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- (54) **LIQUID CRYSTAL DISPLAY**
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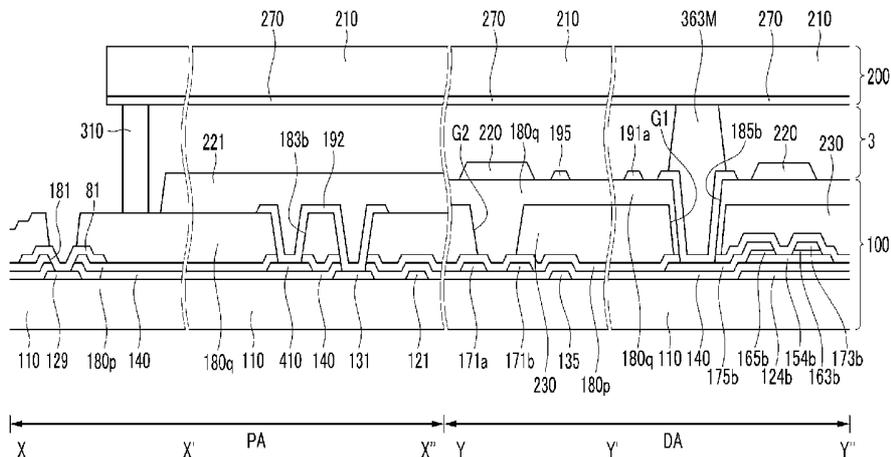
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(57) **ABSTRACT**

An exemplary embodiment of the present invention relates to a liquid crystal display having a display area and a non-display area which includes a first substrate and a second substrate facing the first substrate, a layer having a first opening, a spacer disposed in the first opening, and a first light blocking member disposed in the non-display area. The spacer is disposed in the first opening to maintain an interval between the first substrate and the second substrate. The spacer and the first light blocking member include the same material.

