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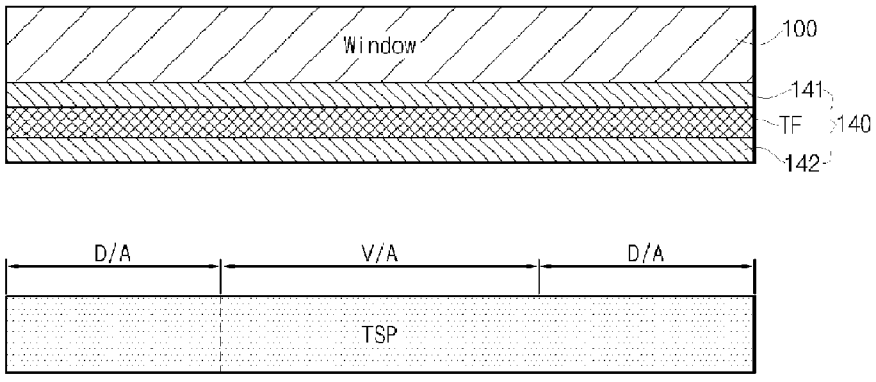
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(54) Title: TOUCH-WINDOW



(57) Abstract: Disclosed is the structure of a touch window. The touch window includes a transparent window, a touch sensor module on one surface of the transparent window, and a transfer film layer between the transparent window and the touch sensor module. The transfer film layer is provided in the touch sensor module to remove the structure of a printed pattern, so that the conventional problems related to the flatness caused by a printing step are solved, thereby improving the adhesive efficiency and expanding the realization range of various colors.

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Description

Title of Invention: TOUCH-WINDOW

Technical Field

[1] The disclosure relates to a printed pattern structure of a touch window.

Background Art

[2] A touch panel is installed on a display surface of an image display device such as a cathode ray tube (CRT), a liquid crystal display (LCD), a field emission display (FED), a plasma display panel (PDP), and an electro-luminescence device (ELD), so that a user inputs predetermined information into a computer by pressing the touch panel while viewing the image display device.

[3] FIGS. 1 and 2 are views showing main components of a capacitive type touch panel. FIG. 1 is a plan view showing a multi-bonding structure, and FIG. 2 is a sectional view taken along a line X of FIG. 1. Referring to FIGS. 1 and 2, the touch panel generally includes a transparent window 10, an upper OCA 50 provided under the transparent window 10, an upper electrode layer (ITO) 40 provided under the upper OCA 50, a lower OCA 30, and a lower electrode layer 20. In addition, a liquid crystal panel 60 adheres to the bottom surface of the above structure. A touch screen panel TSP formed by bonding various layers to each other has a bonding area C which is formed by cutting the upper OCA 50, the upper electrode layer (ITO) 40, and the lower OCA 30 for the purpose of bonding to an FPCB module and exposes a connection pad P.

[4] The above touch panel includes a printed pattern realized to represent various colors depending on the design of a terminal or hide internal wirings. Although the printed pattern is directly printed on the bottom surface of the transparent window 10, the thickness of the printed pattern degrades the adhesive strength with the upper OCA 50 provided under the transparent window 10, thereby causing the failure of the touch panel.

Disclosure of Invention

Technical Problem

[5] Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the prior art, and an object of the present invention is a touch window in which an IMD film or an IML film is provided in a touch sensor module to remove the structure of a printed pattern, so that the conventional problems related to the flatness caused by a printing step can be solved, thereby improving the adhesive efficiency and expanding the realization range of various colors.

Solution to Problem

[6] According to the embodiments, there is provided a touch window. The touch window

includes a transparent window, a touch sensor module on one surface of the transparent window, and a transfer film layer between the transparent window and the touch sensor module.

[7] In the touch window according to embodiments, the transfer film layer includes any one of an in mold decoration (IMD) film, an in mold lamination (IML) film, and an insert mold transcription (IMT) film.

Advantageous Effects of Invention

[8] As described above, according to the disclosure, the IMD film or the IML film is provided in the touch sensor module to remove the structure of the printed pattern, so that the conventional problems related to the flatness caused by a printing step can be solved, thereby improving the adhesive efficiency and expanding the realization range of various colors.

