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See3CAM_CU27



Datasheet

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1 Introduction

See3CAM_CU27 is a 2 MP, UVC compliant, USB 3.1 Gen 1 SuperSpeed camera from e-con Systems, which has over two decades of experience in designing, developing, and manufacturing OEM cameras. See3CAM_CU27 is the latest member of the See3CAM family of USB 3.1 Gen 1 SuperSpeed camera products.

See3CAM_CU27 camera is provided with the S-mount (also known as M12 board lens) lens holder. The S-mount is one of the most used small form factor lens mounts for board cameras. See3CAM_CU27 is a two-board solution given in single unit with help of rigid flex cable containing the camera sensor module board with 1/2.8" SONY® STARVIS IMX462LQR CMOS image sensor and the USB 3.1 Gen 1 interface. It is also backward compatible with the USB 2.0 high speed interface, albeit with fewer resolutions at lower frame rates.

See3CAM_CU27 is a UVC compliant USB 3.1 Gen 1 SuperSpeed camera that is also backward compatible with USB 2.0 host ports, and it does not require any special camera drivers to be installed on the PC. The native UVC drivers of Windows and Linux Operating Systems (OS) will be compatible with this camera. e-con Systems also provides the sample application that demonstrates some of the features of this camera.

This document describes the features of See3CAM_CU27 camera board and the pinouts of the connectors including with mechanical diagram.

2 Disclaimer

The specifications and features of See3CAM_CU27 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

See3CAM_CU27 is 30 mm x 30 mm x 26 mm (without lens) sized USB camera module. The camera has IMX462LQR CMOS image sensor from SONY® and USB interface controller with USB Type-C connector. This See3CAM_CU27 is a ready-to-manufacture camera board with all the necessary firmware built-in and is compatible with the UVC version 1.1 standard. You can integrate this camera into the products, and this helps to cut short the time-to-market.

See3CAM_CU27 is a UVC compliant camera, and it does not require any drivers to be installed on the PC. So, video streaming through UVC is possible without any special drivers on OSes that have built-in support for UVC standards. The camera is exposed as DirectShow capture source to the Windows PC and e-con Systems provides sample DirectShow application that demonstrates the features of this camera.

In Linux, the built-in UVC driver works very well with this camera. This camera is exposed as a Video4Linux2 (V4L2) camera and e-con Systems also provides a sample application for Linux OS. You can also develop customized applications for the See3CAM_CU27 camera using standard V4L2 APIs.

See3CAM_CU27 is available in two variants, which are, without casing (See3CAM_CU27_CHL_TC) and with casing (See3CAM_CU27_CHLCC_BX_H02R1).

The side view of See3CAM_CU27 without casing (See3CAM_CU27_CHL_TC) and with casing (See3CAM_CU27_CHLCC_BX_H02R1) are shown in following figures.





Figure 1: See3CAM_CU27 without Casing



Figure 2: See3CAM_CU27 with Casing

The front and rear views of See3CAM_CU27 with and without casing are shown in following figures.

