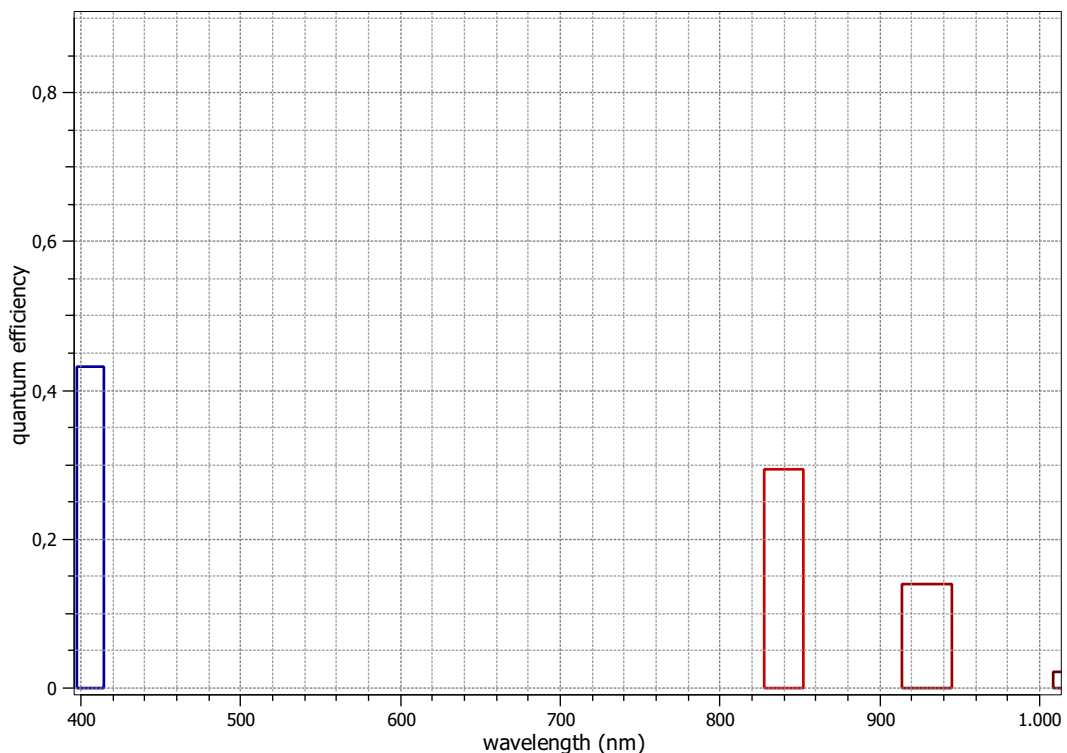


EMVA 1288 Summary Sheet

This datasheet describes the specification according to the standard 1288 release 3.1 for "Characterization and Presentation of Specification Data for Image Sensors and Cameras" issued on December 30, 2016 by the European Machine Vision Association (EMVA), published at www.standard1288.org and the *zenodo EMVA 1288 community* with proprietary extensions from AEON. The measurements were performed with the AEON ACC4, Release 3d, 06.10.2019, SN 0003(Baumer).

Measurements performed by Technical and Application Support Center, Baumer Optronic GmbH.

