capital markets day 2024

Meet Group Management

Darmstadt, October 17, 2024

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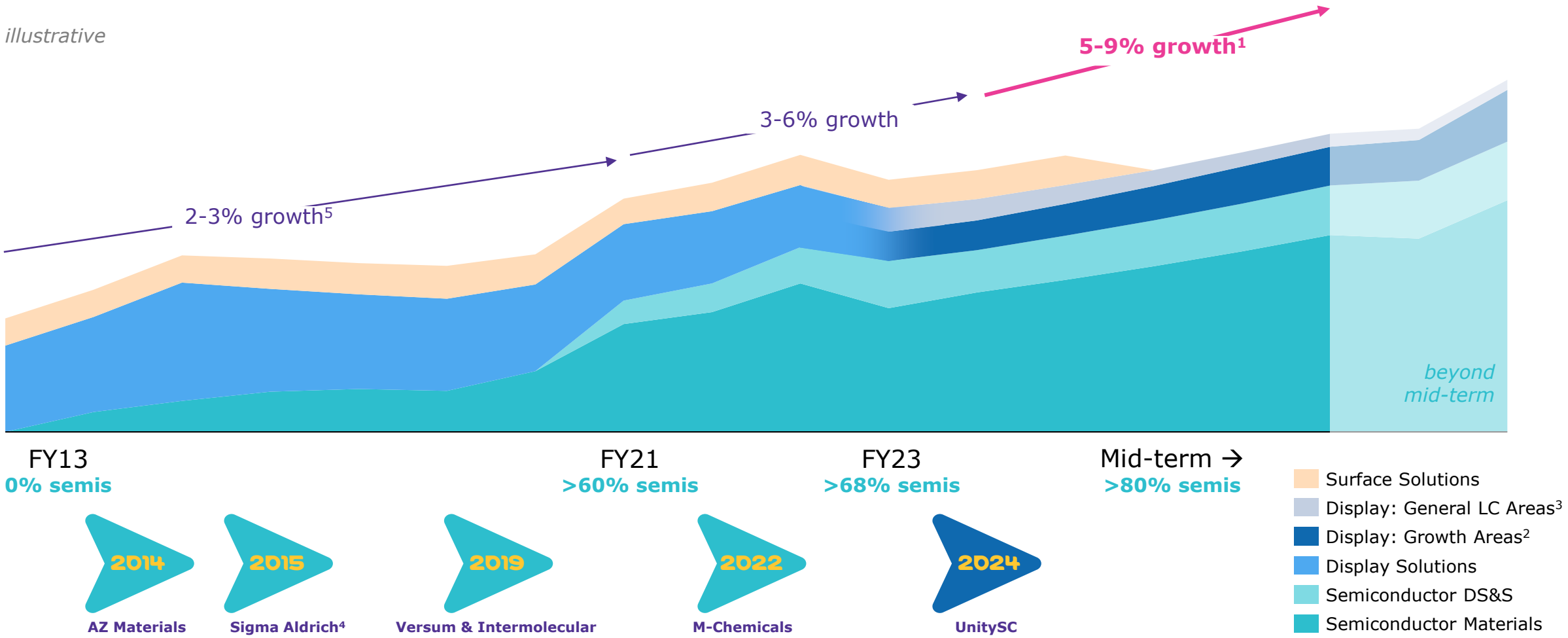
Transformation to electronics pureplay

CMD Spotlight Session Electronics

Electronics Spotlight
Transformation complete: accelerating growth as a pure-play

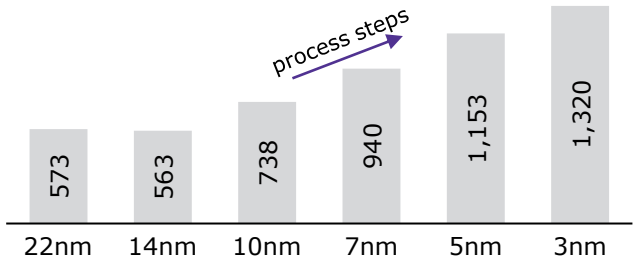


1) Mid-term ambition assumes 5-9% org. sales growth in Electronics excluding sales of Surface Solutions, with divestment expected to complete in H2'25 2) constituted from premium LC, patterning and OLED applications; 3) general applications, particularly TV, experience continuous price pressure; 4) SAFC Hitech, a business area of Aldrich developed and manufactured CVD and ALD materials and was integrated into the Thin-Films business of Electronics, while the rest of the business was integrated into the Life Science business sector; 5) Prior sector guidances