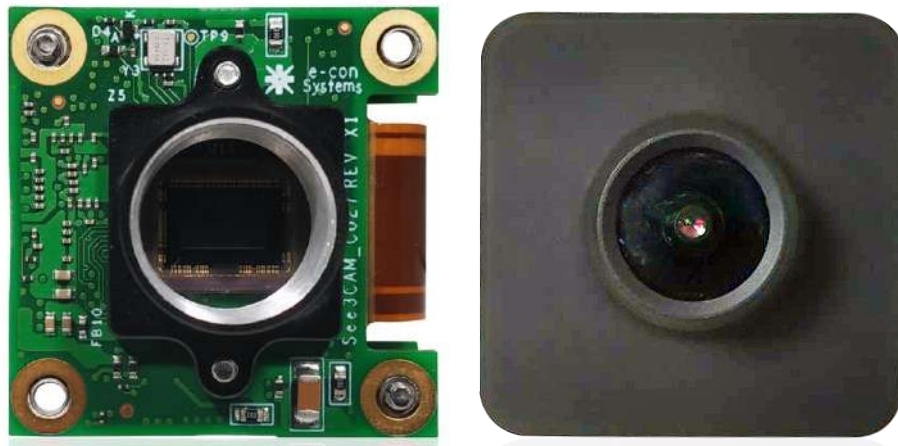


Figure 3: Front Views of See3CAM_CU27 with and without Casing



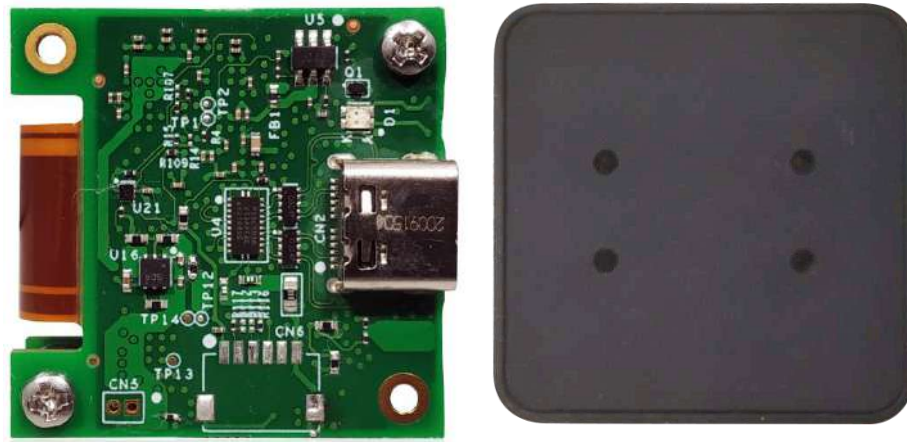


Figure 4: Rear Views of See3CAM_CU27 with and without Casing

3.1 Features

The features of See3CAM_CU27 are as follows:

- Single-board solution of size 30 mm x 30 mm x 26 mm (Without lens)
- 2 MP camera sensor
- UYVY and MJPEG output format
- Standard M12 lens holder for use with customized optics or lenses for various applications
- USB 3.1 Gen 1 device with Type-C reversible interface connector
- Light weight, versatile, and portable design
- Plug-and-Play setup (UVC compliant) for Windows 8.1(32-bit & 64-bit) and 10(64-bit), Linux Ubuntu 16.04(32-bit & 64-bit) and 18.04(64-bit).
- Electronic shutter
- Imaging applications
 - Preview format UYVY – VGA (640 x 480), HD (1280 x 720), and FHD (1920 x 1080).
 - Preview format MJPEG - VGA (640 x 480), HD (1280 x 720), and FHD (1920 x 1080)
 - Still capture support – USB 3.1 Gen 1 UYVY and MJPEG - 1080p, USB 2.0 UYVY – VGA and MJPEG – 1080p
 - Field of View (FOV) – 121.35 deg diagonal for the maximum resolution
- Exposure control - Manual and auto exposure control
- Operating voltage - 5V +/- 5%, Current - 424 mA
- Restriction of Hazardous Substances (RoHS) compliant

4 Key Specification

The following table lists the specifications of See3CAM_CU27.

| Description | Specification |
|------------------|--------------------------------|
| Size (L x W x H) | 30 x 30 x 26 mm (without lens) |
| Video Format | UYVY and MJPEG |



| | |
|------------------|--|
| USB | USB 3.1 Gen 1 and 2.0 |
| Image Resolution | VGA (640 x 480) |
| | HD (1280 x 720) |
| | FHD (1920 x 1080) |
| Supported OS | Windows 8.1(32-bit & 64-bit) and 10(64-bit), Linux Ubuntu 16.04(32-bit & 64-bit) and 18.04(64-bit). |
| UVC Compliant | Yes, compliant with UVC version 1.1 |
| Product ID (PID) | 0x2560 |
| Vendor ID (VID) | 0xC12C |

Table 1: Key Specifications of See3CAM_CU27

The FOV of See3CAM_CU27 is shown below.

