

Cleanroom Lithography

Process Qualification Procedures

Roger Robbins

5/15/2008

Purpose

This document defines the qualification steps required to certify a standard lithography process flow from mask making to qualifying the pattern as transferred to a wafer. This process will be a generic standard pattern that tests the tools involved in the process flow.

Definition of the Process

These are the detailed process steps defined for the lithography process qualification procedure.

DWL

- Determine the proper exposure and focus values by running a focus/expose pattern on a photomask .
- Using these values, expose a full array of patterns on to a 5 inch photomask to measure the resolution of the process.
- Develop the mask in the CPK spin developer
 - Inspect pattern and record photoresist resolution and resolution uniformity over the mask
- Etch the resolution pattern into the chrome using the CPK spin etcher.
 - Inspect the etched pattern and determine the resolution and uniformity over the full mask.
- Obtain two new 4 inch Si wafers
- Run both wafers through the HMDS process
- Coat both wafers with 1.3 microns of S1813 photoresist in the CEE spinner using the following parameters;
 - Spin speed – 3000 rpm
 - Acceleration – 3000 rpm/s
 - Spin Time – 60 sec
- Measure film thickness on the NanoSpec, obtaining 25 data points
 - Record average thickness and uniformity
- Using the Karl Suss contact printer, expose the above photomask pattern onto the wafer using a previously optimized exposure dose for similar wafer/resist substrates.

- Using the Quintel contact printer, expose the above photomask pattern onto the wafer using a previously optimized exposure dose for similar wafer/resist substrates.
- Develop both wafers using the CPK spin developer
- Inspect both wafers for resolution and uniformity
 - Record resolution values from the full pattern extent on the wafer
 - Determine average resolution
 - Determine resolution uniformity over the wafer