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ICSD Update

April 30, 2021

Danny Scheffer, PLM ICSD P7



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Headlines

XGS devices

- Ordering Information
- Program Updates
- Positioning information
- Timeline Summary
- Demo / Evaluation / Reference Design

PYTHON updates

Machine Vision / ITS application examples

Recent Document Updates

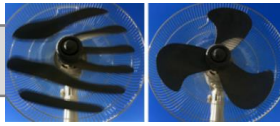


More Data, Better Data

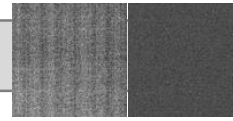
Technology Drivers



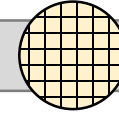
High-speed Output



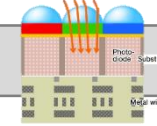
Global Shutter Advancement



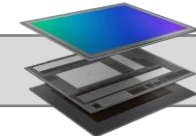
In-pixel image correction



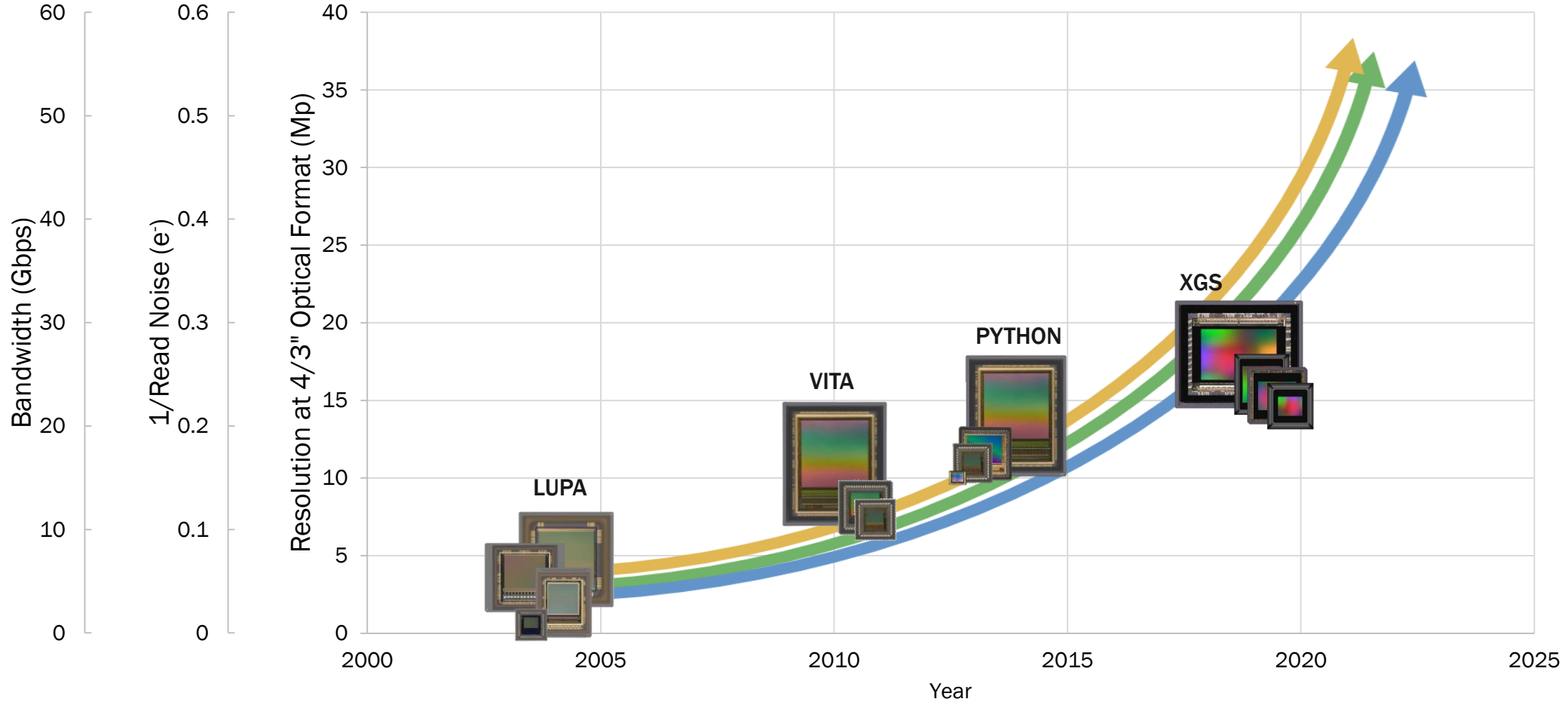
Process node reduction



BSI



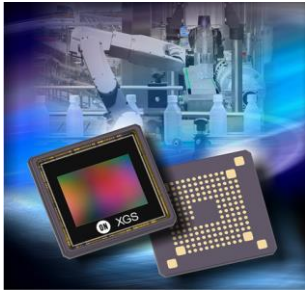
Stacked Architecture



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XGS Global Shutter Product Summary



Aggressive price settings:

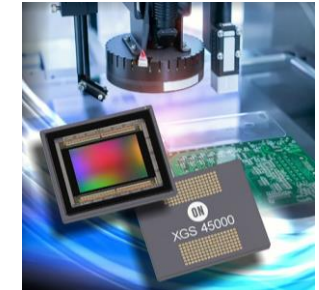
- Exceeds market expectations, beats competition
- No price differentiation between color and monochrome devices
- Pretty flat price curve, limited volume dependency

Value proposition:

- Excellent image quality, artifact/pattern free raw images
- Family concept: one footprint supports all resolutions from 2Mp up to 16Mp, while a second footprint supports a 20Mp up to a 45Mp solution
- All XGS family member have the same 'look and feel' (IP reuse)
- Better than 'state of the art' power dissipation
- 29x29mm² camera format compatible (XGS 2000 – XGS 16000)
- Dedicated versions available for the ITS markets, incl. optimized CRA to reduce roll-off