Electronics Spotlight
AI needs even more 3D densification, increasing complexity

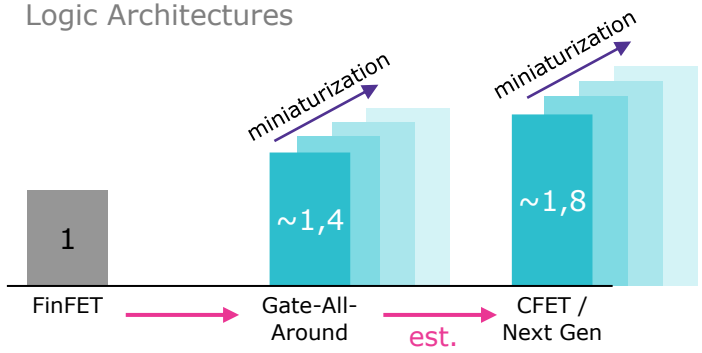
Miniaturization

FinFET logic nodes

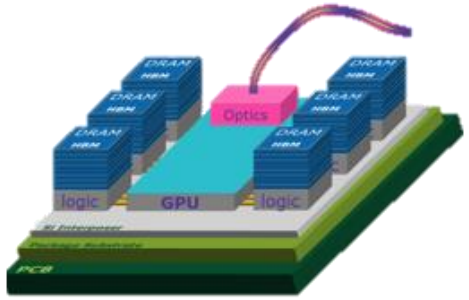


Vertical stacking and equivalent scaling

Logic Architectures



Heterogenous integration



3D Densification

Thin-films	GAA	3D metrology
Moly & other new materials	More VNAND layers	Adv. Packaging Materials
DSA	Sustainable gases	Silicon Photonics

Complexity

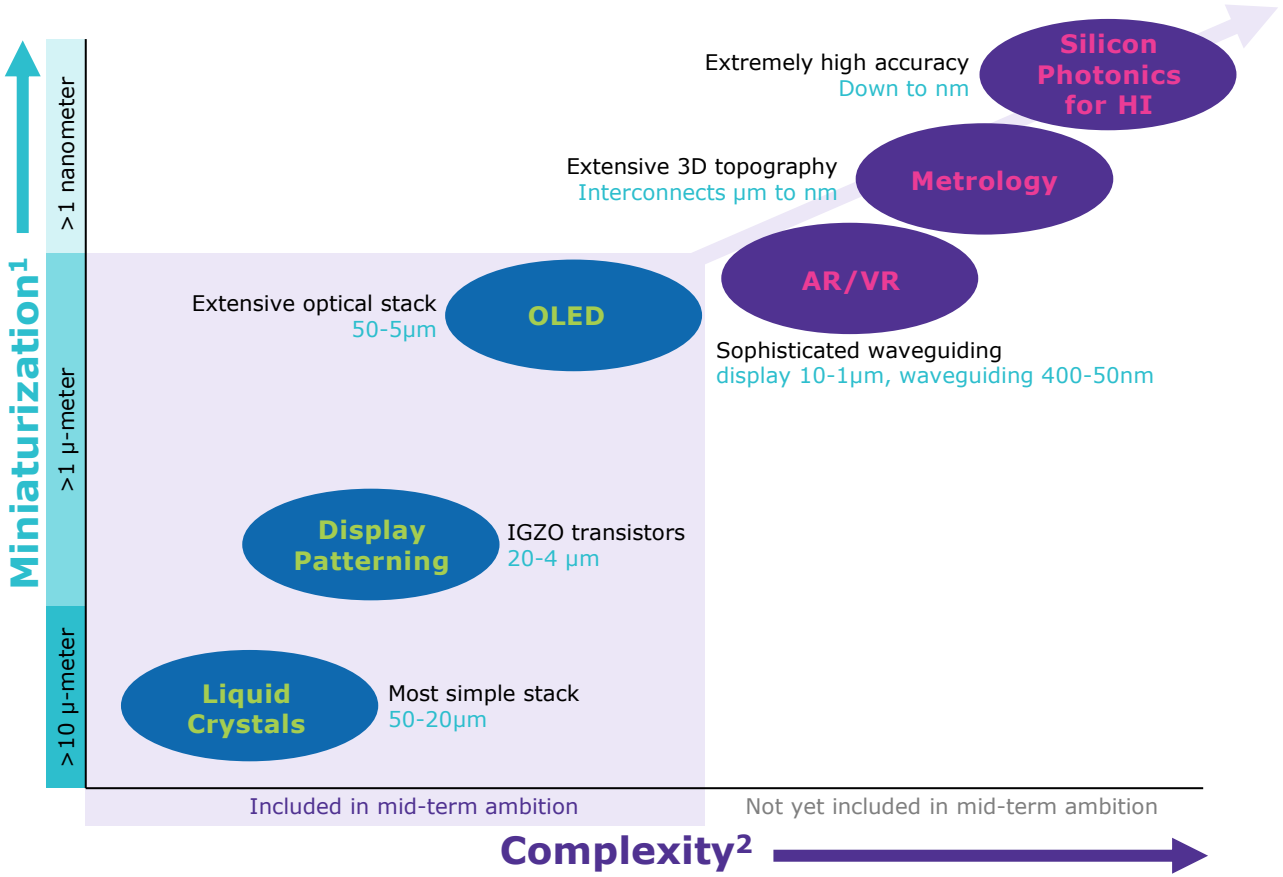
"None of miniaturization, vertical stacking and HI are able to deliver what we need on their own… you need an integrated solution and even that has challenges to meet what we need" Fabless Semi Company

