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OMB Control Number: 0694-0119

Expiration Date: September 30, 2024

DEFENSE INDUSTRIAL BASE ASSESSMENT: U.S. MICROELECTRONICS INDUSTRY**SCOPE OF ASSESSMENT**

The U.S. Department of Commerce (DOC), Bureau of Industry and Security (BIS), Office of Technology Evaluation (OTE), is conducting a survey and assessment of the capabilities of the U.S. microelectronics industrial base to support the national defense as required in Section 9904 of the National Defense Authorization Act (NDAA) of Fiscal Year 2021 (15 USC §4654), in light of the global nature and interdependencies of the supply chain. The survey will collect information on the upstream materials and downstream end uses associated with microelectronics production.

**This survey is not part of the application for funding under Section 9902 of the 2021 NDAA (15 USC §4652).
Individual survey responses will not affect your organization's eligibility and/or consideration for CHIPS Act or other government funding.**

RESPONSE TO THIS SURVEY IS REQUIRED BY LAW

A response to this survey is required by law (50 USC §4555). Failure to respond can result in a maximum fine of \$10,000, imprisonment of up to one year, or both. Information furnished herewith is deemed confidential and will not be published or disclosed except in accordance with Section 705 of the Defense Production Act of 1950, as amended (50 USC §4555). Section 705 prohibits the publication or disclosure of this information unless the President determines that its withholding is contrary to the national defense. Information will not be shared with any non-government entity, other than in aggregate form. The information will be protected pursuant to the appropriate exemptions from disclosure under the Freedom of Information Act (FOIA), should it be the subject of a FOIA request.

Notwithstanding any other provision of law, no person is required to respond to nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a currently valid OMB Control Number.

BURDEN ESTIMATE AND REQUEST FOR COMMENT

Public reporting burden for this collection of information is estimated to average 14 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. 0694-0119), Washington, D.C. 20503.

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[Previous Page](#)[Next Page](#)**General Instructions**

Your organization is required to complete this survey on the U.S. Microelectronics industrial base.

You must complete the survey using the DOC/BIS template which is Microsoft Excel based and can be downloaded at [link TBA].

A If you are not able to download the survey document, at your request BIS staff will email the Excel survey template directly to you.

For your convenience, a PDF version of the survey and required drop-down content is available on the BIS website to aid internal data collection. DO NOT SUBMIT the PDF version of the survey as your response to BIS. Should this occur, your organization will be required to resubmit the survey in Excel format.

B **This survey is not part of the application for funding under Section 9902 of the 2021 NDAA (15 USC \$4652). Individual survey responses will not affect your organization's eligibility and/or consideration for CHIPS Act or other government funding.**

Any forecasts requested in this survey are understood to be speculative and for aggregate, statistical purposes.

C Your organization has the option to provide a single Corporate level response or separate Business Unit/Division level responses for each of its semiconductor-related businesses.

Note, if your organization is completing Business Unit/Division level surveys, any reference to "your organization" should be inferred as business unit or division. The reporting level must remain consistent throughout the survey, unless instructed otherwise.

D Respond to every question. Surveys that are not fully completed will be returned for completion. Use the comment boxes to provide any information to supplement responses provided in the survey form. Make sure to record a complete answer in the space provided, even if the space does not appear to expand to fit all of the information.

Survey inputs should be completed by typing in responses or by using a drop-down menu.

E **Do not disclose any U.S. Government (USG) classified information in this survey form.**

F Submission of completed survey documents should be done using the designated Semiconductor Study inbox: SemiconductorStudy@bis.doc.gov

Questions related to the survey should be directed to BIS survey support staff at SemiconductorStudy@bis.doc.gov

G E-mail is the preferred method of contact.

You may speak with a member of the BIS survey support staff by calling (202)-482-7808.

For questions related to the overall scope of this assessment, contact SemiconductorStudy@bis.doc.gov or:

H Jason D. Bolton
Division Director, Industrial Studies
Defense Industrial Base Division
BIS/Export Administration/Office of Technology Evaluation
1401 Constitution Avenue, NW, Room 1093
Washington, DC 20230

DO NOT submit completed surveys to Mr. Bolton's postal or personal email address. All surveys must be submitted electronically to [TBD].

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Section 2: Facilities and Operations

Identify each of your organization's facilities in operation since 2017, including facilities that are idle/standby, closed, or planned/expected (e.g. facilities that are or will be under construction or development). Then, provide the information related to each facility, as applicable. Note, for (g), (h), (i), and (j), you may specify the metric as applicable to your organization if the default metric is not appropriate using the dropdown menu option.

Facilities should include manufacturing facilities, design/R&D facilities, and distribution facilities. Do not include facilities that are solely engaged in sales and/or marketing activities. If you are reporting closed facilities, you only need to report facilities that have been closed within the past five years.

For column (h), "optimal 2022 capacity" is the capacity level this facility would have in 2022 if your organization were able to make this change with no cost or lead time.

Facility Name	Location			Operations							Energy Use				Future Outlook	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)		(l)	(m)	(n)	
	City	State/Province	Country	Primary Operation (select from drop-down)	Operating Status (select from drop-down)	Initial Year of Operations (yyyy)	2022 Capacity (if applicable) Wafer Starts / Week (200mm equiv.)	Optimal 2022 Capacity (if applicable) Wafer Starts / Week (200mm equiv.)	Expected 2027 Capacity (if applicable) Wafer Starts / Week (200mm equiv.)	2022 Facility Total Energy Usage Megawatt Hour (MWh)	Expected Facility Energy Use Change Through 2027 (select from drop-down) Change in Energy UseReason for the Change		Do you have any plans to expand this facility within the next 10 years? (select from drop-down)	Do you have any plans to modernize this facility within the next 10 years? (select from drop-down)	Explain the future outlook for this facility, as applicable.	
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[Previous Page](#)[Next Page](#)**Section 3a: Product Capability**

Note: Sections 3a-3d are interconnected. In sections 3a-3c, you are asked to provide information on your organization's general product capabilities, production capabilities, and the estimated end use for each category. In section 3d, you are asked to provide more specification on your organization's primary products within each category, as applicable.

For each product category your organization designs, manufactures, and/or distributes, indicate the appropriate participation type and provide the corresponding product category information, as applicable. For (f), (g), (h), and (i), the default metric is nanometer (nm), however, you may specify the metric as applicable to your organization within the dropdown menu.

		Product Category Information								
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Product Category		Participation Type (select from drop-down)	Percent (%) of Production (By Revenue)	Current Lead Time (Weeks)	Primary Material (select from drop-down)	Primary Wafer Size (select from drop-down)	Primary Technology Node	Smallest Technology Node	Largest Technology Node	Expected Primary Technology Node in 2027
							Nanometer (nm)	Nanometer (nm)	Nanometer (nm)	Nanometer (nm)
1	Analog ICs									
2	Microcontroller and Microprocessor ICs									
3	Logic ICs									
4	Memory ICs	Dropdown: - Design Only - Manufacture Only - Both Design and Manufacture - Distribute Only		Dropdown: - Amorphous Silicon - Bulk Silicon - Silicon on Insulator - Silicon Germanium - Silicon on Sapphire - Silicon Carbide - Gallium Arsenide - Gallium Nitride - Indium Phosphide - Antimonides - Organic Technologies - Carbon Based Technologies (e.g. nanotubes) - Superconducting Materials	Dropdown: - 300mm - 200mm - 150mm - <=100mm - Not Applicable					
5	Discretes									
6	Optoelectronics									
7	Sensors & Actuators									
8	Printed Circuit Boards									
9	Equipment and Tooling									
10	Intermediate or End Product									
11	Test and Design Verification									
12	Assembly and/or Packaging									
13	Other (Specify Here)									
14	Other (Specify Here)									
15	Other (Specify Here)									
Comments										

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For each product category your organization designs, manufactures, and/or distributes, **estimate** the percentage of each function (i.e. Design, Manufacture, Assembly/Packaging/Test, and Distribution) that is carried out by the specified locations (U.S. or Non-U.S.) and by whom (in-house or outsourced). For the Design function, pre-existing IP blocks should be counted separately from both in-house and out-sourced design.

A

Comments

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Section 3c: Product End Use (Estimate)

For each product category your organization designs, manufactures, and/or distributes, estimate the percentage of revenue attributed to each commercial and defense end use, where known.

