

**onsemi Explanations and Comments
Commerce Department Semiconductor Supply Chain
Request for Information (RFI)**

November 8, 2021

**For semiconductor product design, front and back-end manufacturers and
microelectronics assemblers, and their suppliers and distributors**

Business confidential redactions shaded in grey.

2. Identify your company's role in the semiconductor product supply chain. Indicate the technology nodes (in nanometers), semiconductor material types, and device types that this organization is capable of providing (design and/or manufacture).

No additional comments.

3. For any integrated circuits you produce--whether fabricated at your own facilities or elsewhere--identify the primary integrated circuit type, product type, relevant technology nodes (in nanometers), and actuals or estimates of annual sales for the years 2019, 2020, and 2021 based on anticipated end use.

For purposes of the RFI response, onsemi has defined "integrated circuit" as synonymous with "semiconductor." The World Semiconductor Trade Statistics (WSTS) program subdivides total semiconductors into four categories: discrete, optoelectronic semiconductors, sensors/actuators, and integrated circuits. The RFI's intent is best served by including discretely as "other ICs" in the questionnaire because 1) onsemi is a major producer of discretely and image sensors (optoelectronic semiconductors), 2) the shortage that precipitated the RFI is present in all semiconductor categories, and 3) the "S" in the CHIPS for America and FABS Acts stands for "Semiconductors".

For the IC type section larger representative products were used as it is difficult to identify "primary types" in many cases.

First half 2021 figures were used for the IC Production, "2021 Projected".

The "Capacity (Units)" row in IC production is not available. We measure internal fab capacity in mask layers, and the unit capacity would depend on the number of

mask layers per wafer and the number of die per wafer which vary on the production product mix. There is also year to year variability in the number of units produced internally versus externally so unit capacity, even if we had an internal capacity number, could not be meaningfully compared with actual units sold.

The Industrial row includes Aerospace and Medical which are low to mid-single digit percentages of total company sales. The company's Computer segment sales including servers were listed in the "IT/Computers Personal and Consumer Products" line, the company's Communications segment sales were listed in the "Mobile Devices" line and the company's Consumer segment sales were included in the "Other" line

4a. For the semiconductor products that your organization sells, identify those with the largest order backlog. Then for the total and for each product, identify the product attributes, sales in the past month, and location of fabrication and package/assembly.

List each product's top three current customers and the estimated percentage of that product's sales accounted for by each customer.

Note: Product Names are listed in no particular order.

Note: Units expressed in Millions of units.

Note: Image sensors have an additional fabrication step that deposits a color filter array on top of the CMOS die so each pixel can sense the appropriate color. onsemi performs this fabrication step at its facility in Nampa, Idaho.

The sales situation and in some cases even the identity of individual customers is highly sensitive and often covered by Non-Disclosure-Agreements (NDAs). Consequently, responses are highly anonymized.

4b. For the Top Semiconductor products identified in Section 4a, list each products Top 3 customers.

No additional comments.

4c. For each phase of the production process, identify whether your organization carries out the step internally or externally. For your organization's top semiconductor products, estimate each product's (a) 2019 lead time and (b) current lead time (in days), both overall and for each phase of the production process. Provide an explanation of any current delays or bottlenecks.

REDACTED

4d. For your organization's top semiconductor products, list each product's typical and current inventory (in days), for finished product, in-progress product, and inbound product. Provide an explanation for any changes in inventory practices.

For rows 1. and 2. (Optical/Photo Tech): In-progress inventory has increased substantially for two reasons: 1) with longer front-end cycle times and inventory management we have plenty of working material at bottlenecks to ensure we maintain very high utilization for bottleneck areas and 2) our business is growing but Finished Inventory is measured in a backward looking sales volume rather than forecast.

5A. What are the primary disruptions or bottlenecks that have affected your ability to provide products to customers in the last year?

1. Fab Constraints: Fab constraints are evident at most internal fabs. We need the CHIPS and FABS Acts to prevent future shortages.
2. Foundry Constraints: Foundries serve many customers. onsemi has had more demand for its products than our capacity allocation at the foundries could address. In some cases we have negotiated higher allocations for Q4'2021 and 2022 but we are still supply constrained relative to demand.
3. Assembly Test constraints: Internal assembly/test facilities are constrained. Internal assembly/test facilities are constrained. Tariffs on imports from onsemi China sites are counterproductive.
4. External Assembly/Test Constraints: External assembly and test companies are constrained due to increased demand from all of their customers
5. COVID Shutdowns: Government movement restrictions and shutdowns in South East Asia have impacted production and were primarily responsible for Q3 2021 factory capacity utilization declining several percentage points to 80%. As of the date of this RFI submission, internal factories are stabilizing and production is quickly returning to normal.
6. Logistics: Backups at ports have delayed shipments of inputs and outputs.

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5B. What is your organization's book-to-bill ratio for the past three years? Explain any changes.

The company's Book to Bill ratios are as follows:

	End of year B:B	Simple Ave B:B	Range
2019	Redacted	Redacted	Redacted
2020	Redacted	Redacted	Redacted
2021	Redacted	Redacted	Redacted

In 2019 B:B was low due to inventory corrections. In early 2020 the situation improved until COVID took hold and automotive orders plummeted. B:B then improved heading towards the end of 2020 and into 2021.

