



## DATA SHEET:

GE 2048 2048 series

## SPECTRAL RANGES:

Ultraviolet (UV)

Visible (VIS)

Near-infrared (NIR)

### GE 2048 2048 series

2048 × 2048 pixels, 27.6 mm × 27.6 mm image area, 13.5 μm × 13.5 μm pixel size

Based on a unique platform concept, greateyes offers a portfolio of large format scientific cameras for imaging and spectroscopy in the UV, VIS and NIR range. The deep-cooled, high performance cameras combine scientific CCD sensors with ultra low noise electronics for optimal detection of weak photon signals. Select among different sensor technologies and various sensor coatings to find the best solution for your imaging or spectroscopic application.

The full-frame CCD sensors are integrated in hermetically sealed vacuum chambers with single optical windows. Deep cooling of the sensor is achieved by means of multi-stage thermoelectric coolers. The cameras are equipped with a rich set of functionalities including flexible binning operation, various trigger and synchronisation modes, software adjustable gain settings as well as temperature monitoring of the sensor and the heat radiation system.

### Key features

Scientific low noise CCD sensors	Flexible binning modes	Quantum efficiency up to 98%
Full well capacity up to 150 ke <sup>-</sup>	Software adjustable gain setting	Deep cooling to -60°C
Read noise: min. 2.4 e <sup>-</sup>	Temperature monitoring	16 bit dynamic range
Wide spectral sensitivity	Compact size	greateyes Vision software included
SDK & Labview and EPICS drivers	Ext. trigger, shutter, sync signals	Water and forced air cooling

## SPECIFICATIONS

### Model specifications

	<b>GE 2048 2048 FI GE 2048 2048 BI MID</b>	<b>GE 2048 2048 BI UV3 GE 2048 2048 DD NIR</b>
Pixel format	2048 × 2048	2048 × 2048
Image area	27.6 mm × 27.6 mm	27.6 mm × 27.6 mm
Pixel size	13.5 μm × 13.5 μm	13.5 μm × 13.5 μm
Full well capacity	100 ke <sup>-</sup>	150 ke <sup>-</sup>
Register well capacity	1 000 ke <sup>-</sup>	1 000 ke <sup>-</sup>
Dark current @ -80°C	0.0003 e <sup>-</sup> /pixel/sec	0.05 e <sup>-</sup> /pixel/sec
Gain	1 counts/e <sup>-</sup> (high) 0.4 counts/e <sup>-</sup> (low)	1 counts/e <sup>-</sup> (high) 0.4 counts/e <sup>-</sup> (low)
CCD epitaxial thickness	15 μm	15 μm or 40 μm (DD)
Max. dynamic range	33 333:1	50 000:1
CCD sensor type	Front-illuminated (FI), back-illuminated (BI), deep depletion fringe suppression (DD)	
Sensor coating	Antireflective UV (UV1, UV2, UV3), broadband (BR), midband (MID), near-infrared (NIR) coating	
Blemish specifications	Grade 0 or grade 1 (standard) as specified by sensor manufacturer	

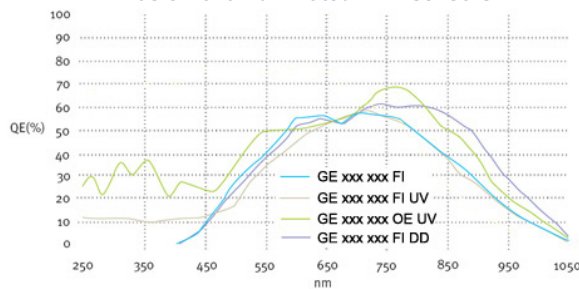
### Common specifications

Pixel readout frequency	500 kHz - 3.0 MHz
AD converter resolution	16 bit
Read noise at 500kHz	min.: 2.4 e <sup>-</sup> rms, typical: 4 e <sup>-</sup> rms
Linearity	better than 99%
Vertical shift speed	software selectable max. 100 μs/row
Window material	MgF <sub>2</sub> or UVFS for UV sensitive models, otherwise BK7
Distance flange - focal plane	9.0 mm
CCD sensor cooling	-60°C to 20°C, forced air or water cooling
Temperature monitoring	CCD sensor and thermoelectric cooler (hot side)
Data link	USB, Gigabit-Ethernet
Software	greateyes Vision software for Windows XP / Vista / 7 / 10
SDK and drivers	DLL for Windows XP / Vista / 7 / 10, LabVIEW, EPICS, Linux driver
TTL interface signals	Sync out, shutter out, external trigger in
Operating conditions	temperature: 0°C to 30°C ambient, relative humidity <70% (non condensing)
Power supply	110-240 VAC, 50 Hz-60 Hz, max. 1A
Certification	CE
Dimensions	9.7 cm (3.82") × 9.1 cm (3.58") × 13.6 cm (5.35") (W × H × L)
Weight	1 700 g

