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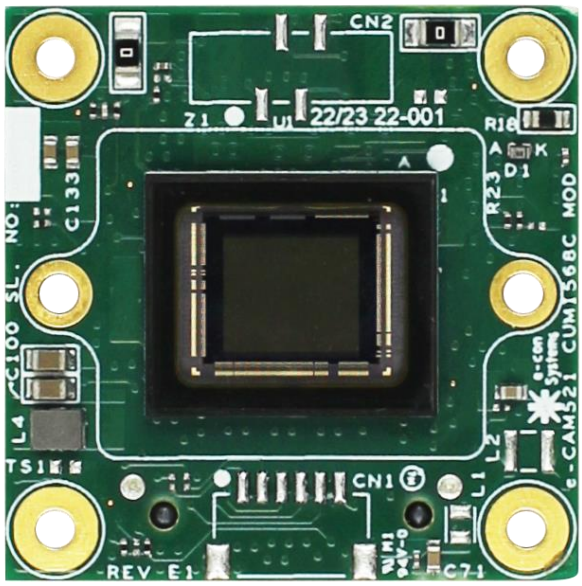
e-CAM521_CUMI568C_MOD_H01R1



Camera Module Datasheet

Revision 1.4
07th March 2024

Contents

1 Introduction

e-CAM521_CUMI568C_MOD_H01R1 is a 5 MP, MIPI, global shutter color camera from e-con Systems, a company with over two decades of experience in designing, developing, and manufacturing OEM cameras. It is based on IMX568 CMOS image sensor from Pregius S SONY®. e-CAM521_CUMI568C_MOD_H01R1 is designed to connect with any application processor that has MIPI interface.

This document serves as the datasheet for e-CAM521_CUMI568C_MOD_H01R1 with electrical, mechanical and software features.

2 Disclaimer

The specifications and features of e-CAM521_CUMI568C_MOD_H01R1 camera board are provided here as reference only and e-con Systems reserves the right to edit/modify this document without any prior intimation of whatsoever.

3 Description

e-CAM521_CUMI568C_MOD_H01R1 manual focus camera module is based on IMX568 CMOS image sensor from Pregius S Sony®. The IMX568 is a 1/1.8" optical form-factor, CMOS image sensor with global shutter. e-CAM521_CUMI568C_MOD_H01R1 can stream video with various supported resolutions as mentioned in the Table1.

The front view of e-CAM521_CUMI568C_MOD_H01R1 is shown in the below figure.

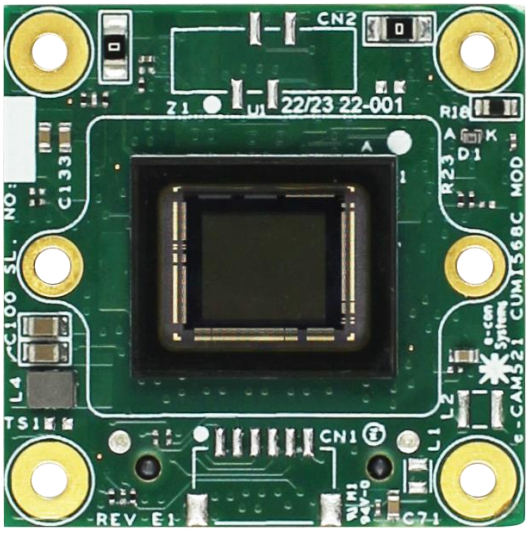


Figure 1: e-CAM521_CUMI568C_MOD_H01R1 Camera Module

3.1 Camera Module Features

The features of camera module are as follows:

- 1/1.8" optical form-factor, 5 MP camera module
- Global shutter camera sensor
- Manual focus lens option with S-Mount holder
- MIPI CSI-2 2lane and 4lane video output
- External Trigger supported.
- Operating Voltage: 3.3V ±5%, Power consumption: ~1W
- Small form factor 30 mm x 30 mm
- Restriction of Hazardous Substances (RoHS) compliant

3.2 CMOS Image Sensor Features

The features of CMOS image sensor are as follows:

- IMX568 – 5 MP RAW 10/12-bit CMOS image sensor from SONY®
- RGB RAW 10-bit/12-bit Data per pixel
- 1/1.8" optical form-factor
- Unit cell size: 2.74 µm x 2.74 µm

3.3 Maximum Frame Rate Supported

The maximum frame rate supported in e-CAM521_CUMI568C_MOD_H01R1 for 2-lane and 4-lane are listed in the below table.

Resolution	Lanes	Frame Rate(fps) in 10-bit Output	Frame Rate(fps) in 12-bit Output
2432 x 2048	2-lane	42	35
	4-lane	79	67
1920 x 1080	2-lane	76	64
	4-lane	142	121
1280 x 720	2-lane	109	92
	4-lane	202	172
640 x 480	2-lane	153	129
	4-lane	280	240

Table 1: Maximum Frame Rate Supported

4 Pin Description

e-CAM521_CUMI568C_MOD_H01R1 has dual row, 26-pin connector. The pin numbers, signal names, pin types and their description from sensor perspective are listed in the below table.

