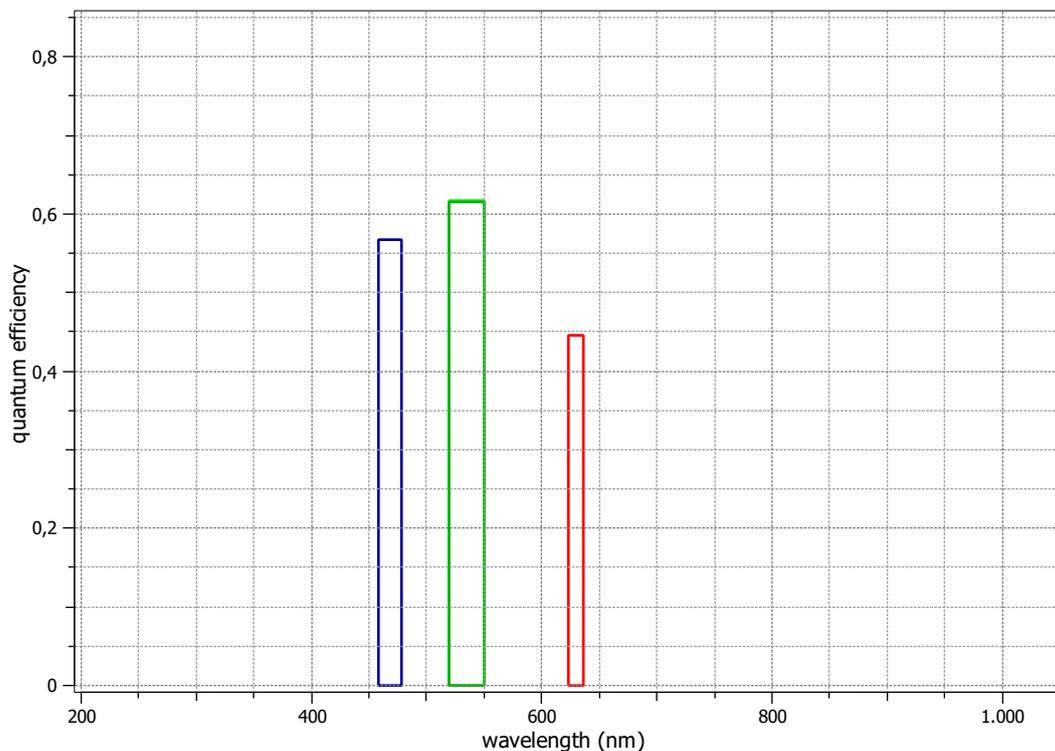


EMVA 1288 Data Sheet m1022

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 ACC3 Release 6, 26.11.2016, SN 0005(MatrixVision.

Measurements performed by T.Renner, Matrix Vision GmbH

Vendor	MATRIX VISION	Type of data presented	Single
Model	mvBlueCOUGAR-X106C	Operation point 1 (page 5)	
Serial number	GX410089	Wavelength centroid	468.0 nm
Sensor diagonal	8.95 mm	Wavelength FWHM	20.0 nm
Lens category	C-Mount	Gain, black-level	0dB, 0.1
Resolution	3096 × 2080, 12 bit	Operation point 2 (page 19)	
Pixel size (h×v)	2.40 μm × 2.40 μm	Wavelength centroid	535.0 nm
Sensor	IMX178	Wavelength FWHM	31.0 nm
Sensor type	CMOS	Gain, black-level	0dB, 0.1
Shutter type	Rolling	Operation point 3 (page 33)	
Overlap cap.	Overlapping	Wavelength centroid	630.0 nm
Max. frame rate	9.3 Hz	Wavelength FWHM	13.0 nm
Interface type	GigE Vision	Gain, black-level	0dB, 0.1
		Optional data measured	
		None	

