SONY

Ver.1.0

IMX533CQK-D

Diagonal 15.968 mm (Type 1) CMOS Image Sensor with Square Pixel for Color Cameras

Description

The IMX533CQK-D is a diagonal 15.968 mm (Type 1) CMOS image sensor with a color square pixel array and approximately 9.07 M effective pixels. This sensor incorporates maximum 36 dB PGA circuit and 14-bit A/D converter. 14-bit digital output makes it possible to readout the signals of 9.07 M effective pixels at high-speed of 26.9 frame/s in still picture mode. In addition, it realizes 12-bit digital output at high-speed of 63.6 frame/s.
The quality and reliability of this product are also the surveillance use application range. This quality and reliability range should be kept in mind when using this product for other than surveillance use applications. Consult your Sony Semiconductor Solutions Corporation sales representative if you have any questions.

Features

- Type 1 CMOS active pixel type pixels
- Square 1:1 aspect ratio
- Input clock frequency 72 MHz
- All-pixel readout mode
  Various readout modes (*)
- Rolling shutter function moving picture mode
- H driver, V driver and serial communication circuit on chip
- +36 dB gain in CDS/PGA on chip (when A/D 14-bit, 12-bit)
- Built-in 11-bit/12-bit/14-bit A/D converter
- 8 Lane SLVS-EC output, baud rates of 2.304 / 1.152 Gbps are supported
- Multi Camera Function (chip ID up to six)
- Gyro data insertion function (Insert data from Gyro IC into frame data)
- H/V direction inverted readout mode
- Back-illuminated type
- R, G, B primary color mosaic filter on chip

* Please refer to the datasheet for binning/subsampling details of readout modes.

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 μm^2 (color product, when imaging with a 706 cd/m^2 light source, F5.6 in 1 s accumulation equivalent), and realizes high picture quality in the visible-light and near infrared light regions.

Device Structure

- ◆CMOS image sensor
- ◆Image size — Diagonal 15.968 mm (Type 1)
- ◆Total number of pixels — 3015 (H) × 3080 (V) approx. 9.286 M pixels
- ◆Number of effective pixels — 3011 (H) × 3011 (V) approx. 9.066 M pixels
- ◆Number of active pixels — 3003 (H) × 3003 (V) approx. 9.018 M pixels
- ◆Chip size — 15.469 mm (H) × 16.375 mm (V)
- ◆Unit cell size — 3.76 µm (H) × 3.76 µm (V)
- ◆Optical black — Horizontal (H) direction: Front 0 pixel, Rear 0 pixel
  Vertical (V) direction: Front 12 pixels, Rear 0 pixel
- ◆Package — 178 pin LGA

Image Sensor Characteristics

(Tj = 60 °C)

Item		Value	Remarks
Sensitivity (F5.6)	Typ.	6210 LSB	1/30 s integration
Saturation signal	Min.	16382 LSB	

Basic Drive Mode

Readout Drive Mode (1/2)

Drive mode	Number of active pixels	Max frame rate [frame/s]	Output data bit length [bit]
Readout mode 0	3003 (H) × 3003 (V) approx. 9.018 M pixels	26.90	14
Readout mode 0N	3003 (H) × 3003 (V) approx. 9.018 M pixels	12.65	14
Readout mode 1	3003 (H) × 3003 (V) approx. 9.018 M pixels	63.63	12
Readout mode 1N	3003 (H) × 3003 (V) approx. 9.018 M pixels	27.67	12
Readout mode 4	1501 (H) × 1501 (V) approx. 2.253 M pixels	63.42	12
Readout mode 5	1501 (H) × 1501 (V) approx. 2.253 M pixels	126.67	12
Readout mode 7	999 (H) × 999 (V) approx. 0.998 M pixels	189.01	12
Readout mode 8	999 (H) × 999 (V) approx. 0.998 M pixels	188.64	12
Readout mode 11	999 (H) × 599 (V) approx. 0.598 M pixels	406.05	10
Readout mode 12	999 (H) × 599 (V) approx. 0.598 M pixels	406.05	10
Readout mode 13	999 (H) × 427 (V) approx. 0.427 M pixels	561.94	10
Readout mode 14	999 (H) × 427 (V) approx. 0.427 M pixels	561.94	10
Readout mode 15	999 (H) × 331 (V) approx. 0.331 M pixels	715.19	10
Readout mode 16	999 (H) × 331 (V) approx. 0.331 M pixels	715.19	10
Readout mode 17	999 (H) × 227 (V) approx. 0.227 M pixels	1015.11	10
Readout mode 18	999 (H) × 227 (V) approx. 0.227 M pixels	1015.11	10

Readout Drive Mode (2/2)

Drive mode	Number of active pixels	Max frame rate [frame/s]	Output data bit length [bit]
Readout mode 0F	3003 (H) × 3003 (V) approx. 9.018 M pixels	32.63	14
Readout mode 2F	3003 (H) × 3003 (V) approx. 9.018 M pixels	76.35	10
Readout mode 4F	1501 (H) × 1501 (V) approx. 2.253 M pixels	82.49	10
Readout mode 5F	1501 (H) × 1501 (V) approx. 2.253 M pixels	164.76	10
Readout mode 7F	999 (H) × 999 (V) approx. 0.998 M pixels	245.85	10
Readout mode 8F	999 (H) × 999 (V) approx. 0.998 M pixels	245.37	10

Readout Drive Mode (DOL)

Drive mode	Number of active pixels	Max frame rate [frame/s]	Output data bit length [bit]
DOL- 0	3003 (H) × 3003 (V) approx. 9.018 M pixels	13.38	14
DOL- 1	3003 (H) × 3003 (V) approx. 9.018 M pixels	31.64	12
DOL- 2	3003 (H) × 3003 (V) approx. 9.018 M pixels	37.97	10
DOL- 6	1501 (H) × 1501 (V) approx. 2.253 M pixels	62.67	12
DOL- 9	999 (H) × 999 (V) approx. 0.998 M pixels	93.05	12
DOL- 10	999 (H) × 999 (V) approx. 0.998 M pixels	92.78	12
DOL- 6F	1501 (H) × 1501 (V) approx. 2.253 M pixels	81.52	10
DOL- 9F	999 (H) × 999 (V) approx. 0.998 M pixels	121.03	10
DOL- 10F	999 (H) × 999 (V) approx. 0.998 M pixels	120.68	10

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