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(54) **TOUCH LIQUID CRYSTAL DISPLAY PANEL, DISPLAY DEVICE AND TERMINAL**

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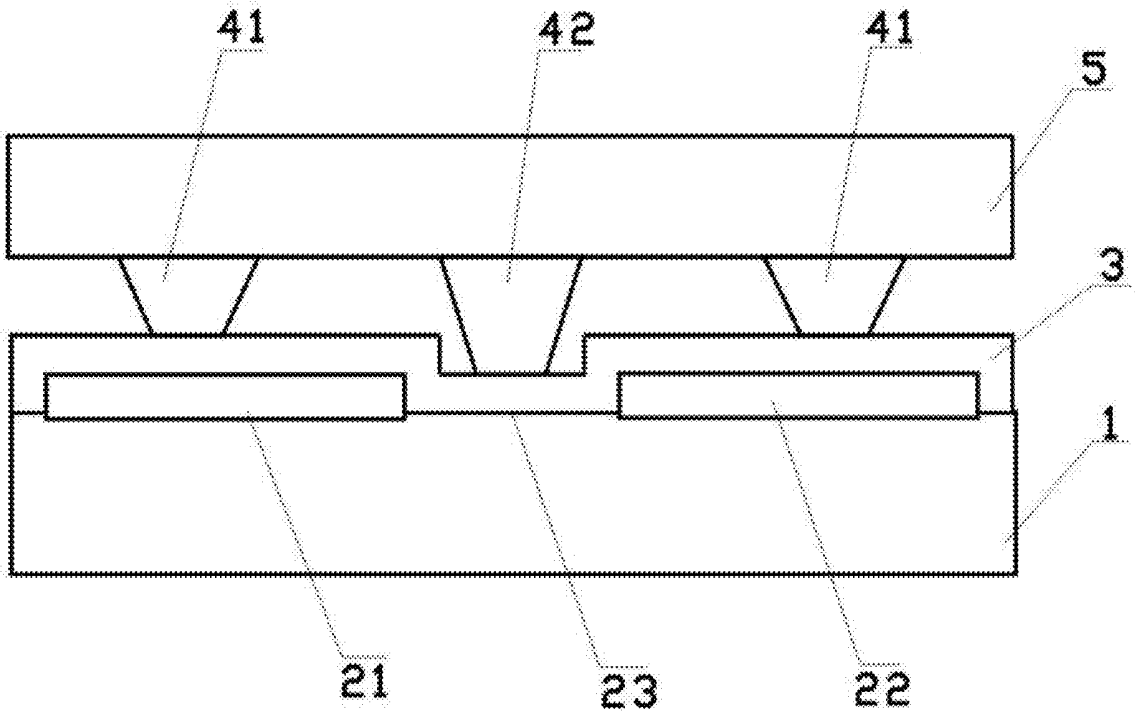
(57) **ABSTRACT**

The present invention discloses a touch liquid crystal display panel. The panel includes: a lower substrate, wherein an inner surface of the lower substrate is provided with a first and a second common electrode regions, and a spacer region located between the first and the second common electrode regions; a dielectric insulation layer covering on the first and the second common electrode regions and the entire spacer region; and an upper substrate opposite to the lower substrate, wherein an inner surface of the upper substrate is provided with a first and a second spacers, and the first spacer is pressed against the dielectric insulation layer corresponding to the first common electrode region and/or the second common electrode regions, and the second spacer is pressed against the dielectric insulation layer corresponding to the spacer region; wherein a height of the second spacer is greater than a height of the first spacer.



