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# XGS 5000, XGS 3000 and XGS 2000 Global Shutter CMOS Image Sensors

## XGS Family

### Description

The XGS CMOS image sensor family provides high performance global shutter image capture. The family comes in different resolutions in a single package: 2, 3 and 5 MP with up to 2/3-inch optical format. The 16 mm x 16 mm package makes the XGS family particularly suited for integration in 29 mm x 29 mm camera formats. The high speed, 12-bit output maximally leverages interfaces such as USB 3.2, Thunderbolt™ 2 and 10 GigE.

Image data is read out through a column ADC architecture and then transferred over a HiSPi interface. On-chip logic, programmable via the serial interface, generates internal timing for integration and readout control. Up to three register configurations can be programmed and sequentially enabled (frame by frame) using a single command over the control interface.

**Table 1. KEY PERFORMANCE PARAMETERS**

Parameter	Typical Value	
Optical Format	XGS 5000	2/3-inch (10.6 mm Diagonal)
	XGS 3000	1/2-inch (8.2 mm Diagonal)
	XGS 2000	1/2.2-inch (7.3 mm Diagonal)
Active Pixels	XGS 5000	2592 (H) x 2048 (V)
	XGS 3000	2048 (H) x 1536 (V)
	XGS 2000	1920 (H) x 1200 (V)
Pixel Size	3.2 μm	
Color Filter Array	Monochrome, Bayer	
Shutter Type	Global Shutter	
Input Clock	32.4 MHz	
Output Interface	HiSPi (16 Lanes – 777.6 Mbps/lane)	
Frame Rate (12-bit)	16 Lanes (–X4)	
	XGS 5000	132
	XGS 3000	175
	XGS 2000	220
	4 Lanes (–X5)	
	XGS 5000	43
Read Noise	4 e <sup>-</sup> (1x), 1.9 e <sup>-</sup> (4x)	
SNR <sub>MAX</sub>	40 dB	
Dynamic Range	68 dB	
Supply Voltages	1.2 V, 2.8 V, 3 V (0.4 V, 1.8 V Optional)	
Power Consumption	0.75 W	
Operating Temp.	–40°C to 85°C (Junction)	
Package	163-pin iLGA (Inspectable Land Grid Array)	

### ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

## Non-NDA Data Sheet

**Interested in what you see?** If you would like more detailed information, please request the full version of our data sheet.

[Request Full Data Sheet](#)

### Features

- On-chip 12-bit Column ADCs
- 10-bit Mode with Increased Frame Rate of 148 fps (16-lane) at Full Resolution
- Companding & 10-Bit Mode at 100 fps (8-lane) and 50 fps (8-lane)
- Dual Gain Mode with 74.5 dB Dynamic Range (T<sub>J</sub> = 40°C) at Half Frame Rate
- Data Interface: 16-lane HiSPi (Scalable Low-Voltage Signaling)
- Configurable Number of HiSPi Lanes: 16, 12, 8 or 4 Lanes
- Two-Wire (I2C) and Four-Wire (SPI) Serial Interface
- Triggered Integration and Readout Control
- Programmable Control for up to 8 Regions of Interest (ROI)
- Context Switching
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### Applications

- Machine Vision
- Security
- Intelligent Transportation Systems (ITS)
- Broadcasting
- Medical
- Scientific

## XGS Family

**Table 2. ORDERABLE PART NUMBERS** (Note 2)

Part Number	Product Description				Speed Grade	Resolution (H x V)
NOIX4SN5000B-LTI	5 MP	Mono	Production device	0° CRA	16 Lanes	2592 x 2048
NOIX4SE5000B-LTI	5 MP	Color	Production device	0° CRA		
NOIX4SF5000B-LTI	5 MP	Color	Production device	4.7° CRA		
NOIX5SN5000B-LTI	5 MP	Mono	Production device	0° CRA	4 Lanes	
NOIX5SE5000B-LTI	5 MP	Color	Production device	0° CRA		

NOIX4SF3000B-LTI	3 MP	Color	Production device	4.7° CRA	16 Lanes	2048 x 1536
NOIX4SP3000B-LTI	3 MP	Mono	Production device	4.7° CRA		

NOIX4SN2000B-LTI	2 MP	Mono	Production device	0° CRA	16 Lanes	1920 x 1200
NOIX4SE2000B-LTI	2 MP	Color	Production device	0° CRA		

1. Production Device part numbers are listed for informational purpose only. Production Device part numbers are not available for orders at this time. Please contact **onsemi** for availability dates.
2. See the **onsemi** Device Nomenclature document (TND310/D) for a full description of the naming convention used for image sensors. For reference documentation, including information on evaluation kits, please visit our web site at [www.onsemi.com](http://www.onsemi.com).

