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DISPLAY PANEL AND DISPLAY DEVICE

Abstract

A display panel and a display device are provided. A pixel driving circuit included in the display panel includes a switch transistor, a driving transistor, a compensation transistor, and a first capacitor which are interconnected. A first electrode of the compensation transistor is connected to a gate of the driving transistor, and a compensation gate of the compensation transistor is connected to a first control signal line. A first plate of the first capacitor is connected to the first control signal line, and a second plate of the first capacitor is connected to a first high potential line.

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Background/Summary

TECHNICAL FIELD

[0001] The present application relates to a field of display technology, and in particular, to display panel and a display device.

DESCRIPTION OF RELATED ART

[0002] Organic light-emitting diode (OLED) display technology is a new type of display technology that has gradually gained attention for its unique advantages of low power consumption, high saturation, fast response time, and wide viewing angle, occupying a certain position in the field of panel display technology.

[0003] In related technologies, the pixel driving circuit of an OLED display panel usually includes a switch transistor, a driving transistor, and a compensation transistor. A drain of the switch transistor is connected to a data line, and a gate of the compensation transistor is connected to a control signal line. There is an overlapping area between the data line and the control signal line. When a voltage input to the data line changes, a coupling capacitance between the data line and the control signal line causes a voltage signal on the control signal line to change, resulting in abnormal turning on of the compensation transistor, thereby affecting a potential of the gate of the driving transistor and causing display anomalies of the display panel.

SUMMARY OF INVENTION

[0004] The present application provides a display panel and a display device for addressing technical issues of display anomalies of existing display panels.

[0005] Accordingly, the present application provides the following technical solutions.

[0006] The present application provides a display panel, including a plurality of sub-pixel units, each of the sub-pixel units including a light-emitting device and a pixel driving circuit connected to the light-emitting device, wherein each of the pixel driving circuits includes: [0007] a switch transistor, wherein a first electrode of the switch transistor is connected to a first data signal line, and a second electrode of the switch transistor is connected to a first node; [0008] a driving transistor, wherein a first electrode of the driving transistor is connected to the first node, a second electrode of the driving transistor is connected to a second node, and a drive gate of the driving transistor is connected to a third node; [0009] a compensation transistor, wherein a first electrode of the compensation transistor is connected to the third node, a second electrode of the compensation transistor is connected to the second node, and a compensation gate of the compensation transistor is connected to a first control signal line; and [0010] a first capacitor, wherein a first plate of the first capacitor is connected to the first control signal line, and a second plate of the first capacitor is connected to a first high potential line.

[0011] The present application further provides a display device. The display device includes a display panel, wherein the display panel includes a plurality of sub-pixel units, and each of the sub-pixel units includes a light-emitting device and a pixel driving circuit connected to the light-emitting device, wherein each of the pixel driving circuits includes: [0012] a switch transistor, wherein a first electrode of the switch transistor is connected to a first data signal line, and a second electrode of the switch transistor is connected to a first node; [0013] a driving transistor, wherein a first electrode of the driving transistor is connected to the first node, a second electrode of the driving transistor is connected to a second node, and a drive gate of the driving transistor is connected to a third node; [0014] a compensation transistor, wherein a first electrode of the compensation transistor is connected to the third node, a second electrode of the compensation transistor is connected to the second node, and a compensation gate of the compensation transistor

is connected to a first control signal line; and [0015] a first capacitor, wherein a first plate of the first capacitor is connected to the first control signal line, and a second plate of the first capacitor is connected to a first high potential line.

Description

BRIEF DESCRIPTION OF DRAWINGS

[0016] FIG. 1 is a schematic structural view of a display panel in the present application.

[0017] FIG. 2 is an equivalent circuit diagram of a pixel driving circuit in the display panel of the present application.

[0018] FIG. 3 is a schematic film layer view of the display panel of the present application.

[0019] FIG. 4 is a film layer diagram of a first gate layer in the display panel of the present application.

[0020] FIG. 5 is a film layer diagram of a first active layer in the display panel of the present application.

[0021] FIG. 6 is a laminated film layer diagram of the first gate layer and the first active layer in the display panel of the present application.

[0022] FIG. 7 is a film layer diagram of a second gate layer in the display panel of the present application.

[0023] FIG. 8 is a laminated film layer diagram of the first gate layer and the second gate layer in the display panel of the present application.

[0024] FIG. 9 is a film layer diagram of a second active layer in the display panel of the present application.

[0025] FIG. 10 is a film layer diagram of a third gate layer in the display panel of the present application.

[0026] FIG. 11 is a film layer diagram of the first active layer, the second active layer, the second gate layer, and the third gate layer in the display panel of the present application.

[0027] FIG. 12 is a film layer diagram of a first source-drain layer in the display panel of the present application.

[0028] FIG. 13 is a film layer diagram of the first gate layer, the third gate layer, the first active layer, the second active layer, and the first source-drain layer in the display panel of the present application.

[0029] FIG. 14 is a film layer diagram of the second active layer, the second gate layer, and the first source-drain layer in the display panel of the present application.

[0030] FIG. 15 is a film layer diagram of the first gate layer, the second gate layer, the third gate layer, the first active layer, the second active layer, and the first source-drain layer in the display panel of the present application.

[0031] FIG. 16 is a first type of film layer diagram of a second source-drain layer in the display panel of the present application.

[0032] FIG. 17 is a first type of laminated film layer diagram of the first active layer, the second active layer, the third gate layer, the first source-drain layer, and the second source-drain layer in the display panel of the present application.

[0033] FIG. 18 is a first type of laminated film layer diagram of the pixel driving circuit in the present application.

[0034] FIG. 19 is a connection diagram of different sub-pixel units and different data lines in the display panel of the present application.

[0035] FIG. 20 is a second type of film layer diagram of the second source-drain layer in the display panel of the present application.

[0036] FIG. 21 is a second type of laminated film layer diagram of the first active layer, the second

active layer, the third gate layer, the first source-drain layer, and the second source-drain layer in the display panel of the present application.

[0037] FIG. **22** is a second type of laminated film layer diagram of the pixel driving circuit in the present application.

[0038] FIG. **23** is a third type of film layer diagram of the second source-drain layer in the display panel of the present application.

[0039] FIG. **24** is a third type of laminated film layer diagram of the first active layer, the second active layer, the third gate layer, the first source-drain layer, and the second source-drain layer in the display panel of the present application.

[0040] FIG. **25** is a third type of laminated film layer diagram of the pixel driving circuit in the present application.

[0041] FIG. **26** is a film layer diagram of a third source-drain layer in the display panel of the present application.

[0042] FIG. **27** is a laminated film layer diagram of the second source-drain layer and the third source-drain layer in the display panel of the present application.

[0043] FIG. **28** is a fourth type of laminated film layer diagram of the pixel driving circuit in the present application.

[0044] FIG. **29** is a film layer diagram of the third source-drain layer across multiple sub-pixel units in the display panel of the present application.

[0045] FIG. **30** is a connection diagram of a first reset signal line, a second reset signal line, a third reset signal line, and a fourth reset signal line in the display panel of the present application.

[0046] FIG. **31** is a laminated film layer diagram of the third source-drain layer, a data signal line, and an anode of a light-emitting device in the display panel of the present application.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0047] The following provides a clear and comprehensive description of the technical solutions in the embodiments of the present application, in conjunction with the drawings included in the embodiments of the application. It is evident that the described embodiments are only a part of the embodiments of the application and not all of them. Based on the embodiments in this application, all other embodiments obtained by those skilled in the art without making creative efforts fall within the protection scope of this application. Moreover, it should be understood that the specific embodiments described here are only for illustrating and explaining this application and not for limiting this application. In this application, unless stated otherwise, orientation terms such as “upper” and “lower” generally refer to the direction above and below when the device is in actual use or working state, specifically, the directions in the drawings; whereas “inner” and “outer” refer to the outline of the device.

[0048] Referring to FIGS. **1** to **30**, the present application provides a display panel **100**. The display panel **100** can include a display part **200**, and a gate driving circuit **300** located on one side of the display part **200**. The gate driving circuit **300** is used to input control signals to the display part **200**.

[0049] In the present embodiment, referring to FIG. **1**, the display part **200** comprises a plurality of sub-pixel rows **210**. Each sub-pixel row **210** includes a plurality of sub-pixel units **211**. Each sub-pixel unit **211** is provided with a light-emitting device **211b** and a pixel driving circuit **211a** connected to the light-emitting device **211b**. The gate driving circuit **300** is used to input gate control signals to transistors in the pixel driving circuit **211a**.