Brief Description of Drawings

[9] FIGS. 1 and 2 are views showing the structure of a touch panel according to the related art;

[10] FIGS. 3 and 4 are schematic sectional views showing main components of a touch window according to the disclosure; and

[11] FIGS. 5 to 7 are sectional views showing a touch sensor module according to various embodiments of the disclosure.

Mode for the Invention

[12] Hereinafter, the structure and the operation of the disclosure will be described in detail with reference to accompanying drawings. In the following description based on accompanying drawings, the same reference numeral represents the same component, and the repetition in the description will be omitted. The terms 'first' and 'second' are used for the purpose of explanation about various components, and the components should not be limited to the terms 'first' and 'second'. The terms 'first' and 'second' are only used to distinguish one component from another component.

[13] FIG. 3 is a schematic sectional view showing the structure of a touch window according to the related art, and FIG. 4 is a schematic sectional view showing the structure of the touch window according to the disclosure.

[14] Referring to FIGS. 3 and 4, as shown in FIG. 3, a typical touch window may include a transparent window 100, a touch sensor module TSP bonded to one surface of the transparent window 100 through an adhesive material layer 140, and a printed pattern P formed on the transparent window 100 or the touch sensor module TSP. In other words, the touch window includes the transparent window 100 touching with the outside and the touch sensor module TSP provided under the transparent window 100 and divided into a view area V/A and dead areas D/A through a sensing electrode

pattern layer.

[15] In particular, the printed pattern P printed on the transparent window 100 is realized in the structure in which at least two layers are laminated. The printed pattern P may be provided in the dead area D/A of the touch sensor module TSP in order to realize a function of shielding a wiring pattern from being sighed from the outside and to represent the superior design effect of a product. In general, in order to realize the function of the printed pattern P, the printed pattern P is preferably formed in such a manner that a plurality of layers are overlapped with each other. When the printed pattern P is realized in the multi-structure, and when the touch sensor module TSP, the adhesive material layer 140, and the transparent window 100 are bonded to each other, an air layer A is formed between the adhesive material layer 140 and the printed pattern P due to the height (thickness) of the printed pattern, and such a space causes the bonding failure. In addition, the printed pattern P may not represent colors other than black or white due to the limitation in a printing technology.

[16] In order to overcome the above limitation, as shown in FIG. 4, the touch window according to the disclosure includes the touch sensor module TSP bonded to one surface of the transparent window 100 through the adhesive material layer 140, and, particularly, a transfer film layer TF may be interposed between the transparent window 100 and the touch sensor module TSP.

[17] In this case, the transfer film layer TF may include any one of an in-mold decoration film (IMD) film, an in-mold lamination (IML) film, or an insert mold transcription (IMT) film. Each film layer is realized by forming a thin film on a film including PET, PC, or PMMA, performing a printing process, and inserting a film therein while injection-molding the resultant structure.

[18] In this case, the IMD film can be obtained by inserting a film, which is transparently printed and deposited through a gravure printing scheme, into an injection mold or an extrusion mold and then transferring a pattern printed on the film to a resin surface. The IML film can be obtained by inserting a film, which is transparently printed and deposited through a gravure printing scheme, into an injection mold or an extrusion mold and then bonding a pattern printed on the film to a resin surface. Different from a conventional IML scheme, the IMT film obtained through an insert mold transcription (IMT) scheme can be formed by inserting a mold through a vacuum suction scheme, after forming a base layer, without a forming process or a cutting process to form a pattern on a resin, and then releasing a film.

[19] Hereinafter, the structure of a typical IMD film will be described for the illustrative purpose. The IMD film may include a base layer, a release layer covered on the base layer, and a printed layer covered on the release layer. An adhesion layer OCA may be provided on the top surface of the printed layer. In this case, a color ink layer is addi-

tionally interposed between the printed layer and the adhesion layer OCA to represent various colors. The release layer is separated after the printed layer has been bonded with the resin.

