

## Sivers Semiconductors

is a leading and internationally recognized technology company that supplies ICs and integrated modules through its two business areas Wireless and Photonics.

**Wireless** develops mmWave products for advanced 5G systems for data and telecommunications networks and satellite communication. The portfolio includes RF transceivers, beamforming front end ICs, integrated mmWave antennas, repeaters, and software algorithms for optimum mmWave RF performance.

**Photonics** develops and manufactures semiconductor based optical products for optical fiber networks, sensors and optical fiber communications (Li-Fi).

### Global Presence



### Strong Combined Ecosystem of Wireless and Photonics Leaders



### SIVERS SEMICONDUCTORS

A global supplier of semiconductors to the sensor, data and telecommunication industry and satellite communication.

The company is listed on Nasdaq Stockholm under SIVE.

### BUSINESS AREAS

Wireless and Photonics



### EMPLOYEES

137 excluding consultants | 42 PHD's

### OFFICES & CONTACTS

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# 5G Wireless – Advanced Technology addressing a wide range of applications

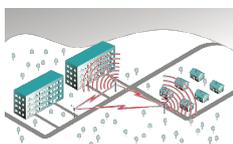
**BUSINESS AREA WIRELESS** SIVERS WIRELESS has been consistently innovating for almost 70 years, developing an enviable reputation for quality in every component. As our demand for data grows, you need solutions that can offer the speed and flexibility that industry requires. The proliferation of wireless devices – and the congestion on current frequency bands – drive data and telecoms companies to find solutions that can reliably exploit higher frequencies, increasing speed, power, and reliability. Sivers Wireless is a leading innovator of mmWave semiconductor and antenna technologies that meet – and exceed – these needs.

## EXPERTS IN MMWAVE, WITH PROVEN APPLICATIONS



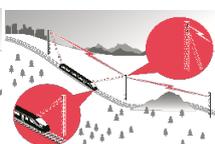
### OPEN RADIO ACCESS NETWORK

The Open Radio Access initiative reduces cost and complexity by allowing operators to mix and match hardware as they choose.



### FIXED WIRELESS ACCESS

A genuine, Gigabit speed alternative or complement to fiber connections, operating in the licensed and unlicensed spectrums.



### TRACK TO TRAIN

The ever increasing demand for mobile data at volume has now exceeded the capabilities of 3G and 4G. 5G offers the ability to move data at gigabit speeds to vehicles on the move.



### MOBILE / WIFI BACKHAUL

Since the introduction of GSM, microwave connectivity has been one of the leading ways to connect mobile base stations, offering rapid deployment, flexibility, and low TCO.



### UNCOMPRESSED REAL-TIME DATA

Millimeter-wave technology opens up new use cases, with the possibility to transport uncompressed real-time data.



### SATCOM

We provide antennas and chipsets for the SatCom vendors. For mobile, private and government network suppliers.

## COMPLETE PRODUCT PORTFOLIO FOR LICENSED AND UNLICENSED 5G



### 5G mmWave RFICs

Family of RFIC with highest level of integration including BF, UDC and PLL

Support for both IF and Zero IF i/f (configurable).

Part of verified solution Integrated with 4x4 antenna array

Optimized for CPE and Small cell implementation.



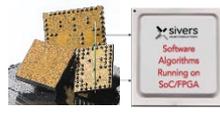
### Unlicensed 5G RFICs and Antenna modules

Highest level of performance and widest frequency coverage with one Hardware

Sivers offer "Chip only" or integrated with antenna (several antenna options available)

Support for 802.11ad and 60 GHz 5G NR-U

Optimized for infrastructure applications in the unlicensed 60 GHz space



### Algorithms

Performance boosting algorithms that run on a customer's baseband

World's first array pre-distortion algorithm

Adds value and "stickiness" to Open RAN and Open RF architectures

### Evaluation Kits & Evaluation Boards



Leverage our integration test platform to reduce costs and time to market  
Seamless operation together with any Zero-IF based broadband solution



### 5G NR FR2 Beamformers and Antenna In package

Family of highly integrated beamformer ICs with remarkable output power and efficiency

GlobalFoundries Enhanced 45RFSOI, following 10 years of collaboration

Chip-scale package and industry-first Antenna-in-Package technology



### Satcom Tx and Rx Chipsets

Dual-pol 4-antenna multi-beam Ka Band Satcom RX and TX Chipset

Developed for and funded by Satellite Terminal vendor

Prototype systems in trial, production ramp in 2022

# Advanced III-V Semiconductor Photonics Devices, from design to High Volume Manufacturing

**BUSINESS AREA PHOTONICS** SIVERS PHOTONICS is the world's most advanced supplier of customised III-V semiconductor photonics devices, enabling next generation applications in optical communications and sensing markets, and a key strategic supplier to many Fortune-100 and Silicon Valley customers. With over 20 years of expertise designing and manufacturing III-V photonic devices across diverse material systems, our foundry provides end-to-end in-house capability, from prototype design to qualified high-volume manufacturing. With a particular focus on InP sources optimised for silicon photonics integration, we offer customisable high power, InP-based DFB lasers and gain chips, as single emitters or arrays, on our InP100 Product Platform.