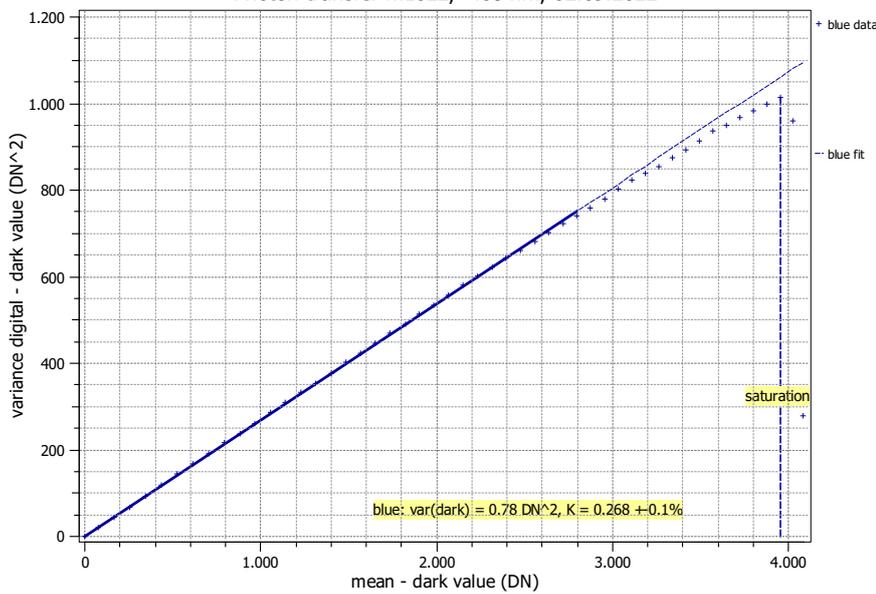


Summary Sheet for Operation Point 1 at a Wavelength of 468 nm

Type of data	Single	Gain, black-level	0dB, 0.1
Exposure control	By irradiance	Environmental temperature	24.9°C
Exposure time	2.00 ms	Camera body temperature	35.5°C
Frame rate	9.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	468 nm, 20.0 nm

