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Advanced Backend Solutions – Business Update

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Capital Markets Day 2023

Disclaimer

All presentations at our Capital Markets Day 2023 contain forward-looking statements relating to the business, financial performance and earnings of SUSS MicroTec SE and its subsidiaries and associates.

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SUSS MicroTec SE does not intend or accept any obligation to publish updates of these forward-looking statements.

01

Our new set-up to enable profitable growth

02

Focus topics from Product Lines

03

Summary

Clear focus and agility in a fast evolution of market dynamics

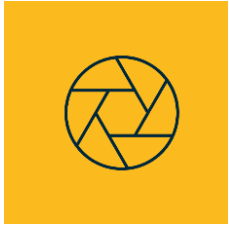
Merge of Business Units Bonder and Lithography into one Business Unit Advanced Backend Solutions, effective Dec 1, 2022

Objective

- Provide clear product and solution offering from “one” SUSS MicroTec
- Leverage synergies and ease interaction between sales & marketing
- Enable profitable growth by using full business potential in this market



Solution offering from “one” SUSS MicroTec



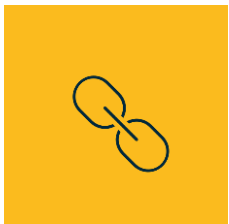
Imaging Systems

- Mask Aligner
- Scanner
- Micro- & Nano Imprint



Coating Systems

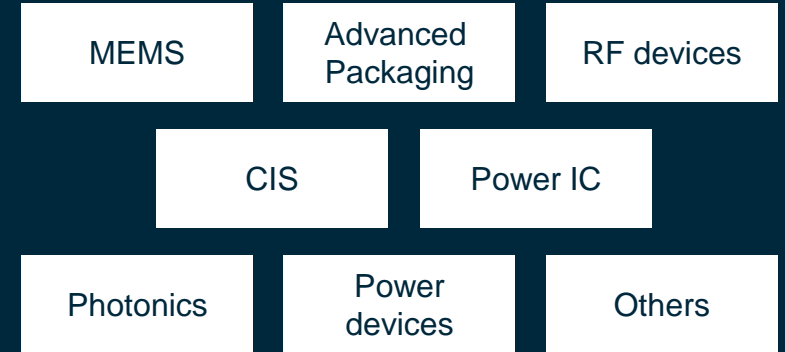
- Spin & Spray Coater
- Inkjet
- Metrology



Bonding Systems

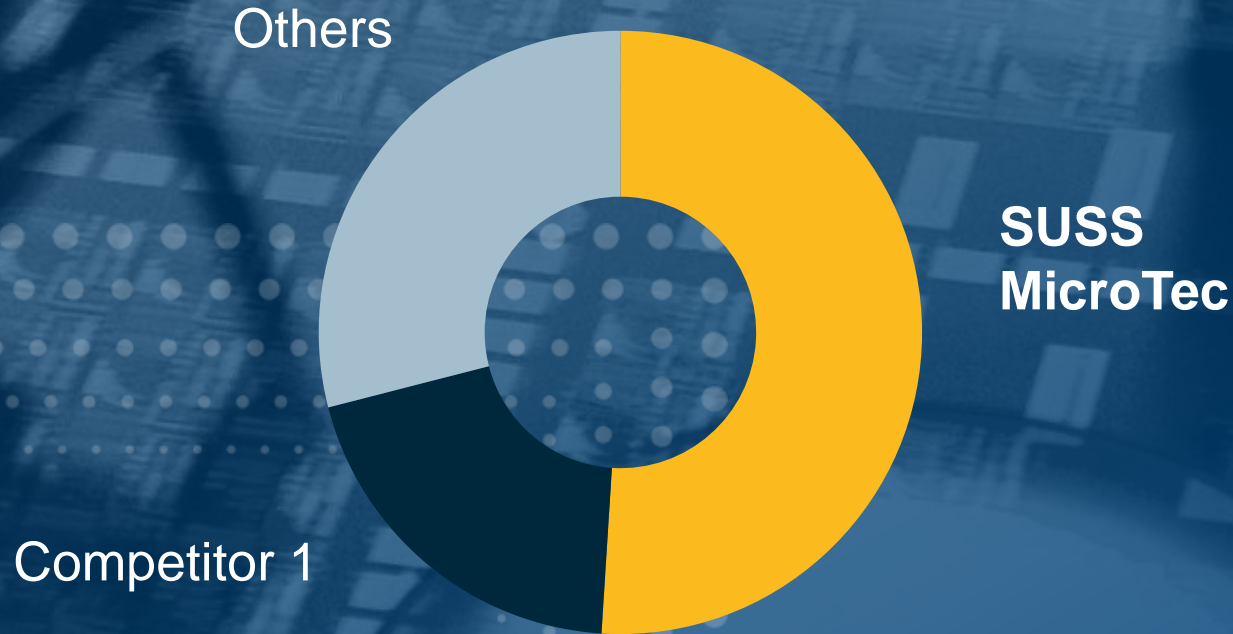
- Temporary Bonder & De-bonder
- Permanent Bonder (incl. Hybrid Bonder)