Acronym(s): **HI** = Heterogenous Integration, **GAA** = Gate All Around, **DSA** = Directed Self Assembly

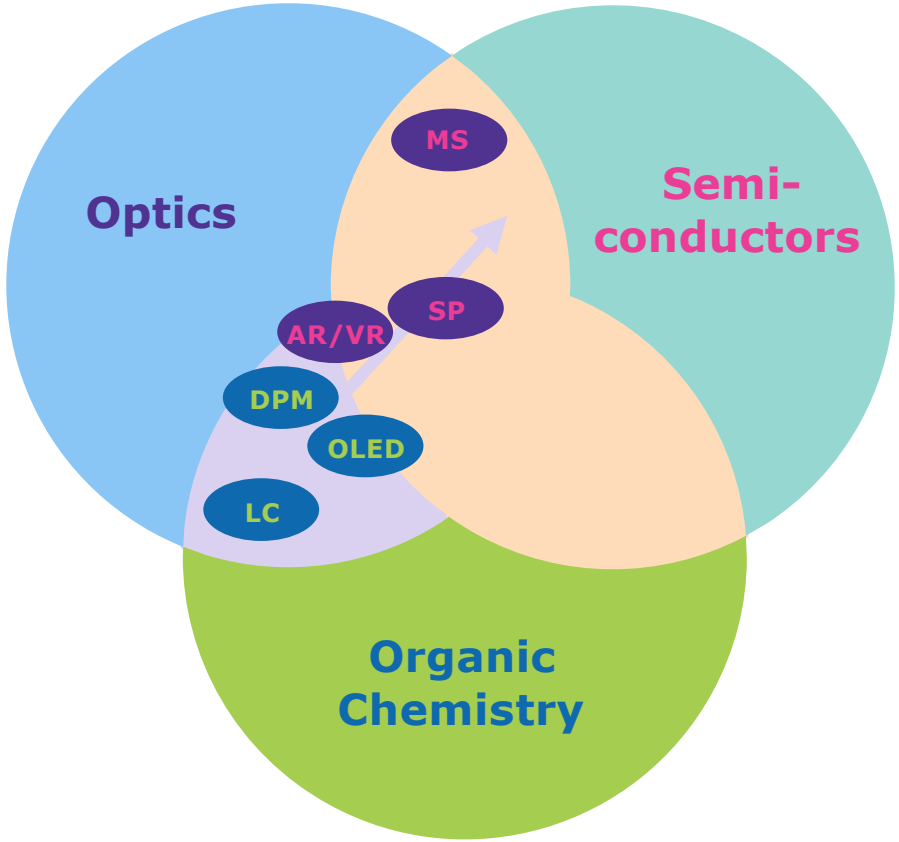
Electronics Spotlight

Complexity and miniaturization needs driving Display growth areas

Group to deploy Materials Intelligence™ amid increasing complexity



Semiconductor and light-based technologies converge into Optronics

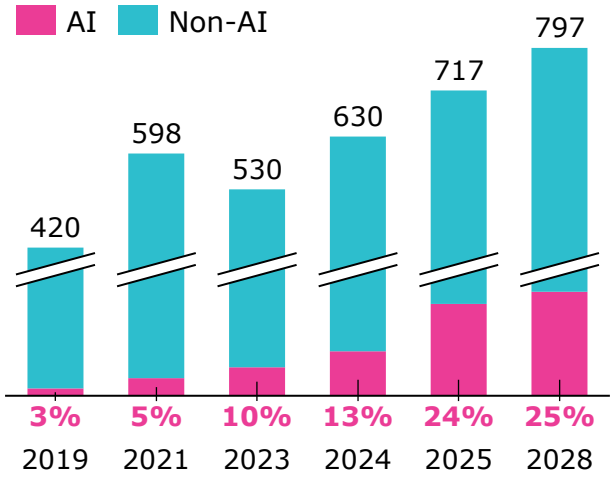


1) smallest feature size, illustrative scale; 2) device complexity, illustrative scale
Acronyms: **LC** = liquid crystal, **DPM** = display patterning, **OLED** = organic light emitting diode, **AR/VR** = augmented, virtual and mixed reality, **MS** = Metrology, **SP** = Silicon Photonics

