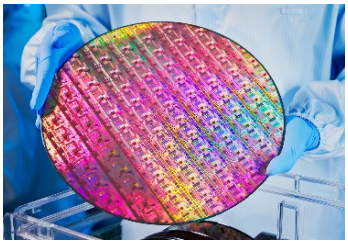
December 10, 2025

New! We will exhibit Flap Wrist at SEMICON Japan

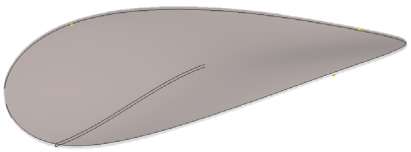
Patent pending

The fingers conform to the wafer's shape, enabling the pick-up of various wafer types.
～ Toward more flexible wafer handling ～

As semiconductor applications expand into advanced fields such as AI and data centers, the functional sophistication of semiconductors continues to advance day by day. Along with this progress, manufacturing processes now demand an even higher level of precision than before, in addition to conventional miniaturization technologies. In the chiplet approach—where semiconductors are manufactured separately by function, such as CPUs and memory, and then optimally integrated into a single package—substrate layers are arranged and stacked in two-dimensional and three-dimensional configurations. In manufacturing sites known as advanced packaging, the range of items to be handled has diversified. In addition to conventional silicon wafers, these include "warpage wafers" that deform like potato chips during the manufacturing process, as well as "thin wafers" that have been processed to extreme thinness. As a result, the handling and transfer technologies used for these materials are also required to achieve a higher level of precision and control.



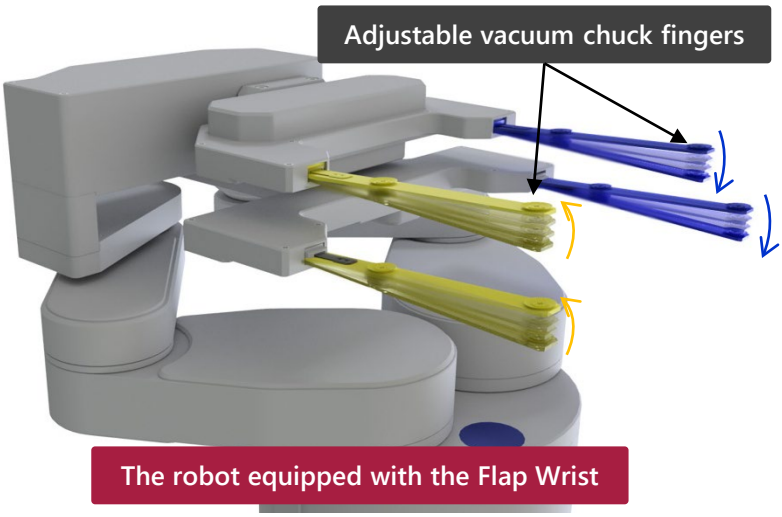
Standard wafer



Warpage wafer

wafers warped and deformed by thermal processes during semiconductor manufacturing

The "Flap Wrist" (patent pending), which will be exhibited at SEMICON Japan 2025, is designed to flexibly handle such challenging workpieces. This wrist mechanism features left and right vacuum suction fingers that move independently up and down, conforming to the shape of the workpiece to securely hold it for precise transfer. During handling, the same suction fingers can also be used to optionally adjust and flatten deformed wafers.



The robot equipped with the Flap Wrist

- Finger angle freely controllable
- Matching the chucking area to warpage wafers
- Alternating between vacuum and flap operation to reduce workpiece stress during suction

With this technology, robots equipped with the Flap Wrist can handle all types of wafers, including conventional standard silicon wafers, warpage wafers, and thin wafers. In addition, the required transfer area has been reduced as much as possible to achieve a more space-saving design. Furthermore, as an option, the system can be equipped with a wafer flip mechanism, enabling direct transfer to the down-face placement stage without another stand-alone flipper unit.
Going forward, we will continue to pursue the development of new technologies under the motto "Create what is not in the world" in order to meet the increasingly advanced needs of our customers as semiconductor technologies continue to evolve.

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