SUSS MicroTec
product portfolio for
Advanced Backend market



Market leader for Mask Aligner and best cost-of-ownership to customers

Market segment share Mask Aligner¹



Best optic and alignment capabilities

Superior **resolution** and light **uniformity**

Excellent **process performance** and **yield**

High **flexibility** to process different materials

Easy maintenance and **low downtime**

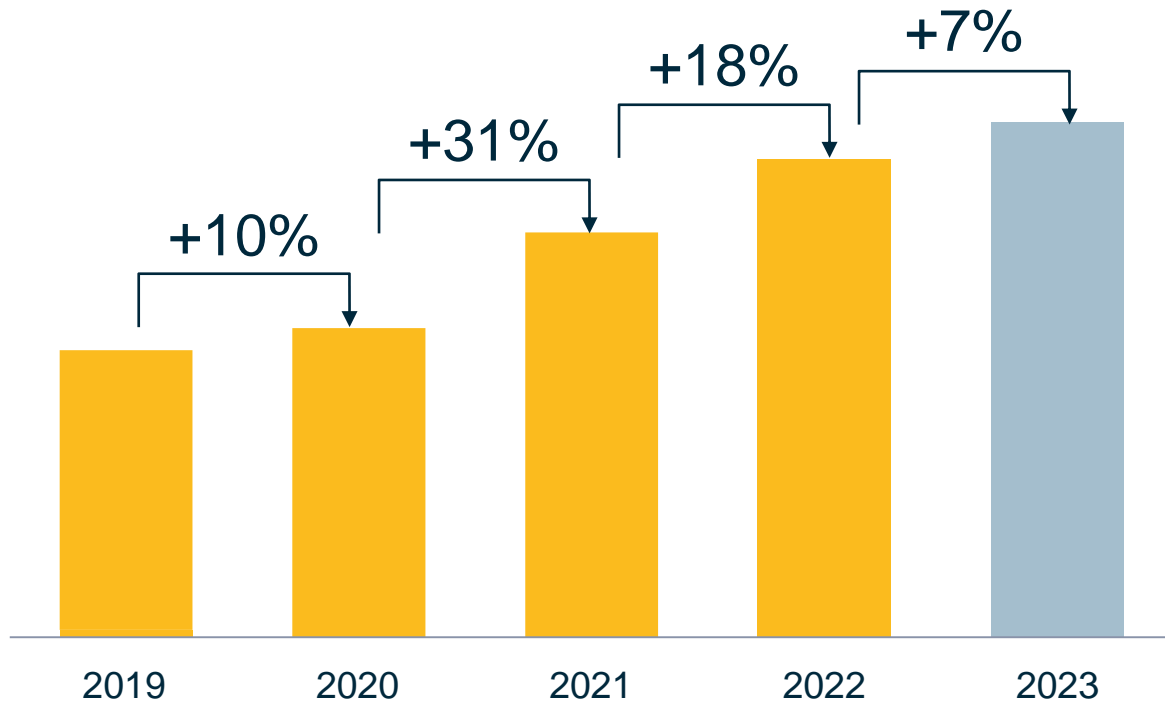
Strong global **service support**

Full lithography solution supplier
(coat, expose, develop)

¹ Source: Yole market and technology report "Lithography and Bonding Equipment 2022, Focus on More Than Moore"

Mask Aligner are solid foundation of SUSS

Strong revenue growth despite challenging market environment



1 New equipment only; 2 Source: Yole market and technology report Lithography and Bonding Equipment 2022

Our Mask Aligner business performance is remarkable

2022

+18% YoY



Mask Aligner revenue¹

>50%



Market share

**CAGR₂₂₋₂₇
+5-8%²**



MEMS, RF & Power
remain core markets

Business highlight 2022

15 x MA200 Gen3 ordered to support capacity expansion at key customer for SiC devices (e-mobility)

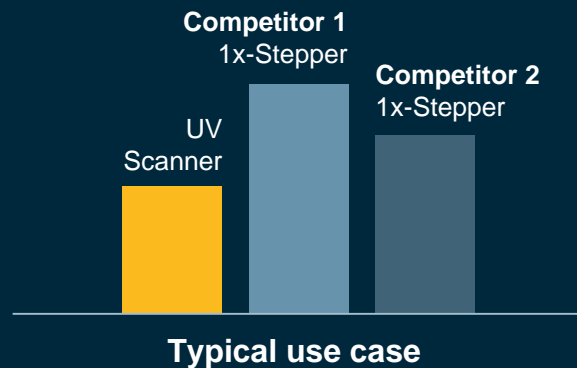
Successful relaunch of UV Scanner

- Advanced Packaging/More than Moore applications show significant growth since years
- Moderate but continuous increase of requirements for exposure and projection lithography
- SUSS MicroTec venture to position UV Scanner was too little during last 5-7 years

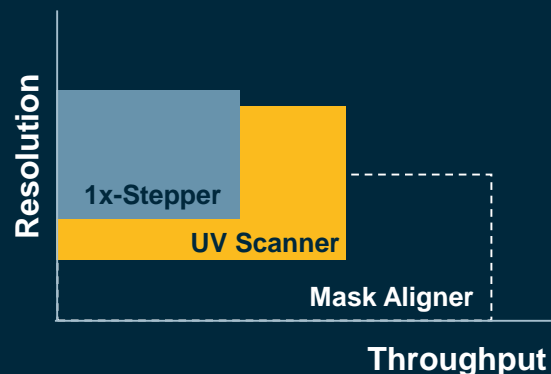
But:

Potential for UV Scanner is available due to game-changing performance

Best-in-class
Cost-of-Ownership (CoO)



Significant higher throughput
at same printing performance



Achievements since December 2021

- Complete supply chain relocated from US to Taiwan
- Strong collaboration with R&D for Mask Aligner to leverage synergies
- Further expansion as preferred solution at leading foundry customer
- Successful development of customer base, three additional customers in Taiwan, US and Japan



Current opportunity funnel
more than
€35 million

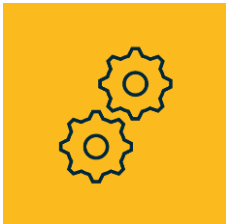
Exposure remains solid foundation of SUSS

Underlying hypothesis



- SUSS MicroTec superior optic and alignment performance in feature-enhanced Mask Aligner & UV Scanner can meet rising exposure requirements for quality and cost
- SUSS MicroTec right-fit approach with differentiation and performance will slow down shift to Stepper

