

ACUROS[®] CQD[®] 640 USB3 SWIR Camera

ACUROS-0640-USB3-001

The ACUROS CQD SWIR cameras are sensitive to wavelengths from 400 nm to 1700 nm and feature up to 1920 x 1080 resolution with 15 μ m pixels to enable high performance at the lowest cost. The camera features low noise, highly stable performance, and up to 10 dB higher SNR compared to the competition's 5 μ m pixel InGaAs cameras. It supports a range of applications, including industrial inspection, military intelligence, and advanced research, offering versatility and outstanding image quality for both low-cost and high-performance applications.

Please see the ACUROS eSWIR product line for expanded sensitivity capabilities from 400 nm to 2000 nm.

SPECIFICATIONS

Table 1. ELECTRO-OPTICAL SPECIFICATIONS

Parameter	Value/Description
Sensor	ACUROS CQD sensor
Temperature Stabilization	Single-stage thermo-electric cooler
Sensor Array Format	640 x 512
Resolution	0.33 MP (megapixel)
Spectral Band	400–1700 nm
Array Size	9.6 mm x 7.7 mm, 12.3 mm diagonal
Pixel Pitch	15 μ m x 15 μ m
Max Frame Rate at Full Resolution	270 fps (8, 10, 12, 14 bit)
Pixel Operability	99.9% typical, 99.75% min
Bit Depth	8, 10, 12, 14 bit selectable
Integration Type	Snapshot global shutter
Trigger	External TTL
Integration Time	100 μ s to 4 s
Dynamic Range	70 dB typical
Windowing & Windowing Frame Rate	Array centered. Scales inversely to window size
Laser Beam Fringeless Operation	No (See ACUROS laser series cameras)
Binning Arrays	2 x 2, 4 x 4
Non-uniformity Correction	2-point non-uniformity correction
Temporal Dark Noise	80/70/65 e ⁻ typical
Quantum Efficiency	See typical QE curve (Figure 4)



ORDERING INFORMATION

Part Number
ACUROS-0640-USB3-001

Features

- VGA Resolution
- TEC Cooling
- Low Noise
- Fast Frame Rate
- Visible-SWIR
- USB3 Vision

Applications

- Machine Vision
- Silicon Inspection
- Automotive
- Fill-level
- Surveillance
- Hyperspectral
- Chemical Sensors
- Agricultural
- Medical Imaging
- Thermography

ACUROS-0640-USB3-001

Table 2. ENVIRONMENTAL & POWER SPECIFICATIONS, TYPICAL PERFORMANCE

Parameter	Value/Description
Operating Case Temperature	-20 °C to +55 °C
Power Consumption	6.5–12 W depending on TEC settings
Power Supply Voltage	6–16 V dc
Regulatory Compliance	CE mark

Table 3. MECHANICAL SPECIFICATIONS

Parameter	Value/Description
Dimensions Excluding Lens	6.1 x 6.1 x 9.7 cm (C-mount)
Weight Excluding Lens	590 grams with C-mount adapter
Lens Mounts	C, M42 (C-mount flange-back distance)
Power Connector	Hirose 12-pin, HR10A-10R-12PB (71)
Trigger Connector	BNC

Table 4. SOFTWARE AND USER INTERFACE

Parameter	Value/Description
Software Development Kit	Windows GUI
GenICam Compliance	Yes
Interface	USB3 Vision

