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(54) **ORGANIC LIGHT EMITTING DIODE DISPLAY HAVING SHIELD ELECTRODES**

ORGANISCHE LEUCHTDIODENANZEIGEVORRICHTUNG MIT ABSCHIRMELEKTRODEN

DISPOSITIF D' AFFICHAGE A DIODES ELECTROLUMINESCENTES ORGANIQUES COMPRENANT DES ELECTRODES DE BLINDAGE

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(56) References cited:
EP-A- 0 940 796 **EP-A- 1 028 471**
JP-A- 2000 352 941

- **NATHAN A ET AL: "Thin film imaging technology on glass and plastic" ICM 2000. PROCEEDINGS OF THE 12TH INTERNATIONAL CONFERENCE ON MICROELECTRONICS. (IEEE CAT. NO. 00EX453), ICM 2000. PROCEEDINGS OF THE 12TH INTERNATIONAL CONFERENCE ON MICROELECTRONICS, TEHRAN, IRAN, 31 OCT.- 2 NOV. 2000, pages 11-14, XP002206242 2000, Tehran, Iran, Univ. Tehran, Iran ISBN: 964-360-057-2**
- **PATENT ABSTRACTS OF JAPAN vol. 1997, no. 08, 29 August 1997 (1997-08-29) -& JP 09 090405 A (SHARP CORP), 4 April 1997 (1997-04-04)**
- **PATENT ABSTRACTS OF JAPAN vol. 2000, no. 09, 13 October 2000 (2000-10-13) -& JP 2000 172199 A (SANYO ELECTRIC CO LTD), 23 June 2000 (2000-06-23)**

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Description

BACKGROUND OF THE INVENTION

1.Field of the Invention

[0001] The present invention relates to a display device, and more particularly to an organic light emitting diode display having shield electrodes.

2.Description of the Prior Art

[0002] The polymeric or organic light emitting diodes (OLEDs) are electroluminescent(EL) layers that emit light generated by radiative recombination of injected electrons and holes within one or more organic EL layers or an organic EL region thereof.

[0003] The OLED displays employing the OLED have been attracting more attention because of their various advantages including simple structures, fast response times and wide viewing angles.

[0004] FIG. 1A is a top view of a general active matrix OLED(AMOLED) display device. In FIG. 1A, a reference numeral 10 denotes an OLED display device. The OLED display device 10 has an OLED display 12, a gate multiplexer 16, and a driver 18. The OLED display 12 consists of a plurality of pixels 14 in a matrix array form for displaying images, for example. A reference numeral C denotes a portion of the OLED display 12 in store for enlargement of pixels

[0005] FIG. 1B is a partially enlarged view of the OLED display of FIG. 1A, taken from the portion C of FIG. 1A. As shown in FIG. 1B, each of the pixels 14 has an OLED 22 and a thin-film (TFT) drive circuit 24. Address and data lines in FIG. 1B are connected to the gate multiplexer 16 and the driver 18, respectively, as shown in FIG. 1A.

[0006] FIG. 1C is a cross-sectioned view for one pixel, taken along lines A-A' of FIG. 1B, showing that the OLED 22 and the TFT drive circuit 24 are formed on a glass substrate 32.

[0007] The substrate 32 may be transparent or opaque. Thus, the OLED display may be configured to emit light through the substrate 32 or through the cathode layer. FIG. 1C shows such a pixel emitting light through the substrate 32.

[0008] In the OLED 22, the anode layer is typically made of a transparent conducting material, while the cathode layer is typically made of a conducting metal with a low work function.

[0009] The anode layer is formed as a transparent bottom electrode, while the cathode layer is formed as a continuous top electrode over the OLED layer.

[0010] In a general AMOLED display, it is important to ensure that the aperture ratio or fill factor, which is defined as the ratio of light emitting display area to the total pixel area, should be high enough to ensure display quality.

[0011] The AMOLED display 10 in FIG. 1A is based on light emission through an aperture on the glass substrate 32 where the backplane electronics is integrated. Increasing the on-pixel density of TFT integration for stable drive current reduces the size of the aperture. The same problem happens when pixel sizes are scaled down.

[0012] The solution to having an aperture ratio that is invariant on scaling or on-pixel integration density is to vertically stack the OLED layer on the backplane electronics or the TFT drive circuit, along with a transparent top electrode. FIG. 2 is a cross-sectioned view for a pixel formed with an OLED vertically stacked on the backplane electronics. In FIG. 2, a reference number 14 denotes the pixel. The pixel 14 has the OLED 31 and the backplane electronics 24 which are vertically stacked on the substrate 32. Reference numerals T1 and T2 denote thin-film transistors respectively. A more description of FIG. 2 can be found, later, when FIG. 3 is described.

[0013] The operations of the AMOLED display device 10 having the above structure will be described in detail with reference to FIGs. 1A-1D.

[0014] FIG. 1D is a view for showing an equivalent circuit of FIG. 1C. A 2-transistor driver circuit realized, for example, in polysilicon technology is illustrated for the equivalent circuit. The equivalent circuit can be applied to the AMLOED display as shown in FIG. 2 using amorphous silicon technology but with variation in TFT type and OLED location.

[0015] When a voltage Vaddress from the gate multiplexer 16 activates one of the address lines, a thin-film transistor T1 is turned on so that a voltage Vdata from the driver 18 starts charging a capacitor Cs through one of the data lines. At this time, the voltage Vdata also causes a gate capacitance of a driver thin-film transistor T2. Depending on the voltage Vdata on the data line, the capacitor Cs charges up to turn the driver transistor T2 on, which then starts conducting to drive the OLED 22 with an appropriate level of current. When the address line is turned off, the transistor T1 is turned off, and a voltage at the gate of the driver transistor T2 remains almost the same. Hence, the current through the OLED remains unchanged after the turn-off of the transistor T1. The current of the OLED changes only the next time around when a different voltage is written into the pixel.

[0016] However, the continuous back electrode can give rise to parasitic capacitance causing the leakage current of the transistor T1, whose effects can become significant enough to affect the operation of the driver transistor T2 when the continuous back electrode runs over the switching and other thin film transistors. That is, the presence of the continuous back electrode can induce a parasitic channel in thin-film transistors giving rise to high leakage current. The leakage current is the current that flows between the source and drain of the thin-film transistor T1 when the gate of the thin-film transistor T1 is in its OFF state.