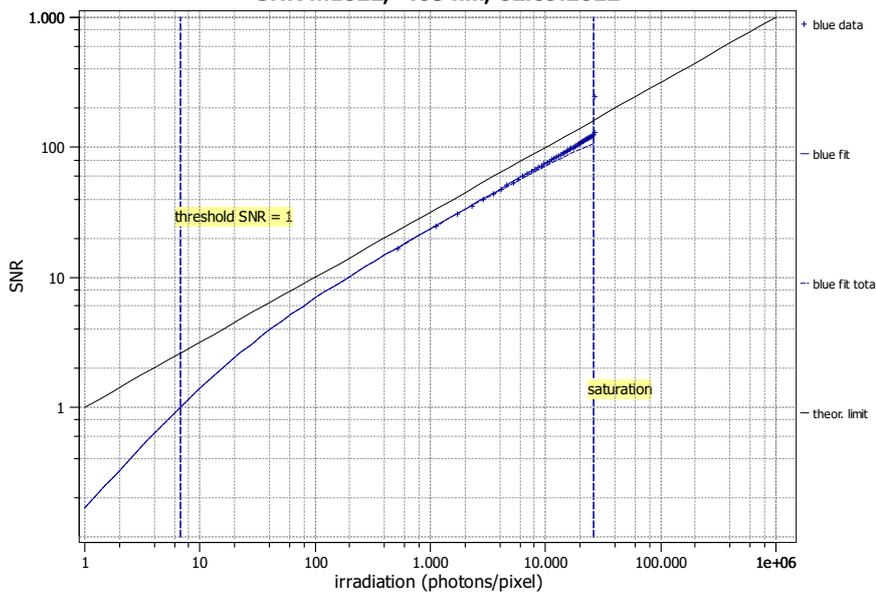
Photon Transfer

Photon transfer m1022, 468 nm, 02.09.2022



Signal-to-Noise Ratio

SNR m1022, 468 nm, 02.09.2022



Quantum efficiency

η 56.7%

Overall system gain

K 0.268 DN/e⁻

$1/K$ 3.725 e⁻/DN

Temporal dark noise

σ_d 3.12 e⁻

$\sigma_{y,\text{dark}}$ 0.88 DN

Signal-to-noise ratio

SNR_{max} 121

41.7 dB

6.9 bit

$1/\text{SNR}_{\text{max}}$ 0.82%

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 6.77 p

$\mu_{p,\text{min,area}}$ 1.175 p/μm²

$\mu_{e,\text{min}}$ 3.83 e⁻

$\mu_{e,\text{min,area}}$ 0.666 e⁻/μm²

Saturation capacity

$\mu_{p,\text{sat}}$ 26008 p

$\mu_{p,\text{sat,area}}$ 4515 p/μm²

$\mu_{e,\text{sat}}$ 14739 e⁻

$\mu_{e,\text{sat,area}}$ 2559 e⁻/μm²

Dynamic range

DR 3844

71.7 dB

11.9 bit

Spatial nonuniformities

DSNU₁₂₈₈ 0.20 e⁻

0.05 DN

PRNU₁₂₈₈ 0.43%

Linearity error

LE_{min} -0.51%

LE_{max} 0.92%

Dark current

$\mu_{c,\text{mean}}$ 0.66 ± 0.03 e⁻/s

0.18 DN/s

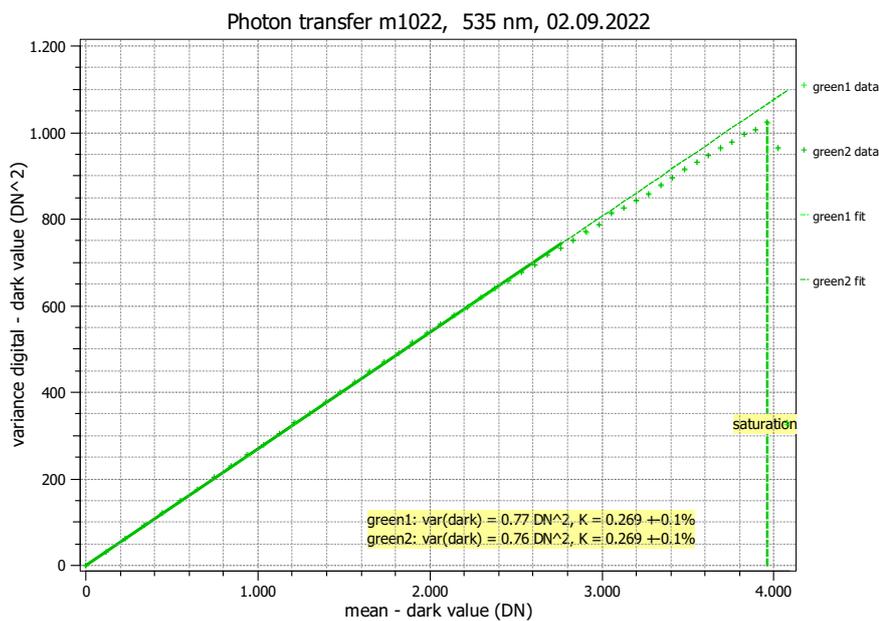
$\mu_{c,\text{var}}$ 0.65 ± 0.05 e⁻/s

T_d — °C

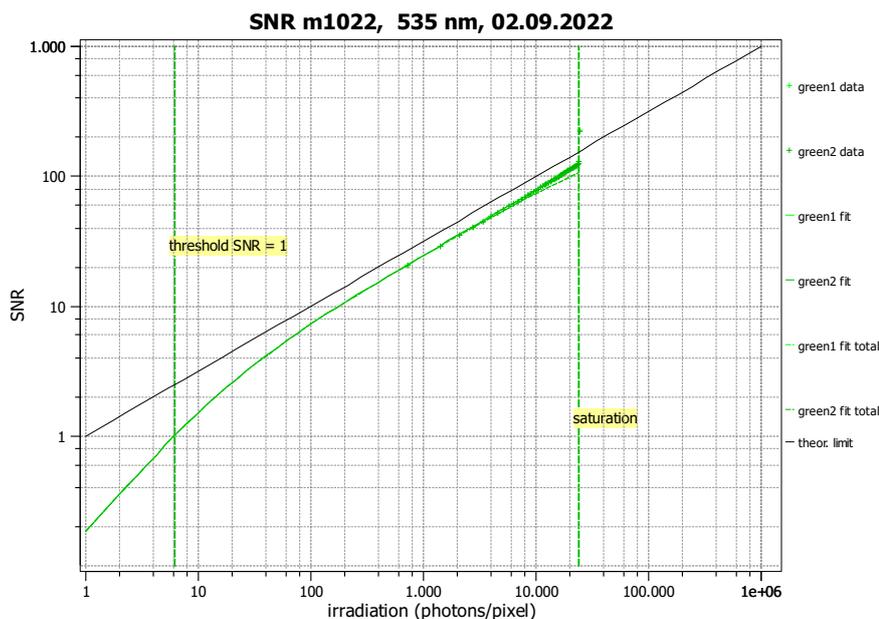
Summary Sheet for Operation Point 2 at a Wavelength of 535 nm

