

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:

BUSINESS CONFIDENTIAL

Justification of nondisclosure and legal authority claimed:

This information qualifies for protection under FOIA, 5 U.S.C. § 552(b)(4), and should be exempt from public disclosure

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 business confidential information.

A.	Organization Name	ABCD Semiconductor Company	
	Street Address	123 Sample Street	
	City	Sampleburg	
	State	California	
	Zip Code	99999	
	Country	United States	
	Website	https://www.websiteforabcdsemiconductorcompany.com	

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	Additional
Front End Fabrication	Primary
Back End/Assembly Test/Packaging	Additional
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 6883, 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. 0694-0143), Washington, D.C. 20503.

This file is provided as an example of a form as might be completed by a semiconductor producer.
It is intended to be instructive, not exhaustive. When completing the form, please provide as much information as possible.

Previous Page	Next Page
Table of Contents	
I	Organization Information
II	Table of Contents
Sections for Semiconductor Product Manufacturers	
2	Capabilities
3	Production
4a	Products
4b	Product Customers
4c	Product Lead Times
4d	Product Inventories
5	Disruptions
Sections for Semiconductor Product Intermediate or End Users	
6	Semiconductor Product Consumers
7a	Supplier Products
7b	Lead Times and Inventories
8	Disruptions
General Response Section	
9	General Comments
A	Definitions

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".						
A.	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	Design and Manufacture	Digital Logic Technologies	Design and Manufacture
	1,500 - <3,000		Silicon on Insulator		Digital Signal Processors	
	1,000 - <1,500		Silicon Germanium		Field Programmable Gate Arrays	Design and Manufacture
	800 - <1,000		Silicon on Sapphire		Structured ASICs	Design Only
	500 - <800		Silicon Carbide		Standard Cell ASICs	
	350 - <500		Gallium Arsenide	Design Only	Custom ASICs	
	250 - <350		Gallium Nitride		3D/2.5 ASICs	
	180 - <250		Indium Phosphide		System-on-Chip	
	130 - <180	Design and Manufacture	Antimonides		Other Processors	
	90 - <130	Design and Manufacture	Organic Technologies		Mixed Signal Technologies	
	65 - <90	Design and Manufacture	Carbon Based Technologies (e.g. nanotubes)		Nonvolatile Memory	
	45 - <65	Design and Manufacture	Superconducting Materials		SRAM	
	32 - <45	Design Only	Other	(specify here)	DRAM	
	28 - <32	Design Only			MEMS Technologies	
	14 - <28				Optical/Photonic Technologies	
	7 - <14				MMIC Technologies	
	<7				Other RF Technologies	
				Other	(specify here)	
B.	Point of Contact					
	Name	Title	Phone Number	E-mail	State	Country
	Albert Sampleton	CEO	888-888-8888	sampleton@abcdsemiconductorcompay.com	California	United States
Clarifying Comments (if applicable):						

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[Previous Page](#)

[Next Page](#)

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Section 3: Semiconductor Providers - Integrated Circuit Production

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.

Integrated Circuit Type						Integrated Circuit Production				
	Primary IC Type	Product Type	Primary Technology Node (nm)	Smallest Technology Node (nm)	Largest Technology Node (nm)			2019	2020	2021 (Projected)
Total	Digital Logic Technologies	logic gate/inverter	90	45	130	Total	\$ (millions)	\$435	\$512	\$553
							Units	12,700,000	14,400,000	14,350,000
							Capacity (Units)	15,000,000	15,000,000	15,000,000
Aerospace						Aerospace	% of Total \$			
Automotive						Automotive	% of Total \$			
Healthcare/Medical						Healthcare/Medical	% of Total \$			
Industrial						Industrial	% of Total \$			
IT/Computers - Personal and Consumer Products	Digital Logic Technologies	Logic multiplexer	90	45	130	IT/Computers - Personal and Consumer Products	% of Total \$	65%	70%	70%
IT/Computers - Servers						IT/Computers - Servers	% of Total \$			
Mobile Devices	Digital Logic Technologies	Logic multiplexer	45	45	65	Mobile Devices	% of Total \$	35%	30%	30%
Network Infrastructure						Network Infrastructure	% of Total \$			
Other						Other	% of Total \$			
(specify here)										
Clarifying Comments (if applicable):										

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[Previous Page](#)
[Next Page](#)

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Section 4a: Semiconductor Providers - Products

For the semiconductor products that your organization sells, identify those with the largest order backlog. Then for each product, identify the product attributes, sales in the past month, and location of fabrication and package/assembly. The total should account for all semiconductor products that your organization sells, not only the sum of those listed with the largest order backlogs. This information will carry over into subsequent questions.