[0017] The leakage current could drain away the charge on the gate of the driver thin-film transistor T2 by discharging the capacitance that keeps it continuously in its ON state. Accordingly, it adds to the total power consumption of the display.

[0018] EP A 0 940 796 describes an active matrix display having a bank layer formed along data lines and scanning lines.

[0019] EP A 1 028 471 describes an electroluminescence (EL) display device having an EL element where the cathode of the EL element is disposed in a region other than the drive circuit region.

[0020] JP 09 090405 describes a TFT having an upper gates and a lower gate.

[0021] JP 2000 172199 describes an electroluminescence display having a TFT where a shading material is formed on the active layer of the TFT.

[0022] JP 2000352941 describes a display device having shielding conductor film which is arranged on upper surface of channel to cut off influence of electric field from drain to thin film transistor and stabilize supplied current.

SUMMARY OF THE INVENTION

[0023] It is an object of the present invention to provide a polymeric or organic light emitting diode(OLED) display having shield electrodes for minimizing parasitic capacitances to enhance the performance thereof.

[0024] It is another object of the present invention to provide an OLED display having shield electrodes for allowing surface emission through vertical pixel circuitry integration for a high aperture ratio.

[0025] The architecture enables high density drive circuit integration in amorphous silicon or other technologies, yet preserving the high aperture ratio.

[0026] These objects are solved by the present invention as claimed in the independent claim. Advantageous embodiments of the invention are defined by the dependent claims.

[0027] An OLED display according to an example comprises a substrate, and a plurality of pixels formed on the substrate and each having a unit for reducing parasitic capacitances causing leakage currents therein.

[0028] The parasitic capacitance reducing unit is formed with at least one shield electrode of electric conductor. Further, the pixels each include an OLED layer for emitting light; and a drive circuit for electrically driving the OLED layer, the at least one shield electrode being disposed between the OLED layer and the drive circuit.

[0029] The OLED layer includes an anode layer, an electroluminescent layer, and a cathode layer, and the drive circuit has at least one thin-film transistor, the at least one shield electrode being disposed to correspond to the at least one thin-film transistor between the cathode layer and the at least one thin-film transistor. The at least one shield electrode covers an entire region between a source and a drain of the at least one thin-film transistor. Preferably, the at least one shield electrode is disposed closer to the cathode layer.

[0030] The OLED layer and the drive circuit are vertically stacked over the substrate, the vertically stacked OLED layer and the drive circuit can form a top emission, and the drive circuit is formed in inverted staggered thin-film transistor structure. The at least one shield electrode can be formed of Aluminium, Molybdenum, or a standard metallization layer in LCD process in a rectangular shape. The parasitic capacitance reducing unit can be electrically grounded or tied to a gate of the at least one thin-film transistor.

[0031] The OLED display according to the present invention minimizes parasitic capacitance in the drive circuit and leakage currents in the thin-film transistors by holding the voltage at the gate of the driver thin-film transistor.

[0032] Further, the OLED display according to the present invention allows the OLED layer to be vertically stacked on the backplane electronics, along with a transparent top electrode for the top or surface emission.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] The above objects and features of the present invention will become more apparent by describing in detail a preferred embodiments thereof with reference to the attached drawings, in which:

FIG. 1A is a top view of a general active matrix OLED(AMOLED) display with driving units;
FIG. 1B is a partially enlarged view of the AMOLED display of FIG. 1A;
FIG. 1C is a cross-sectioned view for one pixel, taken along lines A-A' of FIG. 1B;
FIG. 1D is a view for showing an equivalent circuit of FIG. 1C;
FIG. 2 is a cross-sectioned view for a pixel formed with an OLED vertically stacked on backplane electronics;
FIG. 3 is a cross-sectioned view for showing a pixel of an AMOLED display with shield electrodes formed over a drive circuit according to an embodiment of the present invention;
FIG. 4 is a view for showing the pixel of FIG. 3 with parasitic capacitance induced during operation thereof;
FIG. 5 is a view for showing a first equivalent circuit of FIG. 4; and
FIG. 6 is a view for showing a second equivalent circuit of FIG. 4.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0034] Hereinafter, descriptions will be made in detail on an organic light emitting diode display according to the embodiments of the present invention with reference to the accompanying drawings. Like reference numerals denotes like constituents throughout the disclosure.

[0035] FIG. 3 is a cross-sectioned view for showing a pixel of an AMOLED display with shield electrodes formed over a drive circuit according to an embodiment of the present invention.

[0036] As stated above, the AMOLED display consists of a matrix array of pixels, but FIG. 3 shows only one pixel for the sake of simplicity in description.

[0037] As shown in FIG. 3, a pixel 30 includes an OLED layer 31, intermediate or shield electrodes SE, a drive circuit 34, and a substrate 32.

[0038] The OLED 31 has an anode electrode or an anode layer 31A, an EL layer 31B, and a cathode layer 31C. FIG. 3 shows the top or surface emission pixel. The cathode electrode 31C forms a continuous back electrode.

[0039] The drive circuit 34 consists of two thin-film transistors T1 and T2. The drive circuit 34 may be constructed with more than two thin-film transistors, and the pixel 30 is structured with the OLED 31 vertically stacked over drive circuit 34 formed on the substrate 32. The drive circuit 34 is formed with inverted staggered thin-film transistor structures. The a-Si:H and a-SiN:H denotes materials employed for the pixel 30. FIG. 3 also shows the pixel 30 has a dielectric layer between the cathode layer 31C and the drive circuit 34.

[0040] The TFT transistor T1 has a source S1, a drain D1, and a gate G1, and the TFT transistor T2 consists of a source S2, a drain D2, and a gate G2. In FIG. 3, the source S2 of the thin-film transistor T2 is electrically connected to the cathode layer 31C.

[0041] The substrate 32 may be made of glass, plastic, or semiconductor wafer which is known to one skilled in the art.

[0042] The shield electrodes SE are disposed between the OLED 31 and the drive circuit 34. The shield electrodes SE are preferably located closer to the continuous back electrode 31C.

[0043] Shield electrodes SE may be formed of Aluminium or Molybdenum, and a standard metallization layer in the LCD process may be formed for the shield electrodes SE.

