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Product Specification

Product: InnoCAM_DCM_IMX686PDAF

Part Number: INV-IMX686AF-64MP

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INV-IMX686AF-64MP

REVISION HISTORY

Revision	Description of change	Changed by	Date
1.0	Initial Draft	Jamie Lynn	03/21/2022
1.1			
1.2			
1.3			

APPROVAL

Company	Name	Signature	Date
InnoWave Design LLC	Tony Reed		08/09/2023
InnoWave Design LLC	Jamie Lyn		08/09/2023

Contents

Product Specification	4
1. General	4
1.1. Specifications	4
1.2. Sensor Features	5
1.3. Applications	5
1.4. Layout	6
2. Electrical	7
2.1. Absolute Maximum Ratings	7
2.2. Recommended Operation Voltage	7
3. Environment Requirements	7-8
3.1. Operating Temperature	7
3.2. Storage Temperature	7
3.3. Humidity	7
3.4. Thermal Shock	7
3.5. High Temperature Test	8
3.6. Low Temperature Test	8
4. Reliability Requirements	8
4.1. Drop Test	8
4.2. Random Vibration	8
4.3. Salt Fog Test	8
4.4. ESD (Electronic Discharge)	8
5. Product Performance Verification	8
5.1. Electrical Parameters	9
5.2. Mechanical Parameters	9
5.3. Environmental and Reliability Test Parameters	9
6. Product Identification TBD	9
7 Packaging	10

1. General

The INV-IMX686AF-64MP is an auto focus camera module with a diagonal 9.251 mm (Type 1/1.73) Sony IMX686 64 Mega-pixel CMOS active pixel type stacked image sensor with a square pixel array. It adopts Sony's back-illuminated and stacked CMOS image sensor to achieve high speed image capturing by column parallel A/D converter circuits and high sensitivity and low noise image (comparing with conventional CMOS image sensor) through the backside illuminated imaging pixel structure. R, G, and B pigment primary color mosaic filter is employed. It operates with four power supply voltages: analog 2.9 V and 1.8V, digital 1.1 V and 1.8 V for input/output interface and achieves low power consumption. The camera module has an auto focus lens, holder, VCM and FPC.

1.1. Specifications

Sensor Make and Model	Sony IMX686-FAJH5-C
Sensor Type	CMOS
Resolution	64MP
Active array size	5360x4032
Pixel Size	0.80um x 0.80um
Module Size	11.8x11.3x6.95mm
Optical size	1/1.73"
Output Format	10-bit RAW RGB data
Chroma	Color
Image Size	Diagonal 9.251 mm (Type 1/1.73)
Number of effective pixels	9344 (H) × 7024 (V) approx. 65.6 M pixels
Number of active pixels	9248 (H) × 6944 (V) approx. 64.2 M pixels
Chip Size	8.638 mm (H) × 6.460 mm (V)
Substrate material	Silicon
Frame Rate	30fps@Full resolution (QBC Re-mosaic) 30fps@QBC-HDR 30fps@V2H2 QBC-HDR 120fps@2x2 Adjacent Pixel Binning (16:9) 240fps@2x2 Adjacent Pixel Binning V2H2(16:9)
Sensor CRA	35 degrees
Guaranteed Temperature Ranges	Operating -20C to +85C Storage -30 to +85C Performance -20C to +60C
Lens Manufacturer	Largan
Lens Model	60122A1
Construction	5P
Lens Type	Auto focus
Field of View (FOV) degrees	Diagonal 79.8
Aperture (F#)	1.89
Distortion (TV)	<1.5%



INV-IMX686AF-64MP

Focus Range	10cm - inf
VCM	
VCM Driver	DW9800W

Table 1: Specifications

1.2. Sensor Features

Back-illuminated and stacked CMOS image sensor Exmor RSTM
Single Frame High Dynamic Range (HDR) with equivalent full pixels.
High signal to noise ratio (SNR).
Full resolution @24fps (Normal / HDR). 4K2K @30fps (Normal / HDR) 1080p @60fps (Normal / HDR)
Output video format of RAW10/8, COMP8/6.
Pixel binning readout and H/V sub-sampling function.
Advanced Noise Reduction (Chroma noise reduction and RAW noise reduction).
Independent flipping and mirroring.
CSI-2 serial data output (MIPI 2lane/4lane, Max. 1.5Gbps/lane, D-PHY spec. ver. 1.1 compliant)
2-wire serial communication.
Two PLLs for independent clock generation for pixel control and data output interface.
Dynamic Defect Pixel Correction.
Zero shutter lag.
Power-on reset function
Dual sensor synchronization operation.
9K bit of OTP ROM for users.
Built-in temperature sensor

