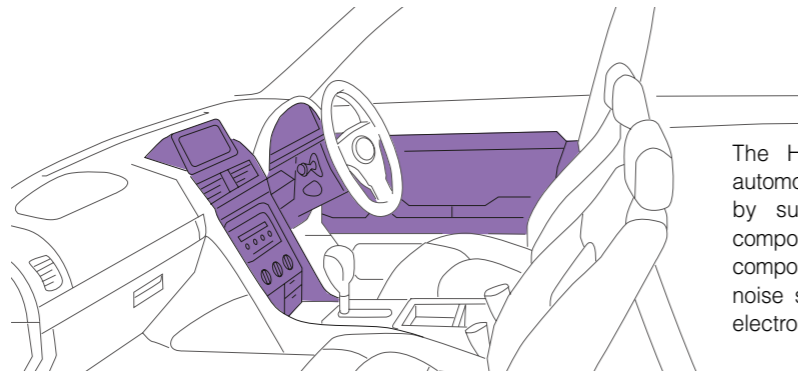


Our Dreams
Onboard

Utilities & Passenger space



The Hitachi Metals Group works to make automobiles more comfortable and convenient by supplying a wide variety of electrical components, information and telecommunications components, sensors and various EMC-compliant noise suppression products to prevent diverse electronic equipment from malfunctioning.

Components and Materials for Motors Used in Electrical Equipment

“NMF Series” High-Performance Ferrite Magnets [NEOMAX Company]



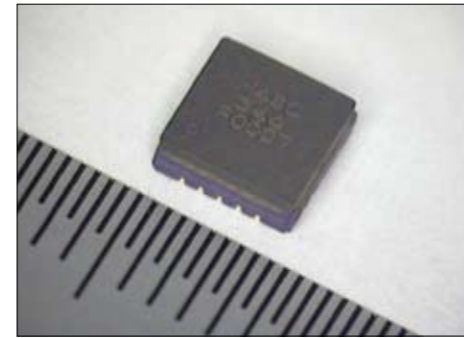
NMF series high-performance ferrite magnets

With ferric oxide as their main component, ferrite magnets are most frequently used in the motors of automotive electrical equipment, and feature superior cost performance. NMF Series magnets include not only conventional ferrite magnets, but also the 9B Series high-performance magnet, in which a portion of a conventional Sr ferrite magnet is replaced by lanthanum (La) and cobalt (Co), and the company's new-composition ferrite magnet 12B Series, which delivers the world's highest magnetic strength. The temperature coefficient of the new magnet's intrinsic coercive force has been lowered to achieve little demagnetization even at low temperatures, and it is also resistant to temperature fluctuations. Therefore, it contributes to further reductions in the size of a magnet, thereby minimizing the sizes of motors in which the magnets are applied.

These magnets are suitable for a wide range of applications including starter motors, power window motors, cooling fan motors, EPS motors, and wiper motors.

Car Navigation Components and Materials

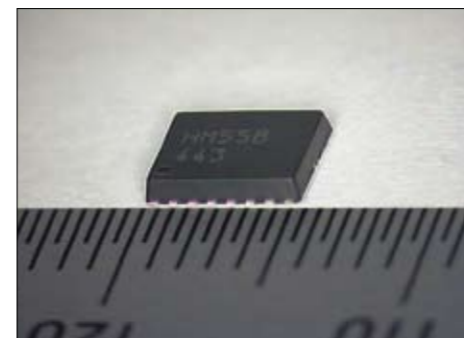
Piezoresistive 3-Axes Accelerometer [Information System Components Company]



A piezoresistive 3-axes accelerometer

This type of acceleration sensor can detect the tilt and motion of objects along three axes (X, Y and Z) simultaneously. Compactness and thinness, as well as low power consumption and high shock resistance, are embodied by drawing on the combination of Hitachi Metals' original MEMS and precision assembly technologies. The new product lineup features the restricted dispersion in sensor properties of each sensor and has included an IC that can compensate for property fluctuations due to the change of ambient temperature. The sensing range varies from $\pm 3G$ to $\pm 100G$ ($\pm 29.42m/s^2$ to $\pm 980.67m/s^2$) according to customers' applications. As they can detect vibrations, impacts, drops, angles and speeds of the measured objects, a wide range of applications are anticipated including operating displays for medical and healthcare equipment, vehicle accident recorders, antitheft devices and portable devices, as well as input devices for electronic pets, robots and various game machines. These products are lead-free.

