

Taiwan's small-to-mid-size LCD panels

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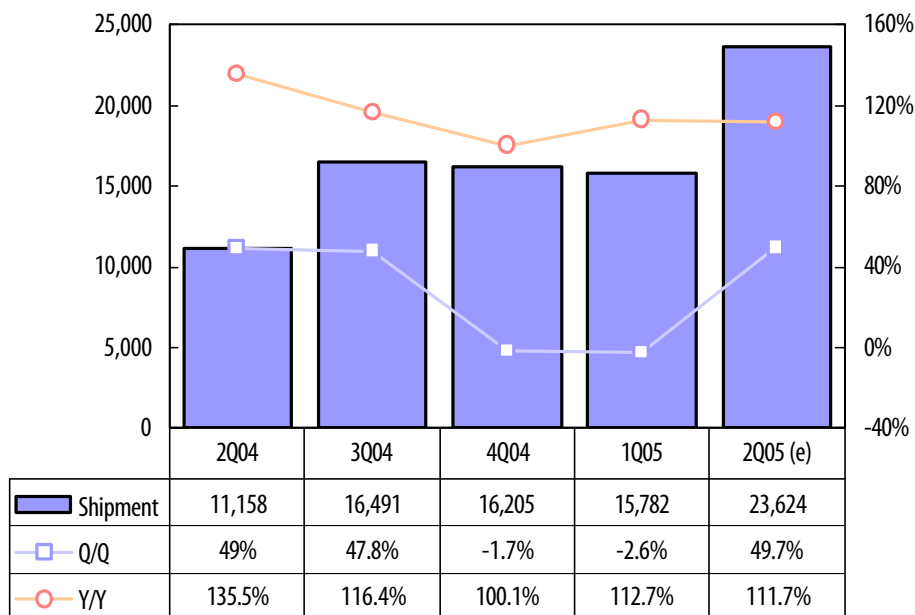
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Introduction

The traditional first-quarter low season turned out to be not too bad for Taiwan's small-to-mid-size TFT-LCD panel sector in 2005. Business was stable because of substantial orders for handset-use panels. Newcomers to the small-to-mid-size panel sector, Chunghwa Picture Tubes (CPT), HannStar Display, and Innolux Display, also started shipping car-use and handset-use panels. As a result, the first quarter only recorded a slight on-quarter shipment decline of less than 3%.

Demand is expected to increase in the second-quarter. New plants are ramping up their production, with more applications of small-to-mid-size panels hitting the market. On-quarter growth in small-to-mid size panel shipment is expected to reach 50%. However, fierce competition will drive down prices 10%, with total shipment value rising 38% on-quarter to US\$418 million.

Chart 1: Taiwan small-to-mid-size TFT-LCD panel shipment, 2Q04-2Q05 (k units)



Source: DigiTimes Research, April 2005

The first quarter

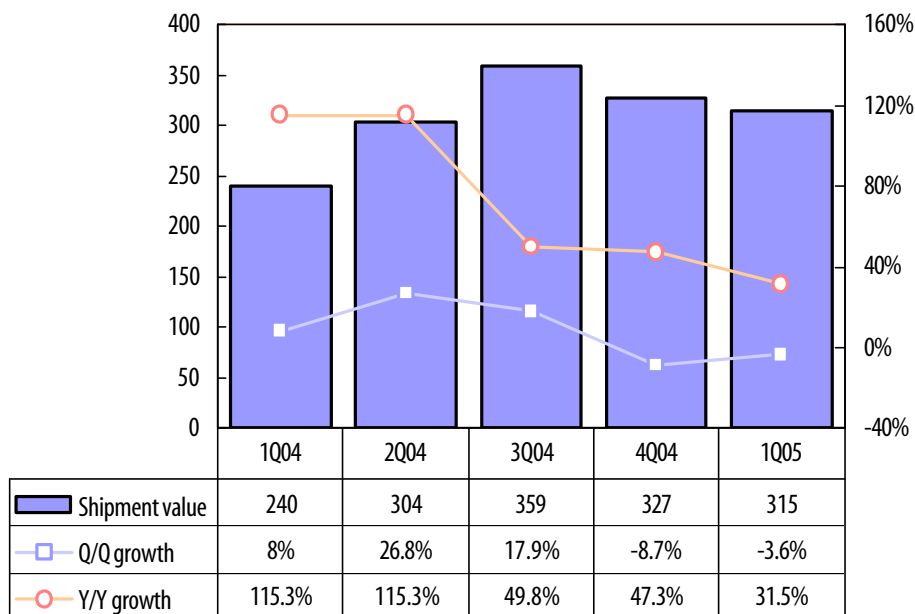
First-quarter small-to-mid-size LCD panel shipments remained stable in the low season as the sector saw increased output from CPT, HannStar, and Innolux, the former two having shifted production to small-to-mid-size panels at their third-generation (3G) plants, and the last at its 4.5G plant.

