



*Densitron Guide to*  
**IPS TFT TECHNOLOGY**





## What is IPS Technology?

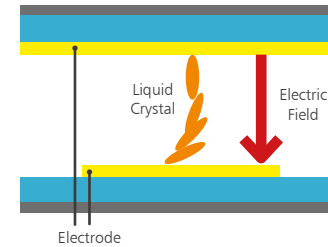
In-plane switching (IPS), is a type of monitor and screen technology that is used widely in high quality Liquid Crystal Displays (LCDs) for TVs, computers, smartphones, tablets and mobile devices as well as for other B2B and industrial applications.

Sometimes referred to as 'Super TFT', the term 'In-plane switching' is derived from the way in which its crystal molecules are aligned, which always run parallel to the glass plates when energised. The result of this very specific molecular alignment is a display panel that offers consistent, clear and accurate viewing from a wide range of angles.

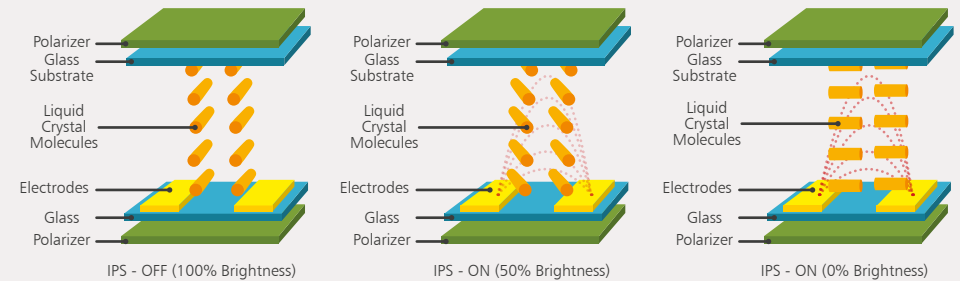
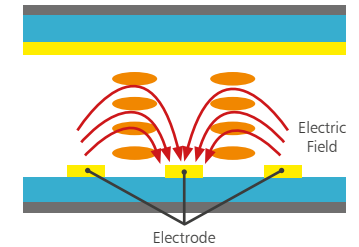
Prior to the development of IPS technology, TFT LCD displays relied on the Twisted Nematic (TN) field effect whereby the crystals lie in a perpendicular orientation. However, this technology was only capable of producing displays that offered limited colour quality and viewing angles.

These early TN panels displayed colour inversion along the vertical viewing cone, associated with the effects of birefringence. This phenomenon, often referred to as 'contrast inversion', affects either the lower or the upper edge of the TFT module with respect to the eyeline (six or twelve o'clock viewing angle). The resultant poor contrast and colour inversion significantly affected visibility for the user, rendering these TN-based displays unsuitable for many applications such as handheld and mobile devices.

