

**FOR IMMEDIATE RELEASE**

**LUMINESCENT SHIPS INDUSTRY'S FIRST FULL-CHIP INVERSE LITHOGRAPHY SYSTEM  
FOR SUB-WAVELENGTH MASK DESIGNS**

***Luminizer™ set to replace optical proximity correction technologies  
for 45- and 32-nm IC manufacturing***

**PALO ALTO, Calif.—Dec. 5, 2006**—Luminescent Technologies, Inc., a provider of revolutionary lithography-enhancement products to the global semiconductor industry, today announced the shipment of its first full-chip-capable system—the Luminizer™—to a leading semiconductor manufacturer in Asia. Based on Luminescent's patented Inverse Lithography Technology (ILT) platform, the Luminizer is an integrated hardware and software replacement for optical proximity correction (OPC) technologies used for sub-wavelength lithography resolution enhancement. Results obtained on printed silicon demonstrate that the Luminizer produces significantly better pattern fidelity and lithography process windows than what is possible with state-of-the-art OPC. In addition, the Luminizer substantially reduces mask-design cycle time for 45- and 32-nm integrated circuit (IC) manufacturing.

**OPC Technologies Stretched Beyond Their Practical Limits**

Despite the emergence of new approaches to overcome lithography-related design constraints, OPC engineers still struggle with the basic challenges of smaller process windows, higher mask costs, and compromised yields at advanced nodes. Even the promise of faster OPC techniques using image-based forward simulation and other new methods fails to solve the inherent accuracy challenges of a process that iteratively moves design edges to approximate intended on-wafer results. Furthermore, because OPC is an ad hoc approach, there is no guarantee that if a reticle pattern exists to hit the wafer target, the solution can even be found. OPC is also time-consuming and labor-intensive, requiring extensive script writing and verification, with several mask file respins typically occurring before chipmakers can confidently commit a design to mask and silicon. Moreover, at the 45- and 32-nm nodes, OPC approaches are being stretched beyond their practical limits.

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### **A New-Generation Resolution Enhancement Technology Solution**

Luminescent's ILT is the first mask synthesis solution to transition beyond OPC software while fitting seamlessly into existing tape-out flows. 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 mask pattern that generates maximum design fidelity with the broadest possible process window. With its computational speed, the Luminizer is already patterning advanced-node features rendered "extremely difficult-to-print" by other OPC techniques. The result: a ground-breaking new-generation RET solution that accelerates lithography yield ramps and reduces time-to-silicon. In addition, the Luminizer potentially enables the use of more-economical 193-nm dry lithography instead of immersion for printing certain 45-nm critical layers and could delay the need for more advanced immersion steppers for 32-nm designs.

### **ILT: Shattering the 45- and 32-nm Patterning Obstacles**

Luminescent's ILT is the industry's first practical inverse algorithmic approach built to overcome the following patterning obstacles at the 45- and 32-nm nodes.

- 1. Accuracy:** ILT enables superior accuracy in four important ways: First, it analyzes the entire image to generate the mask, not just discrete sampling points on the pattern edges. As such, ILT produces optimized mask features that are not locally constrained but are the result of image-quality considerations at locations that are distant by several optical wavelengths. Second, the mask is pre-verified and correct by construction. Third, ILT automatically generates and optimizes assist features during inversion, thus avoiding any special accommodation for assist-feature placement. Finally, ILT enhances accuracy by leveraging state-of-the-art optical and resist models.
- 2. Mask manufacturability:** ILT considers mask-writing and inspection rules during the inversion calculation, thereby optimizing the design for manufacturability. Mask rules can be user-specified to meet mask-writing and inspection requirements.
- 3. Ease of use:** ILT is pattern-independent for any manufacturing process, which eliminates the extensive, costly scriptwriting requirements that burden OPC software. A highly intuitive user interface cuts the learning curve time significantly.
- 4. Speed:** ILT's computation speed is enabled by a combination of fast lithography simulation, patented rapid inversion algorithms and an efficient repetition extraction methodology. These speed enablers are all compatible with massively parallel hardware acceleration.

Calling ILT a landmark approach that enables next-generation patterning, Luminescent's Chief Executive Officer David Fried noted, "ILT evaluations at multiple customer sites used a mix of both dry and immersion lithography approaches. When applied to 45- and 32-nm designs, silicon results consistently revealed better pattern accuracy and process windows relative to conventional RET approaches. Such results cast ILT as more than just a superior enabler of advanced lithography technology; they also highlight the compelling economic advantages of this revolutionary new solution. These advantages include the potential to stretch the performance range of lithography equipment, which could delay the need for immersion steppers on some designs," added Fried.

**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 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](http://www.luminescent.com).

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