Product Specification

Product Model Number: INV-IMX219FF-8MP

Product Part Number: InnoCAM_DCM_IMX219FF

Revision: Rev 1.1

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REVISION HISTORY

Revision	Description of change	Changed by	Date
1.0	Initial Draft	Jamie Lynn	03/08/2022
1.1	Updated with new connector and pinout	Jamie Lynn	08/02/2022
1.2			
1.3			

APPROVAL

Company	Name	Signature	Date
InnoWave Design LLC	Tony Reed		05/19/23
InnoWave Design LLC	Jamie Lyn		06/05/23

Contents

1. General

The INV-IMX219-8MP is a fixed focus camera module with a diagonal 4.60 mm (Type 1/4.0) CMOS active pixel type image sensor with a square pixel array and 8.08M effective pixels. This chip operates with three power supplies, analogue 2.8 V, digital 1.2 V, and IF 1.8 V, and has low power consumption. High sensitivity, low dark current, and no smear are achieved through the adoption of R, G, and B primary color pigment mosaic filters. This chip features an electronic shutter with variable charge-storage time. The camera module has a fixed focus lens, holder, and FPC.

1.1. Specifications

Sensor Make and Model	Sony IMX219PQH5-C
Sensor Type	CMOS
Resolution	8.28MP
Pixel Size	1.12um x 1.12um
Module Size	8.5x8.5x4.2mm
Optical size	1/4.0"
Output Format	10-bit RAW RGB data
Chroma	Color
Image Size	Diagonal 4.60 mm
Total number of pixels	3296 (H) × 2512 (V) approx. 8.28 M pixels
Number of effective pixels	3296 (H) × 2480 (V) approx. 8.17 M pixels
Number of active pixels	3280 (H) × 2464 (V) approx. 8.08 M pixels
Chip Size	5.095mm H x 4.930mm V
Substrate material	Silicon
Frame Rate	Rate 30fps@Full resolution
	120fps@2x2 Adjacent Pixel Binning (4:3)
	150fps@2x2 Adjacent Pixel Binning (16:9)
Sensor CRA	34 degrees @ 80% field
Guaranteed Temperature Ranges	Operating -20C to+70C Storage -30 to +80C Performance -20C to +60C
Connector	OK-23GM030-04
Lens Model	S1403
Construction	4P
Lens Type	Fixed focus
Field of View (FOV) degrees	Diagonal 84 degrees
Aperture (F#)	2
Focal Length	2.47mm
Distortion (TV)	<1%
Focus Range	30cm - inf

Table 1: Specifications

1.2. Sensor Features

Back-illuminated CMOS image sensor Exmor RTM
2-wire serial communication circuit on chip
CSI2 serial data output (selection of 4lane/2lane)
Timing generator, H and V driver circuits on chip
CDS/PGA on chip
10-bit A/D converter on chip
Automatic optical black (OB) clamp circuit on chip
PLL on chip (rectangular wave)
High sensitivity, low dark current, no smear
Excellent anti-blooming characteristics
Variable-speed shutter function (1 H units)
R, G, B primary color pigment mosaic filters on chip
Max. 30 frame/s in all-pixel scan mode
Pixel rate: 280 MHz (All-pixels mode)
720p/120 frame/s, 1080p (crop)/30 frame/s
Data rate: Max. 755 Mbps/lane

