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Section 301 and China: Mature-Node Semiconductors

Title III of the Trade Act of 1974 (Sections 301-310, codified at 19 U.S.C. §§2411-2420) is referred to as "Section 301." It is one of the principal statutory means by which the United States enforces U.S. rights under trade agreements and addresses "unfair" foreign barriers to U.S. exports. It grants the U.S. Trade Representative (USTR) a range of authorities to investigate foreign trade actions, policies, and practices and to impose trade sanctions on foreign countries found to have violated U.S. trade agreements or to have engaged in acts that are "unjustifiable," "unreasonable," or "discriminatory," and burden or restrict U.S. commerce.

In December 2024, USTR initiated a Section 301 investigation regarding the People's Republic of China (PRC or China)'s "acts, policies, and practices related to targeting of the semiconductor industry for dominance." USTR says it is focusing on PRC production of mature-node or "legacy" chips (see "Mature-Node Chips") and their use in products in critical industries (e.g., defense, automotive, medical devices, aerospace, communications, and power). USTR is also examining PRC production of silicon carbide substrates and wafers used in chip production. USTR has requested consultations with PRC officials, accepted public comments, and held a public hearing. A report on its findings is slated to be issued later in 2025. This is the third Section 301 case involving China since 2018. In 2018, USTR investigated PRC technology transfer, intellectual property (IP), and innovation policies, and imposed U.S. tariffs. In April 2024, USTR investigated PRC shipbuilding and shipping policies and proposed shipping fees. See CRS In Focus IF12125, *Section 301 and China: The U.S.-China Phase One Trade Deal* and CRS In Focus IF12666, *Section 301 and China: Shipping and Shipbuilding Issues*.

Semiconductors (integrated circuits or chips) are tiny electronic devices (based primarily on silicon or germanium) composed of billions of components that can process, store, sense, and move data or signals—essentially serving as the brains, memory, sensors, communications, and power lines of electronic devices. A **wafer** is a flat, thin slice of silicon material on which an integrated circuit is created. **Silicon carbide** is used in certain substrates and wafers; it is a compound known for its high thermal conductivity, mechanical strength, and wide bandgap (enabling devices to operate at higher voltages, frequencies, and temperatures).

U.S. economic, trade, technology, and defense policies have sought to sustain U.S. strength in semiconductor technology and production, along with secure supply chains, as a vital element of U.S. economic and national security. Semiconductors are an important strategic technology that is broadly enabling of and fundamental to nearly all modern industrial and national security activities. They are essential building blocks of other technologies (e.g., artificial intelligence, autonomous systems, 5G communications, and quantum computing). Some U.S. policymakers have warned that PRC state-led policies, if successful, could lead to a loss of U.S. technological leadership, shift semiconductor production and related capabilities to China, and ultimately support a range of PRC advancements, including military applications. Congress has considered ways to counter PRC policies and boost U.S. capabilities. The CHIPS and Science Act (P.L. 117-167) appropriated $52.7 billion in federal funding until expended and provided tax incentives to expand U.S. semiconductor capacity. The Trump Administration is reportedly asking firms to commit more U.S. investment before it issues CHIPS funds.

Section 301 Process

Investigations: Section 301 generally requires that USTR conclude investigations within 12 months. USTR may determine, after carrying out an investigation, whether action under Section 301 would address its concerns.

Consultations: During an investigation and prior to making a determination on whether to take action, USTR must consult with the petitioner and seek advice from private sector advisory representatives. The agency can—but is not required to—request the views of the U.S. International Trade Commission concerning how a proposed retaliatory action could impact the U.S. economy.

Negotiations: Section 301 requires the USTR to seek a negotiated settlement with the country concerned. USTR has 12 to 18 months to seek a negotiated resolution, except for cases that involve a trade agreement or IP rights issue. For cases involving trade agreements, USTR is required to use such agreements' dispute process.

Retaliation: If a settlement is not obtained, USTR may determine whether to retaliate at a level it deems equivalent to the estimated U.S. economic losses incurred from the foreign barrier/practice. Section 301 authorizes USTR to

- impose duties or other import restrictions;
- withdraw or suspend trade agreement concessions;
- enter into a binding agreement with the foreign government to either eliminate the conduct (or burden to U.S. commerce) in question or compensate the United States with satisfactory trade benefits; or
- restrict terms and conditions or deny licenses and permits that allow access to the U.S. market.

The executive branch's invocation of Section 301 authorities does not require congressional approval. Provisions in the section authorize the President to take any action "with respect to trade in any goods or services, or with respect to any other area of pertinent relations with the foreign country" to address the policy or practice under investigation.

PRC Industrial Policies

In June 2014, the PRC government issued industrial plans that appear to aim to establish a vertically integrated semiconductor industry in which China has a leading role in

all segments of the supply chain by 2030. These plans call for domestic production to meet 80% of PRC demand for chips by 2030. PRC efforts are leveraging over $150 billion in announced state funding to advance stated ambitions to lead across the entire value chain. Such efforts include the targeting of foreign capabilities. USTR has denounced PRC efforts to pressure or incentivize foreign firms to transfer knowhow to build out China's industry. While the U.S. government has restricted some advanced chip technologies, it has allowed most commercial activity with China below these thresholds. Access to U.S. and foreign talent, training, research, and open-source technology has allowed PRC institutes and firms to design advanced chips and work at the industry's leading edge. Design and front-end production comprise 90% of value in the industry; it is an area China says it is targeting to advance its capabilities.