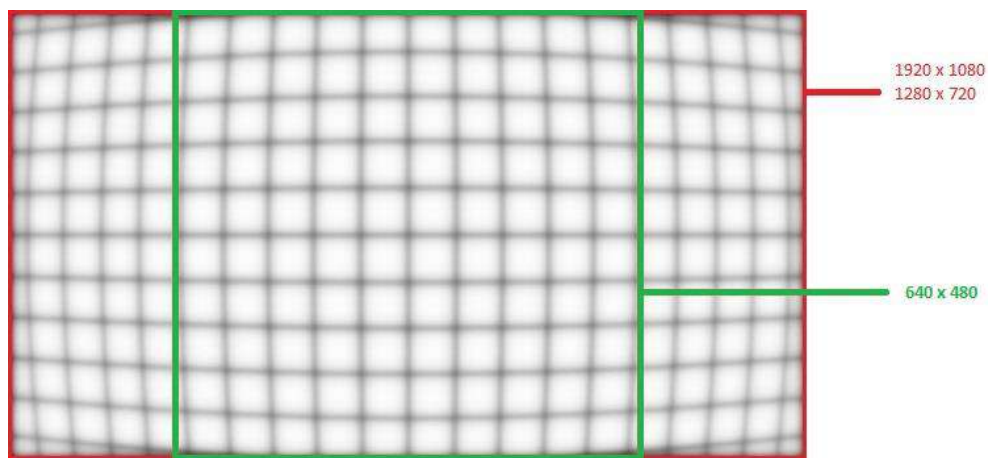


Figure 5: FOV of See3CAM_CU27

4.1 Supported Resolution and Crop in FOV

The supported resolution and crop in FOV are listed in the following tables.

| Format | Resolution | Frame Rate (fps) | | Crop in FOV | |
|--------|-------------------|------------------|---------|-------------|----------|
| | | USB 3.1 Gen1 | USB 2.0 | Horizontal | Vertical |
| UYVY | VGA (640 x 480) | 120 | 30 | 41.87% | 0% |
| | HD (1280 x 720) | 80 | NA | 0% | 0% |
| | | 50 | | | |
| | FHD (1920 x 1080) | 60 | NA | 0% | 0% |
| | | 30 | | | |
| MJPEG | VGA (640 x 480) | 120 | 30 | 41.87% | 0% |
| | HD (1280 x 720) | 100 | 30 | 0% | 0% |
| | FHD (1920 x 1080) | 100 | 30 | 0% | 0% |

Table 2: Supported Resolutions and Crop in FOV

4.2 CMOS Image Sensor Specification

The following table lists the specifications of CMOS image sensor used in this



See3CAM_CU27 camera board.

| Sensor Specification | |
|----------------------|---|
| Type/Optical Size | 1/2.8" Optical format CMOS image sensor |
| Resolution | 2 MP |
| Sensor Type | Electronic shutter |
| Pixel Size | 2.9 μm |
| Sensor Active Pixels | 1937H x 1097V |

Table 3: CMOS Image Sensor Specification

The IMX462LQR sensor is a 2 MP CMOS image sensor. For more information about the IMX462LQR sensor or for *Datasheet*, please contact SONY.

5 Pin Description

See3CAM_CU27 has one USB Type-C connector. The following figure shows the front view of the Type-C connector on See3CAM_CU27 without Casing.

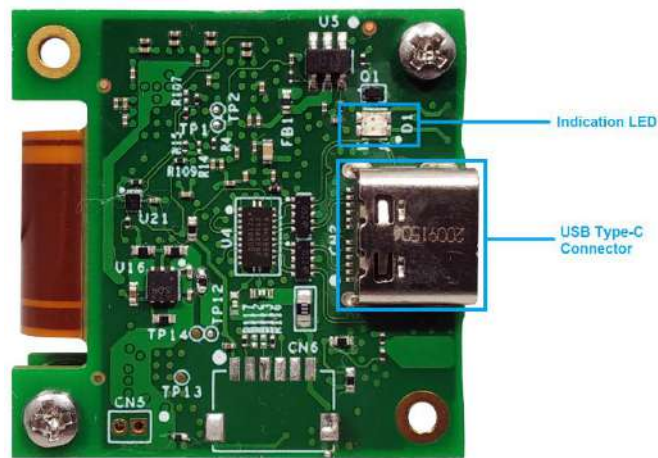


Figure 6: Type-C Connector on See3CAM_CU27 without Casing

The location of USB Type-C connector on See3CAM_CU27 board with casing is shown in following figure.



