Mira016

Datasheet

Published by ams-OSRAM AG
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Mira016 0.16 MP NIR-enhanced global shutter image sensor

1 General description

Mira016 is a compact 0.16 MP NIR-enhanced global shutter image sensor designed for 2D and 3D consumer and industrial machine vision applications. The sensor has a small 2.79 µm pixel size with high sensitivity made possible by a state of the art BSI technology. The sensor has a MIPI CSI-2 interface to allow easy interfacing with a plethora of processors and FPGAs. Due to its small size, configurability and high sensitivity both in visual as well as NIR, the Mira016 is well suited for 2D and 3D applications, which include Active Stereo Vision, Structured Light Vision and AR/VR. High sensitivity in NIR enables increased measurement range and allows overall system power consumption optimization which is key for battery powered consumer and industrial applications.

2 Specifications & special features

Table 1: Key specifications

Parameter	Value	Remark
Active pixels	400 (H) x 400 (V)	
Pixel	2.79 µm × 2.79 µm	BSI stacked technology with high NIR sensitivity and QE coupled with low noise and low cross talk
Optical format	1/11.6”	
Package size (CSP)	1.79mm x 1.79mm	Active area 62% of die size
Shutter type	Voltage domain pipelined global shutter	Supports pipelined exposure and image readout
Quantum efficiency (QE)	95 / 56 / 36%	550 / 850 / 940nm Mono
Supported lens chief ray angle (CRA)	0° to 27°	Also, without shifted microlens available
ADC modes	8-bit | 8-bit HS | 10-bit | 10-bit HS | 12-bit	
Max frames	360 fps in 10-bit mode 200 fps in 12-bit mode	At full resolution Higher fps settings upon request
	730 fps in 8-bit mode 640 fps in 10-bit mode	Special high-speed mode Limited to 400x300 resolution

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Parameter	Value	Remark
Programmable gain	**Analog**: 1x | 2x | 4x | 8x | 16x in 8-bit mode 1x | 2x | 4x in 10-bit mode 1x | 2x in 12-bit mode **Digital**: in 1/16th increments	Higher analog gains and finer gain tuning are available upon request
Data interface	MIPI CSI-2 v1.3 DPHY v1.2 1 Data lane | 1 Clock lane	1.5 Gbps with data scrambling support

Table 2: Special features

Features	Benefits
High sensitivity and NIR enhanced pixel	High sensitivity and compact pixel size achieved via state-of-the-art BSI technology with NIR enhancement allowing to use lower power illuminators
Context switching	Two register contexts for on-the-fly configuration changes to exposure and readout settings without interrupting the video stream
On-chip processing	• Defect pixel detection and correction on-chip • Image statistics histogram can be output • Event detection • In-pixel background light cancellation • Digital pixel binning • Black sun protection • Flexible ROI selection (incl. mirroring, flipping, cropping & subsampling) • Automatic black level calibration
On-chip advanced power management	Smart powering of on-chip blocks with respect to frame rate and exposure time resulting in extended battery life
On-chip temperature sensor	Accurate temperature reading on junction temperature
Illumination synchronization trigger	Accurate timing between illumination and actual exposure
Fast ADC with analog and digital CDS	Low column FPN, low 1/f noise and high fps

