

The MXIQER-LN-30 optical IQ modulator is a high bandwidth, low insertion loss, high extinction ratio Dual Parallel Mach-Zehnder Modulator. ixblue 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 modulator is key device in all applications where a combination of high extinction and high bandwidth is required, such as Single Side Band optical signal generation with high suppression ratio of main carrier.

FEATURES

- Superior extinction ratio
- High bandwidth
- X-cut for high stability
- Low insertion loss

APPLICATIONS

- Carrier Suppression Single Side Band
- QPSK, QAM, OFDM

RELATED EQUIPMENTS

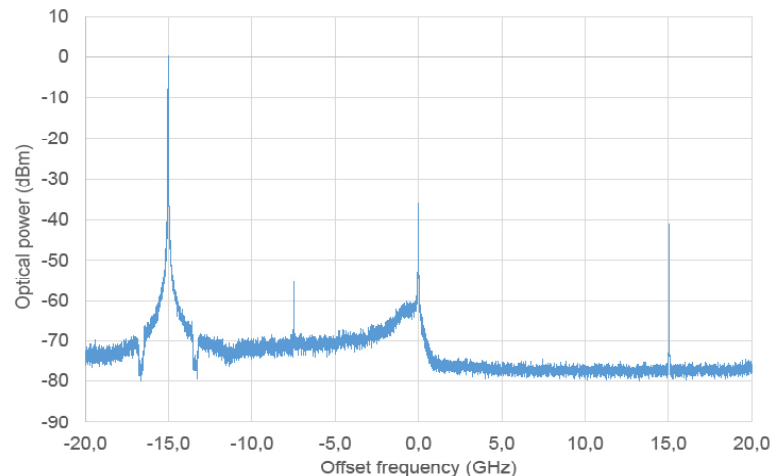
- Analog driver DR-AN
- MBC-IQ Automatic Bias Controller
- ModBox-CS-SSB

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 |

Specifications given at 25 °C, 1550 nm

Optical CS-SSB modulation with carrier and subcarrier suppressions



Electrical Characteristics

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|--|-------------------------|--|-----|-----|-----|------------|
| Electro-optic bandwidth | S_{21} | RF electrodes, from 2 GHz | 20 | 25 | - | 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 |
| V_{π} RF @50 kHz | $V_{\pi RF_{50kHz}}$ | RF ₁ & RF ₂ electrodes | - | 6 | 7 | V |
| V_{π} DC _{1,2} electrodes | $V_{\pi DC_{1,2}}$ | DC ₁ & DC ₂ electrodes | - | 7 | 7.5 | V |
| V_{π} DC ₃ electrodes | $V_{\pi DC_3}$ | DC ₃ electrodes | - | 9 | 12 | V |
| V_{π} DC ₃ CS-SSB | $V_{\pi DC_{3-CS-SSB}}$ | DC ₃ biasing for CS-SSB | - | 4.5 | 6 | V |
| Impedance matching | Z_{in-RF} | - | - | 50 | - | Ω |
| DC input impedance | Z_{in-DC} | - | 1 | - | - | M Ω |

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 connectors | - | 5 | 7 | dB |
| Carrier attenuation | C-SER | Measured at 1550 nm and 15 GHz | 32 | 40 | - | dB |
| Side-Band attenuation | SB-SER | | 32 | 40 | - | dB |
| Optical return loss | ORL | - | -40 | -45 | -40 | dB |
| Chirp | α | - | -0.1 | 0 | -0.1 | - |

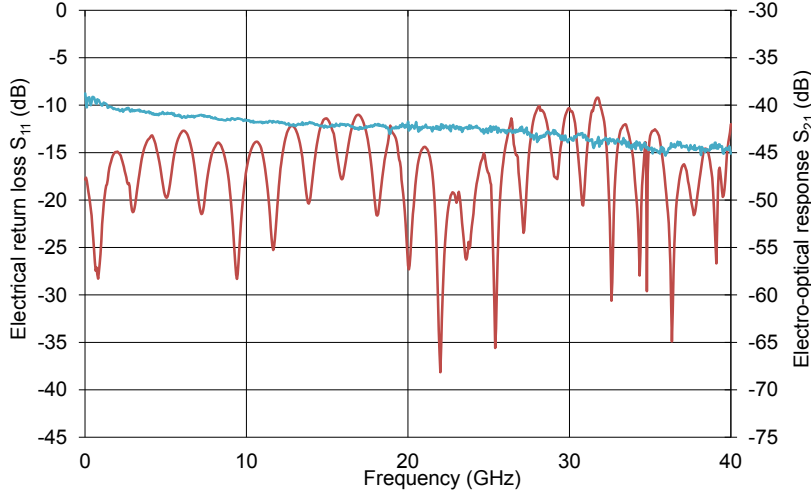
All specifications given at 25°C, 1550 nm, unless differently specified

