WORKSHOP OF PHOTONICS

# How to Meet Today's Needs of Those Fabricating Glass in Various Forms?

## Novelties in Laser Micromachining Workstations

EPIC
European Photonics Industry Consortium

wophotonics.com

WOP

WORKSHOP OF PHOTONICS

# We deliver **solutions** for **your μ tasks**

## 18+ years of expertise

in femtosecond laser micromachining
with a high focus on glass

## 6 in-house and 2 licensed patents

enabling cutting-edge technologies

## 50+ professionals

5 Ph.D., 30 M.S. and B.S.

## R&D studies

continuous projects with
academic and research partners

wophotonics.com

Members of

EPIC European Photonics Industry Consortium

LITHUANIAN LASER ASSOCIATION

semi

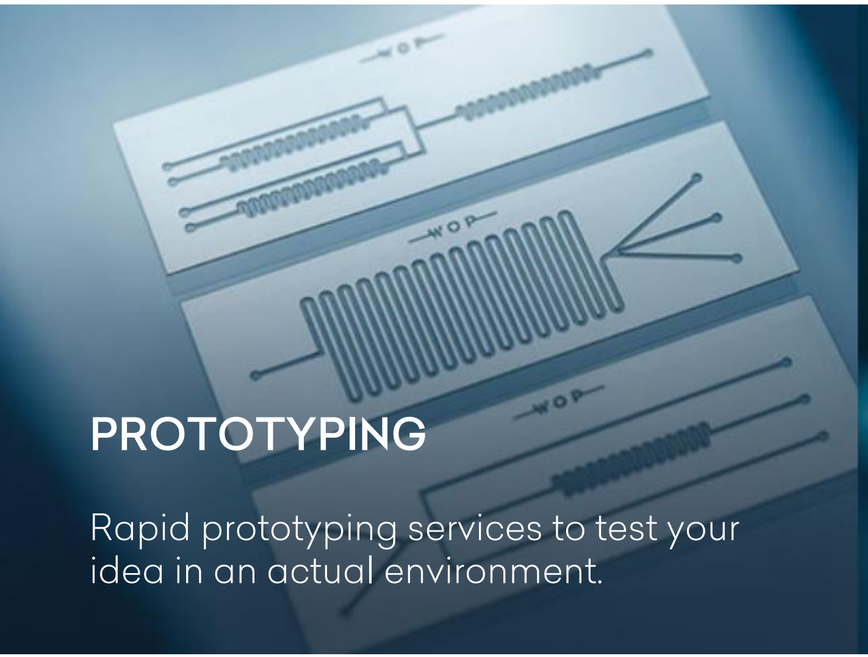
Toolas

ISO certified

SERTIKA ISO 9001

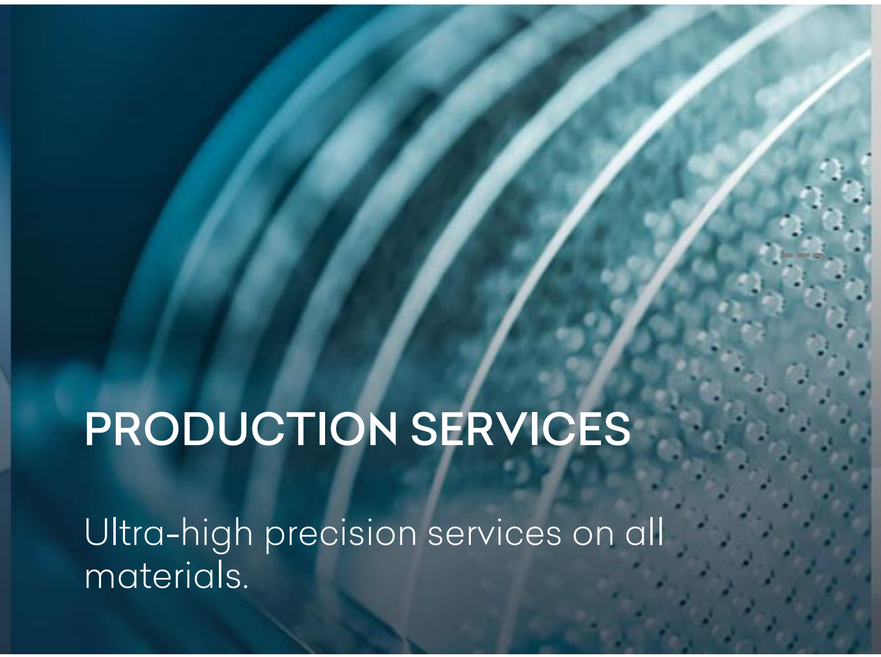
# How we work

## HAVE A MICRON CHALLENGE?



### PROTOTYPING

Rapid prototyping services to test your idea in an actual environment.



