



Business Strategies

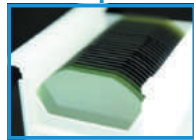
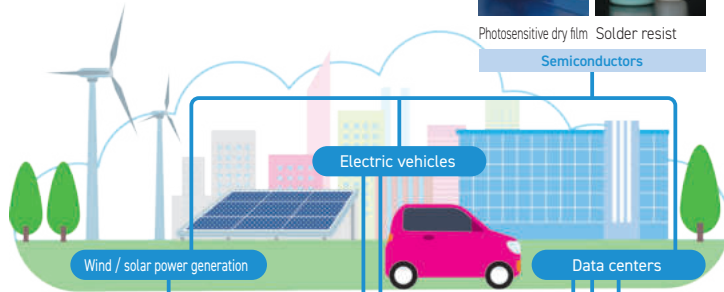
Semiconductor and Electronic Materials

Resonac products in everyday life



Photonsensitive dry film Solder resist

Semiconductors



SiC epitaxial wafers



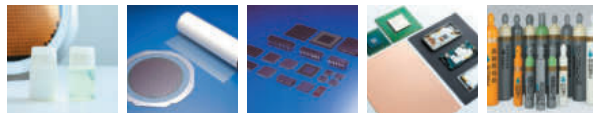
Optical semiconductors



HD media

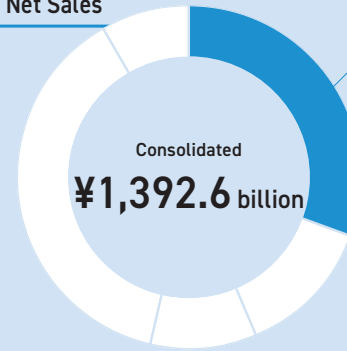


Semiconductors



CMP slurry Die bonding film Epoxy molding compounds Copper clad laminates High-purity gases, etc.

Fiscal 2022 Net Sales



Semiconductor and Electronic Materials

Segment net sales

¥427.2 billion

Segment operating income

¥45.5 billion

Management Target

EBITDA margin **30% or more** in 2025

Semiconductor materials: Front-end **¥100.2 billion**

Semiconductor materials: Back-end **¥188.3 billion**

Device Solutions **¥99.3 billion**

Strategy for Realizing the Long-Term Vision

As a leading global manufacturer, Resonac is driving the advancement of semiconductor technologies with its strength in materials. Our front-end and back-end semiconductor materials are key technology contributing to people's happiness while protecting the environment through semiconductor manufacturing processes and end products.

