

# DMM 36SX296-ML

## Technical Reference Manual



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## 1 Quick Facts

General	
Dynamic Range	10 bit
Resolution	1440x1080
Frame Rate at Full Resolution	60
Pixel Formats	10-Bit Monochrome

Optical Interface	
Sensor Type	Sony IMX296LQR-C
Shutter Type	Global
Sensor Format	1/2.9 inch
Pixel Size	3.45 $\mu\text{m}$

Electrical Interface	
Interface	22-Pin FFC Connector
Supply voltage	3.3V ( $\pm 5\%$ )
Current consumption	approx 300 mA @ 3.3 VDC

Mechanical Data	
Dimensions	H: 30 mm, W: 30 mm, L: 6 mm
Mass	4 g

Adjustments	
Shutter	1 $\mu\text{s}$ to 1 s
Gain	0 dB to 48 dB

Environmental	
Device Temperature (operating) *	-30 °C to 85 °C
Sensor Temperature (operating, performance guarantee)	-10 °C to 60 °C
Temperature (storage)	-40 °C to 85 °C
Humidity (operating)	20 % to 80 % (non-condensing)
Humidity (storage)	20 % to 95 % (non-condensing)

\*) See section Temperature Measurement Point for details.



## 2 Electrical Characteristics

### 2.1 Absolute Maximum Ratings

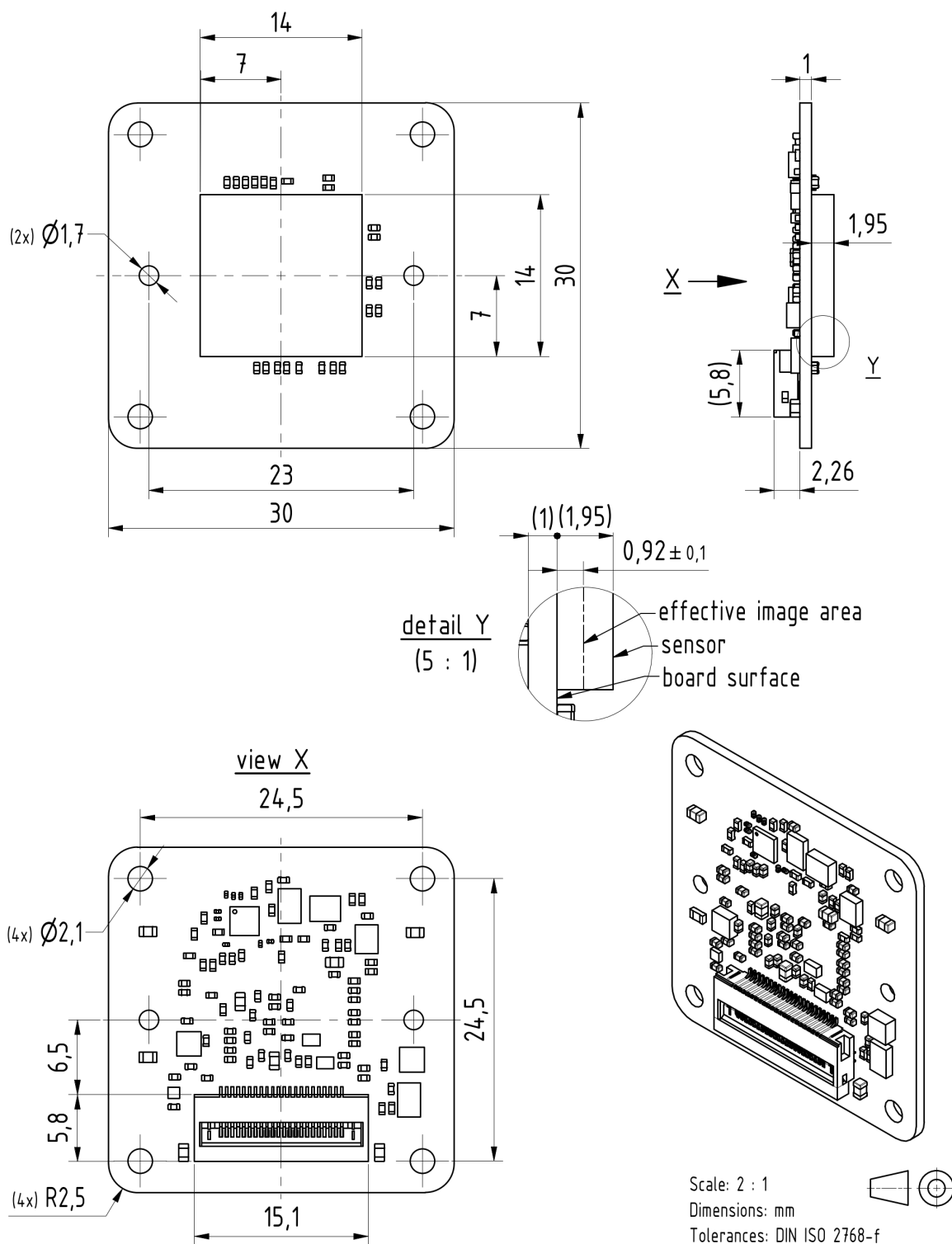
Item	Symbol	Pins	Min	Max	Unit
Supply voltage	+3V3_D (VCC)	22	-0.3	+5.5	V
I/O voltage	GPIO1 GPIO2	17 18	-0.3	VCC	V
I2C voltage	IC2_SCL I2C_SDA	20 21	-0.5	+3.8	V