### PRODUCTION SERVICES

Ultra-high precision services on all materials.

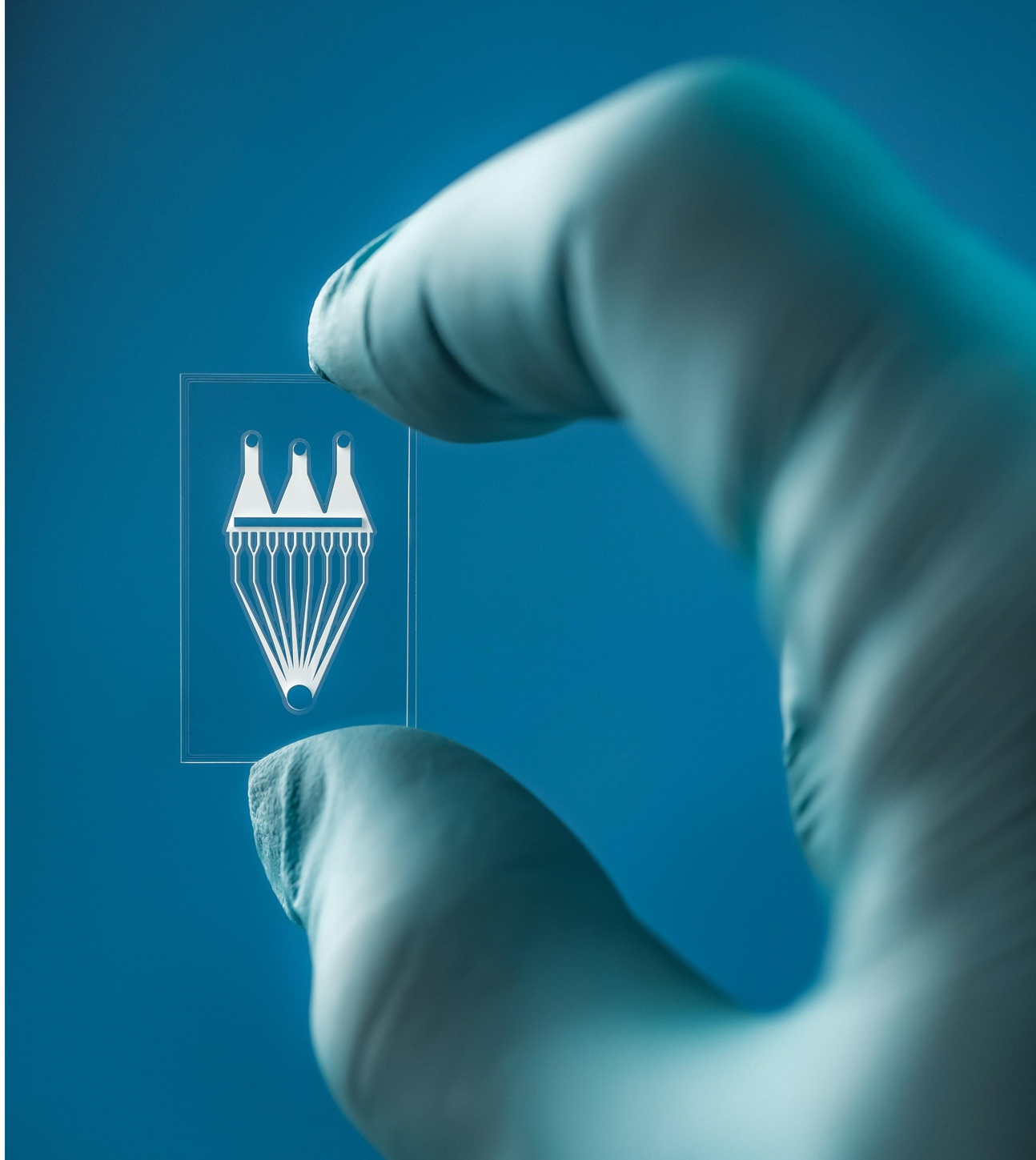
### LASER SYSTEM DEVELOPMENT

Tailor-made laser systems designed for your specific application.

