

Product Document

Published by
ams OSRAM Group

am **OSRAM**



Datasheet

DS001056

Mira220

1/2.7" 2.2MP NIR Enhanced Global Shutter Image

v1-00 • 2022-Jun-21

Content Guide

1	General Description	3	4	Legal Information.....	9
1.1	Key Benefits & Features.....	3			
1.2	Applications	4			
1.3	Block Diagram	5			
2	Typical Operating Characteristics	6			
2.1	Electro-Optical Characteristics	6			
2.2	Functional Characteristics	7			
3	Revision Information.....	8			

1 General Description

Mira220 is a 2.2 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. With an effective resolution of 1600 × 1400 and a maximum bit depth of 12 bits, the sensor supports on-chip operations like external triggering, windowing, horizontal or vertical mirroring. The maximum frame rate is 90 fps at full resolution and bit depth. The sensor has a MIPI CSI-2 interface to allow easy interfacing with a plethora of processors and FPGAs. On-chip registers can be accessed via the standard I²C interface for easy configuration of the sensor.

Due to its small size, configurability and high sensitivity both in visual as well as NIR, the Mira220 is well suited for 2D and 3D applications, which include Active Stereo Vision, Structured Light Vision for Robotics 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.

1.1 Key Benefits & Features

The benefits and features of Mira220, 1/2.7" 2.2MP NIR Enhanced Global Shutter Image are listed below:

Figure 1:
Added Value of Using Mira220

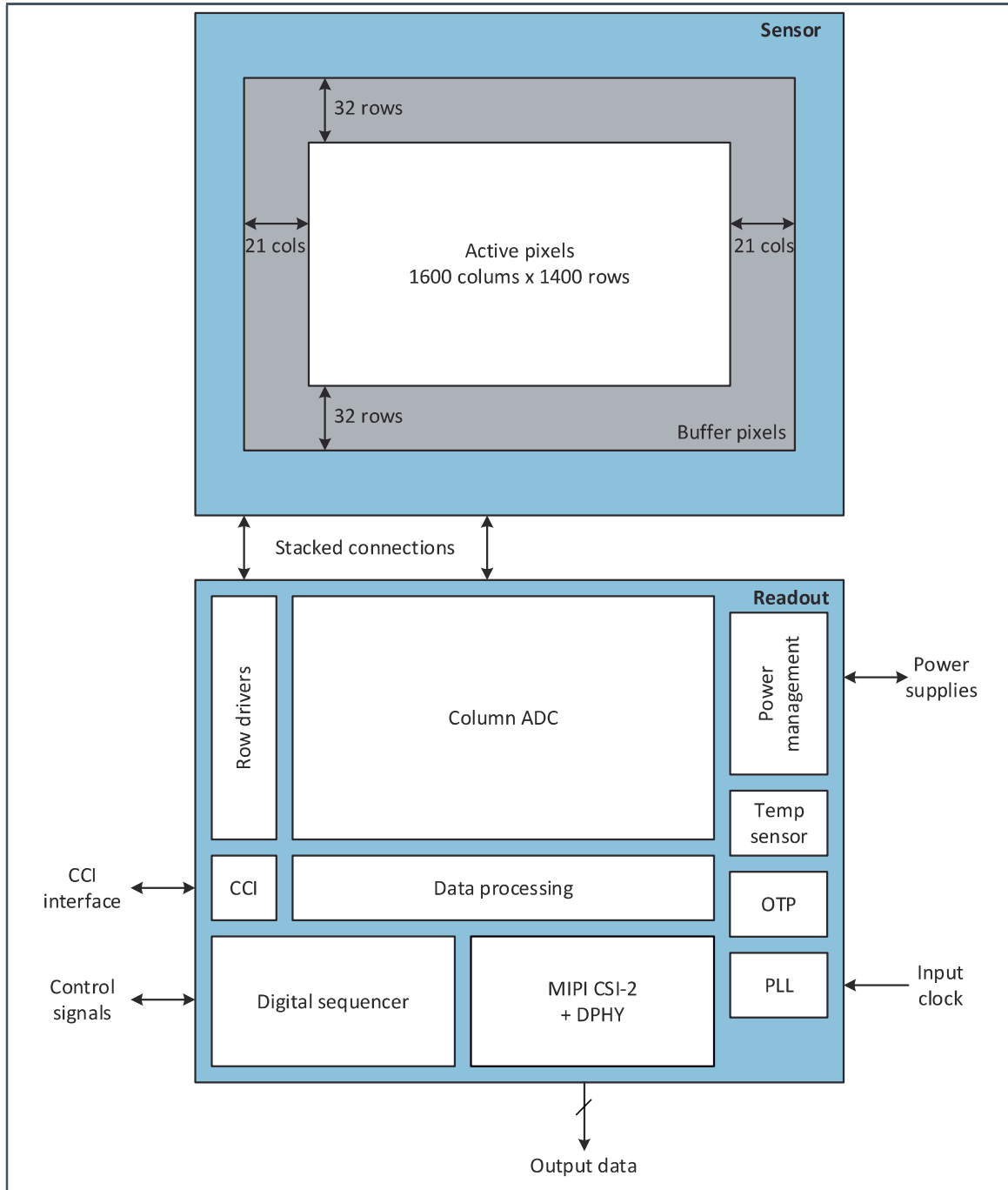
Benefits	Features
Compact size with high resolution and bit depth	<ul style="list-style-type: none"> • 1/2.7" • 1600x1400 • 8/10/12-bit • 2.79 μm
High speed applications	90 fps global shutter with CDS
Use in low light conditions	High sensitivity
Compact size	Small die size achieved via state-of-the-art BSI technology
NIR enhanced with high sensitivity	Class leading QE at 940 nm combined with high sensitivity. Industry leading PLS at 940 nm
On-chip noise reduction	Digital CDS and row noise correction
Reduced off-chip processing	<ul style="list-style-type: none"> • On-chip defect pixel detection and correction • On-chip image statistics generation
Extended battery operation	Low power consumption

