

Diagonal 5.867 mm (Type 1/3.06) 13Mega-Pixel CMOS Image Sensor with Square Pixel for Color Cameras

IMX135-xxW

General description and application

IMX135xxx is a diagonal 5.867 mm (Type 1/3.06) 13 Mega-pixel CMOS active pixel type stacked image sensor with a square pixel array. It adopts Exmor-R™ technology to achieve high speed image capturing by column parallel A/D converter circuits and high sensitivity and low noise image (comparing with conventional CMOS image sensor) through the backside illuminated imaging pixel structure. "RGBW coding" color filter is employed and RGB primary color mosaic is reproduced on chip. High sensitivity, low dark current and smear-free features are achieved. It equips an electronic shutter with variable integration time. It operates with three power supply voltages: analog 2.7V, digital 1.05V and 1.8V for input/output interface and achieves low power consumption (comparing with CCD sensors). This product is designed for use in mobile phone application. The quality and reliability of this product cannot be guaranteed when used in applications other than mobile phones. Please consult with your Sony sales representatives if you have any question.

Functions and Features

- ◆ Back-illuminated and stacked type CMOS image sensor "Exmor-R™"
- ◆ 2-wire serial communication circuit on chip
- ◆ CSI-2 serial data output (2Lane/4Lane selectable) on chip
- ◆ Timing generator, horizontal(H) and vertical(V) driver circuits on chip
- ◆ CDS/PGA on chip
- ◆ 10-bit A/D converter on chip
- ◆ Automatic optical black (OB) clamp circuit on chip
- ◆ Two PLL on chip (independent clock generation for pixel control and data output I/F)
- ◆ High sensitivity, low dark current, no smear, excellent anti-blooming characteristics
- ◆ Variable-speed shutter function (Minimum unit: One horizontal sync signal period)
- ◆ RGBW coding (R,G,B, and "White"(achromatic)) color filter and RGB primary color mosaic reproduction on chip
- ◆ Supports external mechanical shutter
- ◆ Flash control pulse generation function
- ◆ Max. 24.01 frame/s in all-pixel scan mode
- ◆ Pixel rate: 360 MHz (all pixels, 4Lane, 24 frame/s)
- ◆ Supports 720/60 p, 1080/30 p, 1080/60 p drive ※NOTE
- ◆ Up/down and/or right/left inversed readout function
- ◆ Pixel binning readout function
- ◆ Image cutout function
- ◆ OTP ROM (One Time Programmable Read Only Memory) 8K-bit for user, 10K-bit as a whole
- ◆ Power-on reset function
- ◆ Power-on sequence free
- ◆ Image compensation processing functions (defect correction, noise reduction)
- ◆ High Dynamic Range(HDR) and tone reproduction in movie mode

NOTE) Please ask about the details of a required register.



* "Exmor R" is a trademark of Sony Corporation. The "Exmor R" is a Sony's CMOS image sensor with significantly enhanced imaging characteristics including sensitivity and low noise by changing fundamental structure of "Exmor" pixel adopted column parallel A/D converter to back-illuminated type.

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Application circuits shown, if any, are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits.

Device Structure

- ◆ CMOS image sensor
- ◆ Image size : Diagonal 5.867 mm (Type 1/3.06)
- ◆ Total number of pixels : 4224 (H) × 3176 (V) approx. 13.42 M pixels
- ◆ Number of effective pixels : 4224 (H) × 3136 (V) approx. 13.25 M pixels
- ◆ Number of active pixels : 4208 (H) × 3120 (V) approx. 13.13 M pixels
- ◆ Chip size : 5.940 mm (H) × 4.280 mm (V)
- ◆ Unit cell size : 1.12 μm (H) × 1.12 μm (V)
- ◆ Substrate material : Silicon

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	notes
Supply voltage (analog)	VANA	-0.3to+3.3	V	refer to Vss level
Supply voltage (digital)	VDIG	-0.3to+1.8	V	
Supply voltage (interface)	VIF	-0.3to+3.3	V	
Input voltage (digital)	VI	-0.3to+3.3	V	
Output voltage (digital)	VO	-0.3to+3.3	V	
Guaranteed Operating temperature	TOPR	-20to+60	°C	
Guaranteed storage temperature	TSTG	-30to+80	°C	
Guaranteed performance temperature	TSPEC	-20to+60	°C	

Recommended Operating Voltage

Item	Symbol	Ratings	Unit	notes
Supply voltage (analog)	VANA	2.7+0.2/-0.1 V	V	refer to Vss level
Supply voltage (digital)	VDIG	1.05±0.1	V	
Supply voltage (interface)	VIF	1.8±0.1	V	