

Sanken Electric
CORPORATE PROFILE

Power Electronics for Your Innovat!on



SANKEN ELECTRIC CO., LTD.

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<https://www.sanken-ele.co.jp/en/>

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Become a highly profitable company that grows on the performance of its unique technologies, people and organization, contributing to social innovation.

Hiroshi Takahashi
Representative Director, President



Since 2024, the Company has been implementing a new medium-term management plan. Guided by this plan, we have made a fresh start as a dedicated power semiconductor manufacturer, concentrating our management resources further on power modules and power devices.

Looking at current global conditions, industries and people’s daily lives are being profoundly affected by issues such as the increase in natural disasters caused by climate change, as well as geopolitical risks and associated human rights problems. Despite these challenges, various efforts are under way to drive economic growth and build a sustainable society. As the world faces a turning point in energy, with the widespread adoption of renewable energy and progress on electrification, one key effort has been the evolution

of power semiconductors into a core technology for increasing energy efficiency.

Amid steadily shifting paradigms, Sanken Electric possesses numerous products and technologies that lead to high efficiency and energy savings. We aim to be an enterprise that supports next-generation energy solutions, including products for inverters used in air conditioners and products for low fuel consumption and increased efficiency in automobiles. Going forward, through both technological innovations and reliable high-quality products, we will continue to achieve sustainable growth as a company while making positive contributions to society, including solutions to global environmental and social issues, and the development of industry, economy and culture.

Corporate Philosophy

April 1, 2003

More than 50 years have passed since Sanken Electric was first founded. Now, in the 21st century and at this time of great change, we designate a second founding for Sanken Electric and the Sanken Group, taking this opportunity to declare our corporate philosophy as a pathway for success.

- We will contribute to the advancement of industries, economies, and cultures all over the world, aspiring to our mission to provide optimal solutions in our core semiconductor businesses for power electronics and peripheral fields.
- We will strive constantly to innovate our technological strengths and creative power as we pursue reliable quality. Moreover, we will share our customers’ values as we develop our business globally, leveraging our proprietary technologies.
- We will respect each of our employees and treat all of them fairly. We will also endeavor to help our employees grow as trustworthy individuals and as businesspeople.
- We will carry out our duties with high ethical standards as businesspeople who value technology and creativity, treating our customers and suppliers with fairness and integrity.
- We will strive to maximize our corporate value for the sake of our shareholders, while fulfilling our social responsibilities and striving for harmony with the environment.

Action Guidelines

April 1, 2021

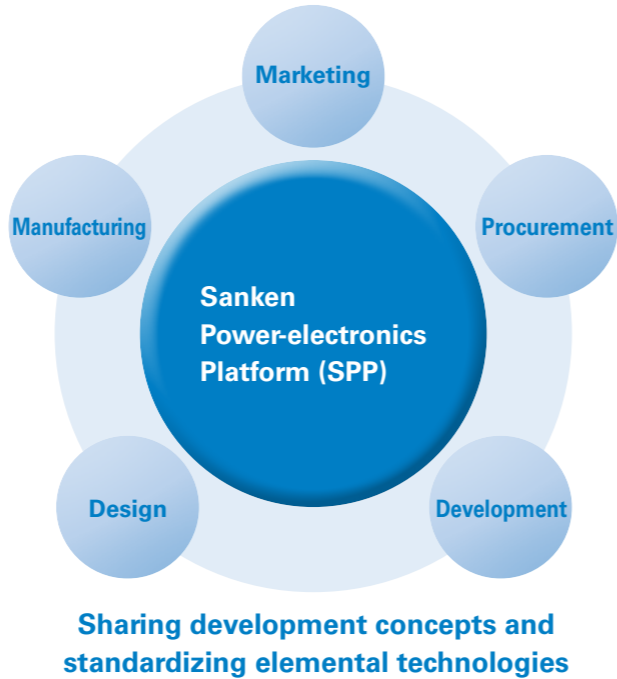
- To provide optimal solutions by sharing our customers’ values.
- To observe global trends, doing business with a broad perspective.
- To create a new culture by demonstrating flexible ideas and originality.
- To innovate each and every day at a global pace, responding to changes in the business environment.
- To enhance individual skills with professionalism, challenging ourselves to perform work of the utmost quality.
- To build trust in every individual, maximizing results through teamwork.
- To prioritize compliance with rules, acting in a fair manner based on high ethical standards.
- To contribute to solving environmental problems for the sustainable development of local communities and society.



