

CAMERA CATALOG AND SENSOR REVIEW

USB
VISION

GiGE
VISION

IO
FireWire

CAMERA
Link

USB
2.0

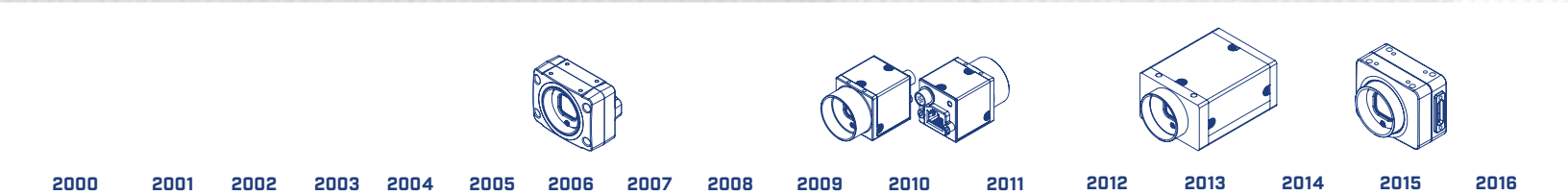
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 **FLIR**[®]

The World's **Sixth Sense**[®]



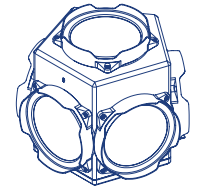
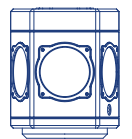
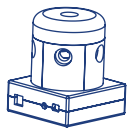
FLIR is a global leader in the design and manufacture of innovative, high-performance digital cameras for industrial, medical and life science, traffic, biometric, GIS, and people counting applications. We offer a unique and comprehensive portfolio of USB3 Vision, GigE Vision, FireWire, and USB 2.0 products known for their outstanding quality, ease of use, and unbeatable price-performance.



2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
First IEEE 1394 stereo vision camera Digiclops	First IEEE 1394 imaging camera Firefly	First spherical vision camera Ladybug	First Flea camera	First IEEE 1394b camera Dragonfly Express	New products Dragonfly2 Ladybug2	New products Flea2 Firefly MV	New products Grasshopper FirePRO	New product USB 2.0 camera Chameleon New product Ladybug3	World's first USB 3.0 Camera	New product Flea3 New product GigE camera Grasshopper2	First Camera Link camera Gazelle First USB 3.0 camera Flea3 World's smallest GigE camera Flea3 New product Grasshopper Express	New Product IP camera Zebra2 World's Smallest PoE GigE Camera Blackfly	New USB3 products Ladybug5 Grasshopper3	New USB3 product Blackfly USB 3.0 New GigE product Grasshopper3	New USB3 product Chameleon 3	New USB3 and GigE Vision product Blackfly S

QUICK FACTS

- FLIR acquired Point Grey in Nov 2016
- **ISO 9001:2008** registered
- **200k/yr** machine vision camera capacity
- Designed and manufactured in **Canada**
- **3 year warranty** on most products
- **Global offices** & distribution network





USB 3.0 Camera Features:

- Largest selection of CCD and CMOS sensors
- FPGA and frame buffer-based architecture for optimal reliability
- Proprietary USB 3.0 link layer and driver stack
- Industry-standard C- and CS- mount
- Fully tested USB 3.0 accessories: interface cards, hubs, and cables



BLACKFLY[®]S

TRUE IMAGE CAPTURE



CHAMELEON[®]3

FLEXIBLE FORM FACTOR



Model#	Sensor Specifications	Shutter	Max Res	Max FPS	Model#	Sensor Specifications	Shutter	Max Res	Max FPS
BFS-U3-13Y3C/M-C	1.3MP ON Semi PYTHON 1300 CMOS	1/2" 4.8µm Global	1280 x 1024	170 fps	CM3-U3-13S2C/M-CS	1.3MP Sony ICX445 CCD**	1/3" 3.75µm Global	1288 x 964	30 fps
BFS-U3-32S4C/M-C	3.2MP Sony IMX252 CMOS*	1/1.8" 3.45µm Global	2048 x 1536	118 fps	CM3-U3-13S2C/M-CS-BD	1.3MP Sony ICX445 CCD**	1/3" 3.75µm Global	1288 x 964	30 fps
BFS-U3-51S5C/M-C	5.0MP Sony IMX250 CMOS*	2/3" 3.45µm Global	2464 x 2048	75 fps	CM3-U3-13Y3C/M-CS	1.3MP ON Semi PYTHON 1300 CMOS	1/2" 4.8µm Global	1280 x 1024	149 fps
BFS-U3-63S4C/M-C ¹	6.3MP Sony IMX178 CMOS**	1/1.8" 2.4µm Rolling	3072 x 2064	60 fps	CM3-U3-13Y3C/M-S-BD	1.3MP ON Semi PYTHON 1300 CMOS	1/2" 4.8µm Global	1280 x 1024	149 fps
BFS-U3-89S6C/M-C ¹	8.9MP Sony IMX255 CMOS*	1" 3.45µm Global	4096 x 2160	43 fps	CM3-U3-28S4C/M-CS	2.8MP Sony ICX818 CCD**	1/1.8" 3.69µm Global	1928 x 1448	13 fps
BFS-U3-123S6C/M-C ¹	12.3MP Sony IMX253 CMOS*	1.1" 3.45µm Global	4096 x 3000	30 fps	CM3-U3-31S4C/M-CS ¹	3.2MP Sony IMX265 CMOS*	1/1.8" 3.45µm Global	2048 x 1536	55 fps
BFS-U3-200S6C/M-C ¹	20MP Sony IMX183 CMOS**	1" 2.4µm Rolling	5472 x 3648	18 fps	CM3-U3-50S5C/M-CS ¹	5.0MP Sony IMX264 CMOS*	2/3" 3.45µm Global	2448 x 2048	35 fps

¹Coming Soon *High performance Sony Pregius* Global Shutter CMOS **Low Light Sensitivity Sony STARVIS** CMOS ***Sony Exmor R** CMOS **High performance Sony Pregius** Global Shutter CMOS ***High sensitivity Sony ExView HAD CCD**

	BLACKFLY [®] S	CHAMELEON [®] 3
INTERFACE	USB 3.0 interface with screw locks for camera control, data, and power	USB 3.0 interface with screw locks for camera control, data, and power
GPIO	6-pin Hirose HR10A-7R-6PB GPIO connector for trigger, strobe, and power. 1 opto-isolated input, 1 opto-isolated output. 1 bi-directional I/O pin, 1 input pin.	9-pin JST GPIO connector, 4 pins for trigger and strobe, 1 pin +3.3 V, 1 VEXT pin for external power 1 opto-isolated input, 1 opto-isolated output
ADC	12-bit • 10-bit (BFS-U3-13Y3) • 10/14-bit (BFS-U3-63S4)	12-bit • 10-bit (CM3-U3-13Y3)
IMAGE DATA FORMATS	Mono8, Mono16, Bayer8, Bayer16, RGB8, YCbCr8, YCbCr411_8, YCbCr422_8	Y8, Y16, Mono8, Mono12, Mono16 (all models) RGB8, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)
PARTIAL IMAGE MODES	Pixel binning and region of interest (ROI) modes	Pixel binning and region of interest (ROI) modes
GAMMA	0.50 to 4.00, programmable lookup table	0.50 to 4.00, programmable lookup table
TRIGGER MODES	External trigger and software trigger	Standard, bulb, multi-shot, overlapped, low smear mode (CCD models only)
IMAGE BUFFER	240 MB	16 MB frame buffer
USER SETS	2 memory channels for custom camera settings	2 memory channels for custom camera settings
SIZE (WxHxD)	29 x 29 x 30 mm excluding lens holder (metal case)	44 x 35 x 19.5 mm excluding lens holder (metal case)
MASS	36g (Without optics or tripod mounting bracket)	55g (Without optics or tripod mounting bracket)
POWER	8-24 V via GPIO or 5 V via USB 3.0 interface, <3 W	5 V, <3 W, via GPIO or USB 3.0 interface
LENS MOUNT	C-mount	CS-mount
TEMPERATURE	-30° to 60°C (storage) • 0° to 50°C (operating)	-30° to 60°C (storage) • 0° to 45°C (operating)
WARRANTY	3 years	3 years



