KLA-Tencor Speeds Yield Learning and Enables Baseline Yield Improvement with Automated Spatial Signature Analysis

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KLA-Tencor (NASDAQ: KLAC) today introduced Klarity SSA (Spatial Signature Analysis), a new software capability that enhances the company's suite of defect management systems by providing automated classification and root cause analysis of spatial signatures, which are defect clusters and patterns that can be indicative of an out-of-spec process or process tool problem. Klarity SSA imports wafer-map data generated by wafer inspection tools, and then characterizes and groups defect clusters by their identifiable signatures automatically. With Klarity SSA incorporated into their fab-wide process control strategies, defect and yield engineers can gain greater insight into their manufacturing processes--accelerating their yield learning and improving baseline yields. Klarity SSA can be utilized for a variety of applications where enhanced excursion detection is needed, including process line and tool monitoring, as well as engineering analysis, across all key process modules.

Traditional excursion monitoring relies on defect count or density as the trigger for flagging a wafer for manual review. However, process- or tool-induced problems may arise during wafer fabrication that cause scratches and other spatial signatures on the wafer that will not be caught by statistical process control (SPC) methods if the raw wafer defect count or density is low. Since these signatures can cause yield loss, detecting them in real-time, as well as isolating their source, are critical to maximizing fab return on investment (ROI). Even if a spatial

signature is detected using traditional SPC methods, fab engineers still have to manually review the wafer and use their best judgment to determine the root cause. In addition to being manually intensive, this process is unreliable and can result in inconsistent classification—placing work in process (WIP) at risk. Klarity SSA automatically detects and classifies spatial signatures independent of defect counts and densities. It complements existing SPC methods, while adding an additional data filter that allows greater insight into the manufacturing process with consistent and reliable results—giving users greater confidence in their defect management strategies.

Micron is one of several leading chip manufacturers that plan to utilize Klarity SSA. "By integrating Klarity SSA into our existing excursion monitoring system, we can reduce the time needed to detect and react to spatial signatures that would have otherwise been missed by normal SPC controls and without tying up valuable resources," stated Kurt Bossart, section manager, RDA (real-time defect analysis) at Micron.

Klarity SSA is an open-architecture platform, supported by all KLA-Tencor inspection tools—including brightfield, darkfield, e-beam and unpatterned—as well as other defect management tools in the fab. Klarity SSA works with KLA-Tencor's Klarity Defect fab-wide data management system to quickly and effectively convert defect data into relevant quantitative information. In addition to classifying signature defects by type (e.g., ring, radial, scratch, line, area and slip line), Klarity SSA can map signatures to pre-defined zones on the wafer to further refine signature defect identification. Klarity SSA recipes can be set up by inspection tool or tool cluster, by device layer, by the device itself, or by other, user-defined parameters, such as operator, tool brand or process—all enabling users to quickly narrow down the search to the source of the signature.

"With modern 300-mm fabs costing upwards of $3 billion or more to

construct and outfit, process-induced signature defects can spell disaster for fab managers under pressure to push productivity and yields ever higher," stated Dr. Ellis Chang, vice president of marketing for KLA-Tencor's Defect and Yield Solutions Division. "Yet, with the mountains of yield data that can be generated in today's fabs, it can be a difficult challenge for our customers to sort through it all to find the information needed to track down and eliminate the source of these problems. Klarity SSA enables our customers to find and fix these defects as early in the manufacturing process as possible—providing enhanced value to their process control investments and helping them to meet their yield and profitability goals."

Klarity SSA v.1.0 is currently available for purchase.

More information at: www.kla-tencor.com/

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