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LUMINESCENT UNVEILS 45- AND 32-NM RESOLUTION ENHANCEMENT TECHNOLOGY RESULTS USING INVERSE LITHOGRAPHY TECHNOLOGY (ILT)

Evaluations Confirm ILT as Best RET Approach to Optimize 45- and 32-nm IC Designs for Manufacturability

PALO ALTO, Calif.—Feb. 27, 2007—Luminescent Technologies, Inc., a provider of revolutionary lithography-enhancement products to the global semiconductor industry, today unveiled new results of its most aggressive deployment of Inverse Lithography Technology (ILT) to date—this time on extremely complex 45-nm and 32-nm critical layers. The patented technology is already outperforming the capabilities of state-of-the-art optical proximity correction (OPC) approaches at 65 nm by producing significantly better pattern fidelity and the broadest possible lithography process windows on printed silicon. Now it is surpassing those early success benchmarks. Today's results demonstrate ILT's remarkable ability to reach and process areas of all critical layers that elude the capabilities of conventional OPC solutions. They also reveal substantial depth-of-focus improvements and new cost-of-ownership advantages.

The latest data emerges from the evaluation of ILT by a selection of semiconductor manufacturers. The line-up includes a mix of foundries and integrated device (memory and logic) manufacturers on multiple continents leveraging both dry and wet immersion lithography techniques; all are exploring ILT's potential to optimize their cutting-edge 45- and 32-nm IC designs for manufacturability. One customer has already installed Luminescent's full-chip product, the Luminizer™, for its 32-nm development efforts. Another Luminizer order was received this month for a customer's 45-nm development initiatives.

Beyond the known advantages of ILT—superior pattern fidelity and a broader process window—customers are reporting additional findings for this new-generation RET solution at the 45- and 32-nm nodes:

1. Going where OPC can't reach: ILT has demonstrated the ability to solve line-end shortening problems in the poly and diffusion layers at 45 nm. At this node, manufacturers are exploring the possibility of extending their dry steppers and delaying the move to immersion. With conventional OPC, printing critical layers such as poly and active has been extremely difficult due to the line-end shortening problem. The poly layer is especially complex since the line-end space is tight, leaving no room for OPC to correct the problem. ILT solves the line-end shortening problem, easily printing 45-nm poly and diffusion layers with adequate process window.
2. New depth-of-focus (DoF) benchmark: ILT has demonstrated improved DoF by at least 100 nm, which represents an improvement of more than 30 percent over conventional

solutions. This improvement has important implications for mask manufacturability. Using conventional OPC, the best DoF tends to fall below 300 nm, which leaves a very small process margin. The improved DoF generated by ILT expands the process margin, thereby allowing manufacturers to proceed to production with confidence using reticles with currently available CD controls.

3. Mask-write speed metrics and mask-inspection validation: Because ILT considers mask-writing and inspection rules during the inversion calculation, the IC design is inherently optimized for manufacturability. Manufacturers using ILT to tape out full masks are reporting mask-write time that is equal to if not better than conventional OPC. More importantly, they are verifying that the full masks can be comprehensively inspected by current-generation mask-inspection equipment.
4. Cost-of-ownership (CoO) advantages: Beyond the cost benefit of eliminating the need for script writers, customers report new CoO benefits in the form of accelerated turnaround time; with ILT, they are consistently developing recipes in days instead of weeks.

“From the outset, ILT showed tremendous promise as the most intuitive, practical and optimal mask synthesis solution,” said Luminescent CEO David Fried. “But its power as an advanced lithography enabler is even more apparent with the latest results from a selection of the world’s most advanced semiconductor R&D sites. At the leading edge, ILT is patterning features beyond the capabilities of even the most advanced OPC while fitting into existing lithography flows. But beyond the technical superiority of this new-generation RET solution, manufacturers are most excited by ILT’s potential to enable the use of more-economical 193-nm dry lithography instead of immersion for printing certain 45-nm critical layers. They’re also excited by the possibility of delaying the need for more advanced immersion steppers for 32-nm designs,” added Fried.

To learn more about Luminescent’s ILT products, please visit the company at the SPIE Advanced Lithography Conference, February 25–March 2, 2007, in San Jose, California; Luminescent representatives will present a poster session on Thursday, March 1.

About Inverse Lithography Technology

Inverse Lithography Technology (ILT), developed by Luminescent, is the semiconductor industry’s first mask synthesis solution to transition beyond the limitations of optical proximity correction (OPC) software. It is the only automated resolution enhancement technology (RET) that starts directly with the desired IC pattern on the wafer, explores the entire available optical lithography space by mathematical inversion, and ultimately delivers a manufacturable mask pattern that generates the maximum design fidelity with the broadest possible process window. A new-generation RET solution, ILT fits seamlessly into existing tape-out flows and leverages current-generation 193-nm lithography equipment to pattern 45- and 32-nm IC designs.

About Luminescent's ILT Products

ILT is the engine that drives the company's Luminizer product family—a configurable and highly scalable integrated hardware and software platform with multiple cutting-edge applications. The Luminizer family includes the Luminizer FX for full-chip correction at nodes of 90 nm down to 32 nm and the Luminizer LE for small-area cell optimization.

About Luminescent Technologies, Inc.

Luminescent provides lithography technology to the semiconductor industry. The company's Inverse Lithography Technology (ILT) products turn design intent into production reality by improving on-wafer pattern fidelity, expanding process windows, and accelerating time-to-silicon. Luminescent is a privately held, venture-backed company based in Palo Alto, California. To learn more about Luminescent, please visit the company on the Internet at www.luminescent.com.

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Corporate Contact

Linyong (Leo) Pang, Ph.D.
Phone: (650) 433-1025
Email: leo@luminescent.com

Media Contact

Jane Evans-Ryan
Phone: (408) 489-6391
Email: jevansryan@sbcglobal.net