

DEFENSE INDUSTRIAL BASE ASSESSMENT: U.S. INTEGRATED CIRCUIT DESIGN AND MANUFACTURING INDUSTRY**SCOPE OF ASSESSMENT**

The U.S. Department of Commerce (DOC), Bureau of Industry and Security (BIS), Office of Technology Evaluation, is conducting a survey and assessment of the health and competitiveness of the design and manufacturing industry for Integrated Circuit products in the United States. The assessment, requested by the DOC's International Trade Administration, updates and expands a similar BIS assessment conducted in 2009. This survey covers topics including employment, design and manufacturing capabilities, customers, supply chain, financial information, research and development, and future industrial challenges. The resulting aggregate data and subsequent analysis will allow the Integrated Circuit design and manufacturing industry and government policy officials to monitor trends, benchmark industry performance, and raise awareness of potential issues of concern.

RESPONSE TO THIS SURVEY IS REQUIRED BY LAW

A response to this survey is required by law (50 U.S.C. App. Sec. 2155). 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 Information furnished herewith is deemed confidential and will not be published or disclosed except in accordance with Section 705 of the Defense Production Act of 1950, as amended (50 U.S.C App. Sec. 2155). 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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Section III: General Instructions

- A. Your organization is required to complete this survey of the U.S. Integrated Circuit design and manufacturing industry using an Excel template, which can be downloaded from the BIS website: <http://bis.doc.gov/chipsurvey>
- If you are not able to download the survey document, at your request, BIS staff will e-mail 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 the requested Excel format.
- B. 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 cell provided, even if the cell does not appear to expand to fit all of the information.
- DO NOT CUT AND PASTE RESPONSES WITHIN THIS SURVEY.**
- Survey inputs should be completed by typing in responses or by using a drop-down menu. The use of cut and paste can corrupt the survey template. If your survey response is corrupted as a result of cut and paste responses, a new survey will be sent to your organization for immediate completion.
- C. **Do not disclose any classified information in this survey form.**
- D. Upon completion of the survey, final review, and certification, **transmit the survey document via e-mail to:** chipstudy@bis.doc.gov.
- E. Questions related to the survey should be directed to BIS survey support staff at chipstudy@bis.doc.gov
- E-mail is the preferred method of contact.
- You may also speak with a member of the BIS survey support staff by calling (202) 482-0377.
- F. For questions related to the overall scope of this Industrial Base assessment, contact chipstudy@bis.doc.gov or:
- Brad Botwin, Director, Industrial Studies
Office of Technology Evaluation, Room 1093
U.S. Department of Commerce
1401 Constitution Avenue, NW
Washington, DC 20230
- DO NOT submit completed surveys to Mr. Botwin's postal or personal e-mail address. All surveys must be submitted electronically to chipstudy@bis.doc.gov.

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Section IV: Definitions

Term	Definition
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.
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.
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.
Commodity Jurisdiction (CJ)	A formal determination of whether an item or service is subject to the export licensing authority of the Department of Commerce or the Department of State, Directorate of Defense Trade Controls (DDTC). The Bureau of Industry and Security (BIS) is the licensing agency for exports subject to the Export Administration Regulations (EAR), while DDTC licenses defense articles and services covered by the U.S. Munitions List (USML), subject to the International Traffic in Arms Regulations (ITAR). The commodity jurisdiction procedure is used if doubt exists as to whether an article is covered by the U.S. Munitions List. It may also be used for consideration of a redesignation of an article or service currently covered by the U.S. Munitions List. A CJ determination will only identify the proper licensing authority for an item and is not a license or an approval to export. CJ requests are processed by DDTC under procedures established by that office (see 22CFR 120.3 and 120.4). For specific filing procedures, contact DDTC at (202) 663-1282 or access further information at: http://www.pmddtc.state.gov/commodity_jurisdiction/index.html .
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.dla.mil/search/ .
Commercially Sensitive Information (CSI)	Privileged or proprietary information which, if compromised through alteration, corruption, loss, misuse, or unauthorized disclosure, could cause serious harm to the organization owning it. This includes customer/client information, financial information and records, human resource information, intellectual property information, internal communications, manufacturing and production line information, patent and trademark information, research and development information, regulatory/compliance information, and supplier/supply chain information.
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.

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.
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.
Harmonized Tariff Schedule (HTS)	The Harmonized Tariff Schedule (HTS) is the statute used to determine tariff classifications for goods imported into the United States. It is maintained and published by the United States International Trade Commission. The HTS is based on the International Harmonized System.
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.
Minority Carrier Device	A device in which current is conducted by charge carriers of sign (positive or negative) opposite to the dopant polarity of the underlying semiconductor material. In other words, current carried by electrons (negative) in a p-type semiconductor, or by holes in an n-type semiconductor. In semiconductors, minority charge carriers are less abundant than majority charge carriers. Minority carrier devices include: Bipolar junction transistors, charge-coupled devices (CCDs), and solar cells.
Neutron Hardened	Integrated circuit products incorporating design features and/or physical characteristics that can withstand the damaging effects of high-speed neutrons, gamma rays, and electromagnetic pulses that accompany a nuclear weapons detonation. Most CMOS technologies are inherently neutron hardened without any specific effort on the part of an ICs designer/manufacturer. For "minority carrier" IC devices that are affected by neutron-induced displacement damage, a level of 1×10^{14} n/cm ² (1MeV equivalent fluence) is the accepted standard.
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/epcd/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.

Radiation Hardened	Integrated circuit products incorporating design features and/or physical characteristics that demonstrate a capability to resist radiation-induced damage from industrial sources, electromagnetic pulses, weapons systems, and/or charged particles in space that can damage circuitry and render a device inoperable. Some IC devices may be considered radiation hardened when their total dose failure level exceeds >300 krad. A total dose failure level of 500 krad is the standard cited in International Traffic in Arms Regulations (ITAR).
Radiation Resistant	The ability of an organization to design or manufacture Integrated Circuit products that are classified as Conventional, Radiation Tolerant, Single-Event Effects Resistant, Radiation Hardened, or Neutron Hardened.
Radiation Tolerant	Integrated circuit products incorporating design features and/or physical characteristics with limited capability to resist radiation induced damage from industrial sources, electromagnetic pulses, industrial sources, weapons systems, and charged particles in space that can damage circuitry and render a device inoperable. Radiation tolerant covers parts having a total dose failure level >100 krad but less than 300 krad.
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-Event Effects (SEE) Resistant - Destructive	Resistant to effects caused by a single energetic particle striking an integrated circuit (IC) device. Performance of the IC device is not compromised to a point where it is inoperable or not reliable for executing a mission as a result of event latch-up, burnout, gate rupture, or snapback. (Immune to destructive SEEs up to an ion linear energy transfer (LET) of 80 MeV.cm 2/mg.)
Single-Event Effects (SEE) Resistant - Non-Destructive	Resistant to effects caused by a single energetic particle striking an integrated circuit (IC) device. Performance of the IC device is not compromised to a point where it is inoperable or not reliable for executing a mission as a result of event upset, transient, or functional interrupt. (Immune to non-destructive SEEs is at an LET of 30-40 MeV.cm 2/mg.)
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.
Trust	The confidence in one's ability to secure national security systems by assessing the integrity of the people and processes used to design, generate, manufacture, and distribute national security critical components.
Trusted Access Program	The Trusted Access Program was established to provide guaranteed access for the DoD and the Intelligence Community to trusted microelectronics technologies for their critical system needs now and into the future. An organization that operates a facility adhering to the standards of this program and that is certified by the Defense Microelectronics Activity is referred to as "Trusted".
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.

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Section 1a: Organization Reporting Level

If your organization has a single facility performing work related to Integrated Circuits, a single survey response is required. Please select Response Type A below and complete all sections of the survey.

If your organization has more than one facility performing work related to Integrated Circuits, a facility-level response is required for each facility (Sections 2 through 4 only), as well as an organization-level response (Section 1, and Sections 5 through 20) for each division or business unit that contains a facility performing work related to Integrated Circuits.

Please select below whether this response is a facility-level response (Response Type B) or an organization-level response (Response Type C).

If you have questions or your organization does not design or manufacture Integrated Circuits in the U.S., contact BIS survey staff at chipstudy@bis.doc.gov or 202-482-0377.

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ORGANIZATION LEVEL RESPONSE**Section 1b: Organization Reporting Level - continued**

Organization Name	
Street Address	
City	
A. State	
Zip Code	
Website	
Phone Number	

B. Does your organization have a parent company? If "Yes", provide details below:					
Parent Name		Parent City		Parent Country	
Parent Street Address		Parent State/Province		Parent Zip/Postal Code	

C. Identify the number of Integrated Circuit-related design, manufacturing*, and package, test and assembly facilities that your organization currently operates.	IC Activity		U.S. Facilities	Non-U.S. Facilities
	Design IC products			
	Manufacture IC products			
	Provide Package, Test and Assembly Services			

U.S. Facilities					
Identify the total number of your organization's Integrated Circuit-related design, manufacturing, and package, test and assembly U.S. facilities. Then list their name, city, state, DMEA certification, primary scope of work, and expected change from 2018-2022.					
Facility Name	City	State	DMEA Certified Trusted** Facility	Primary Scope of Work	Expected Change 2018-2022
D. If any of your U.S. facilities will be closing in 2018-2022 provide an explanation:					

Non-U.S. Facilities					
Identify the total number of your organization's Integrated Circuit-related design, manufacturing, and package, test and assembly non-U.S. facilities. Then list their name, city, country, DMEA certification, primary scope of work, and expected change from 2018-2022.					
Facility Name	City	Country	DMEA Certified Trusted** Facility	Primary Scope of Work	Expected Change 2018-2022

* See "Design Facility" and "Manufacturing Facility" on the Definitions tab for more information.

