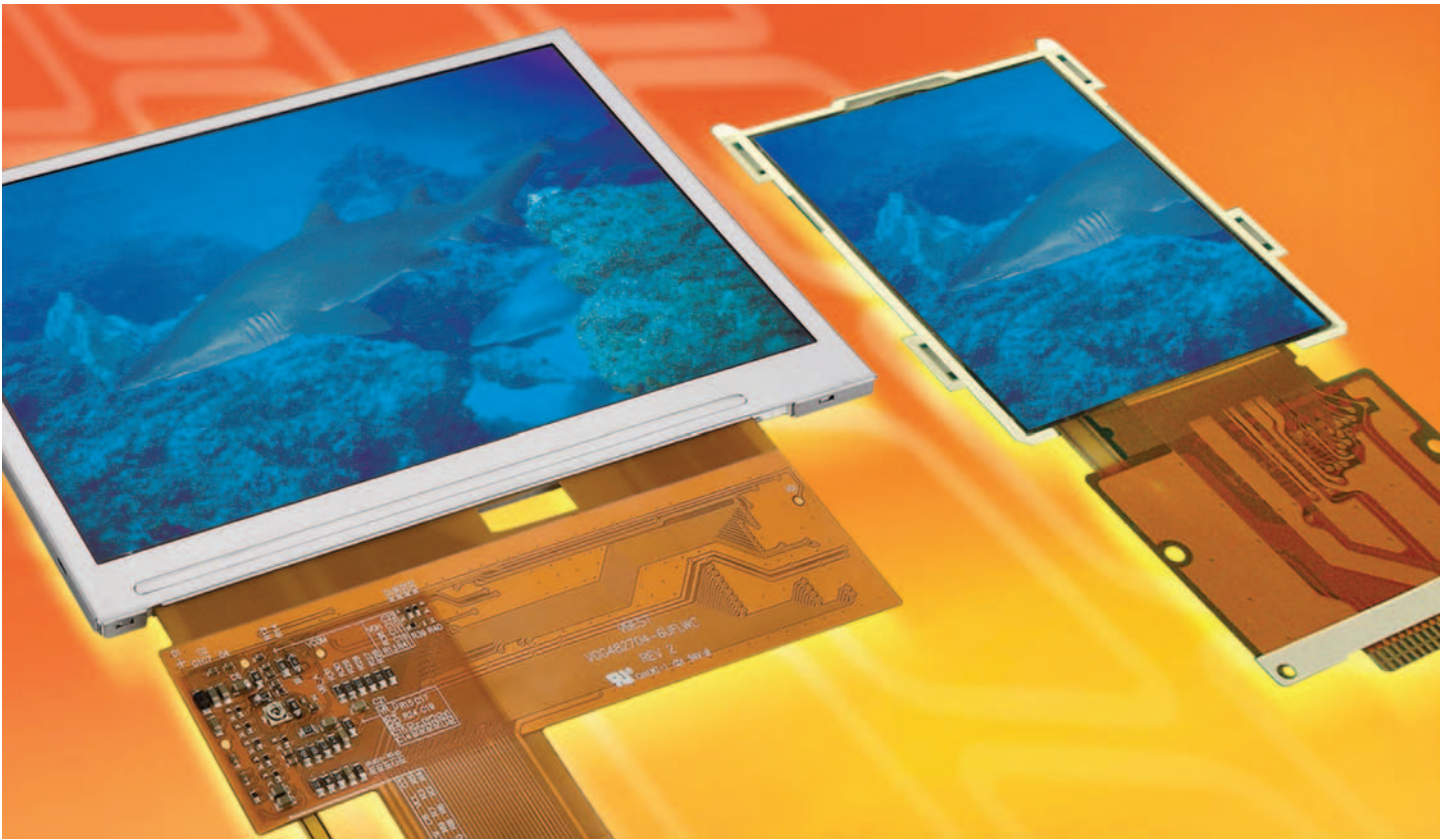


# Swimming with sharks?

Rolling the dice: the commercial and technical risks of the small/medium sized TFT display module market. By **Rob Anders**.



The market for small/medium format (3.5 to 15in) industrial tft displays is increasing; figures from DisplaySearch suggest an annual growth of approximately 24%. However, the risks associated with choosing this technology are also rising and OEMs need to have adequate strategies in place for dealing with them.

Industrial TFT growth has been driven by migration of existing applications from passive-matrix monochrome STN displays to the enhanced performance and lower power consumption of active-matrix colour TFTs. Growth is being further stimulated by the emergence of a range of new applications.

Next generation display interfaces will require the merging of different technical skill sets – the display, the embedded system to support it and the GUI itself. Facing time/human resource restrictions, engineering teams concentrate on their core competencies and, as a result, most OEMs will look to source complete TFT modules – electronics, glass and backlight – rather than buying the components and trying to integrate them.