[0044] The shield electrodes SE are formed, for example, in a rectangular shape, and should cover the entire region between the source and drain of each of the thin-film transistors T1 and T2. The shield electrodes SE are electrically either grounded or tied to the gates of the thin-film transistors T1 and T2, respectively.

[0045] FIG. 4 is a view for showing the pixel of FIG. 3 with parasitic capacitances Cp1 and Cp2 induced during operation thereof.

[0046] FIG. 5 is a view for showing a first equivalent circuit of FIG. 4, in which the shield electrodes SE are electrically tied to the gates of the driver TFT transistors T1 and T2, respectively.

[0047] FIG. 6 is a view for showing a second equivalent circuit of FIG. 4, in which the shield electrodes SE are electrically grounded.

[0048] FIGs. 4, 5, and 6 show that, during the operations of the pixel 30, the parasitic capacitances Cp1 and Cp2 are induced between the continuous back electrode 31C and the shield electrodes SE.

[0049] The operations of the pixel having the shield electrodes SE as shown in FIGs. 4, 5, and 6 are still the same as those of FIG. 1D, even though the shield electrodes SE are electrically connected to either ground or the gates of the thin-film transistors respectively. That is, when a voltage Vaddress from the gate multiplexer 16 activates one of the address lines, a thin-film transistor T1 is turned on so that a voltage Vdata from the driver 18 starts charging a capacitor Cs through one of the data lines. At this time, the voltage Vdata also causes a gate capacitance of a driver thin-film transistor T2. Depending on the voltage Vdata on the data line, the capacitor Cs charges up to turn the driver transistor T2 on, which then starts conducting to drive the OLED 22 with an appropriate level of current. When the address line is turned off, the transistor T1 is turned off, and a voltage at the gate of the driver transistor T2 remains almost the same. Hence, the current through the OLED remains unchanged after the turn-off of the transistor T1. The current of the OLED changes only the next time around when a different voltage is written into the pixel. At this time, the continuous back electrode can give rise to parasitic capacitance causing the leakage current of the transistor T1. In order to minimize the effect of the parasitic capacitance, the shield electrodes SE are introduced. That is during the above operation the shield electrodes SE shield electric potentials from propagating through to the thin-film transistors T1 and T2, hence preventing electric charges from being induced in the undesired regions of the pixel 30, and the parasitic capacitances Cp1 and Cp2 caused by the shield electrodes SE serve to stabilize the OLED operations by holding the voltage at the cathode steady.

[0050] Although the preferred embodiments of the present invention have been described, it will be understood by those skilled in the art that the present invention should not be limited to the described preferred embodiments, but various changes and modifications can be made within the scope of the present invention as defined by the appended claims.

Claims

1. An organic light emitting diode, "OLED", display, comprising:

    a substrate (32); and
    a plurality of pixels (30) formed on the substrate (32), each pixel of said plurality of pixels (30) comprising:

        an OLED (31) having:

            an anode layer (31 A),
            a cathode layer (31 C), and
            an electroluminescent layer (31 B) dis-

posed between the anode layer (31 A) and the cathode layer (31 C),

a drive circuit (34) including a driver thin-film transistor (T2) for driving the OLED (31) and a switching thin-film transistor (T1) for selectively coupling the driver thin-film transistor (T2) to a data line (Vdata), wherein the drive circuit (34) is formed in an inverted staggered thin-film structure and is vertically stacked over the substrate (32), the OLED (31) being vertically stacked over the drive circuit (34);

characterized in that
each pixel of said plurality of pixels (30) further comprises:

a first shield electrode (SE) disposed between the cathode layer (31C) and the switching thin-film transistor (T1), and a second shield electrode (SE) disposed between the cathode layer (31 C) and the driver thin-film transistor (T2), wherein the first and second shield electrodes (SE) are made from an electric conductor and are arranged to cover an entire region between a source (S1, S2) and a drain (D1, D2) of the first and second thin-film transistors (T1, T2), respectively, thereby reducing parasitic capacitances induced between the cathode layer (31 C) and the thin-film transistors (T1, T2) as well as leakage current of the switching transistor (T1) when a gate of the switching transistor (T1) is in an OFF state.

2. The OLED display as claimed in claim 1, wherein the first and second shield electrodes (SE) are electrically connected to ground.

3. The OLED display as claimed in claim 1 or 2, wherein the first and second shield electrodes (SE) are electrically tied to the gates of the switching thin-film transistor (T1) and the driver thin-film transistor (T2), respectively.

4. The OLED display as claimed in any one of claims 1 to 3, wherein the pixels (30) are each formed for a top emission in which light is directed away from the substrate (32).

5. The OLED display as claimed in any one of claims 1 to 4, wherein the first and second shield electrodes (SE) are formed of a metallization layer.

6. The OLED display as claimed in any one of claims 1 to 4, wherein the first and second shield electrodes (SE) are formed in a rectangular shape.

7. The OLED display as claimed in any one of claims 1 to 4, wherein the first and second shield electrodes (SE) are formed of aluminium or molybdenum.

8. The OLED display as claimed in any one of claims 1 to 7, wherein the drive circuit (34) is formed in amorphous silicon.

Patentansprüche

1. Anzeigevorrichtung mit organischen Leuchtdioden, "OLED", die umfasst:

ein Substrat (32); und
eine Vielzahl auf dem Substrat (32) ausgebildeter Pixel (30), wobei jedes Pixel der Vielzahl von Pixeln (30) umfasst:

eine OLED (31), die aufweist:

eine Anodenschicht (31A),
eine Kathodenschicht (31 C), und
eine Elektrolumineszenzschicht (31 B), die zwischen der Anodenschicht (31A) und der Kathodenschicht (31 C) angeordnet ist,

eine Ansteuerschaltung (34), die einen Ansteuer-Dünnfilmtransistor (T2) zum Ansteuern der OLED (31) und einen Schalt-Dünnfilmtransistor (T1) zum selektiven Koppeln des Ansteuer-Dünnfilmtransistors (T2) mit einer Datenleitung (Vdata) enthält,
wobei die Ansteuerschaltung (34) in einer invertierten gestaffelten ("inverted staggered") Dünnfilmstruktur ausgebildet ist und vertikal auf das Substrat (32) geschichtet ist und die OLED (31) vertikal auf die Ansteuerschaltung (34) geschichtet ist;

