MODULATOR

MXIQER-LN series

1550 nm band Very High Extinction Ratio IQ Modulator

The MXIQER-LN series optical IQ modulator are wide bandwidth, low insertion loss and high extinction ratio Dual Parallel Mach-Zehnder Modulators.
Exail proprietary "Magic Junction" (patent n° US2008193077) confers it an unmatched low insertion loss with high optical extinction ratio, and its X-cut design guarantees high stability and zero chirp in a wide range of operational conditions.



The MXIQER modulators are key devices in all applications where a combination of high extinction and wide bandwidth is required, such as Single Side Band optical signal generation with high suppression ratio of main carrier and one side band.

Features

- Superior extinction ratio
- High bandwidth
- X-cut for high stability
- Low insertion loss
- Bandwidth 10 GHz, 30 GHz

Applications

- Single Side Band
- QPSK, QAM, OFDM

Related Equipments

- Analog driver DR-AN
- MBC-IQ Automatic Bias Controller
- ModBox-CS-SSB

MXIQER-LN-10 Performance Highlights

Parameter	Min	Typ	Max	Unit
Operating wavelength	1530	1550	1580	nm
Insertion loss	-	5	7	dB
Carrier attenuation	32	40	-	dB
Side-Band attenuation	32	40	-	dB
Electro-optical bandwidth	10	12	-	GHz
Usable electro-optical bandwidth	20	-	-	GHz
Vπ RF @50 kHz	-	3.8	-	V

Specifications given at 25 °C, 1550 nm

MXIQER-LN-30 Performance Highlights

Parameter	Min	Typ	Max	Unit
Operating wavelength	1530	1550	1580	nm
Insertion loss	-	5	7	dB
Carrier attenuation	32	40	-	dB
Side-Band attenuation	32	40	-	dB
Electro-optical bandwidth	20	25	-	GHz
Usable electro-optical bandwidth	30	40	-	GHz
Vπ RF @50 kHz	-	5	-	V

Specifications given at 25 °C, 1550 nm

MXIQER-LN-10

Electrical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Electro-optical bandwidth	S_{21}	RF electrodes, from 2 GHz	10	12	-	GHz
Usable EO bandwidth	S_{21}	-	20	-	-	GHz
Ripple S_{21}	ΔS_{21}	RF electrodes	-	0.5	1	dB
Electrical return loss	S_{11}	RF electrodes, 0 - 20 GHz	-	-12	-10	dB
Vπ RF @50 kHz	$V\pi_{RF\ 50\ kHz}$	RF1 & RF2 electrodes	-	3.8	4.5	V
Vπ $DC_{1,2}$ electrodes	$V\pi_{DC\ 1,2}$	DC1 & DC2 electrodes	-	6	7	V
Vπ DC_3 electrodes	$V\pi_{DC\ 3}$	DC3 electrodes	-	9.5	10.5	V
Vπ DC_3 CS-SSB	$V\pi_{DC\ 3\ CS\text{-}SSB}$	DC3 biaising for CS-SSB	-	4.5	6	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	-	1530	1550	1580	nm
Insertion loss	IL	Without optical connectors [1]	-	5	7	dB
Carrier attenuation	C-SER	Measured at 1550 nm and 15 GHz	32	40	-	dB
Side-Band attenuation	SB-SER	Measured at 1550 nm and 15 GHz	32	40	-	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.
[1] 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 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

