液晶与显示
中文核心期刊
Chinese Journal of Liquid Crystals and Displays
主管：中国科学院
主办：中国科学院长春光学精密机械与物理研究所
中国物理学会液晶分会
中国光学光电子行业协会液晶分会
主编：郭海成

液晶与显示 2013, 28(4) 534-538 ISSN: CN:

器件物理及器件制备技术

针对OLED衰退补偿的电流PWM像素驱动电路研究

冉峰[1], 储楚[1], 季渊[1], 王勇[1], 邹荣[2]

1. 上海大学 微电子研究与开发中心, 上海 200072;
2. 上海大学 材料科学与工程学院, 上海 200072

摘要： 有机发光二极管(OLED)微显示器在长时间显示高亮、高对比度的静态画面之后会产生像素衰退不同,发光亮度衰减存在较大差异,更新画面后存在残影现象。为此,提出了一种电流PWM像素驱动电路对OLED像素衰退做出一定的补偿。文章介绍了电流PWM像素驱动电路的结构及其工作原理,分析了电流PWM像素驱动电路对OLED像素衰退补偿原理。通过实验得出该电路结构中提高OLED衰退补偿效果的几个主要因素。在像素衰退差异在30 MΩ以下时,电流PWM驱动电路的像素衰退率只有传统驱动电路的50%。

关键词： OLED 衰退补偿 电流PWM像素驱动电路 残影 饱和深度

Current PWM Pixel Driving Circuit for OLED Recession Compensation

RAN Feng[1], CHU Chu[1], JI Yuan[1], WANG Yong[1], ZOU Rong[2]

1. Microelectronic R&D Center, Shanghai University, Shanghai 200072, China;
2. School of Material Science and Engineering College, Shanghai University, Shanghai 200072, China

Abstract: This paper aims to solve some existing problems in OLED micro display-when showing highlighting static images with a high contrast ratio for very long time, the OLED micro display presents quite different phenomena in the process of pixel and brightness recession, and when the images are updated, sticking appear on the micro display-through making some compensation for the pixel recession on the OLED micro display in the current PWM pixel driving circuit. In the paper, a brief introduction of the structure and theoretical analysis of the working principles of the driving circuit are given. It introduces the principle of OLED pixel recession and compensation in the driving circuit, and analyzes the relations between the recession and compensation process and some parameters in the circuit through trials and errors in the experiment. The conclusion that shows when the difference of the pixel recession is below 30 MΩ, the ratio of pixel recession in the current PWM driving circuit is only 50% of the traditional driving circuit.

Keywords: OLED recession compensation current PWM pixel driving circuit sticking saturation depth

收稿日期 2013-02-28 修回日期 2013-04-09 网络版发布日期

基金项目:

