3.1 Innovation Management

To meet the increasing semiconductor content demand driven by technological innovation and the accelerated digital transformation following the pandemic, GlobalWafers has implemented large-scale capacity expansion plans across Asia, Europe, and the United States. The capacity expansion covers next-generation large-diameter products, including 12-inch wafers and EPI Wafer, 12-inch SOI Wafer, 8-inch FZ Wafer, SiC wafers (including SiC EPI), and GaN on Si.

Currently, GlobalWafers is upgrading and replacing equipment at its Phase II Hsinchu Science Park facility, investing in 12-inch silicon wafers for advanced processes and expanding its R&D center to develop advanced compound semiconductor materials, including silicon carbide (SiC) and GaN Epi. These two wide-bandgap materials are widely used in power devices and microwave RF communication applications, including 5G, high-power devices and fast-charging applications, high-frequency and high-voltage applications, automotive electronics, photonic data communications, AIoT, and green energy. Market demand for these applications has continued to grow significantly. These products have gradually entered mass production and become new growth drivers supporting GlobalWafers' continued strong growth.

In terms of products and R&D, the following strategies have been established:

- Significantly increase the capacity and technology for advanced semiconductor wafers dedicated to advanced process technologies
- Accelerate the development of SiC wafers and semi-insulating SiC/GaN EPI wafers required for emerging technologies such as 5G, power electronics, and electric vehicles
- Expand the scale and R&D capabilities of the Taiwan wafer R&D center
- Support the development of domestic green energy and increase the proportion of green energy used in semiconductor wafer manufacturing processes

From the perspective of product categories, the products can be divided into three major categories. The development directions of these three product categories are described below:

GlobalWafers Product Development Directions

1. Integrated Circuit Wafer Materials:

The main products include 8–12 inch perfect silicon wafers, 8–12 inch annealed wafers, wafers for optical sensing devices, SOI wafers, and square silicon wafers for advanced packaging. Large-diameter wafers are mainly used in the manufacturing of integrated circuit components, including five major categories: bipolar digital, memory, micro, logic, and analog devices.

As process technologies continue to advance toward smaller geometries, the requirements for wafer defects, surface flatness, and cleanliness become increasingly stringent. Therefore, improvements in crystal growth engineering technologies (such as oxygen concentration control and micro-defect reduction) as well as breakthroughs in wafer processing technologies have become increasingly important. As the line widths of integrated circuits continue to shrink, the quality requirements for silicon wafers also become more demanding. In the field of integrated circuit wafer materials, GlobalWafers will continue to develop wafers that meet the requirements of advanced integrated circuit manufacturing processes, while also providing customers with the best services and product options.

2. Power Electronics Wafer Materials:

With increasing environmental awareness, the demand for green energy has become a global trend. At the same time, the growing adoption of renewable energy and the rapid development of the electric vehicle industry have made power electronics a major global focus. In addition, trends toward industrial automation, rising consumer purchasing power, and increasing demand for consumer electronics products have further driven the development of power electronics. Industry participants are placing greater emphasis on energy-saving requirements achieved through advanced power electronics solutions and the broad industrial application track records of such technologies, further supporting the expansion of power electronics-related vertical markets. The wafers required for silicon-based power semiconductor devices include ultra-low resistivity heavily doped wafers, high-power electronic wafers, automotive diode wafers, deep diffusion polished wafers, FZ wafers, and Taiko wafers. With industry development and large-scale market adoption, demand for both wafer quality and quantity continues to increase year by year. Under continued market growth, the global power electronics market size is expected to reach US$51.7 billion in 2025 and US$67.4 billion by the end of 2030. Higher power density requirements and growing demand from the automotive industry are the primary drivers of market growth. Meanwhile, a material transition revolution continues to advance, with GaN and SiC technologies gradually replacing certain silicon transistors and more diode products to improve product performance. Global demand for power semiconductors continues to grow, and GlobalWafers maintains a leading position in this field while continuously strengthening the development of related products and technologies.

3. Wide Bandgap Wafer Materials:

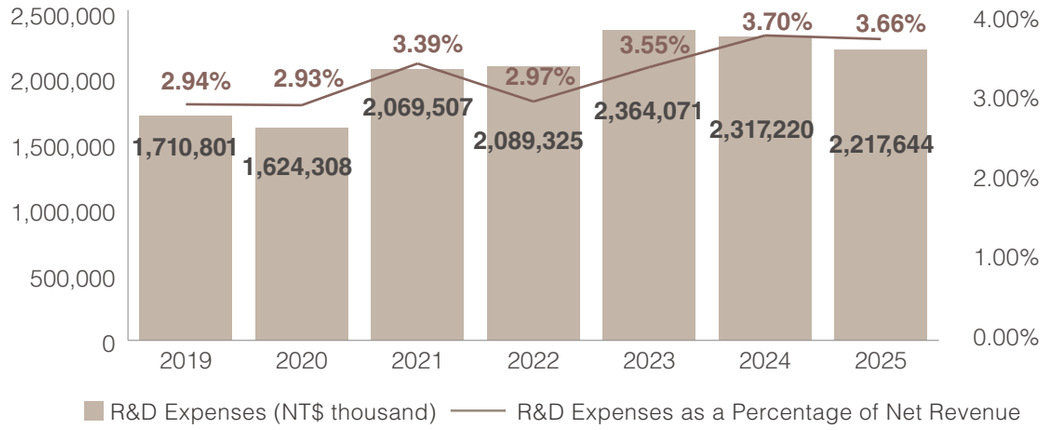
Wide-bandgap power devices offer many advantages, including high breakdown electric field strength, high electron saturation velocity, and excellent thermal conductivity. These characteristics make wide-bandgap devices more suitable for applications in high-power, high-frequency, and high-temperature environments. The use of wide-bandgap power devices can reduce energy loss during conduction and switching, while the overall power consumption of system operation can be reduced by approximately half. In addition, due to lower energy consumption and superior heat dissipation characteristics, systems using wide-bandgap power devices can significantly reduce size and weight. Currently, new materials such as SiC, GaN, and gallium oxide are regarded as next-generation power semiconductor materials. With the advancement of semiconductor technology, the