[20] In this case, the base layer may include a sheet made of polyester (PET), methyl methacrylate (PMMA), polycarbonate (PC), acrylonitrile butadiene styrene (ABS), polystyrene (PS), any other transparent inorganic chemical compounds, any other transparent organic chemical compounds, or any transparent paper. The release layer may include a sheet made of transparent (or color) hydrophilic inorganic (or organic) chemical compounds. The printed layer may include a sheet made of transparent resin, a fluorescence inorganic material, a fluorescence organic material. The release layer may be interposed between the base layer and the printed layer. The printed layer is covered on the release layer through a printing scheme.

[21] In other words, in the structure shown in FIG. 4, after the IMD film has been laminated on the touch sensor module TSP, the transparent window 100 is bonded to the resultant structure. According to the technology employed for the structure of FIG. 3, when the transparent window 100 is bonded to the touch sensor module TSP, a bonding failure occurs because the irregular surface is formed without maintaining the surface flatness due to the printing step formed on the surface of the transparent window 100. In contrast, when the IMD film is applied as shown in the structure of FIG. 4, since the printing step is not formed, the surface flatness is easily maintained, so that an adhesive property can be improved. In other words, according to the technology of the disclosure, the printed pattern P is substituted with a transfer film layer TF such as the IMD film, so that the printing step is not formed, and various colors of the transfer film layer TF can be realized.

[22] Hereinafter, the structure of the touch sensor module TSP to which the transfer film layer TF according to the disclosure is applied will be described in brief. The touch sensor module TSP to be formed under the transparent window 100 from the above structure may have the structure shown in FIG. 5.

[23] In other words, the touch sensor module TSP according to the disclosure has a structure including base substrates 130 and 110 and sensing electrodes 132 and 112 patterned on one surfaces of the base substrates 130 and 110 or on opposite surfaces to the one surfaces of the base substrates 130 and 110. In other words, first adhesive material layers 141 and 142 are provided on the transparent window 100, so that the transfer film layer TF makes contact with the touch sensor module TSP provided under the transfer film layer TF. The touch sensor module TSP may include a first sensing electrode pattern layer provided on one surface thereof with the first sensing electrode pattern 132, and a second sensing electrode pattern layer adhering to an opposite surface of the first sensing electrode pattern layer through the second adhesive material

layer 120 and provided on one surface thereof with the second sensing electrode pattern 112. In particular, the first and second sensing electrode patterns 132 and 112 may be formed on the first and second base substrates 130 and 110, respectively, while being spaced apart from each other. In addition, wiring patterns 131 and 111 are connected to the first and second sensing electrode patterns 132 and 112, respectively.

[24] Each adhesive material layer may include an OCA film, and the first and second sensing electrode patterns may include one of indium tin oxide (ITO), indium zinc oxide (IZO), and zinc oxide (ZnO).

[25] In addition, different from the structure of FIG. 5, the transfer film layer TF is bonded to the touch sensor module TSP by using the adhesive material layers 221 and 222 under the transparent window 200 as shown in FIG. 6. In this case, the touch sensor module TSP may be realized in the structure including a base substrate 230 bonded to one surface of the transparent window 200 by using an adhesive material layer 222, and first and second sensing electrode patterns 232 patterned on one surface of the base substrate 230 and the opposite surface provided to the one surface of the base substrate 230. In addition, the touch window may further include a protective film 210 to protect the second sensing electrode pattern provided on the bottom surface of the base substrate 230.

[26] In addition, as shown in FIG. 7, a transparent window 300 is formed, a sensing electrode pattern 312 is patterned on the sectional surface of the base substrate 310, and a wiring part 311 may be formed together with the sensing electrode pattern 312. In this case, as described above, the transfer film layer TF according to the disclosure is bonded to one surface of the transparent window 300 by using adhesive material layers 321 and 322.

