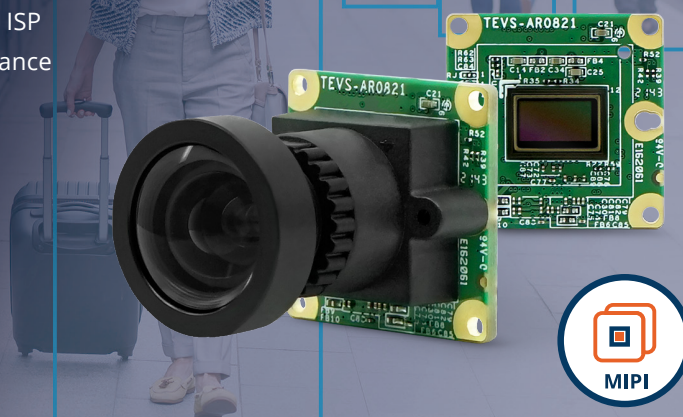


# TEVS-AR0821

- onsemi AR0821 8MP rolling shutter camera sensor with ISP
- Designed for low light and high dynamic range performance
- Convenient S-Mount (M12) interchangeable lens
- VizionViewer™ configuration utility
- VizionSDK for custom development

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## Camera Information

|                                  |                                                                                                                   |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------|
| CMOS Sensor                      | onsemi AR0821                                                                                                     |
| Active Pixels                    | 3848 (H) x 2168 (V) = 8 MP                                                                                        |
| Pixel Size                       | 2.1 $\mu\text{m}$ x 2.1 $\mu\text{m}$                                                                             |
| Illuminated Type                 | Back Side Illuminated (BSI)                                                                                       |
| Maximum S/N Ratio                | 41.8 dB                                                                                                           |
| Input Clock Range                | 48 MHz                                                                                                            |
| Optical Format                   | 1/1.7" (Diagonal 9.25 mm)                                                                                         |
| Shutter Type                     | Rolling Shutter                                                                                                   |
| Chromaticity                     | Color                                                                                                             |
| HDR Support                      | Yes                                                                                                               |
| Maximum Frame Rate (YUV422-UYYV) | 3840 x 2160 @ 15 fps<br>2560 x 1440 @ 30 fps<br>1920 x 1080 @ 60 fps<br>1280 x 720 @ 60 fps<br>640 x 480 @ 60 fps |
| Output Format                    | YUV422-UYYV / YUV420<br>RGB888 / RGB565 / RGB555<br>JPEG / MJPEG<br>RAW8 / RAW10 / RAW12                          |

## Camera Interface

|                          |                               |
|--------------------------|-------------------------------|
| Module Data Transmission | MIPI CSI-2, up to 4 lanes     |
| Communication Interface  | I <sup>2</sup> C              |
| Connector                | 70 Pin Standardized Connector |

## Environmental and Mechanical

|                       |                                |
|-----------------------|--------------------------------|
| Dimensions            | 24.5(W) x 24.5(H) x 4.43(D) mm |
| Weight                | $\leq 3$ grams                 |
| Operating Temperature | -30°C to + 70°C                |

## Software Support

|                  |                                                                                                                          |
|------------------|--------------------------------------------------------------------------------------------------------------------------|
| Platform Support | NXP<br>NVIDIA<br>Texas Instruments<br>Intel<br>Renesas<br>Synaptics<br>STMicroelectronics<br>BeagleBoard<br>Raspberry Pi |
| Operation System | Linux<br>Yocto<br>Android                                                                                                |
| Software         | VizionViewer™                                                                                                            |
| Development SDK  | VizionSDK                                                                                                                |

## Power

|                   |                                                    |
|-------------------|----------------------------------------------------|
| Supply Voltage    | I/O: 1.8V<br>Analog: 2.8V<br>Digital: 1.15V & 3.3V |
| Power Consumption | 3840 x 2160 @ 15 fps $\leq 1004$ mW                |
| SW Standby Power  | $\leq 97$ mW Standby                               |
| HW Standby Power  | $\leq 52$ mW Standby                               |

