

made extensive studies to improve such a touch panel and have made a touch panel display device which gives further excellent touch feeling to a user.

[0025] Accordingly, it is an object of the present invention to provide a display device with a touch panel which gives excellent touch feeling to a user.

[0026] (1) According to one aspect of the present invention, there is provided a display device with a touch panel which includes: a touch panel which includes a first substrate, a second substrate arranged to face the first substrate in an opposed manner with a gap formed therebetween, a first electrode which is constituted of a plurality of metal lines formed on a surface of the first substrate which faces the second substrate, and a second electrode formed on a surface of the second substrate which faces the first substrate; a display panel which is mounted on the second substrate on a side opposite to the first substrate; and a resin film which is adhered to the first substrate on a side opposite to the second substrate. According to the present invention, the resin film is adhered to the touch panel, the unevenness attributed to the first electrode is absorbed and hence, the touch panel can give a user excellent touch feeling.

[0027] (2) In the display device with a touch panel having the constitution (1), the display panel may be a liquid crystal display panel which excludes a polarizing plate, a first polarizing plate may be adhered to a surface of the display panel opposite to the second substrate, and the resin film may constitute a second polarizing plate.

[0028] (3) In the display device with a touch panel having the constitution (1), the resin film may constitute a circular polarizing plate.

[0029] (4) In the display device with a touch panel having any one of the constitutions (1) to (3), a cushion layer which is softer than the resin film may be further interposed between the resin film and the touch panel.

[0030] (5) In the display device with a touch panel having any one of the constitutions (1) to (3), an air cushion layer may be further interposed between the resin film and the touch panel.

[0031] (6) In the display device with a touch panel having any one of the constitutions (1) to (3), a cushion layer which is softer than the resin film may be further interposed between the display panel and the touch panel.

[0032] (7) In the display device with a touch panel having any one of the constitutions (1) to (3), an air cushion layer may be further interposed between the display panel and the touch panel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] FIG. 1 is a plan view schematically showing a display device with a touch panel according to an embodiment of the present invention;

[0034] FIG. 2 is a cross-sectional view schematically showing the display device with a touch panel according to the embodiment of the present invention;

[0035] FIG. 3 is a cross-sectional view schematically showing a display device with a touch panel according to a modification 1 of the embodiment of the present invention;

[0036] FIG. 4 is a cross-sectional view schematically showing a display device with a touch panel according to a modification 2 of the embodiment of the present invention;

[0037] FIG. 5 is a plan view schematically showing a display device with a touch panel according to a modification 3 of the embodiment of the present invention;

[0038] FIG. 6 is a cross-sectional view schematically showing the display device with a touch panel according to the modification 3 of the embodiment;

[0039] FIG. 7 is a cross-sectional view schematically showing a display device with a touch panel according to a modification 4 of the embodiment of the present invention;

[0040] FIG. 8 is a cross-sectional view schematically showing a display device with a touch panel according to a modification 5 of the embodiment of the present invention;

[0041] FIG. 9 is a schematic plan view of the touch panel;

[0042] FIG. 10 is a cross-sectional view of the touch panel;

[0043] FIG. 11 is an enlarged cross-sectional view of a second substrate SUB2 within an AA region in FIG. 9;

[0044] FIG. 12 is a perspective view of the touch panel according to the embodiment of the present invention;

[0045] FIG. 13 is a perspective view of the touch panel according to the embodiment of the present invention;

[0046] FIG. 14 is a schematic plan view of the touch panel;

[0047] FIG. 15 is a schematic plan view of the touch panel;

[0048] FIG. 16 is a cross-sectional view of a substrate which constitutes the touch panel;

[0049] FIG. 17 is a cross-sectional view of a substrate which constitutes the touch panel;

[0050] FIG. 18 is a cross-sectional view of a substrate which constitutes the touch panel;

[0051] FIG. 19 is a cross-sectional view of a substrate which constitutes the touch panel;

[0052] FIG. 20 is a view for explaining the principle of a conventional capacity-type touch panel; and

[0053] FIG. 21 is a view for explaining the principle of a conventional resistance-film-type touch panel.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0054] Hereinafter, an embodiment of the present invention is explained in conjunction with drawings.

[0055] FIG. 1 is a plan view schematically showing a display device with a touch panel according to the embodiment of the present invention. FIG. 2 is a cross-sectional view schematically showing the display device with a touch panel according to the embodiment of the present invention.

[0056] The display device includes a touch panel (or referred to as "touch screen") 10. The touch panel 10 includes a first substrate 12, and a second substrate 14 which is arranged to face the first substrate 12 in an opposed manner with a gap formed therebetween. On a surface of the first substrate 12 which faces the second substrate 14 in an opposed manner, a first electrode 16 which is constituted of a plurality of metal lines is formed (omitted from FIG. 2). On a surface of the second substrate 14 which faces the first substrate 12 in an opposed manner, a second electrode 18 is formed (omitted from FIG. 2). The second electrode 18 is also constituted of a plurality of metal lines. Spacers 20 are arranged between the first substrate 12 and the second substrate 14 thus preventing the first electrode 16 and the second electrode 18 from coming into contact with each other. The spacers 20 can be formed by screen printing.

[0057] When a user touches an outer surface of the first substrate 12 with his finger or a pen, the first substrate 12 is recessed, and the first electrode 16 and the second electrode 18 are brought into contact and are electrically connected with each other. The detail of the touch panel 10 is described