通讯作者: 储 楚,E-mail:dream_shu@126.com

作者简介: 冉峰(1954-),男,山东济宁人,教授,主要从事智能信息与集成电子系统,高清晰度平板显示与应用集成技术等方面的研究。

作者Email: dream_shu@126.com

参考文献：

[1] Aruga S. High temperature poly-Si TFT LCD for projection[C]//*International Display Manufacturing Confe-rence,* Taiper, China:SID,2002:551-556. [2] Prache O. Active matrix molecular OLED microdisplays[J]. *Displays,* 2001, 22(2):49-56. [3] Ghosh A P, Ali T A, Khayrullin I, *et al.* Recent advances in small molecule OLED-on-silicon microdisplays [C]//*Organic Light Emitting Materials and Devices XIII,* San Diego, CA, United States: The Society of Photo-Optical Instrumentation Engineers (SPIE),2009. [4] Levy G B, Evans W, Ebner J, *et al.*An 852×600 pixel OLED-on-silicon color microdisplay using CMOS subthreshold-voltage-scaling current drivers [J] *IEEE Journal of Solid-State Circuits,*2002,37:1879-1889. [5] Kelly G, Woodburn R, Underwood I, *et al.*A full-color QVGA microdisplay using light-emitting-polymer on CMOS[C]//*IEEE International Conference on Electronics, Circuits and Systems,* New York: IEEE, 2006,(1-3):760-763. [6] Richter B, Vogel U, Herold R, *et al.*Bidirectional OLED microdisplay: Combining display and image sensor functionality into a monolithic CMOS chip[C]//*Solid-State Circuits Conference-Digest of Technical Papers (ISSCC),* San Francisco USA:IEEE, 2011:314-316. [7] Gohri V, Hofmann S, Reineke S, *et al.*White top-emitting organic light-emitting diodes employing a heterostructure of down-conversion layers [J]. *Organic Electronics,*2011,12:2126-2130. [8] Xu M H, Ran F, Chen Z J. A novel OLED controller with fractal scan scheme [J]. *Robotics and Computer-Integrated Manufacturing,* 2010, 26(6):570-575. [9] 尹盛,江博,李喜峰.17.8 cm彩色AMOLED驱动模块的研制[J]. 液晶与显示, 2012,27(3):347-351. [10] 刘健,谢文法.1OLED器件光电性能集成测试系统研制[J]. 液晶与显示, 2012,28(1):132-137. [11] 徐美华, 陈章进, 冉峰,等.平板显示系统的最优扫描结构及分形模型[J]. 电子学报, 2006, 34(8):1376-1380. [12] Ji Y, Ran F, Ji W G, *et al.*Optimal scan strategy for mega-pixel and kilo-gray-level OLED-on-silicon microdisplay [J]. *Applied Optics,* 2012.51(17):3731-3743.

本刊中的类似文章

1．王宇, 田朝勇, 周刚.AMOLED像素驱动电路参数设计[J]. 液晶与显示, 2013,28(4): 587-592

2．周九飞, 刘明, 张继超, 周刚.航空胶片相机胶片注释方法[J]. 液晶与显示, 2013,28(3): 408-412

3．姜菡雨, 徐茂梁, 胡琳琳, 张创军, 王歌扬.蓝光材料3,3'-二甲基-9,9'-联蒽的合成及光电性能研究[J]. 液晶与显示, 2013,(1): 45-49

4．冉峰, 何林奇, 季渊.无线OLED微显示器系统的设计与实现[J]. 液晶与显示, 2012,(5): 633-637

5．尹盛, 江博, 李喜峰.17.8 cm彩色AMOLED驱动模块的研制[J]. 液晶与显示, 2012,(3): 347-351

6．李艳菲, 张方辉, 牟曦媛, 杜红兵.利用有机覆盖层提高OLED出光效率[J]. 液晶与显示, 2012,(3): 308-312
7．张建平, 吴亮, 成国梁, 周廷君, 朱文清.基于BRM的白光OLED恒定与步进应力加速寿命试验研究[J]. 液晶与显示, 2012,(2): 187-192
8．张建平, 刘宇, 成国梁, 朱文清, 刘芳.基于MAM的白光OLED恒定应力加速寿命试验研究[J]. 液晶与显示, 2012,27(1): 61-65
9．梁田静, 张方辉, 丁磊.多层氧化物复合阴极透明OLED器件[J]. 液晶与显示, 2012,27(1): 43-46
10．李想, 郑喜凤, 陈宇.基于Linux下的OLED显示模块设计[J]. 液晶与显示, 2012,27(1): 103-107
11．李永忠, 纪伟丰, 周炎宏.STN-LCD残影显示的原理分析及实验研究[J]. 液晶与显示, 2011,26(6): 733-740
12．李奇奋, 李妥, 陈志良.用于AM-OLED显示屏控制的 MDDI数据处理芯片设计[J]. 液晶与显示, 2011,26(6): 801-807
13．张雷, 吴华夏, 胡俊涛, 吕国强.一种基于FPGA的OLED显示系统[J]. 液晶与显示, 2011,26(4): 538-543
14．尹盛, 夏淑淳, 陈杰.AMOLED的图像缩放及时序控制方案[J]. 液晶与显示, 2011,26(3): 334-338
15．张玉杰, 宋孟华.OLED光电性能综合测试系统的设计[J]. 液晶与显示, 2011,26(1): 64-67