

# Product Document

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## Datasheet

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# Mira220

**1/2.7" 2.2MP NIR Enhanced Global Shutter Image**

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# Content Guide

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# 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  $\mu\text{m}$  pixel size with high sensitivity made possible by a state-of-the-art BSI technology. With an effective resolution of 1600  $\times$  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 I<sup>2</sup>C 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"> <li>• 1/2.7"</li> <li>• 1600x1400</li> <li>• 8/10/12-bit</li> <li>• 2.79 <math>\mu\text{m}</math></li> </ul>
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"> <li>• On-chip defect pixel detection and correction</li> <li>• On-chip image statistics generation</li> </ul>
Extended battery operation	Low power consumption

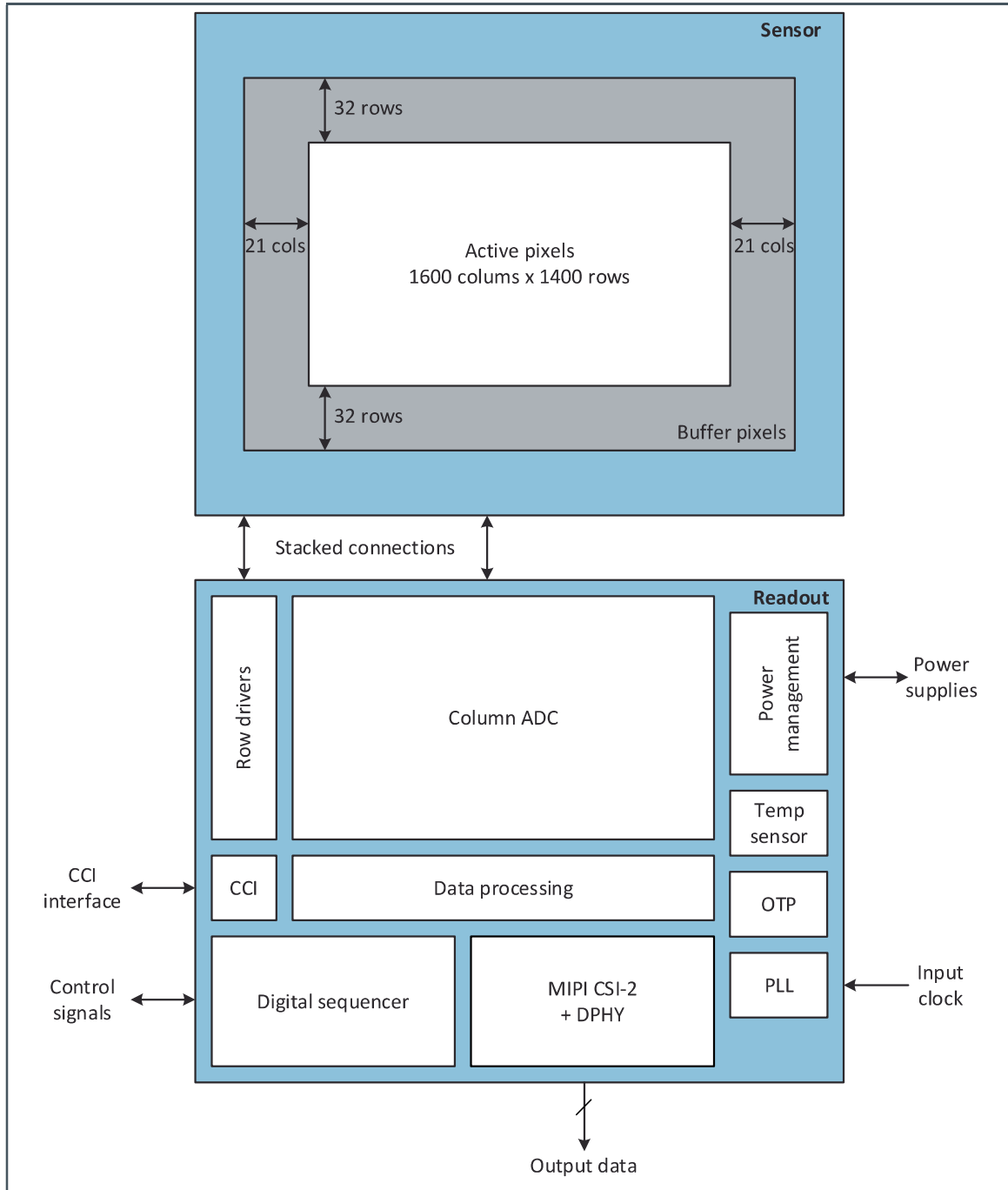
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## 1.2 Applications

- 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 <sup>2</sup>	
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 <sup>-</sup>	Linear Range
Dark Temporal Noise (DTN)	8.5 e <sup>-</sup>	
Dynamic Range (DR)	62 dB	
SNR <sub>MAX</sub>	40 dB	
Shutter Efficiency (1/PLS)	95 dB	940 nm
Dark Current (DC)	58 e <sup>-</sup> /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) <sup>(1)</sup>	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



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## 3 Revision Information

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Changes from previous version to current revision v1-00	Page
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Initial short datasheet	
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- 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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### Headquarters

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

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