All materials: glass, sapphire, ceramics, silicon, metal, plastic, optical fibers.

# Market trends

- COVID-19 pandemic motivated investors to transfer major funds to chip diagnostics, as well as at-home diagnosis
- Prototyping and complex microfluidic devices are primarily prototyped in glass
- High potential applications is pushing manufacturers to develop scalable wafer-level processing techniques
- Price per chip pressure urges to look for all-in-one or at least combined production solutions



# FemtoGLASS

## Glass & sapphire cutting workstation for industry - outperforms other glass cutting methods

- Ultra-fast thin (30 µm to 3 mm) glass & sapphire cutting
- High process speed – up to 1000 mm/s
- Irregular shapes
- Inner and outer contours
- Easy breaking for non-tempered glass and self-breaking for tempered glass


NEW DESIGN COMING SOON!

High speed

Thin glass & sapphire

All shapes

### Type of glass

- Non-tempered glass
- Tempered glass
- Sapphire

### Quality of cuts

- Cut width less than 1 µm
- Ultra-low chipping <10 µm
- No post-processing required

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# FemtoGLASS

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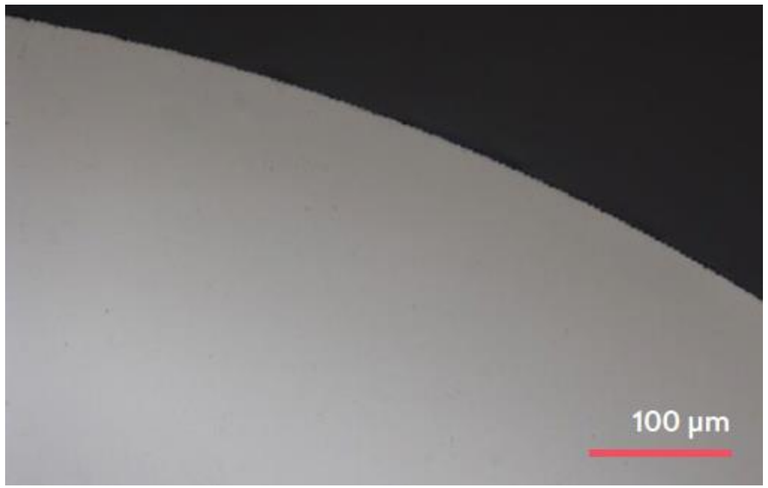
NEW DESIGN COMING SOON!

WOP

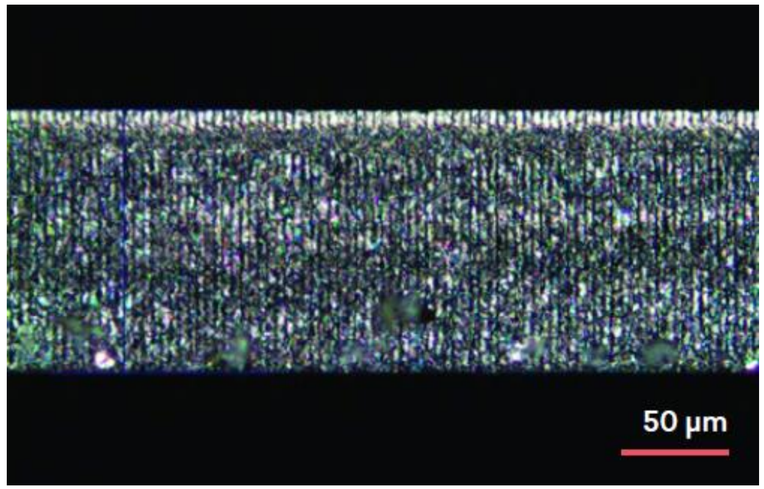
## Solutions

- 8“ and 12“ industry standards
- Variable material thickness
- Glass dicing combined with chips separation process
- Sample recognition (with and without fiducials)

