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Test Design Kit (TDK) for General Wafer-Level Testing of Photonic Devices

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Contents

01

Development and challenges of silicon photonics

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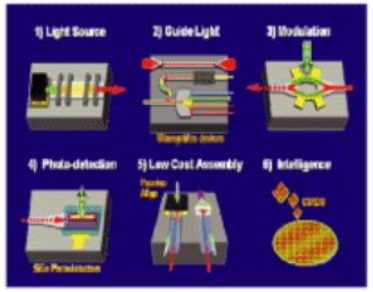
Silicon photonics and its application

Silicon Photonics

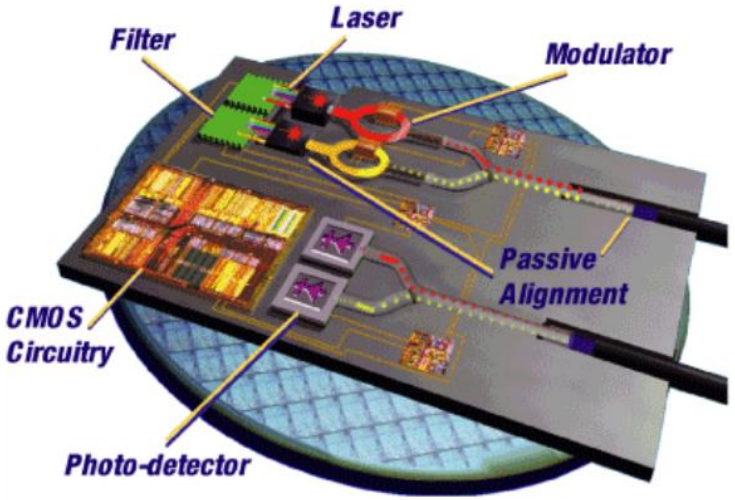
Photonics circuits use many different compounds

CMOS circuitry is made on silicon and others on f.i. Indium Phosphide (InP)