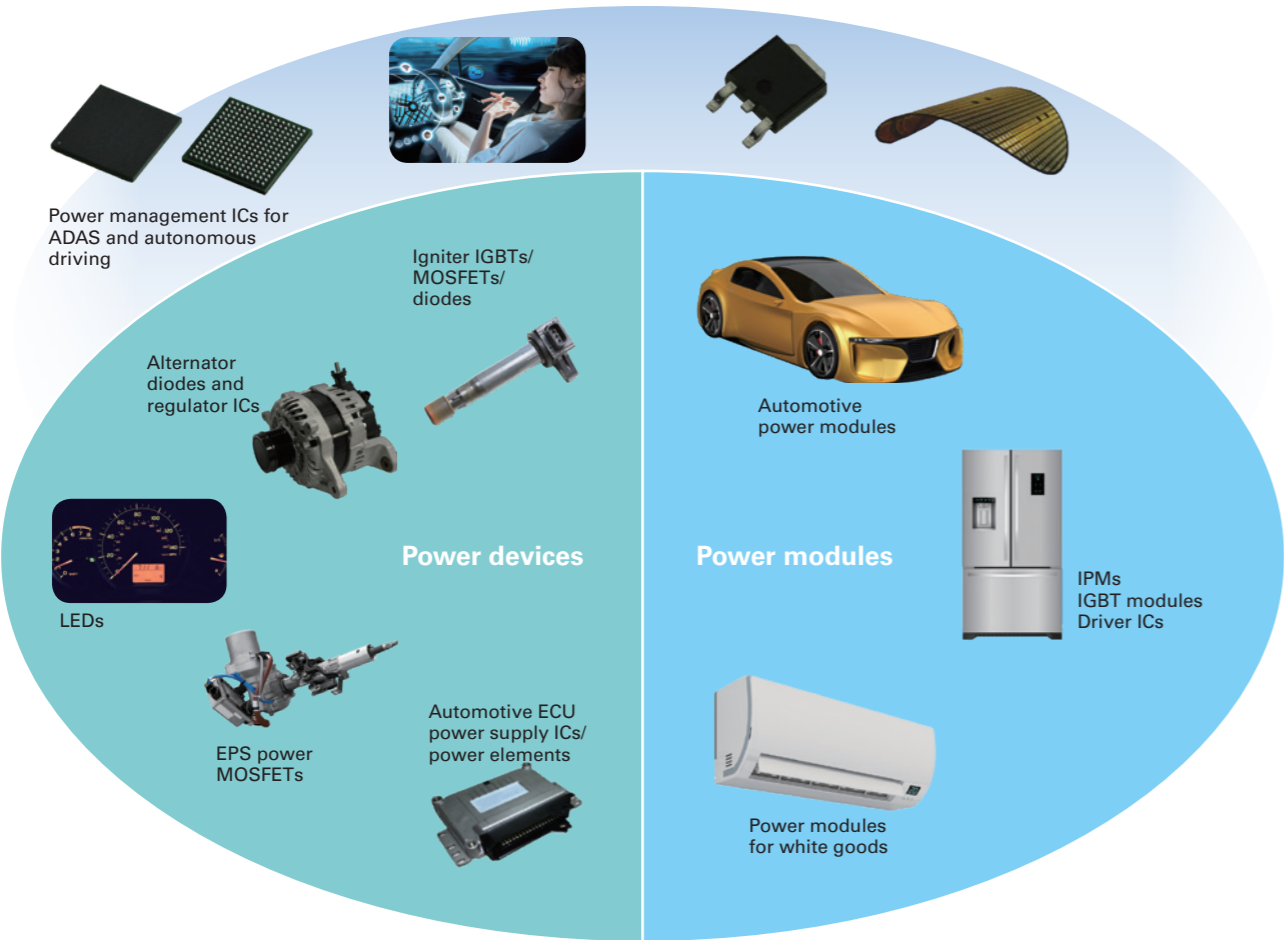
Sanken Power-electronics Platform (SPP)

With the market surrounding us continuing to undergo major changes, customer needs are diversifying, and it is becoming more important than ever to “create what is expected quickly.” Therefore, Sanken Electric is working to strengthen marketing functions and speed up development.

