

BY ELECTRONIC FILING

Ambassador Katherine Tai
United States Trade Representative
Office of the United States Trade Representative
600 17th St. NW
Washington, D.C. 20006

Re: Request for Comments on Promoting Supply Chain Resilience, Docket Number USTR-2024-0002: Building a More Resilient Semiconductor Supply Chain

Dear Ambassador Tai:

The Semiconductor Industry Association (“SIA”) respectfully submits these comments to the Office of the United States Trade Representative (“USTR”) in response to *Request for Comments on Promoting Supply Chain Resilience*, 89 Fed. Reg. 16608 (March 7, 2024) (the “Request”). SIA shares USTR’s goals of bolstering the U.S. semiconductor industry, promoting resilient and reliable supply chains for these critical inputs driving the modern economy, and creating new opportunities for U.S. companies, products, and workers.

In order to do so, SIA urges USTR to leverage trade policy and market-opening trade initiatives and negotiations to boost global demand for U.S. semiconductors and increase U.S. export sales. Such a trade policy would support broader U.S. government efforts to partner with friends and allies to diversify and expand global supply chain capabilities that are complementary to U.S. semiconductor supply chains, which includes printed circuit board manufacturing and assembly, critical materials processing, and semiconductor assembly, test, and packaging. SIA also underscores the importance of the incentives and programs enacted under the CHIPS and Science Act to bolster the resilience of the U.S. semiconductor supply chain. As the administration continues to implement the Act, we encourage the U.S. government to further fund the authorized programs, and to extend and expand the Advanced Manufacturing Investment Credit (AMIC)

under Section 48D of the Internal Revenue Code to boost U.S. semiconductor manufacturing, design, research and development, and jobs. Finally, we request that USTR and other government agencies closely consult with the U.S. semiconductor industry on trade and supply chain initiatives and other semiconductor-related policies to ensure that such policies are aligned with industry needs and priorities and designed to best strengthen U.S. competitiveness, domestic production capabilities, and job creation.

A. INTRODUCTION AND BACKGROUND

SIA has been the voice of the U.S. semiconductor industry for over 45 years. SIA member companies represent more than 99% of the U.S. semiconductor industry by revenue and are engaged in the cutting-edge research, design, and manufacture of semiconductors. The U.S. is a global leader in the semiconductor industry. Continued U.S. leadership in semiconductor technology will drive economic strength, national security, and global competitiveness. More information about SIA and the semiconductor industry is available at www.semiconductors.org.

Semiconductors are the bedrock of today's global economy, powering virtually everything digital from cellphones and cars to supercomputers and medical equipment. They are also critical components in a host of American technologies and industrial products, including cars, household and kitchen appliances, clean energy, and medical devices. Few industries, if any, have a supply chain and development ecosystem as complex, geographically widespread, and interdependent as the semiconductor industry. A joint report by the Boston Consulting Group ("BCG") and SIA found that more than 120 countries were involved as an exporter or importer of semiconductor products. While the United States is a world leader in this global market, recent trade trends suggest cause for some concern.

The U.S. market only accounts for roughly 25% of semiconductor industry sales by U.S. headquartered companies¹, which underscores that access and sales to global markets is absolutely essential to ensure the U.S.-based semiconductor industry remains healthy, globally competitive, and a core driver of innovation and growth for the U.S. economy. Alarming, last year, annual U.S. semiconductor exports fell by 14 percent to \$52.7 billion from 2022², dropping one position to the sixth largest U.S. export by sector. Despite U.S.-led efforts to strengthen economic ties and integrate supply chains with partners in Asia through the Indo-Pacific Economic Framework (IPEF), Asia’s share (excluding China and Japan) of U.S. headquartered company chip sales has fallen for two straight years, from 28 percent in 2021 to 25 percent in 2023³. This trend suggests that U.S. trade initiatives, however well-intentioned, are not delivering for the semiconductor industry in the U.S., underscoring the need for a more proactive and affirmative U.S. trade policy to generate demand and new market access for U.S. semiconductor sales.

Domestically, maintaining a strong U.S. semiconductor research, design, manufacturing, and supplier base is both an economic security and a national security imperative. As stated in both the House and Senate versions of the 2021 National Defense Authorization Act: “The leadership of the United States in semiconductor technology and innovation is critical to the economic growth and national security of the United States.”

