Complete your failure analysis workflow with high-resolution, non-destructive imaging

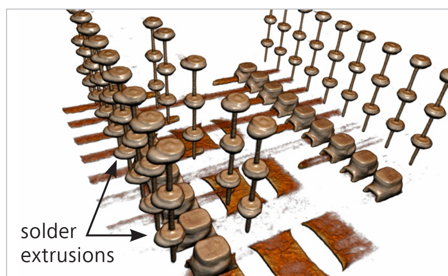
ZEISS Xradia Versa Family

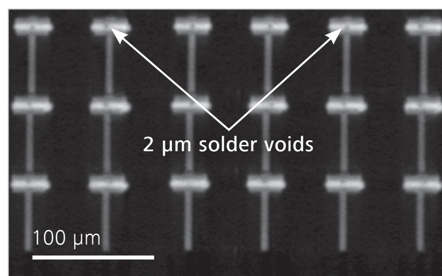
ZEISS Xradia Versa 3D X-ray microscopes (XRM) are the benchmark in non-destructive failure analysis and product verification for semiconductor and electronics packages, components and systems with buried features, including:

- 2.5D interposers
- High bandwidth memory and VNAND
- Stacked chips with TSVs
- All types of flip chip and microbump interconnects
- Smart phone devices and components
- Other electronics products

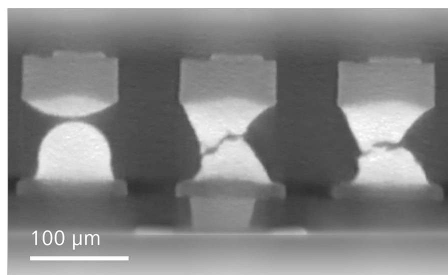
The ZEISS Xradia 600-series Versa is the next generation of 3D XRM, extending the boundaries of the industry-leading 500-series Versa for the acquisition of submicron-resolution 3D images.

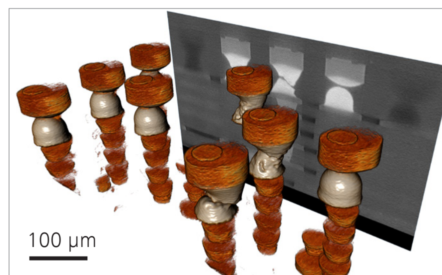
600-series Versa provides up to 2x faster data acquisition maintaining resolution across the full kV and power range, faster source activation, improved spatial resolution, enhanced contrast-to-noise ratio and longer source lifetime with lower cost-of-ownership. 600-series Versa excels in structural and failure analysis for process development, yield improvement and construction analysis.





DRAM interconnect within a 10 mm x 7 mm x 1 mm package containing 4-die stack, 0.8 µm/voxel (left) and virtual cross section of microbumps in DRAM package with 6 µm diameter TSVs and 35 µm diameter microbumps (right).





Solder non-wets and cracks in flip chip package visible in a 2D virtual slice (left) and extracted from a 3D XRM dataset (right).

High-resolution Non-destructive 3D X-ray Imaging

- Capture high-resolution cross-section images and tomographies of fault locations and buried features without cutting the samples
- View images from any orientation, in their native state, using interactive virtual cross sections
- Obtain unsurpassed performance for high-resolution imaging at long working distances in packages, circuit boards and 300 mm wafers

Seeing beyond

Versatile for All Package Types

- Reduces the need for traditional failure analysis such as cross sectioning
- Increases the success rate of physical cross sections, when needed, by more precisely identifying defect locations
- Enables measurement of buried structures within the imaged volume
- Reveals submicron structural changes within samples during multiple reliability test cycles and read-points, while leaving the samples intact

Superior Image Quality and Ease of Use

- Features ZEISS's revolutionary Resolution at a Distance (RaaD™) technology for high resolution even at large working distances
- Excellent source spot-size stability and thermal management control across the full kV and power range
- User-friendly Scout-and-Scan™ system for quick sample set-up and local area positioning
- Plan-view and cross-sectional images may be viewed with accurate isolation of the desired plane, in any direction
- Optional flat panel extension (FPX) with microCT capability
- High Aspect Ratio Tomography (HART) for higher throughput
- Wide Field Mode and Vertical Stitching to extend field of view
- Optional Autoloader for continuous operation

Benefits

- Ideal for a multitude of package applications including: technology development, failure analysis, construction analysis and production validation
- Visualizes buried structures and defects non-destructively across a wide range of package sizes and with a wide range of magnifications
- Enables better process understanding and speeds up learning cycles
- Up to 0.5 µm spatial resolution, 40 nm minimum voxel size
- Flexible system configurations and options

Imaging	**ZEISS Xradia 510 Versa**	**ZEISS Xradia 610 Versa**	**ZEISS Xradia 620 Versa**
Spatial Resolution [a]	0.7 µm	0.5 µm	0.5 µm
Resolution at a Distance (RaaD) [b] (at 50 mm working distance)	1.0 µm	1.0 µm	1.0 µm
Min Achievable Voxel [c]	70 nm	40 nm	40 nm
X-ray Source			
Architecture	Sealed Transmission	Sealed Transmission, Fast Activation	Sealed Transmission, Fast Activation
Voltage Range	30-160 kV	30-160 kV	30-160 kV
Maximum Power Output	10 W	25 W	25 W
Detector System			
ZEISS X-ray microscopes feature an innovative detector turret with multiple objectives at different magnifications. Each objective features optimized scintillators that deliver the highest absorption contrast details.			
Standard Objectives	0.4x, 4x, 20x		
Optional Objectives	40x, Flat Panel Extension (FPX) with microCT capability		
Stages			
Sample Stage (load capacity)	25 kg		
Sample Stage Travel (x, y, z)	50, 100, 50 mm		
Stage Travel (rotation)	360°		
Source Travel (z)	190 mm		
Detector Travel (z)	290 mm		
Versa Features			
Scout-and-Scan Control System	■	■	■
Automated Filter Changer			■
High Aspect Ratio Tomography (HART)			■
Autoloader	Optional	Optional	Optional
Wide Field Mode	0.4x	0.4x	0.4x and 4x
GPU CUDA-based Reconstruction	Single	Dual	Dual

[a] Spatial resolution measured with ZEISS Xradia 2D resolution target, normal field mode, optional 40x objective.
[b} RaaD working distance defined as clearance around axis or rotation.
[c] Voxel is a geometric term that contributes to but does not determine resolution, and is provided here only for comparison. ZEISS specifies resolution via spatial resolution, the true overall measurement of instrument resolution.

microscopy@zeiss.com
www.zeiss.com/xrm

Not for therapeutic use, treatment or medical diagnostic evidence. Not all products are available in every country. Contact your local ZEISS representative for more information.
EN_44_012_083 | CZ 04/2021 | Design, scope of delivery and technical progress subject to change without notice. | © Carl Zeiss Microscopy GmbH