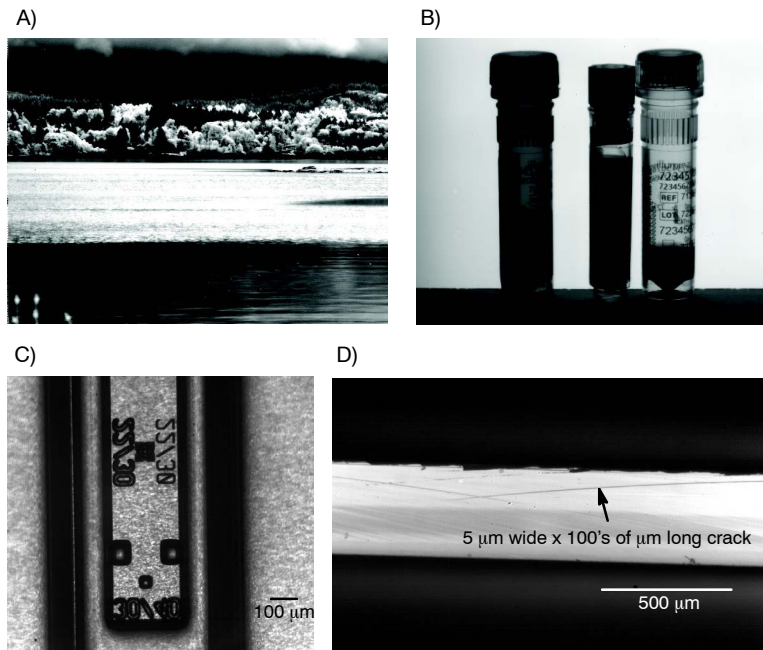


Figure 1. C-mount, and M-42 Lens Mounts



Figure 2. USB3 Vision Interface

ACUROS-0640-USB3-001



- A) ACUROS 640: imaging through maritime rain event
- B) ACUROS 640: imaging through pharmaceutical vial labels
- C) ACUROS 1280: alignment mark in bonded wafers
- D) ACUROS 1920: mag image of semiconductor chip edge

Figure 3. ACUROS CQD SWIR Camera Images

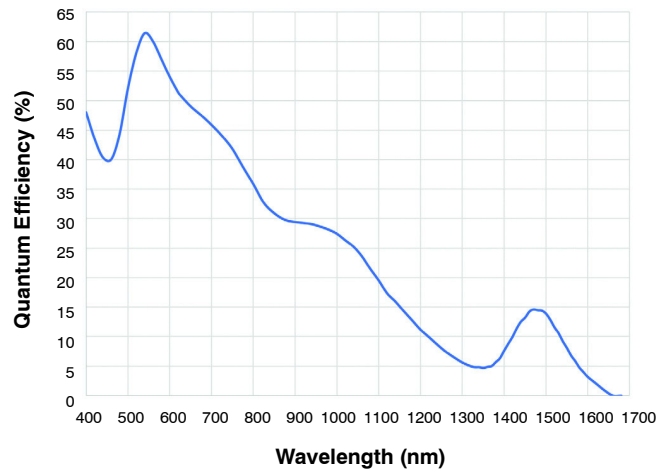


Figure 4. Typical QE Performance

ACUROS, CQD and SWIR VISION SYSTEMS are registered trademarks of Semiconductor Components Industries, LLC dba "onsemi" or its affiliates and/or subsidiaries in the United States and/or other countries. All other brand names and product names appearing in this document are registered trademarks or trademarks of their respective holders.