In July 2022, with bipartisan support, Congress passed and President Biden signed into law the historic CHIPS and Science Act of 2022 to strengthen domestic semiconductor manufacturing, design and research, fortify the economy and national security, and reinforce America’s chip supply chains. According to a recently published BIS report, the U.S. semiconductor industry is

¹ Source: World Semiconductor Trade Statistics and SIA analysis.

² Source: Based on NAICS code 334413.

³ Source: World Semiconductor Trade Statistics and SIA analysis.

spread across 40 states, directly responsible for 345,000 highly skilled and good-paying American jobs, and supports nearly 1.7 million additional U.S. jobs. The same report found that roughly two-thirds of U.S.-headquartered front-end manufacturing facilities are located in the United States. Since the passage of the bill, many companies in the semiconductor ecosystem announced dozens of projects to increase manufacturing capacity in the U.S., including major investments in the construction of new semiconductor manufacturing facilities, expansion of existing sites, and facilities that supply the materials and equipment used in chip manufacturing. These domestic supply-side measures must be complemented by U.S. trade policy initiatives and negotiations designed to create opportunities and enhance competitiveness for U.S. semiconductor products, and the devices and equipment in which they are integrated, in global markets.

SIA appreciates the opportunity to provide comments as USTR considers how trade and investment policy initiatives can support the historic investments in domestic semiconductor manufacturing capacity and promote supply chain resilience for semiconductors.

B. THE GLOBAL SEMICONDUCTOR SUPPLY CHAIN

The semiconductor industry is critical to economic competitiveness and national security in an era of digital transformation, artificial intelligence, Industry 4.0, connected vehicles, and 5G/6G communications. The semiconductor industry's strategic importance is causing many countries to consider how to strengthen their positions across the semiconductor value chain. Against the backdrop of global technology competition and ever-complex geopolitical dynamics, strengthening American and global semiconductor supply chains is a top priority for SIA and its members. Collaboration and two-way information sharing between government and industry will be critical in successfully achieving shared supply chain objectives related to the semiconductor industry, and we look forward to a robust public-private partnership on these issues going forward.

The global semiconductor supply chain is highly specialized, dispersed, and complex – from semiconductor design and manufacturing (both front-end wafer fabrication and back-end assembly, test, packaging) to semiconductor manufacturing equipment and upstream materials necessary for chip production. Different regions have particular strengths at different stages of the value chain, and as underscored by Secretary of State, Anthony Blinken, “No one country, including the United States, can produce or onshore everything it needs.”

With respect to semiconductor manufacturing, the process consists of hundreds of steps to produce a single wafer (i.e., a thin, round slice of a semiconductor material varying in size between 6 and 12 inches in diameter). Patterned layers are added on and into the wafer creating interconnected electrically active regions on the surface, ultimately forming the complete semiconductor. An abridged overview of the semiconductor supply chain, from mine to fabricator, is as follows:

- *Mining and Refinement of Metallurgical Grade Silicon:* Silicon dioxide, also known as silica (which is found in sand), is mined and refined into metallurgical grade silicon.
- *Polysilicon:* Metallurgical grade silicon is further refined into polysilicon.
- *Ingot Production:* Polysilicon is heated into a molten liquid. In a process similar to repeatedly dipping a wick in wax to make a candle, a small piece of solid silicon (i.e, the “seed”) is dipped in molten liquid. As the seed is slowly withdrawn by mechanical means from the melt, the liquid quickly cools to form a single crystal ingot.
- *Blank Wafer Production:* This cylindrical crystal ingot is then ground to a uniform diameter. A diamond saw blade slices the ingot into thin wafers. The cut wafers are then processed through a series of machines where they are ground (optically) smooth and chemically polished.
- *Front-End Wafer Fabrication:* The heart of any semiconductor manufacturing business is the fabrication, where the integrated circuit is formed on the wafer. The fabrication process, which takes place in an environmentally controlled clean room, involves a series of principle repetitive steps.

- *Back-End Wafer Fabrication* : Electrical tests then check the functionality of each chip on the completed wafer, which is then sliced into single chips that are assembled and packaged for delivery to customers.

Creating a single wafer spans continents and requires the participation (directly and indirectly) of hundreds of workers. There are thousands of individual suppliers responsible for the complex materials and tools referenced above. Ensuring that such a complex supply chain remains resilient and secure in the face of global challenges requires a multi-pronged effort on the part of the United States.

