

Seeing **beyond**



**More throughput.
Less risk.
Better nanoprobing.**

ZEISS GeminiSEM 460
Nanoprobing optimization kit

zeiss.com/geminiSEM



Work twice as fast at ultra-low kV with accurate, confident probe placement

Streamlined failure analysis for advanced semiconductor devices

Nanoprobng is essential for advanced semiconductor development and failure analysis (FA) labs, enabling precise electrical characterization of individual device structures using ultra-low-energy SEM imaging for navigation and probe placement. The ZEISS GeminiSEM 460 nanoprobng optimization kit minimizes manual adjustments and reduces risks of errors, helping FA engineers identify root causes faster and more efficiently.

Precision and stability where they matter most

Electrical nanoprobng requires clear visualization of both the target contacts and the probe tips while limiting electron-beam exposure of sensitive structures. The ZEISS nanoprobng optimization kit for GeminiSEM 460 combines factory-calibrated low-energy imaging conditions, optimized system stability, and integrated workflow controls to support navigation and probe placement at landing energies down to 100 eV.

Navigate at low landing energies

Factory calibration points at 300 eV, 200 eV, and 100 eV reduce the need for repeated manual optimization when changing imaging conditions.

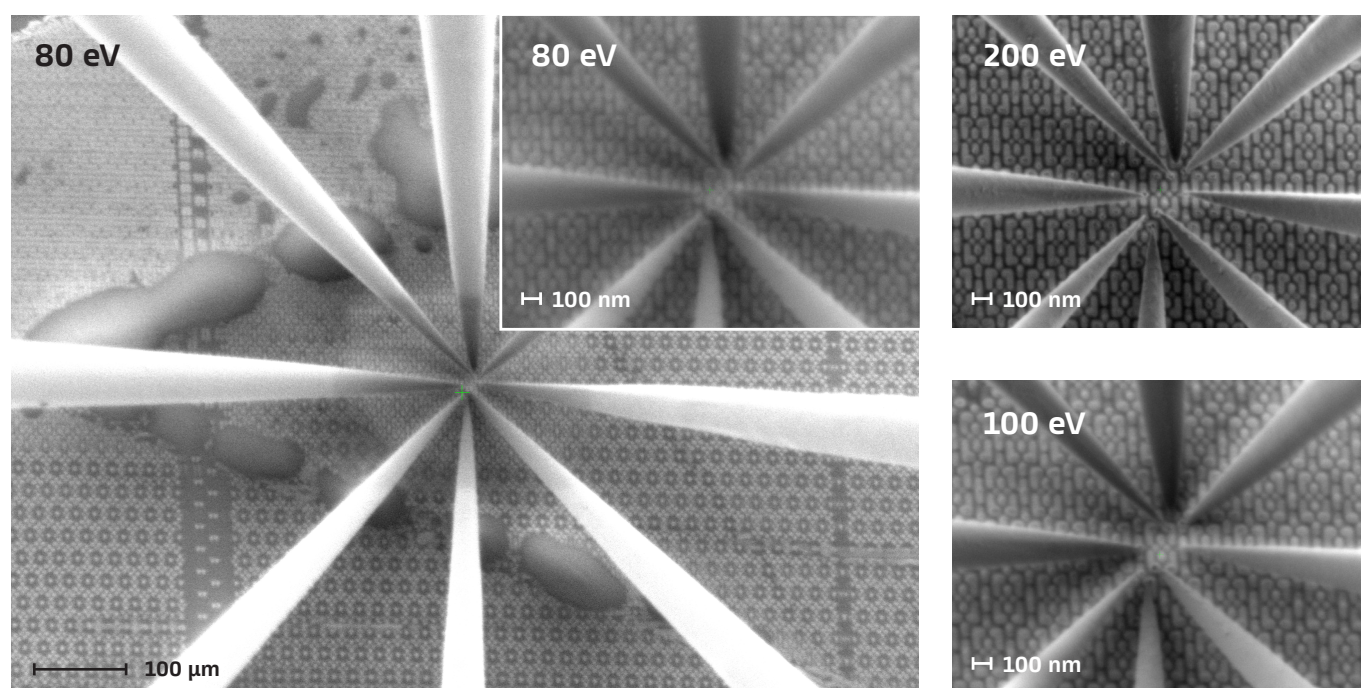
Place probes with confidence

Optimized imaging, alignment routines, and vibration performance help operators identify target contacts and establish consistent probe placement.