We have shifted to a structure that has functions with responsibility for everything from the development of technology for new products to commercialization and mass production to establish the Sanken Power-electronics Platform (SPP), a platform for sharing development concepts throughout the entire development and manufacturing process, from marketing to procurement, development, design, and manufacturing. The SPP will dramatically reduce development and production lead time through the use and standardization of chip packages based on platform development.



We use device technology and module technology to expand into diverse areas from white goods through to automobiles.



Core Technology

Sanken Electric will concentrate management resources on the power devices and power modules businesses to promote further strengthening of competitiveness and improvement of management efficiency, as well as transform ourselves into a company that can grow while solving social issues.

Systems	
High-efficiency power supply control	•Realizes energy-efficient power supply systems by optimally switching frequency and operation mode while monitoring input/output status and load conditions
Motor control	•Realizes power modules that include a pre-driver featuring various controls to suppress noise generated by 3-phase BLDC motors, as well as provides a parameter auto-tuning application for sensorless vector control
Digital AC/DC power supply control	•Easily realizes high-efficiency, low-noise power supply systems with a dedicated microcontroller optimized for power supply control and a 900V high-voltage chip for off-line power supply control in a single package, reducing the number of components
Digital LED lighting power supply control	•Realizes highly functional digital power supply control that supports dimming control and toning communication by improving the efficiency of LED lighting systems using digital control

Semiconductor devices	
BCD process	•Provides a wide range of high added-value products for automotive applications and white goods, etc., through the BCD process from 60V to ultra-high voltage 1200V
SiC MOSFETs	•We are developing a 1200V/800V trench-structure lineup with low Ron and low switching loss
IGBTs/MOSFETs/diodes	•Offers IGBTs with a proven track record in meeting the high reliability and high quality requirements of demanding automotive igniter applications Achieves high breakdown voltage and low Vsat in FS IGBTs (adoption of wafer thinning technology) •Also provides low-voltage MOSFETs with a VFP structure that reduces noise •With multiple lifetime killer processes, optimizes SW characteristics, and tailors features to the product
Wafer thinning technology	•In-house glass support and TAIKO process for 6-inch and 8-inch wafers (capable of processing 8-inch wafers as thin as 50 μm)
Wafer active test	•Facilitates AC measurements, including wafer level high voltage measurement up to 1200V and UIS (L load test) test •High productivity through simultaneous measurement of multiple chips and automatic visual inspection

Packages	
Multi-packaging technology	•Multi-chip packages and passive component molding technologies that realize high integration, compact size, and space saving •Package technology and commercialization support to meet the recent increase in demand for lead-free and halogen-free products
Die bonding technology	•Thin film chip and low thermal resistance die bonding technology for higher power efficiency and higher current •Die bonding technology for chip stacks that achieve high integration and miniaturization
Wafer bonding technology	•Laser soldering technology and copper wire technology for lower costs •Copper clip technology to support higher current and lower impedance
Cooling and heat dissipation technology	•High heat dissipation and high reliability DBC technology used in IGBT modules for automotive and industrial equipment •Double-sided heat dissipation technology to realize thin modules with low thermal resistance and high heat dissipation

Diverse Product Portfolio

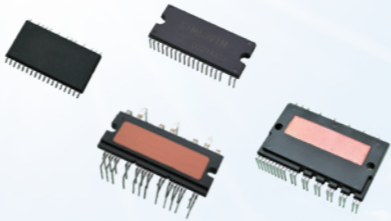
With a diverse product portfolio based on device and module technologies, Sanken Electric provides solutions that bring about innovation in a variety of devices, from white goods to automobiles.

Power modules

Power devices

IPMs/Power modules (motor drivers)

- We provide IPMs (motor drivers) optimized for fan motors and compressor control that are widely adopted by manufacturers of white goods in Japan and overseas.
- We offer high-voltage, 3-phase brushless motor drivers for fan motors with built-in control ICs for sinusoidal drive and sensorless vector control, which significantly reduces the number of components, and both MOSFET and IGBT high-voltage motor drivers with built-in pre-drivers.
- In addition, a high heat dissipation DIP package is available for automotive and industrial applications with a thermistor-based high-precision heat detection function. An FWD optimized for IPM has been developed to achieve low noise. 650V/1200V products are available.