25 Claims, 8 Drawing Sheets



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FIG. 1

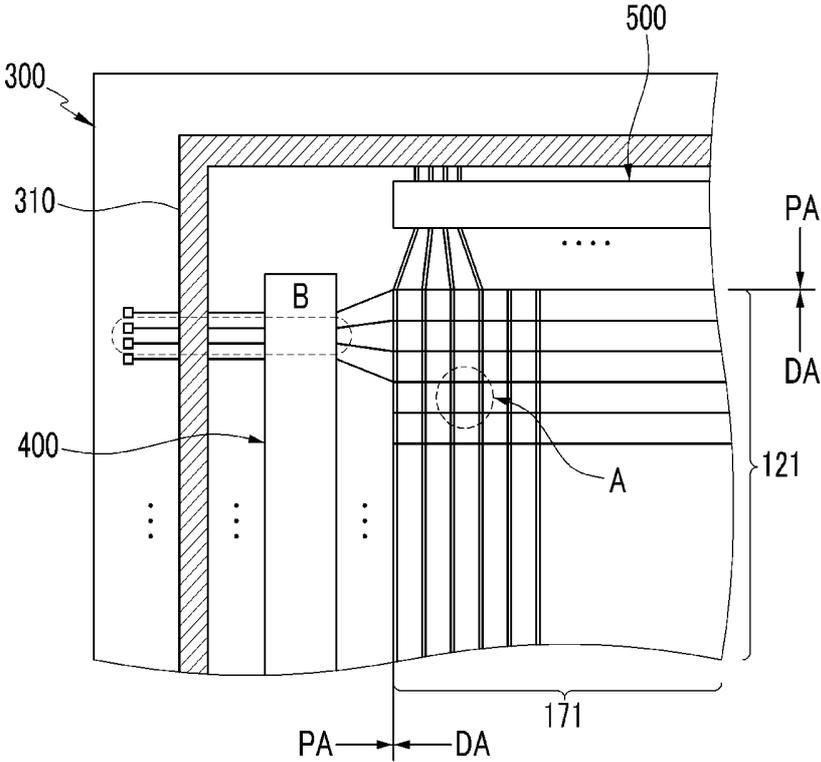


FIG. 2

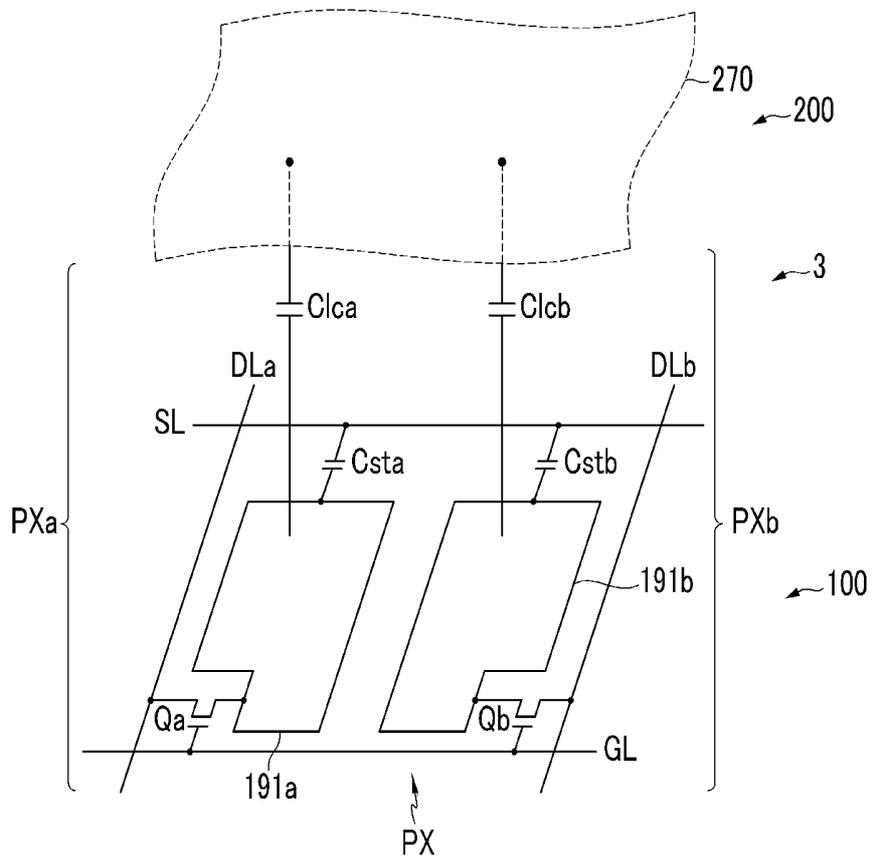
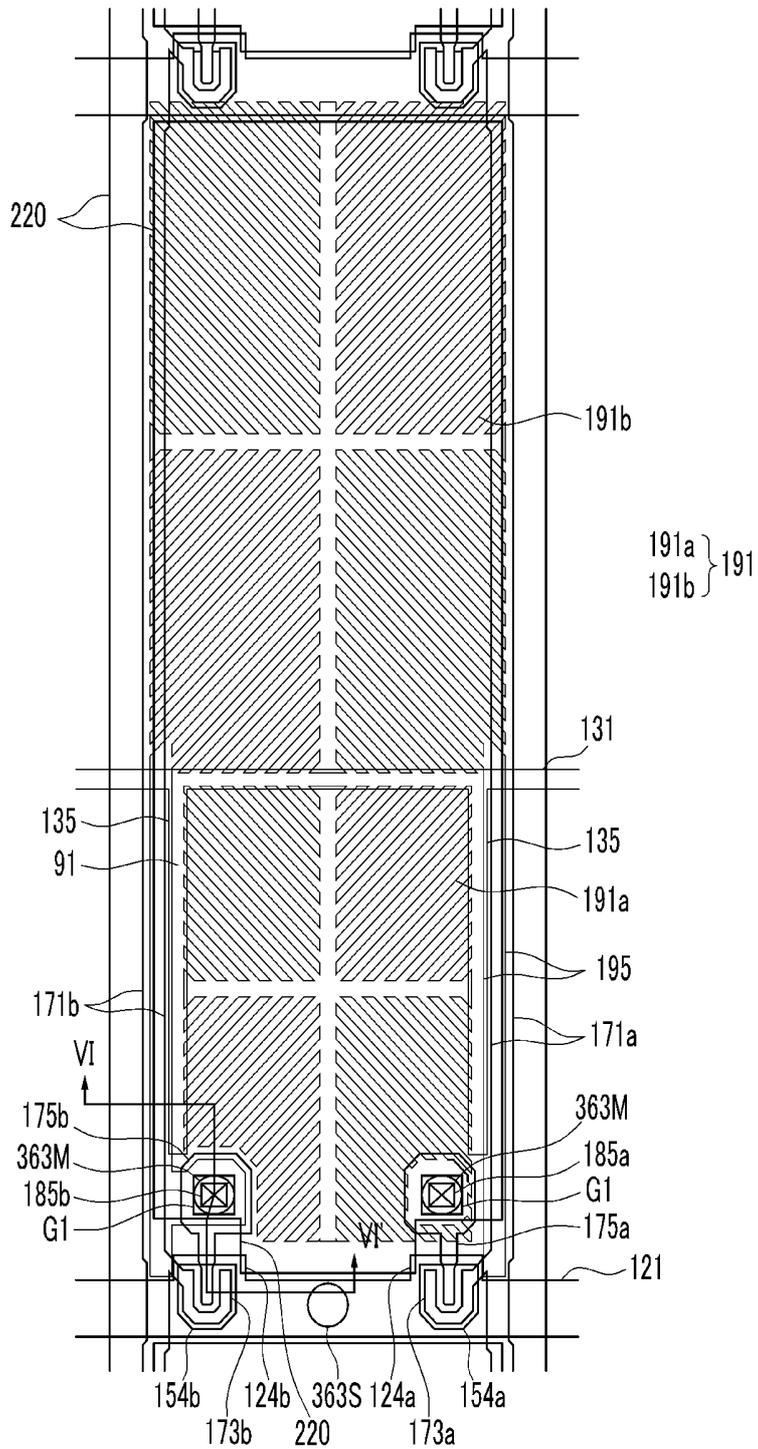


FIG. 5



LIQUID CRYSTAL DISPLAY**CROSS-REFERENCE TO RELATED APPLICATION**

This application claims priority from and the benefit of Korean Patent Application No. 10-2009-0113477, filed on Nov. 23, 2009, which is hereby incorporated by reference for all purposes as if fully set forth herein.

