

March 29, 2024

## **Resonac Increases Capacity to Produce Materials for AI Chips**

### **~ Resonac invests 15 billion yen in facilities to produce non-conductive film and thermal conductive sheet~**

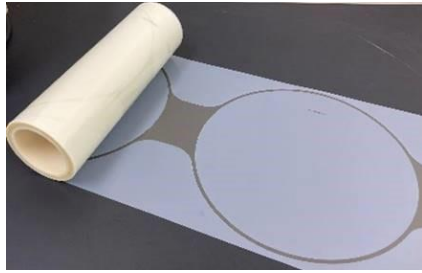
Resonac Corporation (President: Hidehito Takahashi, hereinafter “Resonac”) has decided to increase its capacity to produce materials for high-performance semiconductor chips, which are to be used mainly as CPUs for artificial intelligence (AI), to 3.5 to 5 times of the current level. Resonac will increase production of non-conductive film (NCF) and thermal conductive sheet (thermal interface material: TIM) both of which have already been adopted by Resonac’s customers for use in high-performance semiconductor chips. Resonac plans to invest 15 billion yen in facilities to produce these materials and will commence operation of the expanded facilities in and after 2024 step-by-step. Scale of the market for AI chips in 2027 is expected to expand to 2.7 times of that in 2022\*1. Resonac will increase its capacities to produce NCF and TIM in a timely manner, thereby strengthening the company’s predominance over other competitive companies in the market.

NCF is utilized for connecting and stacking multilayers of high bandwidth memories (HBM\*2), which is installed into high-performance semiconductor chips. NCF is required to have adhesive strength, realize reliable connection of devices, and have precise thickness with tolerance less than microns. Resonac has been producing NCF satisfying quality requirements by making the most of the company’s technologies and experience piled up over many years of development and production of die-bonding film, which is a predecessor of NCF.

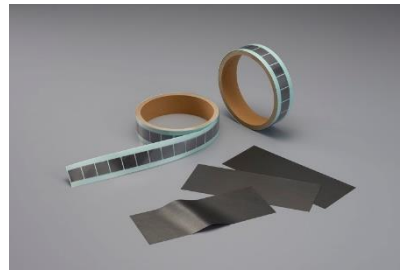
TIM is utilized for expediting heat radiation from high-performance semiconductor chips. TIM is required to have high thermal conductivity to expedite heat radiation from chips generating heat, reliability to endure repeated changes in temperature, and flexibility to adhere closely to fine asperities of chips and radiators\*3. Resonac has been producing TIM satisfying performance requirements by utilizing the company’s original technology to add graphite particles to flexible sheet materials with special placement\*4.

Recently, it is said that evolution of high-performance semiconductor chips in the front-end process of semiconductor manufacturing is reaching the limits of improvement in technologies and cost performance in the front-end process. Therefore, in recent years, 2.xD and 3D semiconductor packaging technologies\*5 are becoming key technologies in manufacturing of semiconductor chips. In addition, utilization of 2.xD and 3D semiconductor packaging technologies is enabling semiconductor manufacturers to realize high-density mounting of semiconductor chips in the back-end process of semiconductor manufacturing and improve performance of chips.

Resonac has been promoting R&D on next generation semiconductor packaging materials by utilizing Packaging Solution Center (PSC)\*6 and JOINT2\*6 consortium. Resonac will continue supporting evolution of high-performance semiconductor chips by promoting co-creation with semiconductor related companies inside and outside Japan and developing leading-edge materials.



NCF



TIM

- \*1: Source: Gartner (as monetary scale of AI semiconductor market)
- \*2: High bandwidth memory consists of laminate of memories and utilizes through silicon via (TSV) technology. It has bandwidth wider than conventional memory chips and can process mass data with high speed.
- \*3: Radiator is fins of metal attached on a semiconductor package whose chips generate heat.
- \*4: Resonac can orient graphite particles vertically on the surface of sheet of TIM. This orientation enables TIM sheet to conduct heat very rapidly.
- \*5: 2.5D is a technology to place semiconductor chips in parallel on the interposer. 3D is a technology to laminate chips with TSV (through silicon via).
- \*6: Packaging Solution Center is a Resonac's base to promote open innovation on evaluation and packaging technology. It has full lineup of leading-edge equipment to manufacture semiconductor packages including dicing saw to cut wafer, chip-mounting equipment, package sealing equipment, inspection and evaluation equipment. JOINT2 is a consortium of 14 semiconductor-related companies established under the leadership of Resonac Corporation with the aim of developing next-generation semiconductor packaging technologies and is acting in the Packaging Solution Center.

#### [About the Resonac Group]

The Resonac Group is a new company established as a result of the integration of the Showa Denko Group and the Showa Denko Materials Group (former Hitachi Chemical Group) in January 2023. The Group's annual sales of semiconductor and electronic materials amount to about 340 billion yen. The Group especially has an extensive lineup of semiconductor materials for back-end process which have global top market share. The integration of the two companies has enabled the Resonac Group to design functions of materials as well as to develop them in-house, going all the way back to raw materials. The new trade name "RESONAC" was created as a combination of two English words, namely, the word of "RESONATE" and "C" as the first letter of CHEMISTRY. The Resonac Group will make the most of its co-creative platform, and accelerate technological innovation with semiconductor manufacturers, material manufacturers, and equipment manufacturers inside and outside Japan.

For detail, please refer to our Website.

Resonac Holdings Corporation: <https://www.resonac.com/>

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