Demand for panels used in handsets, digital cameras and digital camcorders, was declining in the fourth quarter of 2004. The first quarter saw demand rebound for most applications, such as car-use displays and portable DVD players, except for digital-camera-use panels. However, digital-camera-use and handset-use panels still took the biggest portions of the first-quarter shipments.

The first-quarter shipment value amounted to US\$315 million, down 3.6% from the fourth quarter. On-year growth in shipment value dropped to 30%, a figure substantially lower than those for previous quarters.

Although prices for 7-inch and 1.5-inch TFT-LCD panels declined more than expected, shipment volumes for the segments increased. Margins for handset-use panels (most of which were customized products) remained high. The average selling price (ASP) for small-to-mid-size panels bottomed out in the first quarter.

Chart 2: Taiwan small-to-mid-size panel shipment value, 1Q04-1Q05 (m US\$)

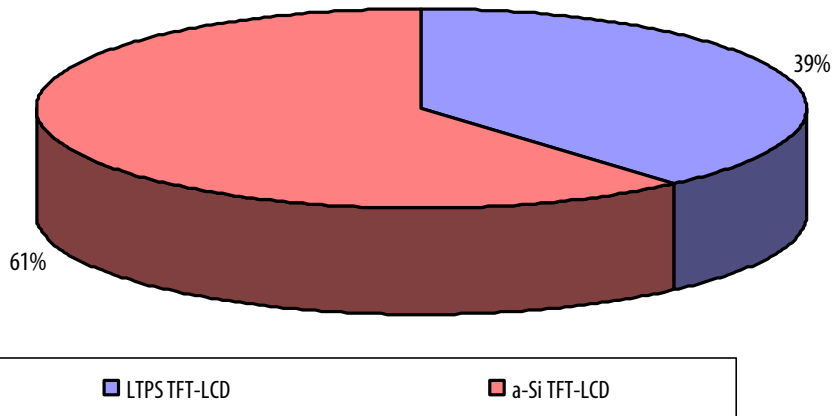


Source: DigiTimes Research, April 2005

Panel technology

Of the first-quarter small-to-mid-size panel shipments, 38.5%, or 6.08 million units, were LTPS (low-temperature polysilicon) TFT-LCD panels, up 3.5 percentage points from the fourth quarter. The rest of the shipments were a-Si (amorphous silicon) TFT-LCD panels, totaling 9.7 million units.

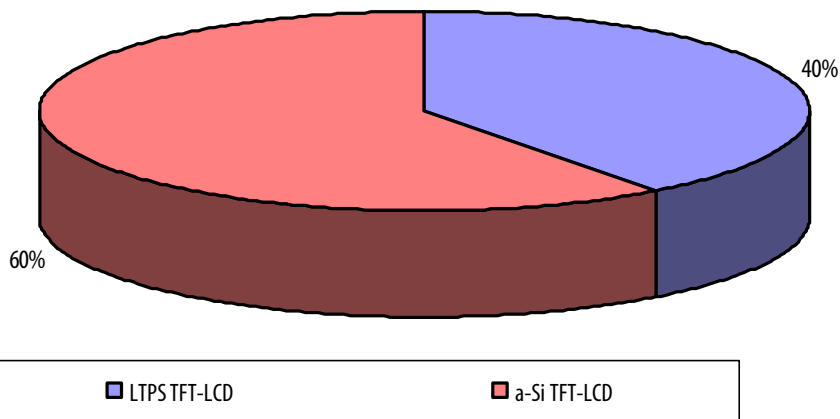
Chart 3: Taiwan small-to-mid-size panel shipments by technology type, 1Q05



Source: DigiTimes Research, April 2005

The LTPS type accounted for almost 40%, or US\$120 million, of the first-quarter shipment value, while the a-Si type totaled US\$180 million.

