

1.1. Subject

Technical Application Note (TAN2007007): Sony® ICX625 CCD image sensor specifications.

1.2. Applicable Product(s)

- Grasshopper GRAS-50S5M/C-C
- Grasshopper2 GS2-xx-50S5M/C

1.3. Application Note Description

The purpose of this Technical Application Note is to document some of the key specifications of the Sony ICX625 CCD. With the exception of spectral sensitivity characteristics, this information applies to both the ICX625AL (monochrome) and ICX625AQ (color) models.



The information included in this document was obtained from the Sony datasheet, which at the time of this writing, has not been officially released. Point Grey Research is not able to provide any further information beyond what is included in this document.

1.3.1. Sensor Overview

The ICX625 is a diagonal 11.016mm (Type 2/3) interline CCD solid-state image sensor with a square pixel array and 5.05M effective pixels. Progressive scan enables all pixel signals to be output separately within approximately 1/15 second, and also output using various addition and elimination methods. This chip features an electronic shutter with variable charge-storage time which makes it possible to realize full-frame still images without a mechanical shutter. High sensitivity and low dark current are achieved through the adoption of Super HAD CCD™ technology.

1.3.2. Features

- High horizontal and vertical resolution
- Supports following readout modes
 - All-pixel scan mode (15 frame/s)
 - 4/16-line readout mode
 - Center scan mode
- Square pixel
- Horizontal drive frequency: 60.0MHz
- R, G, B primary color mosaic filters on chip (ICX625AQ)

- High sensitivity, low dark current, excellent anti-blooming characteristics

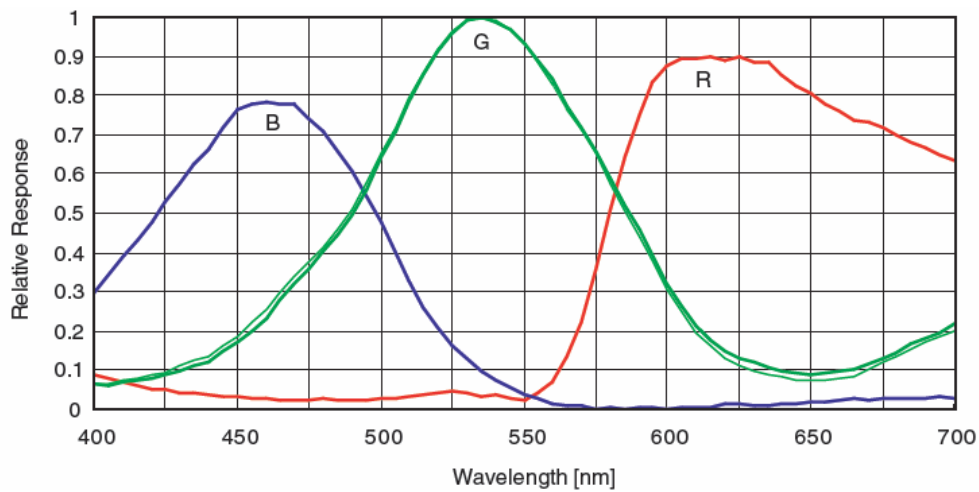
1.3.3. Element Structure

- Interline CCD image sensor
- Image size:
Diagonal 11.016mm (Type 2/3)
- Total number of pixels
2536(H) x 2068(V) approx. 5.24M pixels
- Number of effective pixels
2456(H) x 2058(V) approx. 5.05M pixels
- Number of active pixels
2448(H) x 2050(V) approx. 5.02M pixels
- Chip size
9.93mm(H) x 8.70mm(V)
- Unit cell size
3.45μm(H) x 3.45μm(V)

1.3.4. ICX625AQ Characteristics

1.3.4.1. Spectral Sensitivity

This excludes lens characteristics and light source characteristics.