dadurch gekennzeichnet, dass
jedes Pixel der Vielzahl von Pixeln (30) des Weiteren umfasst:

eine erste Schirmelektrode (SE), die zwischen der Kathodenschicht (31 C) und dem Schalt-Dünnfilmtransistor (T1) angeordnet ist, sowie eine zweite Schirmelektrode (SE), die zwischen der Kathodenschicht (31 C) und dem Ansteuer-Dünnfilmtransistor (T2) angeordnet ist, wobei die erste und die zweite Schirmelektrode (SE) aus einem elektrischen Leiter bestehen und so angeordnet sind, dass sie einen gesamten Bereich zwischen einer Source (S1, S2) und einem Drain (D1, D2) des ersten bzw. des zweiten Dünnfilmtransistors (T1, T2) abdecken und so zwischen der Kathodenschicht (31 C) und den Dünnfilmtransistoren (T1, T2) induzierte parasitäre Kapazitäten sowie einen Leckstrom des Schalt-Transistors (T1) reduzieren, wenn sich ein Gate des Schalt-Transistors (T1) in einem gesperrten Zustand befindet.

2. OLED-Anzeigevorrichtung nach Anspruch 1, wobei die erste und die zweite Schirmelektrode (SE) elektrisch mit Erde verbunden sind.

3. OLED-Anzeigevorrichtung nach Anspruch 1 oder 2, wobei die erste und die zweite Schirmelektrode (SE) elektrisch an die Gates des Schalt-Dünnfilmtransistors (T1) bzw. des Ansteuer-Dünnfilmtransistors (T2) gebunden sind.

4. OLED-Anzeigevorrichtung nach einem der Ansprüche 1 bis 3, wobei die Pixel (30) jeweils für eine Emission nach oben ("top emission") ausgebildet sind, bei der Licht von dem Substrat (32) weg gerichtet wird.

5. OLED-Anzeigevorrichtung nach einem der Ansprüche 1 bis 4, wobei die erste und die zweite Schirmelektrode (SE) aus einer Metallisierungsschicht ausgebildet sind.

6. OLED-Anzeigevorrichtung nach einem der Ansprüche 1 bis 4, wobei die erste und die zweite Schirmelektrode (SE) in einer rechteckigen Form ausgebildet sind.

7. OLED-Anzeigevorrichtung nach einem der Ansprüche 1 bis 4, wobei die erste und die zweite Schirmelektrode (SE) aus Aluminium oder Molybdän ausgebildet sind.

8. OLED-Anzeigevorrichtung nach einem der Ansprüche 1 bis 7, wobei die Ansteuerschaltung (34) in amorphem Silizium ausgebildet ist.

Revendications

1. Dispositif d'affichage à diode électroluminescente organique, « OLED », comprenant :

un substrat (32), et
une pluralité de pixels (30) formée sur le substrat (32), chaque pixel de ladite pluralité de pixels (30) comprenant :

une diode OLED (31) possédant :
une couche formant anode (31A),
une couche formant cathode (31C), et
une couche électroluminescente (31B) placée entre la couche formant anode (31A) et la couche formant cathode (31C),

un circuit d'attaque (34) incluant un transistor d'attaque à couches minces (T2) permettant d'attaquer la diode OLED (31) et un transistor de commutation à couches minces (T1) permettant de coupler sélectivement le transistor d'attaque à couches minces (T2) à une ligne de données (Vdata),
dans lequel le circuit d'attaque (34) est formé d'une structure décalée inversée à couches minces et il est empilé verticalement sur le substrat (32), la diode OLED (31) étant empilée verticalement sur le circuit d'attaque (34),
caractérisé en ce que
chaque pixel de ladite pluralité de pixels (30) comprend en outre :

une première électrode de blindage (SE) placée entre la couche formant cathode (31C) et le transistor de commutation à couches minces (T1), ainsi qu'une seconde électrode de blindage (SE) placée entre la couche formant cathode (31C) et le transistor d'attaque à couches minces (T2), dans lequel les première et seconde électrodes (SE) de blindage sont constituées d'un conducteur électrique et sont agencées pour recouvrir respectivement une zone entière entre la source (S1, S2) et le drain (D1, D2) des premier et second transistors à couches minces (T1, T2) ce qui réduit ainsi les capacités parasites induites entre la couche formant cathode (31C) et les transistors à couches minces (T1, T2) de même que le courant de fuite du transistor de commutation (T1) lorsque la grille du transistor de commutation (T1) est dans un état d'arrêt.

2. Dispositif d'affichage OLED selon la revendication 1, dans lequel les première et seconde électrodes de blindage (SE) sont reliées électriquement à la masse.

3. Dispositif d'affichage OLED selon la revendication 1 ou 2, dans lequel les première et seconde électrodes de blindage (SE) sont électriquement reliées respectivement aux grilles du transistor de commutation à couches minces (T1) et du transistor d'attaque à couches minces (T2).

4. Dispositif d'affichage OLED selon l'une quelconque des revendications 1 à 3, dans lequel les pixels (30) sont chacun formés pour une émission par le haut dans laquelle la lumière est dirigée à partir du substrat (32).

5. Dispositif d'affichage OLED selon l'une quelconque des revendications 1 à 4, dans lequel les première et seconde électrodes de blindage (SE) sont formées d'une couche de métallisation.

