



## Broadband opto-electrical receivers in standard CMOS /

Hermans, Carolien

Springer Verlag,  
2007

Monografía

"This book fits in the quest for integrated opto-electrical solutions, and focuses on the receiver front-end. To further reduce the cost, the cheapest technology is selected: standard CMOS, without any optical tricks or flavors. The emphasis lies on the analysis design and implementation of high performance analog receiver circuits."--Jacket

<https://rebiunoda.pro.baratznet.cloud:38443/OpacDiscovery/public/catalog/detail/b2FpOmNlbGVicmF0aW9uOmVzLmJhemF0ei5yZW4vMzQ5OTEyNDA>

**Título:** Broadband opto-electrical receivers in standard CMOS by Carolien Hermans and Michiel Steyaert

**Editorial:** Dordrecht Springer Verlag 2007

**Descripción física:** 1 online resource (xv, 178 pages) illustrations

**Mención de serie:** Analog circuits and signal processing series

**Documento fuente:** Springer e-books

**Bibliografía:** Includes bibliographical references (pages 171-176) and index

**Contenido:** Machine derived contents note: 1 1 A History of Optical Communication -- 1.2 Emerging Applications 4 -- 1.3 Silicon Opto-Electronics 7 -- 1.4 Outline of the Work 9 -- 2 Optical Receiver Fundamentals 13 -- 21 Introduction 13 -- 2.2 The Optical Receiver Front-End 13 -- 2.2.1 A Transceiver for Optical Communication Systems 13 -- 2.2.2 A Pickup Unit for Optical Storage Systems 15 -- 2.3 Binary Data Formats 17 -- 2.4 Bit Error Rate and Sensitivity 20 -- 2.4.1 Bit Error Rate 20 -- 2.4.2 Sensitivity 22 -- 2.5 Intersymbol Interference. 23 -- 2.5.1 Low-Pass Filtering 23 -- 2.5.2 High-Pass Filtering 24 -- 2.6 Jitter 25 -- 2.7 Conclusions 26 -- 3 Standard CMOS Photodiodes 27 -- 3.1 Introduction 27 -- 3.2 Basic Concepts 27 -- 3.2.1 Principles of Light Detection, 28 -- 3.2.2 The Use of Standard CMOS 31 -- 3.3 Overview of Published Integrated Photodiodes 32 -- 3.3.1 BiCMOS Implementations 32 -- 3.3.2 SOI Implementations 34 -- 3.3.3 CMOS Implementations. 35 -- 3.3.4 Conclusions 36 -- 3.4 One-Dimensional Model 37 -- 3.4.1 N-Well P-Substrate Junction 37 -- 3.4.2 P<sup>+</sup> N-Well Junction with Guard 43 -- 3.5 Two-Dimensional Model 46 -- 3.5.1 Classical N-Well Diode 46 -- 3.5.2 P<sup>+</sup> N-Well Diode with Guard 49 -- 3.5.3 Differential N-Well Diode. 51 -- 3.5.4 Influence of Wavelength 52 -- 3.5.5 Influence of Technology Scaling 56 -- 3.6 Conclusions 58 -- 4 Transimpedance Amplifier Design 61 -- 4.1 Introduction 61 -- 4.2 Performance Requirements 61 -- 4.3 Design of the Shunt-Shunt Feedback TIA 63 -- 4.3.1 Transimpedance Gain and Bandwidth 64 -- 4.3.2 Open-Loop Gain and Loop Gain 68 -- 4.3.3 Noise 70 -- 4.4 Literature Examples 76 -- 4.4.1 Common Source TIA 77 -- 4.4.2 Regulated Cascode TIA 78 -- 4.4.3 The Latest Trends at ISSCC 80 -- 4.5 Case Studies 81 --

4.5.1 An Inverter-Based TIA for Test Photodiodes -- in 0.18 nm CMOS 82 -- 4 5.2 An Inverter- Based TIA for Test Photodiodes -- in 90 nm CMOS 93 -- 4.5.3 A Differential Bandwidth-Optimized TIA in 0 18 um -- C M O S 97 -- 4.6 C onclusions 103 -- 5 Post-Amplifier Design 107 -- 5.1 Introduction 107 -- 5.2 Performance Requirements 108 -- 5.3 Literature Examples 110 -- 5.4 Design of a Fully Differential Broadband LA 113 -- 5.4.1 Cascaded Gain Stages 114 -- 5.4.2 Broadband Cherry-Hooper Stage 116 -- 5.4.3 Broadband Stage with Capacitive Source Degeneration. 120 -- 5.4 Offset Compensation. 122 -- 5.5 Case Studies, 124 -- 5.5.1 A Four-Stage LA in 0.18 p.m CMOS 124 -- 5.5,2 A Five-Stage LA with Offset Compensation -- in 0.18 pim CMOS 126 -- 5,6 C onclusions 129 -- SC MOS Realizations 133 -- 6.1 Introduction 133 -- 6.2 Test Photodiodes with TIA in 0.18 im CMOS 135 -- 6.2.1 Circuit Description 135 -- 6.2.2 Measurements 138 -- 6.3 Test Photodiodes with TIA in 90 nm CMOS 142 -- 6.3.1 Circuit Description 143 -- 6.3 2 Measurements 144 -- 6.4 A 3.5 Gbit/s LA in 0.18 gm CMOS 146 -- 6.4.1 Circuit Description 147 -- 6.4.2 Measurements 149 -- 6.5 A Gbit/s Monolithic Optical Receiver Front-End -- in 0.18 unnm CMOS 152 -- 6.5.1 Circuit Description 152 -- 6.5.2 Measurements 157 -- 6.6 Conclusions 164

**Restricciones de acceso:** University staff and students only. Requires University Computer Account login off-campus

**Lengua:** English

**Copyright/Depósito Legal:** 174132099 179833961 228153544 228153545 228385303 613443835 644366975 648310478 756425673 880108973 994747843 1005781448 1035664433 1044209677 1044325939 1056283816 1056312740 1058075979 1058299752 1060770668 1066970086 1073035393 1078868927 1087331628 1097264200 1105600376 1162698706 1204054036 1341826258 1391808232 1406309355 1413267645 1418771463

**ISBN:** 9781402062223 1402062222 1402062214 Cloth) 9781402062216 Cloth) 9786610937493 6610937494

**Materia:** Photodiodes Optical amplifiers Metal oxide semiconductors, Complementary Photodiodes Amplificateurs optiques MOS complémentaires TECHNOLOGY & ENGINEERING- Imaging Systems. Optical amplifiers. Metal oxide semiconductors, Complementary. Photodiodes. Ingénierie. Metal oxide semiconductors, Complementary. Optical amplifiers. Photodiodes.

**Autores:** Steyaert, Michiel ( 1959-)

**Enlace a formato físico adicional:** Print version Hermans, Carolien. Broadband opto-electrical receivers in standard CMOS. Dordrecht : Springer Verlag, 2007 9781402062216 1402062214 (DLC) 2007440450 (OCOLC) 154712071

**Punto acceso adicional serie-Título:** Analog circuits and signal processing series

---

## Baratz Innovación Documental

- Gran Vía, 59 28013 Madrid
- (+34) 91 456 03 60
- informa@baratz.es