

## Communications

### The world, the future, and security at your fingertips

—With Murata, connection takes up a brand new meaning—

Mobile phones and smartphones are presently in use all around the world. Higher speed and higher capacity communication services are constantly being introduced and multifunctionality is advancing. The miniaturization and modular design of high frequency parts, sensors that improve functionality and operability, as well as low-loss capacitors and power inductors, etc., all contribute to their evolution and diffusion.



#### Monolithic ceramic capacitors

Indispensable to electronic circuits, these components serve to store electricity and handle the electric flow. The number of these units being incorporated is increasing along with the miniaturization, reduced thickness, and high functionality of mobile devices like smartphones, as well as PCs.



#### High frequency inductors (coils)

When electricity flows through these inductors, which are also called coils, a magnetic field develops and that current is affected. These inductors are used in radio circuits, power supply circuits, and more.



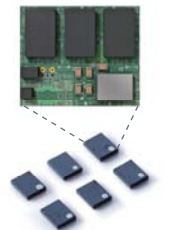
#### Microwave coaxial connectors

Microwave coaxial connectors transmit radio frequency signal between circuits. They contribute to the development of high-performance communication equipments, such as smartphones, tablets and wearable devices with smaller and thinner size.



#### RF modules for cellular phones

These modules support the multiple frequency compatibility of smartphones. They combine a power amplification (PA) function with the conventional function for changing and filtering frequencies. By adding even more functions, they contribute to reducing the thickness and improving the transmission speed of smartphones.



Internal configuration (image)

#### SAW filters

The filters that extract only the required portion of a radio signal are key devices in high frequency circuits. With its unique miniaturization technology, Murata helps RF circuit downsizing.



#### Power amplifier modules

These are key devices that amplify the signal for smartphones and deliver those radio waves to distant locations. Murata's power amplifier modules are compatible with LTE and international frequency bands while contributing to higher functionality in those smartphones.



#### Connectivity modules

Enabling mobile phones to access the Internet via radio signals, these modules lead the trend towards increasing multifunctionality in those phones.



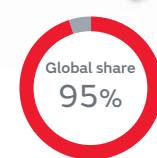
#### Low ESL monolithic ceramic capacitors

These small, high-capacity capacitors stabilize the power supply circuit to the MPU, helping reduce the size and thickness of mobile PCs.



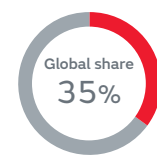
#### Shock sensors

These are electronic components that apply piezoelectric ceramics to change acceleration and vibration into an electrical signal. They are used mainly with HDDs as sensors for preventing the writing of data when an impact is received from an external source.



#### Chip EMI suppression filters (Chip EMIFIL®)

Components for removing the noise that is generated from electronic devices, these filters are useful for preventing the malfunction of such devices. They contribute to the countermeasures for and improvement in electromagnetic wave noise that is made more complex in accordance with the miniaturization, multi-functionalization, and higher frequencies of today's electronic devices.



## Computers

### Ubiquitous computing in the true sense

—Murata makes things “simple” with not-so-simple technologies—

Easy to carry and simple to connect, highly mobile, slim, lightweight notebook PCs and tablet computers are drawing attention with the spread of the Internet and cloud computing services. Murata is responding to the need for high performance and high functionality in PCs with our technologies for the further downsizing and slimming down of electronic components, our high-density package technology, and our sensing technology, etc. We are also supporting new-age computing through wireless communication modules that provide connectivity with reduced power consumption, and through sensors that deliver high reliability and operating comfort.

\* The “Global share” indicated on each page refers to the worldwide share of that particular industry, and is not the share of any corresponding application. Furthermore, the noted shares are merely estimates made by Murata and may differ depending upon the market or the application.



### Combined gyroscopes and accelerometers

Changes in acceleration and in gravity can be handled as changes in capacitance in order to detect acceleration values and the angle of rotation. This sensor is used in areas in connection with the basic performance of automobiles, such as in the Electronic Stability Control (ESC) for the chassis and in the car's Anti-lock Brake Systems (ABS).



### Ultrasonic sensors

This sensor can measure distance according to the reflex time of the ultrasonic waves that are generated by oscillating piezoelectric ceramics. It is used especially for the rear sonar in parking assistance systems.



### DC-DC converters

This thin, lightweight DC-DC converter uses a Murata-proprietary control circuit and sheet transformer. Using this one DC-DC converter, voltage can be supplied to the circuit unit of each block that requires insulation (the low-voltage battery input circuit unit, high-voltage battery input circuit unit, and AC commercial voltage input circuit unit).



### Monolithic ceramic capacitors

Maximizing the heat resistance of ceramics, these highly reliable capacitors are able to demonstrate their excellent performance even under harsh usage environments. They are, thus, naturally utilized in applications that require high reliability, such as in ECUs, drive control units and safety devices, as well as being widely used for infotainment like audio and navigation.



### Power inductors

Electronic control systems in automobiles have advanced. These power inductors efficiently transfer power and suppress the noise generated from electronic devices.



### Timing devices

These are component parts that generate the clock signal in combination with the IC. As electronic outfitting of automobiles progresses, communication between ECUs is needed and timing devices that deliver a highly accurate, high quality clock signal are called for.

#### Crystal Units

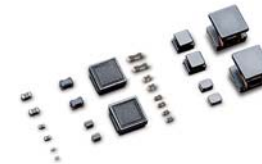


#### Ceramic Resonators (CERALOCK®)



### Chip EMI suppression filters (Chip EMIFIL®)

Digitization of audio-visual equipment and home appliances is advancing and the high-speed clock signal that flows inside those devices may sometimes have a negative influence as electromagnetic noise. Chip EMI suppression filters prevent such malfunctions caused by noise and other factors, and simultaneously contribute to the high definition and high-quality sound in audio-visual equipment.



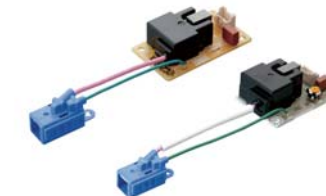
### thermistors

These are parts whose resistance changes with fluctuations in voltage and current. They monitor overheating in and the charge of circuits, and are useful in protecting those circuits from overheating or excessive current, like in ICs, power supply circuits and batteries.



### Ionizers / active oxygen modules (Ionissimo®)

This device ionizes air molecules (gives them a plus or minus electric charge). Deodorization, disinfection, anti-mold, antivirus, anti-static, electrification and other effects can be achieved by ionizing the air and adding certain characteristics.



### Polymer aluminum electrolytic capacitors

These are high capacity capacitors that are characterized by having a low profile and low ESR. They handle the stabilization of voltage in circuits where serious voltage control is demanded, and contribute to the advanced features in audio-visual equipment.



## Audio and visual / Home appliances

### At home, there's your family, and then there's Murata...

—Smart and economical; the epitome of stylish—

The television remembers your favorite program. The air-conditioner cools only those areas with people in them and emits negative ions into the air. Murata's sensors, ionizer modules, and high conversion efficiency power supply modules support a new "smart" and "eco" lifestyle.



## Automotive electronics

### Automotive technology is going through transformation for our Earth and people

—Thus, Murata's missions abound...—

The greater intelligence and electrification of our automobiles is progressing into the next generation, such as with vehicles in which we can travel more safely and comfortably, in coping with environmental issues, and in possessing the entertainment functions with which we can enjoy the driving experience even more. Murata's electronic components have evolved in various automotive applications, including safety equipment, the power train and telecommunications, in order to deliver high reliability that can withstand harsh conditions of use.

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