[0050] In the present embodiment, the pixel driving circuit **211a** can include a switch transistor T2, a driving transistor T1, and a compensation transistor T3, which are interconnected. A first electrode of the switch transistor T2 is connected to a first data signal line Data1, and a second electrode of the switch transistor T2 is connected to a first node A. A first electrode of driving transistor T1 is connected to the first node A, and a second electrode of driving transistor T1 is connected to a second node B. A drive gate T1G of the driving transistor T1 is connected to a third

node Q. A first electrode of the compensation transistor T3 is connected to the third node Q, and a second electrode of the compensation transistor T3 is connected to the second node B. A compensation gate T3G of the compensation transistor T3 is connected to a first control signal line Nscan1.

[0051] In the present embodiment, the pixel driving circuit 211a further includes a first capacitor C1. A first plate of the first capacitor C1 is connected to the first control signal line Nscan1, and a second plate of the first capacitor C1 is connected to a first high potential line VDD1.

[0052] By setting the first capacitor C1 between the first control signal line Nscan1 and the first high potential line VDD1, and utilizing a high potential of the first high potential line VDD1 to enhance the anti-coupling capability of the first control signal line Nscan1, the stability of the control signal transmitted by the first control signal line Nscan1 is improved. This approach avoids abnormal activation of the compensation transistor T3, ensures the stability of a potential of the gate of the driving transistor T1, and addresses the technical issue of display anomalies in the display panel 100.

[0053] It should be noted that the light-emitting device 211b in this application can be an organic light-emitting diode (OLED), a Mini LED, a Micro LED, a regular-sized LED, or other light sources.

[0054] The technical solution of this application is described in conjunction with specific embodiments.

[0055] Referring to FIG. 1, the display panel 100 includes a display area AA and a non-display area NA adjacent to the display area AA, with a display part 200 situated in the display area AA.

Optionally, the non-display area NA surrounds the display area AA, enclosing the display area AA. The display area AA is a region within the display panel 100 that performs the display function, containing multiple sub-pixel units 211 to fulfill the display function. The non-display area NA can be a frame region of the display panel 100, with functional components provided in the frame region to assist the display function of the sub-pixel units 211 within the display area AA.

[0056] Referring to FIG. 1, bonding terminals 400 are arranged on a lower side of the display area AA. The bonding terminals 400 can connect to external circuits. The bonding terminals 400 transmit signals input from the external circuits to the data lines, thereby driving the display panel 100 to display images. For example, the bonding terminals 400 can be bonded to a chip or a flip-chip film, providing power supply and driving signals for the display panel 100.

[0057] In the present embodiment, the gate driving circuit 300 is situated in the non-display area NA, as well as on two sides of the display area AA. The gate driving circuit 300 can include cascaded multiple gate driving units, which can be arranged in a first direction X. The structure of the gate driving units is not specifically limited in this application.

[0058] In the present embodiment, multiple light-emitting devices 211b and pixel driving circuits 211a that drive these light-emitting devices are arranged in an array in the display area AA. The pixel driving circuits 211a can vary in configuration, including 7T1C (7 transistors, 1 capacitor), 7T2C (7 transistors, 2 capacitors), 8T2C (8 transistors, 2 capacitors), 8T3C (8 transistors, 3 capacitors), 8T4C (8 transistors, 4 capacitors), etc. In the following embodiment, the 8T3C pixel driving circuit 211a is used as an example to illustrate.

[0059] Referring to FIG. 2, the pixel driving circuit 211a can include a switch transistor T2, a driving transistor T1, a compensation transistor T3, a first reset transistor T4, a second reset transistor T7, a third reset transistor T8, a first light-emitting transistor T5, a second light-emitting transistor T6, a first capacitor C1, a boost capacitor Cboost, and a storage capacitor Cst. The first capacitor C1 consists of a first plate and a second plate. The storage capacitor Cst includes a third plate Cst1 and a fourth plate Cst2. The boost capacitor Cboost comprises a fifth plate and a sixth plate.

[0060] Referring to FIG. 2, a first electrode of the switch transistor T2 is connected to a first data signal line Data1, and a second electrode of the switch transistor T2 is connected to a first node A.

A switch gate T2G of the switch transistor T2 is connected to a second control signal line Pscan1. A first electrode of the driving transistor T1 is connected to the first node A, a second electrode of the driving transistor T1 is connected to a second node B, and a drive gate T1G of the driving transistor T1 is connected to a third node Q. A first electrode of the compensation transistor T3 is connected to the third node Q, a second electrode of the compensation transistor T3 is connected to the second node B, and a compensation gate T3G of the compensation transistor T3 is connected to a first control signal line Nscan1. A first electrode of the first reset transistor T4 is connected to a first reset signal line Vi1, a second electrode of the first reset transistor T4 is connected to the third node Q, and a first reset gate T4G of the first reset transistor T4 is connected to a third control signal line Nscan2. A first electrode of the second reset transistor T7 is connected to the second reset signal line Vi2, a second electrode of the second reset transistor T7 is connected to an anode of the light-emitting device 211b, and a second reset gate T7G of the second reset transistor T7 is connected to a fourth control signal line Pscan2. A first electrode of the third reset transistor T8 is connected to a third reset signal line Vi3, a second electrode of the third reset transistor T8 is connected to the first node A, and a third reset gate T8G of the third reset transistor T8 is connected to a fourth control signal line Pscan2. A first electrode of the first light-emitting transistor T5 is connected to a first high potential line VDD1, a second electrode of the first light-emitting transistor T5 is connected to the first node A, and a first light-emitting gate T5G of the first light-emitting transistor T5 is connected to a light-emitting signal line EM. A first electrode of the second light-emitting transistor T6 is connected to the second node B, a second electrode of the second light-emitting transistor T6 is connected to the anode of the light-emitting device 211b, and a second light-emitting gate T6G of the second light-emitting transistor T6 is connected to the light-emitting signal line EM. A fifth plate of the boost capacitor Cboost is connected to the third node Q, and a sixth plate of the boost capacitor Cboost is connected to the second control signal line Pscan1. The third plate Cst1 of the storage capacitor Cst is connected to the third node Q, and the fourth plate Cst2 of the storage capacitor Cst is connected to the first high potential line VDD1. The first plate of the first capacitor C1 is connected to the first control signal line Nscan1, and the second plate of the first capacitor C1 is connected to the first high potential line VDD1. A cathode of the light-emitting device 211b is connected to the first low potential line VSS.

[0061] It should be noted that for the switch transistors T2 in different sub-pixel units 211, they are connected to different data signal lines. The present application only takes one of them as an example for description.

[0062] In the present embodiment, the first high potential line VDD1 is used to provide a constant high voltage level to the pixel driving circuit 211a, and the first low potential line VSS is used to provide a constant low voltage level to the pixel driving circuit 211a.

[0063] In the present embodiment, the switch transistor T2, the driving transistor T1, the second reset transistor T7, the third reset transistor T8, the first light-emitting transistor T5, and the second light-emitting transistor T6 can be either P-type or N-type transistors. The compensation transistor T3 and the first reset transistor T4 can be of the other type. This application illustrates with the switch transistor T2, the driving transistor T1, the second reset transistor T7, the third reset transistor T8, the first light-emitting transistor T5, and the second light-emitting transistor T6 as P-type transistors, and the compensation transistor T3 and the first reset transistor T4 as N-type transistors as an example.

[0064] In the present embodiment, a capacitance value of the first capacitor C1 is less than a capacitance value of the storage capacitor Cst, and a capacitance value of the boost capacitor Cboost is also less than the capacitance value of the storage capacitor Cst. The storage capacitor Cst in this embodiment primarily serves to maintain the stability of a potential at the third node Q, and therefore, has a larger capacitance. For example, the capacitance value of the storage capacitor Cst can be in a range from 45 fF to 55 fF, while the capacitance values of the boost capacitor Cboost and the first capacitor C1 can be in a range from 5 fF to 15 fF.

[0065] In the present embodiment, the first electrode can be either a source or a drain, and the second electrode can be the other of the source and the drain.

[0066] In the following embodiment, an angle between the first direction X and the second direction Y is greater than 0 and less than or equal to 90 degrees, for instance, with the first direction X being horizontal and the second direction Y being vertical.

[0067] In the following, the film layer structure of the pixel driving circuit **211a**, as depicted in FIG. 2, is described.

[0068] Refer to FIG. 3, where the display area AA and the non-display area NA of the display panel **100** can include a base substrate **110** and an array driving layer **120** placed on the base substrate **110**. In the display area AA, the display panel **100** can also have a pixel definition layer (not illustrated) set on the array driving layer **120**, a light-emitting device layer (not illustrated) arranged in the same layer as the pixel definition layer, and an encapsulation layer (not illustrated) set on the pixel definition layer. The following mainly describes the film layer structure in the display area AA.

[0069] In the present embodiment, the base substrate **110** supports various layers positioned on it. When the display panel **100** is a bottom-emission or double-side emission light-emitting display device, a transparent base substrate is used. For top-emission light-emitting display devices, a semi-transparent, opaque, or transparent base substrate can be employed.

