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XGS 12000, XGS 9400 and XGS 8000 Global Shutter CMOS Image Sensors XGS Family

Description

The XGS CMOS image sensor family provides high resolution, high performance global shutter image capture. The family comes in different resolutions in a single package; 8.8, 9.4 and 12.6 MP with up to 1−inch optical format. The 21 mm x 20 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 12000	1−inch (16.4 mm Diagonal)
	XGS 9400	1/1.2−inch (13.9 mm Diagonal)
	XGS 8000	1/1.1−inch (14.8 mm Diagonal)
Active Pixels	XGS 12000	4096 (H) x 3072 (V)
	XGS 9400	3072 (H) x 3072 (V)
	XGS 8000	4096 (H) x 2160 (V)
Pixel Size	3.2 μm	
Color Filter Array	Monochrome, Bayer	
Shutter Type	Global Shutter	
Input Clock	32.4 MHz	
Output Interface	HiSPi (24 Lanes − 777.6 Mbps/lane)	
Frame Rate (12−bit)	24 Lanes (−X1)	
	XGS 12000	90 fps
	XGS 9400	90 fps
	XGS 8000	128 fps
	12 Lanes (−X2)	
	XGS 9400	56 fps
	XGS 8000	80 fps
	6 Lanes (−X3)	
	XGS 12000	28 fps
Read Noise	< 4 e^- (1x), 1.9 e^- (4x)	
SNR_{MAX}	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	1 W (Full Speed, Full Resolution)	
Operating Temp.	−40°C to 85°C (Junction)	
Package	163−pin CLGA (Ceramic 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 100 fps (24−lane) at Full Resolution
- Companding and 10−Bit Mode at 60 fps (12−lane) and 30 fps (6−lane)
- Data Interface: 24−lane HiSPi (Scalable Low−Voltage Signaling)
- Configurable Number of HiSPi Lanes: 24, 18, 12 or 6 Lanes
- Two−Wire (I^2C) 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

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

ORDERING INFORMATION

Table 2. ORDERABLE PART NUMBERS (Notes 1 and 2)

Part Number	Minimum Order Quantity	Product Description			Speed Grade	Resolution (H x V)
NOIX1SN012KB−LTI	25	12.6 MP	Mono	0° CRA	24 Lanes	4096 x 3072
NOIX1SN012KB−LTI1	4					
NOIX1SE012KB−LTI	25	12.6 MP	Color	0° CRA		
NOIX1SE012KB−LTI1	4					
NOIX1SF012KB−LTI	25	12.6 MP	Color	7.3° CRA		
NOIX1SF012KB−LTI1	4					
NOIX3SN012KB−LTI	25	12.6 MP	Mono	0° CRA	6 Lanes	
NOIX3SN012KB−LTI1	4					
NOIX3SE012KB−LTI	25	12.6 MP	Color	0° CRA		
NOIX3SE012KB−LTI1	4					
NOIX1SN9400B−LTI	25	9.4 MP	Mono	0° CRA	24 Lanes	3072 x 3072
NOIX1SN9400B−LTI1	4					
NOIX1SE9400B−LTI	25	9.4 MP	Color	0° CRA		
NOIX1SE9400B−LTI1	4					
NOIX2SN9400B−LTI	25	9.4 MP	Mono	0° CRA	12 Lanes	
NOIX2SN9400B−LTI1	4					
NOIX2SE9400B−LTI	25	9.4 MP	Color	0° CRA		
NOIX2SE9400B−LTI	4					
NOIX1SN8000B−LTI	25	8.8 MP	Mono	0° CRA	24 Lanes	4096 x 2160
NOIX1SN8000B−LTI1	4					
NOIX1SE8000B−LTI	25	8.8 MP	Color	0° CRA		
NOIX1SE8000B−LTI1	4					
NOIX2SF8000B−LTI	25	8.8 MP	Color	7.3° CRA	12 Lanes	
NOIX2SF8000B−LTI1	4					
NOIX2SN8000B−LTI	25	8.8 MP	Mono	0° CRA		
NOIX2SN8000B−LTI1	4					
NOIX2SE8000B−LTI	25	8.8 MP	Color	0° CRA		
NOIX2SE8000B−LTI1	4					

1. 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.
2. All devices listed in Table 2 are equipped with microlenses.

Table 3. ORDERING INFORMATION EVALUATION KITS

Part Number	Product Description	Additional Information
NOIX1SN012KBLFB−GEVB	Sensor Headboard (12.6 MP, Mono, 24−Lane)	Demo Kit Headboard (incl. NOIX1SN012KB−LTI) (Note 3)
NOIX1SE012KBLFB−GEVB	Sensor Headboard (12.6 MP, Color, 24−Lane)	Demo Kit Headboard (incl. NOIX1SE012KB−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.