Big push to integrate all these functions onto one substrate



Source: Intel

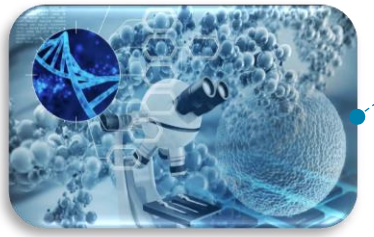


Application

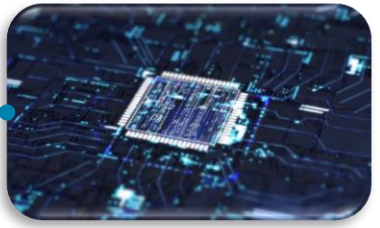
Optical communication

Optical computing

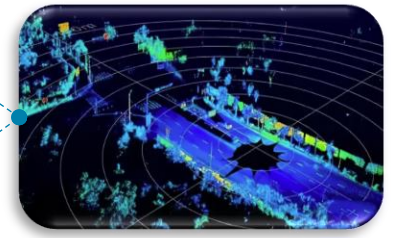
Smart healthcare



Optical interconnect



LiDAR



*The pictures are from the internet

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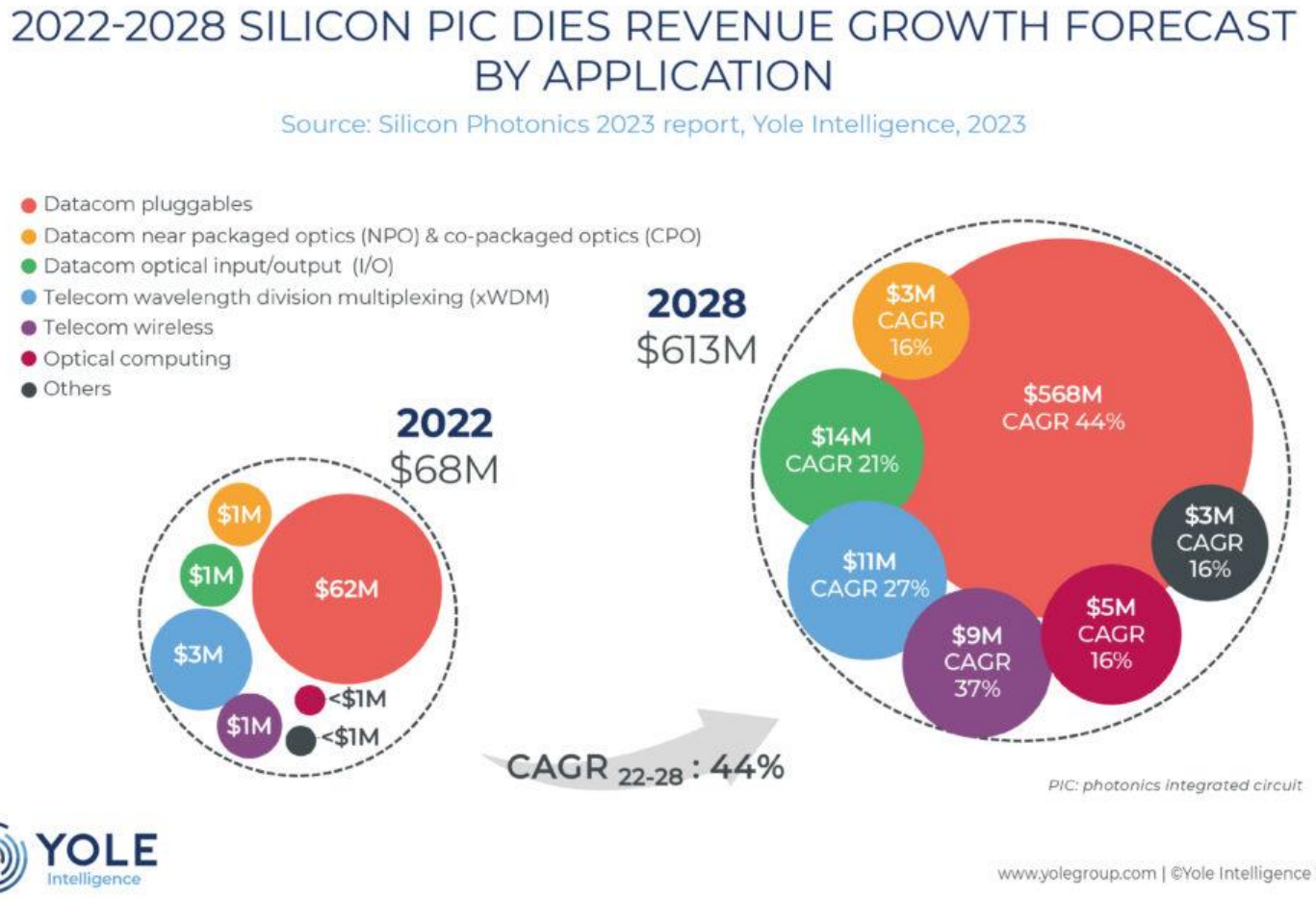
Rapidly growing market of silicon photonics

- **According to the forecast by Yole in November 2023, the market revenue of silicon photonics is expected to reach 68 million US dollars in 2022, and exceed 600 million US dollars by 2028, with a compound annual growth rate of 44% from 2022 to 2028.**



*The pictures are from the internet

Challenges in testing

1 High-volume production testing

The high-volume production of silicon photonics creates a great demand for testing, and it drives forward the wafer-level automatic testing platforms.

2 Increasing complexity of tests

The complexity of automatic tests is constantly increasing. The types of tests include tests with different probe types.

3 “Test walls”

The technical barriers between designers and professional test engineers lead to low testing efficiency.

