

Photomasks Data Preparation

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Objective

Main goal of this course is to present the techniques used in micro and nano components photomask data preparation. This course will allow to fully understand all the issues related to this critical step of chip development as well as the methods used to reduce both costs and delays.

Abstract

Despite the fact that all nowadays microchips use photomasks for their fabrication, it appears that no course is available worldwide on this topic. The only available training are provided internally in companies dealing with this activity and without any formal teaching.

This leads to dramatic discrepancies in the wording used by the professionals as well as an important weakness regarding efficiency and homogeneity of the procedures.

It is then important to correct this lack by providing an up to date course on this topic, especially when knowing that masks cost represents today at least 10% of the full development cost of a chip.

Contents

The course introduces the basics of photolithography and the various types of masks used. A detailed description of the multiple constraints and of all the patterns required on masks will be provided:

- process control modules
- measurement structures
- alignment marks
- identification patterns
- chips

The different steps of mask data preparation will be explained:

- Input data manipulation
 - validation
 - fracturing
 - OPC (optical Proximity Correction)
- assembly of various devices
- constraints and optimization
- inspection techniques
- repair techniques

MEMS related issues will be detailed. A last chapter will give an overview of advanced research and state of the art in photomask development.

Learners

The primary target groups concerned are: professionals from SMEs in electronics and micro-systems, students in engineering education and vocational schools looking for an advanced knowledge in this critical step and a better understanding of all related issues.

Prerequisites

- Basic knowledge in microelectronics
 - design
 - lithography
- It is assumed also that learners have a basic knowledge in physics (electronics and optics).

Estimated duration of the course: 25 hours