BACKGROUND OF THE INVENTION**1. Field of the Invention**

The present invention relates to a liquid crystal display.

2. Discussion of the Background

A liquid crystal display (LCD) is one of the most widely used flat panel displays (FPD), and is composed of two display panels on which electrodes are formed, and a liquid crystal layer interposed between the two display panels. A voltage is applied to the electrodes to generate an electric field on the liquid crystal layer, and the orientation of liquid crystal molecules in the liquid crystal layer is determined and the polarization of incident light is controlled through the generated electric field to display an image.

A widely used LCD has a structure in which field generating electrodes are respectively formed on two display panels. Among the two display panels, a plurality of pixel electrodes and thin film transistors are arranged in a matrix format on one display panel (hereafter referred to as a "thin film array panel"), color filters of red, green, and blue and a light blocking member are formed on the other display panel (hereafter referred to as a "common electrode panel"), and one common electrode covers the entire surface of the other display panel.

However, when the pixel electrodes and the color filters are formed on different display panels, it may be difficult to correctly align the pixel electrodes and the color filters, which may cause an alignment error. To solve this problem, a color filter on array (COA) structure may be used in which the pixel electrodes and the color filters may be formed on the same display panel.

Also, when considering a combination margin of the thin film transistor array panel and the common electrode panel, a light blocking member such as a black matrix may be formed with a larger than predetermined size. However, the aperture ratio may be decreased by the size of the black matrix so that the black matrix may alternatively be formed in the thin film transistor array panel.

An interval of the liquid crystal layer between two display panels is referred to as a cell gap, and the cell gap influences general operation characteristics of the LCD such as response speed, contrast ratio, viewing angle, and luminance uniformity. If the cell gap is not uniform, a uniform image may not be displayed on the whole screen, which may deteriorate the display quality. Accordingly, a plurality of spacers may be formed on one of the two panels to maintain the uniform cell gap throughout the whole region of the substrate.

The light blocking member including the black matrix prevents light leakage at the boundary of the pixels and a non-display area at the circumference of the display area. The spacer and the light blocking member may be simultaneously formed to simplify a manufacturing process. However, when the height of the spacer is low, it may be difficult to form the light blocking member with sufficient optical density to prevent light leakage in the non-display area.

SUMMARY OF THE INVENTION

Exemplary embodiments of the present invention provide a light blocking member arranged in a non-display area of an LCD which is formed with a spacer.

Additional features of the invention will be set forth in the description which follows, and in part will be apparent from the description, or may be learned by practice of the invention.

An exemplary embodiment of the present invention discloses an LCD including a display area and a non-display. The LCD includes a first substrate and a second substrate facing the first substrate, a layer having a first opening, a spacer disposed in the first opening, and a first light blocking member disposed in the non-display area. The spacer is disposed in the first opening to maintain an interval between the first substrate and the second substrate. The spacer and the first light blocking member include the same material.

An exemplary embodiment of the present invention also discloses a manufacturing method of an LCD including a display area and a non-display. The method includes coupling a first substrate and a second substrate together, forming a layer having a first opening on the first substrate, forming a spacer disposed in the first opening, the spacer to maintain an interval between the first substrate and the second substrate, and forming a first light blocking member in the non-display area. The spacer and the first light blocking member are simultaneously formed.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention, and together with the description serve to explain the principles of the invention.

FIG. 1 is a layout view of an LCD according to an exemplary embodiment of the present invention.

FIG. 2 is a layout view of an equivalent circuit diagram of one pixel of a LCD according to an exemplary embodiment of the present invention.

FIG. 3 is a view showing a region "A" of FIG. 1.

FIG. 4 is a cross-sectional view taken along line IV-IV' of FIG. 3.

FIG. 5 is a layout view of a LCD according to an exemplary embodiment of the present invention, showing the region A of FIG. 1.

FIG. 6 is a cross-sectional view taken along line VI-VI' of FIG. 5.

FIG. 7 is a layout view of a region "B" of FIG. 1.

FIG. 8 is cross-sectional view taken along lines X-X' and X'-X" of FIG. 7 and lines Y-Y' and Y'-Y" of FIG. 3.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

The invention is described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the exemplary embodiments set forth herein. Rather, these exemplary embodiments are provided so that this disclosure is thorough, and will fully convey the scope of the invention to those skilled in the art. In the drawings, the size and relative sizes of layers and regions may be exaggerated for clarity. Like reference numerals in the drawings denote like elements.

