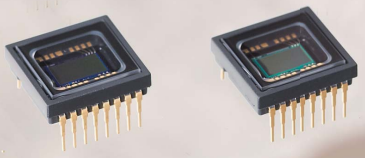
ICX692AQA/ ICX692AKA

Diagonal 6.0 mm (Type 1/3) 950K-Effective Pixel Color CCD Image Sensor for Security Cameras Support 720p High-Definition Output



The demand for high-definition output has grown ever stronger in recent years for IP network and other cameras in the security camera market.
To meet this need, Sony is now releasing the ICX692AQA (primary color filter model) and the ICX692AKA (complementary color filter model) progressive scan image sensors capable of rendering 720p high-definition output at 30 frame/s.
Sony's unique fine pixel fabrication technologies have made possible high sensitivity, a high saturation signal level and low smear while the "EXview HAD CCD II" structure provides high sensitivity also in the near infrared light region.

- Diagonal 6.0 mm (Type 1/3) 950K-effective pixel color CCD image sensor
- Progressive scan method
- 720p (1280 × 720) high-definition output at 30 frame/s
- High sensitivity, high saturation signal level and low smear
- Low power consumption

EXview HAD CCD II™

* "EXview HAD CCD II" is a trademark of Sony Corporation. The "EXview HAD CCD II" is a CCD image sensor that realizes sensitivity (typical) of 1000 mV or more per 1 μm² (Color: F5.6/BW: F8 in 1 s accumulation equivalent) and improves light efficiency by including near infrared light region as a basic structure of Sony's "EXview HAD CCD".

High Sensitivity, High Saturation Signal Level and Low Smear

A number of Sony's proprietary technologies used in developing the ICX692AQA and the ICX692AKA have led to significant improvements over the current Sony products, the ICX445AQA and the ICX445AKA (diagonal 6.0 mm (Type 1/3) 1.25M-effective pixel)*1. For example, sensitivity is now 2.1 times (+6.5 dB), saturation signal level (dynamic range) is 1.86 times (+5.4 dB) and smear characteristics have improved by 6 dB compared to the current products. (See table 2.) The vertical register, the readout gate and channel stop regions have all been optimized to raise the saturation signal level. These changes have maximized the sensor area that accumulates electric charges produced by photoelectric conversion raising saturation signal level by 1.86 times (+5.4 dB) over the current Sony products. Also, advances in fine fabrication technology have enabled changes in electrode wiring structure that lower the layer of the on-chip microlenses and improve light collecting efficiency. And photo shielding film reduces glare from light reflections.

When the lens diaphragm is opened up and a lower f-number is used, it controls the reduction in light collecting efficiency caused by changes in light incident angle.

Also, use of "EXview HAD CCD II" technology has improved high sensitivity in the near infrared light region. (See figure 1.) This sensor is ideal for nigh-time shooting and low-light photography using near infrared cameras. In addition, reducing the thickness of the oxide film below the photo shielding film has successfully diminished contamination of signals by smearing in the vertical register and raised smear characteristics to -110 dB.

*1: See the New Products section in CX-NEWS, Volume 44.

Low Power Consumption

The vertical registers in the ICX692AQA and the ICX692AKA are optimized from those employed in the current Sony products, the ICX445AQA and the ICX445AKA. As a result, electronic charge handling by the vertical registers and their charge transfer characteristics are maintained while lowering the voltage (from V_L-8.5 V to V_L-7.5 V) of the vertical transfer clock. Changes made in the electrode wiring structure of horizontal register to lower capacity between horizontal clocks have maintained charge transfer characteristics while lowering the voltage of the horizontal transfer clock (from 3.6 V to 3.3 V). As an additional benefit, this has reduced the voltage of the reset gate clock (from 3.6 V to 3.3 V) and cut power consumption.

V O I C E

The development of the ICX692AQA and the ICX692AKA involved numerous challenges, but the concerted efforts of the project team made it possible to bring it to a successful conclusion. The result is a CCD image sensor that will meet the needs of any security camera. We hope you will consider this sensor for your new products.