integration of compound semiconductors and Si-based semiconductors has become a market trend, as this enables the combination of the mature manufacturing process and cost advantages of silicon with the high-frequency, high-power, and optoelectronic characteristics of compound semiconductors. Through heterogeneous integration, advanced packaging, epitaxial technologies, and other approaches, materials such as SiC, GaN, GaAs, and InP can deliver high-performance advantages while reducing costs. These integration technologies are expected to significantly enhance applications in 5G/6G communications, electric vehicles (EV), optoelectronics, AI computing, and optical communications, driving semiconductor technology toward the next generation.

According to TrendForce research, the SiC power device market is estimated to reach US$2.73 billion in 2025 and grow to US$8.41 billion by 2030, representing a compound annual growth rate (CAGR) of 25.24% from 2025 to 2030. According to research by Transparency Market Research Inc. (TMR), the GaN semiconductor market is estimated at US$4.13 billion in 2025, with a CAGR of 17.22% from 2025 to 2030, reaching US$9.14 billion by the end of 2030. GlobalWafers continues to invest in the development of GaN and SiC wafers. Currently, the Company can provide dedicated silicon wafer substrates for GaN on silicon, as well as GaN on silicon epitaxial wafers and GaN on SI-SiC epitaxial wafers for customers' device design and development. Meanwhile, shipments of SiC polished wafers and epitaxial wafers continue steadily, and development efforts are also expanding toward thermal management substrates and AR glasses applications. For these two rapidly growing new materials, GlobalWafers will continue to invest R&D resources to provide a wide variety of wafers required for semiconductor applications throughout the development of the semiconductor industry, while offering customers comprehensive solutions.

GlobalWafers has established a cross-disciplinary R&D team centered on materials science, process engineering, system design, and advanced applications, while maintaining long-term and stable investment in forward-looking R&D resources. The cumulative R&D expenditures over the years have been transformed into key process capabilities, breakthroughs in material technologies, and enhanced product performance, forming scalable technological advantages for mass production. This not only demonstrates the achievements of the Company's deep cultivation and innovation in core technologies, but also further strengthens its competitive position in high-end application markets:

R&D Expenses



3.1.1 R&D Resources

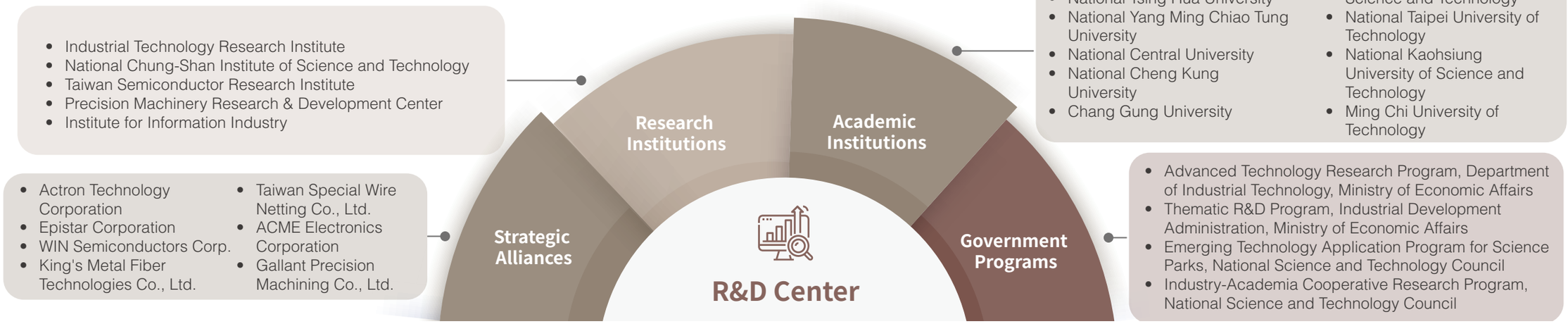
Product development is time-consuming and requires significant manpower and resources. Successfully developing a product depends on support from multiple resources. Under limited resources, how to create greater value with fewer resources is a key challenge that must be learned.

※ Internal Resources

GlobalWafers has 18 operational and manufacturing sites worldwide, located in 9 countries, with customers across Europe, Asia, and the Americas. In global competition, access to information and resource sharing can make decision-making more efficient and accurate. Therefore, GlobalWafers has established a cross-site Knowledge Management (KM) platform to enable the exchange of information and technologies among its sites. Through this platform, resources and support are available for technical issues, market information, product development, production management, quality management, and IP and patent-related activities encountered by each site. At the same time, the platform establishes an internal competition mechanism to accelerate the improvement of capabilities at each site.

Internal Resource – KM Exchange Platform

External Resources – Strategic Alliances with Industry, Government, Academia, and Research Institutions



※ External Resources

Taiwan has excellent academic resources and has accumulated extensive knowledge in basic research and scientific applications. Industry-academia collaboration can rapidly introduce abundant R&D capabilities, accelerate product development, and shorten development time. In addition, Taiwan has a complete Information and Communication Technology (ICT) industry supply chain. Through the integration of upstream and downstream operations, products can be developed with mass production capability from the development stage. Furthermore, to promote industrial upgrading and the practical application of academic research, government agencies provide substantial research funding each year to support collaborative product and new technology development between enterprises and academic research institutions. Since 2015, the Taiwan government has promoted the Industrial Innovation Platform Program to support industrial transformation through four development strategies: enhancing value, strengthening key technologies, developing systems, and fostering emerging industries. In utilizing external resources, GlobalWafers headquarters engages in industry-academia collaboration with academic institutions, commissioned research with research institutions, applies for government subsidies to execute national projects, and forms strategic alliances with industry partners. These external resources together form an external advisory group for R&D, helping to resolve technical issues encountered during product development and conduct validation of R&D products.