MXIQER-LN-30

Electrical Characteristics

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Vπ $DC_{1,2}$ electrodes	$V\pi_{DC\ 1,2}$	DC1 & DC2 electrodes	-	6	7	V
Vπ DC_3 electrodes	$V\pi_{DC\ 3}$	DC3 electrodes	-	9.5	10.5	V
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Impedance matching	$Z_{in\text{-}RF}$	-	-	50	-	Ω
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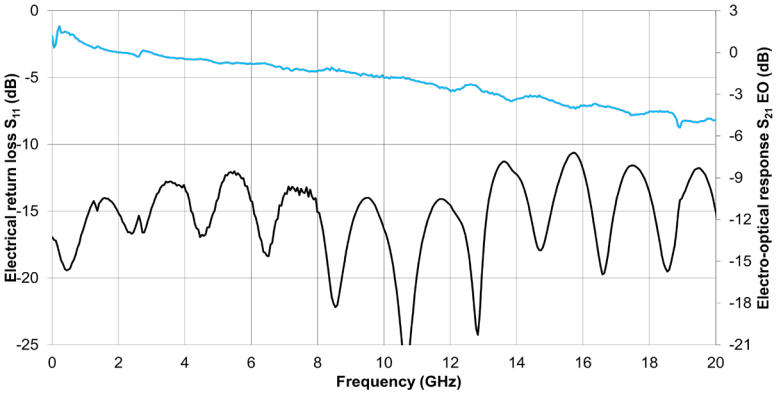
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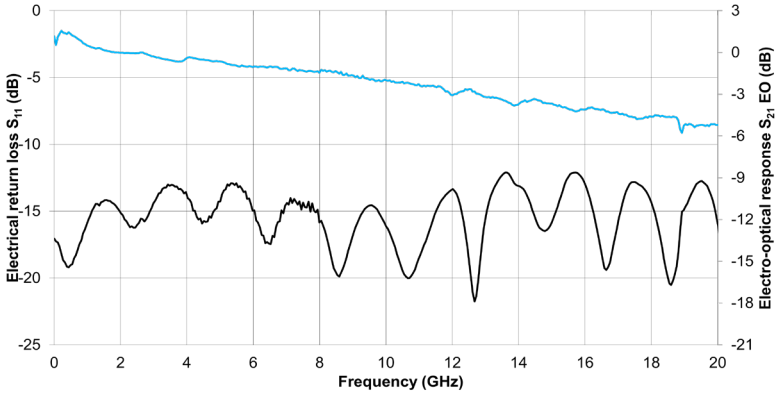
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MXIQER-LN-10

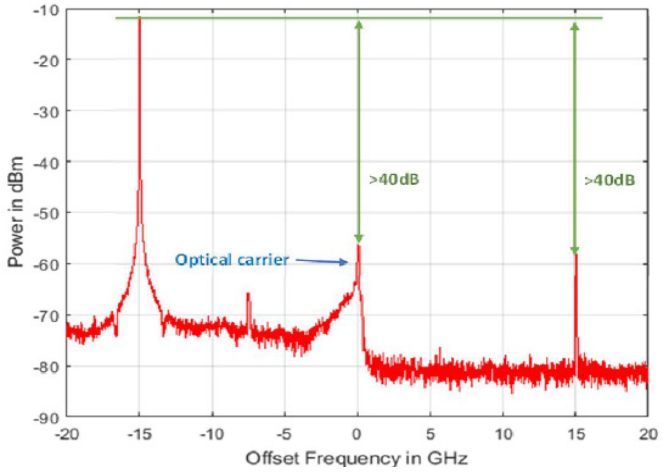
Typical Curve S_{21} & S_{11} from RF_1 Electrode



Typical Curve S_{21} & S_{11} from RF_2 Electrode

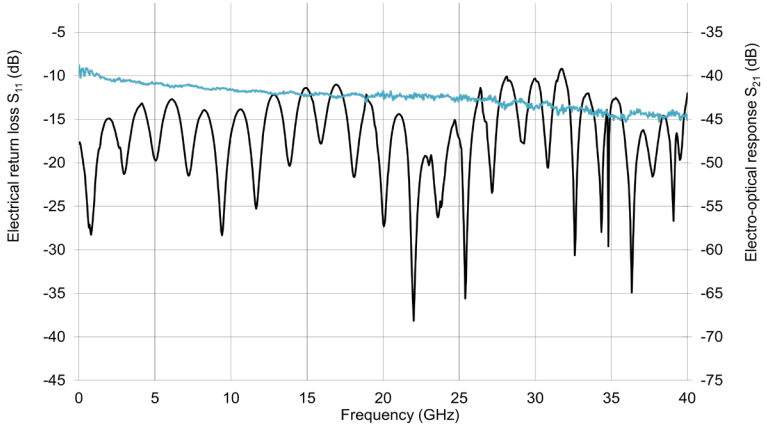


Optical CS-SSB modulation with carrier and subcarrier (modulation @15 GHz) suppressions