Chart 4: Taiwan small-to-mid-size panel shipment value by technology type, 1Q05



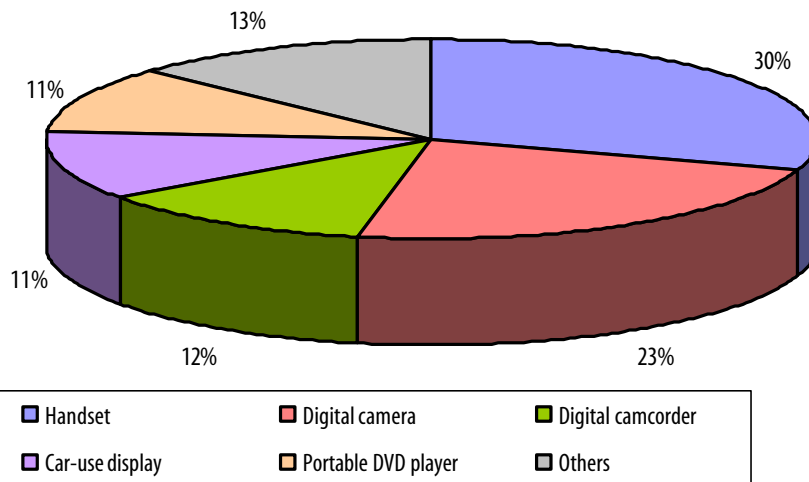
Source: DigiTimes Research, April 2005

Because LTPS TFT-LCD is more power-efficient than a-Si TFT-LCD, it is seeing growing demand from such portable devices as handsets, digital cameras and digital camcorders.

Applications

Handsets represented the biggest share of small-to-mid-size TFT-LCD panel shipments, followed by digital cameras, digital camcorders, car-use displays, and portable DVD players. Handsets and digital cameras took a combined share of more than 50% of the entire first-quarter shipment. Handsets also surpassed digital cameras as the top application for small-to-mid-size panels. Digital cameras were number one in the fourth quarter.

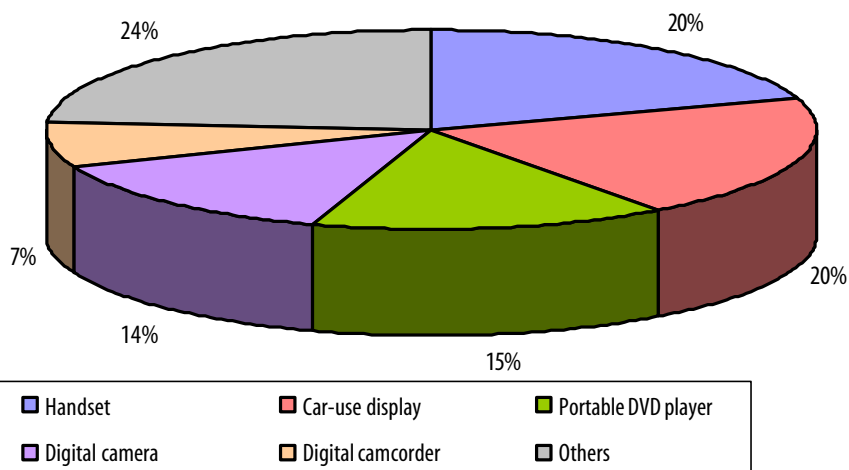
Chart 5: Taiwan small-to-mid-size panel shipment volume by application, 1Q05



