MODULATOR

NIR-MX800-LN series

800 nm band 10 & 20 GHz Intensity Modulators

The NIR-MX800-LN series are 10 GHz and 20 GHz intensity modulators especially designed for operation in the 800 nm wavelength band.

NIR-MX800 Mach-Zehnder modulators offer engineers working in the 800 nm band the intrinsec and unparalleled benefits of $LiNbO_3$ modulation: high bandwidth, high contrast and ease of use.

NIR-MX800 series Intensity Modulators use proton exchange waveguide process on a doped $LiNbO_3$ substrat. This unique combination confers them an unparalleled stability and a superior optical power handling.

FEATURES

- High Bandwidth
- X-cut for high stability
- High optical power handling
- Low drive voltage
- Low insertion loss

APPLICATIONS

- Quantum optics
- 850 nm 100 GbE testing
- Pulse generation / picking

OPTIONS

- High extinction ratio > 30 dB
- Lower insertion loss
- 950 nm band modulators versions

RELATED EQUIPMENTS

- RF amplifiers
- MBC Automatic Bias Controllers
- NIR-MPX800 Phase Modulators
- Modbox 850 nm 28 Gb/s NRZ

NIR-MX800-LN-10 Performance Highlights

Parameter	Min	Typ	Max	Unit
Operating wavelength	780	-	850	nm
Insertion loss	-	4.5	-	dB
Optical input power	-	-	14	dBm
Electro-optical bandwidth	-	12	-	GHz
Vπ RF @50 kHz	-	3.5	-	V
Electrical return loss	-	12	-	dB

Specifications given at 25 °C, 780 nm or 850 n

NIR-MX800-LN-20 Performance Highlights

Parameter	Min	Typ	Max	Unit
Operating wavelength	780	-	850	nm
Insertion loss	-	4.5	-	dB
Optical input power	-	-	14	dBm
Electro-optical bandwidth	-	25	-	GHz
Vπ RF @50 kHz	-	3.5	-	V
Electrical return loss	-	12	-	dB

Specifications given at 25 °C, 780 nm or 850 nm

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NIR-MX800-LN-10

10 GHz Intensity Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optical bandwidth	S_{21}	RF electrodes, from 2 GHz	10	12	-	GHz
Ripple S_{21}	ΔS_{21}	RF electrodes, f < 10 GHz	-	0.5	1	dB
Electrical return loss	S_{11}	RF electrodes	-	-12	-10	dB
Vπ RF @50 kHz	$V\pi_{RF\ 50\ kHz}$	RF electrodes	-	3.5	4.5	V
Vπ DC electrodes	$V\pi_{DC}$	DC electrodes	-	3.5	4.5	V
Impedance matching	$Z_{in\text{-}RF}$	-	-	50	-	Ω
DC input impedance	$Z_{in\text{-}DC}$	-	-	1	-	MΩ

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Operating wavelength	λ	-	780	800	850	nm
Insertion loss	IL	Without connectors	-	4.5	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	-

All specifications given at 25 °C, 780 nm or 850 nm

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}	-	14	dBm
Operating temperature	OT	0	+70	°C
Storage temperature	ST	-40	+85	°C

NIR-MX800-LN-20

20 GHz Intensity Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optical bandwidth	S_{21}	RF electrodes, from 2 GHz	20	25	-	GHz
Ripple S_{21}	ΔS_{21}	RF electrodes, f < 20 GHz	-	0.5	1	dB
Electrical return loss	S_{11}	RF electrodes, f < 20 GHz	-	-13	-10	dB
Vπ RF @50 kHz	$V\pi_{RF\ 50\ kHz}$	RF electrodes	-	3.5	4.5	V
Vπ DC electrodes	$V\pi_{DC}$	DC electrodes	-	3.9	4.5	V
Impedance matching	$Z_{in\text{-}RF}$	-	-	50	-	Ω
DC input impedance	$Z_{in\text{-}DC}$	-	-	1	-	MΩ

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Operating wavelength	λ	-	780	800	850	nm
Insertion loss	IL	Without connectors	-	4.5	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	-

All specifications given at 25 °C, 780 nm or 850 nm

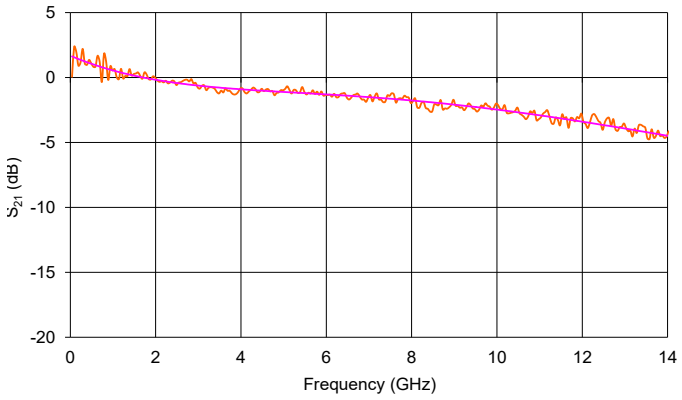
Absolute Maximum Ratings

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.