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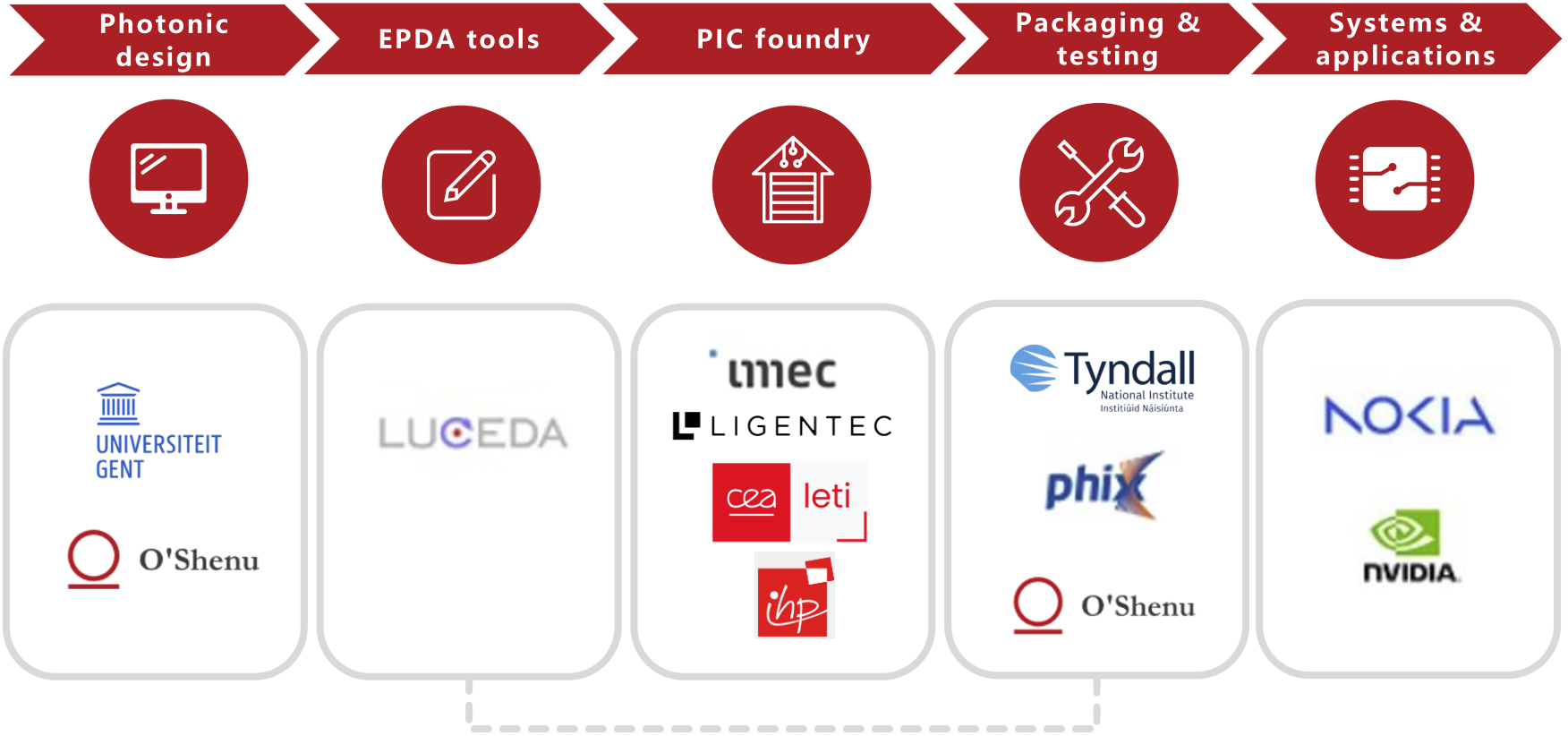
Silicon photonics industry chain

