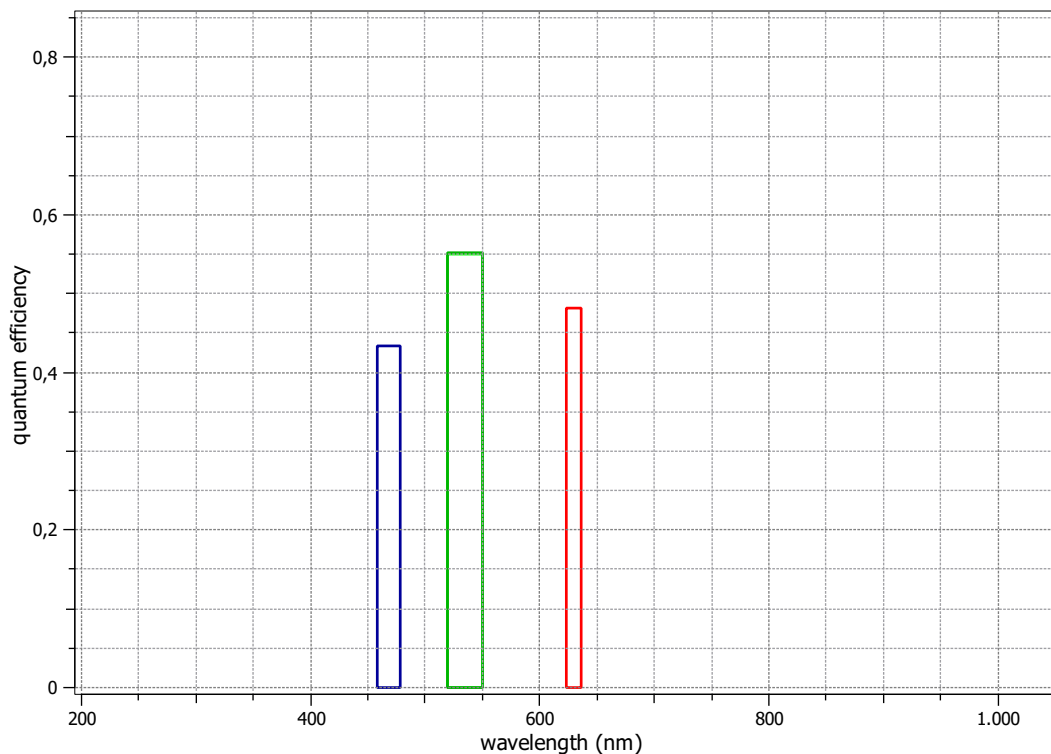


EMVA 1288 Data Sheet m0834

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

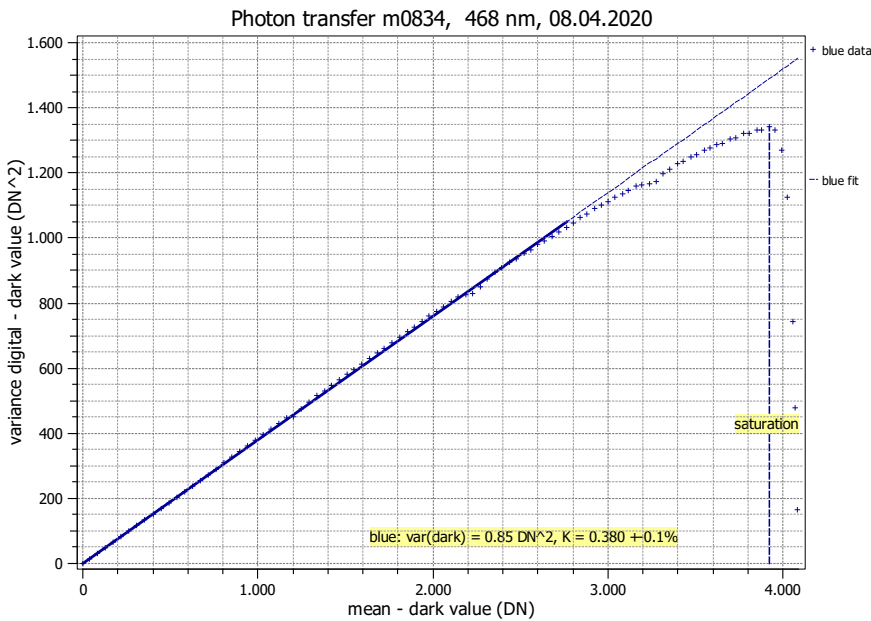
Vendor	Matrix Vision	Type of data presented	Single
Model	BF3-4-0196ZC	Operation point 1 (page 5)	
Serial number	FF005456	Wavelength centroid	468.0 nm
Sensor diagonal	21.62 mm	Wavelength FWHM	20.0 nm
Lens category	C-Mount	Gain, black-level	0dB, 0.1
Resolution	4432 × 4432, 12 bit	Operation point 2 (page 20)	
Pixel size (h×v)	3.45 μm × 3.45 μm	Wavelength centroid	535.0 nm
Sensor	IMX367	Wavelength FWHM	31.0 nm
Sensor type	CMOS	Gain, black-level	0dB, 0.1