Sustainable operations and stable profitability are important foundations for the Company's long-term development. In response to global competition and rapid technological advancement, the Company must continue to maintain growth momentum and enhance its resilience and competitiveness through forward-looking strategies to address changes in the external environment. In terms of business strategy, the Company aligns its operations with industry trends and maintains its market competitiveness through strengthening core capabilities and enhancing technological differentiation, thereby supporting stable business growth. In terms of research and development, the Company continues to deepen its core technologies, while incorporating technology trends and market information into its R&D direction. The Company also integrates internal and external resources to improve R&D efficiency and innovation outcomes. At the same time, the Company places great importance on the protection and utilization of intellectual property, ensuring that its technology assets are properly managed and supporting the Company's progress toward sustainable operations.

R&D Strategy and Company Operations

Product Responsibility

The Company adheres to the principle of Product Responsibility, with "reducing consumption, improving efficiency, and implementing circularity" as its core focus. From the product design stage through mass production processes and packaging delivery, the Company has established a sustainability management framework covering the entire product life cycle to ensure that its products comply with regulatory and environmental sustainability requirements. Key annual objectives include the introduction of high-efficiency and energy-saving hot zones to extend hot zone service life, the elimination of lactic acid use in manufacturing processes to achieve zero lactic acid discharge, the reduction of Diamond Slurry (DS) waste, the recycling and reuse of chemical acid etching solutions, the reduction of lapping slurry waste, and improvements in waste weight reduction. These efforts aim to balance product quality, manufacturing efficiency, and environmental protection.

1. Product Design Principles and ESG Integration in New Product Development (Design for Sustainability)

Without compromising product functional requirements and process stability, the Company considers the environmental impacts throughout the product life cycle during the new product development process. The following measures are adopted to reduce energy consumption and environmental impacts across the product life cycle, ensuring that ESG requirements are incorporated not only into mass production operations but also into decision-making at the R&D and design stages.

- Energy Efficiency

The Company gives priority to low-pollution and low-energy-consumption processes, materials, and supplies. During the design and development stage, the efficiency of energy, water, and other resource usage in the manufacturing process is reviewed to reduce life cycle energy consumption and environmental impacts.

- Hazardous Substance Consideration

Necessary hazardous substance management is conducted during the development process in accordance with relevant regulations and customer requirements. The Company fully complies with domestic and international regulations, such as REACH and RoHS, to ensure compliance with regulatory standards. The Company has established a Hazardous Substance Control Procedure applicable to its products, raw materials stored on Company premises, packaging materials required for product shipment, and critical raw materials, ensuring compliance with control requirements from design and procurement through shipment.

- Packaging Reduction

In accordance with the Company's packaging management principles, packaging usage and necessity are reviewed during both product and packaging design stages. The Company promotes the reduction of packaging materials and enhances their recyclability. Packaging materials are also managed under the Company's Hazardous Substance Control Procedure.

- Product Recyclability

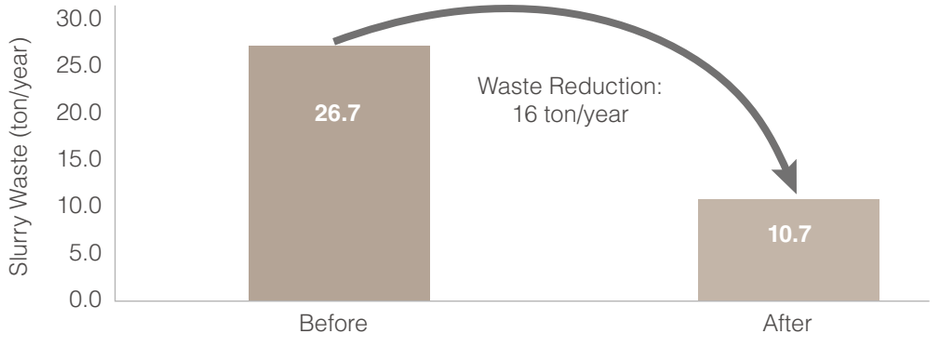
Considering that the Company's products (semiconductor wafers) serve as raw materials for customers and are further processed into components in downstream manufacturing processes, end-of-life recycling of the product itself is not a primary issue. Therefore, the Company focuses on the recyclability and reusability of packaging materials in its design and management practices.

2. Process Responsibility for Environmental Protection and Chemical Management

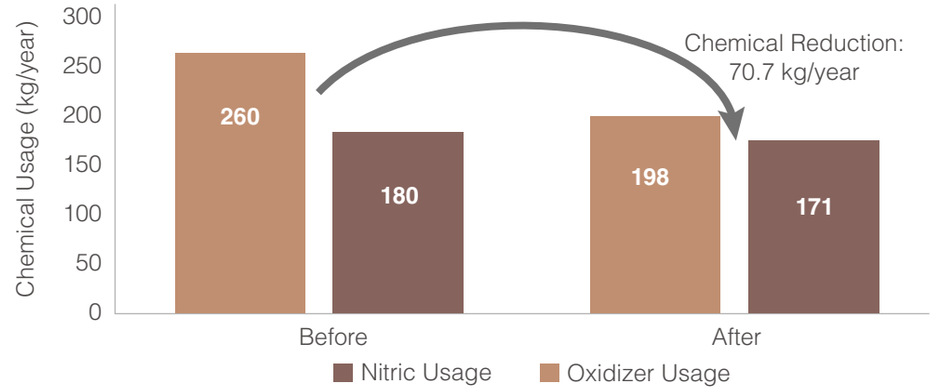
To reduce process chemical consumption and minimize process waste emissions, the Company improves process efficiency through process optimization, precise dosing, and equipment management, thereby achieving source reduction while maintaining product quality and production stability.