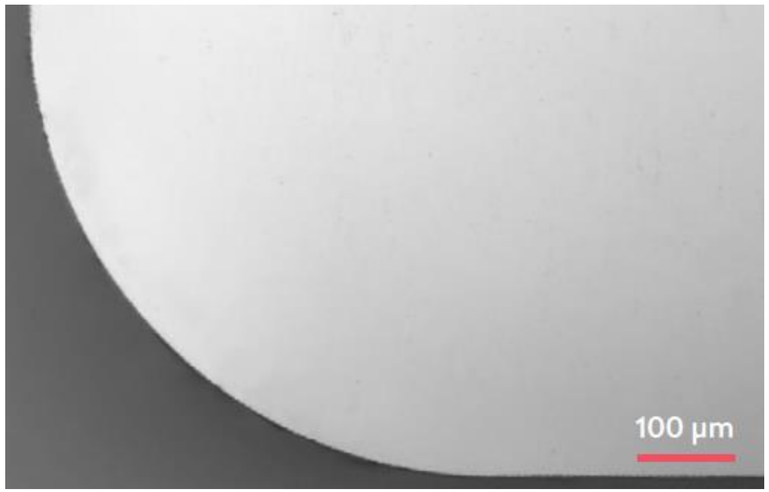
# Glass & sapphire results



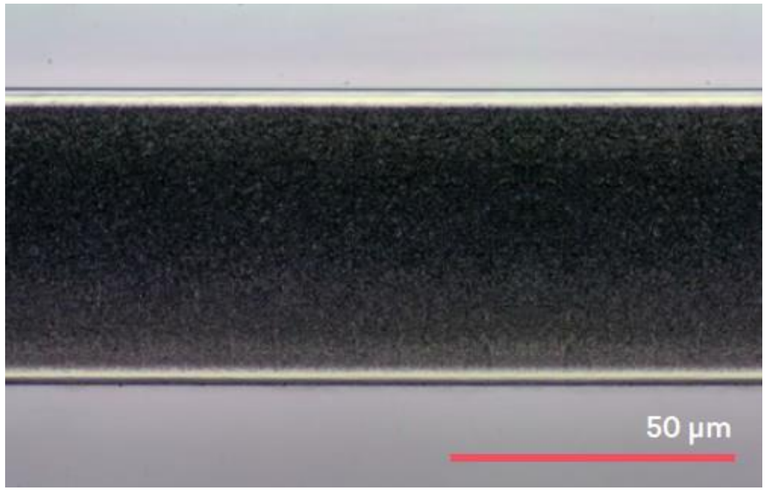

Sapphire 0,6 mm thickness



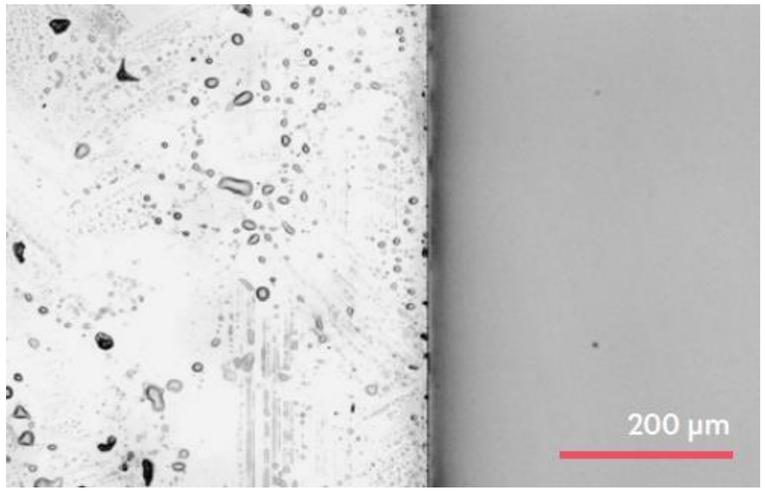

Sapphire 0,1 mm thickness



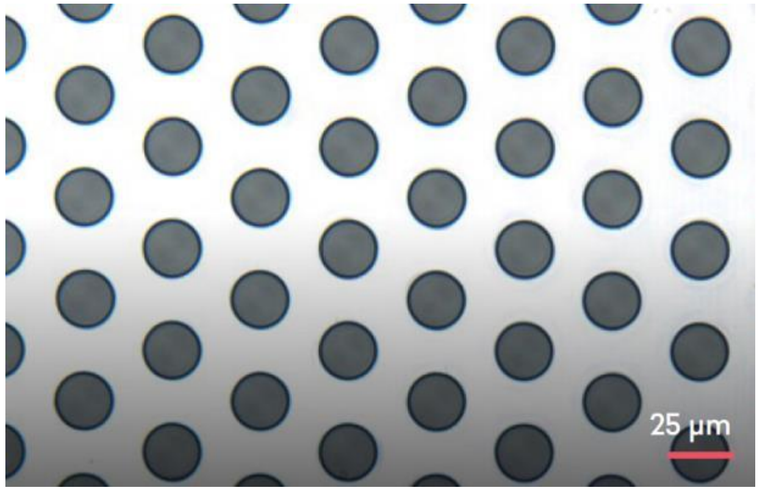

Sapphire 0,6 mm thickness




Tempered glass 0,55 mm thickness




Tempered glass 0,55 mm thickness




Glass wafer drilling

# What are the needs?

- Glass is trending because it is ecological, transparent, inert, chemically resistant, biocompatible, etc.
- The industry is looking for ways to change other materials to glass (ex., in semiconductors, silicon to glass)
- There is an increased demand not only in wafer-level glass microfabrication but also in hybrid-layered chips production