[0070] In the present embodiment, the base substrate **110** is utilized to support the various film layers set upon it and can be made of insulating materials such as glass, quartz, or polymer resin. The base substrate **110** can be either a rigid substrate or a flexible substrate that can be bent, folded, or rolled. Examples of flexible materials for the flexible substrate include polyimide (PI), but are not limited to polyimide (PI).

[0071] In this embodiment, the base substrate **110** may include a stack of a first flexible substrate **111**, a first barrier layer **112**, a second flexible substrate **113**, and a second barrier layer **114**. The first flexible substrate **111** and the second flexible substrate **113** can be made of the same material, such as polyimide. The first barrier layer **112** and the second barrier layer **114** can be formed of inorganic materials, including at least one of SiO_x and SiN_x.

[0072] In the present embodiment, the first flexible substrate **111** is formed by coating a polymer material on a supporting base (not illustrated) and then curing the polymer material. The second flexible substrate **113** is formed by coating a material identical to the material of the first flexible substrate **111** and curing it. The process to form the second flexible substrate **113** is the same as the process used to form the first flexible substrate **111**. Each of the first and second flexible substrates **111** and **113** can be formed to have a thickness of approximately 8 μm to 12 μm. Furthermore, when the base substrate **110** is formed of the first and second flexible substrates **111** and **113**, any small holes, cracks, etc., formed during the manufacturing of the first flexible substrate **111** are covered by the second flexible substrate **113**, thereby eliminating such defects.

[0073] Referring to FIG. 3, the array driving layer **120** can include multiple thin-film transistors (TFTs). These TFTs can be of the etch stop type, back-channel etched type, or categorized based on the position of the gate relative to the active layer as bottom gate TFTs, top gate TFTs, etc. Additionally, TFTs can be classified based on their electrical properties as N-type TFTs or P-type TFTs. It should be noted that the TFTs in FIG. 3 do not represent the structural diagram of any transistor in FIG. 2 but are merely schematic diagrams illustrating the various film layers of the display panel **100** in this application.

[0074] Referring to FIG. 3, the array driving layer **120** can include several layers placed on the base substrate **110**: a light-blocking layer **121** set on the base substrate **110**, a buffer layer **122** set on the light-blocking layer **121**, a first active layer **123** set on the buffer layer **122**, a first gate insulating layer **124** set on the first active layer **123**, a first gate layer **125** set on the first gate insulating layer **124**, a second gate insulating layer **126** set on the first gate layer **125**, a second gate layer **127** on the second gate insulating layer **126**, a third gate insulating layer **128** set on the second

gate layer **127**, a second active layer **129** set on the third gate insulating layer **128**, a fourth gate insulating layer **130** set on the second active layer **129**, a third gate layer **131** set on the fourth gate insulating layer **130**, a first interlayer insulating layer **132** set on the third gate layer **131**, a first source-drain layer **133** set on the first interlayer insulating layer **132**, a second interlayer insulating layer **134** set on the first source-drain layer **133**, a second source-drain layer **135** set on the second interlayer insulating layer **134**, a third interlayer insulating layer **136** set on the second source-drain layer **135**, a third source-drain layer **137** set on the third interlayer insulating layer **136**, and a planarization layer **138** set on the third source-drain layer **137**.

[0075] Referring to FIG. 3, the light-blocking layer **121** is set on the second barrier layer **114**. The light-blocking layer **121** is used to prevent external light from entering the thin-film transistors from below. A material of the light-blocking layer **121** can consist of black light-blocking materials, such as black metal or black organic materials, for example.

[0076] Referring to FIG. 3, the buffer layer **122** is set on the light-blocking layer **121**. The buffer layer **122** serves to isolate the light-blocking layer **121** from the upper metal materials. A material of the buffer layer **122** can include compounds composed of nitrogen, silicon, and oxygen elements, such as a single layer of silicon oxide film, or a stacked structure of silicon oxide and silicon nitride.

[0077] Referring to FIG. 3, the first active layer **123** is set on the buffer layer **122**, and the second active layer **129** can be set on the third gate insulating layer **128**. Materials for the first active layer **123** and the second active layer **129** can be indium gallium zinc oxide semiconductor, amorphous silicon, or low-temperature polysilicon. For example, in this application, the material for the first active layer **123** can be low-temperature polysilicon, and the material for the second active layer **129** can be an indium gallium zinc oxide semiconductor.

[0078] Referring to FIG. 3, the first gate insulating layer **124**, the second gate insulating layer **126**, the third gate insulating layer **128**, the fourth gate insulating layer **130**, the first interlayer insulating layer **132**, the second interlayer insulating layer **134**, and the third interlayer insulating layer **136** are respectively disposed on corresponding metal layers or semiconductor layers, separately isolating different layers of metal or semiconductor. Materials for the first gate insulating layer **124**, the second gate insulating layer **126**, the first interlayer insulating layer **132**, the third gate insulating layer **128**, the fourth gate insulating layer **130**, the second interlayer insulating layer **134**, and the third interlayer insulating layer **136** can be inorganic compounds composed of silicon nitride, or organic materials with planarization properties.

[0079] Referring to FIG. 3, the first gate layer **125**, the second gate layer **127**, and the third gate layer **131** are respectively positioned on corresponding insulating layers. Materials for the first gate layer **125**, the second gate layer **127**, and the third gate layer **131** can include copper, molybdenum, or molybdenum-titanium alloys.

[0080] Referring to FIG. 3, the first source-drain layer **133** is positioned on the first interlayer insulating layer **132**, the second source-drain layer **135** is placed on the second interlayer insulating layer **134**, and the third source-drain layer **137** is located on the third interlayer insulating layer **136**. Materials for the first source-drain layer **133**, the second source-drain layer **135**, and the third source-drain layer **137** can include copper, molybdenum, molybdenum-titanium alloy, or a titanium-aluminum-titanium triple-layer metal, etc.

[0081] Referring to FIG. 3, the planarization layer **138** is laid out entirely to ensure the flatness of the film layers of the array driving layer **120**. A material for the planarization layer **138** can consist of inorganic compounds composed of silicon nitride, or organic materials with planarization properties.

[0082] Referring to FIG. 4, the first gate layer **125** includes the light-emitting signal line EM, the first reset signal line Vi1, the third reset signal line Vi3, the fourth control signal line Pscan2, the light-emitting signal line EM, the first reset signal line Vi1, the third reset signal line Vi3, and the fourth control signal line Pscan2, all extending along the first direction X. The third reset signal

line Vi3, the fourth control signal line Pscan2, the light-emitting signal line EM, and the first reset signal line Vi1 are arranged at intervals along the second direction Y.

[0083] Referring to FIG. 4, the first gate layer 125 also includes the switch gate T2G and the third plate Cst1 of the storage capacitor Cst, which are situated between the light-emitting signal line EM and the first reset signal line Vi1. The switch gate T2G and the third plate Cst1 are spaced apart along the second direction Y, with the third plate Cst1 positioned closer to the light-emitting signal line EM, while the switch gate T2G is positioned further away from the light-emitting signal line EM.

[0084] In the present embodiment, the light-emitting signal line EM can directly serve as the first light-emitting gate T5G and the second light-emitting gate T6G. Similarly, the fourth control signal line Pscan2 can directly serve as the second reset gate T7G and the third reset gate T8G.

[0085] Referring to FIG. 4, the switch gate T2G and the third plate Cst1 can be rectangular-shaped, and all four corners of the third plate Cst1 can be chamfered.

[0086] Referring to FIG. 5, the first active layer 123 includes a switch active part T2A of the switch transistor T2, a drive active part T1A of the driving transistor T1, a second reset active part T7A of the second reset transistor T7, a third reset active part T8A of the third reset transistor T8, a first light-emitting active part T5A of the first light-emitting transistor T5, and a second light-emitting active part T6A of the second light-emitting transistor T6.

[0087] Referring to FIG. 5, the switch active part T2A, the drive active part T1A, the second reset active part T7A, the first light-emitting active part T5A, and the second light-emitting active part T6A are interconnected. The third reset active part T8A is set apart from the other active parts. The switch active part T2A, the second reset active part T7A, the third reset active part T8A, the first light-emitting active part T5A, and the second light-emitting active part T6A are all elongated and extend along the second direction Y. The drive active part T1A is inverted-U-shaped and positioned between the first light-emitting active part T5A and the second light-emitting active part T6A. A first end of the switch active part T2A, a first end of the drive active part T1A, and a first end of the first light-emitting active part T5A are connected at a first connection point P1. A second end of the drive active part T1A and a first end of the second light-emitting active part T6A are connected at a second connection point P2. A first end of the second reset active part T7A and a second end of the second light-emitting active part T6A are connected at a third connection point P3.

[0088] In the present embodiment, the first connection point P1 is designated as the first node A, the second connection point P2 as the second node B, and the third connection point P3 as a point where the anode of the light-emitting device 211b is located.