There are many such modules available and datasheets will often show little to choose between them. The temptation, therefore, is to pick the module with the lowest price tag. Things, however, are not that straightforward and

choosing the wrong TFT can increase the technical and commercial risks.

To understand the various risks involved, it is first necessary to have some understanding of the supply base and the various market drivers.

## The STN market place

The industrial STN business has reached maturity – there are many suppliers, strong competition, low costs and cheap customised designs.

Generally speaking, STN manufacturers produce their own glass substrates, which are cut up and assembled into modules. Their factories have often been bought second hand or

have almost fully depreciated over the years, meaning capital expenditure costs are minimal. Manufacturing the glass themselves means their customers can be assured of long term supply and flexibility on their ordering schedules.

Product manufacturing autonomy, market saturation and immense competition means the OEM's experience of STN can be very positive. And, as STN was the dominant technology for so long, it has set the expectation level for those looking to migrate to TFTs. There are, however, notable differences.

### Understanding the TFT business

TFTs have a similar construction to STNs; a glass sandwich with a liquid crystal, colour filters, polarisers, a backlight arrangement and supporting driver electronics. But what differentiates them from STNs is the glass substrate – with transistors deposited onto the glass as a thin film. This means production is more difficult and requires heavy capital investment in manufacturing facilities.

Though some STN formats have managed to cross into the TFT domain, TFT sizes are driven mostly by consumer product demands.

Many TFT manufacturers will not integrate touchscreens; those that do will mainly focus on lower end four wire resistive solutions. Though the market is moving towards five wire resistive or capacitive/projective-capacitive options, it is still early for TFT manufacturers to offer these.

Display manufacturers will usually buy in touchscreens, and this can lead warranty issues further down the line, where it is difficult to determine who is responsible for product fault – the touchscreen supplier or the display manufacturer which integrated it. This becomes even more complex with emerging touchsensing technologies, which require better understanding both of the technology and integration. For touch solutions that go beyond standard four wire resistive offerings, most TFT manufacturers will prefer their customers to deal directly with a specialist.

### TFT suppliers

TFT display module manufacturers typically fall into two groups – Tier 1s and Tier 2s. Some Tier 1 manufacturers will use state of the art fabs geared to high volume production and typically produce full TFT modules (including the glass). Some focus predominantly on industrial designs,



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but these will tend to have lower manufacturing outputs, leading to higher prices.

Tier 2s typically do not manufacture glass substrates, relying instead on Tier 1s for supplies. The key issues arising are:

- The glass supplied will be driven by a product developed by a Tier 1 for a lead customer, so it will be subject to change whenever that lead customer wants change.
- If the lead customer's project ends, the supply of glass will be threatened unless enough additional demand has been generated.
- The lead customer will be given priority, should demand increase. This means Tier 2s can often have difficulty in assuring consistent glass supply.
- Tier 2s often have to work on allocation and are expected to make certain commitments, such as high minimum order quantities or paying in advance. This can result in considerable changes to payment terms and order flexibility when compared with the more familiar STN model.
- The commodity nature of the TFT market can also expose industrial clients to price fluctuations they would not have experienced when they relied on STN suppliers.

Being aware of what is a TFT supplier's true focus is key: some will be consumer oriented, others will be mainly industrial. The challenge lies with those that mix elements of both: the balance often changes, based on underlying market trends. This means OEMs may find the synergy isn't as ideal as it appeared at the beginning.

### TFT challenges

Each issue will have a direct impact on non consumer OEMs attracted by the low price points offered by Tier 2 suppliers. Such OEMs should therefore be aware of the challenges they are likely to face and how to address them.

- **Product lifetime:** Industrial/medical OEMs, for example, will often need far longer product lifespans than consumer OEMs. Lifetime guarantees will be difficult to obtain unless the customer engages with a specialist Tier 1 supplier.

Without these guarantees, OEMs face the prospect of receiving end of life notices – should the glass format or other key component be phased out – or having to make major engineering changes and gaining reapproval.

- **Glass supply:** Tier 2s may guarantee continued supply, but they have no control over glass delivery. Ultimately, the consumer sector drives volume and volume, in turn, drives the manufacturing strategies and production.

- **Alternative supplies:** There are no widely recognised standards – mechanical dimensions, connector position/format, backlight or power supply – for small sized TFT modules. This hinders dual sourcing and can leave the OEM struggling to find an alternative supply if the module is discontinued or volumes cannot be committed to.

### Mitigating risk

Is there an alternative to engaging with an industrial oriented Tier 1 (and accepting the higher prices) or using a Tier 2 that may be affected by future supply issues?

For those OEMs looking to mitigate the commercial and technical risks of TFT, while keeping costs down, there is a 'third way'. This is to collaborate with a company that is technically strong in TFTs, but with in depth knowledge of commercial considerations.

Choose a partner which sees display selection, supply chain management and integration as fundamental to its business; a company that knows how to deal with the pressures of the volatile TFT market and which can minimise the customer's vulnerability to risk.

### Author profile:

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