- Chemical Mechanical Polishing (CMP) Process: By introducing a precise replenishment mechanism, the service life of polishing slurry is extended while maintaining stable chemical properties. This initiative reduces approximately 16 metric tons of waste slurry and 70.7 kilograms of specialty chemical additives annually, effectively lowering chemical consumption and waste generation.
- Etching Process: By adjusting the acid replenishment and mixed-acid formulation according to wafer size, and through the recovery and reuse of acid solutions, the Company reduced etching acid consumption by 6,618 liters during the year.

60% Slurry Waste Reduction After Replenishment Optimization



16% Chemical Reduction Achieved via Replenishment Optimization



3. Material Circularity and Value Enhancement

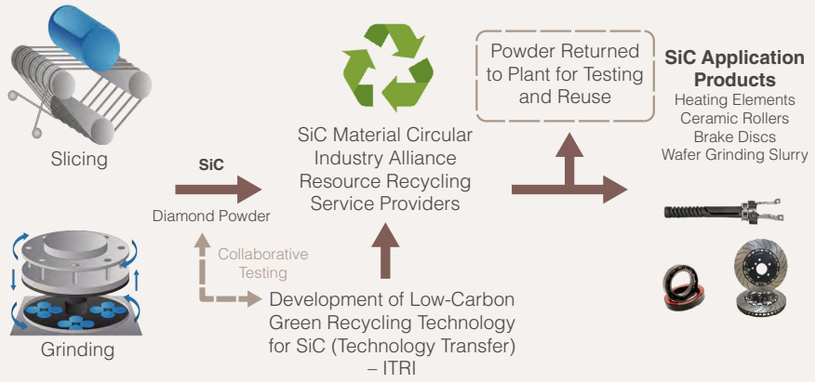
The Company promotes the circular reuse of by-products and consumables. Through recycling, remanufacturing, and reuse strategies, the Company strengthens resource circularity and supply chain collaboration, while improving material utilization efficiency and environmental benefits.

Case 1

Process Waste Recycling and Remanufacturing Project in Collaboration with the Industrial Technology Research Institute (ITRI)

The Company has developed high-value recycling technologies for process materials such as silicon carbide and diamond powder.

Under this project, diamond powder, which accounts for approximately 10–11% of cutting waste, is recovered and regenerated, achieving a diamond powder recovery rate of 90–95%. Through the introduction of high-value recycling technologies, the Company effectively reduces waste disposal and improves the resource recovery efficiency of high-value materials.

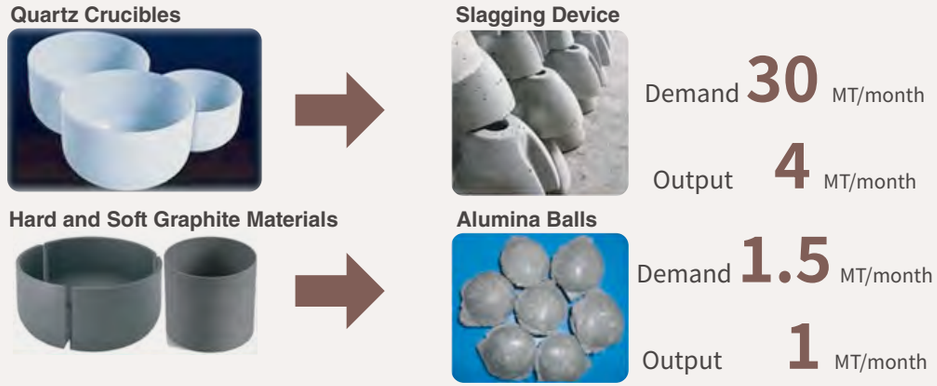


Case 2

Collaborated with China Steel Group to promote a circular reuse project for quartz crucibles and graphite materials.

Through this initiative, discarded quartz crucibles and graphite materials were evaluated and qualified for regenerative applications.

Sample assessments confirmed that their quality and physicochemical properties met the requirements of steelmaking processes, enabling their practical reuse in steel production. This project effectively promotes resource circularity while reducing the consumption of virgin raw materials.



4. Product Packaging and Delivery Responsibility

The Company adopts the principles of "avoiding excessive packaging, reducing packaging materials, and improving material recyclability" in packaging design to enhance transportation safety and resource efficiency. All packaging materials are also subject to the Company's Product Hazardous Substance Control Procedure. The management measures are as follows:

- **Cassette Reuse**
  For wafer shipments, the Company promotes a cassette reuse program in cooperation with customers. By increasing the number of reuse cycles, the program helps reduce the consumption of single-use plastic materials and the generation of waste.
- **Packaging Minimization**
  Through structural optimization, material reduction, and necessity reviews, the Company reduces the weight or volume of packaging materials per unit of product, avoids excessive packaging, improves transportation efficiency, and lowers logistics-related carbon emissions.
- **Paper Pallet Adoption**
  The Company gradually replaces certain plastic and wooden pallets with paper pallets to reduce the use of virgin wood and improve recyclability. Paper pallets are recyclable and lightweight, helping to reduce transportation-related carbon emissions while complying with environmental regulations such as RoHS and REACH.
- **Environmental and Compliance Management of Packaging Materials**
  All packaging materials must comply with the Company's Product Hazardous Substance Control Procedure and applicable regulatory requirements. Material selection may also be adjusted according to customer requirements to ensure environmental compliance while maintaining adequate transportation protection.

