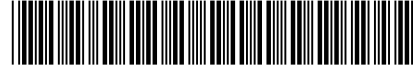


(19)



(11)

EP 3 306 600 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:

11.04.2018 Bulletin 2018/15

(51) Int Cl.:

G09G 3/32^(2016.01)

(21) Application number: **15892794.7**

(86) International application number:

PCT/CN2015/090121

(22) Date of filing: **21.09.2015**

(87) International publication number:

WO 2016/192247 (08.12.2016 Gazette 2016/49)

(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

• **DONG, Xue**

Beijing 100176 (CN)

• **WANG, Haisheng**

Beijing 100176 (CN)

• **CHEN, Xiaochuan**

Beijing 100176 (CN)

• **YANG, Shengji**

Beijing 100176 (CN)

• **LIU, Yingming**

Beijing 100176 (CN)

• **LIU, Wei**

Beijing 100176 (CN)

• **WANG, Lei**

Beijing 100176 (CN)

• **REN, Tao**

Beijing 100176 (CN)

(30) Priority: **01.06.2015 CN 201510293859**

(71) Applicants:

• **BOE Technology Group Co., Ltd.**

Beijing 100015 (CN)

• **Beijing BOE Optoelectronics Technology Co., Ltd.**

Beijing 100176 (CN)

(72) Inventors:

• **DING, Xiaoliang**

Beijing 100176 (CN)

(74) Representative: **Brötz, Helmut**

Rieder & Partner mbB

Patentanwälte - Rechtsanwalt

Corneliusstrasse 45

42329 Wuppertal (DE)

(54) **ORGANIC ELECTROLUMINESCENT TOUCH CONTROL PANEL AND DRIVING METHOD THEREFOR, AND DISPLAY DEVICE**

(57) This application provides an organic electroluminescent touch panel, a driving method for the same, and a display device comprising the same. Without changing the original organic electroluminescent architecture, the cathode layer (2) of the organic electroluminescent architecture is partitioned to form a plurality of cathodes independent of and insulating from each other, the plurality of cathodes serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire, implementing that the display panel is integrated with the touch control function based on organic electroluminescent display, and by the pixel driving circuit, the control terminal of the driving module (04) is initialized

in the initialization stage, threshold voltage compensation of the driving module (04) is performed in the compensation stage, which avoids an affect caused by change of the threshold voltage of the driving module (04) on lightening luminance, meanwhile, in the touch control stage, signals on the respective signal lines are all modulated in synchronization with external touch control signals sensed by the touch electrodes, the parasitic capacitance of the touch electrode can be eliminated, and touch control performance of the touch panel can be improved.

EP 3 306 600 A1

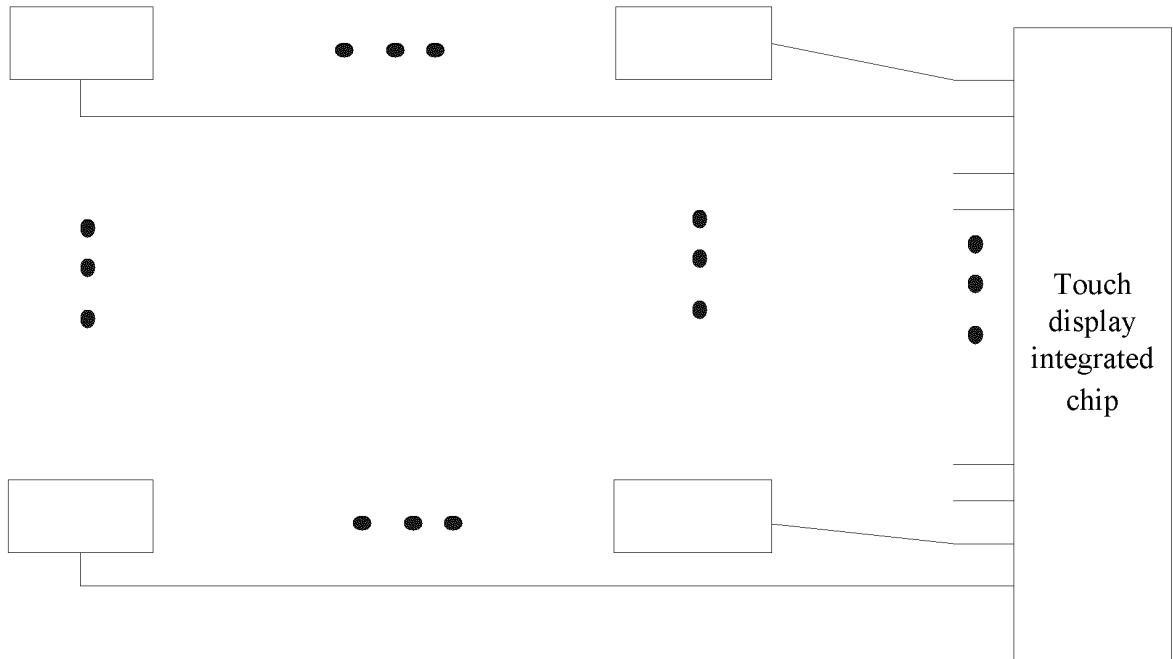


Figure 1b

Description

TECHNICAL FIELD

5 **[0001]** Embodiments of the present application relate to the field of display technique, and more particularly, to an organic electroluminescent touch panel, a driving method for the same, and a display device comprising the same.

BACKGROUND

10 **[0002]** As display technique advances, more and more AMOLED (Active Matrix Organic Light Emitting Diode) display panel appears on the market, in comparison to the conventional TFT LCD (Thin Film Transistor Liquid Crystal Display), the AMOLED display panel has advantages of low energy consumption, low production cost, self-luminescence, wide viewing angle and fast response etc. With development of the touch screen technique and as required by the market, overall module thinning is a market development trend, thus the touch architecture develops from touch sensor plug-in to touch sensor built-in, as such, not only thinning of thickness of the touch panel can be implemented, meanwhile costs of the touch screen technique can also be reduced to a large scale, currently, there are three main types of the built-in touch panel: resistive touch panel, capacitive touch panel, and optical touch panel. Therefore, the built-in touch control technique being integrated into the organic electroluminescent display panel can syncretize the advantages of the two, enhance market competitiveness.

20 **[0003]** However, in a pixel circuit that drives OLED to emit light, because of the manufacturing process and aging of the components, as well as other reasons such as temperature change during operating process, a threshold voltage V_{th} of a driving transistor in the pixel circuit has unevenness, which results in that a current that flows through OLED at each pixel dot changes so that display brightness is uneven, thus display effect of an entire image is affected. Furthermore, in general, a touch electrode of the built-in touch panel adopting the self-capacitance touch control technique has a parasitic capacitance, which mainly comes from signal lines for transmitting various control signals on the touch panel, so, in order to improve touch control performance of the touch panel, it needs to reduce the parasitic capacitance of the touch electrode.

25 **[0004]** Accordingly, how to integrate the touch control function into the organic electroluminescent display panel and improve touch control display performance of the display panel is an urgent problem that needs to be solved by those skilled in the art.

SUMMARY

35 **[0005]** Embodiments of the present application provide an organic electroluminescent touch panel, a driving method for the same, and a display device comprising the same, to implement integrating the touch control function into the organic electroluminescent display panel and improve touch control display performance of the display panel.

[0006] An embodiment of the invention provides an organic electroluminescent touch panel, comprising: a pixel driving circuit and an organic electroluminescent architecture;

40 the organic electroluminescent architecture including: an anode layer, a cathode layer, and a light-emitting layer located between the anode layer and the cathode layer; the cathode layer being partitioned into a plurality of cathodes independent of and insulating from each other, the cathodes being connected, via a lead wire, one-by-one, to pins to which a touch display integrated chip corresponds;

45 the pixel driving circuit including: an initialization module, a charging module, a compensation module, a driving module, and a light-emitting control module; a control terminal of the initialization module being connected to a reset signal terminal, an input terminal thereof being connected to an initialize signal terminal, and an output terminal thereof being connected to a first node; a first control terminal and a second control terminal of the charging module being both connected to a scan signal terminal, a first input terminal thereof being connected to a data signal terminal, a second input terminal thereof being connected to a third node, a first output terminal thereof being connected to the first node, and a second output terminal thereof being connected to a second node; a control terminal of the compensation module being connected to a first signal control terminal, an input terminal thereof being connected to a first reference signal terminal, and an output terminal thereof being connected to the second node; a control terminal of the driving module being connected with the first node, an input terminal thereof being connected to the first reference signal terminal, and an output terminal thereof being connected to the third node; a control terminal of the light-emitting control module being connected to a second signal control terminal, an input terminal thereof being connected to the third node, and an output terminal thereof being connected to the anode layer of the organic electroluminescent architecture, wherein

55 in an initialization stage, the initialization module is configured to, under control of the reset signal terminal, initialize the first node via an initialize signal inputted by the initialize signal terminal; in a charging stage, the charging module is configured to, under control of the scan signal terminal, perform data writing at the first node and the second node via

a data signal inputted by the data signal terminal; in a compensation stage, the compensation module is configured to, under control of the first signal control terminal, perform threshold voltage compensation of the driving module at the first node via a signal inputted by the first reference signal terminal; in a light-emitting stage, the light-emitting control module is turned on under control of the second signal control terminal, the driving module is configured to, under control of the first node, drive the organic electroluminescent architecture to emit light via the light-emitting control module that is turned on; in a touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire.