[0089] Referring to FIG. 6, the light-emitting signal line EM partially overlaps with the first light-emitting active part T5A, and this overlapping portion serves as a channel of the first light-emitting active part T5A. The light-emitting signal line EM also partially overlaps with the second light-emitting active part T6A, and this overlapping portion serves as a channel of the second light-emitting active part T6A. The switch gate T2G partially overlaps with the switch active part T2A, and this overlapping portion serves as a channel of the switch active part T2A. The fourth control signal line Pscan2 partially overlaps with the second reset active part T7A, and this overlapping portion serves as a channel of the second reset active part T7A. The fourth control signal line Pscan2 partially overlaps with the third reset active part T8A, and this overlapping portion serves as a channel of the third reset active part T8A. The drive active part T1A partially overlaps with the third plate Cst1, and this overlapping portion serves as a channel of the drive active part T1A. In this application, the third plate Cst1 is repurposed as the drive gate T1G of the driving transistor T1.

[0090] Referring to FIGS. 7 and 8, the second gate layer 127 includes the fourth plate Cst2 of the storage capacitor Cst, a first shading unit T3S of the compensation transistor T3, and a second shading unit T4S of the first reset transistor T4, all arranged along the second direction Y. The fourth plate Cst2, the first shading unit T3S, and the second shading unit T4S are positioned

between the light-emitting signal line EM and the first reset signal line Vi1. The third plate Cst1 is positioned close to the light-emitting signal line EM, the second shading unit T4S is positioned close to the first reset signal line Vi1, and the first shading unit T3S is located between the second shading unit T4S and the fourth plate Cst2.

[0091] Referring to FIGS. 7 and 8, an area of the fourth plate Cst2 is larger than an area of the third plate Cst1, and an orthographic projection of the third plate Cst1 projected onto the fourth plate Cst2 is within the fourth plate Cst2. A first through hole HL0 is formed in the fourth plate Cst2 to expose a portion of the third plate Cst1.

[0092] Referring to FIG. 8, the first shading unit T3S, the second shading unit T4S, and the fourth plate Cst2 can be rectangular-shaped, and at least some top corners of the first shading unit T3S, the second shading unit T4S, and the fourth plate Cst2 can be chamfered.

[0093] Referring to FIG. 8, the second gate layer 127 also includes the first electrical connection segments 311 disposed on two sides of the fourth plate Cst2. Both the first electrical connection segments 311 extend along the first direction X. In two adjacent sub-pixel units 211 arranged along the first direction X, the fourth plates Cst2 of the two sub-pixel units 211 are electrically connected through the first electrical connection segment 311. In this embodiment, the fourth plate Cst2 is connected to the first high potential line VDD1. To reduce the impedance on the fourth plate Cst2, this application enables the fourth plates (Cst2) of the sub-pixel units (211) arranged along the first direction X to be interconnected and set in parallel with the first high potential line VDD1 in an upper layer, thereby reducing the impedance of the first high potential line VDD1 and the fourth plate Cst2.

[0094] Referring to FIGS. 9 and 11, the second active layer 129 includes a compensation active part T3A of the compensation transistor T3 and a first reset active part T4A of the first reset transistor T4. Both the compensation active part T3A and the first reset active part T4A extend along the second direction Y. A first end of the compensation active part T3A and a first end of the first reset active part T4A are connected at a fourth connection point P4. A second end of the compensation active part T3A extends towards the second connection point P2 but is set apart from the second connection point P2, while a second end of the first reset active part T4A extends towards and overlaps with the first reset signal line Vi1.

[0095] In the present embodiment, the fourth connection point P4 can be the third node Q.

[0096] Referring to FIGS. 9 and 11, the second active layer 129 also includes a first extension segment 321 connected to the fourth connection point P4 and a second extension segment 322 connected to the second end of the first reset active part T4A. The first extension segment 321 extends along the second direction Y towards the storage capacitor Cst but is set apart from it. The second extension segment 322 extends along the first direction X and overlaps at least partially with the first reset signal line Vi1.

[0097] Refer to FIGS. 10 and 11, the third gate layer 131 includes the compensation gate T3G and the first reset gate T4G of the first reset transistor T4. An area of the compensation gate T3G is smaller than an area of the first shading unit T3S, and an orthographic projection of the compensation gate T3G projected on the first shading unit T3S falls within the first shading unit T3S. Similarly, an area of the first reset gate T4G is smaller than an area of the second shading unit T4S, and an orthographic projection of the first reset gate T4G projected on the second shading unit T4S falls within the second shading unit T4S.

[0098] Referring to FIGS. 10 and 11, the first reset gate T4G partially overlaps with the first reset active part T4A, and this overlapping portion serves as a channel of the first reset active part T4A. The compensation gate T3G partially overlaps with the compensation active part T3A, and this overlapping portion serves as a channel of the compensation active part T3A.

[0099] Referring to FIGS. 10 and 11, both the first reset gate T4G and the compensation gate T3G can be rectangular-shaped, and some of their top corners can be chamfered.

[0100] Referring to FIGS. 10 and 11, the third gate layer 131 also includes a first conductive

segment **331** connected to the compensation gate T3G, and a second conductive segment **332** connected to the first reset gate T4G. The first conductive segment **331** extends along the second direction Y towards a side away from the compensation gate T3G, and the second conductive segment **332** also extends along the second direction Y, but towards a side away from the first reset gate T4G.

[0101] Referring to FIGS. 7 and 11, the second gate layer **127** also includes a third conductive segment **333** connected to the first shading unit T3S, and a fourth conductive segment **334** connected to the second shading unit T4S. The third conductive segment **333** extends along the second direction Y towards a side away from the compensation gate T3G. A linewidth of the first conductive segment **331** can be less than or equal to a linewidth of the third conductive segment **333**, and an orthographic projection of the first conductive segment **331** projected on the third conductive segment **333** can fall within the third conductive segment **333**. A fourth conductive segment **334** can initially extend along the second direction Y towards a side away from the first reset gate T4G, and then extend along the first direction X towards a side away from the compensation transistor T3. The ends of the second conductive segment **332** and the fourth conductive segment **334**, which are away from the first reset gate T4G, can be positioned on a same horizontal line.

[0102] Referring to FIG. 12, the first source-drain layer **133** includes the second reset signal line Vi2, a fifth control signal line Nscan3, a second high potential line VDD2, the second control signal line Pscan1, the first control signal line Nscan1, and the third control signal line Nscan2 arranged along the second direction Y. The second reset signal line Vi2, the fifth control signal line Nscan3, the second high potential line VDD2, the second control signal line Pscan1, the first control signal line Nscan1, and the third control signal line Nscan2 can all extend along the first direction X.

[0103] Referring to FIGS. 12 to 15, the second reset signal line Vi2 is positioned between the third reset signal line Vi3 and the first control signal line Nscan1. The fifth control signal line Nscan3 partially overlaps with the fourth control signal line Pscan2. The second high potential line VDD2 is located between the light-emitting signal line EM and the first electrical connection segment **311**. The second control signal line Pscan1, the first control signal line Nscan1, and the third control signal line Nscan2 are placed between the first electrical connection segment **311** and the first reset signal line Vi1. Furthermore, the second control signal line Pscan1 is positioned close to the first electrical connection segment **311**, the third control signal line Nscan2 is close to the first reset signal line Vi1, and the first control signal line Nscan1 is situated between the second control signal line Pscan1 and the third control signal line Nscan2.

[0104] Referring to FIGS. 12 to 15, the first source-drain layer **133** further includes a second electrical connection segment **312** set between the second reset signal line Vi2 and the third reset signal line Vi3. A first end of the second electrical connection segment **312** is electrically connected to the third reset signal line Vi3 through a first via hole HL1, and a second end of the second electrical connection segment **312** is electrically connected to a first end of the third reset active part T8A through a second via hole HL2. The third reset signal line Vi3 transmits a reference voltage to the third reset transistor T8 via the second electrical connection segment **312**.

[0105] In the present embodiment, the first via hole HL1 penetrates the second gate insulating layer **126**, the third gate insulating layer **128**, the fourth gate insulating layer **130**, and the first interlayer insulating layer **132**. The second via hole HL2 penetrates the first gate insulating layer **124**, the second gate insulating layer **126**, the third gate insulating layer **128**, the fourth gate insulating layer **130**, and the first interlayer insulating layer **132**.

[0106] To avoid interference between the second electrical connection segment **312** and the second reset signal line Vi2, a recessed design is employed for the second reset signal line Vi2 at a position of the second reset signal line Vi2 corresponding to the second electrical connection segment **312**, meaning that the signal line in this area is offset towards a side away from the third reset signal line

Vi3. At the same time, to ensure the spacing between the fifth control signal line Nscan3 and the second reset signal line Vi2, the fifth control signal line Nscan3 also employs a recessed design. [0107] Referring to FIGS. 12 to 15, the first source-drain layer 133 also includes a third extension segment 323, a third electrical connection segment 313, and a fourth electrical connection segment 314, set between the second high potential line VDD2 and the fifth control signal line Nscan3. Both the third extension segment 323 and the third electrical connection segment 313 extend along the second direction Y, while the fourth electrical connection segment 314 extends along the first direction X.

