TOUCH PANEL FOR DISPLAY DEVICE

[0001] This application claims the benefit of Korean Application No. P2002-70771 filed on Nov. 14, 2002, which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a touch panel for a display device, and more particularly, a structure for a top surface of a touch panel.

[0004] 2. Discussion of the Related Art

[0005] In order to more efficiently use various electronic machines, touch panels have been generally used to input signals on display surfaces, thereby eliminating additional controls or other types of input devices. Touch panels have been integrated into the display surfaces of flat display devices, such as electronic calculators, liquid crystal display (LCD) devices, plasma display panel (PDP) devices, electroluminescence (EL) devices, and cathode ray tubes (CRTs). By integrating touch panels with display devices, it is possible for a user to select desired information while watching an image displayed on the display device.

[0006] Touch panels are capable of sensing when and where a user touches a display surface. Touch-panels may be classified into analog resistive type, capacitive type, EM (Electro-magnetic) type, saw type, and infrared type touch panels. Generally, touch panels are provided with upper and lower transparent substrates, each of the substrates having upper and lower electrodes formed thereon, respectively. The upper and lower transparent substrates are bonded to each other within a predetermined space therebetween. If a surface of the upper transparent substrate is touched at a predetermined point using an input device, such as a finger, a pen or stylus, the upper electrode formed on the upper transparent substrate electrically connects to the lower electrode formed on the lower transparent substrate. A voltage, made variable by a resistance value or a capacitance value of the touched point, is then detected and output along with a location defined by coordinates of the touched point.

[0007] In the aforementioned capacitive type touch panel, a film having a transparent electrode is formed on an LCD panel, and a voltage is applied to each comer of the film to generate a uniform electric field in the transparent electrode. Thus, a voltage drop is generated when a predetermined point of a display surface is touched with an input device, such as finger or conductive stylus, such that the coordinates of the touched point can be detected.

[0008] The touch panel integrated with the LCD device according to the related art will be described with reference to the accompanying drawings. In the resistive type touch panel integrated with an LCD device, a resistive type touch panel is formed on an LCD module, and the LCD module is integrated with the touch panel by a case top. Hereinafter, the resistive type touch panel integrated with the LCD device will be described in more detail. **FIG. 1** is a cross-sectional view illustrating a resistive type touch panel integrated with an LCD device according to the related art.

[0009] As shown in **FIG. 1**, the resistive type touch panel integrated with an LCD device includes an LCD panel **1**, upper and lower polarizing plates **2** and **3**, a backlight **4**, the resistive type touch panel **5**, and the case top **9**. Upper and lower substrates (not shown) are bonded to each other with a fixed gap in between, and a liquid crystal (not shown) is injected in the gap between the upper and lower substrates to thereby form the LCD panel **1**. The LCD panel **1** displays a picture image according to external driving and picture signals. The upper polarizing plate **2** is formed above the LCD panel **1**, and the lower polarizing plate **3** is formed under the LCD panel **1**, thereby polarizing light passing through them. The backlight **4** uniformly irradiates light upon a rear surface of the LCD panel **1**. The resistive type touch panel **5** detects a touched point by output of a voltage level corresponding to the touched point on the LCD panel **1**. The case top **9** supports the backlight **4**, the LCD panel **1** and the resistive type touch panel **5**.

[0010] **FIG. 2** is a plan view illustrating a resistive type touch panel integrated with the LCD device according to the related art. **FIG. 3** is an exploded view illustrating upper and lower substrates of a touch panel according to the related art. As described above in reference to **FIG. 1, a** touch panel integrated with the LCD device according to the related art is formed on a display surface of the LCD device so that the touch panel may be used to input signal corresponding to where and/or when the display surface is touched.

[0011] As shown in **FIG. 2**, the touch panel includes a viewing area V/A and a dead space region. The viewing area corresponds to the display surface of the display device, and the dead space region D/S/R is formed about the periphery of the viewing area V/A. The upper and lower substrates are bonded to each other in the dead space region D/S/R by an insulating sealant provided in the dead space region D/S/R. When power is provided to the touch panel, and the a point of the touch panel is touched with a pen or finger, a signal line **10** connected to the touch panel in a dummy spacer region has an output of a changed voltage value corresponding to the touched point.

[0012] As shown in **FIG. 3**, the resistive type touch panel **5** includes transparent upper and lower substrates **7** and **6**. Spacers **8** are positioned between the upper and lower transparent substrates **7** and **6** for maintaining a predetermined space therebetween, as shown in **FIG. 4**. Generally, the transparent upper and lower substrates **7** and **6** are formed of Poly Ethylene Terephthalate (PET). A transparent electrode, such as ITO, (not shown in the drawings) having a constant resistance value is formed on a surface (surface opposing the lower substrate) of the upper substrate **7** of the PET film. Metal electrodes **7***a* are also formed on the transparent electrode of the upper substrate **7** corresponding to lower and upper side dead space regions to provide the power along Y-axis direction. A transparent electrode, such as ITO, (not shown in the drawings) having a constant resistance value is formed on a surface of the lower substrate **6**. Further, metal electrodes **6***a* are formed on the transparent electrode corresponding to left and right side dead space regions to provide the power along X-axis direction. Signal lines **10***a* and **10***b* are connected to apply power to the respective metal electrodes **6***a* and **7***a,* and to read the voltage of a contact point. The upper and lower substrates **7** and **6** are bonded to each other in the dead space region by an adhesive tape **11**. In this state, the upper and lower substrates **7** and **6** are bonded to each other at connection portions between the signal lines **10**, **10***a* and **10***b* and the metal electrodes **6***a* and **7***a* by a conducting adhesive.