Table 2: Sensor Features

1.3. Applications

- Cellular Phones
- Tablet PCs

INV-IMX686AF-64MP

1.4. Layout

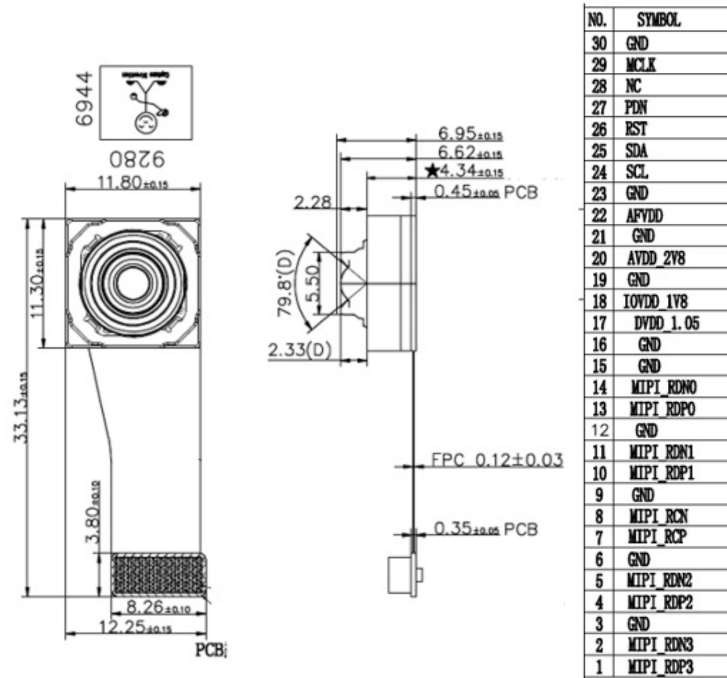


Figure 1: camera module assembly layout

2. Electrical

2.1. Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	notes
Supply voltage (analog1)	VANA1	-0.3 to +4.2	V	refer to VSS level
Supply voltage (analog2)	VANA2	-0.3 to +2.52	V	
Supply voltage (digital)	VDIG	-0.3 to +1.54	V	
Supply voltage (interface)	VIF	-0.3 to +2.52	V	
Input voltage (digital)	VI	-0.3 to +2.52	V	
Output voltage (digital)	VO	-0.3 to +2.52	V	

Table 3: Absolute Maximum Ratings

2.2. Recommended Operation Voltage

Item	Symbol	Ratings	Unit	notes
Supply voltage (analog1)	VANA1	2.9 ± 0.1	V	refer to VSS level
Supply voltage (analog2)	VANA2	1.8 ± 0.1	V	
Supply voltage (digital)	VDIG	1.1 ± 0.1	V	
Supply voltage (interface)	VIF	1.8 ± 0.1	V	

Table 4: Recommended operation voltage

3. Environment Requirements

3.1. 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.

3.2. Storage Temperature

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

3.3. Humidity

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

3.4. 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)



INV-IMX686AF-64MP

3.5. High Temperature Test

60C, humidity off, 24 hours

3.6. 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.

4. Reliability Requirements

4.1. Drop Test

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

4.2. 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)

4.3. Salt Fog Test

Condition: 5%nacl solvent Test duration: 24H

4.4. 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.

5.1. 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 5: Electrical parameter measurements

5.2. 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

5.3. 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

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.

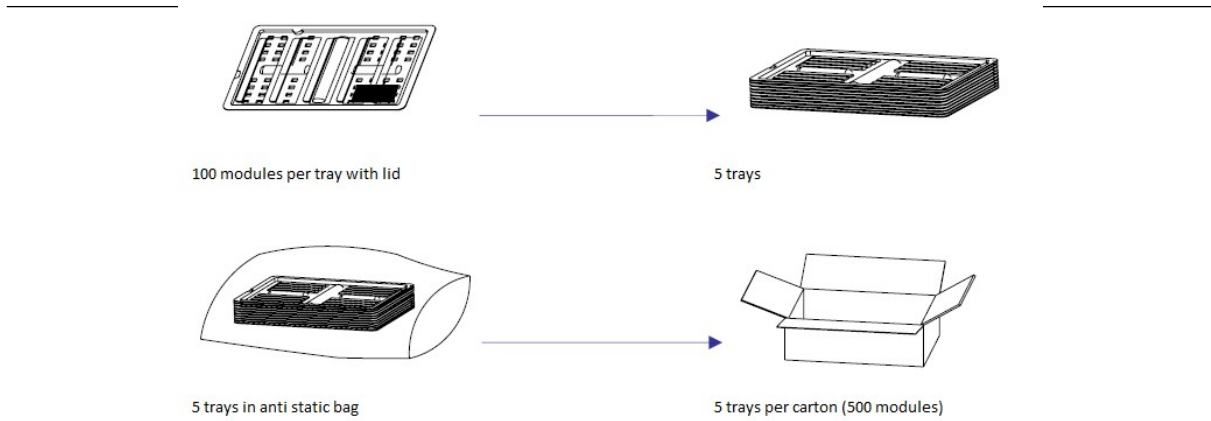


Figure 4: Packaging Example