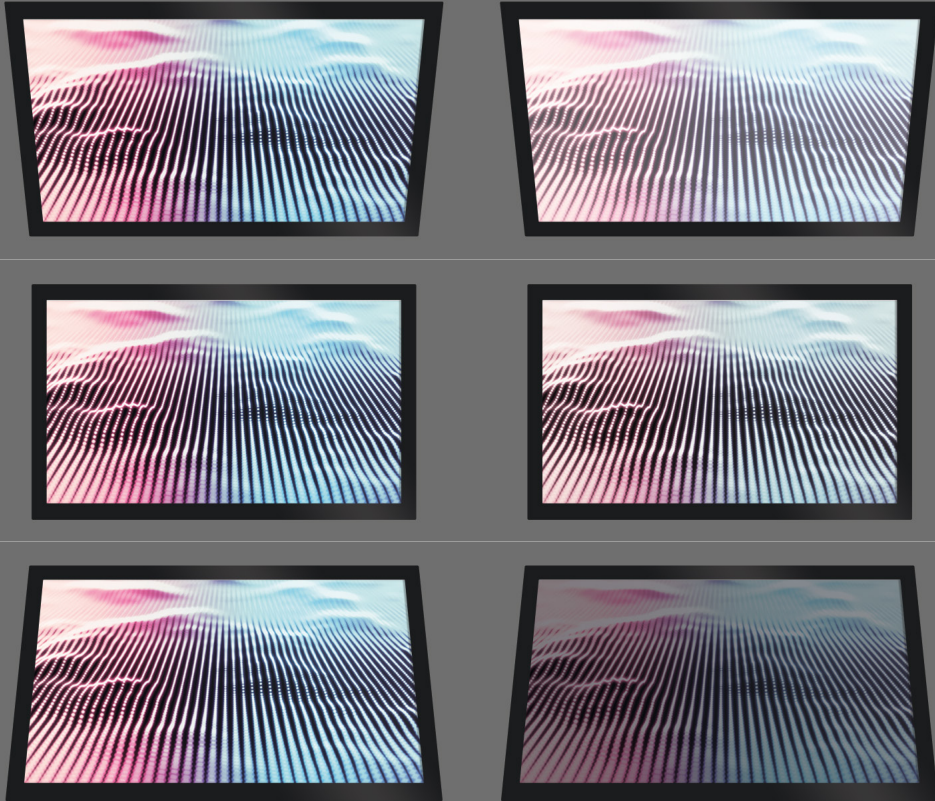
### Conventional TN Process



### IPS Technology



## In-plane switching (IPS) vs Twisted Nematic (TN)



IPS technology was developed during the late 1980s to specifically address the issues with the existing TN LCDs, enabling the introduction of displays that offered increased quality colour reproduction and more accurate and consistent viewing from a wider range of angles.

Leading the field in IPS development at that time was Japanese corporation Hitachi, which became an early adopter, introducing the first active matrix IPS TFT LCDs in 1996 and spurring interest from other LCD manufacturers in Japan, South Korea and Taiwan to incorporate IPS technology into their own TFT display solutions.

# The **Benefits** of IPS TFT technology

IPS TFT displays are particularly suited to applications that require:



Optimal viewing angles



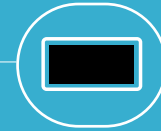
Accurate, high quality colour reproduction



High contrast



Optimum visibility in all conditions & environments (including daylight)



A true black background when powered down



Optically bonded touch screen. Unlike TN LCD, IPS TFTs do not lighten or show Newton rings when touched











Enhanced overall user experience

# The Densitron Total Service Solution

**Densitron offers a comprehensive total solution approach to support its customers in the design, development and integration of IPS TFT display technology.**

Drawing on many years of product knowledge, expertise in design and engineering and ongoing commitment to research and development, Densitron continues to help design and product engineers deliver solutions that not only meet the current needs of their customers, but also anticipate future industry needs.

## Our IPS TFT solutions include:

-  Proprietary IPS TFT module designs for all applications
-  A wide range of slimline displays and screen sizes (from 2"-15" diagonal)
-  All round 80°~85° viewing angles
-  High contrast ratios of up to 1000:1
-  True black background design features
-  Dual-sourced IPS Mother Glass to ensure longevity of supply
-  Ongoing product, technical and software support
-  Global supply chain logistics

For further information, or to discuss your IPS TFT requirements, visit [www.densitron.com](http://www.densitron.com)





## About Densitron

**Densitron is a creator of display technology which is tailored to the needs of customers around the world. We take a consultative approach to design, partner with our customers to understand their particular requirements and then create bespoke products to address those. With offices in Asia, Europe and North America and experienced application engineers based worldwide, our global approach to innovation is always underpinned by a thorough local knowledge and understanding of cultural requirements.**

Our customers depend on us for our:

- In-depth knowledge of the latest display and embedded technology
- More than 40 years of experience in designing electronic displays and embedded boards
- Expertise in market sectors ranging from broadcast and medical to security and automotive