Product Category	Commercial End Use										Defense End Use			
	Appliances/ Consumer Goods	Automotive	Commercial Aerospace	Healthcare/ Medical	Industrial	IT/Computers: Consumer Products	IT/Computers: Servers	Mobile Devices	Network Infrastructure	Other Commercial	U.S. Defense	Foreign Defense	Total	Unknown
1 Analog ICs													0%	100%
2 Microcontroller and Microprocessor ICs													0%	100%
3 Logic ICs													0%	100%
4 Memory ICs													0%	100%
5 Discretes													0%	100%
6 Optoelectronics													0%	100%
7 Sensors & Actuators													0%	100%
8 Printed Circuit Boards													0%	100%
9 Equipment and Tooling													0%	100%
10 Intermediate or End Product													0%	100%
11 Test and Design Verification													0%	100%
12 Assembly and/or Packaging													0%	100%
13 Other: N/A													0%	100%
14 Other: N/A													0%	100%
15 Other: N/A													0%	100%

B

Overall, how confident is your organization in estimating its product end-uses on a scale of 1 (Not at all confident) to 5 (Extremely confident)? Select the closest number from the scale in the dropdown.

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Dropdown:

- 1 - Not at all confident
- 2 - Low confidence
- 3 - Moderate confidence
- 4 - Great confidence
- 5 - Extremely confident

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Section 3d: Primary Products

For each product category your organization designs, manufactures, and/or distributes, list up to the three primary product types with the highest gross revenue and provide the corresponding product type information, as applicable.

For (g), (h), (i), and (j), the default metric is nanometer (nm), however, you may specify the metric as applicable to your organization within the dropdown menu.

Product Category		Product Type Information									
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
		Primary Product Type (select from drop-down)	Product Description	Percent (%) of Category's Production (By Revenue)	Current Lead Time (Weeks)	Primary Material (select from drop-down)	Primary Wafer Size (select from drop-down)	Primary Technology Node	Smallest Technology Node	Largest Technology Node	Expected Primary Technology Node in 2027
							Nanometer (nm)	Nanometer (nm)	Nanometer (nm)	Nanometer (nm)	
A	1 Analog ICs	1 2 3									
	2 Microcontroller and Microprocessor ICs	1 2 3									
	3 Logic ICs	1 2 3									
	4 Memory ICs	1 2 3									
	5 Discretes	1 2 3									
	6 Optoelectronics	1 2 3									
	7 Sensors & Actuators	1 2 3									
	8 Printed Circuit Boards	1 2 3									
	9 Equipment and Tooling	1 2 3									
	10 Intermediate or End Product	1 2 3									
	11 Test and Design Verification	1 2 3									
	12 Assembly and/or Packaging	1 2 3									
	13 Other: N/A	1 2 3									
	14 Other: N/A	1 2 3									
	15 Other: N/A	1 2 3									

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Dropdowns:

Analog ICs:

- General Purpose Analog
- Amplifiers/Comparators
- Interface
- Power Management
- Signal Conversion
- Application Specific Analog
- Consumer
- Computer
- Communications
- Automotive
- Industrial & Others

Microcontroller and Microprocessor ICs:

- MOS MPU
- MOS MCU
- Automotive MCU
- Smart Card MCU
- MOS DSP

Logic ICs:

- Digital Bipolar
- MOS General Purpose Logic
- MOS Gate Arrays
- MOS Standard Cells
- MOS Display Drivers
- MOS Touch Screen Controllers
- MOS Special Purpose Logic
- Consumer
- Computer & Peripherals
- Communication
- Automotive
- Multipurpose & Other

Memory ICs:

- MOS DRAM
- MOS SRAM
- MOS Mask PROM & EPROM
- NOR Flash Memory
- NAND Flash Memory
- Other Memory

Discretes:

- Diodes
- Small Signal and Switching Transistors
- Power Transistors
- Rectifiers
- Thyristors
- All Other Discrete

Optoelectronics:

- Displays
- Lamps
- Opto Couplers & Isolators
- Optical Switches
- CCD & Other Image Sensors
- CMOS Image Sensors
- Other Optoelectronics
- Infrared
- Laser Pickup
- Laser Transmitter
- Light Sensors

Sensors & Actuators:

- Temperature & Other Sensors
- Pressure Sensors
- Acceleration & Yaw Rate Sensors
- Magnetic Field Sensors
- Actuators

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Section 4: Outsourced Production

For each production function your organization outsources (i.e. Design, Manufacturing, Assembly/Packaging/Test, and/or Distribution), indicate the total number of service providers your organization uses both physically located in the U.S. and physically located outside of the U.S. Next, list up to the ten service providers most important for your organization's continued operations in each of respective functions and provide the corresponding information, as applicable.

A) Outsourced Design (IP Licensing)

Total Number of Providers Servicing in the U.S.:

Total Number of Providers Servicing Outside of the U.S.:

Design/IP Provider Name	Primary Location of Service Performance (select from drop-down)	Primary Product Category (select from drop-down)	Percent (%) of Primary Product Dependent on Provider	Percent (%) of Products Dependent Overall on Provider	Primary Reason for Service Provider Selection (select from drop-down)	Availability of Alternative Service Providers (select from drop-down)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Dropdown:
Dropdown will populate from answers in tab 3a

Dropdown:
- Financial Consideration
- Technical Specification
- Existing Relationship
- Delivery Time
- Proximity
- Quality
- Export Controls

Dropdown:
- None - Sole Global Source
- Yes - U.S. Alternate Available
- Yes - Only non-U.S. Alternate Available

B) Outsourced Manufacturing

Total Number of Providers Servicing in the U.S.:

Total Number of Providers Servicing Outside of the U.S.:

Manufacturing Provider Name	Primary Location of Service Performance (select from drop-down)	Primary Product Category (select from drop-down)	Percent (%) of Primary Product Dependent on Provider	Percent (%) of Products Dependent Overall on Provider	Primary Reason for Service Provider Selection (select from drop-down)	Availability of Alternative Service Providers (select from drop-down)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Dropdown:
Dropdown will populate from answers in tab 3a

Dropdown:
- Financial Consideration
- Technical Specification
- Existing Relationship
- Delivery Time
- Proximity
- Quality
- Export Controls

Dropdown:
- None - Sole Global Source
- Yes - U.S. Alternate Available
- Yes - Only non-U.S. Alternate Available

C) Outsourced Assembly/Packaging/Test

Total Number of Providers Servicing in the U.S.:

Total Number of Providers Servicing Outside of the U.S.:

Assembly/Packaging/Test Provider Name	Primary Location of Service Performance (select from drop-down)	Primary Product Category (select from drop-down)	Percent (%) of Primary Product Dependent on Provider	Percent (%) of Products Dependent Overall on Provider	Primary Reason for Service Provider Selection (select from drop-down)	Availability of Alternative Service Providers (select from drop-down)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Dropdown:
Dropdown will populate from answers in tab 3a

Dropdown:
- Financial Consideration
- Technical Specification
- Existing Relationship
- Delivery Time
- Proximity
- Quality
- Export Controls

Dropdown:
- None - Sole Global Source
- Yes - U.S. Alternate Available
- Yes - Only non-U.S. Alternate Available

D) Outsourced (Third-Party) Distribution

Total Number of Providers Servicing in the U.S.:

Total Number of Providers Servicing Outside of the U.S.:

Distribution Provider Name	Primary Location of Service Performance (select from drop-down)	Primary Product Category (select from drop-down)	Percent (%) of Primary Product Dependent on Provider	Percent (%) of Products Dependent Overall on Provider	Primary Reason for Service Provider Selection (select from drop-down)	Availability of Alternative Service Providers (select from drop-down)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Dropdown:
Dropdown will populate from answers in tab 3a

Dropdown:
- Financial Consideration
- Technical Specification
- Existing Relationship
- Delivery Time
- Proximity
- Quality
- Export Controls

Dropdown:
- None - Sole Global Source
- Yes - U.S. Alternate Available
- Yes - Only non-U.S. Alternate Available

Comments

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For each material and input category, provide the total number of suppliers your organization uses for its facilities located in the U.S. (Part A) and its facilities located outside of the U.S. (Part B); then, provide the corresponding information for each material and input category your organization sources, as applicable. Note, estimates for lead time and inventory levels are acceptable.

