Process Overview

Introduction to
Semiconductor Processing

Microchips and Transistors
Challenges – Moore’s Law

The number of transistors on a microchip will double every 18 months.

Currently more than 1 billion transistors per microchip

Challenges

- Smaller size and larger number
- Fundamental limitations
  - Heat transfer
  - Diffusion
  - Structure strength
- Process Concerns
  - Stable process – yield
  - Large area – throughput and uniformity
  - Small feature
  - Process compatibility
Example of Process Flow: 1960 PMOS Process

CMOS in the 2000s
積體電路製程流程

材料

晶圓

設計

積體電路生產廠房

金屬化

化學機械研磨

介電質沉積

加熱製程

離子傳播與光阻剝除

微影製程

測試

封裝

最後測試

Chapter Arrangement

- Ch 5: High temperature (oxidation and diffusion)
- Ch 6: Photolithography
- Ch 8: Ion implantation
- Ch 7: Plasma processes
- Ch 9: Etching
- Ch 10: Thin film (CVD and Dielectric)
- Ch 11: Metallization
- Ch 12: Chemical mechanical deposition (CMP)
- Ch 13: Process Integration