It will be understood that when an element or layer is referred to as being “on” or “connected to” another element or layer, it can be directly on or directly connected to the other element or layer, or intervening elements or layers may be present. In contrast, when an element is referred to as being “directly on” or “directly connected to” another element or layer, there are no intervening elements or layers present.

FIG. 1 is a layout view of an LCD according to an exemplary embodiment of the present invention. FIG. 2 is a layout view of an equivalent circuit diagram of one pixel of an LCD according to an exemplary embodiment of the present invention.

Referring to FIG. 1 and FIG. 2, the LCD according to an exemplary embodiment of the present invention includes a liquid crystal panel assembly 300 and a gate driver 400 and a data driver 500 connected thereto, a gray voltage generator (not shown) connected to the data driver 500, a light source unit (not shown) to provide light to the liquid crystal panel assembly 300, a light source driver (not shown) to control the light source unit (not shown), and a signal controller (not shown).

The gate driver 400 or the data driver 500 may be formed on the lower panel 100 of the liquid crystal panel assembly 300, or may be formed separately in the shape of an integrated circuit (IC) chip.

The liquid crystal panel assembly 300 includes lower and upper panels 100 and 200, and a liquid crystal layer 3 interposed between the two panels 100 and 200. As shown in FIG. 1, a plurality of gate lines 121 proceed in the row direction, and a plurality of data lines 171 proceed in the column direction, in the liquid crystal panel assembly 300. A plurality of pixels are connected to the gate and data lines 121 and 171 and arranged roughly in the form of a matrix. A sealant 310 is formed at the outer boundary of the liquid crystal panel assembly 300 so as to seal the liquid crystal molecules of the liquid crystal layer 3.

The liquid crystal layer 3 may have positive (+) or negative (-) dielectric anisotropy, and liquid crystal molecules of the liquid crystal layer 3 may be aligned such that directors thereof stand substantially parallel or perpendicular to the surface of the two display panels 100 and 200 when an electric field is not applied thereto.

Alignment layers (not shown) may be formed on the inner surfaces of the display panels 100 and 200. The alignment layers may be vertical alignment layers. Polarizers (not shown) may be formed on the outer surfaces of the display panels 100 and 200.

Referring to FIG. 2, an LCD according to an exemplary embodiment of the present invention includes signal lines including a plurality of gate lines GL, a plurality of pairs of data lines DL_a and DL_b, and a plurality of storage electrode lines SL, and a plurality of pixels PX connected thereto.

The pixels PX include a pair of sub-pixels PX_a and PX_b, which include switching elements Q_a and Q_b, liquid crystal capacitors Cl_{ca} and Cl_{cb}, and storage capacitors C_{sta} and C_{stb}, respectively.

The switching elements Q_a and Q_b are three-terminal elements such as thin film transistors formed on the lower panel 100. The control terminals of the switching elements Q_a and Q_b are connected to the gate lines GL, the input terminals thereof are connected to the data lines DL_a and DL_b, and the output terminals thereof are connected to the liquid crystal capacitors Cl_{ca} and Cl_{cb} and the storage capacitors C_{sta} and C_{stb}, respectively.

The liquid crystal capacitors Cl_{ca} and Cl_{cb} have sub-pixel electrodes 191_a and 191_b and a common electrode 270 as two

terminals, and the liquid crystal layer 3 is interposed between the two terminals as a dielectric.

The storage capacitors C_{sta} and C_{stb}, which assist the liquid crystal capacitors Cl_{ca} and Cl_{cb}, are formed by overlapping the storage electrode line SL with the sub-pixel electrodes 191_a and 191_b and interposing an insulator, and a predetermined voltage such as a common voltage V_{com} is applied to the storage electrode line SL.

The voltages charged at the two liquid crystal capacitors Cl_{ca} and Cl_{cb} slightly differ from each other. For example, the data voltage applied to one of the liquid crystal capacitors Cl_{ca} is established to be always lower or higher than the data voltage applied to the other liquid crystal capacitor Cl_{cb}. When the voltages of the two liquid crystal capacitors Cl_{ca} and Cl_{cb} are properly controlled, an image viewed from the side of the LCD maximally approximates an image viewed from the front of the LCD, thereby improving the lateral visibility of the LCD.

An LCD according to an exemplary embodiment of the present invention will be described in detail with reference to FIG. 3, FIG. 4, FIG. 5, and FIG. 6.

FIG. 3 is a layout view of the “A” region of FIG. 1. FIG. 4 is a cross-sectional view of the LCD taken along line IV-IV' of FIG. 3.

Referring to FIG. 3 and FIG. 4, an LCD according to an exemplary embodiment of the present invention includes lower and upper display panels 100 and 200 facing each other, and a liquid crystal layer 3 interposed between the two panels 100 and 200.

The lower display panel 100 will now be described in detail.

A plurality of gate lines 121 and a plurality of storage electrode lines 131 and 135 are formed on an insulation substrate 110.

The gate lines 121 transmit gate signals, and proceed roughly in the transverse direction. The gate lines 121 each include a plurality of first and second gate electrodes 124_a and 124_b which protrude upward.

