WW Fab Expansions (Currently Announced)

2022-2027 Worldwide Fab Expansion ($685 B)

- TSMC: 26.7%
- Samsung: 25.1%
- Intel: 20.0%
- SK hynix: 6.7%
- Micron: 5.1%
- SMIC: 3.7%
- Texas Instruments: 3.4%
- GlobalFoundries: 2.2%
- Infineon: 1.3%
- Nanya Technology: 1.5%
- Kioxia: 1.2%
- MacRonix: 0.2%
- Vanguard (VIS): 0.1%
- Analog Devices Inc.: 0.1%
- Bosch: 0.4%
- Onsemi: 0.2%
- NXP: 0.2%
- Microchip: 0.1%
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- ST Microelectronics: 0.8%
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US FAB EXPANSIONS (CURRENTLY ANNOUNCED)

2022-2027 US FAB EXPANSION ($185 B)

- Intel 25.5%
- Micron 19.2%
- Samsung 13.7%
- Texas Instruments 12.9%
- GlobalFoundries 4.4%
- Bosch 0.8%
- Onsemi 0.7%
- Microchip 0.5%
- Analog Devices Inc. 0.5%
- TSMC 21.9%
- Bosch 0.8%
- Onsemi 0.7%
- Microchip 0.5%
- Analog Devices Inc. 0.5%
- TSMC 21.9%

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After slumping by more than -13% Y-o-Y in 2023, the industry is poised to post consecutive years of double-digit sequential growth:

- Expected to be largely driven by recovering memory ASPs in 2024, total semi revenue up +11.5% versus 2023 - industrial and automotive segments look to be cooling.
- 2025 is expected to represent peak growth of the upturn (+21% versus 2024) with moderating growth in 2026 (+5.5% versus 2025).
- Prior to the close of the decade, TECHCET projects a milestone of > USD $900B.
TECHCET estimates that 2023 experienced a sequential decline of -6%:

- Silicon wafers experienced the largest retreat, falling by -11%.
- Other segments saw decreases of low- to upper-single-digits.

While 2024 and 2025 indicate improving recovery with respective sequential growths of +7.1% and +8.8%, 2026 and 2027 are expected to moderate (low single-digit growths), prior to a stronger performance in 2028.
## Recent Supplier Expansion Examples

<table>
<thead>
<tr>
<th>Company</th>
<th>Product Area</th>
<th>Spending/Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fujifilm</td>
<td>Cleaners, polyimides, developers, and solvents</td>
<td>• Investment of €30 million in Belgium, target completion by the end of 2024</td>
</tr>
<tr>
<td>STMicroelectronics/Catania,</td>
<td>150mm SiC epitaxial substrates</td>
<td>• €730 million investment, supported financially by the government of Italy</td>
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<tr>
<td>Italy</td>
<td></td>
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<tr>
<td>Fujifilm</td>
<td>CMP slurries</td>
<td>• 2 billion-yen investment, plant location is in Kumamoto, Japan with full-scale production anticipated in Jan 2024</td>
</tr>
<tr>
<td>Soitec</td>
<td>300mm SOI wafers</td>
<td>• €400 million investment in a Singapore facility with projected completion in 2024</td>
</tr>
<tr>
<td>Merck</td>
<td>Specialty gases and materials for thin film and</td>
<td>• €500 million investment in Taiwan over the next four to six years with initial operations in 2025</td>
</tr>
<tr>
<td></td>
<td>photolithography</td>
<td></td>
</tr>
<tr>
<td>Ucore Rare Metals Inc.</td>
<td>Rare earth element processing</td>
<td>• Acquired a site in Louisiana for the development of its first commercial rare earth element (REE) processing facility, with a goal of production by early 2025.</td>
</tr>
<tr>
<td>VVC Resources</td>
<td>Helium and natural gas</td>
<td>• Located in Syracuse, Kansas, six additional wells are expected to be completed by the end of 2023</td>
</tr>
</tbody>
</table>
• The global economy has reached a period of slowing growth.

• Current geopolitical risks pose a further downside.

• The semiconductor industry, after facing a cooling off in 2022 and a deepening downturn in 2023, is entering an upturn, though it is off to a slow start in 2024 (many companies providing negative sequential revenue guidance).

• Additionally, several delays in US semiconductor fab expansions have recently been announced (next presentation topic will address).

• And while certain inventory corrections are expected to persist through 1H, 2024 is poised to reach double-digit revenue growth, primarily on strengthening memory ASPs and a broader recovery, particularly in 2H.

• Peak growth for the upturn is expected in 2025 for all semiconductor outlook categories:
  • Overall materials growth is expected to remain positive through 2028, as technology advancements drive expanded demand across most segments.
Thank you!

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