Reduce avoidable rework

A consolidated workflow reduces repeated alignment steps, unsuccessful probe landings, and interruptions caused by manual reconfiguration.

Excellent ultra-low kV imaging enables maximum visibility for landing probes with minimum damage



Left: 80 eV imaging supports probe placement with reduced electron-beam exposure. The inset shows the probes positioned over individual contacts. **Top right:** At 200 eV, enhanced image detail supports inspection of contacts and passive voltage contrast before probing. **Bottom right:** At 100 eV, the image provides a practical balance of target visibility, probe positioning, and low landing energy.

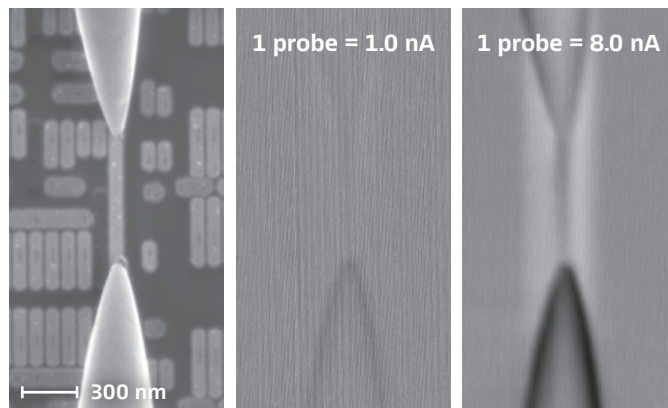
Integrated performance for advanced nanoprobing

Designed for precision. Engineered for efficiency.

The ZEISS GeminiSEM 460 nanoprobing optimization kit combines advanced hardware, software, and performance tuning to deliver high-performance nanoprobing analysis. It enables superior navigation and analysis at ultra-low-kV beam energies, exceptional vibrational stability, and additional controls to enhance operator confidence and efficiency.

Key features

- Continuously variable e-beam current for EBAC/EBIRCH
- Extended field-of-view for navigation and fault isolation
- Ultra-low kV SEM calibration points (300 eV, 200 eV, 100 eV)
- Fast auto-alignments for quick switching between working modes
- Variable beam booster to reduce the need for frequent fine adjustments
- Best-in-class stability across the system, electron beam, and vibration performance
- Integrated nanoprobing workflow with Kleindiek PS8e Prober Shuttle



Electron beam induced resistance change (EBIRCH) imaging of a copper line on a 22 nm device. Continuously variable beam-current control allows the operator to optimize the signal-to-noise ratio while limiting electron-beam exposure of the sample.

Easier probe alignment at 200 eV

Variable beam booster reduces probe-induced image distortion and supports navigation at larger working distances

At 200 eV landing energy, inserted nanoprobes can introduce image distortion that complicates navigation and probe placement. The ZEISS nanoprobing optimization kit can substantially reduce distortion at low magnification through convenient beam booster adjustments, speeding navigation and making probe landing safer.

This enables the nanoprobing workflow—from sample insertion and tip alignment to final probe placement—to be performed at landing energies down to 100 eV. The additional working-distance flexibility can also benefit selected probing, heating/cooling, and wafer-probing configurations.