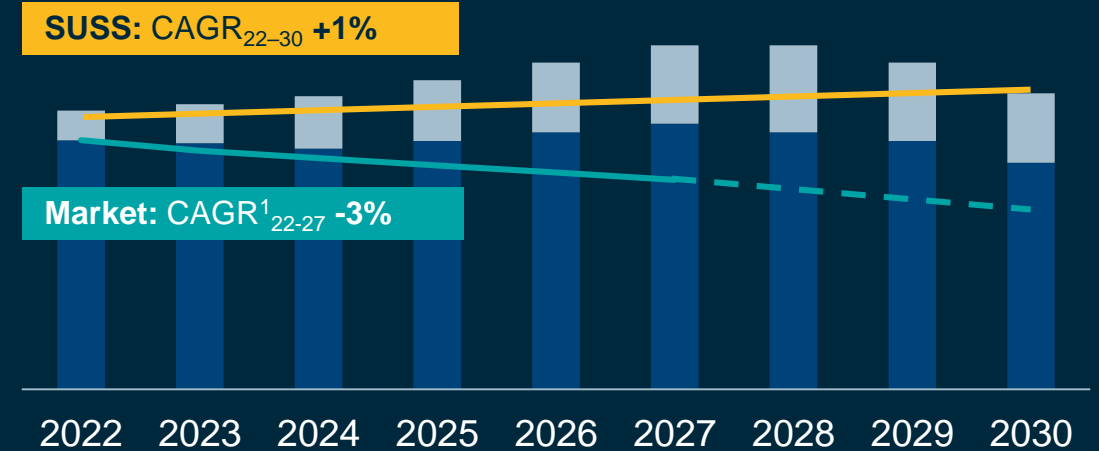
Key initiatives



- HW/SW interface to Mask Library/Mask Cleaner
- Throughput up to 200 wph for Mask Aligner (+50%)
- Throughput up to 100 wph for UV Scanner (+25%)
- Introduction of backside alignment at UV Scanner
- Integrated metrology (Industry 4.0)

1 Source: Yole market and technology report “Lithography and Bonding Equipment 2022, Focus on More Than Moore”

Despite ongoing market shrink for Mask Aligner equipment we keep today's SUSS MicroTec exposure revenue level at high profitability



More than €500 million

cumulated revenue with SUSS exposure solutions targeted until 2030

Switch from Imprint equipment supplier to a solution provider

Market environment¹

- Disruptive 3D imaging & sensing technology are changing key markets for smartphones, AR/VR and automotive
- Micro- and Nano Imprint are foreseen as enabler for CAGR₂₀₋₂₆ +14.5%

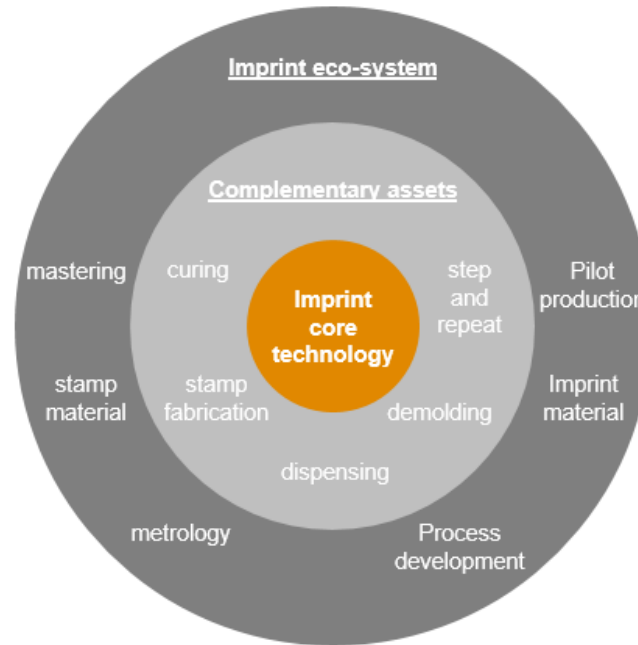
SUSS MicroTec SMILE core technology

- Superior process performance by SUSS MicroTec imprint core technology
- Unique solution offering with inkjet as enabler technology
- Modular and scalable concept from process development to volume production
- Market release of 1st 300 mm Micro- & Nano Imprint equipment

¹ Source: Yole market and technology report “Lithography and Bonding Equipment 2022, Focus on More Than Moore”

SUSS MicroTec Imprint eco-system

Offering a complete eco-system will benefit our customer with a full turn-key solution for Micro- & Nano Imprint and wafer stacking



