



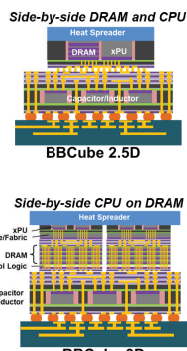
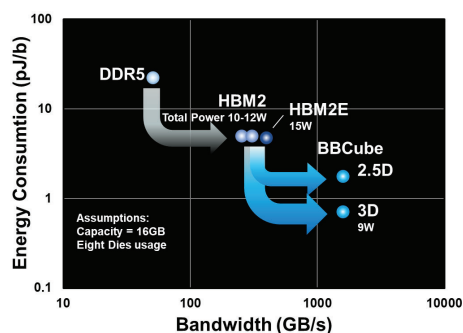
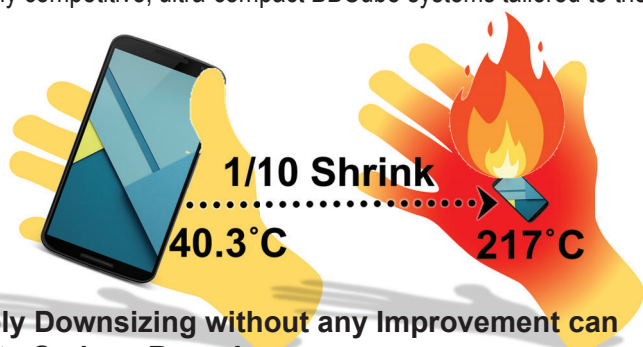
BBCube 3DI, Cooling and Apparatus, SiC/GaN Semiconductor

IIR, Heterogeneous and Functional Integration Unit

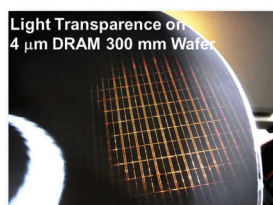
<http://www.wow.pi.titech.ac.jp/index.html>

In our research unit, we are at the forefront of the WOW Alliance, a collaborative research and development organization bridging academia and industry. Our primary focus has been on the development of BBCube (Bumpless Build Cube), a cutting-edge three-dimensional large-scale integration technology that promises unrivaled performance in both transmission energy and transmission bandwidth. BBCube leverages advanced techniques such as super-parallel and minimal wiring, which are ideally suited for front-end wafer manufacturing processes.

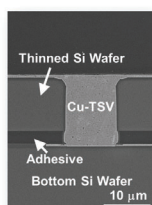
To make BBCube a reality, we've introduced Via-Last TSV (Through-Silicon Via) technology, enabling vertical wiring directly from the device's surface without the need for traditional bumps. Additionally, we've pioneered the WOW/COW (Wafer-on-Wafer/Chip-on-Wafer) hybrid process, allowing for stacking on 300mm wafers. Our relentless pursuit of these groundbreaking technologies takes place within the unique domestic development platform of the WOW Alliance, which fosters collaboration between academia and industry. Our ultimate objective is to bring to market highly competitive, ultra-compact BBCube systems tailored to the demands of the post-scaling semiconductor industry.



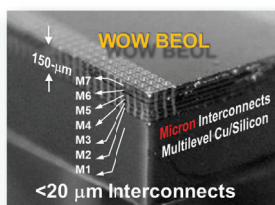
Realizing Ultimate Energy Efficiency with Super-Parallel and High-Density TSVs.



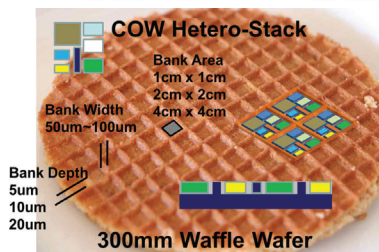
Ultra Thinned Wafer



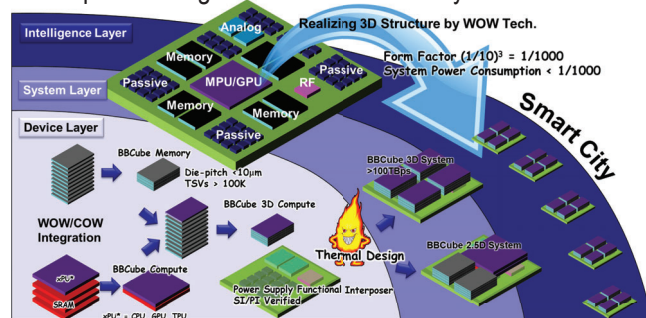
TSV Interconnect



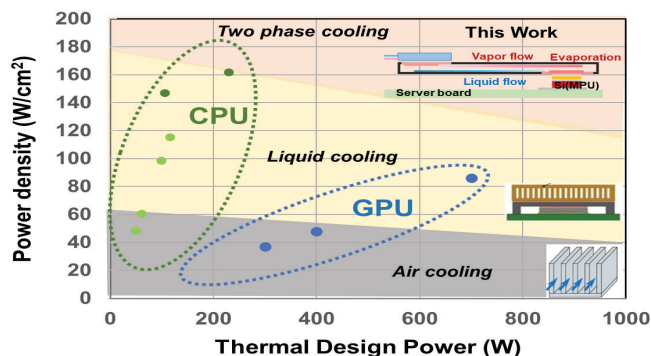
Stacked 6 Si Layer



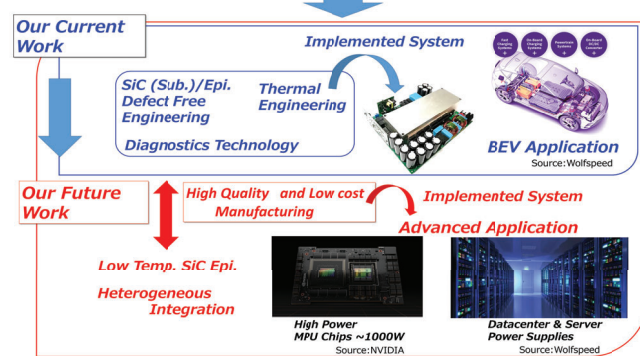
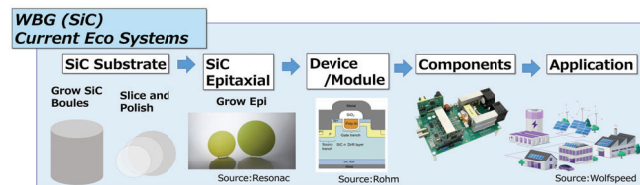
How to Build a BBCube: Ultra-Thinning and Via-Last TSV Wiring for WOW and COW Wafer Processes.



Integrate All Devices into an All-in-One Solution.



Achieving Two-Phase Flow Cooling for High Heat-Density Devices



Wide Bandgap Semiconductor (SiC/GaN)