Digital power supply ICs

- We provide optimal power supply systems for applications used in power supply control for TVs and LED lighting, etc.
- We provide bridgeless PFC and current mode LLC converters with the latest digital control technology.
- With flexibility through optimal settings and tuning using firmware and fewer components than analog control, digital power supply ICs achieve highly efficient and low noise power supply.



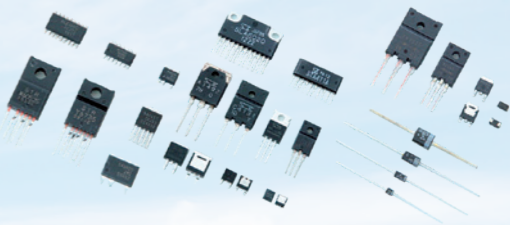
Automotive ICs

- We offer a wide range of automotive IC products with a history of adoption by Japanese and overseas automotive manufacturers and a long track record in mass production.
- Our lineup includes driver ICs for igniters that boast high reliability and surge resistance, highly reliable alternator regulator ICs with many protection, adjustment, and diagnostic functions, high-side drivers with built-in high-precision current control functions, and high-precision multi-output regulators with built-in power sections in high heat dissipation packages.
- We are also developing ICs for next-generation automotive applications such as xEV and ADAS/LiDAR.



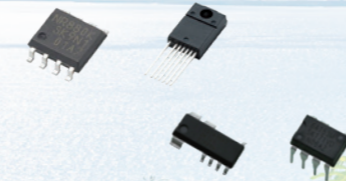
Discretes

- Our high voltage, long life rectifier diodes provide high efficiency through low VF.
- Our Schottky diodes provide high efficiency with avalanche guarantee and outstanding heat dissipation through heat dissipation packages.
- Our IGBTs with built-in Zener diodes and gate resistors and feature low saturation voltage.
- Our MOS arrays are low Ron with 3-phase bridge configuration.



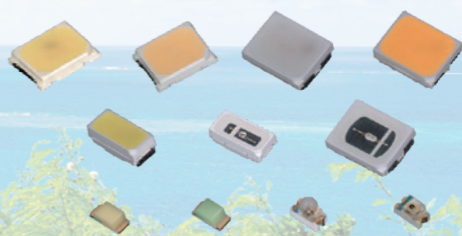
Power supply ICs

- We develop high-efficiency power supply ICs that are widely used in applications such as white goods and TVs.
- Our product lineup includes the STR series, a highly efficient single-chip solution with built-in flyback PWM control IC and MOSFET, and high-efficiency, low-noise AC/DC converters with built-in LLC current control IC and high-side driver in a compact surface-mount package that support flow mounting.
- We offer a critical mode PFC control IC with fewer components and lower standby power consumption using the input voltage detection-less method.
- We offer a wide variety of products such as step-down switching regulators, linear regulators, etc. for various applications.



LEDs

- Our LEDs enable high-precision tones for automotive interiors.
- They also support individual requirements such as narrow chromaticity and luminosity.
- We offer a diverse lineup of luminous intensity distribution, chromaticity, etc.
- We propose high value-added LEDs for special lighting, etc. capable of handling customized spectra such as high color rendering and color enhancement.
- We produce a large number of products with a strong presence in specific markets.
- We have a high reliability and flexible follow up system for domestic production.



Click here for more information



Creating New Value in Response to Environmentally-Driven Market Changes and Respect for Diversity

In response to changes in the business environment surrounding power semiconductors, the Sanken Group is actively working to digitally transform with the aim of significantly improving operational productivity through the use of advanced digital technologies.

Through our digital transformation, we will impassion and inspire all our employees to make people's lives richer and more fulfilling through power semiconductors, further elevating our business to one everyone can benefit from.