Electronics Spotlight

Enabling AI and adv. nodes, outgrowing the wider Semi market

AI segment outpaces the semiconductor market[1]



CAGR (24-28):

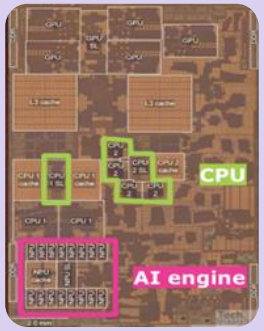
Semi growth: MSD **AI growth:** Mid-20s

AI at the Edge will be the bigger opportunity

Cloud/ (data center)

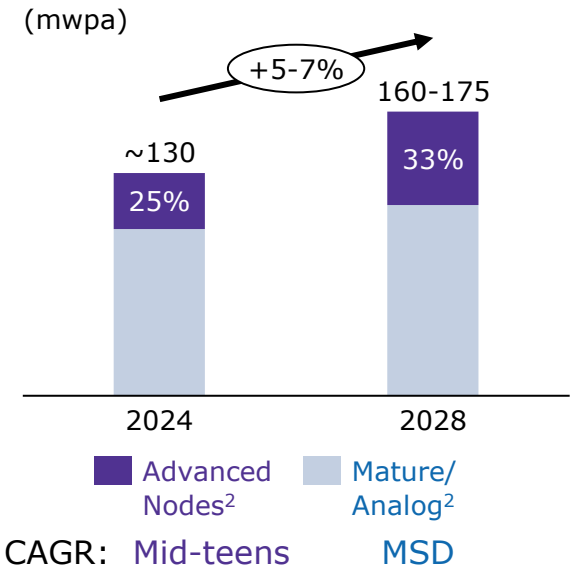
Nvidia H100 AI accelerator

Edge (on device)



Apple A15 processor

Faster growth in adv. nodes[2,3], where Group is prominent



CAGR: Mid-teens MSD

AI has high value, but still small volume

10% of semiconductor market size, but only

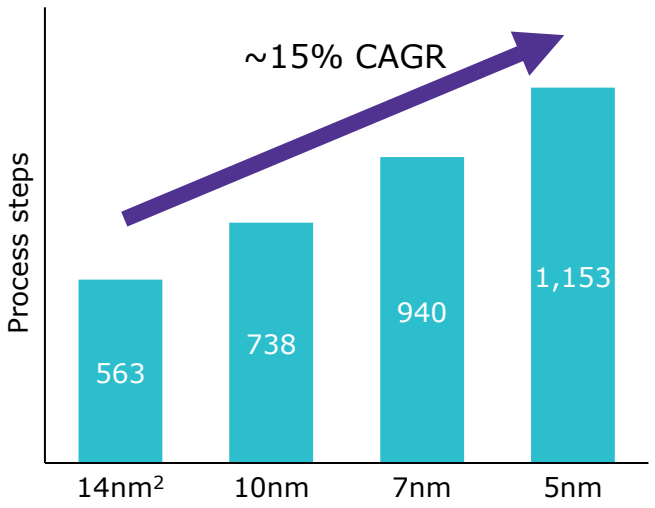
0.1% of all produced devices[1]

