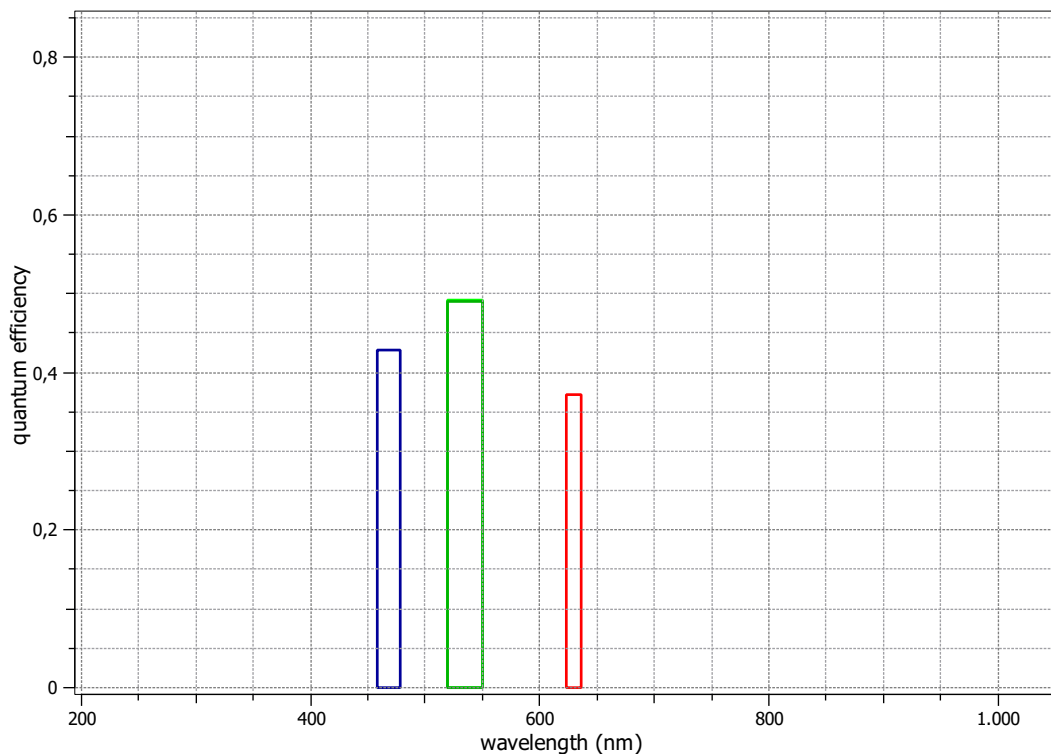


EMVA 1288 Data Sheet m0954

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

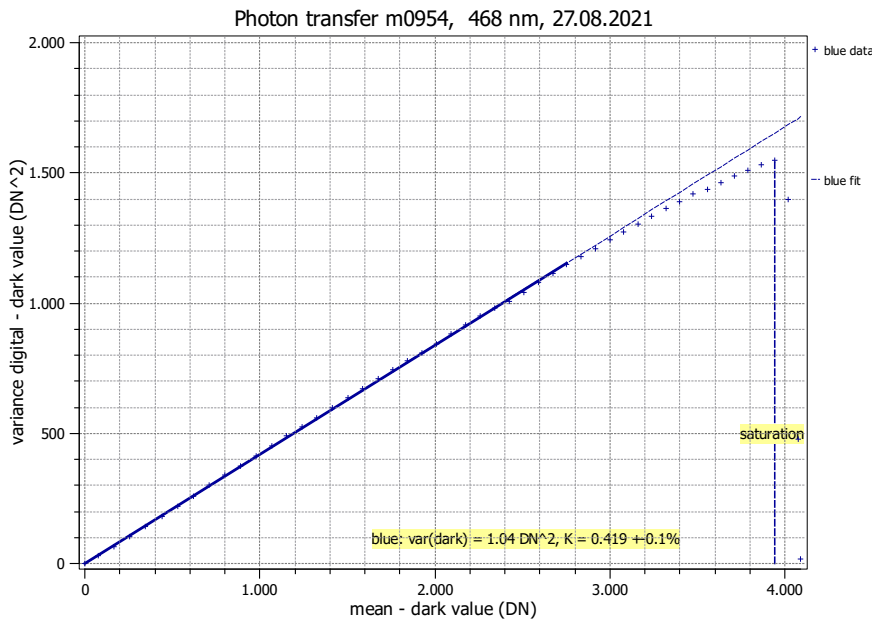
Vendor	MATRIX VISION	Type of data presented	Single
Model	mvBlueCOUGAR-X1012dC	Operation point 1 (page 5)	
Serial number	GX410007	Wavelength centroid	468.0 nm
Sensor diagonal	14.00 mm	Wavelength FWHM	20.0 nm
Lens category	C-Mount	Gain, black-level	0dB, 0.1
Resolution	4128 × 3008, 12 bit	Operation point 2 (page 19)	
Pixel size (h×v)	2.74 μm × 2.74 μm	Wavelength centroid	535.0 nm
Sensor	IMX545	Wavelength FWHM	31.0 nm
Sensor type	CMOS	Gain, black-level	0dB, 0.1