Source: DigiTimes Research, April 2005

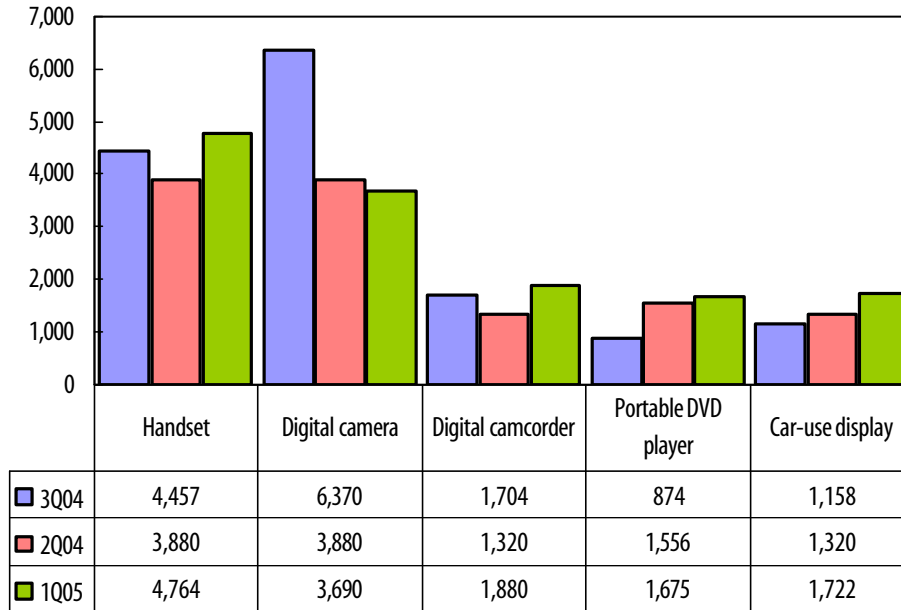
In terms of shipment value, handsets were still the top application for the first quarter of this year, followed by car-use displays, portable DVD players, digital cameras, and digital camcorders. Digital cameras dropped to number four from its fourth-quarter top notch.

Chart 6: Taiwan small-to-mid-size panel shipment value by application, 1Q05



Source: DigiTimes Research, April 2005

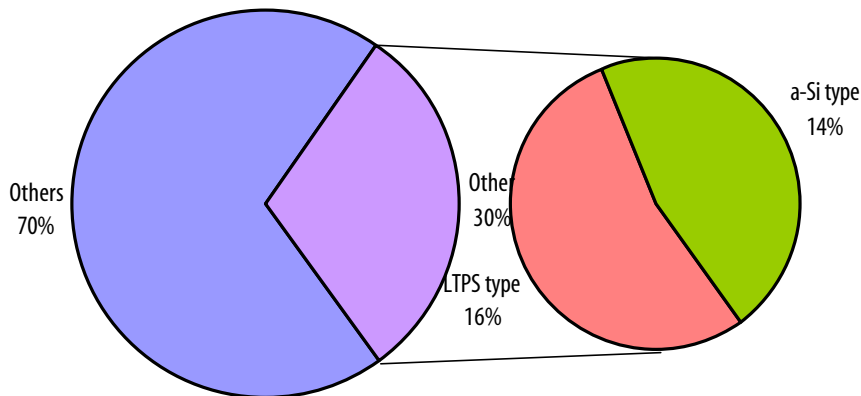
Other applications than the above-mentioned five major ones accounted for 13% of the entire first-quarter shipment volume, but their value totaled 24%, because they were mostly high-margin customized production for entertainment, medical and industrial devices. Of all the major applications, digital cameras was the only one that saw shipments decline, while the rest were all on the rise.

Chart 7: Taiwan small-to-mid-size panel shipments by application, 3Q04-1Q05 (k units)

Source: DigiTimes Research, April 2005

In the first-quarter of 2005, car-use displays enjoyed high growth because of the increasing popularity of digital broadcast, on-board movie entertainment, and car-navigation systems. Car-use displays are becoming an integral part of public and private transportation, which is expected to translate into big growth for the segment.

Of 4.76 million handset-use panels shipped from Taiwan in the first quarter, 2.2 million were of the a-Si type, and 2.56 million were of the LTPS type.