See the possibilities



29 x 29 mm² compatible, one single foot print, fully pin compatible

One single foot print, fully pin compatible

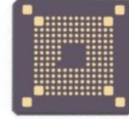
	XGS 2000	XGS 3000	XGS 5000	XGS 8000	XGS 9400	XGS 12000	XGS 16000
Production status	Today	Today	Today	Today	Today	Today	MP: July 2021 ES: today
	Requalification ongoing. Production on hold till early July						
Resolution (x,y)	1920 x 1200	2048 x 1536	2592 x 2048	4096 x 2160	3072 x 3072	4096 x 3072	4000 x 4000
Resolution (Mp)	2.3	3.1	5.3	8.8	9.4	12.6	16.0
Imaging Diagonal (mm)	7.3	8.2	10.6	14.8	13.9	16.4	18,1
Optical Format	1/2.2	1/2	2/3	1/1.1	1/1.2	1	1.1"
Max Frame Rate (12 bit)	220	175	132 & 43	128 & 80	90 & 56	90 & 28	65 & 42 & 21
CRA Options	0 degree	4.7 degree	0/4.7 degree	0/7.3 degree	0 degree	0/7.3 degree	0 degree
Speed Grade	✓		✓	✓	✓	✓	✓
Evaluation Kit	✓	✓	✓	✓	✓	✓	✓

	XGS 20000	XGS 30000	XGS 32000	XGS 45000
	Today	Today	Today	Today
Resolution (x,y)	4500 x 4500	5460 x 5460	6580 x 4935	8192 x 5460
Resolution (Mp)	20	30	32	45
Imaging Diagonal (mm)	20.4 mm	24.9 mm	26.3 mm	31.6 mm
Optical Format	4/3"	~ APS-C	APS-C	Super 35mm
Max Frame Rate (12 bit)	57 & 38	47 & 30	53 & 35	47 & 30 & 15
CRA Options	10 degree			
	✓	✓	✓	✓
	✓	✓	✓	✓

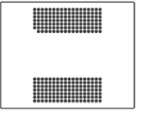


XGS Family overview

XP24
29 x 29 mm² compatible



XP48



	XGS 2000	XGS 3000	XGS 5000	XGS 8000	XGS 9400	XGS 12000	XGS 16000
Resolution (x,y)	1920 x 1200	2048 x 1536	2592 x 2048	4096 x 2160	3072 x 3072	4096 x 3072	4000 x 4000
Resolution (Mp)	2.3	3.1	5.3	8.8	9.4	12.6	16.0
Imaging Diagonal (mm)	7.3	8.2	10.6	14.8	13.9	16.4	18,1
Optical Format	1/2.2	1/2	2/3	1/1.1	1/1.2	1	1.1"
Max Frame Rate (12 bit)	220	175	132 & 43	128 & 80	90 & 56	90 & 28	65 & 42 & 21
Shutter Type	Global						
Pixel Size (µm)	3.2						
Linear Full Well (e-)	10,100						
Dark Temporal Noise (e-)	4.0 (default gain); 1.9 (4x gain)						
Dynamic Range (dB)	68.4 (EMVA 66.9)						
QE (%)	62%						
SNR max (dB)	40						
Dark Current (Tj=60 °C)	PD: 80 e-/s, SN: 20 e-/s						
GSE	~ 6000:1			~ 4000:1			~ 7000:1
Channel Mux	16,12,8,4			24, 18, 12, 6			24, 18, 12, 6
Power dissipation	< 1000 mW for highest speed grade			<900 mW at full speed			≤ 1200 mW
Package Options	iLGA, < 16 x 16 mm ²			163 pin cLGA, 21 x 20 mm ²			163p iLGA
ADC Bit Depth	12-bit, 10-bit			12-bit, 10-bit			12-/10-bit
CFA Options	Mono, Bayer			Mono, Bayer			Mono, Bayer
CRA Options	0 degree	4.7 degree	0/4.7 degree	0/7.3 degree	0 degree	0/7.3 degree	0 degree
Speed Grade	✓		✓	✓	✓	✓	✓
Evaluation Kit	✓	✓	✓	✓	✓	✓	✓

XGS 20000	XGS 30000	XGS 32000	XGS 45000
4500 x 4500	5460 x 5460	6580 x 4935	8192 x 5460
20	30	32	45
20.4 mm	24.9 mm	26.3 mm	31.6 mm
4/3"	~ APS-C	APS-C	Super 35mm
57 & 38	47 & 30	53 & 35	47 & 30 & 15
Global			
3.2			
10,100			
4.25 (default gain); ~ 2.0 (max gain)			
67.2			
62%			
40			
PD: 90 e-/s, SN: 49 e-/s			
~ 7000:1			
48,36,24,12			
<2.1 W @ max fps			
338 µPGA, 46.5 x 39.5 mm ²			
12-bit, 10-bit			
Mono, Bayer			
10 degree			
✓	✓	✓	✓
✓	✓	✓	✓



XGS for the ITS market segment

Four XGS variants dedicated for traffic applications specifically:

- Market compliant price setting
- Optimised CRA adjustment enabling ITS lens reuse
- Color version, running at 60fps or higher
- Fully pin compatible with other XP-24 XGS family members
- Aggressive pricing subject to MOQ of 10k units.

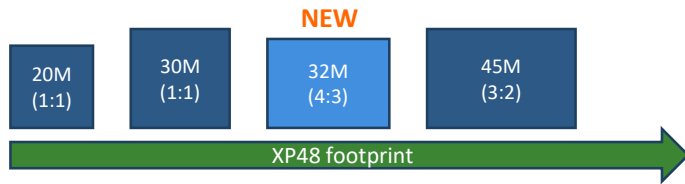
WPN	OPN	Status	Color/Mono	#Ports	FPS	CRA
XGS 12000	NOIX1SF012KB-LTI	Production	Color	24	90	7.3°
XGS 8000	NOIX2SF8000B-LTI	Production	Color	12	75	7.3°
XGS 5000	NOIX4SF5000B-LTI	Production	Color	12	132	4.7°
XGS 3000	NOIX4SF3000B-LTI	Production	Color	12	175	4.7°



XGS 32000

Replacement for the IMX342, at ~25% - 30% lower cost
 Opens the doors at companies normally using Sony!