Shutter type	Global	Operation point 3 (page 35)	
Overlap cap.	Overlapping	Wavelength centroid	630.0 nm
Max. frame rate	11.2 Hz	Wavelength FWHM	13.0 nm
Interface type	USB3 Vision	Gain, black-level	0dB, 0.1
		Optional data measured	
		None	



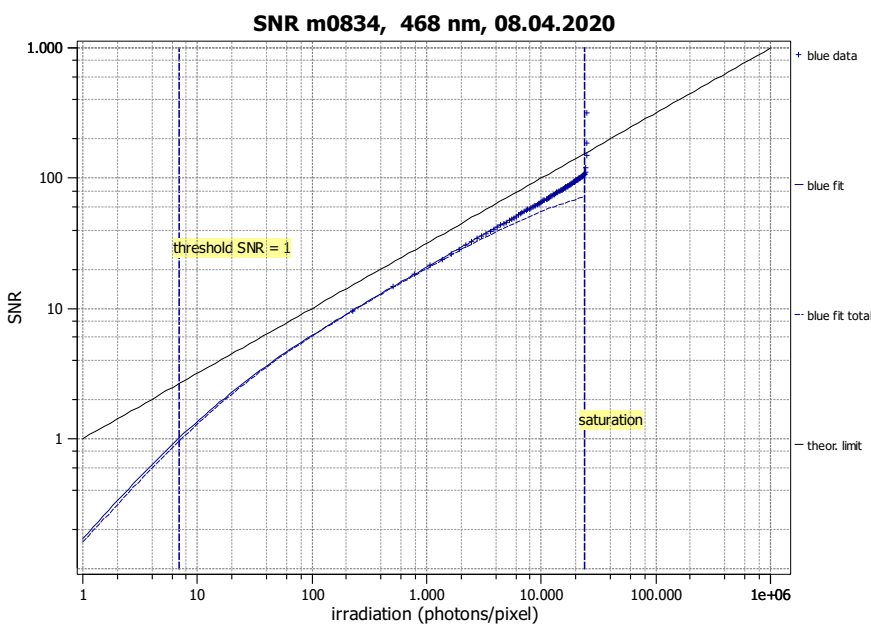
Summary Sheet for Operation Point 1 at a Wavelength of 468 nm

Type of data	Single	Gain, black-level	0dB, 0.1
Exposure control	By irradiance	Environmental temperature	23.4°C
Exposure time	18.00 ms	Camera body temperature	31.0°C
Frame rate	11.2 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 43.4%

