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Product Specification

Product: InnoCAM_DCM_VD56G3FF-PDAF

Part Number: INV-VD56G3FF-1.5MP

Revision: Rev 1.2

Document No: INV448

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INV-VD56G3FF-1.5MP

REVISION HISTORY

Revision	Description of change	Changed by	Date
1.0	Initial Draft	Jamie Lynn	11/06/2025
1.1	Updated with new connector and pinout	Jamie Lynn	11/10/2025
1.2	Updated with Schematic	Jamie Lynn	01/13/2026

APPROVAL

Company	Name	Signature	Date
InnoWave Design LLC	Jamie Lynn		12/02/2025
InnoWave Design LLC	Tony Reed		12/04/2025



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1. General

The camera module INV-VD56G3FF-1.5MP is a compact, high-sensitive 1.5 megapixel monochrome global shutter camera module.

1.1. Sensor Features

Cutting-edge performance of ST proprietary pixel:

- BSI structure provides superior QE, MTF, and angular response.
- Full DTI technology further increases sensitivity and sharpness.
- Benefits both visible and NIR imaging (850 nm and 940 nm).
- Proprietary technology from ST foundry in France, ensuring safe supply.

Easy integration into your system:

- Ultracompact die with a centered design to minimize your system size.
- Small optical format: 4.6 mm (1/4") at full resolution and 3.7 mm (1/5") with 1 MP crop.
- Low power, ideal for battery-powered devices.
- Robust design and image quality in temperature.

A complete toolbox of in-sensor features:

- Stunning images with in-sensor autoexposure and various corrections.
- Multiple features to optimize data size and frame rates such as crop, binning, and programmable sequences.
- 8 GPIOs enabling extra controls such as trigger or LED synchronization.

Seamless connection to embedded processing platforms:

- 1 or 2 lanes MIPI CSI-2 interface enabling straight connection to entry-level cost-effective processing platforms.
- Start immediately your development with our turnkey sensor boards, modules, and drivers for the VD56G3 image sensor.

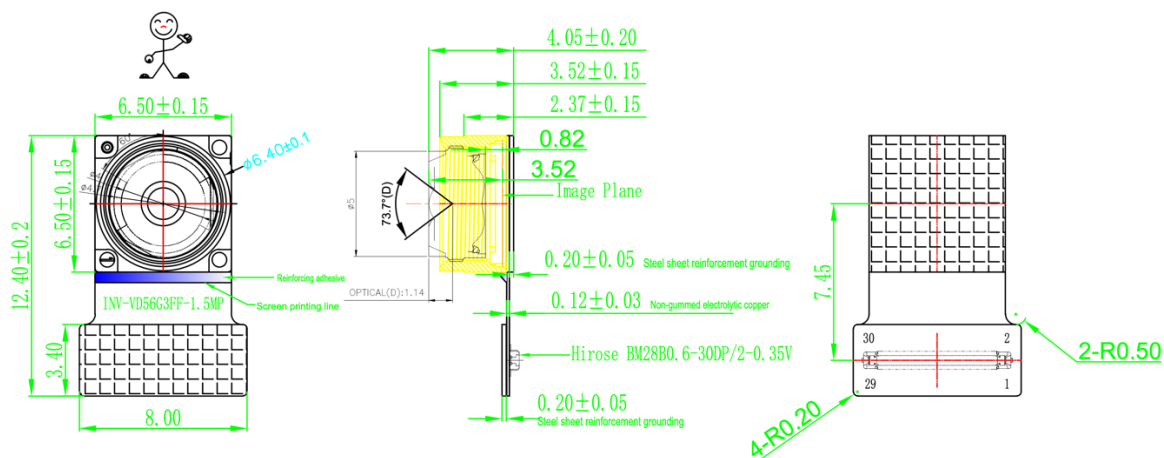
INV-VD56G3FF-1.5MP

1.2. Specifications

Make and Model	STMicroelectronics VD56G3
Resolution	1.53 MP
Pixels Array	1124H x 1364V
Lens Elements	1/3.44"-5P
EFL	3.08mm
F.No	2.0±5%
FoV	D73.7°, H60°, V51°
Distortion	<1.5%
Lens Type	¼ inch
Aspect Ratio	5:6
Shutter Type	Global Shutter
Illumination Type	BSI
Pixel Size	2.61 µm
Color Options	Monochrome
Frame Rate - Full Resolution	88fps
Frame Rate - 1MP Resolution	121fps
Frame Rate - VGA Resolution	237fps
Pixel array size [H x V]	2.93 mm x 3.56 mm
Optical format	1/4" (4.61 mm)
Die footprint [H x V]	3.65 mm x 4.34 mm
Die centering (optical vs. mechanical)	Yes
Die pinout	115 pins
Operating temperature range	-30 to +85°C
Sensor data interface	MIPI CSI-2 1 or 2 lanes
Sensor control interface	I²C, up to 1 Mbits/s
Output format	RAW8, RAW10
Supply voltages	2.8 V – 1.8 V – 1.15 V
External clock frequency	6 to 27 MHz
Power consumption	120 mW (typical) 4 mW (standby)
Image quality optimization	- Autoexposure - Automatic dark calibration - Defective pixel correction - Analog and digital gains - Binning
Data and frame rate optimization	- Cropping - Subsampling - Context management with up to 4 contexts