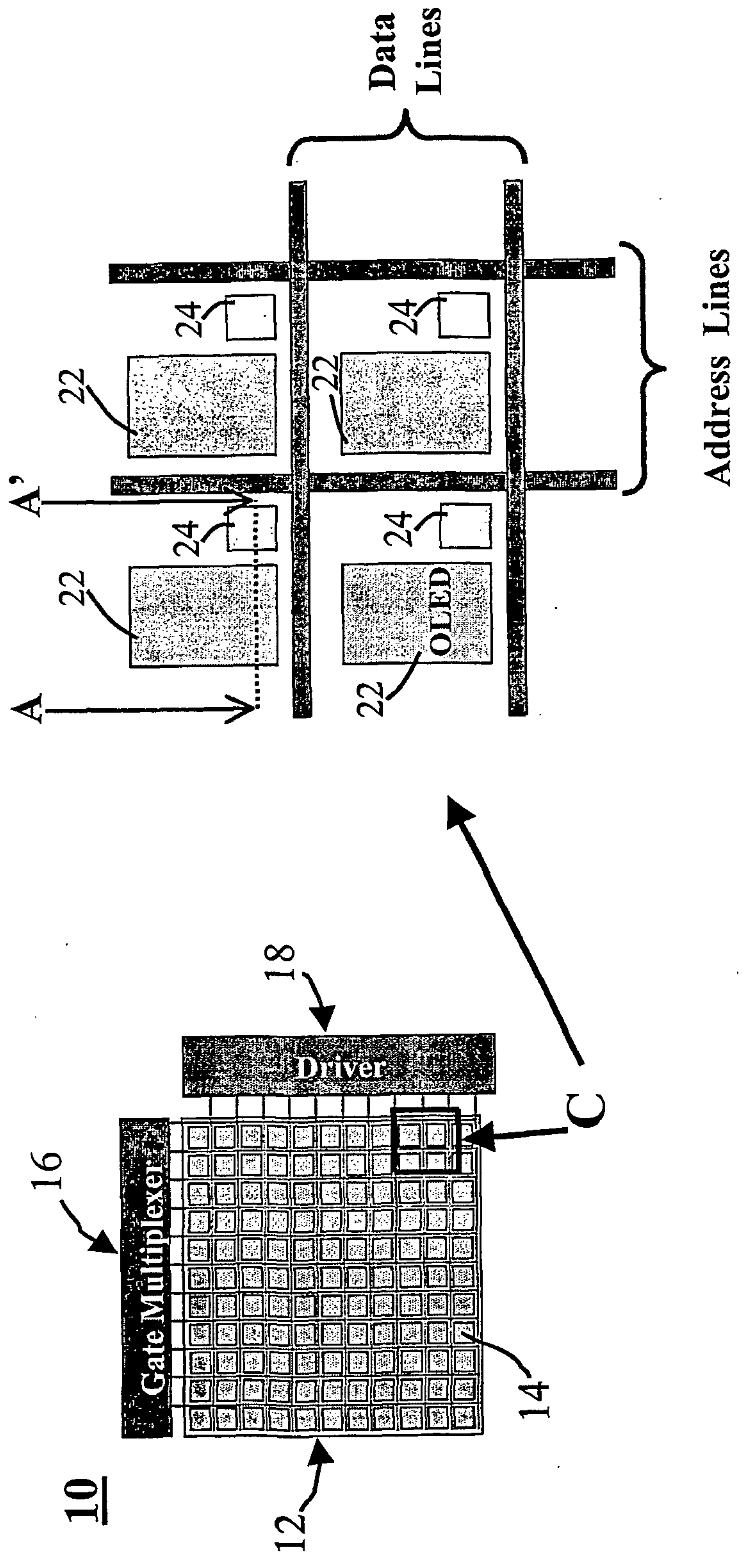
6. Dispositif d'affichage OLED selon l'une quelconque des revendications 1 à 4, dans lequel les première et seconde électrodes de blindage (SE) sont façonnées de manière rectangulaire.

7. Dispositif d'affichage OLED selon l'une quelconque des revendications 1 à 4, dans lequel les première et seconde électrodes de blindage (SE) sont formées d'aluminium ou de molybdène.

8. Dispositif d'affichage OLED selon l'une quelconque des revendications 1 à 7, dans lequel le circuit d'attaque (34) est formé de silicium amorphe.

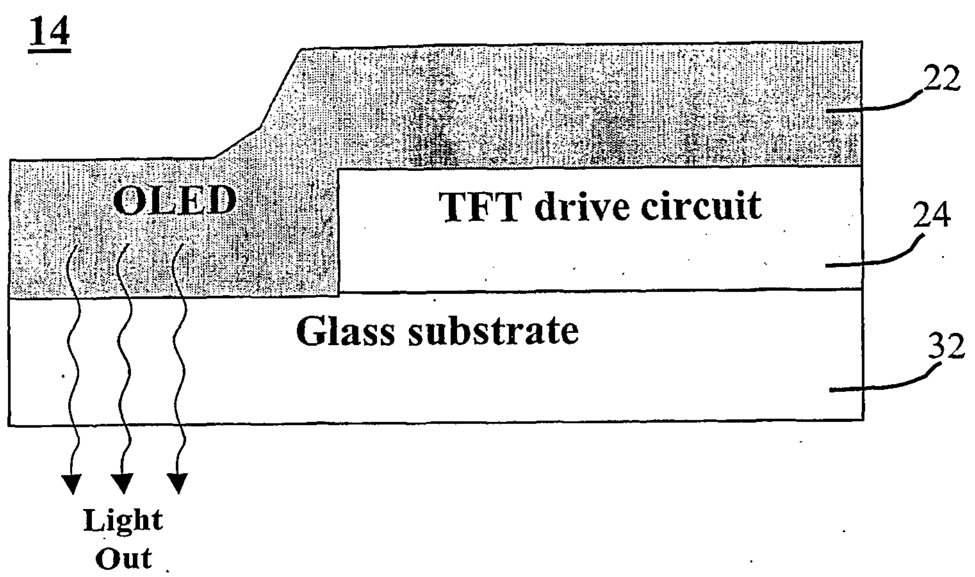
FIG. 1A

FIG. 1B



10
12
14
16
Gate Multiplexer
18
Driver
C
A
A'
22
24
OLED
Data Lines
Address Lines

