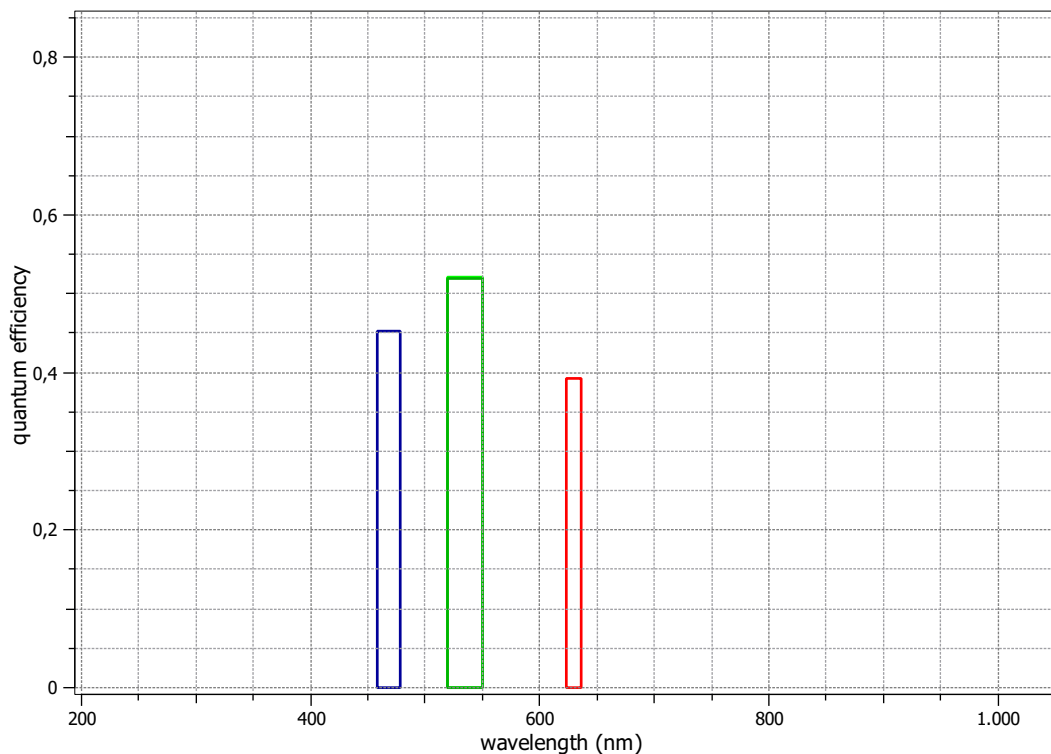


EMVA 1288 Data Sheet m0925

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

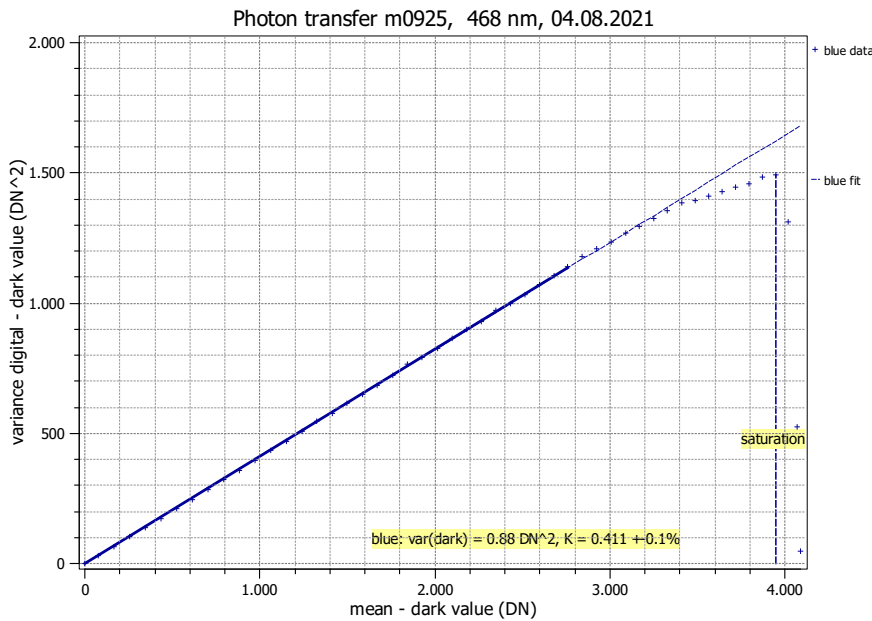
Vendor	MATRIX VISION	Type of data presented	Single
Model	BVS CA-GT1-0204ZC	Operation point 1 (page 5)	
Serial number	GT000013	Wavelength centroid	468.0 nm
Sensor diagonal	17.48 mm	Wavelength FWHM	20.0 nm
Lens category	C-Mount	Gain, black-level	0dB, 0.1
Resolution	4512 × 4512, 12 bit	Operation point 2 (page 19)	
Pixel size (h×v)	2.74 μm × 2.74 μm	Wavelength centroid	535.0 nm
Sensor	IMX531	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	40.5 Hz	Wavelength FWHM	13.0 nm
Interface type	USB3 Vision	Gain, black-level	0dB, 0.1
		Optional data measured	None