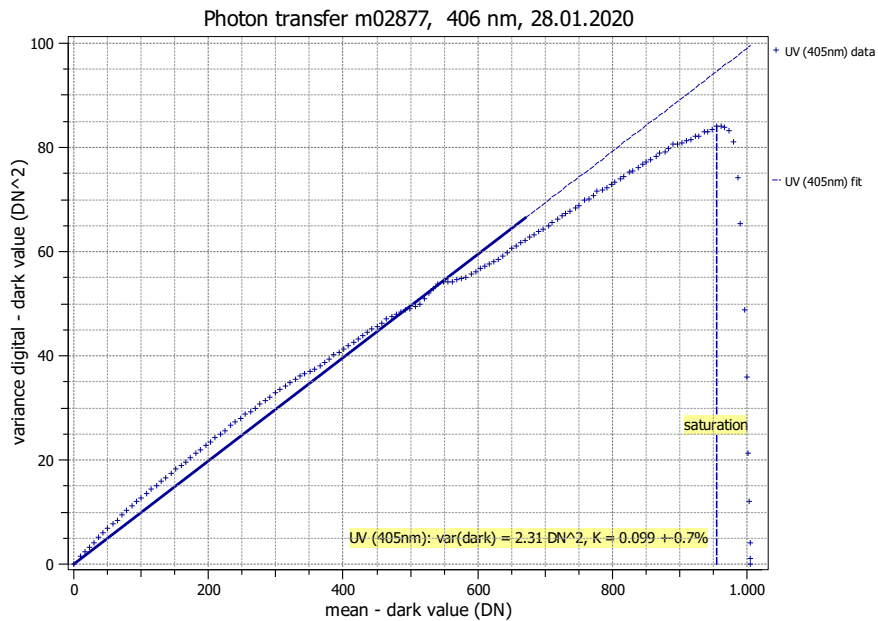
Vendor	Baumer	Type of data presented	Single	Optional data measured None
Model	LXG-20NIR	Operation point 1		
Serial number	700004593319	Wavelength centroid	405.6 nm	
Sensor diagonal	12.75 mm	Wavelength FWHM	16.7 nm	
Lens category	C-Mount	Gain, black-level	1.0 / 0.0	
Resolution	2048 × 1088, 10 bit	Operation point 2		
Pixel size (h×v)	5.50 μm × 5.50 μm	Wavelength centroid	839.7 nm	
Sensor	CMOSIS CMV2000	Wavelength FWHM	24.7 nm	
Sensor type	CMOS	Gain, black-level	1.0 / 0.0	
Shutter type	Global shutter	Operation point 3		
Overlap cap.	Overlapped	Wavelength centroid	929.6 nm	
Max. frame rate	0.0 Hz	Wavelength FWHM	31.3 nm	
Interface type	GEV	Gain, black-level	1.0 / 0.0	
		Operation point 4		
		Wavelength centroid	1041.2 nm	
		Wavelength FWHM	65.2 nm	
		Gain, black-level	1.0 / 0.0	



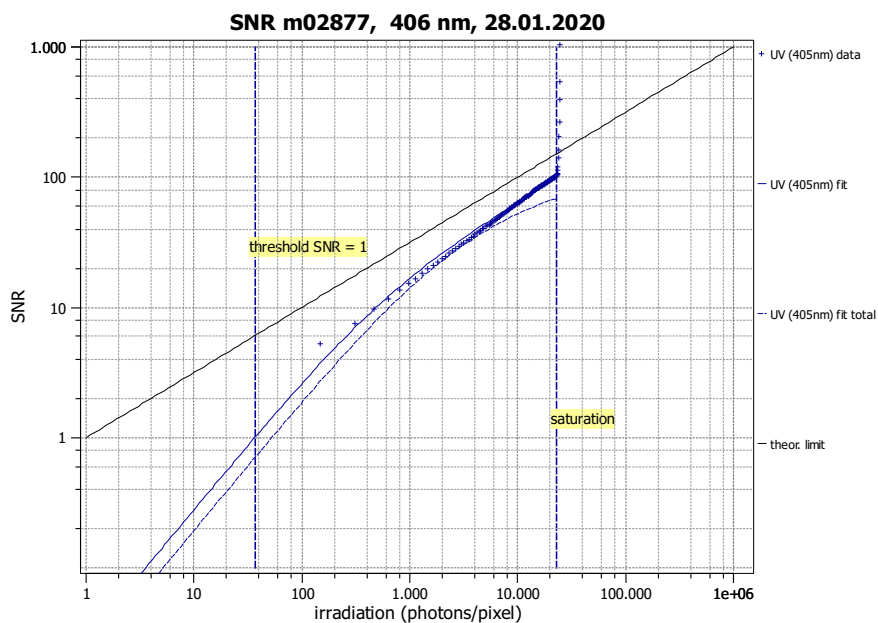
Summary Sheet for Operation Point 1 at a Wavelength of 406 nm

Type of data	Single	Gain, black-level	1.0 / 0.0
Exposure control	By irradiance	Environmental temperature	23.4 °C
Exposure time	420.00 μ s	Camera body temperature	32.6 °C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono10	Wavelength, centr., FWHM	406 nm, 16.7 nm