Geomagnetic Sensors [Information System Components Company]

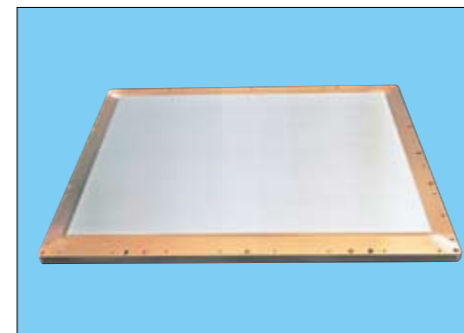


A geomagnetic sensor

Our 2-axes geomagnetic sensors detect direction from the earth's magnetic field. Our thin-film process has materialized small sensors with low power consumption and outstanding cost performance. Their simple 11-bit digital output serial interface is ideal for the onboard application. These products are lead-free.

These products are suitable for car navigation systems, electronic compasses and the navigation system for pedestrians.

Sputtering Target Materials for Flat-Panel Displays [Specialty Steel Company]

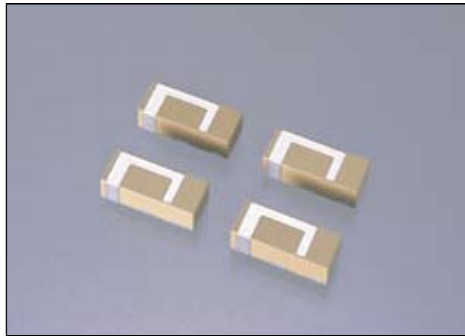


A liquid crystal target material

Target materials are those used in a thin-film fabrication technology called the "Sputtering method." Our high-quality target materials are produced with a unique thermal plasma drop refining process in which uniform and high-purity metal can be extracted by letting raw material pass through the plasma heat area. In the near future, the role and importance of the display is expected to expand for car navigation and other functions on the dashboard. Accordingly, Hitachi Metals endeavors to assist automakers from the initial design of component materials to meet diversified customer needs. One such example is the supply of newly developed target materials that form high-reflectance film. Our sputtering target materials are extensively applicable to large-scale liquid crystal displays and organic EL (electroluminescence) displays.

Dielectric Chip Antennas

[Information System Components Company]



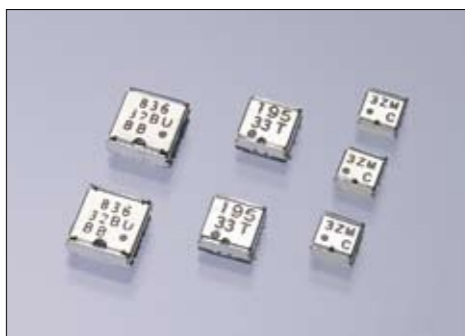
Dielectric chip antennas

Our small and wideband-compliant dielectric chip antennas are suitable for portable information terminals such as mobile phones and GPS (Global Positioning System)-based car navigation units. Based on its unique ceramic material excelling in high-frequency properties and component design technology, Hitachi Metals can supply very small chip antennas for wireless LAN equipped with dual-band functionality that shares both 2.4-GHz and 5-GHz frequency bands. These products are lead-free.

For this type of antenna, the initial design can be adjustable for GPS W-CDMA communication systems as well as for wireless LAN.

Isolators

[Information System Components Company]

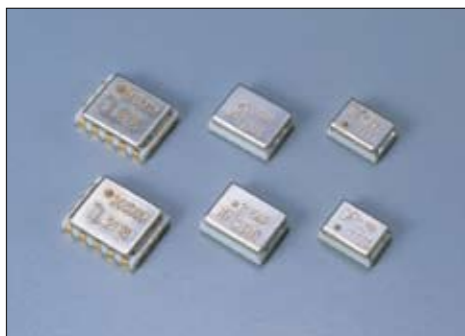


Isolators

Isolators are often used for wireless communications equipment such as portable telephone sets. These important components are useful for improving sound quality and reducing data errors with such functions as the stabilization of amplifier operations and noise absorption. Given the extensive adoption of communications systems such as W-CDMA and CDMA 1x, which are the so-called third-generation mobile phones that can handle video pictures, the necessity of stabilizing telecommunications signals is increasingly demanded. In addition, improvements in communication quality are considered increasingly important as automobile onboard communications services such as telematics are spreading. Hitachi Metals' isolators meet these rising needs and higher performance is pursued through our original circuitry and material designs. These products are lead-free.

