Step-and-Repeat Lithography System for Industrial Production of Photonic Patterns

PhableS™

- Step & Repeat photolithography system for high volume printing of periodic patterns
- Full area patterning of 200mm and 300mm wafers
- Non-contact: protects masks and substrates from damage and contamination
- Cassette-to-cassette automatic wafer processing
- Automatic handling of masks (industry standard 6-inch)
- Up to 140mm x 140mm adjustable exposure field
- Highly uniform and reproducible printing
- 1D and 2D periodic pattern printing
- Resolution: 60 nm half pitch
- Automatic overlay alignment capability
- Suitable for non-flat substrates
- Suitable for thin glass substrates
- Mini environment for defect control
- Integrated Post Exposure Bake (PEB) module (optional)
- Low maintenance and operation costs
- Customizable platform

Applications

XR (AR/VR/MR)
Near-Eye Waveguides
Head-Up Displays (HUD)

BIO /MEDICAL
Bio Molecular Sensors
X-Ray Imaging

OPTOELECTRONICS
DFB/DBR Lasers
VCSEL Polarizer Gratings
PCSEL Photonic Crystals
Nanowire Devices
PSS

COLOR/VISUAL EFFECTS
Structural Colors
Security Applications

OPTICAL COMPONENTS
Telecom Gratings
Anti-Reflective Surfaces
Wire Grid (Polarizers)
Laser Diffraction Gratings
Spectrometer Gratings
Sports Optics - Reticles

Eulitha

LITHOGRAPHY FOR PHOTONICS

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PhableS

PhableS is a step-and-repeat lithography tool. It provides the ability to print high resolution periodic structures on wafer sizes up to 300mm in a low cost photolithography system. In addition, the tool's variable field size feature enables selective printing on multiple device masks. With automatic wafer and mask handling in a particle controlled mini-environment, the tool is suitable for high volume industrial production. Eulitha's breakthrough Displacement Talbot Lithography (DTL) technology enables high resolution printing near the wavelength limit in a non-contact configuration. Structures such as sub-micron period linear gratings and 2D patterns such as hexagonal and square gratings are printed with high uniformity and fidelity. The technique shares the same material and process solutions with photolithography methods that have been successfully used for semiconductor lithography for many decades.

PATTERN EXAMPLES

Hexagonal lattice
100nm holes,
600nm period

Hexagonal lattice
300nm pillars,
600nm period

Hexagonal lattice
1,5μm pillars,
3,0μm period

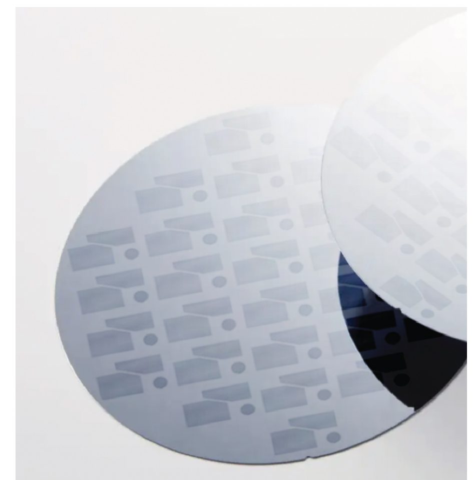
Linear grating
50nm lines,
140nm period

Square holes
500nm holes,
1000nm period

Square lattice
200nm holes,
400nm period

Variable
fill-factor
300nm period

Rhombic lattice
200nm holes,
400nm period



300mm Substrate

SPECIFICATIONS

SPECIFICATIONS	UV	DUV
Resolution (linear grating)	<125nm half pitch	<65nm half pitch
Wafer size	300mm	
Mask format	6”	
Illumination uniformity	<3%	
Operation	Automated wafer and mask handling	
Overlay alignment	<1μm frontside, <5μm backside	
Duty cycle control	Variable duty cycle (optional)	
Beam size	Blade-able exposure control	