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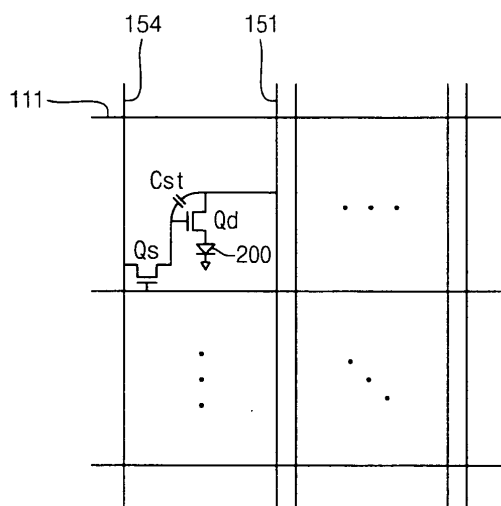
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(54) **Display apparatus and method of manufacturing thereof**

(57) A display apparatus, such as an organic light emitting diode ("OLED") display, is driven by thin film transistors ("TFTs"), including a driving TFT and a switching TFT, and a pixel electrode. The display apparatus includes an amorphous silicon layer for the switching TFT and a microcrystalline silicon or polycrystalline silicon layer for the driving TFT. The amorphous silicon layer and the microcrystalline silicon layer are separated by an insulating layer. The apparatus provides product reliability and high image quality. A method of manufacturing the apparatus is characterized by reducing processing steps, and using a special mask which is a half tone mask or a slit mask adapted to forming a source electrode and a drain electrode of the switching TFT or the driving TFT and a semiconductor layer during a photolithographic process.

FIG.1





EUROPEAN SEARCH REPORT

Application Number
EP 07 00 1840

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 2005/092998 A1 (YAMAZAKI SHUNPEI [JP] ET AL) 5 May 2005 (2005-05-05) * paragraphs [0002], [0003], [0009], [0013] - [0015], [0021] - [0044], [0070], [0083] - [0135], [0146] - [0162], [0180]; figures 4C, 9C, 12 *	1-3	INV. H01L27/32 H01L29/04 H01L21/77
Y	US 5 585 647 A (NAKAJIMA MITSUO [JP] ET AL) 17 December 1996 (1996-12-17) * column 1, line 12 - column 2, line 52 * * column 4, line 62 - column 8, line 26; figures 1-3 *	1-3	
			TECHNICAL FIELDS SEARCHED (IPC)
			H01L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 30 January 2012	Examiner Boetticher, Harald
CATEGORY OF CITED DOCUMENTS		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	
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			

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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:

1-3

☐ 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 07 00 1840

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: 1-3

Display having first and second TFTs, an insulating film over the first TFT, the semiconductor layer of the second TFT being on the insulating layer

2. claims: 6-13

The display of the first invention, with specified features of the TFTs (connections; gate type; layers, ...)

3. claims: 14-16

The display of the first invention, with specified signal line widths

4. claims: 4, 5, 17-20

A display having a first TFT using amorphous silicon and connected to a pixel, and a second TFT using polycrystalline silicon and connected to the first TFT

5. claims: 21-23

A display similar to the first invention, the gates of the TFTs being formed on a same layer

6. claims: 24, 25, 31-35

A display having first and second TFTs, with specified features of gate, source and drain of each transistor, an organic material on a pixel electrode, and its method of manufacture

7. claims: 26-30

A method of manufacturing a display having source and drain electrodes and semiconducting layers, first and second gate electrodes being formed on a substrate

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

EP 07 00 1840

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
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30-01-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005092998 A1	05-05-2005	NONE	
US 5585647 A	17-12-1996	JP 7092500 A US 5585647 A	07-04-1995 17-12-1996

专利名称(译)	显示装置及其制造方法		
公开(公告)号	EP1837913A3	公开(公告)日	2012-07-04
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[标]申请(专利权)人(译)	三星电子株式会社		
申请(专利权)人(译)	SAMSUNG ELECTRONICS CO. , LTD.		
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IPC分类号	H01L27/32 H01L29/04 H01L21/77		
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代理机构(译)	韦策尔, WOLFGANG		
优先权	1020060026031 2006-03-22 KR		
其他公开文献	EP1837913A2		
外部链接	Espacenet		

摘要(译)

诸如有机发光二极管 (“OLED”) 显示器的显示装置由包括驱动TFT和开关TFT的薄膜晶体管 (“TFT”) 和像素电极驱动。显示装置包括用于开关TFT的非晶硅层和用于驱动TFT的微晶硅或多晶硅层。非晶硅层和微晶硅层通过绝缘层分离。该装置提供产品可靠性和高图像质量。制造该装置的方法的特征在于减少了处理步骤，并且使用特殊的掩模，该掩模是半色调掩模或狭缝掩模，适于形成开关TFT或驱动TFT的源电极和漏电极，以及半导体层在光刻工艺期间。

FIG. 1