C. COMMENTS AND RECOMMENDATIONS

SIA Encourages USTR to Leverage Trade Policy and Pursue Market-Opening Trade Initiatives and Negotiations to Boost Global Demand for U.S. Semiconductors

In its request for comments (RFC), USTR asks how U.S. trade and investment policy, in conjunction with relevant domestic incentive measures, can better support growth and investment in domestic manufacturing and services (question 1). The RFC also asks for examples of trade and investment policy tools that can be deployed to enhance semiconductor supply chain resilience (question 4).

Since the CHIPS Act was introduced, semiconductor companies have announced over 80 new manufacturing projects in the U.S., totaling more than \$350 billion in private investments across 25 states. These projects will create 48,000 direct jobs and support hundreds of thousands of additional jobs throughout the U.S. economy. These supply-side investments are helping to reverse a decades-long downward trajectory in semiconductor manufacturing capacity in the U.S. We likewise encourage the U.S. government to consider similar policies to incentivize more R&D and design activity in the U.S.

At the same time, it is equally important for the U.S. government to pursue demand creation measures for domestically manufactured semiconductors through global market access initiatives

and negotiations, while also aggressively combating market access barriers and non-market practices in other countries that unfairly tilt the playing field and undercut U.S. semiconductor competitiveness. In other words, to ensure that the CHIPS Act-fueled domestic investments will be successful and sustainable over the long term, the U.S. must pursue a proactive, affirmative, and market-opening trade and investment agenda that promotes and facilitates U.S. semiconductor sales in new and emerging markets. Such an agenda would also help to offset the negative impacts of trade restrictive measures intended to reduce U.S. sales of advanced semiconductors and chip manufacturing equipment to certain overseas markets. As U.S. domestic semiconductor manufacturing capacity and supply increase, USTR and other agencies should take steps to ensure there is sufficient market demand to generate a return on these investments spurred by the CHIPS Act and to sustain further growth, production, and jobs in the United States.

SIA strongly encourages the U.S. government to launch negotiations and initiatives with the express mandate to open new markets for U.S. semiconductors and related products.

On average U.S.-headquartered semiconductor companies generate around 75 percent of revenue from sales to foreign markets, and the U.S. has maintained a consistent trade surplus in semiconductors. When launching IPEF in May 2022, the White House noted that “the Indo-Pacific is projected to be the largest contributor to global growth over the next 30 years”⁴. This is true for semiconductors, where the market for chips in Asia more than tripled from US\$21.2 billion in 2001 to over US\$73 billion in 2021.⁵ However, as previously noted, the IPEF initiative has not resulted in the expected growth in U.S. semiconductor sales in Indo-Pacific markets. Rather, the

⁴ “FACT SHEET: In Asia, President Biden and a Dozen Indo-Pacific Partners Launch the Indo-Pacific Economic Framework for Prosperity,” May 23, 2022. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/05/23/fact-sheet-in-asia-president-biden-and-a-dozen-indo-pacific-partners-launch-the-indo-pacific-economic-framework-for-prosperity/>

⁵ Source: World Semiconductor Trade Statistics and SIA analysis.

share of overall U.S. semiconductor sales to Asia (ex-China) has declined over the past few years (per the above).

With respect to specific trade policy tools, the U.S. industry has reaped major benefits from increased market access under U.S. free trade agreements and World Trade Organization (WTO) tariff liberalization initiatives, namely the 1996 Information Technology Agreement (ITA-1) and its 2015 expansion (ITA-2), which substantially reduced import costs for semiconductors and related products, including chip design software, materials, semiconductor manufacturing and testing tools and equipment, multi-component ICs (MCOs), and certain machine tools. These agreements have served both to create new markets for U.S.-built technologies and strengthen and expand global supply chains. USTR's successful challenges to barriers to semiconductor trade under the WTO's dispute settlement system helped lay the groundwork for the ITA agreements and address discriminatory barriers to U.S. semiconductors.

Participation in ITA-1 and ITA-2 have become a virtual prerequisite for developing countries seeking to attract major semiconductor industry investments. As the U.S. government seeks to work with third countries in the Indo-Pacific and Americas to expand and diversify downstream semiconductor manufacturing capacity—including through the State Department's International Technology Security and Innovation (ITSI) Fund, appropriated under (CHIPS) Act of 2022—SIA and its member companies encourage USTR to prioritize efforts to expand country participation in the ITA-1 and ITA-2, as well as expand product coverage under those agreements. Put simply, USTR should work closely with all ITSI fund partner countries to expeditiously join the ITA-1 and ITA-2, and participation in ITA-1 and ITA-2 should be a prerequisite for future ITSI fund partnerships.