[0007] In a possible implementation, in the organic electroluminescent touch panel provided above by the embodiment of the present application, the cathode layer of the organic electroluminescent architecture are partitioned to form a plurality of square cathodes, each square cathode has a side length of 4 mm.

[0008] In a possible implementation, in the organic electroluminescent touch panel provided above by the embodiment of the present application, the lead wire is located in a metal layer where a gate line resides, or in a source-drain metal layer, or in a third metal layer other than the metal layer where a gate line resides and the source-drain metal layer.

[0009] In a possible implementation, in the organic electroluminescent touch panel provided above by the embodiment of the present application, the organic electroluminescent architecture further comprises a hole transmission layer and an electron transmission layer;

the hole transmission layer is located between the anode layer and the light-emitting layer;

the electron transmission layer is located between the cathode layer and the light-emitting layer.

[0010] In a possible implementation, in the organic electroluminescent touch panel provided above by the embodiment of the present application, material of the cathode layer is a magnesium aluminum alloy or a magnesium silver alloy, material of the anode material layer is ITO material.

[0011] In a possible implementation, in the organic electroluminescent touch panel provided above by the embodiment of the present application, the driving module includes a driving transistor;

a gate of the driving transistor is connected to the first node, a source thereof is connected to the first reference signal terminal, and a drain thereof is connected to the third node.

[0012] In a possible implementation, in the organic electroluminescent touch panel provided above by the embodiment of the present application, the initialization module includes a first switching transistor;

a gate of the first switching transistor is connected to the reset signal terminal, a source thereof is connected to the initialize signal terminal, and a drain thereof is connected to the first node.

[0013] In a possible implementation, in the organic electroluminescent touch panel provided above by the embodiment of the present application, the charging module includes a second switching transistor, a third switching transistor, and a capacitor;

a gate of the second switching transistor is connected to the scan signal terminal, a source thereof is connected to the third node, and a drain thereof is connected to the first node;

a gate of the third switching transistor is connected to the scan signal terminal, a source thereof is connected to the data signal terminal, and a drain thereof is connected to the second node; and the capacitor is connected between the first node and the second node.

[0014] In a possible implementation, in the organic electroluminescent touch panel provided above by the embodiment of the present application, the compensation module includes a fourth switching transistor;

a gate of the fourth switching transistor is connected to the first signal control terminal, a source thereof is connected to the first reference signal terminal, a drain thereof is connected to the second node.

[0015] In a possible implementation, in the organic electroluminescent touch panel provided above by the embodiment of the present application, the light-emitting control module includes a fifth switching transistor;

a gate of the fifth switching transistor is connected to the second signal control terminal, a source thereof is connected to the third node, and a drain thereof is connected to the anode layer of the organic electroluminescent architecture.

[0016] An embodiment of the present application provides a driving method for the organic electroluminescent touch panel described above, comprising: an initialization stage, a charging stage, a compensation stage, a light-emitting stage, and a touch control stage that proceed sequentially; wherein

in the initialization stage, the initialization module is configured to, under control of the reset signal terminal, initialize the first node via an initialize signal inputted by the initialize signal terminal;

in the charging stage, the charging module is configured to, under control of the scan signal terminal, perform data writing at the first node and the second node via a data signal inputted by the data signal terminal;

in the compensation stage, the compensation module is configured to, under control of the first signal control terminal, perform threshold voltage compensation of the driving module at the first node via a signal inputted by the first reference signal terminal;

in the light-emitting stage, the light-emitting control module is turned on under control of the second signal control terminal, the driving module is configured to, under control of the first node, drive the organic electroluminescent architecture to

emit light via the light-emitting control module that is turned on; and
 in the touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire.

[0017] An embodiment of the present application provides a display device comprising the organic electroluminescent touch panel described above.

[0018] Beneficial effects of the embodiments of the present application comprise:

The embodiments of the present application provide an organic electroluminescent touch panel, a driving method for the same, and a display device comprising the same, the organic electroluminescent touch panel comprising: a pixel driving circuit and an organic electroluminescent architecture; wherein a cathode layer of the organic electroluminescent architecture is partitioned into a plurality of cathodes independent of and insulating from each other, the cathodes being connected, via a lead wire, one-by-one, to pins to which a touch display integrated chip corresponds; as such, in a charging stage, the charging module performs data writing at the first node and the second node; in a compensation stage, the compensation module performs threshold voltage compensation of the driving module at the first node; in a light-emitting stage, the driving module drives the organic electroluminescent architecture to emit light via the light-emitting control module that is turned on; in a touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire. Without changing the original organic electroluminescent architecture, by means of partitioning the cathode layer of the organic electroluminescent architecture, in the touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire, and further, determination of touch control points is implemented, that is, implementing that the display panel is integrated with the touch control function based on organic electroluminescent display, and the pixel driving circuit initializes the control terminal of the driving module in the initialization stage, threshold voltage compensation of the driving module is performed in the compensation stage, which avoids an affect caused by change of the threshold voltage of the driving module on lightening luminance, and improves evenness of lightening luminance of the display panel, thus ensures display image quality, meanwhile, in the touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch, signals on the rest signal lines for transmitting various signals, such as a scan signal line, a data line, a power source voltage line, are all modulated in synchronization with external touch control signals sensed by the touch electrodes, the parasitic capacitance of the touch electrode can be eliminated, and touch control performance of the touch panel can be improved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

Figure 1a is a first schematic diagram of the organic electroluminescent architecture provided by an embodiment of the present application;

Figure 1b is a schematic diagram of partitions of the cathode layer of the organic electroluminescent architecture provided by an embodiment of the present application;

Figure 1c is a schematic diagram of pixel cells to which the cathode provided by an embodiment of the present application corresponds;

Figure 2 is a schematic diagram of structure of the pixel driving circuit provided by an embodiment of the present application;

Figure 3 is a second schematic diagram of the organic electroluminescent architecture provided by an embodiment of the present application;

Figure 4 is a schematic diagram of specific configuration of the pixel driving circuit provided by an embodiment of the present application;

Figure 5 is an operation timing diagram of the pixel driving circuit provided by an embodiment of the present application;

Figure 6 is a schematic diagram of synchronous modulation of respective signal lines in the touch control stage provided by an embodiment of the present application; and

Figure 7 is a flowchart of the driving method for the organic electroluminescent architecture provided by an embodiment of the present application.

DETAILED DESCRIPTION OF THE EMBODIMENTS

5 [0020] Hereinafter, in conjunction with the accompanying drawings, concrete implementations of the organic electroluminescent touch panel, the driving method for the same, and the display device comprising the same provided by the embodiments of the present application will be described in detail.

[0021] An embodiment of the present application provides an organic electroluminescent touch panel, which may comprise: a pixel driving circuit and an organic electroluminescent architecture.

10 [0022] As shown in Figure 1a, the organic electroluminescent architecture may include: an anode layer 1, a cathode layer 2, and a light-emitting layer 3 located between the anode layer 1 and the cathode layer 2; wherein the cathode layer 2 is partitioned into a plurality of cathodes independent of and insulating from each other (partitions of the cathode layer are as shown in Figure 1b, wherein no limitations are made to shape of regions into which the cathode layer are partitioned, shape of partitions of the cathode layer may be determined according to practical manufacturing process, each partitioned cathode corresponds to a corresponding pixel cell, corresponding pixel cells are as shown in Figure 1c), the cathodes are connected, via a lead wire, one-by-one, to pins to which a touch display integrated chip corresponds; the cathode serves as the cathode of the organic electroluminescent architecture in the display stage, and as the touch electrode in the touch control stage, the organic electroluminescent control panel is driven in a time-sharing way.

15 [0023] As shown in Figure 2, the pixel driving circuit may include: an initialization module 01, a charging module 02, a compensation module 03, a driving module 04, and a light-emitting control module 05; a control terminal of the initialization module 01 being connected to a reset signal terminal Reset, an input terminal thereof being connected to an initialize signal terminal Vinit, and an output terminal thereof being connected to a first node P1; a first control terminal and a second control terminal of the charging module 02 being both connected to a scan signal terminal Gate, a first input terminal thereof being connected to a data signal terminal Data, a second input terminal thereof being connected to a third node P3, a first output terminal thereof being connected to the first node P1, and a second output terminal thereof being connected to a second node P2; a control terminal of the compensation module 03 being connected to a first signal control terminal EM1, an input terminal thereof being connected to a first reference signal terminal Ref1, and an output terminal thereof being connected to the second node P2; a control terminal of the driving module 04 being connected with the first node P1, an input terminal thereof being connected to the first reference signal terminal Ref1, and an output terminal thereof being connected to the third node P3; a control terminal of the light-emitting control module 05 being connected to a second signal control terminal EM2, an input terminal thereof being connected to the third node P3, and an output terminal thereof being connected to the anode layer of the organic electroluminescent architecture.

20 [0024] In an initialization stage, the initialization module 01 is configured to, under control of the reset signal terminal Reset, initialize the first node P1 via an initialize signal inputted by the initialize signal terminal Vinit; in a charging stage, the charging module 02 is configured to, under control of the scan signal terminal Gate, perform data writing at the first node P1 and the second node P2 via a data signal inputted by the data signal terminal Data; in a compensation stage, the compensation module 03 is configured to, under control of the first signal control terminal EM1, perform threshold voltage compensation of the driving module 04 at the first node P1 via a signal inputted by the first reference signal terminal Ref1; in a light-emitting stage, the light-emitting control module 05 is turned on under control of the second signal control terminal EM2, the driving module 04 is configured to, under control of the first node P1, drive the organic electroluminescent architecture to emit light via the light-emitting control module 05 that is turned on; and in a touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire.