Shutter type	Global	Operation point 3 (page 33)	
Overlap cap.	Overlapping	Wavelength centroid	630.0 nm
Max. frame rate	4.8 Hz	Wavelength FWHM	13.0 nm
Interface type	GigE Vision	Gain, black-level	0dB, 0.1
		Optional data measured	None



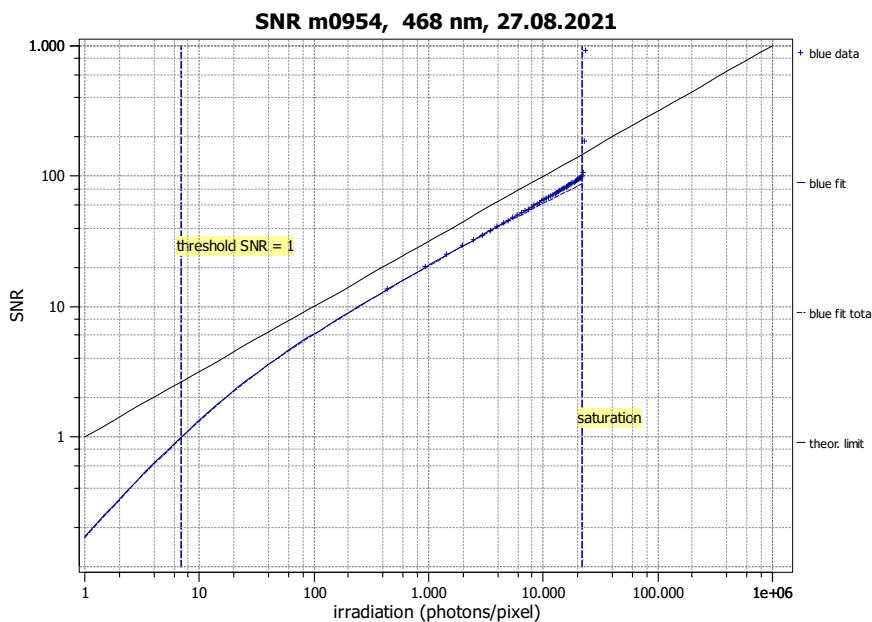
Summary Sheet for Operation Point 1 at a Wavelength of 468 nm

Type of data	Single	Gain, black-level	0dB, 0.1
Exposure control	By irradiance	Environmental temperature	22.0°C
Exposure time	1.50 ms	Camera body temperature	32.7°C
Frame rate	3.5 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	468 nm, 20.0 nm