Our digital transformation can be summarized in the following four perspectives:

1. Utilizing technology — Transforming operations by applying digital technology across the entire value chain
2. Shaping the business environment — Creating a safe, flexible, and robust IT infrastructure that supports digital transformation
3. Developing human resources — Building a system to support greater digital skills across the workforce
4. Control measures — Establishing and strengthening the organization to comprehensively control company-wide digital transformation

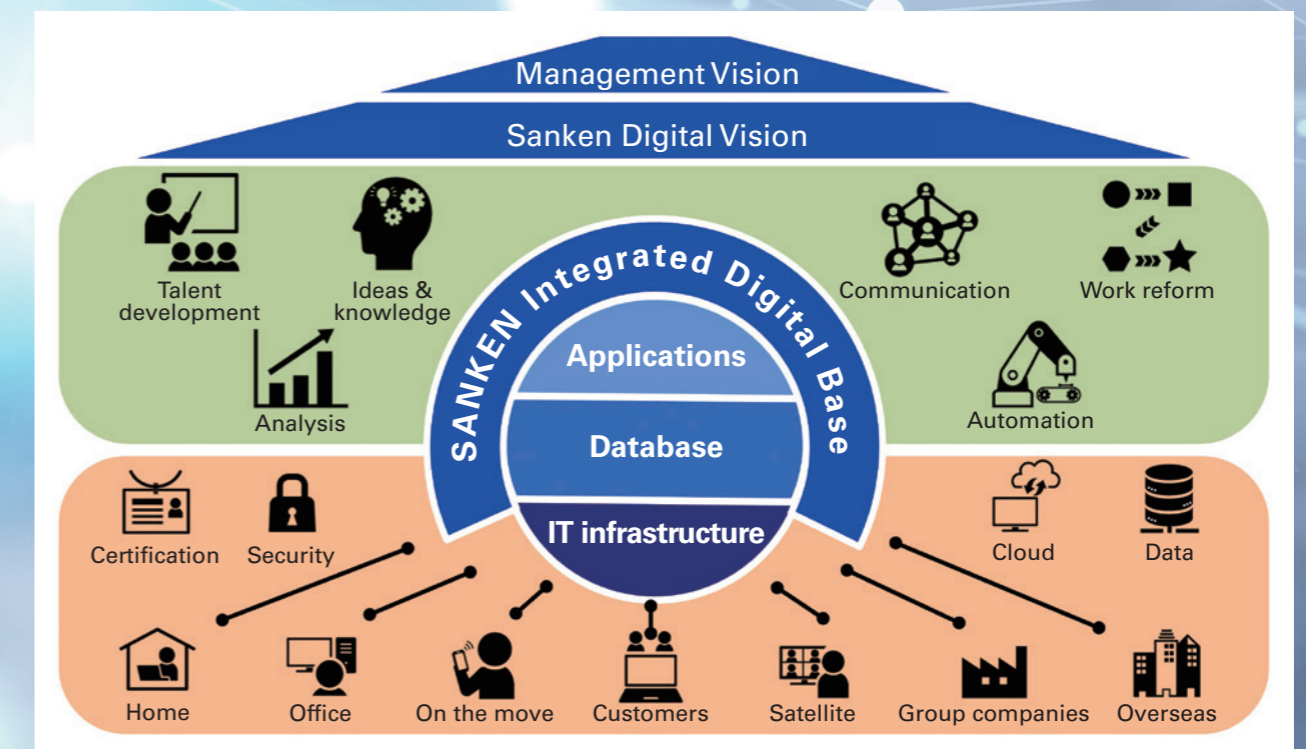


Recognized as a DX-certified Business by the Ministry of Economy, Trade and Industry

Since December 1, 2023, Sanken Electric has been recognized as a DX-certified business based on the digital transformation (DX) certification system stipulated by the Ministry of Economy, Trade and Industry. The DX Certification is based on the Act on Facilitation of Information Processing. The national certification initiative spearheaded by the Japanese Ministry of Economy, Trade and Industry (METI) certifies companies that are recognized as ready to promote digital transformation and meet the basic requirements specified in the Digital Governance Code.



The Sanken Digital Vision sets out our aspiration to provide innovative products and services to our customers, contributing to innovation in society by actively utilizing digital technology to facilitate operations and make them more productive. To realize this vision, we have established our Initiatives for Productivity Improvement, and Initiatives to Strengthen Human Resources strategies. We are also working on development of the Sanken Integrated Digital Base, a platform for swift work reform rollout through digital technology.