** "Trusted" refers to certification from the Defense Microelectronics Activity's Trusted Access Program to design or manufacture Integrated Circuit products.

Comments:	
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ORGANIZATION LEVEL RESPONSE

Section 1c: Organization Reporting Level - continued

A. Is your organization publicly traded or privately held?						
If your organization is privately held, list your top five shareholders:						
B.		Shareholder Name	Country of Origin/Incorporation			
	1					
	2					
	3					
	4					
	5					
Provide the following identification codes, as applicable, for your organization.						
C.	Data Universal Numbering System (DUNS) Code(s)		Harmonized Tariff Schedule (HTS) Code(s)		NAICS (6-digit) Code(s)	
	Find DUNS codes at:		Find HTS codes at:		Find NAICS codes at:	
	http://fedgov.dnb.com/webform		http://hts.usitc.gov		http://www.census.gov/eprd/www/naics.html	
Indicate if your organization qualifies as any of the following types of business:						
D.	A small business enterprise (as defined by the Small Business Administration)					
	8(a) Firm (as defined by the Small Business Administration)					
	A historically underutilized business zone (HUB Zone)					
	A minority-owned business					
	A woman-owned business					
	A veteran-owned or service-disabled veteran owned business					
Indicate which industry sectors your organization provides IC-related design and/or manufacturing services in the United States:						
E.	Aerospace		Healthcare			
	Automotive		Industrial			
	Communications		Marine (surface and underwater)			
	Computing/IT		Optical/Photonics			
	Construction/Infrastructure		Research and Development			
	Consumer Goods		Other	(specify here)		
	Electronics		Other	(specify here)		
	Energy		Other	(specify here)		
	Food/Agriculture		Other	(specify here)		
	Comments:					

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FACILITY LEVEL RESPONSE

Section 2a: Facility Information

This survey consists of sections that must be answered at the Organization Level and other sections that must be answered at the Facility Level. The reporting level will be specified at the top of each section as appropriate.

Provide the following information for your facility:

A.	Facility Name	
	Street Address	
	City	
	State	
	Zip Code	
	Phone Number	
	CAGE Code (if applicable)	

Identify the Integrated Circuit-related operations this facility performs, selecting "Primary Business Line" for one, and "Additional Business Line" as applicable.

B.	Design		Does this facility also serve as your organization's corporate headquarters?	
	Manufacturing			
	Packaging, Test and Assembly			
	Research and Development			

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

Technology Node				Semiconductor Material Type			
6,000 - 10,000		130 - <180		Amorphous Silicon		Gallium Nitride	
3,000 - <6,000		90 - <130		Bulk Silicon		Indium Phosphide	
1,500 - <3,000		65 - <90		Silicon on Insulator		Antimonides	
1,000 - <1,500		45 - <65		Silicon Germanium		Organic Technologies	
800 - <1,000		32 - <45		Silicon on Sapphire		Carbon Based Technologies (e.g. nanotubes)	
500 - <800		28 - <32		Silicon Carbide		Superconducting Materials	
350 - <500		14 - <28		Gallium Arsenide		Other	(specify here)
250 - <350		7 - <14					
180 - <250		<7					

List this facility's current and past Integrated Circuit design and manufacturing capabilities, interest in developing capabilities to support the U.S. Government, and market sectors supported. (See definitions page for explanations of capability types.)

D.	Radiation Resistance	Currently (in 2017) has Capabilities	Had Capabilities 2013-2016	Interested in Developing Capabilities for U.S. Government		Market Sectors Supported		
				Re-constituting Capacity	Initiating Capacity	Consumer/Commercial	Industrial	Defense/Space
	Conventional IC							
	Single-Event Effects Resistant - Destructive							
	Single-Event Effects Resistant - Non-Destructive							
	Radiation Tolerant							
	Radiation Hardened							
	Neutron Hardened							

Point of Contact regarding this survey:

E.	Name	Title	Phone Number	E-mail	State

Comments:

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FACILITY LEVEL RESPONSE

Section 2b: Integrated Circuit Design

You indicated no design capability at this facility in Section 2a, Part B. Please proceed to Section 2c.

Identify this facility's current Integrated Circuit-related design capabilities by radiation resistance and semiconductor material type. Select all that apply -- A blank response is counted as "No Capability".

Note: Cells may be shaded based on your responses in Section 2a to help guide your response.

Radiation Resistance	Semiconductor Material Type												
	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)	Super-conducting Materials
Conventional IC													
Single-Event Effects Resistant-Destructive													
Single-Event Effects Resistant-Non-Destructive													
Radiation Tolerant													
Radiation Hardened													
Neutron Hardened													

Capability to Design - by Technology Node & Material Type

Identify this facility's current Integrated Circuit-related design capabilities by technology node and semiconductor material type. Select all that apply -- A blank response is counted as "No Capability".

Minimum Technology Node Capability (nanometers)	Semiconductor Material Type												
	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)	Super-conducting Materials
6,000 - 10,000													
3,000 - <6,000													
1,500 - <3,000													
1,000 - <1,500													
800 - <1,000													
500 - <800													
350 - <500													
250 - <350													
180 - <250													
130 - <180													
90 - <130													
65 - <90													
45 - <65													
32 - <45													
28 - <32													
14 - <28													
7 - <14													
<7													

C. Do you plan to design Integrated Circuit products at a technology node below 7nm within the next five years?

Comments:

Note: 10,000 nanometers equals 10 micrometers.

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FACILITY LEVEL RESPONSE

Section 2c: Integrated Circuit Manufacturing

You indicated no manufacturing capability at this facility in Section 2a, Part B. Please proceed to Section 2d.

Identify this facility's current Integrated Circuit-related manufacturing capabilities by radiation resistance and semiconductor material type. Select all that apply -- A blank response is counted as "No Capability".

Note: Cells may be shaded based on your responses in Section 2a to help guide your response.

A. Radiation Resistance	Semiconductor Material Type												
	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)	Super-conducting Materials
Conventional IC													
Single-Event Effects Resistant-Destructive													
Single-Event Effects Resistant-Non-Destructive													
Radiation Tolerant													
Radiation Hardened													
Neutron Hardened													

Capability to Manufacture - by Technology Node, Wafer Size & Material Type

Identify this facility's current Integrated Circuit-related manufacturing capabilities by technology node, wafer size, and semiconductor material type. Select all that apply -- A blank response is counted as "No Capability".

Minimum Technology Node Capability (nanometers)	Wafer Size	Semiconductor Material Type												
		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)	Super-conducting Materials
6,000 - 10,000	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
3,000 - <6,000	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
1,500 - <3,000	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
1,000 - <1,500	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
800 - <1,000	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
500 - <800	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
350 - <500	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
250 - <350	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													

B.	180 - <250	12-inch																	
		2- or 3-inch																	
		4-inch																	
		6-inch																	
		8-inch																	
	12-inch																		
	130 - <180	2- or 3-inch																	
		4-inch																	
		6-inch																	
		8-inch																	
		12-inch																	
90 - <130	2- or 3-inch																		
	4-inch																		
	6-inch																		
	8-inch																		
	12-inch																		
65 - <90	2- or 3-inch																		
	4-inch																		
	6-inch																		
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	12-inch																		
45 - <65	2- or 3-inch																		
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	6-inch																		
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32 - <45	2- or 3-inch																		
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	8-inch																		
	12-inch																		

C. Do you plan to manufacture Integrated Circuit products at a technology node below 7nm within the next five years?

Comments:

Note: 10,000 nanometers equals 10 micrometers.

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

FACILITY LEVEL RESPONSE

Section 2d: Integrated Circuit Design & Manufacturing

Identify this facility's current Integrated Circuit design and/or manufacturing capabilities for each device type by radiation resistance and semiconductor material type. Select all that apply -- A blank response is counted as "No Capability".

Note: Cells may be shaded based on your responses in Section 2a to help guide your response.

Device Type	Capability to Design and/or Manufacture - by Device, Radiation Resistance & Material Type																		
	Radiation Resistance						Semiconductor Material Type												
	Conventional IC Products	Single-Event Effects Resistant - Destructive	Single-Event Effects Resistant -Non-Destructive	Radiation Tolerant	Radiation Hardened	Neutron Hardened	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)	Super-conducting Materials
Analog/Linear Technologies																			
Digital Logic Technologies																			
Digital Signal Processors																			
Field Programmable Gate Arrays																			
One-time, Electrically Programmable Gate Arrays																			
Mask Programmable Gate Arrays																			
Structured ASICs (a.k.a. Structured Arrays; Platform ASICs)																			
Standard Cell ASICs (a.k.a. cell-based ASICs)																			
Custom ASICs																			
3D/2.5 ASICs																			
System-on-Chip																			
Other Processors																			
Mixed Signal Technologies																			
Nonvolatile Memory																			
3-D Nonvolatile Memory																			
SRAM																			
DRAM - DDR3																			
DRAM - DDR4																			
IR-Focal Plane Arrays																			
Anti-Tamper Technology																			
Display Electronics																			
MEMS Technologies																			
Optical/Photonic Technologies																			
MMIC Technologies																			
Other RF Technologies																			
Other (specify here)																			
Comments:																			

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

FACILITY LEVEL RESPONSE

Section 2e: Integrated Circuit Design & Manufacturing - continued

Does this facility design or manufacture Nonvolatile Memory products? If no, proceed to Section 3.