SUSS solution expertise will support our customer along their imprint journey

€250-300 million

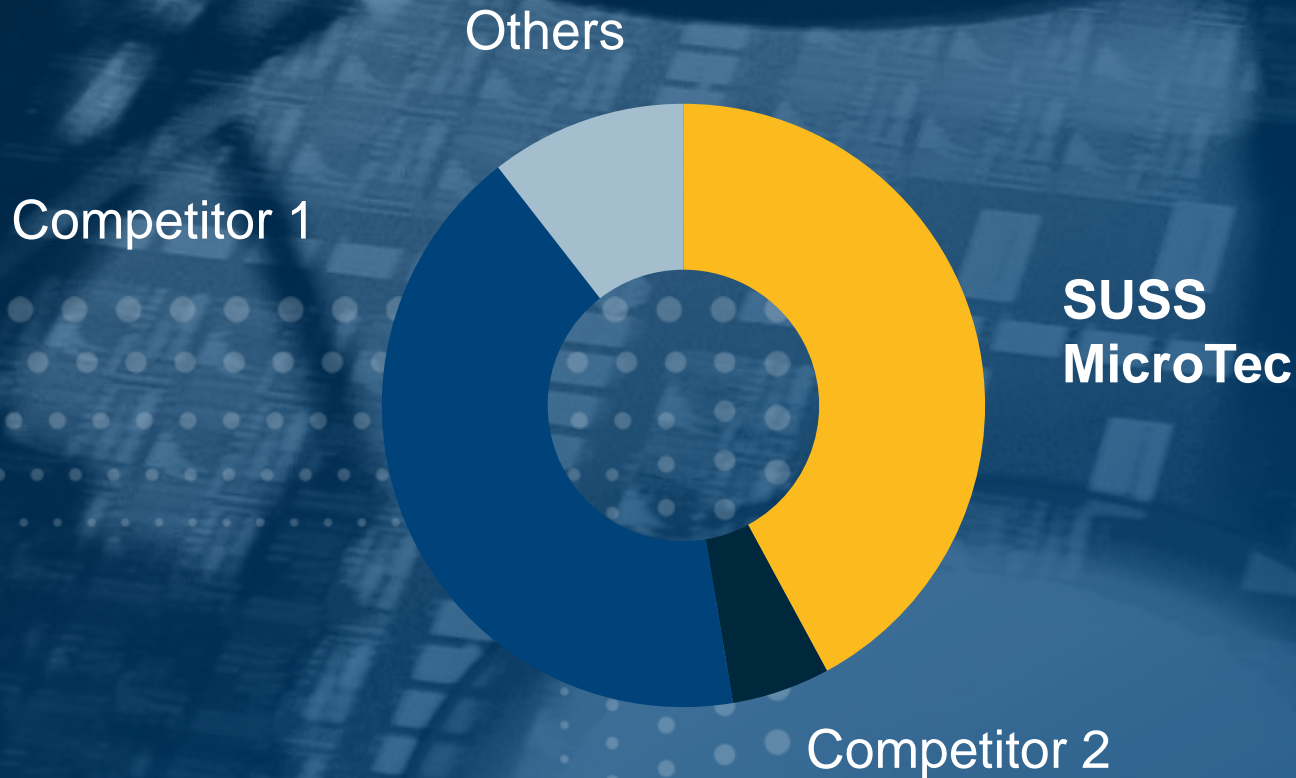
cumulated revenue with SUSS MicroTec Imprint solutions targeted until 2030



Revenue projection for SUSS MicroTec Imprint

Leading supplier for coating equipment

Market share Coater for Advanced Packaging¹



More than **2,000** SUSS MicroTec Coating systems installed

Right balance between standardized **solutions & customized features**

High **flexibility to process** different materials

Strong global **service support**

Full lithography solution supplier (coat, expose, develop)

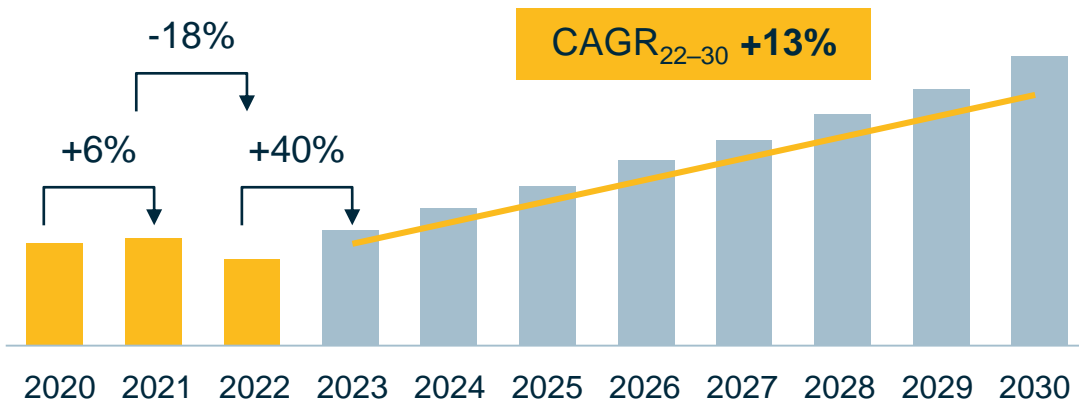
¹ Source: Yole market and technology report “Advanced Packaging”, 2019

We are ready to grow further with coating solutions



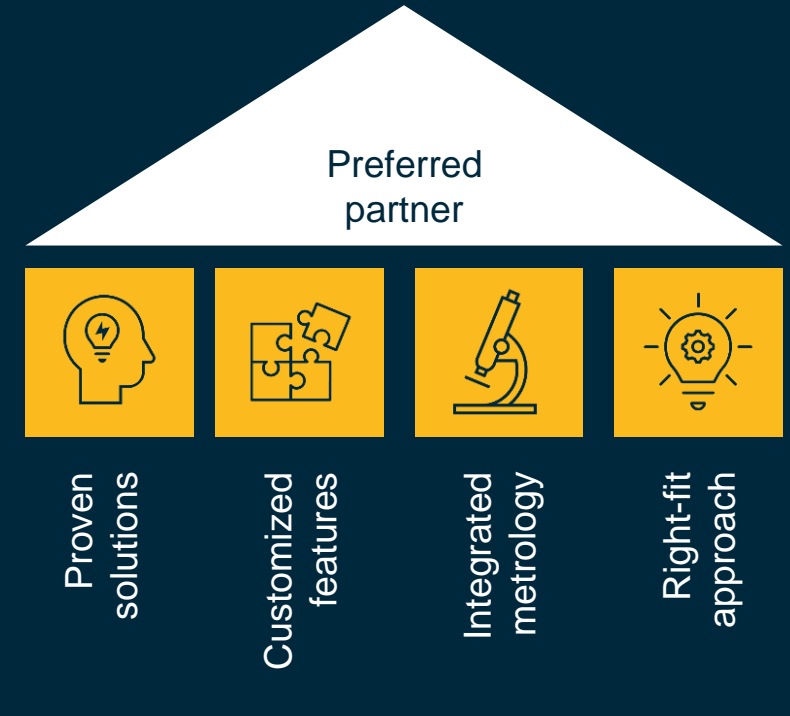
- Business performance in 2022 significantly impacted by material supply constraints, catch-up and over-proportional growth in 2023
- More than Moore applications will further grow with CAGR₂₂₋₂₇ +5-8%¹
- Next generation of high performing Coater/Developer equipment ready:
 - Added features for higher yield → lower CoO
 - Added modules for up to 60% higher throughput/m² → lower CoO
- Unique capabilities to offer right-fit approach for coating technologies (spin, spray, inkjet) will allow us to further outgrow the market

