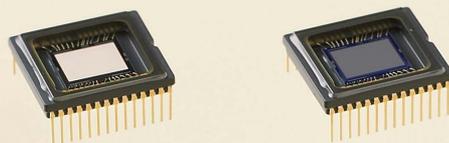


ICX687ALA/ ICX687AQA

Diagonal 8.918 mm (Type 1/1.8) 2.83M-Effective Pixel Black-and-White and Color CCD Image Sensors for Industrial Cameras with Full HD Pixel Count, High Sensitivity and Low Smear



The demand for higher pixel counts, compact size and high frame rates is growing stronger in the industrial and traffic monitoring camera markets.

Sony is now releasing the ICX687ALA (black-and-white) and ICX687AQA (color) 2.8M-pixel, 2-channel multi output, high sensitivity and low smear sensors with a full HD pixel count.

The ICX687ALA (black-and-white) and the ICX687AQA (color) can be integrated in a small, general use package when limited to an optical system with a diagonal size of 8.918 mm (Type 1/1.8) and 2-channel output.

This will reduce the size of products that manufacturers can incorporate the sensors into and enable use of numerous applications.

- Diagonal 8.918 mm (Type 1/1.8) 2.83M-effective pixel progressive scan method CCD image sensors
- Provides full HD pixel count
- High resolution, high sensitivity and low smear
- Extensive set of drive modes
- Compact device size (28-pin plastic DIP)

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 $1 \mu\text{m}^2$ (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".

The ICX687ALA and ICX687AQA are diagonal 8.918 mm (Type 1/1.8) 2.83M-effective pixel CCD image sensors designed for use in industrial and traffic monitoring cameras.

The new sensors have a higher pixel count, high frame rates and greatly enhanced features than the current ICX274AL/AQ.

High Resolution, High Sensitivity and Low Smear Characteristics

The ICX687ALA and the ICX687AQA provide a full HD pixel count at an optical size of Type 1/1.8 by reducing the unit pixel size from $4.40 \mu\text{m}$ in the current ICX274AL/AQ that have a similar optical system (diagonal 8.923 mm (Type 1/1.8) 2.01M-effective pixels) to $3.69 \mu\text{m}$.

Although the area occupied per pixel has been reduced by about 30% when compared to the current ICX274AL/AQ, the latest fine pixel processing technology and optimization of pixel pattern and light-collecting structure have increased sensitivity.

The smear characteristics are also 5 dB better than the current ICX274AL/AQ. This makes the new sensors high performance devices that combine high resolution and high sensitivity with low smear.

Use of the "EXview HAD CCD II" structure gives them high near infrared sensitivity making them suitable for day and night monitoring and near infrared shooting. They will meet the needs of a wide variety of camera applications. (See figure 1, figure 2, table 1 and table 2.)

Extensive Set of Drive Modes

Since the sensors are equipped with output circuits capable of high-speed processing, they can operate at a maximum horizontal

drive frequency of 54 MHz.

This means they can operate at high frame rates. In progressive scan mode, it is possible to individually output all pixels at a frame rate of 25 frame/s. Also, by changing the drive timing of the horizontal transfer register as required by the frame rate allows switching between 1-channel output and two horizontally split channels (multichannel output). (See figure 3.)

Compact Device Size

By limiting the number of output channels of the ICX687ALA and ICX687AQA to two channels the resulting reduction in pin numbers makes it possible to fit them in the same compact package (28-pin plastic DIP) as the current ICX625/655.

The smaller size of the sensors allows design of slim and compact products.

VOICE

To satisfy the market demand for higher pixel counts, compact size and high frame rates, we have developed two Type 1/1.8 CCD image sensors with 2.83M effective pixels and a full HD pixel count. Sony's fine fabrication technology makes possible high resolution, high sensitivity and low smear in compact products.

We hope you will consider these sensors, which are the result of the concentrated efforts of all the project members.

