

ICX224AK (Complementary color, DIP)

ICX224AKF (Complementary color, SOP)

ICX224AQ (Primary color, DIP)

ICX224AQF (Primary color, SOP)

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 1/2-inch optical system interlaced CCDs that achieve the industry's highest performance level.

The ICX224 is a 2-million pixel class device with the industry's smallest unit pixel, yet it still achieves high sensitivity and low smear. Furthermore, this device is provided in a new miniature package and can contribute to digital still camera miniaturization.

Additionally, the ICX224 provides a high frame rate readout mode that can increase the speed of the feedback to the liquid crystal finder and the AE/AF control systems.

- High resolution
Provides 2.02 million effective pixels (1636H × 1236V)
- High sensitivity and low smear (-100 dB)
- New miniature packages (DIP and SOP)
- High frame rate readout mode (30 frame/s)

The ICX224 is a 1/2-inch 2.02-million effective pixel CCD image sensor that was developed for use in high-resolution digital still cameras. When used with a mechanical shutter it allows the acquisition of high-resolution images. Table 1 presents the device structure of the ICX224.

■ High Resolution

Sony achieved a device with the industry's top pixel count class, 2.02-million effective pixels (1636H × 1236V), in a consumer product by developing a unit pixel with a 3.9 μm square. This allows this device to achieve horizontal and vertical resolutions of about 1000 TV lines (color). (See photograph 1.)

■ High Sensitivity and Low Smear

The ICX224 achieves a saturation signal level of 500 mV and a sensitivity of 270 mV (primary color products) or 350 mV (complementary color products) despite having the industry's smallest square pixel of 3.9 μm in a 2-million pixel class product by the adoption of a newly developed sensor structure and the optimization of the shape of the on-chip microlenses. Since this product also achieves a smear of -100 dB, it is a CCD that provides excellent imaging characteristics despite its large number of pixels. (See table 2.)

■ Newly Developed Miniature Packages

Sony has developed new miniature thin form factor plastic packages that reduce the package volume by 50% and the thickness by 15% as compared to conventional products. In addition to DIP products, SOP products, which allows surface mounting, has been added to the product line. These packages allow miniaturization an thinner form factors to be achieved in new digital still camera products. (See figure 1.)

■ High Frame Rate Readout Mode

The ICX224 provides a high frame rate readout mode which provides 30 frames per second and in which the device outputs 305 vertical lines covering the whole imaging area. In this mode applications only read out two of every eight signal lines. Applications can increase the feedback speed both to the user through the liquid crystal finder and to the AE and AF control systems by using this mode.

■ Timing Generator ICs Provided

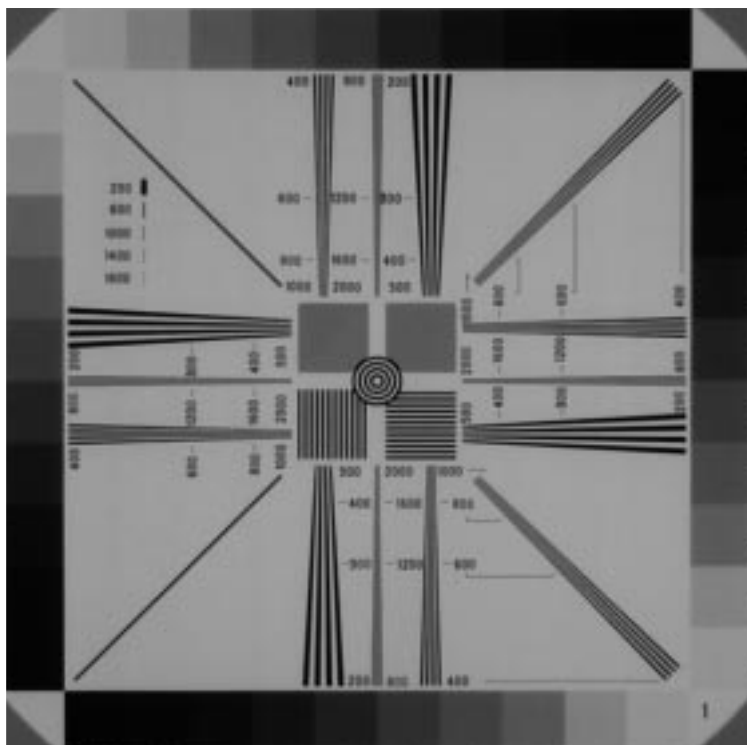
Sony is now planning timing generator ICs with built-in vertical drivers for driving these CCDs. These timing generator ICs will also support high-frame rate readout mode.

