# EMVA 1288 Data Sheet m0945

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.

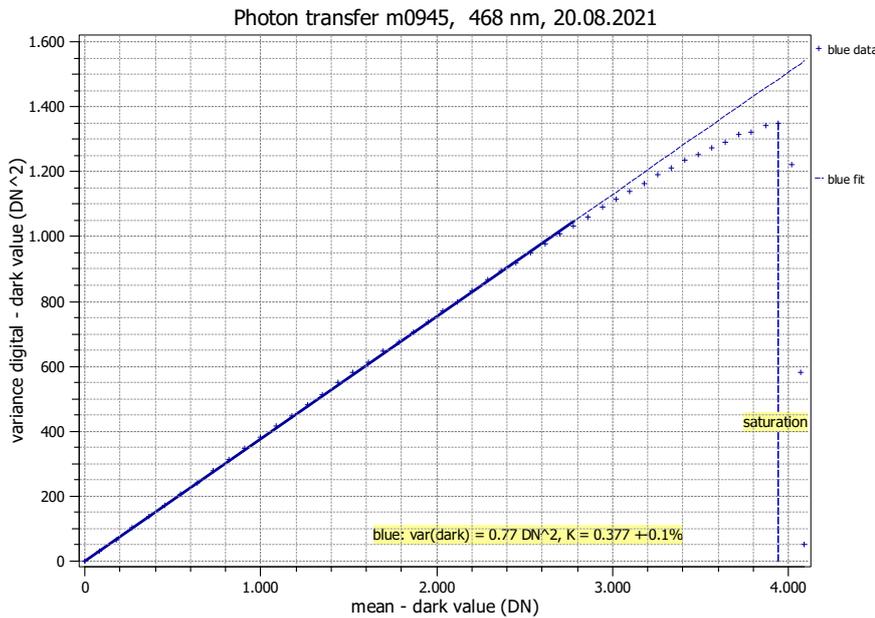Measurements performed by T.Renner, Matrix Vision GmbH

Vendor	MATRIX VISION	Type of data presented	Single	
Model	BVS_CA-BN2-0051ZC	**Operation point 1 (page 5)**		
		Wavelength centroid	468.0 nm	
Serial number	BN000153	Wavelength FWHM	20.0 nm	
Sensor diagonal	11.07 mm	Gain, black-level	0dB, 0.1	
Lens category	C-Mount	**Operation point 2 (page 19)**		
Resolution	2464 × 2056, 12 bit	Wavelength centroid	535.0 nm	
		Wavelength FWHM	31.0 nm	
Pixel size (h×v)	3.45 μm × 3.45 μm	Gain, black-level	0dB, 0.1	
Sensor	IMX250	**Operation point 3 (page 33)**		
Sensor type	CMOS	Wavelength centroid	630.0 nm	
Shutter type	Global	Wavelength FWHM	13.0 nm	
Overlap cap.	Overlapping	Gain, black-level	0dB, 0.1	
Max. frame rate	57.5 Hz	**Optional data measured**		
Interface type	GENiCAM	None		
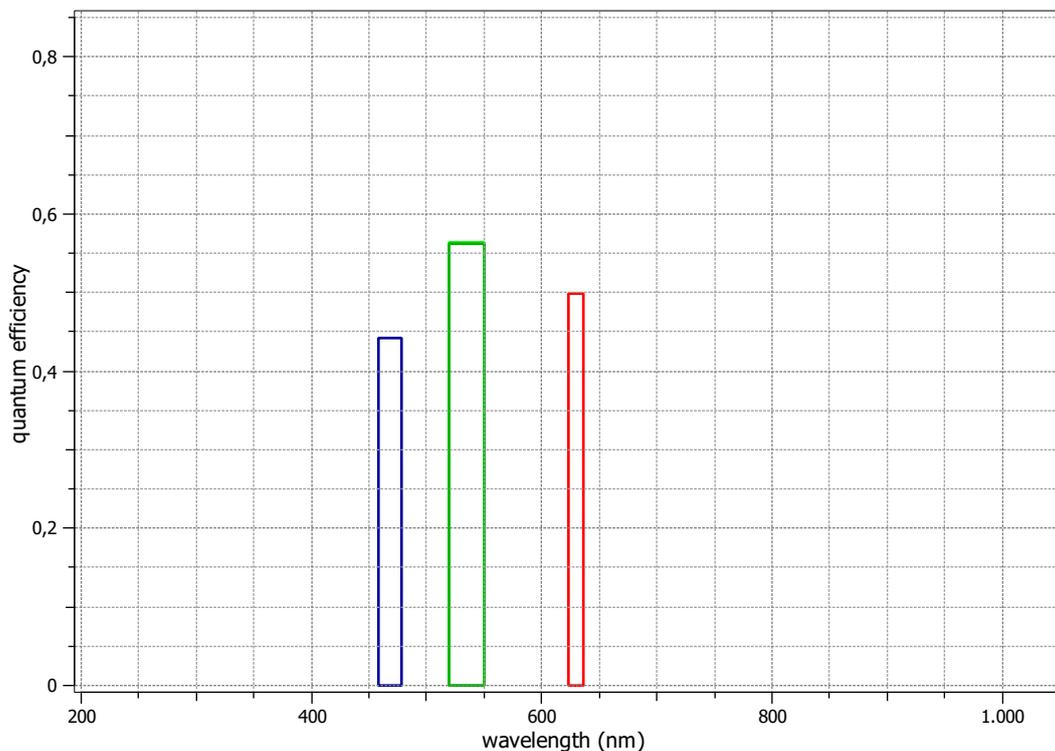
Summary Sheet for Operation Point 1 at a Wavelength of 468 nm