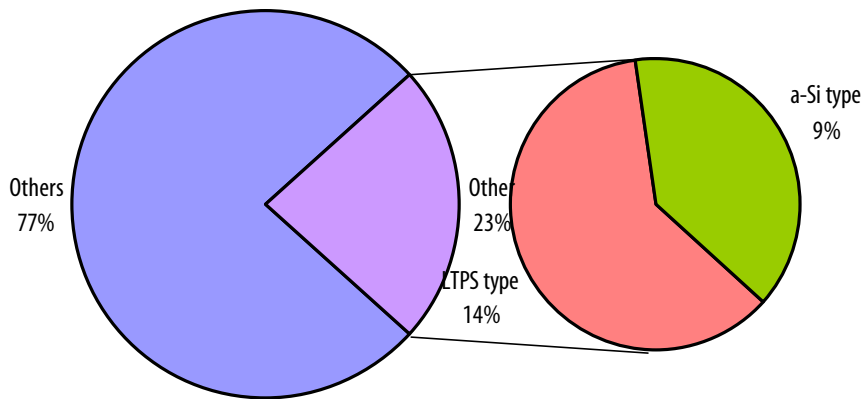
Chart 8: Taiwan handset-use panel shipment volume by technology, 1Q05

Source: DigiTimes Research, April 2005

AU Optronics (AUO) and Toppoly Optoelectronics were Taiwan's chief makers of handset-use panels in the first quarter, with both producing the LTPS type for the segment. Their major handset-use products were 1.5-inch, 1.8-inch, 2-inch and 2.2-inch single panels, and 1.8-inch + 1.2-inch and 2-inch + 1.2-inch dual-panel modules.

Of 3.69 million digital-camera-use panels, the a-Si type and the LTPF type accounted for 1.44 million and 2.25 million units respectively. AUO and Toppoly were also Taiwan's chief suppliers for digital-camera-use panels. Their products, all of the LTPS type, were chiefly 1.5-inch, 1.8-inch and 2-inch panels.

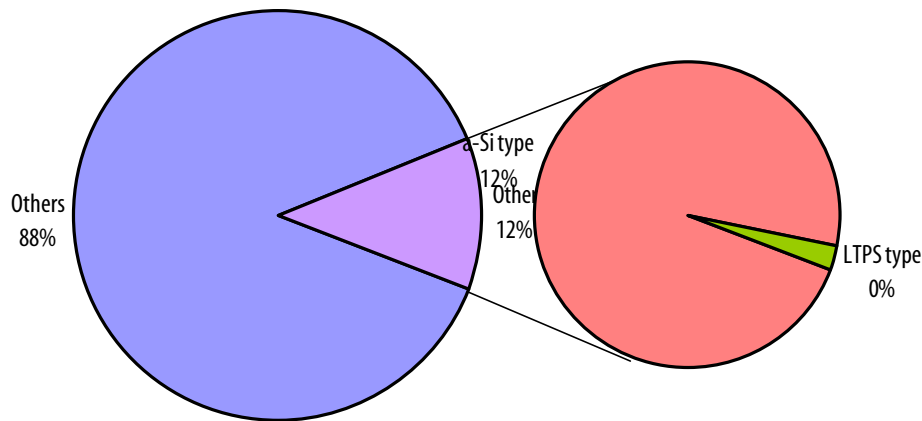
Chart 9: Taiwan digital-camera-use panel shipment volume by technology, 1Q05



Source: DigiTimes Research, April 2005

Most of the 1.88 million digital-camcorder-use panels shipped from Taiwan in the first quarter were a-Si TFT-LCD panels; LTPS TFT-LCD panels amounted to only 50,000 units.