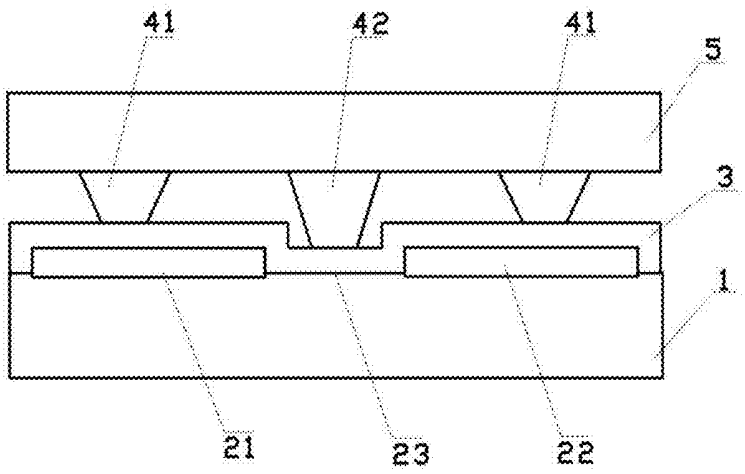


FIG. 1

TOUCH LIQUID CRYSTAL DISPLAY PANEL, DISPLAY DEVICE AND TERMINAL

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is a continuing application of PCT Patent Application No. PCT/CN2018/104464, entitled "TOUCH LIQUID CRYSTAL DISPLAY PANEL, DISPLAY DEVICE AND TERMINAL", filed on Sep. 7, 2018, which claims priority to China Patent Application No. 201810541890.5 filed on May 30, 2018, both of which are hereby incorporated in its entireties by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to a display panel field, and more particularly to a touch liquid crystal display panel, a display device and a terminal.

BACKGROUND OF THE INVENTION

[0003] In the field of touch display, a common electrode is generally divided into different regions, which are used to sense the touch signals of the fingers corresponding to a location of a checkerboard pattern. The partition structure of the common electrode causes the cross section to be uneven. The deformation is found by the influence of its own gravity, which easily leads to unevenness of the gap after the cell box is formed. The existence of the structural defect is likely to cause display abnormality, which leads to deterioration of display quality or even poor display.

SUMMARY OF THE INVENTION

[0004] The technical problem to be solved by the present invention is to provide a touch liquid crystal display panel, a display device and a terminal, which can effectively avoid product display abnormality caused by uneven product gap, and improve the performance of the touch display panel without increasing the process and quality to improve product yield.

[0005] In order to solve the above technology problem, the present invention provides a touch liquid crystal display panel, comprising: a lower substrate, wherein an inner surface of the lower substrate is provided with a first common electrode region, a second common electrode region, and a spacer region located between the first common electrode region and the second common electrode region; a dielectric insulation layer covering on the first common electrode region, the second common electrode region and the spacer region; and an upper substrate opposite to the lower substrate, wherein an inner surface of the upper substrate is provided with a first spacer and a second spacer respectively, and the first spacer is pressed against the dielectric insulation layer corresponding to the first common electrode region and/or the second common electrode regions, and the second spacer is pressed against the dielectric insulation layer corresponding to the spacer region; wherein a height of the second spacer is greater than a height of the first spacer.

[0006] Wherein a height difference between the second spacer and the first spacer is set as a height of the first common electrode region or the second common electrode region.

[0007] Wherein the upper substrate and the lower substrate are parallel.

[0008] Wherein the upper substrate is a color filter substrate.

[0009] Wherein the first common electrode region and the second common electrode region are arranged in a checkerboard pattern.

[0010] In order to solve the above technology problem, the present invention also provides a display device using the above touch liquid crystal display panel. Wherein the display device includes a touch liquid crystal display panel, and the touch liquid crystal display panel comprises: a lower substrate, wherein an inner surface of the lower substrate is provided with a first common electrode region, a second common electrode region, and a spacer region located between the first common electrode region and the second common electrode region; a dielectric insulation layer covering on the first common electrode region, the second common electrode region and the spacer region; and an upper substrate opposite to the lower substrate, wherein an inner surface of the upper substrate is provided with a first spacer and a second spacer respectively, and the first spacer is pressed against the dielectric insulation layer corresponding to the first common electrode region and/or the second common electrode regions, and the second spacer is pressed against the dielectric insulation layer corresponding to the spacer region; wherein a height of the second spacer is greater than a height of the first spacer.

[0011] Wherein a height difference between the second spacer and the first spacer is set as a height of the first common electrode region or the second common electrode region.

[0012] Wherein the upper substrate and the lower substrate are parallel.

[0013] Wherein the upper substrate is a color filter substrate.

[0014] Wherein the first common electrode region and the second common electrode region are arranged in a checkerboard pattern.

