

Brief Introduction of ITO Materials

ITO is a kind of N-type oxide semiconductor-indium tin oxide. ITO thin films, i.e. transparent conductive indium tin oxide semiconductor films, usually have two performance indicators: resistivity and transmittance.

Main uses:

In the LCD routing design, the ITO resistance calculation method shows that the following factors affect the ITO resistance value:

1. Block Resistance of ITO Glass

In order to ensure that the line resistance is small and the ITO glass block resistance is small, because $R=P/d$, the material with smaller P and larger d must be selected.

2, L1/L2

L1/L2 is the ratio of the length of the line in parallel current direction to that in vertical current direction. When R_{is} is constant, to ensure that the resistance value of the line is small, L1/L2 should be small. When L1 is constant, only L2 should be increased, that is to say, the line should be widened as far as possible; when L2 is constant, L1 should be small, that is, when the width of the line is constant, the thin line should be widened

as possible. As short as possible.

3. Influences of ITO Resistance Value

In the design of LCD display screen, not only the influence of wiring on ITO resistance value, but also the influence of production process on ITO resistance value should be considered, so as to select ITO glass with appropriate block resistance, so as to control the design and production of high contrast LCD products. At this time, high duty cycle and COG products are not important, such as ITO film thickness. The uniformity of ITO is due to the instability of ITO target material and process, which will change the resistance value of ITO with the same length and width. For example, when the target value is $10\ \Omega$, its R_{range} is between $8\ \Omega$ and $12\ \Omega$, so uniform conductive glass with ITO film thickness should be used in production to reduce the change of resistance, followed by high temperature resistance of ITO glass, acid-alkali resistance. Because the high temperature baking and soaking of various acid and alkali liquids are usually used in LCD production process, and the R_{value} will increase 2-3 times in the environment of $300\ \text{C} * 30\ \text{minutes}$, while it will increase to about 1.1 times in the environment of $10\text{wt}\% \text{NaOH} * 5\ \text{minutes}$ and $6\text{wt}\% \text{HCL} * 2\ \text{minutes}$ ($60\ \text{C}$). Therefore, high temperature production and acid-alkali production are not suitable in the production process. Long-term cleaning, if unavoidable, should be carried out at low temperature and

shorten the action time as far as possible.

4. Because in LCD, ITO block resistance is equivalent to the dividing resistance in the circuit diagram, its resistance value directly affects the voltage at both ends of the circuit, that is, the larger the block resistance, the larger the LCD value voltage. Data show that the block resistance of ITO decreases from 100_/_to 60_/. (Cell Gap is about 6um), the Vth value will decrease by about 0.03V. It is mostly used in touch panel, touch screen, cold light film, etc.