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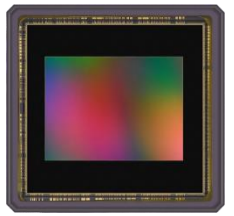
XGS Image Sensor Family

Public Information

XGS Image Sensor Family



High bandwidth, low power architecture

One camera design supports multiple resolutions and configurations

XGS Pixel

- Advanced 3.2 µm Global Shutter CMOS design
- High performance, low noise

Compatible with 29 x 29 mm^2 camera footprint

• XGS 8000	4k UHD	4096 x 2180
• XGS 9400	9.4 Mp	3072 x 3072
• XGS 12000	12 Mp	4096 x 3072

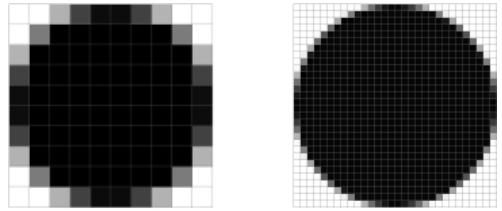
General Purpose Machine Vision

ITS

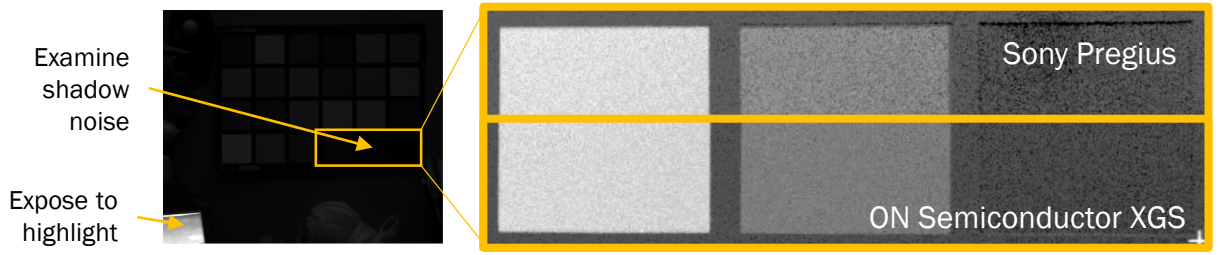
Broadcast

XGS Global Shutter Pixel

3.2 µm size → High resolution at optical format

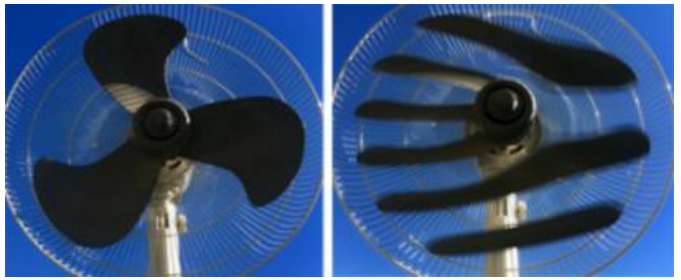


Advanced pixel design → Low noise, high image quality



Similar noise profile under low light

Global Shutter → Capture moving objects without motion artifacts

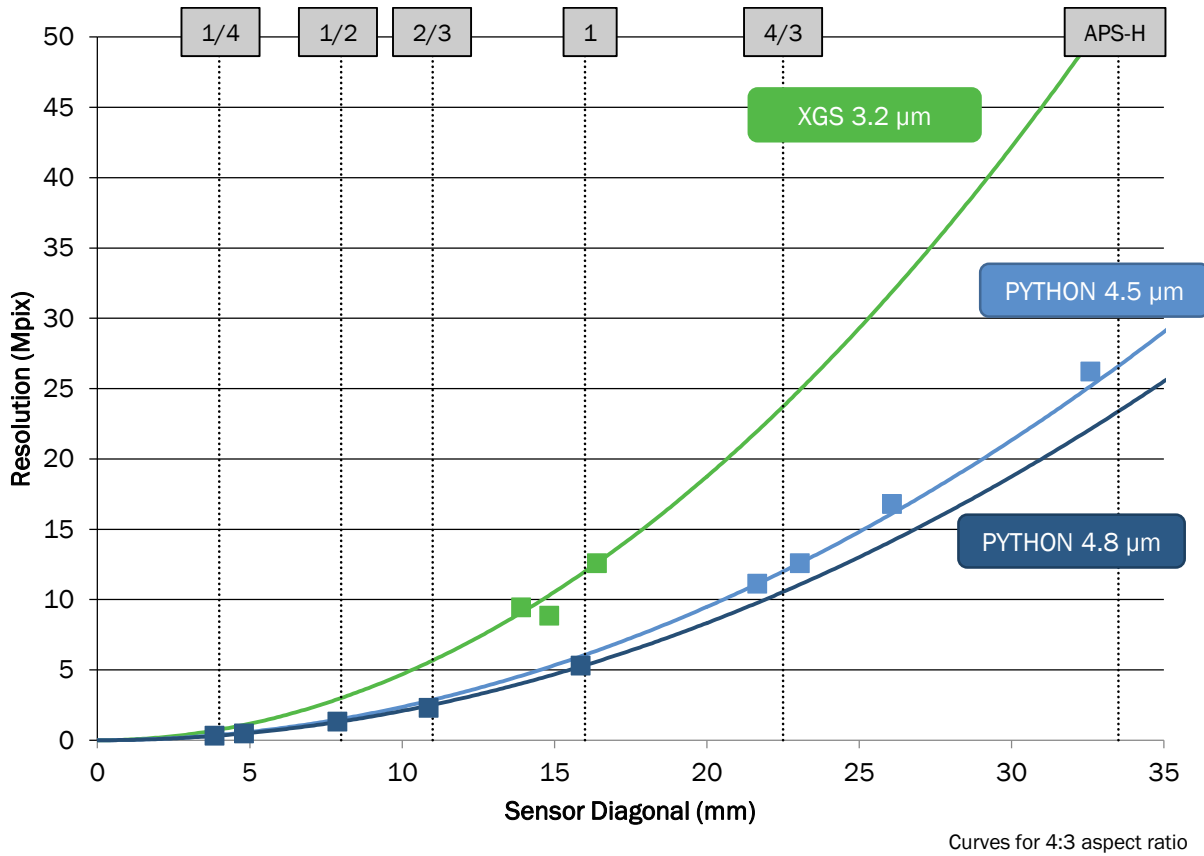


3.2 µm Global Shutter Pixel (XGS)

High performance from compact pixel

Scales to high resolution at large optical formats

Enables small footprint camera to reduce cost, simplify manufacturing flow



Curves for 4:3 aspect ratio

Advanced XGS Pixel Performance

Superior Image Quality with Reduced Pixel Size