Identify this facility's current Integrated Circuit design and/or manufacturing capabilities for each Nonvolatile Memory device type by memory density and access time. Select all that apply -- A blank response is counted as "No Capability".

Nonvolatile Memory Device Type (Stand-Alone)	Capability to Design and/or Manufacture Nonvolatile Memory - by Device, Density, Access Time																
	Memory Density								Access Time [Nano Seconds (ns), Pico Seconds [Ⓔ] (ps)]								
	<1 Mbit	1 - <16 Mbit	16 - <64 Mbit	64 - <256 Mbit	256 - <1024 Mbit	1 - <16 Gbit	16 - <64 Gbit	64 - <128 Gbit	≥128 Gbit	100 - 300ps	300 - <700ps	700ps - <1ns	1 - <10ns	10 - <20ns	20 - <50ns	50 - <150ns	≥150ns
Erasable Programmable Read-Only Memory (EPROM)																	
Electrically Erasable Programmable Read-Only Memory (EEPROM)																	
Flash - NOR*																	
Flash - NAND																	
Flash - NAND 3D†																	
Ferro Electric (FeRAM)																	
Magnetoresistive (MRAM)																	
MEMS-base (nanotube, NRAM)																	
Memristor‡																	
Phase Change Memory (PCM, a.k.a. PRAM)																	
Polymer																	
Storage Class Memory (e.g. RRAM)																	
Super Permanent Memory (XPM)																	
Zero Capacitor (ZRAM)																	
Other	(specify here)																
Other	(specify here)																

* NOR Flash memory is able to read individual flash memory cells, and as such it behaves like a traditional read-only memory (ROM).

† Nonvolatile random access memory that can be erased electronically and rewritten up to 100,000 times.

‡ A non-volatile memory technology that can change its resistance in varying levels. It can offer resistance in two states for a digital 0 or 1 or to levels in between to go beyond a binary system.

Ⓔ Pico second = 1 trillionth of a second.

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

FACILITY LEVEL RESPONSE

Section 3: Manufacturing Capabilities & Production Rates

You indicated no manufacturing capability at this facility in Section 2a, Part B. Please proceed to Section 4.

- 1) State the average manufacturing capacity utilization rates at this facility for 2013-2016.
- 2) State the maximum capacity of wafer starts per week at this facility in 2016.
- 3) State the actual average wafer starts per week at your facility in 2016.

A.	Average Manufacturing Capacity Utilization Rates				2016 Maximum Number of Wafer Starts Per Week*	2016 Average Actual Wafer Starts Per Week*
	2013	2014	2015	2016		

*Normalized to 8-inch wafer equivalents. Assumes 7-days-a-week operation.

Note: 100% utilization rate equals full operation with no downtime beyond that necessary for maintenance.

List this facility's current maximum Wafer Start capacity per week by technology node, wafer size and semiconductor material type. A blank response is counted as "No Capability".

Note: Cells may be shaded based on your responses in Section 2a to help guide your response.

Minimum Technology Node Capability (nanometers)	Wafer Size	Semiconductor Material Type												
		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)	Super-conducting Materials
6,000 - 10,000	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
3,000 - <6,000	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
1,500 - <3,000	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
1,000 - <1,500	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
800 - <1,000	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
500 - <800	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
350 - <500	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
250 - <350	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													
	12-inch													
B. 180 - <250	2- or 3-inch													
	4-inch													
	6-inch													
	8-inch													

	12-inch																		
130 - <180	2- or 3-inch																		
	4-inch																		
	6-inch																		
	8-inch																		
	12-inch																		
90 - <130	2- or 3-inch																		
	4-inch																		
	6-inch																		
	8-inch																		
	12-inch																		
65 - <90	2- or 3-inch																		
	4-inch																		
	6-inch																		
	8-inch																		
	12-inch																		
45 - <65	2- or 3-inch																		
	4-inch																		
	6-inch																		
	8-inch																		
	12-inch																		
32 - <45	2- or 3-inch																		
	4-inch																		
	6-inch																		
	8-inch																		
	12-inch																		
28 - <32	2- or 3-inch																		
	4-inch																		
	6-inch																		
	8-inch																		
	12-inch																		
14 - <28	2- or 3-inch																		
	4-inch																		
	6-inch																		
	8-inch																		
	12-inch																		
7 - <14	2- or 3-inch																		
	4-inch																		
	6-inch																		
	8-inch																		
	12-inch																		
<7	2- or 3-inch																		
	4-inch																		
	6-inch																		
	8-inch																		
	12-inch																		
Note: 10,000 nanometers equals 10 micrometers																			
Comments:																			
BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act																			

FACILITY LEVEL RESPONSE

Section 4: Employment

Record the total number of FTE employees and contractors at this facility for calendar years 2013-2016. Next, estimate the percentage of FTE employees and contractors who are U.S. and non-U.S. citizens. Do not double count personnel who may perform cross-operational roles.

Reporting Schedule:		2013	2014	2015	2016	
A.	1	FTE Employees				
	a	FTE Employees - U.S. Citizens (as a % of line 1)				
	b	FTE Employees - non-U.S. Citizens (as a % of line 1)				
2	FTE Contractors					
	a	FTE Contractors - U.S. Citizens (as a % of line 2)				
	b	FTE Contractors - non-U.S. Citizens (as a % of line 2)				

List the top five countries (other than the U.S.) from which your facility has non-U.S. citizen workers (employees or contractors), and identify the number of each type of visa or green card holder associated with each country.

Country	H-1B	H-2B	F-1	Green Card	O-1	Other

List the number of FTE employees (excluding contractors) located at this facility working in the positions listed below that support Integrated Circuit design and/or manufacturing. Personnel who perform cross-operational roles should be listed under each role they perform.

Blanks will be interpreted as meaning that there are no (zero) employees at this facility performing the listed job function.

Design Roles		Manufacturing Roles			
Occupational Category	Number of Employees	Occupational Category	Number of Employees	Occupational Category	Number of Employees
CAD Engineer		Automation Engineer		Manufacturing Manager	
Debug Engineer		Automation Technician		Manufacturing Technician	
Electronic Engineer		Engineering Manager		Planning/Procurement/Supply Chain	
Integration Engineer		Environmental Engineer		Process Engineer	
Layout Engineer		Equipment Engineer		Process Technician	
Mechanical Engineer		Facilities Engineer		Product Engineer	
Packaging Engineer		Facilities Technician		Reticle Engineer	
Post Silicon Validation Engineer		Factory Manager		Safety Engineer	
Pre Silicon Validation Engineer		Failure Analysis Engineer		Shift Manager	
Program Manager		Industrial Engineer		Statistician	
Quality Engineers		Integration Engineer		Yield Engineer	
Researcher		Other (specify here)		Other (specify here)	
RF/Analog Engineer		Other (specify here)		Other (specify here)	
Silicon Design Architect		Other (specify here)		Other (specify here)	
Thermal Engineer		Other (specify here)		Other (specify here)	
Other (specify here)		Other (specify here)		Other (specify here)	
Other (specify here)		Other (specify here)		Other (specify here)	
Other (specify here)		Other (specify here)		Other (specify here)	

D.	1	From the list of design and manufacturing occupations listed in Part C, indicate the top three for which your facility has the most vacancies:	
	2	From the list of design and manufacturing occupations listed in Part C, indicate the top three for which this facility has the most difficulty hiring:	
	3	Identify up to three key workforce issues that this facility anticipates from 2018-2022:	
	4	How many job vacancies does this facility currently have advertised?	
	5	What is the average age of the FTE employees at this facility?	
	6	What percentage of this facility's FTE employees do you expect to retire by 2022?	

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Please complete Section 1a to ensure consistent reporting.

ORGANIZATION LEVEL RESPONSE

Section 5: Mask Production & Capability

Does your organization currently have captive in-house Integrated Circuit mask-making capability at U.S. or non-U.S. facilities? If "No", proceed to Section 6.

A. Identify all technology nodes for which your organization currently produces binary and phase-shift masks in the United States and at non-U.S. facilities and indicate the type(s) of masks. Select all that apply -- A blank response is counted as "No Capability".

Mask Technology Node (Nanometers)																		
	10000 - 6000	<6000 - 3000	<3000 - 1500	<1500 - 1000	<1000 - 800	<800 - 500	<500 - 350	<350 - 250	<250 - 180	<180 - 130	<130 - 90	<90 - 65	<65 - 45	<45 - 32	<32 - 28	<28 - 14	<14 - 7	<7
Location(s)																		
Mask Type																		

B. Indicate the percentage of your organization's binary and phase-shift mask production that are fulfilled by captive in-house and external suppliers.