Photon Transfer



Signal-to-Noise Ratio



Quantum efficiency

η 42.9%

Overall system gain

K 0.419 DN/e⁻

$1/K$ 2.386 e⁻/DN

Temporal dark noise

σ_d 2.33 e⁻

$\sigma_{y,\text{dark}}$ 1.02 DN

Signal-to-noise ratio

SNR_{max} 97

39.7 dB

6.6 bit

$1/\text{SNR}_{\text{max}}$ 1.03 %

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 6.96 p

$\mu_{p,\text{min},\text{area}}$ 0.927 p/ μm^2

$\mu_{e,\text{min}}$ 2.98 e⁻

$\mu_{e,\text{min},\text{area}}$ 0.397 e⁻/ μm^2

Saturation capacity

$\mu_{p,\text{sat}}$ 21935 p

$\mu_{p,\text{sat},\text{area}}$ 2922 p/ μm^2

$\mu_{e,\text{sat}}$ 9403 e⁻

$\mu_{e,\text{sat},\text{area}}$ 1253 e⁻/ μm^2

Dynamic range

DR 3152

70.0 dB

11.6 bit

Spatial nonuniformities

DSNU₁₂₈₈ 0.48 e⁻

0.20 DN

PRNU₁₂₈₈ 0.52 %

Linearity error

LE_{min} -0.16%

LE_{max} 0.15%

Dark current

$\mu_{c,\text{mean}}$ 0.83 ± 0.01 e⁻/s

0.35 DN/s

$\mu_{c,\text{var}}$ 0.82 ± 0.02 e⁻/s

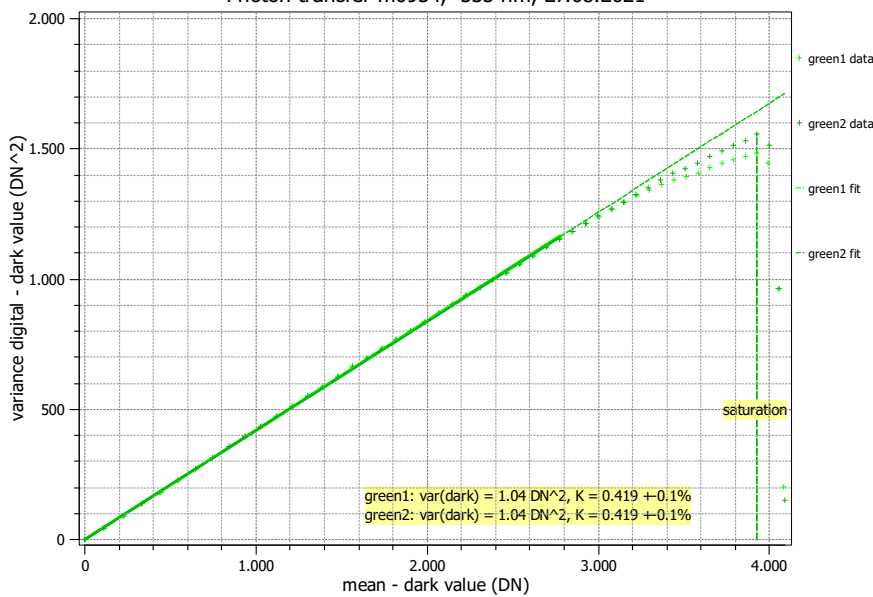
T_d — °C

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	22.0°C
Exposure time	1.50 ms	Camera body temperature	33.4°C
Frame rate	3.5 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	535 nm, 31.0 nm