- New high resolution XGS option has been added to the family
- XGS 32000, rectangular 4:3 aspect ratio, 6580x4935 pixels
- Markets: high end ITS, security, FA, FPD inspection and more



	XGS 32000	XGS Benefits		
		DR	fps (12-b)	Other remark
KAI-29050 @ MP	✓	+4 / +11 dB	13x	CMOS integration, power efficiency, ASP
KAI-16050 @ MP		+4 / +11 dB	9.2x	4/3", CMOS integration, power efficiency, ASP
KAI-08050 @ OF	✓	+4 / +11 dB	3.3x	4/3", CMOS integration, power efficiency, ASP
IMX387 (16.9M) @ MP		-2 / + 3 dB	1.9x	XGS power efficiency, ASP, scales to 45MP
IMX367 (19.7M) @ MP		-2 / + 3 dB	2.7x	XGS power efficiency, ASP, scales to 45MP
IMX342 (31.5M) @ MP	✓	-2 / + 3 dB	2.1x	XGS power efficiency, ASP, scales to 45MP
CMV8000 @ OF	✓	+6 / +13 dB	0.7x(**)	XGS power efficiency, ASP, scales to 45MP

	XGS 20000	XGS 30000	XGS 32000	XGS 45000
Resolution (x,y)	4500 x 4500	5460 x 5460	6580 x 4935	8192 x 5460
Resolution (Mp)	20	30	32	45
Imaging Diagonal (mm)	20.4 mm	24.9 mm	26.3 mm	31.6 mm
Optical Format	4/3"	~ APS-C	APS-C	Super 35mm
Max Frame Rate (12 bit)	57 & 38	47 & 30	53 & 35	47 & 30 & 15
Shutter Type	Global			
Pixel Size (µm)	3.2			
Linear Full Well (e-)	10,100			
Dark Temporal Noise (e-)	4.25 (default gain); ~ 2.0 (max gain)			
Dynamic Range (dB)	67.2			
QE (%)	62%			
SNR max (dB)	40			
Dark Current (Tj=60 °C)	PD: 90 e-/s, SN: 49 e-/s			
GSE	~ 7000:1			
Channel Mux	48,36,24,12			
Power dissipation	<2.1 W @ max fps			
Package Options	338 µPGA, 46.5 x 39.5 mm ²			
ADC Bit Depth	12-bit, 10-bit			
CFA Options	Mono, Bayer			
CRA Options	10 degree			
Speed Grade	✓	✓	✓	✓
Evaluation Kit	✓	✓	✓	✓



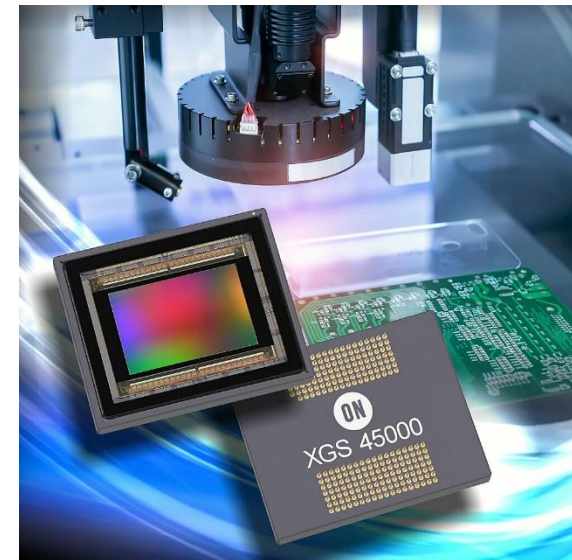
Key take aways XGS product family

Aggressive price settings:

- Exceeds market expectations
- No price differentiation between color and monochrome devices
- Pretty flat price curve, limited volume dependency

Value proposition:

- Family concept: one footprint supports all resolutions from 2Mp up to 16Mp, while a second footprint supports a 20Mp up to a 45Mp solution
- All XGS family member have the same 'look and feel' (IP reuse)
- High degree of footprint compatibility
- Better than 'state of the art' power dissipation
- 29x29mm² camera format compatible (XGS 2000 – XGS 16000)
- Dedicated versions available for the ITS market segments, having an optimized CRA to reduce roll-off in the sensor corners



XGS Device Ordering Information

All OPNs included in ON Target

WPN	Resolution	Speed	Frame Rate	CFA	CRA	OPN (MOQ = 25)	OPN (MOQ = 4)	Availability	Comment
XGS 2000	1920 x 2000	High	220	Mono	0	NOIX4SN2000B-LTI	NOIX4SN2000B-LTI1	Production units available mid April 2021. Re-qualification ongoing to address a potential bondwire issue	Production Units
				Color	0	NOIX4SE2000B-LTI	NOIX4SE2000B-LTI1		
XGS 3000	2048 x 1536	High	175	Mono	4.7	NOIX4SP3000B-LTI	NOIX4SP3000B-LTI1		
				Color	4.7	NOIX4SF3000B-LTI	NOIX4SF3000B-LTI1		
XGS 5000	2592 x 2048	High	132	Mono	0	NOIX4SN5000B-LTI	NOIX4SN5000B-LTI1		
				Color	0	NOIX4SE5000B-LTI	NOIX4SE5000B-LTI1		
				Color	4.7	NOIX4SF5000B-LTI	NOIX4SF5000B-LTI1		
		Low	43	Mono	0	NOIX5SN5000B-LTI	NOIX5SN5000B-LTI1		
				Color	0	NOIX5SE5000B-LTI	NOIX5SE5000B-LTI1		

Notes

- Quantities for all sample orders ('-LTI1', with '1' at end of OPN) must be in multiples of 4.
- No performance or manufacturing difference between -LTI and -LTI1 (Same device, only MPQ differs)
- Requests for No Charge samples must be approved by BU (to be entered via ModelN)
- Special attention to the 7.3 degree CRA devices optimized for specifically the ITS market

All XGS 2000/3000/5000 variants are footprint compatible with XGS 8000/9400/8000/16000!