BLACKFLY®

PERFORMANCE AND VALUE



FLEA3®

ULTRA-COMPACT, ULTRA-FAST CMOS



Model#	Sensor Specifications	Shutter	Max Res	Max FPS	Model#	Sensor Specifications	Shutter	Max Res	Max FPS
BFLY-U3-03S2C/M-CS	0.3MP Sony ICX424 CCD 1/3" 7.4 µm Global	648 x 488	84 fps		FL3-U3-13S2C/M-CS	1.3MP Sony IMX035 CMOS* 1/3" 3.63 µm Rolling	1328 x 1048	120 fps	
BFLY-U3-05S2C/M-CS	0.5MP Sony ICX693 CCD 1/3" 6.0 µm Global	808 x 608	50 fps		FL3-U3-13Y3M-C	1.3MP ON Semi VITA 1300 CMOS 1/2" 4.8 µm Global	1280 x 1024	150 fps	
BFLY-U3-13S2C/M-CS	1.3MP Sony ICX445 CCD** 1/3" 3.75 µm Global	1288 x 964	30 fps		FL3-U3-13E4C/M-C	1.3MP e2v EV76C560 CMOS 1/1.8" 5.3 µm Global	1280 x 1024	60 fps	
BFLY-U3-20S4C/M-CS	2.0MP Sony ICX274 CCD** 1/1.8" 4.4 µm Global	1624 x 1224	15 fps		FL3-U3-20E4C/M-C	2.0MP e2v EV76C5706F CMOS 1/1.8" 4.5 µm Global	1600 x 1200	59 fps	
BFLY-U3-23S6C/M-C	2.3MP Sony IMX249 CMOS* 1/1.2" 5.86 µm Global	1920 x 1200	41 fps		FL3-U3-32S2C/M-CS	3.2MP Sony IMX036 CMOS* 1/2.8" 2.5 µm Rolling	2080 x 1552	60 fps	
BFLY-U3-50H5C/M-C	5.0MP Sharp R132S4/S3AA00T 2/3" 3.45 µm Global	2448 x 2048	7.5 fps		FL3-U3-120S3C-C	12MP Sony IMX172 CMOS** 1/2.3" 1.55 µm Rolling	4000 x 3000	15 fps	

*High performance Sony Pregius™ Global Shutter CMOS **High sensitivity Sony EXview HAD CCD*

*High performance Sony Exmor CMOS™

**Low Light Sensitivity Sony STARVIS™ CMOS

USB 3.0 interface with screw locks for camera control, data, and power

6-pin Hirose HR10A-7R-6PB GPIO connector for trigger, strobe, and power. 1 opto-isolated input, 1 opto-isolated output

12-bit

Y8, Y16, Mono8, Mono12, Mono16 (all models)
RGB8, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)

Pixel binning and region of interest (ROI) modes

0.50 to 4.00, programmable lookup table

Standard, bulb, multi-shot, overlapped, low smear mode (CCD models only)

16 MB frame buffer

2 memory channels for custom camera settings

29 x 29 x 30 mm excluding lens holder (metal case)

36g (Without optics or tripod mounting bracket)

5 V, <3 W, via GPIO or USB 3.0 interface

CS-mount, C-mount

-30° to 60°C (storage) • 0° to 45°C (operating)

3 years

USB 3.0 interface with screw locks for camera control, data, and power

8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O:
1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins

12-bit (FL3-U3-13S2, FL3-U3-32S2, FL3-U3-88S2) / 10-bit (FL3-U3-13Y3, FL3-U3-13E4, FL3-U3-20E4)

Y8, Y16, Mono8, Mono12, Mono16 (all models)
RGB8, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)

Pixel binning and region of interest (ROI) modes

0.50 to 4.00, programmable lookup table

Standard, bulb (except FL3-U3-13E4, FL3-U3-20E4), multi-shot

32 MB frame buffer

2 memory channels for custom camera settings

29 x 29 x 30 mm excluding lens holder (metal case)

41 g (Without optics or tripod mounting bracket)

5-24 V via GPIO or 5 V via USB 3.0, <3 W

CS-mount, C-mount

-30° to 60°C (storage) • 0° to 45°C (operating)

3 years

INTERFACE

GPIO

ADC

IMAGE DATA FORMATS

PARTIAL IMAGE MODES

GAMMA

TRIGGER MODES

IMAGE BUFFER

USER SETS

SIZE (WxHxD)

MASS

POWER

LENS MOUNT

TEMPERATURE

WARRANTY



GRASSHOPPER[®] 3

HIGH PERFORMANCE CCD AND CMOS



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
GS3-U3-14S5C/M-C	1.4MP Sony ICX285 CCD	2/3" 6.45 μm Global	1384 x 1036	30 fps
GS3-U3-15S5C/M-C	1.4MP Sony ICX825 CCD	2/3" 6.45 μm Global	1384 x 1036	45 fps
GS3-U3-23S6C/M-C	2.3MP Sony IMX174 CMOS*	1/1.2" 5.86 μm Global	1920 x 1200	163 fps
GS3-U3-28S4C/M-C	2.8MP Sony ICX687 CCD**	1/1.8" 3.69 μm Global	1928 x 1448	26 fps
GS3-U3-28S5C/M-C	2.8MP Sony ICX674 CCD**	2/3" 4.54 μm Global	1920 x 1440	26 fps
GS3-U3-32S4C/M-C	3.2MP Sony IMX252 CMOS*	1/1.8" 3.45 μm Global	2048 x 1536	121 fps
GS3-U3-41S4C/M-C	4.1MP Sony ICX808 CCD**	1/1.8" 3.1 μm Global	2016 x 2016	18 fps
GS3-U3-41C6NIR-C	4.1MP CMOSIS CMV4000-3E12 CMOS	1" 5.5 μm Global	2048 x 2048	90 fps
GS3-U3-41C6C/M-C	4.1MP CMOSIS CMV4000-3E5 CMOS	1" 5.5 μm Global	2048 x 2048	90 fps
GS3-U3-50S5C/M-C	5.0MP Sony ICX625 CCD	2/3" 3.45 μm Global	2448 x 2048	15 fps
GS3-U3-51S5C/M-C	5.0MP Sony IMX250 CMOS*	2/3" 3.45 μm Global	2448 x 2048	75 fps
GS3-U3-60S6C/M-C	6.0MP Sony ICX694 CCD**	1" 4.54 μm Global	2736 x 2192	13 fps
GS3-U3-60S6C/M-C	6.0MP Sony ICX694 CCD**	1" 4.54 μm Global	2736 x 2192	25 fps
GS3-U3-89S6C/M-C	8.9MP Sony IMX255 CMOS*	1" 3.45 μm Global	4096 x 2160	43 fps
GS3-U3-91S6C/M-C	9.1MP Sony ICX814 CCD**	1" 3.69 μm Global	3376 x 2704	9 fps
GS3-U3-120S6C/M-C	12MP Sony ICX834 CCD**	1" 3.1 μm Global	4240 x 2824	7 fps
GS3-U3-123S6C/M-C	12.3MP Sony IMX253 CMOS*	1.1" 3.45 μm Global	4096 x 3000	30 fps

*High performance Sony Pregius™ Global Shutter CMOS **High sensitivity Sony EXview HAD CCD II*

