

ACX702AKM

Sony has now developed, based on their industry-leading low-temperature polysilicon TFT technology, a 3.8-inch QVGA *¹ color reflective LCD, the ACX702AKM, that achieves the industry's highest display performance.

This device features low power, integrates a compact 3-bit D/A converter circuit within the panel, and in conjunction with the point that no backlight is required, achieves an ultralow power consumption level.

In addition to the high display quality when used outdoors that is an inherent feature of reflective LCDs, this panel incorporates an ultrathin frontlight that assures viewability in dim ambient lighting environments. Thus the ACX702AKM is an extremely attractive display for the rapidly evolving PDA and portable information terminal area.

- Built-in 3-bit D/A converter circuit and 15 mW power consumption
- Achieves a reflection ratio of 34% and a contrast ratio of 19:1
- Ultrathin highly efficient frontlight
- Supports the Windows CE*² display format

■ Built-in 3-bit D/A Converter Circuit and 15 mW Power Consumption

Small size and light weight for portability, and low power consumption for long battery life are required in portable information terminals such as PDAs and handheld PCs. By taking full advantage of advanced low-temperature polysilicon technology and LCD drive circuit design technology, Sony has now integrated, within the panel itself, a compact 3-bit D/A converter that increases portability and reduces power consumption even further. This significantly reduces the number of peripheral components and increases the reliability of the required connections. Furthermore, the ACX702AKM achieves a narrow frame even though the peripheral circuits are integrated on the panel, and also achieves the ultralow power consumption of 15 mW (typical). This LCD not only supports the Windows CE display format, but also supports set miniaturization and reduced power consumption at a high level.

V O I C E

Reflective color LCDs can display orders of magnitude more information than earlier monochrome reflective LCDs. The ACX702AKM LCD can achieve, at a high level, the performance required in current and future portable information terminals.

■ Achieves a Reflection Ratio of 34% and a Contrast Ratio of 19:1

Sony has adopted ECB*³ mode as the display method. (See figure 2.) The design of a diffusing reflective electrode that reflects light with a high efficiency, and optimal design of the optical materials used in the LCD are technological issues critical for achieving the bright high contrast display of pure colors in this mode. To respond to the former, Sony has established the new BDM*⁴ technology, which optimizes the birefringence balance of the retardation film and the liquid crystal layer (See figure 3.) , and to respond to the latter, Sony has established the new RMP*⁵ technology by designing an optimal fine depressions and protrusions structure and creating that shape on the electrode surface by taking full advantage of photolithographic processes. (See figure 4.) Furthermore, Sony has developed color filters that achieve both brightness and color reproduction. Due to these technologies, this device achieves the industry's highest reflection ratio of 34%, a contrast ratio of 19:1*⁶, and rich and natural color display.

■ Ultrathin Highly Efficient Frontlight

To allow this reflective LCD to be used even under dim ambient lighting environments, Sony, in a joint development project with Stanley Electric, has developed the industry's thinnest (1 mm) parallel flat panel highly efficient frontlight system. (See figure 5.) A prism shape that guides the light from a cold cathode fluorescent tube efficiently was designed using computer simulation to achieve a light guide plate a mere 1 mm thin. This is the latest technology for providing high picture quality in a wide range of usage environments.

*1: Quarter VGA (320 × 240)

*2: Windows CE is a registered trademark of Microsoft Corporation.

