Datasheet

DS001066

Mira050

1/7” Compact 0.5 MP NIR Enhanced Global Shutter Image

v1-01 • 2022-Dec-21

Content Guide

1 General Description

Mira050 is a compact 0.5 MP Near IR 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 Mira050 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 and Special Features

Figure 1:
Typical Specifications Mira050

Parameter	Value	Remark
Active Pixels	576 (H) x 768 (V) CSP 600 (H) x 800 (V) Bare Die	On CSP the addressable area is 600 x 800 but only 576 x 768 is useable.
Pixel	2.79 µm × 2.79 µm	BSI stacked technology with high NIR sensitivity. Low noise and low cross talk.
Optical Format	1/7”	
Dimensions	2.25 mm x 2.75 mm – Die 2.29 mm x 2.83 mm – CSP	Active area 60% of total
Shutter Type	Voltage domain pipelined global shutter	Possibility of exposure of next image during readout of the previous image.
Quantum Efficiency (QE)	94 / 56 / 36 %	550 / 850 / 940 nm Mono
Supported Lens Chief Ray Angle (CRA)	0° to 30°	Extra wide acceptance angle of the Mira050 pixel means any lens profile with these CRA values can be used.
ADC Modes	8-bit | 10-bit | 10-bit HS | 12-bit	
Max Frames Per Second Full Resolution	120 fps	All ADC modes
Analog Gain	1x → 4x step: 2x 1x → 16x step: 2x 1x → 4x step: 3% 1x → 32x step: 2x 1x → 16x step: 3%	12-bit | 10-bit HS (Default mode) 10-bit (Default mode) 10-bit HS (Fine gain mode) 8-bit (Default mode) 8-bit (Fine gain mode)
Digital Gain	1x → 16x step: 1/16x	8-bit |10-bit | 10-bit HS | 12-bit
Data Interface	MIPI CSI-2 v1.3 DPHY v1.2 1 Data lane | 1 Clock lane	1.5 Gbps with data scrambling support

Figure 2:
Special Features

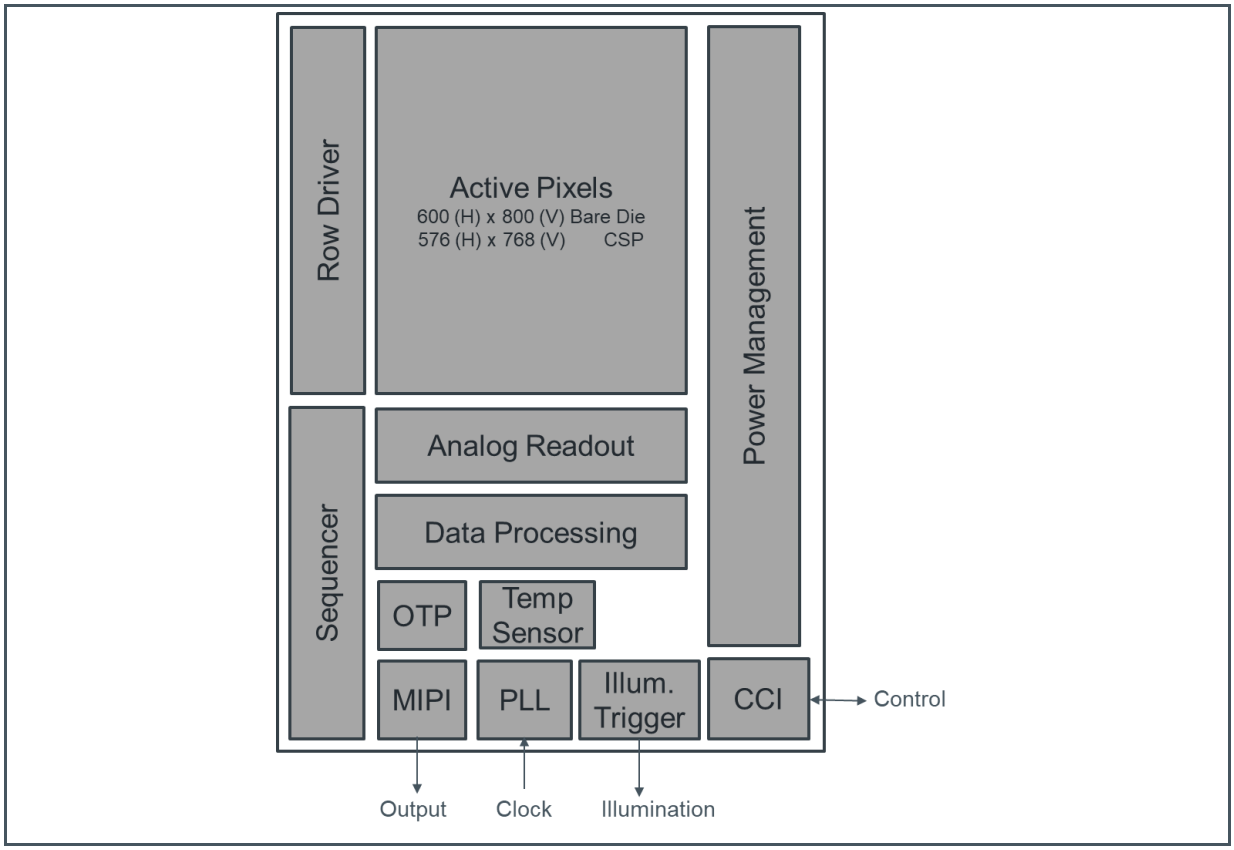
Features	Benefits
Programmable registers	Programming of window coordinates, timing parameters, exposure time, mirror, flipping, cropping.
High sensitivity and NIR enhanced pixel	High sensitivity and compact pixel size achieved via state of the art BSI technology with NIR enhancement resulting in less power hungry illuminators.
Context switching	Two register contexts for on the fly configuration changes.
On-chip processing	Defect pixel detection and correction. Image statistics generation. Event detection. In pixel Background light cancellation. Digital Pixel Binning. Black Sun Protection. Flexible ROI selection.
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.

