



(11) **EP 3 109 853 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
12.04.2017 Bulletin 2017/15

(51) Int Cl.:
G09G 3/3233 (2016.01) G09G 3/3266 (2016.01)

(43) Date of publication A2:
28.12.2016 Bulletin 2016/52

(21) Application number: **16176470.9**

(22) Date of filing: **27.06.2016**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(71) Applicant: **Samsung Display Co., Ltd.**
Gyeonggi-do (KR)

(72) Inventor: **CHO, Geun Ho**
17113 Gyeonggi-do (KR)

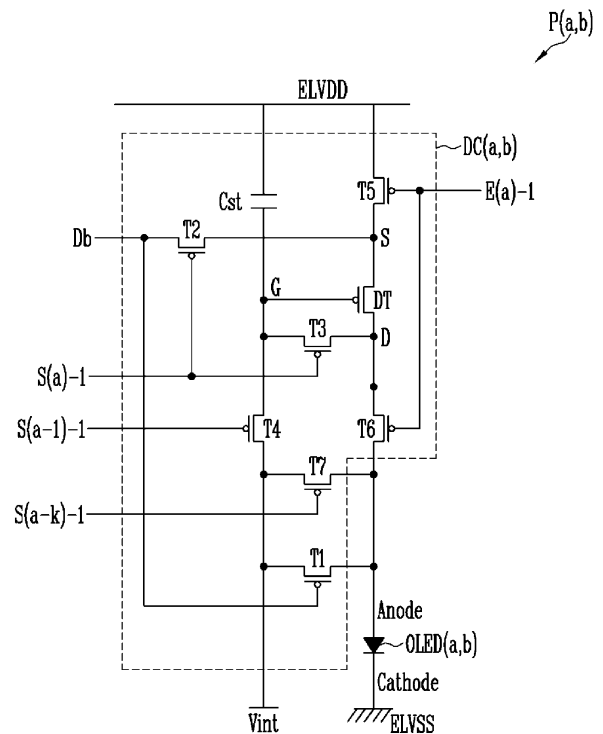
(74) Representative: **Mouteney, Simon James**
Marks & Clerk LLP
90 Long Acre
London
WC2E 9RA (GB)

(30) Priority: **26.06.2015 KR 20150091342**

(54) **PIXEL, ORGANIC LIGHT EMITTING DISPLAY DEVICE INCLUDING THE PIXEL AND DRIVING METHOD OF ORGANIC LIGHT EMITTING DISPLAY DEVICE**

(57) A pixel includes an organic light emitting diode (OLED), and a driving circuit configured to supply current to the organic light emitting diode, the driving circuit including a driving transistor (DT) configured to control a level of the current flowing in the organic light emitting diode based on a level of a voltage supplied to a data line (Db), and a first transistor (T1) including a first electrode electrically connected to an anode of the organic light emitting diode, a second electrode configured to receive an initialization power (Vint), and a gate electrode electrically connected to the data line, wherein the first transistor is configured to supply the initialization power to the anode of the organic light emitting diode when the first transistor is turned on such that the organic light emitting diode does not emit light.