Figure 7: USB Type-C Connector on See3CAM_CU27 with Casing

5.1 USB Type-C Connector Pin Description

The following table lists the pinouts of USB Type-C connector which is used to connect See3CAM_CU27 board with PC through the USB Type-A to Type-C cable.

This is a standard USB Type-C connector.

| Pin No | Signal | Description | Pin No | Signal | Description |
|--------|--------|--|--------|--------|--|
| A1 | GND | Ground return | B12 | GND | Ground return |
| A2 | SSTXp1 | SuperSpeed differential pair 1, TX, positive | B11 | SSRXp1 | SuperSpeed differential pair 2, RX, positive |
| A3 | SSTXn1 | SuperSpeed differential pair 1, TX, negative | B10 | SSRXn1 | SuperSpeed differential pair 2, RX, negative |
| A4 | VBUS | Bus power | B9 | VBUS | Bus power |
| A5 | CC1 | Configuration channel | B8 | SBU2 | - |
| A6 | Dp1 | Hi-Speed differential pair, position 1, positive | B7 | Dn2 | Hi-Speed differential pair, position 2, negative |
| A7 | Dn1 | Hi-Speed differential pair, position 1, negative | B6 | Dp2 | Hi-Speed differential pair, position 2, positive |
| A8 | SBU1 | - | B5 | CC2 | Configuration channel |
| A9 | VBUS | Bus power | B4 | VBUS | Bus power |
| A10 | SSRXn2 | SuperSpeed differential pair 4, RX, negative | B3 | SSTXn2 | SuperSpeed differential pair 3, TX, negative |
| A11 | SSRXp2 | SuperSpeed differential pair 4, RX, positive | B2 | SSTXp2 | SuperSpeed differential pair 3, TX, positive |
| A12 | GND | Ground return | B1 | GND | Ground return |

Table 4: USB Type-C Connector Pin Description

6 Connector Part Numbers

The following table lists the connectors used in the See3CAM_CU27 camera board. The USB connector is the standard USB Type-C connector as specified in the USB 3.1 Gen 1 standards. Any USB standard compliant USB 3.1 Gen 1 Type-A to Type-C cable will be compatible with this connector.

| Connector | Description | Manufacturer | Part Number |
|--------------------------|---|--------------|-------------|
| USB 3.1 Type-C Connector | CONN USB-C Receptacle 24Pos Right Angle SMT | Molex | 105450-0101 |

Table 5: Connectors and its Part Number Details

7 Electrical Specification

The electrical specifications of See3CAM_CU27 are as follows:



- [Recommended Operating Condition](#)
- [Operating Temperature Range](#)

The values described in this section are measured in e-con Systems lab and this can be used as reference only. The current measurements are typical values and are subject to change for different camera boards under different conditions. However, these values can be taken as a reference for power estimation and power supply design.

7.1 Recommended Operating Condition

The following table lists the recommended operating condition of See3CAM_CU27 under various resolutions.

| Parameter | Typical Operating Voltage | Current (mA) | Typical Power Consumption (W) |
|--|---------------------------|--------------|-------------------------------|
| Streaming Maximum Power at 1920 x 1080 at 100 fps in USB 3.1 Gen 1 | 5V \pm 250 mV | 424 | 2.12 |
| Streaming Minimum Power 640 x 480 at 30 fps in USB 2.0 | | 171 | 0.855 |
| Power at Idle Condition | | 126 | 0.630 |

Table 6: Recommended Operating Condition of See3CAM_CU27

7.1.1 UYVY with USB 3.1 Gen 1

The following table lists the current consumed by See3CAM_CU27 in UYVY format with USB 3.1 Gen 1 under various resolutions.

| S. No | Resolution | Frame Rate (fps) | Supply Voltage (V) | Typical Current (mA) | Power Consumption (W) |
|-------|-------------|------------------|--------------------|----------------------|-----------------------|
| 1 | 640 x 480 | 120 | 5 | 276 | 1.38 |
| 2 | 1280 x 720 | 80 | 5 | 296 | 1.48 |
| 3 | 1920 x 1080 | 60 | 5 | 323 | 1.615 |