	Parameter	PYTHON 12k	XGS 12000	Comments
Small Pixel	Pixel Size	4.5 µm	3.2 µm	2x increase in resolution at same optical node Same resolution at reduced optical node
	Optical Format	4/3”	1”	
Improved Performance	QE (550 nm, mono, with cover glass)	50%	62%	Improved light detection
	Dynamic Range Intrascene	59 dB	68 dB	>2x improvement
	Max ADC Resolution	10-bit	12-bit	Supports improved dynamic range
Reduced Noise	Dark noise 1x gain	14 e^-	4 e^-	>3x reduction
	Dark current Room Temp 60 °C	3.9 e^-/s 3100 e^-/s	<2 e^-/s 80e^-/s	2x reduction Over 35x reduction
	Row, Column FPN	Baseline	<1/10 random read noise	Enhanced image uniformity

X-Class Platform Design Advantages

Platform Feature	Key Benefit
Common frame throughout platform	Scalable to multiple resolution nodes Compatible with multiple pixel architectures • Global Shutter / Rolling Shutter • Small pixel / Large pixel • High speed / Low noise
HiSPi interface	High bandwidth for full utilization of 10GigE interface Low power digital output
Family architecture	One camera design for multiple image sensors • Foot print compatibility • Resolutions • Pixel architectures

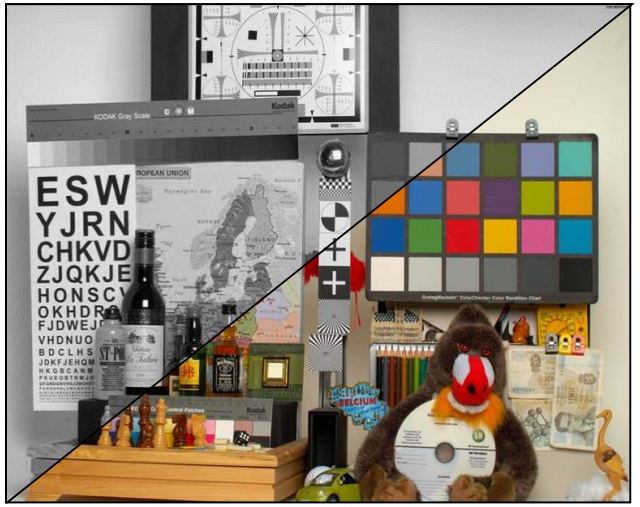
Matching Resolution, Features, Performance to Application Needs