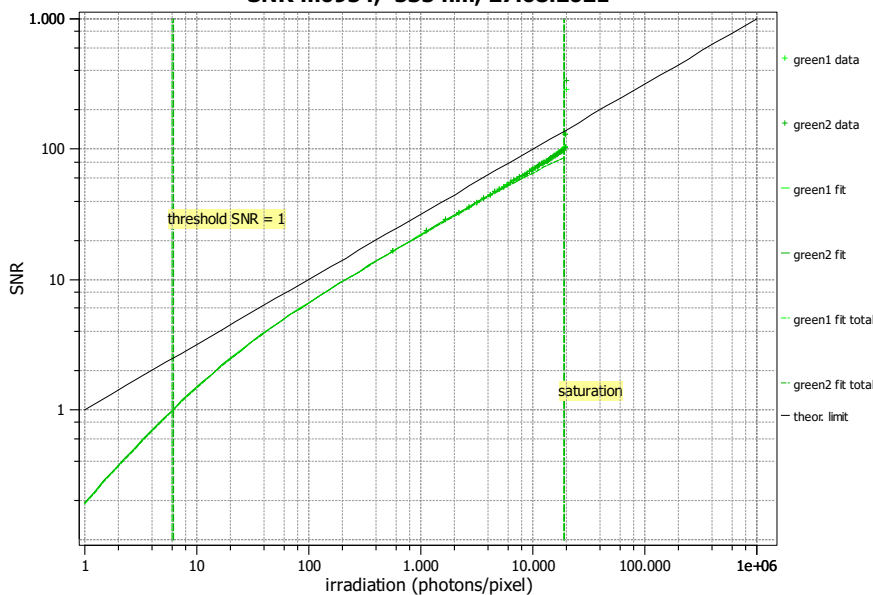
Photon Transfer

Photon transfer m0954, 535 nm, 27.08.2021



Signal-to-Noise Ratio

SNR m0954, 535 nm, 27.08.2021



Quantum efficiency

η 49.1%

Overall system gain

K 0.419 DN/e⁻

$1/K$ 2.386 e⁻/DN

Temporal dark noise

σ_d 2.33 e⁻

$\sigma_{y,\text{dark}}$ 1.02 DN

Signal-to-noise ratio

SNR_{max} 97

39.7 dB

6.6 bit

$1/\text{SNR}_{\text{max}}$ 1.04 %

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 6.08 p

$\mu_{p,\text{min},\text{area}}$ 0.810 p/ μm^2

$\mu_{e,\text{min}}$ 2.98 e⁻

$\mu_{e,\text{min},\text{area}}$ 0.398 e⁻/ μm^2

Saturation capacity

$\mu_{p,\text{sat}}$ 19009 p

$\mu_{p,\text{sat},\text{area}}$ 2532 p/ μm^2

$\mu_{e,\text{sat}}$ 9334 e⁻

$\mu_{e,\text{sat},\text{area}}$ 1243 e⁻/ μm^2

Dynamic range

DR 3127

69.9 dB

11.6 bit

Spatial nonuniformities

DSNU₁₂₈₈ 0.58 e⁻

0.24 DN

PRNU₁₂₈₈ 0.52 %

Linearity error

LE_{min} -0.45%

LE_{max} 0.68%

Dark current

$\mu_{c,\text{mean}}$ 0.84 ± 0.01 e⁻/s

0.35 DN/s

$\mu_{c,\text{var}}$ 0.83 ± 0.02 e⁻/s

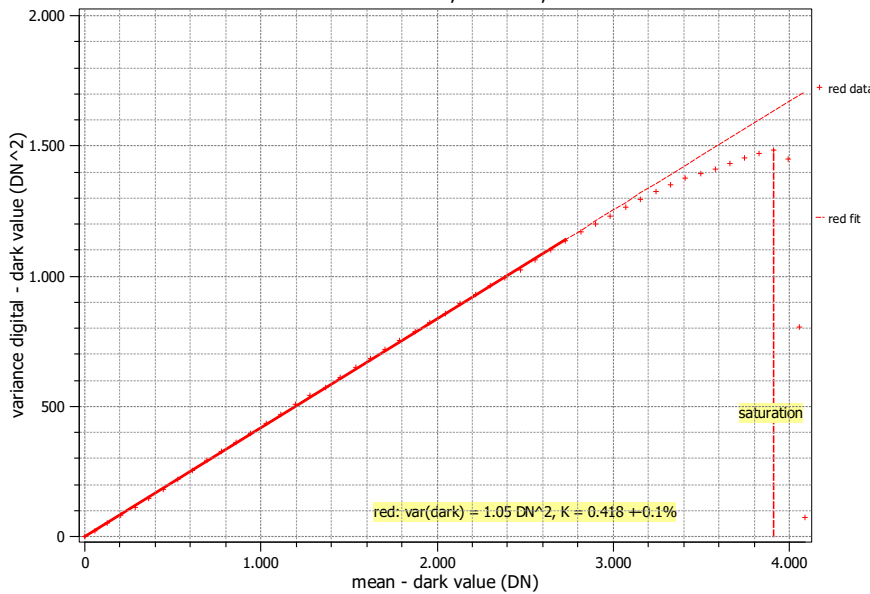
T_d — °C

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	22.0°C
Exposure time	1.50 ms	Camera body temperature	33.6°C
Frame rate	3.5 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	630 nm, 13.0 nm