Figure 1 Enlargement of Photodiode Aperture Surface

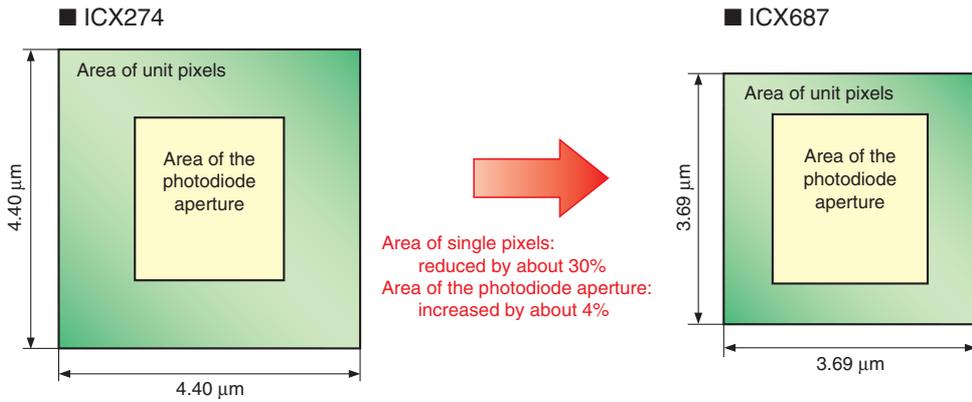


Figure 2 Pixel Array Structure

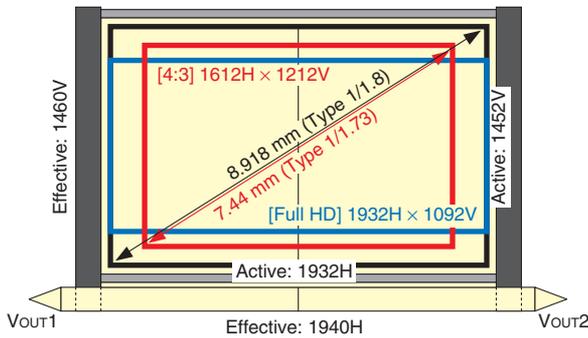


Figure 3 Output Channel Count /Frame Rate Relationship

Readout Modes

Drive mode	Output channels	Output pin Vout	Horizontal drive frequency [MHz]	Frame rate [frame/s]
Progressive scan Active: 1932H × 1452V	1	1	54	15
	2	1/2	↑	25
Vertical cropping Active: 1612H × 1212V Active: 1932H × 1092V	1	1	↑	18
	2	1/2	↑	30

Table 1 Device Structure

Item	ICX687ALA ICX687AQA	ICX274AL ICX274AQ
Image size	Diagonal 8.918 mm (Type 1/1.8)	Diagonal 8.923 mm (Type 1/1.8)
Transfer method	Progressive scan	Progressive scan
Total number of pixels	2020H × 1476V Approx. 2.98M pixels	1688H × 1248V Approx. 2.11M pixels
Number of effective pixels	1940H × 1460V Approx. 2.83M pixels	1628H × 1236V Approx. 2.01M pixels
Number of active pixels	1932H × 1452V Approx. 2.81M pixels	1620H × 1220V Approx. 1.98M pixels
Unit cell size	3.69 μm (H) × 3.69 μm (V)	4.40 μm (H) × 4.40 μm (V)
Optical blacks	Horizontal	Front: 40 pixels, rear: 40 pixels
	Vertical	Front: 8 pixels, rear: 8 pixels
		Front: 12 pixels, rear: 48 pixels
		Front: 10 pixels, rear: 2 pixels
Number of dummy bits	Horizontal, front: 1 pixel, rear: 1 pixel	Horizontal: 28 pixels, vertical: 1 pixel
Horizontal drive frequency	54 MHz	Typ.: 28.6364 MHz, max.: 36.0 MHz
Package	28-pin plastic DIP	20-pin plastic DIP

Table 2 Image Sensor Characteristics

Item	ICX687ALA ICX687AQA	ICX274AL ICX274AQ	Remarks
Sensitivity	Typ.	660 mV (F8.0) 580 mV (G signal, F5.6)	3200K, 706cd/m ² 1/30 s accumulation
		420 mV (F8.0) 420 mV (G signal, F5.6)	
Saturation signal	Min.	520 mV	T _j = 60°C
Smear	Typ.	-105 dB (F8.0) -105 dB (F5.6)	V/10 method
		-100 dB (F8.0) -100 dB (F5.6)	