	Captive In-House		External Suppliers	
	U.S.	Non-U.S.	U.S.	Non-U.S.
Indicate the percentage of your organization's binary mask requirements that are fulfilled by mask production performed by:				
Indicate the percentage of your organization's phase-shift mask requirements that are fulfilled by mask production performed by:				

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 6: Performance of Production Steps – Wafer Processing & Die Packaging

You indicated no manufacturing capability at this facility in Section 1b, Part C. Please proceed to Section 7a.

1) Identify your organization's current Integrated Circuit wafer processing and wafer die packaging steps performed at its U.S. and/or non-U.S. facilities 2) Next, identify the country location(s) of the contractor(s) that your organization uses to perform wafer processing and die packaging activities at facilities outside the United States. Select all that apply -- A blank response is counted as "No Capability".

Wafer Processing and Die Packaging Steps	1					2		
	U.S.	Non-U.S.	Country/Countries of Organization-Owned Facilities			Non-U.S. Locations of Contractors		
			Country #1	Country #2	Country #3	Contractor Country #1	Contractor Country #2	Contractor Country #3
Wafer Thinning								
Backgrinding								
Other	(specify here)							
Wafer Dicing								
Saw Blade								
Laser Dicing								
Plasma Dicing								
Other	(specify here)							
Interconnects								
Wired Bonding								
Solder Bumping								
Stud Bumping								
Pillar								
Redistribution Layer Connects								
Other	(specify here)							
Circuit Bonding								
Direct Die Film (DDF) Attach								
Silver Glass Attach								
Leaded Solder Attach								
Gold Silicon Eutectic Attach								
Wafer-to-Wafer								
Other	(specify here)							
Substrate/Packaging								
Ceramic								
Organic								
Through Silicon Via								
Flexible								
Other	(specify here)							

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 7a: On-Die Input/Output Integrated Circuit Controller Devices & Enabling Firmware

For each of the Integrated Circuit on-die hardware protocol controllers and firmware controlled devices below, identify the percentage your organization currently 1) produces internally at U.S. and non-U.S. organization facilities, 2) licenses from U.S. organizations and 3) licenses from non-U.S. organizations. Next, identify your organization's top three controller and firmware non-U.S. supplier countries. A blank response is counted as "Not Used".

Type of On-die Hardware Protocol Controller & Firmware Controlled Device	Organization Produced/Licensed On-die Input/Output Controllers and Firmware					Top Three Non-U.S. Supplier Countries		
	1		2	3	Total (must add up to 100%)	Country #1	Country #2	Country #3
	Internally Produced at Organization Facilities in U.S.	Internally Produced at Organization Facilities Outside the U.S.	Licensed from U.S. Organizations	Licensed from Non-U.S. Organizations				
PCI Express - Controller					0%			
PCI Express - Firmware					0%			
Ethernet (1G, 10G, 25G, 100G) - Controller					0%			
Ethernet (1G, 10G, 25G, 100G) - Firmware					0%			
USB (1.0, 2.0, 3.0) - Controller					0%			
USB (1.0, 2.0, 3.0) - Firmware					0%			
SATA - Controller					0%			
SATA - Firmware					0%			
Thunderbolt - Controller					0%			
Thunderbolt - Firmware					0%			
Firewire - Controller					0%			
Firewire - Firmware					0%			
Memory - DDR3 and DDR4 - Controller					0%			
Memory - DDR3 and DDR4 - Firmware					0%			
ZigBee - Controller					0%			
ZigBee - Firmware					0%			
Bluetooth - Controller					0%			
Bluetooth - Firmware					0%			
802.11 - Controller					0%			
802.11 - Firmware					0%			
InfiniBand - Controller					0%			
InfiniBand - Firmware					0%			
NUMalink - Controller					0%			
NUMalink - Firmware					0%			
Other - Controller (specify here)					0%			
Other - Firmware (specify here)					0%			

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 7b: Embedded Integrated Circuit Bit Cell and Memory Compiler Intellectual Property Sources

For each of the embedded Integrated Circuit bit cell and memory compiler intellectual property used by your organization, identify the percentage your organization currently 1) produces internally at U.S. and non-U.S. organization facilities, 2) licenses from U.S. organizations, and 3) licenses from non-U.S. organizations. Next, identify your organization's top three bit cell and memory compiler non-U.S. supplier countries. A blank response is counted as "Not Used".

Type of Memory Device IP	Organization Produced/Licensed Bit Cell and Memory Compiler IP					Top Three Non-U.S. Supplier Countries		
	1		2	3	Total (must add up to 100%)	Country #1	Country #2	Country #3
	Internally Produced at Organization Facilities in U.S.	Internally Produced at Organization Facilities Outside the U.S.	Licensed from U.S. Organizations	Licensed from Non-U.S. Organizations				
Embedded EEPROM – <i>Bit Cell</i>					0%			
Embedded EEPROM – <i>Memory Compiler</i>					0%			
Embedded FLASH – <i>Bit Cell</i>					0%			
Embedded FLASH – <i>Memory Compiler</i>					0%			
Embedded SRAM – <i>Bit Cell</i>					0%			
Embedded SRAM – <i>Memory Compiler</i>					0%			
Embedded DRAM – <i>Bit Cell</i>					0%			
Embedded DRAM – <i>Memory Compiler</i>					0%			
Embedded Other – <i>Bit Cell</i>	(specify here)				0%			
Embedded Other – <i>Memory Compiler</i>	(specify here)				0%			
Comments:								

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE**Section 7c: Access to Integrated Circuit-Related Intellectual Property**

From 2013 to present, has your organization experienced issues related to intellectual property (IP) block availability for the design of Integrated Circuit products from original equipment manufacturers (OEM) or third-party companies?

If "Yes", identify the supplier, the type of supplier, the country, and which change(s) occurred.

A.		Supplier Name	Type of Supplier	Country	Reduction in IP Block Availability	Increased Delays or Other Difficulties in Obtaining IP Blocks	Denial of Licensing IP blocks that were Previously Available for Licensing	Refusal to License IP Blocks for Specific Classes of Products	Escalation of IP Block Licensing Fees
1									
2									
3									
4									
5									
		Comments:							

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 8a: Performance of Production Functions for the Design of Integrated Circuits

For each of the design functions below identify whether your organization currently has captive in-house capability at U.S. and/or non-U.S. facilities. Next, identify whether it outsources* these functions to external contractors at U.S. and/or non-U.S. facilities. Then, indicate if there will be anticipated changes to either your organization's captive in-house capability or outsourcing from 2018-2022.

Integrated Circuit Design Functions	Current		2018-2022	
	Captive In-House Capability	Outsourcing	Future Captive In-House Capability	Future Outsourcing
A. Analog				
Digital				
RTL Design				
Synthesis				
Physical Layout				
Functional Verification				
Simulation				
Test Vector Generation				
Other	(specify here)			
Comments:				

Identify the top three countries to which your organization outsources Integrated Circuit design. Then, list up to three reasons why your organization outsources to each country:

	Country	Reason 1	Reason 2	Reason 3
B. 1				
2				
3				
Comments:				

Name the foundries that your organization uses to fabricate its Integrated Circuit products at locations in the United States and at non-U.S. locations.

	Organization Name	Country
C. 1		
2		
3		
4		
5		

* To obtain goods and/or services by contract from a supplier (domestic or foreign) outside the organization.

Comments:	
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BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 8b: Performance of Production Functions for the Manufacture of Integrated Circuits

For each of the manufacturing functions below identify whether your organization currently has captive in-house capability at U.S. and/or non-U.S. facilities. Next, identify whether it outsources* these functions to external contractors at U.S. and/or non-U.S. facilities. Then, indicate if there will be anticipated changes to either your organization's captive in-house capability or outsourcing from 2018-2022.

Integrated Circuit Manufacturing Functions	Current		2018-2022	
	Captive In-House Capability	Outsourcing	Future Captive In-House Capability	Future Outsourcing
Wafer Manufacturing (Front End)				
Wafer Manufacturing (Back End)				
A. E-Test				
Wafer Sorting				
Dicing				
Packaging				
Final Test and Inspection				
Other	(specify here)			
Comments:				

Identify the top three countries to which your organization outsources Integrated Circuit manufacturing. Then, list up to three reasons why your organization outsources to each country:

	Country	Reason 1	Reason 2	Reason 3
B. 1				
2				
3				
Comments:				

* To obtain goods and/or services by contract from a supplier (domestic or foreign) outside the organization.

Comments:	
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BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE**Section 9a: National Security Requirements - The Trusted Access Program**

Identify if any facility in your organization is certified by the Defense Microelectronics Activity (DMEA) for the design, manufacture and/or package, test and assembly of Integrated Circuit products:					
1	Manufacturing				
	Design				
	Package, Test and Assembly				
A.	2	How does your organization view the process for securing accreditation through DMEA's Trusted Access Program Office?			
	3	Identify up to three factors that shape your organization's perception of DMEA's Trusted Access Program and explain.			
		Factor	Explain		
Has your organization recently withdrawn from operating a facility under the DMEA Trusted Access Program or is it planning to do so?					
If "Yes", identify the affected facility by name and address and explain.					
B.	Name		Address		
	Explain				
Is your organization familiar with proposed alternatives to the current DMEA Trusted program? If "Yes", explain below.					
C.	Split Manufacturing				
	Trust by Design				
	Tiers of Trust				
	Other				
Is your organization planning to seek certification by the Defense Microelectronics Activity as a "trusted" supplier of Integrated Circuit products?					
If "Yes", identify the manufacturing, design, and/or package, test and assembly facilities for which certification is being sought or may be sought, and the primary business activity at that facility.					
		Facility Name	City	State	Primary Business Activity
D.	1				
	2				
	3				
	4				
	5				
Comments:					

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 9b: National Security Requirements - Outlook on Future Capability to Supply Integrated Circuit Products

For each of the Integrated Circuit devices listed, indicate how your organization's ability to design and/or manufacture at its U.S. facilities may change from 2018-2022 and explain. Select all that apply -- A blank response is counted as "No Capability".