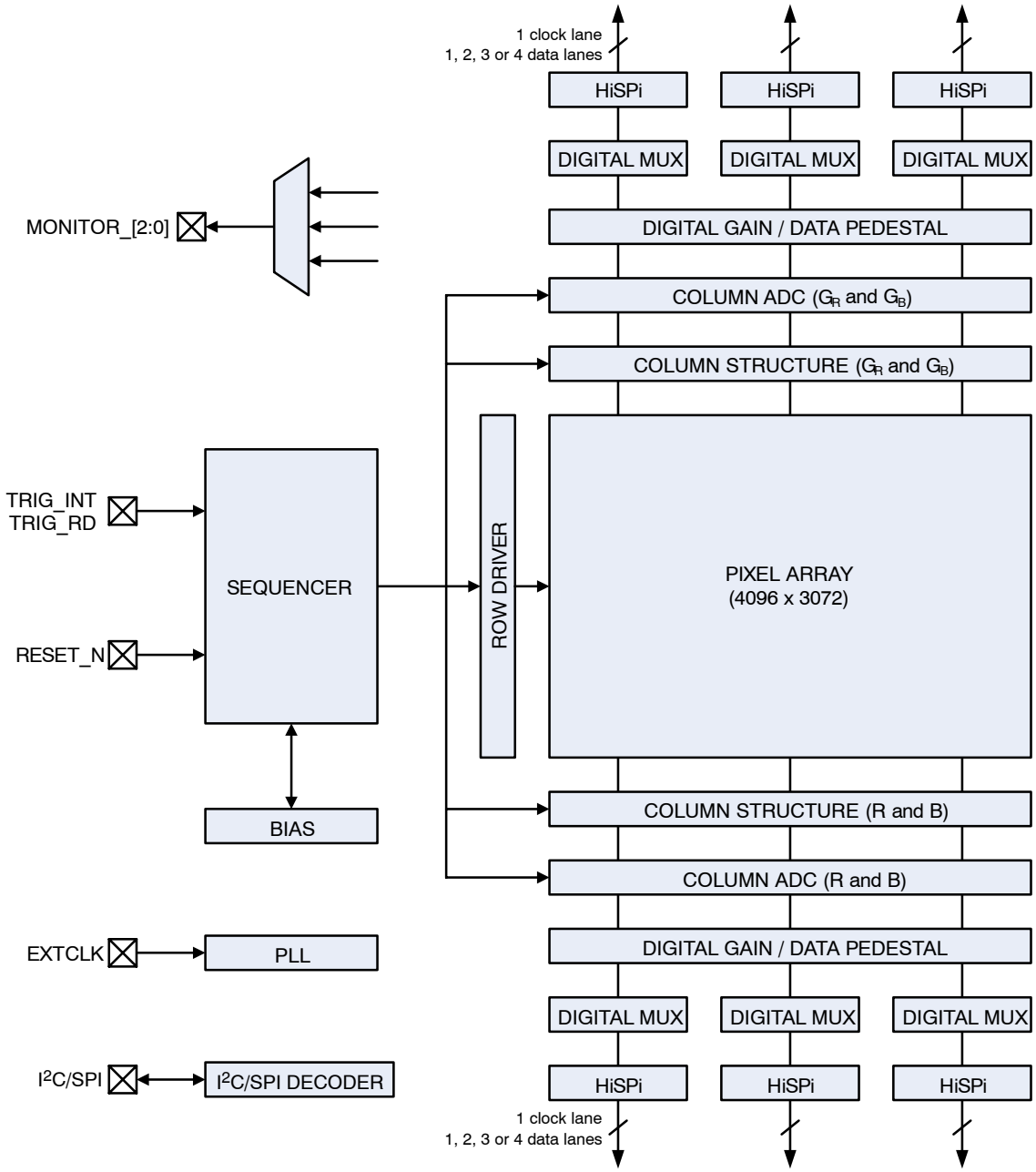

Figure 1. Functional Block Diagram (XGS 12000)

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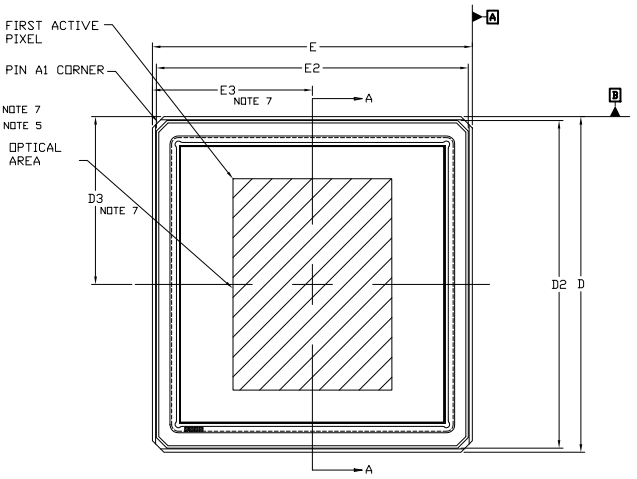
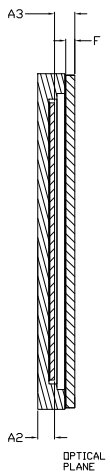
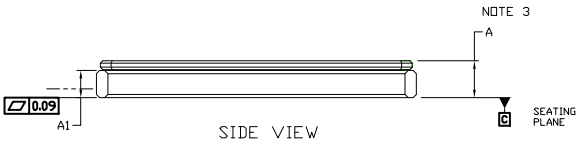