- INTERFACE** USB 3.0 interface with screw locks for camera control, data, and power
- GPIO** 8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O: 1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins
- ADC** 14-bit • 10/12-bit (GS3-U3-23S6, 32S4, 51S5, 89S6, 123S6) • 10-bit (GS3-U3-41C6)
- IMAGE DATA FORMATS** Mono8, Mono12, Mono16 (all models) RGB, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)
- PARTIAL IMAGE MODES** Pixel binning and region of interest (ROI) modes
- GAMMA** 0.50 to 4.00, programmable lookup table
- TRIGGER MODES** Standard, bulb, multi-shot, overlapped, low smear mode (CCD models only)
- IMAGE BUFFER** 128 MB frame buffer
- USER SETS** 2 memory channels for custom camera settings
- SIZE (WxHxD)** 44 x 29 x 58 mm excluding lens holder (metal case)
- MASS** 90 g (Without optics or tripod mounting bracket)
- POWER** 5 V via USB 3.0 or 8-24 V via GPIO (external power is recommended for this model)
- LENS MOUNT** C-mount
- TEMPERATURE** -30° to 60°C (storage) • 0° to 50°C (operating)
- WARRANTY** 3 years





GigE Camera Features:

- Unique selection of CCD and CMOS sensors
- Supports GigE Vision 1.2
- Industry's most compact sizes
- GigE image filter driver for reduced latency and maximized bandwidth
- Firmware versions updatable in the field
- On-board temperature, power sensors, and status LED

BLACKFLY[®] S

TRUE IMAGE CAPTURE



BLACKFLY[®]

WORLD'S SMALLEST POE CAMERA



Model#	Sensor Specifications	Shutter	Max Res	Max FPS	Model#	Sensor Specifications	Shutter	Max Res	Max FPS
BFS-PGE-13Y3C/M-C ¹	1.3MP ON Semi PYTHON 1300 CMOS 1/2"	4.8 μm Global	1280 x 1024	84 fps	BFLY-PGE-03S2C/M-CS	0.3MP Sony ICX424 CCD 1/3"	7.4 μm Global	648 x 488	84 fps
BFS-PGE-31S4C/M-C ¹	3.2MP Sony IMX265 CMOS ²	1/1.8" 3.45 μm Global	2048 x 1536	35 fps	BFLY-PGE-03S3C/M-CS	0.3MP Sony ICX414 CCD 1/2"	9.9 μm Global	648 x 488	90 fps
BFS-PGE-50S5C/M-C ¹	5.0MP Sony IMX264 CMOS ²	2/3" 3.45 μm Global	2448 x 2048	24 fps	BFLY-PGE-05S2C/M-CS	0.5MP Sony ICX693 CCD 1/3"	6.0 μm Global	808 x 608	50 fps
					BFLY-PGE-09S2C/M-CS	0.9MP Sony ICX692 CCD ³	1/3" 4.08 μm Global	1288 x 728	30 fps
					BFLY-PGE-12A2C/M-CS	1.2MP Aptina AR0134 CMOS 1/3"	3.75 μm Global	1280 x 960	52 fps
					BFLY-PGE-13S2C/M-CS	1.3MP Sony ICX445 CCD ³	1/3" 3.75 μm Global	1288 x 964	30 fps
					BFLY-PGE-13H2C/M-CS	1.3MP Sharp RJ33J3/RJ33J4 CCD 1/3"	3.75 μm Global	1288 x 964	30 fps
					BFLY-PGE-13E4C/M-CS	1.3MP e2v EV76C560 CMOS 1/1.8"	5.3 μm Global	1280 x 1024	60 fps
					BFLY-PGE-14S2C-CS	1.4MP Sony IMX104 CMOS 1/3"	3.75 μm Rolling	1296 x 1032	60 fps
					BFLY-PGE-20E4C/M-CS	2.0MP e2v EV76C570 CMOS 1/1.8"	4.5 μm Global	1600 x 1200	50 fps
					BFLY-PGE-23S2C-CS	2.3MP Sony IMX136 CMOS 1/2.8"	2.8 μm Rolling	1920 x 1200	27 fps
					BFLY-PGE-23S6C/M-C	2.3MP Sony IMX249 CMOS ⁴	1/1.2" 5.86 μm Global	1920 x 1200	41 fps
					BFLY-PGE-31S4M/C-C ¹	3.2MP Sony IMX265 CMOS ⁴	1/1.8" 3.45 μm Global	2048 x 1536	35 fps
					BFLY-PGE-50A2C/M-CS	5.0MP Aptina MT9P006/031 CMOS 1/2.5"	2.2 μm Rolling	2592 x 1944	13 fps
					BFLY-PGE-50H5C/M-C	5.0MP Sharp RJ32S4/S3AAODT CCD 2/3"	3.45 μm Global	2448 x 2048	7.5 fps
					BFLY-PGE-50S5M/C-C ¹	5.0MP Sony IMX264 CMOS ⁴	2/3" 3.45 μm Global	2448 x 2048	22 fps

¹Coming Soon

²High performance Sony Pregius[™] Global Shutter CMOS

³High sensitivity Sony EXview HAD CCD[™] ⁴High sensitivity Sony EXview HAD CCD II[™] ⁵High performance Sony Pregius[™] Global Shutter CMOS

Gigabit Ethernet interface with screw locks for camera control and data; Power over Ethernet
 6-pin Hirose HR10A-7R-6PB GPIO connector for trigger, strobe, and power. 1 opto-isolated input, 1 opto-isolated output. 1 bi-directional I/O pin, 1 input pin.
 12-bit • 10-bit (BFS-PGE-13Y3)
 Mono8, Mono16, Bayer8, Bayer16, RGB8, YCbCr8, YCbCr411_8, YCbCr422_8
 Pixel binning and region of interest (ROI) modes
 0.50 to 4.00, programmable lookup table
 External trigger and software trigger
 240 MB
 2 memory channels for custom camera settings
 29 x 29 x 30 mm excluding lens holder (metal case)
 36g (Without optics or tripod mounting bracket)
 Standard voltage via Power over Ethernet (PoE) or 8 - 24 V via GPIO interface, < 2.5 W
 C-mount
 -30° to 60°C (storage) • 0° to 50°C (operating)
 3 years

Gigabit Ethernet interface with screw locks for camera control and data; Power over Ethernet
 6-pin Hirose HR10A-7R-6PB GPIO connector for trigger, strobe, and power. 1 opto-isolated input, 1 opto-isolated output
 10-bit (BFLY-PGE-13E4, BFLY-PGE-20E4) • 12-bit
 Mono8, Mono12, Mono16, Raw8, Raw12, Raw16 (all models) / RGB, YUV411, YUV422, YUV 444 (color models)
 Pixel binning and region of interest (ROI) modes
 0.50 to 4.00, programmable lookup table
 Standard, bulb (except BFLY-PGE-05S2, BFLY-PGE-09S2, BFLY-PGE-12A2, BFLY-PGE-13E4, BFLY-PGE-20E4) overlapped (except BFLY-PGE-12A2, BFLY-PGE-13E4, BFLY-PGE-14S2, BFLY-PGE-20E4, BFLY-PGE-50A2), multi-shot, low smear mode (CCD models only)
 16 MB frame buffer
 2 memory channels for custom camera settings
 29x29x30 mm excluding lens holder, without optics (metal case)
 36 grams (without optics or tripod mounting bracket)
 Standard voltage via Power over Ethernet (PoE) or 5 - 24 V via GPIO interface, < 2.5 W
 CS-mount (5 mm C-mount adapter sold separately) / C-mount
 -30° to 60°C (storage) • 0° to 45°C (operating)
 3 years

INTERFACE
GPIO
ADC
IMAGE DATA FORMATS
PARTIAL IMAGE MODES
GAMMA
TRIGGER MODES
IMAGE BUFFER
USER SETS
SIZE (WxHxD)
MASS
POWER
LENS MOUNT
TEMPERATURE
WARRANTY