*3: Electrically Controlled Birefringence

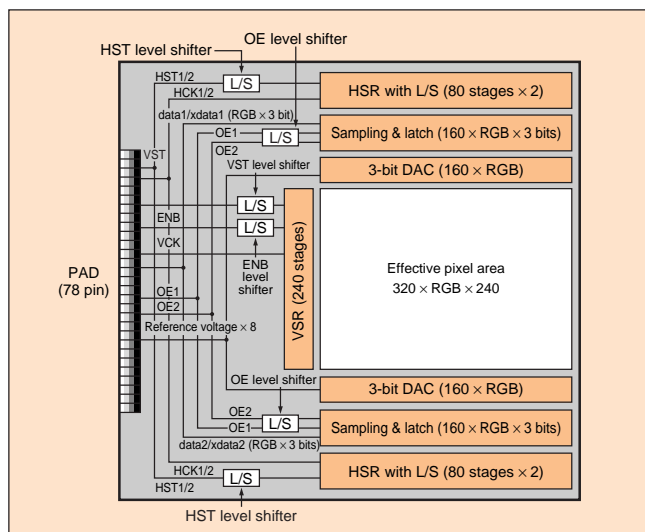
*4: Birefringence Dispersion Matching

*5: Random Multi Profile

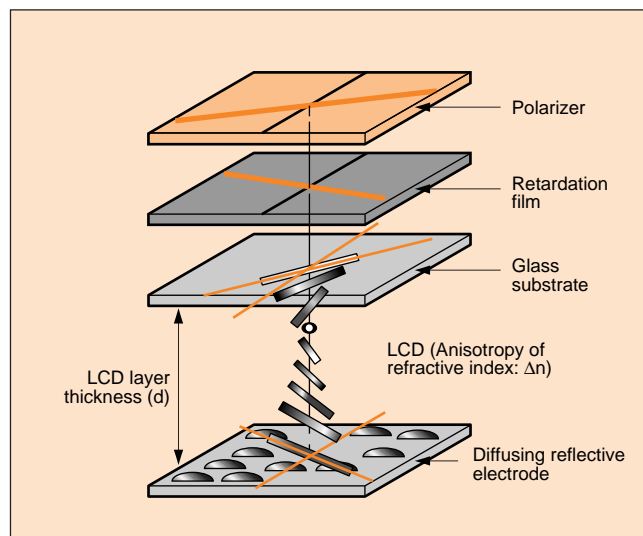
*6: When measured at 0/30°.



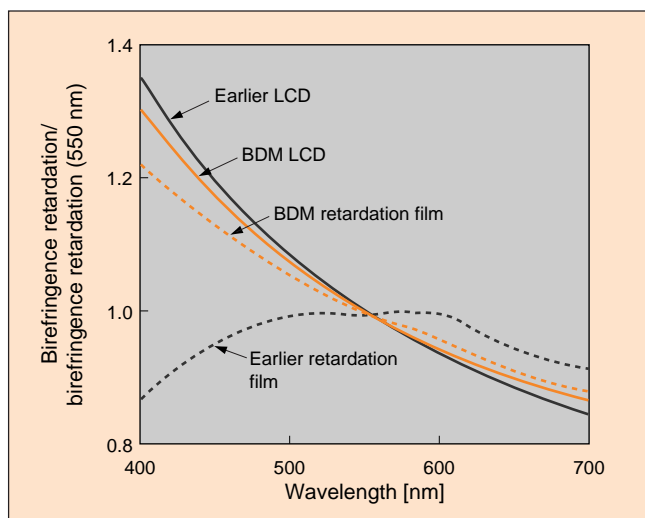
New
Products



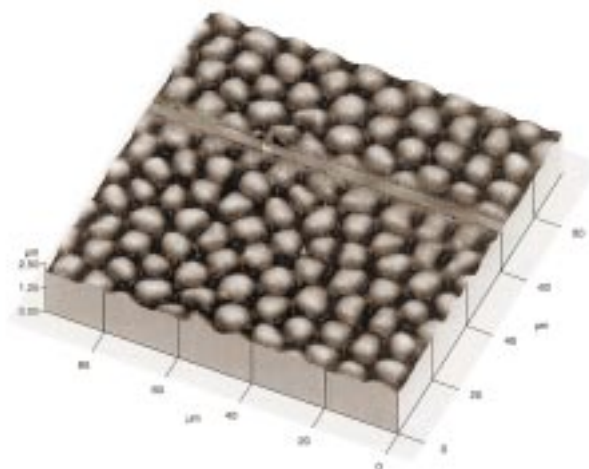
■ Figure 1 ACX702AKM System Block Diagram



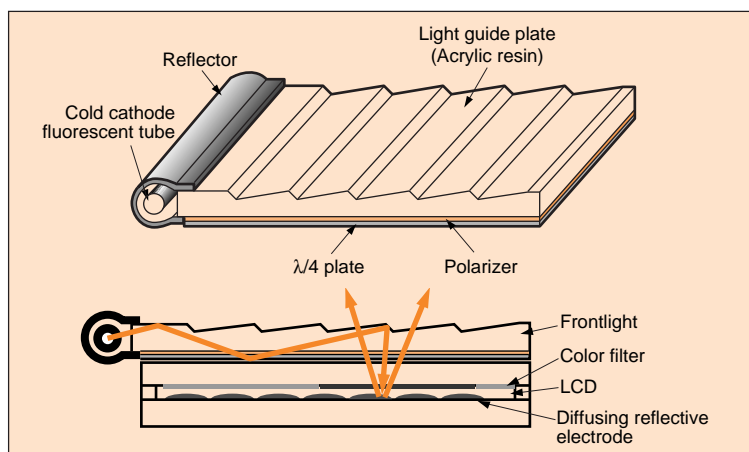
■ Figure 2 EBC Mode LCD Structure Overview



■ Figure 3 LCD and Retardation Film Characteristic Optimization Due to BDM Technology



■ Figure 4 Diffusing Reflective Electrode Surface Form Created by RMP Design Technology (AFM based)



■ Figure 5 Frontlight Structure and Panel Illumination Overview

■ Table 1 ACX702AKM Specifications

Drive method	Built-in 3-bit D/A converter
Screen size	3.78 inch
Number of effective dots	230K dots (QVGA) 240 (H) × 320 (V) × RGB
Pixel arrangement	Stripe
Dot pitch (H × V)	80.0 × 240.0 μm
Panel package dimensions (W × H × D)	57.6 × 76.8 × 2.2 mm
Aperture ratio	92%
Reflection ratio	34%
Contrast	19:1
Number of colors	Three bits for each of RGB (512 colors)
Power consumption	15 mW (F/L Off) 515 mW (F/L On)