25 [0025] In the organic electroluminescent touch panel provided above by an embodiment of the present application comprises a pixel driving circuit and an organic electroluminescent architecture. A cathode layer of the organic electroluminescent architecture is partitioned into a plurality of cathodes independent of and insulating from each other, the cathodes being connected, via a lead wire, one-by-one, to pins to which a touch display integrated chip corresponds; as such, in a charging stage, the charging module 02 performs data writing at the first node P1 and the second node P2; in a compensation stage, the compensation module 03 performs threshold voltage compensation of the driving module 04 at the first node P1; in a light-emitting stage, the driving module 04 drives the organic electroluminescent architecture to emit light via the light-emitting control module 05 that is turned on; in a touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire. Without changing the original organic electroluminescent architecture, by means of partitioning the cathode layer of the organic electroluminescent architecture, in the touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire, and further, determination of touch control points is implemented, that is, implementing that the display panel is integrated with the touch control function based on organic electroluminescent display, and the pixel driving circuit initializes the control

terminal of the driving module in the initialization stage, threshold voltage compensation of the driving module is performed in the compensation stage, which avoids an affect caused by change of the threshold voltage of the driving module on lightening luminance, and improves evenness of lightening luminance of the display panel, thus ensures display image quality, meanwhile, in the touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch, signals on the rest signal lines for transmitting various signals, such as a scan signal line, a data line, a power source voltage line, are all modulated in synchronization with external touch control signals sensed by the touch electrodes, the parasitic capacitance of the touch electrode can be eliminated, and touch control performance of the touch panel can be improved.

[0026] In a specific implementation, in the organic electroluminescent touch panel provided by an embodiment of the present application, in order to implement integrating the touch control technique into the organic electroluminescent touch panel, as shown in Figure 1b, the cathode layer of the organic electroluminescent architecture is partitioned into a plurality of cathodes m independent of and insulating from each other, the cathodes are connected, via a lead wire, one-by-one, to pins to which a touch display integrated chip corresponds, in the touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire, to thereby achieve the touch control function. No limitations are made to shape of the cathodes formed by partitioning the cathode layer, shape and size of partitions of the cathode layer can be determined according to practical manufacturing process and parameters such as size of the touch panel and accuracy of the touch control, for example, the cathode layer of the organic electroluminescent architecture may be partitioned to form a plurality of square cathodes, each square cathode has a side length of 4 mm.

[0027] In a specific implementation, in the organic electroluminescent touch panel provided by an embodiment of the present application, in order to simplify manufacturing process of the touch panel, the lead wire, which connects the cathode layer of the organic electroluminescent architecture and the pins to which a touch display integrated chip corresponds, may be disposed in the same layer of the original metal layer, that is, the lead wire may be located in a metal layer where a gate line resides, or in a source-drain metal layer, or in a third metal layer other than the metal layer where a gate line resides and the source-drain metal layer, thus disposing of the lead wire may be determined according to practical manufacturing process, and no definitions are made here, as such, in the touch control stage, the cathode layer of the organic electroluminescent architecture serves as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire, thereby finally determining the touch control points and achieving the touch control function.

[0028] In a specific implementation, in the organic electroluminescent touch panel provided by an embodiment of the present application, as shown in Figure 3, the organic electroluminescent architecture further comprises a hole transmission layer 4 and an electron transmission layer 5; the hole transmission layer 4 is located between the anode layer 1 and the light-emitting layer 3; the electron transmission layer 5 is located between the cathode layer 2 and the light-emitting layer 3, as such, in the display stage, by applying a voltage to the anode layer 1 and cathode layer 2 of the organic electroluminescent architecture, holes and electrons are separately injected from the cathode layer 2 and the anode layer 1, pass through the hole transmission layer 4 and the electron transmission layer 5 and meet in the light-emitting layer 3 to form excitons, exciton recombination luminescence achieves normal light emitting of the organic electroluminescent architecture, which has the following advantages in comparison to the liquid crystal display: light and thin, wide viewing angle, fast response, high light emitting efficiency.

[0029] In a specific implementation, in the organic electroluminescent touch panel provided by an embodiment of the present application, material of the cathode layer of the organic electroluminescent architecture is a magnesium aluminum alloy or a magnesium silver alloy, material of the anode material layer thereof is ITO material. Of course, the cathode layer and the anode layer of the organic electroluminescent architecture may be other materials capable of achieving their corresponding functions, no limitations are made here, wherein corresponding voltage signals are applied to the cathode layer and the anode layer of the organic electroluminescent architecture in the display stage to implement normal light emitting of the organic electroluminescent architecture, in the touch control stage, the cathode layer of the organic electroluminescent architecture serves as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire, thereby finally determining the touch control points and achieving the touch control function. Therefore, the organic electroluminescent display panel provided above by an embodiment of the present application integrates the original electroluminescent display and the touch control function, and syncretize the advantages of the two.

[0030] In a specific implementation, in the organic electroluminescent touch panel provided by an embodiment of the present application, as shown in Figure 4, the driving module 04 may include a driving transistor D1; a gate of the driving transistor D1 is connected to the first node P1, a source thereof is connected to the first reference signal terminal Ref1, and a drain thereof is connected to the third node P3. Specifically, in the initialization stage, the initialization module 01 makes, under control of the reset signal terminal Reset, the gate of the driving transistor D1, i.e. the first node P1, and the initialization signal terminal Vini conductive, initializes the control terminal of the driving module 04, i.e., the gate of

the driving transistor D1, which can eliminate the influence of a previous pressure difference on a subsequent stage, meanwhile provide time for a recovery process of the threshold voltage of the process driving transistor D1, in the charging stage and the compensation stage, data writing and threshold voltage compensation are performed at the first node P1, i.e., the gate of the driving transistor D1, via the charging module 01 and the compensation module 03, so that

5 the driving transistor D1 drives the organic electroluminescent architecture to normally emit light in the light-emitting stage, and a driving current that drives the organic electroluminescent architecture to emit light is independent of the threshold voltage of the driving transistor D1, which avoids the affect caused by change of the threshold voltage of the driving module on lightening luminance.

[0031] In a specific implementation, in the organic electroluminescent touch panel provided by an embodiment of the present application, as shown in Figure 4, the initialization module 01 includes a first switching transistor T1; a gate of the first switching transistor T1 is connected to the reset signal terminal Reset, a source thereof is connected to the initialize signal terminal Vinit, and a drain thereof is connected to the first node P1. Specifically, in the initialization stage, the first switching transistor T1 is turned on under control of the reset signal terminal Reset, the turned-on first switching transistor T1 makes the initialize signal terminal Vinit and the first node P1 conductive, the initialize signal terminal Vinit

10 inputs an initialized voltage signal (the initialized voltage signal may be 0 or other initialized voltage signal, the initialized voltage signal may be selected according to a type of the transistor in the driving circuit), the initialized voltage signal passes through the turned-on first switching transistor T1, a voltage signal at the first node P1 is initialized as the initialized voltage signal, thereby implementing initialization to the first node P, that is, the initialization to the control terminal of the driving module 04.

[0032] In a specific implementation, in the organic electroluminescent touch panel provided by an embodiment of the present application, as shown in Figure 4, the charging module 02 may include a second switching transistor T2, a third switching transistor T3, and a capacitor C; wherein a gate of the second switching transistor T2 is connected to the scan signal terminal Gate, a source thereof is connected to the third node P3, and a drain thereof is connected to the first node P1; a gate of the third switching transistor T3 is connected to the scan signal terminal Gate, a source thereof is

15 connected to the data signal terminal Data, and a drain thereof is connected to the second node P2; and the capacitor C is connected between the first node P1 and the second node P2.

[0033] Specifically, in the charging stage, the second switching transistor T2 and the third switching transistor T3 are turned on under control of the scan signal terminal Gate, the turned-on third switching transistor T3 makes the data signal terminal Data and the second node P2, i.e., the left terminal of the capacitor C conductive, and then passes a signal Vdata inputted by the data signal terminal Data to the left terminal of the capacitor C, that is, in this case, a voltage V1 at the left terminal of the capacitor C is $V1 = V_{data}$, and a voltage at the right terminal (i.e., the first node P1) of the capacitor C also becomes Vdata as driven by the charging of the capacitor C, in this case, the driving transistor D1 is in a turned-on state, the signal Vdd at the first reference signal terminal Ref1 is outputted to the right terminal of the capacitor C via the turned-on driving transistor D1 and second switching transistor T2, i.e., in this case, a voltage at the

20 first node P1 is $V_{dd} - V_{th}$, where V_{th} is a threshold voltage of the driving transistor D1, and at this time, a voltage difference across two terminals of the capacitor C is $V_{data} - V_{dd} + V_{th}$.

