(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 245 996 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
01.06.2005 Bulletin 2005/22

(43) Date of publication A2:
02.10.2002 Bulletin 2002/40

(21) Application number: **02252387.2**

(22) Date of filing: **02.04.2002**

(51) Int Cl.^{7}: **G02F 1/1362**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(30) Priority:
30.03.2001 JP 2001098269
30.03.2001 JP 2001098281
30.03.2001 JP 2001098323
30.03.2001 JP 2001098334

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(54) Active matrix display device with storage capacitor for each pixel

(57) An active matrix display device employing a top gate type TFT structure has a storage capacitor Csc and a liquid crystal capacitor Clc in each pixel of a pixel section, a first electrode (30) of the storage capacitor Csc served by a p-Si active layer (14) of the TFT, and a second electrode (32) formed to at least partly overlap the active layer (14), with an insulating layer (12) between the active layer (14) and the second electrode (32) below it. When a driver section is to be built in, the driver section TFT is the same top gate type as the pixel section TFT, and an active layer (140) is made of the same material as the active layer (14) and has a conductive layer (32D) which is made of the same material as the second electrode (32) with the insulating layer (12) held between the active layer (140) and the conductive layer (32D) below it. The pixel section can form the storage capacitor while preventing lowering of the aperture ratio. Because conditions for the polycrystalization annealing of the active layer are equal for the pixel section TFT and the driver section TFT, TFTs with the same properties can be obtained.

Printed by Jouve, 75001 PARIS (FR)

European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 25 2387

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 5 956 103 A (ISHIGURO KENICHI) 21 September 1999 (1999-09-21) * abstract * * column 4, line 39 - line 42 * * column 5, line 51 - line 61 * * column 6, line 66 - column 7, line 7 * * column 7, line 20 - line 30 * * column 7, line 46 - line 50 * * figures 1,2A,2B * -----	1-4,6-8, 12	G02F1/1362
X	WO 00/31714 A (MURADE MASAO ; SEIKO EPSON CORP (JP)) 2 June 2000 (2000-06-02) * abstract * & US 6 521 913 B1 (MURADE MASAO) 18 February 2003 (2003-02-18) * column 2, line 30 - line 53 * * column 16, line 54 - line 65 * * column 17, line 28 - column 18, line 6 * * column 30, line 26 - line 63 * * figure 9 * -----	1,2,6-8, 12	
X	US 5 724 107 A (NISHIKAWA RYUJI ET AL) 3 March 1998 (1998-03-03) * column 1, line 1 - line 21 * * column 6, line 7 - line 27 * * figure 4 * -----	1,12	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G02F

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
The Hague	8 December 2004	Boubal, F

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

1

EPO FORM 1503 03.82 (P04C01)

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Application Number
EP 02 25 2387

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims 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 the first ten claims.

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:

1-8, 12

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Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 02 25 2387

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: 1-8, 12 (as far as depending on claims 1 to 8)

   The special technical feature of dependent claim 5 (the first claim which makes a contribution over the prior art US 5956103) is the use of the gate line (20) as a conductive shielding layer (20e) in the region where the data line and the storage capacitor overlap (page 37, lines 6 to 19, and figures 14-15).

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2. claims: 9-11, 12 (as far as depending on claims 9 to 11)

   The special technical feature of independent claim 9 over the prior art US 5956103 is that at least a channel region (14c, figure 17) of the thin-film transistor is open (no electrode 32 of the storage capacitor under this region).

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3. claims: 13-16

   The special technical feature of independent claim 13 over the prior art US 5956103 is the disposition of a driver section and a pixel section on the same substrate (page 22, line 22 to page 23, line 11; figure 7).

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 25 2387

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.

08-12-2004

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

专利名称(译)	有源矩阵显示装置，每个像素带有存储电容		
公开(公告)号	EP1245996A3	公开(公告)日	2005-06-01
申请号	EP2002252387	申请日	2002-04-02
[标]申请(专利权)人(译)	三洋电机株式会社		
申请(专利权)人(译)	SANYO ELECTRIC CO. , LTD.		
当前申请(专利权)人(译)	SANYO ELECTRIC CO. , LTD.		
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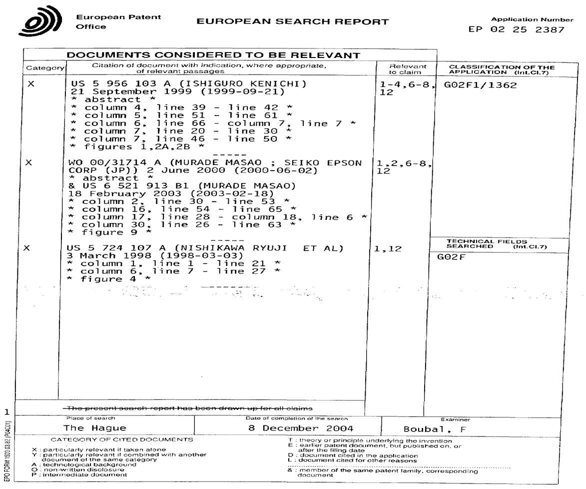
发明人	MIYAJIMA, YASUSHI YOKOYAMA, RYOICHI YAMADA, TSUTOMU YONEDA, KIYOSHI		
IPC分类号	G02F1/136 G02F1/1362		
CPC分类号	G02F1/136213		
优先权	2001098323 2001-03-30 JP 2001098334 2001-03-30 JP 2001098269 2001-03-30 JP 2001098281 2001-03-30 JP		
其他公开文献	EP1245996A2		
外部链接	Espacenet		

摘要(译)

采用顶栅型TFT结构的有源矩阵显示装置在像素部分的每个像素中具有存储电容器Csc和液晶电容器Clc，存储电容器Csc的第一电极（30）由p-Si有源层服务（14）TFT，和形成为至少部分地与有源层（14）重叠的第二电极（32），在其下方的有源层（14）和第二电极（32）之间具有绝缘层（12）。当要内置驱动器部分时，驱动器部分TFT是与像素部分TFT相同的顶部栅极类型，并且有源层（140）由与有源层（14）相同的材料制成并且具有导电性。层（32D）由与第二电极（32）相同的材料制成，绝缘层（12）保持在有源层（140）和位于其下方的导电层（32D）之间。像素部分可以形成存储电容器，同时防止孔径比的降低。因为像素部分TFT和驱动部分TFT的有源层的多晶化退火的条件相同，所以可以获得具有相同特性的TFT。



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