[0108] In this embodiment, a first end of the third extension segment 323 is electrically connected to the second high potential line VDD2, and a second end of the third extension segment 323 extends away from the second high potential line VDD2. Additionally, the third extension segment 323 partially overlaps with the first light-emitting active part T5A, and the second end of the third extension segment 323 is electrically connected to a second end of the first light-emitting active part T5A through a third via hole HL3. The first end of the third electrical connection segment 313 is electrically connected to a second end of the third reset active part T8A through a fourth via hole HL4. The first active layer 123 also includes a fourth extension segment 324 connected to the first light-emitting active part T5A, with the fourth extension segment 324 extending along the first direction X. A second end of the third electrical connection segment 313 is electrically connected to the fourth extension segment 324 through a fifth via hole HL5. The third reset signal line Vi3 transmits the reference voltage to the first connection point P1 via the second electrical connection segment 312, the third electrical connection segment 313, and the fourth extension segment 324, thereby resetting the voltage at the first node A. One end of the fourth electrical connection segment 314 is electrically connected to the third connection point P3 in the first active layer 123 through a via, and another end of the fourth electrical connection segment 314 is electrically connected to a conductive layer in the second source-drain layer 135 through another via.

[0109] In the present embodiment, the third via hole HL3 penetrates the first gate insulating layer 124, the second gate insulating layer 126, the third gate insulating layer 128, the fourth gate insulating layer 130, and the first interlayer insulating layer 132. Both the fourth via hole HL4 and the fifth via hole HL5 penetrate the first gate insulating layer 124, the second gate insulating layer 126, the third gate insulating layer 128, the fourth gate insulating layer 130, and the first interlayer insulating layer 132.

[0110] Referring to FIGS. 12 to 15, the first source-drain layer 133 further includes a fifth electrical connection segment 315 and a sixth electrical connection segment 316 set between the second high potential line VDD2 and the second control signal line Pscan1. Both the fifth electrical connection segment 315 and the sixth electrical connection segment 316 extend along the second direction Y

[0111] In this embodiment, a first end of the fifth electrical connection segment 315 passes through a sixth via hole HL6 and is electrically connected to an end of the first extension segment 321 that is away from the second control signal line Pscan1. A second end of the fifth electrical connection segment 315 extends into the storage capacitor Cst and is electrically connected to the third plate Cst1 of the storage capacitor Cst through a seventh via hole HL7. In the structure shown in FIG. 14, the seventh via hole HL7 passes through the first through hole HL0 in the fourth plate Cst2. A center of the first through hole HL0 and a center of the seventh via hole HL7 can be located on a same line perpendicular to a light-emitting surface of the display panel 100. A first end of the sixth electrical connection segment 316 passes through an eighth via hole HL8 to be electrically connected to the second connection point P2 in the first active layer 123. A second end of the sixth electrical connection segment 316 passes through a ninth via hole HL9 to be electrically connected to the second end of the compensation active part T3A.

[0112] In the present embodiment, the sixth via hole HL6 and the ninth via hole HL9 penetrate through the fourth gate insulating layer 130 and the first interlayer insulating layer 132. The seventh via hole HL7 and the eighth via hole HL8 penetrate through the first gate insulating layer

124, the second gate insulating layer **126**, the third gate insulating layer **128**, the fourth gate insulating layer **130**, and the first interlayer insulating layer **132**.

[0113] Referring to FIGS. **12** to **15**, the first source-drain layer **133** further includes a fifth extension segment **325**. One end of the fifth extension segment **325** is electrically connected to the first control signal line Nscan**1**, and the fifth extension segment **325** extends along the second direction Y towards a side away from the first control signal line Nscan**1**. An end of the fifth extension segment **325**, which is away from the first control signal line Nscan**1**, is electrically connected to the first conductive segment **331** through a tenth via hole HL**10**. The first control signal line Nscan**1** transmits control signals to the compensation gate T3G of the compensation transistor T**3** through the fifth extension segment **325** and the first conductive segment **331**. At the same time, an end of the second conductive segment **332**, which is away from the first reset gate T4G, overlaps with the third control signal line Nscan**2** and is electrically connected to the third control signal line Nscan**2** through an eleventh via hole HL**11**. The third control signal line Nscan**2** transmits control signals to the first reset gate T4G of the first reset transistor T**4** through the second conductive segment **332**.

[0114] In the present embodiment, both the tenth via hole HL**10** and the eleventh via hole HL**11** penetrate the first interlayer insulating layer **132**.

[0115] Referring to FIGS. **12** to **15**, the third conductive segment **333** overlaps with both the first conductive segment **331** and the fifth extension segment **325**, and is electrically connected to the first control signal line Nscan**1** through a twelfth via hole HL**12**. The first control signal line Nscan**1** transmits the control signal to the first shading unit T3S via the third conductive segment **333**. Hence, the first shading unit T3S can be repurposed as a bottom gate of the compensation transistor T**3**, while the compensation gate T3G serves as a top gate of the compensation transistor T**3**. The configuration of the first shading unit T3S and the compensation gate T3G can enhance the conductivity rate of the compensation transistor T**3**, improving the device performance of the compensation transistor T**3**. The fourth conductive segment **334** overlaps with a portion of the third control signal line Nscan**2** and is electrically connected to the third control signal line Nscan**2** through a thirteenth via hole HL**13**. The third control signal line Nscan**2** transmits the control signal to the second shading unit T4S via the fourth conductive segment **334**. Therefore, the second shading unit T4S can be repurposed as a bottom gate of the first reset transistor T**4**, with the first reset gate T4G serving as a top gate of the first reset transistor T**4**. The configuration of the second shading unit T4S and the first reset gate T4G can enhance the conductivity rate of the first reset transistor T**4**, improving the device performance of the first reset transistor T**4**.

[0116] In the present embodiment, both the twelfth via hole HL**12** and the thirteenth via hole HL**13** penetrate the third gate insulating layer **128**, the fourth gate insulating layer **130**, and the first interlayer insulating layer **132**.

[0117] It should be noted that the third conductive segment **333** can be electrically insulated from the first control signal line Nscan**1**, and the fourth conductive segment **334** can be electrically insulated from the third control signal line Nscan**2**.

[0118] Referring to FIGS. **12** to **15**, the fifth control signal line Nscan**3** can pass through a fourteenth via hole HL**14** to be connected in parallel with the fourth control signal line Pscan**2**. This means that the fifth control signal line Nscan **3** and the fourth control signal line Pscan**2** are configured in parallel, reducing the impedance of both the fifth control signal line Nscan**3** and the fourth control signal line Pscan**2**.

[0119] In this embodiment, the fourteenth via hole HL**14** penetrates the second gate insulating layer **126**, the third gate insulating layer **128**, the fourth gate insulating layer **130**, and the first interlayer insulating layer **132**.

[0120] Refer to FIGS. **12** to **15**, where the first control signal line Nscan**1** partially overlaps with the first reset active part T4A, the second control signal line Pscan**1** partially overlaps with the first extension segment **321**, and the second control signal line Pscan**1** partially overlaps with the

compensation active part T3A. The third control signal line Nscan2 also partially overlaps with the first reset active part T4A. These four overlapping regions involve the material of the second active layer 129 overlapping with the material of the first source-drain layer 133. Between the first source-drain layer 133 and the second active layer 129, the fourth gate insulating layer 130 and the first interlayer insulating layer 132 are disposed, without the material of the third gate layer 131 being set in between. This arrangement avoids the technical issue of potential short-circuiting between the third gate layer 131 and the first source-drain layer 133.

[0121] Referring to FIGS. 12 to 15, the overlap between the second control signal line Pscan1 and the first extension segment 321 forms the boost capacitor Cboost in this application. The fifth plate of the boost capacitor Cboost can be the part of the first extension segment 321 that overlaps with the second control signal line Pscan1, and the sixth plate of the boost capacitor Cboost can be the part of the second control signal line Pscan1 that overlaps with the first extension segment 321.

[0122] Referring to FIGS. 12 to 15, the first source-drain layer 133 also includes a seventh electrical connection segment 317 disposed between the second reset signal line Vi2 and the third control signal line Nscan2. The seventh electrical connection segment 317 extends along the second direction Y, and towards a side away from the second reset signal line Vi2. The seventh electrical connection segment 317 overlaps with the second extension segment 322. This setup effectively forms a capacitor between the first reset signal line Vi1 and the second reset signal line Vi2, ensuring the stability of the voltage on the first reset signal line Vi1 and the second reset signal line Vi2.

