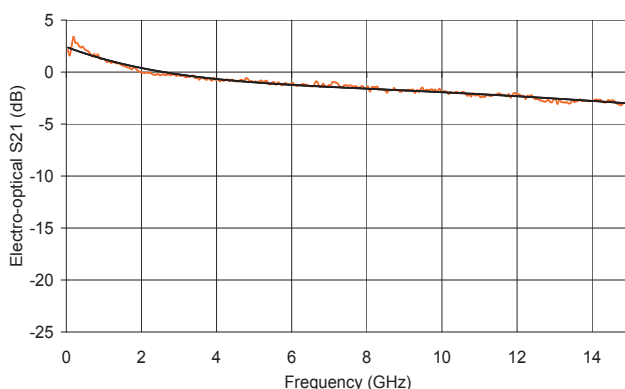
Optical Characteristics All specifications given at 25°C, 1310 nm, unless differently specified

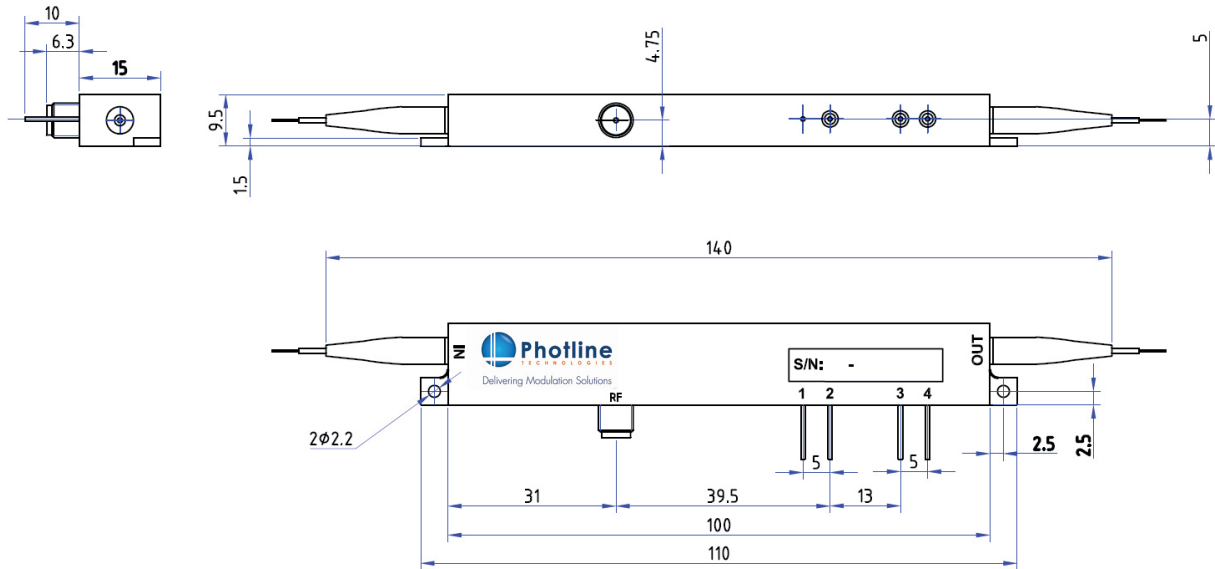
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Operating wavelength	λ	-	1290	1310	1330	nm
Insertion loss	IL	Without connectors	-	3.5	5	dB
DC extinction ratio	ER	Measured with narrow source linewidth < 200 MHz	20	22	-	dB
Optical return loss	ORL	-	-40	-45	-	dB
Chirp	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

Typical S21 & S11 Parameters Curves


Mechanical Diagram and Pinout All measurements in mm


Port	Function	Note
IN	Optical input port	1310 nm Polarization maintaining fiber, PM13-U25A length : 1.5 meter, buffer diameter : 900 um
OUT	Optical output port	1310 nm Polarization maintaining fiber, PM13-U25A length : 1.5 meter, buffer diameter : 900 um
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
MX1300-LN-10-XX-Y-Z-AB-CD

BW = Bandwidth : 10 10 GHz

XX = Internal photodiode : 00 Not integrated PD PD Integrated

Y = Input fiber : P Polarisation maintaining S Standard single mode

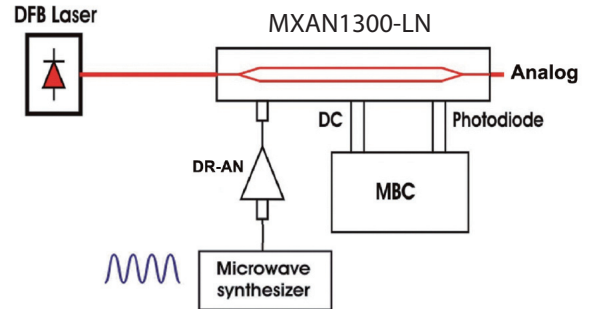
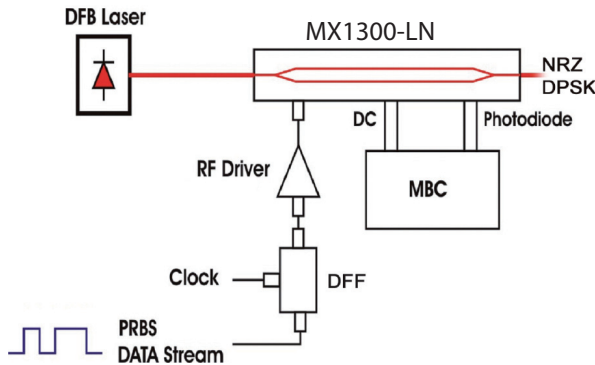
Z = Input fiber : P Polarisation maintaining S Standard single mode

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 Seikoh-Giken with narrow key or equivalent

Related equipments



OOK-NRZ, DPSK transmission

DR-DG series amplifiers are designed to drive MX1300-LN at one and two times V_T for NRZ and DPSK modulation scheme.

MBC-DG-BT is an automatic bias controller that locks the operating point of the MX1300-LN modulators.

DFF-DG-30 is a D-type Flip Flop module intended for NRZ retiming and reshaping PRBS data-stream.



Carrier suppressed / Analog modulation

DR-AN amplifiers series are a wideband amplifiers modules designed for analog applications at frequencies up to 40 GHz.

MBC-DG-BT is an automatic bias controller designed to lock the operating point of the MXAN1300-LN modulators.



ModBoxes are a family of turnkey Optical Modulation Units and Transmitters for optical communications and pulse applications.

ModBoxes are available at 1300 nm for 10 Gb/s NRZ, 28 Gb/s NRZ, 44 Gb/s NRZ, DQPSK, analog modulation and pulse generation. They can be tailored to match the specific requirements of a wide range of applications.

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.