FIG. 1C


14
OLED
TFT drive circuit
Glass substrate
22
24
32
Light
Out

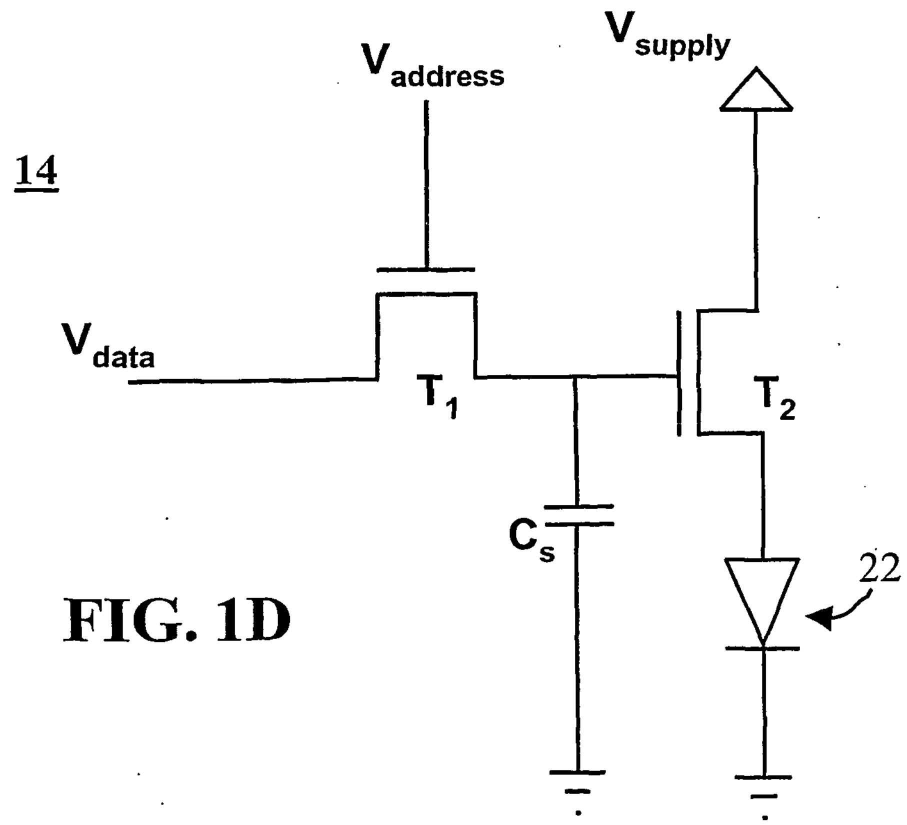

14
V address
V supply
V data
T1
T2
Cs
22

FIG. 1D

FIG. 2
(PRIOR ART)

