

EE143 Week 8: Suggest Pre-Lab Quiz Solution 2006/02/20 Shong Yin

(1) What layer will we be cutting through today?

Intermediate oxide

(2) What etchant (and what concentration) will we be using? What is the nominal etch-rate? Assuming 1400 Å of the layer and using a 10% overetch, how long (in minutes and seconds) would you need to etch?

Buffered HF 4:1. Nominal Etch Rate: 1000Å/min. ~1:32 seconds total etch time.

(3) What are the potential problems if we overetch or underetch?

Underetch, no CONTACT formed. Overetch, contacts holes are larger, etchant may start to attach Si. Better to overetch than underetch.

(4) What is the purpose of the NH₄F in the BHF (i.e. why is there NH₄F in BHF instead of H₂O)?

NH₄F maintains a constant etch rate by replacing F ions.

(5) Is today's mask (CONT) a bright-field or dark-field mask?

Dark Field. Most of the mask is covered by metal.

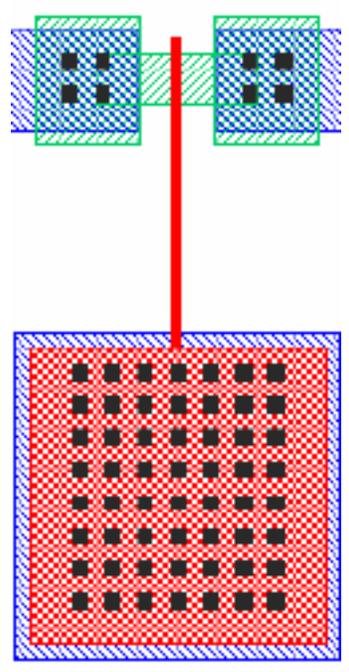
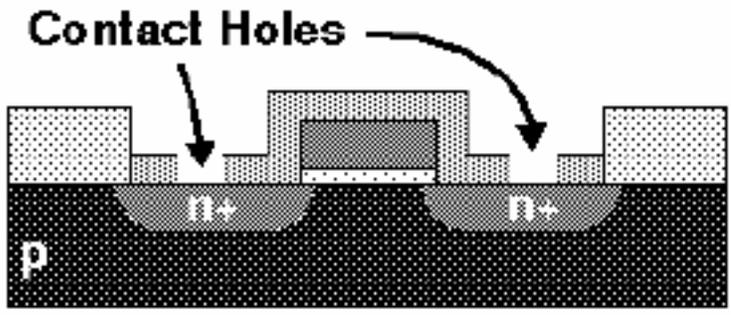
(6) What will you be aligning this week's mask to, the ACTV or POLY alignment markers? If we're off by several microns in alignment, how will this affect the performance of your MOSFETs?

Align to the ACTV layer. If aligning to Poly, will result in two levels of misalignment: CONT->POLY->ACTV. Performance of MOSFETs should not be significantly affected. May observed some differences in series resistance on MOSFET I-V curves.

(7) If the wet etch is done for twice as long as needed, how will this affect the performance of your MOSFETs?

Larger contact holes formed. May have lower contact resistance to MOSFET.

(8) Draw the cross-sectional view, and top down view of a MOSFET before and after today's processing (3 points).



(Neglect the blue metal)