

<https://www.federalregister.gov/documents/2021/09/24/2021-20348/notice-of-request-for-public-comments-on-risks-in-the-semiconductor-supply-chain>

The Department is specifically seeking the following information and data:

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

a. Identify your company's role in the semiconductor product supply chain.

Microchip Technology Incorporated and its subsidiaries (“Microchip”) are a leading supplier of embedded control solutions by delivering a broad spectrum of innovative standard and specialized microcontrollers, FPGA products, analog, mixed-signal, and security products, wired and wireless connectivity products, related non-volatile memory products and Flash-IP solutions. In order to contribute to the ongoing success of customers, employees, shareholders, and the communities in which we operate, our mission is to focus resources on high value, high quality products, total system solutions, software, and services, and to continuously improve all aspects of our business, providing an industry leading return on investment.

U.S. Based: Microchip is a publicly owned U.S. headquartered company based in Chandler, Arizona with large internal manufacturing sites in AZ, CO and OR.

Government Friendly Aerospace & Defense: Microchip has the #1 market share in A&D products. Microchip offers radiation hardened FPGAs and Microcontrollers. Microchip has 26% of USG A&D market share, over 60-years partnership in Space and is the leading MIL-PRF-19500 discrete supplier. Microchip has numerous chips in the Mars Rover; See Appendix 1.

Microcontrollers: Microchip designs, manufactures, and markets microcontrollers for more than 120,000 customers. In a simplistic definition, microprocessors run computers and microcontrollers run every other type of electronics systems. This includes embedded controllers used in industrial controls, computing peripheral products, automotive systems, consumer electronics or radiation hardened space applications.

Data Center/Computing: Microchip delivers critical and proprietary semiconductor components to all our nation’s key providers of IT infrastructure. This IT infrastructure includes Personal and Business Computers for work and home, Servers and Data Storage platforms for Enterprise, Cloud, and Edge Data Centers, as well as communications between Data Centers. Our semiconductor solutions provide essential functions in these platforms including, but not limited to security, AI-enablement, power/thermal management, high-speed interconnect, timing, and disk/solid-state drives control. Without these functions, our clients cannot produce and deliver products. This can impact our clients’ revenue by hundreds of millions of dollars as well as potentially cripple the sectors they serve including Education, Medical, Industrial, Business, and Defense.

Automotive: Microchip delivers robust embedded solutions which support explosive growth of semiconductor content in a vehicle environment which is connected, automated and electrified. Automotive semiconductors are the cornerstone of innovation to address the challenges which the car makers are facing. In some luxury vehicles, thousands of semiconductor components are included in various sub-systems and the supply chain must provide all components to allow timely vehicle production efficiency. As one of the leading suppliers to the global automotive segment, Microchip's broad product portfolio enables development support of those global designers challenged with continued enhancements of existing sub-systems and inclusion of emerging technologies for processing electronics, communications, infotainment, sensor controls, timing, power management and cybersecurity. Microchip's semiconductor solutions are designed into or being developed for all vehicle types across the globe --- internal combustion engine vehicles, electric vehicles, hybrid electric vehicles and autonomous vehicles. Our products and processes are designed to support the rigorous requirements of the automotive industry.

Timing and 5G: Microchip products are the cornerstone of the 5G infrastructure. See Appendix 2 flow sheets on 5G and the scope of Microchip products in them. We like to say, *"Microchip Timing and Synchronization provides the heartbeat for 5G."*

Microchip Technology has the following general product types:

- MCU - Microcontrollers
- Analog – Sensors, interface, and Power solutions
- Memory – Flash and Serial EEPROM memory storage products
- FPGA – Field Programmable Gate Arrays

Microchip has developed Product Marketing Slides and Technical Flow Diagrams to serve as examples of the systems that our products are used in and the scope of the content that Microchip provides in our Total Systems Solutions (TSS) approach. **The Product Marketing Slides are attached in Appendix 1 and the Technical Flow Diagrams are in Appendix 2.**

b. Indicate the technology nodes (in nanometers), semiconductor material types, and device types that this organization can provide (design and/or manufacture).

- **Nodes**
 - 3nm (nanometers) – 5mu (microns)
- **Material Types**
 - Silicon, SOI (Silicon on Insulator)
 - SiC – Silicon Carbide
 - GaN – Gallium Nitride, GaAs – Gallium Arsenide

- **Device Types**
 - MCU
 - Analog
 - Memory
 - FPGA

c. 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.