Table 7: UYVY with USB 3.1 Gen 1

7.1.2 MJPEG with USB 3.1 Gen 1

The following table lists the current consumed by See3CAM_CU27 in MJPEG format with USB 3.1 Gen 1 under various resolutions.

| S. No | Resolution | Frame Rate (fps) | Supply Voltage (V) | Typical Current (mA) | Power Consumption (W) |
|-------|-------------|------------------|--------------------|----------------------|-----------------------|
| 1 | 640 x 480 | 120 | 5 | 270 | 1.35 |
| 2 | 1280 x 720 | 100 | 5 | 310 | 1.55 |
| 3 | 1920 x 1080 | 100 | 5 | 424 | 2.12 |

Table 8: MJPEG with USB 3.1 Gen 1

7.1.3 UYVY with USB 2.0

The following table lists the current consumed by See3CAM_CU27 in UYVY format with USB 2.0 under various resolutions.

| S. No | Resolution | Frame Rate (fps) | Supply Voltage (V) | Typical Current (mA) | Power Consumption (W) |
|-------|------------|------------------|--------------------|----------------------|-----------------------|
| 1 | 640 x 480 | 30 | 5 | 171 | 0.855 |



Table 9: UYVY with USB 2.0

7.1.4 MJPEG with USB 2.0

The following table lists the current consumed by See3CAM_CU27 in MJPEG format with USB 2.0 under various resolutions.

| S. No | Resolution | Frame Rate (fps) | Supply Voltage (V) | Typical Current (mA) | Power Consumption (W) |
|-------|-------------|------------------|--------------------|----------------------|-----------------------|
| 1 | 640 x 480 | 30 | 5 | 171 | 0.855 |
| 2 | 1280 x 720 | 30 | 5 | 208 | 1.04 |
| 3 | 1920 x 1080 | 30 | 5 | 197 | 0.985 |

Table 10: MJPEG with USB 2.0

7.2 Operating Temperature Range

The following table lists the operating temperature range of See3CAM_CU27.

| Parameter Description | Temperature Range (without casing) | Temperature Range (with casing) |
|--|------------------------------------|---------------------------------|
| Operating temperature range ¹ | -30°C to 60°C | 0°C to 40°C |

Table 11: Operating Temperature Range

¹This is the maximum temperature range up to which the camera sensor can be operated. Value measured at junction.

Note: The default lens supplied with this camera has an operating range of -20°C to 60°C. You can select wider operating temperature lens as per the requirements.

8 Mechanical Specifications

The size of See3CAM_CU27 without casing is 30 mm x 30 mm x 26 mm (without Lens). The size of See3CAM_CU27 with casing is 35.3x35.3x38.80 (with lens) and 35.3x35.3x29 (without lens). The board drawing and dimensions are given in the following sections.

- [See3CAM_CU27 without casing dimension](#)
- [See3CAM_CU27 with casing dimension](#)
- [Lens holder dimension](#)

8.1 See3CAM_CU27 without Casing Dimension

The top and bottom views of See3CAM_CU27 board with mechanical dimensions are shown below.