	Results in 2022	Plan for 2023	Vision for the future (2030)
<b>Semiconductor materials</b> Front-end / Back-end	<ul style="list-style-type: none"> <li>Year-on-year increase in sales and decrease in income</li> <li>Sales increased reflecting strong semiconductor demand through the first half of 2022, despite the impact of semiconductor production adjustment starting in the second half of the year. Operating income decreased owing to the impact of soaring raw materials prices.</li> <li>Implementation of the largest investment plan in the past several years to ensure capture of strong future demand (Copper clad laminates for semiconductor package substrates and CMP slurry)</li> </ul>	<ul style="list-style-type: none"> <li>Enhancement of the business model to continue winning with cutting-edge technology while strengthening the earnings base</li> <li>Despite the current difficult market conditions due to the deteriorating semiconductor market, steady implementation of the following measures to achieve sustainable growth over the medium to long term                             <ol style="list-style-type: none"> <li>Promotion of carbon neutrality</li> <li>Introduction of global supply chain management system</li> <li>Medium- to long-term R&amp;D and account strategies</li> <li>Response to geopolitical risks</li> <li>Improvement of EBITDA margin</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>Goal of becoming a world-leading semiconductor material manufacturer that supports the advancement of a sustainable, digital society</li> <li>Contribution to the realization of a sustainable society by conserving energy and reducing environmental impacts through the supply of advanced semiconductor materials</li> </ul>
<b>Device Solutions</b> HD/SiC	<p><b>HD media</b></p> <ul style="list-style-type: none"> <li>Start of shipment of newly developed HD media for near-line HDDs with the industry's largest storage capacity of 26 TB <a href="#">Web</a></li> <li>HDD demand, having expanded rapidly during the COVID-19 pandemic, slowed down and entered an adjustment phase in the second half of 2022.</li> <li>Completion of expansion of aluminum substrate production capacity</li> </ul> <p><b>SiC</b></p> <ul style="list-style-type: none"> <li>Year-on-year increases in sales and income as a result of maximization of production and sales to meet strong demand</li> <li>Strengthened partnerships with Inflexion Technologies AG (Germany) and other customers, and concluded long-term supply contracts <a href="#">Web</a></li> <li>Acceleration of development and launch; start of mass production of third-generation six-inch epitaxial wafers and shipment of 8-inch epitaxial wafer samples</li> <li>Eight-inch epitaxial wafer development program selected for NEDO Green Innovation Fund Projects <a href="#">Web</a></li> </ul>	<p><b>HD media</b></p> <ul style="list-style-type: none"> <li>Continuation of industry-leading development and mass production of best-in-class HD media to lead technological innovation in media for large-capacity near-line servers</li> <li>Optimization of production scale in response to adjustment of HDD demand, which expanded rapidly until 2022</li> </ul> <p><b>SiC</b></p> <ul style="list-style-type: none"> <li>Year-on-year increases in sales and income due to persistently strong demand</li> <li>Realization of stable supply (stable and maximized production of epitaxial wafers and substrates, stable procurement of key materials)</li> <li>Thorough implementation of key account strategies and conclusion of long-term supply contracts with more customers and renewal</li> <li>Acceleration of development of eight-inch epitaxial wafers and substrates</li> </ul>	<p><b>HD media</b></p> <ul style="list-style-type: none"> <li>Contribution to storage demand supporting increased data traffic volume and transmission speed as a large-capacity media technology leader</li> <li>Pursuit of sustainable growth through production activities and recycling of post-sale products</li> </ul> <p><b>SiC</b></p> <ul style="list-style-type: none"> <li>Maintenance of top share as an independent supplier of SiC epitaxial wafers</li> <li>SiC epitaxial wafer technology leader to lead the industry's technological innovation</li> <li>Proactive supply of solutions in response to more sophisticated and specialized quality requirements</li> <li>Expansion of production of eight-inch wafers and productivity improvement to contribute to further expansion of the SiC device market</li> </ul>

## Business Strategies: Semiconductor and Electronic Materials

### Competitive Edge (Semiconductor Materials)

#### Operating Environment Outlook and Resonac's Strategy

Affected by the rapid deterioration of the global economy and declining consumer demand in 2022, the semiconductor market is experiencing a temporary decrease in demand. However, we expect that technological innovation and market growth are likely to continue in line with the advancement of society's digitalization. Moreover, the importance of semiconductors as specified critical materials designated by the Economic Security Promotion Act is increasing, and countries are making major efforts and introducing regulations to secure the supply of semiconductors. We view these developments as both a risk and an opportunity for us.

Risks include the potential for increases in raw material, energy, or logistics costs or supply chain disruptions as a result of geopolitical risks. Resonac is striving to develop a resilient supply chain management system designed to facilitate the swift detection of risks and the stable supply of products to customers and is making steady progress step by step.

There will be opportunities to capture new demand. In the future, along with changes in the supply chain, changes in the business formats of players and the entry of new manufacturers are expected, and uncertainty and complexity will increase. Capitalizing on a lineup that encompasses a wide variety of front-end and back-end semiconductor materials and the high market share, and the broad customer network built on those strengths, as well as the JOINT2 consortium activities, which aim to establish advanced semiconductor mounting technology through co-creation with industry peers, we will quickly identify changes and create high value-added products that meet the needs in order to develop highly competitive operations.

#### Semiconductor Material Technology Trends

As semiconductors are endowed with more sophisticated functions, there is a rising need for more minutely detailed circuit patterns to be etched through front-end wafer fabrication processes. Meanwhile, in back-end processes, which generally entail mounting chips made from individual wafers onto substrates, the number of components included on chips and in electronic components is increasing at a rapid pace, creating a rising need for new package structures that use 2.xD and 3D mounting technologies to achieve higher mounting density.

