MODULATOR

MXER-LN series

1550 nm band Very High Extinction Ratio Intensity Modulators

The MXER-LN series of intensity modulators is a family of high performance modulators exhibiting superior Extinction Ratio.
Their specific design relies on Exail "Magic Junction" (patent n° US2008193077).

MXER-LN series intensity modulators are key devices in all applications where a combination of high extinction and high bandwidth is required: laser pulse picking prior optical amplification, pulse generation or lidar based sensing systems are a few examples, as well as fiber optics sensors.



Features

- Superior extinction ratio: 40 dB
- High bandwidth
- X-cut for high stability
- Low drive voltage
- Low insertion loss

Applications

- Pulse generation / picking
- Carrier suppression
- Fiber optics sensors
- Pulse applications

Options

- 20 GHz version
- 1060 nm, 1300 nm band versions

Related Equipments

- Pulsed driver DR-PL
- MBC Automatic Bias Controllers

MXER-LN-10 Performance Highlights

Parameter	Min	Typ	Max	Unit
Operating wavelength	1530	1550	1580	nm
Insertion loss	-	3.5	-	dB
Extinction ratio	-	30, 35, 40	-	dB
Electro-optical bandwidth	10	-	-	GHz

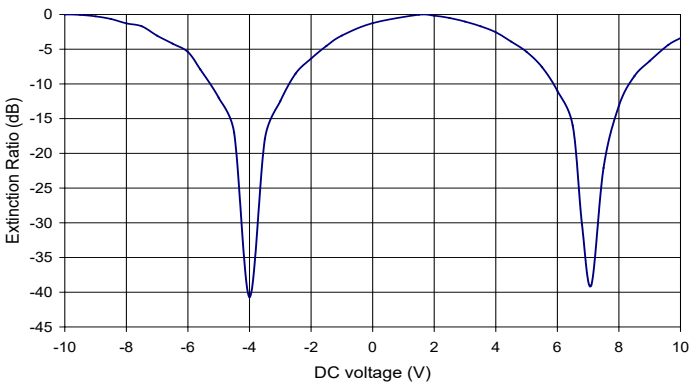
Specifications given at 25 °C, 1550 nm

MXER-LN-20 Performance Highlights

Parameter	Min	Typ	Max	Unit
Operating wavelength	1530	1550	1580	nm
Insertion loss	-	3.5	-	dB
Extinction ratio	-	30, 35, 40	-	dB
Electro-optical bandwidth	18	-	-	GHz

Specifications given at 25 °C, 1550 nm

Extinction Ratio Response



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MXER-LN-10

10 GHz Very High Extinction Ratio Intensity Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optical bandwidth	S_{21}	-3 dB, from 2 GHz	10	12	-	GHz
Rise / fall times	tr / tr	Optical pulse, using DR-VE-10-MO	-	30	35	ps
Ripple S_{21}	ΔS_{21}	RF electrodes, f < 10 GHz	-	0.5	1	dB
Electrical return loss	S_{11}	RF electrodes, f < 10 GHz	-	-12	-10	dB
Vπ RF @50 kHz	$V\pi_{RF\ 50\ kHz}$	RF electrodes, @ 1550 nm	-	5.5	6	V
Vπ RF @10 GHz	$V\pi_{RF\ 10\ GHz}$	RF electrodes, @ 1550 nm	-	6.5	7	V
Vπ DC electrodes	$V\pi_{DC}$	DC electrodes	-	4.2	5	V
RF input impedance	Z_{in-RF}	-	-	50	-	Ω
DC input impedance	Z_{in-DC}	-	1	-	-	MΩ

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Operating wavelength	λ	-	1530	1550	1580	nm
Insertion loss	IL	Without optical connectors*	-	3.5	5	dB
DC Extinction ratio	ER > 30 ER > 35 ER > 40	Measured at 1550 nm by default, contact us for other λ	30 35 40	- - -	- - -	dB dB dB
Optical return loss	ORL	-	-40	-45	-	dB
Chirp	α	-	-0.1	0	-0.1	-

All specifications given at 25 °C, 1550 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 shewet. 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

MXER-LN-20

20 GHz Very High Extinction Ratio Intensity Modulator

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optical bandwidth	S_{21}	-3 dB, from 2 GHz	18	20	-	GHz
Rise / fall times	tr / tr	Optical pulse	-	20	25	ps
Ripple S_{21}	ΔS_{21}	RF electrodes, f < 20 GHz	-	0.5	1	dB
Electrical return loss	S_{11}	RF electrodes, f < 20 GHz	-	-12	-10	dB
Vπ RF @50 kHz	$V\pi_{RF\ 50\ kHz}$	RF electrodes, @ 1550 nm	-	5.5	6.5	V
Vπ DC electrodes	$V\pi_{DC}$	DC electrodes	-	4.2	5	V
RF input impedance	Z_{in-RF}	-	-	50	-	Ω
DC input impedance	Z_{in-DC}	-	1	-	-	MΩ