Product						Most Recent Monthly Sales		Production				
	Product Name	Integrated Circuit Type	Material	Node (nm)	Product Description	\$ (millions)	Units	Fabricated By	Fab Location	Packaged/Assembled By	Packaging/Assembly Location	Distributed By
	Total (all semiconductor products, including those not listed below)				logic chips	\$47	1200000					
1	ABCD Go130	Digital Logic Technologies	Bulk Silicon	130	wireless LAN device	\$3	13000	Self	Sampleburg, California	Exemplar Packaging	Boise, ID	Self
2	ABCD Go90	Digital Logic Technologies	Bulk Silicon	90	tv chipset	\$13	27000	Self	Sampleburg, California	Grouch Assemblers	El Paso, TX	Self
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Clarifying Comments (if applicable):												

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[Previous Page](#)
[Next Page](#)

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Section 4b: Semiconductor Providers - Customers

For the top semiconductor products identified in Section 4a, list each product's top three current customers and the estimated percentage of that product's sales accounted for by each customer.

	Product Name (auto-generated from 4a)	Customer 1			Customer 2			Customer 3		
		Customer Name or Industry	Customer Location (City, State/Country)	% of Sales	Customer Name or Industry	Customer Location (City, State/Country)	% of Sales	Customer Name or Industry	Customer Location (City, State/Country)	% of Sales
1	ABCD Go130 (Digital Logic Technologies, Bulk Silicon, 130)	MicroWiFi Group	Kansas City, MO	88%	Franklin Wireless	Paris, France	12%			
2	ABCD Go90 (Digital Logic Technologies, Bulk Silicon, 90)	Alpha TV Corp	Seattle, WA	34%	Healthcare/Medical	Shenzhen, China	22%	Consumer Electronics	Vienna, Austria	12%
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Clarifying Comments (if applicable):										

For each phase of the production process, identify whether your organization carries out the step internally or externally. For the top semiconductor products identified in Section 4a, 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.

	Product Name (auto-generated from 4a)	Total Lead Time		Design phase		Acquisition of manufacturing inputs		Front End Manufacturing Process		Back End manufacturing process (ATP)		Electronic Manufacturing Services / Printed Circuit Board Assembly		Time in Outbound Transit/Shipping		Other		Explanation of Delays/Bottlenecks
		Internal/External --->		Internal		Internal		Internal		External		External		External		External		
		2019	Current	2019	Current	2019	Current	2019	Current	2019	Current	2019	Current	2019	Current	2019	Current	
	Total (all semiconductor products)	65 days	90 days	14 days	14 days	3 days	45 days	12 days	12 days	5 days	30 days	6 days	12 days	4 days	12 days			it has been challenging to get several chemicals needed for the manufacturing process, and covid-related shutdowns have
1	ABCD Go130 (Digital Logic Technologies, Bulk Silicon, 130)	70 days	195 days	12 days	12 days	3 days	30 days	9 days	9 days	4 days	60 days	6 days	12 days	4 days	14 days			Specific to this product, our assembler in Boise has had trouble maintaining enough
2	ABCD Go90 (Digital Logic Technologies, Bulk Silicon, 90)	12 days	120 days	17 days	15 days	2 days	75 days	8 days	7 days	4 days	40 days	6 days	14 days	7 days	14 days			COVID shutdowns at ATP facility, difficulty sourcing silicon and phosphene
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Clarifying Comments (if applicable):																		

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[Previous Page](#)

[Next Page](#)

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Section 4d: Semiconductor Providers - Product Inventories

For the top semiconductor products identified in Section 4a, list each product's 2019 and current inventory (in days), for finished product, in-progress product, and inbound product. Provide an explanation for any changes in inventory practices.