SUSS Coating revenue



more than €1.000 million
 cumulated revenue with SUSS MicroTec coating solutions targeted until 2030

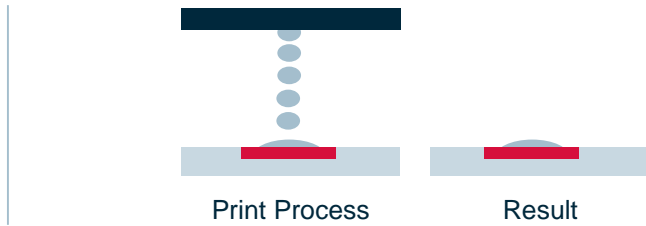
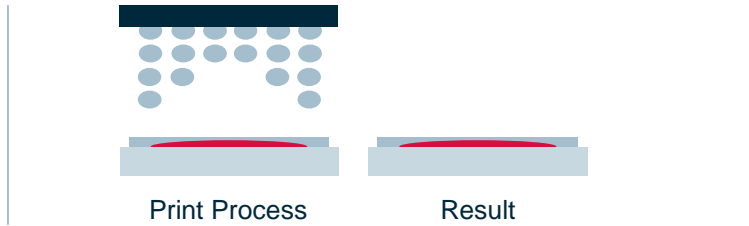
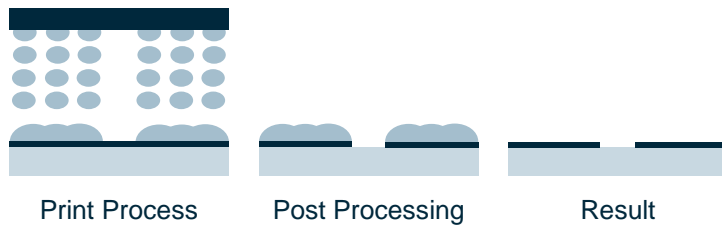
¹ Source: Yole market and technology report "Lithography and Bonding Equipment 2022, Focus on More Than Moore"



Customer focus

Inkjet offers cost optimized processes and enables new process flows

Application



Masking

- Direct application of masking layer
- Less process steps required
- **Benefit:** lower CoO
- **Use case:** etching mask

Selective coating

- Topology specific application of materials
- Less material consumption (zero waste) & less process steps required
- **Benefit:** lower CoO
- **Use case:** photosensitive or dielectric layers

Functionalization

- Direct application of functional materials
- Higher flexibility in process flows
- **Benefit:** enabling of new technologies
- **Use case:** functionalization of sensor areas

1st ACS200 Gen3 system with integrated JETx installed in 2022 at key customer
Additional orders received





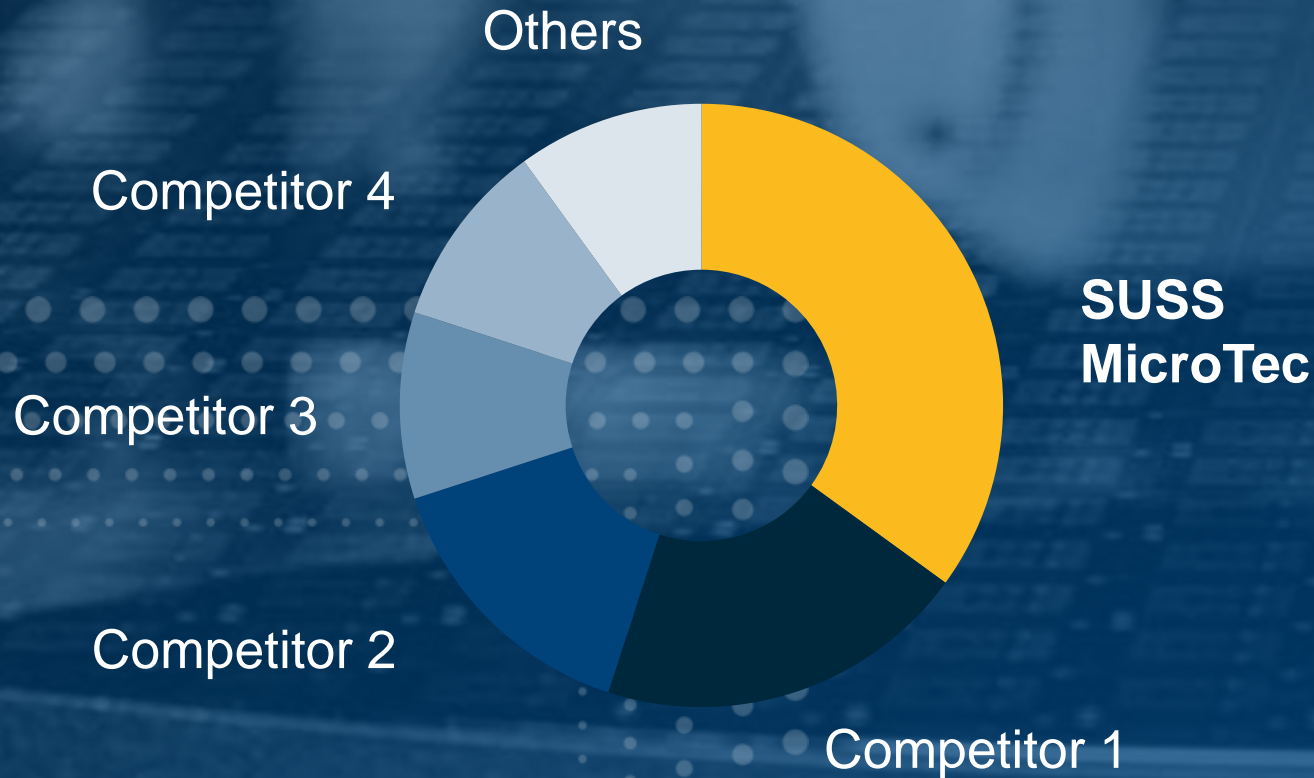
Temporary bonding & de-bonding



Permanent bonding (incl. hybrid bonding)