The storage electrode lines include stems 131 extending substantially parallel to the gate lines 121, and a plurality of storage electrodes 135 which protrude from the stems 131.

The shape and disposition of the storage electrode lines 131 and 135 may be altered in various manners.

A gate insulating layer 140 is formed on the gate lines 121 and the storage electrode lines 131 and 135, and a plurality of semiconductors 154_a and 154_b are formed on the gate insulating layer 140 using amorphous silicon or crystalline silicon.

A plurality of pairs of ohmic contacts 163_b and 165_b are formed on the semiconductors 154_a and 154_b. The ohmic contacts 163_b and 165_b may be formed using silicide or n+ hydrogenated amorphous silicon in which n-type impurities are doped at a high concentration.

A plurality of pairs of data lines 171_a and 171_b and a plurality of pairs of first and second drain electrodes 175_a and 175_b are formed on the ohmic contacts 163_b and 165_b and the gate insulating layer 140.

The data lines 171_a and 171_b transmit data signals, and proceed roughly in the column direction such that they cross the gate lines 121 and the stems 131 of the storage electrode lines. The data lines 171_a and 171_b include first and second source electrodes 173_a and 173_b bent toward the first and second gate electrode 124_a and 124_b in the shape of a letter “U”. The first and second source electrodes 173_a and 173_b face the first and second drain electrodes 175_a and 175_b around the first and second gate electrodes 124_a and 124_b.

The first and second drain electrodes **175a** and **175b** include one end portion partially surrounded by the first and second source electrodes **173a** and **173b**, body portions extended upward from the end portions, and wide opposite end portions to be connected with other layers.

However, the shape and disposition of the data lines **171a** and **171b** including the first and second drain electrodes **175a** and **175b** may be altered in various manners.

The first and second gate electrodes **124a** and **124b**, the first and second source electrodes **173a** and **173b**, and the first and second drain electrodes **175a** and **175b** form first and second thin film transistors (TFT) Qa and Qb together with the first and second semiconductors **154a** and **154b**, and the channels of the first and second TFTs Qa and Qb are formed at the first and second semiconductors **154a** and **154b** between the first and second source electrodes **173a** and **173b** and the first and second drain electrodes **175a** and **175b**.

The ohmic contacts **163b** and **165b** exist only between the underlying semiconductors **154a** and **154b** and the overlying data lines **171a** and **171b** and drain electrodes **175a** and **175b** so as to lower the contact resistance therebetween. The semiconductors **154a** and **154b** have exposed portions not covered by the data lines **171a** and **171b** and the drain electrodes **175a** and **175b**, including a portion thereof between the source electrodes **173a** and **173b** and the drain electrodes **175a** and **175b**.

A lower passivation layer **180p** is formed on the data lines **171a** and **171b**, the drain electrodes **175a** and **175b**, and the exposed portions of the semiconductors **154a** and **154b**, using silicon nitride or silicon oxide.

A color filter **230** is formed through a lithography process on the lower passivation layer **180p**. The color filter **230** may be formed in a pixel area defined by the intersection of the gate line **121** and the data lines **171a** and **171b**, and the respective color filters **230** may express one of three primary colors of red, green, and blue. The left and right boundaries of the color filter **230** may be disposed on the data lines **171a** and **171b** and extend according to the data lines **171a** and **171b**. In this case, the color filter **230** may have a belt shape. Color filters **230** of the same color may not be adjacent to each other.

The color filter **230** may include a structure having a photosensitive organic composition and a pigment to realize full colors. For example, the color filter **230** may include pigments of red, green, or blue that are included in the photosensitive organic composition.

The color filter **230** may have an opening G1 and a groove G2. The opening G1 exposes the lower passivation layer **180p** in the region where the first and second drain electrodes **175a** and **175b** and the pixel electrode **191** contact each other. The groove G2 is disposed between the neighboring data lines **171a** and **171b** between the pixel areas. In an exemplary embodiment, color filters **230** displaying different colors overlap each other between the neighboring data lines **171a** and **171b** between the pixel areas, and the groove G2 is not formed.

An upper passivation layer **180q** made of an organic material or an inorganic material is formed on the lower passivation layer **180p** and the color filter **230**. The upper passivation layer **180q** protects the color filter **230**, and simultaneously flattens the underlying layers.

The lower passivation layer **180p** may prevent the pigment of the color filter **230** from flowing into the exposed semiconductors **154a** and **154b**.

The upper passivation layer **180q** has contact holes **185a** and **185b** exposing the drain electrodes **175a** and **175b**. The contact holes **185a** and **185b** are connected to and overlap the opening G1 of the color filter **230**.