[0034] In a specific implementation, in the organic electroluminescent touch panel provided by an embodiment of the present application, as shown in Figure 4, the compensation module 03 may include a fourth switching transistor T4; a gate of the fourth switching transistor T4 is connected to the first signal control terminal EM1, a source thereof is connected to the first reference signal terminal Ref1, a drain thereof is connected to the second node P2. Specifically, in the compensation stage, the fourth switching transistor T4 is turned on under control of the first signal control terminal EM1, the turned-on fourth switching transistor T4 makes the first reference signal Ref1 and the second node P2 conductive, thus, a voltage signal Vdd inputted by the first reference signal terminal is transmitted to the second node P2, and then a voltage signal at the second node P2, i.e., the left terminal of the capacitor C, becomes Vdd, since the charging stage

25 makes a voltage difference across two terminals of the capacitor C be $V_{data} - V_{dd} + V_{th}$, therefore, at this time, a voltage at the right terminal of the capacitor C is $2V_{dd} - V_{data} - V_{th}$.

[0035] In a specific implementation, in the organic electroluminescent touch panel provided by an embodiment of the present application, as shown in Figure 4, the light-emitting control module 05 may include a fifth switching transistor T5; a gate of the fifth switching transistor T5 is connected to the second signal control terminal EM2, a source thereof is connected to the third node P3, and a drain thereof is connected to the anode layer of the organic electroluminescent architecture. Specifically, in the light-emitting stage, the fifth switching transistor T5 is turned on under control of the second signal control terminal EM2, the turned-on fifth switching transistor T5 makes the third node P3, i.e., the drain of the driving transistor D1, and the anode layer of the organic electroluminescent architecture conductive, in this case, a signal Vss at the second reference voltage signal terminal Ref2 is inputted to the cathode layer of the organic electroluminescent architecture, the driving transistor D1 is turned on under the control of the first node P1, to drive the organic electroluminescent architecture to normally emit light by turning on the fifth switching transistor T5; in the touch control stage, in the touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch

signal to the touch display integrated chip via the lead wire, thus achieving the touch control function.

[0036] It needs to be noted that the switching transistors and the driving transistor mentioned above in the embodiments of the present application may be TFT (Thin Film Transistor), may also be MOS (Metal Oxide Semiconductor), no limitations are made here. In a specific implementation, source and drain of these transistors can be interchanged, no differentiation is made in particular. When describing a specific embodiment, description is provided with the TFT as an example.

[0037] Next, an operation process of the pixel circuit provided by the embodiments of the present application will be described in detail in conjunction with the pixel driving circuit and the operation timing provided by the embodiments of the present application. The operation process of the pixel driving circuit provided by the embodiments of the present application is described by adopting the pixel circuit designed with the P-type transistor shown in Figure 4 and the input output timing diagram shown in Figure 5. Specifically, five stages t1 to t5 in the input output timing diagram as shown in Figure 5 are selected. In the following description, 1 represents a high level signal, 0 indicates a low level signal.

[0038] At stage t1, Reset = 0, EM1 = 1, EM2 = 1, Gate = 1, Ref1 = Vdd, Ref2 = Vss. Since Reset = 0, thus the first switching transistor T1 is turned on; since EM1 = 1, EM2 = 1, Gate = 1, thus the second switching transistor T2, the third switching transistor T3, the fourth switching transistor T4, and the fifth switching transistor T5 are turned off. The turned-on first switching transistor T1 makes the gate of the driving transistor D1 (i.e., the first node P1) and the initialize signal terminal Vinit conductive, thereby initializes the voltage at the gate of the driving transistor D1, charges at the two terminals of the capacitor C are cleared, to eliminate the influence of a previous pressure difference on a subsequent stage. The stage t1 is the initialization stage.

[0039] At stage t2, Reset = 1, EM1 = 1, EM2 = 1, Gate = 0, Ref1 = Vdd, Ref2 = Vss. Since Gate = 0, thus the second switching transistor T2 and the third switching transistor T3 are turned on; since Reset = 1, EM1 = 1, EM2 = 1, thus the first switching transistor T1, the fourth switching transistor T4, and the fifth switching transistor T5 are turned off. The turned-on third switching transistor T3 makes the data signal terminal Data and the second node P2, i.e., the left terminal of capacitor C, conductive, and then passes the data signal Vdata inputted by the data signal input terminal Data to the left terminal of the capacitor C, in this case, a voltage V1 at the left terminal of the capacitor C is $V_1 = V_{data}$, and a voltage at the right terminal of the capacitor C (i.e., the first node P1) also becomes Vdata as driven by the charging of the capacitor C, in this case, the driving transistor D1 in the turned-on state, the signal Vdd at the first reference signal terminal Ref1 is outputted to the right terminal of the capacitor C via the turned-on driving transistor D1 and second switching transistor T2, i.e., in this case, the voltage at the first node P1 is $V_{dd} - V_{th}$, where V_{th} is the threshold voltage of the driving transistor D1, and at this time a voltage difference across two terminals of the capacitor C is $V_{data} - V_{dd} + V_{th}$. Stage t2 is the charging stage.

[0040] At stage t3, Reset = 1, EM1 = 1, EM2 = 0, Gate = 1, Ref1 = Vdd, Ref2 = Vss. Since EM2 = 0, thus the fourth switching transistor T4 is turned on; since the Reset = 1, EM2 = 1, Gate = 1, thus the first switching transistor T1, the second switching transistor T2, the third switching transistor T3, and the fifth switching transistor T5 are turned off. The turned-on fourth switching transistor T4 makes the first reference signal Ref1 and the second node P2 conductive, thus the voltage signal Vdd inputted by first reference signal terminal Ref1 is transmitted to the second node P2, further, the voltage signal at the second node P2, i.e., the left terminal of the capacitor C, becomes Vdd, since the charging stage makes a voltage difference across two terminals of the capacitor C be $V_{data} - V_{dd} + V_{th}$, therefore, at this time, a voltage at the right terminal of the capacitor C is $2V_{dd} - V_{data} - V_{th}$. Stage t3 is the compensation stage.

[0041] At stage t4, Reset = 1, EM1 = 1, EM2 = 0, Gate = 1, Ref1 = Vdd, Ref2 = Vss. Since EM2 = 0, thus the fifth switching transistor T5 is turned on; since the Reset = 1, EM1 = 1, Gate = 1, thus the first switching transistor T1, the second switching transistor T2, the third switching transistor T3, and the fourth switching transistor T4 are turned off. The turned-on fifth switching transistor T5 makes the third node P3, i.e. the drain of the driving transistor D1, and the anode layer of the organic electroluminescent light-emitting architecture conductive, in this case, a signal Vss at the second reference voltage signal terminal Ref2 is inputted to the cathode layer of the organic electroluminescent architecture, the driving transistor D1 is turned on under control of the first node P1, to drive the organic electroluminescent architecture to normally emit light by turning on the fifth switching transistor T5, at this time, the current that drives the organic electroluminescent architecture to emit light is:

$$I = \frac{1}{2}K(V_{gs} - V_{th})^2 = \frac{1}{2}K[V_{dd} - (2V_{dd} - V_{data} - V_{th}) - V_{th}]^2 = \frac{1}{2}K(V_{data} - V_{dd})^2$$

where K is a constant related to a manufacturing parameter and a geometry size of the driving transistor D1, V_{gs} is a voltage difference between the gate and the source of the driving transistor D1. From the above analysis it is known that the current that drives the organic electroluminescent architecture to emit light is authentically independent of the threshold voltage of the driving transistor D1, which eliminates the affect caused by change of the threshold voltage of the driving transistor D1 on lightening luminance, and improves evenness of lightening luminance of the display panel.

Stage t4 is the light emitting stage.

[0042] At stage t5, the cathode layer of the organic electroluminescent architecture serves as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire, thereby achieving the touch control function, thus stage t5 is the touch control stage, at this stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch g electrodes to sense occurrence of an outside touch, thus the signal at the second reference signal terminal connected to the cathodes will change due to the generation of the touch control signal, correspondingly, the signal at the driving signal line that drives the touch electrodes, i.e., the signal line that provides a signal to the second reference signal terminal, will change along with the change of the touch control signal, accordingly, the signals on the rest signal lines are regulated in synchronization. For example, as shown in Figure 6, the signal at the second reference signal terminal Ref2 becomes Vss-Vtouch, accordingly, the signals at the reset signal lines are all reduced by Vtouch, so signals on the driving signal line that drives the touch electrodes and respective signal lines are modulated in synchronization, no additional signal difference will be generated between the respective signal lines, thus it is possible to keep the signal differences between the respective signal lines and the signal line that drives the touch electrode constant, which eliminates the parasitic capacitance of the touch electrodes caused by the generation of the touch control signal, and improves touch control performance of the touch panel.

[0043] In a subsequent period, the pixel driving circuit will repeat the operation process in steps t1 to t5 as described above.

[0044] Based on the same inventive concept, an embodiment of the present application provides a driving method for the organic electroluminescent touch panel described above, as shown in Figure 7, the method may comprise the following steps: an initialization stage, a charging stage, a compensation stage, a light-emitting stage, and a touch control stage that proceed sequentially; wherein

S101: in the initialization stage, the initialization module is configured to, under control of the reset signal terminal, initialize the first node via an initialize signal inputted by the initialize signal terminal;

S102: in the charging stage, the charging module is configured to, under control of the scan signal terminal, perform data writing at the first node and the second node via a data signal inputted by the data signal terminal;

S103: in the compensation stage, the compensation module is configured to, under control of the first signal control terminal, perform threshold voltage compensation of the driving module at the first node via a signal inputted by the first reference signal terminal;

S104: in the light-emitting stage, the light-emitting control module is turned on under control of the second signal control terminal, the driving module is configured to, under control of the first node, drive the organic electroluminescent architecture to emit light via the light-emitting control module that is turned on; and

S105: in the touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire.