Device Types	Future Capability		
	Design	Manufacture	Explain
Analog/Linear Technologies			
Digital Logic Technologies			
Digital Signal Processors			
Field Programmable Gate Arrays			
One-time, Electrically Programmable Gate Arrays			
Mask Programmable Gate Arrays			
Structured ASICs (a.k.a. Structured Arrays; Platform ASICs)			
Standard Cell ASICs (a.k.a. cell-based ASICs)			
Custom ASICs			
A. 3D/2.5 ASICs			
System-on-Chip			
Other Processors			
Mixed Signal Technologies			
Nonvolatile Memory			
3-D Nonvolatile Memory			
SRAM			
DRAM - DDR3			
DRAM - DDR4			
IR-Focal Plane Arrays			
Anti-Tamper Technology			
Display Electronics			
MEMS Technologies			
Optical/Photonic Technologies			
MMIC Technologies			
Other RF Technologies			
Other (specify here)			
Does your organization engage in Diminishing Manufacturing Sources & Material Shortages (DMSMS) or obsolescence activities? If no, continue to Section 10a.			
Who is the point of contact for DMSMS/obsolescence at your organization?			
	Name	Title	Phone
			E-mail
		Year	\$ (Thousands)
Estimate how much (in thousands of dollars) your organization spent in each of the last four years on finding, managing, and/or resolving DMSMS/obsolescence problems on DOD systems or projects, including parts, components, materials, and software:		2013	Explain
		2014	
		2015	
		2016	
Comments:			

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 10a: Suppliers - Manufacturing Equipment

You indicated that your organization has no manufacturing capability in Section 1b, Part C. Please proceed to Section 11.

For each of the listed processes, list the total number of original equipment manufacturers (OEMs) your organization uses, identify the primary equipment manufacturer, country of manufacturer, whether that equipment manufacturer is single or sole source, and who typically performs equipment maintenance. A blank response is counted as "No Equipment Supplier".

Note: **Provision of supplier information is mandatory**. Per Section 705(d) of the Defense Production Act, all data contained in this survey response remains business confidential and is exempt from Freedom of Information Act (FOIA) requests.

Integrated Circuit Manufacturing Processes - Front to Back	Primary Manufacturer of Equipment - By Process				
	Total Number of OEMs	Primary Equipment Manufacturer	Country of Manufacturer	Single or Sole Source Supplier	Equipment Maintenance Typically Performed By
Wet wafer cleaning					
Piranha solution					
RCA clean					
Photolithography					
Ion implantation					
Dry etching					
Wet etching					
Plasma strip/Ashing					
Thermal treatments rapid thermal anneal					
Furnace anneals					
Furnace thermal oxidation					
Rapid thermal oxidation					
Epitaxy					
Chemical Vapor Deposition (CVD)					
Plasma Enhanced Chemical Vapor Deposition (PECVD)					
Rapid thermal chemical vapor deposition					
Physical Vapor Deposition (PVD)					
Molecular Beam Epitaxy (MBE)					
Electrochemical Deposition (ECD)					
Chemical-Mechanical Planarization (CMP)					
Inline monitor testing at wafer level (interstitial/ silver /kerf structures)					
Wafer bumping (flip chip products only)					

Through Silicon Via (TSV), back side thinning and backside metal redistribution (if a 3-D chip)					
Wafer functional test (testing of design structures)					
Wafer backgrinding (Smartcard, PCMCIA cards, other applications)					
Die preparation wafer mounting/tape					
Die cutting/dicing					
IC packaging die attachment/bonding					
IC bonding wire bonding (if wirebond product)					
Thermosonic bonding					
Wafer bonding (if a wafer level bonded assembly)					
Tape Automated Bonding (TAB)					
IC encapsulation baking					
Plating					
Laser marking					
Trim and form					
IC testing					
Comments:					
BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act					

ORGANIZATION LEVEL RESPONSE**Section 10b: Suppliers - continued****You indicated that your organization has no manufacturing capability in Section 1b, Part C. Please proceed to Section 11.**

For each input listed below, estimate the total number of manufacturing non-equipment suppliers your organization uses, name the primary supplier, provide a description of the input, and the primary supplier country. Then, indicate if the supplier is single or sole source. A blank response is counted as "No Supplier".

Note: **Provision of supplier information is mandatory**. Per Section 705(d) of the Defense Production Act, all data contained in this survey response remains business confidential and is exempt from Freedom of Information Act (FOIA) requests.

Input	Total Number of Suppliers	Primary Supplier Name	Input Description	Supplier Country	Single or Sole Source Supplier
Raw Materials					
Wafers					
Photomasks					
Photoresist					
Chemicals					
Gases					
Deposition Materials					
Packaging Materials					
Wafer Processing Intellectual Property					
High Temperature Materials					
Wet Processing Materials					
Testing Materials					
Assembly Materials					
Clean Room Materials					
Software					
Other (specify in comments)					
Comments:					

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 11: Sales

From 2013-2016, provide your organization's U.S. and non-U.S. sales information. For 2017, estimate the percentage change in sales from 2016. For example, a 10% change would indicate an estimated 10% increase in sales from 2016.

Reporting Schedule:

Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12		2013	2014	2015	2016	2017
A.	Total Sales, all Customers U.S./Non-U.S. (in \$)					
B.	Total IC-Related Sales, all Customers U.S./Non-U.S. (in \$)					
	1. Total U.S. IC-Related Sales (as a % of B)					
	2. Total Non-U.S. IC-Related Sales (as a % of B)					
	3. Total Sales of Trusted IC-related products (as a % of B)					

Identify your organization's top five IC-related commercial customers by revenue in 2016, their country location, and whether the products were supplied through DMEA Trusted Access Program Office certification.

Top Five Commercial Customers by Revenue (\$)		
	Commercial Customers	DMEA Trusted Program
C. 1		
2		
3		
4		
5		

Identify your organization's top five IC-related U.S. Government customers by revenue in 2016, the associated federal agency, and whether the products were supplied through DMEA Trusted Access Program Office certification.

Top Five U.S. Government Customers for Custom Products (Non-COTS) by Revenue (\$)		
	US Government Customers	DMEA Trusted Program
D. 1		
2		
3		
4		
5		

Comments:

Disclosure of financial information is required for both public and private companies. All financial data is treated as Business Confidential and exempt from Freedom of Information Act (FOIA) requests. Providing BIS with financial information will not result in the public release of your organization's financial data.

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE**Section 12: Financials**

Provide the following Income Statement and Balance Sheet financial line items for your organization for 2013-2016.

Reporting Schedule:					
Income Statement (Select Line Items)		Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12			
		2013	2014	2015	2016
A.	Net Sales (and other revenue)				
B.	Cost of Goods Sold				
C.	Total Operating Income (Loss)				
D.	Earnings Before Interest and Taxes				
E.	Net Income				
Reporting Schedule:					
Balance Sheet (Select Line Items)		Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12			
		2013	2014	2015	2016
A.	Cash				
B.	Inventories				
C.	Current Assets				
D.	Total Assets				
E.	Current Liabilities				
F.	Total Liabilities				
G.	Retained Earnings				
H.	Total Owners Equity				

Reporting of Significant One-Time Events

Provide an explanation of any significant one-time events that would skew assessments of the financial performance of your organization.

2013	
2014	
2015	
2016	

Comments:

Disclosure of financial information is required for both public and private companies. All financial data is treated as Business Confidential and exempt from Freedom of Information Act (FOIA) requests. Providing BIS with financial information will not result in the public release of your organization's financial data.

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE**Section 13: Acquisitions, Divestitures, Mergers and Joint Ventures****Acquisitions, Divestitures, and Mergers**

How many Integrated Circuit-related acquisitions, divestitures, and mergers has your organization participated in since 2013? If none, a "0" must be recorded.

Identify your organization's five most recent Integrated Circuit-related acquisitions, divestitures, and mergers. Then provide the following information for each:

	Organization Name	Controlling Shareholder	Country	Type of Activity	Year	Primary Objective	Explain
A. 1							
2							
3							
4							
5							

Joint Ventures

In how many Integrated Circuit-related joint ventures does your organization currently participate? If none, a "0" must be recorded.

Identify your organization's current Integrated Circuit-related joint venture relationships, including public/private R&D partnerships. Then provide the following information for each:

	Joint Venture Name	Controlling Shareholder	Country	Year Initiated	Primary Objective	Explain
B. 1						
2						
3						
4						
5						

C. 1	Have any foreign governments (including sovereign wealth funds) invested, directly or indirectly, in your organization and also collectively control five percent or more of stockholder voting shares?	
	If "Yes", identify the foreign government(s), explain the nature of the investment(s) and their percentage stake.	

