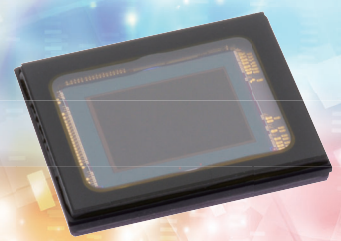
SONY

IMX226CQJ



Diagonal 9.33 mm (Type 1/1.7) 12.40M-Effective Pixel Color CMOS Image Sensor

Back-illuminated CMOS Image Sensor for Security Cameras and Industrial Applications Supports 4K High Resolution and High Sensitivity

Sony developed approximately 12.40M pixels back-illuminated CMOS image sensor, "IMX226CQJ", supporting Type 1/2 and 4K (approximately 17:9 ratio).

This image sensor has advantages in both high resolution and high sensitivity with back-illuminated structure 1.85 µm unit pixel, and suits for next generation of 4K security camera.

- Back-illuminated structure 1.85 µm unit pixel
- Higher resolution 4K video imaging mode (4096 H × 2160 V, 60 frame/s)
- Higher sensitivity and lower noise
- Favorable incident light angle characteristics and F-number dependency

Exmor R

* Exmor R is a registered trademark or trademark of Sony Group Corporation or its affiliates. The Exmor R is a Sony's CMOS image sensor with significantly enhanced imaging characteristics including sensitivity and low noise by changing fundamental structure of Exmor™ pixel adopted column parallel A/D converter to back-illuminated type.

STARVIS

* STARVIS is a registered trademark or trademark of Sony Group Corporation or its affiliates. The STARVIS is back-illuminated pixel technology used in CMOS image sensors for security camera applications. It features a sensitivity of 2000 mV or more per 1 µm² (color product, when imaging with a 706 cd/m² light source, F5.6 in 1 s accumulation equivalent), and realizes high picture quality in the visible-light and near infrared light regions.

Higher Resolution

The IMX226CQJ employs approximately 12.40M effective pixels and supports 12M (4:3 ratio) and 4K (approximately 17:9 ratio). High quality picture and fast video imaging is possible at 4K 60 frame/s with Type 1/1.9 approximately 9.03M pixels (approximately 17:9 ratio), and the specifications serve best for next generation of 4K high resolution security camera.

This image sensor provides higher quality picture and clearer imaging than full HD output image of the existing front-illuminated structure 3.75 µm unit pixel, the IMX185LQJ*1. (See photograph 1 and photograph 2.)

*1: See the New Products section released in 2013 August.

Higher Sensitivity and Lower Noise

For the image sensor with higher pixel counts supporting 4K video or other formats, the reduced pixel size might cause sensitivity deterioration, which is crucial for security camera purpose.
The IMX226CQJ has back-illuminated structure 1.85 µm unit pixel and achieves a big difference in its high sensitivity and low noise compared with the existing front-illuminated CMOS image sensor while it keeps 4K and the image size of Type 1/2.

Favorable Incident Light Angle Characteristics and F-number Dependency

The light collecting characteristics were optimized to maximize the light collecting efficiency of the back-illuminated structure. As a result, it obtained better conditions in incident light angle characteristics (See figure 1.) and F-number dependency (See figure 2.) than the existing IMX136LQJ*2 with front-illuminated structure 2.8 µm unit pixel.
These characteristics are extremely important for security camera which often opens lens diaphragm during night-time shooting. And at the lower F-number better low light performance is possible than front-illuminated structure 2.8 µm unit pixel, the IMX136LQJ. (See photograph 3.)
Also, optical characteristics of this magnitude mean that the sensor can handle high power zoom lenses.

*2 See the New Products section in CX-NEWS, Volume 68

＜Photograph 1＞ Resolution Comparison (2000 lx, 0 dB)

IMX226CQJ

Sony's existing IMX185LQJ

＜Photograph 2＞ Resolution Comparison (F11, 0 dB)

IMX226CQJ

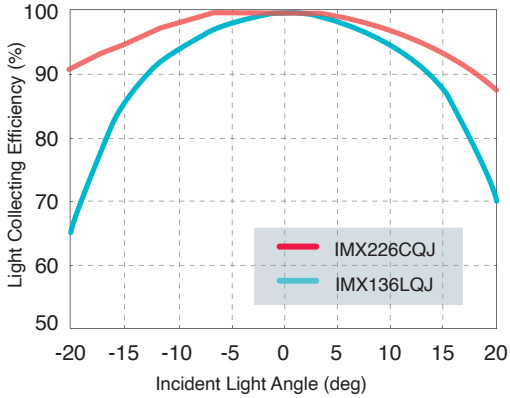
Sony's existing IMX185LQJ

＜Photograph 3＞ Low Light Sensitivity Comparison (0.68 lx, F0.95, 12 bit, 60 fps, 45 dB)

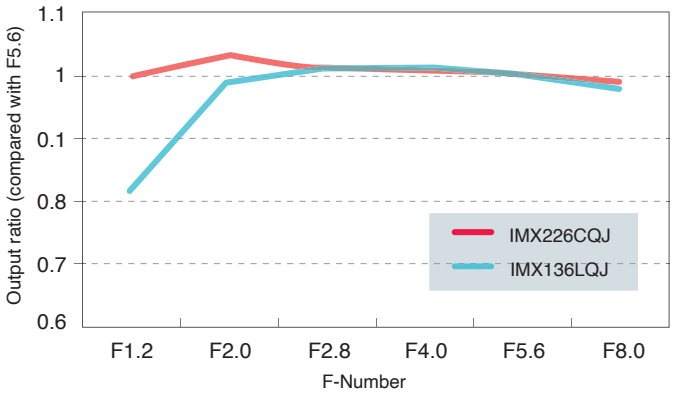
IMX226CQJ

Sony's existing IMX136LQJ

＜Figure 1＞Incident Light Angle Characteristics



＜Figure 2＞F-number Dependency



＜Table 1＞ Device Structure

Item		IMX226CQJ
Output image size		Diagonal 9.33 mm (Type 1/1.7) 12M 4:3 ratio Diagonal 8.61 mm (Type 1/1.9) 4K Approx. 17:9 ratio
Number of effective pixels		4072 (H) × 3046 (V) Approx. 12.40M pixels 4152 (H) × 2174 (V) Approx. 9.03M pixels
Unit cell size		1.85 µm (H) × 1.85 µm (V)
Optical blacks	Horizontal	Front: 96 pixels, rear: 0 pixels
	Vertical	Front: 16 pixels, rear: 0 pixels
Input drive frequency		72 MHz
Package		128-pin LGA
Supply voltage V_{DD} (Typ.)		2.9 V / 1.8 V / 1.2 V

＜Table 2＞ Image Sensor Characteristics

Item		Value	Remarks
sensitivity (F5.6)	Typ.	280 mV	1/30s accumulation
Saturation signal	Min.	810 mV	Tj = 60 °C

＜Table 3＞ Basic Drive Mode

Drive mode	Number of recommended recording pixels	ADC	Frame rate
12M 4:3 ratio	4000 (H) × 3000 (V) 12.00M pixels	10 bit	40 frame/s
		12 bit	35 frame/s
4K Approx. 17:9 ratio	4096 (H) × 2160 (V) Approx. 8.85M pixels	10 bit	60 frame/s
		12 bit	30 frame/s
Full HD	2048 (H) × 1080 (V) Approx. 2.21M pixels	10 bit	60 frame/s

Image Sensors for Security Cameras:
https://www.sony.net/cis-security/