Type of data	Single	Gain, black-level	0dB, 0.1
Exposure control	By irradiance	Environmental temperature	22.6°C
Exposure time	17.00 ms	Camera body temperature	37.6°C
Frame rate	57.5 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12p	Wavelength, centr., FWHM	468 nm, 20.0 nm

Photon Transfer

Photon transfer m0945, 468 nm, 20.08.2021

blue: var(dark) = 0.77 DN^2, K = 0.377 +-0.1%

Signal-to-Noise Ratio

SNR m0945, 468 nm, 20.08.2021
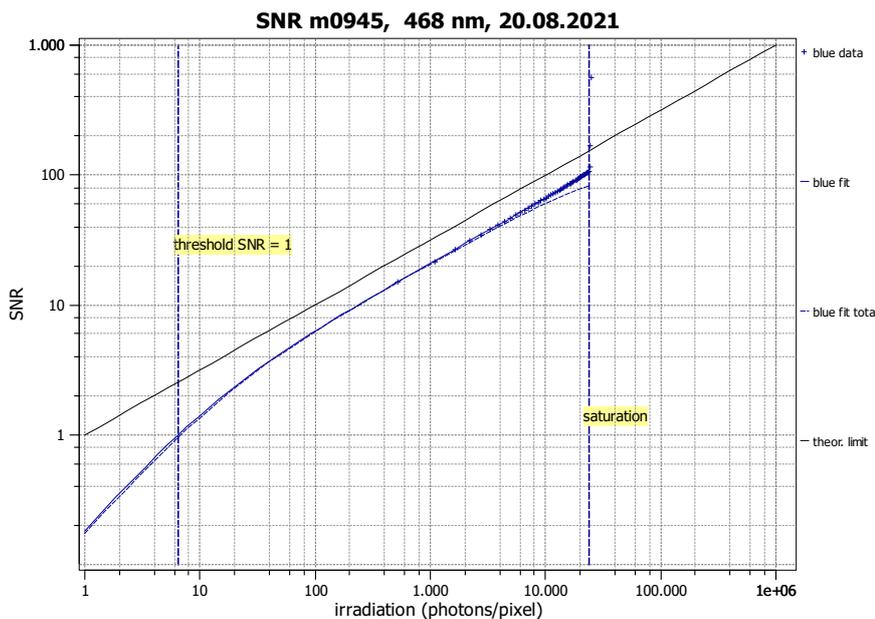
	Quantum efficiency
η	44.2%
	Overall system gain
K	0.377 DN/e$^-$
$1/K$	2.654 e$^-$/DN
	Temporal dark noise
σ_d	2.20 e$^-$
$\sigma_{y.dark}$	0.88 DN
	Signal-to-noise ratio
SNR$_{max}$	102
	40.2 dB
	6.7 bit
$1/$SNR$_{max}$	0.98 %
	Absolute sensitivity threshold
$\mu_{p.min}$	6.52 p
$\mu_{p.min.area}$	0.547 p/μm^2
$\mu_{e.min}$	2.88 e$^-$
$\mu_{e.min.area}$	0.242 e$^-$/μm^2
	Saturation capacity
$\mu_{p.sat}$	23712 p
$\mu_{p.sat.area}$	1992 p/μm^2
$\mu_{e.sat}$	10483 e$^-$
$\mu_{e.sat.area}$	881 e$^-$/μm^2
	Dynamic range
DR	3639
	71.2 dB
	11.8 bit
	Spatial nonuniformities
DSNU$_{1288}$	0.81 e$^-$
	0.30 DN
PRNU$_{1288}$	0.70 %
	Linearity error
LE$_{min}$	-0.66%
LE$_{max}$	1.12%
	Dark current
$\mu_{c.mean}$	-11 ± 3 e$^-$/s
	-4.3 DN/s
$\mu_{c.var}$	12 ± 8 e$^-$/s
T_d	— °C

