

Contents

1	Introduction	1
1.1	Motivation	1
1.2	Book Organization	2
1.3	Main Contributions	3
	References	3
2	Thin-Film Transistors	5
2.1	TFTs Structure and Operation	5
2.2	An Historical Perspective: From Conceptual Patents to Oxide TFTs	9
2.3	Oxide TFTs: Materials, Processes, and Comparison with Other Semiconductor Technologies	9
2.4	High- κ Dielectrics for Oxide TFTs	11
2.5	Current Research Trends in Oxide TFTs	12
	References	13
3	Oxide TFTs @ FCT-UNL	17
3.1	Fabrication and Characterization Routes	17
3.1.1	Sputtering	18
3.1.2	Patterning Techniques	20
3.1.3	Post-deposition Processes	23
3.1.4	Characterization Techniques	24
3.2	Amorphous Multicomponent High- κ Dielectrics Based on Ta ₂ O ₅ and SiO ₂ : Thin Films and Integration in IGZO TFTs	29
3.2.1	Single Layer Structure Using Ta ₂ O ₅ and TSiO	31
3.2.2	Multilayer Structures Based on TSiO and SiO ₂	39
3.3	IGZO TFT Modeling	46
	References	47

4	Analog-to-Digital Converters	49
4.1	ADCs: Relevance, Historical Perspective, and Main Architectures ...	49
4.1.1	Successive Approximation ADCs (SAR-ADCs)	51
4.1.2	Sigma-Delta ($\Sigma\Delta$) Modulators	52
4.2	ADCs Using Thin-Film Technologies	53
	References	56
5	A Second-Order $\Sigma\Delta$ ADC with Oxide TFTs @ FCT-UNL	57
5.1	Simulation and EDA Tools	57
5.2	Comparator: Circuit and Simulation Results	58
5.3	$\Sigma\Delta$ Modulator: Circuit and Simulation Results	63
5.4	Circuit Layout	67
	References	71
6	Conclusions and Future Perspectives	73

A Second-Order $\Sigma\Delta$ ADC Using Sputtered IGZO TFTs
Correia, A.P.P.; Cândido Barquinha, P.M.; Goes, J.C.d.P.
2016, XIV, 75 p. 54 illus., 12 illus. in color., Softcover
ISBN: 978-3-319-27190-3