To understand the recent high B:B ratios, it should be noted that the ratios increase as lead times increase and that any Long Term Supply Agreements (LTSAs) that the company signed would bump up bookings for that period even though billings would be expected to be spread over a long term.

If the demand for your products exceeds your capacity, what is the primary method by which your organization allocates the available supply? Explanation.

We use multiple factors and work closely with our customers when our product has an economic multiplier. Examples are potential automotive line down situations, or image sensors for factory automation where a high value sensor enables inspection of thousands of LCD displays that go into cell phones. We also consider contractual commitments such as long-term supply agreements (LTSAs), gross margins, and overall throughput.

Is your Organization considering increasing its capacity? If Yes, in what ways, over what timeframe, and what impediments exist to such an increase?

onsemi has added capacity at an external manufacturer through joint investment over the last year; built an internal assembly and test line in Seremban, Malaysia to add capacity and improve supply resilience (production will begin in Q2'22); and continues to work with a foundry to negotiate higher wafer allocation even if it requires higher wafer pricing. For longer term capacity, the company continues to invest in equipment for the fab in East Fishkill, NY which the company will take procession of at the end of 2022.

The greatest impediment is lack of sufficient capital. Passage of CHIPS Act funding and FABS Act tax incentives will help accelerate internal investments in capacity.

What factors does your organization consider when evaluating whether to increase capacity?

Overcoming capacity limits require long-term investment and planning to implement as well as large budgets. Once implemented, these assets have a long operating life so a company must be confident of the ROI over the operating life of the investment and the capital must be available from internal budgets or external sources. As a public company, the company must manage its business through all business cycles which, coupled with the time lag from investment to production, makes it difficult to invest for short-term trends.

5C. Has your organization changed its material and/or equipment purchasing levels or practices in the past three years?

In order to secure our supply to support our customers' growing demand across all markets, we had to revisit our procurement practices. Not only do we have to work closely with our current suppliers to establish long term supply agreements (traditional practice is usually to get RFQ bids) that locks us in for certain capacity allocation at a certain price, we also have to invest in multiple sourcing qualifications, and increase our safety stock level (generally REDACTED% increase depending on space, shelf life and supply availability). Business continuity is the number one priority in the past 2 years.

onsemi is investing in internal capacity in the U.S. to partially in-source a product line that is currently produced entirely by external manufacturers. Once implemented, the company would rely on both internal and external manufacturing. CHIPS Act funding will help accelerate these investments.

What single change (and to what portion of the supply chain) would most significantly increase your ability to supply semiconductor products in the next six months?

As the material/ commodity/ equipment ecosystem is quite complex with symbiotic relationships, it is very difficult to solve one single problem and expect the entire supply chain to untangle. Following materials and manufacturing challenges are logistics and delivery issues. If there are ways to relieve the logistic bottlenecks such as port traffic and custom clearance, that would help to reduce and mitigate the impact to the delivery lead time.

9. General Comments

1. Double ordering is an impediment to accurate demand forecasting. During tight supply situations, buyers will place orders with multiple suppliers and plan to purchase from the first supplier who can provide product and cancel the orders with the other suppliers who had ramped up capacity and production in response to the orders. onsemi has taken steps to reduce double ordering of its products by reducing inventories at the distribution level where double ordering is more likely

to occur and increasing internal inventory to better align shipments to true end demand and by encouraging customers to sign Long Term Supply Agreements. The Commerce Department should recognize the potential false demand signals in book to bill ratios as it evaluates overall responses to its RFI.

2. The Commerce Department should encourage Long Term Supply Agreements (LTSA)s. Increasing semiconductor manufacturing capacity is an expensive multi-year process. The risk of future semiconductor shortages can be mitigated if major customers enter LTSA's with their suppliers so the suppliers can make the necessary investments knowing that there will be demand to support the increased capacity.

3. Congress must provide funding for the CHIPS for America Act and pass an Advanced Manufacturing Investment Credit to provide tax incentives for semiconductor investments. Worldwide semiconductor capacity located in the U.S. has declined from 37% in 1990 to only 12% today, largely because of the substantial financial support that foreign governments provide for semiconductor factories located in their jurisdictions. The Federal government can no longer ignore these trends; it must choose to compete.

4. The Commerce RFI looks backwards to better understand where we are today. As the Commerce Department looks forward to improve future supply chain resiliency, it is worth noting the importance of Silicon Carbide (SiC) devices that vastly improve system efficiencies in electric vehicles, EV charging, and energy infrastructure. These systems are key to the President's climate change proposals, and increased supplies of SiC are necessary to avoid future shortages that would impede the success of the President's initiatives.

On November 1, 2021, onsemi announced the completion of its acquisition of GT Advanced Technologies ("GTAT"), a producer SiC boules, and can begin work to scale and accelerate GTAT's development of this stage of semiconductor production to assure customers' supply of critical SiC semiconductors. The link to the onsemi press release is available at: <https://investor.onsemi.com/news/news-details/2021/onsemi-Completes-Acquisition-of-GT-Advanced-Technologies/default.aspx> .