

# ACX388AKZ

## Narrow-Frame, High-Contrast Low-Temperature Polycrystalline Silicon TFT LCD System Display for Mobile Phones



The ACX388AKZ presented in this article is a thin-form LCD panel for the mobile environment that includes the industry's first automatic flicker correction circuit.

Sony optimized their system on glass and chip on glass (COG) mounting technologies to achieve a narrow frame display. This device achieves both the high contrast optimal for mobile phone terminals, in which higher image quality is desired and color reproducibility that covers the sRGB color space, and can contribute to the design of end products that achieve further miniaturization and thinner form factors.

- Narrow frame panel achieved by optimizing Sony's system on glass technology
- Automatic flicker correction circuit
- Ultrathin panel that allows module thickness to be held to under 1.3 mm
- Contrast: 800:1

### Narrow Frame Panel Achieved by Optimizing Sony's System on Glass Technology

Current COG panels are designed by arranging the COG chips and an FPC as shown in figure 2. Therefore the frame of the single glass sheet section is determined by the clearance between the color filter (CF) glass and the COG chip, the clearance between the COG chips and the FPC, the FPC pad length, and the length of the COG chips in the short direction. For the newly-developed ACX388AKZ, Sony optimized their system on glass technology and reduced each of these clearances by arranging the COG chip and FPC horizontally. This made it possible to make the frame area around the single glass sheet section even

narrower. In this design, Sony held the functions (such as digital interface and VRAM) on the COG chips to an absolute minimum and formed all of the circuits required for panel drive (such as the DDC, H-driver, V-driver, TG, and Vcom compensation circuits) on the glass substrate using system on glass technology. Thus it was possible to hold the dimensions of the single glass sheet section to about the same dimensions as the left and right frames. This results in a panel with increased flexibility for end product designs.

### Automatic Flicker Correction Circuit

This display includes an automatic flicker correction circuit for the first time in the industry. In current models, the flicker ratio changes with changes in the environment and flicker can be seen on the screen. However in this device, a circuit that allows optimal, and electrical, Vcom adjustment (detection pixels, signal drivers, a comparator, and an amplifier to drive Vcom) is formed on the glass substrate using system on glass technology. Also, the flicker ratio temperature characteristic is reduced to 1/5 that of current products,

resulting in a clear display with no flicker that can stand up to the demanding mobile environment.

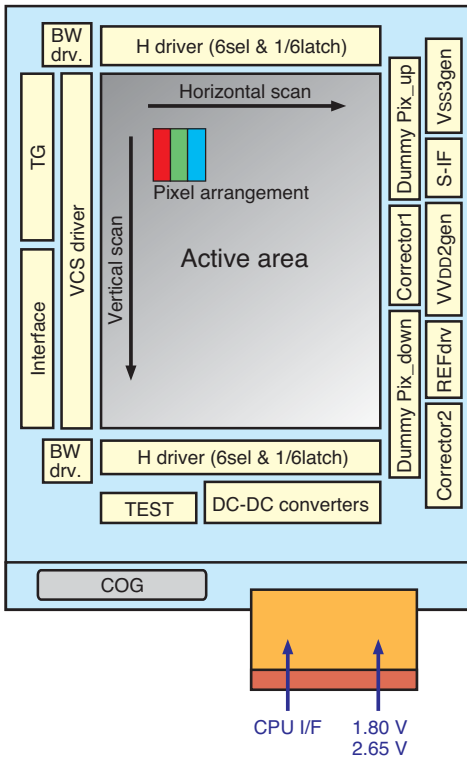
### High Contrast

With the increasing pixel counts in the cameras included in mobile phones and the increasing availability of video content such as One Seg and other video broadcasts, mobile phone hardware that focuses on images is in now in demand. To respond to this demand, Sony achieved color reproducibility that covers the sRGB space and a contrast ratio of 800:1 to provide the same level of pleasure in the mobile environment as is now provided by home TVs.

### V O I C E

This LCD panel includes an automatic flicker correction circuit for the first time in the industry. It achieves faithful image display with a high contrast ratio and color reproducibility that covers the sRGB space. I strongly recommend that you look into this thin-form narrow-frame LCD panel that is optimal for mobile applications and supports flexible end product design.

**Figure 1** Block Diagram



**Table 1** ACX388AKZ Main Characteristics

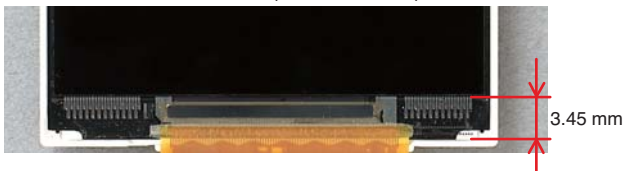
Number of pixels	240 × RGB × 320 (QVGA)
Diagonal size	5.64 cm (2.22 type)
Panel dimensions	38.04 mm × 52.95 mm × 0.4 mm
Display mode	Transmissive mode wide viewing angle LCD
Number of colors	262,144 colors
Viewing angle	160° or greater (CR < 10)
Transmittance	6.2%
Contrast	800:1
Power consumption	17.1 mW

**Table 2** Module Characteristics (For reference purposes)

Number of pixels	240 × RGB × 320 (QVGA)
Diagonal size	5.64 cm (2.22 type)
Module dimensions	40.24 mm × 55.5 mm × 1.3 mm
Number of colors	262,144 colors
Viewing angle	160° or greater (CR < 10)
Brightness	500 cd/m <sup>2</sup>
Contrast	800:1
Interface	CPU

**Figure 2** Narrow Frame Width (single glass sheet section)

Current Model (ACX383AKZ)



ACX388AKZ



**Figure 3** Changes in Flicker Ratio

