



Other components

Inductors (coils)

(New segment of net sales classification: Inductors/EMI filters)



An inductor is one of the passive components that make up an electronic circuit, along with a capacitor and a resistor. Major products include power inductors used for the power supply circuit and RF inductors used for the high-frequency circuit.

Power inductors are largely related to power conversion efficiency, which is an important performance of dc-dc converters, and the required performance differs depending on the property of the relevant converter to be used. In addition to traditional processes such as ferrite windings and ferrite multilayer, Murata has added the Metal Alloy process owned by Saitama Murata Manufacturing Co., Ltd. (formerly: TOKO, INC.), which became our wholly owned subsidiary in 2016, to its product lineup to achieve further miniaturization and increased performance as well as well-balanced performance at high currents, which is a characteristic of metal alloy technology, and stable performance during operation. By taking advantage of such higher performance of power inductors and Murata's monozukuri (manufacturing) capabilities as our strength, we are growing our business areas while expanding our sales channels not only into the communications market but also into the in-vehicle system market.

RF inductors are used as an inductor for high-frequency circuits for smartphones. The product series that uses the film manufacturing method,

which is Murata's unique process, has been highly regarded due to their unparalleled characteristics, which are compact and have a high Q (quality factor) value, and adopted in many high-frequency circuits. In addition, wire wound RF inductors are used for chokes in high-power amplifiers or for matching, utilizing its high current characteristics and high Q. As for 5G communications, the market is expected to expand for RF inductors through their use not only in smartphones but also in new applications such as IoT, and it is considered that the quantity of RF inductors used will increase. Meanwhile, the market for RF inductors is also expanding in the automotive field due to the shift toward electrification and the addition of advanced communication functions of automobiles such as telematics and V2X. As for RF inductors, which are characterized by compactness and high performance, Murata is expanding its lineup of highly reliable designs for automotive applications.

Murata's inductors are supported by Murata's various manufacturing methods and processes. Murata aims to create innovation through integration of advanced material development, product development, process development and basic technologies (simulations, reliability evaluation, mounting technology, application). We focus on the 5G and automotive markets and work strategically towards them by clarifying the target.



Other components

Lithium ion secondary batteries

(New segment of net sales classification: Battery and power supply)



Murata's lithium ion secondary batteries are classified into three types: cylindrical, laminated, and small batteries.

Cylindrical type batteries are reliable, keep for a long time, have high temperature characteristic and have advantages particularly in high-power applications. To leverage these characteristics, Murata focuses on the markets for the driving system and storage batteries that are growing in line with decarbonization. Currently, small engines are used for driving systems (for electric tools, gardening tools, etc.), however, it is difficult to control emissions with them. In accordance with the movements towards decarbonization, petrol engines are being replaced with batteries/motors. As for the storage battery market, Murata will expand its business not only for residential use but also for companies, promoting an integrated energy management system of solar power, storage battery modules, and power converter technologies. This energy management system will be introduced at Murata's own offices and facilities, thereby aiming for 100% renewable energy used in the business activities by 2050, contributing to the realization of a sustainable society.

Laminated type batteries can be freely changed in size owing to the laminate film exterior material. In addition, gel electrolytes are highly safe because they do not easily leak or swell. They are employed in mobile devices including tablet PCs and gaming devices.

The use of small batteries for the Tire Pressure Monitoring System (TPMS), medical devices and IoT is increasing due to their compactness and reliability. Demand for small batteries is expected to increase especially for wireless earphones and hearing aids. Murata will continue to provide safe and reliable batteries, adding fully solid-state batteries to our lineup that we developed applying manufacturing technology gained from multilayer ceramic capacitors and materials technology acquired through lithium-ion batteries.

Although the fiercely competitive environment is expected to continue in the lithium ion secondary battery market, demand is projected to grow continuously. We will provide batteries that can satisfy our customers and contribute to the realization of a decarbonized society by leveraging the competitive advantages of our batteries, such as high safety, high input/output and high capacity characteristics.

Business opportunities

- Increased demand for inductors for smartphones and IoT devices and their improved performance by growing adoption of 5G
- Electrification of automobiles and electrification through ADAS and autonomous driving

Competitors

TDK (Japan), TAIYO YUDEN (Japan), Cyntec (Taiwan), Chilisin Electronics (Taiwan), etc.

Strengths

- Extensive product lineup/High market share
- Compact size and high Q characteristics achieved by Murata's unique film manufacturing method
- Reliable quality and stable supply

Risks

- Stable supply of inductors, meeting increasing demand due to the introduction of 5G and electrification of automobiles

Business opportunities

- Trends toward cordless power tools and gardening tools, as well as shift to decarbonization (from gasoline engines to batteries and motors)
- Greater demand for small batteries for automotive, medical, wearable devices and IoT applications
- Utilization of natural energy, in-house consumption of electricity, and backup power supplies during power outage

Competitors

Samsung SDI (South Korea), LG Chem (South Korea), Panasonic (Japan), TDK (Japan), VARTA (Germany), etc.

Strengths

- High-quality, high-output technology
- Packaging technology that enables impact resistance and miniaturization

Risks

- Market entry and expansion by competitors in our target markets



Other components

Sensors

(New segment of net sales classification: Functional devices)



Murata's MEMS inertial sensors use unique processing technology called 3D-MEMS technology and design technology that enable the output of precise strong signals at the component level. Integration with advanced circuit technology ensures high reliability, stability and accuracy even in a harsh environment. These features have gained trust from many customers and our products have been adopted not only in the automotive applications market but in other markets where high reliability is required, such as industrial equipment and medical devices.

In the rapidly growing automobile market, as the installation of safety features to protect lives, such as electronic stability control (ESC) and antilock braking system (ABS), becomes mandatory, our sensors are increasingly adopted for gyro sensors and acceleration sensors.

Recently, technologies have been developed globally for realization of self-driving cars. For the system to control self-driving and ensure safety, it needs to detect a wide range of information such as weather, traffic regulations and surrounding environment for decision making using various

sensors. For example, it has been a challenge to accurately identify the location and the direction of a car and drive it safely in poor conditions where the Global Positioning System (GPS) is ineffective, such as in a tunnel, or where cameras or radars do not function. For that purpose, demand has been increasing for MEMS inertial sensors that can accurately measure the location, position and direction of a vehicle and enable safe driving. Murata can leverage the competitive advantage of 3D-MEMS technologies in this business domain. Murata will propose products to automobile manufactures and Tier 1 customers by quickly capturing their needs for the future.

By integrating the MEMS development technology from Murata Electronics Oy (formerly VTI Technologies) in Finland, which we acquired in 2012, and Murata's strengths in monozukuri, we will have a system to supply advanced products. We will further develop new products and enhance supply capability in a timely manner. Murata will continue to contribute to social development by improving our technologies and produce advanced MEMS inertial sensors.

Business opportunities

- Increased demand for high-performance sensors driven by growing use of advanced driver assistance systems (ADAS) and self-driving cars
- Demand for multi-axis sensors that assists mounting, calibration and calculation

Competitors

Bosch (Germany), Analog Devices (U.S.), STMicroelectronics (Switzerland), Panasonic (Japan), etc.

Strengths

- Low noise level, high sensitivity, high accuracy, robustness and reliability achieved with Murata's unique 3D-MEMS designing and processing technologies

Risks

- Intensified competition with competitors