

## Multi-functional Integrated Optical Circuit (MIOC-1550-S)

### Overview

MIOC-S chip is a key component in Fiber Optic Gyroscope (FOG) for measuring angular velocity of an inertial navigation system. This integrated device, fabricated on Lithium Niobate (LiNbO<sub>3</sub>) material, is composed of a polarizer, a Y-junction coupler and dual electro-optical phase modulators. Waveguides on the chip are produced by the High Temperature Proton Exchange (HTPE) process. The MIOC-S has more than 60dB Polarization Extinction Ratio (PER) and can minimize bias drift resulting from polarization crosstalk induced non-reciprocity. This MIOC-S device has been used in a high-sensitivity inertial navigation system to detect less than 0.5 deg/hour angular velocity change. It has highly reliable performance with wide temperature range tolerance.

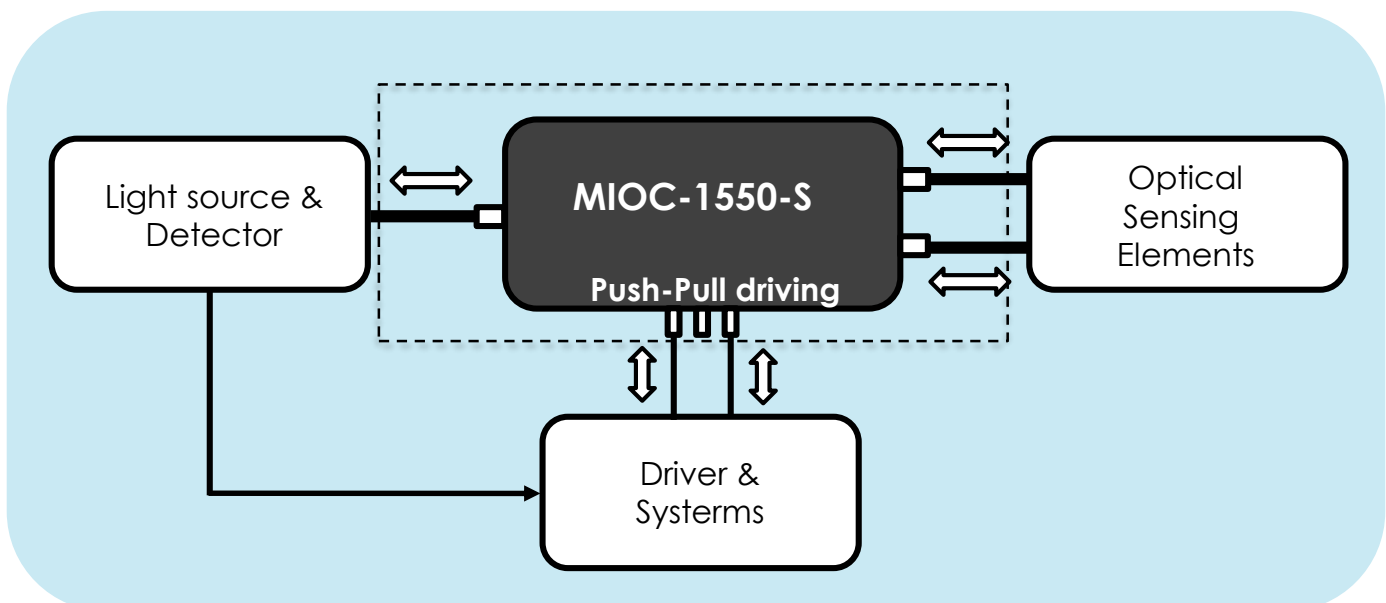
### Key Features

- 1550 ± 20 nm operation
- PM fiber input and output port
- Polarization extinction ratio > 60 dB
- V<sub>π</sub> voltage < 4.5 V
- Fiber/chip crosstalk < -20 dB
- Low fiber-to-fiber insertion loss
- Push-pull electrode design

### Applications

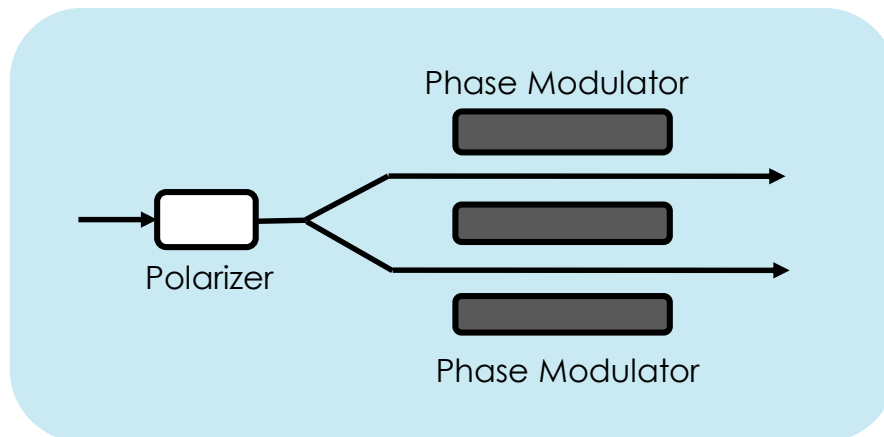
- Fiber Optic Gyroscope (FOG)
- Fiber Optic Current Sensor (FOCS)
- Hydrophone
- CubeSat and SmallSat
- Other Optical Sensing Applications

### Application Diagram



| Specifications                |  |               |
|-------------------------------|--|---------------|
| Model                         | MIOC-1550-S-A                          | MIOC-1550-S-B |
| Substrate                     | X-cut, Y-propagation Lithium Niobate   |               |
| Operation wavelength          | 1550 ± 20 nm                           |               |
| Bare chip loss                | ≤ 3.0 dB                               | ≤ 3.5 dB      |
| Pigtailed-chip insertion loss | ≤ 3.5 dB                               | ≤ 4.0 dB      |
| Splitting ratio               | 50 ± 5 %                               |               |
| V <sub>π</sub> @ 0.1 MHz      | ≤ 4.2 V                                | ≤ 4.4 V       |
| Polarization extinction ratio | ≥ 60 dB                                |               |
| Intensity modulation          | ≤ 0.1 %                                |               |
| Electrode type                | Push-pull                              |               |
| Chip polished angle           | 10 ± 0.5 degree                        |               |
| Chip dimension                | 21.5 mm (L) x 2 mm (W) x 1mm (H), ±5 % |               |
| Operating Temperature         | -45°C ~ + 70°C                         |               |
| Storage Temperature           | -50°C ~ + 85°C                         |               |

### Simple Functional Drawing



### Business Offers

- Special customization for PER higher than 75dB
- ODM Customization for other MIOC design, including polarizer, dual-phase modulators, Y splitter/combiner and anti-reflection