Overall system gain

K 0.380 DN/e⁻

$1/K$ 2.633 e⁻/DN

Temporal dark noise

σ_d 2.31 e⁻

$\sigma_{y,\text{dark}}$ 0.92 DN

Signal-to-noise ratio

SNR_{max} 102

40.1 dB

6.7 bit

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

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 6.88 p

$\mu_{p,\text{min},\text{area}}$ 0.578 p/μm²

$\mu_{e,\text{min}}$ 2.98 e⁻

$\mu_{e,\text{min},\text{area}}$ 0.251 e⁻/μm²

Saturation capacity

$\mu_{p,\text{sat}}$ 23823 p

$\mu_{p,\text{sat},\text{area}}$ 2002 p/μm²

$\mu_{e,\text{sat}}$ 10340 e⁻

$\mu_{e,\text{sat},\text{area}}$ 869 e⁻/μm²

Dynamic range

DR 3465

70.8 dB

11.8 bit

Spatial nonuniformities

DSNU₁₂₈₈ 1.00 e⁻

0.38 DN

PRNU₁₂₈₈ 0.98 %

Linearity error

LE_{min} -0.56%

LE_{max} 1.18%

Dark current

$\mu_{c,\text{mean}}$ 2.5 ± 0.0 e⁻/s

0.96 DN/s

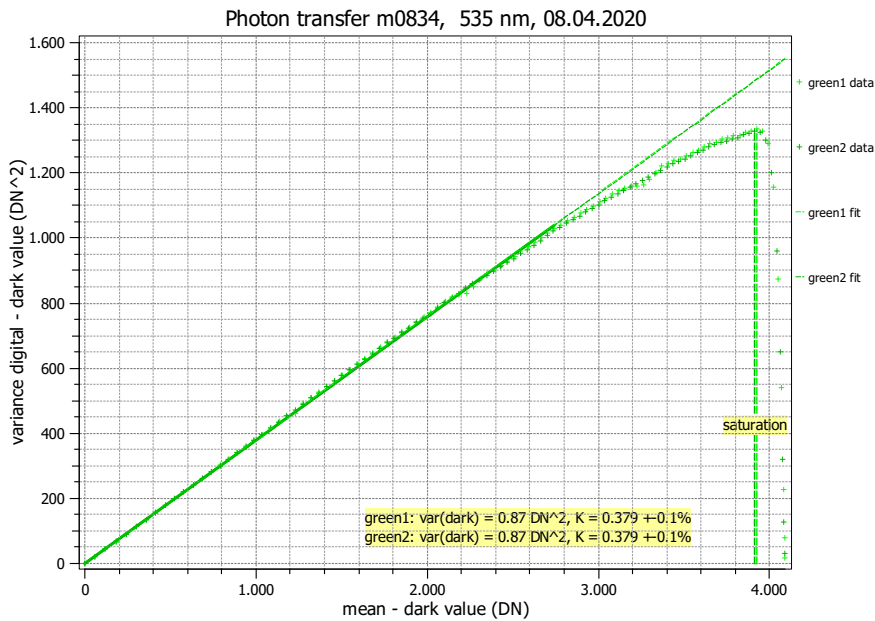
$\mu_{c,\text{var}}$ 2.6 ± 0.0 e⁻/s

T_d — °C

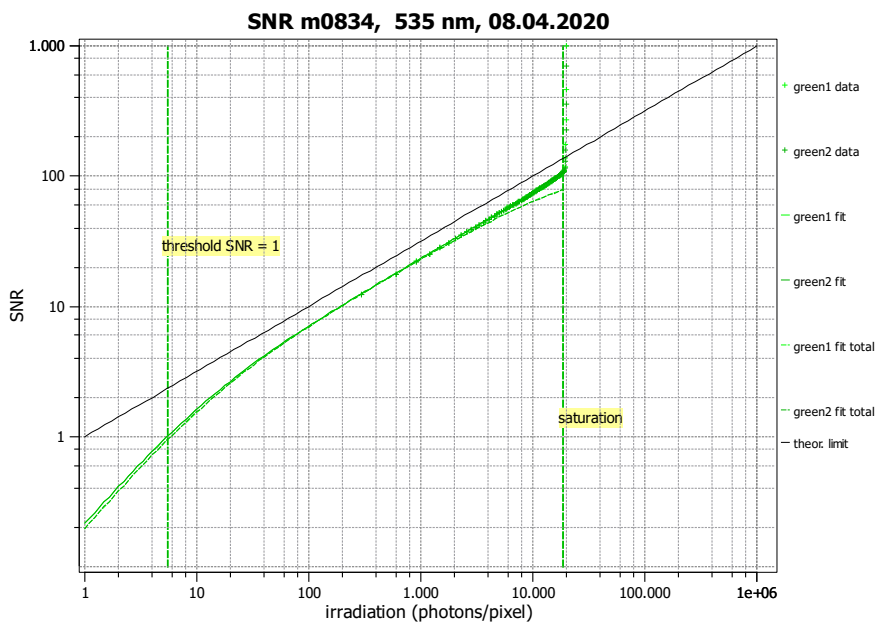
Summary Sheet for Operation Point 2 at a Wavelength of 535 nm

