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Meridian S System

Static optical fault isolation solution for semiconductor failure analysis and service labs

High-sensitivity static electrical fault localization with a highly upgradable, multi-generation system lifetime.

Overview

The Thermo Scientific™ Meridian™ S System is designed to perform inverted photon emission (EMMI) and laser scanning microscopy analysis on devices stimulated by static bias via probe card or micro-probes.

With the overall cost of ownership for the system being a critical aspect of profitability, the Meridian S System offers a range of photon emission options, dual-side probing flexibility and an upgrade path to dynamic optical fault isolation capabilities such as laser voltage imaging/probing and soft defect localization.

The Meridian S System is designed for use in failure analysis labs worldwide, aiding in:

- Identification of systematic process, design or integration issues
- Isolation of root cause for random electrical failures

System-level specifications:

- Inverted optical system
- Combo system: LSM + PEM standard, with optional LSM-only or PEM-only configurations
- 220VAC, 50Hz/60Hz
- Standard 9” x 9” load board interface, plus customizable alternatives
- Tester direct-dock compatible
- Stage repeatability ≤2µm
- Optional laser marker for defect redetection

Key benefits
High-sensitivity, lock-in capable, noise-eliminating static laser stimulation/optical beam induced resistance change (SLS/OBIRCH) detection enabled by Fault Diagnostic with Active Probe Technology
Photon emission options spanning a range of sensitivity requirements for isolating shorts, detecting areas of excess leakage and mapping active regions
Probing setup and software designed for ease-of-use and productivity
Fully scalable and upgradable optical platform
Packaged parts and wafer-level base-systems supported

Figure 1. The Meridian S System

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Photon emission microscopy (PEM)

Photon emission microscopy (PEM) collects small amounts of light generated by IC device activity or certain electrical faults. Thermo Scientific Meridian WaferScan and WS-DP Systems offer a range of infrared detector systems capable of analyzing emissions across a broad spectrum of wavelengths and operating voltages, as well as a suite of software analysis tools, including centroid identification, background subtraction and multi-tile mosaic.

Photon emission options:

- TE-cooled 320 x 256 InGaAs
- TE-cooled 640 x 512 InGaAs
- LN_2-cooled 640 x 640 InGaAs
- LN_2-cooled 1k x 1k InGaAs
- LN_2-cooled 1k x 1k Broadband DBX

Photon emission specifications:

- Illumination (navigation) @ 1200nm LED
- Ultra-low read noise and dark current
- Large suite of software tools including hotspot overlay, live emission, multi-tile mosaic and die-to-die comparison

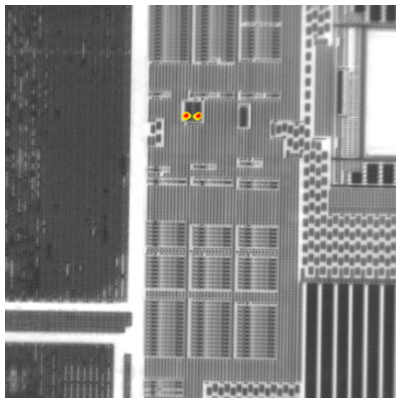

Figure 2. Photon emission overlay onto optical image of device.

Static laser stimulation (SLS / OBIRCH)

The Fault Diagnostic (FDx) with Active Probe Technology on Meridian S Systems provides a suite of techniques to isolate electrical and IDDQ failures in active areas, as well as in device metallization. The active probe and active noise cancelling noise reduction schemes are designed to enable maximum sensitivity to the broadest range of defect types. Lock-in capability is available across the entire operating range.

Laser scanning microscope specifications:

- High power 1340nm laser
- Optional fringe-free SLED imaging

FDx with Active Probe Technology specifications:

- Multiple forced current and forced voltage modes
- 4 quadrant operability
- Bias accuracy: ≤1%
- Detectability: 3pA detectability calculated, ≤10pA with ≥1.5 SNR without lock-In
- Active probe selection for low-ohmic shorts
- Fully upgradable to dynamic laser stimulation (DLS) techniques such as soft defect localization (SDL)
- Simple software interface features curve tracer, Seebeck effect, and external power supply (IDDQ) analysis

Dual-side probing

The dual-side probing option supports both micro-probing and probe card device stimulation for both top-down and inverted setups. A light-tight enclosure with a door for easy accessibility creates an ideal dark environment surrounding prober platen and over-probing microscope.

Dual-side micro-probing:

- Vacuum or magnetic micro-manipulators supported, for up to 6 probe positions
- Compatible with all lenses, including solid immersion lenses (SIL)

Over-probing microscope:

Eyepiece microscope option:

- 0.7-4.5x zoom, 1x objective, 20x eyepieces as standard (14-90x mag)
- Working distance: 100mm

High-resolution CCD camera option with LCD screen:

- 5-70x continuous magnification
- Working distance: 37mm

Dual-side probe card option:

- Top-side/back-side probing supported, using standard 4" rectangular or 8" circular probe cards
- Supports packaged parts and wafer pieces
- Compatible with all lenses, including SIL

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

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