[0045] Specifically, in the driving method for the organic electroluminescent touch panel provided above by an embodiment of the present application, by means of partitioning the cathode layer of the organic electroluminescent architecture, in the touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire, and further, determination of touch control points is implemented, that is, implementing that the display panel is integrated with the touch control function based on organic electroluminescent display, and the pixel driving circuit initializes the control terminal of the driving module in the initialization stage, threshold voltage compensation of the driving module is performed in the compensation stage, which avoids an affect caused by change of the threshold voltage of the driving module on lightening luminance, and improves evenness of lightening luminance of the display panel, thus ensures display image quality, meanwhile, in the touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch, signals on the rest signal lines for transmitting various signals, such as a scan signal line, a data line, a power source voltage line, are all modulated in synchronization with external touch control signals sensed by the touch electrodes, the parasitic capacitance of the touch electrode can be eliminated, and touch control performance of the touch panel can be improved.

[0046] Based on the same inventive concept, an embodiment of the present application provides a display device comprising the organic electroluminescent touch panel described above. The display device may be applied to mobile phones, tablet computers, televisions, monitors, notebook computers, digital picture frames, navigation systems and any other products or components having a display function. Since the principle by which the display device solves the problem is similar to that of the organic electroluminescent touch panel, thus, as to implementations of this display device, reference may be made to the implementations of the above-described organic electroluminescent touch panel, details

are omitted here.

[0047] The embodiments of the present application provide an organic electroluminescent touch panel, a driving method for the same, and a display device comprising the same, the organic electroluminescent touch panel comprising: a pixel driving circuit and an organic electroluminescent architecture; wherein a cathode layer of the organic electroluminescent architecture is partitioned into a plurality of cathodes independent of and insulating from each other, the cathodes being connected, via a lead wire, one-by-one, to pins to which a touch display integrated chip corresponds; as such, in a charging stage, the charging module performs data writing at the first node and the second node; in a compensation stage, the compensation module performs threshold voltage compensation of the driving module at the first node; in a light-emitting stage, the driving module drives the organic electroluminescent architecture to emit light via the light-emitting control module that is turned on; in a touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire. Without changing the original organic electroluminescent architecture, by means of partitioning the cathode layer of the organic electroluminescent architecture, in the touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire, and further, determination of touch control points is implemented, that is, implementing that the display panel is integrated with the touch control function based on organic electroluminescent display, and the pixel driving circuit initializes the control terminal of the driving module in the initialization stage, threshold voltage compensation of the driving module is performed in the compensation stage, which avoids an affect caused by change of the threshold voltage of the driving module on lightening luminance, and improves evenness of lightening luminance of the display panel, thus ensures display image quality, meanwhile, in the touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch, signals on the rest signal lines for transmitting various signals, such as a scan signal line, a data line, a power source voltage line, are all modulated in synchronization with external touch control signals sensed by the touch electrodes, the parasitic capacitance of the touch electrode can be eliminated, and touch control performance of the touch panel can be improved.

[0048] Obviously, those skilled in the art can make various modifications and variations to the present disclosure without departing from the spirit and scope thereof. Thus, if these modifications and variations of the present disclosure are within the scope of the claims of the application as well as their equivalents, the present disclosure is also intended to include these modifications and variations.

[0049] The present application claims priority of the Chinese Patent Application No. 201510293859.0 filed on June 01, 2015, the entire disclosure of which is hereby incorporated in full text by reference as part of the present application.

Claims

1. An organic electroluminescent touch panel, comprising: a pixel driving circuit and an organic electroluminescent architecture;
the organic electroluminescent architecture including: an anode layer, a cathode layer, and a light-emitting layer located between the anode layer and the cathode layer; the cathode layer being partitioned into a plurality of cathodes independent of and insulating from each other, the cathodes being connected, via a lead wire, one-by-one, to pins to which a touch display integrated chip corresponds;
the pixel driving circuit including: an initialization module, a charging module, a compensation module, a driving module, and a light-emitting control module; a control terminal of the initialization module being connected to a reset signal terminal, an input terminal thereof being connected to an initialize signal terminal, and an output terminal thereof being connected to a first node; a first control terminal and a second control terminal of the charging module being both connected to a scan signal terminal, a first input terminal thereof being connected to a data signal terminal, a second input terminal thereof being connected to a third node, a first output terminal thereof being connected to the first node, and a second output terminal thereof being connected to a second node; a control terminal of the compensation module being connected to a first signal control terminal, an input terminal thereof being connected to a first reference signal terminal, and an output terminal thereof being connected to the second node; a control terminal of the driving module being connected with the first node, an input terminal thereof being connected to the first reference signal terminal, and an output terminal thereof being connected to the third node; a control terminal of the light-emitting control module being connected to a second signal control terminal, an input terminal thereof being connected to the third node, and an output terminal thereof being connected to the anode layer of the organic electroluminescent architecture, wherein
in an initialization stage, the initialization module is configured to, under control of the reset signal terminal, initialize the first node via an initialize signal inputted by the initialize signal terminal; in a charging stage, the charging module

is configured to, under control of the scan signal terminal, perform data writing at the first node and the second node via a data signal inputted by the data signal terminal; in a compensation stage, the compensation module is configured to, under control of the first signal control terminal, perform threshold voltage compensation of the driving module at the first node via a signal inputted by the first reference signal terminal; in a light-emitting stage, the light-emitting control module is turned on under control of the second signal control terminal, the driving module is configured to, under control of the first node, drive the organic electroluminescent architecture to emit light via the light-emitting control module that is turned on; in a touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire.

- 5 **2.** The organic electroluminescent touch panel according to claim 1, wherein the cathode layer of the organic electroluminescent architecture are partitioned to form a plurality of square cathodes, each square cathode has a side length of 4 mm.
- 15 **3.** The organic electroluminescent touch panel according to claim 2, wherein the lead wire is located in a metal layer where a gate line resides, or in a source-drain metal layer, or in a third metal layer other than the metal layer where a gate line resides and the source-drain metal layer.
- 20 **4.** The organic electroluminescent touch panel according to claim 3, wherein the organic electroluminescent architecture further comprises a hole transmission layer and an electron transmission layer; the hole transmission layer is located between the anode layer and the light-emitting layer; the electron transmission layer is located between the cathode layer and the light-emitting layer.
- 25 **5.** The organic electroluminescent touch panel according to claim 4, wherein material of the cathode layer is a magnesium aluminum alloy or a magnesium silver alloy, material of the anode material layer is ITO material.
- 30 **6.** The organic electroluminescent touch panel according to any one of claims 1-6, wherein the driving module includes a driving transistor; a gate of the driving transistor is connected to the first node, a source thereof is connected to the first reference signal terminal, and a drain thereof is connected to the third node.
- 35 **7.** The organic electroluminescent touch panel according to any one of claims 1-6, wherein the initialization module includes a first switching transistor; a gate of the first switching transistor is connected to the reset signal terminal, a source thereof is connected to the initialize signal terminal, and a drain thereof is connected to the first node.
- 40 **8.** The organic electroluminescent touch panel according to any one of claims 1-6, wherein the charging module includes a second switching transistor, a third switching transistor, and a capacitor; a gate of the second switching transistor is connected to the scan signal terminal, a source thereof is connected to the third node, and a drain thereof is connected to the first node; a gate of the third switching transistor is connected to the scan signal terminal, a source thereof is connected to the data signal terminal, and a drain thereof is connected to the second node; and the capacitor is connected between the first node and the second node.
- 45 **9.** The organic electroluminescent touch panel according to any one of claims 1-6, wherein the compensation module includes a fourth switching transistor; a gate of the fourth switching transistor is connected to the first signal control terminal, a source thereof is connected to the first reference signal terminal, a drain thereof is connected to the second node.
- 50 **10.** The organic electroluminescent touch panel according to any one of claims 1-6, wherein the light-emitting control module includes a fifth switching transistor; a gate of the fifth switching transistor is connected to the second signal control terminal, a source thereof is connected to the third node, and a drain thereof is connected to the anode layer of the organic electroluminescent architecture.
- 55 **11.** A driving method for the organic electroluminescent touch panel according to any one of claims 1-10, comprising: an initialization stage, a charging stage, a compensation stage, a light-emitting stage, and a touch control stage that proceed sequentially; wherein in the initialization stage, the initialization module is configured to, under control of the reset signal terminal, initialize

the first node via a initialize signal inputted by the initialize signal terminal;
in the charging stage, the charging module is configured to, under control of the scan signal terminal, perform data writing at the first node and the second node via a data signal inputted by the data signal terminal;
5 in the compensation stage, the compensation module is configured to, under control of the first signal control terminal, perform threshold voltage compensation of the driving module at the first node via a signal inputted by the first reference signal terminal;
in the light-emitting stage, the light-emitting control module is turned on under control of the second signal control terminal, the driving module is configured to, under control of the first node, drive the organic electroluminescent architecture to emit light via the light-emitting control module that is turned on; and
10 in the touch control stage, the plurality of cathodes formed by partitioning the cathode layer of the organic electroluminescent architecture serve as touch electrodes to sense occurrence of an outside touch and transmit a touch signal to the touch display integrated chip via the lead wire.

