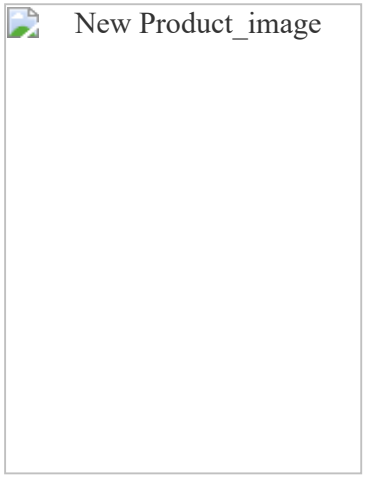
New Products



High-Resolution Diagonal 7.208 mm (Type 1/2.5) 7.24M-Effective Pixel Digital Still Camera CCDs for Consumer Products Support VGA Resolution Moving Picture Imaging

ICX629 Series [ICX629AQN/CQV/CQZ]

The compact digital still camera market is now seeing stronger demands for higher ISO sensitivities in addition to the earlier desires for higher resolution.
In particular, the market continues to demand evolution in image sensors in terms of both smaller pixels sizes and improved performance, i.e. higher sensitivity, wider dynamic range, and lower noise.
To respond to these needs, Sony has further improved their unique fine fabrication technologies to develop and now release the ICX629AQN/CQV/ CQZ diagonal 7.208 mm (Type 1/2.5) 7.24M-effective pixel interline CCDs.
These CCDs feature the industry's smallest unit pixel (1.86 µm) yet still achieve superb imaging qualities. These new products also include a horizontal and vertical pixel addition function that makes it possible for them to achieve 30 frame/s VGA resolution moving picture imaging.

ICX629 Series[ICX629AQN/CQV/CQZ]

* Diagonal 7.208 mm (Type 1/2.5), 7.24M effective pixels (3112H × 2328V)
* Pixel size: 1.86 µm unit pixel
* 5-field readout
* Supports 30 frame/s VGA moving picture imaging

Cameras with Type 1/2.5 optical size, good high-ISO sensitivity characteristics, and a resolution of 6M pixels or higher are expected to become the mainstream in the consumer digital still camera market.
Sony has led the industry in grasping this trend, and in addition to Type 1/2.5 6M-pixel CCDs (the ICX624 Series) is now releasing the high-performance 7M-pixel ICX629AQN/CQV/CQZ CCDs (the ICX629 Series), which are based on an even further evolution of Sony's unique fine fabrication technologies. (See table 1.)

Pixel Miniaturization

By miniaturizing the earlier 2.03 µm unit pixel to a 1.86 µm unit pixel size, which is the industry's smallest unit pixel, Sony has achieved a significant increase in the pixel count in the Type 1/2.5 CCD. At the same time, Sony maximized the sizes of the photodiode and the pixel aperture area (see figure 1), which determine the basic characteristics of the image sensor, to achieve high performance in the sensitivity, saturation signal level (dynamic range), and smear characteristics. As a result, even though the pixel area was reduced by 16% compared to the 2.03 µm unit pixel, Sony was able to

The basic characteristics were improved by about 20% on a per unit area basis from the 2.03 µm unit pixel CCDs by these pixel size reducing and basic characteristics improvement technologies. This allowed Sony to achieve equivalent or better sensitivity and saturation signal level characteristics than the earlier products. (See table 2.)

Open Source Output Circuit

In the ICX629 Series, Sony has moved some of the output circuit MOSFETs, which are the largest heat sources in the CCD, outside the chip to suppress noise during dark subject imaging. Thus the output pin circuits have an open source structure. (See figure 2.) This reduces the CCD internal heat generation and reduces the dark current generated from the pixels by about 10% compared to the earlier products.

Buffer IC

Sony provides the high-speed/low-power CXA3691EN as a buffer IC to handle the open source output circuits. It is thought that in the future, the open source output circuit will become standard as a noise reduction technology. We strongly recommend that you take advantage of the CXA3691EN along with the ICX629 Series CCDs in your next digital still camera product.