XGS Device Ordering Information

All OPNs included in ON Target

WPN	Resolution	Speed	Frame Rate	CFA	CRA	OPN (MOQ = 25)	OPN (MOQ = 4)	Availability	Comment
XGS 12000	4096 x 3072	High	90	Mono	0	NOIX1SN012KB-LTI	NOIX1SN012KB-LTI1	Today	Production Units
				Color	0	NOIX1SE012KB-LTI	NOIX1SE012KB-LTI1		
				Color	7.3	NOIX1SF012KB-LTI	NOIX1SF012KB-LTI1		
		Low	28	Mono	0	NOIX3SN012KB-LTI	NOIX3SN012KB-LTI1		
				Color	0	NOIX3SE012KB-LTI	NOIX3SE012KB-LTI1		
XGS 9400	3072 x 3072	High	90	Mono	0	NOIX1SN9400B-LTI	NOIX1SN9400B-LTI1		
				Color	0	NOIX1SE9400B-LTI	NOIX1SE9400B-LTI1		
		Low	56	Mono	0	NOIX2SN9400B-LTI	NOIX2SN9400B-LTI1		
				Color	0	NOIX2SE9400B-LTI	NOIX2SE9400B-LTI1		
XGS 8000	4096 x 2048	High	128	Mono	0	NOIX1SN8000B-LTI	NOIX1SN8000B-LTI1		
				Color	0	NOIX1SE8000B-LTI	NOIX1SE8000B-LTI1		
		Low	80	Mono	0	NOIX2SN8000B-LTI	NOIX2SN8000B-LTI1		
				Color	0	NOIX2SE8000B-LTI	NOIX2SE8000B-LTI1		
				Color	7.3	NOIX2SF8000B-LTI	NOIX2SF8000B-LTI1		

Notes

- Inventory available
- Quantities for all sample orders ('-LTI1', with 1 at end of OPN) must be in multiples of 4
- No performance or manufacturing difference between -LTI and -LTI1 (Same device, only MPQ differs)
- Requests for No Charge samples must be approved by BU (entered via ModelN)
- Special attention to the 7.3 degree CRA devices optimized for specifically the ITS market

*All XGS 8000/9400/12000 variants
are footprint compatible with XGS
2000/3000/5000/16000!*



XGS Device Ordering Information

All OPNs included in ON Target

WPN	Resolution	Speed	Frame Rate	CFA	CRA	OPN (MOQ = 4)	Availability	Comment
XGS 20000	4500 x 4500	High	57	Mono	10	NOIX0SN020KB-GTI	Today	Production Units
				Color	10	NOIX0SE020KB-GTI		
		Low	38	Mono	10	NOIX1SN020KB-GTI		
				Color	10	NOIX1SE020KB-GTI		
XGS 30000	5460 x 5460	High	47	Mono	10	NOIX0SN030KB-GTI		
				Color	10	NOIX0SE030KB-GTI		
		Low	30	Mono	10	NOIX1SN030KB-GTI		
				Color	10	NOIX1SE030KB-GTI		
XGS 32000	6580 x 4935	High	53	Mono	10	NOIX0SN032KB-GTI		
				Color	10	NOIX0SE032KB-GTI		
		Low	35	Mono	10	NOIX1SN032KB-GTI		
				Color	10	NOIX1SE032KB-GTI		
XGS 45000	8192 x 5460	High	47	Mono	10	NOIX0SN045KB-GTI		
				Color	10	NOIX0SE045KB-GTI		
		Medium	30	Mono	10	NOIX1SN045KB-GTI		
				Color	10	NOIX1SE045KB-GTI		
		Low	15	Mono	10	NOIX2SN045KB-GTI		
				Color	10	NOIX2SE045KB-GTI		

Notes

- Inventory limited
- Need active backlog for device allocation

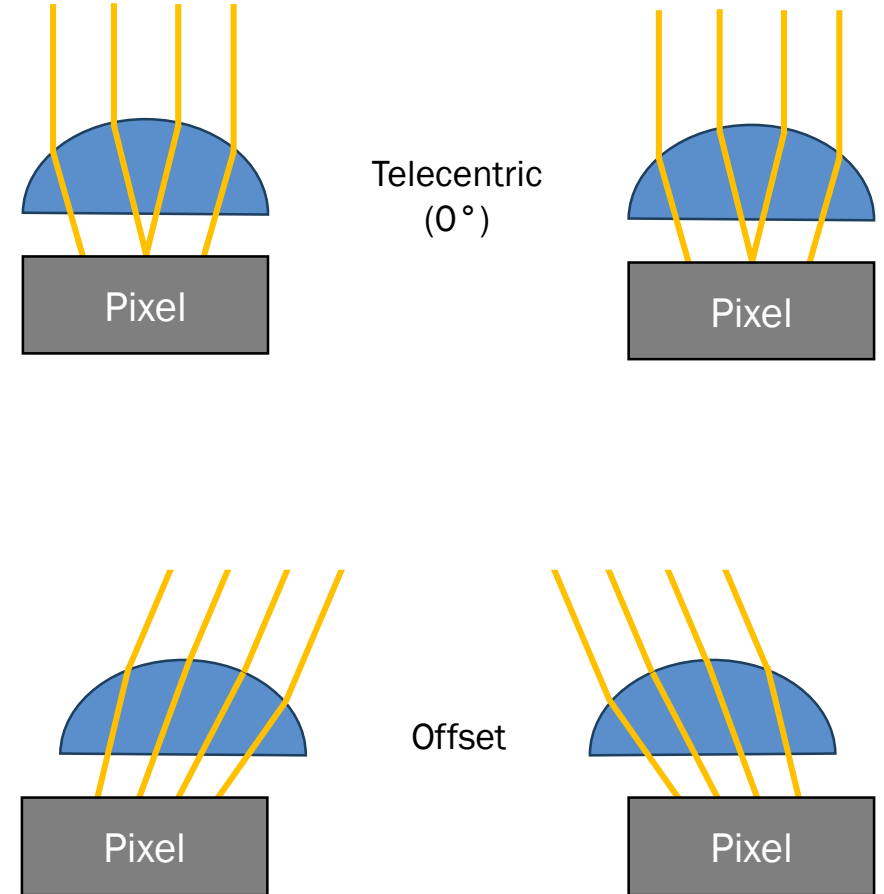


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Chief Ray Angles (CRA) Optimized for Different Use Cases

