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1/2.9-inch 8 MP CMOS Digital Image Sensor

AR0830

General Description

The **onsemi** AR0830 is a stacked 1/2.9-inch back side illuminated (BSI) CMOS active-pixel digital image sensor with a pixel array of 3840Hx2160V (3856H x 2176V including border pixels). The AR0830 has enhanced NIR response.

It incorporates sophisticated on-chip camera functions such as Wake on Motion (WOM), context switching and multiple subsampling modes. It is programmable through a simple I²C interface and has very low power consumption.

The AR0830 digital image sensor features **onsemi**'s breakthrough low-noise CMOS imaging technology.

The AR0830 sensor can generate full resolution image at up to 60 frames per second (fps) in 10-bit linear mode. AR0830 can achieve 30 fps in line interleaved high dynamic range (LI-HDR) and enhanced Dynamic Range (eDR) modes.

Features

- 8 MP CMOS Sensor with Advanced 1.4 μm Pixel Stacked BSI Technology
- Enhanced NIR Response at 850 nm and 940 nm Wavelength
- LI-HDR: Supports Line Interleaved T1/T2 Readout to Enable HDR Processing in ISP Chip
- enhanced Dynamic Range (eDR)
- Super Low Power Mode (SLP)
- Wake On Motion (WOM)/Motion Detection
- Subsampling Modes: Skipping, Binning, Summing
- Data Interfaces:
 - ♦ MIPI D-PHY 4 Lanes
- Bit-depth Compression Available for MIPI Interface
- I²C Fast Mode+ Serial Interface (I²C)
- Various Trigger Modes for Multi-sensor Synchronization
- Electronic Rolling Shutter (ERS) and Global Reset Release (GRR)
 Modes Supported
- Context Switching
- 800 bytes One-time Programmable Memory (OTPM) for Storing Shading Correction Coefficients and Module Information
- Programmable Controls: Gain, Horizontal and Vertical Blanking, Frame Size/Rate, Exposure, Window Size, Cropping and Mirror and Flip

1

- On-chip Temperature Sensor
- Simple Two-wire Fast-mode+ Serial Interface
- On-chip Lens Shading Correction



ORDERING INFORMATION

See detailed ordering and shipping information on page 3 of this data sheet.

Non-NDA Data Sheet

Interested in what you see? If you would like more detailed information, please request the full version of our data sheet.

Request Full Data Sheet

Applications

- Videoconferencing Endpoints
- Webcams
- Machine Vision Cameras
- Video Doorbells
- Security Cameras
- Retail In-store Cameras, Bodycams, etc.
- 3D and Stereo Cameras

AR0830

Table 1. KEY PERFORMANCE PARAMETERS

Parameter		Value	
Optical Format		1/2.9-inch 8 MP (16:9)	
Active Pixels		3840 x 2160	
Pixel Size		1.4 μm Back Side Illuminated (BSI),	
Chief Ray Angl	e (CRA)	11°, 35°	
Color Filter Arra	ay	RGB Bayer, RGB-IR, Monochrome	
Input Clock Fre	equency	6-48 MHz	
Interface		4-lane MIPI (1- and 2-lane supported) using D-PHY; Max data rate: 1.5 Gbps/lane	
ADC Resolution	n	10-bits, on die	
Gain Control: G	Gain Table	Linear Mode: 0-53.6 dB total (Analog 0-27.3 dB, Digital 0-26.3 dB)	
Subsampling		Subsampling: Skipping (RGB, Mono), Binning (RGB), Summing (Mono) (Note 2)	
Temperature Se	ensor	10-bit, controlled by two-wire serial I/F	
Frame Rate Full Size, Linear Mode		60 fps (MIPIx4), 30 fps (MIPIx2)	
Compression		DPCM: 10-8	
3D Support		Frame rate and exposure synchronization	
Supply Volt-	Analog, Pixel	2.8 V (2.7 V < V _{supply} < 2.9 V)	
age	I/O	1.8 V (1.7 V < V _{supply} < 1.9 V)	
	PLL, MIPIphy	1.05 V (1 V < V _{supply} < 1.1 V)	
Power Consum	ption	190 mW (Typical condition) at 8M and 60 fps	
Responsivity		17.3 ke-/lux-sec (Clear in Mono) 8.0 ke-/lux-sec (Green in RGB-IR) 8.7 ke-/lux-sec (Green in RGB)	
SNR _{MAX}		39.9 dB	
Dynamic Range	е	100 dB (LI-HDR Mode) 73 dB (eDR 1-exp)	
Operating Temperature Range (at junction) – T _J		-30°C to +85°C	
Optimal Performance Temperature Range (at junction) – T _J		0°C to +60°C	
Package Options:		CSP-59 (6.42 mm x 3.92 mm)	
θ_{JA}		30°C/W (Note 1)	
θ_{JB}		6°C/W	

^{1.} θ_{JA} is dependent on the customer module design and should not be used for calculating junction temperature. 2. Subsampling modes are not available for AR0830 RGBIR sensors.