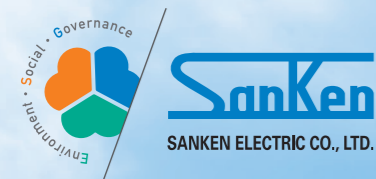


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Fulfilling Our Responsibility to the Next Generation (Promoting ESG Management)

The pace of change in the times/environment, such as globalization, digitalization, worsening natural disasters, and increased demand for environmental conservation, as well as the need to address diversity, is accelerating, making it increasingly difficult to predict. To respond to such changes in the times and to foster harmony between the creation of societal value and the pursuit of economic value, Sanken Electric believes it is increasingly important to steadily implement ESG management that integrates business activities with enhancement of the social value of existence as a company.



The Sanken Group engages in ESG management with a commitment to contribute to creating a sustainable society by providing optimal solutions in the field of power electronics as the source of its corporate social responsibility and new value creation.

Contributing to
a sustainable society
through promotion of
the main business

Efforts to
reduce environmental
impact

Environment

Contributions through products
Reduce the environmental
impact of our business activities

- Reduce CO₂ emissions from products to prevent global warming
- Implement initiatives towards carbon neutrality
- Reduce and more effective use of water
- Use clean energy in production
- Introduce production processes considerate of the environment
- Reduce waste materials and plastics generated at each plant



Social

Value creation to improve a
working environment

- Realize a safe and secure working environment
- Promote good mental and physical health among employees
- Provide equal opportunities to all
- Create workplaces where diverse human resources can thrive
- Provide flexible work styles



Governance

Strengthen governance

- Respect human rights
- Engage in fair business transactions
- Prevent misconduct
- Strengthen risk management
- Strengthen information security



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Renovating the Office for a More Comfortable Place to Work

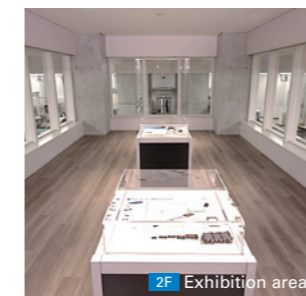
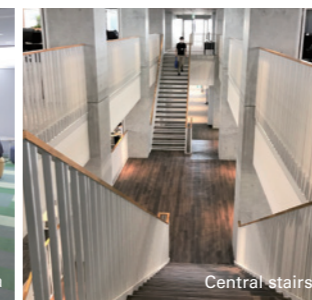
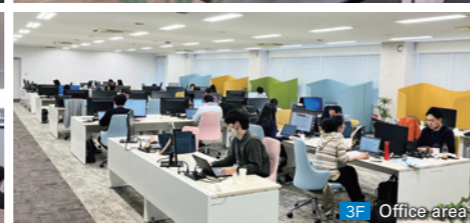
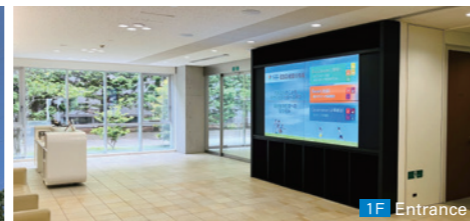
The Production Development Center was completed in 2021.

The adjacent Technical Center was also renovated in May 2022.

We transformed our previous office setup to create a hot desking workplace with no fixed desks for employees.

We also upgraded the training room on the 2nd floor of the gymnasium in the welfare building with exercise machines and gym equipment so employees can workout during breaks or after work.

Renovations of the Tokyo Office, Osaka Branch, and Nagoya Sales Office were also completed in April 2024.



Domestic / Overseas Centers

1 Headquarters



Overview As the headquarters for the Sanken Group, it oversees the entire Group, and the central functions related to management, technology, production, and quality are located. It aims to halve development speed through the Technical Center, the Production Development Center, and the Evaluation and Analysis Center.

Address 3-6-3 Kitano, Niiza-shi, Saitama-ken 352-8666, Japan

URL <https://www.sanken-ele.co.jp/en/>

2 Ishikawa Sanken Co., Ltd.



Overview Ishikawa Sanken is Sanken Electric's main production center for semiconductor manufacturing, responsible for assembly, which is the back-end process of semiconductor manufacturing. It produces ICs, transistors, diodes, and other products at the Horimatsu Plant, the Shika Plant, and the Noto Plant, its three plants in Ishikawa Prefecture.

Address Ha-5 Nashitanikoyama, Shikamachi, Hakui-gun, Ishikawa-ken 925-0151, Japan

URL <https://www.sanken-ele.co.jp/ishikawa/>

3 Yamagata Sanken Co., Ltd.



Overview Yamagata Sanken is Sanken Electric's main production center responsible for semiconductor chip manufacturing, which is the front-end process of semiconductor manufacturing. It produces ICs, transistors, and diodes among other products.