CN1 Pin No	Signal Nam	Pin Type	Description
1	MIPI_CLK_N	OUTPUT	MIPI Clock Lane Differential Pair -

2	MIPI_DATA0_N	OUTPUT	MIPI Data Lane 0 Differential Pair -
3	MIPI_CLK_P	OUTPUT	MIPI Clock Lane Differential Pair +
4	MIPI_DATA0_P	OUTPUT	MIPI Data Lane 0 Differential Pair +
5	GND	POWER	Ground signal for digital and analog
6	GND	POWER	Ground signal for digital and analog
7	MIPI_DATA2_N	OUTPUT	MIPI Data Lane 2 Differential Pair -
8	I2C_SCL	INPUT	1.8V IO I2C Clock signal with internal pull-up of 4.7k
9	MIPI_DATA2_P	OUTPUT	MIPI Data Lane 2 Differential Pair +
10	I2C_SDA	Bi-Directional	1.8V IO I2C Data signal with internal pull-up of 4.7k
11	GND	POWER	Ground signal for digital and analog
12	RESET	INPUT	Camera reset signal (Active low)
13	MIPI_DATA3_N	OUTPUT	MIPI Data Lane 3 Differential Pair -
14	BOOT	INPUT	1.8V IO camera Boot signal with internal pull down of 470k
15	MIPI_DATA3_P	OUTPUT	MIPI Data Lane 3 Differential Pair +
16	GND	POWER	Ground signal for digital and analog
17	GND	POWER	Ground signal for digital and analog
18	CAM_HSYNC	Bi-Directional	Horizontal frame synchronization for camera
19	MIPI_DATA1_N	OUTPUT	MIPI Data Lane 1 Differential Pair -
20	CAM_VSYNC	Bi-Directional	Vertical frame synchronization for camera
21	MIPI_DATA1_P	OUTPUT	MIPI Data Lane 1 Differential Pair +
22	CAM_XMASTER	INPUT	1.8V Master or slave control pin with internal pulldown of 4.7K
23	GND	POWER	Ground signal for digital and analog
24	SEN_TRIG	INPUT	1.8V Camera trigger signal
25	RESERVED	RSVD	Reserved for future use
26	VCC_3P3	POWER	3.3V Input Power Supply for camera

Table 2: Pin Descriptions

4.1 Mating Connector Details

The details of mating connectors are listed in the below table.

Connector	Description	Manufacturer	Part Number
On-board connector	0.80 mm, Board - Board, 26 pin	Samtec	ERM8-013-03.0-L-DV-L-K-TR
Mating connector	0.80 mm, Board - Board, 26 pin	Samtec	ERF8-013-05.0-L-DV-L-K-TR

Table 3: Mating Connector Details

5 Electrical Specification

The electrical specification of e-CAM521_CUMI568C_MOD_H01R1 are as follows:

- Power Consumption

5.1 Power Consumption

The recommended operating power consumption of e-CAM521_CUMI568C_MOD_H01R1 in active mode are listed in the below table.

Resolution	Bits Per Pixel (bpp)	Voltage (V)	Frame Rate(fps)	Power Consumption (W) for one camera
2432 x 2048	12	3.3	67	0.6468
2432 x 2048	10	3.3	79	0.6336
1920 x 1080	12	3.3	121	0.6369
1920 x 1080	10	3.3	142	0.627
1280 x 720	12	3.3	172	0.6303
1280 x 720	10	3.3	202	0.6204
640 x 480	12	3.3	240	0.6237
640 x 480	10	3.3	280	0.6138

Table 4: Power Consumption in 4-lane configuration

5.2 Functional Temperature Range

The functional temperature range of e-CAM521_CUMI568C_MOD_H01R1 is listed in the below table.

Temperature Range	Parameter Description
-30°C to 70°C	Electrically functional operating range

Table 5: Functional Temperature Range

5.3 DC Characteristics

The typical condition: EXTCLK = 37.125MHz; Analog Voltage AVDDHx = 2.9V, VDD33x = 3.3V; Interface Voltage IOVDD = 1.8 V; Digital Voltage DVDDLx = 1.1 V @TA = 25°C.

The DC characteristics of e-CAM521_CUMI568C_MOD_H01R1 HSYNC, VSYNC, XMASTER and TRIGGER are shown in the below table.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Digital Input Signals						
V_{IL}	Input voltage LOW	IOVDD = 1.8 V	-		0.3 × IOV_{DD}	V
V_{IH}	Input voltage HIGH	IOVDD = 1.8 V	0.7 × IOV_{DD}		-	V
Digital Output Signals						
V_{OL}	Output voltage LOW	IOVDD = 1.8 V	-		0.2	V
V_{OH}	Output voltage HIGH	IOVDD = 1.8 V	IOV_{DD} – 0.2		-	V

Table 6: DC Characteristics of IO Signals

The DC characteristics of e-CAM521_CUMI568C_MOD_H01R1 RESET and BOOT are shown in the below table.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Digital Input Signals						
V_{IL}	Input voltage LOW	IOVDD = 1.8 V	-		0.14 × IOV_{DD}	V
V_{IH}	Input voltage HIGH	IOVDD = 1.8 V	1.4		-	V

Table 7: DC Characteristics of RESET and BOOT Signal

Note: e-con Systems recommends the working voltage levels to be typically $1.8V_{DC}$ and not to reach the maximum limit.