1.3. Layout

Figure 1: Camera module assembly layout



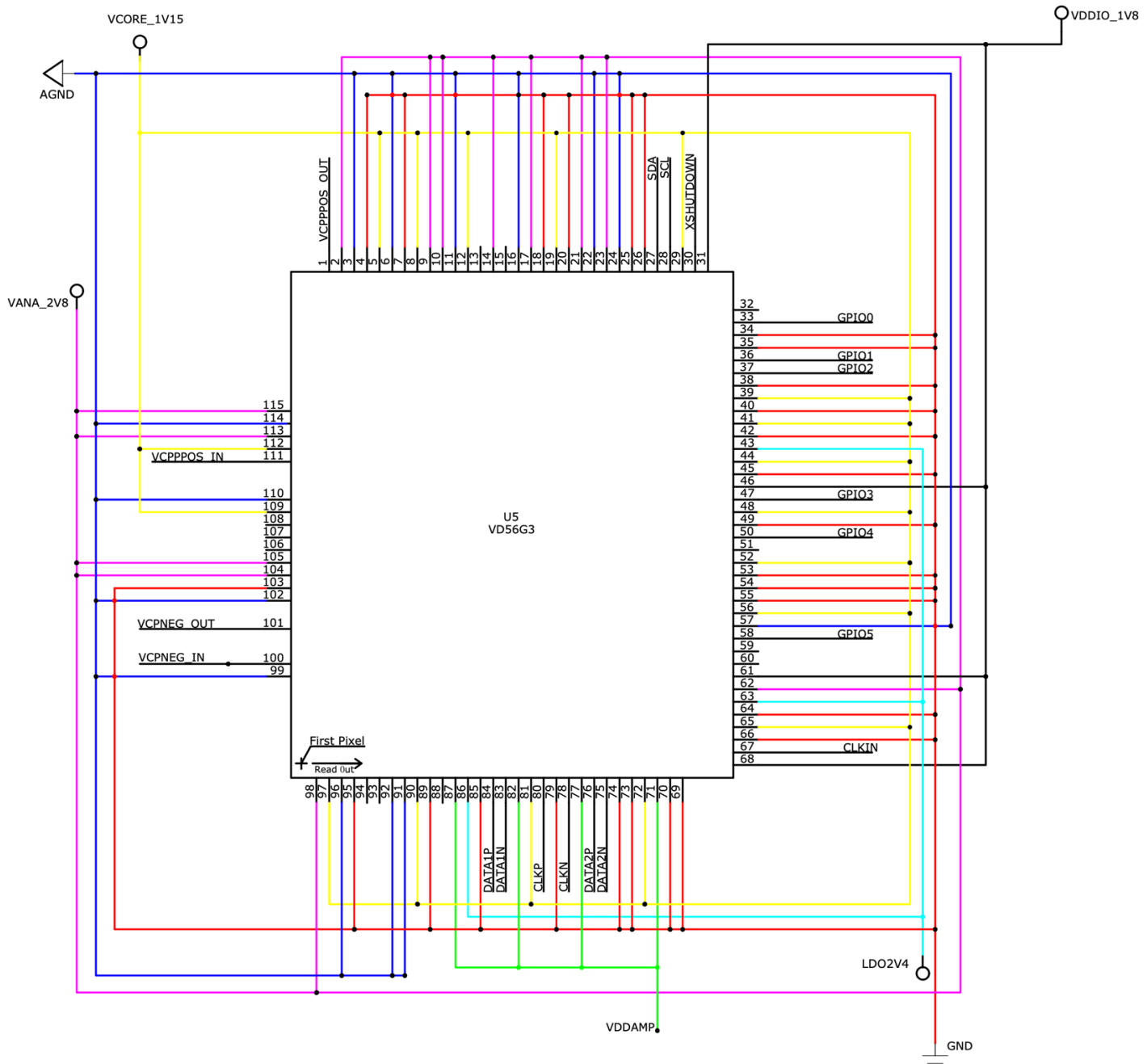
Notes:

