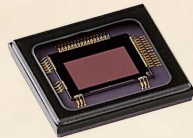


# IMX122LQJ

## Diagonal 6.4 mm (Type 1/2.8) 2.43M-Effective Pixel HD1080 p CMOS Image Sensor for Industrial Applications Achieves High Picture Quality under Low Illumination Due to High Sensitivity and High S/N Ratio



In recent years, there is an increasing demand for HD1080 p capability in CMOS image sensors for industrial applications. Sony has released the IMX122LQJ, a CMOS image sensor (Type 1/3 optical size) that provides HD1080 p high picture quality video output under low illumination thanks to high sensitivity and high signal-to-noise ratio.

The sensor features an improved pixel technology using diagonal 2.8  $\mu\text{m}$  square pixels, which has improved the signal-to-noise ratio by +8 dB over the current Sony products.

The compact and low profile package contributes to space saving when mounting.

- High sensitivity (425 mV typ.)
- High signal-to-noise ratio (+8 dB compared to existing Sony products)
- Supports HD1080 p and HD720 p
- Window cropping function
- Switchable I/O interface
- Built-in 10 and 12-bit A/D converters

### Exmor™

\* "Exmor" is a trademark of Sony Corporation. The "Exmor" is a version of Sony's high performance CMOS image sensor with high-speed processing, low noise and low power dissipation by using column-parallel A/D conversion.

#### High Sensitivity and Signal-to-Noise Ratio Characteristics

In the release of the IMX122LQJ CMOS image sensor, Sony has created a Type 1/3 highly sensitive CMOS image sensor that supports high speed operation of HD1080 p at 30 frame/s for industrial applications. The IMX122LQJ employs diagonal 2.8  $\mu\text{m}$  square pixel whose light collecting efficiency has been improved by better process technology while optimum pixel design has provided it with high picture quality due to high sensitivity and low noise.

In addition, it incorporates internal high-speed processing and circuit technology

to counteract fixed pattern noise to enable HD1080 p at 30 frame/s even in peripheral circuits. As a result, it delivers sensitivity characteristics of +6 dB and an signal-to-noise ratio of +8 dB when compared to our current Type 1/3 HD1080 p sensor. Our customers especially appreciate new product high sensitivity under low illumination and high picture quality due to its low noise .

This sensor also reduces random noise and fixed pattern noise at high temperatures.

#### HD1080 p Operation Mode

The demand for HD1080 p in industrial cameras is growing now and the demand for CMOS image sensors capable of 30 frame/s output in HD1080 p is equally strong.

Sony has now developed the IMX122LQJ image sensor, which achieve HD1080 p output at 30 frame/s with 10-bit/12-bit A/D conversion. And WUXGA (Wide Ultra Extended Graphics Array) resolution is adopted in an all-pixel scan mode to support UXGA (Ultra Extended Graphics Array) resolution at a 4:3 aspect ratio.

Furthermore, this sensor has other various functions for industrial applications, such as HD720 p mode or window cropping mode provide functions for changing the output pixel area.

#### Parallel/Serial Interface

The IMX122LQJ has two output interfaces, a

CMOS parallel output (max. 74.25M pixels/s) that is designed for flexible use to connect DSP and high-speed LVDS serial output (max. 648 Mbps/port), 1 port or 2 ports, that can be selected according to their usage conditions.

#### Compact and Low-Profile Package

The IMX122LQJ is integrated in a compact and low-profile LGA package (98-pin LGA) to meet the need for compact sensors in low-profile and compact devices.

This has reduced the chip size package by about 30% compared to the current Sony products and makes possible the design of compact devices. And its high temperature reflow (peak temperature: 240°C) characteristics facilitates mounting.

#### VOICE

In the development of the IMX122LQJ, our development team members worked together to create a product with both high sensitivity and low-noise characteristics.

The sensor enables shooting in low ambient lighting conditions where objects are invisible to the human eye, so we succeeded in our goal of creating a sensor that could exceed the human eye despite the small 2.8  $\mu\text{m}$  square pixel size that it employs.

I strongly recommend that you look into this image sensor with its high picture quality in your next product.

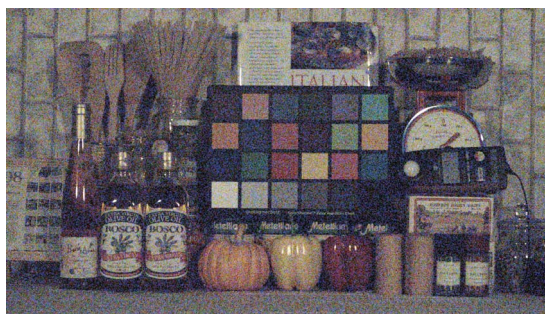
**Photograph 1** Sample Images (HD1080 p, 12-bit A/D converter mode, 30 frame/s)



2000 lx PGA built-in, 0 dB F5.6



20 lx PGA built-in, 24 dB F2.0



0.5 lx PGA built-in, 42 dB + rear-end gain 12 dB F2.0

**Table 1** Device Structure

Item	IMX122LQJ	
Image size	All-pixel scan mode: diagonal 6.4 mm (Type 1/2.8) HD1080 p mode: diagonal 6.23 mm (Type 1/2.9)	
Transfer method	All-pixel scan	
Total number of pixels	2000H × 1241V Approx. 2.48M pixels	
Number of effective pixels	1984H × 1225V Approx. 2.43M pixels	
Chip size	7.6 mm (H) × 5.8 mm (V)	
Unit cell size	2.8 μm (H) × 2.8 μm (V)	
Optical blacks	Horizontal	Front: 16 pixels, rear: 0 pixels
	Vertical	Front: 16 pixels, rear: 0 pixels
Horizontal drive frequency	54 MHz or 27 MHz 37.125 MHz (HD1080 p or HD720 p mode)	
Package	98-pin LGA	
Supply voltage $V_{DD}/V_L$ (typ.)	2.7 V / 1.8 V / 1.2 V	

**Table 2** Image Sensor Characteristics

Item	IMX122LQJ	Remarks
Sensitivity (F5.6)	Typ. 425 mV	3200K, 706 cd/m <sup>2</sup>
Saturation signal	Min. 812 mV	T <sub>j</sub> = 60°C

**Table 3** Drive Modes

Drive mode	Number of effective pixels	ADC	Frame rate
All-pixel scan	1984 (H) × 1225 (V) Approx. 2.43M pixels	10 bits	40/20 frame/s
		12 bits	20 frame/s
HD1080 p	1984 (H) × 1105 (V) Approx. 2.19M pixels	10 bits	30 frame/s
		12 bits	30 frame/s
HD720 p	1344 (H) × 733 (V) Approx. 0.98M pixels	10 bits	60/30 frame/s
		12 bits	30 frame/s
Mode 1	992 (H) × 551 (V) Approx. 0.55M pixels	10 bits	40/20 frame/s
Window cropping (UXGA)	1664 (H) × 1225 (V) Approx. 2.04M pixels	10 bits	40/20 frame/s
		12 bits	20 frame/s