

formed in the gate insulating film **304** and interlayer dielectric film **306** are formed on the interlayer dielectric film **306** by using, e.g., a metal or alloy such as Mo, MoW, MoTa, Al, or Al—Cu, or highly doped silicon.

[0123] In the same layer as the source electrodes **307** and drain electrodes **308**, an electrode **312** which applies a potential to a connecting pad electrode **110**, interconnections such as scanning/signal lines **320**, and a common electrode **205** is formed using the same conductor material as described above.

[0124] On these electrodes and interconnections, a passivation film **321** is formed by plasma CVD or the like by using, e.g., a silicon nitride film. On this passivation film **321**, a transparent organic insulating film about 1  $\mu\text{m}$  to 4  $\mu\text{m}$  thick may be formed by substantially the same pattern as the passivation film **321**, in order to improve the insulating properties and reduce the parasitic capacitance between the interconnections.

[0125] On the passivation film **321**, color filter layers **309** made of a photosensitive organic resin are formed for individual pixels, thereby forming a color filter on array (COA) structure.

[0126] Pixel electrodes **310** are formed on the color filter layers **309**. These pixel electrodes **310** are connected to the drain electrodes **308** via through-holes formed in the color filter layers **309** and passivation film **321**. When the COA structure is formed or the display device is a transmitting type display device, a transparent conductive film such as ITO can be used as the pixel electrodes **310**. When the display device is a reflecting type display device, a high-reflectivity metal such as Al or Ag can be used.

[0127] Since the surface on which the pixel electrodes **310** are formed is brought into contact with a liquid crystal, an alignment film (not shown) is formed and subjected to rubbing. An alignment film (not shown) is also formed on the surface of the common electrode **205** made of a transparent conductive film such as ITO on a second non-alkaline glass substrate **202**, and subjected to rubbing. Depending on the display mode, the common electrode **205** may be unnecessary, or the rubbing process using an alignment film may be unnecessary. Also, the color filter structure need not be the COA structure. For example, color filter layers may be formed between the second non-alkaline glass substrate **202** and common electrode **205**, or overcoat layers may be formed on the color filter layers.

[0128] Not only the above-mentioned element structures are formed in the prospective pixel region but also transistors of control circuits such as a signal line driver and scanning line driver can be integrated with the pixel region. In this case, the control circuits are also bonded by the pixel region adhesion layer **1002** having a low glass transition temperature.

[0129] On the connecting pad electrode **110** formed in the peripheral region, a flexible substrate **317** is placed via an anisotropic conductive film (ACF) and electrically connected by thermal compression bonding or thermal cure. This flexible substrate **317** is made of polyimide or PET, and an interconnection **318** made of a metal such as copper is formed. In this embodiment, a material having a high glass transition temperature is used as the peripheral region adhesion layer **1001**. Therefore, cracking does not easily occur

even when thermal compression bonding is performed. This connection can also be formed by a mechanical connecting method or wire bonding, instead of thermal compression bonding.

[0130] The electrode **312** which applies a potential to the common electrode **205** is connected to the common electrode **205** via transfer conductors **313** made of, e.g., conductive paste when the cell is formed. Resin protectors **314** are formed around these transfer conductors **313** to reinforce the connection between the common electrode **305** and electrode **312**, thereby preventing poor connections if the display device is bent when in use. As this resin protector **314**, an acryl-, epoxy-, or allyl-based ultraviolet ray curable resin is used. The first and second non-alkaline glass substrates may be thinned and bonded to the first and second plastic substrates after the cell is formed and a liquid crystal is injected. In this case, reinforcement of the connection by the resin protectors **314** is more important. These resin protectors **314** can be formed not only around the transfer conductors **313** but also around the connecting pad electrode **110**.

[0131] In the active matrix type display device of this embodiment, after an element circuit region is formed on a substrate such as a non-alkaline glass substrate which is highly resistant against heat, this substrate is thinned and bonded to a plastic substrate which is light in weight. The glass transition temperature of a pixel region adhesion layer is 30° C. (inclusive) to 80° C. (inclusive), and the glass transition temperature of a peripheral region adhesion layer is higher by 10° C. or more than that of the pixel region adhesion layer, and is 80° C. (exclusive) to 200° C. (inclusive). The pixel region adhesion layer is a soft adhesive because its glass transition temperature is low. Therefore, when the plastic substrate contracts or expands because the display device is bent, the force of this contraction or expansion can be absorbed without being transmitted directly to the thin glass layer.

[0132] If the glass transition temperature of the pixel region adhesion layer is lower than 30° C., the temperature of the display device is always equal to or higher than this glass transition temperature when the device is used at a room temperature, so no adhesion may be obtained. On the other hand, a glass transition temperature of higher than 80° C. is too high, so the adhesion layer becomes hard.

[0133] Also, the peripheral region adhesion layer is a hard adhesive because its glass transition temperature is high. Therefore, the outermost region of the thin glass layer which easily cracks can be strongly bonded. In addition, bonding to a flexible substrate for obtaining electrical connection to the pixel region is performed in the peripheral region by thermal compression bonding or the like. In this bonding, the hard peripheral region adhesion layer suppresses contraction and expansion of the plastic substrate by heat, and also suppresses cracking of the thin glass layer by the pressure or the like during bonding.

[0134] If the glass transition temperature of this peripheral region adhesion layer is about 80° C. or less, the adhesion layer may become a soft adhesion layer depending on the use conditions. On the other hand, a glass transition temperature of higher than 200° C. is too high, so the plastic substrate may deform when it is bonded. By setting the difference between the glass transition temperatures of the