A plurality of pixel electrodes **191** are formed on the upper passivation layer **180q**. The pixel electrodes **191** may be formed using a transparent conductive material such as Indium Tin Oxide (ITO) and Indium Zinc Oxide (IZO). The respective pixel electrodes **191** include first and second sub-pixel electrodes **191a** and **191b** separated from each other by a gap **91**. The second sub-pixel electrode **191b** includes a pair of branches **195** extending along the data line **171**. The branches **195** are disposed between the first sub-pixel electrode **191a** and the data lines **171a** and **171b**, and are connected to the bottom of the first sub-pixel electrode **191a**. The first and second sub-pixel electrodes **191a** and **191b** are connected to the first and second drain electrodes **175a** and **175b** through the contact holes **185a** and **185b** so as to receive data voltages from the first and second drain electrodes **175a** and **175b**.

A light blocking member **220** is formed on the upper passivation layer **180q**, and a main spacer **363M** is formed on the pixel electrode **191**. The light blocking member **220** is formed at a portion corresponding to the boundary of the pixel area and the first and second TFTs Qa and Qb. However, the light blocking member **220** is not formed where the pixel electrode **191** and the drain electrodes **175a** and **175b** contact each other. The main spacer **363M** may be formed in the contact holes **185a** and **185b**.

The main spacer **363M** fills the contact holes **185a** and **185b**, and extends toward the upper panel **200**. The main spacer **363M** functions to maintain the interval between the upper panel **200** and the lower panel **100**. The main spacer **363M** may contact the upper panel **200**.

The light blocking member **220** and the main spacer **363M** may be simultaneously formed, and may be made of a material such as a colored organic layer.

The thickness of the main spacer **363M** may be greater than a height of a cell gap, the cell gap corresponding to the interval of the liquid crystal layer **3**. The thickness of the main spacer **363M** may be greater than the height of the cell gap by more than 1 μm .

When the height of the cell gap corresponding to the interval of the liquid crystal layer **3** is 3.6 μm and the area of the contact holes **185a** and **185b** is 22 μm *22 μm , the thickness of the main spacer **363M** to maintain the height of the cell gap may be greater than 5.0 μm .

The light blocking member **220** may be formed with a thickness that is less than that of the main spacer **363M**.

The contact holes **185a** and **185b** of the upper passivation layer **180q** may have a slope such that the width thereof is decreased closer to the lower side. Accordingly, the width of the main spacer **363M** formed in the contact holes **185a** and **185b** is decreased closer to a lower portion of the main spacer **363M** compared to a middle portion of the main spacer **363M** according to the shape of the contact holes **185a** and **185b**. On the other hand, the width of the main spacer **363M** formed on the upper passivation layer **180q** may be decreased closer to an upper portion of the main spacer **363M** compared to a middle portion of the main spacer **363M**.

The main spacer **363M** according to an exemplary embodiment of the present invention is filled in the contact holes **185a** and **185b** such that when an external force is applied, the force is dispersed in a wide area, and thereby a smear defect may be decreased. The smear defect occurs when the elasticity of the spacer is damaged by external pressure.

The panel **200** will now be described in detail.

In the upper display panel **200**, a common electrode **270** is formed on the entire surface of a transparent insulation substrate **210**, and an alignment layer (not shown) is formed on the common electrode **270**.

FIG. 5 is a layout view of an LCD according to an exemplary embodiment of the present invention, showing the "A" portion of FIG. 1. FIG. 6 is a cross-sectional view taken along line VI-VI' of FIG. 5.

The exemplary embodiment shown in FIG. 5 and FIG. 6 has almost the same configuration as the exemplary embodiment shown in FIG. 3 and FIG. 4. However, the LCD according to the exemplary embodiment shown in FIG. 5 and FIG. 6 further includes an assistance spacer 363S formed on the gate line 121.

The assistance spacer 363S may be formed along with the main spacer 363M, and may be further away from the upper panel 200 than the main spacer 363M. However, the assistance spacer 363S may be closer to the upper panel 200 than the light blocking member 220. The assistance spacer 363S maintains the height of the cell gap along with the main spacer 363M.

FIG. 7 is a layout view of the "B" region of FIG. 1. FIG. 8 is a cross-sectional view taken along lines X-X' and X'-X" of FIG. 7 and lines Y-Y' and Y'-Y" of FIG. 3.

Referring to FIG. 7, contact assistants 81 are connected to end portions 129 of the gate lines 121 through contact holes 181, respectively. The contact assistants 81 assist the adhesion of the end portions 129 of the gate lines 121 to external devices, and protect them. Although not shown, the end portions of the data lines 171 may have a similar configuration as end portions 129 of the gate lines 121, and contact assistants may be connected to end portions of the data lines 171.

Images are displayed at the display area DA of the LCD, and a light blocking member 221 is formed at the non-display area PA. The light blocking member 221 of the non-display area PA is formed on the upper passivation layer 180q. In FIG. 8, the light blocking member 221 is formed inside the sealant 310, however it may be formed under or outside the sealant 310.

The storage electrode line 131 extends on the left and right sides of the non-display area PA of the LCD roughly in the row direction while standing on the same plane as the gate line 121. The storage electrode line 131 includes outer storage electrodes 138. The outer storage electrode 138 may be roughly square-shaped or rectangular-shaped.