Type of data	Single	Gain, black-level	0dB, 0.1
Exposure control	By irradiance	Environmental temperature	23.5°C
Exposure time	18.00 ms	Camera body temperature	33.4°C
Frame rate	11.2 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 55.1%

Overall system gain

K 0.379 DN/e⁻

$1/K$ 2.636 e⁻/DN

Temporal dark noise

σ_d 2.33 e⁻

$\sigma_{y,\text{dark}}$ 0.93 DN

Signal-to-noise ratio

SNR_{max} 102

40.2 dB

6.7 bit

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

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 5.45 p

$\mu_{p,\text{min},\text{area}}$ 0.458 p/ μm^2

$\mu_{e,\text{min}}$ 3.00 e⁻

$\mu_{e,\text{min},\text{area}}$ 0.252 e⁻/ μm^2

Saturation capacity

$\mu_{p,\text{sat}}$ 18812 p

$\mu_{p,\text{sat},\text{area}}$ 1581 p/ μm^2

$\mu_{e,\text{sat}}$ 10361 e⁻

$\mu_{e,\text{sat},\text{area}}$ 871 e⁻/ μm^2

Dynamic range

DR 3450

70.8 dB

11.8 bit

Spatial nonuniformities

DSNU_{1288} 1.12 e⁻

0.42 DN

PRNU_{1288} 0.80 %

Linearity error

LE_{min} -0.82%

LE_{max} 1.80%

Dark current

$\mu_{c,\text{mean}}$ 2.5 ± 0.0 e⁻/s

0.96 DN/s

$\mu_{c,\text{var}}$ 2.6 ± 0.0 e⁻/s

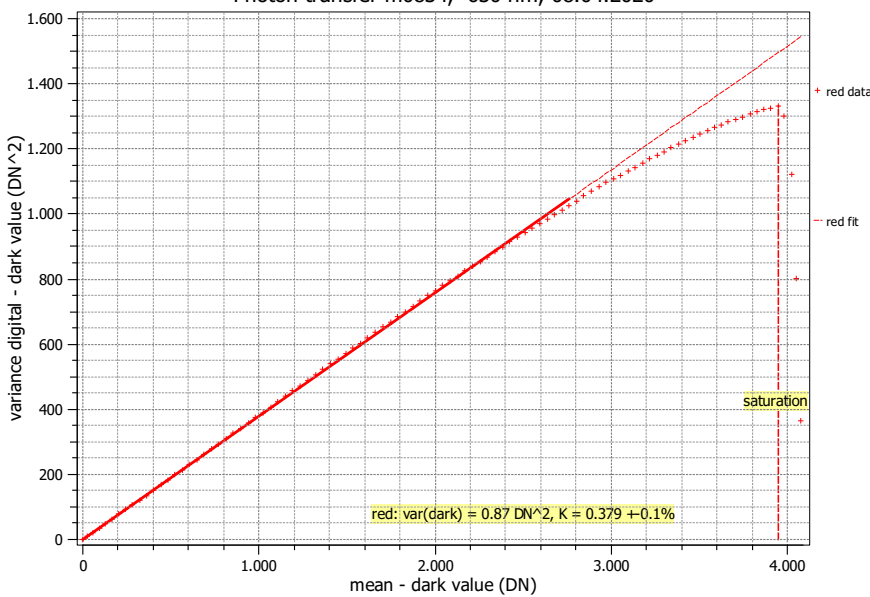
T_d — °C

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	18.00 ms	Camera body temperature	34.1°C
Frame rate	11.2 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	630 nm, 13.0 nm

