MANUFACTURING MADE LIGHT
Solutions for integrated photonics. Built to scale.

WAFER TESTLINE
Wafer-level photonic device test

Innovative mixed-signal electro-optical test systems for non-singulated photonic integrated circuits (PICs) and other optoelectronic devices. Featuring fully automated DC, RF and optical measurements both on-wafer and for single photonic devices on appropriate carrier formats.

Highlights

✔ State-of-the-art, mixed-signal electro-optical probing

✔ Reproducible low-loss alignment to single/multiple optical I/O ports

✔ Full device referencing/traceability as well as vital wafer yield data

✔ Fully adaptable to different PIC I/O designs and material systems

PHOTONICS AUTOMATED ASSEMBLY AND TESTING
FROM LAB TO FAB

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photonics assembly & testing

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Fully automated electro-optical test of wafer-level devices

ficonTEC's new Wafer Testline product line is specially designed as a versatile electro-optical test-&-measurement system platform for wafer-level photonic device test. A re-configurable probe-wafer layout even caters to multiple PIC designs on a multi-project wafer (MPW).

For R&D proof-of-concept device test tasks, Wafer Testline provides state-of-the-art, multi-channel e/o test of on-wafer waveguide and PIC I/O. Custom 3D-printed fiber tips provide support for edge-coupling, so low-loss coupling is enabled for all optical coupling mechanisms. Wafer Testline also works equally well for multiple singulated devices on appropriate carrier formats.

For volume manufacturing, all identical devices on a wafer can be tested fully automatically. Built-in device cataloging and traceability thus enable yield and performance data across entire wafers, resulting in extremely valuable and previously unattainable feedback for the wafer fabs.
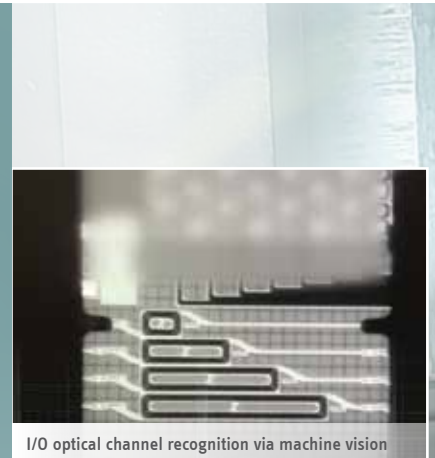
I/O optical channel recognition via machine vision
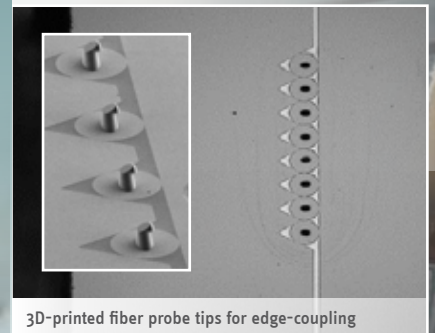
3D-printed fiber probe tips for edge-coupling

Multi-channel optical I/O coupling to on-wafer devices

Software Control

Process Control Master (PCM) is ficonTEC's unified process-oriented control interface that ships with all turn-key stand-alone systems and multiple machine configurations. PCM features an intuitive UI that includes all machine vision, high-resolution positioning and system management software routines required to reliably and repeatably drive test process hardware.

PCM is fully enabled for automated mixed-signal electro-optical test and characterization tasks, as well as providing machine vision support for I/O probe-to-port alignment. An up-to-date feature set includes AI-based Deep Learning defect recognition capability, ML-oriented monitoring of production performance data, and the possibility to direct call functions in Python files.

(Source: VLC Photonics)

Insertion Loss at 1550nm (dB)

-1.6
-1.8
-2.0
-2.2
-2.4
-2.6
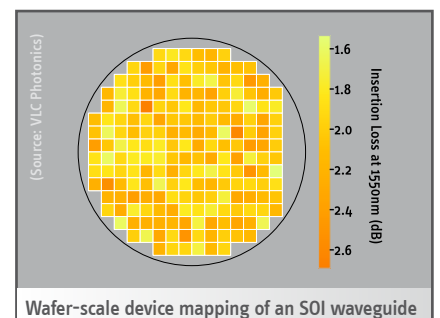
Wafer-scale device mapping of an SOI waveguide