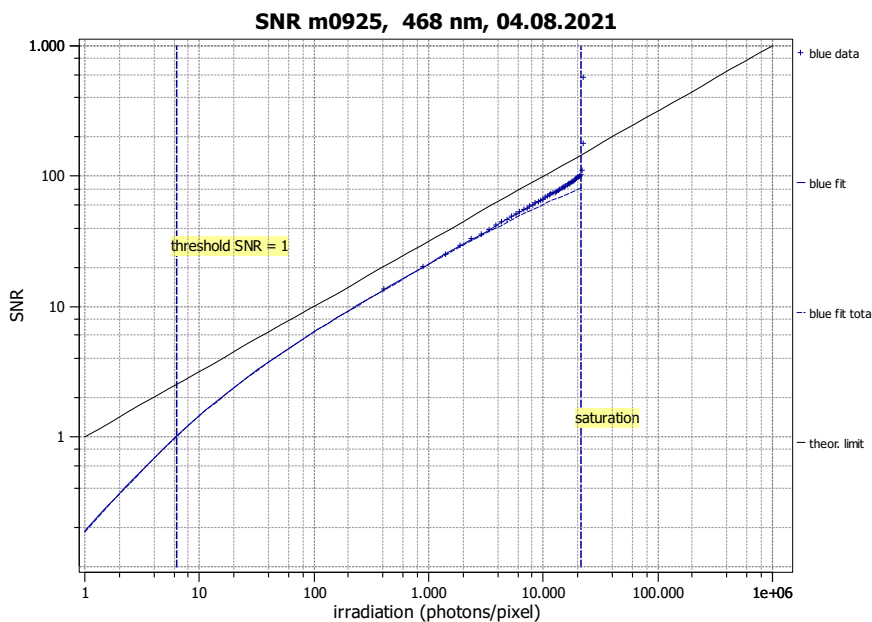
Summary Sheet for Operation Point 1 at a Wavelength of 468 nm

Type of data	Single	Gain, black-level	0dB, 0.1
Exposure control	By irradiance	Environmental temperature	23.5°C
Exposure time	1.50 ms	Camera body temperature	34.7°C
Frame rate	3.8 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12p	Wavelength, centr., FWHM	468 nm, 20.0 nm