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Crystal	-	-	Lithium Niobate X-Cut Y-Prop			
Operating wavelength	λ	-	1530	1550	1580	nm
Insertion loss	IL	Without optical connectors*	-	3.5	5	dB
DC Extinction ratio	ER > 30 ER > 35 ER > 40	Measured at 1550 nm by default, contact us for other λ	30 35 40	- - -	- - -	dB dB dB
Optical return loss	ORL	-	-40	-45	-	dB
Chirp	α	-	-0.1	0	-0.1	-

All specifications given at 25 °C, 1550 nm, unless differently specified.
(*) Consider an extra-loss up to 0.25 dB for each FC/APC optical connector

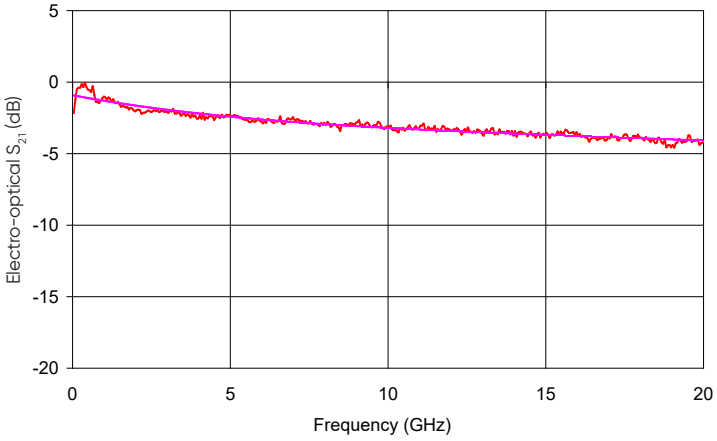
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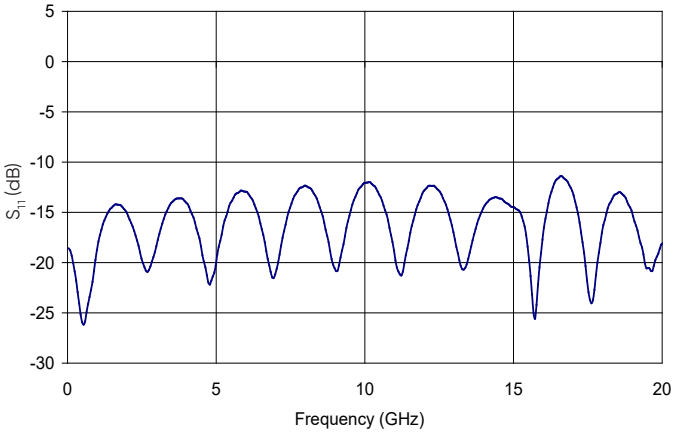
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RF input power	EP_{in}	-	28	dBm
Bias Voltage	V_{bias}	-20	+20	V
Optical input power	OP_{in}	-	20	dBm
Operating temperature	OT	0	+70	°C
Storage temperature	ST	-40	+85	°C