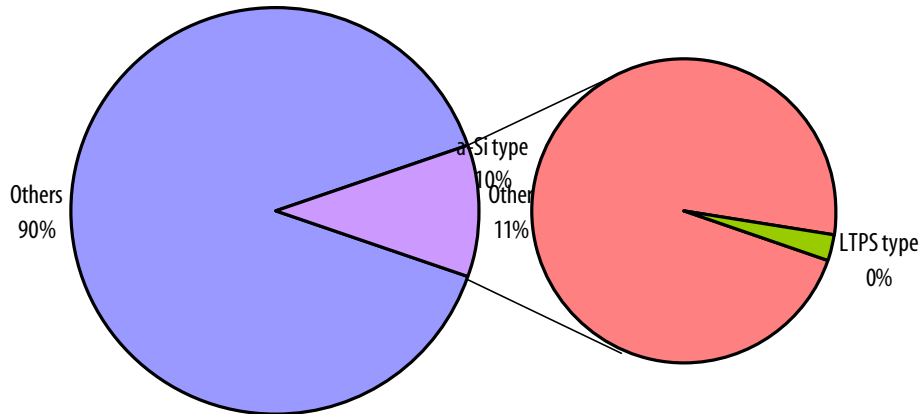
Chart 10: Taiwan digital-camcorder-use panel shipment volume by technology, 1Q05



Source: DigiTimes Research, April 2005

AUO and Toppoly were still the major makers of digital-camcorder-use panels. Prime View International (PVI) was also a player in the segment. Chief sizes for the segment were 2.5-inch, 3.5-inch and 3.6-inch panels.

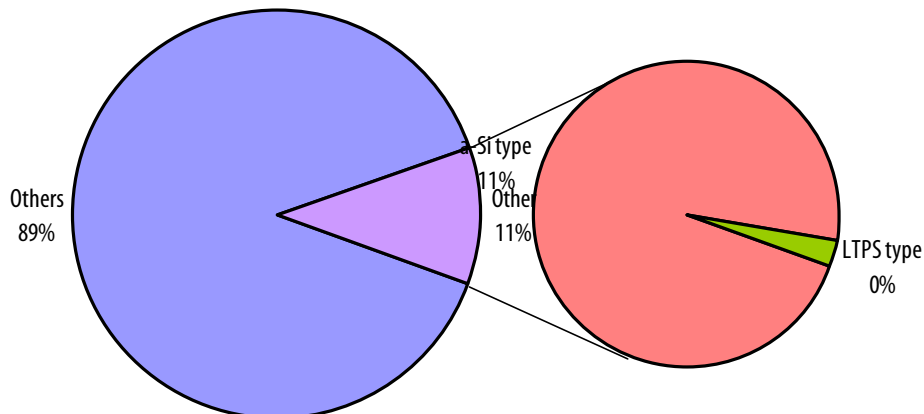
In the portable DVD player segment, the a-Si type totaled 1.62 million units in first-quarter shipments of 1.68 million panels, while the LTPS type amounted to only 60,000.

Chart 11: Taiwan portable-DVD-player panel shipment volume by technology, 1Q05

Source: DigiTimes Research, April 2005

Chief Taiwan panel suppliers for portable DVD players were AUO, PVI, Toppoly, and HannStar. Their chief products were 5-inch, 6.5-inch and 7-inch panels.

Taiwan makers shipped 1.72 million car-use panels in the first quarter, of which 1.67 million were a-Si panels, and 50,000 were LTPS ones. Chief players in the segment were AUO, PVI, Toppoly, HannStar, CPT, and Innolux. Except for Toppoly, which produced the LTPS type, the others made the a-Si type. Major products in the segment were 5-inch, 6.5-inch, 7-inch and 9-inch panels.

Chart 12: Taiwan car-use panel shipment volume by technology, 1Q05

Source: DigiTimes Research, April 2005

Large-size panel makers eye smaller panels

In 2004, many large-size panel makers announced plans to produce small-to-mid-size panels. However, up to the first quarter of 2005, their outputs remained low.

CPT's first-quarter output of small-to-mid-size panels was less than 100,000 units, but its second-quarter shipment is expected to increase to 200,000-300,000 panels, with half of them coming from its T1 plant, which has been undergoing capacity adjustment to produce small-to-mid-size panels. CPT's chief output for the small-to-mid-size segment consisted of 5-inch, 7-inch, 8-inch and 9-inch panels for car-use displays and portable DVD players. It has also sent clients samples of handset-use panels, and it expects to begin shipping the segment in volume in June.