Application	CRA	Devices
Machine Vision	Telecentric (0°)	<ul style="list-style-type: none"> XGS 16000 and lower (0°)
ITS	Options available	<ul style="list-style-type: none"> XGS 12000 (0°/7.3°) XGS 8000 (0°/7.3°) XGS 5000 (0°/4.7°) XGS 3000 (4.7°)
Large Format	Default offset of 10° for all variants	<ul style="list-style-type: none"> XGS 45000 (10°) XGS 32000 (10°) XGS 30000 (10°) XGS 20000 (10°)



XGS Launch time line summary

Mass Production (MP):

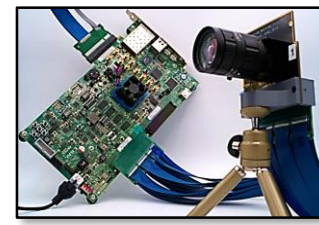
- Qualification closed,
- Build to forecast.
- All speed grades available

	MP	Eval kit
XGS 2000	Early July 2021	NA
XGS 3000	Early July 2021	NA
XGS 5000	Early July 2021	Limited quantities
XGS 8000	Today	NA
XGS 9400	Today	NA
XGS 12000	Today	Available
XGS 16000	Early July 2021	Limited quantities
XGS 20000	Today	NA
XGS 30000	Today	NA
XGS 32000	Today	NA
XGS 45000	Today	Limited quantities

Schedules may change, and for the latest update, please contact your local sales representative



XGS Platform Comparison



	Demo Kit	X-Celerator	X-Cube
Target	Customer/Conference Demo IQ benchmarking	FPGA Development Ecosystem (Distributors)	Access Existing MIPI ISP systems
Sensor + Lens Mount	Large	Large	Small
Power System in Headboard?	No	Yes	Yes
FPGA in Camera Head?	No	No	Yes (HiSPi -> MIPI)
Enabled System Speed (fps)	High Capture (Max fps) Lower Display (<30 fps)	High (Max fps)	Medium (30 fps)
Intermediate HW	FrameBuffer Board + Demo3	FPGA Development Kit	IAS Board + Demo3 Board
PC Communication	USB3	User Defined	USB3
Software	DevWare Only	Customer	Customer or DevWare
Public Algorithm Code	No	Yes	No
Cost (ASP)	Headboard: \$650 + FrameBuffer Board: \$2000 + Demo3 Board: \$650	Headboard: \$675 + FPGA Dev Kit: \$1k->\$4k	MIPI output X-Cube: \$675 + IAS Adapter Board: \$75 + Demo3 Board: \$650

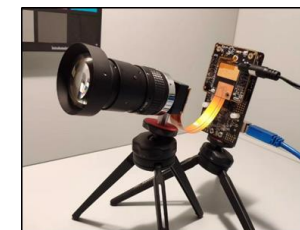


X-Celerator / X-Cube ordering information

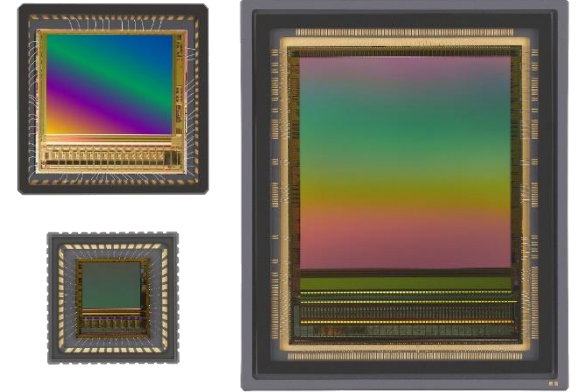
Name	Part Number (OPN)	Applicable Sensors	Availability
XGS 5000 Mono	XCEL-NOIX4SN5000BL-GEVK	XGS 2000 XGS 3000 XGS 5000	Today. Check with BU for inventory and lead time
XGS 5000 Color	XCEL-NOIX4SE5000BL-GEVK		
XGS 12000 Mono	XCEL-NOIX1SN012KBL-GEVK	XGS 8000 XGS 9400 XGS 12000	
XGS 12000 Color	XCEL-NOIX1SE012KBL-GEVK		
XGS 16000 Mono	XCEL-NOIX1SN016KBL-GEVK	XGS 16000	
XGS 16000 Color	XCEL-NOIX1SE016KBL-GEVK		
XGS 45000 Mono	XCEL-NOIX0SN045KBL-GEVK	XGS 20000 XGS 30000 XGS 32000 XGS 45000	Expected March 2021
XGS 45000 Color	XCEL-NOIX0SE045KBL-GEVK		



Name	Part Number (OPN)	Applicable Sensors	Availability
XGS 5000 Mono	XCUBE-NOIX4SN5000BL-GEVK	XGS 2000 XGS 3000 XGS 5000	Expected March 2021
XGS 5000 Color	XCUBE-NOIX4SE5000BL-GEVK		
XGS 12000 Mono	XCUBE-NOIX1SN012KBL-GEVK	XGS 8000 XGS 9400 XGS 12000	Today. Check with BU for inventory and lead time
XGS 12000 Color	XCUBE-NOIX1SE012KBL-GEVK		
XGS 16000 Mono	XCUBE-NOIX1SN016KBL-GEVK	XGS 16000	
XGS 16000 Color	XCUBE-NOIX1SE016KBL-GEVK		



