

REQUEST FOR PUBLIC COMMENT: RISKS IN THE SEMICONDUCTOR PRODUCT SUPPLY CHAIN

This form is intended to be used to submit comments on challenges currently facing the semiconductor product supply chain. All comments are invited, with this form designed to facilitate submission of information from sellers of integrated circuits (in Sections 2 through 5) and purchasers of integrated circuits or related products (in Sections 6 through 8).

Indicate here if this form contains business confidential information, or if all information contained throughout this form is public:

| | | |
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| | | |
|--|--|--|

Those submitting a form containing business confidential information will need to submit a non-confidential version of the same form that does not contain the confidential business information.

| | |
|-----------------------------|--|
| A. Organization Name | |
| Street Address | |
| City | |
| State | |
| Zip Code | |
| Website | |

From the list below, identify your organization's primary and additional participation in the semiconductor product supply chain. Please mark all applicable rows.

| Segment | Participation |
|--|----------------|
| Integrated Circuit Design | |
| Front End Fabrication | |
| Back End/Assembly Test/Packaging | |
| B. Electronic Manufacturing Services / Printed Circuit Board Assembly | |
| IC Distributor | |
| Equipment Supplier | |
| Material Supplier | |
| Electronic Component Supplier | |
| Intermediate or End User of Semiconductor Products | |
| Other | (specify here) |

Next Step:

Sections 2 through 5 of this form are intended to be filled out by organizations that have primary or additional participation in the following segments: Integrated Circuit Design, Front End Fabrication, Back End/Assembly Test/Packaging, Electronic Manufacturing Services / Printed Circuit Board Assembly, and IC distributor.

Sections 6 through 8 of this form are intended to be filled out by organizations that purchase integrated circuits.

If your organization's responses do not reasonably fit in the above sections, please provide comments in Section 9.

BURDEN ESTIMATE AND REQUEST FOR COMMENT

Public reporting burden for this collection of information is estimated to average 4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information to BIS Information Collection Officer, Room 6863, Bureau of Industry and Security, U.S. Department of Commerce, Washington, D.C. 20230, and to the Office of Management and Budget, Paperwork Reduction Project (OMB Control No. 0694-XXXX), Washington, D.C. 20503.

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Section 2: Semiconductor Providers - Product Capabilities

Indicate the technology nodes (in nanometers), semiconductor material types, and device types which this organization is capable of providing (design and/or manufacture). A blank response is counted as "No Capability".

| C. | Technology Node (nm) | | Semiconductor Material Type | | Device Type | |
|----|----------------------|-------|--|----------------|--|----------------|
| | | | | | Organizations participating in the Electronic Manufacturing Services / Printed Circuit Board Assembly segment should list device types under "Other" | |
| | 6,000 - 10,000 | | Amorphous Silicon | | Analog/Linear Technologies | |
| | 3,000 - <6,000 | | Bulk Silicon | | Digital Logic Technologies | |
| | 1,500 - <3,000 | | Silicon on Insulator | | Digital Signal Processors | |
| | 1,000 - <1,500 | | Silicon Germanium | | Field Programmable Gate Arrays | |
| | 800 - <1,000 | | Silicon on Sapphire | | Structured ASICs | |
| | 500 - <800 | | Silicon Carbide | | Standard Cell ASICs | |
| | 350 - <500 | | Gallium Arsenide | | Custom ASICs | |
| | 250 - <350 | | Gallium Nitride | | 3D/2.5 ASICs | |
| | 180 - <250 | | Indium Phosphide | | System-on-Chip | |
| | 130 - <180 | | Antimonides | | Other Processors | |
| | 90 - <130 | | Organic Technologies | | Mixed Signal Technologies | |
| | 65 - <90 | | Carbon Based Technologies (e.g. nanotubes) | | Nonvolatile Memory | |
| | 45 - <65 | | Superconducting Materials | | SRAM | |
| | 32 - <45 | | Other | (specify here) | DRAM | |
| | 28 - <32 | | | | MEMS Technologies | |
| | 14 - <28 | | | | Optical/Photonic Technologies | |
| | 7 - <14 | | | | MMIC Technologies | |
| | <7 | | | | Other RF Technologies | |
| | | | | | Other | (specify here) |
| E. | Point of Contact | | | | | |
| | Name | Title | Phone Number | E-mail | State | |
| | | | | | | |
| | Comments: | | | | | |

This response was not identified as either BUSINESS CONFIDENTIAL or PUBLIC; please complete this information on the Organization Information tab.