[0123] Referring to FIG. 16, the second source-drain layer 135 includes the first data signal line Data1, the second data signal line Data2, and the first high potential line VDD1. The second data signal line Data2, the first data signal line Data1, and the first high potential line VDD1 are arranged along the first direction X and extend along the second direction Y. The first data signal line Data1 is positioned between the second data signal line Data2 and the first high potential line VDD1.

[0124] Referring to FIGS. 17 to 19, the first source-drain layer 133 includes an eighth electrical connection segment 318 disposed between the first control signal line Nscan1 and the second control signal line Pscan1. One end of the eighth electrical connection segment 318 is electrically connected to a second end of the switch active part T2A, and another end of the eighth electrical connection segment 318 is electrically connected to the first data signal line Data1. The first data signal line Data1 transmits data signals to the switch transistor T2 through the eighth electrical connection segment 318.

[0125] In the structure shown in FIG. 19, this application lists 6 sub-pixel units 211 as an example. The sub-pixel units 211 located in the first row are all connected to the first data signal line Data1, while the sub-pixel units 211 located in the second row are all connected to the second data signal line Data2. The sub-pixel units 211 listed in FIGS. 17 and 18 correspond to the sub-pixel units 211 in the first row of FIG. 19.

[0126] In the present embodiment, the structure of each pixel driving circuit 211a is identical, meaning that input ends of the switch active parts T2A of the switch transistors T2 are all positioned on the same side. If the first data signal line Data1 and the second data signal line Data2 are positioned on opposite sides of the pixel driving circuit 211a, for example, with the first data signal line Data1 on the left side of pixel driving circuit 211a and the second data signal line Data2 on the right side, then the input ends of the switch active parts T2A for the sub-pixel units 211 in the first row are positioned adjacent to the first data signal line Data1. Meanwhile, a distance between the switch active part T2A of the sub-pixel unit 211 in the second row and the second data signal line Data2 equals a width of the sub-pixel unit 211. This configuration necessitates a connection line that spans the width of the sub-pixel unit 211 to electrically connect the second data signal line Data2 with the switch active part T2A of the sub-pixel unit 211 in the second row. This connection line overlaps with multiple components within the pixel driving circuit 211a, increasing

coupling capacitance and thereby degrading the stability of the pixel driving circuit **211a**. In the structure shown in FIG. **19**, by positioning both data signal lines on the same side of the pixel driving circuit **211a**, the application reduces the connection distance between the data signal lines and the switch active parts T2A of the sub-pixel units **211**, thereby minimizing internal coupling capacitance of the pixel driving circuit **211a** and enhancing the stability of the pixel driving circuit **211a**.

[0127] Referring to FIGS. **16** to **18**, the first high potential line VDD1 includes a first sub-plate **341**, a second sub-plate **342**, a third sub-plate **343**, a fourth sub-plate **344**, and a fifth sub-plate **345**. The third sub-plate **343**, the first sub-plate **341**, the fourth sub-plate **344**, the second sub-plate **342**, and the fifth sub-plate **345** are arranged along the second direction Y. The first sub-plate **341** is positioned between the third sub-plate **343** and the fourth sub-plate **344**, while the second sub-plate **342** is located between the fourth sub-plate **344** and the fifth sub-plate **345**. Along the first direction X, a width of the first sub-plate **341** is less than a width of the second sub-plate **342**, the width of the first sub-plate **341** can be greater than a width of the fourth sub-plate **344**, and the width of the fourth sub-plate **344** can be greater than or equal to widths of the third sub-plate **343** and the fifth sub-plate **345**.

[0128] In this embodiment, since a potential of the drive gate T1G corresponds to a potential of the third node Q, and changes in the potential of the third node Q directly impact a working current of the light-emitting device **211b**, it's crucial to ensure the stability of the potential of the third node Q. To achieve this, the present application can ensure that an orthographic projection of the drive gate T1G projected on the first high potential line VDD1 falls within the first sub-plate **341**. This effectively utilizes the first sub-plate **341** as a shielding layer to maintain the stability of the potential of the third node Q. Therefore, it's necessary to increase the lateral width of the first sub-plate **341** so that the first sub-plate **341** entirely covers the drive gate T1G. The third plate Cst1 of the storage capacitor Cst, repurposed as the drive gate T1G, also has its orthographic projection projected on the first high potential line VDD1 located within the first sub-plate **341**. Consequently, the width of the first sub-plate **341** in this application can be greater than the widths of the third sub-plate **343**, the fourth sub-plate **344**, and the fifth sub-plate **345**.

[0129] In the present embodiment, since both the fifth electrical connection segment **315** and the first extension segment **321** are electrically connected to the drive gate T1G, variations in the potential on the fifth electrical connection segment **315** and the first extension segment **321** can also affect the potential of the drive gate T1G. To address this, this application increases the width of the fourth sub-plate **344** to fully cover both the fifth electrical connection segment **315** and the first extension segment **321**. Therefore, the lateral width of the fourth sub-plate **344** in this application can be made greater than the lateral widths of both the third sub-plate **343** and the fifth sub-plate **345**.

[0130] Refer to FIGS. **16** and **17**, where the compensation gate T3G acts as a first subpart of the first plate. An orthographic projection of the compensation gate T3G projected on the first high potential line VDD1 located within the second sub-plate **342**. The second sub-plate **342** can serve as the second plate for the first capacitor C1.

[0131] The present application achieves an arrangement where a portion of the first high potential line VDD1 overlaps with the compensation gate T3G, utilizing the compensation gate T3G as the first plate and the second sub-plate **342** as the second plate, thereby forming the first capacitor C1. The constant high potential on the second plate enhances the anti-coupling capability of the first control signal line Nscan1, thereby improving the stability of the control signal transmitted by the first control signal line Nscan1. This prevents abnormal activation of the compensation transistor T3, ensures the stability of the gate potential of the driving transistor T1, and addresses technical issues related to display anomalies in display panel **100**.

[0132] It should be noted that because the second sub-plate **342** needs to fully cover both the compensation gate T3G and a portion of the first extension segment **321**, the lateral width of the

second sub-plate **342** in this application is greater than the lateral width of the first sub-plate **341**. [0133] Refer to FIGS. **20** to **22**, in comparison with the structures shown in FIGS. **16** and **17**, a longitudinal width of the second sub-plate **342** is increased in this application. An orthographic projection of the first conductive segment **331** on the first high potential line VDD1 can be located within the second sub-plate **342**. That is, the first conductive segment **331** can act as a second subpart of the first plate, where an orthographic projection of the second subpart projected on the second source-drain layer **135** falls within the first high potential line VDD1.

[0134] By increasing the longitudinal width of the second sub-plate **342**, this application ensures that the second sub-plate **342** covers both the compensation gate T3G and the first conductive segment **331** simultaneously. With the compensation gate T3G and the first conductive segment **331** acting as the first plate, and the second sub-plate **342** acting as the second plate, the first plate and the second plate form the first capacitor C1. The increase in the relative area between the first plate and the second plate boosts the capacitance value of the first capacitor C1, thereby enhancing the stability of the control signal transmitted by the first control signal line Nscan1. This prevents abnormal activation of the compensation transistor T3, ensures the stability of the gate potential of the driving transistor T1, and addresses technical issues related to display anomalies in display panel **100**.

[0135] Referring to FIGS. **23** to **25**, compared to FIGS. **20** to **22**, the longitudinal width of the second sub-plate **342** in this application is further increased, such that a portion of the first control signal line Nscan1 overlaps with the second sub-plate **342**. The portion of the first control signal line Nscan1 that overlaps with the second sub-plate **342** acts as the third subpart of the first plate. An orthographic projection of the third subpart projected on the second source-drain layer **135** falls within the first high potential line VDD1.

[0136] By increasing the longitudinal width of the second sub-plate **342** to make the second sub-plate **342** cover the compensation gate T3G, the first conductive segment **331**, and a portion of the first control signal line Nscan1 simultaneously, where the compensation gate T3G, the first conductive segment **331**, and the portion of the first control signal line Nscan1 serve as the first plate, and the second sub-plate **342** serves as the second plate, the first plate and the second plate form the first capacitor C1. The increase in the relative area between the first plate and the second plate enhances the capacitance value of the first capacitor C1, thereby improving the stability of the control signal transmitted by the first control signal line Nscan1. This prevents abnormal activation of the compensation transistor T3, ensures the stability of the gate potential of the driving transistor T1, and addresses technical issues related to display anomalies in display panel **100**. This strategic design choice contributes to improving the overall performance and reliability of the display.

[0137] Therefore, the first plate can be positioned in the third gate layer **131**, or the first plate can be disposed in the first source-drain layer **133**, or the first plate can be concurrently positioned in both the third gate layer **131** and the first source-drain layer **133**, while the second plate is solely positioned in the second source-drain layer **135**.