Absolute Maximum Ratings

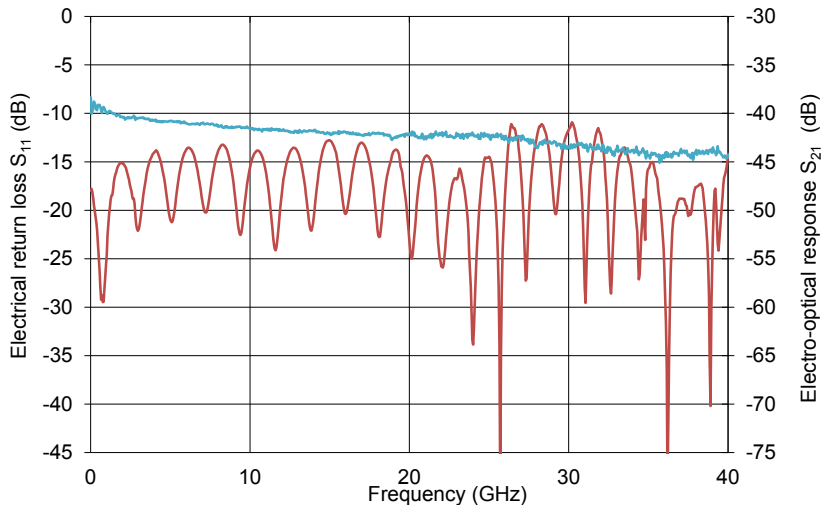
Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute 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 |

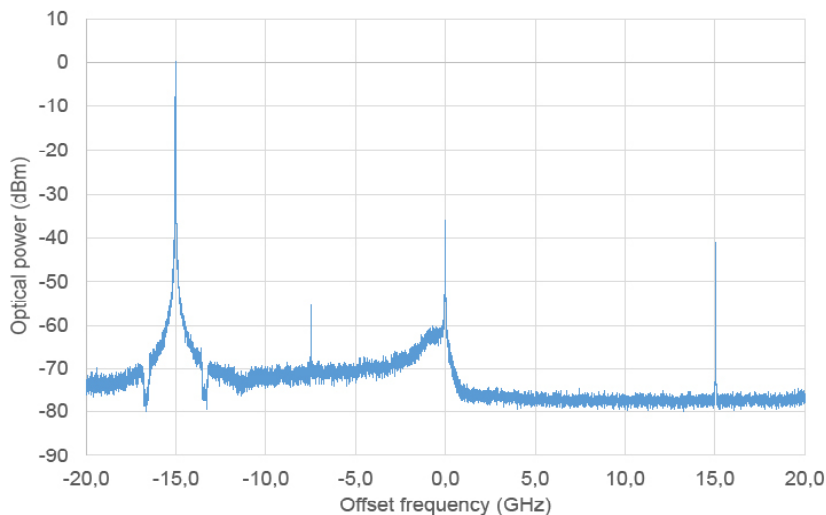
Typical Curve S_{21} & S_{11} from RF₁ Electrode



Typical Curve S_{21} & S_{11} from RF₂ Electrode

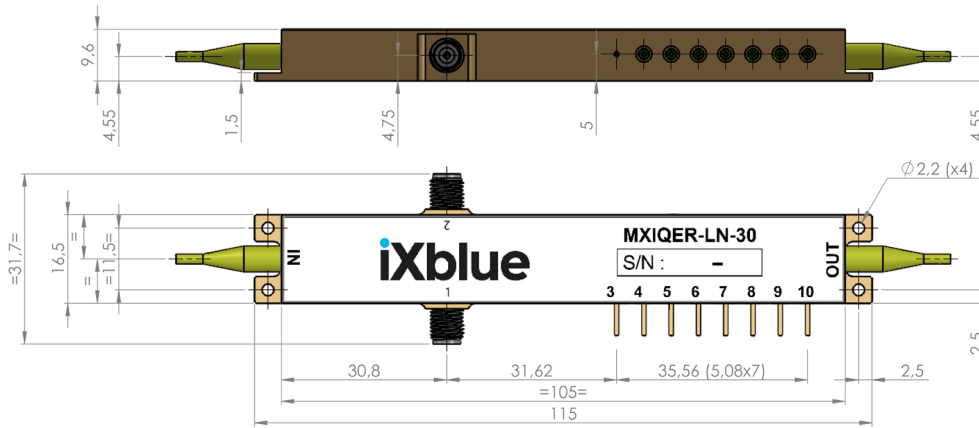


Optical CS-SSB modulation with carrier and subcarrier (modulation @15 GHz)



Mechanical Diagram and Pinout

All measurements in mm



| Port | Function | Note |
|-----------|---|---|
| IN / OUT | Optical input port / Optical output port | Polarization maintaining 1550 nm Corning PM 15-U25D length: 1.5 meter, buffer diameter: 900 μm |
| 1 / 2 | RF ₁ input port / RF ₂ input port | Wiltron female K (SMA compatible) |
| 3 | Ground | Pin feed through diameter 1.0 mm |
| 4 / 5 / 6 | DC ₂ / DC ₁ / DC ₃ | 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-30-PD-Y-Z-AB-CD

Y = Input fiber : P Polarisation maintening
 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

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 (LiNbO₃) 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.