12. A display device comprising the organic electroluminescent touch panel according to any one of claims 1-10.

15

20

25

30

35

40

45

50

55

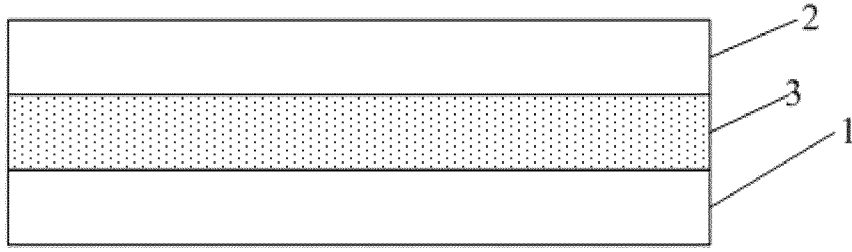


Figure 1a

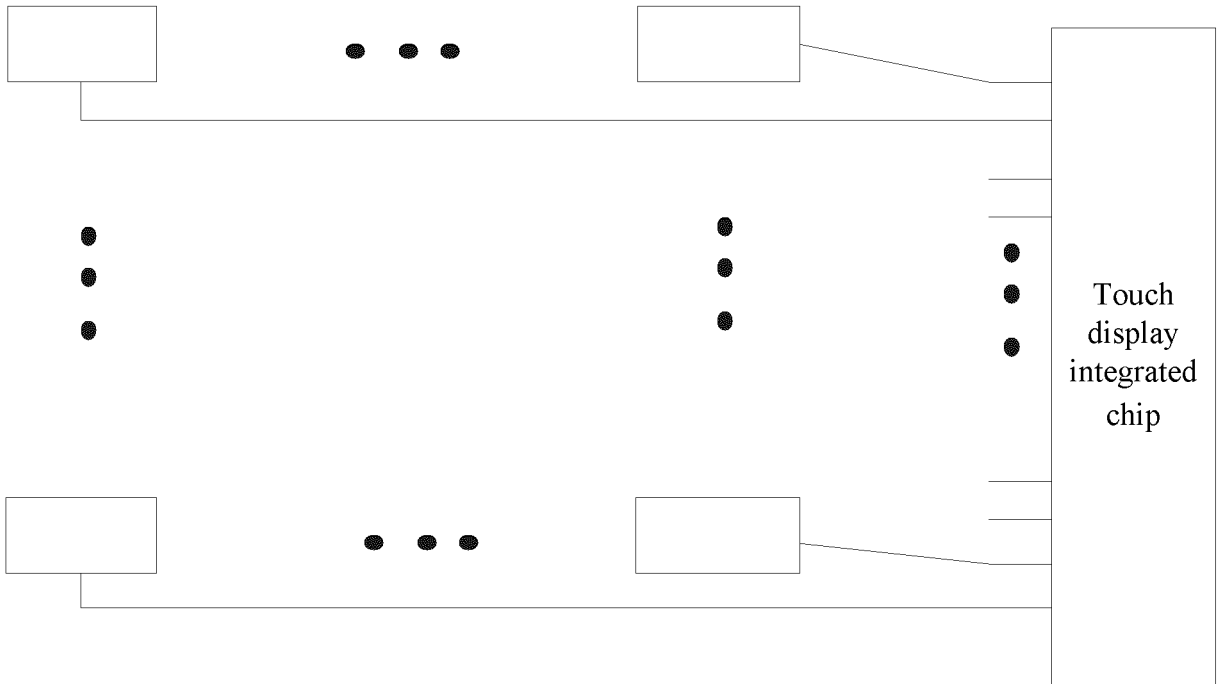


Figure 1b

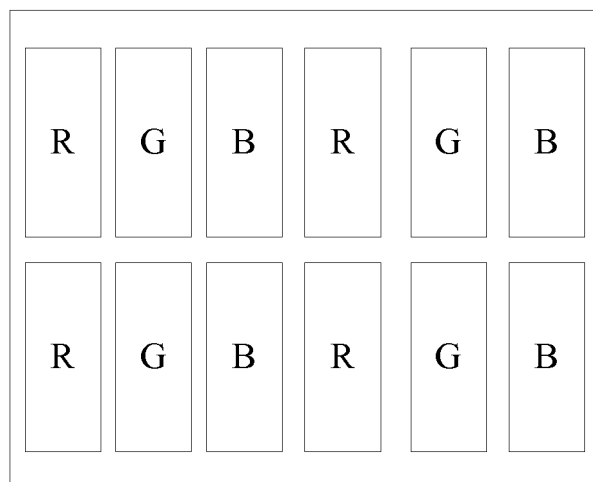


Figure 1c

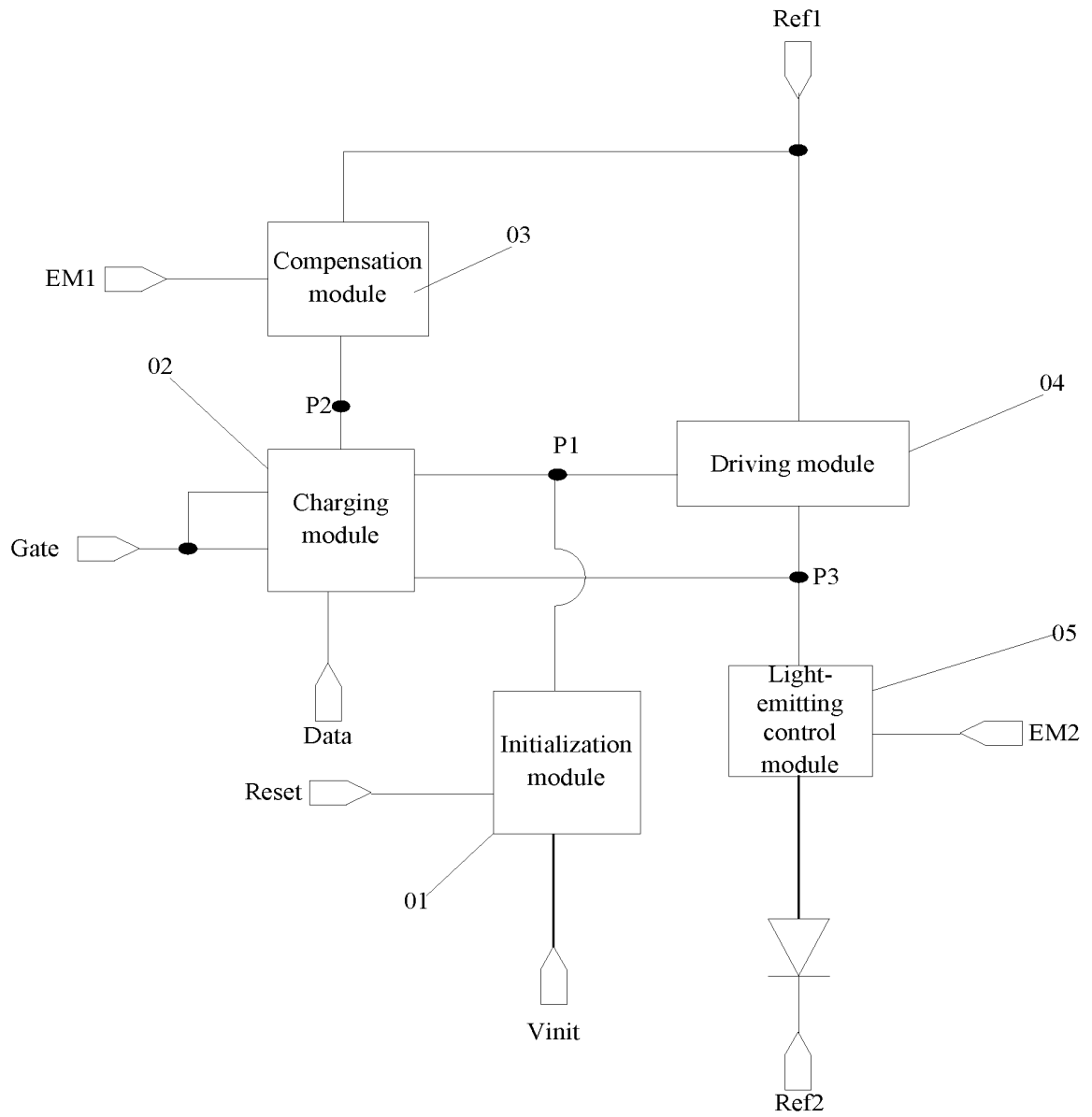


Figure 2

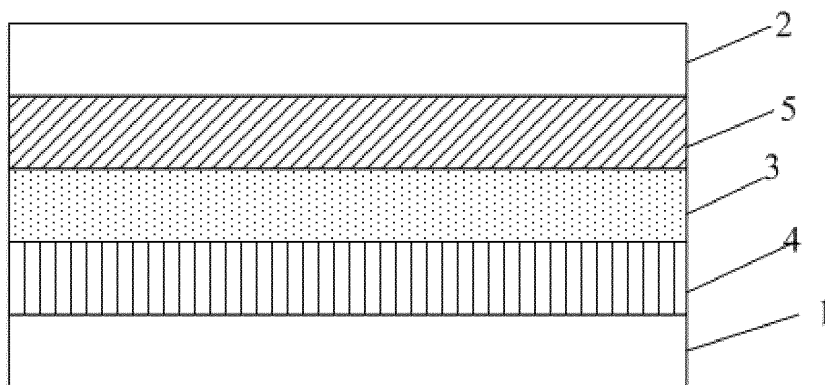


Figure 3

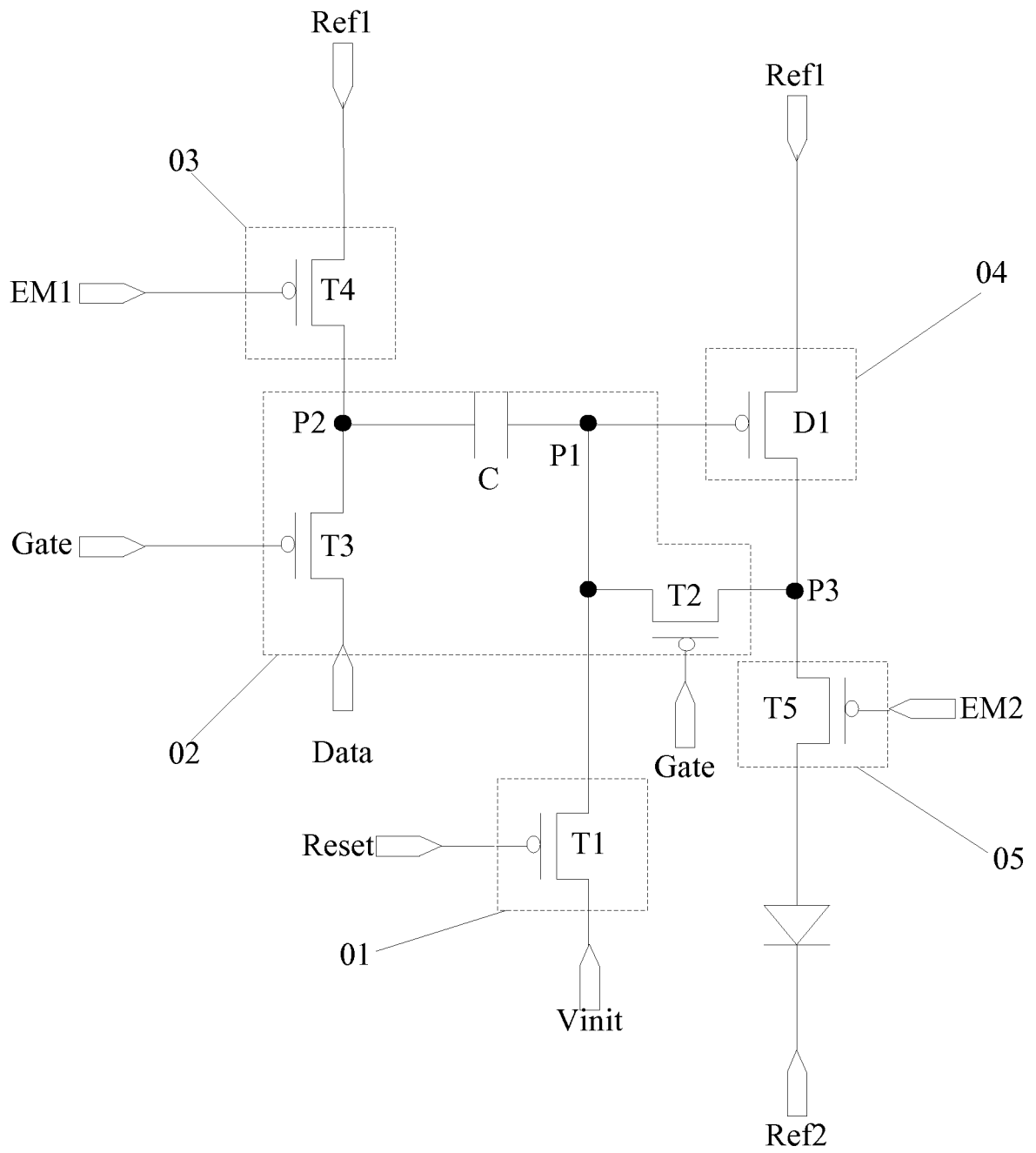


Figure 4

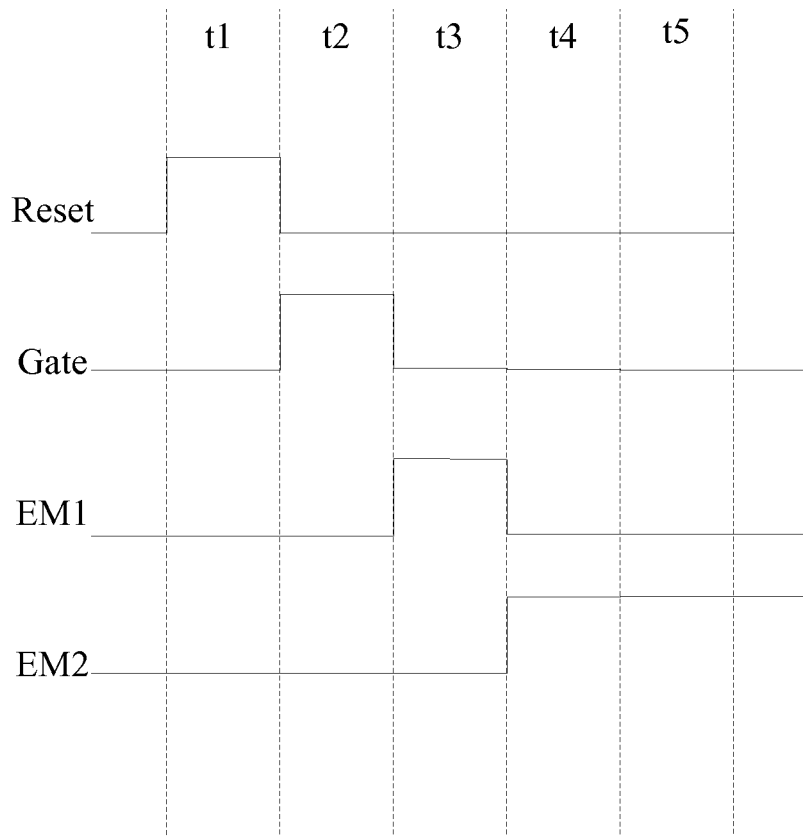


Figure 5

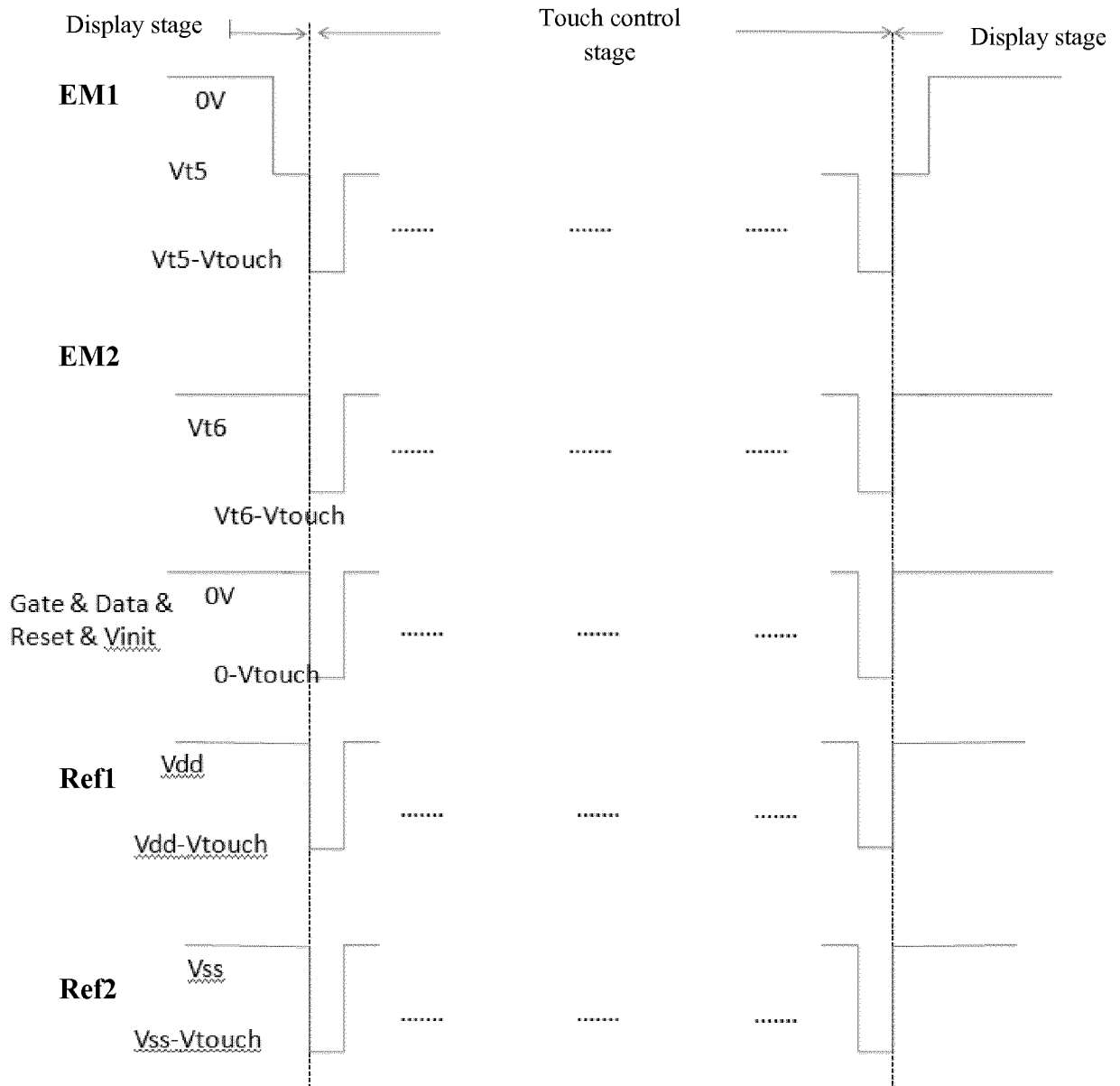


Figure 6

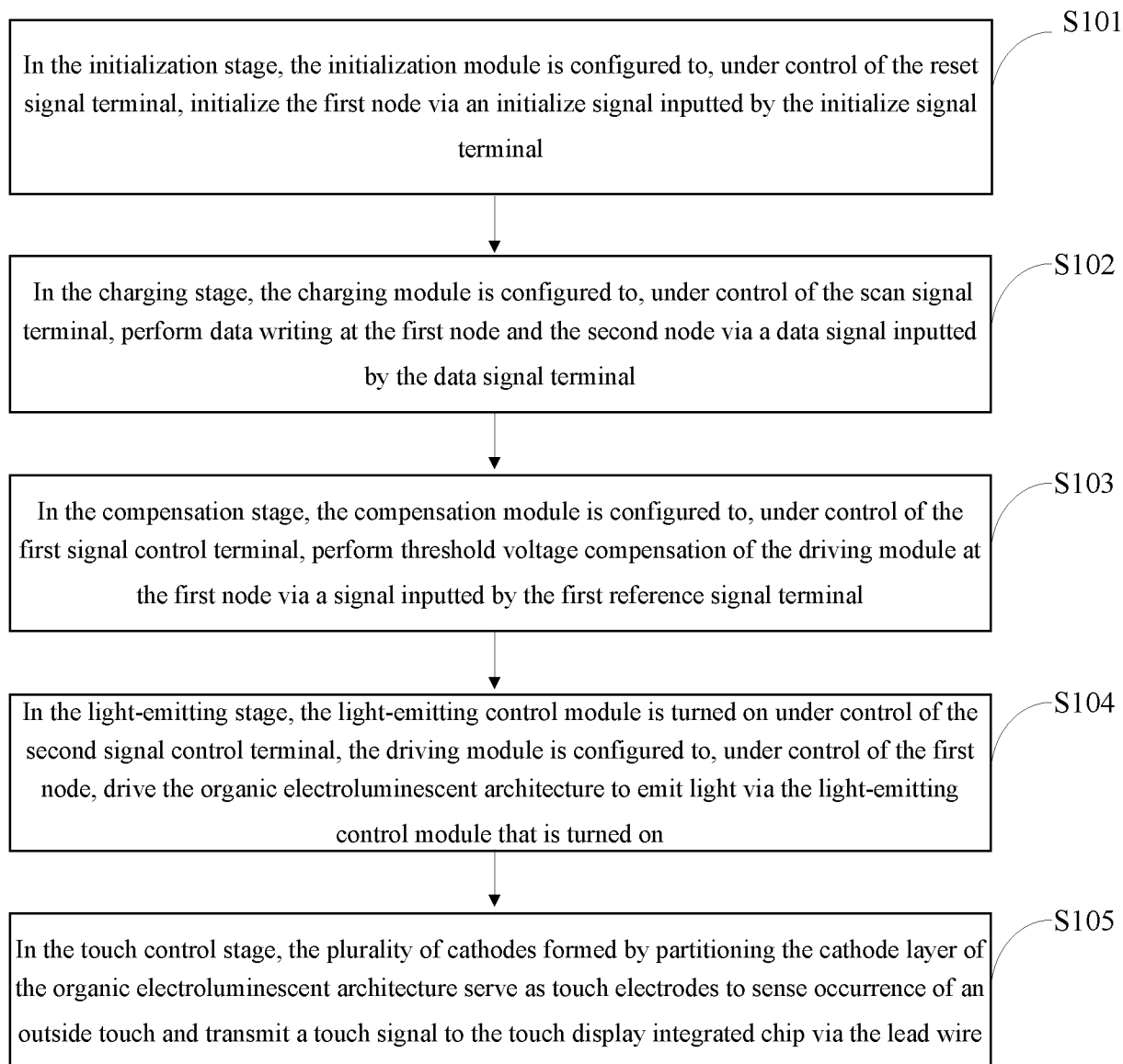


Figure 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2015/090121

A. CLASSIFICATION OF SUBJECT MATTER

G09G 3/32 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G09G 3/32

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT, CNKI, WPI, EPODOC: luminescence, OLED, touch+, anode, cathode, reset+, compensat+, threshold, transistor?, switch, capacit+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 104835454 A (BOE TECHNOLOGY GROUP CO., LTD. et al.) 12 August 2015 (12.08.2015) claims 1-12	1-12
A	CN 104599638 A (BOE TECHNOLOGY GROUP CO., LTD. et al.) 06 May 2015 (06.05.2015) description, paragraphs [0070]-[0089], [0130] and [0131], and figures 1 and 2	1-12
A	CN 104036725 A (BOE TECHNOLOGY GROUP CO., LTD. et al.) 10 September 2014 (10.09.2014) the whole document	1-12
A	CN 104575398 A (BOE TECHNOLOGY GROUP CO., LTD. et al.) 29 April 2015 (29.04.2015) the whole document	1-12

 Further documents are listed in the continuation of Box C.
 See patent family annex.