Photon Transfer



Signal-to-Noise Ratio

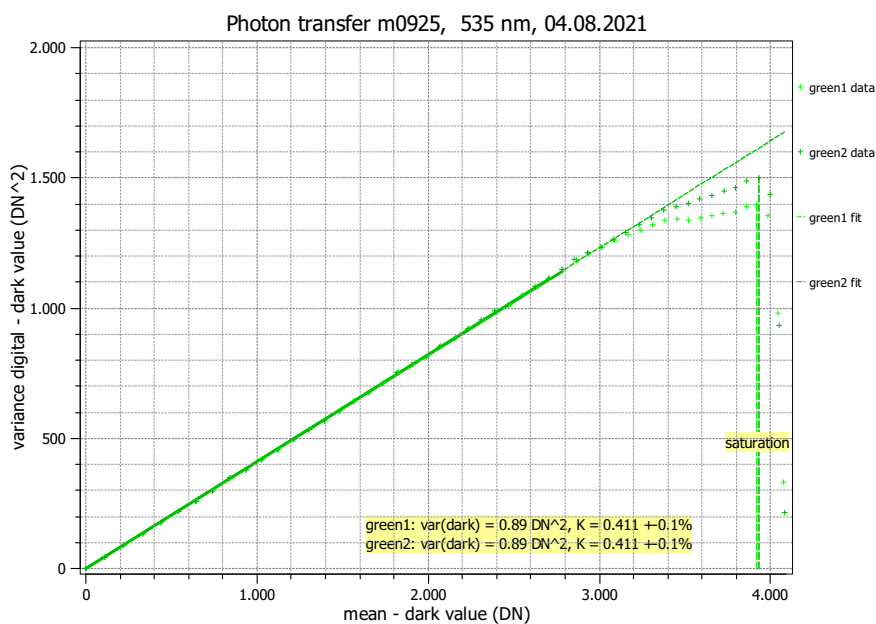


Quantum efficiency	
η	45.2%
Overall system gain	
K	0.411 DN/e ⁻
$1/K$	2.433 e ⁻ /DN
Temporal dark noise	
σ_d	2.18 e ⁻
$\sigma_{y,\text{dark}}$	0.94 DN
Signal-to-noise ratio	
SNR_{max}	98
	39.8 dB
	6.6 bit
$1/\text{SNR}_{\text{max}}$	1.02 %
Absolute sensitivity threshold	
$\mu_{p,\text{min}}$	6.29 p
$\mu_{p,\text{min.area}}$	0.838 p/ μm^2
$\mu_{e,\text{min}}$	2.84 e ⁻
$\mu_{e,\text{min.area}}$	0.378 e ⁻ / μm^2
Saturation capacity	
$\mu_{p,\text{sat}}$	21278 p
$\mu_{p,\text{sat.area}}$	2834 p/ μm^2
$\mu_{e,\text{sat}}$	9608 e ⁻
$\mu_{e,\text{sat.area}}$	1280 e ⁻ / μm^2
Dynamic range	
DR	3383
	70.6 dB
	11.7 bit
Spatial nonuniformities	
DSNU_{1288}	0.47 e ⁻
	0.19 DN
PRNU_{1288}	0.70 %
Linearity error	
LE_{min}	-0.47%
LE_{max}	0.75%
Dark current	
$\mu_{c,\text{mean}}$	1.7 ± 0.1 e ⁻ /s
	0.69 DN/s
$\mu_{c,\text{var}}$	1.0 ± 0.0 e ⁻ /s
T_d	— °C

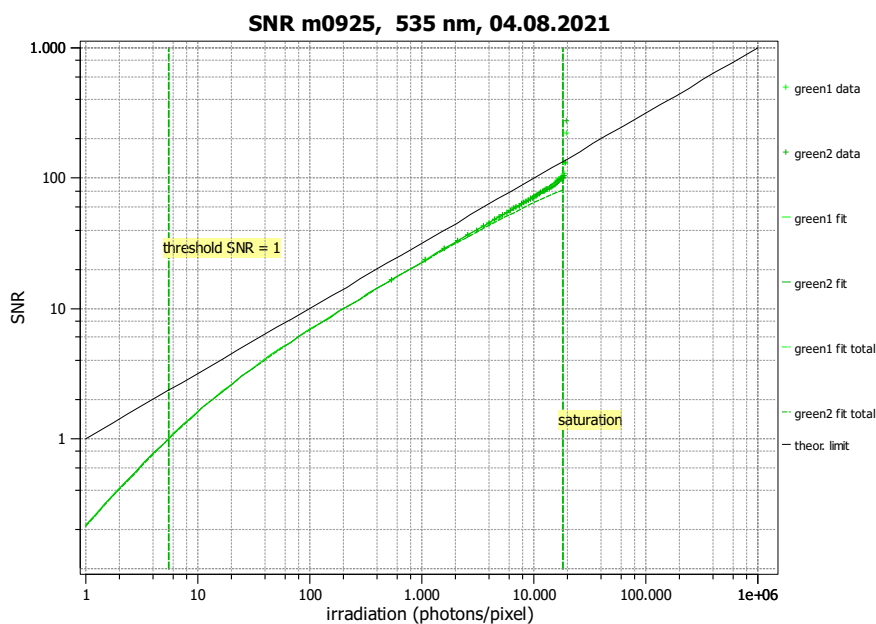
Summary Sheet for Operation Point 2 at a Wavelength of 535 nm