Outgrowing the market by +200 to +400 basis points[3]

1) Merck KGaA, Darmstadt, Germany estimates and Gartner, Q3'24, revenues from all chips with dedicated AI functionality excluding memory; the major contributing factor is the high average selling price of AI chips;
2) Company estimates; 3) Semiconductor Solutions mid-term ambition of 7-11% constituted by MSI growth of 5-7% with outperformance of the market by +200 to +400 basis points
Acronym(s): **AI** = artificial intelligence, **mwpa** = million wafers per annum, in the mid-term interchangeable with MSI (millions of inches of silicon wafers); **MSD** = mid-single digit

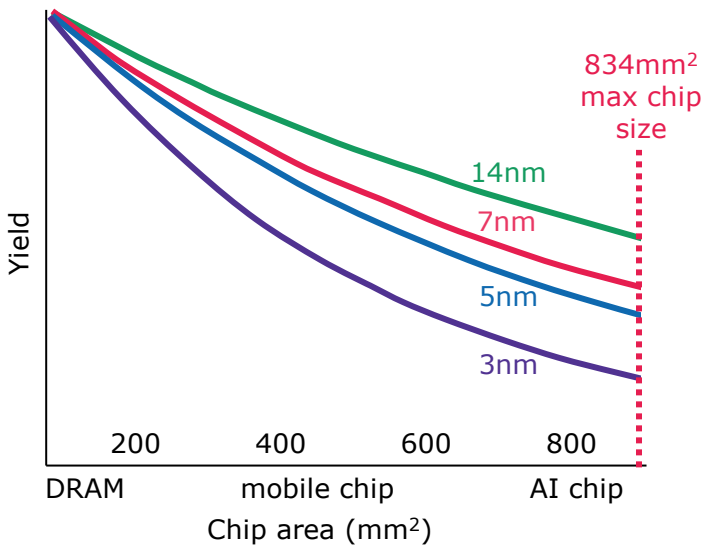
Electronics Spotlight
AI-driven complexity makes yield even more challenging

Increasing cost per chip[1]



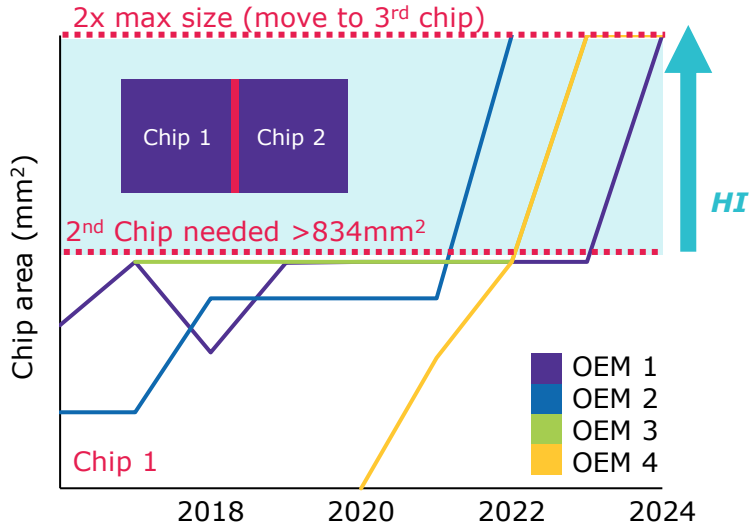
- More materials
- Advanced materials
- EUV limitations

Falling yields[3]



- Materials Intelligence™
- Smart processes
- Better material delivery

AI adds complexity[4]



