LASER THERMAL

SEMICONDUCTOR INNOVATION

How Laser Thermal can help you innovate

THE SITUATION

At a major designer and fabricator of semiconductor technologies, everything is getting smaller. Moore's Law has historically tracked the progress of semiconductor design, but the chip industry is pushing up against the laws of physics. Soon, transistors won't be able to get any smaller, and chipmakers will need to shift to new designs like stacking transistors into three dimensions.

At ever-smaller length scales and with new packaging necessary, **thermal management is the most significant challenge to the ability to design and build the next generation of chips.** Overcoming these challenges will require a better understanding of thermal conductivity and thermal interface resistances to develop multi physics-based modeling and approaches necessary for heat removal.

THE PROBLEM

Today's most advanced chips have feature sizes of 3 nanometers, but **existing thermal measurement technologies can't support the design of the next generation**, because they're not capable of measuring thermal properties at the nano-scale.

This means that major manufacturers are "flying blind" when it comes to the thermal properties of their wafers and microelectronics. They're not able to accurately predict device performance limits due to thermal failures, which has been a dominant limitation for previous generations of these technologies.

HOW LASER THERMAL CAN HELP

Laser Thermal's SSTR-F is an innovative new thermal measurement tool and analysis suite that can **detect minute variations in thermal properties with lateral resolution down to 3 micrometers and cross-plane thermal resistances down to 1 nanometers.**

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.

THE POTENTIAL OUTCOME

The semiconductor manufacturer can use the SSTR-F tool & analysis suite to measure thermal properties of a host of their device materials on a silicon wafer. They're able to measure thermal resistances and thermal conductivities, giving them previously unavailable information about their materials.

As a result, they're able to improve their product designs and understand temperature variations by adjusting their deposition process parameters in order to reduce the temperature hot-spots during device operation.

(833) 582-7787 | laserthermal.com | info@laserthermal.com | Charlottesville, VA