PYTHON Family summary



	PYTHON 480	PYTHON 300	PYTHON 500	PYTHON 1300	PYTHON 2000	PYTHON 5000	PYTHON 16K	PYTHON 25K
Resolution	SVGA	VGA	SVGA	SXGA	WUXGA	QSXGA	>DCI 4k	>5k / UHD+
Resolution (x,y)	800 x 600	640 x 480	800 x 600	1280 x 1024	1920 x 1200	2592 x 2048	4096 x 4096	5120 x 5120
Resolution (Mp)	0.5	0.3	0.5	1.3	2.3	5.3	16.8	26.2
Imaging Diagonal (mm)	4.8	3.8	4.8	7.9	10.9	15.9	26.1	32.6
Optical Format	1/3.3	1/4	1/3.3	1/2	2/3	1	APS-C	APS-H
Max Frame Rate (10 bit)	120	815	545	210	225	100	120	80
Shutter Type	Global	Global		Global		Global		Global
Pixel Size (µm)	4.8	4.8		4.8		4.8		4.5
Responsivity (V/lux*s)	7.7	7.7		7.5		5.8		5.8
Full Well Capacity (e-)	10,000	10,000		10,000		12,000		12,000
Dark Noise (e-)	11	9		11		14		14
Dynamic Range (dB)	60	60		60		59		59
HDR (dB)	N/A	Up to 90 (multiple slope)		Up to 90 (multiple slope)		N/A		N/A
SNR max (dB)	40	40		40		41		41
PLS	1/6200	1/8000		1/5000		1/5000		1/5000
Channel Mux	1	4, 2, 1		8, 4, 2, 1		32, 16, 8, 4		32, 16, 8, 4
Package Options	67-CSP	48 LCC		84 LCC, 128 LGA		355 pin µPGA		355 pin µPGA
ADC Bit Depth	10-bit, 8-bit	10-bit, 8-bit		10-bit, 8-bit		10-bit, 8-bit		10-bit, 8-bit
CFA Options	Mono, Color	Mono, Color, Extended NIR		Mono, Color, Extended NIR		Mono, Bayer, Extended NIR		Mono, Bayer, Extended NIR
Low Cost OPN				✓		✓		
Protective Tape	✓	✓	✓	✓	✓	✓		
Evaluation Kit	✓	✓	✓	✓	✓	✓	✓	✓

- High degree of footprint compatibility
- Color/Mono/NIR variants available for selected resolutions
- Speed grades available for selected resolutions
- Protective foil standard on all versions
- Excellent for MV applications where speed is key: quadratic speed increase in of ROI read out
- Extensive documentation available to support new Design-Ins.

• *Due to increased demand all PYTHON lead times have increased. Please contact your local sales person for the latest status update.*



Technology evolution: PYTHON -> XGS

Superior Image Quality with Reduced Pixel Size

	Parameter	PYTHON 12k	XGS 12000	Comments
Smaller Pixel	Pixel Size	4.5 μm	3.2 μm	2x increase in resolution at same optical node
	Optical Format	4/3"	1"	Same resolution at reduced optical node
Improved Performance	QE (550 nm, mono)	50%	> 60%	Improved light detection
	Dynamic Range Intrinsic	60 dB	68 dB	> 2x improvement
	Max ADC Resolution	10-bit	12-bit	Supports improved dynamic range
Reduced Noise	Dark noise 1x gain	14 e^-	4.0 e^-	> 3x reduction
	Dark current Room Temp 60 °C	3.9 e^-/s 3100 e^-/s	2 e^-/s < 120 e^-/s	Over 2x reduction Over 25x reduction
	Row, Column FPN	Baseline	< 1/10 random read noise	Enhanced image uniformity

- *Due to increased demand all PYTHON lead times have increased. Please contact your local sales person for the latest status update.*

But:

- PYTHON features quadratic speed increase when windowing
- Designed in for many applications
- Home working triggers increased market demand:
 - *Golf swing analysis*
 - *Wafer inspection (IC demand!)*
 - *Solar panel inspection*
 - *Glass bottle inspection*
 - ...
- PYTHON family on allocation: focus on key customers while trying to maximize revenue and margins
- PYTHON continues to blow your mind!

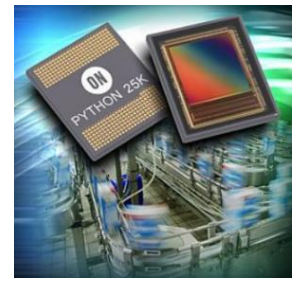


Industrial Vision, and more ...

High End MV cameras



> 40 x 40 mm

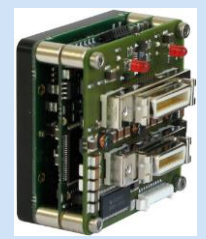


29 x 29 mm MV cameras

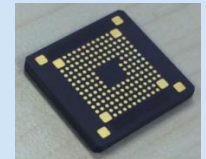
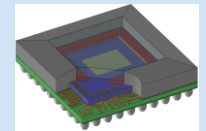


ON Semiconductor ON

Sensor card



Camera Platform



Embedded (Industrial) Vision

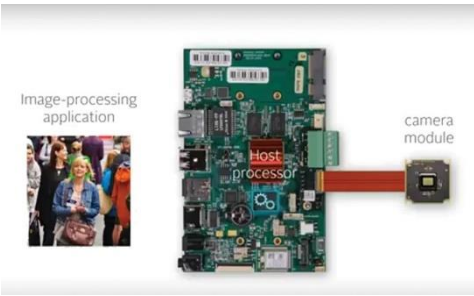
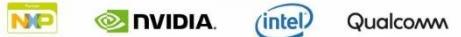


Image-processing application

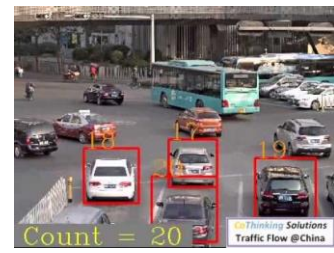
camera module



Application Specific MV (ASMV) systems



ITS



Count = 20 Traffic Flow @China

Provideo / Broadcast / Aerial



Motion Capture Solutions



Confidential

Embedded Machine Vision (incl. AI)

