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Product Specification

Product: InnoCAM_DCM_AR0830PDF

Part Number: INV-AR0830FF-8MP

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INV-AR0830FF-8MP

REVISION HISTORY

Revision	Description of change	Changed by	Date
1.0	Initial Draft	Jamie Lynn	04/11/2023
1.1	Updated Draft	Jamie Lynn	07/05/2023

APPROVAL

Company	Name	Signature	Date
InnoWave Design LLC	Tony Reed		07/06/2023
InnoWave Design LLC	Jamie Lyn		07/07/2023

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1. General

The INV-AR0830FF-8MP camera module has the On-Semi AR0830 1/2.9-inch CMOS digital image sensor with an active-pixel array of 3840Hx2160V. The sensor produces clear, low noise images in both low-light and bright scenes. It is programmable through a simple two-wire serial interface.

1.1. Specifications

Sensor Make and Model	On Semi AR0830
Optical Format	1/2.9-inch 8 Mp (169)
Active Pixels	3840H x 2160V, not including 8 border pixels on each side
Pixel Size	1.4um with Advanced pixel stacked BSI technology
Die Thickness	200um $\pm$ 12um
Module Size	10x10x16.6mm
Singulated Die Size	6432um $\pm$ 25 um, 3929 um $\pm$ 25um
Color Filter Array	RGB Bayer, RGB-IR, Monochrome
Chief Ray Angle (CRA))	35°
Input Clock Range	6–48 MHz
Output Interface	4-lane MIPI (1- and 2-lane supported) using D-PHY;
Max data rate	1.5 Gbps/lane
ADC Resolution	10-bits on die
Analog Gain	0–18 dB
Digital gain	Up to 24 dB
Subsampling	Skipping, Binning (RGB), Summing (Mono)
Temperature sensor	10-bit, controlled by two-wire serial I/F, $\pm$ 5°C accuracy
Supply voltage	
Digital	1.05 V (1.0 V < Vsupply < 1.1 V)
I/O	1.8 V (1.7 V < Vsupply < 1.9 V)
Analog	2.8 V (2.7 < Vsupply < 2.9 V)
Operating Temperature	–30°C < TJ < +85°C
Optimal Performance Temperature Range	0°C < TJ < +60°C
SNRMAX	39.9dB
Dynamic Range	73 dB (xDR 1-exp)
Construction	6G+IR
Lens Type	Fixed Focus
TTL	15.95mm
Maximum Image Circle	7.8 mm
Field of View (FOV) degrees	Vertical 49
	Horizontal 89
	Diagonal 108
Aperture (F#)	2 +/-5%
EFL	3.65

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Relative illumination at sensor corner	88%
Distortion (TV)	<-20%
Lens CRA	34.6 degrees
Focus Range	120cm to infinity
Calculated Hyperfocal distance	240cm
IR Filter Cutoff	628nm
Thread	M7.0* P0.35

Table 1: Specifications

1.2. Sensor Features

- 8 Mp CMOS Sensor with Advanced 1.4 μm Pixel Stacked BSI Technology
- Enhanced NIR Response on 850 nm and 940 nm wavelength
- Support Line Interleaved T1/T2 Readout to Enable HDR Processing in ISP Chip
- Extended Dynamic Range (xDR)
- Super Low Power Mode
- Data Interfaces: MIPI D-PHY – 4 Lanes
- Bit-depth Compression Available for MIPI Interface: 10–8 to Enable Lower Bandwidth Receivers for Full Frame Rate Applications
- Various Trigger Modes for Multi-sensor Synchronization
- Electronic Rolling Shutter (ERS) and Global Reset Release (GRR) modes supported
- TBD bytes One-time Programmable Memory (OTPM) for Storing Shading Correction Coefficients and Module Information
- Programmable Controls: Gain, Horizontal and Vertical Blanking, Frame Size/Rate, Exposure, Left-Right and Top-Bottom Image Reversal, Window Size.
- Onchip Temperature Sensor
- Simple Two-wire Fast-mode+ Serial Interface
- On-chip Lens Shading Correction
- Low Dark Current

1.3. Applications

- Videoconferencing Endpoints
- Webcams
- Machine Vision Cameras
- Video Doorbells
- 3D and Stereo Cameras
- Retail In-store Cameras, Bodycams, etc.

