WaferSense™
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NEWS RELEASE

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Announcing New WaferSense® Airborne Particle Sensor (APS)

CyberOptics Demonstrated the New WaferSense® Airborne Particle Sensor (APS) at SEMICON West.

The wafer-processing section at this year's SEMICON West featured engineers from CyberOptics Semiconductor. They discussed the role of a newly developed particle-sensing technology to monitor airborne particles in process equipment. APS is a unique device that reports information in real-time to validate and analyze wafer contamination. The wafer-like device is designed to "lower the time and expense of process equipment particle qualification, as well as raise die yields," according to Craig C. Ramsey, Ph.D., CyberOptics Semiconductor's general manager.

The company developed the new wireless particle-sensing technology during the last year. Prototypes of the new WaferSense® Airborne Particle Sensor (APS) have been demonstrated to fabs and OEMs in preparation for the launch at SEMICON West, according to Ramsey. He says the APS will be ready for purchase order fulfillment before the end of 2009.

The recently qualified APS improves die yield and compresses final wafer inspection. Ramsey observed that fabs which are unable to isolate and mitigate the source of particles in a tool before wafer processing experience reduced die yield due to wafer contamination. The APS allows users to improve die yield by validating and analyzing real-time wafer contamination.

CyberOptics Semiconductor developed the APS to allow engineers to efficiently detect and classify particles and their exact sources. The wireless design allows the user to qualify each chamber in a process as wafers are transferred, slit valves actuate and chambers are cycled, pumped down and purged, according to Ramsey. APS is compatible with front-ends, coater/developer tracks, deposition and etch equipment.

The APS is designed to help fabs "reduce their overall cost of operation by reducing process equipment downtime, lowering monitor wafer consumption and associated equipment engineering labor," Ramsey said. Fabs gain efficiencies from reduced surface particle metrology equipment loading. They also run more smoothly when their metrology queues remain short.

"When process engineers have real-time views of particle conditions and can address specific trouble spots -- rather than guess-and-check throughout the whole tool -- they're far better prepared to pass particle qualifications on the very first attempt," Ramsey said. "When a tool fails particle qualification, APS can be used to discover where in the process particles were added to monitor wafers."

Ramsey added that the automation friendly, vacuum-compatible device doesn't require engineers to open chambers or expose ultra-clean process areas to atmospheric gases. Testing has shown the sensor has the ability to detect 0.1 um particles. The self-contained device uses a fan to pull particle-contaminated gas through a channel as a laser illuminates the gas stream while particles scatter light on to the sensor's photo-diode detectors.

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Fab engineers validate and analyze the particle conditions in process equipment with the device's companion software, ParticleView™ and ParticleReview™. ParticleView's GUI displays cumulative or differential particle counts and allows users to mark log files. The marks indicate where, exactly, the device is in a process for real-time partitioning. ParticleReview's GUI displays log-file data obtained by the APS to allow users to conduct machine-to-machine trend analysis of particle conditions. The software helps users to establish process control and conduct process improvement.

The WaferSense APS' specifications and features include form factors of 200 and 300 mm, with 450 mm versions available by special order. The APS, like other WaferSense devices, uses a wireless Bluetooth link and is compatible with Windows 2000, XP and Vista.

The WaferSense APS package includes the particle-sensing wafer, USB-compatible link, ParticleView and ParticleReview software, charging clean box and suitcase.

The WaferSense family of devices includes the Auto Vibration System (AVS), Auto Leveling System (ALS2 Vertical), Auto Teaching System (ATS) and Auto Gapping System (AGS). Each device follows the processing life of a wafer and reports real-time metrology data.

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