XGS 8000
4096 x 2160

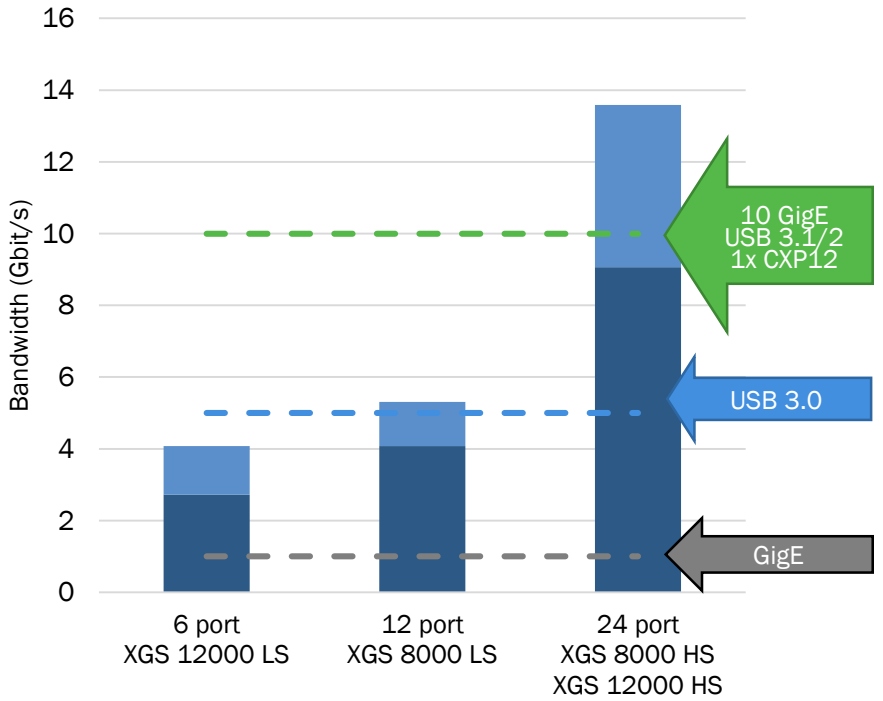
XGS 9400
3072 x 3072

XGS 12000
4096 x 3072

Resolutions



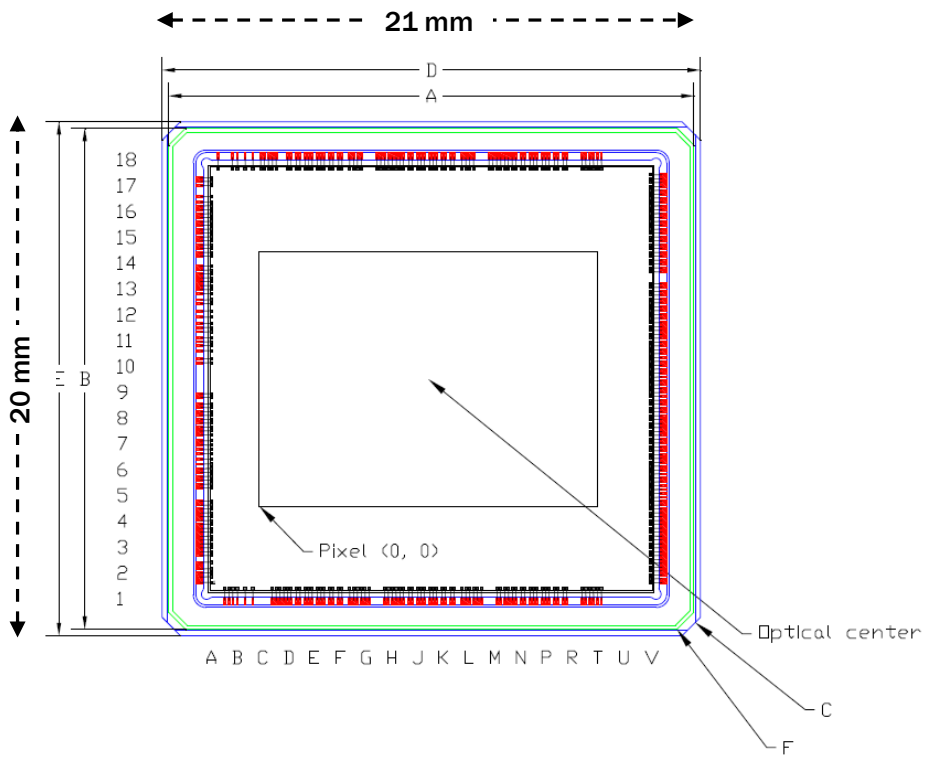
Mono / Color



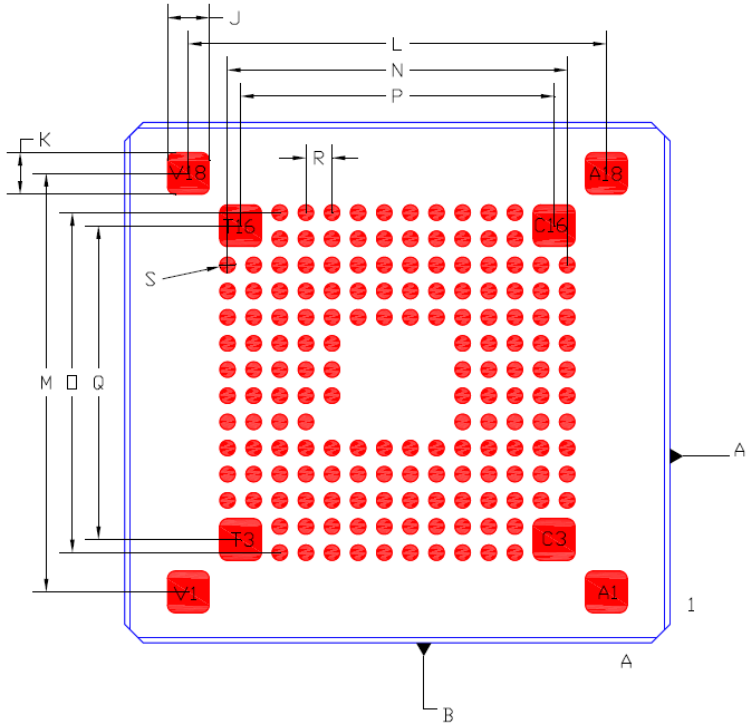
