

Contents

Chinese Abstract	I
English Abstract	III
Acknowledgment	VI
Contents	VII
Table Captions	IX
Figure Captions	X
Chapter 1. Introduction	1
1-1. Overview of polysilicon thin-film transistor technology	1
1-2. Motivation	4
1-3. Thesis outline	6
Chapter 2. Poly-Si conduction mechanism & MILC formation	
mechanism	6
2-1. TFT transportation mechanism	8
2-2. Methods of Device Parameter Extraction	11
2-2-1. Determination of the threshold voltage	12
2-2-2. Determination of the subthreshold slope	12
2-2-3. Determination of <i>On/Off</i> Current Ratio	13
2-2-4. Determination of the field-effect mobility	13
2-2-5. Determination of the trap density	16
2-3. TFT non-ideal effect	17
2-3-1. leakage current	17
2-3-2. kink effect	18
2-4. MILC formula mechanism	18
Chapter 3. Device Structure, Simulation, and Fabrication	28
3-1. Pattern-dependent MILC (PDMILC) TFT Structure and	
Simulation	28
3-2. Fabrication of Pattern-dependent MILC TFT	29
3-3. Fabrication results of Pattern-dependent MILC TFT	31

Chapter 4. Results and Discussion	39
4-1. Effects of Channel Width and NH ₃ Plasma Passivation on Electrical Characteristics	39
4-2. Multi-gate Effects on Electrical Characteristics	42
4-3. Reliability of Multi-gate Pattern-dependent MILC (PDMILC) TFT under Static Stress	46
Chapter 5. Conclusion	68
References	70

