Improved Overlay for ASML Systems

Image Placement Accuracy for Superior Overlay

Accurate and reliable image placement is a prerequisite to high-precision process overlay, and ASML offers a series of tools and solutions to meet this demand in its steppers and scanners.

As part of our commitment to continuous overlay improvement, ASML has introduced a series of key hardware packages for improving overlay called IOST (Improved Overlay for Steppers), IOSc (Improved Overlay for Scanners) and TOP (TWINSCAN™ Overlay Package). These kits address all factors in the overlay budget, including environmental, wafer, reticle and signal processing effects. IOST, IOSc and TOP dramatically improve field-to-field, wafer-to-wafer and lot-to-lot overlay consistency.

ATHENA™

ATHENA (Advanced Technology using High order ENhancement of Alignment) is an advanced phase-grating system that provides a larger overlay process window for more complex film stacks, including difficult CMP layers. It incorporates an off-axis alignment sensor that uses the same phase-grating principles currently implemented in the standard ASML TTL (Through The Lens) alignment system, but it increases the number of detected orders from one to seven. It uses both red and green illumination in a high-order system that characterizes mark asymmetry, making it possible to accurately place the image for the most difficult process film stacks.

ATHENA Narrow Marks

To maximize die per wafer ATHENA Narrow Marks allows scribe line widths to be reduced to below 80 µm. ATHENA Narrow Marks includes a new sensor arrangement that guarantees accurate alignment on narrow marks that fit into a scribe line with a minimum width of 40 µm. This creates space for additional product and can provide up to 5% additional die per wafer without any additional processing costs—effectively increasing yielding output.
3DAign™

3DAign is a unique alignment system that provides highly accurate targets on the backside of the wafer for imaging on the front, for true front-to-back alignment (FTBA). 3DAign substantially increases performance over previously available FTBA techniques, and is one of the essential technologies for high-throughput MEMS/MOEMS and compound semiconductor processing. 3DAign overcomes many common processing challenges such as CMP damaged marks, EPI shift for thick layers and noisy signals from granular metals.