Speed Grades

Package Design

Compact Footprint



163-pin LGA

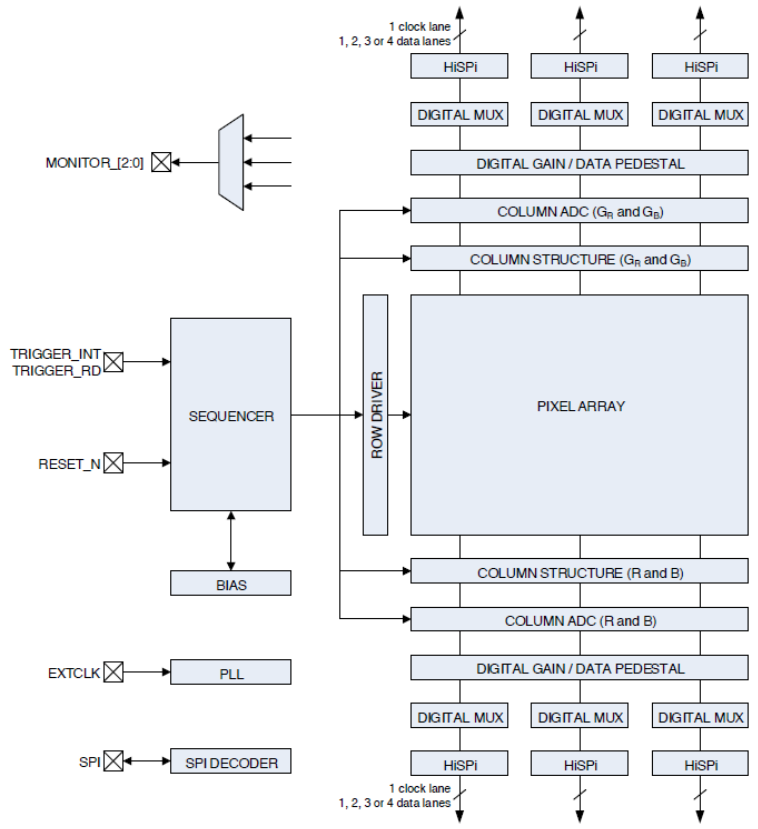


Common package throughout family
All resolutions support 29 x 29 mm² camera design