Major player in temporary bonding & de-bonding (TBDB)

Market share Temporary Bonder¹



Market share in the **top3 3D memory IDMs is ~50%**

Successful **qualification** for next node for **3D memory (HBM3)** and **capacity increase for 2.5D**

Successful **process qualification** at **key customer** for **200 mm SiC**

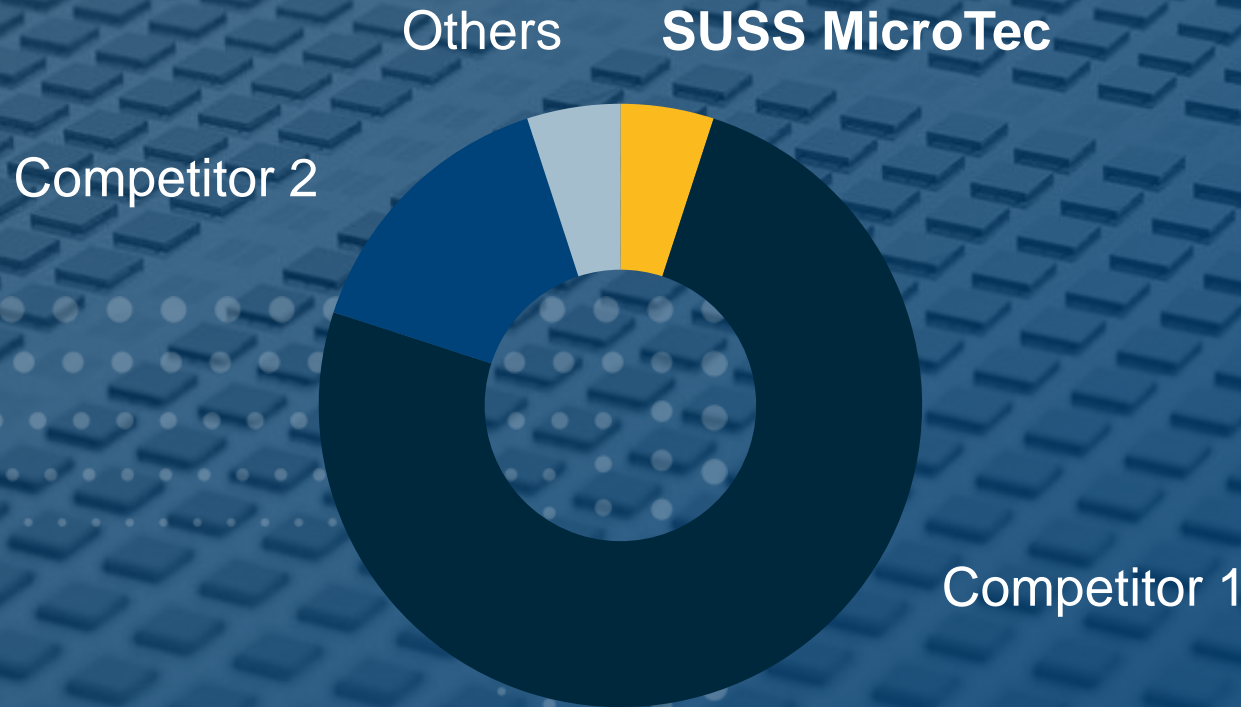
Continuous innovation of **value-add features and technologies**

Excellent process performance and yield

¹ Source: Yole market and technology report "Lithography and Bonding Equipment 2022, Focus on More Than Moore", SUSS market analysis

Increased market share for permanent bonding applications

Market share Permanent Bonder¹



Initiative to **re-enter the permanent bonding market** resulted in double digit order intake for **automated Bonder in 2022**

First orders for 200 mm and 300 mm W2W² and D2W² Hybrid Bonder

Modular platform approach to cover a variety of processes, including metal thermo-compression, fusion- and hybrid bonding

Unique fixture-less aligned wafer handling in automated 200 mm tool

Continuous innovation of value-add features and technologies

Excellent process performance and yield

¹ Source: Yole market and technology report "Lithography and Bonding Equipment 2022, Focus on More Than Moore", SUSS market analysis; ² W2W: wafer-to-wafer, D2W: die-to-wafer; Image: imec