**Table 3. ORDERING INFORMATION EVALUATION KITS**

Part Number	Product Description	Additional Information
NOIX4SN5000KBLFB-GEVB	Sensor Headboard (5 MP, Mono, 16-Lane)	Demo Kit Headboard (incl. NOIX4SN5000KB-LTI) (Note 3)
NOIX4SE5000KBLFB-GEVB	Sensor Headboard (5 MP, Color, 16-Lane)	Demo Kit Headboard (incl. NOIX4SE5000KB-LTI) (Note 3)
AGBAN6CS-GEVK	Frame Buffer Demo Board	AP21088 including Power Adapter
AGB1N0CS-GEVK	Demo 3 Board	FPGA Base Board including USB Cable and Tripod

3. Sensors are soldered to the headboard.

# XGS Family

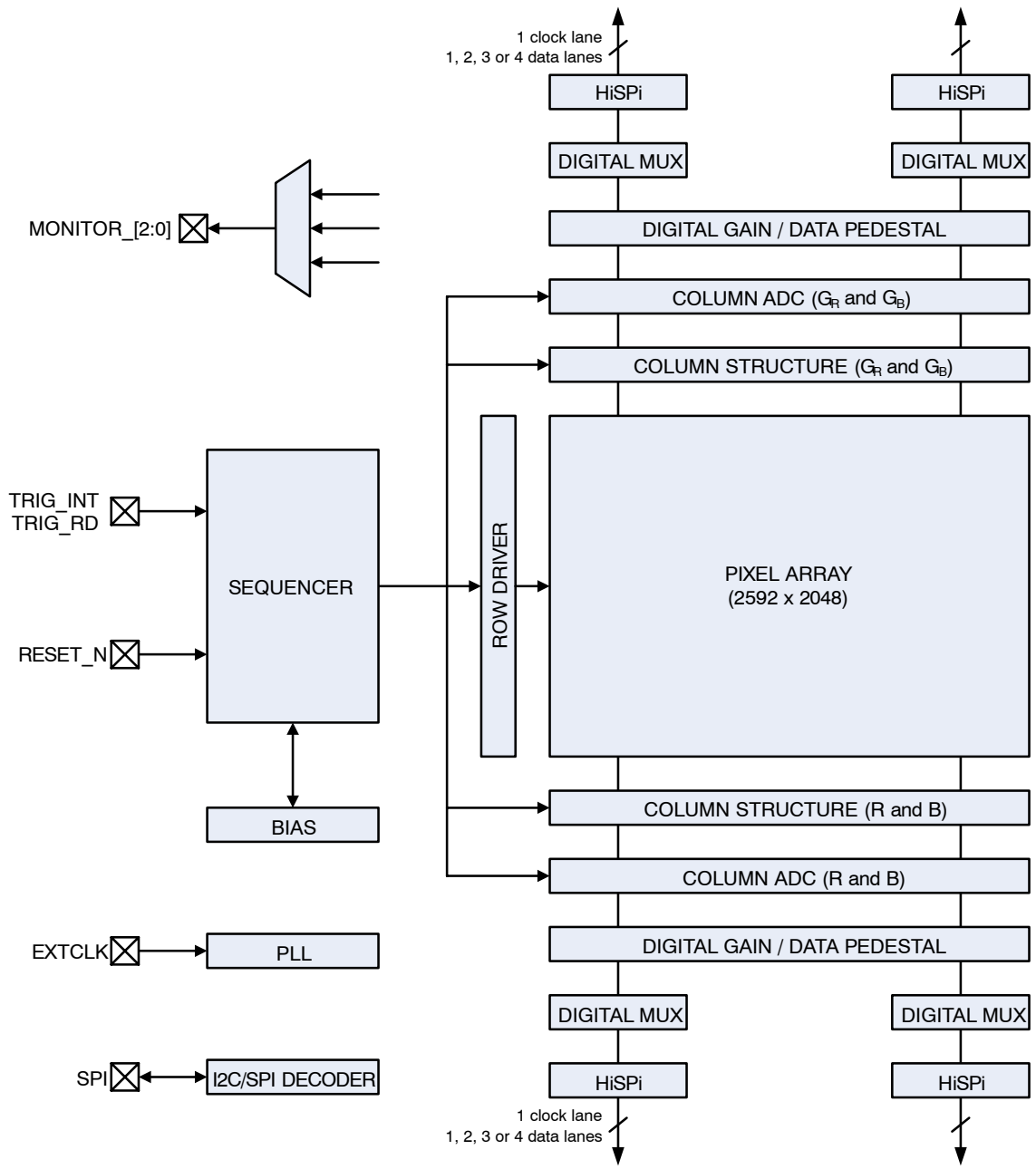
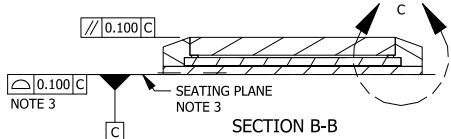
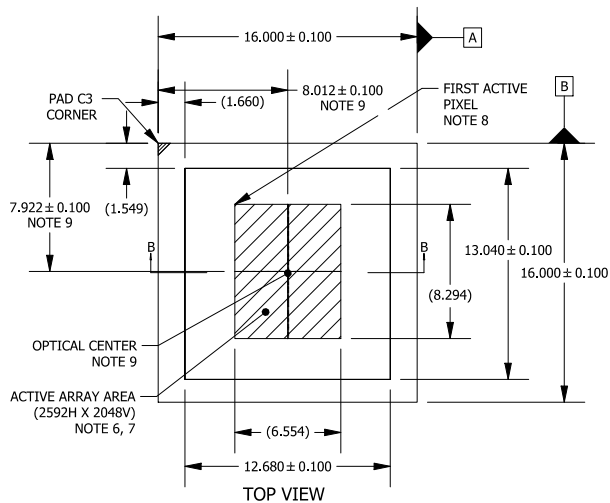


