



(11) **EP 3 336 831 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
24.10.2018 Bulletin 2018/43

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

(43) Date of publication A2:
20.06.2018 Bulletin 2018/25

(21) Application number: **17208323.0**

(22) Date of filing: **19.12.2017**

(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 TN

(72) Inventors:
• **KIM, JinYeong**
10845 Gyeonggi-do (KR)
• **SON, HyeonHo**
10845 Gyeonggi-do (KR)
• **KANG, HanSaem**
10845 Gyeonggi-do (KR)

(30) Priority: **19.12.2016 KR 20160173807**

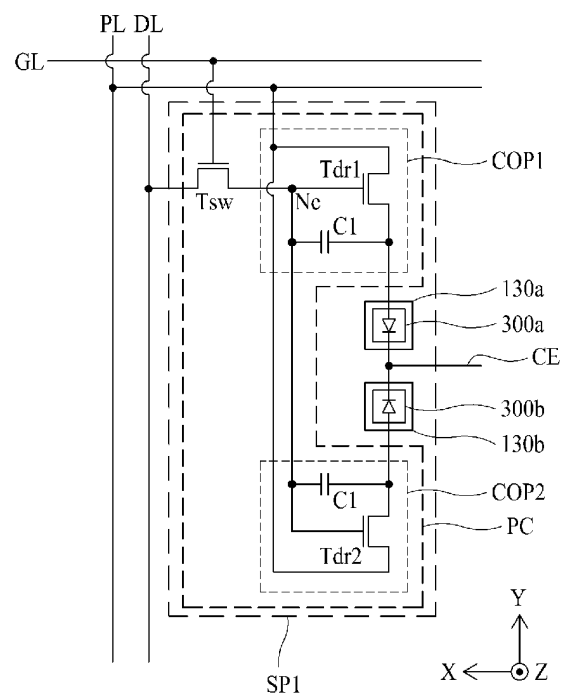
(74) Representative: **Ter Meer Steinmeister & Partner**
Patentanwlte mbB
Nymphenburger Strae 4
80335 Mnchen (DE)

(71) Applicant: **LG Display Co., Ltd.**
Seoul, 07336 (KR)

(54) **LIGHT EMITTING DIODE DISPLAY DEVICE**

(57) Disclosed is a light emitting diode display device for minimizing a screen defect caused by a defect of a light emitting diode device. The light emitting diode display device includes a plurality of subpixels (SP1) which each include first to Nth (where N is a natural number equal to or greater than two) light emitting diode devices (300a, 300b) emitting light with the data current and a pixel circuit (PC) including first to Nth driving transistors (Tdr1, Tdr2) respectively supplying the data current corresponding to a data signal to the first to Nth light emitting diode devices.

FIG. 3





EUROPEAN SEARCH REPORT

 Application Number
EP 17 20 8323

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 2011/074838 A1 (YAMAMOTO TETSURO [JP] ET AL) 31 March 2011 (2011-03-31)	1,2,6, 10,13-15	INV. G09G3/3233
Y	* paragraph [0210] - paragraph [0253]; figures 12-16 *	3-5,7-9, 11,12	
X	US 2006/061525 A1 (KIM EUN-AH [KR] ET AL) 23 March 2006 (2006-03-23)	1,2,6, 10,13-15	
Y	* paragraph [0039] - paragraph [0051]; figure 5 *		
X	US 2015/332628 A1 (REN LIJUN [CN] ET AL) 19 November 2015 (2015-11-19)	1,2,10, 13-15	TECHNICAL FIELDS SEARCHED (IPC) G09G
Y	* paragraphs [0005], [0047]; figure 5 *		
Y	CN 104 952 899 A (AU OPTRONICS CORP) 30 September 2015 (2015-09-30)	3-5,8,9	
Y	* figures 4-6 * & US 2016/372514 A1 (CHANG CHENG-CHIEH [TW] ET AL) 22 December 2016 (2016-12-22)		
Y	* paragraphs [0035] - [0040]; figures 4-6 *		
Y	US 2014/367633 A1 (BIBL ANDREAS [US] ET AL) 18 December 2014 (2014-12-18)	7	
Y	* paragraph [0074]; figure 1D *		
Y	EP 1 591 993 A1 (SAMSUNG SDI CO LTD [KR]) 2 November 2005 (2005-11-02)	11,12	
	* paragraph [0036]; figures 3,4 *		
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 September 2018	Examiner Giancane, Iacopo
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)



Application Number

EP 17 20 8323

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:

☐ 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 17 20 8323

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, 2, 6, 10, 13-15

A light emitting diode display device comprising: a plurality of subpixels displaying an image based on a data current based on a data signal, the plurality of subpixels each including: first to Nth light emitting diode devices emitting light based on the data current, where N is a natural number equal to or greater than two; and a pixel circuit including first to Nth driving transistors respectively supplying the data current corresponding to the data signal to the first to Nth light emitting diode devices, wherein one of the first to Nth light emitting diode devices is used as a redundancy light emitting diode device.