SUSS MicroTec's solutions for different hybrid bonding processing schemes

Wafer level processing – 2 main competitors



Single die processing – 2-3 main competitors in R&D phase

Pick & Place or Bonding



Surface Preparation

= Wet Clean & Plasma Activation



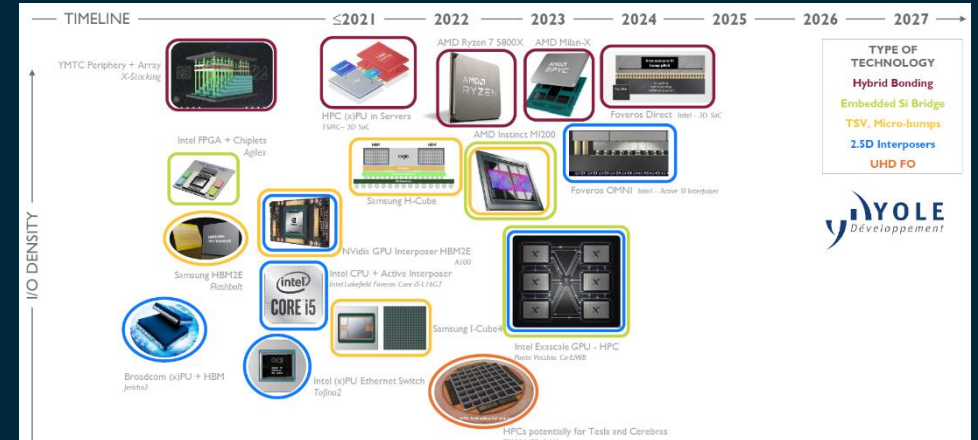
Surface Preparation & Bonding



I/O density scaling is key driver for hybrid bonding

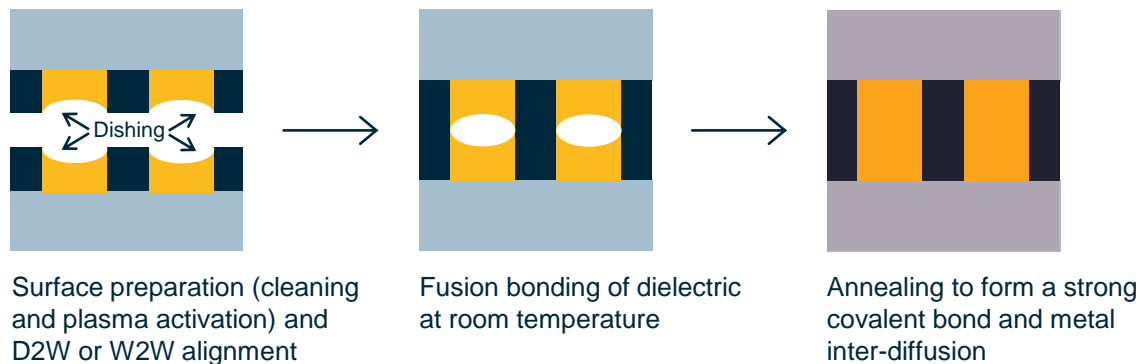
Packaging roadmaps require scaling of I/O density enabled by hybrid bonding (mechanical & electrical contact in one process)

| Key requirements | SUSS status | Competition |
|-------------------------------|-------------|-------------|
| Inline metrology | ● | ◐ |
| Alignment and overlay control | ◐ | ◐ |
| 100 nm accuracy (W2W) | ◐ | ◐ |
| 250 nm accuracy (D2W) | ◐ | ◐ |
| High throughput | ◐ | ◐ |



Source: Yole market and technology report “High-End Performance Packaging 2022, Focus 2.5D/3D Integration”

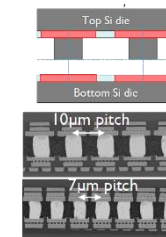
Hybrid bonding process principle



■ Silicon ■ Dielectric ■ Cu

1 Source: imec presentation “High Performance 3D system partitioning and backside power delivery: progress in EDA and 3D integration technology”, semi 3D Systems Summit 2020

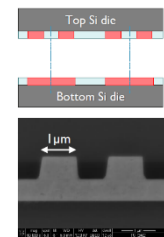
Thermo-compression bonding



Cu bump with solder connection and polymer underfill material¹

VS.

Hybrid bonding



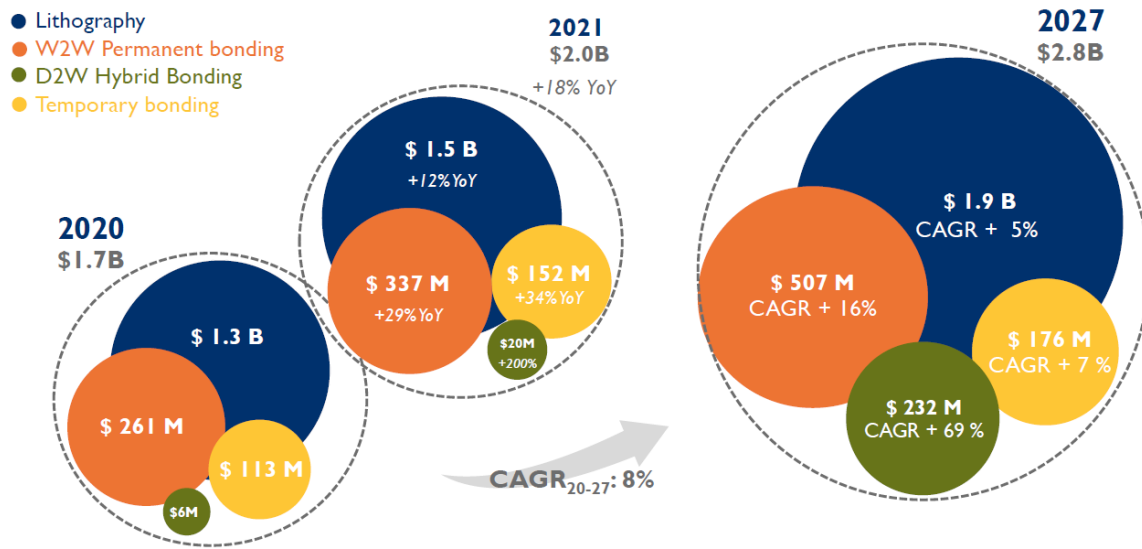
Hybrid bonding of dielectric and embedded Cu pads¹

Focused initiatives for an attractive market

Permanent Bonder equipment market is forecasted¹ to grow at

- CAGR₂₀₋₂₇ of +16% for W2W permanent bonding applications (incl. hybrid bonding)
- CAGR₂₀₋₂₇ of +69% for D2W hybrid bonding

2020-2027 equipment market forecast for More than Moore



1 Source: Yole market and technology report "Lithography and Bonding Equipment 2022, Focus on More Than Moore"

SUSS MicroTec Permanent Bonder initiatives and highlights 2022

Book-to-bill for XBS200 Permanent Bonder steadily increasing

Installed XBS300 W2W Hybrid Bonder evaluation tool at leading foundry in Asia

Partnership with SET for integrated D2W hybrid bonding, target for proof-of-concept tool Q2/2023



Received first order for integrated D2W hybrid bonding system for shipment in Q1/2024