A) U.S. Facilities										
	Material and Input Category	Total Suppliers	Total # of Suppliers Physically Located in the U.S.	Percent (%) Supplied by U.S Based Suppliers	Primary Reason for Supplier Selection (select from drop-down)	Availability of Alternate Suppliers (select from drop-down)	Lead Time (Weeks)	2018 Inventory Levels (Weeks of Supply)	2022 Inventory Levels (Weeks of Supply)	Optimal Inventory Levels (Weeks of Supply)
A	1 Wafer									
	a Bulk Silicon									
	b Other (Specify Here)									
	c Other (Specify Here)									
	2 Photoresist									
	3 Photomask									
	4 Gases									
	5 Wet Chemicals									
	6 CMP Slurry									
	7 PVD Targets									
	8 ALD/CVD Materials									
	9 Electroplating Metals									
	10 Spin-on Dielectrics									
	11 Leadframes									
	12 Packaging Substrates									
	13 Ceramics									
	14 Bonding Wire									
	15 Die Attach Material									
	16 Encapsulation Resins									
	17 Other (Specify Here)									
18 Other (Specify Here)										
19 Other (Specify Here)										
20 Other (Specify Here)										
B) Non-U.S. Facilities										
	Material and Input Category	Total Suppliers	Total # of Suppliers Physically Located in the U.S.	Percent (%) Supplied by U.S Based Suppliers	Primary Reason for Supplier Selection (select from drop-down)	Availability of Alternate Suppliers (select from drop-down)	Lead Time (Weeks)	2018 Inventory Levels (Weeks of Supply)	2022 Inventory Levels (Weeks of Supply)	Optimal Inventory Levels (Weeks of Supply)
B	1 Wafer									
	a Bulk Silicon									
	b Other (Specify Here)									
	c Other (Specify Here)									
	2 Photoresist									
	3 Photomask									
	4 Gases									
	5 Wet Chemicals									
	6 CMP Slurry									
	7 PVD Targets									
	8 ALD/CVD Materials									
	9 Electroplating Metals									
	10 Spin-on Dielectrics									
	11 Leadframes									
	12 Packaging Substrates									
	13 Ceramics									
	14 Bonding Wire									
	15 Die Attach Material									
	16 Encapsulation Resins									
	21 Other (Specify Here)									
	22 Other (Specify Here)									
	23 Other (Specify Here)									
	24 Other (Specify Here)									
	Comments									

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Section 5b: Material and Inputs of Concern

For each material and input category that your organization sources, name up to three of the most essential material and inputs that your organization has difficulty acquiring. When reporting the supplier's country, provide the country where the supplier is physically located not the country where the supplier's headquarters are located.

Material and Input Category	Name of Material or Input of Concern	Level of Difficulty to Acquire (select from drop-down)	Primary Product Affected (select from drop-down)	Primary Supplier			Secondary Supplier			Lead Time (Weeks)	Inventory Levels (Weeks of Supply)			Do you anticipate difficulties to acquire this material/input in the future?	
				Supplier Name	Supplier Country	Percent (%) Supplied	Supplier Name	Supplier Country	Percent (%) Supplied		2018	2022	Optimal	Level of Difficulty	Explain
1	Wafer	1 2 3													
2	Photoresist	1 2 3													
3	Photomask	1 2 3													
4	Gases	1 2 3													
5	Wet Chemicals	1 2 3													
6	CMP Slurry	1 2 3													
7	PVD Targets	1 2 3													
8	ALD/CVD Materials	1 2 3													
9	Electroplating Metals	1 2 3													
10	Spin-on Dielectrics	1 2 3													
A 11	Leadframes	1 2 3													
12	Packaging Substrates	1 2 3													
13	Ceramics	1 2 3													
14	Bonding Wire	1 2 3													
15	Die Attach Material	1 2 3													
16	Encapsulation Resins	1 2 3													
17	Other: N/A	1 2 3													
18	Other: N/A	1 2 3													
19	Other: N/A	1 2 3													
20	Other: N/A	1 2 3													
21	Other: N/A	1 2 3													
22	Other: N/A	1 2 3													
23	Other: N/A	1 2 3													
24	Other: N/A	1 2 3													
Comments															

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For each equipment category, provide the total number of suppliers your organization uses for its facilities located in the U.S. (Part A) and its facilities located outside of the U.S. (Part B); and provide the corresponding information, as applicable.

A) U.S. Facilities												
Equipment Category	Total Number of Suppliers	Primary Equipment Supplier Name	Primary Supplier Country	Description/ Specific Tool	Average Lead Time by Equipment Wafer Size (Weeks) (as applicable)				Primary Reason for Supplier Selection (select from drop-down)	Primary Challenge/Concern (select from drop-down)	Availability of Alternate Suppliers (select from drop-down)	Additional Comments
					<=150mm	200mm	300mm	No Size				
1 Design Tools and EDA Software												
2 Deposition												
3 RTP and Oxidation Diffusion												
4 Lithography												
5 Photoresist Processing												
6 Material Removal and Cleaning												
7 Diffusion/Ion Implantation (doping)												
8 Process Control (Metrology and Inspection)												
9 Manufacturing Automation												
10 Other Wafer Fabrication Equipment												
11 Test and Related Equipment												
12 Assembly Equipment												
13 Other (Specify Here)												
14 Other (Specify Here)												
15 Other (Specify Here)												

Dropdown:
 - Financial Consideration
 - Technical Specification
 - Existing Relationship
 - Delivery Time
 - Proximity
 - Quality
 - Export Controls
 - Other

Dropdown:
 - Aging equipment
 - Maintenance
 - Energy Cost
 - Purchase Cost
 - Regulation/Export Controls
 - Obsolescence
 - Throughput
 - Other (Specify Here)

Dropdown:
 - None - Sole Global Source
 - Yes - U.S. Alternate Available
 - Yes - Only non-U.S. Alternate Available

B) Non-U.S. Facilities												
Equipment Category	Total Number of Suppliers	Primary Equipment Supplier Name	Primary Supplier Country	Description/ Specific Tool	Average Lead Time by Equipment Wafer Size (Weeks) (as applicable)				Primary Reason for Supplier Selection (select from drop-down)	Primary Challenge/Concern (select from drop-down)	Availability of Alternate Suppliers (select from drop-down)	Additional Comments
					<=150mm	200mm	300mm	No Size				
1 Design Tools and EDA Software												
2 Deposition												
3 RTP and Oxidation Diffusion												
4 Lithography												
5 Photoresist Processing												
6 Material Removal and Cleaning												
7 Diffusion/Ion Implantation (doping)												
8 Process Control (Metrology and Inspection)												
9 Manufacturing Automation												
10 Other Wafer Fabrication Equipment												
11 Test and Related Equipment												
12 Assembly Equipment												
13 Other (Specify Here)												
14 Other (Specify Here)												
15 Other (Specify Here)												

Dropdown:
 - Financial Consideration
 - Technical Specification
 - Existing Relationship
 - Delivery Time
 - Proximity
 - Quality
 - Export Controls
 - Other

Dropdown:
 - Aging equipment
 - Maintenance
 - Energy Cost
 - Purchase Cost
 - Regulation/Export Controls
 - Obsolescence
 - Throughput
 - Other (Specify Here)

Dropdown:
 - None - Sole Global Source
 - Yes - U.S. Alternate Available
 - Yes - Only non-U.S. Alternate Available

Export Controls

1 What is your organization's outlook for equipment supply over the next three years?

Dropdown:
 - No impact
 - Great Impact - Positively
 - Great Impact - Negatively
 - Moderate Impact - Positively
 - Moderate Impact - Negatively
 - Low Impact - Positively
 - Low Impact - Negatively

2 Indicate the impact of export controls on your production levels and provide an explanation below.

Dropdown:
 - Yes, positively
 - Yes, negatively
 - No

3 Have export controls affected your organization's equipment acquisition processes? If yes, provide an explanation below.

Dropdown:
 - Yes, positively
 - Yes, negatively
 - No

4 Has your organization experienced loss of sales opportunities due to export controls? If yes, provide an explanation below.

Comments

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For each commercial and defense end use segment that your organization supports, provide the following estimates for both current end uses (Part A) and future/expected end uses in the next five and ten years (Part B):

(a) the percentage (%) of your organization's total revenue attributed to the end use overall, (b) the percentage (%) of (a) attributed to U.S. sales in the end use, (c) the primary non-U.S. country of end use, (d) the total percentage (%) of (a) attributed to its primary country of end use, and (e) the percentage (%) of the end use segment using advanced packaging.

Example: Your organization's total revenue is split 50/50 between the Automotive and Commercial Aerospace end uses. Of the percentage of total revenue attributed to each respective end use, 50% of the Automotive and 100% of the Commercial Aerospace end use total revenue is attributed to U.S. sales. Overall, 75% of your organization's total revenue is attributed to U.S. sales across its end uses.

	(a)	(b)
Commercial End Use	Percent (%) of Total Revenue	Percent (%) of End Use Total Revenue from U.S. Sales
Automotive	50%	50%
Commercial Aerospace	50%	100%
Total Commercial	100%	75%

Next, in each Total Commercial and Total Defense row in both Part A (current end uses) and Part B (future/expected end uses), identify the primary non-U.S. country of respective total end use, the percentage (%) of total revenue attributed to the primary country, and the percentage (%) of the respective total end use using advantaged packaging.

