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DATASHEET

OptiFIB Taipan G2+ System

Circuit edit solution for 7 nm and beyond

Circuit edit technology provides nanomachining capability for rapid prototyping of small design corrections at various points in the IC manufacturing process: at first silicon debug, for performance enhancements during yield ramp, to create a small number of functional chips for beta developers, and to resolve reliability issues.

Circuit edit engineers mill the chip at the site of the suspected defect and then remove or deposit conductors or insulators in precise geometries, allowing IC manufacturers to validate design changes without re-spinning masks and processing additional wafers.

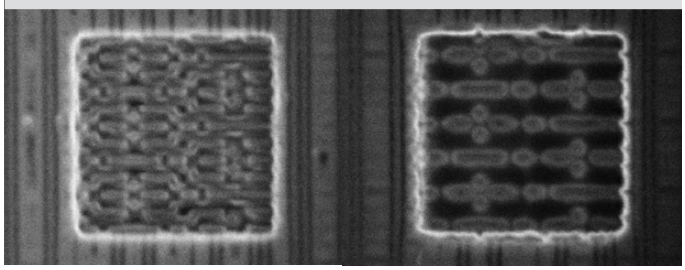
To meet the stringent circuit edit requirements of the 7 nm node, the Thermo Scientific™ OptiFIB Taipan G2+ System was re-engineered to meet the challenges of nanomachining for advanced designs and processes. Built on the success of the Taipan G1 platform, the OptiFIB Taipan G2+ System provides ultra-high FIB milling and imaging resolution to address the requirements for increasing device density and smaller feature sizes for the most advanced device technologies.

The OptiFIB Taipan G2+ System is designed with a new secondary electron detector (Super SED) that provides much higher SNR and improved collection efficiency at low beam currents, enabling higher resolution and sensitivity with more precise end-pointing. Great engineering attention has also been placed into the design of an entirely new gas delivery system. This state-of-the-art advanced gas delivery system includes individual gas delivery lines to maintain highest purity at point of use and a closed loop PID feedback control system for fast ramp of chemistries and accurate real-time pressure control, enabling precise and repeatable edits. The OptiFIB Taipan G2+ System is also powered by a new scan engine that provides the most advanced patterning capabilities for milling and deposition. The coaxial ion-photon column, robust chamber design, and laser interferometry-based, high-accuracy stage enable a highly controlled beam profile and beam current for accurate navigation and ion beam placement.

Finally, Fusion, the main system software for the OptiFIB Taipan G2+ System, has been enhanced to support advanced patterning features, user customizable milling shapes, as well as exclusion zone capabilities, along with multiple end point graphs. The new release of Fusion runs on 64-bit Windows 7 operating system, providing an improved user interface for more intuitive workflows and a much improved circuit edit user experience.

Key benefits

- **Ultra-high FIB resolution** for imaging and milling at low beam currents
- **Super-SED** for higher SNR and improved end-point sensitivity, especially enabling low beam current performance
- **Unique coaxial ion-photon beam column** that enables simultaneous FIB and optical imaging and precise silicon trenching
- **Advanced gas delivery system** enabling superior precision and control through fast stabilization, real-time response, and continuous closed-loop feedback/monitoring
- **Advanced patterning** enabled by the industry-proven PIA scan engine
- **Capability to perform HAR circuit edits,** requiring access from either the frontside or backside of advanced design node devices, with accuracy, precision and control



Backside poly FinFET device exposure (left image) and backside Metal/Via FinFET device exposure (right image).

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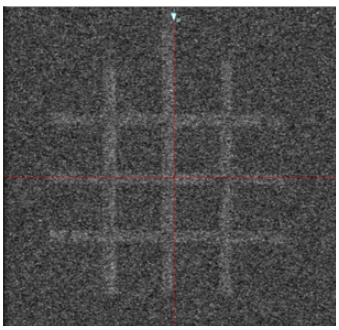
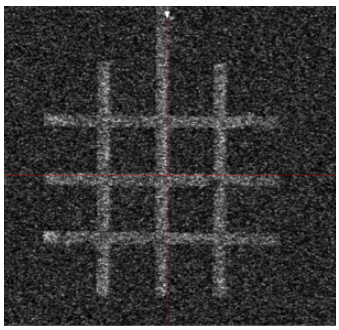
OptiFIB Taipan G1 System

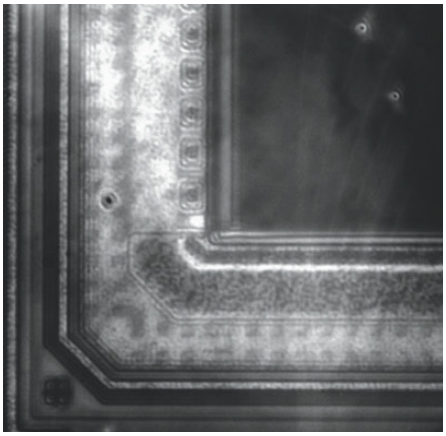


OptiFIB Taipan G2+ System



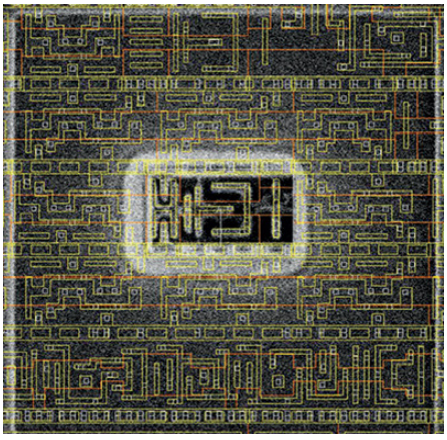
High image resolution illustrated by superior imaging performance of OptiFIB Taipan G2+ System at 250 fA when compared to OptiFIB Taipan G1 System.

Real-time *in situ* optical imaging.



The OptiFIB Taipan G2+ System's patented coaxial technology allows users to simultaneously acquire FIB and optical images.

Fast and accurate navigation



The OptiFIB Taipan G2+ System's CAD interface enables overlaying the CAD image with the FIB image for faster navigation and higher beam placement accuracy.

Taipan G2+ System

Technical specifications*

- FIB Column: Ion-Photon Coaxial Taipan column for backside and frontside circuit edits
- FIB image resolution: 2.7 nm @250 fA and 30 kV (Thermo Scientific graphite sample)
- Acceleration voltage: 0.5–30 kV
- Beam current: 250 fA–20 nA
- Stage travel (X, Y, Z): 75 mm x 75 mm x 20 mm
- Beam stability/drift control: 4 nm/min
- Conductor resistivity: ≤ 200 μΩ·cm
- Insulator resistivity: ≥ 1E15 μΩ·cm

*Specifications are based on SAT document and may vary depending on sample and specific setup.

Find out more at **thermofisher.com/EM-Sales**

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