## FOUNDRY & DESIGN SERVICES



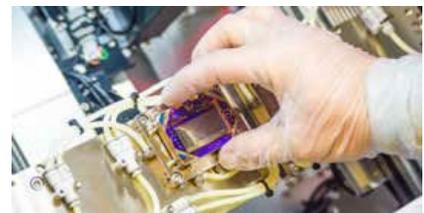
### DESIGN

Library of epitaxy designs for high-power, high-speed lasers  
Advanced chip design with focus on reliability and performance



### PROTOTYPING

Complex 3D architectures  
Add-on modules for application specific functionalities  
Full on-wafer front and back side processing  
Optical coatings for non-hermetic packaging  
Low volume samples

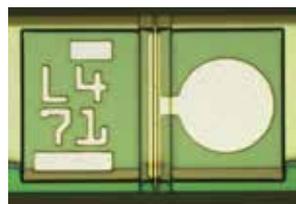


### VOLUME PRODUCTION

100mm/4" wafer processing  
Automated bar cleave and device singulation  
Automated test & inspection  
High-volume test capacity (>2M lasers/month)  
On-wafer optical testing  
GR468 qualification  
Damp-heat testing

**DEVICE TYPES** Our photonic devices are enabling next generation applications across a wide range of growth markets including optical communications, sensing and SiPh applications.

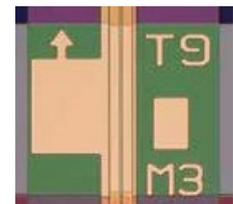
## Optical Communications



O-band 25Gbps CWDM DFB  
O-band CWDM DFB for PAM4



1310nm DFB -50°C to +95°C



1270nm 2.5 Gbps PON DFB  
1270nm 10 Gbps PON DFB

## Optical Sensing



Reflective SOA for tuneable lasers



C-band High Power DFB Phased  
DFB laser arrays



High power GAAs laser diodes  
Resonant Cavity LEDs

## InP100 PRODUCT PLATFORM

The InP100 Product Platform is a common design and manufacturing framework for InP photonics devices that uses established process modules to produce a broad range of device types on 100mm wafers.

# Sivers Semiconductors adds value to customers



**WIRELESS**



**CCS Metnet 60G** - Fixed Wireless Access and Small Cell networks delivering gigabit broadband connectivity in cities and rural regions



**Ontix FWA Service** - Ultra-fast Fixed Wireless Access broadband service in central London



**MicroNät 6XG** - Fixed Wireless Access network in northern Sweden



**Blu Wireless** - Track & Train modules provide high-speed rail connectivity



**Blu Wireless AutoAir Project** - 5G Testbed for Connected and Autonomous Vehicles



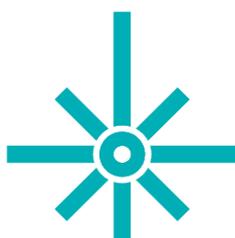
**Fujikura** - 60 GHz mmWave Wireless Communications Module & Outdoor Evaluation Kit



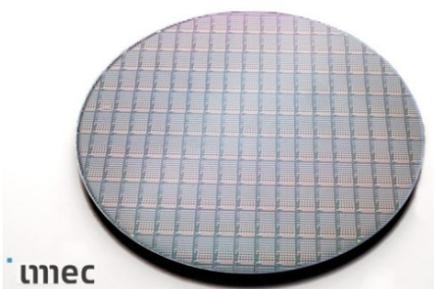
**Fujikura High-speed V2X communication** enabling safe driving support for local bus service in Japan



**Airvine** - The All-Wireless Enterprise: Indoor Wireless Backbones at Gigabit Speeds



**PHOTONICS**



**DFB laser dies** bonded onto 300mm silicon photonics wafer

The collaboration with **imec**, a world-leading research and innovation center in nanoelectronics and digital technologies, began in 2019. The aim of the project is to accelerate hybrid integration of InP Lasers and Amplifiers with silicon photonics.