A) Current End Use (Estimated)										
	(a)		(b)		(c)		(d)		(e)	
Commercial End Use	Percent (%) of Total Revenue		Percent (%) of End Use Total Revenue from U.S. Sales		Primary Non-U.S. Country of End Use (select from drop-down)		Percent (%) of End Use Total Revenue to Primary Country		Percent (%) of End Use Using Advanced Packaging	
Appliances/Consumer Goods										
Automotive										
Commercial Aerospace										
Healthcare/Medical										
Industrial										
IT/Computers - Personal and Consumer Products										
IT/Computers - Servers										
Mobile Devices										
Network Infrastructure										
Other										
Total Commercial (Current)	0%		0%							
Defense End Use	Percent (%) of Total Revenue		Percent (%) of End Use Total Revenue from U.S. Sales		Primary Non-U.S. Country of End Use (select from drop-down)		Percent (%) of End Use Total Revenue to Primary Country		Percent (%) of End Use Using Advanced Packaging	
U.S. Defense										
Foreign Defense										
Total Defense (Current)	0%		0%							
B) Future/Expected End Use (Estimated)										
	(a)		(b)		(c)		(d)		(e)	
Commercial End Use	Percent (%) of Total Revenue		Percent (%) of End Use Total Revenue from U.S. Sales		Primary Non-U.S. Country of End Use (select from drop-down)		Percent (%) of End Use Total Revenue to Primary Country		Percent (%) of End Use Using Advanced Packaging	
	2027	2032	2027	2032	2027	2032	2027	2032	2027	2032
Appliances/Consumer Goods										
Automotive										
Commercial Aerospace										
Healthcare/Medical										
Industrial										
IT/Computers - Personal and Consumer Products										
IT/Computers - Servers										
Mobile Devices										
Network Infrastructure										
Other										
Total Commercial (Future/Expected)	0%	0%	0%	0%						
Defense End Use	Percent (%) of Total Revenue		Percent (%) of End Use Total Revenue from U.S. Sales		Primary Non-U.S. Country of End Use (select from drop-down)		Percent (%) of End Use Total Revenue to Primary Country		Percent (%) of End Use Using Advanced Packaging	
	2027	2032	2027	2032	2027	2032	2027	2032	2027	2032
U.S. Defense										
Foreign Defense										
Total Defense (Future/Expected)	0%	0%	0%	0%						
Comments										
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Section 8: Supply Chain and Risk Management

Does your organization have a supply chain risk management (SCRM) program?

What software, subscriptions, and/or tools do your organization use to help anticipate and monitor supply chain risks (e.g. disruptions, bottlenecks, delays, etc.)?

What protocols do your organization have in place to mitigate supply chain risks (e.g. bottlenecks, disruptions, delays, etc)? Please explain.

For the below supply chain practices or features, identify how your organization's activities (a) have changed since 2017 and (b) are expected to change from 2022 to 2027.

Item	Change since 2017	Explanation of Changes	Expected Changes from 2022 to 2027	Explanation of Anticipated Changes
1 Redundancy of suppliers				
2 Localized supply chains				
3 Target inventory levels				
4 Length of supplier contracts				
5 Length of customer contracts				
6 Use of non-cancellable supplier contracts				
7 Use of non-cancellable customer contracts				
8 Number of supply chain management workers				
9 Use of distributors				
10 Use of supply chain modeling and forecasting				
11 Use of shipping and receiving ports				
12 Other (Specify Here)				
13 Other (Specify Here)				

Please describe your organization's general method for maintaining inventory levels of critical materials:

In the event of an unexpected shutdown, how long would it take your organization to resume normal levels of production? (select from dropdown)

Identify the three materials/inputs for which your organization expects to have the greatest increase in usage/demand in the next 10 years:

Material/Input	Explanation
1	
2	
3	

Comments

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Dropdown:
- Yes
- No

Dropdown:
- Increase
- Decrease
- No Change

Dropdown:
- Increase
- Decrease
- No Change

Dropdown:
- Less than 2 weeks
- About 2 weeks
- About 4 weeks
- About 6 weeks
- About 3 months
- About 6 months
- More than 6 months

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Section 9: U.S. Employment and Workforce Development											
Respond to the questions below pertaining to employment and workforce development in the U.S.											
Employment Totals											
Record the total number of U.S. Citizen and non-U.S. Citizen full time equivalent (FTE) employees and contractors at your U.S. facilities for each year from 2017 to present, as well as the percentage of non-U.S. Citizen FTE employees and contractors that are H1-B Visa Holders. Then, indicate the annual turnover rate for U.S. Citizen and non-U.S. Citizen FTE employees.											
		2017	2018	2019	2020	2021	2022	Annual Turnover Rate			
A	1 U.S. Citizen										
	2 Non-U.S. Citizen										
	a % of H1-B Visa Holders										
		b % from U.S. Arms Embargoed Countries*									
*As of the release of this survey this includes: Afghanistan, Belarus, Burma, Cambodia, Central African Republic, China (PRC), Congo, Cuba, Cyprus, Eritrea, Haiti, Iran, Iraq, Lebanon, Libya, North Korea, Russia, Somalia, South Sudan, Sudan, Syria, Venezuela, and Zimbabwe											
Educational Qualifications											
Record the total number of current and expected full time equivalent (FTE) employees by qualification. Then, identify the primary job title associated with each educational level and key challenges associated with recruiting or maintaining employees at each educational level.											
		2022	2027	2032	Primary Job Title		Explanation of Challenges Recruiting/Maintaining				
B	No Education Requirement										
	High School/GED										
	Certification or Partial College										
	B.S./B.A.										
	M.S./M.A.										
	Doctorate										
Vacancies											
For each occupation category that your organization employs, indicate the minimum educational qualification required, the average salary, and the average starting salary. Then, record the number of current employees and number of current vacancies (2022) as well as the number of vacancies expected in the next 5 years (2027) and in the next 10 years (2032) in each category.											
Occupational Categories		Minimum Educational Qualification Required (select from dropdown)	Average Salary (\$)	Average Starting Salary (\$)	Current Employees	Current Vacancies	Total Number of Employees (Expected)				
					2022	2022	2027	2032			
C	Manufacturing Engineers, Scientists, R&D										
	Production Line Operations										
	Testing and Quality Control										
	Information Technology/Computing										
	Sales, Administrative, and Management										
	Other (Specify Here)										
	Other (Specify Here)										
Workforce Development											
Indicate your organization's level of difficulty recruiting/training workers with little industry experience.		Explain:									
Indicate which of the following methods you currently employ, then rank the top five by their value to your organization's recruitment/training programs:											
Program		Use	Rank	Explanation							
1	Internships										
2	Outreach to K-12										
3	Partnership with local high schools										
4	Partnership with local community college										
5	Partnership with local university										
6	Partnership with semiconductor associations										
7	Participation in career fairs										
8	Direct advertising										
9	Outreach to specific communities (e.g., Veterans)										
10	Partnership with local American Job Centers										
11	Other (Specify here)										
12	Other (Specify here)										
D	Identify the skills necessary for your industry that are currently least available:										
	If you have had difficulty obtaining and retaining the necessary skilled workforce; what steps could and should the U.S. government pursue to assist industry prevent that difficulty in the future?										
	What key workforce programs are your organization undertaking to rebuild the semiconductor workforce in the U.S.?										
What does your organization offer to employees as part of workforce retention efforts? (e.g. salary/wage increases, bonuses, tuition reimbursement, etc)											
What trainings or certifications does your organization cover for employees?											
What percentage of your current employees has received on-the-job training related to the skills identified as necessary for the industry and how often are these trainings conducted?											
Comments											
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[Previous Page](#)[Next Page](#)**Section 10a: Financials**

Report the following financial line items for the years 2017 to present.

Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12

Reporting Schedule:		2017	2018	2019	2020	2021	2022 (Estimate)
Income Statement (Select Line Items)							
	1 Net Sales (and other revenue)						
	a. % of U.S. Sales						
	1.1. % of U.S. sales from U.S. locations						
	1.2. % of U.S. sales from non U.S. locations						
A	b. % of Non-U.S. Sales						
	2.1. % of non-U.S. sales from U.S. locations						
	2.2. % of non-U.S. sales from non-U.S. locations						
	2 Cost of Goods Sold						
	3 Total Operating Income (Loss)						
	4 Earnings Before Interest and Taxes						
	5 Net Income						
Balance Statement (Select Line Items)							
	1 Cash						
	2 Inventories						
B	3 Current Assets						
	4 Total Assets						
	5 Current Liabilities						
	6 Total Liabilities						
	7 Retained Earnings						
	8 Total Owner's Equity						
Human Capital Expenditure							
C	1 a. Total Salary and Wages (Including Benefits)						
	b. Estimated costs associated with recruitment						
	c. Estimated costs associated with workforce training						
D	On a scale of 1 to 10, estimate your organization's overall financial health (1 being imminent failure and 10 being highly profitable for the foreseeable future).						
Comments							

Data Confirmation

2020 Net Sales

None

Dropdown:

- Calendar Year
- Fiscal Year

Dropdown:

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

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Section 10b: Research, Development, and Capital Expenditures

Research & Development (R&D) Expenditure		2017	2018	2019	2020	2021	2022 (Estimate)	2027 (Expected)	2032 (Expected)
1 Total R&D Investment									
a. % of investment in R&D carried out in the U.S.									
b. % of investment in R&D carried out outside of the U.S.									
Government-Funded R&D		2017	2018	2019	2020	2021	2022 (Estimate)	2027 (Expected)	2032 (Expected)
2 Total R&D funding received from U.S. government sources									
a. % of R&D funding from U.S. Federal Government									
b. % of R&D funding from U.S. State and Local Governments									
3 Total R&D funding received from non-U.S. government sources									
a. Primary country and % of R&D funding received									
b. Secondary country and % of R&D funding received									
c. Tertiary country and % of R&D funding received									
Identify your organization's top anticipated R&D priorities over the next five years and provide a brief description. Next, indicate the percent (%) of funding your organization anticipates to receive from government (both U.S. or non-U.S.), and provide the primary Country and State source of funding, as applicable.									
R&D Priority	Description	Percent (%) of Funding Anticipated from Government	Primary Source of Government Funding (as applicable)						
			Country	% of Funding	State	% of Funding			
1									
2									
3									
4									
5									
Capital Expenditure (CapEx)		2017	2018	2019	2020	2021	2022 (Estimate)	2027 (Expected)	2032 (Expected)
1 a. Total CapEx Investment									
b. % of investment in the U.S.									
c. % of investment outside of the U.S.									
Does your organization expect to use the investment tax credit included in Section 107 of the CHIPS Act of 2022 (also known as the FABS Act)?		Dropdown: - Yes - No		Explain:					
2 If Yes, estimate the expected total value of the applicable investment				Explain:					
Does your organization expect to be impacted by the corporate minimum tax included as part of the Inflation Reduction Act of 2022?		Dropdown: - Yes - No		Explain:					
In the table below, identify your organization's anticipated top CapEx priorities over the next five to ten years.									
For each CapEx priority, select the option from the drop down menu that best aligns with your organization's investment. If the option provided do not represent your organization's investment priority, use the "Other: Specify here:" option to write in your response. Then, provide a description of the CapEx investment priority. For example, if your organization is investing in equipment, describe the type of equipment that will be acquired through the investment.									
For the Product Category, select the two product categories that will be primarily affected by the investment and the respective primary technology node. If you need to report additional product categories, use the comment section at the end of the page. When providing the "Anticipated Total Cost (\$)", indicate the overall cost of the investment, including any government or third party funding.									
CapEx Investment		Primary Facility	Product Category (select from dropdown)	Primary Technology Node Nanometer (nm)	Year	Anticipated Total Cost (\$)	Percent (%) of Government Funding	Primary Source of Government Funding Anticipated (as applicable)	
Priority	Description							Country	State
1									
2									
3									
4									
5									
Have any of your investment projections increased due to unexpected disruptions such as construction delays, licensing issues, labor shortages/increased wages, etc.? If yes, indicate the type of delay, the percent of budget increase attributed to the delay, the number of days delayed, and provide an explanation.									
Type of Delay (select from dropdown)		Budget Increase (%)	# of Days Delayed	Explain					
1									
2									
3									
4									
5									
6									
7									
1 Are any of your investment plans currently on hold or pending until government funding is available?									
Explain									
2 Will investment plans receive foreign funding or incentives if U.S. funding is unavailable?									
Explain									
Comments									

Dropdown:
 - Analog ICs
 - Microcontroller and Microprocessor ICs
 - Logic ICs
 - Memory ICs
 - Discretes
 - Optoelectronics
 - Sensors & Actuators
 - PCBs
 - Equipment/Tooling
 - Intermediate/End Product
 - Test and Design Verification
 - Assembly and/or Packaging

Dropdown:
 - Nanometer (nm)
 - Other metric (specify here)

Dropdown:
 - No access to Government Funding
 - Licensing issues
 - Labor shortages
 - Materials Shortage
 - Construction delays
 - Other (Specify Here)

Dropdown:
 - Yes
 - No

Dropdown:
 - Yes
 - No

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Section 11a: Joint Ventures and Partnerships

How many joint ventures does your organization currently participate in?

Identify your organization's current joint venture relationships, including public/private R&D partnerships. Explain the purpose of each joint venture (e.g. patent licensing, co-production, product integration, after-market support, etc.), as applicable.

Partner Organization/Entity Name	Country	Controlling Shareholder	Year Initiated	Primary Purpose of Relationship (select from dropdown)	Explain
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Has your organization had any actions blocked (or failed as a result of lack of government approval) or mandated by a government entity? Such actions might include mergers, acquisitions, joint ventures, partnerships, sales agreements, licensing agreements, etc.

If yes, identify the action(s) and government(s) involved.

Actions	Government Involved	Explain
1		
2		
3		
4		
5		

Has your organization received solicitations or requests for partnership from entities that are known/suspected of being state owned or affiliated with foreign government?

If yes, identify each entity and the foreign government, then provide an explanation.

Entity Name	Foreign Government	Explain
1		
2		
3		
4		
5		

Has your organization felt coerced to share technology with a JV partner or government?

If yes, provide the following information for each instance your organization felt coerced to share technology.

Entity Name	Type of Technology	Description	Did the transfer occur?	Method of Transfer	Country (if applicable)	Estimated Value (USD) of the transferred technology
1						
2						
3						
4						
5						

Does your organization currently participate in any semiconductor industry consortia? If yes, please provide an explanation.

Explain

Does your organization currently participate in any Cooperative Research or Production Agreements? If yes, please provide an explanation.

Explain

Comments

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Dropdown:

- Access to financial resources
- Access to government contracts
- Access to Intellectual Property
- Access to suppliers or reduced lead times
- Broaden customer base
- Creation of new technologies or product improvements
- Develop new capabilities
- Improved access to foreign markets (required)
- Improved access to foreign markets (voluntary)
- Improved access to U.S. markets
- Other objective/purpose (Explain)
- Overcome market entry barrier/Geopolitical concerns
- R&D access/coordination
- Reduce Costs
- Risk sharing
- Shared/improved technology or skills
- Tax-related
- Vertical integration

Dropdown:

- Yes
- No

Dropdown:

- Yes
- No

Dropdown:

- Yes
- No

Dropdown:

- Yes
- No

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Section 11b: Technology Transfers						
Has your organization lost control of its IP to any entity whose primary beneficiary your organization knows or suspects is a foreign government or is affiliated with a foreign government or is otherwise state-controlled?						
If yes, identify the most recent entities of such transfers, the beneficiary country, the primary method of transfer, the type of IP, and provide an explanation.						
	Entity Name	Beneficiary Country	Primary Method of Transfer	Type of IP	Explain	
A	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10					
Has your organization experienced any unauthorized transfers of its microelectronics-related design and manufacturing intellectual property, including trade secrets or confidential business information, from 2017 to present?						
Indicate the methods by which unauthorized transfers of your organization's microelectronics-related design and manufacturing intellectual property, including trade secrets or confidential business information, occurred from 2017 to present, the suspected location of the perpetrator(s), the type of IP, trade secrets or confidential business information that was transferred, and explain.						
	Method	Suspected Country	Suspected Perpetrator if Known	Type of IP/ TradeSecrets/ Confidential Business Information	Explain	
B	Cybersecurity intrusions					
	Planting staff in your organization					
	Physical break-ins at organization facilities					
	Business partners					
	Dumpster diving					
	Current employees (other than persons performing R&D within your organization)					
	Former employees					
	External IT system contractors					
	Persons performing R&D within your organization					
	Organization campus Wi-Fi network interceptions					
	Disclosure by outside industry analysts/experts					
	Disclosure by your bankers/financiers					
	Disclosure by contractors and suppliers					
	Violation of Non-Disclosure Agreements (NDAs)					
	Insertion of vulnerabilities in the supply chain					
	Compromised managed service provider					
	Phishing/spear-phishing					
	Other	(Specify Here)				
	Comments					
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Dropdown:
- Yes
- No

Dropdown:
- Licensing intellectual property
- Joint ventures
- Research collaborations
- Participation in scientific/technical conferences
- Information provided to potential investors
- Non-Disclosure Agreements (NDAs)
- Other (Specify Here)

Dropdown:
- Design
- Manufacture
- Both

Dropdown:
- Yes
- No

Dropdown:
- Design
- Manufacture
- Both

[Previous Page](#)[Next Page](#)**Section 12: Competitive Factors****Estimate** the current percentage of cost of sales by process step, as well as the breakout of the percentage of cost of sales carried out or sourced (a) in the U.S. and (b) outside of the U.S.