These trends are boosting demand for Resonac's existing highly functional, high-share materials as well as for the new cutting-edge materials under development.

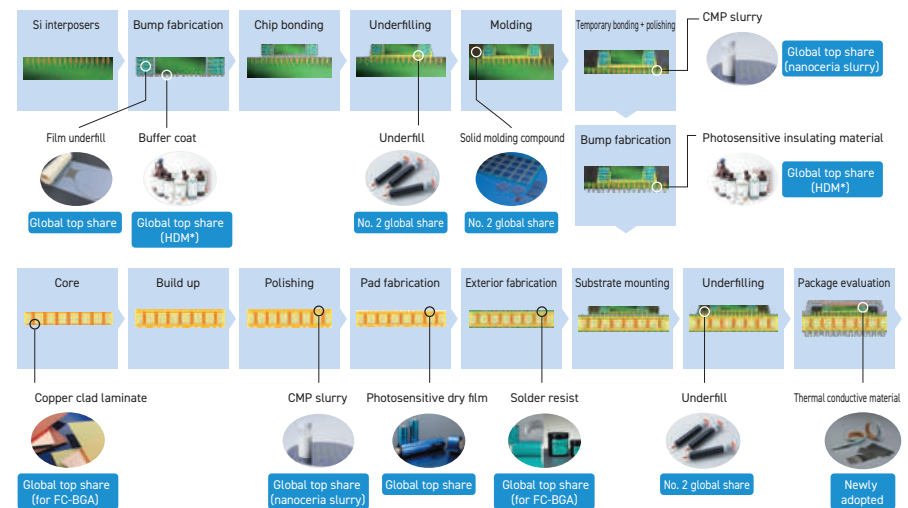
In front-end processes, we facilitate customers' development activities with our CMP slurry (nanoceria slurry) capable of creating precise circuit patterns with 2 nm nodes as well as with our precision etching gases and high-purity solvents. At the same time, we assist production activities around the world with back-end process offerings such as photosensitive dry film, copper clad laminates, and die bonding film supported by superior functionality and strong supply capabilities. (See the figure below.)

Moreover, the JOINT2 consortium is collaborating on substrates, materials, and equipment to help resolve customer issues and accelerate development. Specifically, we are conducting collaborative evaluations with several leading semiconductor manufacturers on 2.xD/3D packages.

#### Technological requirements and Resonac's products

Front-end semiconductor materials	
Technological requirements	Requirement-satisfying products
Precision polishing	CMP slurry (nanoceria slurry)
Precision processing (etching)	High-purity gases for electronic materials
Higher-quality solvents	High-purity solvents
Back-end semiconductor materials	
Technological requirements	Requirement-satisfying products
Close connection, resolution	Photosensitive dry film
Dielectric property, low warping	Copper clad laminates
Reliability	Die bonding materials

#### Resonac's lineup of 2.xD and 3D mounting products



\*Shares of HDM (HD Microsystems, Ltd.) in the buffer coat and photosensitive insulating material markets  
Note: The above global share figures for products are based on Resonac's estimates.

