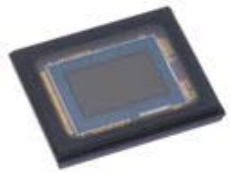
IMX185LQJ

Diagonal 8.58 mm (Type 1/1.9) 2.38M-Effective Pixel Color CMOS Image Sensor



Type 1/2 Full HD CMOS Image Sensor for Security Cameras and Industrial Applications Achieves High Sensitivity

Sony developed optical size type 1/2 full HD CMOS image sensor for industrial applications, "IMX185LQJ". The sensor uses the technology from the EXview HAD CCD*1, and significantly improved the sensitivity in the near infrared light region. Newly developed 3.75 µm unit pixel was adopted to have high sensitivity and high signal-to-noise ratio. Also the near infrared sensitivity improved approximately 1.8 times compared to the existing products, "IMX104LQJ"*2, using 3.75 µm unit pixel. The data output with the versatile connection interface gives options to customers to suit their operating conditions.

*1: "EXview HAD CCD" is a trademark of Sony Corporation.
*2: See the New Products section in CX-NEWS, Volume 68.

- High sensitivity characteristics: (sensitivity 1120 mV)
- Improved near infrared sensitivity: (1.8 times compared to the existing product)
- Supporting optical size type 1/2 full HD

- High frame rate: (10 bit 120 frame/s, 12 bit 60 frame/s)

- Versatile output interface: (low-voltage LVDS parallel, serial, and CSI-2 serial)

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.

Improved Sensitivity in the Visible Light and the Near Infrared Light

High picture quality at the low illumination is requested for security camera industry. In recent years, sensitivity in the near infrared light is also recognized of increasing weight. Responding to this demand, Sony developed 3.75 µm unit pixel and improved the sensitivity both in the visible light and the near infrared light.
Process technology specialized for industrial applications and newly developed pixel technology decreased characteristics degradation to significantly improve the sensitivity in the visible light and the near infrared light. This enables to identify objects clear enough even in the starlight or moonlight shooting. Even in the case of near infrared light LED used as auxiliary light, high picture quality imaging is possible.

Supporting Type 1/2 Full HD Format

The IMX185LQJ is a CMOS image sensor for industrial applications supporting optical size type 1/2 full HD for the first time.
Combination of the type 1/2 optical system and newly developed pixels, characteristics at the low illumination showed a big improvement compared with the existing product, optical size type 1/2.9 full HD "IMX136LQJ"*3.

*3: See the New Products section in CX-NEWS, Volume 68.

Frame Rate

Movie recording performance of the IMX185LQJ achieves up to 120 frame/s in 10 bit A/D conversion mode, and up to 60 frame/s in 12 bit A/D conversion mode. Optimization of the pixel and peripheral circuit at high-speed processing reduces fixed patterned noise and minimizes imaging degradation with increasing temperature.

Output Interface

The IMX185LQJ supports CSI-2 (2 lane/4 lane, RAW10, and RAW12) addition to the existing low-voltage LVDS parallel and low-voltage LVDS serial (selectable from 2 ch or 4 ch). The versatile output interface provides customers with options to suit their operating conditions.
Furthermore, it is pin compatible with the optical size type 1/2 5M-Effective pixel CMOS image sensor, "IMX178LQJ"*4, which simplifies making additions to the lineup in the type 1/2 optical system series.

*4: For details on the IMX178LQJ, see the New Products section of this volume.

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

Photograph 1 Sample Images (full HD ADC 12 bit mode, 60 frame/s)

500 lx internal gain 12 dB F5.6

1 lx internal gain 38 dB F1.4

Photograph 2 Comparing Low-light Picture Quality (full HD ADC 12 bit mode, 60 frame/s)

IMX185LQJ

IMX136LQJ

Table 1 Device Structure

Item		IMX185LQJ
Image size		Diagonal 8.58 mm (Type 1/1.9)
Transfer method		All-pixel scan
Number of effective pixels		1945 (H) × 1225 (V) Approx. 2.38M pixels
Unit cell size		3.75 µm (H) × 3.75 µm (V)
Optical blacks	Horizontal	Front:4 pixels, rear: 0 pixels
	Vertical	Front:16 pixels, rear: 0 pixels

Input drive frequency	54 MHz/27 MHz/74.25 MHz/37.125 MHz
Package	128-pin LGA
Supply voltage V_{DD} (Typ.)	3.3 V/1.8 V/1.2 V

Table 2 Image Sensor Characteristics

Item		IMX185LQJ	Remarks
Sensitivity (F5.6)	Typ.	1120 mV	1/30s accumulation
Saturation signal	Min.	1440 mV	Tj = 60°C

Table 3 Basic Drive Mode (at low voltage LVDS parallel output)

Drive mode	Number of recommended recording pixels	ADC	Frame rate (Max.)
All-pixel scan	1920 (H) × 1200 (V) Approx. 2.3M pixels	10 bit	100 frame/s
		12 bit	50 frame/s
Full HD	1920 (H) × 1080 (V) Approx. 2M pixels	10 bit	120 frame/s
		12 bit	60 frame/s

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

V O I C E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To satisfy the recent market demand for performance at low illumination and high near infrared sensitivity, the project members worked on this development of the IMX185LQJ. At the result, we completed full HD CMOS image sensor with higher performance at low illumination and higher near infrared sensitivity than ever before. Be sure to consider Sony's type 1/2 CMOS image sensors with the IMX185LQJ at the top of the list.