

High-Resolution 1/3.6-Inch (5.0 mm Diagonal)
1.25-Million Pixel Color Digital Still Camera CCD

ICX232AK (Complementary color) ICX232AQ (Primary color)

The demands for higher pixel counts and miniaturization in the CCDs used in digital still camera are stronger than ever. To respond, Sony has developed a new high-resolution miniature CCD image sensor.

The development of the industry's smallest unit pixel allows the ICX232 to achieve an effective pixel count of 1.25-million pixels in a 1/3.6-inch (5.0 mm diagonal) optical system image sensor. This device also achieves even lower power consumption levels.

Additionally, the ICX232 provides a high frame rate readout mode that can increase the speed of feedback to the LCD viewfinder and the AE/AF control systems.

- **High resolution and miniaturization**
Provides 1.25 million effective pixels (1290H × 966V) in a 10.0 mm square 16-pin DIP package
- **Power consumption reduced by 40%***
* As compared to Sony 1/2.7-inch CCD products with the same pixel count.
- **High frames rate readout mode (30 frames/s)**

The ICX232 is a 1/3.6-inch (5.0 mm diagonal) 1.25-million pixel color CCD image sensor that was developed for use in digital still cameras. When used with a mechanical shutter it allows the acquisition of high-resolution images. Table 1 presents the structure of the ICX232 device, and table 2 presents its imaging characteristics.

■ High Resolution and Miniaturization

By developing the industry's smallest unit pixel (3.125 μm square), Sony achieved an effective pixel count of 1.25-million pixels in a 1/3.6-inch (5.0 mm diagonal) optical system image sensor in the ICX232. Also, the ICX232 is provided in the same package size as Sony's 1/4-inch CCDs. This allows the camera's optical system to be miniaturized, and also allows, for example, a high magnification zoom function to be included without increasing the overall size of the camera.

■ Reduced Power Consumption

Power consumption was reduced by optimizing the output circuits, and by reducing the transfer register load capacitances. This results in power consumption reduced by 40% over Sony 1/2.7-inch (6.64 mm diagonal) CCD products with the same pixel count, to a mere 92 mW, including the driver power consumption. (See figure 1.)

■ High Frame Rate Readout Mode

The ICX232 provides a high frame rate readout mode (30 frames per second) in which it outputs 241 lines (vertical) covering the whole imaging area by only reading out two of every eight signal lines. Applications can increase the speed of feedback, both to the LCD viewfinder and to the AE/AF control systems, by using this mode.

■ Timing Generator IC

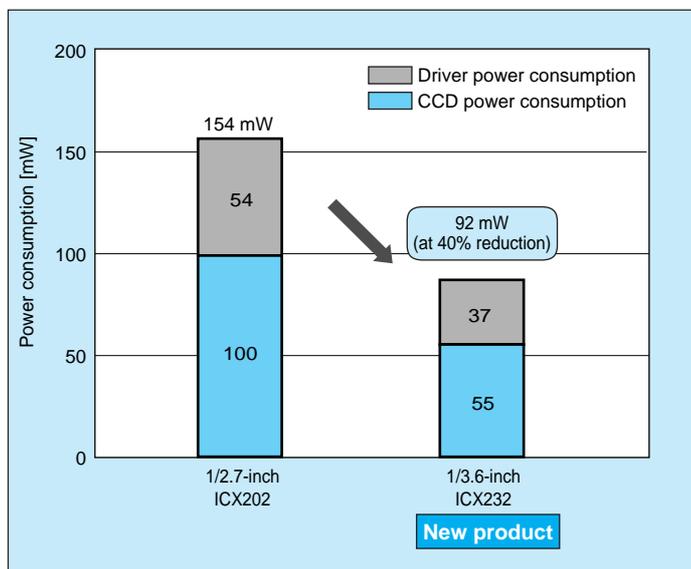
Sony provides the CXD2470R CCD drive timing generator that includes on-chip vertical clock drivers. This IC also supports the high frame rate readout mode. (See figure 3.)