Address 5600-2 Oaza-Higashine-Ko, Higashine-shi, Yamagata-ken 999-3701, Japan

URL <https://www.sanken-ele.co.jp/yamagata/>

4 Fukushima Sanken Co., Ltd.



Overview Fukushima Sanken is responsible for Sanken Electric's semiconductor chip inspection process, playing a role that connects front-end and back-end processes. It also produces LEDs.

Address 15 Miyado, Nihonmatsu-shi, Fukushima-ken 964-0811, Japan

URL <https://www.sanken-ele.co.jp/fukushima/>

5 Niigata Sanken Co., Ltd.



Overview Niigata Sanken is a new plant built in May 2023. It serves as the assembly base for the back-end semiconductor manufacturing processes at Sanken Electric and as the production hub for power modules targeting the EV market.

Address Koh 3000, Chiya, Ojiya-shi, Niigata-ken 947-0052, Japan

URL <https://www.sanken-ele.co.jp/niigata/>

6 Dalian Sanken Electric Co., Ltd.



Overview Dalian Sanken Electric is Sanken Electric's main overseas production center for semiconductor manufacturing, responsible for assembly, which is the back-end process of semiconductor manufacturing. It mainly produces white goods ICs and automotive ICs, and is focusing on expanding capacity with an eye to promoting local production for local consumption.

Group companies in Japan and overseas collaborate on sales, development, technology, and manufacturing to respond to globalization with collective strength




Corporate Data

Company Overview

■ Name

Sanken Electric Co., Ltd.

■ Trademark



■ Headquarters

3-6-3 Kitano, Niiza-shi, Saitama-ken
352-8666, Japan

■ Paid-in capital

¥20,896,789,680

■ Number of shares outstanding

25,098,060

■ Date of establishment

September 5, 1946

■ Business purpose

1. Manufacture and sale of electronic components, devices, and electronic circuits
2. Manufacture and sale of electric equipment and apparatus
3. All matters related to the conduct of the business stated in the preceding items

Business Offices

■ Headquarters

3-6-3 Kitano, Niiza-shi, Saitama-ken
352-8666, Japan
Tel: +81-48-472-1111

■ Tokyo Office

Tokyu Building Higashi 5-gokan 2-25-5,
Minami-Ikebukuro, Toshima-ku, Tokyo
171-0022, Japan
Tel: +81-3-3986-6151

■ Osaka Branch

Meiji Yasuda Seimei Osaka Umeda Bldg.
3-3-20, Umeda, Kita-ku, Osaka-shi, Osaka
530-0001, Japan
Tel: +81-6-6450-4400

■ Nagoya Sales Office

Nagoya Crosscourt Tower
4-4-10 Meieki, Nakamura-ku, Nagoya-shi,
Aichi-ken 450-0002, Japan
Tel: +81-52-581-2768

Board of Directors

■ Directors

Representative Director, President

Hiroshi Takahashi

Director

Katsumi Kawashima

Director

Mizuki Utsuno

External Director (Non-executive)

Noriharu Fujita

External Director (Non-executive)

Takaki Yamada

External Director (Non-executive)

Hideki Hirano

External Director (Non-executive)

Yumi Ogose

External Director (Non-executive)

Mariko Sugawara

Director, Full-time Audit and Supervisory Committee Member

Yasuhiro Kato

External Director, Audit and Supervisory Committee Member (Non-executive)

Atsushi Minami

External Director, Audit and Supervisory Committee Member (Non-executive)

Yumiko Moritani

■ Corporate Officers

Executive Vice President

Satoshi Yoshida

Senior Vice President

Katsumi Kawashima

Senior Vice President

Myungjun Lee

Senior Corporate Officer

Mizuki Utsuno

Senior Corporate Officer

Mitsunobu Fukuda

Senior Corporate Officer

Kazuo Akaishi

Senior Corporate Officer

Yusuke Harada

Corporate Officer

Toshio Noguchi

Corporate Officer

Hironobu Soh

Corporate Officer

Hirokazu Maruo

Corporate Officer

Kojiro Hatano

Corporate Officer

Mitsuhiro Suzuki

Corporate Officer

Hirofumi Mizuno