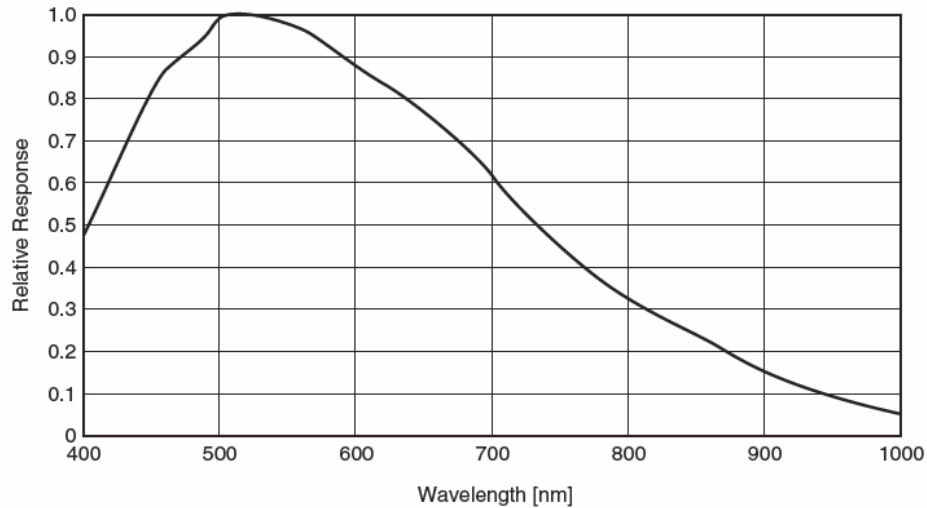
1.3.4.2. Image Sensor

Item	Symbol	Min.	Typ.	Max.	Unit	Measurement method	Remarks
G sensitivity	Sg	330	420		mV	1	1/30s accumulation
Sensitivity ratio R	Rr	0.45		0.75		1	
Sensitivity ratio B	Rb	0.35		0.65		1	
Saturation signal	Vsat	360			mV	2	Ta = 60°C
Smear	Sm		-95	-90	dB	3	All-pixel and center scan modes

1.3.5. ICX625AL Characteristics

1.3.5.1. Spectral Sensitivity

This excludes lens characteristics and light source characteristics.



1.3.5.2. Image Sensor

Item	Symbol	Min.	Typ.	Max.	Unit	Measurement method	Remarks
Sensitivity	S	330	420		mV	1	1/30s accumulation
Saturation signal	Vsat	360			mV	2	Ta = 60°C
Smear	Sm		-95	-90	dB	3	All-pixel and center scan modes

1.3.6. Definition of Standard Imaging Conditions

- Standard imaging condition I:
Use a pattern box (luminance: 706cd/m², color temperature of 3200K halogen source) as a subject. (Pattern for evaluation is not applicable.) Use a testing standard lens with CM500S (t = 1.0mm) as an IR cut filter and image at F5.6. The luminous intensity to the sensor receiving surface at this point is defined as the standard sensitivity testing luminous intensity.
 - Standard imaging condition II:
Image a light source (color temperature of 3200K) with a uniformity of brightness within 2% at all angles. Use a testing standard lens with CM500S (t = 1.0mm) as an IR cut filter. The luminous intensity is adjusted to the value indicated in each testing item by the lens diaphragm.
1. G sensitivity, sensitivity ratio
Set the measurement condition to the standard imaging condition I. After setting the electronic shutter mode with a shutter speed of 1/100s, measure the signal outputs (VGr, VGb, VR, VB) at the center of each Gr, Gb, R and B channel screen, and substitute the values into the following formula.

$$\begin{aligned}
 VG &= (VGr + VGb)/2 \\
 Sg &= VG \times 100/30 \text{ [mV]} \\
 Rr &= VR/VG \\
 Rb &= VB/VG
 \end{aligned}$$

2. Saturation signal

Set the measurement condition to the standard imaging condition II. After adjusting the luminous intensity to 10 times the intensity with the average value of the Gr signal output, 150mV, measure the minimum values of the Gr, Gb, R and B signals.

3. Smear

Set the measurement condition to the standard imaging condition II. With the lens diaphragm at F5.6 to F8, first adjust the average value of the Gr signal output to 150mV. Measure the average values of the Gr, Gb, R and B signal outputs (Gra, Gba, Ra, Ba), and then adjust the luminous intensity to 500 times the intensity with the average value of the Gr signal output, 150mV.

After the readout clock is stopped and the charge drain is executed by the electronic shutter at the respective H blankings, measure the maximum value (Vsm [mV]) independent of the Gr, Gb, R and B signal outputs, and substitute the values into the following formula.

$$Sm = 20 \times \log \{ (Vsm \div (Gra + Gba + Ra + Ba/4)) \times (1/500) \times (1/10) \} \text{ [dB]} \text{ (1/10V method conversion value)}$$

1.4. Additional Downloads and Support

Access more Technical Application Notes on the web at www.ptgrey.com/support/downloads.

Point Grey Research Inc. endeavors to provide the highest level of technical support possible to our customers. Most support resources can be accessed through the Product Support section of our website: www.ptgrey.com/support.

Creating a Customer Login Account

The first step in accessing our technical support resources is to obtain a Customer Login Account. This requires a valid name, e-mail address, and camera serial number. To apply for a Customer Login Account go to www.ptgrey.com/support/downloads/.

Knowledge Base

Our on-line knowledge base at www.ptgrey.com/support/kb/ contains answers to some of the most common support questions. It is constantly updated, expanded, and refined to ensure that our customers have access to the latest information.

Product Downloads

Customers with a Customer Login Account can access the latest software and firmware for their cameras from our downloads site at www.ptgrey.com/support/downloads. We encourage our customers to keep their software and firmware up-to-date by downloading and installing the latest versions.

Contacting Technical Support

Before contacting Technical Support, have you:

1. *Read the product documentation and user manual?*
2. *Searched the Knowledge Base?*
3. *Downloaded and installed the latest version of software and/or firmware?*

If you have done all the above and still can't find an answer to your question, contact our Technical Support team at www.ptgrey.com/support/contact/.