FLEA³

WORLD'S SMALLEST GIGE CAMERA



GRASSHOPPER³

POE, FAST, HIGH-RESOLUTION IMAGING



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
FL3-GE-03S1C/M-C	0.3MP Sony ICX618 CCD	1/4" 5.6 μm Global	648 x 488	120 fps
FL3-GE-03S2C/M-C	0.3MP Sony ICX424 CCD	1/3" 7.4 μm Global	648 x 488	82 fps
FL3-GE-08S2C/M-C	0.8MP Sony ICX204 CCD	1/3" 4.65 μm Global	1032 x 776	31 fps
FL3-GE-13S2C/M-C/CS	1.3MP Sony ICX445 CCD	1/3" 3.75 μm Global	1288 x 964	31 fps
FL3-GE-14S3C/M-C	1.4MP Sony ICX267 CCD	1/2" 4.65 μm Global	1384 x 1032	18 fps
FL3-GE-20S4C/M-C	2.0MP Sony ICX274 CCD	1/1.8" 4.4 μm Global	1624 x 1224	15 fps
FL3-GE-28S4C/M-C	2.8MP Sony ICX687 CCD**	1/1.8" 3.69 μm Global	1928 x 1448	14 fps
FL3-GE-50S5C/M-C	5.0MP Sony ICX655 CCD	2/3" 3.45 μm Global	2448 x 2048	8 fps

*High sensitivity Sony EXview HAD CCD™ **High sensitivity Sony EXview HAD CCD II™

Model#	Sensor Specifications	Shutter	Max Res	Max FPS
GS3-PGE-23S6C/M-C	2.3MP Sony IMX174 CMOS	1/1.2" 5.86 μm Global	1920 x 1200	45 fps
GS3-PGE-50S5C/M-C	5.0MP Sony ICX625 CCD	2/3" 3.45 μm Global	2448 x 2048	15 fps
GS3-PGE-60S6C/M-C	6.0MP Sony ICX694 CCD**	1" 4.54 μm Global	2736 x 2192	13 fps
GS3-PGE-91S6C/M-C	9.1MP Sony ICX814 CCD**	1" 3.69 μm Global	3376 x 2704	9 fps

*High performance Sony Exmor CMOS**High sensitivity Sony EXview HAD CCD II™

	FLEA ³	GRASSHOPPER ³
INTERFACE	Gigabit Ethernet interface with screw locks for camera control and data	Gigabit Ethernet interface with screw locks for camera control and data; Power over Ethernet
GPIO	8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O, 1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins	8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O 1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins
ADC	12-bit	10/12-bit (GS3-PGE-23S6) • 14-bit
IMAGE DATA FORMATS	Y8, Y16, Mono8, Mono12, Mono16 (all models) / RGB, YUV411, YUV422, YUV 444, Raw8, Raw12, Raw16 (color models)	Mono8, Mono12, Mono16 (all models) RGB, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)
PARTIAL IMAGE MODES	Pixel binning and region of interest (ROI) modes	Pixel binning and region of interest (ROI) modes
GAMMA	0.50 to 4.00, programmable lookup table	0.50 to 4.00, programmable lookup table
TRIGGER MODES	Standard, bulb, skip frames, multi-exposure preset, multi-exposure pulse width, overlapped, multi-shot	Standard, bulb, overlapped, multi-shot, low smear mode (CCD models only)
IMAGE BUFFER	32 MB frame buffer	128 MB frame buffer
USER SETS	2 memory channels for custom camera settings	2 memory channels for custom camera settings
SIZE (WxHxD)	29x29x30 mm excluding lens holder, without optics (metal case)	44x29x58 mm excluding lens holder and connectors (metal case)
MASS	38 grams (without optics or tripod mounting bracket)	90 grams (without optics or tripod mounting bracket)
POWER	Standard voltage via Power over Ethernet (PoE) or 5 - 24 V via GPIO interface, < 2.5 W	Standard voltage via Power over Ethernet (PoE) or 5 - 24 V via GPIO interface, < 2.5 W
LENS MOUNT	C-mount (FL3-GE-13S2 also available with CS-mount)	C-mount
TEMPERATURE	-30° to 60°C (storage) • 0° to 45°C (operating)	-30° to 60°C (storage) • 0° to 50°C (operating)
WARRANTY	3 years	3 years





USB 2.0 Camera Features:

- Cost effective
- Industry-standard CS- mount
- Includes CS-C 5 mm adapter
- Firmware versions updatable in the field
- On-board temperature, power sensors, and status LED
- Board-level and custom options available for OEMs

CHAMELEON®

COMPACT, COST EFFECTIVE, CCD QUALITY



FIREFLY® MV

SMALL, AFFORDABLE, VERSATILE CMOS



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
MLN-13S2C/M-CS	1.3MP Sony ICX445 CCD* 1/3" 3.75 µm Global	1296 x 964	18 fps	

*High sensitivity Sony EXview HAD CCD™

Model#	Sensor Specifications	Shutter	Max Res	Max FPS
FMVU-03MTC/M-CS	0.3MP Micron MT9V022 CMOS 1/3" 6.0 µm Global	752 x 480	60 fps	
FMVU-13S2C-CS	1.3MP Sony IMX035 CMOS* 1/3" 3.63 µm Rolling	1328 x 1048	23 fps	

*High speed Sony Exmor™ CMOS

Mini-B USB2.0 for camera control, video data, and power

Mini-B USB2.0 for camera control, video data, and power

INTERFACE

7-pin JST GPIO connector, 4 pins for trigger and strobe, 1 pin +3.3 V, 1 VEXT pin for external power

7-pin JST GPIO connector, 4 pins for trigger and strobe, 1 pin +3.3 V, 1 VEXT pin for external power

GPIO

12-bit
Y8, Y16 (mono)
8-bit and 16-bit Raw Bayer data (color)
Pixel binning and region of interest (ROI) modes
0.50 to 4.00, programmable lookup table
Standard, bulb, skip frames, overlapped
N/A
2 memory channels for custom camera settings

10-bit (FMVU-03MT) • 10/12-bit (FMVU-13S2)
Y8, Y16 (mono)
8-bit and 16-bit raw Bayer data (color)
Pixel binning and region of interest (ROI) modes
0 to 1 (FMVU-03MT)/0.50 to 4.00 (FMVU-13S2)
Standard, skip frames
N/A
2 memory channels for custom camera settings

ADC
IMAGE DATA FORMATS
PARTIAL IMAGE MODES
GAMMA
TRIGGER MODES
IMAGE BUFFER
USER SETS

39x31mm (board level) / 25.5x44x41 mm excluding lens holder, without optics (plastic case)
22 g (board level) / 37 g (plastic case) (without optics or tripod mounting bracket)
2 W, 4.745 to 5.25 V via USB 2.0 interface or JST 7-pin GPIO connector
CS-mount (5 mm C-mount adapter included)
-30° to 60°C (storage) • 0° to 45°C (operating)
1 year

39x24 mm (board level) / 24.4x44x34 mm excluding lens holder, without optics (plastic case)
14 g (board level) / 37 g (plastic case) (without optics or tripod mounting bracket)
8-30 V, 1 W at 12 V via 1394a interface
CS-mount
-30° to 60°C (storage) • 0° to 45°C (operating)
1 year

SIZE (WxHxD)
MASS
POWER
LENS MOUNT
TEMPERATURE
WARRANTY





IEEE 1394 Camera Features:

- Compact sizes including board level options
- Supports IIDC v1.32
- Industry-standard C-mount
- Firmware versions updatable in the field
- On-board temperature, power sensors, and status LED
- Automatic synchronization



Camera Link Camera Features:

- 2 SDR connectors with screw locks
- Industry-standard C-mount
- 8- and 10-bit image modes
- Firmware versions updatable in the field
- On-board temperature, power sensors, and status LED