Figure 1 Spectral Sensitivity Characteristics

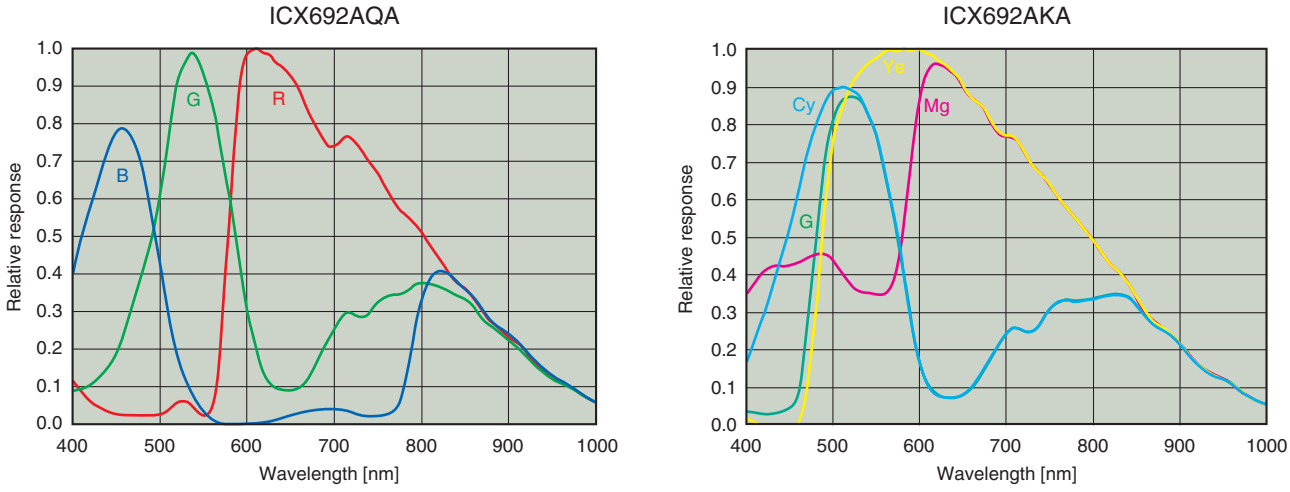


Table 1 Device Structure

Item		ICX692AQA	ICX692AKA	ICX445AQA*1	ICX445AKA*1
Color filter		Primary color (R, G, B)	Complementary color (Ye, Cy, Mg, G)	Primary color (R, G, B)	Complementary color (Ye, Cy, Mg, G)
Image size		Diagonal 6.0 mm (Type 1/3)	←	←	←
Transfer method		Progressive scan method	←	←	←
Total number of pixels		Approx. 1.0M (1348H × 746V)	←	Approx. 1.32M (1348H × 976V)	←
Number of effective pixels		Approx. 950K (1296H × 736V)	←	Approx. 1.25M (1296H × 966V)	←
Number of active pixels		Approx. 920K (1280H × 720V)	←	Approx. 1.23M (1280H × 960V)	←
Unit cell size		4.08 µm (H) × 4.08 µm (V)	←	3.75 µm (H) × 3.75 µm (V)	←
Optical blacks	Horizontal	Front: 12 pixels, rear: 40 pixels	←	←	←
	Vertical	Front: 8 pixels, rear: 2 pixels	←	←	←
Number of dummy bits		Horizontal (H): Front: 4 pixels Vertical (V): Front: 2 pixels	←	←	←
Horizontal drive frequency		36 MHz	←	←	←
Supply voltage V_{DD}/V_L (typical values)		15 V/–7.5 V	←	15 V/–8.5 V	←
Horizontal transfer clock voltage (typical values)/reset gate clock voltage (typical values)		3.3 V/3.3 V	←	3.6 V/3.6 V	←
Package		16-pin plastic DIP	←	24-pin plastic DIP	←

*1: Current Sony products

Table 2 Image Sensor Characteristics

Item		ICX692AQA	ICX692AKA	ICX445AQA*1	ICX445AKA*1	Remarks
Sensitivity (F5.6)	Typ.	800 mV [G signal]	1000 mV [Y signal = (Ye + Cy + Mg + G)/4]	380 mV [G signal]	460 mV [Y signal = (Ye + Cy + Mg + G)/4]	3200K, 706 cd/m² 1/30 s accumulation
Saturation signal	Min.	650 mV	650 mV	350 mV	350 mV	Tj = 60°C
Smear (F5.6)	Typ.	–110 dB	–110 dB	–104 dB	–104 dB	V/10 method

*1: Current Sony products