LASER THERMAL

YIELD IMPROVEMENT

How Laser Thermal can help improve your yield

THE SITUATION

At a large semiconductor foundry, it's often too late. By the time they identify defects on one of their wafers, the wafer has already gone through most of the manufacturing process and will have to be scrapped or recycled. Every time this happens, their yield creeps down.

Yield is the single most important factor in overall wafer processing costs, and foundries have invested billions of dollars into people, process, and technology improvements to drive cost savings and revenue gains through yield improvements. As demand for chips grows, yield will remain a crucial metric for managing financial performance at foundries.

THE PROBLEM

Maintaining high yields are difficult due to process variability required for the most advanced chip designs. Despite efforts by the foundry to improve yield through investments in equipment performance, operator capability, technical design, and automation, **yield is inconsistent and defects aren't being identified until it's too late in the manufacturing process.**

Not only does yield impact cost-of-goods-sold, but foundries are losing customers because their yield can't match the demands of other chip designers. As demand for high-end chips grows, this problem will only get worse.

HOW LASER THERMAL CAN HELP

Laser Thermal's SSTR-F is an innovative new thermal measurement tool and analysis suite. Our customers **can use thermo-reflectance to help uncover variations in other correlated material properties like thickness and quality across a wafer.**

Our easy-to-use software suite has an intuitive user interface, supports rapid data analysis, requires minimal maintenance, and can be operated by a technician rather than a PhD-level engineer.

SSTR-F uses a probe laser and a pump laser. The pump laser repeatedly heats the sample while the probe laser interrogates the temperature change. This provides a direct measurement of thermal properties at nano- to bulk-length scales, and supports measurements up to 200C. These property measurements can be directly linked to other yield metrics.

THE POTENTIAL OUTCOME

The semiconductor manufacturer can use the SSTR-F tool & analysis suite to identify a 35% variation in material properties on a silicon wafer at the beginning stage of the manufacturing process, compared to the 5% variation they were seeing on traditional optical metrology equipment.

As a result, they're able to improve their yield by scrapping defective wafers earlier in the process, and by binning parts of the wafer for chips with different qualities and processing speeds.

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