FLEA³

ULTRA-COMPACT, CCD FAMILY



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
FL3-FW-03S1C/M-C	0.3MP Sony ICX618 CCD* 1/4" 5.6 μm	Global	648 x 488	120 fps
FL3-FW-03S3C/M-C	0.3MP Sony ICX414 CCD 1/2" 9.9 μm	Global	648 x 488	76 fps
FL3-FW-14S3C/M-C	1.4MP Sony ICX267 CCD 1/2" 4.65 μm	Global	1384 x 1032	16 fps
FL3-FW-20S4C/M-C	2.0MP Sony ICX274 CCD 1/1.8" 4.4 μm	Global	1624 x 1224	15 fps

*High sensitivity Sony EXview HAD CCD *

GAZELLE[®]

HIGH RESOLUTION, FAST FRAME RATES



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
GZL-CL-22C5M-C	2.2MP CMOSIS CMV2000 CMOS 2/3" 5.5 μm	Global	2048 x 1088	280 fps
GZL-CL-41C6M-C	4.1MP CMOSIS CMV4000-2E5 CMOS 1" 5.5 μm	Global	2048 x 2048	150 fps

INTERFACE IEEE 1394b interface with screw locks for camera control, data, and power

Camera Link LVDS for camera control and video data transmission. Base (2-tap) and Full (8-tap) configurations

GPIO 8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O, 1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins

8-pin Hirose HR25 GPIO connector; opto-isolated pins for trigger and strobe

ADC 12-bit

10-bit

IMAGE DATA FORMATS Y8, Y16 (all models)
RGB, YUV411, YUV422, Raw8, Raw16 (color models)

Mono8, Mono10

PARTIAL IMAGE MODES Pixel binning and region of interest (ROI) modes

Single or multiple region of interest modes

GAMMA 0.50 to 4.00, programmable lookup table

N/A

TRIGGER MODES Standard, bulb, skip frames, overlapped, multiple exposure, multi-shot

Single-shot, bulb, software trigger

IMAGE BUFFER 32 MB frame buffer

N/A

USER SETS 2 memory channels for custom camera settings

2 memory channels for custom camera settings

SIZE (WxHxD) 29x29x30 mm excluding lens holder, without optics (metal case)

44x29x59.5 mm excluding lens holder, without optics (metal case)

MASS 58 g (without optics or tripod mounting bracket)

90 g (without optics or tripod mounting bracket)

POWER 8-30 V, <2.5 W via GPIO or 1394b interface

12 V, 6 W at 12 V

LENS MOUNT C-mount

C-mount

TEMPERATURE -30° to 60°C (storage) • 0° to 45°C (operating)

-30° to 60°C (storage) • -10° to 50°C (operating)

WARRANTY 3 years

3 years



SPINNAKER SDK

SPINNAKER SDK IS A GENICAM3 API LIBRARY BUILT FOR MACHINE VISION DEVELOPERS. It features an intuitive SpinView GUI, rich example code, and comprehensive documentation designed to help you build your application faster. Spinnaker is recommended for new projects.

BUILD FASTER

Engineered for faster development into your application and better forward compatibility.

ACCELERATED INTEGRATION

Unlock the power of GenICam3. Quickly build your own software and have UI customizations. Minimize future development time with Spinnaker's API forward compatibility.

DYNAMIC FEATURES

Simplify and improve performance by enabling camera events, imaging sequencer and programmable logic. Use chunk data to gather image metadata and validate system performance.

TRANSMISSION RELIABILITY

Superior image transfer control and bandwidth management offers greater flexibility and insight into all transmission pipeline layers. Review detailed diagnostics and take command of our advanced logging functionality.

MULTIPLE PLATFORM

- **WINDOWS**® 32/64-bit
XP, 7, 8, 10 
- **LINUX**®
Ubuntu® 32/64-bit
ARM*
*Coming Soon 

MULTIPLE INTERFACES



This SDK provides the same programming interface across USB3 Vision and GigE Vision cameras.

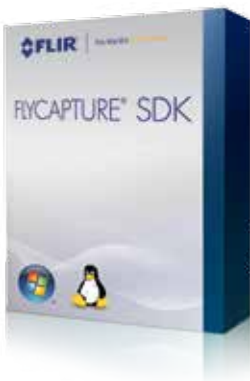
MULTIPLE LANGUAGES

- **C, C++, C#**
- **Visual Basic .NET**
- **DirectShow**
- **Cognex**

FLYCAPTURE SDK

THE FLYCAPTURE SOFTWARE DEVELOPMENT KIT (SDK) provides a common software interface to control and acquire images from FLIR USB 3.0*, GigE, FireWire, and USB 2.0 cameras using the same API under 32- or 64-bit Windows or Linux. FlyCapture supports ActiveX and DirectShow interfaces, and includes the FirePRO low-level 1394b interface driver, enhanced USB 3.0 interface driver, and the GigE image filter driver. A complete software API library, ready-to-use demo programs, and comprehensive source code examples enable users to easily build custom imaging applications.



*Excluding Blackfly S camera



KEY FEATURES

- Proprietary USB 3.0 and FireWire driver stacks for robust diagnostics and, with complete end-to-end control, faster issue resolution
- GigE image filter driver for reduced latency and dropped frames, and maximized bandwidth
- Support for IIDC 1.32 features such as frame buffering and lookup table functionality
- OpenGL and Direct 2D support for better display performance and CPU usage
- Managed interface to decrease development time
- Simple (API) - only 3 function calls required to grab an image
- Example programs and source code

MULTIPLE PLATFORMS

- **WINDOWS**® 32/64-bit
XP, 7, 8, 10 
- **LINUX**®
Ubuntu® 32/64-bit
Arm 32/64 bit 
- **macOS** (API only)

MULTIPLE INTERFACES



The SDK provides the same programming interface across USB 3.0*, USB 2.0, GigE and FireWire products.

MULTIPLE LANGUAGES

- **C, C++, C#**
- **Visual Basic .NET**
- **ActiveX**
- **DirectShow**
- **Python**

The compact, cost-effective Cricket IP camera uses high resolution Sony CMOS Exmor sensors for exceptional sensitivity and excellent dynamic range.

CRICKET® IP CAMERA

HD WDR, 60 FPS, IP SECURITY CAMERA*



Model#	Sensor Specifications	Shutter	Max Res	Max FPS
CR-POE-13S2C-CS	1.3MP Sony IMX139 CMOS 1/3"	Rolling	1280 x 1024	60 fps
CR-POE-20S2C-CS	2.0MP Sony IMX140 CMOS 1/2.8"	Rolling	1920 x 1080	60 fps
CR-POE-20S3C-CS	2.0MP Sony IMX185 CMOS 1/2"	Rolling	1920 x 1080	60 fps