Type of data	Single	Gain, black-level	0dB, 0.1
Exposure control	By irradiance	Environmental temperature	23.6°C
Exposure time	1.50 ms	Camera body temperature	35.8°C
Frame rate	3.8 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12p	Wavelength, centr., FWHM	535 nm, 31.0 nm

Photon Transfer



Signal-to-Noise Ratio



Quantum efficiency

η 52.1%

Overall system gain

K 0.411 DN/e⁻

$1/K$ 2.435 e⁻/DN

Temporal dark noise

σ_d 2.18 e⁻

$\sigma_{y,\text{dark}}$ 0.94 DN

Signal-to-noise ratio

SNR_{max} 98

39.8 dB

6.6 bit

$1/\text{SNR}_{\text{max}}$ 1.02 %

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 5.47 p

$\mu_{p,\text{min},\text{area}}$ 0.728 p/μm²

$\mu_{e,\text{min}}$ 2.85 e⁻

$\mu_{e,\text{min},\text{area}}$ 0.379 e⁻/μm²

Saturation capacity

$\mu_{p,\text{sat}}$ 18350 p

$\mu_{p,\text{sat},\text{area}}$ 2444 p/μm²

$\mu_{e,\text{sat}}$ 9558 e⁻

$\mu_{e,\text{sat},\text{area}}$ 1273 e⁻/μm²

Dynamic range

DR 3357

70.5 dB

11.7 bit

Spatial nonuniformities

DSNU₁₂₈₈ 0.38 e⁻

0.16 DN

PRNU₁₂₈₈ 0.69 %

Linearity error

LE_{min} -0.64%

LE_{max} 1.12%

Dark current

$\mu_{c,\text{mean}}$ 1.7 ± 0.1 e⁻/s

0.69 DN/s

$\mu_{c,\text{var}}$ 1.0 ± 0.0 e⁻/s

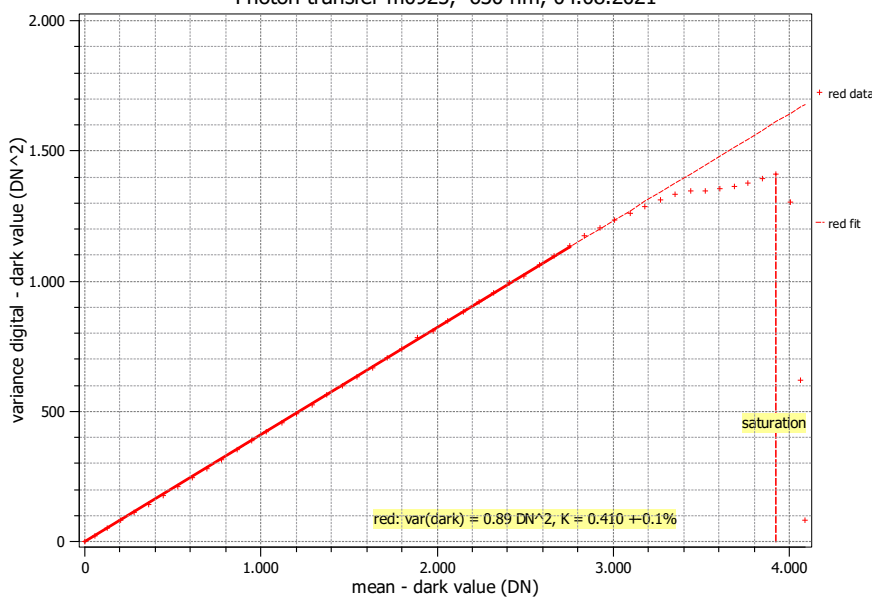
T_d — °C

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	23.6°C
Exposure time	1.50 ms	Camera body temperature	36.7°C
Frame rate	3.8 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12p	Wavelength, centr., FWHM	630 nm, 13.0 nm