## Certification and Compliance

|               |                                                   |
|---------------|---------------------------------------------------|
| Certification | Compliant with CE / FCC / RoHS / REACH directives |
|---------------|---------------------------------------------------|

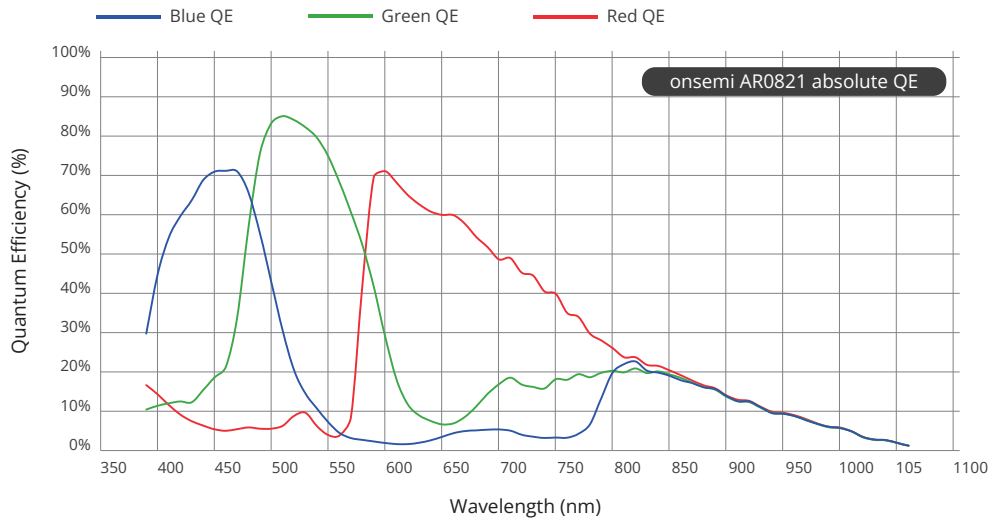