Figure 1. Functional Block Diagram (XGS 5000)

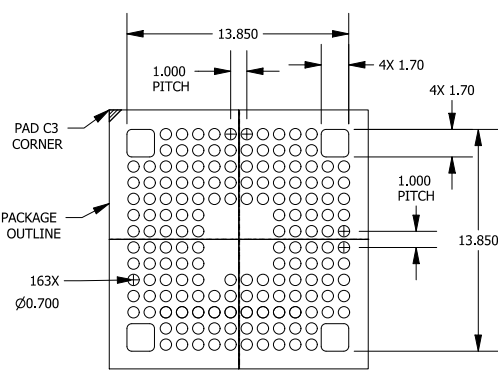
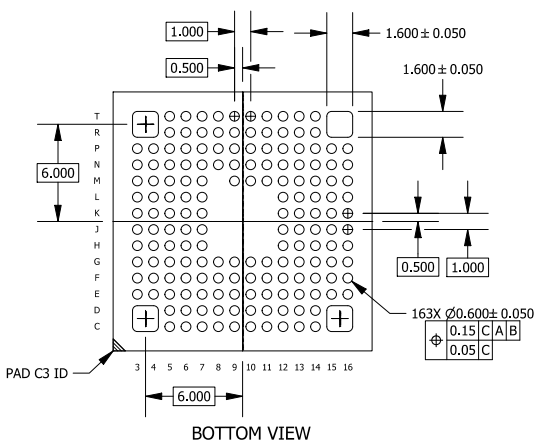
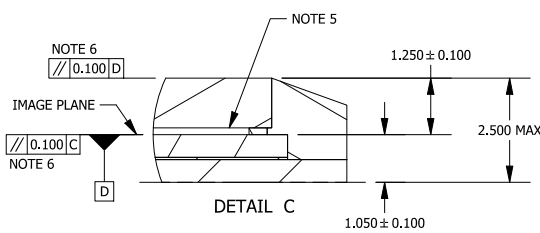
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ILGA163 16x16  
CASE 710AB  
ISSUE D

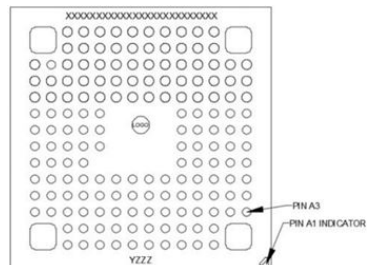
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- NOTES
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
  2. CONTROLLING DIMENSION: MILLIMETERS [mm].
  3. COPLANARITY APPLIES TO THE PLATED LAND PADS.
  4. GLASS: 1.100 THICKNESS; REFRACTIVE INDEX = 1.52.
  5. AIR GAP BETWEEN GLASS AND PIXEL ARRAY: 0.150 THICKNESS.
  6. PARALLELISM APPLIES ONLY TO THE ACTIVE ARRAY.
  7. MAXIMUM ROTATION OF ACTIVE ARRAY RELATIVE TO DATUMS A AND B IS  $\pm 1^\circ$ .
  8. REFER TO THE DEVICE DATA SHEET FOR TOTAL PIXEL ARRAY DEFINITIONS.
  9. OPTICAL CENTER RELATIVE TO PACKAGE CENTER (X, Y) = (0.012, 0.078).
  10. PACKAGE CENTER (X, Y) = (0.000, 0.000).



GENERIC MARKING DIAGRAM\*



XXXX = Specific Device Code  
Y = Year  
ZZZ = Assembly Lot Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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