- Thin glass micromachining is still a challenge. However, WOP, for the last ten years is heavily investing in developing glass micromachining to overcome these challenges.
- Automated and combined processes

# FemtoGLASS

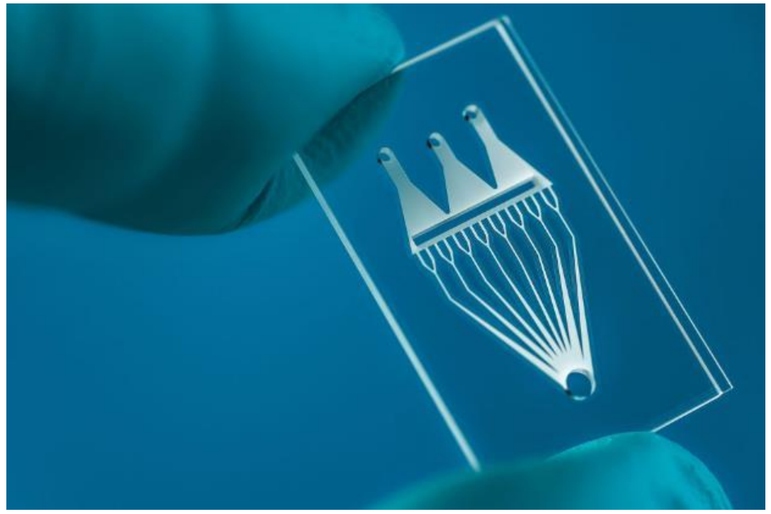
**Glass & sapphire cutting workstation for industry - outperforms other glass cutting methods**

NEW SOLUTIONS

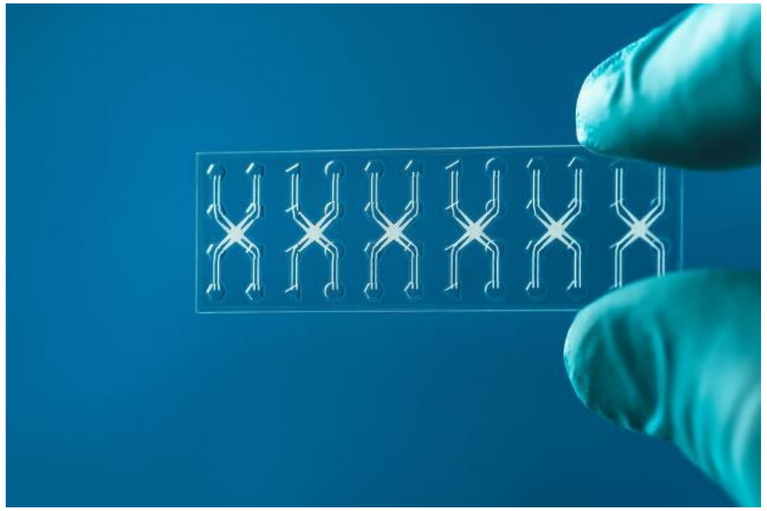
## Future needs:

- Integrated marking solution for chips traceability
- Maximum efficiency by automated loading
- Different material layers laser dicing
- Integrated bonding function for truly all-in-one machine design