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

Figure 3:
Functional Blocks of Mira050



5 Ordering Information

Product Code	Ordering Code	Package	Delivery Form	Delivery Quantity
Mira050-1QM1D0	511930021 Q65113A5663	Reconstructed Wafer (bare die)	R/W	Multiples of 3418
Mira050-1QM1WB	511930019 Q65113A5422	CSP	Tray	Multiples of 120

6 Revision Information

Changes from previous version to current revision v1-01	Page
Initial short datasheet	
Removed “Remarks” for “ADC Modes” under Figure 1	4

- 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.

7 Legal Information

Copyrights & Disclaimer

Devices sold by ams-OSRAM AG are covered by the warranty and patent indemnification provisions appearing in its General Terms of Trade. ams-OSRAM AG makes no warranty, express, statutory, implied, or by description regarding the information set forth herein. ams-OSRAM AG reserves the right to change specifications and prices at any time and without notice. Therefore, prior to designing this product into a system, it is necessary to check with ams-OSRAM AG for current information. This product is intended for use in commercial applications. Applications requiring extended temperature range, unusual environmental requirements, or high reliability applications, such as military, medical life-support or life-sustaining equipment are specifically not recommended without additional processing by ams-OSRAM AG for each application. This product is provided by ams-OSRAM AG “AS IS” and any express or implied warranties, including, but not limited to the implied warranties of merchantability and fitness for a particular purpose are disclaimed.

ams-OSRAM AG shall not be liable to recipient or any third party for any damages, including but not limited to personal injury, property damage, loss of profits, loss of use, interruption of business or indirect, special, incidental or consequential damages, of any kind, in connection with or arising out of the furnishing, performance or use of the technical data herein. No obligation or liability to recipient or any third party shall arise or flow out of ams-OSRAM AG rendering of technical or other services.

RoHS Compliant & ams Green Statement

RoHS Compliant: The term RoHS compliant means that ams-OSRAM AG products fully comply with current RoHS directives. Our semiconductor products do not contain any chemicals for all 6 substance categories plus additional 4 substance categories (per amendment EU 2015/863), including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, RoHS compliant products are suitable for use in specified lead-free processes.

ams Green (RoHS compliant and no Sb/Br/Cl): ams Green defines that in addition to RoHS compliance, our products are free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material) and do not contain Chlorine (Cl not exceed 0.1% by weight in homogeneous material).

Important Information: The information provided in this statement represents ams-OSRAM AG knowledge and belief as of the date that it is provided. ams-OSRAM AG bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. ams-OSRAM AG has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. ams-OSRAM AG and ams-OSRAM AG suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

Headquarters
ams-OSRAM AG
Tobelbader Strasse 30
8141 Premstaetten
Austria, Europe
Tel: +43 (0) 3136 500 0

Please visit our website at www.ams.com
Buy our products or get free samples online at www.ams.com/Products
Technical Support is available at www.ams.com/Technical-Support
Provide feedback about this document at www.ams.com/Document-Feedback
For sales offices, distributors and representatives go to www.ams.com/Contact
For further information and requests, e-mail us at ams_sales@ams.com