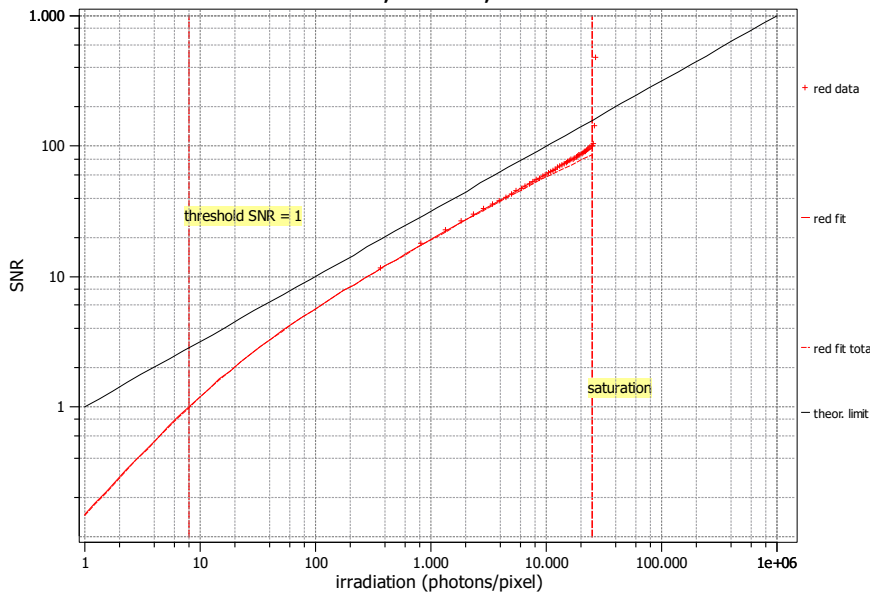
Photon Transfer

Photon transfer m0954, 630 nm, 27.08.2021



Signal-to-Noise Ratio

SNR m0954, 630 nm, 27.08.2021



Quantum efficiency

η 37.2%

Overall system gain

K 0.418 DN/e⁻

$1/K$ 2.392 e⁻/DN

Temporal dark noise

σ_d 2.35 e⁻

$\sigma_{y,\text{dark}}$ 1.02 DN

Signal-to-noise ratio

SNR_{max} 97

39.7 dB

6.6 bit

$1/\text{SNR}_{\text{max}}$ 1.03 %

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 8.05 p

$\mu_{p,\text{min,area}}$ 1.073 p/ μm^2

$\mu_{e,\text{min}}$ 3.00 e⁻

$\mu_{e,\text{min,area}}$ 0.400 e⁻/ μm^2

Saturation capacity

$\mu_{p,\text{sat}}$ 25258 p

$\mu_{p,\text{sat,area}}$ 3364 p/ μm^2

$\mu_{e,\text{sat}}$ 9406 e⁻

$\mu_{e,\text{sat,area}}$ 1253 e⁻/ μm^2

Dynamic range

DR 3136

69.9 dB

11.6 bit

Spatial nonuniformities

DSNU₁₂₈₈ 0.48 e⁻

0.20 DN

PRNU₁₂₈₈ 0.55 %

Linearity error

LE_{min} -0.36%

LE_{max} 0.26%

Dark current

$\mu_{c,\text{mean}}$ 0.80 ± 0.01 e⁻/s

0.34 DN/s

$\mu_{c,\text{var}}$ 0.78 ± 0.01 e⁻/s

T_d — °C