WAFER TESTLINE
Wafer-level PIC device test

PHOTONICS AUTOMATED ASSEMBLY AND TESTING
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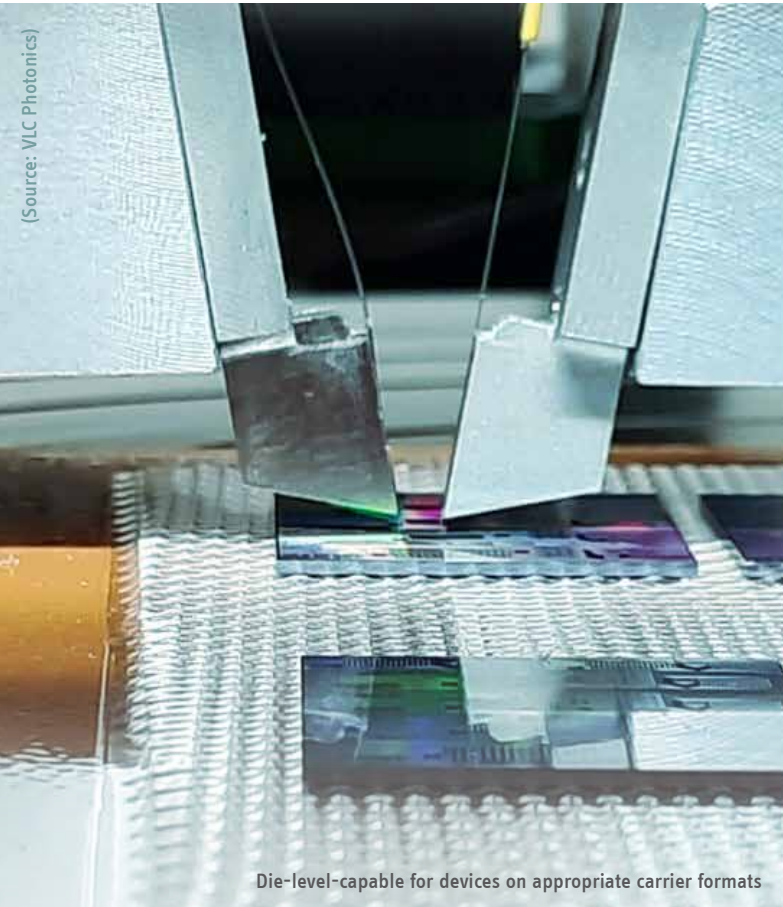
Die-level-capable for devices on appropriate carrier formats

Key features

- Automated I/O port referencing to sub-µm accuracy
- Vertical and edge alignment to I/O ports in max. 4s
- Low-loss I/O port coupling with < 0.4 dB repeatability
- Superior test data acquisition over manual approach
- Wafer fabs receive PIC yield data across entire wafer

General tasks & applications

- Automated test-&-qualify for passive/active devices
- Proof-of-concept and low-complexity volume e/o test
- MPW-capable due to adaptable probe-wafer layout
- Off-wafer device capable with suitable carrier formats
- Adaptable to high-complexity co-packaged applications
- For communications, sensors/lidar/IoT and 3D scanning

Modular & (re-)configurable platform

- State-of-the-art wafer and carrier handling options
- FAB & HVM-ready – scalable and parallelizable
- Performance Services options for ML-based operation
- Operate, monitor and sync parallel lines remotely
- Add and/or swap modules to re-configure & re-purpose

WAFER TESTLINE is PXI-capable

Compatible with PXI-based instrumentation modules and leveraging NI's LabVIEW™. Integration with PCM is seamless, enabling sophisticated electro-optical test solutions to match individual requirements. Non-LabVIEW and alternative instrumentation environments are also compatible.

www.ficontec.com

ficonTEC
photonics assembly & testing

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ficonTEC is the global market leader for automated assembly and test systems for modern optoelectronics and integrated photonic devices. An unequalled breadth in process capability has been developed in serving the needs of a broad range of applications, including telecom/datacom and 5G, sensors and lidar, IoT and mobility, high-power diode laser assembly, and many more.

A unique and modular approach to production equipment design means that each system delivered is the automated and optimized embodiment of a customer-defined process.

Contact us

Core system specifications	WT800	WT1200	WT1600	WT2000
Motion system	single optical probing with 6-axis high-precision alignment electrical probing with 3-axis alignment		multiple optical probing with 6-axis high-precision alignment electrical probing with 3-axis alignment	
Wafer table	up to 4" wafers (+/- 100° rotation only)		up to 12" wafers (+/- 100° rotation + xy translation)	
Temperature control	temperature-controlled chuck, +15 to +80 (+/- 0.1) °C			
Handling options (wafer)	manual loading		manual loading or wafer feed system	
Handling options (die)	manual loading		automated loading	
Machine vision	system referencing and observation camera options | device and I/O port referencing			
Software features	flexible and powerful process programming | extended operator-less control | Windows 10 PC			
Minimum connections	120 VAC (or country specific) | air/vacuum | 100 Mbit/s network			
Cleanroom compliance	ISO 6**			
Physical features	rugged steel base production cell			
Dimensions (w x b x h, mm)	800 x 1200 x 1600/2000	1200 x 1200 x 2000	1600 x 1200 x 2000	1800 x 1200 x 2000
Weight (typ., kg)	1300	1800	2300	2500

** others available on request

WAFER TESTLINE mixed-signal electro-optical test systems are suitable for volume testing of on-wafer or on-carrier photonic-enabled devices. Multiple production systems can be remotely controlled and operated in parallel and in sync. Custom systems, special purpose cells and robotic systems can be flexibly incorporated to suit customer requirements.