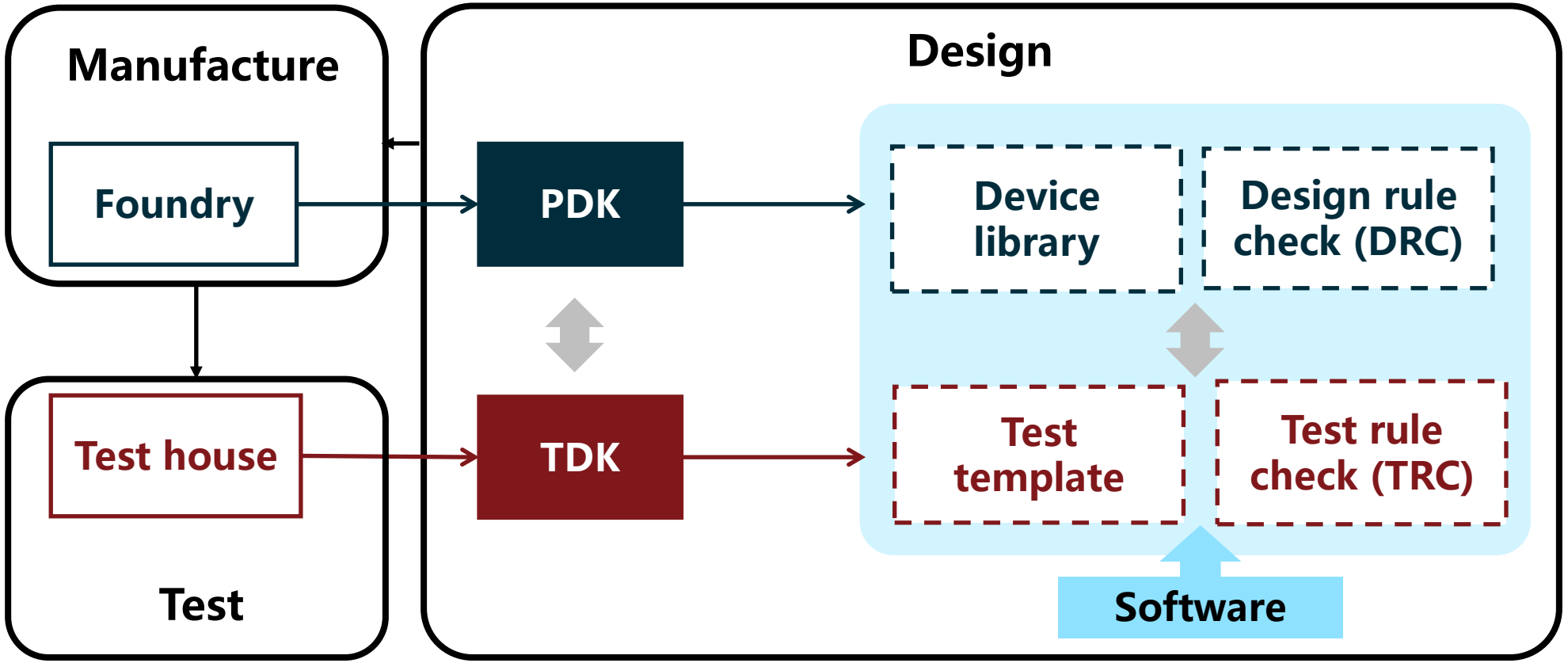


O’ Shenu provides TDK technologies embedded in EPDA tools for the automatic wafer-level testing platform.

02

Test Design Kit （TDK）

- **Compared with PDK, TDK is developed for the test house and can be integrated as a new module in the layout design software. It can build a communication bridge between design and test, allowing designers to import test requirements in the design phase and accelerate the subsequent testing.**