Antenna Switch Modules

[Information System Components Company]



Antenna switch modules

Our compact antenna switch modules package an antenna switch to change between reception and transmission, a branching filter and a low pass filter. One outstanding feature is the low insertion loss especially on reception. These products are lead-free.

Other Components and Materials Used in Other Electrical Equipment

Keyless Entry Antennas

[Information System Components Company]



Keyless Entry Antennas

The compact and lightweight antennas for keyless entry allow drivers to lock and unlock with a wireless remote controller. We offer remote controller antennas and receiving antennas for vehicles. In recent years, highly functional keyless entry systems have become popular especially for premium cars not only for locking/unlocking but also for ON/OFF operation of air conditioners and starting the engine via an immobilizer.*

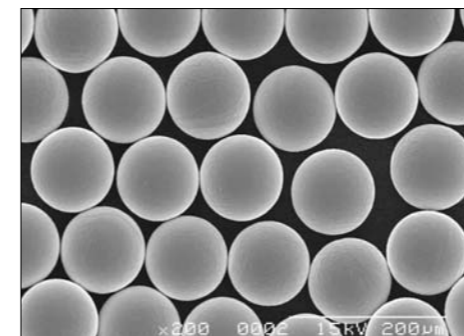
Hitachi Ferrite Electronics develops compact and more sensitive antennas that are optimal for a high-performance operating environment, with ferrite that excels in receiving sensitivity and amorphous having high impact resistance and temperature characteristics.

* Immobilizer

A function that does not enable the engine to start unless the ID code of the transponder built into the engine and the counterpart previously registered in the electronic control unit of the car body agree. They are mainly equipped as an antitheft device.

Lead-Free Solder Balls

[Specialty Steel Company]



Lead-free solder balls

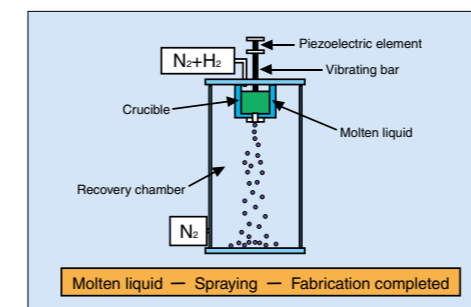
We supply lead-free solder balls for which demand has been rising in recent years in the application of electric contact for BGA*/CSP.* Hitachi Metals' uniform liquid droplet spray method does not require the processing of foils and fine wires as they are manufactured directly from molten liquid without oil in the process. So our new process is applicable for fragile material, and enables a ball diameter of 80 – 760 μm. We can propose appropriate ball size and composition in compliance with customers' wishes.

* BGA: Ball Grid Array

A surface-mounting-type IC package developed for high pin count LSIs.

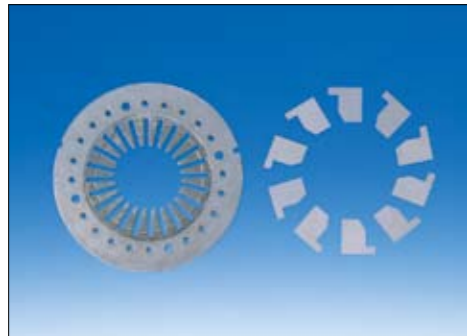
* CSP: Chip Size Package

A surface-mounting type semiconductor package developed for compactness and high-response.



A conceptual diagram of the uniform liquid droplet spray method

“Permendur” High Flux Density Soft Magnetic Material
[Specialty Steel Company]



Permendur

Of all the Fe-Co alloys featuring high flux density, the 49%Co-2%V-Bal.Fe alloy known as “Permendur” boasts especially high saturation flux density and high permeability, as well as high damping capacity. We have established a special cold rolling process for Permendur coil that should improve the compactness, light weight and sophisticated functionality of products. Suitable applications include magnetic poles, choke coils for motors, small transformers and relays.