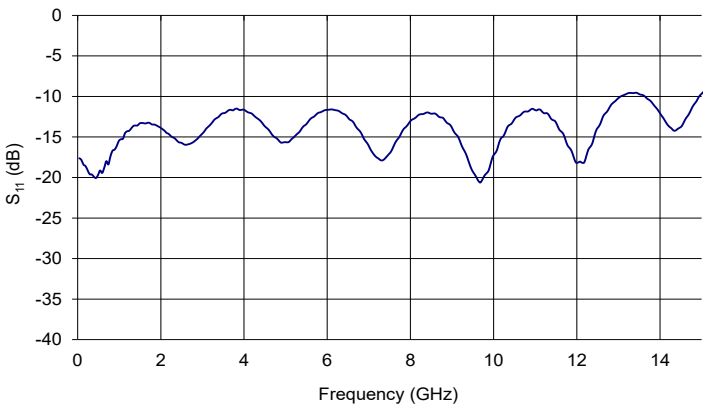
Parameter	Symbol	Min	Max	Unit
RF input power	EP_{in}	-	28	dBm
Bias Voltage	V_{bias}	-20	+20	V
Optical input power	OP_{in}	-	14	dBm
Operating temperature	OT	0	+70	°C
Storage temperature	ST	-40	+85	°C