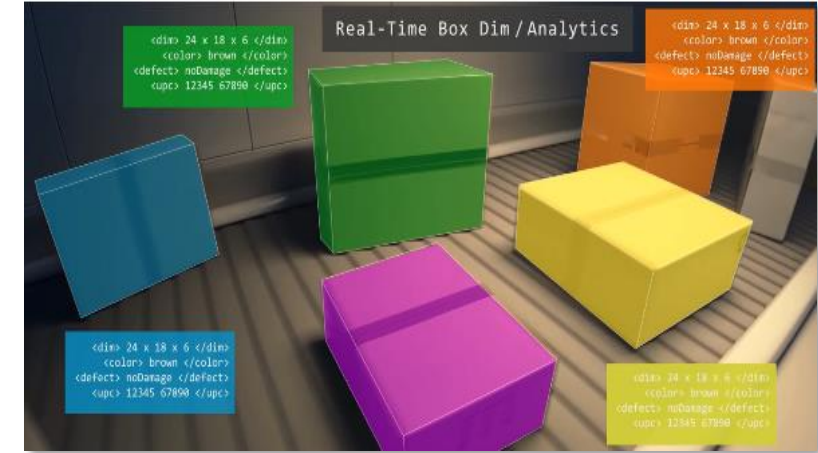
Home Delivery



Object Avoidance



3D mapping



Warehouse Automation



Inventory Tracking



Sensor specifics:

- ❑ Optical format $\leq \frac{1}{2}$ "
- ❑ Very compact package
- ❑ Low cost (< \$15 typically)
- ❑ Low power
- ❑ MIPI – ecosystem – AI

Typically : served by ICSD – BA sensors (e.g. AR0521, AR0821, AR0144)

Occasionally : PYTHON ≤ 5 Mp traction (P7)



Confidential



More Embedded Machine Vision and AI Examples



Unmanned Retail



Unmanned Bank



Cashless Restaurant Cashier



Restaurant Robot



Facial Recognition



Red Light Violation



Wearable Cameras



FriendBot



Car Parking AGV



Logistics Robot



CafeBot



Factory Robots

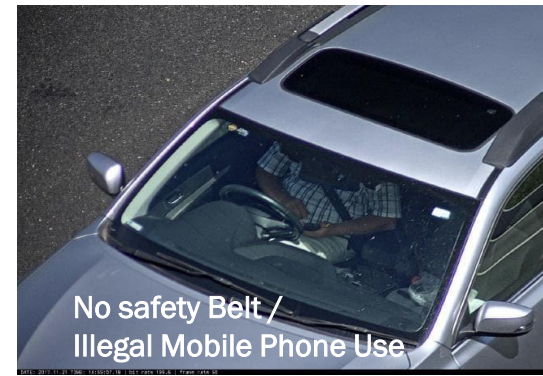
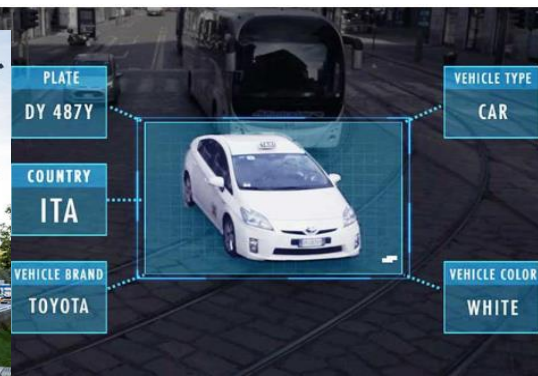


Confidential



ITS: Maximized Optical Performance, Minimized failure rate

Traffic monitoring, w/ or w/o ANPR/identification/tracking



Confidential



ISD Demonstration, Evaluation, and Reference Design Strategy

Demo: Customer Eval/Demo Focus (Eval Kit- Demo3)

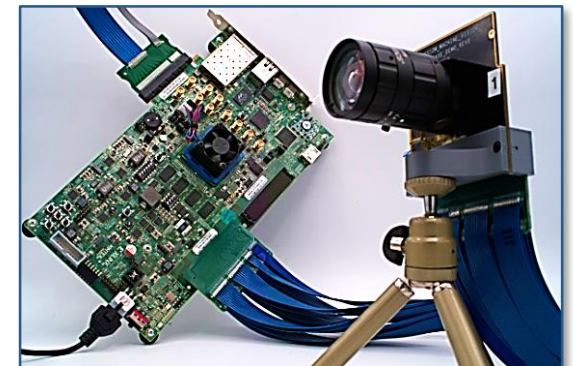
- ISG-wide platform (Demo3/DevWare)
- High imager capture rate (Max fps), Lower display rate (Demo3 USB3 output limited)
- Closed system Software (DevWare)
- Customer/Trade shows demo and image quality evaluation

Development: Distributor Bundling Focused (X-Celerator)

- Enable use of standard FPGA development environments: Xilinx, Altera (Intel),...
- FMC compatible camera head for FPGA development kits
- Max imager lanes/fps enabled, all major silicon
- Public FPGA code (**No SLA required**) software enablement platform

Reference: HW Form Factor restricted end-end implementation (X-Cube)

- Machine Vision Industry Standard form factor (29mm C-Mount, 29mm S-Mount)
- Supports XGS imagers sized up to XGS 16000. 30 fps for XGS 12000 and smaller.
- One Voltage in, PC Data out in a small camera head (power generation, IO conversion)
- “Black box” HiSPi-to-MIPI FPGA code
- Standard PC compatible IO output (USB3)
- DevWare Image capture, processing, and analysis



X-Cube: XGS Reference Design for 29 x 29 mm² Footprint Camera

Included

- XGS 12000 sensor board (color or mono)
- FPGA board to convert to MIPI output
- C-mount lens holder
- Flex cable to IAS module for Demo 3 / DevWare interface

Documentation

- Design files and RTL Code (available today via Image Sensor Portal):

