STUDY THE EFFECT OF BIRD'S BEAK ON FULLY RECESSED LOCOS AND POLY BUFFERED LOCOS USING 2 DIFFERENT PAD OXIDE

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Study the Effect of Bird's Beak on Fully Recessed LOCOS and Poly Buffered LOCOS Using 2 Different Pad Oxide

by

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IN THE NAME OF ALLAH, THE MERCIFUL, THE COMPASSIONATE

Peace and blessing of the Almighty are on our beloved, Muhammad, his relatives, his companions and all those who follow them. Amen.

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APPROVAL AND DECLARATION SHEET

This project report titled Poly Buffered LOCOS and Fully Recessed LOCOS was prepared and submitted by Hafizal Hafiz B. Sarjoni(Matrix Number: 031010107) and has been found satisfactory in terms of scope, quality and presentation as partial fulfillment of the requirement for the Bachelor of Engineering (Microelectronic Engineering) in Universiti Malaysia Perlis (UNIMAP)

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ABSTRAK

Pengasingan peranti merupakan salah satu teknologi terpenting disebabkan oleh peningkatan jumlah peranti CMOS berskala besar. Dalam industri semikonduktor teknik pengasingan oksida setempat merupakan teknik yang paling meluas digunakan sejak kebelakangan ini. Walaubagaimanapun, dalam penggunaan teknologi CMOS berskala sangat kecil halangan utama yang dihadapi ialah pencerobohan oksida yang berlaku di bawah kawasan aktif. Dalam projek ini, kaedah yang digunakan untuk meningkatkan struktur pengoksidaan setempat adalah Poly Buffered LOCOS dan Fully Recessed LOCOS di mana, kaedah ini telah dikaji dapat mengurangkan kewujudan paruh burung. Dengan penemuan kaedah Poly Buffered LOCOS dan Fully Recessed LOCOS ianya telah diakui dapat mengurangkan pembentukan oksida yang berlaku di bawah kawasan aktif.

ABSTRACT

Device isolation is one of the most important technology features towards the realization of very large scale CMOS device integration. Since the early days of semiconductor industry, LOCOS isolation has been the major isolation scheme. However, one of it is major drawback is the oxide encroachment, or so called, bird's beak beneath under active areas which limits its application in deep sub-micron CMOS technology. This project investigates the use of modified LOCOS structures for example Poly Buffered LOCOS (PBL) and Fully Recessed LOCOS as a bird's beak suppressing technique. It was found that, Poly Buffered LOCOS and Fully Recessed LOCOS structures, have been dramatically reduce the oxide encroachment beneath the active areas.

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LIST OF ABBREVIATIONS

VLSI	Very Large Scale Integration
HF	Hydrofluoric Acid
LOCOS	Local Oxidation
PECVD	Plasma Enhanced Chemical Vapor Deposition
SWAMI	Sidewall-Masked Isolation
CVD	Chemical Vapor Deposition
PBL	Poly Buffered LOCOS
NH_3	Ammonia
SILO	Sealed Interface Local Oxidation
SiO_2	Silicon Dioxide
SPOT	Self Aligned Planar Oxidation Technology
LPCVD	Low Pressure Chemical Vapor Deposition
FUROX	Fully Recessed Oxide
CMOS	Complementary Metal Oxide Semiconductor
STI	Shallow Trench Isolation
RCA	Ratio Corporate America
DI	Deionized Water
BOE	Buffered Oxide Etch
NH_4OH	Ammonium Hydroxide
H_2O_2	Hydrogen Peroxide
H_2O	Water
H_3PO_4	Hot Phosphoric Acid
RIE	Reactive Ion Etch
HNO_3	Nitric Acid
CF_4	Carbon Tetra Fluoride
N	Nitrogen

GOF	Good Of Fitness
EDX	Energy Dispersive X-ray (EDX).
Si_3N_4	Silicon Nitride