	Product Name (auto-generated from 4a)	Finished Inventory		In-Progress Inventory		Inbound Inventory		Explanation of Inventory Changes
		2019	Current	2019	Current	2019	Current	
	Total (all semiconductor products)	12 days	17 days	6 days	25 days			Delays in sourcing several key items have increased in-progress inventory
1	ABCD Go130 (Digital Logic Technologies, Bulk Silicon, 130)	9 days	13 days	3 days	22 days			We've had to hold this particular item due to inbound shipping delays of tin from Indonesia via Los Angeles
2	ABCD Go90 (Digital Logic Technologies, Bulk Silicon, 90)	8 days	14 days	3 days	21 days			ATP provider asked us to hold some shipments due to backlog; lack of chemical inputs delayed completion
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Clarifying Comments (if applicable):								

[Previous Page](#)

[Next Page](#)

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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 4a)	Explanation		
A.	1	COVID shutdowns at ATP facility	Exemplar Packaging	ABCD Go130 (Digital Logic Technologies, Bulk Silicon, 130)	Delays at ATP facility (primarily Exemplar Packaging in Boise) cause slowdowns throughout the process	
	2	COVID shutdowns at ATP facility	Grouch Assemblers	ABCD Go90 (Digital Logic Technologies, Bulk Silicon, 90)	Delays at ATP facility (primarily Exemplar Packaging in Boise) cause slowdowns throughout the process	
	3	Inability to source phosphene	ChemicGasGroup Suppliers Inc	ABCD Go90 (Digital Logic Technologies, Bulk Silicon, 90)	Our primary supplier of phosphene has been unable to continue operating	
	4	Shipping delays	Various shipping companies	ABCD Go90 (Digital Logic Technologies, Bulk Silicon, 90)	It's hard to get a company that will deliver on time	
	5					
	6					
	7					
	8					
	9					
	10					
B.	What is your organization's book-to-bill ratio for the past three years?		2019	0.75	Explanation of any changes:	We've had a lot more orders come in.
			2020	1.1		
			2021	1.15		
	If the demand for your products exceeds your capacity, what is the primary method by which your organization allocates the available supply?		Prioritize existing customers		Explanation:	Loyalty is important to us. In areas where we are concerned about double-booking, we may reduce orders based on historical volumes.
	Does your organization have available capacity?		No	If Yes, what is preventing the filling of that capacity?		
C.	Is your organization considering increasing its capacity?		Yes	If Yes, in what ways, over what timeframe, and what impediments exist to such an increase?		We are considering expanding, but are unsure about our ability to procure additional equipment to manufacture at current nodes and wafer sizes
	What factors does your organization consider when evaluating whether to increase capacity?		We typically discuss expected demand with our long-term customers, as well as business solicitations from potential new customers. We typically forecast demand 7 years into the future.			
	Has your organization changed its material and/or equipment purchasing levels or practices in the past three years?		Yes	Explanation:	We've had to add several supplemental suppliers due to our primary's inability to maintain consistent supply	
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?			Increase supply of substrates			
Clarifying Comments (if applicable):						

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[Previous Page](#)

[Next Page](#)

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Section 6: Semiconductor Product Consumers

A.	From the list below, identify the market segments that your organization currently serves:		
	Market Segment	Primary/Secondary/Other	Defense/Commercial
	Aerospace		
	Automotive		
	Healthcare/Medical		
	Industrial		
	IT/Computers - Personal and Consumer Products		
	IT/Computers - Servers		
	Mobile Devices		
	Network Infrastructure		
	Other	(specify here)	
	Other	(specify here)	

B.

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

Clarifying Comments (if applicable):

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[Previous Page](#)[Next Page](#)

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Section 7a: Consumers - Inputs

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 average monthly 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 actually be able to purchase. This information will carry over into subsequent questions.

	Product					2019 Average Monthly Purchase		2021 Average Monthly Purchase		2021 Average Monthly Orders		Ideal Monthly Purchase Quantity, Next 6 Months		Expected Monthly Purchase Quantity, Next 6 Months	
	Supplier	Product Description	Semiconductor Type	Material	Node	\$ (millions)	Units	\$ (millions)	Units	\$ (millions)	Units	\$ (millions)	Units	\$ (millions)	Units
	Total (all semiconductor products)														
1															
2															
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Clarifying Comments (if applicable):															

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Previous Page	Next Page					
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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						
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Clarifying Comments (if applicable):						

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[Previous Page](#)[Next Page](#)

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Section 8: Consumers - Supply Chain Disruptions

A.

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 (from Section 7a)	Supplier of Delayed Input	Your Organization's Primary Product Impacted	Explanation
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

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

C.

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
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 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)

Clarifying Comments (if applicable):

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Previous Page	Next Page
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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.	
A.	

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Section A: 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.