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

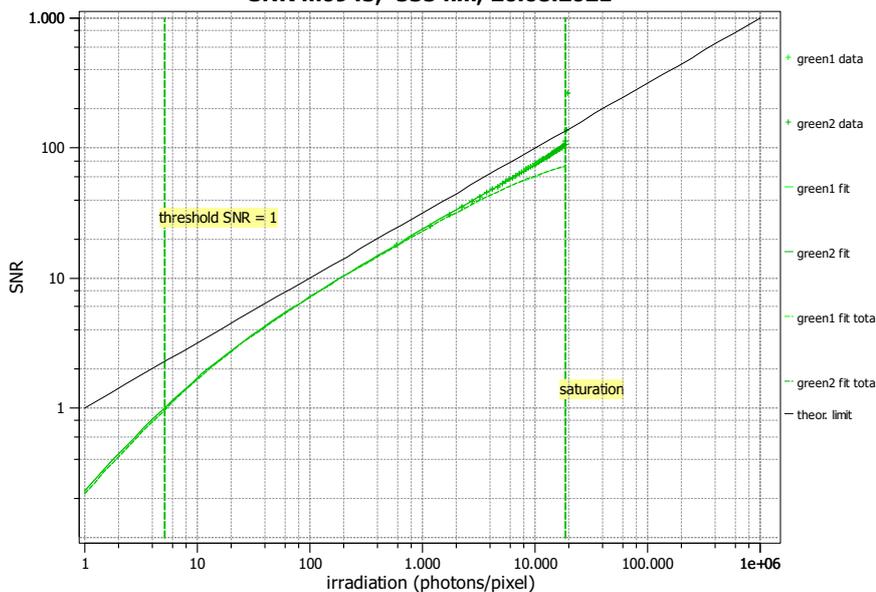|			
Type of data	Single	Gain, black-level	0dB, 0.1
Exposure control	By irradiance	Environmental temperature	22.7°C
Exposure time	17.00 ms	Camera body temperature	39.3°C
Frame rate	57.5 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12p	Wavelength, centr., FWHM	535 nm, 31.0 nm

Photon Transfer

Photon transfer m0945, 535 nm, 20.08.2021

green1: var(dark) = 0.77 DN^2, K = 0.377 +0.1%
green2: var(dark) = 0.77 DN^2, K = 0.378 +0.1%
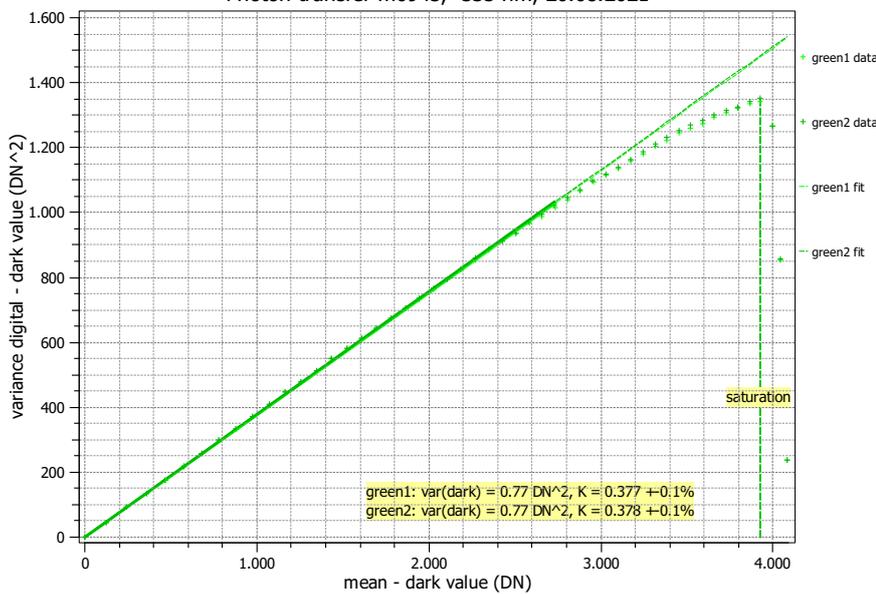
Signal-to-Noise Ratio