5.4 Power-Up Sequence

The e-CAM521_CUMI568C_MOD_H01R1 camera module uses 3.3V supply for camera's power. There is not any specific power-up sequence should be followed. Power up sequence is already taken care in the camera module board. Only 3.3V power is sufficient to operate this module.

6 Mechanical Specifications

The module size is 30 mm x 30 mm and the stack-up height of the board with its mating connector is 8 mm.

The e-CAM521_CUMI568C_MOD_H01R1 board drawings and dimensions are described in the following section.

6.1 e-CAM521_CUMI568C_MOD_H01R1 Mechanical Drawing

The top and bottom views of e-CAM521_CUMI568C_MOD_H01R1 mechanical drawing with optical orientations are shown in the below figures.

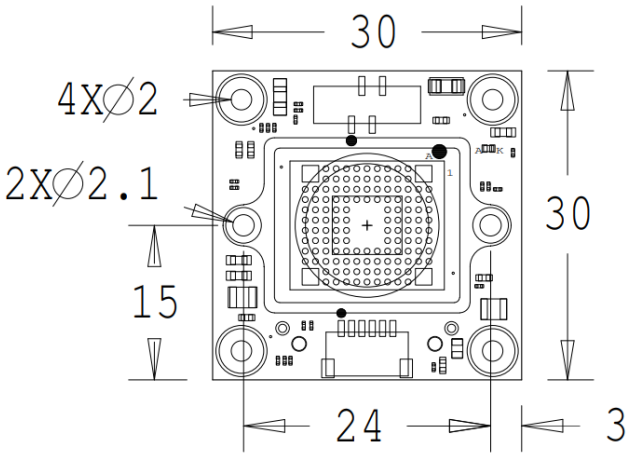


Figure 3: Top View of e-CAM521_CUMI568C_MOD_H01R1 Mechanical Drawing

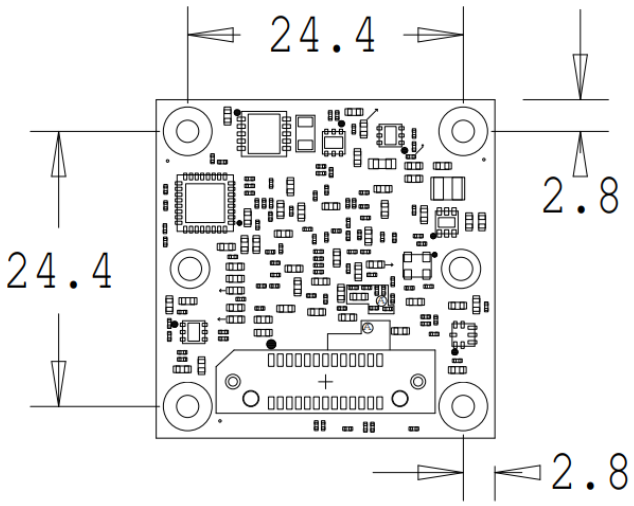


Figure 4: Bottom View of e-CAM521_CUMI568C_MOD_H01R1 Mechanical Drawing (Mirrored)

Note:

- All dimensions are in mm.
- Board outline dimension tolerance should be within ±0.2mm.
- Further mechanical details will be provided based on your request.

6.2 Mechanical Part Details

The mechanical accessories for e-CAM521_CUMI568C_MOD_H01R1 camera board is listed in the below table.

Part	Quantity	Specification
e-LH-MS-1325-006	1	Lens Holder M12x0.5
1541641	2	Screws M2X0.4 Pitch

Table 8: Mechanical Part Details

Revision History

Rev	Date	Description	Author
1.0	08-August-2023	Initial Draft	Camera Team - Products
1.1	20-October-2023	Updated with 2-lane configuration and new resolution 2432x2048	Camera Team - Products
1.2	31-October-2023	Updated resolution to 5 MP	Camera Team – Products
1.3	16-November-2023	Updated the supported resolutions and added power consumption details for the same	Camera Team – Products
1.4	07-March-2024	Removed the platform specific data	Camera Team – Products

Support

Contact Us

If you need any support on e-CAM521_CUMI568C_MOD_H01R1 product, please contact us using the Live Chat option available on our website - https://www.e-consystems.com/

Creating a Ticket

If you need to create a ticket for any type of issue, please visit the ticketing page on our website - https://www.e-consystems.com/create-ticket.asp

RMA

To know about our Return Material Authorization (RMA) policy, please visit the RMA Policy page on our website - https://www.e-consystems.com/RMA-Policy.asp

General Product Warranty Terms

To know about our General Product Warranty Terms, please visit the General Warranty Terms page on our website - https://www.e-consystems.com/warranty.asp