## STEP 1: Choose camera model by order code

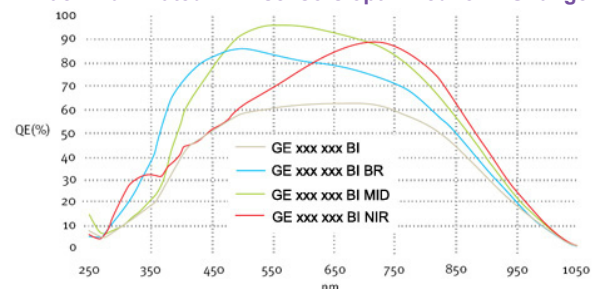
Order code	Description
GE 2048 2048 FI	Front-illuminated CCD sensor
GE 2048 2048 BI MID	Back-illuminated CCD sensor with antireflective midband coating
GE 2048 2048 BI UV3	Back-illuminated CCD sensor with antireflective UV coating
GE 2048 2048 DD NIR	Deep depletion fringe suppression CCD sensor with antireflective near-infrared coating

### Basic front-illuminated CCD sensors



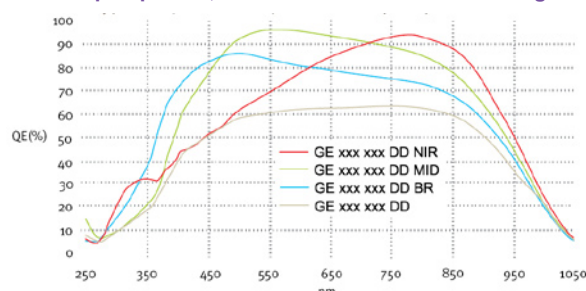
The QE Curves are taken from the e2V data sheets.

### Back-illuminated CCD sensors optimized for VIS range



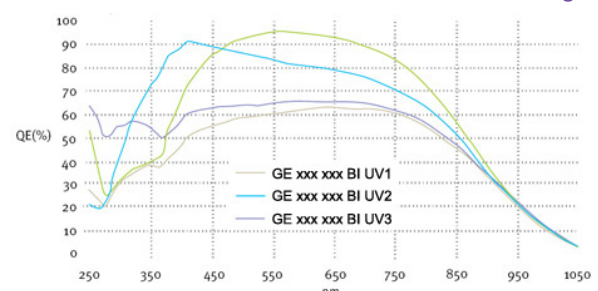
The QE Curves are taken from the e2V data sheets.

### Deep-depletion, NIMO CCD sensors for NIR range



The QE Curves are taken from the e2V data sheets.

