excillum

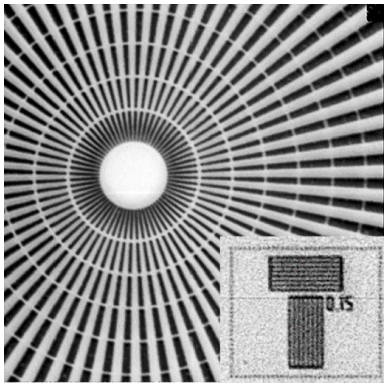
Sharper scans, faster ramp-up

X-ray imaging for failure analysis

How a leap forward in X-ray resolution can drive development and boost yield

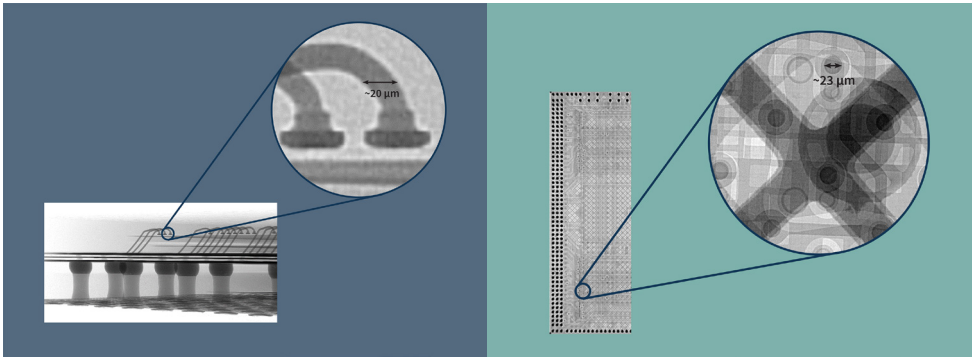
High-density interconnects. Micron-scale solder bumps. Sub-micron defects. As semiconductor architecture grows more complex with 3D heterogenous integration and ever decreasing dimensions, critical reliability issues arise with smaller defects. To achieve faster prototypes and improve ramp-up yield, the next generation of inspection tools need a major increase in 3D imaging resolution down to sub-micron level.

Fortunately, new advances in X-ray imaging make it possible to capture high-resolution 3D images of bump bonds, vias and other critical features with sub-micron precision. Using an Excillum NanoTube N3 X-ray source with the world's smallest X-ray spot size, down to 150 nm resolution can be achieved using simple geometric magnification. This is illustrated by the reference patterns of a JIMA resolution chart and Siemens star, resulting in highly detailed metrology that is simply sharper and more multidimensional than any other inspection method to date.

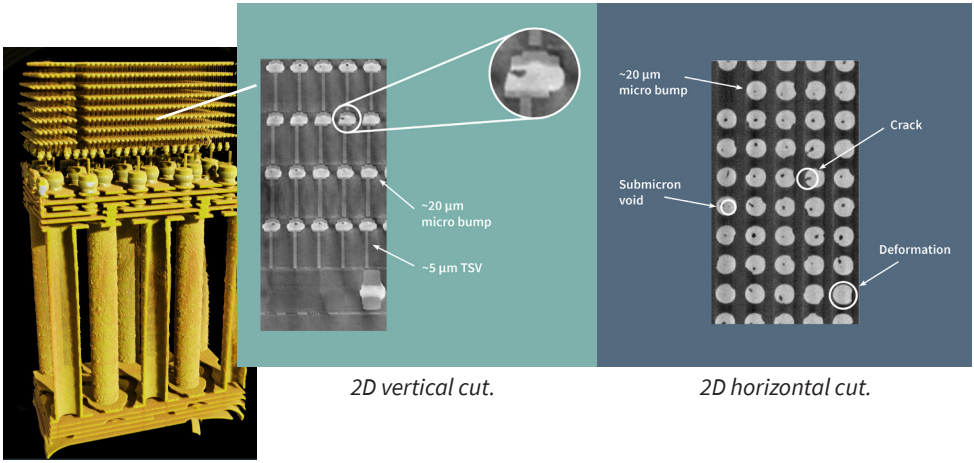


Crystal clear 2D and 3D imaging

System on chip package (SoC)
A 2D radiography was performed from top and side on an A15 chip. Even the smallest features and shapes on the ball grid array (BGA) and wire bond connections are clearly visible providing valuable insight for quality and yield improvement.



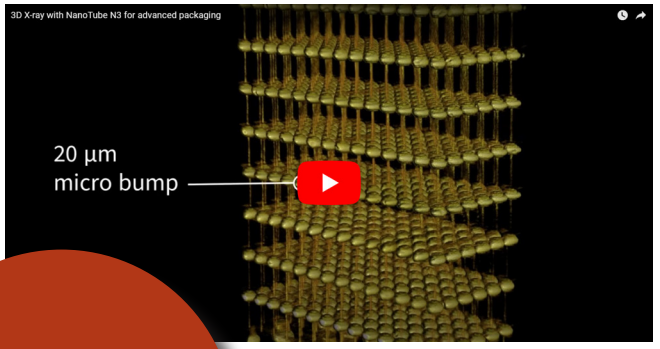
HBM micro bumps
A commercial GPU with HBM was analyzed in a nanoCT setup. Alignment and shift of TSVs, and shape and defects (voids, cracks, non-wetting, bulge, missing bumps etc) in the micro bumps can be measured and analyzed.



2D vertical cut. *2D horizontal cut.*

Multi-layer ceramic capacitors (MLCC)
A 01005 component approximately 400 x 200 µm in size was analyzed in a nanoCT setup. Full internal 3D information of the MLCC is achieved, revealing intricate internal structures and defects with unmatched clarity. This enables failure analysis and quality assurance at previously unattainable levels.

Watch video
3D X-ray for advanced packaging



Scan me

Interested in a demo? Contact us!

About Excillum

Excillum is the global source for X-ray innovation. We develop, manufacture, and service the world's brightest and most advanced industrial and laboratory X-ray sources. In close collaboration with best-in-class scientific, industrial and system integration partners we enable new science, improve medicine and enhance manufacturing. Headquartered in Stockholm, Sweden, Excillum is pushing the limits of X-ray source technologies since 2007.

Intellectual property

Excillum AB • Jan Stenbecks Torg 17 • 164 40 Kista, Sweden • excillum.com

excillum

Revision 2024-06-24