Product Specification

Product: InnoCAM_DCM_IMX258PDFF

Product Part Number: INV-IMX258FF-13MP

Revision: Rev 1.0

Document No: INV405

REVISION HISTORY

Revision	Description of change	Changed by	Date
1.0	Initial Draft	Jamie Lynn	03/22/2022

APPROVAL

Company	Name	Signature	Date
InnoWave Design LLC	Tony Reed		05/17/2022
InnoWave Design LLC	Jamie Lynn		05/17/2022

Contents

1. General

The camera module has the Sony IMX258 color CMOS 13-megapixel sensor with 1.2-micron pixel architecture, fixed focus lens, holder, and custom FPC.

1.1. Specifications

Sensor Make and Model	Sony IMX258-0AQH5-C (RGB)
Sensor Type	CMOS
Resolution	13.2MP
Active array size	4208 x 3120 pixels
Pixel Size	1.12um x 1.12um
Module Size	8.5x8.5x4.63mm
Optical size	1/3.06"
Output Format	10-bit RAW RGB data
Chroma	Color
Image Area Size	Diagonal 5.867mm (Type 1/3.06)
Total number of pixels	4224 (H) × 3192 (V) approx. 13.48 M pixels
Number of effective pixels	4224 (H) × 3144 (V) approx. 13.28 M pixels
Number of active pixels	4208 (H) × 3120 (V) approx. 13.13 M pixels
Chip Size	5.990 mm (H) x 3.908 mm (V)
Substrate material	Silicon
Frame Rate	Full @30fps
Sensor CRA	34.5 degrees @ 80% field
Absolute Maximum Voltage Ratings	Supply voltage (analog) -0.3 to +3.3 V Supply voltage (digital) -0.3 to +1.8 V Supply voltage (interface) -0.3 to +3.3 V Input voltage (digital) -0.3 to +3.3 V Output voltage (digital) -0.3 to +3.3 V
Recommended Operating Voltage	Supply Voltage (Analog) 2.7 +0.2/-0.2 V Supply Voltage (Digital) 1.2 +/- 0.1 V Supply Voltage (Interface) 1.8 +/- 0.1 V
Input Clock Frequency	6 - 27 MHz
Guaranteed Temperature Ranges	Operating -20C to+70C Storage -30 to +80C Performance -20C to +60C
Lens Manufacturer	Largan
Lens Model	50021
Construction	5P
Lens Type	Fixed Focus
Maximum Image Circle	6.31 mm
Field of View (FOV) degrees	Vertical 44.3 Horizontal 57.6 Diagonal 69.0
Aperture (F#)	2.0 +/-5%

EFL	4.24mm
Flange Back Length (FB)	5.1 +/-0.1 mm (From top barrel to image plane at infinity, including 0.3mm IRF) (1)mm (From rear barrel to image plane at infinity, including 0.3mm IRF)
Relative illumination at sensor corner	0.423
Distortion (TV)	<1.0%
Distortion (Optical)	<2.0%
Lens CRA	<32 deg
Lens Resolution (MTF) On Axis 80% Field	 35%(S、T) @ 446 Lp/mm 62%(S、T) @ 223 Lp/mm 70%(S、T) @ 149 Lp/mm 75%(S、T) @ 112 Lp/mm 5%(S)、13%(T) @ 446 Lp/mm 25%(S)、28%(T) @ 223 Lp/mm 30%(S)、35%(T) @ 149 Lp/mm 50%(S)、53%(T) @ 112 Lp/mm
Focus Range	1.87m to infinity
Calculated Hyperfocal distance	3.75m
Thread	M6.5 * P0.25

Table 1: Specifications

1.2. Sensor Features

Back-illuminated and stacked CMOS image sensor
Phase Detection pixel data output for Phase Detection Auto Focus
High Dynamic Range (HDR) mode with raw data output.
High signal to noise ratio (SNR).
Full resolution @30fps (Normal / HDR). 4K2K @30fps (Normal / HDR) 1080p @60fps (Normal)
Output video format of RAW10/8.
Pixel binning readout and V sub-sampling function.
Independent flipping and mirroring.
CSI-2 serial data output (MIPI 2lane/4lane, Max. 1.3Gbps/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.
Fast mode transition. (on the fly)
Dual sensor synchronization operation.
4K bit of OTP ROM for users.
Built-in temperature sensor