[0015] In order to solve the above technology problem, the present invention also provides a terminal using the above display device, wherein the terminal has a display device, the display device includes a touch liquid crystal display panel, and the touch liquid crystal display panel comprises: a lower substrate, wherein an inner surface of the lower substrate is provided with a first common electrode region, a second common electrode region, and a spacer region located between the first common electrode region and the second common electrode region; a dielectric insulation layer covering on the first common electrode region, the second common electrode region and the spacer region; and an upper substrate opposite to the lower substrate, wherein an inner surface of the upper substrate is provided with a first spacer and a second spacer respectively, and the first spacer is pressed against the dielectric insulation layer corresponding to the first common electrode region and/or the second common electrode regions, and the second spacer is pressed against the dielectric insulation layer corresponding to the spacer region; wherein a height of the second spacer is greater than a height of the first spacer.

[0016] Wherein a height difference between the second spacer and the first spacer is set as a height of the first common electrode region or the second common electrode region.

[0017] Wherein the upper substrate and the lower substrate are parallel.

[0018] Wherein the upper substrate is a color filter substrate.

[0019] Wherein the first common electrode region and the second common electrode region are arranged in a checkerboard pattern.

[0020] The touch liquid crystal display panel, display device and terminal provided by the present invention have following beneficial effect: the first spacer is pressed against the dielectric insulation layer corresponding to the first common electrode region and/or the second common electrode regions, and the second spacer is pressed against the dielectric insulation layer corresponding to the spacer region; wherein a height of the second spacer is greater than a height of the first spacer; accordingly, the present invention can effectively avoid product display abnormalities caused by uneven product gaps, improve the performance and quality of touch display panels, and improve product yield without increasing the process.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] In order to more clearly illustrate the embodiments of the present invention or the technical solutions in the prior art, the drawings used in the embodiments or the prior art description will be briefly introduced below. Obviously, the drawings in the following description are only some embodiments of the present invention. For those of ordinary skill in the art, without creative labor, other drawings can also be obtained from these figures.

[0022] FIG. **1** is a schematic structural view of a touch liquid crystal display panel of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0023] The technical solutions in the embodiments of the present invention are clearly and completely described in the following with reference to the accompanying drawings in the embodiments of the present invention. Obviously, the described embodiments are only a part of the embodiments of the present invention, and not all of the embodiments. Based on an embodiment of the present invention, all other embodiments obtained by those skilled in the art without creative efforts are within the scope of protection of the present invention.

[0024] As shown in FIG. **1**, FIG. **1** is a first embodiment of the touch liquid crystal display panel of the present invention.

[0025] The touch liquid crystal display panel in this embodiment includes: a lower substrate **1**, wherein an inner surface of the lower substrate **1** is provided with a first common electrode region **21**, a second common electrode region **22**, and a spacer region **23**; wherein the first common electrode region **21** and the second common electrode region **22** are arranged as a checkerboard pattern, and the first common electrode region **21** and the second common electrode region **22** arranged in the above structure can respectively generate electrode touch signal corresponding to pixels of each row of the array substrate through corresponding driving components. The spacer region **23** is a region between the first common electrode region **21** and the second common electrode region **22**;

[0026] a dielectric insulation layer **3** covering on the first common electrode region **21**, the second common electrode region **22**, and the entire spacer region **23**; and

[0027] an upper substrate **5** opposite to the lower substrate **1**, wherein an inner surface of the upper substrate **5** is provided with a first spacer **41** and a second spacer **42** respectively, and the first spacer **41** is pressed against the dielectric insulation layer **3** corresponding to the first common electrode region **21** and/or the second common electrode regions **22**, and the second spacer **42** is pressed against the dielectric insulation layer **3** corresponding to the spacer region **23**.

[0028] Wherein, a height of the second spacer **42** is greater than a height of the first spacer **41**. A position of a surface of the lower substrate **1** corresponding to any position of the upper substrate **5** means that any of the position that is vertically projected on the surface of the lower substrate **1**.

[0029] In a specific implementation, the touch liquid crystal display panel further includes: a liquid crystal layer (not shown) clamped between the upper substrate **5** and the lower substrate **1**, and a polarizing films respectively attached to the outer surfaces of the upper substrate **5** and the lower substrate **1**. The upper substrate **5** in this embodiment is a color filter substrate, and the upper substrate **5** and the lower substrate **1** form a cell gap by connection or compression.

