

1/4-inch 2 MP CMOS Digital Image Sensor

AR0246

General Description

The **onsemi** AR0246 is a stacked 1/4-inch back side illuminated (BSI) CMOS active-pixel digital image sensor with a pixel array of 1920 (H) x 1080 (V). The sensor has enhanced NIR response. It captures images in either linear or high dynamic range modes with a rolling shutter readout, and includes sophisticated camera functions such as binning, windowing and both video and single frame modes. It is designed for both low light and high dynamic range performance. AR0246 can combine on chip up to three exposures and compand to 12-bit HDR output (eHDR) or it could provide line interleaved output of two exposures to support off chip HDR (LI HDR) in an ISP chip. It could also provide enhanced Dynamic Range (eDR) from single exposure. The AR0246 produces extraordinarily clear, sharp digital pictures, and its ability to capture both continuous video and single frame enhanced NIR response makes it the perfect choice for security applications.

Features

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Table 1. KEY PERFORMANCE PARAMETERS

Parameter	Typical Value
Optical Format	1/4-inch (4.41 mm Diagonal, 16:9)
Active Pixels	1920 (H) x 1080 (V)
Pixel Size	2.0 μm x 2.0 μm, BSI
Color Filter Array	RGB
Chief Ray Angle	10°, 32°
Shutter Type	ERS and GRR
One-Time Programmable Memory (OTPM)	160 Bytes
Input Clock Range	6 ~ 48 MHz
Output Interface	2-lane MIPI (2 lanes, 1 Gbps/lane)
ADC Resolution	12-bit on die
Global Gain Range Analog Gain: Digital Gain:	0 dB to 42 dB (in steps of 0.375 dB) 0-18 dB 18-42 dB
Frame Rate	Linear: 1080p @ 60 fps LI-HDR (2exp): 1080p @ 30 fps eHDR (3 exp): 1080p @ 30 fps eDR (1 exp): 1080p @ 30 fps
Subsampling	Bin2, skip2
Multi-camera Support	Frame Rate and Exposure Synchronization
Responsivity	18 ke-/lux*s
SNR _{MAX}	39 dB
Dynamic Range	80 dB – eDR Mode Dynamic Range 120 dB – eHDR Mode Dynamic Range 96 dB – LI-HDR Mode Dynamic Range

Table 1. KEY PERFORMANCE PARAMETERS

Parameter	Typical Value
Supply Voltage I/O	1.8 V (1.7 V < V _{supply} < 1.9 V) or 2.8 V (2.7 V < V _{supply} < 2.9 V)
Digital	1.05 V (1 V < V _{supply} < 1.1 V)
Analog	2.8 V (2.7 V < V _{supply} < 2.9 V)
Power Consumption (Typical)	Linear 60 fps: 180 mW (Note 1) eHDR 30 fps: 281 mW (Note 1)
Operating Temperature	(-30°C < T _J < +85°C)
Optimal Performance Temperature	(0°C < T _J < +60°C)
Package Options	5.31 mm x 3.61 mm 53-pin CSP package Bare Die
θ _{JA} (Note 2)	41.65°C/W (Note 2)
θ _{JB}	13.45°C/W

1. Power consumption numbers are estimated values.
2. θ_{JA} is dependent on the customer module design and should not be used for calculating junction temperature.

Applications

€ Security

€ IoT

€ Car DVR

Table 2. 12-bit MODE OF OPERATION AND POWER

Mode Name	Mode Description	Resolution	Frame Rate
Native	1080p Linear	1920 x 1080	60
Native	1080p Linear, Lower Frame Rate	1920 x 1080	30
eHDR Native	1080p eHDR 2exp	1920 x 1080	45
eHDR 3exp Native	1080p eHDR 3exp	1920 x 1080	30
eHDR 3exp ALTM Native	1080p eHDR 3exp ALTM	1920 x 1080	30
LI Native	1080p LI-HDR 2exp	1920 x 1080	30
WoM bin4skip2 (Note 3)	Wake on Motion w/ Streaming	240 x 135	1
Bin2	0.5 MP Linear	960 x 540	180
eDR Native	1080p eDR	1920 x 1080	45
eDR ALTM Native	1080p eDR ALTM	1920 x 1080	45
LI-eDR Native	1080p LI-eDR	1920 x 1080	30
SLP Native	1080p SLP	1920 x 1080	1

AR0246

Table 3. ORDERING INFORMATION

Part Number	Product Description		Orderable Product Attribute Description
AR0246NPSC10SMKA1-CP	2 MP	RGB 10 μ	

DIM	MILLIMETERS		
	MIN	NOM	MAX
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RECOMMENDED MOUNTING FOOTPRINT*

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