Photon Transfer



Signal-to-Noise Ratio



Quantum efficiency

η 43.2%

Overall system gain

K 0.099 DN/e⁻

$1/K$ 10.092 e⁻/DN

Temporal dark noise

σ_d 15.04 e⁻

$\sigma_{y,\text{dark}}$ 1.52 DN

Signal-to-noise ratio

SNR_{max} 99

39.9 dB

6.6 bit

$1/\text{SNR}_{\text{max}}$ 1.01 %

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 36.6 p

$\mu_{p,\text{min,area}}$ 1.21 p/ μm^2

$\mu_{e,\text{min}}$ 15.8 e⁻

$\mu_{e,\text{min,area}}$ 0.52 e⁻/ μm^2

Saturation capacity

$\mu_{p,\text{sat}}$ 22752 p

$\mu_{p,\text{sat,area}}$ 752 p/ μm^2

$\mu_{e,\text{sat}}$ 9833 e⁻

$\mu_{e,\text{sat,area}}$ 325 e⁻/ μm^2

Dynamic range

DR 621

55.9 dB

9.3 bit

Spatial nonuniformities

DSNU₁₂₈₈ 16.15 e⁻

1.60 DN

PRNU₁₂₈₈ 1.04 %

Linearity error

LE_{min} -1.13%

LE_{max} 1.05%

Dark current

$\mu_{c,\text{mean}}$ 393 ± 3 e⁻/s

39.0 DN/s

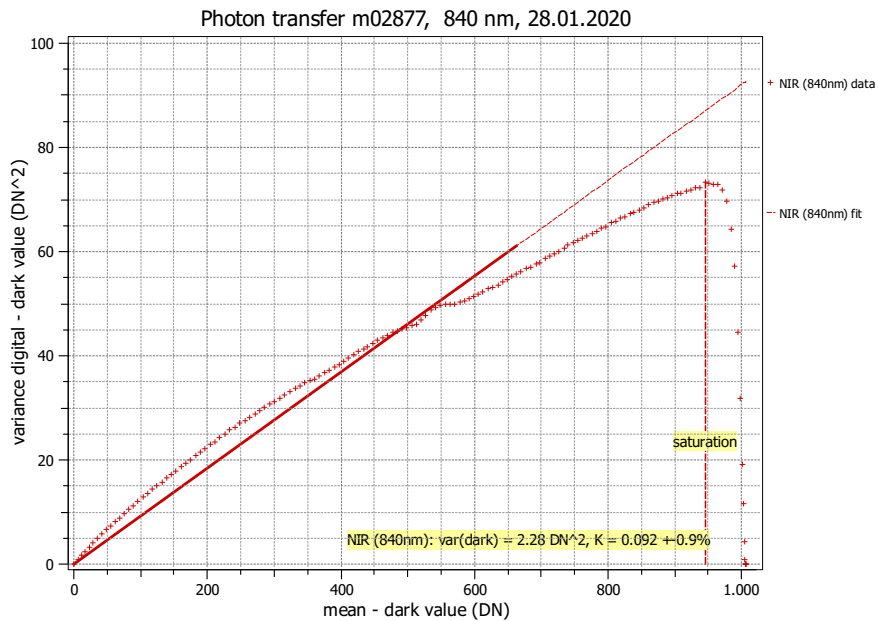
$\mu_{c,\text{var}}$ 522 ± 6 e⁻/s

T_d — °C

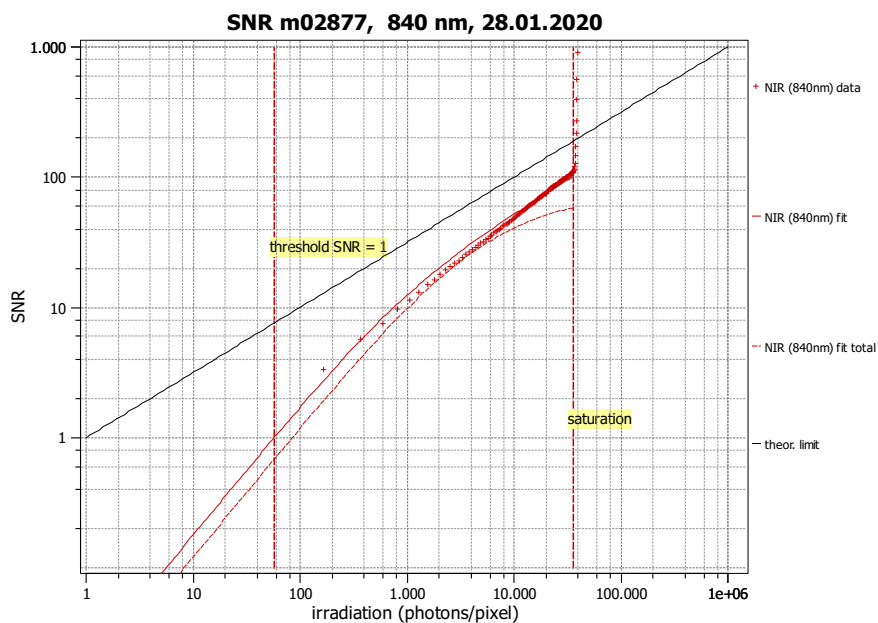
Summary Sheet for Operation Point 2 at a Wavelength of 840 nm

