UBS Global I/O Semiconductors

Terafab Update: Premises for a Paradigm Shift in Semi Manufacturing

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Semiconductors

Timothy Arcuri
Analyst
timothy.arcuri@ubs.com
+1-415-352 5676

John C. Hodulik, CFA
Analyst
john.hodulik@ubs.com
+1-212-713 4226

Nicolas Gaudois
Analyst
nicolas.gaudois@ubs.com
+65-6495 5148

Sunny Lin
Analyst
sunny.lin@ubs.com
+886-2-8722 7346

Randy Abrams
Analyst
randy.abrams@ubs.com
+886-2-8722 7338

Francois-Xavier Bouvignies
Analyst
francois.bouvignies@ubs.com
+44-20-7568 7105

Kenji Yasui
Analyst
kenji.yasui@ubs.com
+81-3-5208 6211

Gianmarco Vella
Associate Analyst
gianmarco.vella@ubs.com
+1-415-352 4555

Early days, but the innovations brewing at Terafab have the potential to reshape the industry

We previously outlined the potential significance of SPCX's (covered by John Hodulik) Terafab to the broader Semi Equipment supply chain here. Since then, our conversations w/ industry contacts and at SEMICON West (takeaways here) have surfaced incremental details that point to a far more fundamental rethinking of the chipmaking process by SPCX. The company has so far disclosed ambitions to reach ~1MM wsm in Phase 1 with a targeted mix of ~70% DRAM and ~30% logic (based on our supply chain work), although we believe its initial toolset has shifted toward a logic process flow in recent months - despite SPCX repeatedly emphasizing the value of manufacturing its own memory - which makes this mix look more aspirational than anything else. On the logic front, the process flow IP is, at least initially, based on INTC 14A copy-exact, with INTC highly supportive of the Terafab project as the company likely stands as a primary beneficiary of this effort, if successful (more in Read Across below). The ramp is on a very aggressive timeline with test silicon by May/Jun-27 and volume production by 3Q28 with a base WFE assumption of ~$5B in 2027 and ~$10B in 2028, though we believe this number could potentially be much higher depending on Terafab's ability to procure accelerated equipment slots (for which, we believe, the company is currently offering much higher prices for slots). We also believe Terafab is pushing a considerably different process and wafer flow than is traditionally the case for the rest of the chip making world (more below). Probably most interesting to us are the competitive dynamics that appear to be emerging around Terafab - in particular, TSMC's posture toward this effort. Specifically, we believe SPCX may have initially approached TSMC, even ahead of INTC, for a potential collaboration and a dedicated fab. However, with such an arrangement being generally inconsistent with TSMC's model, Terafab ultimately settled on its current model, and TSMC is now potentially evaluating the buildout of a large fab complex near Terafab's site in Texas. Even so, SPCX has reiterated its full intention to push forward aggressively with these plans. Consequently, we believe this all could have a ripple effect on TSMC's wafer allocations to INTC in 2027, but of course this is primarily PC-related (Panther Lake) where demand is soft anyway. Net, to us this is beginning to resemble the broader efforts by the US government to create a US foundry (here and here). While still early, we view these developments as indicative of the potentially far reaching competitive implications of Terafab, extending well beyond Semicap Equipment, and into strategic relationships underpinning the broader Foundry landscape.

At the heart of it is a fundamental rethinking of cleanrooms, tools and process flows

We understand SPCX's push to rethink semiconductor manufacturing to be driven by the fact that only ~25% of a wafer's cycle time is currently spent on active processing (while the remaining ~75% is spent in storage, buffers, and AMHS systems), along with the fact that process tools themselves occupy only ~40% of total fab space. On top of this, we believe SPCX can bring more efficiency to the actual timeline from ground-breaking to first silicon. Specifically, Terafab's focus on rethinking fab workflows appears to be relying on the adoption of workflow clusters that bring process tools closer together, and that integrate wafer movement and processing into a more continuous system. A simple way to conceptualize this for investors could be to think of a wafer going through a process flow as a train, and the process chambers as stations; the wafers move through an interconnected vacuum environment, stopping at individual chambers for processing rather than being transferred sequentially between robots, interfaces (e.g., EFEMs), and storage buffers. To do so, we believe Terafab may be



