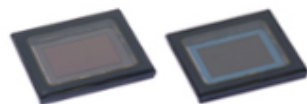


IMX174LLJ/IMX174LQJ

Diagonal 13.4mm (Type 1/1.2) 2.35M-Effective Pixel Black-and-White and Color CMOS Image Sensors



CMOS Image Sensors with Global Shutter Function for Industrial Use

In such cases where a high-speed moving subject is to be shot with standard CMOS Image sensors, focal plane distortion will occur and it might be a problem especially for the fields of industrial use. The new sensors feature a global shutter function and able to capture a high-speed moving image without focal plane distortion. Also the sensors have various functions including trigger mode or ROI (Region of interest) mode specially required in the fields of industrial use.

- Global shutter function

- High frame rate (10 bit 164.5 frame/s, 12 bit 128.2 frame/s)

- ROI mode (able to set at a maximum of 16 areas)

- Trigger mode (able to control accumulation time by external pulse)

- A variety of operating modes (V inversion output and multiple frame set output mode)

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.

Precious

* Pregius is a trademark of Sony Corporation. The Pregius is global shutter pixel technology for active pixel-type CMOS image sensors that use Sony's low-noise CCD structure, and realizes high picture quality.

Global Shutter Function

For industrial use, it is required to capture the exact shape of a high-speed moving subject. The existing CMOS image sensors have a rolling shutter as the electronic shutter function; therefore, focal plane distortion was inevitable in principle. A new pixel with analog memory was developed for the IMX174LLJ/LQJ and eliminated generation of the focal plane distortion by enabling to scan all pixel signals at once (referred to as "global shutter function" below). (See [moving image 1](#).) The sensors accomplished high-picture quality combining with the column-parallel A/D conversion technology used for the existing Sony's CMOS Image sensors. (See [photograph 1](#).)

High Frame Rate

For industrial use, it is required to capture the sequence of high-speed moving subject; therefore, frame rate is equally important as global shutter function. The IMX174LLJ/LQJ optimized the internal circuit and adopted LVDS 8ch output, and then realized high-speed imaging by achieving high frame rate with a maximum 164.5 frame/s using 10 bit ADC, and with a maximum 128.2 frame/s using 12 bit ADC. (See [table 3](#).)

ROI Mode

To meet market needs, there is a requirement to capture moving subject only in partial areas rather than a whole image view angle. ROI mode makes this possible. The IMX174LLJ/LQJ have the ROI mode and able to set at a maximum of 16 areas inside the effective pixels and output cropped partial pictures out of the image view angle. Also, since ROI mode scans less pixel count, even higher frame rate is achievable. (See [photograph 2](#).)

Trigger Mode

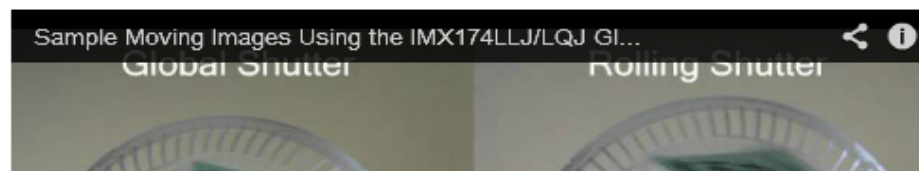
The IMX174LLJ/LQJ are equipped with trigger mode, and the external pulse can control accumulation time. The sensors also have a pulse output function to indicate respective conditions during shutter operation and can be coordinated with peripheral circuits.

