CMOS Baseline Operation at MiRC

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Outline

- Introduction
  - History
- Baselines
  - Equipment
  - Processing
  - Test and Measurement
- Operation
  - Rules

Introduction

- Dominance of the CMOS technology
  - Constitutes over 75% of semiconductor consumption today
- Georgia Tech's First CMOS device
  - First CMOS inverter in August, 1998
- Georgia Tech's Baseline Initiative
  - Three baselines have been established so far
- The Necessity of the Platform
  - Baselines are not enough to support new research initiatives

Baselines

Three baselines have been established:

- 20 μm NMOS and CHEMFET
- 2.5 μm P-well, single metal, single poly
- 1.3 μm N-well, double metal, double poly

Components:

- Process simulation
- Circuit design
- Processing equipment and recipes
- Test and measurement instruments

Baselines

Processing equipment

GCA pattern generator
Four point probe
Piranha clean station
Karl Suss RC8 spin coater
Solitec Developer
Plasma-Therm RIE
CVC DC sputterer
Hitachi 3500H SEM
Wyko profilometer
Veeco AFM

GCA 5X stepper
Diffusion furnace tubes
Rinse and dryer
MA6 mask aligners
ICP etcher
STS PECVD
CVC e-beam evaporator
Woollam ellipsometer
Tencor Alpha-Step Profilometer
Olympus Vanox Microscope

Baselines

Processing steps and recipes

See web pages
http://cmos.mirc.gatech.edu/processes/13cmos.html
http://cmos.mirc.gatech.edu/projects/CMOS_Processing_Schematics/sld001.htm

Baselines

Test and Measurement

See web page
http://cmos.mirc.gatech.edu/projects/charauto/charauto.html

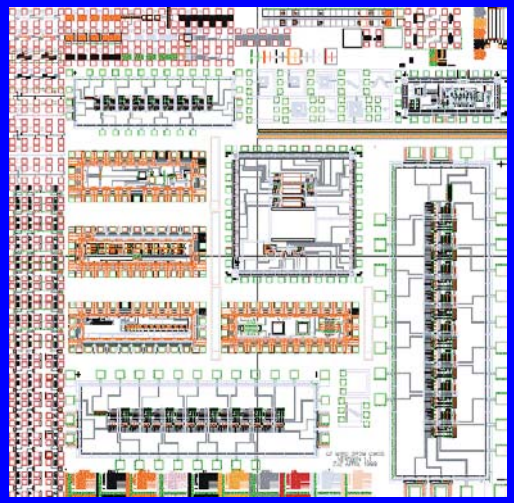
Operation

Rules

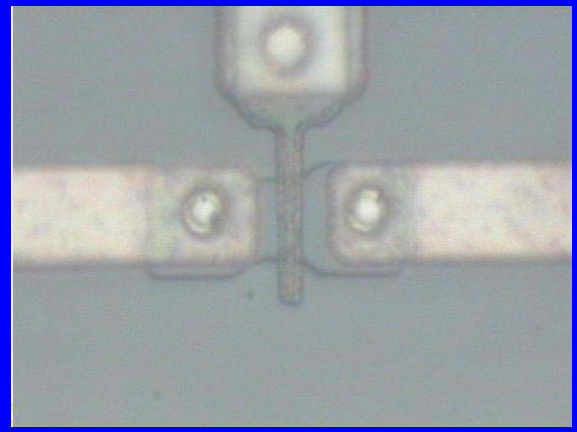
- Cleanness: personal, tool, environment, and wafer handling
- No Gold: metal and metal based chemicals (354, AZ400k)
- Recipes: no change on baseline recipes
- Projects: proposal and recipe approval
- Records: log book and process request form
- Repair: dedicated personnel

Furnace assignment

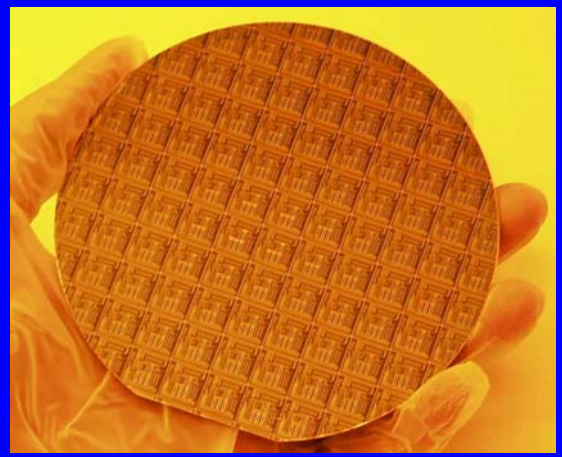
http://cmos.mirc.gatech.edu /processes/13cmos.html



2 Poly, 2 Metal, N-well CMOS Circuits



1 micron P-MOS device



CMOS Circuits on 4” wafer

Test: I-V curves of 1.3 μm CMOS transistors