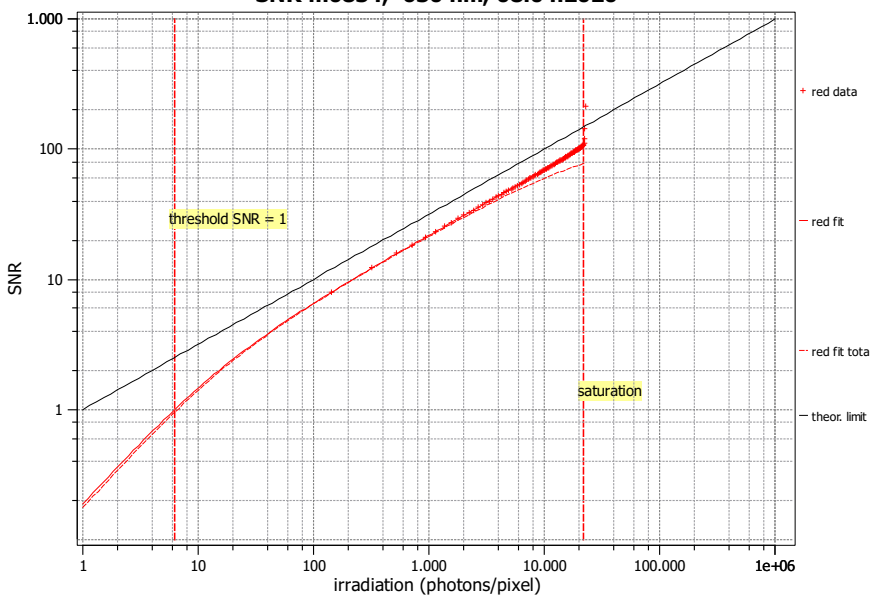
Photon Transfer

Photon transfer m0834, 630 nm, 08.04.2020



Signal-to-Noise Ratio

SNR m0834, 630 nm, 08.04.2020



Quantum efficiency

η 48.1%

Overall system gain

K 0.379 DN/e⁻

$1/K$ 2.640 e⁻/DN

Temporal dark noise

σ_d 2.34 e⁻

$\sigma_{y,\text{dark}}$ 0.93 DN

Signal-to-noise ratio

SNR_{max} 103

40.2 dB

6.7 bit

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

Absolute sensitivity threshold

$\mu_{p,\text{min}}$ 6.26 p

$\mu_{p,\text{min},\text{area}}$ 0.526 p/ μm^2

$\mu_{e,\text{min}}$ 3.01 e⁻

$\mu_{e,\text{min},\text{area}}$ 0.253 e⁻/ μm^2

Saturation capacity

$\mu_{p,\text{sat}}$ 21891 p

$\mu_{p,\text{sat},\text{area}}$ 1839 p/ μm^2

$\mu_{e,\text{sat}}$ 10528 e⁻

$\mu_{e,\text{sat},\text{area}}$ 884 e⁻/ μm^2

Dynamic range

DR 3494

70.9 dB

11.8 bit

Spatial nonuniformities

DSNU_{1288} 0.94 e⁻

0.36 DN

PRNU_{1288} 0.86 %

Linearity error

LE_{min} -0.61%

LE_{max} 0.60%

Dark current

$\mu_{c,\text{mean}}$ 2.2 ± 0.0 e⁻/s

0.81 DN/s

$\mu_{c,\text{var}}$ 2.2 ± 0.0 e⁻/s

T_d — °C