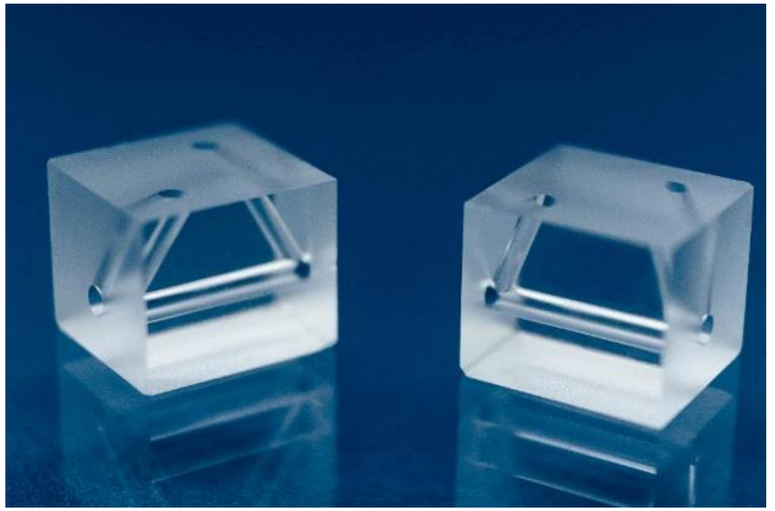
# Our recent glass solutions



Custom design microfluidic chips manufacturing

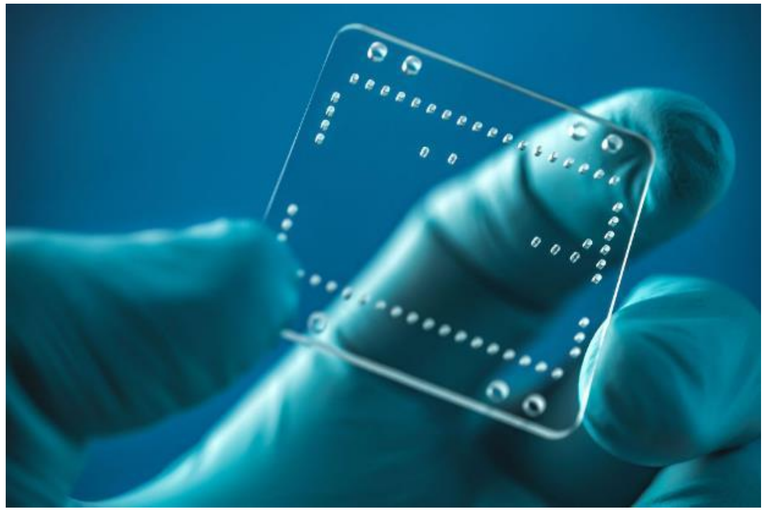


Microfluidic chip bonding up to 5 hermetic layers bonded without adhesive

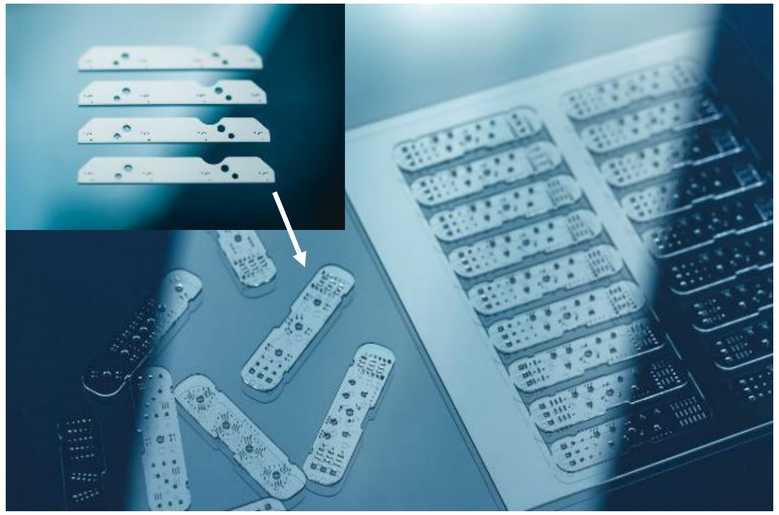


Perfect channels in glass cubes, glass drilling with SLE


Glass wafer Ø 8“, 500 µm thickness, fused silica



Glass probe cards



Switch ceramics to glass for probe cards: 80% less defects and 20x faster processing

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# Let us know Your µ tasks – we will deliver a solution!

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