VizionSDK

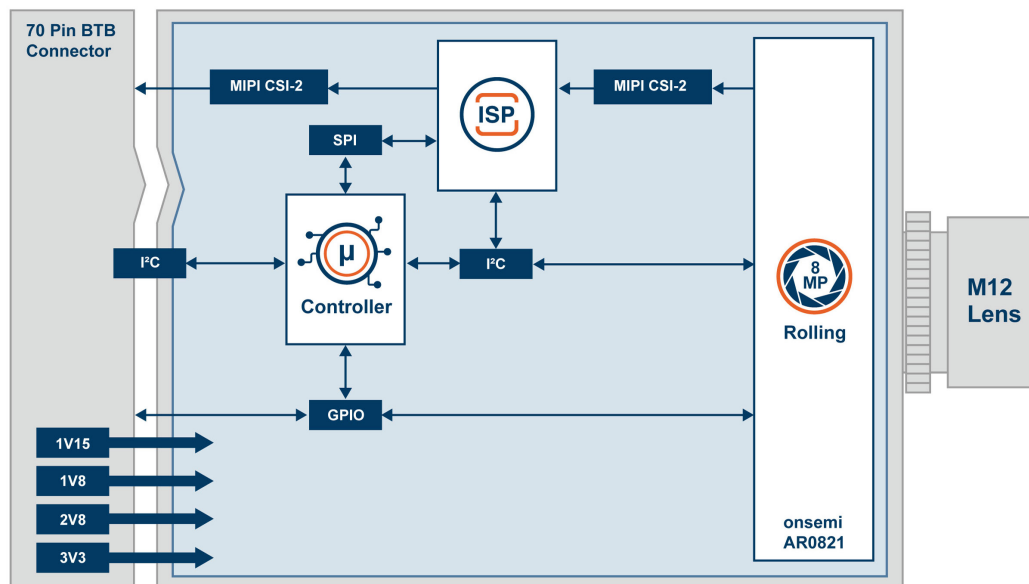


VizionViewer™

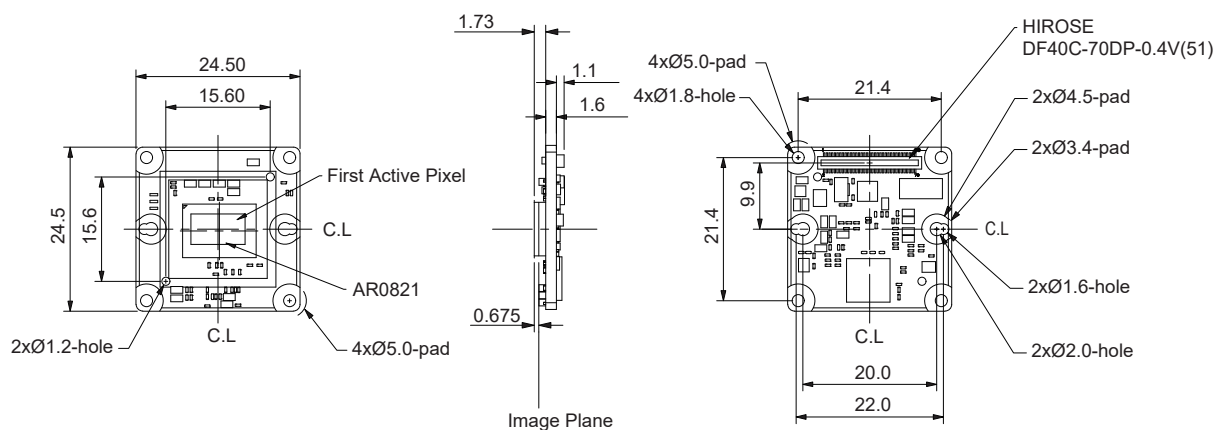
## Spectral Characteristics



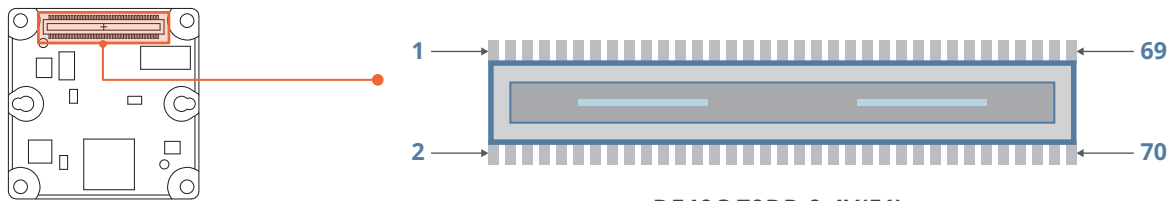
## Block Diagram



## Dimensions (units in mm)



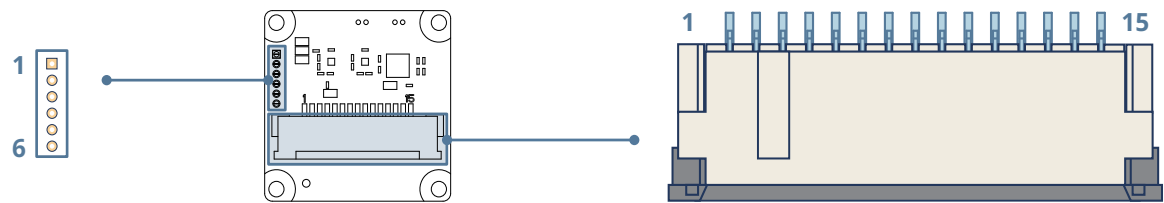
# 70 Pin Connector Pin Definition



DF40C-70DP-0.4V(51)