* Special categories of cited documents:	“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
“A” document defining the general state of the art which is not considered to be of particular relevance	“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
“E” earlier application or patent but published on or after the international filing date	“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	“&” document member of the same patent family
“O” document referring to an oral disclosure, use, exhibition or other means	
“P” document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 08 January 2016	Date of mailing of the international search report 19 January 2016
Name and mailing address of the ISA State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	Authorized officer LI, Wenfei Telephone No. (86-10) 62414443

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2015/090121

5

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

10

15

20

25

30

35

40

45

50

55

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 104464640 A (KUNSHAN GOVISIONOX OPTOELECTRONICS CO., LTD.) 25 March 2015 (25.03.2015) the whole document	1-12
A	CN 103456267 A (BEIJING BOE OPTOELECTRONICS TECHNOLOGY CO., LTD.) 18 December 2013 (18.12.2013) the whole document	1-12
A	US 2011050674 A1 (KIM, YANG-WAN) 03 March 2011 (03.03.2011) the whole document	1-12

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2015/090121

5
10
15
20
25
30
35
40
45
50

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 104835454 A	12 August 2015	None	
CN 104599638 A	06 May 2015	None	
CN 104036725 A	10 September 2014	WO 2015180352 A1	03 December 2015
CN 104575398 A	29 April 2015	None	
CN 104464640 A	25 March 2015	None	
CN 103456267 A	18 December 2013	CN 103456267 B	02 December 2015
		EP 2887344 A1	24 June 2015
		WO 2015027631 A1	05 March 2015
		KR 20150032927 A	31 March 2015
US 2011050674 A1	03 March 2011	US 8797311 B2	05 August 2014
		KR 20110024099 A	09 March 2011

55

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 201510293859 [0049]

专利名称(译)	有机电致发光触控面板及其驱动方法，以及显示装置		
公开(公告)号	EP3306600A4	公开(公告)日	2019-01-23
申请号	EP2015892794	申请日	2015-09-21
[标]申请(专利权)人(译)	京东方科技集团股份有限公司 北京京东方光电科技有限公司		
申请(专利权)人(译)	京东方科技集团股份有限公司. 北京京东方光电科技有限公司.		
当前申请(专利权)人(译)	京东方科技集团股份有限公司. 北京京东方光电科技有限公司.		
[标]发明人	DING XIAOLIANG DONG XUE WANG HAISHENG CHEN XIAOCHUAN YANG SHENGJI LIU YINGMING LIU WEI WANG LEI REN TAO		
发明人	DING, XIAOLIANG DONG, XUE WANG, HAISHENG CHEN, XIAOCHUAN YANG, SHENGJI LIU, YINGMING LIU, WEI WANG, LEI REN, TAO		
IPC分类号	G09G3/32		
CPC分类号	G06F3/0412 G06F3/04184 G06F3/044 G09G3/3233 G09G2300/0819 G09G2300/0861 G09G2310/0251 G09G2310/0262 G09G2320/043 G09G2354/00 G09G3/32 H01L27/323 H01L51/5225 G06F3/0418 H01L27/3276 H01L51/5012 H01L51/5056 H01L51/5072 H01L51/5206 H01L2251/301 H01L2251/308		
优先权	201510293859.0 2015-06-01 CN		
其他公开文献	EP3306600A1		
外部链接	Espacenet		

摘要(译)

本申请提供了一种有机电致发光触摸面板，其驱动方法以及包括该触摸面板的显示装置。在不改变原始有机电致发光结构的情况下，有机电致发光结构的阴极层（2）被分隔以形成彼此独立且彼此绝缘的多个阴极，多个阴极用作触摸电极以感测外部触摸的发生并且通过引线将触摸信号传输到触摸显示集成芯片，实现显示面板与基于有机电致发光显示的触摸控制功能集成，以及通过像素驱动电路，驱动模块的控制端子（04在初始化阶段初始化，在补偿阶段进行驱动模块（04）的阈值电压补偿，避免了驱动模块（04）的阈值电压对亮度亮度的影响，同时，在触摸控制级中，各个信号线上的信号都与ex同步调制通过触摸电极感测到的触摸控制信号，可以消除触摸电极的寄生电容，提高触摸屏的触摸控制性能。