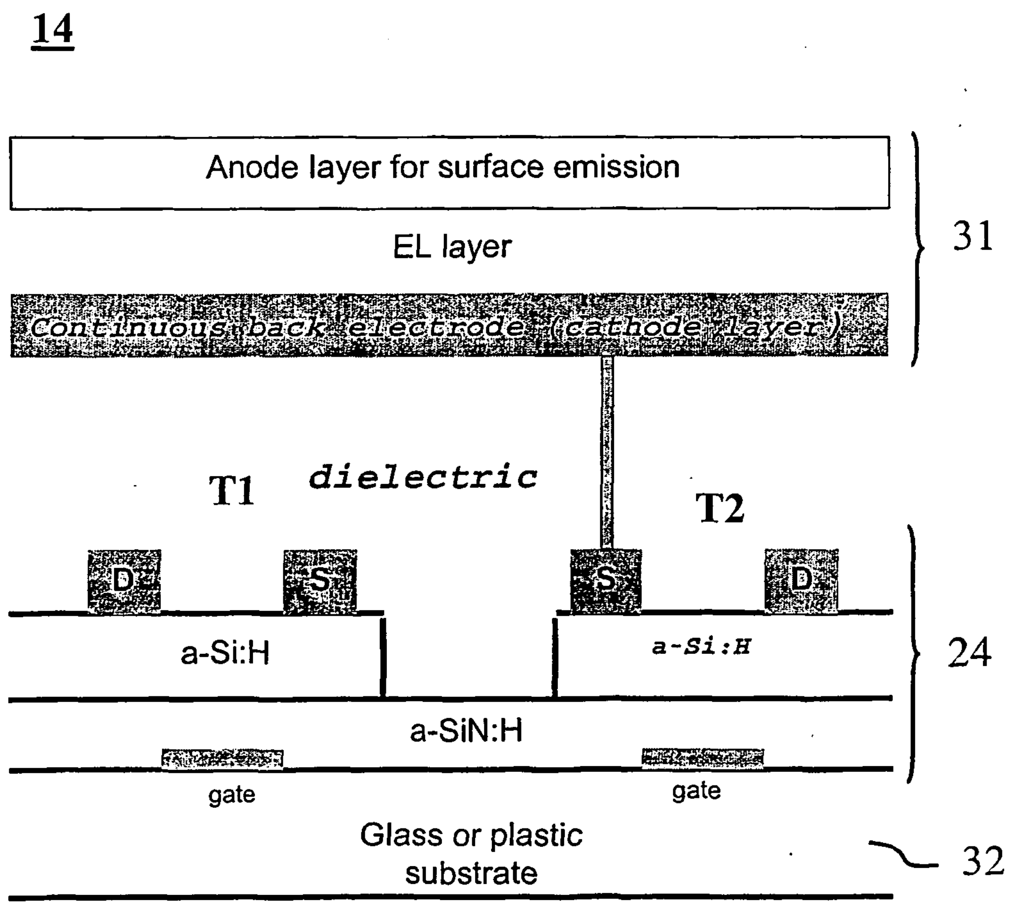


FIG. 3

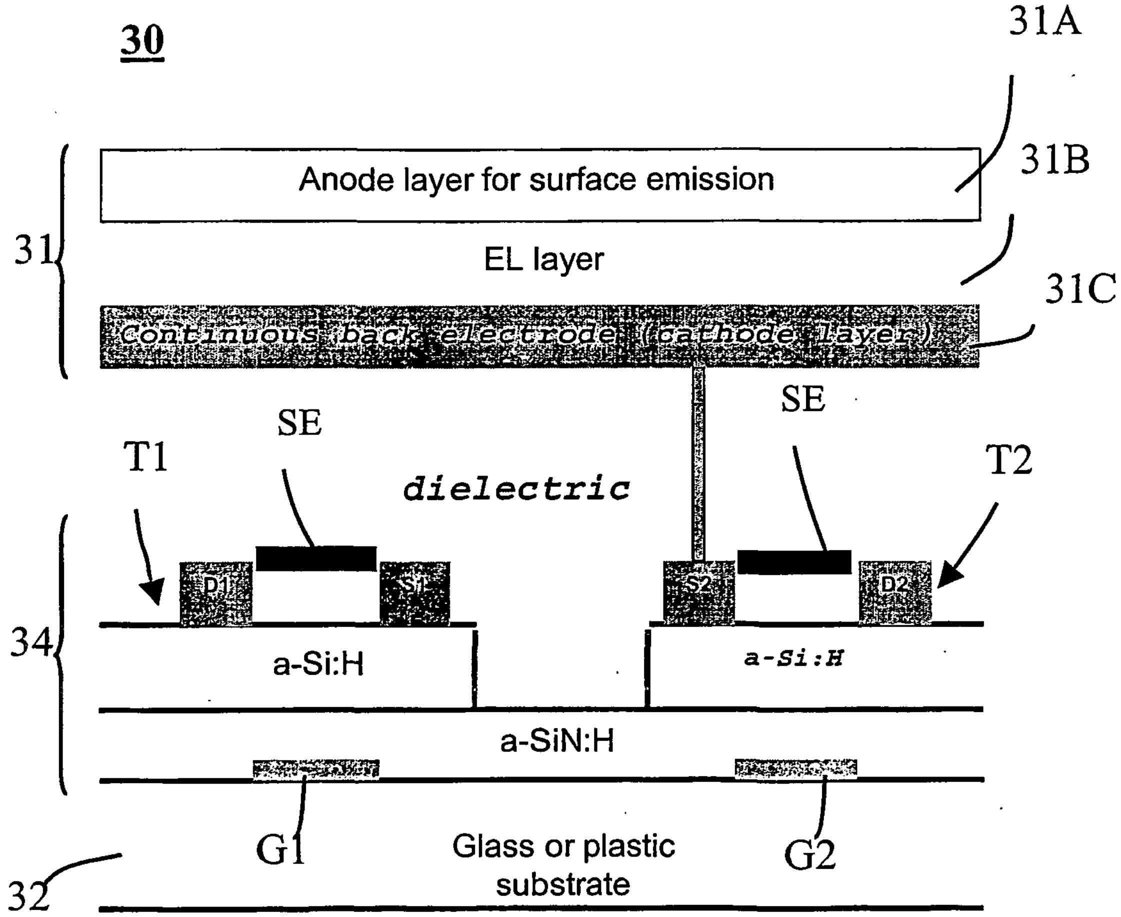
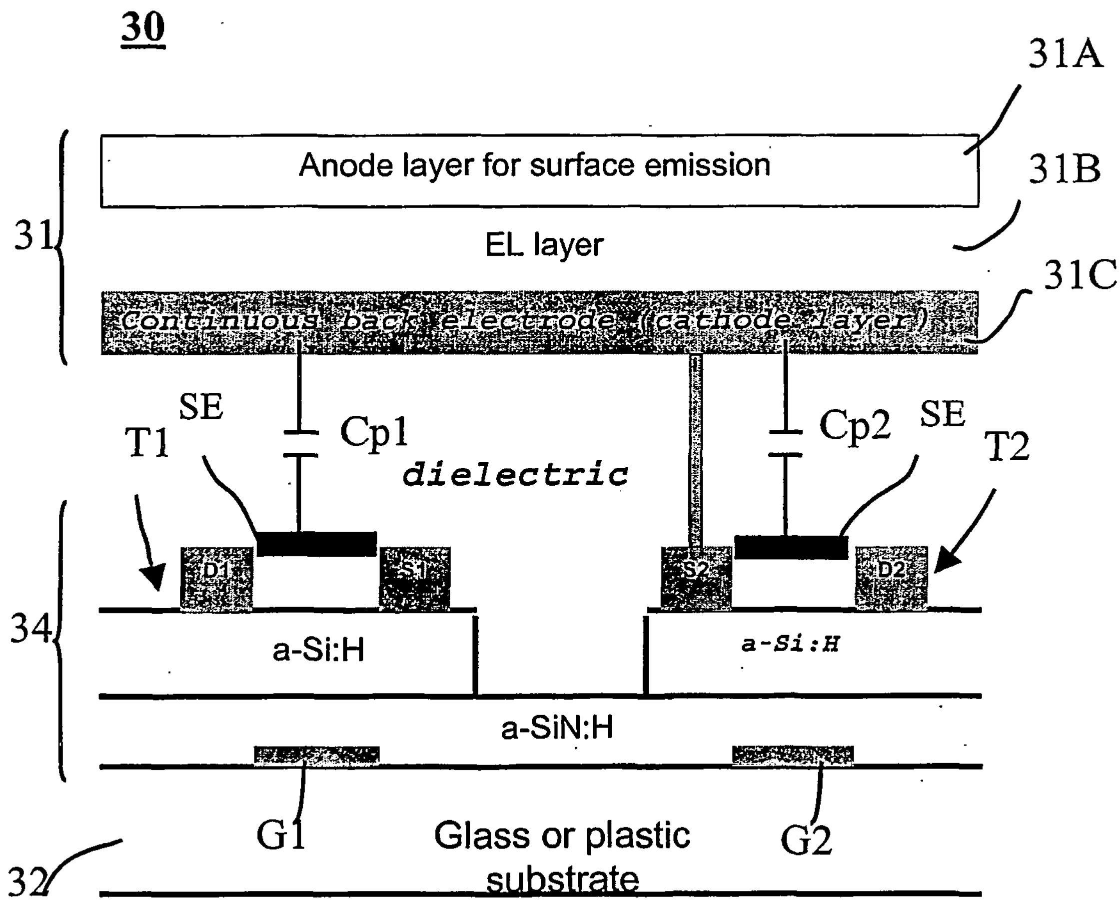

30
31A
31B
31C
Anode layer for surface emission
EL layer
Continuous back electrode (cathode layer)
31
SE
SE
T1
T2
dielectric
D1
S1
S2
D2
34
a-Si:H
a-Si:H
a-SiN:H
G1
G2
Glass or plastic substrate
32

FIG. 4


30
31A
31B
31C
31
Anode layer for surface emission
EL layer
Continuous back electrode (cathode layer)
SE
T1
Cp1
dielectric
Cp2
SE
T2
D1
S1
S2
D2
34
a-Si:H
a-Si:H
a-SiN:H
G1
Glass or plastic substrate
G2
32