3.1.2 Intellectual Property Management System

1. Intellectual Property Management Plan Overview

TIPS Validation History

GlobalWafers implemented the Taiwan Intellectual Property Management System (TIPS) in 2013, establishing management processes and obtaining the basic certification. The Company subsequently passed the advanced certification in 2014 and 2015, and achieved AA-level certification six times in 2016, 2017, 2019, 2021, 2023, and 2025. For system implementation, the head of the R&D unit serves as the management representative and works together with the intellectual property unit and representatives from each functional unit to form a promotion team. Internal audits and management reviews are conducted regularly each year, and external verifications are carried out to ensure the effective implementation of the management system. Through the establishment of a systematic intellectual property management framework, GlobalWafers continues to strengthen and enhance its intellectual property management capabilities, which have been recognized and certified by independent third parties.

Milestones in Promoting Intellectual Property Management

Foundational Phase

- Established a robust patent review mechanism to enhance the quality of IP output
- Provided IP search results to stimulate innovative development proposals

Stable Growth Phase

- Held various intellectual property seminars to strengthen company-wide awareness of IP management
- Conducted diversified patent analyses to formulate effective patent portfolio strategies

Obtained the first U.S. patent in the silicon-based GaN field in 2016

Obtained the first U.S. patent in the SiC field in 2019

Continuous Breakthrough Phase

- Strengthen outsourced collaboration management and create opportunities for industry–academia–research cooperation
- Conduct joint brainstorming activities to continuously drive new product innovation

- Ranked among the Top 100 domestic patent applicants for five consecutive years
- Ranked among the Top 100 domestic patent grantees for four consecutive years

Surpassed 1,500 active patent filings in 2021

Surpassed 2,000 active patent filings in 2023

Surpassed 2,700 active patent filings in 2025

GlobalWafers Japan Co., Ltd. Joined

Topsil GlobalWafers A/S Joined
MEMC LLC Joined

2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026

2013
First obtained TIPS basic certification

2014
First obtained TIPS advanced certification

2016
First obtained TIPS AA-level certification

2025
Achieved six consecutive TIPS AA-level certifications

Intellectual Property Management Strategy

- Improve intellectual property management capabilities and cultivate long-term competitiveness.
- Encourage all employees to make innovative proposals and strengthen the layout of product patents
- Establish a confidentiality management mechanism to protect the rights and interests of corporate customers.

Through the implementation of the Taiwan Intellectual Property Management System (TIPS), GlobalWafers has established its intellectual property management policy with a focus on confidential information protection and patent portfolio deployment. In alignment with the Group's operational and R&D strategies, and with the vision of becoming the world's largest and most comprehensive wafer supplier, the Company adopts "leveraging core technological capabilities to build the competitiveness of next-generation products" as its R&D strategy. Based on this framework, the Company has established management procedures covering patent management, confidential information management, R&D management, and external collaboration management (such as project management and industry–academia cooperation). In addition, intellectual property training programs are regularly conducted to strengthen employees' understanding of intellectual property rights. Through these efforts, the Company aims to enhance management capabilities, strengthen patent portfolio deployment for its products, establish a comprehensive confidential information management mechanism, maintain long-term competitiveness, and safeguard the interests of both the Company and its customers.

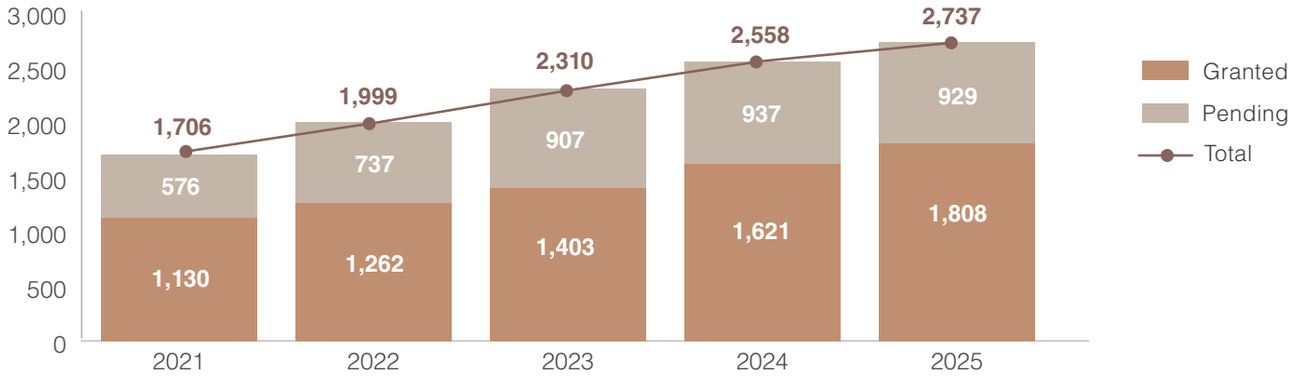
Intellectual Property Management Achievements: Diversified Patent Portfolio Strengthening Competitive Advantages

In patent management, intellectual property personnel work closely with innovation and development teams to identify patent filing opportunities through technical analysis and competitor patent analysis. Brainstorming activities are also conducted to sustain innovation momentum and strengthen patent deployment for new products and technologies. The Company's patent portfolio covers a wide range of technologies, spanning from first-generation semiconductor materials to emerging third-generation semiconductor materials. Going forward, GlobalWafers will continue to focus on green technologies that contribute to reduced energy consumption, lower environmental impact, and more efficient use of resources.

As of the end of December 2025, GlobalWafers had accumulated 2,737 active patent filings worldwide, including 1,808 granted patents and 929 patent applications under review. In patent applications, the Company has been ranked among the Top 1001 Domestic Patent Applicants by the Taiwan Intellectual Property Office (TIPO) for five consecutive years. In patent grants, the Company has been ranked among the Top 100 Domestic Patent Grantees by TIPO for four consecutive years.