Magnetic Properties of Permendur

Flux density B (T)						Max. permeability μm	Coercive force Hc (A/m)
B80*	B240	B400	B800	B2000	B2800		
1.60	2.05	2.10	2.15	2.20	2.25	15,000	48

* For example, B80 means the flux density B at 80 A/m.

Noise Suppression Components and Materials

Choke Coils for Removing Motor Noises
[Information System Components Company]



Choke coils for removing motor noises

These coil products work to remove noises generated by the brush motor of fan motors and power motors.

“FM-VL series” Common Mode Choke Coils
[Information System Components Company]



Common-mode choke coils (single-phased FM coils)

Common-mode noise refers to the high-frequency noises generated between a power supply line or a signal line and the ground (GND). Common-mode choke coils reduce common-mode noises. Hitachi Metals’ common-mode choke coils feature the high permeability and stable temperature characteristics of “FINEMET®.” Common-mode choke coils are suitable for use in the line noise filters of onboard inverter devices, switching power supplies and signal lines. The main features are strong noise suppression for a wide frequency range and small characteristic variations against temperature change, thereby enabling smaller and lighter choke coils.

“FINEMET® Beads” Surge Absorber Cores
[Information System Components Company]



FINEMET® beads

Hitachi Metals’ surge absorber cores can suppress high-level surge current and voltage using small cores due to high flux density and high pulse permeability comparable with the Co-based amorphous material, and low core loss—all of which are main features of “FINEMET®.” The characteristic degradation that may be caused by temperature rise is relatively small compared with the Co-based amorphous material and ferrite. These surge absorber cores have a good effect in preventing or reducing surge currents, including a reverse recovery current of diodes, a current surge that might occur on switching circuits or a surge current that occurs when a semiconductor switching element such as a power

* MOS-FET (Metal Oxide Semiconductor Field Effect Transistor)
Field-effect transistors on which an oxide film insulates the gate.

“MICROLITE®” Power Inductor / Normal Mode Choke Cores
[Information System Components Company]



“MICROLITE®” cores

The MICROLITE® Power Inductor / Normal Mode Choke Cores use Fe-based amorphous materials of high saturation flux density and low core loss. Three types with permeability of 100, 245 and 270 are available.

They can be used in environments that are exposed to considerable vibrations and/or temperature change as smoothening or choke coils used in the audiovisual equipment for automobiles and instrument panels. In addition, they are suitable for manufacturing more compact coils with lower core loss.

“ABSORSHIELD®” Noise Suppression Sheet

[Information System Components Company]



ABSORSHIELD®

The ABSORSHIELD® Noise Suppression Sheet is a compound of the FINEMET® powder and resin. It can be used over a wide frequency range of 100 MHz to 10 GHz. The sheet is thin, flexible and easy to install in your equipment, and is also halogen-free and incombustible (UL94V-0* certification obtained). ABSORSHIELD® is suitable for noise suppression of onboard electronic devices such as car navigation system.

* UL File No. E210819

UL (Underwriters Laboratories, Inc.) is a nonprofit U.S. organization that investigates and certifies the safety of various materials, products, structures, systems and the like.

“FM shield™” Magnetic Shielding Sheet

[Information System Components Company]



FM shield™

The FM Shield™ Magnetic Shielding Sheet consists of a FINEMET® ribbon sandwiched with PET films on both sides. The sheet is thin (0.12 mm thick), flexible and lightweight. It provides an excellent shielding effect for DC current and in a frequency range of several hundred kHz. It also features little characteristic deterioration after cutting or bending and does not require heat treatment.

This magnetic shielding sheet is suitable for use in such applications as magnetic field shielding for LCDs, the shielding of flexible PC board wiring and radiation-prevention in steel case.

“MS-AM series” Amorphous Magnetic Shielding Tapes

[Information System Components Company]



Amorphous magnetic shielding tapes

These thin (0.1 mm thick) and lightweight Amorphous Magnetic Shielding Tapes consist of a Co-based amorphous ribbon with a PET film on one face and a double-faced adhesive tape on the other. They are more flexible than FINEMET® magnetic shield tapes so that they can be easily wrapped around electric cords.