

# Contents

ABSTRACT(Chinese).....	i
ABSTRACT.....	iii
ACKNOWLEDGEMENT.....	v
CONTENTS.....	vi
FIGURE CAPTIONS .....	ix

## ***Chapter 1 Introduction.....1***

1.1 An overview of Polycrystalline Silicon Thin-Film Transistors (Poly-Si TFTs)	
Technology.....	1
1.1.1 Applications to Active-Matrix (AM) Display and System-on-Pannel (SOP).....	1
1.1.2 Applications to Three-Dimensional Integrated Circuits (3D ICs).....	2
1.1.3 Development in LTPS TFTs.....	3
1.2 Motivation.....	4
1.3 Thesis Organization.....	5

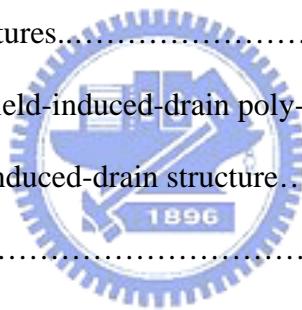
## ***Chapter 2 Drain Engineering in Low-Temperature Polycrystalline Silicon Thin-Film Transistors.....6***

2.1 Introduction .....	6
2.1.1 Leakage current.....	7
2.1.2 Kink effect.....	9
2.1.3 Hot-carrier effect.....	10

2.2 Device architectures for drain-relief.....	12
2.2.1 Offset gate.....	12
2.2.2 Lightly doped drain (LDD).....	13
2.2.3 Gate overlapped LDD (GO-LDD) .....	13
2.3 The electric field comparison of different structures by the 2-D simulators.....	14

### **Chapter 3 A Novel Low Temperature Self-Aligned Field Induced Drain Polycrystalline Silicon Thin Film Transistor by Using Selective Side-Etching Process.....16**

3.1 Introduction.....	16
3.2 Field-Induced-Drain Structures.....	18
3.3.1 An overview of the field-induced-drain poly-Si TFTs.....	18
3.3.2 The proposed field-induced-drain structure.....	20
3.3 Experimental Procedure.....	21
3.4 Electrical simulations.....	23
3.5 Result and discussion.....	27
3.6 Summary.....	28



### **Chapter 4 Two Novel Low Temperature Gate Overlapped Graded Lightly-Doped-Drain Polycrystalline Silicon Thin Film Transistors with the Bottom-Gate Structure and Double-Gate Structure.....29**

4.1 Introduction.....	29
4.2 Gate Overlapped Graded Lightly-Doped-Drain Polycrystalline Silicon Thin Film	

Transistor with a Bottom-Gate Structure.....	30
4.2.1 Experimental details.....	31
4.2.2 Simulation results.....	34
4.3 Gate Overlapped Graded Lightly-Doped-Drain Polycrystalline Silicon Thin Film Transistor with a Double-Gate Structure.....	36
4.3.1 The proposed double-gate structure.....	37
4.3.2 Experimental details.....	38
4.3.3 Simulation results.....	44
4.4 Summary.....	45
<b>Chapter 5 Conclusions.....</b>	<b>46</b>
<b>References.....</b>	<b>48</b>
<b>Vita</b>	