SIA also remains a strong supporter of the WTO as the cornerstone of an open, rules-based, global trading system. As an export-oriented industry with global supply chains, our industry benefits from strong multilateral trade rules, duty-free treatment, effective disciplines on non-tariff barriers, and increased transparency, among other key WTO principles. Other landmark WTO agreements such as the Trade Facilitation Agreement (TFA), Trade-Related Aspects of Intellectual Property Rights (TRIPS), and the Moratorium on Customs Duties on Electronic Transmissions have helped to improve U.S. semiconductor competitiveness globally and protect American innovation and supply chains. And, to the extent that U.S. ally and partner governments have adopted commitments under these agreements, they have also helped lay the groundwork for further expansion and diversification of global semiconductor supply chains.

Given the complexity of global semiconductor supply chains, continued implementation of WTO's Trade Facilitation Agreement will be important to address customs barriers, improve transparency, and expedite customs clearance procedures. Semiconductor companies and their customers across all sectors of the U.S. and global economy can ill-afford to have shipments of semiconductors and related materials and equipment necessary in their design and production bogged down for weeks or months awaiting customs clearance.

The free flow of data across borders is also critical to enabling semiconductor supply chains. Over the past few years, governments and companies dedicated significant efforts to strengthen physical supply chains to avoid chip shortages and other disruptions. The smooth functioning of physical supply chains is also critically dependent on open and secure cross-border data flows. In the semiconductor sector, every step in the value chain involves the electronic transmission of data – from semiconductor design, to wafer manufacturing, to back-end assembly, testing, and packaging. For example, chip design can be a massive undertaking, with engineering

teams across multiple countries. Semiconductor design data can cross borders hundreds, and even thousands of times in the design development phase. When semiconductor design is handed off to a manufacturing fab or foundry, that design data is transferred across borders in what is called a GDS, or Graphical Data System, file. Likewise, during the semiconductor manufacturing process, huge amounts of data are generated and collected at every step in multiple production areas, with data coming from wafer fab, probe/testing, assembly, and final testing. Again, this data will often cross borders multiple times over the course of production.

Likewise, the protection of intellectual property (IP) is essential to technological progress and continued U.S. semiconductor competitiveness. U.S. semiconductor companies devote about one-fifth of sales revenue to R&D, often leading to the creation of trade secrets and other valuable IP. The rapid pace of technological change in semiconductor technology requires constant advancement in semiconductor process technology and device capabilities. Strong IP protection and enforcement incentivizes companies and research institutions to invest in research and development and share technology without compromising their return on investments. Securing effective trade secrets protection abroad is a pressing issue for U.S. innovators who face rising threats from cross-border misappropriation, corporate espionage, cyber-intrusions, and other forms of trade secret theft. Such theft can put thousands of high-paying jobs in the United States at risk, while also posing threats to U.S. economic security, national security, and technological leadership. Trade rules prohibiting partners from requiring companies to transfer their technology, production processes, or other proprietary information such as source code (often as a condition of market access) will help prevent unhelpful distortions generated by such non-market driven behavior and the unauthorized disclosure or theft of IP.

Lastly, as many countries roll out incentives and support policies for the semiconductor industry, we urge the USTR and other agencies to work with other U.S. allies and trading partners to help ensure mutual nondiscriminatory access to each country's incentive programs. More efforts and greater collaboration are also needed to ensure incentive programs for the semiconductor industry are market-based and do not distort the market. We urge the USTR and other agencies to look at new norms and principles in this regard, whether within the WTO, GAMS, or in other plurilateral constellations.

USTR's RFC also asks how U.S. trade and investment policy can promote a virtuous cycle and "race to the top" within trusted networks among regional and like-minded trading partners and allies. The U.S., however, is not currently engaged in any free trade agreement negotiations with allies and earlier initiatives with the UK and Kenya have lapsed. This is worrying. While USTR sits on the sidelines, U.S. partners and competitors have continued to negotiate new market opening deals and forge new supply chain networks that put the U.S. and its companies at a competitive disadvantage with other global players in the semiconductor sector. For example, China has taken an aggressive approach to bolstering its domestic industry and pursuing a greater share of the global exports through trade agreements. China has active free trade agreements with 26 countries and territories and is negotiating an additional eight agreements. China is part of the Regional Comprehensive Economic Partnership (RCEP), which provides its companies with preferential access to 15 foreign markets across ASEAN, South Korea, Australia, New Zealand, and Japan – economies that represent around 30% of global GDP. To build on these gains and further benefit its domestic industry, including semiconductor companies, China has applied to join the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP), in a bid to further

expand its economic influence and role in regional supply chains, and gain an edge over the U.S. by securing preferential market access for its exports into key emerging economies in Asia.