SNR m0945, 535 nm, 20.08.2021

threshold SNR = 1

saturation

Quantum efficiency	
η	56.5%
Overall system gain	
K	0.377 DN/e$^-$
$1/K$	2.655 e$^-$/DN
Temporal dark noise	
σ_d	2.21 e$^-$
$\sigma_{y.dark}$	0.88 DN
Signal-to-noise ratio	
SNR$_{max}$	102
	40.2 dB
	6.7 bit
$1/$SNR$_{max}$	0.98%
Absolute sensitivity threshold	
$\mu_{p.min}$	5.12 p
$\mu_{p.min.area}$	0.430 p/μm^2
$\mu_{e.min}$	2.89 e$^-$
$\mu_{e.min.area}$	0.243 e$^-$/μm^2
Saturation capacity	
$\mu_{p.sat}$	18467 p
$\mu_{p.sat.area}$	1551 p/μm^2
$\mu_{e.sat}$	10425 e$^-$
$\mu_{e.sat.area}$	876 e$^-$/μm^2
Dynamic range	
DR	3608
	71.1 dB
	11.8 bit
Spatial nonuniformities	
DSNU$_{1288}$	0.83 e$^-$
	0.31 DN
PRNU$_{1288}$	0.98%
Linearity error	
LE$_{min}$	-0.83%
LE$_{max}$	1.49%
Dark current	
$\mu_{c.mean}$	-11 ± 3 e$^-$/s
	-4.3 DN/s
$\mu_{c.var}$	12 ± 8 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	22.7°C
Exposure time	17.00 ms	Camera body temperature	40.5°C
Frame rate	57.5 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12p	Wavelength, centr., FWHM	630 nm, 13.0 nm

Photon Transfer

Photon transfer m0945, 630 nm, 20.08.2021

red: var(dark) = 0.77 DN^2, K = 0.378 +0.1%
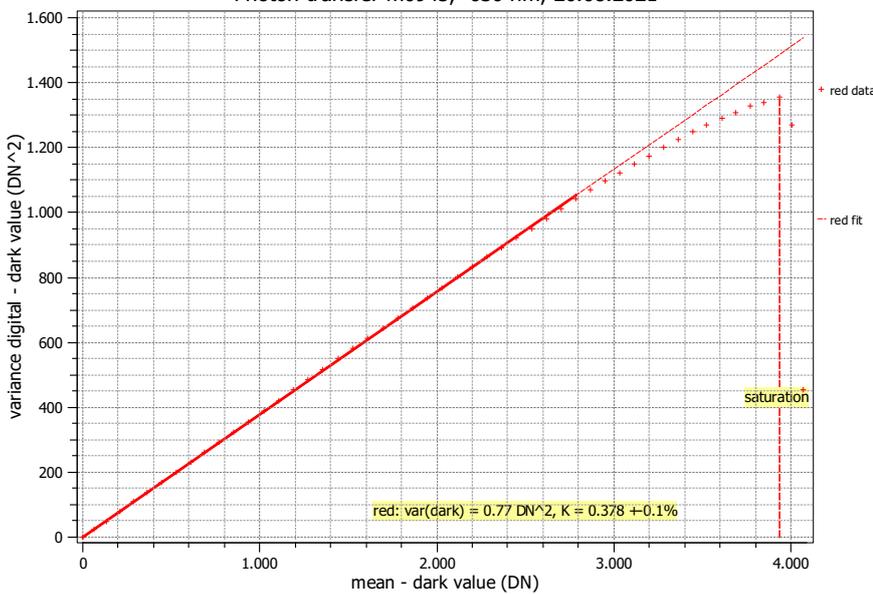
Signal-to-Noise Ratio