[0030] Furthermore, the first common electrode region **21** and the second common electrode region **22** are respectively disposed on the inner side surface of the lower substrate **1**, and the first common electrode region **21** and the second common electrode region **22** are arranged as a checkerboard pattern. The heights of the first common electrode region **21** and the second common electrode region **22** are set to be the same, and the insulation region between the first common electrode region **21** and the second common electrode region **22** is the spacer region **23**.

[0031] The dielectric insulation layer **3** covers the first common electrode region **21** and the second common electrode region **22**, and is filled in the spacer region **23**. Since the first common electrode region **21** and the second common electrode region **22** have a certain height, the dielectric insulation layer **3** is not flat, and a groove appears at the position of the spacer region **23**.

[0032] Furthermore, the inner surface of the upper substrate **5** is respectively provided with a first spacer **41** and a second spacer **42**, wherein the first spacer **41** is pressed against the dielectric insulation layer **3** corresponding to the first common electrode region **21** and the second common electrode region **22**, the number of the first spacers **41** is multiple, and the multiple first spacers **41** form an array. The second spacer **42** is pressed against the dielectric insulation layer **3** corresponding to the spacer region **23**, the number of the second spacer **42** is set to be multiple, and the multiple second spacers **42** form an array.

[0033] Preferably, the height of the second spacer **42** is greater than the height of the first spacer **41**, so that the heights between any position of the upper substrate **5** and the surface of the lower substrate **1** corresponding the any position is uniform. In a specific implementation, the first spacers **41** arranged in an array are adapted to be connected to the dielectric insulation layer **3** corresponding to the first common electrode region **21** and the second common electrode region **22**, and the second spacers **42** arranged in an array are adapted to be connected to the dielectric insulation layer **3** corresponding to the spacer region **23** to form a thickness of the liquid crystal cell. Due to the difference in height between the second spacer **42** and the first spacer **41**, a height difference between the second spacer **42** and the

first spacer **41** is set as a height of the first common electrode region **21** or the second common electrode region **22**, so that the cell thicknesses at the center position and the both ends of the display panel are uniform. That is, the upper substrate **5** and the lower substrate **1** are kept in a relatively parallel state, which contributes to the improvement of the yield of the product.

[0034] The present invention also discloses a display device. In a specific implementation, the display device includes the touch liquid crystal display panel described above. The implementation manner is the same as that of the touch liquid crystal display panel, and details are not described herein.

[0035] The present invention also discloses a terminal. In a specific implementation, the terminal has a display device, and the display device includes the touch liquid crystal display panel. The implementation manner is the same as that of the touch liquid crystal display panel, and details are not described herein.

[0036] Implementing the touch liquid crystal display panel provided by the invention has following beneficial effect: the first spacer is pressed against the dielectric insulation layer corresponding to the first common electrode region and/or the second common electrode regions, and the second spacer is pressed against the dielectric insulation layer corresponding to the spacer region; wherein a height of the second spacer is greater than a height of the first spacer; accordingly, the present invention can effectively avoid product display abnormalities caused by uneven product gaps, improve the performance and quality of touch display panels, and improve product yield without increasing the process.

1. A touch liquid crystal display panel, comprising:

a lower substrate, wherein an inner surface of the lower substrate is provided with a first common electrode region, a second common electrode region, and a spacer region located between the first common electrode region and the second common electrode region;

a dielectric insulation layer covering on the first common electrode region, the second common electrode region and the spacer region; and

an upper substrate opposite to the lower substrate, wherein an inner surface of the upper substrate is provided with a first spacer and a second spacer respectively, and the first spacer is pressed against the dielectric insulation layer corresponding to the first common electrode region and/or the second common electrode regions, and the second spacer is pressed against the dielectric insulation layer corresponding to the spacer region;

wherein a height of the second spacer is greater than a height of the first spacer wherein the upper substrate and the lower substrate are maintained to be parallel a cell thickness at a center position of the display panel and a cell thickness at both ends of the touch liquid crystal display panel are uniform by arranging the second spacer which is higher in the spacer region and the first spacer which is lower in the first common electrode region or the second common electrode region having a height equal to a height difference between the second spacer and the first spacer.

2-3. (canceled)

4. The touch liquid crystal display panel according to claim **1**, wherein the upper substrate is a color filter substrate.

5. The touch liquid crystal display panel according to claim **1**, wherein the first common electrode region and the second common electrode region are arranged in a checkerboard pattern.