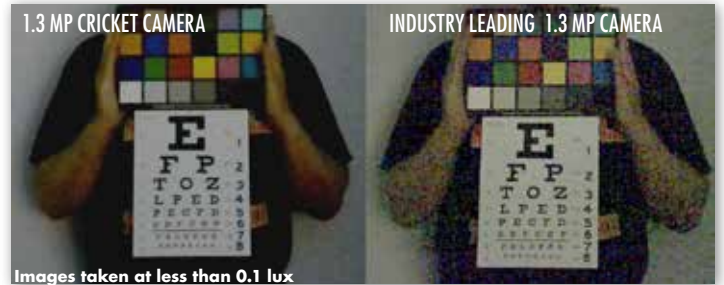
INTERFACE	RJ45 100Base-TX for data and power (PoE), 4-pin DC auto-iris connector
LIGHT SENSITIVITY/ MINIMUM ILLUMINATION	0.1 lux, F1.2 at 30 FPS, 1/30 second shutter
DYNAMIC RANGE	120 dB (CR-POE-13S2), 90 dB (CR-POE-20S2) in 4 image WDR mode
LENS TYPE	CS-mount, DC Auto Iris (optional)
COMPRESSION FORMAT	MJPEG; H.264 Base/Main/High Profile
STREAM RESOLUTIONS	CR-POE-13S2: ranging from 1280 x 1024 to 160 x 120, including SXGA, 720p, XGA, VGA CR-POE-20S2: ranging from 1920 x 1080 to 160 x 120, including 1080p, SXGA, 720p, XGA, VGA CR-POE-20S3: ranging from 1920 x 1080 to 160 x 120, including 1080p, SXGA, 720p, XGA, VGA
MULTI-STREAMING	2 streams, individually configurable frame rate, resolution and compression (H.264 or MJPEG)
PAN/TILT/ZOOM	Digital
IMAGE SETTINGS	Auto exposure, auto white balance, gain, shutter, contrast, sharpness, gamma
IMAGE ENHANCEMENTS	WDR, 2D noise reduction, 3D noise reduction, image flip
SECURITY	Password protection, HTTPS encryption
SUPPORTED PROTOCOLS	ONVIF Profile S, RTSP, RTP, IPv4, TCP, UDP, HTTP, HTTPS, DHCP, NTP
MULTICASTING	Yes
CASING	Plastic and aluminum, white or black, integrated tripod mount (1/4-20 thread)
POWER CONSUMPTION	~4 W, via PoE 802.3af, at full frame rate and resolution with a single stream
TEMPERATURE	0°-45°C, 20-80% relative humidity (operating) • -30° to 60°C, 20-95% relative humidity (storage)
APPROVALS	CE, FCC, RoHS, TUV
SIZE (WxHxD)	88.1 mm x 44 mm x 32 mm
MASS	~75 grams (without lens)
WARRANTY	1 year



Wide Dynamic Range for challenging lighting conditions



Excellent sensitivity with Sony Exmor CMOS sensors



Ultra-compact and lightweight



Available in a black enclosure

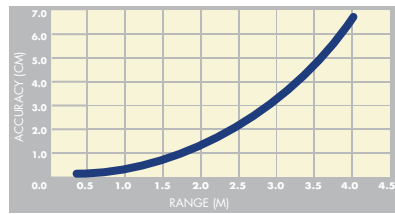


*Note: Cricket is recommended for customers familiar with the use of standard security IP cameras. Key differences between the Cricket IP security camera and other FLIR cameras include:

- Cricket produces compressed images only;
- Cricket requires a 3rd party Video Management Software (VMS) and does not support FlyCapture SDK;
- Cricket does not support external triggering or strobe capabilities.

BUMBLEBEE FAMILY KEY FEATURES

- Highly accurate, passive 3D sensing – no lasers or projectors required
- Over one mil 3D points per second
- Full featured Triclops® SDK provides access to all levels of the stereo processing pipeline
- Pre-calibration for lens distortion and misalignments



RANGE VS ACCURACY

This chart shows the accuracy of 3D point calculations versus the range to the point. Results are dependent on image resolution, lens focal length and calibration accuracy.

BUMBLEBEE® XB3

3-SENSOR AND MULTI-BASELINE



BUMBLEBEE® 2

COMPACT SIZE



Model#	Sensor Specifications	Shutter	Max Res	Max FPS	Focal Length	Model#	Sensor Specifications	Shutter	Max Res	Max FPS	Focal Length
BBX3-1352C/M-38	1.3MP Sony ICX445 CCD	1/3" 3.75 μm Global	1280 x 960	16 fps	3.8 mm	BB2-0352C/M-25	0.3MP Sony ICX424 CCD	1/3" 7.4 μm Global	648 x 488	48 fps	2.5 mm
BBX3-1352C/M-60	1.3MP Sony ICX445 CCD	1/3" 3.75 μm Global	1280 x 960	16 fps	6 mm	BB2-0352C/M-38	0.3MP Sony ICX424 CCD	1/3" 7.4 μm Global	648 x 488	48 fps	3.8 mm
						BB2-0352C/M-60	0.3MP Sony ICX424 CCD	1/3" 7.4 μm Global	648 x 488	48 fps	6 mm
						BB2-0852C/M-25	0.8MP Sony ICX204 CCD	1/3" 4.65 μm Global	1032 x 776	20 fps	2.5 mm
						BB2-0852C/M-38	0.8MP Sony ICX204 CCD	1/3" 4.65 μm Global	1032 x 776	20 fps	3.8 mm
						BB2-0852C/M-60	0.8MP Sony ICX204 CCD	1/3" 4.65 μm Global	1032 x 776	20 fps	6 mm

Two IEEE-1394b interfaces for camera control, data, and power
4 general-purpose digital input/output pins

IEEE-1394a interfaces for camera control, data, and power
4 general-purpose digital input/output pins

INTERFACE
GPIO

12-bit
YUV411, YUV422, and RGB formats
8, 12, 16 and 24-bit digital data
Automatic/Manual/One-Push Gain modes, 0 dB to 24 dB
12 cm and 24 cm
3.8 mm with 66° HFOV, 6 mm with 43° HFOV
f/2.0 (2.5 mm and 3.8 mm focal length), f/2.5 (6.0 mm focal length)
54 dB
Standard, bulb, skip frames, overlapped
277 x 37 x 41.8 mm
505 g
4 W at 12 V via IEEE-1394 interface or GPIO connector
3 x M12 microlens mount
-30° to 60°C (storage) • 0° to 45°C (operating)
2 years

12-bit
YUV411, YUV422, and RGB formats
8, 12, 16 and 24-bit digital data
Automatic/Manual/One-Push Gain modes, 0 dB to 24 dB
12 cm
2.5 mm with 97° HFOV, 3.8 mm with 66° HFOV, 6 mm with 43° HFOV
f/2.0 (2.5 mm and 3.8 mm focal length), f/2.5 (6.0 mm focal length)
60 dB
Standard, bulb, skip frames, overlapped
157 x 36 x 47.4 mm
342 g
2.5 W at 12 V via IEEE-1394 interface or GPIO connector
2 x M12 microlens mount
-30° to 60°C (storage) • 0° to 45°C (operating)
2 years

ADC
IMAGE DATA FORMATS
IMAGE DATA OUTPUT
GAIN
BASELINE
FIELD OF VIEW
APERTURE
SIGNAL TO NOISE RATIO
TRIGGER MODES
SIZE (WXHxD)
MASS
POWER
LENS MOUNT
TEMPERATURE
WARRANTY



STEREEO

LADYBUG FAMILY KEY FEATURES

- 360° degree video streaming
- Covers 90% of visual sphere; 6 sensors each camera
- Full featured SDK including dynamic stitching & image stabilization
- Independent imaging control CCD settings controlled individually or in unison
- Pre-calibrated for ease of use
- High dynamic range mode continuously cycles through a series of camera shutter and gain settings

Complete Development Accessory Kit included:



LADYBUG® 5

30 MP AND 12-BIT CAMERA RAW



LADYBUG® 3

HIGH RESOLUTION, WATER RESISTANT



Model#	Sensor Specifications	Shutter	Max Res Per Sensor	Max FPS	Model#	Sensor Specifications	Shutter	Max Res Per Sensor	Max FPS
LD5-U3-5155C-44	30MP Sony ICX655 CCD	2/3" 3.45 µm Global	2048 x 2448	10 FPS Compressed, 5 FPS Uncompressed	LD3-2054C-33	12MP Sony ICX274 CCD	1/1.8" 4.4 µm Global	1600 x 1200	16 FPS Compressed, 6.5 FPS Uncompressed

INTERFACE USB 3.0 interface with screw locks for camera control and data

IEEE 1394b interface with screw locks for camera control, data, and power

GPIO 12-pin GPIO connector for external trigger input, strobe output, and camera power

8-pin GPIO connector for external trigger, strobe, serial port, or external power

OPTICS Six high quality 4.4 mm focal length lenses

Six high quality 3.3 mm focal length lenses

SPHERICAL DISTANCE Calibrated from 2 m to infinity

Calibrated at 20 m

FOCUS DISTANCE ~200 cm. Objects have an acceptable sharpness from ~60 cm to infinity