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exploring new technologies that should allow it to eliminate many intermediate handling (via AMHS), purging, and buffering steps. From a fab construction standpoint, the implications could be equally important, as it is our understanding that Terafab is exploring ways to challenge several established industry conventions: including the need for a subfab in a traditional sense and potentially less stringent cleanroom standards. Effectively, we think the company is attempting to eliminate the many layers of infrastructure and overhead costs that have historically been viewed as necessary/ unavoidable in leading-edge fabs. Beyond fab construction, we believe Terafab may also be exploring alternative approaches to EUV light generation via the potential use of free electron laser (FEL)-based EUV sources - an approach that Elon Musk has publicly endorsed on social media in Aug-2026. xLight is among the companies developing this technology, with the potential for a single accelerator to supply multiple EUV scanners. If successfully developed and integrated into HVM, this could materially improve the economics of EUV, though we do flag that the technology remains at a pre-commercial stage and the timing, number of scanners supported per accelerator, and potential throughput benefits remain uncertain, with other tool-level bottlenecks beyond source power also needing to be addressed.

Read Across

- **INTC:** we read Terafab itself positively for INTC, although the details around the value transfer associated with SPCX's use of INTC process technology remain unclear. What is clearer to us is that INTC does, in fact, have access to practically all of the innovations and IP that could emerge from Terafab; however, the company is not yet ready to discuss potential monetization - other than for management to note that INTC is well aware of the value of its technology. Probably more relevant here is that we have long argued for INTC to split the product and manufacturing businesses, and this could be a major first step in such a process. Ergo, a potential outcome could go beyond a partnership of INTC's foundry business with Terafab. Now, assuming the Intel Foundry+Terafab partnership was to advance further and evolve as a merchant foundry to serve external clients, it would first need to demonstrate competitive yield, reliability under the proposed manufacturing flow, and cost efficiency at scale before US customers commit meaningful volumes - and this is unlikely before 2030, and could even take longer. Potential customers may also need to consider conflict of interest and foundry neutrality concerns. Another peripheral impact from Terafab could be significant upside bias to INTC's capex plans over the next few years if it fears supply curtailment from TSMC. We would note that INTC in recent days has publicly disclosed having installed a first, major structural truss at its Ohio One site in New Albany. This suggests construction has resumed and is proceeding at full speed.
- **TSMC:** it is fair to say we believe Terafab will take a couple years to start initial production and further to disrupt. For Terafab, the project out in C2H28 is still ~2yrs from initial volume and would take a few more years at an accelerated pace to emerge as a major production source if it can disrupt the manufacturing process, and in-house more of its own chips. We also would note by the time it reaches scale in a few years, TSMC could also have ramped up two advanced packaging facilities on top of at least 3 or more front-end fabs in the US. Its initial process is based on INTC, although it is also in discussions with TSMC, likely in the form of TSMC managing the fabs with reserved capacity for SpaceX and TLSA. We acknowledge that investor perception on its disruptive potential could affect sentiment before there is any real impact, particularly if the project hits its milestones. This would be similar to the way Starlink is impacting sentiment on the incumbent mobile carriers, although the technological and ecosystem cooperation hurdles are much higher in advanced semiconductor manufacturing.
- **WFE + SPE names (LRCX/KLAC/AMAT):** as we have said in multiple instances now (here, here), the Terafab effort could essentially grow to something in the range of TSMC's scale in terms of WFE within 4-5yrs, as the math would suggest that Terafab's WFE spending would have to grow above ~$50B/yr in the C2030/2031 timeframe - in the same ballpark as TSMC's WFE spend over the next few years. In the short-term, Terafab is clearly a large game changer for how high WFE can go over the coming years (putting $300B+ WFE in sight for C2028E), and poyrnyisllu with significant NT benefits to semicap equipment suppliers. In the near term, we see clearly positive implications for WFE, though it is fair to wonder if Terafab effectively has a custom toolset, what longer-term impact this could have on WFE intensity.

Valuation Method and Risk Statement

We use various valuation techniques such as P/E, EV/FCF for valuing the companies in this report. Risk factors include but are not limited to macroeconomic factors such as a downturn in the economy, a disruption of international trade, technological disruption due to new inventions, or business model innovation whereby structural changes in the industry alter the future course of unit sales, ASPs, and revenues.