### 2.2 Recommended Operating Conditions

Item	Symbol	Pins	Min	Typ	Max	Unit
Supply voltage	+3V3_D (VCC)	22	+3.1	+3.3	+3.5	V
I/O voltage	GPIO1 GPIO2	17 18	+2.9	+3.3	VCC	V
I2C voltage	IC2_SCL I2C_SDA	20 21	+2.9	+3.3	VCC	V

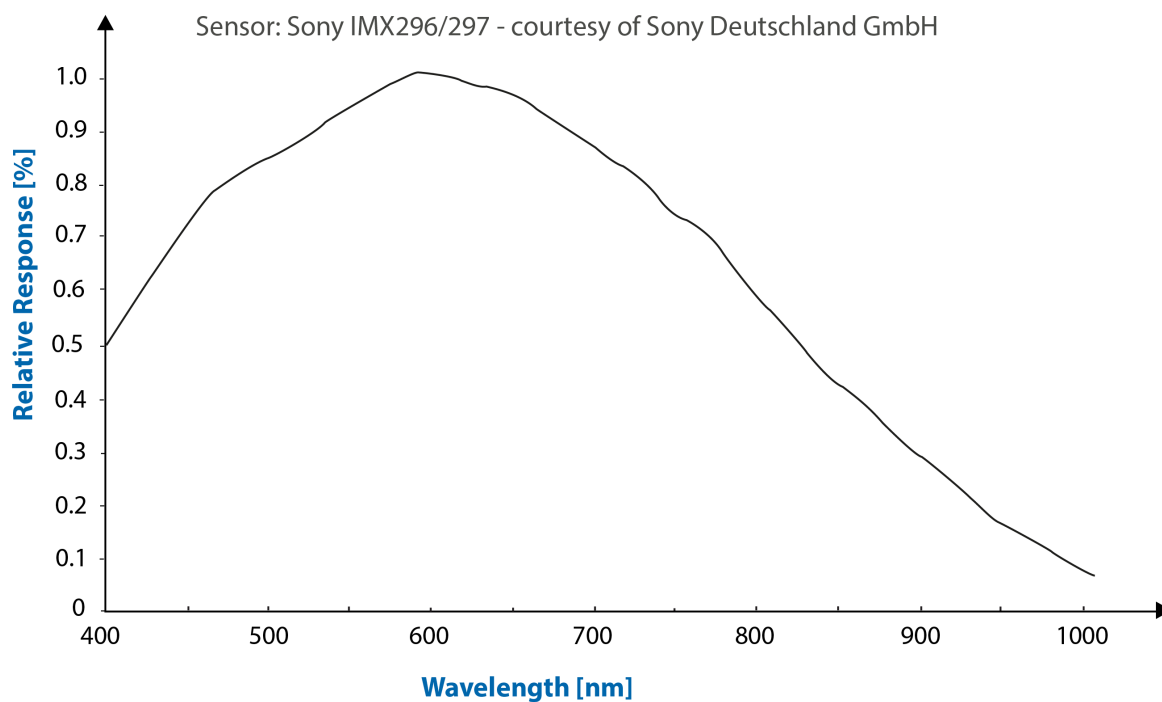
## 3 Dimensional Diagrams

### 3.1 DMM 36SX296-ML