VOICE

•••• Mr. KANI ••••

Although we needed many trial and error steps in the development stage, all of the team members worked together to advance Sony's unique fine fabrication technology and we succeeded in breaking the 2.0 µm unit pixel size barrier while retaining high performance.
I strongly recommend that you take advantage of the trend-leading ICX629 Series devices.

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ICX629 Series
[ICX629AQN/CQV/CQZ]

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To respond to these needs, Sony has further improved their unique fine fabrication technologies to develop and now release the ICX629AQN/CQV/CQZ diagonal 7.208 mm (Type 1/2.5) 7.24M-effective pixel interline CCDs. These CCDs feature the industry's smallest unit pixel (1.86 µm) yet still achieve superb imaging qualities. These new products also include a horizontal and vertical pixel addition function that makes it possible for them to achieve 30 frame/s VGA resolution moving picture imaging.

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Pixel Characteristics

The basic characteristics were improved by about 20% on a per unit area basis from the 2.03 µm unit pixel CCDs by these pixel size reducing and basic characteristics improvement technologies. This allowed Sony to achieve equivalent or better sensitivity characteristics than the earlier products. (See table 2.)

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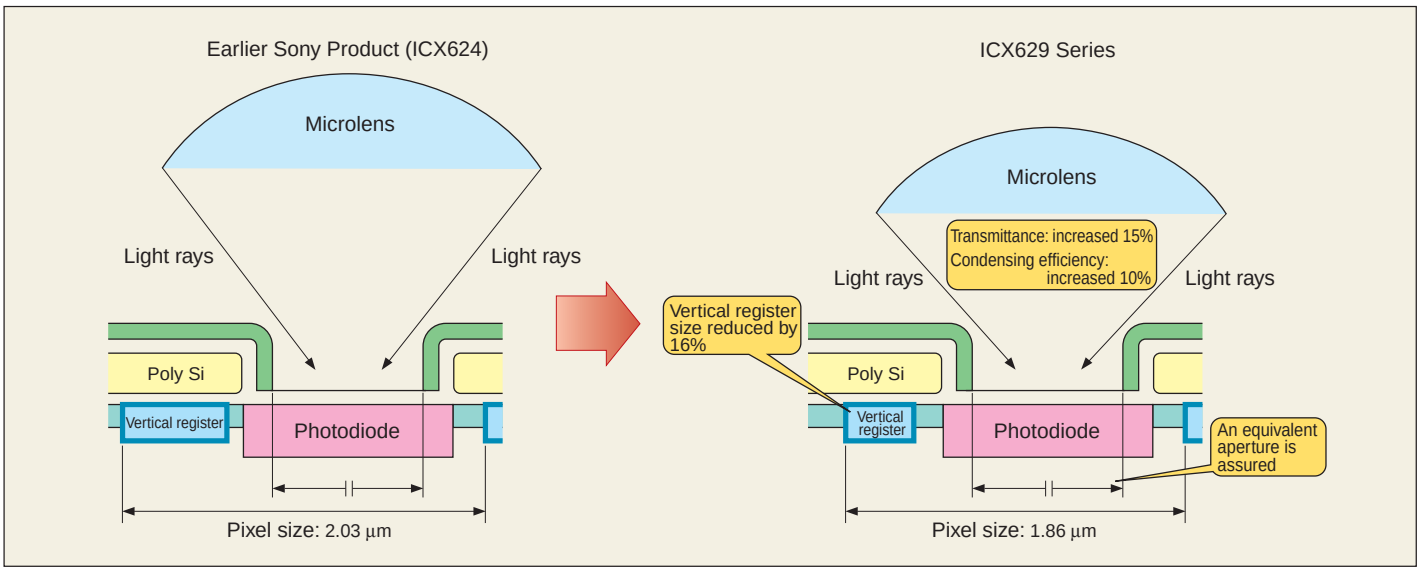
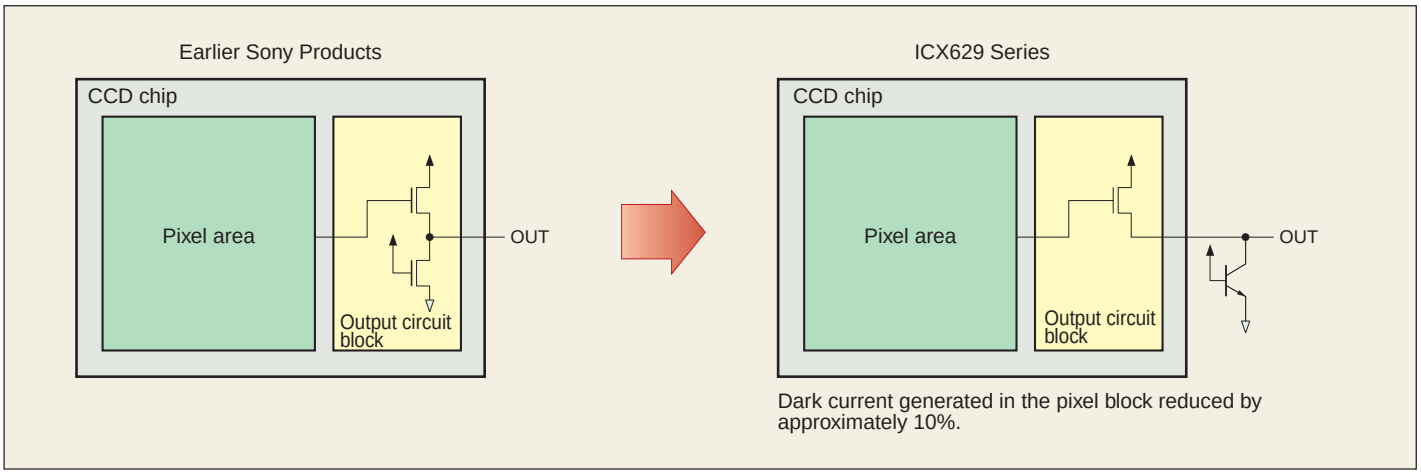