A plurality of storage electrode line connecting members 174 extend on the left and right sides of the non-display area PA of the LCD roughly in the column direction while standing on the same plane as the data lines 171.

Transparent connectors 192 electrically connect the storage electrode line connecting members 174 and the outer storage electrodes 138 with each other. Contact holes 183b are formed at the contact area between the transparent connectors 192 and the storage electrode line connecting members 174, and other contact holes 183a are formed at the contact area between the transparent connectors 192 and the outer storage electrodes 138. Alternatively, the outer storage electrodes 138 and the storage electrode line connecting members 174 may be omitted.

A gate driver 400 is formed on the left and right sides of the non-display area PA of the LCD and is connected to the gate lines 121. The gate driver 400 includes data signal lines 410 and gate signal lines 420, which are electrically connected to each other via transparent connectors 192. The gate signal lines 420 of the gate driver 400 are formed on the same plane as the gate lines 121, and the data signal lines 410 of the gate driver 400 are formed on the same plane as the data lines 171. The contact holes 183b are formed at the contact area between the transparent connectors 192 and the data signal lines 410 of the gate driver 400, and the contact holes 183a are formed at the contact area between the transparent connectors 192 and

the gate signal lines 420 of the gate driver 400. Alternatively, the gate driver 400 may not be formed on the lower display panel 100, but may be formed on a separate IC chip, and in this case, the contact holes 183a and 183b through which the transparent connectors 192 contact the data signal line 410 or the gate signal line 420 of the gate driver 400 do not exist.

The features of the non-display area PA of an LCD according to an exemplary embodiment of the present invention, and details relevant to the display area DA thereof, will now be described

Here, the light blocking member 221 formed in the non-display area PA and the light blocking member 220 formed in the display area DA are respectively described as the first light blocking member 221 and the second light blocking member 220.

The first light blocking member 221 may cover all portions where the light leakage may be generated on the insulation substrate 110 of the non-display area PA. The first light blocking member 221 may be simultaneously formed with the second light blocking member 220 and the main spacer 363M of the display area DA. Also, the first light blocking member 221 may be formed using the same material as the second light blocking member 220 and the main spacer 363M of the display area DA.

The first light blocking member 221 may be formed using the colored organic layer, and have an optical density of 4 to 5. The first light blocking member 221 may have an optical density of more than 4 to substantially prevent the light leakage. The first light blocking member 221 is further away from the upper panel 200 than the main spacer 363M. Here, the first light blocking member 221 may be thinner than the main spacer 363M by more than 1 μm .

According to an exemplary embodiment of the present invention, the main spacer 363M of the display area DA is formed in the contact holes 185a and 185b through which the pixel electrode 191 and the drain electrodes 175a and 175b are contacted with each other. Thus, the thickness of the main spacer 363M that is greater than 5.0 μm may be formed while maintaining a height of the cell gap of about 3.6 μm .

The main spacer 363M may be disposed at the portion where the organic layer or the inorganic layer is removed such as at the contact holes 185a and 185b. Therefore, the coating thickness may be increased when coating the main spacer 363M and the first light blocking member 221 of the non-display area PA, and the thickness of the first light blocking member 221 may also be increased.

Although the main spacer 363M may be formed with a thickness of 3.6 μm , the first light blocking member 221 of the non-display area PA may be formed with a thickness of more than 4.0 μm such that the optical density is more than 4. Accordingly, the first light blocking member 221 may prevent the light leakage.

Next, a manufacturing method of an LCD according to an exemplary embodiment of the present invention will be described with reference to FIG. 7 and FIG. 8.

The TFT Qb including the gate electrode 124b, the source electrode 173b, the drain electrode 175b, and the semiconductor 154b is formed on the insulation substrate 110 including the display area DA and the non-display area PA.

A lower passivation layer 180p made of silicon nitride or silicon oxide is formed on the TFT Qb, and a color filter 230 having an opening G1 and a groove G2 is formed through a lithography process.

An upper passivation layer 180q having a contact hole 185b exposing the drain electrode 175b is formed on the lower passivation layer 180p and the color filter 230.

The first light blocking member **221** of the non-display area PA, the second light blocking member **220** of the display area DA, and the main spacer **363M** on the pixel electrode **191** are formed on the upper passivation layer **180g**. The main spacer **363M** maintains the interval between the upper panel **200** and the lower panel **100**.

The first light blocking member **221** may be simultaneously formed with the second light blocking member **220** and the main spacer **363M** of the display area DA. Here, a step of reducing the thickness of the first light blocking member **221** compared with the thickness of the main spacer **363M** may be executed by using a translucent mask.

Also, the main spacer **363M** may have a width that decreases closer to the upper and lower portions of the main spacer **363M** compared to a middle portion of the main spacer **363M**.

Next, the upper panel **200** including the common electrode **270** formed on the insulation substrate **210** and the lower panel **100** are combined.