AR0830

Table 2. 10-bit MODES OF OPERATION

Mode Name	Mode Description	Resolution	Frame Rate
Native	4K Linear Full Res	3840 x 2160	60
Native	4K Linear Full Res, Lower Frame Rate	3840 x 2160	30
SLP Native	4K Linear Full Res, Lowest Power	3840 x 2160	1
LI Native	4K 2-exp LI-HDR	3840 x 2160	30
eDR Native	4K eDR	3840 x 2160	30
Max Frame Rate	Crop Linear for Max Fps	1650 x 1650	90
Bin2	2 MP Linear	1920 x 1080	120
Bin4	0.5 MP Linear	960 x 540	1
WOM Bin4	Wake On Motion w/ Streaming	960 x 540	1

Table 3. 12-bit MODES OF OPERATION

Mode Name	Mode Description	Resolution	Frame Rate
eDR Native	4K eDR	3840 x 2160	30

Table 4. ORDERING INFORMATION

Part Number	Product Description	Orderable Product Attribute Description	
AR0830CSSC11SMKA1-CP	8 MP 1/2.9" CMOS Image sensor RGB 11° CRA	CSP with Protective Film	
AR0830CSSC11SMKA1-CP2	8 MP 1/2.9" CMOS Image sensor RGB 11° CRA	CSP with Protective Film Low MOQ	
AR0830CSSC11SMKAH3-GEVB	8 MP 1/2.9" CMOS Image sensor RGB 11° CRA	Demo3 Headboard	

AR0830CSSM11SMKA1-CP	8 MP 1/2.9" CMOS Image sensor Mono 11° CRA	CSP with Protective Film
AR0830CSSM11SMKA1-CP2	8 MP 1/2.9" CMOS Image sensor Mono 11° CRA	CSP with Protective Film Low MOQ
AR0830CSSM11SMKAH3-GEVB	8 MP 1/2.9" CMOS Image sensor Mono 11° CRA	Demo3 Headboard

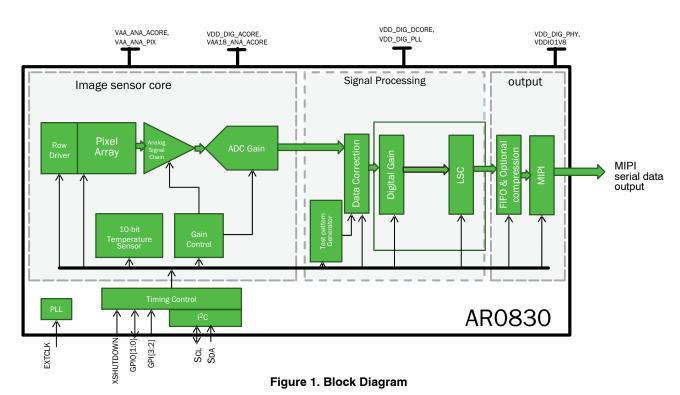
AR0830CSSH11SMKA1-CP	8 MP 1/2.9" CMOS Image sensor RGBIR 11° CRA	CSP with Protective Film
AR0830CSSH11SMKA1-CP2	8 MP 1/2.9" CMOS Image sensor RGBIR 11° CRA	CSP with Protective Film Low MOQ
AR0830CSSH11SMKAH3-GEVB	8 MP 1/2.9" CMOS Image sensor RGBIR 11° CRA	Demo3 Headboard

AR0830CSSC35SMKA1-CP	8 MP 1/2.9" CMOS Image sensor RGB 35° CRA	CSP with Protective Film
AR0830CSSC35SMKA1-CP2	8 MP 1/2.9" CMOS Image sensor RGB 35° CRA	CSP with Protective Film Low MOQ
AR0830CSSC35SMKAH3-GEVB	8 MP 1/2.9" CMOS Image sensor RGB 35° CRA	Demo3 Headboard

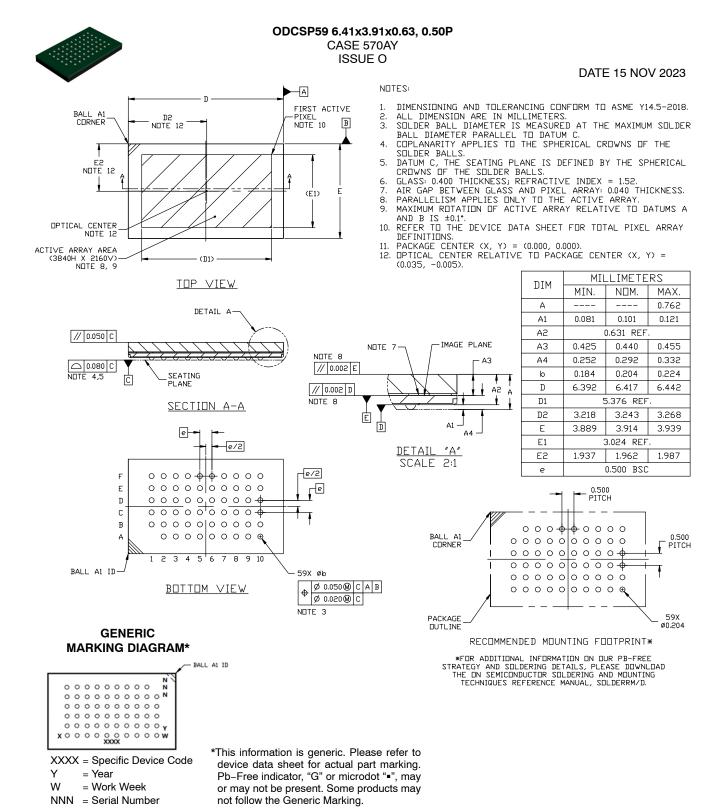
AR0830CSSH35SMKA1-CP 8 MP 1/2.9" CMOS Image sensor RGBIR 35° CRA		CSP with Protective Film
AR0830CSSH35SMKA1-CP2	8 MP 1/2.9" CMOS Image sensor RGBIR 35° CRA	CSP with Protective Film Low MOQ
AR0830CSSH35SMKAH3-GEVB	8 MP 1/2.9" CMOS Image sensor RGBIR 35° CRA	Demo Headboard

^{3.} Refer to AR0830 Die Data Sheet for Die Part Numbers & Ordering Information.

AR0830







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