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 14: Capital Expenditures

Report your organization's U.S. and non-U.S. capital expenditures for 2013-2016. If your organization had no capital expenditures in this period enter "0" for each year.

Capital Expenditure Reporting Schedule:		Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12							
Capital Expenditure Category		2013		2014		2015		2016	
		U.S.	Non-U.S.	U.S.	Non-U.S.	U.S.	Non-U.S.	U.S.	Non-U.S.
A. 1	Total Capital Expenditures								
2	Total Integrated Circuit-related Capital Expenditures								
3	Machinery and Equipment (as a % of A2)								
4	IT, Computers, Software (as a % of A2)								
5	Land, Buildings, and Leasehold Improvements (as a % of A2)								
6	Other (as a % of A2) (specify here)								
Lines 3 through 6 must total 100%		0%	0%	0%	0%	0%	0%	0%	0%

Rank your organization's top three (1 being most important, 3 being least important) capital expenditure priorities for 2013-2016, anticipated priorities through 2022, and explain.

Expenditure Priority		2013-2016 Ranking	Explain	Present-2022 Ranking	Explain
B. 1	Replace old machinery and equipment				
2	Improve productivity				
3	Expand capacity				
4	Add new capability				
5	Upgrade technology				
6	Meet specific customer requirements				
7	Other (specify here)				

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 15: Research & Development

A. Does your organization perform Research and Development (R&D)?		If "No", proceed to Section 16.
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In Part B, record your organization's total R&D expenditures for 2013-2016.
 In Part C, report the percentages of your organization's total R&D expenditures for supporting Integrated Circuit product design and manufacturing activity performed in U.S. and Non-U.S. locations for 2013-2016.
 In Part D, identify your organization's total R&D funding sources, by percentage of total R&D dollars sourced.
 Note: Total annual funding sources reported (Part D) can exceed total expenditures reported (Part B) for a given year.

Reporting Schedule:					
		Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12			
		2013	2014	2015	2016
B.	1 Total R&D Expenditures				
	2 Total Integrated Circuit R&D Expenditures				
	3 Basic Research (as a % of B2)				
	4 Applied Research (as a % of B2)				
	5 Product/Process Development (as a % of B2)				
	Total of 3 - 5 (must equal 100%)	0%	0%	0%	0%
		Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12			
		2013	2014	2015	2016
C.	1 Total Integrated Circuit R&D Expenditures	\$0	\$0	\$0	\$0
	2 Performed at U.S. Locations - Design (as a % of C1)				
	3 Performed at U.S. Locations - Manufacturing (as a % of C1)				
	4 Performed at Non-U.S. Locations - Design (as a % of C1)				
	5 Performed at Non-U.S. Locations - Manufacturing (as a % of C1)				
		Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12			
		2013	2014	2015	2016
D.	1 Total R&D Funding				
	2 Total Integrated Circuit R&D Funding				
	3 Parent Company (Internal) (as a % of D2)				
	4 U.S. Federal Government (as a % of D2)				
	5 State and Local Government (as a % of D2)				
	6 U.S. Private Entity (includes industry, universities) (as a % of D2)				
	8 Foreign Investors (includes industry, governments) (as a % of D2)				
	9 Other (as a % of D2)	(specify here)			
	Total of 3 - 9 (must equal 100%)	0%	0%	0%	0%

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 16a: Export Regulation & Trade Issues

The mission of the U.S. Department of Commerce's Bureau of Industry and Security (BIS) is to advance U.S. national security, foreign policy, and economic objectives by ensuring an effective export control and treaty compliance system and promoting continued U.S. strategic technology leadership. BIS is responsible for the maintenance and administration of the Export Administration Regulations (EAR)/Commerce Control List (CCL). More information is available at: <https://www.bis.doc.gov>.

The mission of the U.S. Department of State's Directorate of Defense Trade Controls is to ensure that exports of defense articles and defense services are consistent with U.S. national security and foreign policy objectives. It is responsible for the maintenance and administration of International Traffic in Arms Regulations (ITAR)/U.S. Munitions List (USML). More information is available at: <http://www.pmdtdc.state.gov>.

Does your organization have an export control compliance program?		
Does your organization have a designated point of contact to oversee its compliance with U.S. export control regulations? If "Yes", provide contact information.		
Name:	<input type="text"/>	Phone Number: <input type="text"/> E-mail: <input type="text"/>
Does your organization expect to export Integrated Circuit products (devices or technical data) in the next five years?		
A. Does your organization design or manufacture Integrated Circuit products subject to U.S. export control systems?	EAR/CCL	
	ITAR/USML	
Has your organization determined the category your commodity is subject to?	IC Designs	
	Partially Built IC Die	
	Complete IC Devices	

Provide the number of distinct Integrated Circuit devices and technical data (IC designs, intellectual property blocks, firmware, etc.) produced by your organization that are subject to the listed EAR/CCL or ITAR/USML categories.

For the types of IC devices and technical data reported, select the percentage range for which formal commodity jurisdiction and commodity classification rulings have been obtained.

B. Category	Devices			Technical Data		
	Number of Distinct Commodities	Percent of Products for which Formal Commodity Jurisdiction Rulings were Obtained*	Percent of Products for which Formal Commodity Classification were Obtained	Number of Distinct Commodities	Percent of Products for which Formal Commodity Jurisdiction Rulings were Obtained*	Percent of Products for which Formal Commodity Classification were Obtained
EAR 3						
EAR 4						
EAR 5						
EAR 9						
EAR 99						
ITAR XI						
ITAR XV						

* Unless your organization has previously obtained a formal commodity jurisdiction (CJ) determination, designation of a product category in this survey does not mean that the declaration is correct.

Comments:	<input style="width: 100%;" type="text"/>
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BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 16b: Export Regulation & Trade Issues - continued

If your organization did not export Integrated Circuit products (IC designs, Partially built IC die, Complete IC devices) from 2015 to present, proceed to Section 16c.

A. How many Integrated Circuit commodities (devices and technical data) did your organization transfer from 2015 to present under License Exception?

B. How many Integrated Circuit commodities (devices and technical data) did your organization transfer from 2015 to present under No License Required?

Identify the Integrated Circuit commodities (including devices and technical data) that your organization has transferred from 2015 to present to foreign entities or persons subject to U.S. arms embargoes or other export limitations (D:5a countries* and Russia) under License Exception or No License Required authority.

Next, specify the: type of commodity -- devices or technical data (IC designs, intellectual property blocks, firmware, etc.), types of IC technologies transferred, pertinent Export Administration Regulations (EAR) authority (License Exception or No License Required), and destination country/countries.

Note: Do not include transfers covered by deemed export licenses.

	Type of Commodity	Integrated Circuit Technology Type	EAR Authority	Destination Country 1	Destination Country 2	Destination Country 3	Destination Country 4	Explain
1								
2								
3								
4								
5								
6								
7								
8								
9								
C. 10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23	Other:	(specify here)						
24	Other:	(specify here)						

Comments:

* Includes D:5a Countries: Afghanistan, Belarus, Burma, Central African Republic, China, Congo, Cuba, Cyprus, Eritrea, Haiti, Iran, Iraq, Laos, Liberia, Libya, North Korea, Somalia, Sri Lanka, Sudan, Syria, Venezuela, Vietnam, and Zimbabwe.

ORGANIZATION LEVEL RESPONSE

Section 16c: Export Regulation & Trade Issues - continued

1	Since 2015, has your organization been contacted by entities or persons representing organizations subject to U.S. arms embargoes or other export limitations (D:5a countries* and Russia) about supplying them with Integrated Circuit devices or technical data (IC designs, intellectual property blocks, firmware, etc.). If "Yes", explain.					
	Explain:					
A. 2	If "Yes", identify the foreign entities/persons in U.S. arms embargoed countries or Russia from 2015 to present who have attempted to acquire your organization's Integrated Circuit devices or technical data. Then identify the type of commodity, regulatory system, desired mode of access, destination country, and the year of the attempt.					
	Entity/Person	Type of Commodity	Regulatory System	Desired Mode of Access	Destination Country	Year
Comments:						
* D:5a Countries: Afghanistan, Belarus, Burma, Central African Republic, China, Congo, Cuba, Cyprus, Eritrea, Haiti, Iran, Iraq, Laos, Liberia, Libya, North Korea, Somalia, Sri Lanka, Sudan, Syria, Venezuela, Vietnam, and Zimbabwe.						

1	Since 2015, has your organization been contacted by entities or persons representing organizations subject to U.S. arms embargoes (D:5a countries* and Russia) or other export limitations and chosen not to do business with them?					
	Comments:					
B. 2	If "Yes", identify the entities/persons in U.S. arms embargoed countries or Russia that your organization has chosen not to do business with and identify up to three factors affecting decision.					
	Entity/Person	Country	#1 Factor Affecting Decision	#2 Factor Affecting Decision	#3 Factor Affecting Decision	Explain
Comments:						

ORGANIZATION LEVEL RESPONSE

Section 16d: Export Regulation & Trade Issues - continued

Identify whether U.S. export control regulations have impacted your organization in any of the ways listed below. If "Yes," identify the type of regulation and explain.