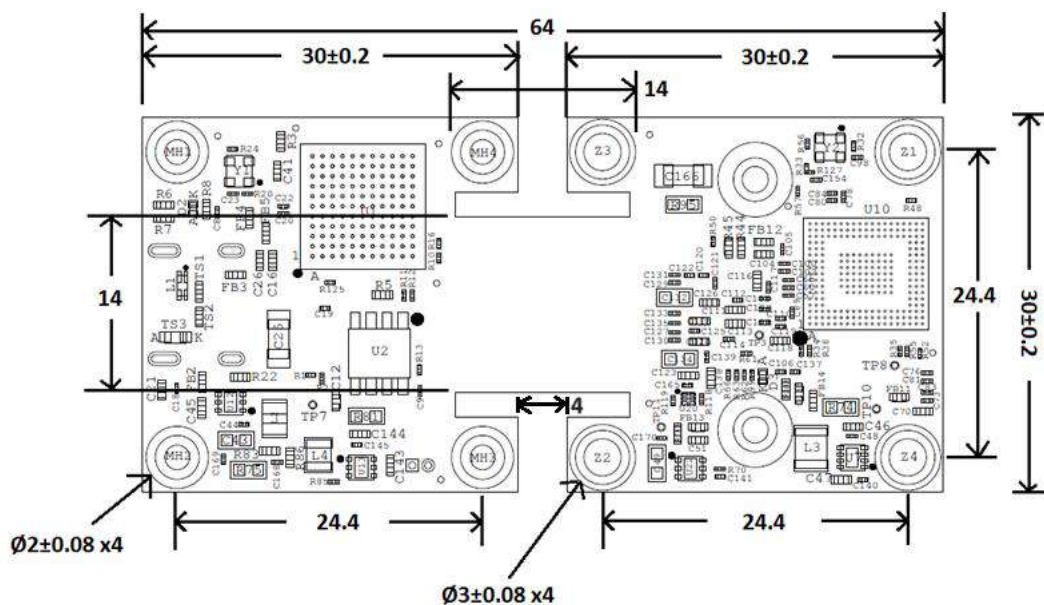


Figure 8: Top View of See3CAM_CU27 Mechanical Dimensions

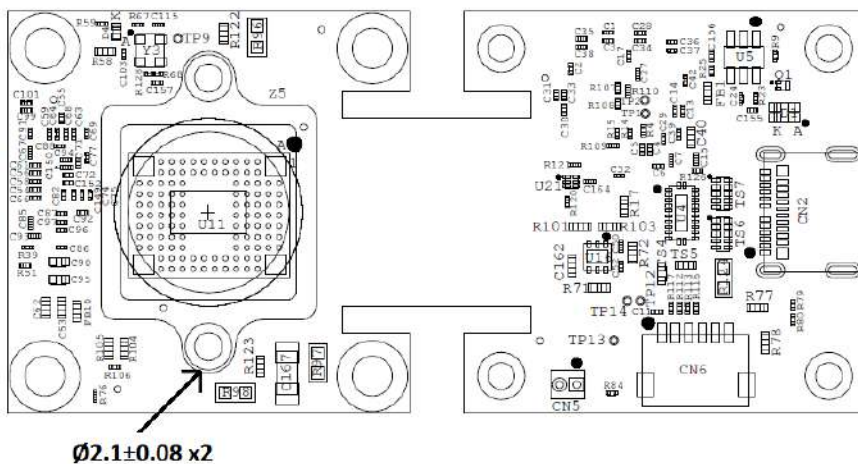


Figure 9: Bottom View of See3CAM_CU27 Mechanical Dimensions

Note: All dimensions are in millimeter (mm). The unfolded camera module dimensions are given above. You will be given with folded camera module with 30 x 30 x 26 mm (without lens) outer dimensions.

The image orientation of See3CAM_CU27 camera with respect to USB cable is shown below.



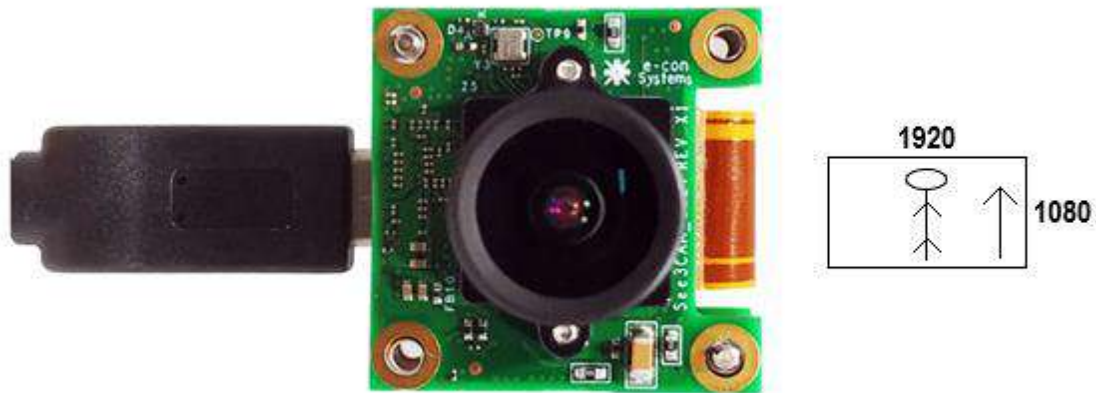


Figure 10: Camera Image Orientation with respect to USB Cable

8.2 See3CAM_CU27 with Casing Dimension

The size of the See3CAM_CU27 with casing is 35.3 mm x 29 mm (without Lens). The dimension details are shown in the following figure.