V O I C E

While I am often asked how a particular CCD device compares to silver chloride film, with these products I finally have the confidence to say that they are in no way inferior to the film. These devices provide resolution that is clearly superior to conventional megapixel CCDs. I strongly recommend that you base your next high-resolution/high-performance digital still camera design on one of these devices.

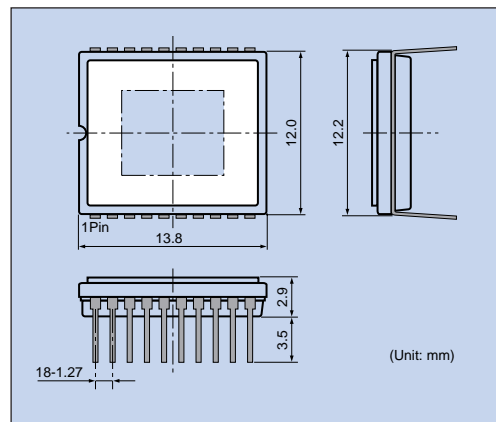


New Products

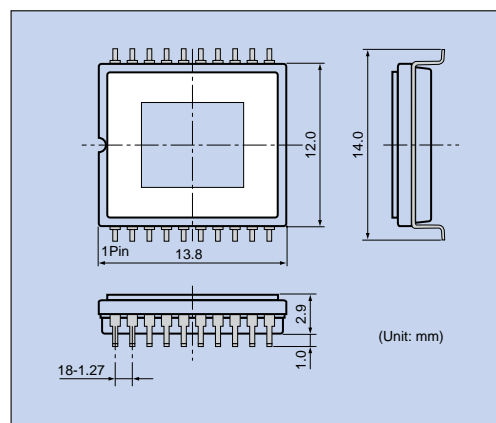


* This figure is an enlargement of a photograph of the central section of an "ITE High-Precision High-Resolution Chart."

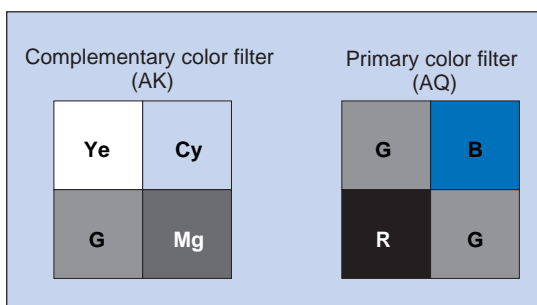
■ Photograph 1 Resolution Chart



■ Figure 1-1 Package Dimension (DIP)



■ Figure 1-2 Package Dimension (SOP)



■ Figure 2 Color Filter Arrangement

■ Table 1 Device Structure

Item	
Optical size	1/2 inch (8.0 mm diagonal)
Format	4 : 3
Transfer system	Frame readout interline transfer system
Total pixels	Approximately 2.11 million (1688H × 1248V)
Effective pixels	Approximately 2.02 million (1636H × 1236V)
Chip size	7.6 mm (H) × 6.2 mm (V)
Unit cell size	3.9 μm (H) × 3.9 μm (V) square pixels
Horizontal drive frequency	18 MHz
Package external dimensions	20-pin plastic DIP/SOP lead pitch 1.27 mm 13.8 mm (H) × 12.0 mm (V) × 2.9 mm (t) (excluding lead)

■ Table 2 Image Sensor Characteristics

Item	Typical values	Remarks
Sensitivity	ICX224AK: 350 mV (Y signal) ICX224AQ: 270 mV (G signal)	3200K, 706 cd/m ² , F5.6, 1/30 s accumulation
Sensor saturation signal	500 mV	During frame readout
Smear	Standard mode: -100 dB High frame rate readout mode: -88 dB	None when a mechanical shutter is used
Frame rate	Standard mode: 7.5 frame/s High frame rate readout mode: 30 frame/s	When operated at 18 MHz