[27] Since the first and second sensing electrode patterns 312 are realized on the same plane, the first sensing electrode pattern 312 is patterned to determine a first axial component (e.g., X-axial component) of a touch, and the second sensing electrode pattern 312 for determining a second axial component (e.g., Y-axial component) of the touch is patterned while being insulated from the first sensing electrode pattern 312. In addition, when the first and second sensing electrode patterns 312 are formed on the bottom surface of the base substrate 310, the touch window may further include a protective film (not shown) formed on the bottom surface of the base substrate 310 to protect the first and second sensing electrode patterns 312.

[28] Although FIG. 7 shows that the first and second sensing electrode patterns are formed on the same plane of the additional base substrate 310, the first and second sensing electrode patterns may be directly formed on one surface of the transparent window 300 through a deposition process or a coating process without the base substrate 310. In addition, the touch window may further include a protective film (not

shown) formed on one surface of the transparent window 300 to protect the first and second sensing electrode patterns.

[29] The touch window according to the disclosure may be attached to various display devices. In other words, the display device may include an organic light emitting device or a plasma display panel other than a liquid crystal display. In this case, to prevent a touch sensing panel from erroneously operating as the noise component generated due to the driving of the display device is transferred to a touch sensor module, that is, a touch screen panel (TSP), a shield layer may be selectively provided between the touch sensing panel and the display device.

[30] Although the exemplary embodiments of the present invention have been described, it is understood that the present invention should not be limited to these exemplary embodiments but various changes and modifications can be made by one ordinary skilled in the art within the spirit and scope of the present invention as hereinafter claimed.

Claims

[Claim 1] A touch window comprising:
a transparent window;
a touch sensor module on one surface of the transparent window; and
a transfer film layer between the transparent window and the touch sensor module.

[Claim 2] The touch window of claim 1, wherein the transfer film layer includes any one of an in mold decoration (IMD) film, an in mold lamination (IML) film, and an insert mold transcription (IMT) film.

[Claim 3] The touch window of claim 2, wherein the transfer film layer comprises:
a base layer; and
a printed layer on the base layer.

[Claim 4] The touch window of claim 3, wherein the transfer film layer further comprises:
a color ink layer on the printed layer; and
an adhesion layer on the color ink layer.

[Claim 5] The touch window of claim 1, further comprising an adhesive material layer interposed between the transparent window and the transfer film layer to bond the transparent window with the transfer film layer.

[Claim 6] The touch window of claim 5, wherein the adhesive material layer is interposed between the transfer film layer and the touch sensor module to bond the transfer film layer to the touch sensor module.

[Claim 7] The touch window of claim 1, wherein the touch sensor module comprises:
a base substrate on one surface of the transparent window;
a first sensing electrode pattern patterned on one surface of the base substrate; and
a second sensing electrode pattern patterned on an opposite surface to the one surface of the base substrate.

[Claim 8] The touch window of claim 7, wherein the touch sensor module further comprises a protective film provided on the opposite surface of the base substrate to protect the second sensing electrode pattern.

[Claim 9] The touch window of claim 1, wherein the touch sensor module comprises:
a first sensing electrode pattern layer including a first base substrate on one surface of the transparent window and a first sensing electrode

pattern patterned on one surface of the first base substrate; and
a second sensing electrode pattern layer including a second base substrate on an opposite surface of the first sensing electrode pattern layer and a second sensing electrode pattern patterned on one surface of the second base substrate.

[Claim 10] The touch window of claim 9, wherein the touch sensor module further comprises an adhesive material layer interposed between the first and second sensing electrode pattern layers to bond the first sensing electrode pattern layer to the second sensing electrode pattern layer.

[Claim 11] The touch window of claim 1, wherein the touch sensor module comprises first and second sensing electrode patterns formed on the one surface of the transparent window and patterned while being insulated from each other.