Board Camera



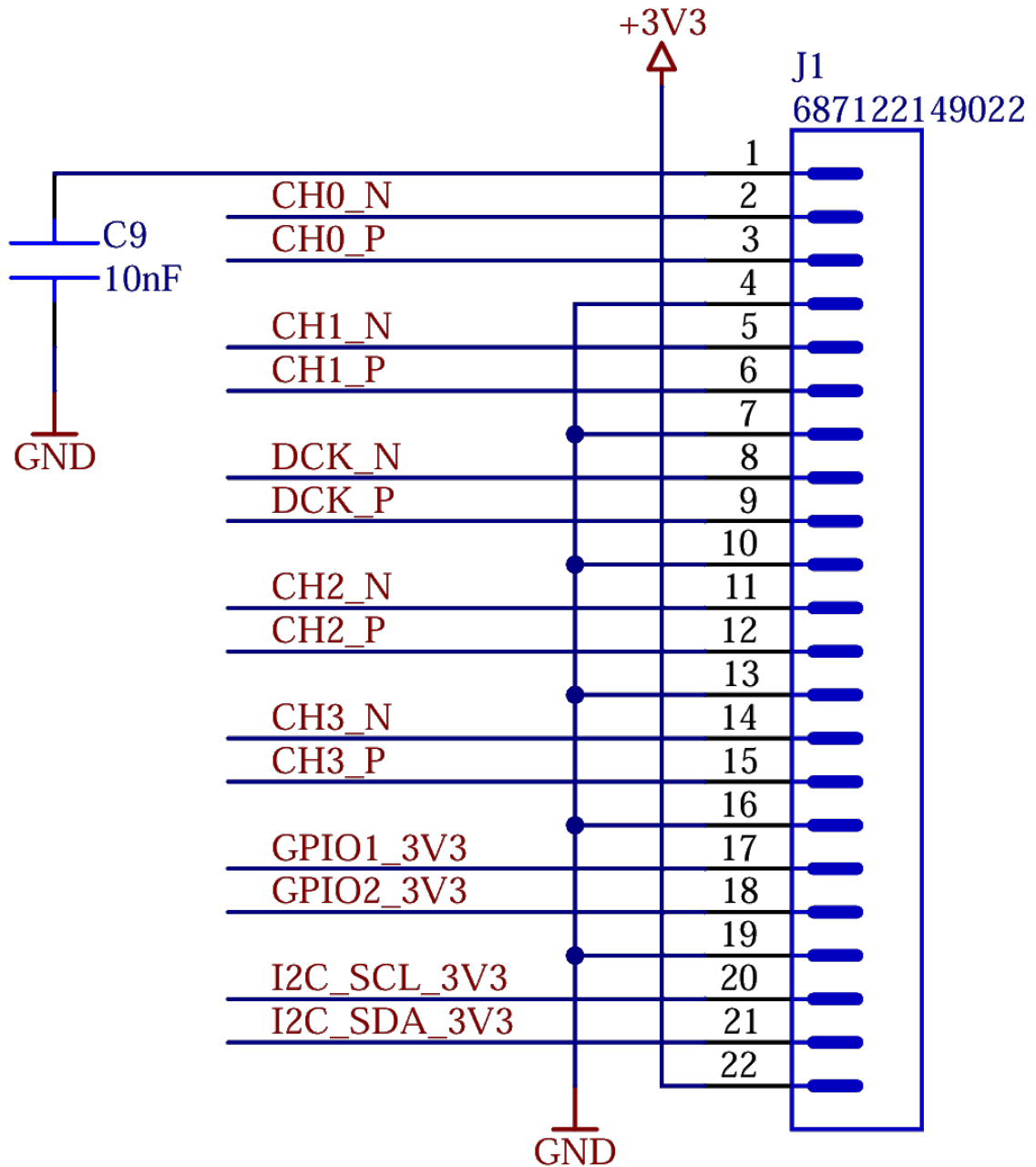
## 4 Spectral Characteristics

### 4.1 Spectral Sensitivity - IMX296LQR-C



## 5 22-Pin Camera Connector

The DMM 36SX296-ML sensor board is connected to the system via a 22-pin FFC connector that is compatible to the 22-pin Raspberry Pi MIPI Interface.