Lower distortion during probe tip alignment

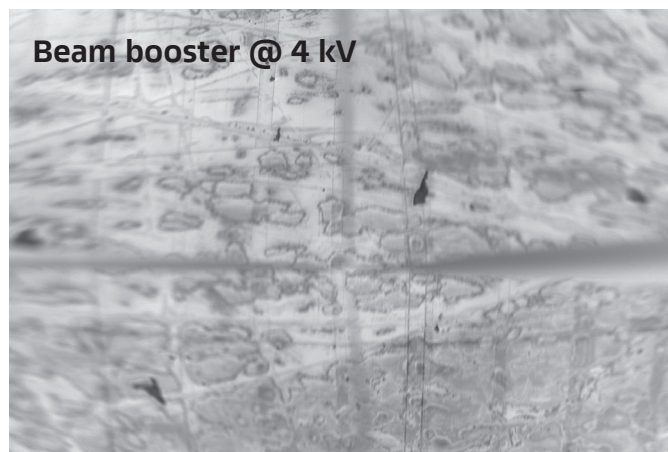
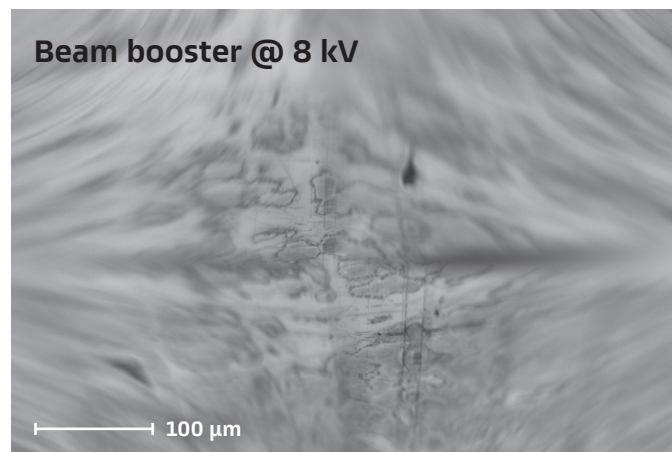
At 100 eV, the 4 kV beam booster setting showed reduced image distortion from inserted probes compared with the 8 kV setting.

Low-energy operation throughout the the entire workflow

The entire workflow—from sample navigation to final probe touchdown—can be performed at 100 eV, eliminating the need to change imaging conditions mid-session.

Greater working-distance flexibility

The 4 kV beam booster setting supports visibility of the probe tips and sample surface at larger working distances, benefiting selected probing and sample-stage configurations.



Low-magnification images at 200x, with nanoprobing tips creating distortion in the field of view. Lowering the variable beam booster from 8 kV to 4 kV greatly reduces distortion and speeds probe tip positioning and sample navigation. Results are from internal evaluation. Image quality depends on sample, probe geometry, working distance, and imaging conditions.

Optimized for the complete nanoprobing workflow

From sample insertion and low-magnification navigation to tip alignment and final touchdown, the ZEISS GeminiSEM 460 nanoprobing optimization kit pairs factory-calibrated low-energy imaging, selectable beam booster settings, rapid alignment routines, improved vibration performance, and integrated nanoprobing controls. The result is a more reliable workflow for advanced semiconductor failure analysis – especially for electron-beam-sensitive structures and larger working distances.

Workflow challenge	ZEISS nanoprobing optimization kit benefits
Repeated image optimization when changing landing energy	Factory calibration points at 300 eV, 200 eV, and 100 eV reduce manual optimization steps.
Probe-induced image distortion during low-energy alignment	The variable beam booster provides a means to reduce/eliminate probe tip distortion at low magnification.
Electron-beam-sensitive structures	Imaging and probe placement at landing energies down to 100 eV help limit electron-beam exposure and minimize beam damage.
Unstable or interrupted probing sessions	Optimized system and vibration performance supports stable, repeatable operation.
Complex multi-step operation	Consolidated controls and fast auto-alignment routines streamline the complete workflow from navigation to final probe placement.
Probing at larger working distances	The variable beam booster setting provides greater flexibility for selected probing and sample-stage configurations.
Probe-tip or sample damage from unsuccessful placement	Clearer tip and sample visibility helps reduce avoidable landings and rework.

The ZEISS GeminiSEM 460 nanoprobing optimization kit is not simply a low-energy imaging option. It combines factory-calibrated low-energy operation, a 4 kV beam booster setting for clearer probe alignment, optimized system stability, and integrated workflow controls – enabling users to navigate, align, and place probes at landing energies down to 100 eV, even at larger working distances.