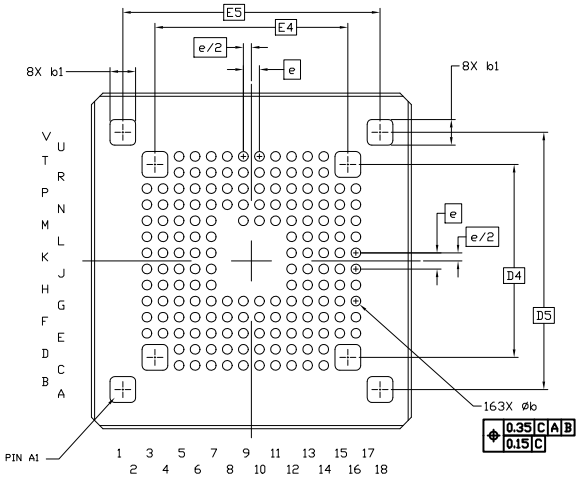
TOP VIEW



SECTION A–A



SIDE VIEW

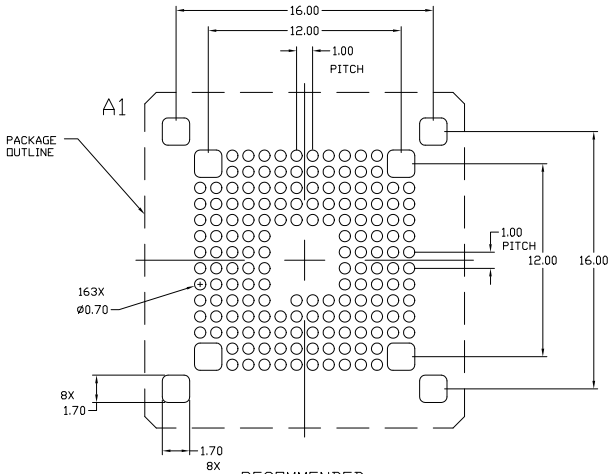


BOTTOM VIEW

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION A INCLUDES THE PACKAGE BODY AND LID BUT DOES NOT INCLUDE HEATSINKS OR OTHER ATTACHED FEATURES.
4. THE LID DEFINED BY DIMENSIONS D2 AND E2 MUST BE LOCATED WITHIN DIMENSIONS D AND E.
5. MAXIMUM ROTATION OF OPTICAL AREA RELATIVE TO PACKAGE EDGES JOINING AT A1 CORNER, WILL BE 0.7°. OPTICAL AREA IS IS DEFINED BY THE ACTIVE PIXEL ARRAY. REFER TO THE DEVICE DATA SHEET FOR TOTAL ARRAY AND FIRST PIXEL DEFINITIONS.
6. PARALLELISM APPLIES ONLY TO THE OPTICAL AREA.
7. OPTICAL CENTER OFFSET WITH RESPECT TO THE PACKAGE CENTER IS X= 12.345 MICRONS, Y= 77.63 MICRONS ±200 MICRONS.

	MILLIMETERS	
DIM	MIN.	MAX.
A	---	2.54
A1	1.61	1.89
A2	0.91	1.19
A3	1.05	1.45
b	0.55	0.65
b1	1.60 REF	
D	20.76	21.00
D2	20.30	20.46
D3	10.16	10.56
D4	12.00 BSC	
D5	16.00 BSC	
E	19.80	20.00
E2	19.32	19.48
E3	9.76	10.16
E4	12.00 BSC	
E5	16.00 BSC	
e	1.00 BSC	
F	0.50	0.60



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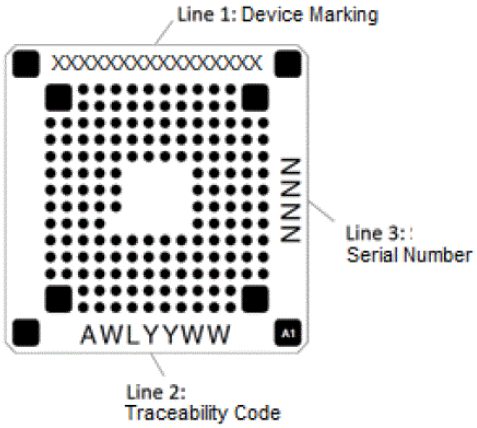
GENERIC MARKING DIAGRAM*



XXXX = Specific Device Code
A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week
NN = Serial Number

*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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