

Optical modules and lithography machines



Article Overview

Optical modules are integral components of lithography machines, enabling the precise projection of microchip patterns onto silicon wafers.

How Lithography Machines Work

Lithography machines, also known as photolithography systems, are used to create intricate patterns on silicon wafers for semiconductor devices. They project light through a photomask (or reticle) onto a photosensitive layer of the wafer, transferring the desired circuit patterns. The process requires extremely high precision to achieve nanometer-scale features, which is critical for modern microchips like CPUs, GPUs, and memory chips .

Role of Optical Modules

Optical modules include lenses, mirrors, illumination systems, and other high-precision optical components. These modules are responsible for focusing, shaping, and directing light with nanometer-level accuracy. The quality of these optical modules directly affects the resolution, alignment, and overall performance of the lithography machine. For example, ZEISS Semiconductor Manufacturing Technology supplies optical modules that allow lithography lasers to expose wafers with extreme precision, determining how small and accurate the microchip structures can be .

Integration in Semiconductor Manufacturing...

Article Content

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Semiconductor Manufacturing Optics | ZEISS SMT

High-quality optical components and modules (no sales in Germany) for lithography lasers and special microscope lenses for wafer

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An Introduction to Lithography Machine

In fact, the lithography machine is the key equipment to realize the lithography process, which is used to copy the circuit structure on

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ASML products & services | Supplying the semiconductor industry

Explore ASML products and services that optimize the chip-making process, including our advanced lithography machines and

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Optical Lithography

Optical lithography is defined as a photon-based technique that involves projecting an image onto a photosensitive emulsion

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Optical lithography: Introduction

Optical lithography: Introduction Abstract: The dramatic increase in performance and cost reduction in the electronics industry are

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Mechanics & mechatronics

ASML's lithography machines feature some of the world's most advanced, precision-engineered mechanical and mechatronic systems.

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What is Lithography? - How it Works | Synopsys

Lithography is a critical process in semiconductor manufacturing, enabling the precise patterning of micro- and nano

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Application of Optical Components in Lithography Machines

In lithography machines, the optical system is responsible for focusing and projecting the light beam emitted by the light source onto

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Photolithography

Photolithography (also known as optical lithography) is a process that involves using light to transfer a pattern onto a photoresist

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Lenses & mirrors

The core of every lithography machine is an extended optical system made up of dozens of individual components. In deep

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(PDF) An Introduction to Lithography Machine

PDF | On Jan 1, 2021, Xihao Zhang published An Introduction to Lithography Machine | Find, read and cite all the research you need

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Lithography

Photolithography is a patterning process in chip manufacturing. The process involves transferring a pattern from a

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The TWINSKAN NXT:2000i delivers outstanding overlay, focus control and cross-matching for high-volume manufacturing of

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Optical lithography

The SPIE Digital Library offers a comprehensive collection of content on optical lithography, a critical technology in the

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Lithography Equipment | Springer Nature Link

This chapter reviews the history of photolithography equipment for HVM mainly from the aspects of proximity

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EUV lithography systems – Products | ASML

Discover our NXE systems that use EUV light to deliver high-resolution lithography and make mass production of the world's most

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Lithography principles

The complex optical systems in our lithography machines reduce the image to be printed on a wafer to the

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Lithography Equipment | Springer Nature Link

Optical lithography equipment can be classified as contact/proximity lithography equipment and projection lithography

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Optical Lithography and Technology | ZEISS SMT

ZEISS SMT is the global technology leader in the field of optical lithography, making it an enabler for the

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The Principle and Development of Optical Maskless Lithography

A comprehensive review of the DMD-based optical lithography system has been conducted. The essence of the point

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Recent advances in computational lithography technology

As semiconductor manufacturing technology advances, lithography faces increasingly severe challenges from

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Optical Lithography

Optical lithography is the mainstream patterning technology in today's fabs. A scanner makes use of an optical

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Top 10 Lithography Equipment Manufacturers in 2025

Their systems are widely used by global foundries and integrated device manufacturers (IDMs), supporting both

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Analysis of core technologies of lithography machines and domestic ...

The optical system, the "eyes" of the lithography machine, includes the illumination system and projection lens, directly

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Top 10 Lithography Equipment Manufacturers in 2025

3. Canon Inc. (Japan) Canon Inc., a name synonymous with imaging and optical technology, also holds a strong

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Extreme ultraviolet lithography

Extreme ultraviolet (EUV) lithography is used to fabricate features with nanometre-scale resolution. This Primer

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