



WINSTAR Display
華凌光電股份有限公司

VA Display Introduction

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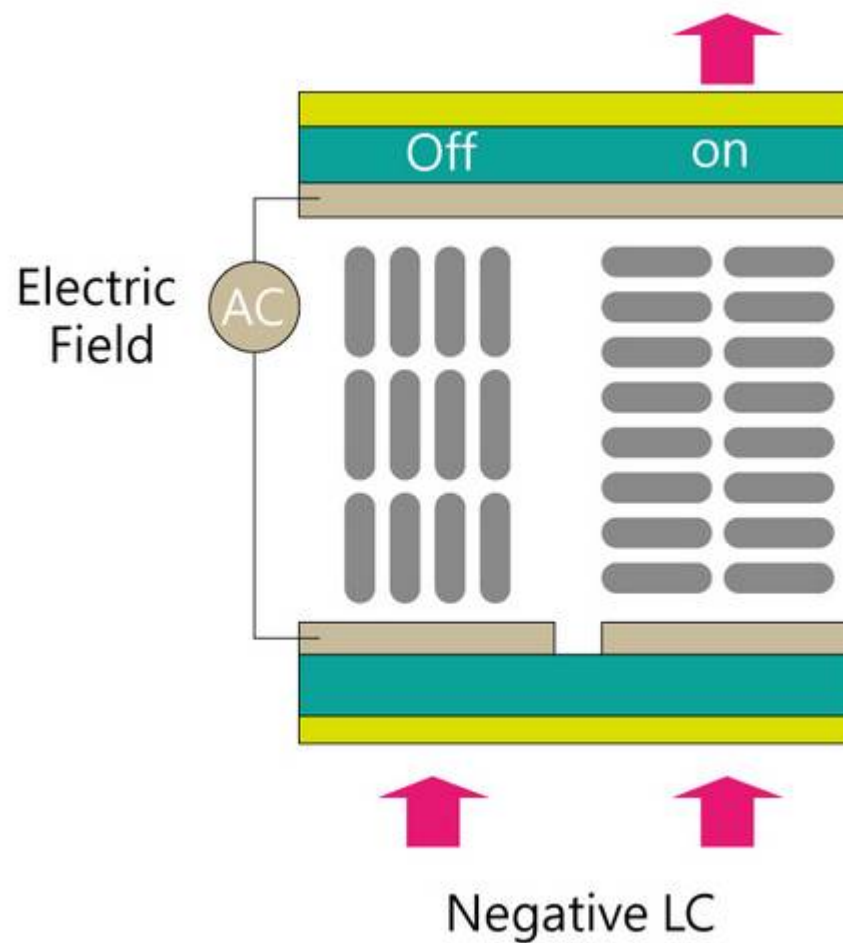
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Vertical Alignment (VA) Display

The Vertical alignment displays are a form of LCDs in which the liquid crystals naturally align vertically to the glass substrates. When no voltage is applied, the liquid crystals remain perpendicular to the substrate creating a black display between crossed polarizers.

When voltage is applied, the liquid crystals shift to a tilted position allowing light to pass through and create a gray-scale display depending on the amount of tilt generated by the electric field.

VA Display Theory



Advantages of VA Display

- *Super black background*
- *Super high contrast ratio*
- *Wide viewing angle*
- *Better performance, tooling cost 15~20% higher than normal STN*





Main Features of VA Display

- **Mode:** *Negative mode*
- **Application:** *Automotive application, industrial and electrical appliance, home appliance*
- **Backlighting:** *white backlight with best performance*
- **Temperature:**
 - Normal Temp.: -30~85 °C(St.) -20~70 °C(Op.)*
 - Wide Temp.: - 40~90 °C(St.) -30~80 °C(Op.)*
 - (It depends on requirement and application)*
- **Durability:** *Automotive industry grade*



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VA vs DFSTN Comparison

Item	VATN	DFSTN
Contrast	1/4 duty: 1000 1/16 duty: 100-200	15
Interface	Pin/FPC	Pin/PFC
Construction	COG/COB	COG/COB
Tooling Cost	15~20% higher than STN	Lower
LCD voltage	High (it requires negative voltage)	Normal
Backlight	Higher brightness LED will have much better contrast	Even enhance the LED brightness, the contrast will not improve

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