1.2 Applications

- Mobile Facial Authentication
- Active Stereo Vision
- Smart Home Appliances
- QR Readers.
- Automatic Identification and Data Capture (AIDC).
- AR/VR
- Structured Light Vision
- Drones
- Smart Wearable Devices
- SLAM for Robotics

1.3 Block Diagram

Figure 2:
Functional Blocks of Mira220



2 Typical Operating Characteristics

2.1 Electro-Optical Characteristics

Below are the typical electro-optical specifications of Mira220.

Figure 3:
Optical Features of Mira220

Parameter	Value	Remark
Active Pixels	1600 (H) × 1400 (V)	
Pixel Pitch	2.79 × 2.79 μm ²	
Optical Format	1/2.7"	
Pixel Type	BSI global shutter	With fixed pattern noise correction and reset (kTC) noise canceling by correlated double sampling (CDS) coupled with high sensitivity.
Shutter Type	Pipelined global shutter	Exposure of next image during readout of the previous image.

Figure 4:
Typical Electro-Optical Characteristics

Parameter	Value	Remark
Full Well Charge (FWC)	10700 e ⁻	Linear Range
Dark Temporal Noise (DTN)	8.5 e ⁻	
Dynamic Range (DR)	62 dB	
SNR _{MAX}	40 dB	
Shutter Efficiency (1/PLS)	95 dB	940 nm
Dark Current (DC)	58 e ⁻ /s	60 °C
Color Filters	No	
Supported Lens Chief Ray Angles (CRA)	0° to 30°	Extra wide acceptance angle of the Mira220 pixel means any lens profile with these CRA values would provide decent performance.
Quantum Efficiency (QE) ⁽¹⁾	94 / 54 / 35 %	550 / 850 / 940 nm

(1) As measured without cover glass.

2.2 Functional Characteristics

Figure 5:
Functional Characteristics

Parameter	Value
Bit Depth	12-bit
	10-bit
	8-bit
Timing Generation	On-chip
Programmable Registers	Sensor parameters, e.g. Window coordinates, Timing parameters, and Exposure time
Power Consumption	350 mW Active
	40 mW Idle
	4 mW Sleep
Data Interface Standard	MIPI CSI-2 DPHY
MIPI Outputs	2 Data
	1 Clock
Output Interface Bit Rate	1.5 Gbit/s
Frame Rates	90 fps
Black Sun Protection	Yes
Temperature Sensor	Yes
Context Switching	Two register contexts

3 Revision Information

Changes from previous version to current revision v1-00	Page
---	------

Initial short datasheet	
-------------------------	--

- 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.

4 Legal Information

Copyrights & Disclaimer

Copyright ams-OSRAM AG, Tobelbader Strasse 30, 8141 Premstaetten, Austria-Europe. Trademarks Registered. All rights reserved. The material herein may not be reproduced, adapted, merged, translated, stored, or used without the prior written consent of the copyright owner.

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