Type of data	Single	Gain, black-level	0dB, 0.1
Exposure control	By irradiance	Environmental temperature	25.0°C
Exposure time	2.00 ms	Camera body temperature	35.6°C
Frame rate	9.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	535 nm, 31.0 nm

Photon Transfer



Signal-to-Noise Ratio



Quantum efficiency

η 61.6%

Overall system gain

K 0.269 DN/e⁻

$1/K$ 3.718 e⁻/DN

Temporal dark noise

σ_d 3.08 e⁻

$\sigma_{y,\text{dark}}$ 0.88 DN

Signal-to-noise ratio

SNR_{max} 121

41.7 dB

6.9 bit

$1/\text{SNR}_{\text{max}}$ 0.83 %

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 6.16 p

$\mu_{p,\text{min,area}}$ 1.069 p/ μm^2

$\mu_{e,\text{min}}$ 3.80 e⁻

$\mu_{e,\text{min,area}}$ 0.659 e⁻/ μm^2

Saturation capacity

$\mu_{p,\text{sat}}$ 23732 p

$\mu_{p,\text{sat,area}}$ 4120 p/ μm^2

$\mu_{e,\text{sat}}$ 14629 e⁻

$\mu_{e,\text{sat,area}}$ 2540 e⁻/ μm^2

Dynamic range

DR 3853

71.7 dB

11.9 bit

Spatial nonuniformities

DSNU₁₂₈₈ 0.19 e⁻

0.05 DN

PRNU₁₂₈₈ 0.46 %

Linearity error

LE_{min} -0.73%

LE_{max} 1.53%

Dark current

$\mu_{c,\text{mean}}$ 0.70 ± 0.03 e⁻/s

0.19 DN/s

$\mu_{c,\text{var}}$ 0.70 ± 0.06 e⁻/s

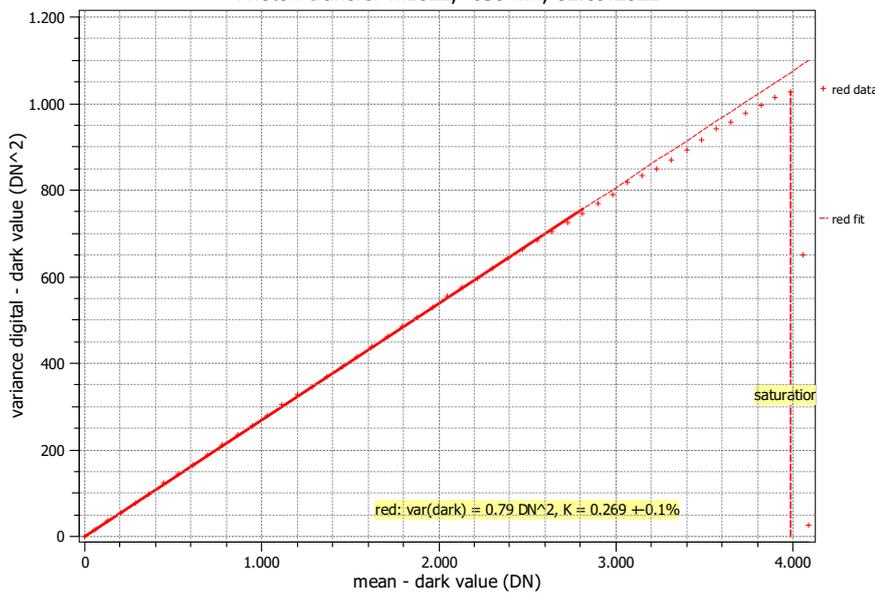
T_d — °C