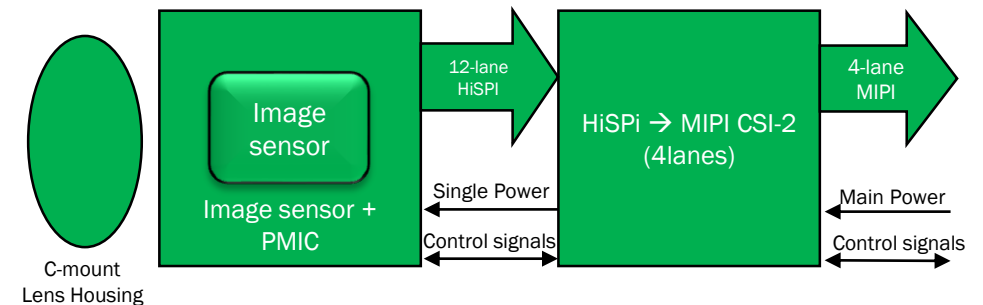
<https://www.onsemi.com/PowerSolutions/myon/erFolder.do?folderId=191640>

X-cube FAE training presentation:

<https://salesconnect.onsemi.com/lesson/view/21337521/X-Cube-Training-iFAE-Sales-Connect-v1-pptx>

Availability

- Hardware on stock at SGDC
- OPNs active in ModelN



- 12-lane XGS 12000 to 4-lane MIPI
- Up to 28 fps
- Master/Slave mode
- Noise floor similar to Demo3
- Single Power supply (PMIC)



X-Celerator: XGS Interface for standard FPGA Eval Environments

Included

- XGS 12000 imager board (color or mono)
- RTL code for Xilinx environment (adaptable to Altera and other FPGAs)
- Flex cable to extend to FMC connector

Documentation

- Design files and RTL Code (available today via Image Sensor Portal):

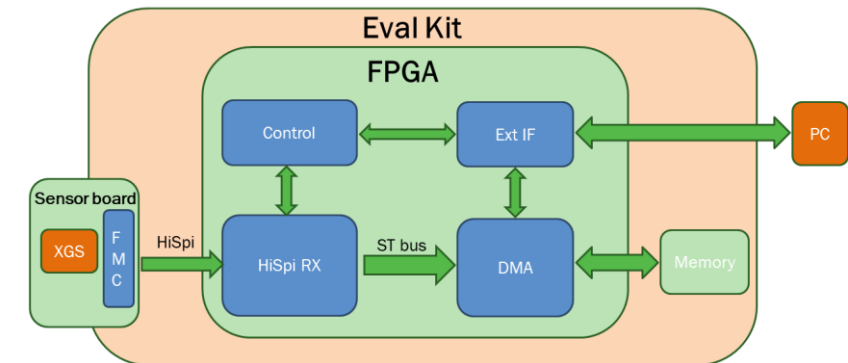
<https://www.onsemi.com/PowerSolutions/myon/erFolder.do?folderId=1191639>

X-Celerator FAE training presentation:

<https://salesconnect.onsemi.com/lesson/view/21337523/X-Celerator-Training-iFAE-Sales-Connect-v1-pptx>

Availability

- Hardware on stock at SGDC
- OPNs active in ModelN:



- Compatible with ANSI / VITA 57.1 FMC standard
- Fits on FMC LPC and HPC, possible to mount on different FPGA dev kits
- All HiSPi data lanes connected
- Only 2 HiSPi clocks (top + bottom)



PYTHON evaluation kits

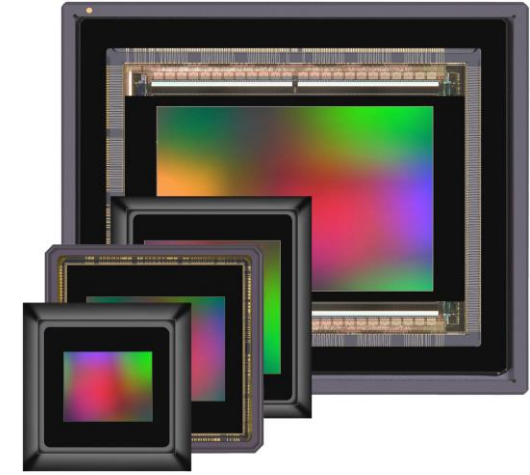
- All PYTHON evaluation kits used to be assembled and tested in Rochester facility, USA.
- End of 2020, ON Semiconductor has shut down the Rochester site
- All inventory of the PYTHON evaluation kits has been transferred to the Mechelen site (Belgium) and will be managed manually.
- Check with the BU for availability

Sensor	Part Number (OPN)	Applicable Sensors
PYTHON480	NOIP1S(E/N)0480A-STI-A-GEVK	PYTHON480
PYTHON1300	NOIP1S(E/N)1300A-QDI-A-GEVK	PYTHON300 PYTHON500 PYTHON1300
PYTHON5000	NOIP1S(E/N)5000A-QDI-A-GEVK	PYTHON2000 PYTHON5000
PYTHON25K	NOIP1S(E/N)025KA-GDI-A-GEVK	PYTHON12K (EOL 2020) PYTHON16K PYTHON25K



Documentation location

- XGS 2000/3000/5000 Product info and Datasheet
<https://www.onsemi.com/PowerSolutions/myon/erFolder.do?folderId=1249428>
(includes Application notes, eval kit info and more)
- XGS 8000/9400/12000 Product info and Datasheet
<https://www.onsemi.com/products/sensors/image-sensors-processors/image-sensors/xgs-12000>
(includes Application notes, eval kit info and more)
- XGS 20000/30000/45000 Product info and Datasheet
<https://www.onsemi.com/PowerSolutions/myon/erFolder.do?folderId=1249425>
(includes Application notes, eval kit info and more)
- XGS 20000/30000/45000 Developer Guide and Optical Defect Specs
<https://www.onsemi.com/PowerSolutions/myon/erFolder.do?folderId=1249425>
- CMOS Image Sensor selection guide:
<https://www.onsemi.com/products/sensors/image-sensors-processors/image-sensors#products>



All XGS documentation is only available via MyOn/Image Sensor Portal, subject to an NDA