Process Step	Percent (%) of Cost of Sales	Percent (%) Carried out or sourced in U.S.	Percent (%) Carried out or sourced outside U.S.	Explain
1 Direct Labor				
a Design Labor				
b Front-End Manufacturing Labor				
c Back-End Manufacturing Labor				
2 Core IP				
3 Fabrication as a Service (Foundry Services)				
4 Material Inputs				
5 Processed Inputs				
6 Energy				
7 Water				
8 Test and Verification				
9 Assembly and/or Packaging				
10 Transportation				
11 Other				

For each of the following factors, indicate whether locating the factor inside the U.S. or outside the U.S. provides the greater competitive advantage. Next, rank your organization's top five factors (1 being the most important; 2 being the next most important, etc.) when deciding on a location to invest on the expansion or construction of facilities, and explain.

Factor	Location with Greatest Advantage	Country with Greatest Advantage	Rank	Explain
Labor Cost				
Labor Availability				
Labor Quality				
Material Cost				
Material Availability				
Material Quality				
Equipment Cost				
Equipment Availability				
Equipment Quality				
R&D Cost				
R&D Quality				
Energy Reliability				
Environmental Compliance Cost				
Export Control Compliance Cost				
Export Control Policies				
Energy Cost				
Renewable Energy Accessibility				
Construction Time				
Construction Cost				
Proximity to Customers				
Tax Costs				
Government Incentives				
Collaboration Benefits				
Ability to Protect IP				
Other	(specify here)			
Other	(specify here)			

Comments

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Dropdown:

- U.S.
- Non-U.S
- Neither

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Section 13: Long Term Development and Investment			
What factors do you consider when investing on the expansion or construction of facilities? Please list the decision making factors by importance.			
Deciding Factor		Explanation	
A	1		
	2		
	3		
	4		
	5		
Which value chain segments are most in need of government incentives and/or financial intervention? (List up to the 3 by order of importance).			
Value Chain Segment (select from dropdown)		Explanation	
	1		
	2		
	3		
1 Are there any regulations preventing your organization from constructing, expanding or modernizing any facilities in the U.S.? If yes, provide an explanation.			
2 What can the U.S. government do to promote higher investment of microelectronics manufacturing in the United States?			
3 What can help your organization's coordination with local economic development organizations to help facilitate investment?			
4 How can the United States government help facilitate the long-term competitiveness of your organization?			
B	5 What other economic clusters should the United States Government invest in to help strengthen the semiconductor industry? For example, AI, etc. How could these investments benefit your company?		
	6 How could the United States Government stimulate R&D partnerships within the semiconductor fields and related sectors such as metals, materials, etc at research universities, etc to help with R&D?		
	7 What are the most important emerging technologies that your organization is currently exploring or developing?		
8 What are the most important emerging technologies for the microelectronics industry as a whole?			
9 What are the main obstacles to introducing emerging technologies into broad-scale manufacturing? Are those obstacles larger or smaller in the United States? How and why?			
Comments			
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Dropdown:

- Core IP
- Electronic Design Automation (EDA)
- Design
- Test and Verification
- Front-End Manufacturing
- Assembly and/or Packaging
- Equipment and Tooling
- Materials and/or Components
- EMS/PCB Assembly
- R&D
- Distribution/Warehousing
- Other

Dropdown:

- Yes
- No

[Previous Page](#)[Next Page](#)**Section 14: Challenges**

Identify the issues that have impacted your organization between 2017 to present and the issues that you anticipate will impact your organization between 2023 and 2027. Then, rank your organization's top five issues for both time frames (1 being the most important issue; 2 being the next most important issue, etc.) and explain the affirmative issues where examples and narrative will aid the U.S. Government's understanding of your concerns. Then, provide any suggestions for ways the U.S. Government can help mitigate the issue, if applicable. Explanations and suggested solutions are helpful but not required.

Type of Issue	2017 to 2022		2023 to 2027		Explanation of Issue	Suggested USG Solution/Mitigation
	-Yes/No-	Rank	-Yes/No-	Rank		
Aging equipment, facilities, or infrastructure						
Aging workforce						
Competition - domestic						
Competition - foreign						
Counterfeit parts						
Cyber security						
Environmental regulations/remediation						
Export controls/ITAR & EAR						
Financing/credit availability						
Government acquisition process						
Government purchasing volatility						
Government regulatory burden						
A Healthcare						
Industrial espionage - domestic						
Industrial espionage - foreign						
Input availability (e.g. materials)						
Input quality						
Intellectual property/patent infringement						
Labor availability/costs						
Lack of infrastructure						
Lack of public R&D partnerships (e.g. universities)						
Natural disasters (including disease/quarantine)						
Obsolescence						
Pension costs						
Proximity to customers						
Proximity to suppliers						
Qualifications/certifications						
R&D costs						
Reduction in USG demand						
Taxes						
Trade disputes						
Worker/skills retention						
Other (specify here)						
Other (specify here)						
Other (specify here)						
Comments						

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[Previous Page](#)[Next Page](#)**Section 15: Certification**

The undersigned certifies that the information herein supplied in response to this questionnaire is complete and correct to the best of his/her knowledge. It is a criminal offense to willfully make a false statement or representation to any department or agency of the United States Government as to any matter within its jurisdiction (18 U.S.C. 1001 (1984 & SUPP. 1197))

Once this survey is complete, first save it to your computer, and then submit the document via [instructions TBA].

Organization Name	
Organization's Internet Address	
Name of Authorizing Official	
Title of Authorizing Official	
E-mail Address	
Phone Number and Extension	
Date Certified	

In the box below, provide any additional comments or any other information you wish to include regarding this survey assessment.