Lens – 50150A1

Sensor Slave Address: 0X20(W); 0X21(R) VCM driver : /EEPROM : /,Address: /

Pin Assignment	
1	VANA_2V8
2	GND
3	GND
4	VCORE_1V15
5	VDDIO_1V8
6	XSHUTDOWN
7	GPIO0
8	GND
9	GPIO1
10	DATA1P
11	GPIO2
12	DATA1N
13	GPIO3
14	GND
15	GPIO4
16	CLKP
17	GPIO5
18	CLKN
19	NC
20	GND
21	NC
22	DATA2P
23	GND
24	DATA2N
25	SCL
26	GND
27	SDA
28	CLKIN
29	GND
30	GND

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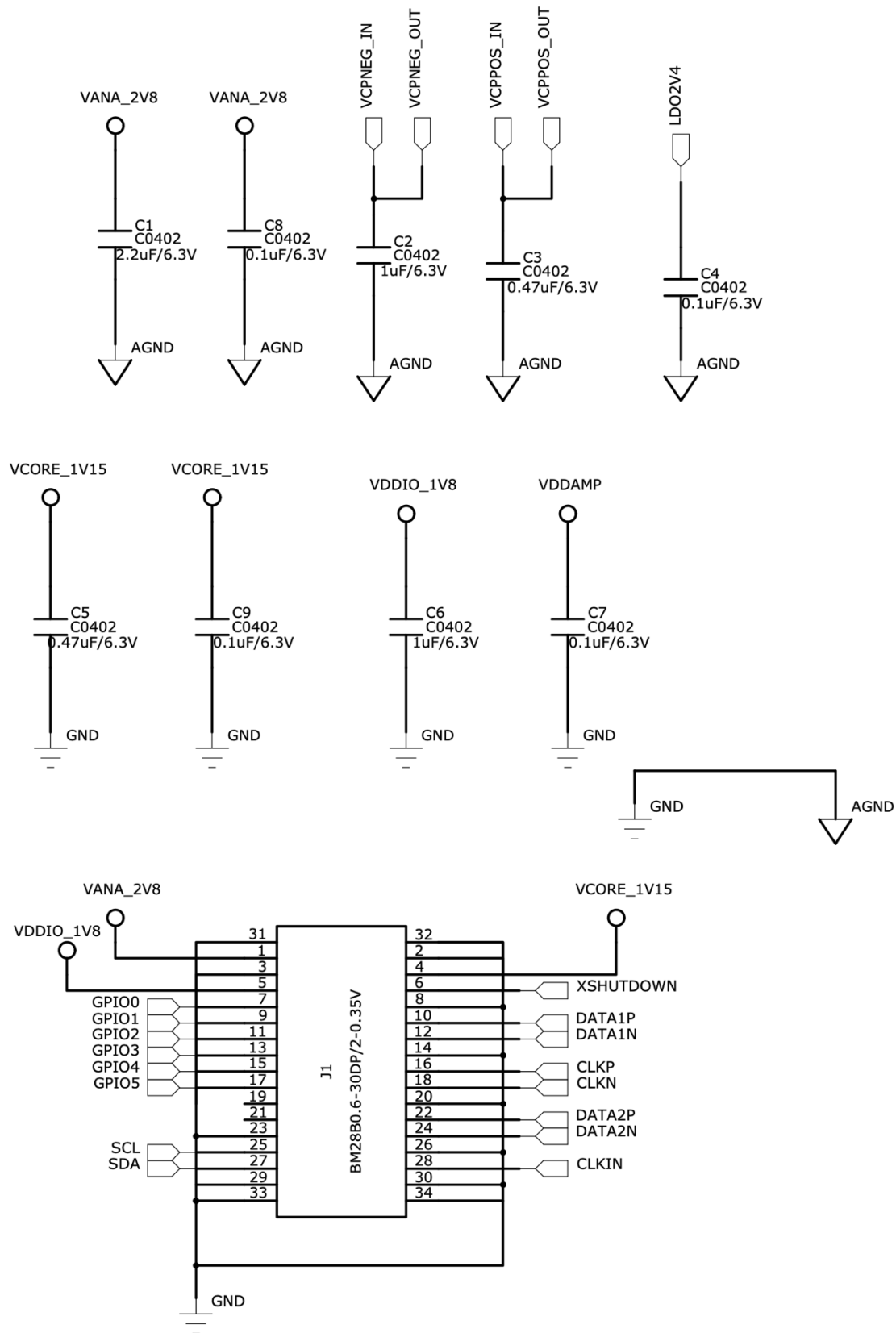


Figure 2: Schematics

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)



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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

All modules will be marked with an identification number using laser marking.

4. Packaging

Each camera module will be individually wrapped in ESD bags and accompanied by a corresponding sticker as follows:



Finished Good: CAM-6G3-070CLR\$1

Figure 3: Packaging Example