Table 2: Sensor Features

1.3. Layout

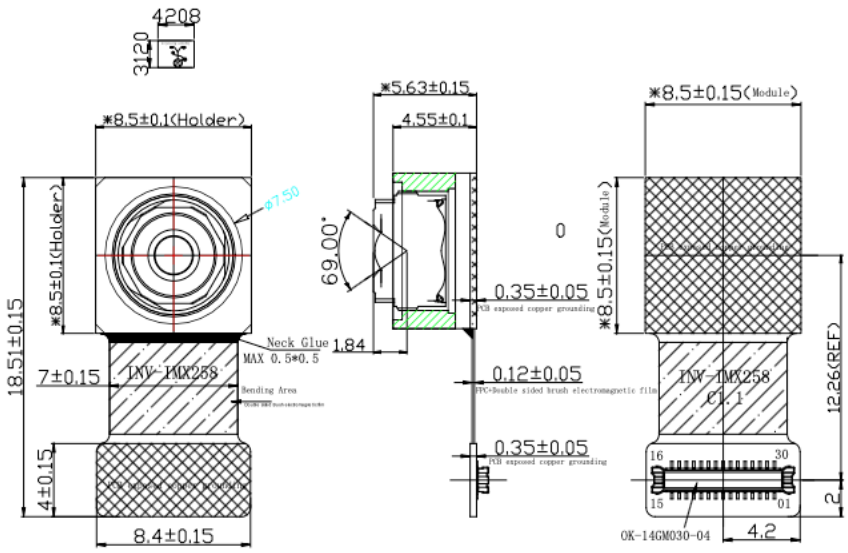

Figure 1: camera module assembly layout

Pin Assignment	
1	DGND
2	AF GND (NC)
3	SDA
4	NC
5	D0VDD 1.8V
6	SCL
7	AGND
8	NC
9	AVDD 2.8V
10	DVDD 1.2V
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

2. Environmental Requirements

2.1. Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	notes
Supply voltage (analog)	VANA	-0.3 to +3.3	V	**refer to VSS level**
Supply voltage (digital)	VDIG	-0.3 to +1.8	V	
Supply voltage (interface)	VIF	-0.3 to +3.3	V	
Input voltage (digital)	VI	-0.3 to +3.3	V	
Output voltage (digital)	VO	-0.3 to +3.3	V	
Guaranteed Operating temperature	TOPR	-20 to +70	°C	
Guaranteed storage temperature	TSTG	-30 to +80	°C	
Guaranteed performance temperature	TSPEC	-20 to +60	°C	

Table 3: Absolute maximum power ratings

2.2. Recommended Operation Voltage

Item	Symbol	Ratings	Unit	notes
Supply voltage (analog)	VANA	2.7 +0.2/-0.1	V	refer to VSS level
Supply voltage (digital)	VDIG	1.2 ± 0.1	V	
Supply voltage (interface)	VIF	1.8 ± 0.1	V	

Table 4: Recommended operation voltage

2.3. 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.

2.4. Storage Temperature

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

2.5. Humidity

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

2.6. 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)

2.7. High Temperature Test

60C, humidity off, 24 hours

2.8. 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.

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
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 5: Electrical parameter measurements

4.2. Image 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 6: Image parameter measurements

4.3. Mechanical Parameters

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

Table 7: Mechanical parameter measurements

4.4. 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 8: Environmental and Reliability parameter measurements

5. Product Identification TBD

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

6. 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.

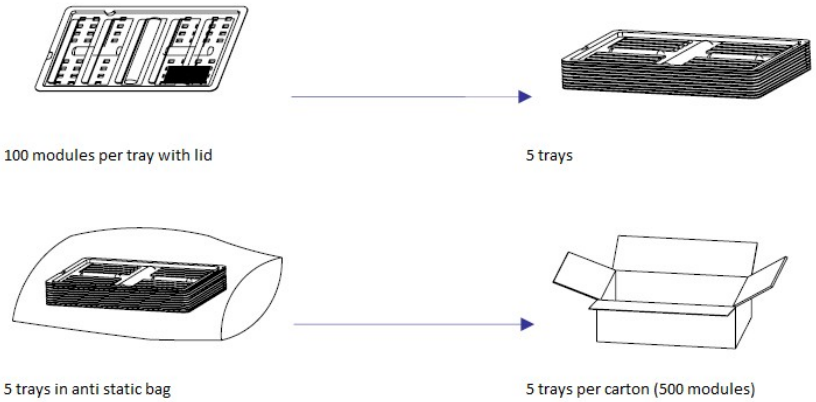

Figure 3: Packaging Example