MXER-LN-10 & 20

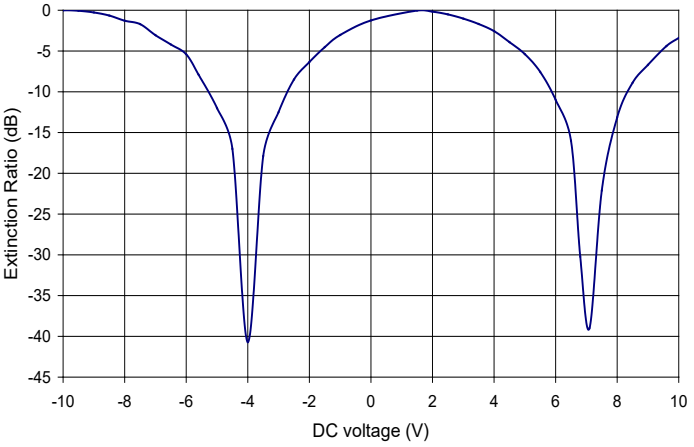
Typical S_{21} Curve



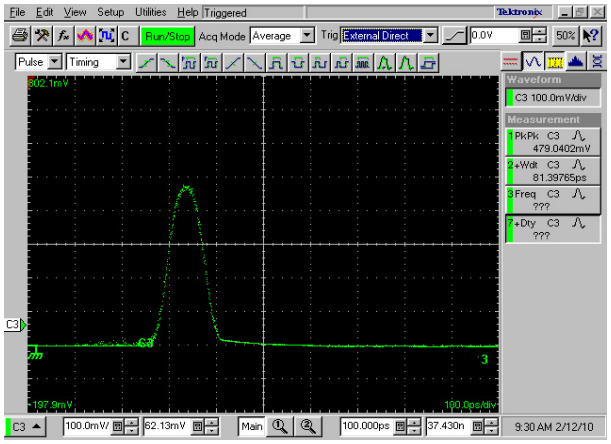
Typical S_{11} Curve



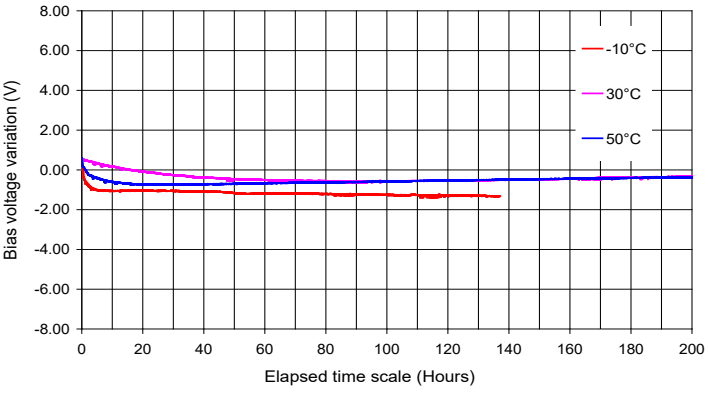
Extinction Ratio



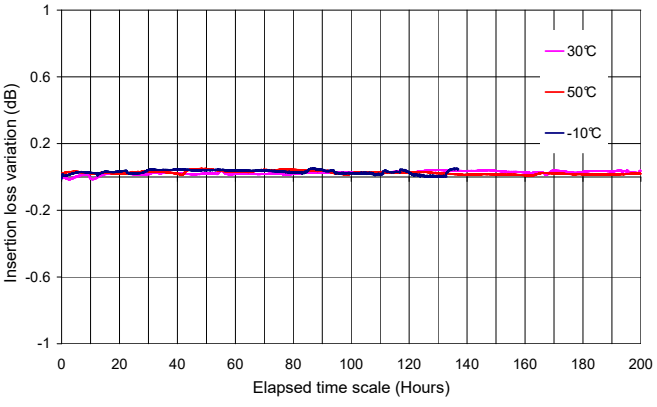
Generated 80 ps Optical Pulse



Stability with Time and Temperature

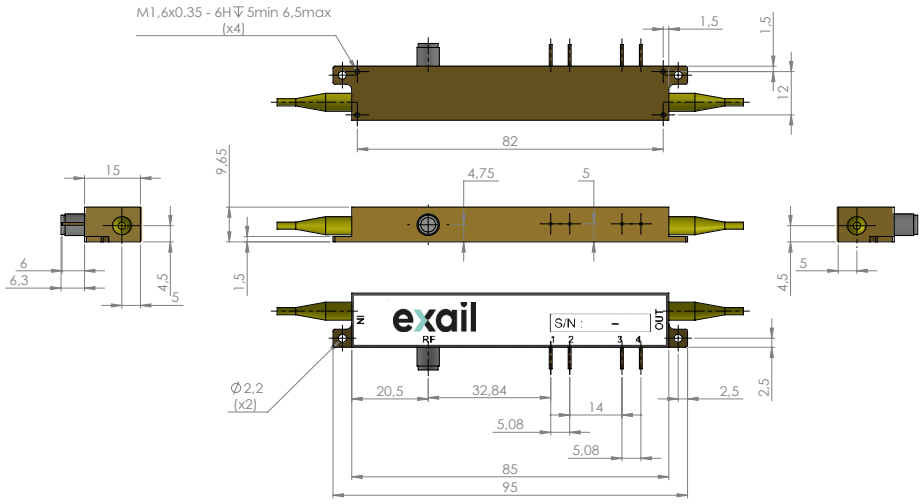


Insertion Loss with Time and Temperature



Mechanical Diagram and Pinout

All measurements in mm



Port	Function	Note
IN	Optical input port	Polarization maintaining fiber Corning PM 15-U25D Length: 1.5 meter, buffer diameter: 900 µm
OUT	Optical output port	Polarization maintaining fiber Corning PM 15-U25D Length: 1.5 meter, buffer diameter: 900 µm
RF	RF input port	Female K (SMA comptatible)
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

MXER-LN-□-□-□-□-□-□-□

- Bandwidth : **10** (10 GHz), **20** (20 GHz)
- Internal photodiode: "**PD**": integrated, "**00**": not integrated (by default)
- Input fiber: **P** Polarization maintaining
- Output fiber: **P** Polarization maintaining
- Input connector: **00** (bare fiber), **FA** (FC/APC), **FC** (FC/SPC)
- Output connector: **00** (bare fiber), **FA** (FC/APC), **FC** (FC/SPC)
- Extinction ratio: **30** (30 dB), **35** (35 dB), **40** (40 dB)

Note: optical connectors are Senko with narrow key or equivalent

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