--

How many hours did it take to complete this survey?	
---	--

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Definitions	
Term	
General Purpose Analog	General Purpose Analog is sub-divided into specific functional subcategories of Amplifiers/Comparators (Signal Conditioning), Signal Conversion, Interface, and Power Management ICs. These subcategories are defined in terms of functionality instead of a specific circuit type. A device should be classified into one of the following subcategories depending on its primary or dominant function, regardless of the mix of circuitry used in the device.
Interface	General Purpose Analog ICs whose primary or dominant function is to modify or shape the signal in order to ensure signal integrity for transmission over a distance through a physical medium such as a wire, cable, waveguide, or tracks within a printed circuit board. These include devices which shape the signal for transmission over the medium or which reconstructs the received signal after transmission to recover the intended signal integrity. A device may be classified into this category if at least one of the following is true; the signal at the input of the device is analog in nature, or the signal at the output of the device is analog in nature. An analog signal is defined as a signal which is continuously varying in voltage or current over time, and is not a digital signal with discrete levels.
Power Management	General Purpose Analog ICs whose primary or dominant function is to convert, control or distribute DC power. This category includes devices which convert a source voltage into another voltage which can be used for powering other integrated circuits and which include a management capability to control the output voltage. AC to DC power conversion should be included in this category. General purpose LED drivers are classified into the appropriate Regulator category. Only products which are integrated circuits should be classified in this Power Management category. Discrete devices such as transformers, bridges and inductors used for power conversion should be classified into one of Discrete categories A-E. Power management ICs designed for use in a specific end application should be classified into the appropriate Application Specific Analog category of JB-JF.
Signal Conversion	General Purpose Analog ICs whose primary or dominant function is to convert the signal from one form to another for further processing by other ICs including digital ICs such as a microprocessor or FPGA. The signal before or after conversion should be analog. These include general purpose devices whose primary function is Analog-to-Digital conversion, Digital-to-Analog conversion, and Voltage-to-Frequency conversion. Discrete sample-and-hold circuits are part of this category. However, this function is generally integrated into the signal conversion circuit. Analog switches and multiplexers which are often used with the above converters are included in this category.
Amplifiers/Comparators	General Purpose Analog ICs whose primary or dominant function is to condition or modify the incoming Analog signal to enhance it for further processing such as signal conversion or interfacing. This category includes devices which provide functions such as signal filtering, signal amplification, level shifting, buffering or comparison. Current sense amplifiers and trans-impedance amplifiers are included in this category.
Application Specific Analog	Among all analog circuits according to the general definition (see the first paragraph of 3.4.1. Analog), this category includes those, which are uniquely designed for a specific application and fall in one of the following categories from JB to JF. These circuits may be customer specific or catalog products for multiple customers sharing the same application. They may be based on any technology and on any methodology of design.
Consumer	Application Specific Analog ICs designed specifically for and used in consumer applications / end equipment. Consumer end equipment is defined as those which are intended for personal or home use, is usable by all demographics, and are generally used for entertainment, capturing/storing of images and audio/video for personal consumption, and for home convenience. They are generally designed for use in the home but are increasingly becoming more and more portable. Included in this category are Digital TVs (DTV), Digital Still Cameras, MP3 players, DVD players, Set Top Boxes (STB), Game Consoles, Hi-Fi Audio/Video products, Home Entertainment Systems and White Goods.
Computer	Application Specific Analog ICs designed for and used in Computing and Computer applications including computer peripherals. ICs in this category are reported into the following subcategories based on the function for which they are designed.
Communications	Application Specific Analog ICs designed for and used in non-military voice and data communications end equipment and infrastructure. ICs under this category shall be classified into one of the following subcategories depending on the application for which they are designed.
Automotive	Application Specific Analog ICs designed for and used in Automotive end equipment.
Industrial & Others	Application Specific Analog ICs designed for and used in Industrial end equipment as defined below, or other applications not specified in JB-JE above. ICs containing semiconductor sensor elements together with analog circuitry shall be classified into the appropriate category in H99-Sensors, irrespective of the analog content and functions of the circuit.
Diodes	General-purpose signal and switching diodes (rated less than 0.5 AMP), zener diodes, transient protection diodes and RF & microwave diodes.
Small Signal and Switching Transistors	Transistors with a power dissipation of less than 1W (the power dissipation represents, for lead mounted types, the rating at 25 degrees C free air or ambient temperature and, for chassis mounted types, the rating at 25 degrees C case temperature). This category includes all RF and microwave small signal transistors, dual transistors, field effect transistors and all generalpurpose bipolar small signal transistors.
Power Transistors	Transistors with a power dissipation of 1W or more (the power dissipation represents, for lead mounted types, the rating at 25 degrees C free air or ambient temperature; and, for chassis mounted types, the rating at 25 degrees C case temperature). This category includes RF and microwave power transistors, bipolar general purpose power transistors, field effect general purpose power transistors, insulated gate bipolar transistors (IGBT), Darlington power transistors, multiple chip devices which behave as a single chip device except for higher current and power rating, and modules assembled from these transistors.
Rectifiers	Includes all discrete rectifiers (rated at 0.5 AMPS average or greater) and assemblies/modules composed thereof.
Thyristors	Includes all unidirectional and bi-directional thyristors and assemblies/modules composed primarily thereof.
All Other Discrete	Includes varactor tuning diodes, selenium rectifiers and other polycrystalline devices, and any other discrete semiconductor device not specifically listed above.
Digital Bipolar	Includes all digital logic and memory product that is made with bipolar integrated circuitry technology (TTL, ECL, DTL, IIL, RTL, etc.). Included are general purpose logic (including CML, ECL, EPL, TTL Schottky, Advance Schottky, Standard TTL and other bipolar logic devices), Gate Array, Standard Cell, bipolar memory and all other bipolar logic circuits (such as FPL, MPU, MCU, micro peripherals, etc.).
MOS General Purpose Logic	Devices in this classification are standard commodity catalog products, usually simple gates, flip-flop circuits and registers. These are used in a wide range of equipment for applications in various market segments. Excluded are catalog products of any programmable device or any Special Purpose Application Specific (ASIC) device.
MOS Gate Arrays	Devices in this classification are logic circuits consisting of fixed and regular arrangement of transistor cells forming a matrix of logic gates of various standard densities. These devices are Customer Specific Integrated Circuits (CSIC) whose design is controlled by customer and are usually proprietary to a specific customer. The manufacturer provides a standard library of logic gates and provides the necessary design tools needed to generate a final metallization interconnect mask set.
MOS Standard Cells	Standard Cells are circuits consisting of a user-specified arrangement of predefined and fixed sub-circuits of any function (analog, logic or memory, etc.).
MOS Display Drivers	Devices specifically designed to control and drive flat panel displays such as LCD (liquid crystal display), PDP (plasma display panels), etc.

MOS Touch Screen Controllers	Controller devices which accompany touch screen displays and are capable of determining the location of single or multi-touch gestures, styli and gloves, using capacitive, resistive or other sensing technologies. These devices are used for interfacing with user's touches on screen displays, i.e. the technology typically prevalent in gaming consoles, media tablets, smartphones, notebook PCs, PDAs, satellite navigation devices, digital still cameras (DSC), etc. Touch screen controllers designed based on any technology, such as firmware, MCU, or logic circuits, should be reported into this category L4, even though they may have been reported into other categories, such as P5 General MCU, L7a Wireless Communication, Cellular Phone (under LA MOS Special Purpose Logic), etc.
Consumer	MOS logic ICs designed specifically for use in consumer equipment such as entertainment, radio, TV, HDTV, Set Top Box, VCR, DVD Player, personal or home appliance, camera, game, etc.
Computer & Peripherals	MOS ICs designed specifically for use in computer equipment or computer peripherals. Application specific ICs designed specifically for use in (a) computer systems, (b) rotating computer magnetic and optical disk storage or tape mass storage media (c) other computer periphery applications (e.g., such as printers, scanners, monitors, keyboards, mice, etc.) are reported in this category.
Communication	MOS ICs designed specifically for voice or data communications applications. These applications include telecommunication network products such as switching equipment, multiplexing equipment, repeaters and line-conditioning equipment; customer premise equipment such as Centrex, key systems, PBX; personal communications products (telephone sets including wireless/cellular), modems, facsimile and answering machines, and tablets. ICs in this category are reported into the following subcategories based on the function for which they are designed.
Automotive	ICs designed specifically for use in auto entertainment, navigation, driver information, engine controls and all other automotive applications.
MOS Special Purpose Logic	The devices in this category are either (i) Application Specific Standard Products (ASSP) designed by semiconductor manufacturer or (ii) Customer Specific Integrated Circuits (CSIC) designed by the customer, all of which are specifically designed for one of the application segments listed below. In addition to logic circuitry, these ICs may include other functions such as analog, micro or memory, and all or part of the circuitry of the products may be based on multiple cores, Gate Array technology, Standard Cell technology, FPL technology, or any combination thereof. Touch Screen Controller devices shall be reported to L4 MOS Touch Screen Controller, including ASSP and CSIC, and those based on any technology.
Multipurpose & Other	ICs designed for multiple applications or for industrial, instrument, military or other applications
MOS DRAM	Dynamic Random Access Memory devices in which bit words (1 bit or longer word length) can be written, stored and read randomly in any desired sequence. The memory information is volatile and is lost when the power supply voltage is removed
Other Memory	Electrically Erasable PROMs (except Flash Memory) and all other MOS Memory devices not defined in M1, M2, M8 and M7. Specifically includes serial FIFOs and LIFOs as well as EAPROM (Electrically Alterable ROM) and NOVRAM (Non Volatile RAM). Devices in this category are reported into the following subcategories based on the function for which they are designed
MOS SRAM	Static Random Access Memory devices are similar to DRAMs except that SRAMs are based on a minimum four transistor memory cell which is configured into a flip-flop circuit. Some SRAMs do not need to have the memory cells refreshed since the bit information is represented by a steady state current in one side of the flip-flop and no current in the other, however "Pseudo SRAMs" have a built-in oscillator which enables self refreshment. Pseudo SRAMs hence behave as a DRAM but are included in M2 for reporting purposes.
MOS Mask PROM & EPROM	<u>Mask Programmable Read Only Memory</u> are non-volatile circuits which have single transistor memory cells that are locked on or off in a pre-determined pattern by means of a masking procedure during the fabrication process. <u>EPROM</u> - Electrically Programmable Read Only Memory devices are non-volatile circuits similar to Mask PROMs except that the memory data pattern is programmed by electrical means rather than a fixed mask. Included are OTP, One Time Programmable devices, from which the programmed memory data pattern is not erasable. EPROMs other than OTPs have a window in the package whereby the programmed memory data pattern may be erased using ultra-violet light and then electrically reprogrammed.
NOR Flash Memory	A type of EEPROM (Electrically Erasable and Programmable Read Only Memory) in which the memory data is electrically erased by large arrays of bits rather than by fractions such as bit by bit, classified in the following subcategories: 2M Bit & less - NOR-Type Flash Memory containing up to and including 2 megabits of memory. 4M Bit & less (>2M) – NOR-Type Flash Memory containing more than 2 megabits and up to and including 4 megabits of memory. 8M Bit & less (>4M) – NOR-Type Flash Memory containing more than 4 megabits and up to and including 8 megabits of memory. 16 M Bit & less (>8M) – NOR-Type Flash Memory containing more than 8 megabits and up to and including 16 megabits of memory. 32 M Bit & less (>16M) – NOR-Type Flash Memory containing more than 16 megabits and up to and including 32 megabits of memory. 64 M Bit & less (>32M) – NOR-Type Flash Memory containing more than 32 megabits and up to and including 64 megabits of memory. 128 M Bit & less (>64M) – NOR-Type Flash Memory containing more than 64 megabits and up to and including 128 megabits of memory. Greater than 128 M Bit – NOR-Type Flash Memory containing more than 128 megabits of memory.
NAND Flash Memory	bits rather than by fractions such as bit by bit, classified in the following subcategories: 512 M Bit & less – NAND-Type Flash Memory containing up to and including 512 megabits of memory 1 G Bit & less (>512M) – NAND-Type Flash Memory containing more than 512 megabits and up to and including 1 gigabits of memory 2 G Bit & less (>1G) – NAND-Type Flash Memory containing more than 1 gigabits and up to and including 2 gigabits of memory 4 G Bit & less (>2G) – NAND-Type Flash Memory containing more than 2 gigabits and up to and including 4 gigabits of memory 8 G Bit & less (>4G) – NAND-Type Flash Memory containing more than 4 gigabits and up to and including 8 gigabits of memory 16 G Bit & less (>8G) – NAND-Type Flash Memory containing more than 8 gigabits and up to and including 16 gigabits of memory 32 G Bit & less (>16G) – NAND-Type Flash Memory containing more than 16 gigabits and up to and including 32 gigabits of memory 64 G Bit & less (>32G) – NAND-Type Flash Memory containing more than 32 gigabits and up to and including 64 gigabits of memory Greater than 64 G Bit – NAND-Type Flash Memory containing more than 64 gigabits of memory