HannStar has shifted one of its 3G plants to the production of small-to-mid-size panels, planning to produce 1.8-inch, 3.2-inch, 5-inch, 5.3-inch, 6.2-inch and 7-inch panels. Its focus will be 5-inch and 7-inch car-use panels. HannStar's first-quarter shipment of small-to-mid-size panels was low.

Innolux's 4.5G plant, which has been shifted back to its original purpose of making small-to-mid-size panels when it was first designed, now chiefly makes 7-inch car-use panels. The company is also developing the handset-use panel market. It has sent samples to first-tier handset makers, and expects to start shipping to the segment in the fourth quarter.

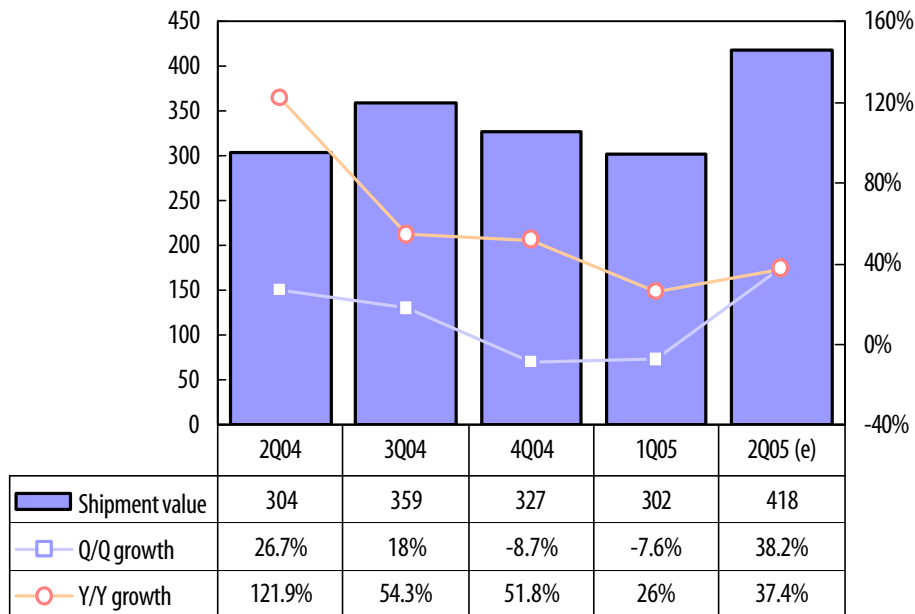
AUO's handset-use panel shipment amounted to more than 5 million units in 2004. AUO will stay focused on the handset segment in 2005. It expects that 40% of the worldwide handset shipment for 2005 will be equipped with TFT LCD panels.

ChiLin Technology, an affiliate of the Chi Mei Group, is interested in developing the car-use panel market, but it remains cautious. As it usually takes a long time to obtain product approval from auto makers, new comers will have difficulties establishing a foothold in the segment.

Forecast for 2005 and beyond

Shipments of TFT-LCD panels will increase for the second and third quarters, with the peak coming in the third quarter to meet Christmas demand. After Christmas, shipments usually start declining through the first quarter. The decline is estimated at 20% over the previous quarter.