#	Name	Type	Description
1	(GND) capacitive coupled	GND	Ground
2	CH1 N	O	MIPI CSI-2 output
3	CH1 P	O	MIPI CSI-2 output
4	GND	GND	Ground
5	CH2 N	O	NC
6	CH2 P	O	NC
7	GND	GND	Ground
8	DCK N	O	MIPI CSI-2 output
9	DCK P	O	MIPI CSI-2 output
10	GND	GND	Ground
11	CH3 N	O	NC
12	CH3 P	O	NC
13	GND	GND	Ground
14	CH4 N	O	NC
15	CH4 P	O	NC
16	GND	GND	Ground
17	GPIO1_3V3	I/O	Trigger input
18	GPIO2_3V3	I/O	Strobe output
19	GND	GND	Ground
20	I2C_SCL_3V3	I/O	I2C serial clock
21	I2C_SDA_3V3	I/O	I2C serial data
22	+3V3	PWR	3.3 V ( $\pm 5\%$ ) power supply

All I/Os have the same I/O voltage of 3.3 V. The part number of the FPC connector is Wuerth 687122149022. 22-pin 0.5 mm Pitch.

## 6 I2C Devices

There are multiple I2C devices on the DMM 36SX296-ML sensor board. The following table describes the parts and their I2C addresses:

Address (7-bit)	Device	Description
0x1A	IMX296LQR-C	Image Sensor
0x40	LCMXO3L-1300E	Trigger Control FPGA (configuration)
0x42	LCMXO3L-1300E	Trigger Control FPGA (control)
0x50	AT24C256C	EEPROM



## 7 Programming the Image Sensor

The data sheet for the IMX296LQR-C image sensor is not publicly available.

### 7.1 Input Clock

The sensor's INCK pin is connected to a clock source with a frequency of 37.5 MHz.

### 7.2 Power-up Sequence

Delay	Action
-	Supply 3.3V to +3V3_D (VDD)
350 ms	Write sensor registers

### 7.3 Further Assistance

For more detailed information, register settings and assistance integrating the sensor board into your product, please contact The Imaging Source support.



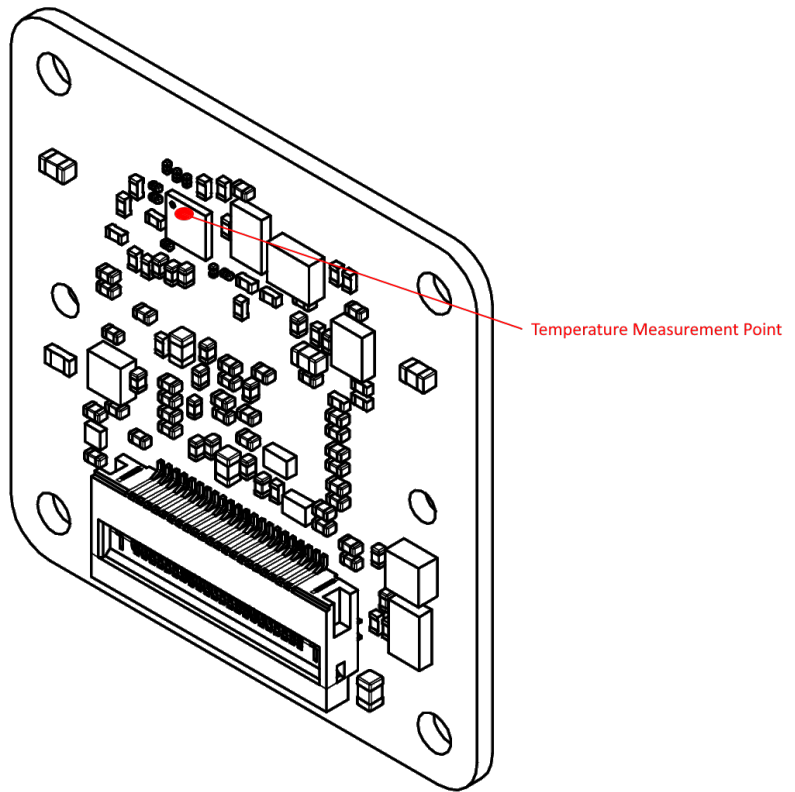
## 8 Trigger Control FPGA

In order to handle complex trigger/strobe functions of the image sensor, a FPGA is present on sensor board revision 2.00 and above.

A reference driver implementation is available upon request.

## 9 Temperature Measurement Point

Device temperature in operating state is measured on the back side of the circuit board:





## DMM 36SX296-ML

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All weights and dimensions are approximate. Unless otherwise specified, the lenses shown in the context of cameras are not shipped with these cameras.

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