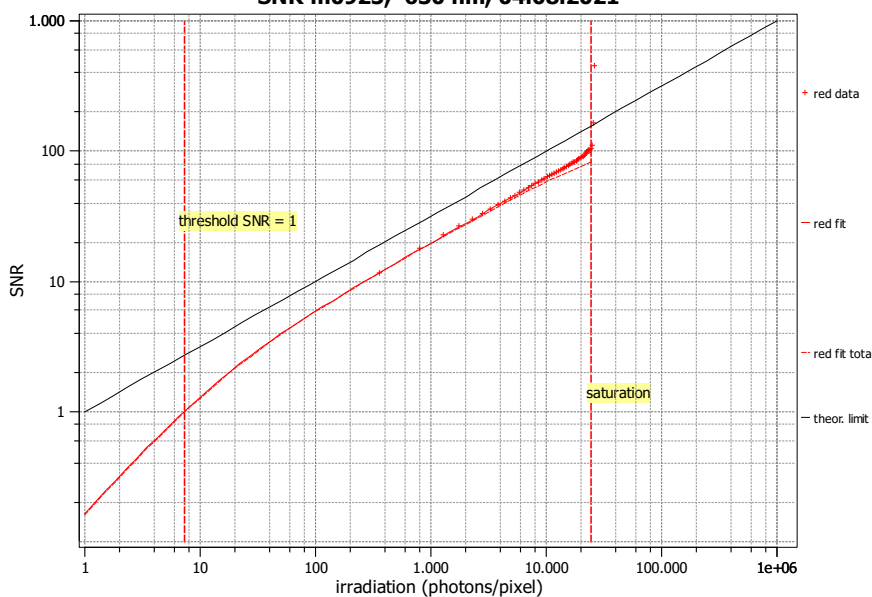
Photon Transfer

Photon transfer m0925, 630 nm, 04.08.2021



Signal-to-Noise Ratio

SNR m0925, 630 nm, 04.08.2021



Quantum efficiency

η 39.2%

Overall system gain

K 0.410 DN/e⁻

1/ K 2.437 e⁻/DN

Temporal dark noise

σ_d 2.19 e⁻

$\sigma_{y,\text{dark}}$ 0.95 DN

Signal-to-noise ratio

SNR_{max} 98

39.8 dB

6.6 bit

1/SNR_{max} 1.02 %

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 7.29 p

$\mu_{p,\text{min},\text{area}}$ 0.971 p/ μm^2

$\mu_{e,\text{min}}$ 2.86 e⁻

$\mu_{e,\text{min},\text{area}}$ 0.381 e⁻/ μm^2

Saturation capacity

$\mu_{p,\text{sat}}$ 24643 p

$\mu_{p,\text{sat},\text{area}}$ 3282 p/ μm^2

$\mu_{e,\text{sat}}$ 9658 e⁻

$\mu_{e,\text{sat},\text{area}}$ 1286 e⁻/ μm^2

Dynamic range

DR 3379

70.6 dB

11.7 bit

Spatial nonuniformities

DSNU₁₂₈₈ 0.42 e⁻

0.17 DN

PRNU₁₂₈₈ 0.65 %

Linearity error

LE_{min} -0.51%

LE_{max} 0.14%

Dark current

$\mu_{c,\text{mean}}$ 1.61 ± 0.09 e⁻/s

0.66 DN/s

$\mu_{c,\text{var}}$ 0.97 ± 0.02 e⁻/s

T_d — °C