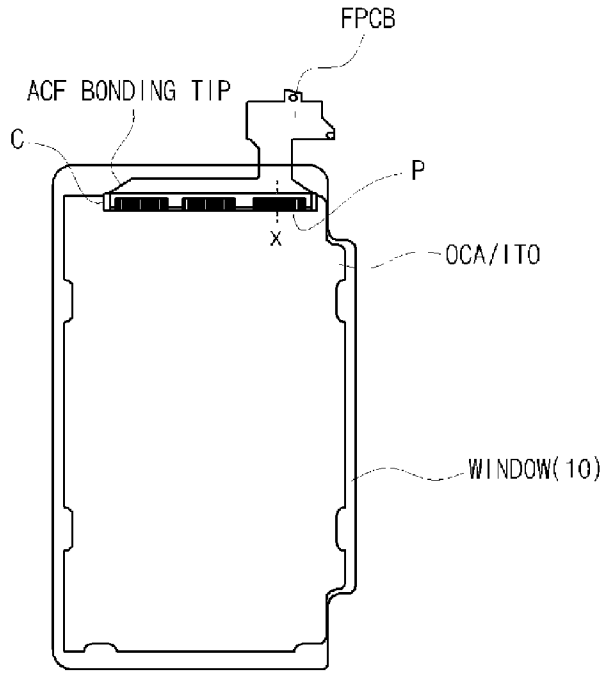
[Claim 12] The touch window of claim 11, wherein the touch sensor module further comprises a protective film provided on the one surface of the transparent window to protect the first and second sensing electrode patterns.

[Claim 13] The touch window of claim 1, wherein the touch sensor module comprises:
a base substrate on the one surface of the transparent window; and
first and second sensing electrode patterns formed on one surface of the base substrate and patterned while being insulated from each other.

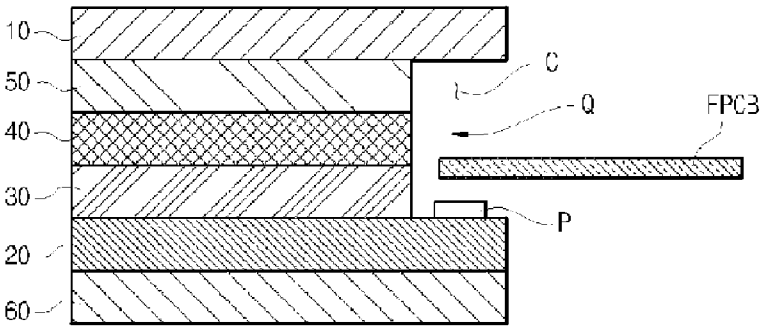
[Claim 14] The touch window of claim 1, wherein the touch sensor module comprises:
a base substrate on the one surface of the transparent window; and
first and second sensing electrode patterns formed on an opposite surface of the base substrate and patterned while being insulated from each other.

[Claim 15] The touch window of claim 14, further comprising a protective film provided on the opposite surface of the base substrate to protect the first and second sensing electrode patterns.

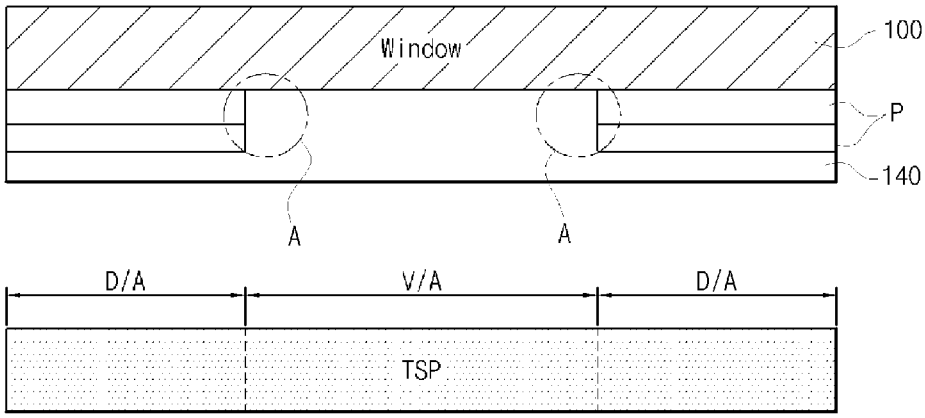
[Fig. 1]