### Enhanced back-illuminated CCD sensors for UV range



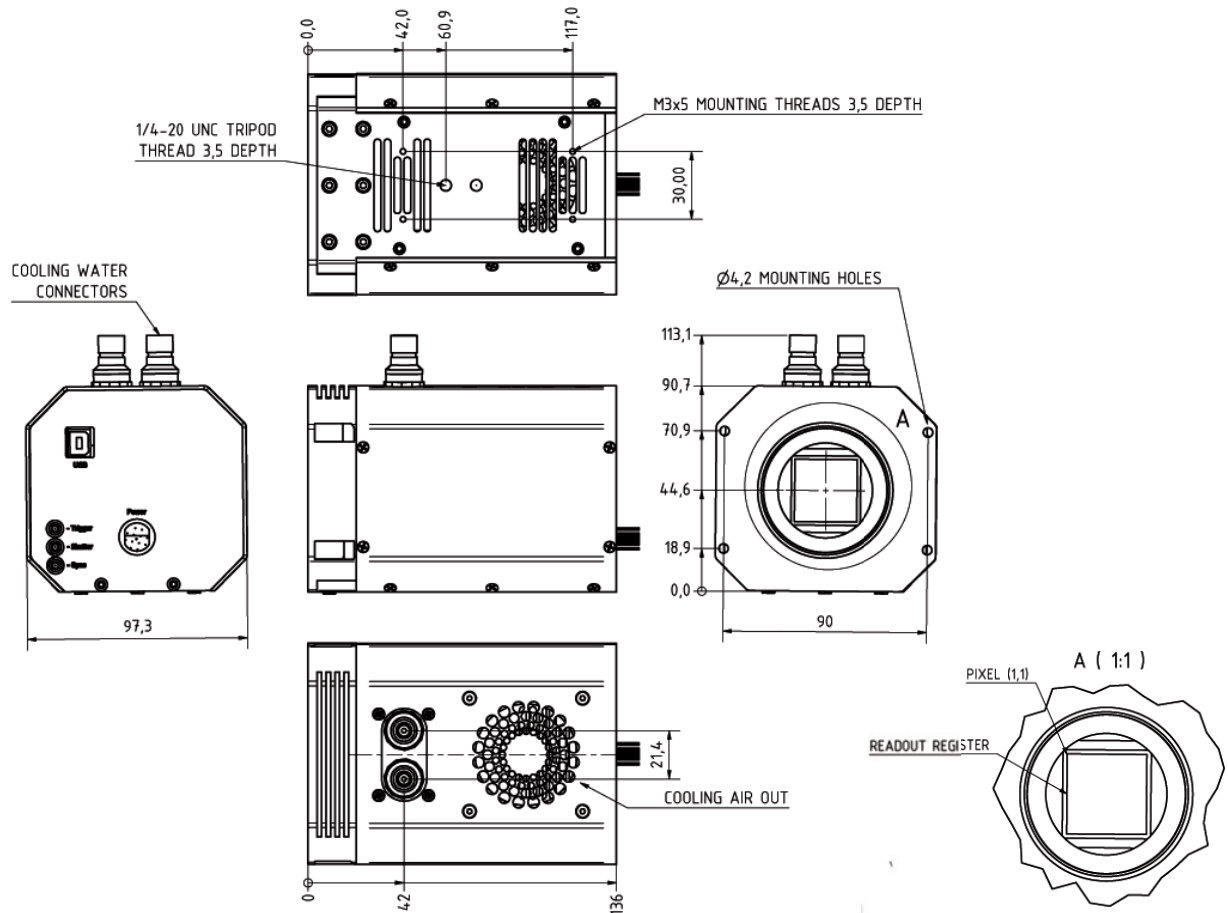
The QE Curves are taken from the e2V data sheets.

## STEP 2: Select accessories and software by order code

Order code	Description
<b>A) Subpixel resolution enhancement</b>	
<b>New</b> GE-S xxx xxx series	Increased spatial resolution (See scientific superresolution camera data sheet for details)
<b>B) Accessories for imaging purposes</b>	
GE-FM01	F-Mount lens adapter with integrated filter holder for 50mm round or square filters
GE-FM02	F-Mount lens adapter with integrated filter holder and bistable electronic shutter
GE-DR01	Electronic shutter driver
GE-M42M01	M42-Mount lens adapter
	Please ask for specific objectives based on your requirements.
<b>C) Accessories for enhanced cooling performance</b>	
GE-CR01	Compact recirculator operating at room temperature for deep camera cooling
GE-CR02	Recirculating water chiller, temperature range -5°C to 30°C for ultra deep camera cooling
<b>D) Software development kit (SDK) and drivers</b>	
GE-SDK01	SDK for Windows and Linux compatible with C/C++, Delphi, Labview
GE-LAB01	Labview driver
GE-EP	EPICS driver
GE-LX01	Linux driver

## STEP 3: For customisation of the camera please tell us about your requirements.

## TECHNICAL DRAWINGS



### Items delivered together with each camera

GE-VI01	greateyes Vision software suite for Windows
GE-StoB2m	2m SMB to BNC connection cable
GE-USB5m	5m USB 2.0 cable type A to type B
GE-POW01	camera power supply with cabling
GE-ManCam	camera instruction manual on CD

### CONTACT INFORMATION

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