

Vertical Alignment Leading LCD Wide Viewing Angle Technologies

SANTA CLARA, CALIF., June 14, 2010—According to the latest DisplaySearch [Quarterly Wide Viewing Angle Technology Report](#) vertical alignment (VA) viewing angle technology continues to lead in wide viewing angle technologies. In Q1'10, VA technology accounted for 42.2% of the area of large-area TFT LCD shipments (see table below), up from 36% in Q1'08. Most LCD TV panel makers have adopted VA technology for panel production of 32" and larger sizes, including Samsung (with technology called PVA), Sharp (Advanced Super View or ASV), AUO (Advanced Multi-domain Vertical Alignment or AMVA), and Chimei Innolux (Multi-domain Vertical Alignment or MVA). Other panel makers like LG Display, IPS Alpha and BOE use in plane switching (IPS) or fringe-field switching (FFS) technologies to achieve wide viewing angles.

The technology commonly found in LCDs is twisted nematic (TN), in which typical viewing angles are 120 degrees horizontal and 90 degrees vertical. This technology is mainly used for notebook and mini-note PC panels since the viewing angle is not critical. To improve the horizontal viewing angle of TN panels, some makers add wide view film (WVF) to the panel, an approach used for LCD monitors and smaller (<32") LCD TV panels.

Table 1. Wide Viewing Angle Area Share of Large-Area TFT LCD (All Applications)

WVA Technology Area Share	Q1'08	Q2'08	Q3'08	Q4'08	Q1'09	Q2'09	Q3'09	Q4'09	Q1'10
TN_None	13.5%	15.1%	14.6%	13.1%	11.7%	12.3%	13.6%	13.6%	13.1%
TN_WVF	37.4%	36.6%	31.3%	29.5%	33.7%	32.5%	28.4%	24.8%	26.4%
IPS/FFS	13.1%	11.9%	14.6%	18.6%	17.8%	17.6%	17.3%	18.5%	18.4%
VA	36.0%	36.4%	39.5%	38.8%	36.9%	37.6%	40.7%	43.1%	42.2%

Source: [Quarterly Wide Viewing Angle Technology Report](#)

The table below shows the different viewing angle technologies by application (original specification) in Q1'10. High-performance IPS and VA panels accounted for a very small portion of monitor and notebook panels, while the VA type accounted for more than 60% of LCD TV panels.

Table 2. Viewing Angle Technologies by Original Specification for Q1'10 (on a unit basis)

WVA Technology	Monitor	Notebook	TV	Other
TN_None	10%	92%		50%
TN_WVF	87%	6%	14%	49%
IPS/FFS	3%	2%	25%	1%
VA	0%		61%	

Source: [Quarterly Wide Viewing Angle Technology Report](#)

In terms of panel maker shipments by wide view angle technology, LG Display led in IPS/FFS with 88% area share, and Samsung led in the VA category with 39%. LG Display is the champion of TN with 29% area share in Q1'10. Samsung and Chimei Innolux are leading in TN+WVF, both with a 22% share.

According to [Yoshio Tamura](#), Vice President of DisplaySearch and author of the report, "Each viewing angle technology uses a unique liquid crystal recipe, cell design layout, TFT structure, manufacturing process and component (like driver IC). Because panel makers own patents on these wide view angle technologies, it can be difficult for new manufacturers to leverage the available technologies."

Wide view angle technologies also influence the panel transmittance rate, which is currently a critical factor for LED backlights. VA and IPS/FFS are more challenging technologies and have higher costs than TN, but panel makers' learning curves are also changing. For example, some panel makers have changed from TN to VA in 26" panels, given that VA technology is maturing and the cost gap is reducing rapidly.

"In the future, we believe the key points to watch for are which wide viewing angle technologies new China TFT LCD manufacturers adopt and how fast they can shorten the learning curve," Tamura added.

With increased demand for LCDs with expanded viewing angles come increased options and applications Ranging from LCDs in notebook PCs, monitors and TVs, the DisplaySearch [Quarterly](#)

Wide Viewing Angle Technology Report tracks current and forecasted wide viewing technology trends, volumes and demand. This report covers all four types of view angle technologies: TN, TN+WVF (Wide View Film), IPS/FFS and VA, and covers all panel makers, all sizes, and all applications.

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