	Impact on Organization	Yes/No	Type of Regulation	Explain
1	Altered your organization's Integrated Circuit-related research and development program.			
2	Caused your organization to avoid the export of Integrated Circuit-related products or services that are subject to EAR/CCL or ITAR/USML related controls.			
3	Changed the composition of specific Integrated Circuit-related product lines designed or manufactured by your organization.			
4	Contributed to the location or relocation of Integrated Circuit-related facilities outside of the United States due to regulatory burdens.			
5	Resulted in non-U.S. organizations avoidance of buying U.S.-origin Integrated Circuit-related products or services.			
6	Spurred non-U.S. organizations to offer "ITAR/USML-free" or "EAR/CCL-free" Integrated Circuit-related products or services.			
7	Other (specify here)			
Comments:				

Since 2015, how have reforms in U.S. export control regulations affected your organization with regard to the development and sale of Integrated Circuit products?

1	EAR/CCL		Explain:	
	ITAR/USML		Explain:	

Identify the top three Integrated Circuit commodities that your organization thinks should have export controls relaxed or removed because of advances in commercially available technology or general availability from non-U.S. manufacturers. Select the type of device and explain.

	Type of IC Commodity	Type of Device	Explain
2	a.		
	b.		
	c.		

Has your organization lost export sales* of Integrated Circuit products to non-U.S. competitors because of U.S. export controls (EAR/CCL or ITAR/USML)? If "Yes," estimate the total dollar amount of lost export sales opportunities from 2013-2016.

		Lost Sales?	Lost Export Sales Estimate (\$)
C	EAR/CCL		
	ITAR/USML		

* Lost Export Sales: Binding, written supply contracts (not estimates) of a stated dollar value that could not be fulfilled because a review of export regulations determined that the Integrated Circuit-related products (designs, technology, and/or manufactured devices) could not be exported to a designated customer or country.

Should the U.S. government review U.S. export control practices related to Integrated Circuit products every two years to consider national security impacts, licensing times, technological advances, and global market availability?

D	Explain:	
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For the Integrated Circuit devices listed, identify the impacts of Export Control Reforms on paperwork, licensing time, your organization's business opportunities, the level of controls, and how your organization's sales have changed. Then, select the number of countries your organization exports to and identify the number of customers.

Impacts of Export Control Reforms							
Type of IC Device	Paperwork	Licensing Time	Business Opportunities	Level of Controls	Sales	Number of Countries	Number of Customers
Microwave Monolithic Integrated Circuits							
Transmit/Receive Modules							
Radiation Tolerant							
Radiation Tolerant - Specially Designed for Space Applications							
Radiation Hardened							
Radiation Hardened - Specially Designed for Space Applications							
Other Device (specify here)							
Other Device (specify here)							
Comments:							

Radiation Tolerant: Integrated Circuit products incorporating design features and/or physical characteristics with limited capability to resist radiation induced damage from industrial sources, electromagnetic pulses, industrial sources, weapons systems, and charged particles in space that can damage circuitry and render a device inoperable. Radiation tolerant covers parts having a total dose failure level >100 krad but less than 300 krad.

Radiation Tolerant - Specially Designed for Space Applications: Radiation tolerant integrated circuit devices and/or technical data for IC devices capable of a total dose failure level >100 krad but less than 300 krad and that are subject EAR 9A515.

Radiation Hardened: Integrated Circuit products incorporating design features and/or physical characteristics that demonstrate a capability to resist radiation-induced damage from industrial sources, electromagnetic pulses, weapons systems; and/or charged particles in space that can damage circuitry and render a device inoperable. Some IC devices may be considered radiation hardened when their total dose failure level exceeds >300 krad. A total dose failure level of 500 krad is the standard cited in International Traffic in Arms (ITAR) regulations.

Radiation Hardened - Specially Designed for Space Applications: Radiation hardened integrated circuit devices and/or technical data for IC devices capable of a total dose failure level that exceeds >300 krad and that are subject EAR 9A515.

Comments:	
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ORGANIZATION LEVEL RESPONSE

Section 17a: Trade and Intellectual Property Issues

For each method your organization used from 2013-2016 to transfer Integrated Circuit-related intellectual property (IP) on a legal, authorized basis, indicate if it was transferred to U.S. or non-U.S. locations and then identify the type of IP.

	Method	U.S. Location	Non-U.S. Location	Type of IP
A.	1 Licensing intellectual property			
	2 Joint ventures			
	3 Research collaborations			
	4 Participation in scientific/technical conferences			
	5 Information provided to potential investors			
	6 Non-Disclosure Agreements (NDAs)			
	7 Other (specify here)			

1	Was any of your organization's IC-related design and/or manufacturing intellectual property transferred without authorization between 2013-2016?	Type of IP	
2	If "Yes", report the number of instances of unauthorized transfers of Design IP and Manufacturing IP.	Design IP	Manufacturing IP

Next, indicate the methods by which unauthorized transfers of your organization's Integrated Circuit-related design and manufacturing intellectual property occurred from 2013-2016, the suspected location of the perpetrator(s), the type of IP that was transferred, and explain.

	Method	Suspected Location	Type of IP	Explain	
B.	Cybersecurity intrusions				
	Planting staff in your organization				
	Physical break-ins at organization facilities				
	Business partners				
	Dumpster diving				
	3	Employees			
		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)			
	Other (specify here)				

1	If your organization has identified the name(s) and country location(s) of the most frequent perpetrators of the unauthorized transfers of your organization's Integrated Circuit-related intellectual property, list up to two:	Perpetrator Name	Country	Perpetrator Name	Country
	Explain:				

C.	1	Did your organization report or seek assistance for unauthorized transfers to the U.S. Government?		If "Yes", which agencies were contacted regarding incidents?
	2	U.S. Department of Defense		U.S. Department of State
		U.S. Department of Commerce		Federal Bureau of Investigation
		U.S. Department of Energy		State/Local Police
		U.S. Department of Homeland Security		Other (specify here)

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE**Section 17b: Trade and Intellectual Property Issues - continued**

Since 2013, has your organization encountered any of the following conditional trade practices where it currently conducts business or has sought to do business directly or indirectly through third parties in non-U.S. countries? If "Yes", indicate the entity, the country, and your organization's response.

Conditional Trade Practices		Yes/No	Name of Non-U.S. Entity	Country #1	Organization Response	Name of Non-U.S. Entity	Country #2	Organization Response	Name of Non-U.S. Entity	Country #3	Organization Response
1	Request or Requirement to transfer Integrated Circuit-related device intellectual property (trade secrets, patents, etc.)										
2	Request or Requirement to transfer Integrated Circuit-related manufacturing process intellectual property (trade secrets, patents, etc.)										
3	Request or Requirement to outsource design of Integrated Circuit-related products to their country										
4	Request or Requirement to establish Integrated Circuit-related design and/or manufacturing operations in their country										
5	Request or Requirement to accept investment/equity in to your organization from non-U.S. entities in order to maintain market access										
6	Request or Requirement for joint ventures as means to achieve transfers on design and/or manufacturing intellectual property and know-how										
7	Other (specify here)										

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 18a: Competitiveness

Select all the issues that your organization faced from 2013 to present then rank the top five issues (1 being most important, 5 being least important). Next, select all the issues that your organization expects to face from 2018-2022 and rank the top five issues. Then explain.

Issue	2013 to Present		2018-2022		Explain
	-Yes/No-	Rank	-Yes/No-	Rank	
Aging equipment, facilities, or infrastructure					
Aging workforce					
Competition - domestic					
Competition - foreign					
Counterfeit parts					
Cybersecurity					
Environmental regulations/remediation - U.S.					
Environmental regulations/remediation - non-U.S.					
Export controls (ITAR/USML and/or EAR/CCL)					
Forced localization (e.g. joint venture requirement, IP transfers, etc.)					
Government acquisition processes					
Government purchasing volatility					
Government regulatory burden					
Healthcare costs					
A. Health and safety regulations					
Imports					
Industrial espionage - domestic					
Industrial espionage - foreign					
Intellectual property/patent infringement					
Labor availability/costs					
Material input availability					
Product obsolescence					
Pension costs					
Proximity to customers					
Proximity to suppliers					
R&D costs					
Reduction in commercial demand					
Reduction in USG demand					
Taxes					
Worker/skills retention					
Other	(specify here)				
Other	(specify here)				

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE**Section 18b: Competitiveness - continued**

For each of the advanced Integrated Circuit technologies, indicate the degree of technological advantage and potential economic payoff in the next 10-15 years for the global IC industry. Next estimate the number of years before this technologies are market ready and indicate whether your organization is currently performing research and development on these technologies.

Advanced Integrated Circuit Technology		Degree of Technological Advantage	Potential Economic Payoff	Deployable/ Market Ready in How Many Years	Organization Currently Performing R&D
1	Analog Technologies				
2	Artificial Intelligence/Deep Learning Architectures				
3	Carbon Electronics (includes carbon nanotube FETs, grapheme interconnects, grapheme transistors, etc.)				
4	Extreme Integration				
5	Ferroelectric Device Technologies				
6	Hybrid Silicon/Compound Semiconductor Devices (heterogeneous integration)				
7	Logic in Memory Structures				
8	Neuromorphic Computing				
9	Next-Generation High Power IC Devices				
10	Phase Change Electronics				
11	Photonic Integrated Circuits/Photonic Computing				
12	Quantum Computing				
13	Spintronics (including spin-torque devices, etc.)				
14	Straintronics				
15	Subthreshold Electronics				
16	Tunneling Field Effect Transistors				
17	Wide Bandgap Semiconductors (beyond GaN and SiC) for RF Technologies				
18	Other	(specify here)			

Comments:	
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BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE**Section 18c: Competitiveness - continued**

For each of the potential U.S. Government policy actions in Sections A-E, identify the impact on the U.S. Integrated Circuit industry and your organization. Then identify their importance (essential or non-essential) and rank the top five actions (1 being highest priority) from Sections A-E that would help strengthen the competitiveness of the U.S. IC industry. If you have additional policy actions for the U.S. Government, explain in the comment boxes provided.