PRC chip firms are state-backed and have benefitted from state funding, including to import foreign equipment and acquire foreign semiconductor firms. PRC firms have also benefitted from PRC tax preferences; market barriers; and discriminatory antitrust, procurement, IP, and standards practices. Since 2020, PRC policies have offered preferences to firms that transfer IP to entities in China that are legally separate from a corporate parent. Such *quid pro quo* links between IP transfer and policy incentives may violate the 2020 U.S.-China *Phase One* trade deal, in which China agreed not to require or pressure firms to transfer technology in relation to investments, or as a condition to receive advantages conferred by China (Article 2.3). Some PRC firms have used patent litigation to challenge foreign firms' exclusive use of proprietary technologies, to press for better licensing terms, and to counter U.S. court rulings with copycat cases in PRC courts. There have been high-profile instances of PRC theft of U.S. semiconductor IP.

Mature-Node Chips

Mature-node chips are made using established production processes. Typically, mature-node is considered as 22nm or 28nm and larger (e.g., 40nm, 65nm, and 130nm). The CHIPS Act set a threshold that firms receiving awards may not produce technology in China below the 28nm node for 10 years. Commerce Department regulations include as "legacy" or mature-node: silicon wafers of 8 inches or less in diameter; compound wafers of 6 inches or less in diameter; and chips that do not use advanced 3D packaging. In contrast, PRC policies treat silicon carbide and 28nm node technology as advanced, and encourage investments, foreign acquisitions, and technology transfer in such areas.

Process node refers to a set of design rules and manufacturing techniques used to create a chip and transistor characteristics (e.g., feature size) in nanometers (nm). Generally, the smaller the node, the more advanced the technology. For some types of chips, however, process node does not indicate performance. Technological advancements have enabled some larger chip features to perform as if they were smaller. For **wafers**, larger diameters tend to indicate more advanced and efficient production capabilities.

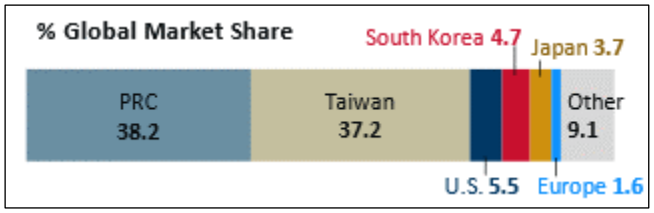
Mature-node chips support most consumer, industrial, and defense needs. They constituted 88% of global chip sales by volume and 40% of chip sales by value in 2023. They support a range of advanced applications: communications (e.g., 5G technology, blue-tooth, wireless); power electronics (e.g., electric vehicles); display systems (e.g., mobile phone and television screens); the internet of things (e.g., smart devices); and sensing. Silicon carbide chips support industrial control systems and defense applications (e.g., avionics, radar, and missile guidance systems) due to their ability to perform consistently in harsh conditions.

China's Role in Mature-Node Chips

While China still has key gaps in its semiconductor capabilities, PRC firms are catching up with foreign firms in some areas. China plays a leading role in mature-node chips and could use its position to expand market share and advance capabilities. Several experts say that there is up to an 80% overlap in technology from one node to the next. The industry has enhanced the performance of mature-node chips with new materials and advanced packaging that adds features and integrates small, modular chips. China can leverage its central role in global manufacturing and its dominance in critical minerals processing and other inputs to advance in semiconductor capabilities and capacity. Some observers say China is pursuing an approach it has used in other sectors whereby the government subsidizes national champions in a closed market, allowing those firms to produce at below-market rates and gain market share, and then expand production and drive out competitors.

About 60% of global chip production capacity is in mature-nodes. According to the market research firm IC Insights, PRC share of the 28nm-65nm market rose from 18% in 2020 to 31.5% in 2023. Global capacity of mature-node chips grew by 41.6% over this same period, with more than half of this growth in China. China could constitute over 38% of global mature-node chip production by 2030 (**Figure 1**).

Figure 1. Projected 2030 Mature-Node Chip Capacity



Source: CRS, with data from International Data Corporation, 2024.

Issues for Congress

Congress can oversee USTR's investigation and might consider whether or not to examine or encourage other actions. Congress could examine U.S. export control, investment, and antitrust policies and paths that are open to PRC firms (e.g., technology licensing, U.S. operations of PRC-tied firms, two-way investment, and access to U.S. research and open-source technology). Congress could consider how USTR treats products with embedded PRC chips for tariff purposes. Other issues for consideration include PRC IP theft and talent poaching; potential overcapacity in China; U.S. firms' partnerships in China and acceptance of PRC incentives and terms; the role of U.S. allies and partners in building PRC capacity; and any effects of U.S. tariffs (on China and third markets) on some firms' efforts to move electronics production out of China.

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