■ **Figure 1 Reducing the Pixel Size**



■ **Figure 2 Open Source Circuit Adopted**

■ **Table 1 Device Structure**

Item	ICX629 Series
Image size	Diagonal 7.208 mm (Type 1/2.5)
Transfer method	Frame readout interline transfer method
Readout method	5-field readout
Total number of pixels	Approx. 7.41M (3164H × 2342V)
Number of effective pixels	Approx. 7.24M (3112H × 2328V)
Number of active pixels	Approx. 7.20M (3104H × 2320V)
Number of recommended recording pixels (Aspect ratio: 4:3)	Approx. 7.08M (3072H × 2304V)
Unit cell size	1.86 µm (H) × 1.86 µm (V)
Horizontal drive frequency	33.75MHz
Package	AQN: 28-pin SOP (Plastic) CQV: 28-pin SON (Ceramic) CQZ: 27-pin QFN (Ceramic)

■ **Table 2 Image Sensor Characteristics**

Item		ICX629 Series	Remarks
Sensitivity (G signal)		170 mV (Typ.)	3200K, 706 cd/m^2, 1/30 s accumulation, F5.6
Saturation signal	Frame readout mode	420 mV (Min.)	Ta = 60°C, per pixel
	4/10-line readout mode*1	200 mV (Min.)	
	4/20-line readout mode*1	200 mV (Min.)	
Smear	Frame readout mode	–87 dB (Typ.)	None when a mechanical shutter is used, V/10 method, F5.6
	4/10-line readout mode	–79 dB (Typ.)	
	4/20-line readout mode	–73 dB (Typ.)	
Frame rate	Frame readout mode	3.33 frame/s	
	4/10-line readout mode*1	30 frame/s	Number of output lines: 466 lines*2
	4/20-line readout mode*1	60 frame/s	Number of output lines: 232 lines*2

*1: With horizontal addition
*2: During the horizontal addition operation, two lines of signal are output in a single horizontal period.