

Low Temperature Polycrystalline Silicon 9.7 cm (3.8-Type) QVGA Color Reflective LCD with Built-in 4-bit D/A Converter

ACX704BKM

Based on the highly respected Sony low temperature polycrystalline silicon TFT technology, Sony has now developed the ACX704BKM 3.8-Type QVGA*¹ color reflective LCD module, that achieves the industry's highest display performance level.

This product integrates a compact 4-bit D/A converter circuit in the panel, and achieves a reflection ratio of 40%*³ and a contrast ratio of 35:1 by the adoption of the newly-developed Advanced BDM*² retardation film and high-brightness color filters.

At the same time, Sony also developed a controller CXD3508TQ and a driver CXD2475TQ to support the creation of low-power display systems.

This panel also includes a high-brightness front light unit that exhibits superb performance in low ambient light conditions, enabling end products to support user work styles that are independent of the work environment.

- 1/4 VGA reflective color LCD module
- 320 × 240 × RGB stripe arrangement color filters
- Built-in 4-bit D/A converter
- Achieves a reflection ratio of 40% and a contrast ratio of 35:1
- Built-in high-brightness front light
- Supports the Windows CE*⁴ format

*1 Quarter VGA

*2 Birefringence Dispersion Matching

*3 Including the front light

*4 Windows CE is a registered trademark of Microsoft Corporation, U.S.A.

*5 Electrically Controlled Birefringence

Low-Power Panel for Digital Interface

The main features required in portable information terminals that are mostly used outdoors are miniaturization and light weight for portability and low power consumption for long battery life. The newly-developed ACX704BKM takes full advantage of Sony's industry-leading low temperature polycrystalline silicon TFT technology, integrates a compact 4-bit D/A converter based on a unique circuit design in the panel, and thus achieves both an ultralow power consumption of 20 mW (typical) and a narrow frame design at the same time. (See figure 1.) The reduction of the

number of peripheral components not only contributes significantly to portability, but also increases reliability. The fusion of Sony's leading-edge TFT process and circuit design technologies has created what can truly be said to be the optimal LCD panel for the next generation of portable information terminals.

Achieves a Reflection Ratio of 40% and a Contrast Ratio of 35:1

Sony has developed the Advanced BDM design technology, which represents a further evolutionary step beyond conventional BDM retardation design technology, and used this technology to create a new retardation film that allows the ACX704BKM to achieve a high contrast ratio. To achieve the high contrast ratio of the ECB*⁵ method, which is the display principle on which this module is based, Sony had to optimize the design of the polarizing retardation film and the birefringence of the LCD layer and make the intensity drop for black display even larger. Sony focused on the wavelength dispersion characteristics of the birefringence ratio of a wide range of materials, and succeeded in reducing the light leakage in the wavelength range where the human eye is most sensitive. (See figure 2.) This is

allowed to increase radically the contrast ratio of this class of device from 19:1 to 35:1. Sony also created color filters with high optical transmittance and thus achieved a reflection ratio of 40%, which is the industry's highest level for a reflective LCD. This is but one of Sony's contributions to the search for improved total display quality.

Related System ICs

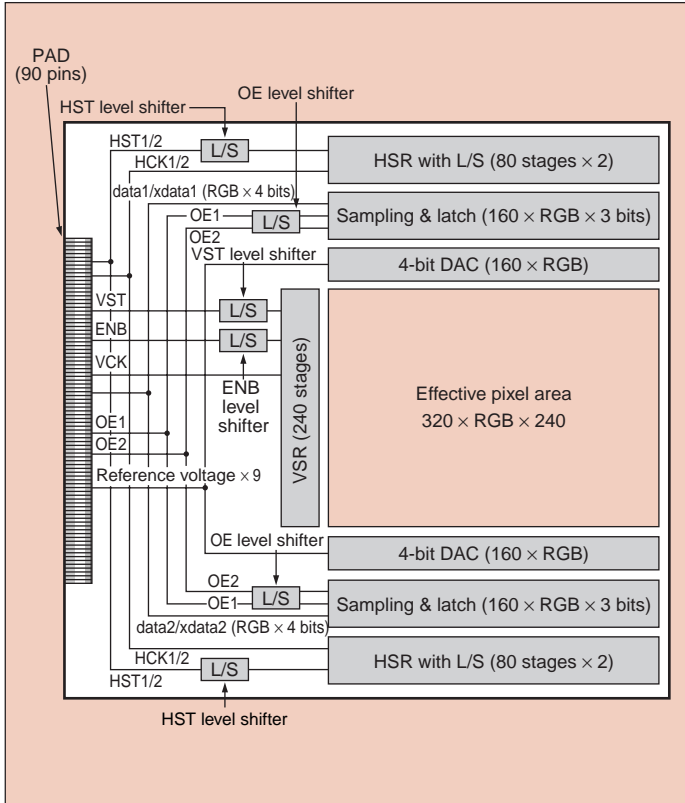
To achieve ultralow power consumption in the total module system, Sony also developed a new controller CXD3508TQ and a driver CXD2475TQ at the same time. (See figure 3.) These are provided in thin-form packages to support further end product miniaturization, and achieve the low power consumption levels of 10 and 35 mW, respectively. Sony is committed to the systematic expansion of the possibilities of portable information terminals.