Summary Sheet for Operation Point 3 at a Wavelength of 630 nm

Type of data	Single	Gain, black-level	0dB, 0.1
Exposure control	By irradiance	Environmental temperature	25.0°C
Exposure time	2.00 ms	Camera body temperature	35.7°C
Frame rate	9.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	630 nm, 13.0 nm

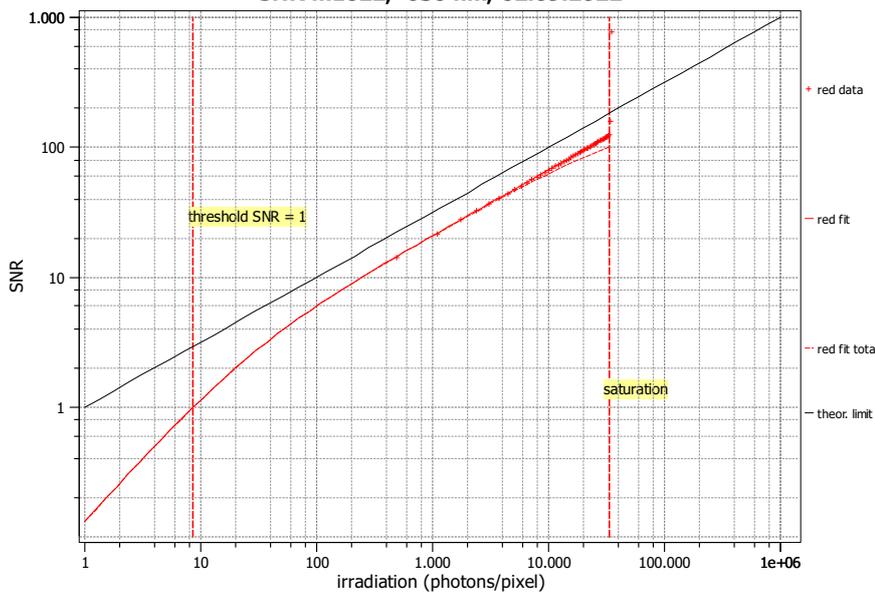
Photon Transfer

Photon transfer m1022, 630 nm, 02.09.2022



Signal-to-Noise Ratio

SNR m1022, 630 nm, 02.09.2022



Quantum efficiency

η 44.6%

Overall system gain

K 0.269 DN/e⁻

$1/K$ 3.720 e⁻/DN

Temporal dark noise

σ_d 3.13 e⁻

$\sigma_{y.dark}$ 0.89 DN

Signal-to-noise ratio

SNR_{max} 122

41.7 dB

6.9 bit

$1/\text{SNR}_{max}$ 0.82%

Absolute sensitivity threshold

$\mu_{p.min}$ 8.62 p

$\mu_{p.min.area}$ 1.497 p/ μm^2

$\mu_{e.min}$ 3.84 e⁻

$\mu_{e.min.area}$ 0.667 e⁻/ μm^2

Saturation capacity

$\mu_{p.sat}$ 33448 p

$\mu_{p.sat.area}$ 5807 p/ μm^2

$\mu_{e.sat}$ 14906 e⁻

$\mu_{e.sat.area}$ 2588 e⁻/ μm^2

Dynamic range

DR 3878

71.8 dB

11.9 bit

Spatial nonuniformities

DSNU₁₂₈₈ 0.23 e⁻

0.06 DN

PRNU₁₂₈₈ 0.56%

Linearity error

LE_{min} -0.39%

LE_{max} 0.18%

Dark current

$\mu_{c.mean}$ 0.74 ± 0.03 e⁻/s

0.20 DN/s

$\mu_{c.var}$ 0.71 ± 0.05 e⁻/s

T_d — °C