Table 2: Sensor Features

1.3 Applications

- Cellular Phones
- Tablet PCs

1.4 Layout

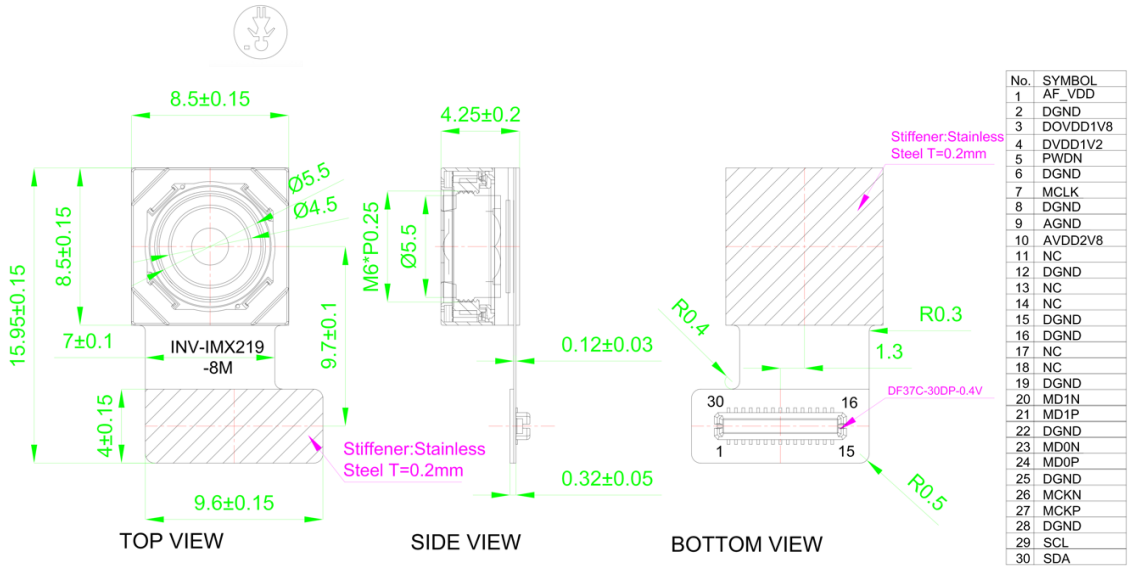

Figure 1: Camera module assembly layout

2 Electrical

2.3 Absolute Maximum Ratings

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
Supply voltage (analogue)	V_{ANA}	-0.3		3.3	V	
Supply voltage (Core)	V_{DDL}	-0.3		2.0	V	
Supply voltage (IF)	V_{DIG}	-0.3		3.3	V	
Input voltage	V_I	-0.3		3.3	V	
Output voltage	V_O	-0.3		3.3	V	
Operating temperature (function)	Topr	-20		60	°C	Junction temperature
Storage temperature	Tstg	-30		80	°C	Junction temperature
Performance guarantee temperature	Tspec	-20		60	°C	Junction temperature

Table 3: Absolute Maximum Ratings

2.4 Recommended Operation Voltage

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
Supply voltage (analogue)	V_{ANA}	2.6	2.8	3.0	V	
Supply voltage (Core)	V_{DDL}	1.08	1.2	1.3	V	
Supply voltage (IF)	V_{DIG}	1.62	1.8	1.98	V	
Analog ripple voltage				20	mVpp	10 kHz-1 MHz needs tobe protected by system

Table 4: Recommended operation voltage

3 Environment Requirements

3.3 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.

3.4 Storage Temperature

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

3.5 Humidity

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

3.6 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)

3.7 High Temperature Test

60C, humidity off, 24 hours

3.8 Low Temperature Test

-20C, humidly 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.

4 Reliability Requirements

4.3 Drop Test

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

4.4 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)

4.5 Salt Fog Test

Condition: 5%nacl solvent Test duration：24H

4.6 ESD (Electronic Discharge)

The camera module shall withstand Electrostatic Discharge of
8KV Contact Discharge
12KV Air Discharge
10 Times for a Second

5 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.

5.3 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 5: Electrical parameter measurements

5.4 Mechanical Parameters

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

Table 6: Mechanical parameter measurements

5.5 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

Table 7: Environmental and Reliability parameter measurements

6 Product Identification TBD

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

7 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.

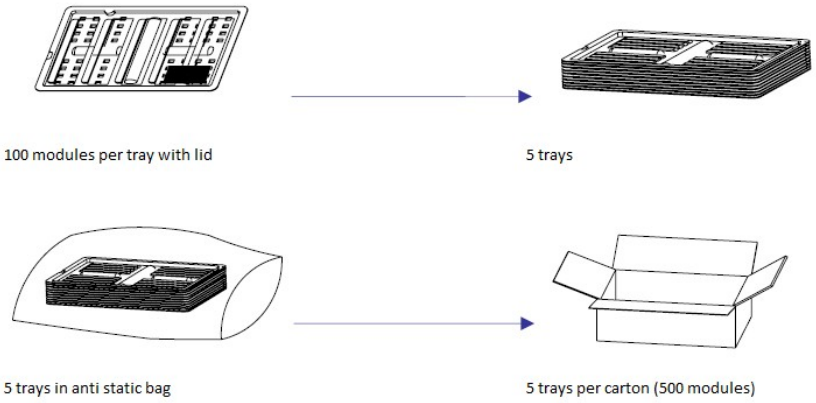

Figure 3: Packaging Example