Note: TIPO Top 100 Patent Rankings: https://www.tipo.gov.tw/tw/patents/544.html

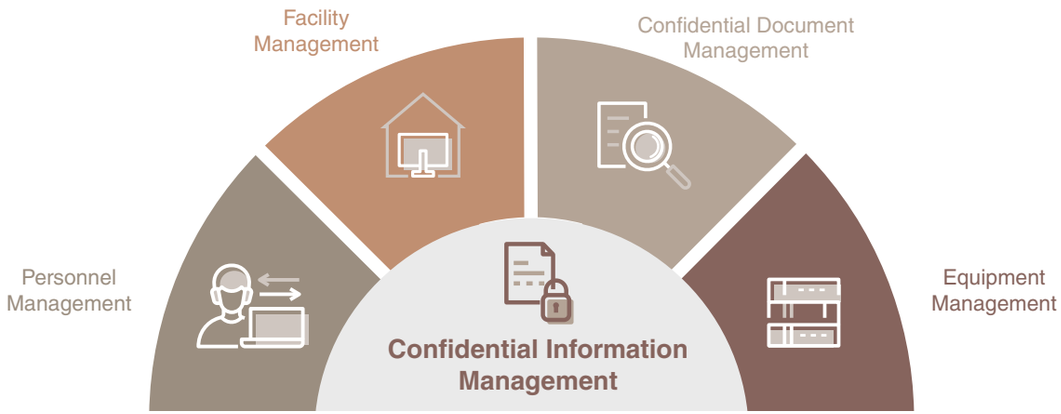
Annual Active Patent Filings Across the Group



Risks and Countermeasures: Strengthening Confidential Information Management to Reduce Information Leakage Risks

As incidents of confidential information leakage are occasionally reported in the media, the Company continues to strengthen its confidentiality management measures to prevent the misappropriation of proprietary technologies and to protect customer interests. For confidentiality management, control mechanisms have been established for personnel, confidential documents, equipment, and facilities. For personnel, intellectual property training is provided to enhance employees' awareness of confidentiality requirements and potential risks. For documents, each department identifies controlled documents, classifies confidentiality levels, and implements document labeling, access control, circulation control, and disposal procedures. For equipment, controls are applied to the use of personal computers and electronic storage devices. For facilities, restricted areas are established for critical server rooms and production areas, with access control and photography restrictions in place. Internal audits are conducted annually to review and verify the implementation of confidentiality management measures across all departments.

Four Key Areas of Confidential Information Management



2. Contribution of Intellectual Property to Sustainable Development

In support of environmental sustainability, the Company conducts technology development in areas such as reducing electricity consumption per unit of product, lowering raw material usage, and developing green recycling technologies. At the same time, the Company actively pursues patent deployment for green technologies. During the patent review and innovative technology development processes, the Company not only considers regulatory requirements but also evaluates the potential impact of technologies on energy conservation and carbon reduction. Through its intellectual property strategy, the Company supports the enhancement of long-term sustainable competitiveness.

Achievements: Innovative Products Supporting Energy Efficiency and Energy Conservation

Sustainability Strategy and Patent Portfolio

To address global trends in energy conservation, carbon reduction, and the growing demand for high-performance electronic components, the Company actively promotes technological innovation in power semiconductor materials and regards patent portfolio deployment as a core strategy for maintaining technological leadership and sustainable competitiveness. The Company's patent portfolio is primarily focused on three key materials: Silicon (Si), Gallium Nitride (GaN), and Silicon Carbide (SiC). Patent coverage extends across critical technologies and processes, including crystal growth, thermal field design, doping engineering, specialized substrate structures, buffer layer design, epitaxial processes, and wafer processing technologies. Based on the characteristics of different materials, the Company has developed a variety of wafer products to support energy-efficient and energy-saving applications.

Material Category	High-Efficiency Wafer Products	
GaN, Gallium Nitride	• GaN on Si D mode power 650V, 200V • GaN on Sap D mode power 650V, 900V • GaN on n-type SiC D mode 650V • GaN on Si E Mode Power	
SiC, Silicon Carbide	• 4–12 inch Conductive SiC Wafers • 6–12 inch SiC Wafers for Thermal Applications • 4–8 inch Semi-Insulating SiC Wafers	
Si, Silicon	• Ultra-Low Resistivity Heavily Boron-Doped Silicon Wafers • Ultra-Low Resistivity Heavily Phosphorus-Doped Silicon Wafers • Ultra-Low Resistivity Heavily Arsenic-Doped Silicon Wafers • Ultra-Low Resistivity Heavily Antimony-Doped Silicon Wafers	• Diffused Wafers and Deep-Diffused Polished Wafers • Neutron Transmutation Doped (NTD) High-Purity Silicon Wafers • 12-inch Specialty Epitaxial Wafers • FZ High-Purity Silicon Wafers • SOI Wafers • Square Silicon Substrates for Advanced Packaging Applications

Silicon Technology and Patent Achievements

- The Company focuses on advanced silicon materials and develops a broad portfolio of products, including customized silicon wafers ranging from 3 to 12 inches, Float-Zone (FZ) high-purity silicon wafers, Silicon-on-Insulator (SOI) wafers, and square silicon substrates for advanced packaging applications. These products are widely used in AI computing, electric vehicles, renewable energy, and smart grid applications, helping improve energy efficiency and reduce energy consumption. Approximately 80% of the Group's patent portfolio is related to the development of silicon material technologies.
- Power device substrates manufactured using FZ high-purity silicon wafers and heavily doped silicon technologies can significantly improve power conversion efficiency and reduce conduction losses. These technologies are widely applied in electric vehicle drive systems, fast-charging equipment, and high-efficiency power modules, effectively reducing energy losses. SOI wafers help substantially lower wafer power consumption by reducing leakage current and parasitic effects, making them particularly suitable for AI and edge computing applications that require both high performance and low power consumption. In addition, square silicon substrates for advanced packaging applications enhance thermal management efficiency and signal transmission performance, further reducing overall system energy consumption.