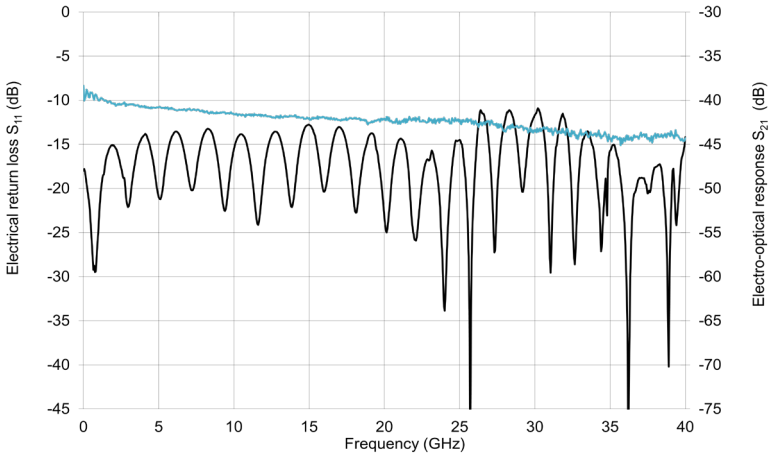


MXIQER-LN-30

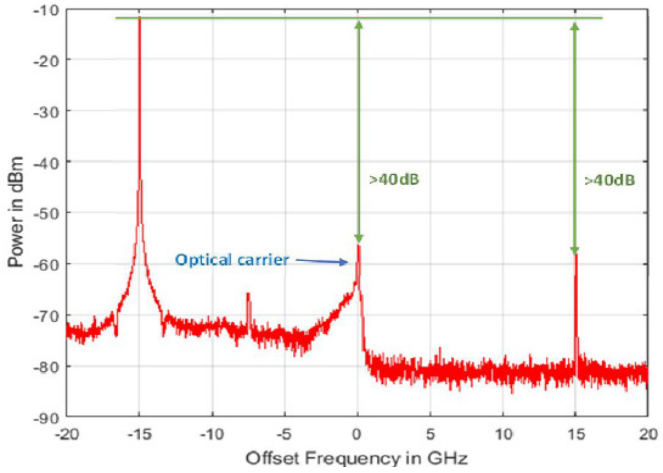
Typical Curve S_{21} & S_{11} from RF_1 Electrode



Typical Curve S_{21} & S_{11} from RF_2 Electrode

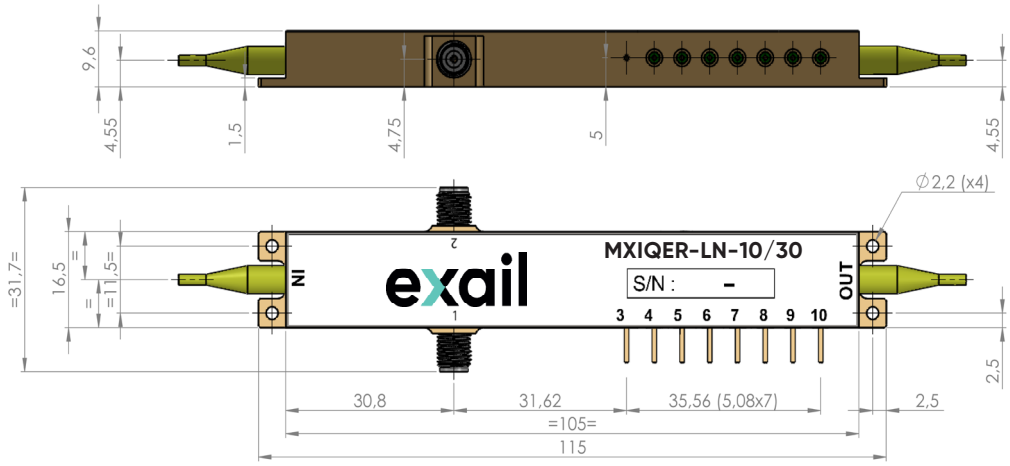


Optical CS-SSB modulation with carrier and subcarrier (modulation @15 GHz) suppressions



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
1, 2	RF1 input port / RF2 input port	Female K (SMA comptatible)
3	Ground	Pin feed through diameter 1.0 mm
4, 5, 6	DC2 / DC1 / DC3	Pin feed through diameter 1.0 mm
7, 8	Photodiode 1 anode / cathode	Pin feed through diameter 1.0 mm
9, 10	Photodiode 2 cathode / anode	Pin feed through diameter 1.0 mm

Ordering information

MXIQER-LN- □ - □ - □ - □ - □ - □

- EO Bandwidth: **10** (10 GHz), **30** (30 GHz)
- Internal photodiode: "**PD**": integrated, "**00**": not integrated (by default)
- Input fiber: **P** Polarization maintaining
- Output fiber: **P** Polarization maintaining, **S** Standard single mode
- Input connector: **00** (bare fiber), **FA** (FC/APC)
- Output connector: **00** (bare fiber), **FA** (FC/APC)

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