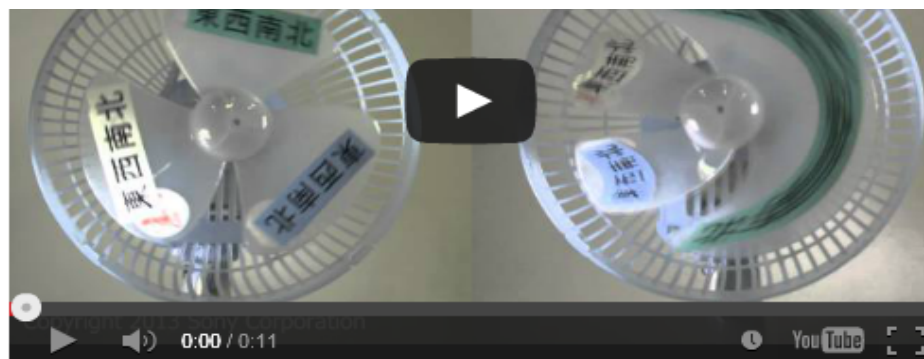
A Variety of Operating Modes

The IMX174LLJ/LQJ have internal register settings which can switch vertical scan direction (normal/inverted) of the sensors and support 2 frame set output mode utilizing high-speed frame rate. In this 2 frame set output mode, separate exposure time can be set for 2 consecutive frames, and each set of 2 frames can be handled as 1 set to automatically output consecutive images. This mode can generate a picture with a wide dynamic range as a result of the combination of multiple frames. Also the sensors support all-pixel scan (WUXGA), including UXGA, and full HD scan mode as the image data output format.

*If the mouse cursor changes over the photo, you can click to see the larger version in a new window.

Moving Image 1 Sample Moving Images





IMX174LQJ
Global Shutter

The existing type
Rolling Shutter

Photograph 1 Sample Images

Condition: 2000 lx F5.6 (UXGA image ADC 12 bit mode, 60 frame/s, internal gain 0 dB)



IMX174LLJ



IMX174LQJ

Photograph 2 ROI Mode Cropping Images

Condition: 2000 lx F5.6 (UXGA image ADC 12 bit mode, 60 frame/s, internal gain 0 dB)



ROI mode
Cropping areas



ROI mode
After cropped

Table 1 Device Structure

Item		IMX174LLJ/IMX174LQJ
Image size		Diagonal 13.4 mm (Type 1/1.2) (WUXGA mode) Diagonal 11.9 mm (Type 1/1.35) (UXGA mode) Diagonal 13.0 mm (Type 1/1.23) (full HD mode)
Number of effective pixels		1936 (H) × 1216 (V) Approx. 2.35M pixels
Unit cell size		5.86 μm (H) × 5.86 μm (V)
Optical blacks	Horizontal	Front: 0 pixels, rear: 0 pixels
	Vertical	Front: 10 pixels, rear: 0 pixels
Input drive frequency		37.125 MHz / 74.25 MHz
Package		118-pin LGA
Power supply voltage VDD (Typ.)		3.3 V / 1.8 V / 1.2 V

Table 2 Image Sensor Characteristics

Item		IMX174LLJ	Remarks
Sensitivity (F8)	Typ.	825 mV	1/30s accumulation
Saturation signal	Min.	850 mV	Tj = 60°C

Table 3 Basic Drive Mode

Drive mode	Number of recommended recording pixels	ADC	Frame rate (Max.)
All-pixel scan (WUXGA)	1920 (H) × 1200 (V) Approx. 2.30M pixels	10 bit	164.5 frame/s
		12 bit	128.2 frame/s
UXGA	1600 (H) × 1200 (V) Approx. 1.92M pixels	10 bit	164.5 frame/s
		12 bit	128.2 frame/s
Full HD	1920 (H) × 1080 (V) Approx. 2.07M pixels	10 bit	120.0 frame/s
		12 bit	120.0 frame/s

*Sony reserves the right to change products and specifications without prior notice.

VOICE



Mr. Hayashi Mr. Iwamoto Mr. Yamada
Mr. Suenaga Mr. Fukumoto

The IMX174LLJ/LQJ are CMOS image sensors featuring a global shutter function developed for industrial use for the first time, and the product team put their best efforts to meet market demands. Please feel the excellence of the IMX174LLJ/LQJ providing high-picture quality and high-speed imaging without distortion.