FIG. 2





EUROPEAN SEARCH REPORT

 Application Number
 EP 16 17 6470

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2013/271501 A1 (YANG TENG-CHIEH [TW] ET AL) 17 October 2013 (2013-10-17) * paragraphs [0035], [0046] - [0050]; figure 5 *	1,4	INV. G09G3/3233 G09G3/3266
X	US 2010/091001 A1 (KIM DO-IK [KR] ET AL) 15 April 2010 (2010-04-15) * paragraph [0030]; figure 3 *	1,4	
X	US 2005/219169 A1 (CHUNG HOON J [KR] ET AL) 6 October 2005 (2005-10-06) * paragraphs [0047] - [0049]; figure 4 *	1 4	
A	US 2012/001896 A1 (HAN SAM-IL [KR] ET AL) 5 January 2012 (2012-01-05) * figure 10 *	2,3	
A	US 2015/170576 A1 (BAE HAN-SUNG [KR]) 18 June 2015 (2015-06-18) * figure 2 *	2,3	
A	EP 2 402 932 A1 (SAMSUNG MOBILE DISPLAY CO LTD [KR]) 4 January 2012 (2012-01-04) * figure 6 *	2,3	TECHNICAL FIELDS SEARCHED (IPC) G09G
X	CN 104 637 431 A (BOE TECHNOLOGY GROUP CO LTD) 20 May 2015 (2015-05-20) * the whole document * & US 2016/358586 A1 (SONG SONG [CN] ET AL) 8 December 2016 (2016-12-08) * paragraphs [0062] - [0064], [0075], [0081] - [0090], [0116], [0126] - [0129]; figures 1,4,5,7-9,12-21 *	5-7, 13-15	
X	US 2009/284500 A1 (YAMASHITA KEITARO [JP]) 19 November 2009 (2009-11-19) * paragraphs [0029], [0031] - [0037]; figure 5 *	5-7, 13-15	
----- -/--			
3 The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 2 March 2017	Examiner Pichon, Jean-Michel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)



EUROPEAN SEARCH REPORT

Application Number
EP 16 17 6470

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 2004/222943 A1 (KUDO YASUYUKI [JP] ET AL) 11 November 2004 (2004-11-11) * figures 2A, 2B * -----	5,6,13, 14 7,15	
			TECHNICAL FIELDS SEARCHED (IPC)
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 2 March 2017	Examiner Pichon, Jean-Michel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/02 (P04C01)



Application Number

EP 16 17 6470

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

1-7, 13-15

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

EP 16 17 6470

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-4

OLED pixel circuit for threshold correction

2-4. claims: 5-15

organic light-emitting display comprising a first and a second display area

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 16 17 6470

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

02-03-2017

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2013271501 A1	17-10-2013	TW 201342343 A	16-10-2013
		US 2013271501 A1	17-10-2013
US 2010091001 A1	15-04-2010	KR 100952826 B1	15-04-2010
		US 2010091001 A1	15-04-2010
US 2005219169 A1	06-10-2005	KR 20050096670 A	06-10-2005
		US 2005219169 A1	06-10-2005
US 2012001896 A1	05-01-2012	KR 20120002071 A	05-01-2012
		US 2012001896 A1	05-01-2012
US 2015170576 A1	18-06-2015	KR 20150070718 A	25-06-2015
		US 2015170576 A1	18-06-2015
EP 2402932 A1	04-01-2012	CN 102314829 A	11-01-2012
		EP 2402932 A1	04-01-2012
		JP 5612988 B2	22-10-2014
		JP 2012014136 A	19-01-2012
		KR 20120002070 A	05-01-2012
		TW 201201180 A	01-01-2012
		US 2012001893 A1	05-01-2012
CN 104637431 A	20-05-2015	CN 104637431 A	20-05-2015
		US 2016358586 A1	08-12-2016
		WO 2016123983 A1	11-08-2016
US 2009284500 A1	19-11-2009	CN 101581863 A	18-11-2009
		JP 2009276547 A	26-11-2009
		TW 200947385 A	16-11-2009
		US 2009284500 A1	19-11-2009
US 2004222943 A1	11-11-2004	CN 1527269 A	08-09-2004
		JP 2004240236 A	26-08-2004
		KR 20040072053 A	16-08-2004
		TW I238377 B	21-08-2005
		US 2004222943 A1	11-11-2004
		US 2007139297 A1	21-06-2007

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

像素包括有机发光二极管 (OLED) , 以及被配置为向有机发光二极管供应电流的驱动电路, 该驱动电路包括被配置为控制在有机发光二极管中流动的电流的电平的驱动晶体管 (DT) 。发光二极管基于提供给数据线 (Db) 的电压电平, 以及第一晶体管 (T1) , 包括电连接到有机发光二极管的阳极的第一电极, 第二电极, 被配置为接收初始化电力 (Vint) , 以及电连接到数据线的栅电极, 其中第一晶体管被配置为当第一晶体管导通时将初始化电力提供给有机发光二极管的阳极, 使得有机发光二极管不发光。

 $P(a,b)$ 