Partnership with Sy&Se for Impulse Current Bonding to penetrate power (SiC) and RF-MEMS applications



Our way forward with SUSS MicroTec Bonding Systems

Temporary bonding & de-bonding



Modularization project with focus on handling unit, cleaner module and 308 nm laser & lower cost photonic UV de-bonding modules to improve cost and lead time

- Expand market position in Advanced Packaging, especially top3 IDMs for 3D memory
- Enter new market segments and applications that offer attractive growth potential
- Important source of revenue with continuous growth through 2030, CAGR₂₂₋₃₀ ~9%

Permanent bonding



- Proven core technology on competitive level
- New technology features, e.g., ICB or Aligned Wafer End-Effector (AWEE) for differentiation
- Modularization project to improve cost and lead time

- Win market share from #1 supplier by offering competitive alternative
- Important source of revenue with continuous growth through 2030, CAGR₂₂₋₃₀ ~17%

Hybrid bonding



- Successful completion of W2W Hybrid Bonder evaluation at key customer
- Evaluation tool for surface preparation for D2W hybrid bonding
- Overlay improvement to <50 nm for W2W with patented wafer joining method

- Secure key customers for D2W Hybrid Bonding against competitors by unique XBS300 for W2W and combined surface preparation/bonding for D2W with SET
- Largest market growth opportunity with continuous revenue growth through 2030, CAGR₂₃₋₃₀ ~42% (in line with D2W market)

SUSS MicroTec steps out from niche

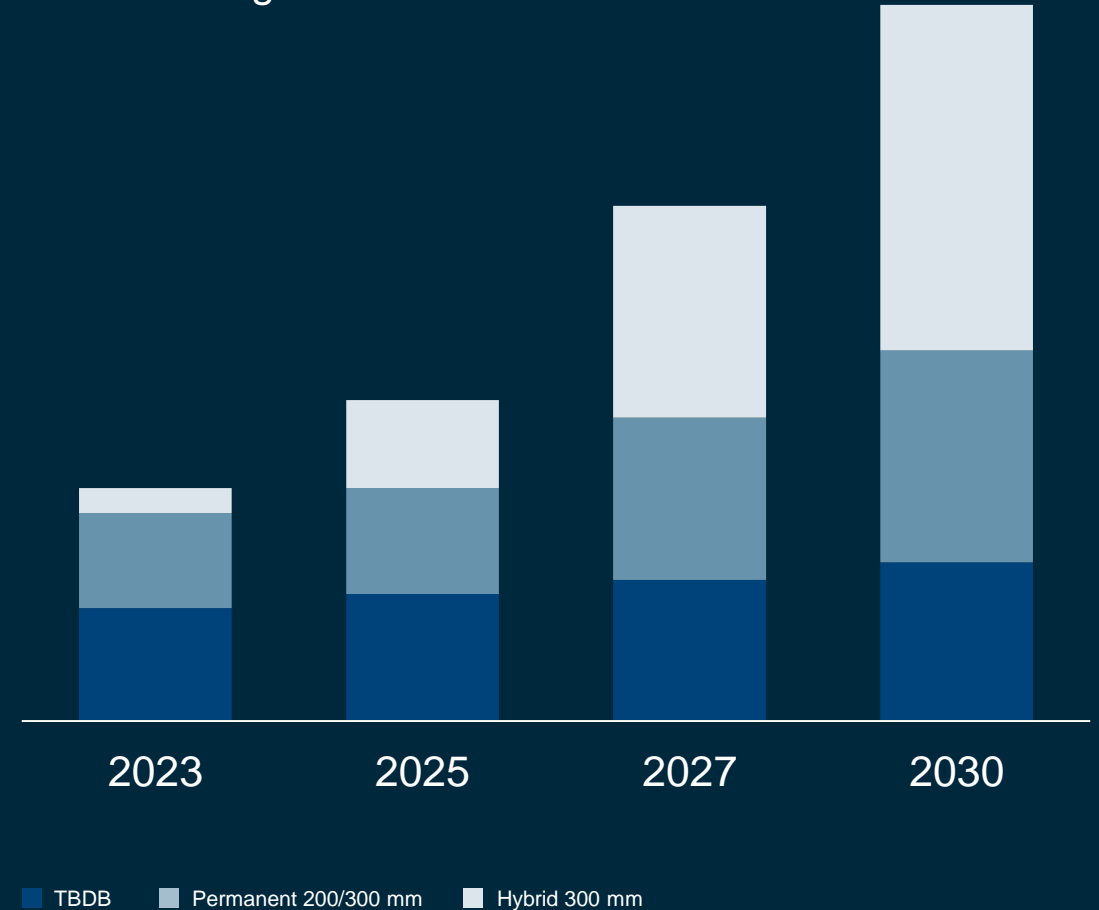
Bonder target position



- Significant revenue contribution in 2030
- Major solution provider for TBDB with ~40% market share in 3D memory, RF/MEMS, Power and 2D materials
- 20% market share in permanent bonding for 200 mm MEMS and 300 mm hybrid bonding at high profitability

More than €500 million

cumulated revenue with SUSS MicroTec bonding solutions targeted until 2030



Summary

Creation of Business Unit Advanced Backend Solutions provides clear product and solution offering and enables profitable growth by using full business potential in this market.

Mask Aligner are solid foundation of SUSS MicroTec’s business. Our superior optic and alignment performance meets rising exposure requirements for quality and cost.

Imprint eco-system will benefit our customer with turn-key solution and make SUSS MicroTec key supplier for growing Micro- and Nano Imprint used in 3D imaging & sensing technology.

Unique capabilities to offer right-fit approach for coating technologies (spin, spray, inkjet) will allow us to further outgrow the market and significantly contribute to our overall business.

Bonding solutions from SUSS step out from niche and will significantly contribute to overall SUSS MicroTec revenue in 2030.



Ambitious revenue growth

in BU Advanced Backend Solutions targeted until 2030