V O I C E

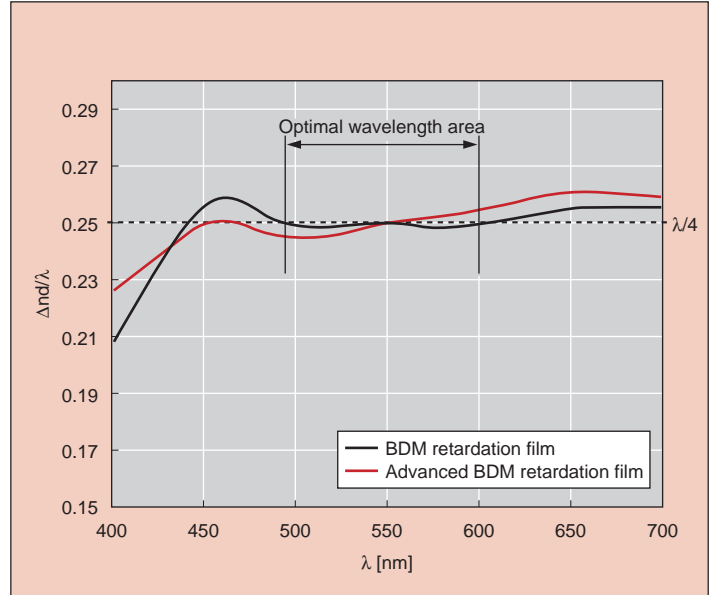
An even more highly evolved version of the ACX702AKM, which was announced last year (see Cx-News, Volume 16), has now appeared. This is an attractive display that is fully capable of playing the leading role in the rapidly growing PDA market. We hope that Sony LCD technology can drive even further growth in the expanding world of portable information terminals.



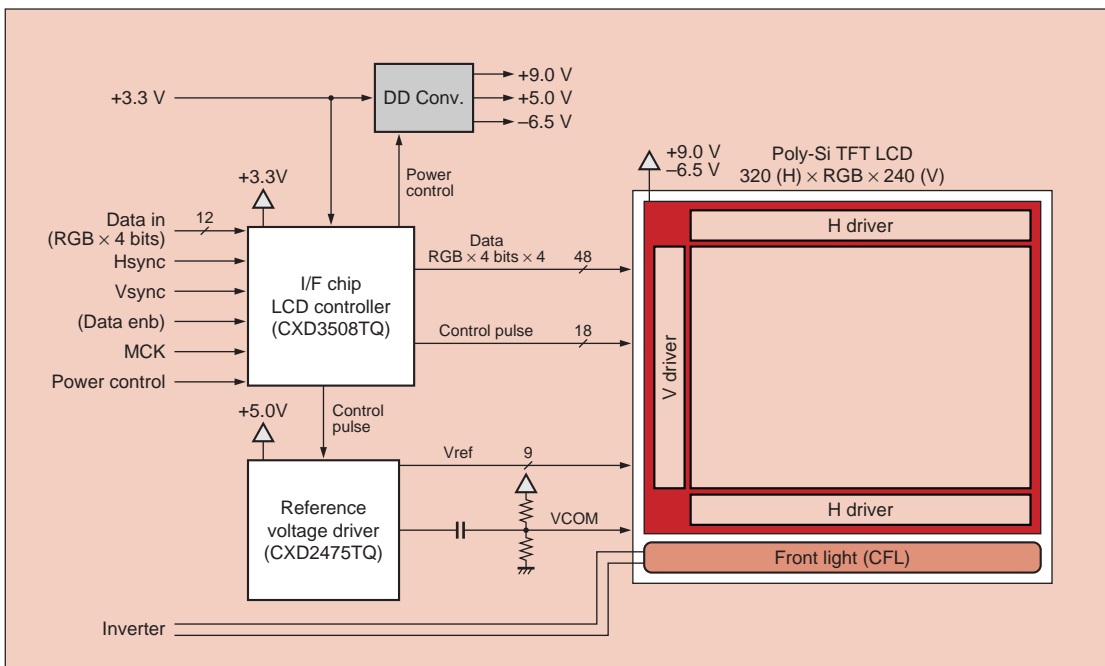
New Products



■ Figure 1 Panel Block Diagram



■ Figure 2 Wavelength Dispersion Comparison during Black Display



■ Figure 3 ACX704BKM System Block Diagram