6. The touch liquid crystal display panel according to claim **1**, wherein the first common electrode region and the second common electrode region are arranged in a checkerboard pattern.

7. A display device, wherein the display device includes a touch liquid crystal display panel, and the touch liquid crystal display panel comprises:

a lower substrate, wherein an inner surface of the lower substrate is provided with a first common electrode region, a second common electrode region, and a spacer region located between the first common electrode region and the second common electrode region;

a dielectric insulation layer covering on the first common electrode region, the second common electrode region and the spacer region; and

an upper substrate opposite to the lower substrate, wherein an inner surface of the upper substrate is provided with a first spacer and a second spacer respectively, and the first spacer is pressed against the dielectric insulation layer corresponding to the first common electrode region and/or the second common electrode regions, and the second spacer is pressed against the dielectric insulation layer corresponding to the spacer region;

wherein a height of the second spacer is greater than a height of the first spacer

wherein the upper substrate and the lower substrate are maintained to be parallel a cell thickness at a center position of the display panel and a cell thickness at both ends of the touch liquid crystal display panel are uniform by arranging the second spacer which is higher in the spacer region and the first spacer which is lower in the first common electrode region or the second common electrode region having a height equal to a height difference between the second spacer and the first spacer.

8-9. (canceled)

10. The display device according to claim **7**, wherein the upper substrate is a color filter substrate.

11. The display device according to claim **7**, wherein the first common electrode region and the second common electrode region are arranged in a checkerboard pattern.

12. A terminal, wherein the terminal has a display device, the display device includes a touch liquid crystal display panel, and the touch liquid crystal display panel comprises:

a lower substrate, wherein an inner surface of the lower substrate is provided with a first common electrode region, a second common electrode region, and a spacer region located between the first common electrode region and the second common electrode region;

a dielectric insulation layer covering on the first common electrode region, the second common electrode region and the spacer region; and

an upper substrate opposite to the lower substrate, wherein an inner surface of the upper substrate is provided with a first spacer and a second spacer respectively, and the first spacer is pressed against the dielectric insulation layer corresponding to the first common electrode region and/or the second common electrode

regions, and the second spacer is pressed against the dielectric insulation layer corresponding to the spacer region;

wherein a height of the second spacer is greater than a height of the first spacer wherein the upper substrate and the lower substrate are maintained to be parallel a cell thickness at a center position of the display panel and a cell thickness at both ends of the touch liquid crystal display panel are uniform by arranging the second spacer which is higher in the spacer region and the first spacer which is lower in the first common electrode region or the second common electrode region having a height equal to a height difference between the second spacer and the first spacer.

13-14. (canceled)

15. The terminal according to claim **12**, wherein the upper substrate is a color filter substrate.

16. The terminal according to claim **12**, wherein the first common electrode region and the second common electrode region are arranged in a checkerboard pattern.

* * * * *

专利名称(译)	触摸液晶显示面板，显示装置及终端		
公开(公告)号	US20190369426A1	公开(公告)日	2019-12-05
申请号	US16/174506	申请日	2018-10-30
[标]发明人	CAO ZHIHAO		
发明人	CAO, ZHIHAO		
IPC分类号	G02F1/1339 G02F1/1343 G02F1/1333 G06F3/041 G06F3/044		
CPC分类号	G02F1/13338 G02F2001/13396 G02F1/134309 G06F3/0412 G06F3/044 G02F1/1339 G02F2201/121 G02F2201/122 G02F1/13394		
优先权	201810541890.5 2018-05-30 CN		
外部链接	Espacenet USPTO		

摘要(译)

本发明公开了一种触摸液晶显示面板。 该面板包括：下基板，其中下基板的内表面设置有第一和第二公共电极区域，以及位于第一和第二公共电极区域之间的间隔物区域； 介电绝缘层覆盖在第一和第二公共电极区域以及整个间隔物区域上； 以及与下基板相对的上基板，其中上基板的内表面设置有第一和第二间隔物，并且将第一间隔物压靠在与第一公共电极区域和/或第二公共电极区域相对应的介电绝缘层上。 第二公共电极区，将第二隔离物压在对应于隔离物区的介电绝缘层上。 其中，第二间隔物的高度大于第一间隔物的高度。