

Aries 6504

The Aries 6504 is based on a BSI sCMOS platform, achieving 0.8 e⁻ readout noise and 297 fps at 4.2 MP resolution, ≤ 0.01 e⁻/p/s dark current at -20°C. It supports high-speed, low-light and long-exposure for life sciences, physical sciences, and industrial inspection.



Key Features

Benefits

High-Speed Mode	297 fps@4.2 MP with 0.8 e ⁻ (RMS) readout noise, optimized for high-speed low-light imaging.
High-Dynamic Mode	170 fps@4.2 MP with 16-bit depth; high-speed acquisition and wide dynamic range.
≤ 0.01 e ⁻ /p/s@-20°C Dark Current	5X gen-over-gen improvement, enabling high-precision quantitative long-exposure imaging.
USB 3.2 & CoaXPress Interfaces	Flexible connectivity at the same frame rate; adaptable to diverse applications.
Air & Liquid Cooling	Reduces dark current and signal fluctuation, supporting long-term system stability.

Typical Applications

- Super-resolution imaging
- Single-molecule imaging
- Light sheet imaging
- SIM imaging
- Calcium / voltage imaging
- Bioluminescence
- High-content imaging
- Quantum physics
- Astronomical research

Noted Examples

[1] The Aries 6504 shows clearly separated histogram peaks at ultra-low illumination of 20 e⁻/pixel, delivering a significant SNR improvement over the previous-generation back-illuminated sCMOS camera.

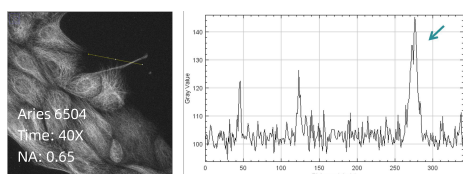


Fig. 1-1 Aries 6504 Ultra-low-light image (20 e⁻/pixel)

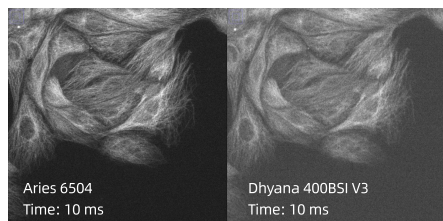
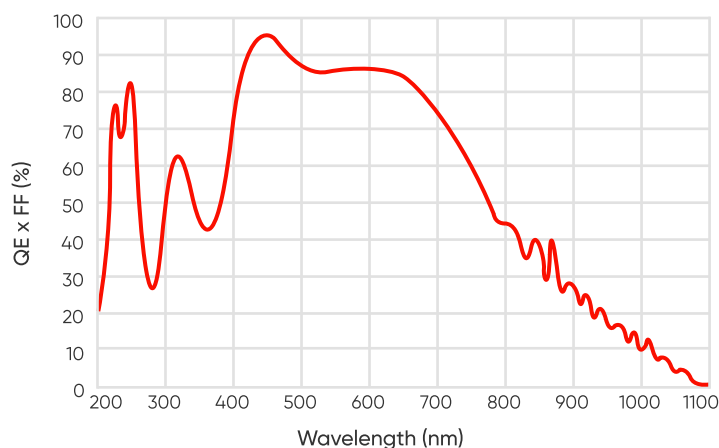
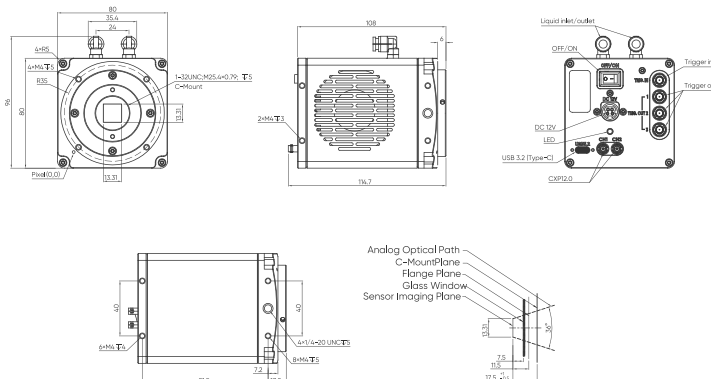


Fig. 1-2 Ultra-low-light comparison (20 e⁻/pixel)

Quantum Efficiency



Dimensions (Unit: mm)



Specifications

Model	Aries 6504
Sensor Type	BSI sCMOS
Sensor Model	GSENSE6504BSI
Chrome	Mono
Peak QE	95%@450 nm
Spectral Range	200 nm - 1100 nm
Resolution	2048 (H) x 2048 (V)
Pixel Size	6.5 μm x 6.5 μm
Effective Area	13.3 mm x 13.3 mm
Frame Rate	170 fps@HDR mode; 297 fps@Speed mode
Full-Well capacity	15 Ke-@HDR mode
Dynamic Range	86 dB@HDR mode
Readout Noise	RMS: 0.8 e-@HDR mode
Shutter Mode	Rolling, Global Reset
Dark Current	$\leq 0.01 \text{ e-}/\text{pixel}/\text{s}@-20^{\circ}\text{C}$
DSNU	0.3 e-
PRNU	0.3%
Cooling Method	Liquid, Air
Cooling Temp.	Liquid: $-20^{\circ}\text{C}@$ Liquid Temperature 20°C ; Air: $-10^{\circ}\text{C}@$ Ambient Temperature 25°C
Binning	2 x 2, 4 x 4
ROI	Support
Timestamp	Support
Trigger Mode	Hardware, Software
Trigger Output	Readout End, Global Exposure, Exposure Start, Trigger Ready, First Row, Any Row, High, Low
Trigger Interface	SMA*4
Data Interface	USB3.2 Gen2, CXP 2.0 x 2
Optical Interface	C Mount
Bit Depth	12 bit, 16 bit
Power Supply	DC12 V
Power Cons.	60 W
Dimensions*	80 mm (H) x 80 mm (W) x 108 mm (L)
Weight	950 g
Software	Sample Pro, Mosaic V3
SDK	C, C++
Operating System	Windows 10 / 11, Ubuntu 22.04
Environment	Working: Temp. $0^{\circ}\text{C}\sim 40^{\circ}\text{C}$, HUM. 20%~80%, Altitude 0 m~3000 m; Storage: Temp. $-20^{\circ}\text{C}\sim 60^{\circ}\text{C}$, HUM. 20%~80%

*Dimensions shown refer to the bare camera body only, excluding water-cooling fittings, adapters, and data interfaces. See the mechanical drawing for details.

*Specifications in this manual are subject to changes without prior notice.



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