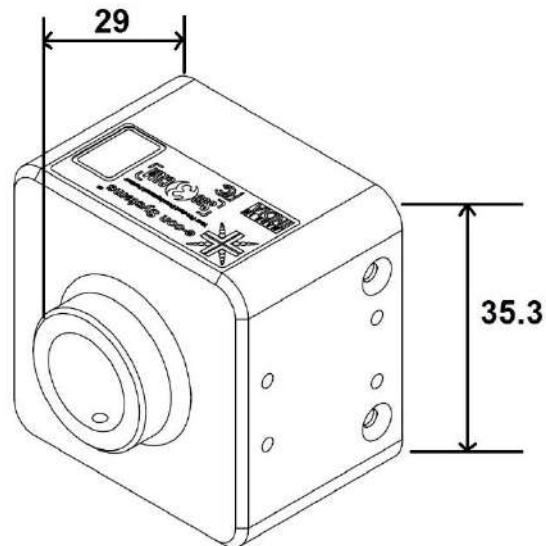


Figure 11: See3CAM_CU27 with Casing Dimensions (Without lens)

8.3 Lens Holder Dimension

The lens holder with mechanical dimensions is shown below.



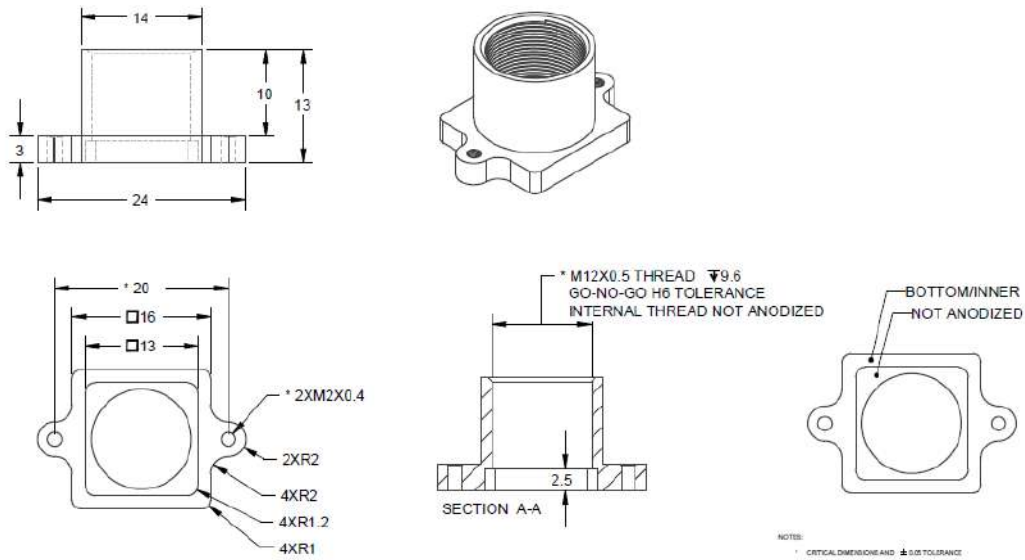


Figure 12: Lens Holder Mechanical Dimensions

Note: All dimensions are in millimeter (mm).



Support

Contact Us

If you need any support on See3CAM_CU27 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>



Revision History

| Rev | Date | Description | Author |
|-----|-------------------|----------------------------------|-------------|
| 1.0 | 08-October-2021 | Initial draft | Camera Team |
| 1.1 | 12-October-2021 | Sensor Specifications updated | Camera Team |
| 1.2 | 12-January-2022 | Changed Camera image orientation | Camera Team |
| 1.3 | 20-June-2022 | Changed Camera image orientation | Camera Team |
| 1.4 | 02-September-2022 | Box Enclosure Images added | Camera Team |
| 1.5 | 02-November-2022 | With casing temperature added | Camera Team |
| 1.6 | 07-November-2022 | Added changes | Camera Team |
| 1.7 | 27-November-2023 | Added changes | Camera Team |