[0138] It should be noted that, in FIGS. **16** to **25**, since the fifth extension segment **325** is connected to the first control signal line Nscan1 and overlaps with the second sub-plate **342**, the fifth extension segment **325** can also act as the fourth subpart of the first plate. This means an orthographic projection of the fourth subpart projected on the first high potential line VDD1 falls within the second sub-plate **342**.

[0139] It should be noted that, in FIGS. **16** to **25**, since the area of the first shading unit T3S is larger than the area of the compensation gate T3G, and the first shading unit T3S can be electrically connected to the first control signal line Nscan1, a capacitor is also formed between a portion of the first shading unit T3S that extends beyond the compensation gate T3G and the second sub-plate **342**. The portion of the first shading unit T3S that extends beyond the compensation gate T3G can act as a part of the first sub-plate **341**.

[0140] It should be mentioned that in FIGS. **16** to **22**, a portion of the third subpart overlaps with

the first control signal line Nscan1. This overlapping part can act as a segment of both the first plate and the second plate.

[0141] Moreover, when the first high potential line VDD1 does not cover the compensation gate T3G and the first conductive segment 331, there exists a small area of overlap between the first control signal line Nscan1 and the first high potential line VDD1. A first capacitance value of the first capacitor C1 between the first control signal line Nscan1 and the first high potential line VDD1 can be 7.3 fF, while a second capacitance value between the data line and the first control signal line Nscan1 is 1.05 fF. Taking the second source-drain layer 135 in FIGS. 22 and 23 as examples, when the first high potential line VDD1 does not cover the compensation gate T3G, the first conductive segment 331, and a portion of the first control signal line Nscan1, the area of the first plate increases, raising the first capacitance value of the first capacitor C1 between the first high potential line VDD1 and the first control signal line Nscan1 to 14.2 fF, while the second capacitance value between the data line and the first control signal line Nscan1 remains at 1.05 fF. Therefore, compared to existing technology, a ratio of the second capacitance value to the first capacitance value (C1) in this application decreases from 14.38% to 7.4%, enhancing the anti-coupling capability of the first control signal line Nscan1, and thereby improving the stability of the control signal transmitted by the first control signal line Nscan1.

[0142] Referring to FIGS. 26 and 28, the third source-drain layer 137 can include a third high potential line VDD3. The third high potential line VDD3 extends along the second direction Y and is electrically connected to the second high potential line VDD2. The implementation of the third high potential line VDD3 primarily aims to reduce the impedance of the wiring that transmit a constant high voltage level.

[0143] It should be noted that, in FIGS. 16 to 26, the first high potential line VDD1 of this application can be electrically connected to the second high potential line VDD2. Subsequently, the second high potential line VDD2 is electrically connected to the fourth plate Cst2 of the storage capacitor Cst, and the fourth plates Cst2 located in the same row are interconnected via the first electrical connection segments 311. Therefore, the conductors in this application used for transmitting a constant high voltage level comprise four layers of metal, which include the fourth plate Cst2 and the first electrical connection segment 311 located in the second gate layer 127, the second high potential line VDD2 in the first source-drain layer 133, the first high potential line VDD1 in the second source-drain layer 135, and the third high potential line VDD3 in the third source-drain layer 137. The fourth plate Cst2, the first electrical connection segment 311, and the second high potential line VDD2 all extend along the first direction X, while the first high potential line VDD1 and the third high potential line VDD3 extend along the second direction Y. Thus, by utilizing four layers of metal to transmit the constant high voltage level and forming a grid-like metal mesh that interlaces vertically and horizontally, this application aims to reduce the impedance of the wiring, thereby minimizing the loss of the constant high voltage level across the transmitted wiring.

[0144] Referring to FIG. 29, the third source-drain layer 137 of this application includes a plurality of repeating units 137a, each corresponding to three adjacent sub-pixel units 211 arranged along the first direction X. For example, these three sub-pixel units 211 can be designated as the first sub-pixel unit 212, the second sub-pixel unit 213, and the third sub-pixel unit 214. Each repeating unit 137a can comprise three high potential lines VDD3, wherein the initial third high potential lines VDD3 corresponds to the first sub-pixel unit 212, the final third high potential lines VDD3 corresponds to the third sub-pixel unit 214, and the middle third high potential line VDD3 corresponds to the second sub-pixel unit 213 and the fourth reset signal line Vi4. The structure of the initial and final third high potential lines VDD3 can be the same, whereas the structure of the middle third high potential line VDD3 differs from the structure of the final third high potential line VDD3, with a lateral width of the middle third high potential line VDD3 being less than a lateral width of the final third high potential line VDD3.

[0145] Referring to FIG. 29, where each repeating unit 137a contains one longitudinal reset signal line and three horizontal reset signal lines. To reduce the impedance of the reset signal lines, the longitudinal reset signal line can be electrically connected to one of the three horizontal reset signal lines. For example, in FIG. 30, there are 3 rows of repeating units 137a, with each row comprising 3 repeating units 137a. Each repeating unit 137a contains one fourth reset signal line Vi4. The fourth reset signal line Vi4 in the first repeating unit 137a can be electrically connected to the first reset signal line Vi1 in each row, the fourth reset signal line Vi4 in the second repeating unit 137a can be electrically connected to the second reset signal line Vi2 in each row, and the fourth reset signal line Vi4 in the third repeating unit 137a can be electrically connected to the third reset signal line Vi3 in each row. This arrangement allows each horizontal reset signal line to be electrically connected to the fourth reset signal line Vi4, forming a crisscrossing metal mesh that reduces the impedance of the reset signal lines.

[0146] It should be noted that in FIG. 29, the first sub-pixel unit 212, the second sub-pixel unit 213, and the third sub-pixel unit 214 merely represent the locations of the pixel driving circuits 211a of the corresponding sub-pixel units 211, and the positions of the anodes within the sub-pixel units 211 may not be within the corresponding areas. For instance, referring to FIG. 31, where the pixel driving circuit 211a in the first sub-pixel unit 212 is electrically connected to a first anode 211b1, and the pixel driving circuit 211a in the second sub-pixel unit 213 is connected to a second anode 211b2. The first anode 211b1 and the second anode 211b2 are arranged along the second direction Y and span across both the first sub-pixel unit 212 and the second sub-pixel unit 213.

[0147] It should be noted that in FIG. 31, the third source-drain layer 137 can also include a ninth electrical connection segment 319 and a tenth electrical connection segment 320. The ninth electrical connection segment 319 is positioned between the fourth reset signal line Vi4 and the middle third high potential line VDD3, while the tenth electrical connection segment 320 is located on one side of the initial and final third high potential lines VDD3, and the tenth electrical connection segment 320 corresponds to the fourth electrical connection segment 314. Additionally, the second source-drain layer 135 can include an eleventh electrical connection segment 321. The second anode 211b2 can be electrically connected to the third connection point P3, which is located in the first active layer 123 of the pixel driving circuit 211a in the second sub-pixel unit 213, through the ninth electrical connection segment 319, the eleventh electrical connection segment 321, the fourth electrical connection segment 314 in the second sub-pixel unit 213. Similarly, the first anode 211b1 can be connected to the third connection point P3, which is located in the first active layer 123 of the pixel driving circuit 211a in the first sub-pixel unit 212, through the tenth electrical connection segment 320, the eleventh electrical connection segment 321, and the fourth electrical connection segment 314 in the first sub-pixel unit 212. Likewise, the manner of connection for the anode in the third sub-pixel unit 314 follows the same pattern as the connection method used for the first anode 211b1.

[0148] The present application further provides a display device that includes the display panel as described above. The display device can be used in a variety of products or components with display functionality, such as smartphones, tablets, televisions, monitors, laptops, digital photo frames, navigators, and more.

[0149] In the embodiments described above, each embodiment has its emphasis, and parts not detailed in one embodiment can refer to the relevant descriptions in other embodiments.

[0150] The detailed description provided above introduces a display panel and a display device according to the present application. Specific examples have been used to describe the principles and implementation methods of this application. The explanations of these embodiments are intended to aid in understanding the technical solution and core ideas of this application. Those of ordinary skill in the art should understand that they can still modify the technical solutions described in the aforementioned embodiments, or equivalently replace some of the technical features within them. These modifications or replacements do not deviate from the essence of the

technical solutions of the embodiments of this application and remain within the scope of the technical solutions.