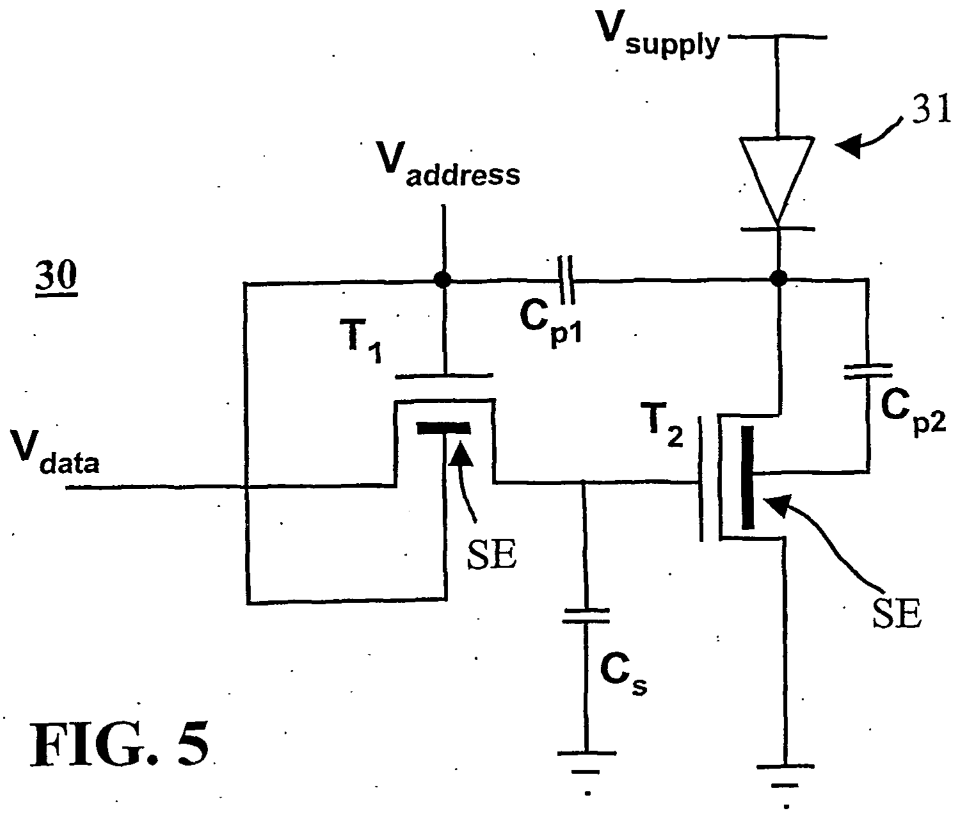

Vsupply
31
Vaddress
30
T1
Cp1
Cp2
T2
Vdata
SE
SE
Cs

FIG. 5

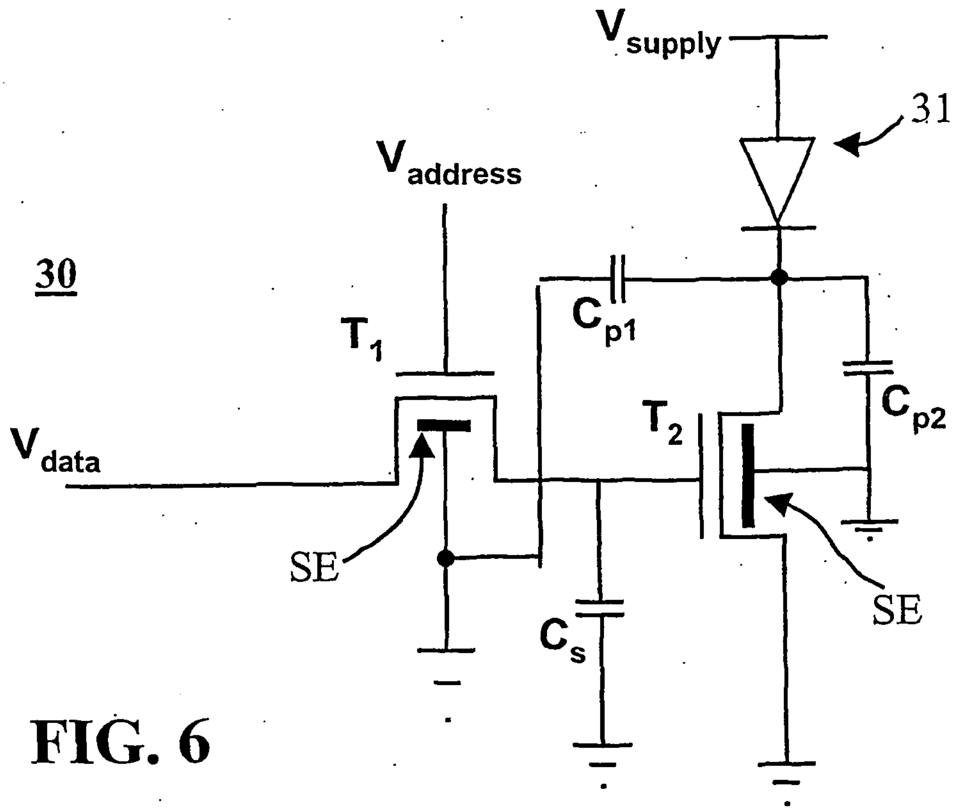

Vsupply
31
Vaddress
30
T1
Cp1
Cp2
T2
Vdata
SE
SE
Cs

FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0940796 A **[0018]**
- EP 1028471 A **[0019]**
- JP 9090405 A **[0020]**
- JP 2000172199 A **[0021]**
- JP 2000352941 B **[0022]**

专利名称(译)	具有屏蔽电极的有机发光二极管显示器		
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代理机构(译)	GRÜNECKER，KINKELDEY，STOCKMAIR & SCHWANHÄUSSER		
优先权	60/268899 2001-02-16 US		
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外部链接	Espacenet		

摘要(译)

有机发光二极管（OLED）显示器包括在阴极层（31c）和OLED驱动电路（34）之间的至少一个屏蔽电极（SE）。 OLED驱动电路具有至少一个薄膜晶体管（TFT），并且屏蔽电极设置为对应于薄膜晶体管并且更靠近阴极层，覆盖薄的源极和漏极之间的整个区域。薄膜晶体管。屏蔽电极接地或连接到薄膜晶体管的栅极，从而最小化显示器的像素中的寄生电容，以提高显示性能。所提出的架构能够在非晶硅或其他技术中集成高密度驱动电路，同时保持高显示孔径比。