ELECTRICAL AND MATERIAL CHARACTERIZATION OF 0.24 MICRON CMOS DEVICE BY USING SIMULATION

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TABLE OF CONTENTS

	PAGE
DECLARATION	**ii**
ACKNOWLEDGEMENTS	**iv**
TABLE OF CONTENTS	**ii**
LIST OF FIGURES	**x**
LIST OF TABLES	**xiv**
ABBREVIATION	**xvi**
ABSTRACT	

CHAPTER 1

INTRODUCTION

1.1	Overview	1
1.2	Objectives of the Project	3
1.3	Scope of Work	3
	1.3.1 Process Simulation	4
	1.3.2 Device Simulation	4
1.4	Organization of Thesis	4

CHAPTER 2

LITERATURE REVIEW

2.1	Overview	6
2.2	Basics Semiconductors	6
2.3	Nmos Transistor	11
2.4	Pmos Transistor	12
2.5	CMOS Transistor	13
2.6	The Electrical Characteristics	14

2.6.1 Triode and Saturation Region 15
2.6.2 Threshold Voltage 18
2.7 Mosfet Scaling 20
2.7.1 Reasons for Mosfet Scaling 20
2.7.2 Scaling Effect 21
2.7.2.1 Higher Sub-Threshold Conduction 21
2.7.2.2 Increased Gate-Oxide Leakage 22
2.7.2.3 Increased Junction Leakage 22
2.7.2.4 Lower Output Resistance 22
2.7.2.5 Lower Transconductance 23
2.7.2.6 Interconnect Capacitance 23
2.7.2.7 Heat Production 23
2.8 Short Channel Effects 24
2.8.1 Drained-Induced Barrier Lowering and Punch-Through 25
2.8.2 Surface Scattering 26
2.8.3 Velocity Saturation 27
2.8.4 Impact Ionization 27
2.8.5 Hot Electrons 28
2.9 Solutions to Short Channel Effects 28
2.9.1 Channel Engineering 29
2.9.1.1 Retrograde Channel Doping 29
2.9.1.2 Halo Doping 32
2.9.2 Source/Drain Engineering 32
2.9.2.1 Source/Drain Extension (Light Doped Drain) 33
2.9.3 Reducing the Gate Oxide Thickness 35

CHAPTER 3
SCOPE OF WORK
3.1 Scope of Work 36
3.2 Explanation of Flow Chart 36
3.3 Silvaco TCAD Tools Software 38

3.3.1 Athena 40
3.3.2 Atlas 40
3.4 Fabrication Process Overview 41
3.4.1 Oxidation 41
3.4.2 Deposition 42
3.4.3 Metallization 43
3.4.4 Photolithography 45
3.4.5 Etch 46
3.4.6 Ion Implant 47
3.4.6.1 Diffusion 48
3.4.6.2 Ion Implantation 48
3.4.6.3 Ion Implant Trends in Process Integration 48

CHAPTER 4

METHODOLOGY

4.1 Overview 50
4.2 Process Simulation 50
4.2.1 Defining Initial Grid 53
4.2.2 Substrate 53
4.2.3 Performing Oxidation and Well Formation Including Masking Off the Well 54
4.2.4 Retrograde n-Well and p-Well Implant with Well-Drive 56
4.2.5 Sacrificial Cleaning Oxide 58
4.2.6 Gate Oxide Growth 59
4.2.7 Threshold Voltage Adjust 60
4.2.8 Polysilicon Gate Formation 61
4.2.9 Polysilicon Oxidation and Light Doped Drain Implant (Source/Drain Extension) 63
4.2.10 Halo Implant 66
4.2.11 Spacer Oxide Formation 68
4.2.12 Source/Drain Formation 69

4.2.13 Rapid Thermal Annealing, Contact Formation and Specification Of Electrodes 71
4.3 Device Simulation 74
4.3.1 Determination of the Gate Oxide 74
4.3.2 Short Channel Mosfet I-V Characteristics 75
4.3.3 Threshold Voltage 78

CHAPTER 5
RESULT AND DISCUSSION
5.1 Overview 81
5.2 Simulation Result 81
5.3 Electrical Characterization 82
5.3.1 The Drain Current versus Drain Voltage, I_D-V_D 83
5.3.2 The Drain Current versus Gate Voltage, I_D-V_G 84
5.4 Compare the Threshold Voltage, V_T from Result Simulation with the Real Fabrication 86

CHAPTER 6
CONCLUSION AND FUTURE DEVELOPMENT
6.1 Conclusion 88
6.2 Future Development 89
6.2.1 Bulk and Silicon on Insulator (SOI) 89
6.2.2 Strained Silicon 90

REFERENCES 92
APPENDICES A 95
APPENDICES B 114

ABSTRACT

This project is to simulate and analyze the electrical characteristics for 0.24 micron CMOS device using SILVACO TCAD. The objective of the project is basically to simulate the fabrication process and electrical characterization for 0.24 micron CMOS devices. Electrical characteristics were carried out by using Atlas simulator while, simulation of the process is carried out by using Athena process simulator to modify theoretical values and obtain more accurate process parameters. At the device simulation process, the electrical parameter was extracted to investigate the device characteristics. Several design analysis are performed to investigate the effectiveness of the advanced method in order to prevent the varying of threshold voltage. The electrical characteristics produces the graph of drain current versus drain voltage, I_D-V_D and drain current versus gate voltage, I_D-V_G. From I_D-V_G can be obtained the threshold voltage, V_T where V_T for NMOS transistor is lower than V_T for PMOS transistor which is 0.6695V and -0.9683 V respectively. The gate length, L_G obtained from the simulated for NMOS and PMOS are same which is 0.235 micron and it is nearest to the scale for the project can be obtained.