| No. | Pin Define    | Level | No. | Pin Define     | Level |
|-----|---------------|-------|-----|----------------|-------|
| 01  | 3V3D          | 3.3V  | 02  | 3V3D           | 3.3V  |
| 03  | 3V3D          | 3.3V  | 04  | 3V3D           | 3.3V  |
| 05  | GND           | GND   | 06  | GND            | GND   |
| 07  | NC            |       | 08  | NC             |       |
| 09  | GND           | GND   | 10  | GND            | GND   |
| 11  | 2V8A          | 2.8V  | 12  | 2V8A           | 2.8V  |
| 13  | GND           | GND   | 14  | GND            | GND   |
| 15  | 1V8D          | 1.8V  | 16  | 1V8D           | 1.8V  |
| 17  | GND           | GND   | 18  | GND            | GND   |
| 19  | 1V15D         | 1.15V | 20  | 1V15D          | 1.15V |
| 21  | GND           | GND   | 22  | GND            | GND   |
| 23  | NC            |       | 24  | NC             |       |
| 25  | NC            |       | 26  | NC             |       |
| 27  | NC            |       | 28  | NC             |       |
| 29  | NC            |       | 30  | NC             |       |
| 31  | NC            |       | 32  | NC             |       |
| 33  | MCU_INT_1V8_N | 1.8V  | 34  | NC             |       |
| 35  | GND           | GND   | 36  | GND            | GND   |
| 37  | H_CAM_DN0     |       | 38  | CSI_FRAME_SYNC | 1.8V  |
| 39  | H_CAM_DP0     |       | 40  | CSI_nRST       | 1.8V  |
| 41  | GND           | GND   | 42  | GND            | GND   |
| 43  | H_CAM_DN1     |       | 44  | NC             | 1.8V  |
| 45  | H_CAM_DP1     |       | 46  | CSI_FLASH_OUT  | 1.8V  |
| 47  | GND           | GND   | 48  | GND            | GND   |
| 49  | H_CAM_DN2     |       | 50  | STANDBY        | 1.8V  |
| 51  | H_CAM_DP2     |       | 52  | CSI_SHUTTER    | 1.8V  |
| 53  | GND           | GND   | 54  | GND            | GND   |
| 55  | H_CAM_DN3     |       | 56  | H_I2C_SCL      | 1.8V  |
| 57  | H_CAM_DP3     |       | 58  | H_I2C_SDA      | 1.8V  |
| 59  | GND           | GND   | 60  | GND            | GND   |
| 61  | H_CAM_CKN     |       | 62  | NC             |       |
| 63  | H_CAM_CKP     |       | 64  | NC             |       |
| 65  | GND           | GND   | 66  | NC             |       |
| 67  | NC            |       | 68  | NC             |       |
| 69  | GND           | GND   | 70  | GND            | GND   |

# 15 Pin Connector Pin Definition

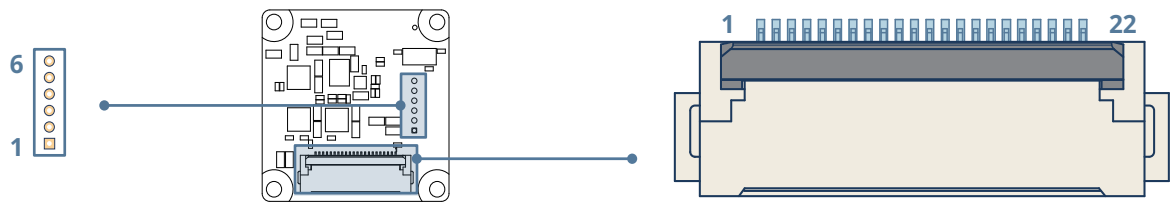


| No. | Pin Define  | Description               |
|-----|-------------|---------------------------|
| 01  | 3V3         | Power 3V3                 |
| 02  | I2C_SDA     | Two-Wire Serial Data 3V3  |
| 03  | I2C_SCL     | Two-Wire Serial Clock 3V3 |
| 04  | Reserved    | Reserved                  |
| 05  | CSI_RST     | Camera Reset Input 3V3    |
| 06  | GND         | Ground                    |
| 07  | CSI_CAM_CKP | MIPI Clock Lane Positive  |
| 08  | CSI_CAM_CKN | MIPI Clock Lane Negative  |
| 09  | GND         | Ground                    |
| 10  | CSI_CAM_DP1 | MIPI Data Lane 1 Positive |
| 11  | CSI_CAM_DN1 | MIPI Data Lane 1 Negative |
| 12  | GND         | Ground                    |
| 13  | CSI_CAM_DP0 | MIPI Data Lane 0 Positive |
| 14  | CSI_CAM_DN0 | MIPI Data Lane 0 Negative |
| 15  | GND         | Ground                    |