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1.4. Layout

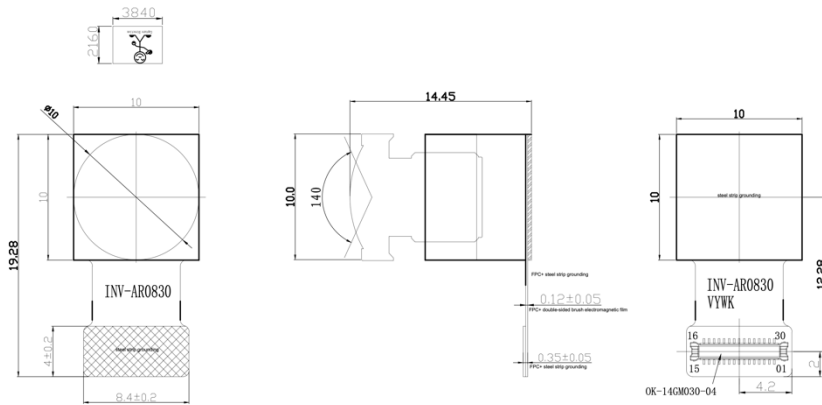


Figure 1: camera module assembly layout

Pin Assignment	
1	DGND
2	AF GND (NC)
3	SDA
4	NC
5	DOVDD 1.8V
6	SCL
7	AGND
8	NC
9	AVDD 2.8V
10	DVDD 1.05V
11	VSYNC
12	RESET
13	DGND
14	MCLK
15	DGND
16	MDP1
17	MDN1
18	DGND
19	MDP4
20	MDN4
21	DGND
22	CLKP
23	CLKN
24	DGND
25	MDP2
26	MDN2
27	DGND
28	MDP3
29	MDN3
30	DGND



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2. Environment Requirements

2.1. Operating Temperature

The camera module shall be fully functional when ambient temperature is between -20°C to 60°C with image quality remaining stable. Test duration is 24 hours.

2.2. Storage Temperature

The camera module shall withstand storage temperatures between -30°C to 70°C. Test duration is 48 hours.

2.3. Humidity

The camera module shall withstand humidity at or below 90% RH under non-condensing conditions for 24 hours.

2.4. Thermal Shock

The camera module shall withstand the following temperatures (with humidity off)
-30°C to 70°C
20 min cycles (10 min dwell, 5 min ramp, 10 min dwell)

2.5. High Temperature Test

60C, humidity off, 24 hours

2.6. Low Temperature Test

-20C, humidity off, 24 hours

Stable image is -30°C to 70°C junction temperature. The sensor functions but image quality may be noticeably different at temperatures outside of stable image range. Image quality remains stable between 0°C to 50°C.

3. Reliability Requirements

3.1. Drop Test

The camera module shall withstand a 1.2m Drop in packaging onto Concrete (12 drops) Random Positions

3.2. Random Vibration

The camera module shall withstand vibration of the following conditions

Frequency range: 50Hz

Amplitude: 2mm Duration 10 minutes for each position

Test all 3 axes (X, Y, Z)

3.3. Salt Fog Test

Condition: 5%nacl solvent Test duration: 24H

3.4. ESD (Electronic Discharge)

The camera module shall withstand Electrostatic Discharge of
8KV Contact Discharge

INV-AR0830FF-8MP
 12KV Air Discharge
 10 Times for a Second

4. Product Performance Verification

To verify the camera module performance, the following tests will be conducted at either the factory during production or as an initial qualification characterization in either the factory laboratory or at the InnoWave laboratory.

4.1. Electrical Parameters

Parameter	Test Frequency
Current consumption – Standby	Initial Qualification
Current consumption – Idle	Initial Qualification
Current consumption – Viewfinder	Initial Qualification
Current consumption – Capture	Initial Qualification

Table 4: Electrical parameter measurements

4.2. Mechanical Parameters

Parameter	Test Frequency
X Dimension (mm)	Initial Qualification
Y dimension (mm)	Initial Qualification
Z Dimension (mm)	Initial Qualification

Table 5: Mechanical parameter measurements

4.3. Environmental and Reliability Test Parameters

Parameter	Test Frequency
Thermal Shock	Initial Qualification
Humidly	Initial Qualification
High Temperature Test	Initial Qualification
Low Temperature Test	Initial Qualification
Drop Test	Initial Qualification
Random Vibration Test	Initial Qualification
Salt Fog Test	Initial Qualification
ESD Test	Initial Qualification

5. Product Identification TBD

All modules will be marked with an identification number using laser marking or bar code label.

9 Packaging

The package will prevent damage to the components during transport and will be suitable for electrostatic-sensitive devices. The single camera modules shall be delivered in a reusable tray of anti-static plastic material. Several cameras shall be packed in one tray.

The tray has separate holders for each camera module.

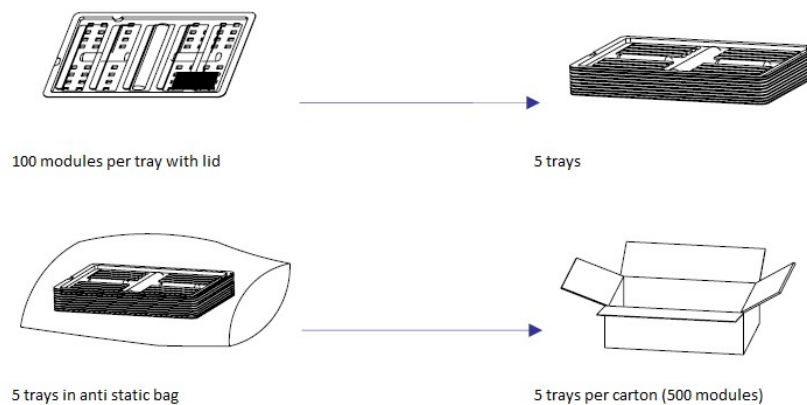


Figure 3: Packaging Example