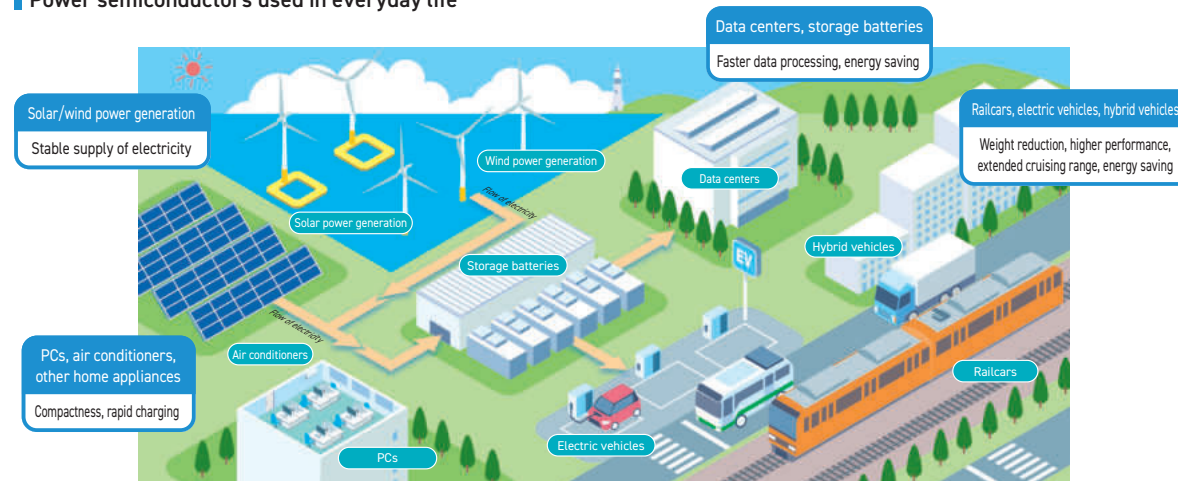
## Business Strategies: Semiconductor and Electronic Materials

### Competitive Edge (Device Solutions/SiC)

#### Society Realized by Power Semiconductors

Power semiconductors control and convert electric power and are used in all types of devices that are powered by electricity, everything from industrial equipment to familiar home appliances. With less power loss and heat generation than conventional silicon-based power semiconductors, SiC power semiconductors are key devices that contribute to energy conservation, achieving both voltage characteristics and conversion efficiency. GaN power semiconductors are also attracting attention. Although, as a material for power devices, GaN has properties superior to those of SiC in some respects, there are still issues to be resolved in terms of high current capability. SiC power semiconductors resolve this issue and are also cost competitive. The market for SiC power semiconductors is expanding rapidly as they are widely used in various applications, such as electric vehicles (EVs), renewable energy, high-speed charging stations for xEVs, and railcars.

#### Power semiconductors used in everyday life



#### Attractiveness of SiC Power Semiconductors

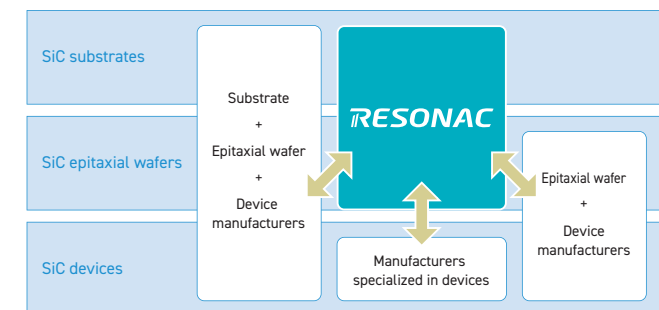
- 1 Compactness and weight reduction** SiC power semiconductors have high withstand voltage and excellent thermal characteristics. Compared to conventional silicon-based power semiconductors, SiC power semiconductors enable compacter design and contribute greatly to weight reduction of electric units.
- 2 Extended cruising range** It is known that the cruising range of vehicles using SiC power semiconductors is extended due to the combined effect of weight reduction and battery performance improvement (loss reduction), making SiC power semiconductors key devices for the diffusion of electric vehicles.

#### Resonac's Contribution to SiC Power Semiconductors

Resonac is the world's largest independent supplier of SiC epitaxial wafers, which are key materials for SiC power semiconductors. As a manufacturer specialized in epitaxial wafers, we aim to be an optimal co-creation partner capable of providing epitaxial wafers tailored to various customers and their respective SiC devices. Our SiC epitaxial wafers have been used for various applications owing to their high quality, including industry-leading low levels of surface-defect density and basal-plane dislocation.