Type of data	Single	Gain, black-level	1.0 / 0.0
Exposure control	By irradiance	Environmental temperature	22.0°C
Exposure time	420.00 μ s	Camera body temperature	32.4°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono10	Wavelength, centr., FWHM	840 nm, 24.7 nm

Photon Transfer



Signal-to-Noise Ratio



Quantum efficiency

η 29.4%

Overall system gain

K 0.092 DN/e⁻

$1/K$ 10.861 e⁻/DN

Temporal dark noise

σ_d 16.11 e⁻

$\sigma_{y,\text{dark}}$ 1.51 DN

Signal-to-noise ratio

SNR_{max} 102

40.2 dB

6.7 bit

$1/\text{SNR}_{\text{max}}$ 0.98 %

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 57.5 p

$\mu_{p,\text{min,area}}$ 1.90 p/ μm^2

$\mu_{e,\text{min}}$ 16.9 e⁻

$\mu_{e,\text{min,area}}$ 0.56 e⁻/ μm^2

Saturation capacity

$\mu_{p,\text{sat}}$ 35469 p

$\mu_{p,\text{sat,area}}$ 1173 p/ μm^2

$\mu_{e,\text{sat}}$ 10436 e⁻

$\mu_{e,\text{sat,area}}$ 345 e⁻/ μm^2

Dynamic range

DR 617

55.8 dB

9.3 bit

Spatial nonuniformities

DSNU₁₂₈₈ 18.11 e⁻

1.67 DN

PRNU₁₂₈₈ 1.39 %

Linearity error

LE_{min} -1.05%

LE_{max} 1.07%

Dark current

$\mu_{c,\text{mean}}$ 423 \pm 3 e⁻/s

39.0 DN/s

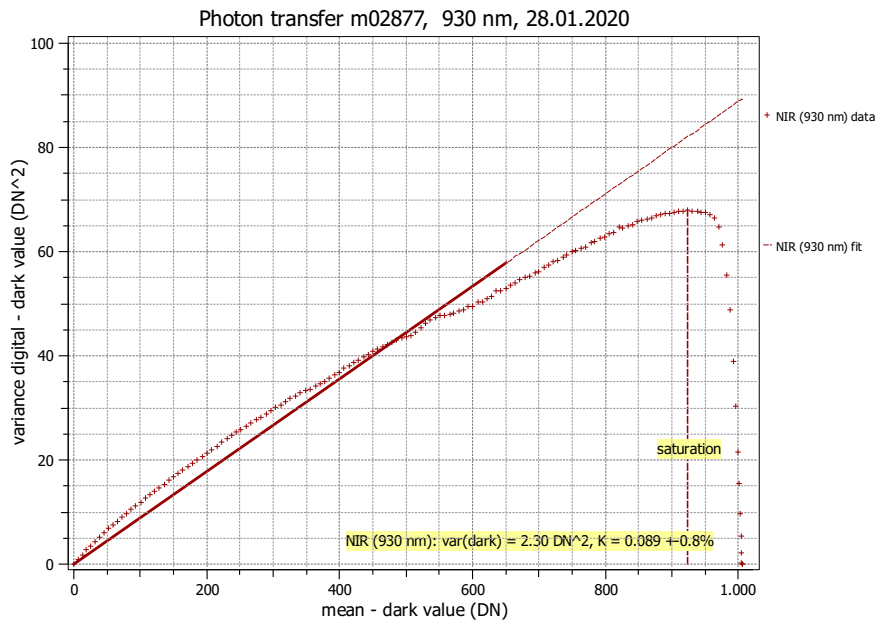
$\mu_{c,\text{var}}$ 604 \pm 7 e⁻/s

T_d — °C

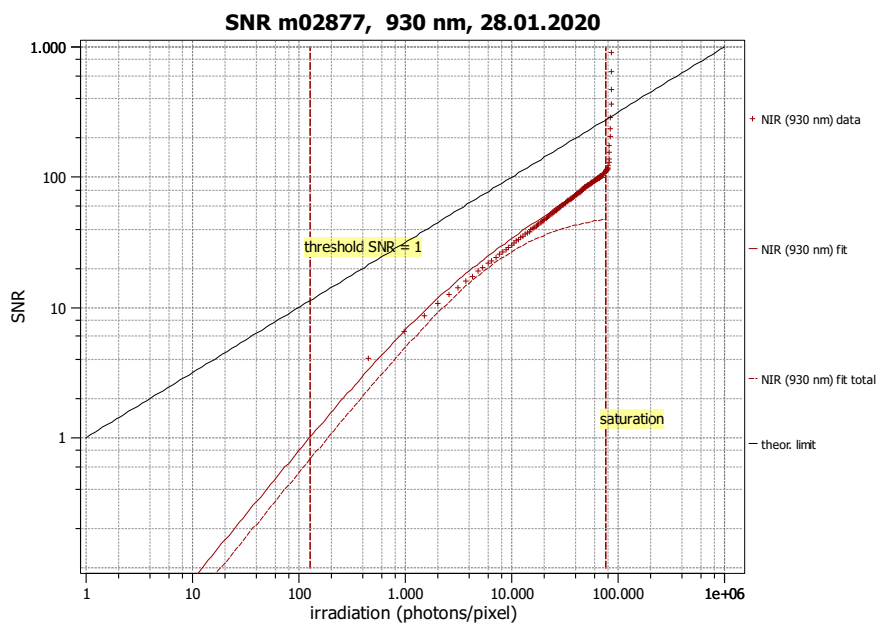
Summary Sheet for Operation Point 3 at a Wavelength of 930 nm

Type of data	Single	Gain, black-level	1.0 / 0.0
Exposure control	By irradiance	Environmental temperature	22.3°C
Exposure time	811.00 μ s	Camera body temperature	33.0°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono10	Wavelength, centr., FWHM	930 nm, 31.3 nm