Potential U.S. Government Policy Actions		Impact on U.S. Industry	Impact on Organization	Importance	Ranking (Top Five)
A. Trade Enforcement/Compliance					
1	Fully enforce the World Trade Organization Subsidies Agreement				
2	Increase U.S. Government self-initiation of IC-related cases on anti-dumping, countervailing duty (CVD), and Section 232 import investigations				
3	Impose targeted tariffs on IC products designed/manufactured at facilities constructed with foreign government funding or operated with foreign government subsidies				
4	Require that the Committee on Foreign Investment in the United States (CFIUS) review all proposed acquisitions by non-U.S. entities of Integrated Circuit design and manufacturing-related businesses operating in the United States				
5	Require CFIUS to review all proposed acquisitions of companies that control intellectual property blocks licensed in the design of Integrated Circuit products				

Other Policy Actions/Comments:

B. Production

1	Provide low/no-interest financing for the new construction or retooled IC-related U.S. manufacturing facilities				
2	Streamline federal and state environmental regulations governing the siting and permitting of Integrated Circuit manufacturing facilities in the United States to enable fast-track approval of projects				
3	Implement phased-in Buy America requirements for electronic systems supporting critical U.S. infrastructure systems, including electrical grid switching control systems, water purification systems, and commercial aircraft electronic control systems				
4	Establish a U.S. Government-owned/contractor-operated facility to provide foundry services at the leading edge to fabless IC companies and university research organizations				

Other Policy Actions/Comments:

C. Research and Development

1	Increase funding for research in targeted IC-related disciplines				
2	Form/fund pre-competitive research consortia to enable Integrated Circuit companies and federal laboratories to undertake collaborative research				
3	Increase federal funding for research on high-risk, high-payoff Integrated Circuit-related technologies including advanced chip architectures, hybrid silicon/compound semiconductor devices, and nanoscale (130nm-28nm) manufacturing technologies to lower capital requirements and costs for low-volume production and prototyping				
4	Establish a U.S. Department of Commerce Technical Advisory Committee (TAC) for Integrated Circuits				
Other Policy Actions/Comments:					
D. Taxes					
1	Lower federal corporate tax rates (from 35% to 15-20%)				
2	Institute a 5% investment tax credit for investments in new Integrated Circuit design and manufacturing equipment in U.S. facilities				
3	Allow accelerated depreciation of Integrated Circuit production equipment from the current 5-year period to a 3-year period				
4	Provide a tax credit on training costs incurred by Integrated Circuit design and manufacturing companies for new hires during their first year of employment				
Other Policy Actions/Comments:					
E. Workforce Improvement					
1	Increase federally funded scholarships for college-level U.S. students in the following Integrated Circuit-related disciplines: electrical engineering, chemical engineering, mechanical engineering, materials science, optics, and solid state physics				
2	Increase green-card and H1-B employment visa caps				
3	Decrease green-card and H1-B employment visa caps				
Other Policy Actions/Comments:					
BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act					

ORGANIZATION LEVEL RESPONSE**Section 18d: Competitiveness - continued**

The normal functioning of the global market in the design and manufacture of Integrated Circuit products is being adversely affected by the intervention of national governments.

One example of government intervention is China's announcement to provide at least \$150 billion to the Chinese IC industry. Goals of this intervention include constructing a series of new manufacturing and design facilities in China, purchasing IC manufacturers in Asian and western countries, acquiring competitors' IC intellectual property libraries, and inducing foreign competitors to enter into joint venture/technology transfer arrangements with Chinese entities.

For each potential scenario listed below, indicate whether you expect your organization to be impacted, and if so the nature of the impact.

Scenario		Expected Impact
1	Will the construction of new subsidized Chinese IC manufacturing facilities impact the operating efficiencies of your organization's own facilities (U.S. and non-U.S.)?	
2	Will your organization have to shift the manufacture of IC products from the U.S. to China to retain market access?	
3	Will the closure of specific Integrated Circuit product lines manufactured in the U.S. due to subsidized Chinese IC competition impact your organization?	
4	Will the closure of one or more Integrated Circuit manufacturing facilities in the U.S. due to subsidized Chinese IC competition impact your organization?	
5	Will your organization have to form joint ventures with Chinese entities and transfer IC intellectual property to remain in business?	
6	Will your organization have to form joint ventures with Chinese entities and transfer IC intellectual property to obtain or maintain access to the Chinese market?	
7	Will your organization be impacted by Chinese acquisition of your suppliers of materials, equipment, software, and other items critical to your organization's supply chain?	
8	Will your organization be impacted by Chinese acquisition of IC intellectual property (IP blocks) normally available under license?	
9	Other (specify here)	

Comments:	
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BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

ORGANIZATION LEVEL RESPONSE

Section 19: Cybersecurity

Estimate your organization's spending on physical and cyber security:					
Reporting Schedule:					
Record \$ in Thousands, e.g. \$12,000.00 = survey input of \$12					
A.		2013	2014	2015	2016
	Cybersecurity Expenditures				
	Physical Security Expenditures				

B. Is your organization aware of Defense Federal Acquisition Regulation Supplement (DFARS) 252.204-7009, Limitations on the Use or Disclosure of Third-Party Contractor Reported Cyber Incident Information?
<http://www.acq.osd.mil/dpap/dars/dfars/html/current/252204.htm>

		Internal Network		External Network	
1	What group is responsible for administering your organization's computer networks?				
2	Is the computer or computer network that houses your organization's Commercially Sensitive Information* (CSI) connected to the Internet, either directly or via an intermediary network or server?				
3	Estimate the percentage of your organization's CSI stored with external data/cloud storage provider(s):				
4	Does your organization either restrict or prohibit your external data/cloud storage provider(s) from storing CSI outside of the U.S.?				
Indicate whether your organization typically encrypts CSI data in each of the following states:					
5	In storage (at rest):		Transmitted across internal networks		Transmitted outside your organization's networks

*Privileged or proprietary information which, if compromised through alteration, corruption, loss, misuse, or unauthorized disclosure, could cause serious harm to the organization owning it. This includes customer/client information, financial information and records, human resources information, intellectual property information, internal communications, manufacturing and production line information, patent and trademark information, research and development information, regulatory/compliance information, and supplier/supply chain information.

D. Indicate the security measures your organization currently has in place:

Account Monitoring and Control		Inventory of Authorized/Unauthorized Software	
Application Software Security		Limitation/Control of Network Ports and Services	
Boundary Defense		Maintenance, Monitoring, & Analysis of Audit Logs	
Continuous Vulnerability Assessment		Malware Defenses	
Controlled Access Based on Need to Know		Penetration Tests and Red Team Exercises	
Controlled Use of Administrative Privileges		Secure Configurations on Hardware	
Data Protection		Secure Configurations of Network Devices	
Data Recovery Capability		Secure Network Engineering	
Incident Response and Management		Security Skills Assessments and Training	
Inventory of Authorized/Unauthorized Devices		Wireless Access Control	
Other	(specify here)	Other	(specify here)

1	Is your organization able to detect the theft of, or unauthorized access to, Commercially Sensitive Information by cyber means?			
2	Does your organization have defined, written protocols in place for responding to a cybersecurity breach?			
	Explain:			
E. Identify any impacts or actions resulting from malicious cyber activity from 2013 to present:				
Impacts Experienced		Actions Undertaken		
3	IT downtime		Revised approach to international partnerships	
	Costs from damage assessment/remediation		Significant change in R&D strategy	
	Loss of sales/Business interruption		Exit from foreign markets or market segments	
	Exfiltration of CSI data		Exit from product or business line	
	Damage to IT infrastructure		Major new investment in cybersecurity	
	Damage to production capabilities or systems		Other	(specify here)
	Theft of software and/or source code		Other	(specify here)
	Other	(specify here)	Other	(specify here)

Note: The FBI encourages recipients to report information concerning suspicious or criminal activity to their local FBI field office or the FBI's 24/7 Cyber Watch (CyWatch). Field office contacts can be identified at <http://www.fbi.gov/contact-us/field>. CyWatch can be contacted by phone at 855-292-3937 or e-mail at CyWatch@ic.fbi.gov. When available, each report submitted should include the date, time, location, type of activity, number of people, and type of equipment used for the activity, the name of the submitting organization, and a designated point of contact.

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 20: 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.A. 1001 (1984 & SUPP. 1197)).

Once this survey is complete, submit it via e-mail to: chipstudy@bis.doc.gov. Be sure to retain a copy for your records and to facilitate any necessary edits or clarifications.

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.

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How many hours did it take to complete this survey?	
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