## Camera Expansion Header

| No. | Name       | Voltage | Description      |
|-----|------------|---------|------------------|
| 01  | 3V3        | 3V3     | Power Output     |
| 02  | FRAME_SYNC | 3V3     | Frame Sync input |
| 03  | EXPOSURE   | 3V3     | Exposure input   |
| 04  | FLASH      | 3V3     | Flash output     |
| 05  | SHUTTER    | 3V3     | Shutter output   |
| 06  | GND        | Ground  | GND              |

## 22 Pin Connector Pin Definition



| No. | Pin Define  | Description               |
|-----|-------------|---------------------------|
| 01  | 3V3         | Power 3V3                 |
| 02  | I2C_SDA     | Two-Wire Serial Data 3V3  |
| 03  | I2C_SCL     | Two-Wire Serial Clock 3V3 |
| 04  | GND         | Ground                    |
| 05  | Reserved    | Reserved                  |
| 06  | CDI_RST     | Camera reset Input 3V3    |
| 07  | GND         | Ground                    |
| 08  | CSI_CAM_DP3 | MIPI Data Lane 3 Positive |
| 09  | CSI_CAM_DN3 | MIPI Data Lane 3 Negative |
| 10  | GND         | Ground                    |
| 11  | CSI_CAM_DP2 | MIPI Data Lane 2 Positive |
| 12  | CSI_CAM_DN2 | MIPI Data Lane 2 Negative |
| 13  | GND         | Ground                    |
| 14  | CSI_CAM_CKP | MIPI Clock Lane Positive  |
| 15  | CSI_CAM_CKN | MIPI Clock Lane Negative  |
| 16  | GND         | Ground                    |
| 17  | CSI_CAM_DP1 | MIPI Data Lane 1 Positive |
| 18  | CSI_CAM_DN1 | MIPI Data Lane 1 Negative |
| 19  | GND         | Ground                    |
| 20  | CSI_CAM_DP0 | MIPI Data Lane 0 Positive |
| 21  | CSI_CAM_DN0 | MIPI Data Lane 0 Negative |
| 22  | GND         | Ground                    |

### Camera Expansion Header

| No. | Name       | Voltage | Description      |
|-----|------------|---------|------------------|
| 01  | 3V3        | 3V3     | Power Output     |
| 02  | FRAME_SYNC | 3V3     | Frame Sync input |
| 03  | EXPOSURE   | 3V3     | Exposure input   |
| 04  | FLASH      | 3V3     | Flash output     |
| 05  | SHUTTER    | 3V3     | Shutter output   |
| 06  | GND        | Ground  | GND              |

## Lens Information

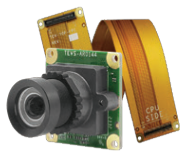
|                      |  |  |  |  |
|----------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                      | TEVS-AR0821-C-S44-IR                                                              | TEVS-AR0821-C-S74-IR                                                              | TEVS-AR0821-C-S119-IR                                                              | TEVS-AR0821-C-S156-IR                                                               |
| Focus Type           | Fixed Focus                                                                       | Fixed Focus                                                                       | Fixed Focus                                                                        | Fixed Focus                                                                         |
| Focal Length         | 12 mm                                                                             | 6 mm                                                                              | 3 mm                                                                               | 3.2 mm                                                                              |
| Aperture             | F2.0                                                                              | F2.8                                                                              | F2.0                                                                               | F2.0                                                                                |
| Module D-FOV         | 44.0° ± 5%                                                                        | 74.4° ± 5%                                                                        | 118.8° ± 5%                                                                        | 156.0° ± 5%                                                                         |
| Module H-FOV         | 38.3° ± 5%                                                                        | 67.1° ± 5%                                                                        | 110.7° ± 5%                                                                        | 137.2° ± 5%                                                                         |
| Module V-FOV         | 21.6° ± 5%                                                                        | 40.8° ± 5%                                                                        | 75.4° ± 5%                                                                         | 79.4° ± 5%                                                                          |
| TTL                  | 23.09 mm                                                                          | 28.6 mm                                                                           | 29.56 mm                                                                           | 44.98 mm                                                                            |
| BFL                  | 5.06 mm                                                                           | 8.8 mm                                                                            | 4.85 mm                                                                            | 6.14 mm                                                                             |
| MOD                  | 0.15 m                                                                            | 0.1 m                                                                             | 0.3 m                                                                              | 0.3 m                                                                               |
| Distortion           | <2%                                                                               | <0.50%                                                                            | <-5%                                                                               | <-32%                                                                               |
| IR-Filter            | 650 nm                                                                            | 650 nm                                                                            | 650 nm                                                                             | 650 nm                                                                              |
| Lens Structure       | 5G + IR                                                                           | 7G + IR                                                                           | 2G + 3P + IR                                                                       | 8G + IR                                                                             |
| First layer material | Glass                                                                             | -                                                                                 | Glass                                                                              | Glass                                                                               |