Claims

1. A display panel, comprising: a plurality of sub-pixel units, each of the sub-pixel units comprising a light-emitting device and a pixel driving circuit connected to the light-emitting device, wherein each of the pixel driving circuits comprises: a switch transistor, wherein a first electrode of the switch transistor is connected to a first data signal line, and a second electrode of the switch transistor is connected to a first node; a driving transistor, wherein a first electrode of the driving transistor is connected to the first node, a second electrode of the driving transistor is connected to a second node, and a drive gate of the driving transistor is connected to a third node; a compensation transistor, wherein a first electrode of the compensation transistor is connected to the third node, a second electrode of the compensation transistor is connected to the second node, and a compensation gate of the compensation transistor is connected to a first control signal line; and a first capacitor, wherein a first plate of the first capacitor is connected to the first control signal line, and a second plate of the first capacitor is connected to a first high potential line.
2. The display panel according to claim 1, further comprising: a base substrate; a first gate layer, disposed on one side of the base substrate; a second gate layer, disposed on one side of the first gate layer away from the base substrate; a third gate layer, disposed on one side of the second gate layer away from the first gate layer; a first source-drain layer, disposed on one side of the third gate layer away from the second gate layer; and a second source-drain layer, disposed on one side of the first source-drain layer away from the third gate layer; wherein the first plate is disposed in at least one of the third gate layer and the first source-drain layer, and the second plate is disposed in the second source-drain layer.
3. The display panel according to claim 2, wherein the second source-drain layer comprises a plurality of first high potential lines arranged along a first direction and extending along the second direction, the third gate layer comprises the compensation gate and a first conductive segment, one end of the first conductive segment is electrically connected to the compensation gate, and another end of the first conductive segment is electrically connected to the first control signal line; wherein the compensation gate serves as a first subpart of the first plate, an orthographic projection of the first subpart projected on the second source-drain layer is located within the first high potential line, and an angle between the first direction and the second direction is greater than 0 and less than or equal to 90 degrees.
4. The display panel according to claim 3, wherein the first conductive segment serves as a second subpart of the first plate, and an orthographic projection of the second subpart projected on the second source-drain layer is located within the first high potential line.
5. The display panel according to claim 4, wherein the first source-drain layer comprises the first control signal line and a second control signal line, both the first control signal line and the second control signal line extend along the first direction, the first control signal line and the second control signal line are arranged spaced apart along the second direction, and the second control signal line is connected to a switch gate of the switch transistor; wherein both the compensation gate and the first conductive segment are disposed between the first control signal line and the second control signal line, the compensation gate extends along the first direction, and the first conductive segment extends along the second direction.
6. The display panel according to claim 5, wherein the first control signal line comprises a third subpart of the first plate, and an orthographic projection of the third subpart projected on the second source-drain layer is located within the first high potential line.
7. The display panel according to claim 6, wherein the first source-drain layer further includes a fourth subpart of the first plate, the fourth subpart extends along the second direction, one end of

the fourth subpart is electrically connected to the first control signal line, and another end of the fourth subpart is electrically connected to the second subpart; wherein an orthographic projection of the fourth subpart projected on the second source-drain layer is located within the first high potential line.

8. The display panel according to claim 1, wherein the first high potential line comprises the first sub-plate and the second sub-plate, arranged along the second direction; an orthographic projection of the drive gate projected on the first high potential line is located within the first sub-plate, while an orthographic projection of the first plate projected on the first high potential line is located within the second sub-plate; wherein in the second direction, a width of the second sub-plate is greater than a width of the first sub-plate.

9. The display panel according to claim 1, wherein the pixel driving circuit further comprises: a storage capacitor, comprising a third plate and a fourth plate, wherein the third plate is connected to the third node, and the fourth plate is connected to the first high potential line; a first reset transistor, wherein a first electrode of the first reset transistor is connected to a first reset signal line, and a second electrode of the first reset transistor is connected to the third node; a second reset transistor, wherein a first electrode of the second reset transistor is connected to a second reset signal line, and a second electrode of the second reset transistor is connected to an anode of the light-emitting device; a third reset transistor, wherein a first electrode of the third reset transistor is connected to a third reset signal line, and a second electrode of the third reset transistor is connected to the first node; a first light-emitting transistor, wherein a first electrode of the first light-emitting transistor is connected to the first high potential line, and a second electrode of the first light-emitting transistor is connected to the first node, and a gate of the first light-emitting transistor is connected to a light-emitting signal line; a second light-emitting transistor, wherein a first electrode of the second light-emitting transistor is connected to the second node, a second electrode of the second light-emitting transistor is connected to an anode of the light-emitting device, and a gate of the second light-emitting transistor is connected to the light-emitting signal line; and a boost capacitor, comprising a fifth plate and a sixth plate, wherein the fifth plate is connected to the third node, and the sixth plate is connected to the second control signal line.

10. The display panel according to claim 9, wherein a capacitance value of the first capacitor is less than a capacitance value of the storage capacitor, and the capacitance value of the boost capacitor is less than the capacitance value of the storage capacitor.

11. The display panel according to claim 9, wherein a first gate layer of the display panel comprises a light-emitting signal line, a first reset signal line, a third reset signal line, and a fourth control signal line; the light-emitting signal line, the first reset signal line, the third reset signal line, and the fourth control signal line all extend along the first direction; and the third reset signal line, the fourth control signal line, the light-emitting signal line, and the first reset signal line are arranged at intervals along the second direction.

12. The display panel according to claim 11, wherein a first active layer of the display panel comprises a switch active part of the switch transistor, a drive active part of the driving transistor, a second reset active part of the second reset transistor, a third reset active part of the third reset transistor, a first light-emitting active part of the first light-emitting transistor, and a second light-emitting active part of the second light-emitting transistor; wherein the switch active part, the drive active part, the second reset active part, the first light-emitting active part, and the second light-emitting active part are interconnected; the switch active part, the second reset active part, the third reset active part, the first light-emitting active part, and the second light-emitting active part extend along the second direction; and the drive active part is disposed between the first light-emitting active part and the second light-emitting active part.

13. The display panel according to claim 12, wherein a second gate layer of the display panel comprises a fourth plate of the storage capacitor, a first shading unit of the compensation transistor, and a second shading unit of the first reset transistor, arranged along the second direction; the

fourth plate, the first shading unit, and the second shading unit are disposed between the light-emitting signal line and the first reset signal line; the third plate is disposed close to the light-emitting signal line, and the second shading unit is disposed close to the first reset signal line; and the first shading unit is located between the second shading unit and the fourth plate.

14. The display panel according to claim 13, wherein the second gate layer further comprises two first electrical connection segments disposed on two sides of the fourth plate, the two first electrical connection segments extend along the first direction, and in two adjacent ones of the sub-pixel units arranged along the first direction, the fourth plates in the two adjacent sub-pixel units are electrically connected through the first electrical connection segment.

15. The display panel according to claim 13, wherein a second active layer of the display panel comprises a compensation active part of the compensation transistor and a first reset active part of the first reset transistor, both the compensation active part and the first reset active part extend along the second direction, a first end of the compensation active part is connected to a first end of the first reset active part, and a second end of the first reset active part extends towards the first reset signal line and overlaps with the first reset signal line.

16. The display panel according to claim 15, wherein the second active layer further comprises a first extension segment and a second extension segment connected to a second end of the first reset active part; the first extension segment extends along the second direction towards a location of the storage capacitor and is set apart from the storage capacitor; and the second extension segment extends along the first direction and at least partially overlaps with the first reset signal line.

17. The display panel according to claim 15, wherein a third gate layer of the display panel comprises a compensation gate of the compensation transistor and a first reset gate of the first reset transistor; an area of the compensation gate is smaller than an area of the first shading unit; an orthographic projection of the compensation gate projected on the first shading unit is located within the first shading unit; an area of the first reset gate is smaller than an area of the second shading unit; and an orthographic projection of the first reset gate projected on the second shading unit is located within the second shading unit.

18. The display panel according to claim 17, wherein the third gate layer further comprises a first conductive segment connected to the compensation gate, and a second conductive segment connected to the first reset gate; the first conductive segment extends along the second direction towards a side away from the compensation gate; and the second conductive segment extends along the second direction towards a side away from the first reset gate.

19. The display panel according to claim 18, wherein the first source-drain layer of the display panel comprises the second reset signal line, a fifth control signal line, a second high potential line, the second control signal line, the first control signal line, and a third control signal line, arranged along the second direction; the second reset signal line, the fifth control signal line, the second high potential line, the second control signal line, the first control signal line, and the third control signal line all extend along the first direction.

20. A display device, comprising a display panel, wherein the display panel comprises a plurality of sub-pixel units, and each of the sub-pixel units comprises a light-emitting device and a pixel driving circuit connected to the light-emitting device, wherein each of the pixel driving circuits comprises: a switch transistor, wherein a first electrode of the switch transistor is connected to a first data signal line, and a second electrode of the switch transistor is connected to a first node; a driving transistor, wherein a first electrode of the driving transistor is connected to the first node, a second electrode of the driving transistor is connected to a second node, and a drive gate of the driving transistor is connected to a third node; a compensation transistor, wherein a first electrode of the compensation transistor is connected to the third node, a second electrode of the compensation transistor is connected to the second node, and a compensation gate of the compensation transistor is connected to a first control signal line; and a first capacitor, wherein a

first plate of the first capacitor is connected to the first control signal line, and a second plate of the first capacitor is connected to a first high potential line.