Regarding automotive applications for which especially high reliability is required, Resonac's SiC epitaxial wafers have been adopted for the drive element of the on-vehicle inverter installed in the new model LEXUS RZ, based on our track record of supplying SiC epitaxial wafers that have excellent features and quality. Whereas 150-mm (six-inch) epitaxial wafers are currently the mainstream for SiC power semiconductors, a shift to 200 mm (eight-inch) wafers is expected. The use of larger-diameter wafers increases chip production output, enabling device manufacturers to improve productivity and reduce costs. Recognizing such market needs, we began sample shipments of 200 mm SiC epitaxial wafers in 2022 and are working toward early mass production.

#### Resonac's business model as a manufacturer specialized in epitaxial wafers



As a manufacturer specialized in epitaxial wafers that does not handle SiC devices, attract device manufacturers that manufacture substrates and epitaxial wafers in-house as customers

## Business Strategies: Semiconductor and Electronic Materials

### Co-Creation Initiatives to Resolve Social Issues

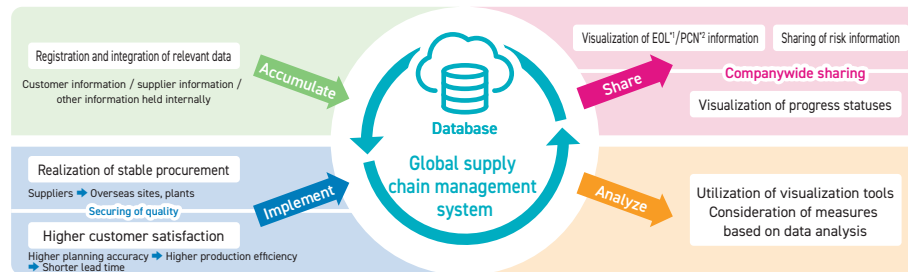
#### Establishment of a Database for Centralized Management of Semiconductor Supply Chain Information to Reduce Risk and Improve Efficiency Throughout the Semiconductor Supply Chain DX

While demand for semiconductor materials is expected to remain robust as digitalization of society advances, the supply chain is unstable owing to the combination of diverse issues, including environmental problems, recent constraints on production and logistics, and geopolitical risks.

In these circumstances, we have been building a supply chain system in the Indo-Pacific area to ensure stable supply of semiconductor products and maintain and strengthen competitiveness. We expect centralized management of supply chain information from suppliers to customers on a common platform will enable us to respond quickly to customer needs and shorten lead times, such as through early detection of risks and optimization of operations at each site. In addition, it will enable us to promptly respond to the increasing number of requests from customers and other parties in recent years for assurances regarding the non-presence of environmentally regulated substances and the absence of human rights abuses, such as forced labor.

This initiative was adopted under the Ministry of Economy, Trade and Industry subsidy program for overseas market survey projects for building resilient supply chains for fiscal 2021. Resonac took part in the Japan-Malaysia Public Private Industrial Policy Dialogue held in Kuala Lumpur, Malaysia, in April 2023 and gave a presentation on its efforts to strengthen the supply chain for semiconductor materials. We are making steady progress with the establishment of a global supply chain management system step by step and we plan to expand it in the future to reduce risk and improve efficiency throughout the supply chain.

#### Goals to be achieved through introduction of a global supply chain management system



Conduct data-driven business operations and decision-making by centrally managing and sharing data, analyzing the accumulated data, and implementing actions based on the analysis results.

\*1 EOL (End of Life): Suppliers' termination of provision of products and services  
\*2 PCN (Product Change Notification): Notification on changes of product specifications and process changes

#### Introducing Advanced HD Media Technology to the Market ahead of Competitors as the World's Largest Manufacturer Specialized in HD Media, Making a Significant Contribution to Development of the Data Economy

With the spread of cloud services and the increase in video content, the amount of data generated and stored continues to increase dramatically worldwide, and data centers to store data require larger-capacity hard disk drives (HDDs). Resonac is a supplier of HD media, key components that determine the storage capacity of HDDs. For 35 years since we started our business in the late 1980s, we have continued to lead the world in providing and mass-producing HD media while always co-creating new technologies with our customers.

As a newly integrated company, Resonac will continue pursuing further technological innovation to realize higher-capacity HDDs and support the growing data economy.

#### Resonac's revolutionary technological development in HD media