~200 cm. Objects have an acceptable sharpness from ~60 cm to infinity

ADC 12-bit

12-bit

IMAGE DATA FORMATS Raw8, Raw12, Raw16 in uncompressed and JPEG

Raw8, Mono8

IMAGE DATA OUTPUT 8-, 12-, or 16-bit, Raw or JPEG compressed

8-bit raw Bayer (color) digital data

PARTIAL IMAGE MODES Pixel binning and region of interest (ROI) modes

Pixel binning and region of interest (ROI) modes

GAIN RANGE Automatic/manual/one-push/ 0dB to 18dB

Automatic/manual/one-push/ 0dB to 24dB

GAMMA 0.50 to 4.00

0.50 to 4.00

TRIGGER MODES Standard, bulb, skip frames, overlapped, multi-shot

Standard, bulb, skip frames, overlapped, multi-shot

HIGH DYNAMIC RANGE Cycle 4 gain and exposure presets

Cycle 4 gain and exposure presets

EXPOSURE RANGE Global shutter; Automatic/manual/one-push/extended shutter modes 0.02 ms to 2 seconds (extended shutter)

Global shutter; Automatic/manual/one-push/extended shutter modes 0.01 ms to 4.2 s (extended shutter mode)

IMAGE PROCESSING Shutter, gain, white balance, gamma & JPEG compression, programmable via software

Shutter, gain, white balance, gamma & JPEG compression, programmable via software

CASE TYPE Single unit, water resistant

Single unit, water resistant

CASE MATERIAL Machined aluminum housing, anodized red or black

Machined aluminum housing, anodized red or black

ENVIRONMENTAL SENSORS Temperature, Barometer, Humidity, Accelerometer, Compass

N/A

SIZE (WXHxD) 197 mm diameter, 160 mm height (with lens hoods)

122 x 141 x 133 mm

MASS 3000 g

2414 g

POWER 12-24 V, 13 W via GPIO

8-30 V, 7.2 W at 12 V via IEEE 1394b

TEMPERATURE -30° to 60°C (storage) • 0° to 45°C (operating)

-30° to 60°C (storage) • 0° to 45°C (operating)

WARRANTY 2 years

1 year

FREQUENTLY ASKED QUESTIONS

What is included with my camera?

During your camera selection please be mindful of which accessories are included and which accessories are not included with the camera.

Here is a quick table guide for your reference:



USB3 VISION CAMERAS	Tripod Adapter	5mm C-Mount Adapter	Cables	Lens
Blackfly S USB3	No	No	No	No
Blackfly USB3	No	No	No	No
Chameleon3 USB3	No	No	No	No
Flea3 USB3	Yes	Yes for CS-mount models	No	No
Grasshopper3 USB3	Yes	N/A (no CS-mount models)	No	No

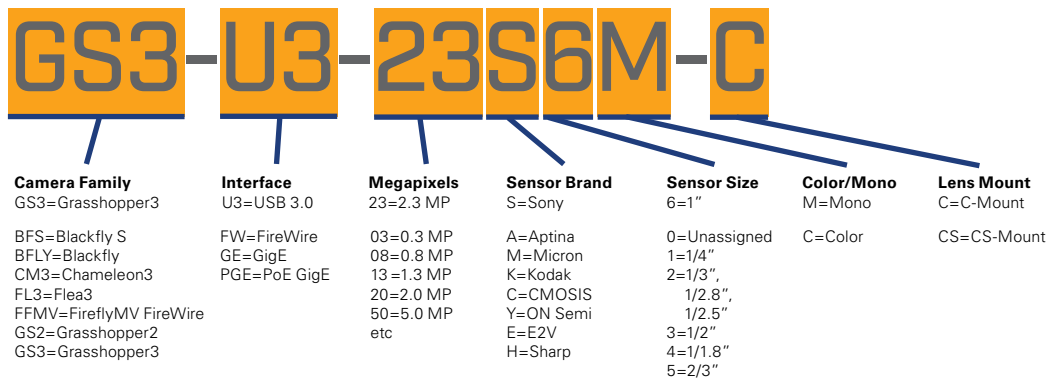


GIGE VISION CAMERAS	Tripod Adapter	5mm C-Mount Adapter	Cables	Lens
Blackfly GigE	No	No	No	No
Flea3 GigE	Yes	Yes for CS-mount models	No	No
Grasshopper2 GigE	Yes	N/A (no CS-mount models)	No	No
Grasshopper3 GigE	Yes	N/A (no CS-mount models)	No	No
Zebra2 GigE Vision/HD-SDI	No	No	No	No
Cricket IP Security Camera	Yes	No	No	No

What do your model numbers mean?

Here is one example of our model numbers and what each section means.

Understanding this will give you a quick explanation of the model's specifications and help you when comparing models.



Where can I get more technical support?

You can search our online Knowledge Base for answers to camera issues here www.ptgrey.com/support/knowledge-base. You can contact our support team directly and email them your issue. We have support teams staffed at our North America, Germany, China and Japan offices ready to assist with your cameras.

Where can I get more sales assistance?

Product pricing is available online after you've registered on our website. To register visit: www.ptgrey.com/register
For online price quotes visit: www.ptgrey.com/sales/request-for-quote