ACUROS-0640-USB3-001

REVISION HISTORY

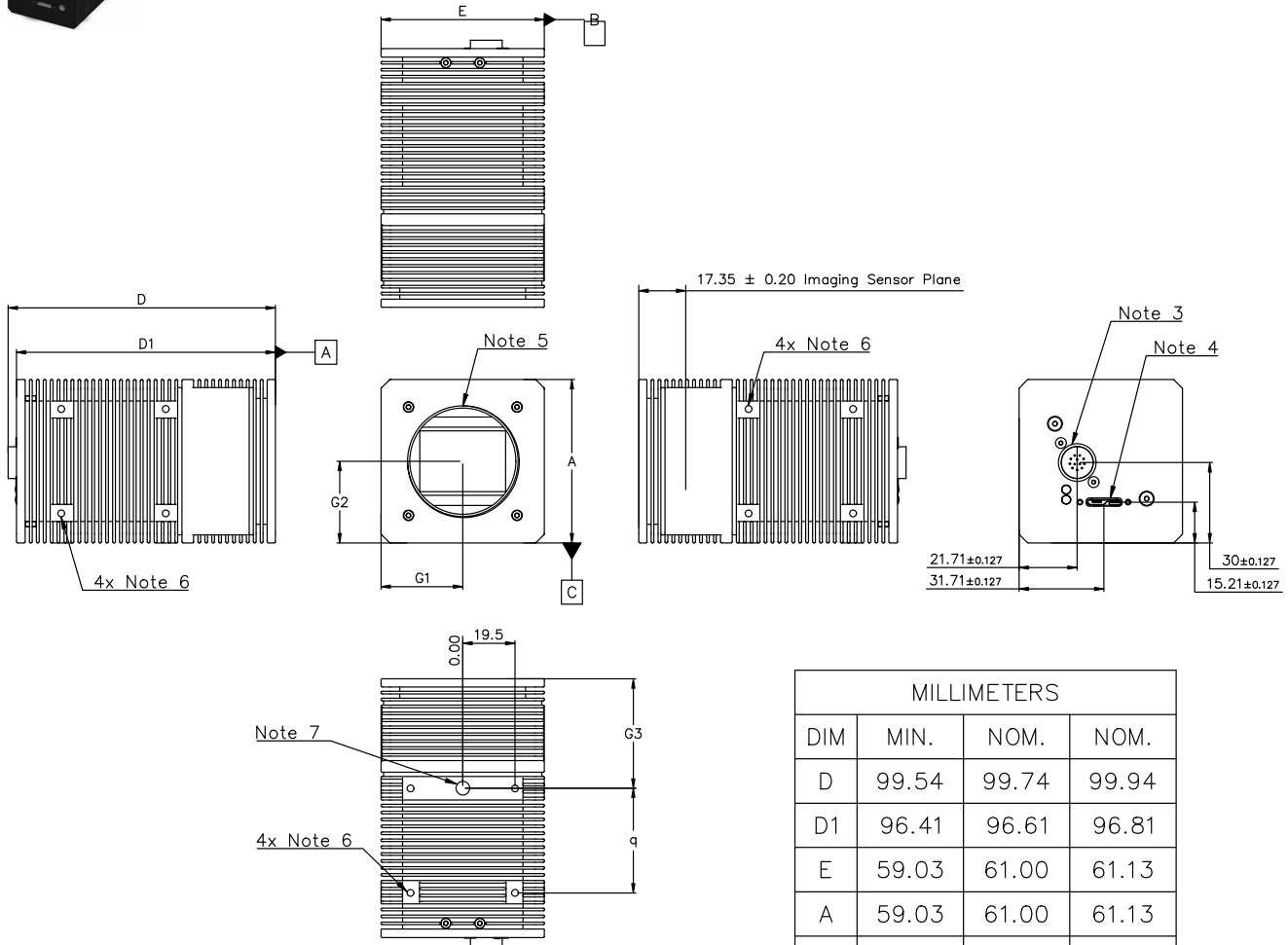
Revision	Description of Changes	Date
2	Removed "eBUS SDK" from Software Development Kit due to change in licensing.	3/13/2026

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.



CMOD 99.74x61.00x61.00
CASE 810AB
ISSUE A

DATE 27 MAY 2025



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M. 2018.
2. CONTROLLING DIMENSION: MILLIMETER
3. HIROSE 12 PIN CONNECTOR
4. USB 3.0 Micro-B
5. M42-MOUNT ∇ 9.8
6. M3X0.5 DEPTH ∇ 3.0
7. 1/4-20 UNC DEPTH ∇ 5.08

DOCUMENT NUMBER:	98AON65069H	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	CMOD 99.74x61.00x61.00	PAGE 1 OF 1

onsemi and ONSEMI are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales