

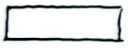
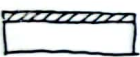
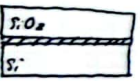

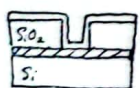
DATE May 31, 1966
 CASE No. 38589-58

MOST Device

This is the invention which made VLSI a practical reality! Bob Joyce

For the past several weeks (since February) our group has been involved in the development of a fabrication procedure for a workable MOST type field effect transistor. As original contributors we have come up with self aligning etching procedures to exactly center the insulated gate and its contact. As one part of that I have suggested that Si be deposited over the gate insulator before etching through this insulator to form source & drain & then on diffusion of the source & drain the Si on top of the IG will also be converted to metallized conductivity thereby serving as perfectly aligned gate contact.

Process steps.

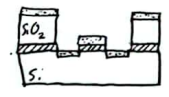
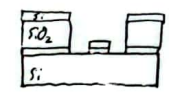
-  high purity silicon slice (type)
- ↓
-  deposit c. 1000 Å Si₃N₄ over whole slice
- ↓
-  deposit c. 10,000 Å SiO₂ - EOS decomposition
- ↓
-  Apply photorezist mask & etch through the SiO₂ but not the Si₃N₄
 Etch rate of SiO₂ = 1000 Å/min
 Si₃N₄ = 100 Å/min } Buffered HF
- ↓
-  deposit c. 1000 Å Si over whole slice.
 By evaporation technique

A \$30 billion + industry was this today! Gordon Moore 6/1/89

DATE
 CASE No.

MOST Device (Cont.)

- By photorezist process (111KTR) define series of etches which provide self centering.
- a) Etch Si to establish final dimensions & remove unnecessary Si from surface at source.
 - b) Etch SiO₂ using the Si as mask = self centering step.
 - c) Etch Si₃N₄ to provide diffusion sites.



Diffuse to provide source & drain regions & to convert all Si on upper surfaces to conductors.

Make test contact to source, drain, and gate & look at characteristic I vs V curves for source to drain under varying gate voltages.

Make contact to margin Si surfaces of interest by evaporating Pt (at a low angle of incidence to prevent gate to source or gate to drain short) - heat to form silicide & then metallize to form interconnectors by standard procedures

Check results of Etching Steps Collected in MOST Folder

First results: 5/27/66
 Very promising
 Few shorts exist.
 Tail-2 prior to fabrication.

R. Keavin 5/31/66