China's aggressive pursuit of greater international cooperation and market access has fueled an increase in its share of global merchandise exports from 13 percent to 16 percent, in the five years between 2017 to 2022. By contrast, the U.S. share of global merchandise exports remained flat at 9 percent over the same period.⁶ This dynamic leaves the U.S. and its companies at a strategic disadvantage. To reverse this trend, the United States needs to urgently get back in the game of negotiating market-opening trade deals to expand export markets for U.S. semiconductors in support of U.S. manufacturing, jobs, and continued American leadership in advanced technologies. Absent U.S. leadership and initiative, the proliferation of regional trade agreements such as RCEP, CPTPP, EU-Japan, UK-Japan, UK-CPTPP, China-CPTPP, and EU-Mercosur means U.S. companies and products will operate at an increasing competitive disadvantage as supply chains gravitate toward suppliers covered by preferential tariffs and rules under regional and bilateral FTAs to which the U.S. is not a party. Such tariff preferences and WTO-plus rules favor non-U.S. suppliers (e.g., China, Japan, EU, ASEAN) and pressure companies to shift production into economies covered by FTAs if they wish to remain competitive in global markets. These effects would directly undermine bipartisan goals of boosting U.S. domestic investment and jobs, U.S. leadership in semiconductors and other advanced technologies, and building more resilient U.S. supply chains.

⁶ Source: UN Comtrade and SIA analysis.

The U.S. Should Continue to Support Incentive Programs to Build U.S. Semiconductor Manufacturing Capacity.

The complex, technologically advanced process of designing and manufacturing semiconductors and semiconductor manufacturing equipment requires high levels of investment in people, facilities, and equipment due to the complexity of the technology and the rigorous and exacting standards needed for construction, equipment, and infrastructure. In light of the critical role of semiconductors to the U.S. economy and national security, U.S. technology leadership, and U.S. competitiveness, Congress enacted the CHIPS and Science Act to provide robust incentives for the expansion of the domestic semiconductor ecosystem. These incentives consist of two separate but complementary programs: (1) a program of direct manufacturing incentives under the authority of the Department of Commerce and (2) an “advanced manufacturing investment credit” codified under section 48D of the Internal Revenue Code.

As the incentives enacted under this law are imperative to building up and sustaining the U.S. semiconductor industry, we encourage the U.S. government to fund all the programs under the CHIPS and Science Act that have encouraged investment in semiconductor manufacturing, design, and R&D in the U.S. Likewise, the Section 48D credit offered under the Act provides an important incentive to address key supply chain gaps and vulnerabilities through enacting a 25% credit for manufacturing semiconductors and semiconductor manufacturing equipment. These new manufacturing facilities will require ongoing investments to remain competitive and additional facilities will need to be built to further strengthen the semiconductor ecosystem in the U.S. SIA encourages extension of the credit beyond the 2026 expiration to spur continued investment in domestic operations. The credit should also be expanded to include semiconductor design and the manufacture of critical semiconductive materials, like polysilicon. Supporting

these critical activities are integral to the long-term strategy of strengthening the domestic chip industry and supply chain.

Meaningful Consultations with Industry Are Vital to Ensure U.S. Policies Are Effective.

SIA and its members companies stand ready to partner with USTR, the Department of Commerce, the Department of Homeland Security, the Department of Defense, and other U.S. agencies to support semiconductor supply chain resilience in the U.S. and partner countries. Continued public-private collaboration, partnership, and consultation is vital to ensure the effectiveness of U.S. trade policies and initiatives, and to minimize negative impacts on U.S. competitiveness, production, and jobs.

CONCLUSION

For the foregoing reasons, SIA strongly recommends that USTR leverage trade policy and pursue market opening initiatives to boost global demand for U.S. semiconductors and support efforts to diversify and expand global supply chain capabilities that are complementary to U.S. semiconductor supply chains. SIA also encourages the U.S. government to implement and expand existing incentive programs to boost U.S. semiconductor manufacturing, design, research and development, and jobs. We again appreciate the opportunity to offer semiconductor industry perspectives on U.S. trade policy, and request that USTR and other government agencies closely consult with the semiconductor industry stakeholders on trade and supply chain initiatives. Taking these steps will strengthen U.S. and global supply semiconductor chains more resilient while supporting American semiconductor manufacturing and jobs, and fueling continued U.S. semiconductor leadership.