V O I C E

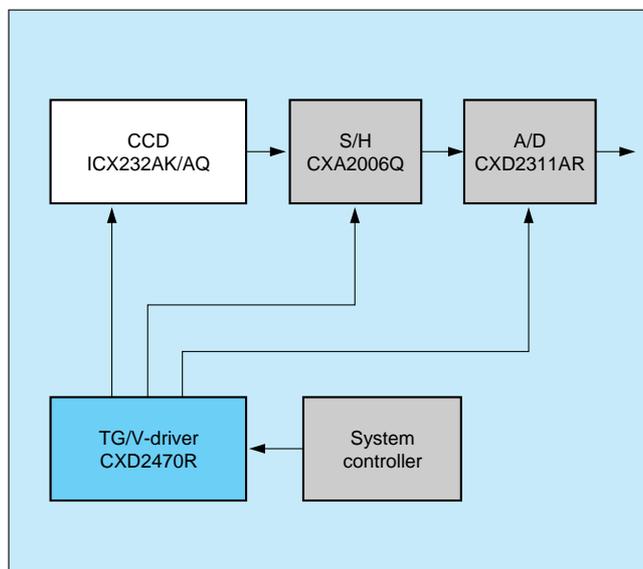
I think that the ICX232AK/AQ CCD can contribute to the creation of miniature high-resolution digital still cameras that match the needs of the market. I hope you will look into creating a unique digital still camera product that takes advantage of this CCD.



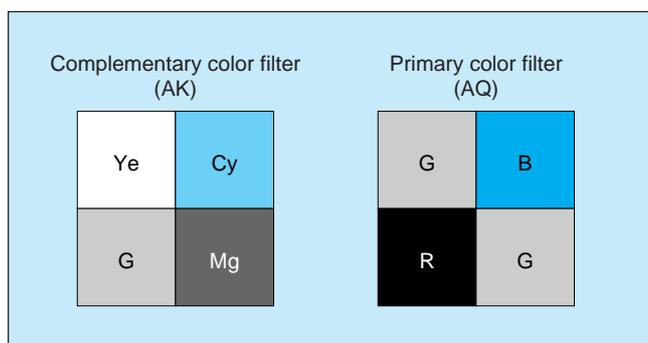
*New
Products*



■ Figure 1 Trends in Power Consumption in 1.25-Million Pixel CCDs



■ Figure 3 System Block Diagram



■ Figure 2 Color Filter Arrangement

■ Table 1 Device Structure

Item	ICX232AK/AQ
Optical size	5.0 mm diagonal (1/3.6 inch)
Format	4 : 3
Transfer method	Frame readout interline transfer method
Total number of pixels	1343(H) × 972(V), approx. 1.3M pixels
Number of effective pixels	1290(H) × 966(V), approx. 1.25M pixels
Number of active pixels	1280(H) × 960(V), approx. 1.23M pixels
Diagonal size	5.0 mm : 1280 (H) × 960 (V) = 1228800 (4.5 mm: 1152 (H) × 872 (V) = 1004544)
Chip size	4.94 mm (H) × 4.20 mm (V)
Unit cell size	3.125 μm (H) × 3.125 μm (V)
Horizontal drive frequency	12.27 MHz
Package	16-pin DIP (plastic)

■ Table 2 Imaging Characteristics

Item	Typical value	Remarks
Sensitivity	ICX232AK: 220 mV (Y signal) ICX232AQ: 200 mV (G signal)	3200K, 706 cd/m ² , F5.6, storage for 1/30 s
Saturation signal	300 mV	In frame readout mode
Smear	Frame readout: -90 dB High frame rate readout mode: -78 dB	None if a mechanical shutter is used.
Frame rate	Frame readout: 7.5 frames/s High frame rate readout mode: 30 frames/s	