It will be apparent to those skilled in the art that various modifications and variation can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

What is claimed is:

1. A liquid crystal display including a display area and a non-display area, comprising:
 - a first substrate;
 - a second substrate facing the first substrate;
 - a layer disposed on the first substrate at the display area and the non-display area, the layer comprising an opening at the display area;
 - a spacer disposed in the opening and protruding from the opening toward the second substrate, the spacer having the second substrate disposed thereon to maintain an interval between the first substrate and the second substrate; and
 - a first light blocking member disposed in the non-display area, wherein the spacer and the first light blocking member comprise the same material.
2. The liquid crystal display of claim 1, further comprising:
 - a gate line disposed on the first substrate;
 - a gate insulating layer disposed on the gate line;
 - a data line disposed on the gate insulating layer; and
 - a pixel electrode disposed on an organic layer, wherein the organic layer is disposed on the data line.
3. The liquid crystal display of claim 2, wherein a thickness of the first light blocking member is greater than 4 μm .
4. The liquid crystal display of claim 3, wherein a thickness of the spacer is greater than a height of a cell gap.
5. The liquid crystal display of claim 4, wherein the thickness of the spacer is greater than the height of the cell gap by more than 1.0 μm .
6. The liquid crystal display of claim 5, wherein the thickness of the spacer is greater than 5.0 μm .
7. The liquid crystal display of claim 6, wherein the first light blocking member is more than 1 μm thinner than the spacer.
8. The liquid crystal display of claim 7, wherein a width of the spacer is decreased in an upper portion and a lower portion of the spacer compared to a middle portion of the spacer.

9. The liquid crystal display of claim 2, wherein a thickness of the spacer is greater than a height of a cell gap.

10. The liquid crystal display of claim 9, wherein the thickness of the spacer is greater than the height of the cell gap by more than 1.0 μm .

11. The liquid crystal display of claim 10, wherein a width of the spacer is decreased in an upper portion and a lower portion of the spacer compared to a middle portion of the spacer.

12. The liquid crystal display of claim 2, wherein a width of the spacer is decreased in an upper portion and a lower portion of the spacer compared to a middle portion of the spacer.

13. The liquid crystal display of claim 1, wherein a thickness of the first light blocking member is greater than 4 μm .

14. The liquid crystal display of claim 13, wherein a thickness of the spacer is greater than a height of a cell gap.

15. The liquid crystal display of claim 14, wherein the thickness of the spacer is greater than the height of the cell gap by more than 1.0 μm .

16. The liquid crystal display of claim 15, wherein a width of the spacer is decreased in an upper portion and a lower portion of the spacer compared to a middle portion of the spacer.

17. The liquid crystal display of claim 1, wherein a thickness of the spacer is greater than a height of a cell gap.

18. The liquid crystal display of claim 17, wherein the thickness of the spacer is greater than the height of the cell gap by more than 1.0 μm .

19. The liquid crystal display of claim 18, wherein a width of the spacer is decreased in an upper portion and a lower portion of the spacer compared to a middle portion of the spacer.

20. The liquid crystal display of claim 17, wherein a width of the spacer is decreased in an upper portion and a lower portion of the spacer compared to a middle portion of the spacer.

21. The liquid crystal display of claim 1, wherein a width of the spacer is decreased in an upper portion and a lower portion of the spacer compared to a middle portion of the spacer.

22. A method for manufacturing a liquid crystal display comprising a display area and a non-display area, the method comprising:

forming a layer on a first substrate at the display area and the non-display area, the layer comprising an opening at the display area;

forming a spacer in the opening, the spacer extending from the opening toward a second substrate and having the second substrate disposed thereon to maintain an interval between the first substrate and the second substrate; and

forming a first light blocking member in the non-display area, wherein the spacer and the first light blocking member are simultaneously formed.

23. The method of claim 22, wherein the forming of the first light blocking member and the spacer comprises using a translucent mask to reduce the thickness of the first light blocking member compared with the thickness of the spacer.

24. The method of claim 23, wherein the spacer is formed to have a width that is decreased in an upper and a lower portion of the spacer compared to a middle portion of the spacer.

25. The method of claim 22, wherein ⁵ the spacer is formed to have a width that is decreased in an upper portion and a lower portion of the spacer compared to a middle portion of the spacer.

* * * * *

专利名称(译)	液晶显示器		
公开(公告)号	US8854579	公开(公告)日	2014-10-07
申请号	US12/790216	申请日	2010-05-28
[标]申请(专利权)人(译)	三星电子株式会社		
申请(专利权)人(译)	SAMSUNG ELECTRONICS CO. , LTD.		
当前申请(专利权)人(译)	三星DISPLAY CO. , LTD.		
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外部链接	Espacenet USPTO		

摘要(译)

本发明的示例性实施例涉及一种具有显示区域和非显示区域的液晶显示器，该非显示区域包括第一基板和面向第一基板的第二基板，具有第一开口的层，设置在第一基板中的间隔物开口，以及设置在非显示区域中的第一光阻挡构件。间隔物设置在第一开口中以保持第一基板和第二基板之间的间隔。间隔物和第一光阻挡构件包括相同的材料。