MOS MPU	The MPU category includes ICs which execute external instructions and perform system control functions as programmed via software with the assembly language instructions retrieved from external memory with data read from and written to external RAM devices to perform system functions. This set up allows the MPU to receive a variety of input commands, manipulate data, direct storage of data and initiate application commands to the outside world. The most common usage is in Multi-Task Computer systems such as PCs. The ICs in this category include Complex Instruction Set Computers (CISC) and Reduced Instruction Set Computers (RISC). The architecture is optimized for general-purpose data processing and includes an instruction decoder, arithmetic logic unit, registers and additional logic to support operation per an assembly language. There is no addressable ROM or RAM within the device, but may include dedicated registers, ROM for micro code and/or on-chip cache.
MOS MCU	These ICs are stand-alone devices, which perform dedicated or embedded computer functions within an overall electronic system without the need of other support circuits. Like microprocessors these include an instruction decoder, arithmetic logic unit, registers and support logic (UARTs, Counter Timers, Comparators, etc.). Unlike microprocessors, MCUs contain some form of ROM, EPROM or Flash Memory, which are programmed to store customer-supplied instructions. The MCU also incorporates read-write memory (RAM) for temporary storage. The embedded instructions cause the MCU to perform pre-determined tasks such as controlling functions in TV, VCR, microwave ovens and automobile engines. In more complex applications the device may need peripheral logic devices or external memory but for simple tasks the device is self-sufficient.
General Purpose MCU	All MCUs including those designed for specific applications and general purposes, other than Smart Cards (i.e. IC cards).
Automotive MCU	MCUs designed for application in automotive entertainment, navigation, driver information, engine controls and all other automotive applications. Automotive MCUs are classified into (I) P5x Infotainment (Information & Entertainment Systems) and (II) P5y Other Automotive
Smart Card MCU	MCUs specifically designed for use in Smart Cards (i.e. IC cards). Total of the Smart Card MCU is classified into the following three (3) sets of subcategories, i.e. (i) by Data Bus, (ii) by Application, and (iii) by Interface.
MOS DSP	Unlike other processors, which usually are embedded in some digital Microcomputer system, DSPs are most commonly used in analog systems to process real time data. Such systems require conversion of the analog signals to digital and hence the systems need A-D and DA converters, which may be integrated on the chip of the DSP used in such systems. The DSPs use parallel multipliers with separate program and data areas (Harvard type architecture), which provide very high-speed performance required in "Sum-of-Product" operations.
Displays	Single or Multiple Digit character displays are reported as complete assemblies.
Light Sensors	Monolithic and assembled modules that detect presence of light and change it into electrical voltages or currents. Such devices include discrete and combo sensors, such as Ambient Light Sensors (ALS), Proximity Sensors (including IR LED Emitter in a same package), Color Sensors (RGB), Ultraviolet Sensors, Heart Rate Sensors, etc.
Lamps	Discrete solid-state light source (visible only) of any size, shape, color and light intensity.
Opto Couplers & Isolators	The device consisting of optical emitting die (mostly infrared) and a silicon detector which is optically coupled with the emitter. The device may be a phototransistor, opto triac or opto IC, integrated into a single package. Coupling devices are designed for signal transmission between two electrically separated circuits. Isolators perform galvanic and electrical isolation between input and output circuitry by using isolating material. The change of the output signal is driven by the change of the input signal. These devices are primarily used to protect the microcontroller from interferences from the power side of the circuitry, in such applications as power supplies, line receivers, computer interfaces, etc.
Optical Switches	Transmissive switches include an emitting die (mostly infrared) and a detector located on the opposite side of the optical axes in a single package, and the light path is broken or modified by an external physical object. Transmissive switches are used for small distances and narrow objects. Reflective switches have the emitter positioned next to the detector, and the signal transmission goes by reflection of a dedicated media. Reflective switches are used for a wide range of distances and objects of different shapes. Interrupters convert mechanical movements into electrical signals. With these devices, the change of the output signal is made by interrupt or reflection of an infrared beam with a media.
CCD & Other Image Sensors	CCD and all Image Sensors not included under F5b below.
CMOS Image Sensors	Image sensors in CMOS technology including ancillary analog and/or digital circuit functions on the same chip.
Other Optoelectronics	All other optoelectronics devices not specifically listed above, including fiber optic components and solar cells.
Infrared	Infrared emitters and all detectors. Includes both discrete devices and assembled modules.
Laser Pickup	Devices generating coherent radiation whose wavelength is generally 0.8um and less, mainly used for optical disk drives.
Laser Transmitter	Devices generating coherent radiation whose wavelength is generally greater than 0.8um, mainly used for optical communications.
Temperature & Other Sensors	All devices for measurement of temperature in gases, liquids or solids, and all other non-optical sensors not included in H2, H3, H4 and H6.
Pressure Sensors	All devices for direct measurement of pressure.
Acceleration & Yaw Rate Sensors	All devices for direct measurement of acceleration and yaw rate or spin rate.
Magnetic Field Sensors	All devices for measuring any kind of magnetic field
Actuators	Devices with the primary purpose to translate electrical signals into physical actions. These devices may also contain complex digital and/or analog circuitry that controls the specific actions. This includes, but is not limited to, ink jet nozzles, micro mirrors, solid-state relays, and SAW filters
Applied Research	A systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met. This activity includes work leading to the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes.
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.
Bare Printed Circuit Board	A completed, tested circuit board ready to be populated with components to create a working system.
Basic Research	A systematic, scientific study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts.
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.
Capital Expenditures	Investments made by an organization in buildings, equipment, property, and systems where the expense is depreciated. This does not include expenditures for consumable materials, other operating expenses, and salaries associated with normal business operations.
Commercial and Government Entity (CAGE) Code	A unique identifier for companies doing or seeking to do business with the U.S. Federal Government. The code supports mechanized government systems and provides a standardized method of identifying a given facility at a specific location. Find CAGE codes at https://cage.dia.mil/search/ .
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.

Cybersecurity	The body of technologies, processes, and practices designed to protect networks, computers, programs, and data from attack, damage, or unauthorized access.
Data Universal Numbering System (DUNS)	A nine-digit numbering system that uniquely identifies an individual business. Find DUNS codes at http://fedgov.dnb.com/webform .
Development	The design, simulation, and testing of a prototype, including experimental software or hardware systems, to validate technological feasibility or concept of operation in order to reduce technological risk, or provide test systems prior to production approval.
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.
Export Controls	1) Regulations administered by the Bureau of Industry and Security (BIS), U.S. Department of Commerce governing the export of dual-use technologies; 2) International Traffic in Arms Regulations (ITAR) administered by the U.S. Department of State governing products and services provided specifically for defense applications.
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.
Full Time Equivalent (FTE) Employees	Employees who work for 40 hours in a normal work week. Convert part-time employees into "full time equivalents" by taking their work hours as a fraction of 40 hours.
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.
North American Industry Classification System (NAICS) Code	A unique identifier for the category of product(s) or service(s) provided by an organization. Find NAICS codes at http://www.census.gov/ipeds/www/naics.html
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.
Research and Development	Basic and applied research in the engineering sciences, as well as design and development of prototype products and processes.
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.
BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act	