Photon Transfer



Signal-to-Noise Ratio



Quantum efficiency

η 13.9%

Overall system gain

K 0.089 DN/e⁻

$1/K$ 11.256 e⁻/DN

Temporal dark noise

σ_d 16.74 e⁻

$\sigma_{y,\text{dark}}$ 1.51 DN

Signal-to-noise ratio

SNR_{max} 103

40.2 dB

6.7 bit

$1/\text{SNR}_{\text{max}}$ 0.97 %

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 126.4 p

$\mu_{p,\text{min,area}}$ 4.18 p/ μm^2

$\mu_{e,\text{min}}$ 17.6 e⁻

$\mu_{e,\text{min,area}}$ 0.58 e⁻/ μm^2

Saturation capacity

$\mu_{p,\text{sat}}$ 76183 p

$\mu_{p,\text{sat,area}}$ 2518 p/ μm^2

$\mu_{e,\text{sat}}$ 10582 e⁻

$\mu_{e,\text{sat,area}}$ 350 e⁻/ μm^2

Dynamic range

DR 603

55.6 dB

9.2 bit

Spatial nonuniformities

DSNU₁₂₈₈ 18.98 e⁻

1.69 DN

PRNU₁₂₈₈ 1.85 %

Linearity error

LE_{min} -1.00%

LE_{max} 0.93%

Dark current

$\mu_{c,\text{mean}}$ 439 \pm 3 e⁻/s

39.0 DN/s

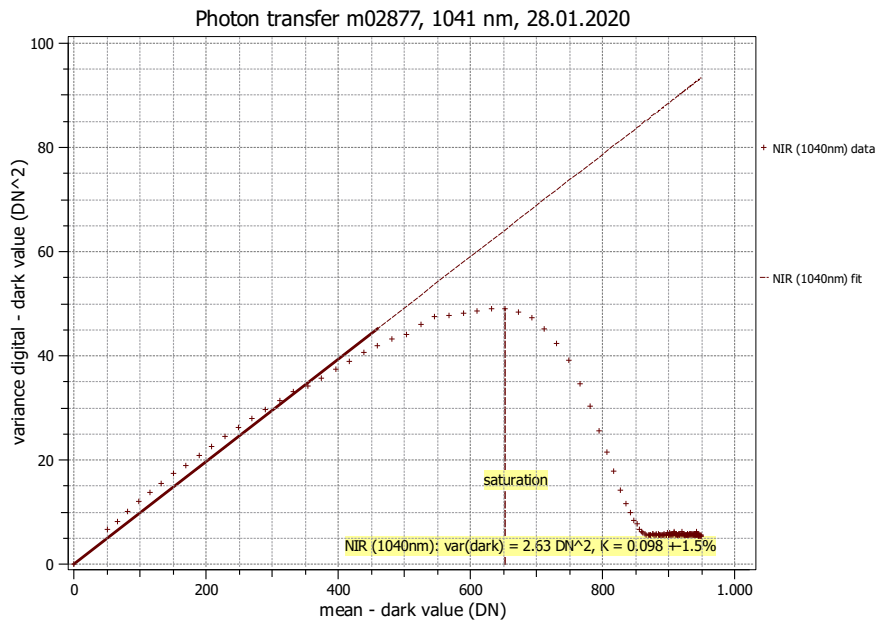
$\mu_{c,\text{var}}$ 649 \pm 7 e⁻/s

T_d — °C

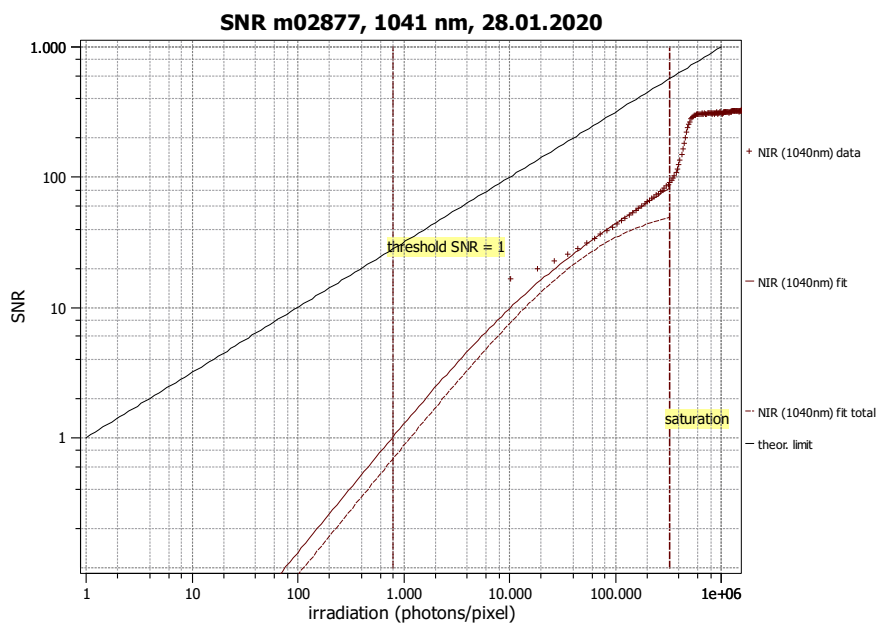
Summary Sheet for Operation Point 4 at a Wavelength of 1041 nm

Type of data	Single	Gain, black-level	1.0 / 0.0