Silicon Carbide Technology and Patent Achievements

- Silicon carbide (SiC) materials play a key role in the development of green products by improving energy efficiency, reducing carbon emissions, and enhancing resource utilization efficiency. SiC demonstrates significant value in applications such as high-efficiency power conversion, renewable energy systems, electric vehicles (EVs) and charging infrastructure, energy-efficient home appliances, and industrial equipment. It also helps end products meet international energy efficiency standards, such as Energy Star and the EU Ecodesign Directive, making it an important technology for supporting green products.
- GlobalWafers (Taiwan) has been deeply engaged in the compound semiconductor field for many years and works closely with Tier-1 customers in Europe and United States. The Company has developed conductive SiC wafers for applications in electric vehicles, charging stations, and renewable energy systems, as well as semi-insulating SiC wafers for applications in 5G communications, RF devices, power electronics, and defense radar systems. The Company has also established patent portfolios covering crystal growth and wafer processing technologies. As of the end of 2025, GlobalWafers held a total of 210 patents related to silicon carbide materials, including 145 granted patents.

Gallium Nitride Technology and Patent Achievements

- Gallium nitride (GaN) power devices offer advantages such as high switching frequency, high efficiency, and low power loss. These characteristics make them particularly suitable for energy-intensive industries, including artificial intelligence (AI), data centers, and high-performance computing applications. Their superior energy efficiency helps reduce energy consumption and supports the transition toward a low-carbon economy.
- GlobalWafers (Taiwan) began investing in the research of key gallium nitride structures in 2013 and has collaborated with leading universities and research institutions through industry–academia partnerships to strengthen its capabilities in material technologies and structural design. These efforts have resulted in a number of important foundational patents. The Company has developed various gallium nitride power device products, including GaN-on-Si, GaN-on-Sapphire, and GaN-on-SiC. As of the end of 2025, GlobalWafers held a total of 168 patents related to gallium nitride materials, including 129 granted patents. Patent deployment focuses on substrate design, buffer layer design, active layer design, and component design.

The Company continues to invest in the research, development, and patent deployment of power semiconductor materials, demonstrating its technological leadership and innovation capabilities. At the manufacturing level, smart manufacturing systems have been introduced to optimize process parameters in real time through AI and big data analytics, improving yield while reducing energy and material consumption intensity. These efforts support the development of a highly efficient and low-carbon production model.

Through advancements in material technologies and improvements in product performance, the Company is committed to providing more energy-efficient and environmentally friendly electronic components to support global demand for environmental sustainability and the transition to a low-carbon economy.

Achievements: Practical Cases of Smart Systems Implemented in Production Processes

Case 1

Melt Image Recognition System (Patent No. TWI766600)

In crystal growth processes, the industry commonly adopts a "recharging" approach to improve raw material utilization and production capacity. However, accurately identifying the melt condition and determining the optimal timing for material replenishment are key challenges affecting yield, process stability, and resource efficiency. Traditional methods rely heavily on operators' subjective judgment, which may result in misjudgments that affect crystal quality and growth schedules, and may even lead to unnecessary energy and raw material consumption.

The Company developed a smart melt image recognition system that analyzes changes in melt surface reflectivity during phase transitions and detects differences in grayscale values between sequential images. By identifying subtle changes in grayscale brightness, the system determines the optimal timing for material replenishment. This technology effectively reduces unnecessary heating compensation and improves process accuracy and energy efficiency.

After implementation of the project, overall melting time was reduced by approximately 9–12%. By enabling material replenishment at the optimal timing, average power consumption during the melting process decreased by approximately 14%, resulting in electricity savings of approximately 85–127.5 kWh per crystal growth cycle. This technology not only improves process efficiency but also delivers measurable energy-saving and carbon-reduction benefits, supporting the Company's commitment to environmental sustainability and responding to the growing demand for green manufacturing processes.

Case 2

Smart Wire-Break Detection System for Slicing Machines (Patent No. TWI854485)

In wafer processing, wire breaks in slicing machines often cause roller groove deformation, preventing the ingot from continuing the slicing process and resulting in ingot scrap and raw material losses. Traditional mechanical sensors lack sufficient sensitivity to detect wire breaks immediately and halt machine operations, causing material losses to remain a persistent issue.

To address this challenge, GlobalWafers developed a smart wire-break detection system incorporating acoustic sensing technology. The system can identify wire-break events in real time and rapidly trigger machine response mechanisms, significantly shortening reaction times. This technology effectively overcomes the limitations of traditional sensors and substantially reduces ingot losses and equipment damage.

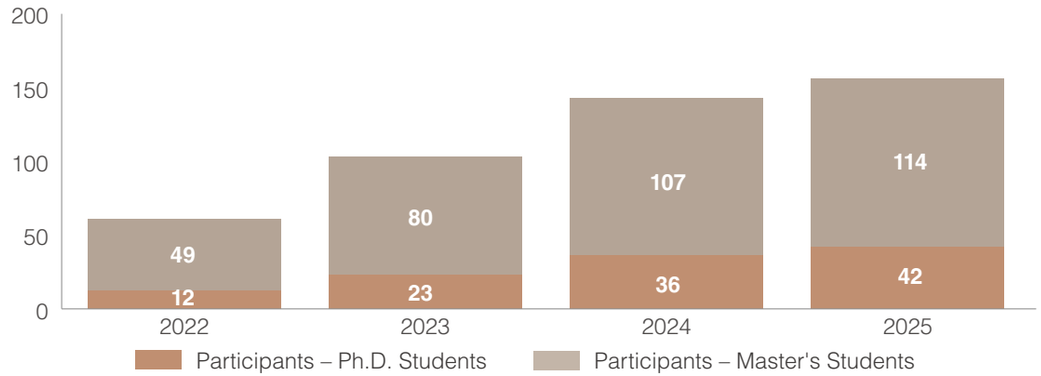
Following implementation of the project, the product recovery rate after wire breakage increased from 20% to 80%, significantly reducing wafer scrap and material waste. This technology not only improves process reliability but also delivers clear resource-saving and environmental benefits, demonstrating the Company's commitment to smart manufacturing and sustainable operations.

In support of social sustainability, the Company strengthens the practical application of innovative technologies through its intellectual property management and R&D collaboration mechanisms, while promoting the overall development of academia, research institutions, and the industrial value chain. Through industry–academia collaboration, the Company advances technology research, facilitates the transformation of academic research outcomes into industrial applications, and supports talent development through student participation in R&D projects. In addition, through government projects and collaboration with research institutions and industry partners, the Company accelerates the upgrading of the domestic compound semiconductor industry chain and the localization of key materials.

Achievements: Contributions to Talent Development through Industry–Academia Collaboration

The Company collaborates with multiple universities to promote industry–academia projects. From 2022 to 2025, a total of 156 master's and doctoral students participated in R&D-related projects. Some of these students joined the Company in R&D positions upon completion of the projects, demonstrating the Company's tangible contribution to the cultivation of advanced semiconductor talent. These initiatives not only strengthen the Company's R&D capabilities but also promote youth employment, help bridge the gap between academic learning and industry practice, and support the long-term sustainable development of semiconductor talent in Taiwan.

Industry–Academia Talent Development Participation Analysis



Achievements: Advancing the Upgrading and Localization of Taiwan's Compound Semiconductor Supply Chain through Government Projects

GlobalWafers, together with King's Metal Fiber Technologies Co. Ltd., Taiwan Special Wire Netting Co., Ltd., and the Industrial Technology Research Institute (ITRI), participated in the Compound Semiconductor Key Materials Promotion Program sponsored by the Industrial Development Administration (IDA), Ministry of Economic Affairs. Through the implementation of two project phases, the Company not only achieved key technological breakthroughs in 8-inch SiC wafer technology, but also promoted collaboration and integrated development across Taiwan's compound semiconductor supply chain.

At the 2025 Project Results Presentation, the project team showcased its R&D achievements and demonstrated how collaborative efforts under the program effectively connected industry, government, and research resources to advance the localization of key materials. These achievements have significantly enhanced the international competitiveness of Taiwan's compound semiconductor industry and established a solid foundation for the continued development of the domestic supply chain.

From a sustainability management perspective, the Company continues to participate in external TIPS verification to strengthen its intellectual property management capabilities and enhance its competitiveness. Through intellectual property risk management, the Company seeks to avoid legal and financial risks arising from patent infringement while encouraging innovation and strengthening competitiveness through strategic patent deployment, thereby safeguarding shareholder interests. The Company has accumulated more than ten years of experience in TIPS verification, from 2013 to 2025, demonstrating its long-term commitment to and investment in intellectual property management.

▲ Group photo of the collaborative team at the 2025 results presentation.

Achievements: Six Consecutive TIPS AA-Level Certifications


台灣智慧財產管理規範
驗 證 通 過 證 書
Certificate of Taiwan Intellectual Property Management System

環球晶圓股份有限公司
GlobalWafers Co., Ltd.

AA

級別 Level：
證書號 Number of Registration：TIPS-2025-cert.-003
證書效期 Date of Expiration：December 31, 2027
驗證執行單位 Certification Body：TIPS 推行體系工作小組 TIPS Working Group

管理標的 Item | 專利 Patent | 商標 Trademark | 著作權 Copyright | 營業秘密 Trade Secret

受評部門：全公司
受評地點：新竹市新竹科學園區工業東二路 8 號
Registered Department：All Company
Registered Address：No. 8, Industrial East Road 2, Hsinchu Science Park, Taiwan, R.O.C. Taiwan

經濟部產業發展署 署長
Director General
Industrial Development Administration, MOEA
邱求慧 Chyou-Huay Chiou

GlobalWafers implemented the Taiwan Intellectual Property Management System (TIPS) in 2013, established its intellectual property management processes, and obtained basic certification. The Company subsequently passed advanced certification in 2014 and 2015, and achieved AA-level certification six consecutive times in 2016, 2017, 2019, 2021, 2023, and 2025.

List of TIPS-certified companies: https://www.tips.org.tw/body?sno=BGCD

Achievements: Ranked Among the Top 5% of TPEx-Listed Companies in the Corporate Governance Evaluation for Eight Consecutive Years

In the 12th (2025) Corporate Governance Evaluation, GlobalWafers was once again ranked among the top 5% of TPEx-listed companies. This marks the eighth consecutive year the company has received this distinction. GlobalWafers was also ranked among the top 10% of electronics companies with a market capitalization of NT$10 billion or above, demonstrating its strong performance in governance systems, information transparency, and sustainable operations.

Historical evaluation results: https://webline.sfi.org.tw/CGE/index.asp

In summary, intellectual property rights enable the Group to demonstrate its technological capabilities, create opportunities for strategic partnerships, enhance overall competitiveness, and strengthen customer trust and recognition. In particular, when developing new technologies or products, the Company formulates intellectual property strategies and establishes patent portfolios in relevant fields to help mitigate potential intellectual property risks. Intellectual property rights are not only an important competitive tool for developing next-generation products, but also a key asset that helps the Company withstand competitive challenges and supports its long-term sustainable development.