TDK in software

PDK

Fabrication information

- Define layers based on process

Waveguides\Components

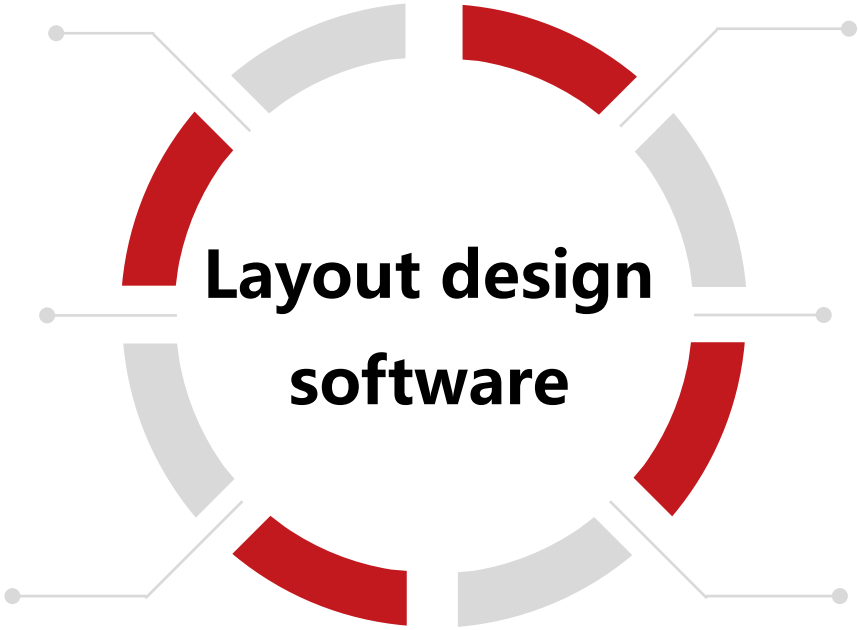
- Design the waveguides and components

Photonics integrated circuit

- Design the silicon photonics circuit

Circuit simulation

- Simulate the photonic circuits based on the circuit model



TDK

Test information

- Capabilities of test equipment

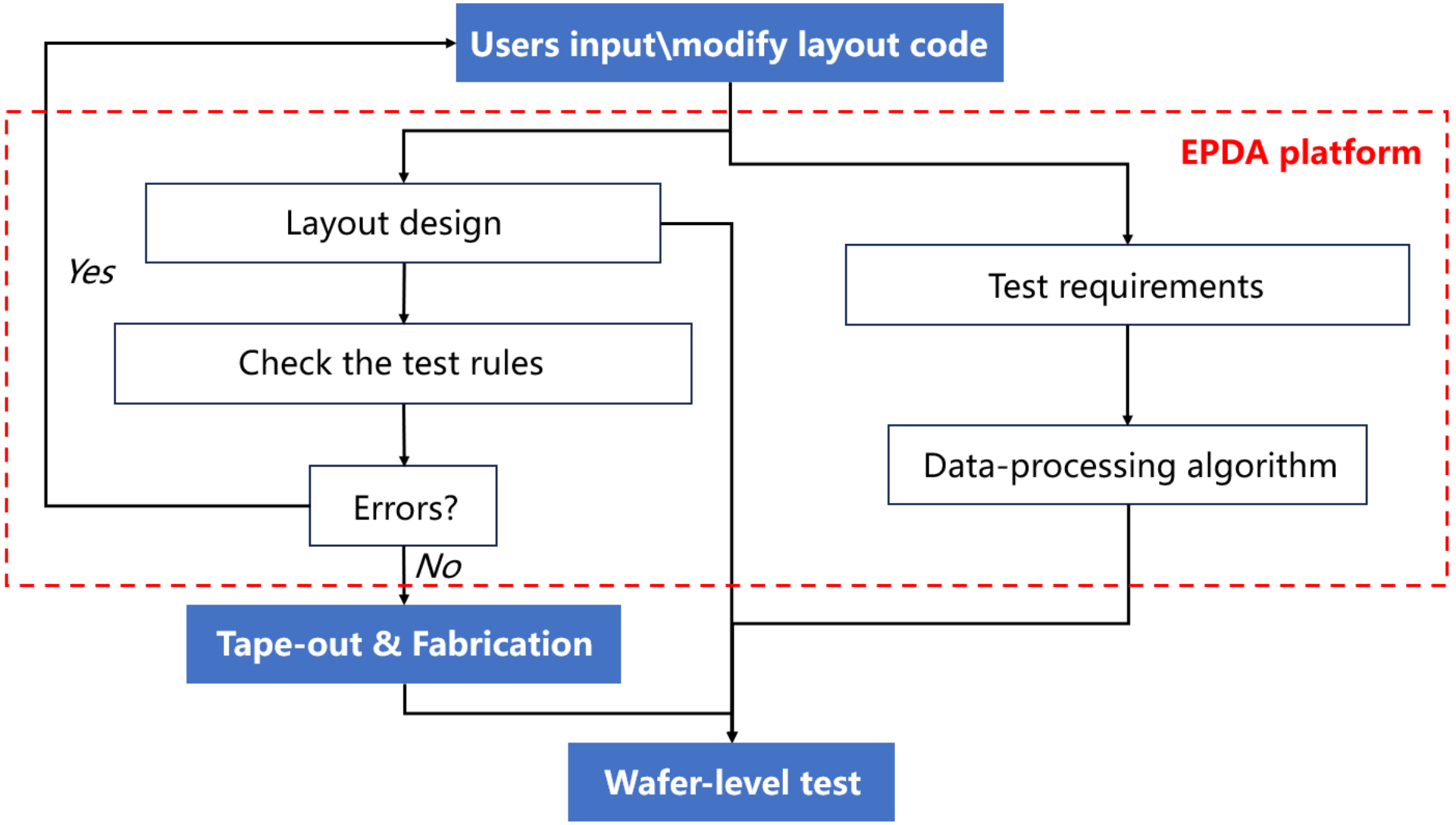
Test rule check

- Check the test rules for the design

Virtual test

- Estimate the test time, and provide data-processing algorithms

TDK workflow



Differences between TDK and design for test

TDK

- It is the bridge between design and test, and can ensure that the design is testable.
- Designers can quickly understand the test capabilities of the equipment and the test methods.

Design for test

- It adds extra circuits to monitor device performance, and can ensure that the devices are good.
- It improves controllability and observability of devices within the chip, enabling verification of specific functions.

What are the benefits of TDK?

Improve testing capabilities

For test houses, it provides effective communication between designers and test engineers to achieve efficient automatic tests.

Improve customer experiences

For customers, it provides efficient and convenient design tools to break down the "test walls".

Improve industry chain

For industry, it provides a standard workflow of design-process-test to shorten the R&D iteration cycle.

03

Company Introduction

Company introduction

O'Shenu Technologies is a fabless advanced technology company headquartered in **Wallonia**, **Belgium**, focusing on the end-to-end development of silicon photonics technology. It provides customers with customized solutions and services to meet specific customer needs.

Design

Provide silicon photonic design services for the application end.

Process

Test

Provide TDK technology development services to test houses or equipment manufacturers.

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Thank you

Future is brighter with photonics