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KLA-Tencor's New Surfscan SP2XP Wafer Inspection System Combines Highest Sensitivity and Throughput to Enable 45nm Generation Defect-Free Wafers

SAN JOSE, Calif.--(BUSINESS WIRE)--

KLA-Tencor (NASDAQ: KLAC) today introduced the Surfscan SP2XP system, a new unpatterned wafer inspection system designed to meet 45nm IC manufacturing requirements for all types of bare wafers, including prime wafers, SOI (silicon-on-insulator), epitaxial and engineered substrates. Employing a proprietary five-channel inspection technology, the Surfscan SP2XP offers customers, for the first time, the ability to detect all major types of defects of interest and to quickly group their wafers into defect-free, re-workable and scrap categories based on type and number of defects. This critical information enables wafer manufacturers to re-work many wafers that were previously scrapped, elevating yield and increasing profitability.

"For virtually all wafer suppliers and chipmakers worldwide, Surfscan is the industry standard for unpatterned wafer inspection. Our new Surfscan SP2XP system now provides customers with the increased throughput and productivity needed to meet the tough challenges of 45nm production," said Mike Kirk, group vice president of KLA-Tencor's Wafer Inspection Group. "Several of the industry's leading wafer suppliers are already using the new system to more cost-effectively produce defect-free 45nm-generation wafers. We plan to soon extend the Surfscan SP2XP technology beyond bare-substrate inspection to the large number of blanket film tool-monitoring applications required in semiconductor manufacturing."

Enhanced with dual-incidence darkfield channels, plus the addition of a new brightfield channel, the Surfscan SP2XP system captures the full spectrum of defect types, then utilizes multi-channel comparison algorithms to reliably separate unacceptable "intrinsic" defects from re-workable ones, in a single inspection step. Even with its added detection capabilities, the new system delivers 20% to 50% higher throughput, depending on the operating mode, compared with the Surfscan SP2.

The Surfscan SP2XP system has been extensively tested through beta partnerships with leading wafer suppliers, including Soitec, the world's leading supplier of SOI wafers.

"The new Surfscan SP2XP system is the only system that provides the SOI sensitivity, independent of film thickness, that we require to address 45nm chipmaking, while at the same time providing a major leap forward in productivity," noted Christophe Maleville, vice president process engineering, at Soitec. "KLA-Tencor's latest Surfscan technology enables us to inspect our SOI substrates using the same specifications as bulk silicon, which contributes to enhanced yield and performance of our products."

About KLA-Tencor: KLA-Tencor is the world leader in yield management and process control solutions for semiconductor manufacturing and related industries. Headquartered in San Jose, California, the Company has sales and service offices around the world. An S&P 500 company, KLA-Tencor is traded on the NASDAQ Global Select Market under the symbol KLAC. Additional information about the Company is available at <http://www.kla-tencor.com>.

Surfscan SP2XP Technology Summary

New Wafer Inspection Technology

In a first for the industry, the Surfscan SP2XP provides a reliable way of detecting yield-killing intrinsic or 'crystallographic' defects on 45nm-generation prime, epi and SOI wafers and separating them from re-workable polishing or fall-on defects. This capability allows wafer manufacturers to reduce scrap wafers previously caused by their inability to distinguish between defect types.

Enhanced inspection technologies detect more defect types

In addition to the Surfscan's traditional oblique- and normal-incidence darkfield channels, the new system incorporates a brightfield channel that provides another means of detecting challenging defect types. This brightfield channel, operating simultaneously with the darkfield channels, provides Differential Interference Contrast (DIC) capability, which uses the phase of the laser beam to distinguish large and shallow defects, providing additional defect classification.

One-Step Dual-Incidence Scan

The new system can perform oblique and normal incidence scans in one step. With both narrow and wide collection channels, the Surfscan SP2XP can generate data from five different optical configurations: oblique-narrow, oblique-wide normal-narrow, normal-wide, and brightfield. This unique, comprehensive optical design enables detection of all defect types. The system's UV wavelength confines the laser beam to the wafer surface, minimizing false counts from buried defects. The 30nm sensitivity on polished wafers represents the industry's highest production sensitivity level.

Cross-Channel Rules-Based Binning

By comparing data from the multiple available channels, new rules-based binning (RBB) algorithms can separate intrinsic defects from polishing and fall-on defects with substantially higher accuracy and purity.

Detecting Challenging 45nm Defects

Scratches and Emerging Defects in Prime Wafers

The Surfscan SP2XP system can capture shallow CMP scratches -- defects which affect yield for Flash memory applications. The system also identifies previously unnoticed defect types such as orange peel, watermarks, slurry residue, and surface roughness changes that have low scattering intensity and a high correlation to process tool issues. The SP2XP detects and separates LLPD faceted pits (also called air pockets or air bubbles) from other defects such as micro-scratches, chatter marks, and particles. Controlling these defect types is critical to gate performance.

Classification of Stacking Faults on Epi Wafers

In epitaxial silicon wafers, the most common crystallographic defect is the epi stacking fault (ESF). The new system enables improved separation of stacking faults from other common epi defects, such as particles and flakes, which may pass IC manufacturers' requirements for 45nm.

Distinguishing Voids from Particles for SOI Wafers

SOI wafers, like prime wafers, can contain yield-killing void defects at the surface of the SOI wafer. The Surfscan SP2XP technology can separate voids from the relatively innocuous particles and other fall-on defects, which may be re-workable. With this capability, wafers having large particles only need not be scrapped along with wafers having voids.

Source: KLA-Tencor