NIR-MX800-LN-10 & 20

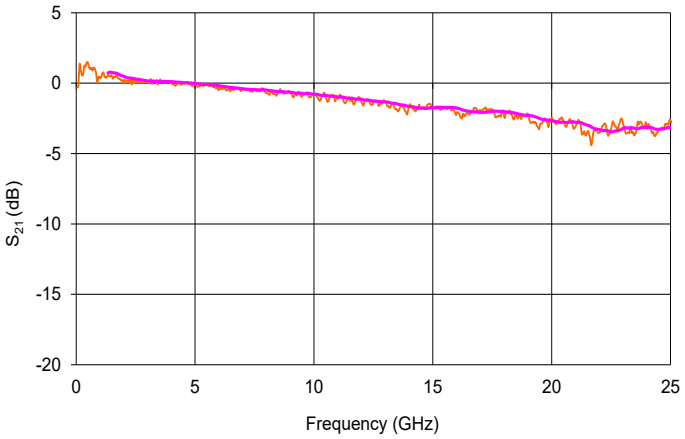
NIR-MX800-LN-10 Typical S_{21} Curve



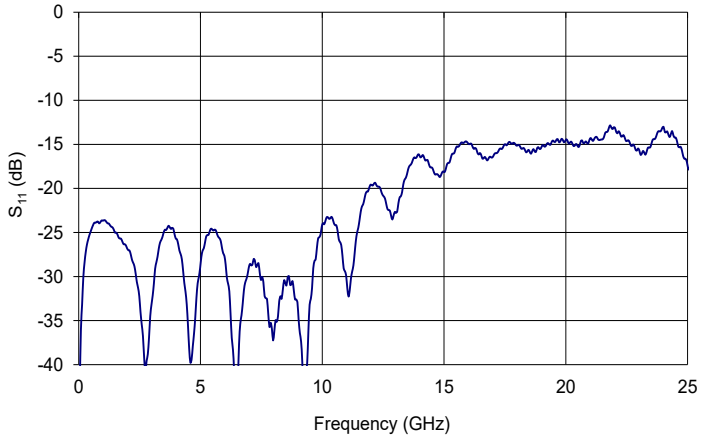
NIR-MX800-LN-10 Typical S_{11} Curve



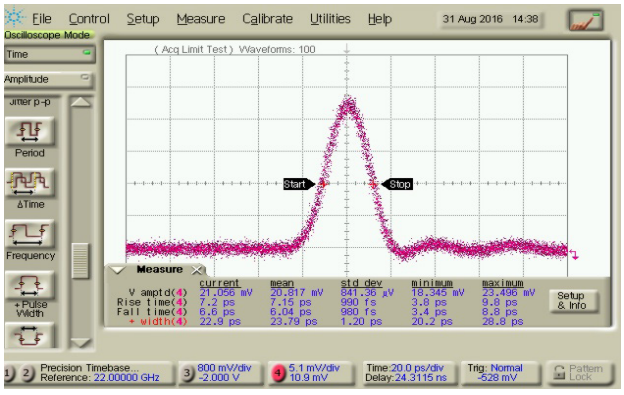
NIR-MX800-LN-20 Typical S_{21} Curve



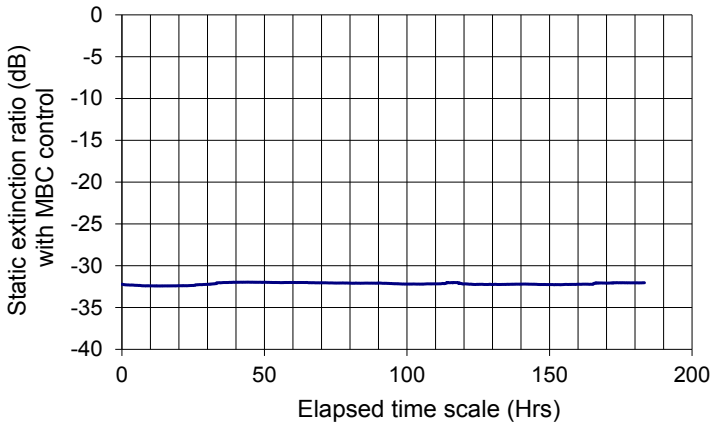
NIR-MX800-LN-20 Typical S_{11} Curve



NIR-MX800-LN-20: 30 ps Square Pulse

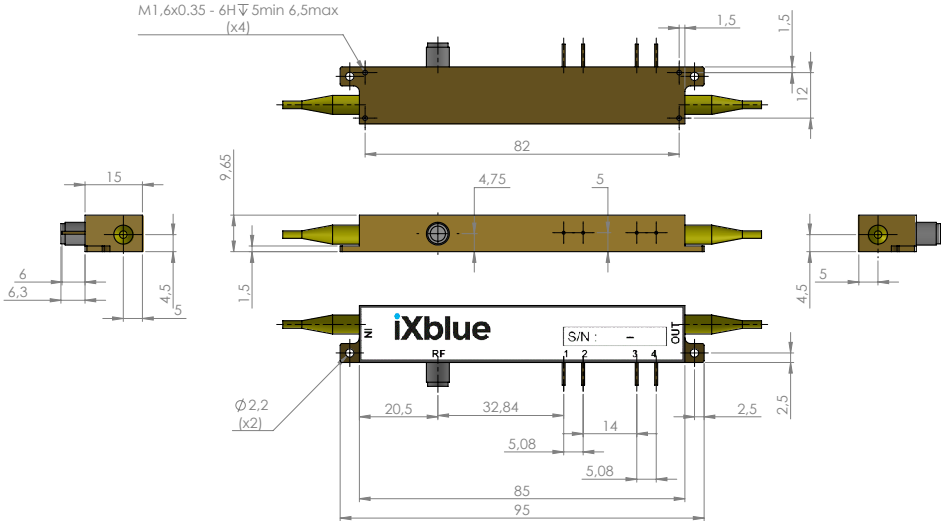


Stability with Time and Temperature



Mechanical Diagram and Pinout

All measurements in mm



Port	Function	Note
IN	Optical input port	Polarization maintaining fiber Corning PM 85-U25D Length: 1.5 meter, buffer diameter: 900 µm
OUT	Optical output port	Polarization maintaining fiber Corning PM 85-U25D Length: 1.5 meter, buffer diameter: 900 µm
RF	RF input port	Female K
1	Ground	Pin feed through diameter 1.0 mm
2	DC	Pin feed through diameter 1.0 mm
3, 4	Photodiode cathode, anode	Pin feed through diameter 1.0 mm

Ordering information

Bandwidth : **10** (10 GHz), **20** (20 GHz),

No monitoring PD

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

Note: optical connectors are Senko with narrow key or equivalent

NIR-MX800-LN-□-00-□-□-□-□

About us

iXblue Photonics produces specialty optical fibers and Bragg gratings based fiber optics components and provides optical modulation solutions based on the company lithium niobate ($LiNbO_3$) 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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