High Performance Advantage

Best-in-class Image Quality from XGS Global Shutter pixel	→	Provides the performance needed for critical industrial applications
Resolutions from 8 MP to 12 MP, with multiple configuration options	→	Match resolution, speed grades, and more to specific application needs
Energy efficient design with compact package	→	Enables cameras with 29 x 29 mm^2 footprint
One camera for multiple image sensors	→	Shorter camera design times, simplified logistics
Global Network of Sales, FAEs, Distributors	→	Partnering for success

Key Specifications



Device	Pixel Count	Resolution (Mp)	Max FR (12 bit)
XGS 8000	4096 x 2160	8.8	128
XGS 9400	3072 x 3072	9.4	90
XGS 12000	4096 x 3072	12.6	90

Parameter	Specification
Pixel Size	3.2 µm x 3.2 µm
Shutter Type	Global Shutter
Global Shutter Efficiency (550 nm)	> 4000:1
Full Well Capacity (linear)	10.1 ke$^-$
Quantum Efficiency (peak) Mono (550 nm, 850 nm) Color (455 nm, 545 nm, 600 nm)	 62%, 20% (incl. cover glass) 48%, 58%, 58% (incl. cover glass)
Dynamic range	68 dB
Read noise 1x Analog gain	 4.0 e$^-$ rms
Column FPN	< 1/10x Read Noise (1x analog gain)
Row Temporal Noise	< 1/10x Read Noise (1x analog gain)
PRNU	2.3% (global)
Dark current (storage node)	80 e$^-$/s @ 60°C (PD only)
Data Interface	HiSPi; up to 24 channel mux
Master Input Clock	32.4 MHz
ADC Resolution	12 bit
Input voltage requirements	3.0 V, 2.8 V, 1.8 V, 1.2 V, (0.4 V optional)
Power Dissipation Max Frame Rate, 24 ch	 <0.9 W
Operational Temperature Range	−40°C to 85°C (ambient)

Device Ordering Information

Device	CFA	LVDS Lanes	Frame Rate	Production OPN (MOQ = 25)	Sampling OPN (MOQ = 4)
XGS 8000 (4096 x 2160)	Color	24	128	NOIX1SE8000B-LTI	NOIX1SE8000B-LTI1
		12	75	NOIX2SE8000B-LTI	NOIX2SE8000B-LTI1
	Mono	24	128	NOIX1SN8000B-LTI	NOIX1SN8000B-LTI1
		12	75	NOIX2SN8000B-LTI	NOIX2SN8000B-LTI

Device	CFA	LVDS Lanes	Frame Rate	Production OPN (MOQ = 25)	Sampling OPN (MOQ -= 4)
XGS 9400 (3072 x 3072)	Color	24	90	NOIX1SE9400B-LTI	NOIX1SE9400B-LTI1
		12	45	NOIX2SE9400B-LTI	NOIX2SE9400B-LTI1
	Mono	24	90	NOIX1SN9400B-LTI	NOIX1SN9400B-LTI1
		12	45	NOIX2SN9400B-LTI	NOIX2SN9400B-LTI1

Device	CFA	LVDS Lanes	Frame Rate	Production OPN (MOQ = 25)	Sampling OPN (MOQ= 4)
XGS 12000 (4096 x 3072)	Color	24	90	NOIX1SE012KB-LTI	NOIX1SE012KB-LTI1
		6	27	NOIX3SE012KB-LTI	NOIX3SE012KB-LTI1
	Mono	24	90	NOIX1SN012KB-LTI	NOIX1SN012KB-LTI1
		6	27	NOIX3SN012KB-LTI	NOIX3SN012KB-LTI1

Evaluation Kit Ordering Information

Component	OPN	Comment
Imager Board	AGB1N0CS-GEVK	Same Demo 3 headboard used for most ASD / CSD devices. Interfaces between eval system and computer
Frame Buffer Card	AGBAN6CS-GEVK	Drives the sensor and includes local memory for image data storage
Monochrome Headboard XGS 12000, high speed	NOIX1SN012KBLFB-GEVB	Contains the monochrome sensor and the required biasing
Color Headboard XGS 12000, high speed	NOIX1SE012KBLFB-GEVB	Contains the color sensor and the required biasing
DevWare	Download from onsemi.com	

Three OPNs are needed for a complete evaluation system:

- One imager board
- One frame buffer card
- The choice of a color or monochrome headboard