

Ver.1.0

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

Description

The IMX533CLK is a diagonal 15.968 mm (Type 1) CMOS image sensor with a 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 industrial camera use application range. 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 per lane 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

* 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 $1 \mu\text{m}^2$ (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.

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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 20.0 mm (H) × 20.0 mm (V)

Image Sensor Characteristics

(T_j = 60 °C)

Item		Value	Remarks
Sensitivity	Typ.	5094 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]	Word 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]	Word 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]	Word 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