Chart 13: Taiwan small-to-mid-size TFT-LCD panel shipment value, 2Q04-2Q05



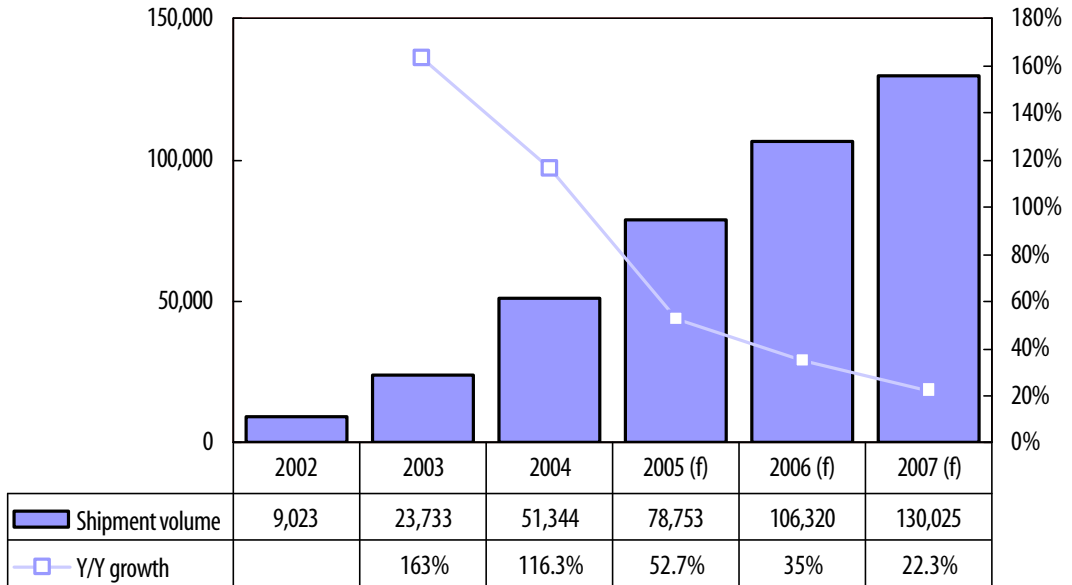
Source: DigiTimes Research, April 2005

With the price difference between TFT-LCD and STN-LCD panels narrowing, demand for handset-use TFT-LCD panels will continue to grow. Shipment of car-use panels will also grow, as newcomers to the small-to-mid-size panel sector are more active in making car-use panels, whose sizes are relatively larger and the technological requirement lower.

Taiwan's total shipment of small-to-mid-size TFT-LCD panels for 2005 is expected to reach 78.75 million units, up 53.4% over 2004. Shipment value will total US\$1.84 billion, up almost 50%.

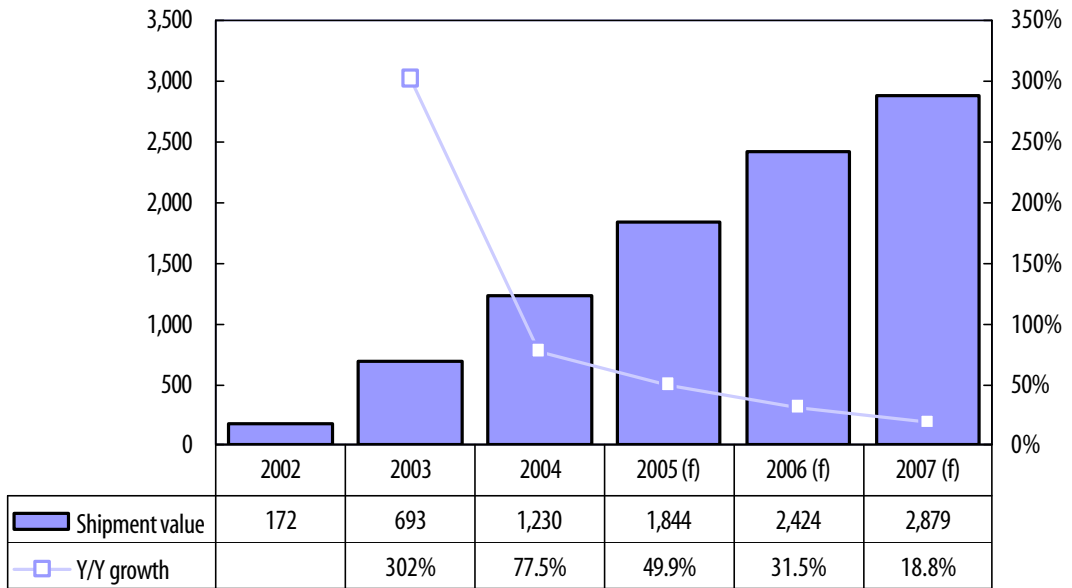
Growth for the sector is expected to continue, with shipment volumes and value totaling 130 million units and US\$2.8 billion, in 2007.

Chart 14: Taiwan small-to-mid-size panel shipment volume, 2002-2007 (k units)



Source: DigiTimes Research, April 2005

Chart 15: Taiwan small-to-mid-size panel shipment value, 2002-2007 (m US\$)



Source: DigiTimes Research, April 2005