

PRODUCTS

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MEMS Technology

Applied to acceleration sensors and future products

MEMS (micro electro mechanical systems) are microstructures manufactured on semiconductor wafers using semiconductor process technologies. In recent years, MEMS technology has been widely applied to various devices used in sensors, ink-jet printer heads, and other products. DENSO has developed a new technology for MEMS that allows a trench that is deeper and narrower than was possible before, and is applying this technology to automotive acceleration sensors and future products such as a micro laser scanner.

Semiconductor Acceleration Sensor

As automotive safety technologies progress, the demand for smaller and less expensive semiconductor acceleration sensors is increasing. With its advanced MEMS technology, DENSO is supplying the world's smallest automotive semiconductor acceleration sensors for safety systems such as airbag systems, vehicle stability control systems and anti-lock braking systems.

The acceleration sensor has a sensor element composed of fixed and movable electrodes that detect acceleration from a change in capacitance, and a control circuit that converts the change in capacitance to an electric signal.

DENSO's advanced MEMS technology for sensor elements enables the world's thickest fixed and movable electrodes to be formed on an SOI (silicon-on-insulator) substrate using only a dry etching process. Usually both wet and dry etching processes are needed. This technology simplifies manufacturing processes and improves production yield, resulting in a lower cost acceleration sensor. The world's thickest fixed and movable electrodes - 15 micrometers - provide a wide detection range and high reliability.

Future Products

DENSO has continuously improved its semiconductor technologies since the early 1970s, developing a number of groundbreaking products. Now it is applying the technologies and expertise cultivated in acceleration sensors to create new products.

One such product is a micro laser scanner composed of micro prisms and laser diodes. DENSO currently is developing a scanner that is approximately 1/100th the size smaller than a conventional mechanical laser scanner, by manufacturing aligned micro prisms using MEMS technology. DENSO expects to use the micro laser scanner for automotive systems.

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