



# Photonic Components and Modules

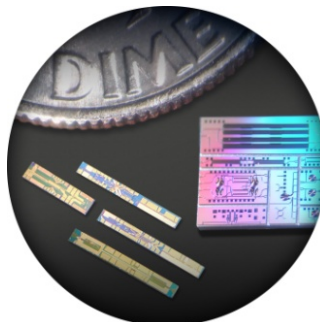
Freedom Photonics leads the way in the development and manufacturing of Photonic Integrated Circuit (PIC) based component, subsystem and system products. Freedom Photonics' advanced technologies and products are enabling new, high-performance optical communication, sensor and instrumentation markets. We can customize our technology to your specific needs, as well as develop fully custom PIC designs (InP, GaAs, Si, Silica). We can provide development and production services to support your company needs.

- **PRODUCT FAMILIES**
  - Monolithic Tunable Lasers (1300 nm and 1550 nm)
  - 760 nm – 850 nm Single-Frequency DFB Lasers
  - High Power Photodetectors for RF Optical Communications
  - 1550 nm Free-Space-Optical (FSO) Transmitters/Receivers
- **CUSTOM PHOTONIC INTEGRATED CIRCUITS (InP, GaAs, Silicon, Silica)**
  - Active and passive planar waveguide components
  - Widely tunable lasers
  - DFB/DBR lasers
  - High-Power lasers
  - High speed modulators (lumped and traveling-wave)
  - Semiconductor Optical Amplifiers (high gain and/or high power)
  - Photodetectors
  - Mode converters
  - Polarization diversity blocks
  - High Speed switches
  - Optical multiplexer / demultiplexer technology

**LASERS & PHOTODIODES**  
InP, GaAs and Silicon



**PHOTONIC INTEGRATED CIRCUITS**  
InP, GaAs, Silicon and Silica



**TRANSMITTERS & RECEIVERS**  
Communications, Test & Sensing



# CAPABILITIES

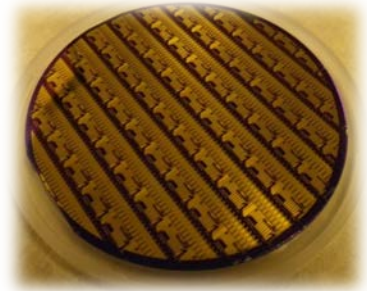
## PHOTONIC DESIGN

- Passive & Active waveguide design
- Epitaxial Structure design
- Semiconductor laser design
- Photodiode design
- Photonic Integrated Circuit (PIC) design



## MICRO AND NANO FABRICATION

- Wafer fabrication process design
- Epitaxial structure specification
- Fabrication process development
- Fast turn-around prototype fabrication
- Wafer fabrication for full – scale manufacturing



## TESTING

- DC testing (die, submount, package), current, voltage, light, bit error rate
- Digital and Analog high speed testing
- 67 GHz lightwave network analyzer, bit error rate performance (40 Gbps), optical modulation analyzer (up to 240 Gbps QPSK)
- Customized automation software for maximum efficiency

## PACKAGING

- Optical train design
- Package mechanical and RF design
- Packaging process development
- Fast turn- around prototype fabrication
- Package fabrication for full- scale manufacturing

## ELECTRONICS

- Optical Transmitter and Receiver design and fabrication
- FPGA design and verification tools
- Bias and control circuit design for photonic systems
- Multilayer mixed signal printed circuit board layout
- PCB fabrication and assembly

