
Fujikura's MEMS Foundry Service
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1. Overview

Fujikura's MEMS technology is based on experiences in the downsizing and integration of sensors. The technology is backed by years of expertise on silicon micromachining, wafer bonding and packaging during our mass-production of semiconductor pressure sensors. By combining silicon planer processes, microcircuits formation on flexible printed circuit boards, and chip-on-film assembling technology, we have developed our wafer-level package (WLP) technology and launched a foundry service. Fujikura is actively pursuing research and development targeting a future MEMS packaging applying silicon through-hole interconnection technology.

2. Wafer-Level Packages

For portable electronic equipments, WLP, which enables real-chip-size IC package, is now becoming widespread. Fujikura has developed technologies for forming thick resin film, fine rule circuits, lead-free solder bumping on the whole wafer and reducing the chip-height by wafer-thinning. Also, building-up multi-layer circuits has been developed. Fujikura started its WLP foundry service in 2002, and now new mass-production line for 8-inch and 6-inch wafers at the Sakura Plant has brought into operation. Further, integrated passive devices for RF-MEMS of high-performance antennas and inductors on WLPs have been successfully developed. Fujikura will continue to contribute improving device performance with novel technology.



Fig. 1 Wafer-level package

3. MEMS Packaging

Fujikura was among the first to focus on promising through-hole interconnects in silicon substrates. A photo-assisted electro-chemical etching (PAECE) process for forming through-holes and a molten metal suctioned method (MMSM) for conductor formation have been developed at early stage. Now by dry etching and by low-cost conductor filling processes, for instance, electroplating, we are pursuing R&D on various techniques for forming through-hole interconnects and wafer bonding that are appropriate for MEMS device packaging and system-in-package technologies.

The image-sensor package is one of the typical product applying these technologies. By embedding conductors in a chip using a through-hole interconnect, solder bumps can be formed on the opposite side of image-sensing area of the device on the optical lens side, achieving a small camera module for a high-density assembly. Combining this WLP technology with our expertise in packaging of pressure sensors with cavities, we are endeavoring to realize practical products by introducing our through-hole interconnects for the coming generation of interposers and wafer-level MEMS packages (WLMP).

4. Conclusion

Fujikura has assembled its wafer-level package foundry service and MEMS R&D at its Sakura Plant, intending to establish a MEMS production service as well as WLPs to meet our customer demands.

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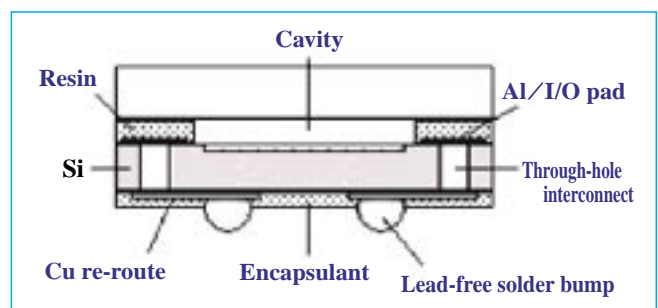


Fig. 2 Cross-sectional view of an image sensor