低功率雷射二極體驅動電路之設計

林雅慧、洪進華

E-mail: 9121428@mail.dyu.edu.tw

摘 要

本論文提出兩個低功率消耗之雷射二極體驅動電路（電路一與電路二），並使用DC coupling與AC coupling兩種介面電路來連接驅動電路與雷射二極體。使用TSMC 0.35 m 1P4M之製程參數來模擬電路，模擬的Data rate是在1.25Gbps的環境下執行。對於電路一，不論使用DC coupling或AC coupling介面，皆能工作在1.25Gbps；對於電路二，使用DC coupling介面時，會因為Headroom不足的問題而導致無法工作在1.25Gbps的要求。唯有使用AC coupling介面時，才能工作在1.25Gbps並正確地將訊號輸出，而且消耗功率也比較小。

關鍵詞 : 雷射二極體驅動電路 ; 低功率 ; 光纖通訊

目錄

參考文獻

[1]董德國、陳萬清編譯,“光纖通訊,”東華書局, 2000.

[2]吳曜東編著,“光纖通訊系統原理與應用,”全欣科技圖書, 1994.

[3]廖得照、黃素真編譯, Donald J. Sterling, Jr.原著,“光纖技術 手冊(第二版),”全華科技圖書股份有限公司, 1995.

[4]陳偉傑,“CMOS 光纖通訊之雷射驅動電路及接收前端整合設計,”國立清華大學碩士論文, 2000.

[5]Leonard P. Chen, Melissa Y. Li; Connie J. Chang-Hasnain; and Kam Y. Lau,“A Low-Power 1-Gb/s CMOS Laser Driver for a Zero-Bias Modulated Optical Transmitter,”IEEE Photonics Technology Letters, Vol. 9, PP. 997~999, 1997.

[6]Wei-Jean Liu,Robin R.-B. Sheen, Jen-Shang Wang, Oscal T.-C. Chen,“A Low-Power and High-Frequency CMOS Transceiver for Chip-to-Chip Interconnection,”IEEE International Symposium on Circuit and Systems, Proceedings, Vol. 3, PP. 1~4, 2000.

[7]Eduard Sackinger, Yusuke Ota, Thaddeus J. Gabara, Wilhelm C. Fischer,“Low Power CMOS Burst-Mode Laser Driver for Full Service Access Network Application,”Lasers and Electro-Optics, CLEO/Pacific Rim '99, The Pacific Rim Conference, Vol. 2, PP. 519~520, 1999.

[8]Eduard Sackinger, Yusuke Ota, Thaddeus J. Gabara, Wilhelm C. Fischer,“A 15-mW, 155-Mb/s CMOS burst-mode laser driver with automatic power control and end-of-life detection,”IEEE J. Solid-State Circuits, Vol. 34, PP. 1944~1950, 1999.

[9]Maxim High-Frequency/Fiber Communications Group,“Interfacing Maxim Laser Driver with Laser Diodes,”Maxim Integrated Products,

Application note: HFAN-2.0, 2000.
[10]Maxim High-Frequency/Fiber Communications Group, “ Introduction to LVDS, PECL, and CML, ” Maxim Integrated Products, Application note: HFAN-1.0, 2000.
[11]MAXIM, “ +3.3V, 2.5Gbps SDH/SONET Laser Driver with Automatic Power Control, ” Maxim Integrated Products, MAX3867, 1998.
[12]MAXIM, “ +3.3V, 622Mbps SDH/SONET Laser Driver with Automatic Power Control, ” Maxim Integrated Products, MAX3667, 2000.
[13]MAXIM, “ +3.3V, 2.5Gbps SDH/SONET Laser Driver with Current Monitors and APC, ” Maxim Integrated Products, MAX3869, 2000.
[14]MAXIM, “ Pre-Emphasis Improves RS-485 Communications, ” Maxim Integrated Products, 1999.
[15]Shao-Sheng Yang, “ Laser Driver for 1.25Gbps, ” National Tsing-Hua University, 2001.
[16]I-Chen Yao, “ Laser Diode Driver, ” National Central University Master Thesis, 2001.
[17]I-Chen Yao, Chung-Chen Kuo, Wei-Zen Chen and Shyh-Jye Jou “ 1.25 Gb/s Laser Diode Driver, ” Proceedings of 12th VLSI Design/CAD Symposium, Hsinchu, Taiwan, 2001.