2. claims: 3-5, 7-9

A light emitting diode display device comprising: a plurality of subpixels displaying an image based on a data current based on a data signal, the plurality of subpixels each including: first to Nth light emitting diode devices emitting light based on the data current, where N is a natural number equal to or greater than two; and a pixel circuit including first to Nth driving transistors respectively supplying the data current corresponding to the data signal to the first to Nth light emitting diode devices, wherein each of the first to Nth light emitting diode devices is a micro light emitting diode device.

3. claims: 11, 12

A light emitting diode display device comprising: a plurality of subpixels displaying an image based on a data current based on a data signal, the plurality of subpixels each including: first to Nth light emitting diode devices emitting light based on the data current, where N is a natural number equal to or greater than two; and a pixel circuit including first to Nth driving transistors respectively supplying the data current corresponding to the data signal to the first to Nth light emitting diode devices, wherein the pixel circuit comprises: a switching transistor supplying the data signal to a first node; a storage capacitor, a first current output part including a first driving transistor, a second current output part including a second driving transistor and a voltage initialization part initializing a voltage of a first node and a voltage of a second node, wherein, the first node is disposed between the switching transistor and the storage capacitor, and the second node is shared by the first current output part and the second current output



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
EP 17 20 8323

5

10

15

20

25

30

35

40

45

50

55

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:

part.

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

EP 17 20 8323

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.

10-09-2018

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 2011074838 A1	31-03-2011	CN 101960504 A	26-01-2011
		CN 103065586 A	24-04-2013
		JP 4807366 B2	02-11-2011
		JP 2009216984 A	24-09-2009
		KR 20100124256 A	26-11-2010
		TW 201003590 A	16-01-2010
		TW 201342332 A	16-10-2013
		US 2011074838 A1	31-03-2011
US 2006061525 A1	23-03-2006	WO 2009113448 A1	17-09-2009
US 2006061525 A1	23-03-2006	KR 20060026787 A	24-03-2006
		US 2006061525 A1	23-03-2006
		US 2013221339 A1	29-08-2013
US 2015332628 A1	19-11-2015		
US 2015332628 A1	19-11-2015	CN 103489401 A	01-01-2014
		US 2015332628 A1	19-11-2015
		WO 2015032224 A1	12-03-2015
CN 104952899 A	30-09-2015		
CN 104952899 A	30-09-2015	CN 104952899 A	30-09-2015
		TW 201701458 A	01-01-2017
		US 2016372514 A1	22-12-2016
		US 2018158847 A1	07-06-2018
US 2014367633 A1	18-12-2014		
US 2014367633 A1	18-12-2014	CN 105339996 A	17-02-2016
		EP 2997564 A1	23-03-2016
		JP 6290389 B2	07-03-2018
		JP 2016523450 A	08-08-2016
		KR 20160010869 A	28-01-2016
		TW 201515260 A	16-04-2015
		US 2014367633 A1	18-12-2014
		US 2015331285 A1	19-11-2015
		US 2017162553 A1	08-06-2017
		WO 2014204694 A1	24-12-2014
EP 1591993 A1	02-11-2005		
EP 1591993 A1	02-11-2005	AT 375587 T	15-10-2007
		DE 602005002777 T2	10-04-2008
		EP 1591993 A1	02-11-2005
		JP 4401971 B2	20-01-2010
		JP 2005316385 A	10-11-2005
		US 2005243037 A1	03-11-2005

EPO FORM P0459

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

专利名称(译)	发光二极管显示装置		
公开(公告)号	EP3336831A3	公开(公告)日	2018-10-24
申请号	EP2017208323	申请日	2017-12-19
[标]申请(专利权)人(译)	乐金显示有限公司		
申请(专利权)人(译)	LG DISPLAY CO. , LTD.		
当前申请(专利权)人(译)	LG DISPLAY CO. , LTD.		
[标]发明人	KIM JINYEONG SON HYEONHO KANG HANSAEM		
发明人	KIM, JINYEONG SON, HYEONHO KANG, HANSAEM		
IPC分类号	G09G3/3233		
CPC分类号	G09G3/32 G09G3/3233 G09G2300/0819 G09G2300/0852 G09G2300/0861 G09G2310/0251 G09G2310/0262 G09G2330/08 G09G2330/10 G09G3/3241 G09G2300/0426 G09G2300/0814 G09G2300/0842 H01L27/156 H01L33/06 H01L33/32 H01L33/42 H01L33/60		
优先权	1020160173807 2016-12-19 KR		
其他公开文献	EP3336831A2		
外部链接	Espacenet		

摘要(译)

公开了一种发光二极管显示装置，用于最小化由发光二极管装置的缺陷引起的屏幕缺陷。发光二极管显示装置包括多个子像素（SP1），每个子像素包括发射具有数据电流的光的第一至第N（其中N是等于或大于2的自然数）的发光二极管装置（300a，300b）。像素电路（PC），包括分别向第一至第N发光二极管器件提供对应于数据信号的数据电流的第一至第N驱动晶体管（Tdr1，Tdr2）。