## Order Information

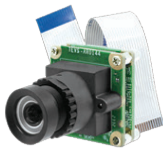
TEVS-AR0821-x-Sxx-xx-xxx-xxxx

| Option                | Code  | Description                                         |
|-----------------------|-------|-----------------------------------------------------|
| <b>Chromaticity</b>   | C     | Color                                               |
| <b>Lens</b>           | S44   | S-Mount Module D-FOV 44°                            |
|                       | S74   | S-Mount Module D-FOV 74°                            |
|                       | S119  | S-Mount Module D-FOV 119°                           |
|                       | S156  | S-Mount Module D-FOV 156°                           |
| <b>Filter</b>         | -     | -                                                   |
|                       | IR    | IR Cut Filter 650nm                                 |
| <b>Evaluation Kit</b> | -     | 70 pin Standardized Camera Connector                |
|                       | EVK   | 70 pin Standardized Camera Connector with FPC cable |
|                       | RPI15 | 15 pin Standardized ZIF Connector with FFC cable    |
|                       | RPI22 | 22 pin Standardized ZIF Connector with FFC cable    |
|                       | NXP   | Mini-SAS connection cable for NXP Evaluation Board  |
| <b>Custom ID</b>      | xxxx  | Custom Part number ID                               |

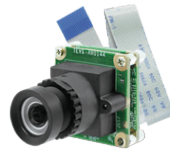
For customization, please contact your TechNexion sales representative.



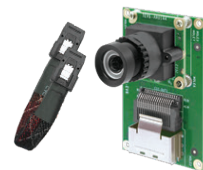
TechNexion EVK



RPI15



RPI22



Mini-SAS

## Cross-Platform Support

TechNexion's camera modules are designed for seamless integration across all platforms, enabling faster innovation and quicker time-to-market. Experience high-performance cameras that adapt to your needs and maximize your system's potential.

|                                                                                     |                                                           |                                                                                     |                                                                                                             |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
|    | i.MX95<br>i.MX93<br>i.MX8M Plus<br>i.MX8M Mini            |   | Jetson AGX Thor<br>Jetson AGX Orin<br>Jetson Orin NX<br>Jetson Orin Nano<br>Jetson Xavier NX<br>Jetson Nano |
|    | Alder Lake-N<br>Meteor Lake<br>Arrow Lake<br>Panther Lake |   | Sitara AM62 / AM62A<br>Sitara AM67/ 68 / 69<br>Jacinto TDA4VM<br>Jacinto TDA4VH                             |
|    | RZ/V2N<br>RZ/V2H                                          |   | BeagleY-AI<br>BeaglePlay                                                                                    |
|   | Raspberry Pi 4<br>Raspberry Pi 5                          |  | SL2610<br>SL1680<br>SL1640<br>SL1620                                                                        |
|  | STM32 MP25<br>STM32 N6                                    |                                                                                     |                                                                                                             |

## Software Support

Compatible with VizionSDK — a cross-platform C++, Python SDK for Windows and Linux. Enables full control of TechNexion cameras across multiple environments, including Ubuntu, Windows 10/11, NXP i.MX, and NVIDIA Jetson.



VizionSDK



VizionViewer™



Find all Software on

<https://www.technexion.com>

# Software SDK Available

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For more information:  
 [www.technexion.com](https://www.technexion.com)  
 [sales@technexion.com](mailto:sales@technexion.com)