

Hitachi MEMS Foundry Service

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MEMS Project

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1. Outline

In i-engineering, an integrated market of its manufacturing technologies, Hitachi, Ltd. supports technicians engaged in research and development, design, production, and inspection. Although Hitachi's MEMS foundry service was launched three years ago with services covering design, processing, and trial production, many customers have expressed a wish for the foundry service to handle the entire process up to and including mass-production. Therefore, beginning this year, we are offering services through mass-production in cooperation with foundry companies in Hitachi Group. We also assist customers in MEMS R&D and the construction of production lines and are providing wide-ranging solutions for MEMS development, from the selection of utilities and manufacturing and inspection equipment to clean room construction required.

2. Hitachi MEMS

Much of the technology supporting MEMS at Hitachi came into being as a result of technologies fostered since the 1970s for developing power devices, optical communications, semiconductor sensors, and other such devices. Applied fields for these technologies have expanded to include biotechnology, micro-chemical processing, and RF-MEMS. These processing technologies originate from the anisotropic etching of single-crystal silicon. Hitachi has worked hard to develop a multi-stage etching process employing a simulator for predicting etching configurations and has used this process to develop many products. For more than ten years now, Hitachi has continually expanded the range of applied fields for MEMS technology and has actively engaged in the development of micromachining and assembly technologies for thin films, glass, metals, and synthetic

resins and has applied these technologies to device development in the various fields.

In this way, processing technologies have become more versatile, and, as advancements of each technology have led to increasing specialization, Hitachi has engaged in the building of a framework capable of effectively utilizing these processing technologies in device development. In one such example, Hitachi has created an environment for linking device design to process development in which process developers can easily analyze the strength and heat flow of devices while seated. Accordingly, robustness that accounts for variations in each process under development by specialists can be easily reflected in the device design, providing efficient device development that enables a smooth transition from trial production to mass-production.

3. Features of Hitachi's MEMS Foundry Service

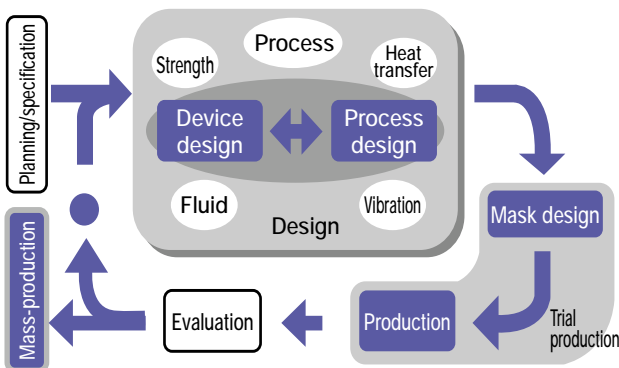
Hitachi's MEMS foundry service has developed into a broad service for supporting the individual circumstances of our customers, from simple questions related to MEMS to device design, trial production, and mass-production. These services are founded on knowledge that Hitachi has accumulated through years of research and development on devices and their design and processing. Our objective is to further strengthen our MEMS R&D system and to provide a richer array of services.

In order to broaden the range of services it provides, Hitachi is strengthening relationships with other companies in Hitachi Group. Two representative examples of companies in Hitachi Group that have developed foundry services independently are Hitachi Metals, Ltd. (<http://www.hitachi-metals.co.jp/index.html>) and Hitachi Haramachi Electronics Co., Ltd. (<http://www.haraden.co.jp/>). Both companies have differing fields of expertise that complement one another and disclose the features of their technologies on their corresponding Web sites.

In summary, Hitachi continually develops the array of services offered through its MEMS foundry service through reinforcement of its MEMS R&D system and collaboration with companies in Hitachi Group. It is our hope that these services will contribute to future MEMS development.

For further information, see the i-engineering Web site for Hitachi's integrated market of manufacturing technologies:

<http://www.i-eng.hitachi.co.jp/>



Flow of processes in Hitachi's MEMS foundry service