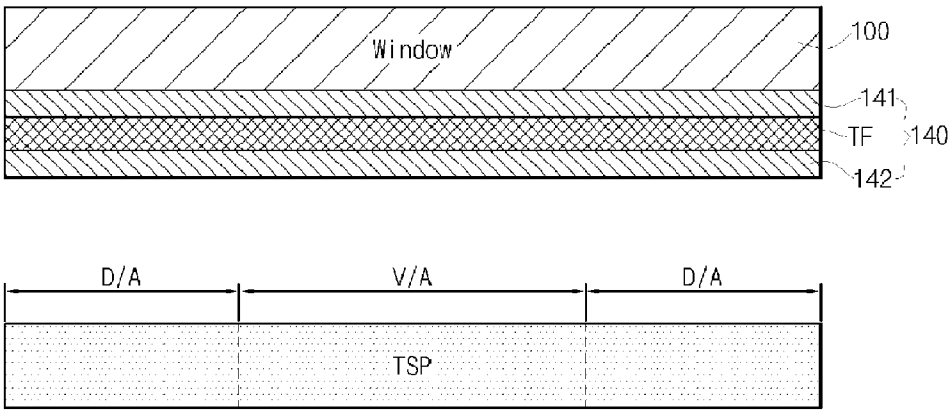
[Fig. 2]



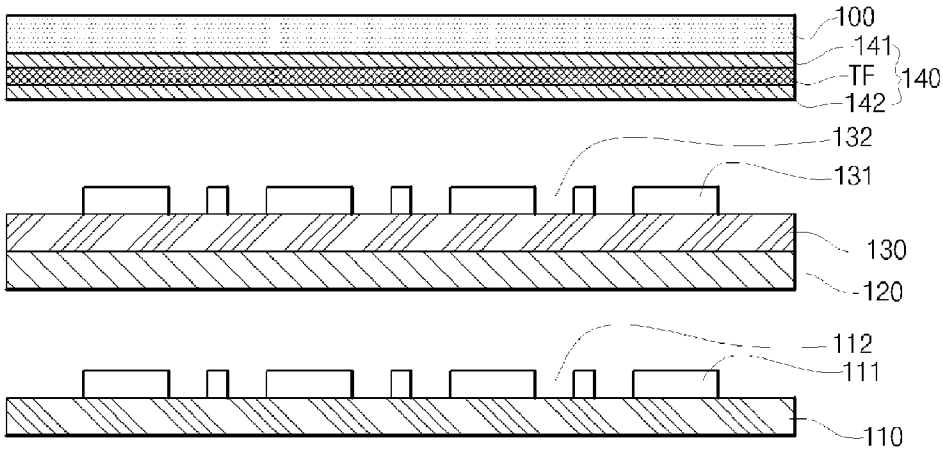
[Fig. 3]



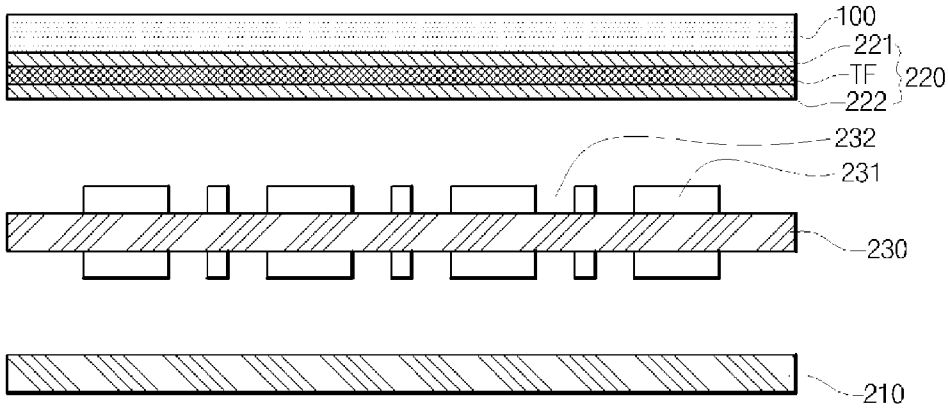
[Fig. 4]



[Fig. 5]



[Fig. 6]



[Fig. 7]

