

MEDIA RELEASE

A*STAR INSTITUTE OF MICROELECTRONICS AND LEADING SEMICONDUCTOR COMPANIES TEAM UP TO DEVELOP COOLING SOLUTIONS FOR HIGH POWER HIGH PERFORMANCE APPLICATIONS

1. **Singapore, 18 March 2014** – A*STAR Institute of Microelectronics (IME) has launched the Silicon Micro Cooler (SMC) consortium to develop integrated thermal management solutions for semiconductor chips with extreme high heat dissipation and local hot spots applications. Members of the consortium include Honeywell Aerospace, Element Six Technologies and an information and telecommunications company.
2. Thermal management is an important technology area that impacts the performance and reliability of high power high performance applications, such as datacenter and networking systems. As the electronics industry continues to trend towards smaller form factor, greater functionality and faster processing speed, the high power dissipation across a smaller chip area can result in hot spots. These are usually high heat flux concentrated in small areas, which could lead to extremely high junction temperature and drastic breakdown of integrated circuits devices.
3. The SMC consortium builds on the R&D capabilities of IME in the field of thermal and fluidics design, deep trench etching, wafer level bonding and system level characterization competency. It aims to develop technologies for thermal solutions required for high heat flux application, develop heat sink design with advanced thermal materials such as synthetic diamond heat spreader, silicon-based micro fabrication, wafer bonding technologies, and demonstrate integrated

hybrid silicon micro coolers that are capable of heat dissipation for processors, RF amplifiers and laser diodes applications.

4. “It is critical for thermal management solutions to keep pace with the increasing requirements of high performance semiconductor modules. Through a collaborative platform where we integrate R&D knowledge with the expertise of stakeholders in the value chain, we believe that the consortium will be successful in the development of novel cooling techniques that will enable the continued advancement of these high performance semiconductor modules,” commented Professor Dim-Lee Kwong, Executive Director of A*STAR IME.
5. “Synthetic diamond has the highest room-temperature thermal conductivity of any commercially available material, and will play an integral role in addressing the semiconductor industry’s ever increasing thermal management challenge. Key to maximizing synthetic diamond’s effectiveness is the method of its integration into device packages. The SMC consortium will provide a critical platform for Element Six to work with industry partners, to optimize diamond package integration and drive future benefits of this technology for the industry as a whole,” said Bruce Bolliger, Senior Director of Element Six Technologies.
6. “Participating in A*STAR IME’s SMC Consortium is a further step in proactively contributing to the aerospace industry with unique and innovative projects and solutions. We look forward to a successful collaboration with our IME consortium partners in Singapore and are very confident that the collaboration will contribute to our mutual success,” commented Dr. Soeren Wiener, Director AME Engineering Technology Programs of Honeywell Aerospace.

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About A*STAR Institute of Microelectronics (IME)

The Institute of Microelectronics (IME) is a research institute of the Science and Engineering Research Council of the Agency for Science, Technology and Research (A*STAR). Positioned to bridge the R&D between academia and industry, IME's mission is to add value to Singapore's semiconductor industry by developing strategic competencies, innovative technologies and intellectual property; enabling enterprises to be technologically competitive; and cultivating a technology talent pool to inject new knowledge to the industry. Its key research areas are in integrated circuits design, advanced packaging, bioelectronics and medical devices, MEMS, nanoelectronics, and photonics. For more information about IME, please visit <https://www.ime.a-star.edu.sg>.

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In line with its mission-oriented mandate, A*STAR spearheads research and development in fields that are essential to growing Singapore's manufacturing sector

and catalysing new growth industries. A*STAR supports these economic clusters by providing intellectual, human and industrial capital to its partners in industry.

A*STAR oversees 18 biomedical sciences and physical sciences and engineering research entities, located in Biopolis and Fusionopolis as well as their vicinity. These two R&D hubs house a bustling and diverse community of local and international research scientists and engineers from A*STAR's research entities as well as a growing number of corporate laboratories.

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