Nodes

- 3nm (nanometers) – 5mu (microns)

Circuit Type

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d. 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.

- **Top 3 Products with the Largest Order Backlog**
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Top 3 Product Attributes:

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

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e. 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.

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f. 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.

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

- BE Assembly limitations – capacity, labor, shutdowns, packaging parts, passives availability
- Hiring (Direct Labor, Equipment Technicians, Contract labor, Construction labor)
- Used Capital Equipment has changed from being plentiful to none in the last year.
- Capital Equipment lead-time has increased from 6 months to 10 to 15 months.
- Availability of spare parts (shipping delays, shortages, etc.)
- Construction Trade Availability for new construction

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

Quarterly Billings

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

- Preferred Supplier Program allowing for long-term visibility and order commitment enabling long-term capital investment strategy
 - Orders vs. forecast
 - Non-Cancellable orders
 - Impact on end market
 - Impact on long-term customers

j. Does your organization have available capacity? If yes, what is preventing the filling of that capacity?

- None is currently unused

k. Is your organization considering increasing its capacity? If yes, in what ways, over what timeframe, and what impediments exist to such an increase? What factors does your organization consider when evaluating whether to increase capacity?

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

- LTAs (Long-term agreements)
- Increased onsite and local stocking levels (Parts, chemicals, supplies)
- Purchasing equipment directly from OEMs vs. used market (increases cost and lead-time vs. "normal" market)
- Capital, direct material and direct expense spend has gone up dramatically
- Shipping costs and lead-time has increased significantly

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

- Attraction and Retention of Direct Labor and Equipment Technicians: Labor availability & the ability to offer higher wages is the main constraint to increasing capacity in the short-term. Retention is a challenge. It is confounded by the time to train new people.

2. Questions for intermediate users and end users of semiconductor products or integrated circuits: Microchip is a semiconductor company. We are not an intermediate or end user. Our answers to this section – N/A – reflect that.

- a. Identify your type of business and the types of products you sell. N/A.
- b. What are the (general) applications for the semiconductor products and integrated circuits that you purchase? N/A.
- c. For the semiconductor products that your organization purchases, identify those that present the greatest challenge for your organization to acquire. Then for each product, identify the product attributes and purchases in 2019 and 2021, as well as average monthly orders in 2021. Then estimate the quantity of each product your organization would purchase in the next six months barring any production constraints as well as the amount your organization expects to be able to purchase. For each of your organization's top semiconductor products, estimate each product's lead times and your organization's inventory for (a) 2019 and (b) currently (in days). Provide an explanation of any current delays or bottlenecks. N/A.
- d. What are the primary disruptions or bottlenecks that have affected your ability to provide products to customers in the last year? N/A.
- e. Is your organization limiting production due to lack of available semiconductors? Explain. N/A.
- f. What percentage of your current production has your organization had to defer, delay, reject, or suspend in the past year? Explain. N/A.
- g. Is your organization considering or carrying out new investments to mitigate semiconductor sourcing difficulties? Explain. N/A.
- h. What semiconductor product types are most in short supply and by what estimated percentage relative to your demand? What is your view of the root cause? N/A.
- i. Has your organization changed its material and/or equipment purchasing levels or practices in the past three years? N/A.

j. What single change (and to which portion of the supply chain) would most significantly increase your ability to purchase semiconductors in the next six months? N/A.

k. What percentage of your orders are fulfilled by distributors versus through direct purchase orders to semiconductor product manufacturers? N/A.

l. For the semiconductor products your organization purchases, how long (in months) are the typical purchase commitments? How, if at all, do your organization's purchase commitments differ for products in short supply? N/A.

m. Has your organization faced “de-commits” (defined as a notification from a supplier that expected or committed supply will not be delivered in the agreed-upon time and quantity) in recent months? If this is a significant issue, please explain (e.g., nature of product, supplier, impact). N/A.

Appendix 1 – Microchip Product Marketing Slides

Data is presented in Business Confidential version of this reply.

Appendix 2 – Microchip Total Systems Solutions Block Diagrams

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Appendix 3 – Product 1 Attributes -

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Appendix 4 – Product 2 Attributes -

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Appendix 5 – Product 3 Attributes -

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Appendix 6 – Customers for Products with the Highest Backlog

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Appendix 7 – Microchip PPP Proposal for Building a New Fab

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