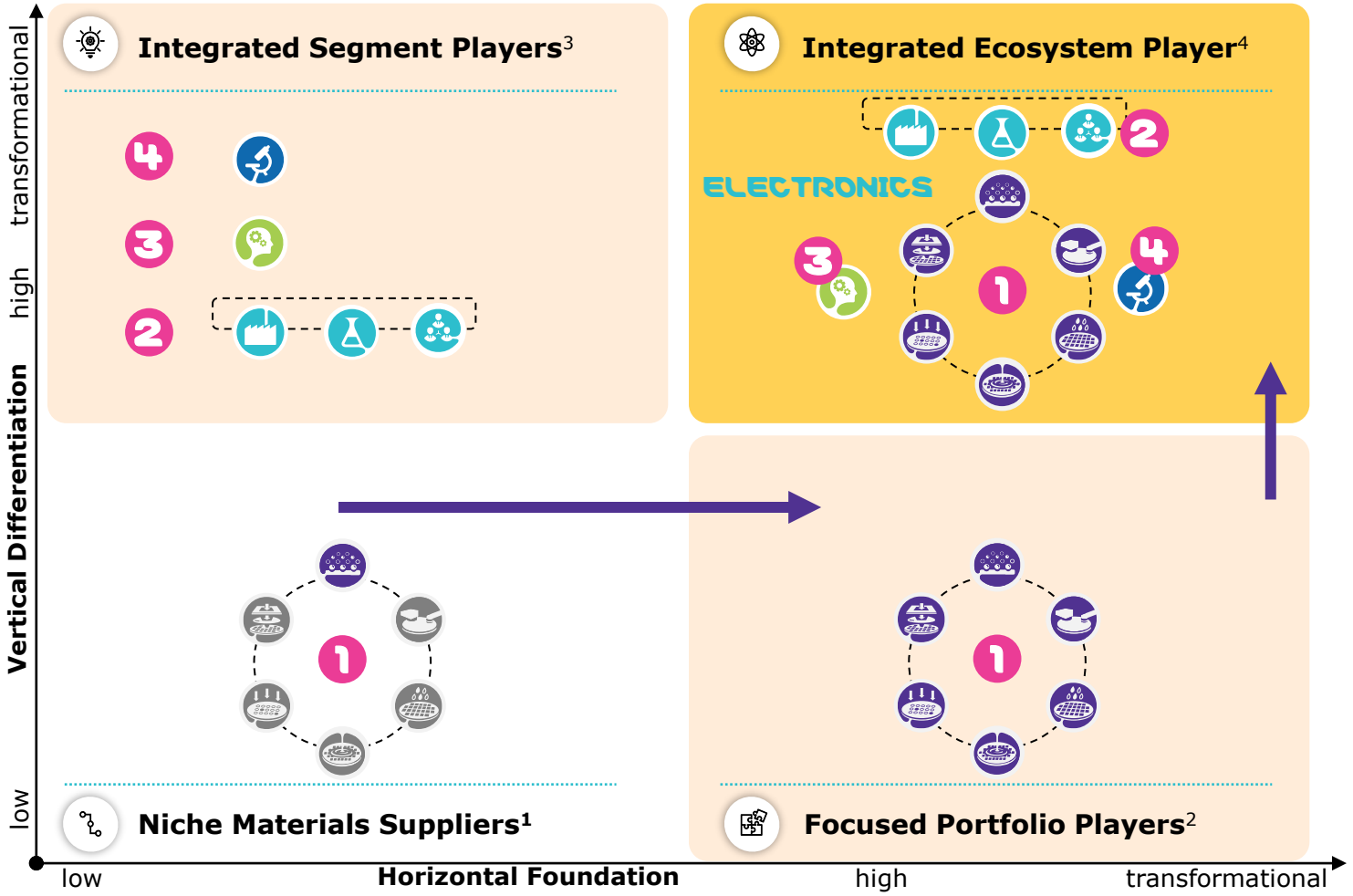
- New adv. packaging materials
- Back-end metrology
- New process & control

Group increasingly important to the Semi ecosystem to solve yield issues with: Materials Intelligence™, new materials, process control & metrology portfolio

1) Bardon et al., DTCO including sustainability, IEEE/IEDM, 2020; 2) node size in nanometers; 3) Yinxiao Feng and Kaisheng Ma. 2022. Chiplet actuary: a quantitative cost model and multi-chiplet architecture exploration. In Proceedings of the 59th ACM/IEEE Design Automation Conference (DAC '22), Association for Computing Machinery, New York, NY, USA, 121–126; 4) source: Jefferies
Acronym(s): **HI** = Heterogenous Integration

Electronics Spotlight

Group perfectly positioned as integrated player



Electronics has four layers of integration

1. **Materials**
2. **Delivery Systems & Services**[5]
3. **R&D Services (Intermolecular)**
4. **Process & Control and Metrology**

1) Niche Small product portfolio and regionally close to customers 2) Leading positions with a broad portfolio of electronics materials with global reach; 3) Surround focused materials portfolio by vertical opportunities up to one-stop-shopping for selected process steps; 4) Built multiple scale positions across customer and application segments and business models through systematic M&A including instrumentation across all key materials-related processes 5) Delivery Systems & Service includes large projects, gas delivery systems and fab services