Exposure control	By irradiance	Environmental temperature	22.9°C
Exposure time	49.95 ms	Camera body temperature	33.5°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono10	Wavelength, centr., FWHM	1041 nm, 65.2 nm

Photon Transfer



Signal-to-Noise Ratio



Quantum efficiency

η 2.2%

Overall system gain

K 0.098 DN/e⁻

$1/K$ 10.159 e⁻/DN

Temporal dark noise

σ_d 16.21 e⁻

$\sigma_{y,\text{dark}}$ 1.62 DN

Signal-to-noise ratio

SNR_{max} 84

38.5 dB

6.4 bit

$1/\text{SNR}_{\text{max}}$ 1.19%

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 783.9 p

$\mu_{p,\text{min,area}}$ 25.91 p/ μm^2

$\mu_{e,\text{min}}$ 17.0 e⁻

$\mu_{e,\text{min,area}}$ 0.56 e⁻/ μm^2

Saturation capacity

$\mu_{p,\text{sat}}$ 326829 p

$\mu_{p,\text{sat,area}}$ 10804 p/ μm^2

$\mu_{e,\text{sat}}$ 7079 e⁻

$\mu_{e,\text{sat,area}}$ 234 e⁻/ μm^2

Dynamic range

DR 417

52.4 dB

8.7 bit

Spatial nonuniformities

DSNU₁₂₈₈ 18.27 e⁻

1.80 DN

PRNU₁₂₈₈ 1.61%

Linearity error

LE_{min} -0.91%

LE_{max} 0.93%

Dark current

$\mu_{c,\text{mean}}$ 396 ± 3 e⁻/s

39.0 DN/s

$\mu_{c,\text{var}}$ 529 ± 6 e⁻/s

T_d — °C