SNR m0945, 630 nm, 20.08.2021

threshold SNR = 1

saturation
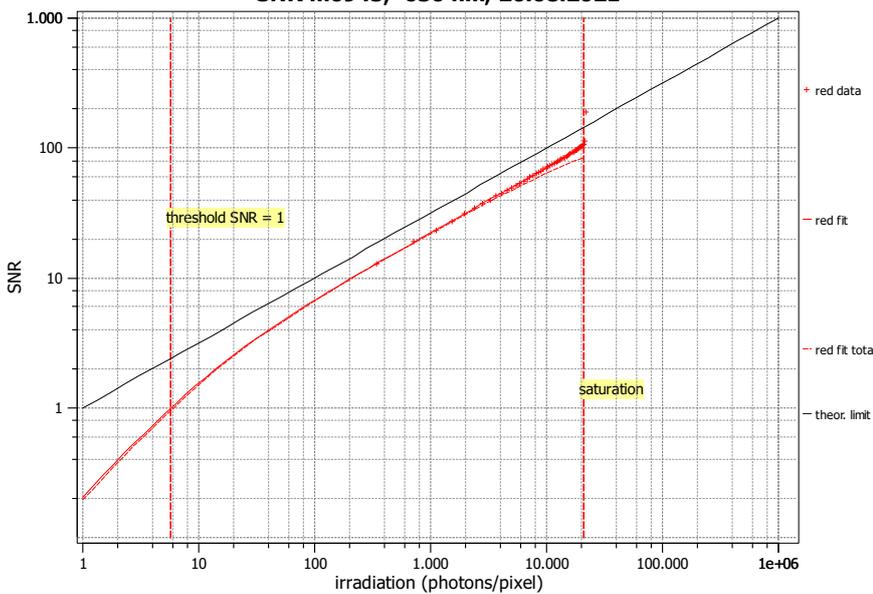
Quantum efficiency
η 49.8%

Overall system gain
K $0.378\,\mathrm{DN/e^-}$
$1/K$ $2.649\,\mathrm{e^-/DN}$

Temporal dark noise
σ_d $2.20\,\mathrm{e^-}$
$\sigma_{y.\mathrm{dark}}$ $0.88\,\mathrm{DN}$

Signal-to-noise ratio
$\mathrm{SNR_{max}}$ 102
  40.2 dB
  6.7 bit
$1/\mathrm{SNR_{max}}$ 0.98 %

Absolute sensitivity threshold
$\mu_{p.\mathrm{min}}$ 5.77 p
$\mu_{p.\mathrm{min.area}}$ $0.485\,\mathrm{p}/\mu\mathrm{m^2}$
$\mu_{e.\mathrm{min}}$ $2.88\,\mathrm{e^-}$
$\mu_{e.\mathrm{min.area}}$ $0.242\,\mathrm{e^-}/\mu\mathrm{m^2}$

Saturation capacity
$\mu_{p.\mathrm{sat}}$ 21015 p
$\mu_{p.\mathrm{sat.area}}$ $1766\,\mathrm{p}/\mu\mathrm{m^2}$
$\mu_{e.\mathrm{sat}}$ $10476\,\mathrm{e^-}$
$\mu_{e.\mathrm{sat.area}}$ $880\,\mathrm{e^-}/\mu\mathrm{m^2}$

Dynamic range
DR 3640
  71.2 dB
  11.8 bit

Spatial nonuniformities
$\mathrm{DSNU_{1288}}$ $0.81\,\mathrm{e^-}$
  0.30 DN
$\mathrm{PRNU_{1288}}$ 0.66 %

Linearity error
$\mathrm{LE_{min}}$ -0.40%
$\mathrm{LE_{max}}$ 0.30%

Dark current
$\mu_{c.\mathrm{mean}}$ $-12.7 \pm 3.4\,\mathrm{e^-/s}$
  -4.82 DN/s
$\mu_{c.\mathrm{var}}$ $9.7 \pm 7.9\,\mathrm{e^-/s}$
T_d — °C