Section 5: Semiconductor Providers - Disruptions

| What are the primary disruptions or bottlenecks that have affected your ability to provide products to customers in the last year? | | | | |
|--|---|--|--|-----------------------------|
| | Disruption/Bottleneck | Supplier of Delayed Input | Primary Product Impacted (from Section 4e) | Explanation |
| A.1 | | | | |
| A.2 | | | | |
| A.3 | | | | |
| A.4 | | | | |
| A.5 | | | | |
| A.6 | | | | |
| A.7 | | | | |
| A.8 | | | | |
| A.9 | | | | |
| A.10 | | | | |
| B. | What is your organization's book-to-bill ratio for the past three years? | 2019 | | Explanation of any changes: |
| | | 2020 | | |
| | | 2021 | | |
| | If the demand for your products exceeds your capacity, what is the primary method by which your organization allocates the available supply? | | | Explanation: |
| | Does your organization have available capacity? | | If Yes, what is preventing the filling of that capacity? | |
| 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? | | | | |
| C. | Has your organization changed its material and/or equipment purchasing levels or practices in the past three years? | | Explanation: | |
| | 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? | | | |

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Section 6: Semiconductor Product Consumers

From the list below, identify the market segments that your organization currently serves:

| Market Segment | | Primary/Secondary/Other | Defense/Commercial |
|----------------|---|-------------------------|--------------------|
| A. | Aerospace | | |
| | Automotive | | |
| | Healthcare/Medical | | |
| | Industrial | | |
| | IT/Computers - Personal and Consumer Products | | |
| | IT/Computers - Servers | | |
| | Mobile Devices | | |
| | Network Infrastructure | | |
| | Other | (specify here) | |
| | Other | (specify here) | |

Provide a general description of the types of products your organization sells that rely on semiconductors:

B.

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Section 7b: Consumers - Input Lead Times and Inventory

For each of the top semiconductor products identified in Section 7a, estimate each product's lead times (between when your organization places the order and receives the order) and your organization's inventory for (a) 2019 and (b) currently (in days). Provide an explanation of any current delays or bottlenecks.

| | Supplier Product (auto-generated from 7a) | Lead Time | | Inventory | | Explanation of Delays/Bottlenecks and Changes in Inventory Practices |
|----|--|-----------|---------|-----------|---------|--|
| | | 2019 | Current | 2019 | Current | |
| | Total (all semiconductor products) | | | | | |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |

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Section 4: Consumers - Supply Chain Disruptions

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

| | Disruption/Bottleneck | Primary Semiconductor Input Impacted (Item Section #) | Supplier of Delayed Input | Your Organization's Primary Product Impacted | Explanation |
|------|-----------------------|---|---------------------------|--|-------------|
| A. 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |

| | | | | |
|----|--|--|-------------|--|
| B. | Is your organization limiting production due to lack of available semiconductors? | | Explanation | |
| | What percentage of your current production has your organization had to defer, delay, reject, or suspend in the past year? | | Explanation | |
| | Is your organization considering or carrying out new investments to mitigate semiconductor sourcing difficulties? | | Explanation | |

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?

| | Product | Percent of your demand you are able to fill | Explanation |
|------|---------|---|-------------|
| C. 1 | | | |
| 2 | | | |
| 3 | | | |

| | | | | |
|----|---|--------------------------|--|--|
| D. | Has your organization changed its material and/or equipment purchasing levels or practices in the past three years? | | Explanation: | |
| | 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? | | | |
| | What percentage of your orders are fulfilled by distributors versus through direct purchase orders to semiconductor product manufacturers? | Direct Purchase from OEM | | |
| | | Distributor | | |
| | 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? | |

| | | |
|----|---|--|
| E. | Has your organization faced "de-commits" (defined as a notification from a supplier that expedited 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) | |
|----|---|--|

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Section 9: General Comments

Use this space to provide any general comments that do not reasonably fit in other sections of the form. Please limit your response to the space available; supplemental information can be submitted as a separate attachment on [regulations.gov](https://www.regulations.gov).