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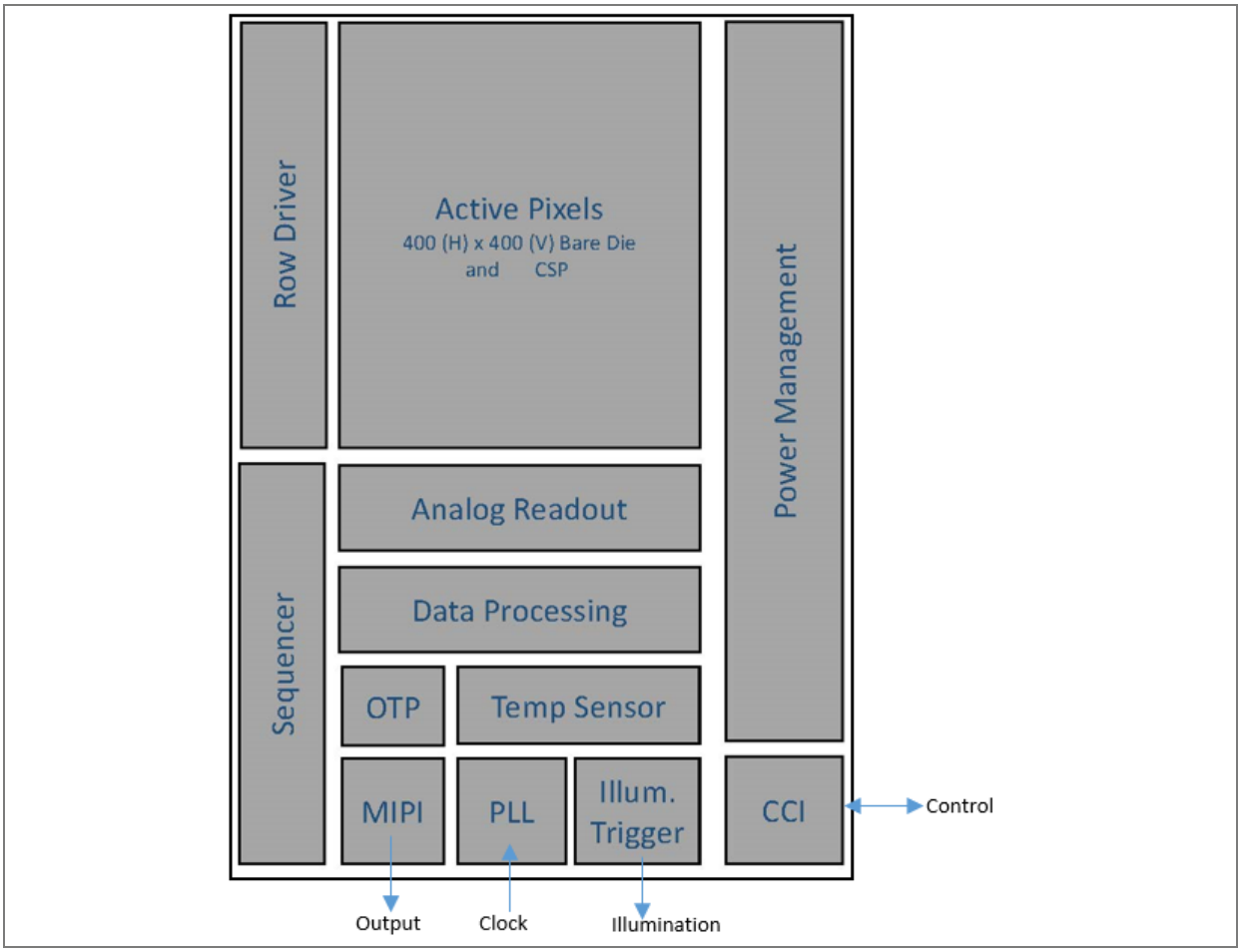
3 Applications

- Facial authentication for mobile devices and points of payments.
- Active stereo and structured light vision (Robotics and other applications).
- Eye, head, hand, environment tracking for AR/VR.

4 Block diagram

The functional blocks of this device are shown below:

Figure 1: Functional blocks of Mira016

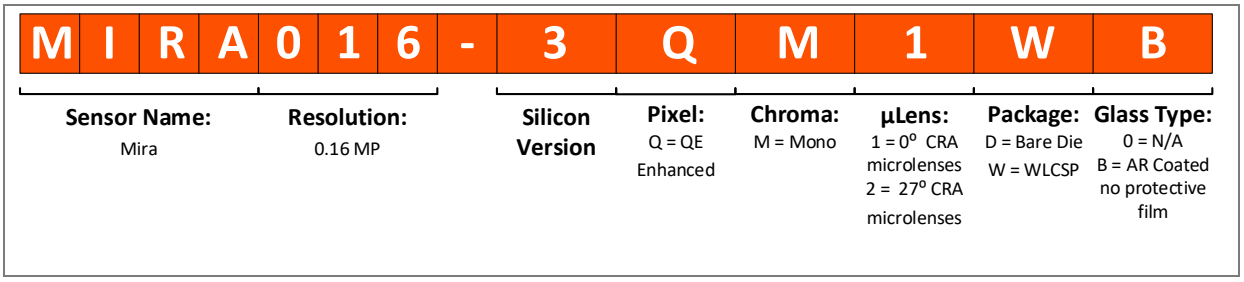


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5 Ordering information

Product type	Ordering code	Package	Delivery form	Color filter	Delivery quantity
Mira016-3QM1WB FT SE	Q65113A7951	CSP	Reel	Mono	2000 pcs/reel
Mira016-3QM2WB FT SE	Q65113A7962	CSP	Reel	Mono	2000 pcs/reel
Mira016-3QM1D0 RW	Q65113A8228	Bare die	RW		

Figure 2: Product code description



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6 Revision information

Document status	Product status	Definition
Product Preview	Pre-development	Information in this datasheet is based on product ideas in the planning phase of development. All specifications are design goals without any warranty and are subject to change without notice
Preliminary Datasheet	Pre-production	Information in this datasheet is based on products in the design, validation or qualification phase of development. The performance and parameters shown in this document are preliminary without any warranty and are subject to change without notice
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Changes from previous released version to current revision v2-00	Page
Added product code description	6

- Page and figure numbers for the previous version may differ from page and figure numbers in the current revision.
- Correction of typographical errors is not explicitly mentioned.

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