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Section X: Definitions

| Term | Definition |
|--|---|
| Authorizing Official | An executive officer of the organization or business unit or another individual who has the authority to execute this survey on behalf of the organization. |
| Capability | The ability to perform standardized design and/or manufacturing steps for producing integrated circuit products within an organization's own facilities and its own employees with little or no outsourcing. |
| Complementary Metal Oxide Semiconductor (CMOS) | A class of semiconductor used in digital logic circuits employed in microcontrollers, microprocessors, memory, and other devices. The technology is also used in analog circuits such as sensors, transceivers, data converters and other systems. |
| Customer | An entity to which an organization directly delivers the product or service that the facility produces. A customer may be another organization or another facility owned by the same parent organization. The customer may be the end user for the item but often will be an intermediate link in the supply chain, adding additional value before transferring the item to yet another customer. |
| Design Facility | A facility with personnel who use design software, intellectual property blocks, supporting computer systems, and other information technology to create integrated circuit designs. |
| Extreme Integration | The incorporation of functional systems (e.g., logic, memory, input/output, etc.) on an integrated circuit (IC) die or in combination with the integration of multiple IC die (such as memory, standard processors, and field programmable gate arrays) to form a single operational component. |
| Foundry | For the purpose of this survey a foundry is considered to be a facility that manufactures integrated circuit products for outside organizations as a business. Foundries are: 1) businesses dedicated solely to manufacturing integrated circuit products for fabless integrated circuit companies and other businesses; and/or 2) organizations that chiefly design and manufacture their own integrated circuit products, but that also operate a business of manufacturing IC products for other entities for a fee. |
| Integrated Circuit (IC) | Analog or digital devices that incorporate transistors, diodes, capacitors, resistors, and other circuit elements that are integrated on a single substrate (chip), typically silicon. |
| Manufacturing | The production of a working integrated circuit product at a fabrication facility. |
| Manufacturing Facility | A facility that transforms integrated circuit designs into integrated circuit devices using an array of fabrication equipment including photolithography, deposition, etch, wafer dicing, and testing tools. These facilities produce functioning die as an end product, devices that may be built with electronics-grade silicon or compound semiconductor materials, including gallium arsenide, gallium nitride, indium phosphide, and others. |
| Non-U.S. Company | For the purpose of this survey, a non-U.S. company is an organization (publicly traded, privately held, for profit, not-for-profit, or non-profit) that is domiciled at a location outside of the United States. Companies that are a business unit of a parent organization with legal domicile located outside of the United States are non-U.S. companies. |
| Organization | A company, firm, laboratory, or other entity that owns or controls one or more U.S. establishment(s) capable of designing and/or manufacturing integrated circuit products. A company may be an individual proprietorship, partnership, joint venture, or corporation including any subsidiary corporation in which more than 50 percent of the outstanding voting stock is owned by a business trust, cooperative, trustee(s) in bankruptcy, or receiver(s) under decree of any court owning or controlling one or more establishment. |
| Outsource | To obtain goods and/or services by contract from a supplier (domestic or foreign) outside the organization. |
| Product/Process Development | Conceptualization and development of a product prior to the production of the product for customers. |
| Semiconductor | Elemental materials such as silicon and germanium (or compounds like gallium arsenide) that possess levels of electrical conductivity that are less than a conductor but greater than an insulator. The properties of these materials and similar ones can be manipulated to affect conductivity through temperature and/or the use of dopants. |
| Service | An intangible product (contrasted to a good, which is a tangible product). Services typically cannot be stored or transported, are instantly perishable, or come into existence at the time they are bought and consumed. |
| Single Source | An organization that is designated as the only accepted source for the supply of parts, components, materials, or services, even though other sources with equivalent technical know-how and production capability may exist. |
| Sole Source | An organization that is the only source for the supply of parts, components, materials, or services. No alternative U.S. or non-U.S. based suppliers exist other than the current supplier. |
| Supplier | An entity from which your organization obtains inputs, which may be goods or services. A supplier may be another firm with which you have a contractual relationship, or it may be another facility owned by the same parent organization. |
| United States | The "United States" or "U.S." includes the 50 states, Puerto Rico, the District of Columbia, Guam, the Trust Territories, and the U.S. Virgin Islands. |
| Wafer Starts Per Week | The number of semiconductor wafers that can be processed by an integrated circuit production line in a 7 day period. |