	MODEL NUMBER	INTERFACE	SENSOR TYPE	OPTICAL FORMAT	PIXEL SIZE	MAX RES	MAX FPS	
 BLACKFLY 5 Page 3	BFS-U3-13Y3C/M-C	USB 3.0	ON Semi PYTHON 1300 CMOS	1/2"	4.8µm	1280 x 1024	170 fps	
	BFS-U3-32S4C/M-C	USB 3.0	Sony IMX252 CMOS	1/1.8"	3.45 µm	2048 x 1536	118 fps	
	BFS-U3-51S5C/M-C	USB 3.0	Sony IMX250 CMOS	2/3"	3.45 µm	2464 x 2048	75 fps	
	BFS-U3-63S4C/M-C	USB 3.0	Sony IMX178 CMOS	1/1.8"	2.4 µm	3072 x 2064	60 fps	
	BFS-U3-89S6C/M-C	USB 3.0	Sony IMX255 CMOS	1"	3.45 µm	4096 x 2160	43 fps	
	BFS-U3-123S6C/M-C	USB 3.0	Sony IMX253 CMOS	1.1"	3.45 µm	4096 x 3000	30 fps	
	BFS-U3-200S6C/M-C	USB 3.0	Sony IMX183 CMOS	1"	2.4 µm	5472 x 3648	19 fps	
CHAMELEON3 Page 3	CM3-U3-13S2C/M-CS	USB 3.0	Sony ICX445 CCD	1/3"	3.75µm	1288 x 964	30 fps	
	CM3-U3-13Y3C/M-CS	USB 3.0	ON Semi PYTHON 1300 CMOS	1/2"	4.8µm	1280 x 1024	149 fps	
	CM3-U3-28S4C/M-CS	USB 3.0	Sony ICX818 CCD	1/1.8"	3.69µm	1928 x 1448	13 fps	
	CM3-U3-31S4C/M-CS	USB 3.0	Sony IMX265 CMOS	1/1.8"	3.45 µm	2048 x 1536	55 fps	
	CM3-U3-50S5C/M-CS	USB 3.0	Sony IMX264 CMOS	2/3"	3.45 µm	2448 x 2048	35 fps	
BLACKFLY Page 4	BFLY-U3-03S2C/M-CS	USB 3.0	Sony ICX424 CCD	1/3"	7.4µm	648 x 488	84 fps	
	BFLY-U3-05S2C/M-CS	USB 3.0	Sony ICX693 CCD	1/3"	6.0µm	808 x 608	50 fps	
	BFLY-U3-13S2C/M-CS	USB 3.0	Sony ICX445 CCD	1/3"	3.75µm	1288 x 964	30 fps	
	BFLY-U3-20S4C/M-CS	USB 3.0	Sony ICX274 CCD	1/1.8"	4.4 µm	1624 x 1224	15 fps	
	BFLY-U3-23S6C/M-C	USB 3.0	Sony IMX249 CMOS	1/1.2"	5.86 µm	1920 x 1200	41 fps	
	BFLY-U3-50H5C/M-C	USB 3.0	Sharp RJ32S3AAODT CCD	2/3"	3.45 µm	2448 x 2048	7.5 fps	
FLEA3 Page 4	FL3-U3-13S2C/M-CS	USB 3.0	Sony IMX035 CMOS	1/3"	3.63µm	1328 x 1048	120 fps	
	FL3-U3-13Y3M-C	USB 3.0	ON Semi VITA1300 CMOS	1/2"	4.8µm	1280 x 1024	150 fps	
	FL3-U3-13E4C/M-C	USB 3.0	e2v EV76C560 CMOS	1/1.8"	5.3µm	1280 x 1024	60 fps	
	FL3-U3-20E4C/M-C	USB 3.0	e2v EV76C5706F CMOS	1/1.8"	4.5µm	1600 x 1200	59 fps	
	FL3-U3-32S2C/M-CS	USB 3.0	Sony IMX036 CMOS	1/2.8"	2.5µm	2080 x 1552	60 fps	
	FL3-U3-120S3C-C	USB 3.0	Sony IMX172 CMOS	1/2.3"	1.55µm	4000 x 3000	15 fps	
GRASSHOPPER3 Page 5	GS3-U3-14S5C/M-C	USB 3.0	Sony ICX285 CCD	2/3"	6.45µm	1384 x 1036	30 fps	
	GS3-U3-15S5C/M-C	USB 3.0	Sony ICX825 CCD	2/3"	6.45µm	1384 x 1032	45 fps	
	GS3-U3-23S6C/M-C	USB 3.0	Sony IMX174 CMOS	1/1.2"	5.86µm	1920 x 1200	163 fps	
	GS3-U3-28S4C/M-C	USB 3.0	Sony ICX687 CCD	1/1.8"	3.69µm	1928 x 1448	26 fps	
	GS3-U3-28S5C/M-C	USB 3.0	Sony ICX674 CCD	2/3"	4.54µm	1920 x 1440	26 fps	
	GS3-U3-32S4C/M-C	USB 3.0	Sony IMX252 CMOS	1/1.8"	3.45µm	2048 x 1536	121 fps	
	GS3-U3-41S4C/M-C	USB 3.0	Sony ICX808 CCD	1/1.8"	3.1µm	2016 x 2016	18 fps	
	GS3-U3-41C6NIR-C	USB 3.0	CMOSIS CMV4000-3E12 CMOS	1"	5.5µm	2048 x 2048	90 fps	
	GS3-U3-41C6C/M-C	USB 3.0	CMOSIS CMV4000-3E5 CMOS	1"	5.5µm	2048 x 2048	90 fps	
	GS3-U3-50S5C/M-C	USB 3.0	Sony ICX625 CCD	2/3"	3.45µm	2448 x 2048	15 fps	
	GS3-U3-51S5C/M-C	USB 3.0	Sony IMX250 CMOS	2/3"	3.45µm	2448 x 2048	75 fps	
	GS3-U3-60S6C/M-C	USB 3.0	Sony ICX694 CCD	1"	4.54µm	2736 x 2192	13 fps	
	GS3-U3-60S6C/M-C	USB 3.0	Sony ICX694 CCD	1"	4.54µm	2736 x 2192	25 fps	
	GS3-U3-89S6C/M-C	USB 3.0	Sony IMX255 CMOS	1"	3.45µm	4096 x 2160	43 fps	
	GS3-U3-91S6C/M-C	USB 3.0	Sony ICX814 CCD	1"	3.69µm	3376 x 2704	9 fps	
	GS3-U3-120S6C/M-C	USB 3.0	Sony ICX834 CCD	1"	3.1µm	4240 x 2824	7 fps	
	GS3-U3-123S6C/M-C	USB 3.0	Sony IMX253 CMOS	1.1"	3.45µm	4096 x 3000	30 fps	
	 BLACKFLY 5 Page 6	BFS-PGE-13Y3C/M-C	GiGE PoE	ON Semi PYTHON 1300 CMOS	1/2"	4.8 µm	1280 x 1024	84 fps
		BFS-PGE-31S4C/M-C	GiGE PoE	Sony IMX265 CMOS	1/1.8"	3.45 µm	2048 x 1536	35 fps
		BFS-PGE-50S5C/M-C	GiGE PoE	Sony IMX264 CMOS	2/3"	3.45 µm	2448 x 2048	24 fps
BLACKFLY Page 6		BFLY-PGE-03S2C/M-CS	GiGE PoE	Sony ICX424 CCD	1/3"	7.4µm	648 x 488	84 fps
	BFLY-PGE-03S3C/M-CS	GiGE PoE	Sony ICX414 CCD	1/2"	9.9µm	648 x 488	90 fps	
	BFLY-PGE-05S2C/M-CS	GiGE PoE	Sony ICX693 CCD	1/3"	6.0µm	808 x 608	50 fps	
	BFLY-PGE-09S2C/M-CS	GiGE PoE	Sony ICX692 CCD	1/3"	4.08µm	1288 x 728	30 fps	
	BFLY-PGE-12A2C/M-CS	GiGE PoE	Apfina AR0134 CMOS	1/3"	3.75µm	1280 x 960	52 fps	
	BFLY-PGE-13S2C/M-CS	GiGE PoE	Sony ICX445 CCD	1/3"	3.75µm	1288 x 964	30 fps	
	BFLY-PGE-13H2C/M-CS	GiGE PoE	Sharp RJ3314/RJ33J3 CCD	1/3"	3.75µm	1288 x 964	30 fps	
	BFLY-PGE-13E4C/M-CS	GiGE PoE	e2v EV76C560 CMOS	1/1.8"	5.3µm	1280 x 1024	60 fps	
	BFLY-PGE-14S2C/M-C	GiGE PoE	Sony IMX104 CMOS	1/3"	3.75µm	1296 x 1032	60 fps	
	BFLY-PGE-20E4C/M-CS	GiGE PoE	e2v EV76C570 CMOS	1/1.8"	4.5µm	1600 x 1200	50 fps	
	BFLY-PGE-23S2C-CS	GiGE PoE	Sony IMX136 CMOS	1/2.8"	2.8µm	1920 x 1200	27 fps	
	BFLY-PGE-23S6C/M-C	GiGE PoE	Sony IMX249 CMOS	1/1.2"	5.86µm	1920 x 1200	41 fps	
	BFLY-PGE-31S4M/C-C	GiGE PoE	Sony IMX265 CMOS	1/1.8"	3.45 µm	2048 x 1536	35 fps	
	BFLY-PGE-50A2C/M-CS	GiGE PoE	Apfina MT9P006/031 CMOS	1/2.5"	2.2µm	2592 x 1944	13 fps	
	BFLY-PGE-50H5C/M-C	GiGE PoE	Sharp RJ32S4/S3AAODT CCD	2/3"	3.45µm	2448 x 2048	7.5 fps	
BFLY-PGE-50S5M/C-C	GiGE PoE	Sony IMX264 CMOS	2/3"	3.45 µm	2448 x 2048	22 fps		
FLEA3 Page 7	FL3-GE-03S1C/M-C	GiGE	Sony ICX618 CCD	1/4"	5.6µm	648 x 488	120 fps	
	FL3-GE-03S2C/M-C	GiGE	Sony ICX424 CCD	1/3"	7.4µm	648 x 488	82 fps	
	FL3-GE-08S2C/M-C	GiGE	Sony ICX204 CCD	1/3"	4.65µm	1032 x 776	31 fps	
	FL3-GE-13S2C/M-C/CS	GiGE	Sony ICX445 CCD	1/3"	3.75µm	1288 x 964	31 fps	
	FL3-GE-14S3C/M-C	GiGE	Sony ICX267 CCD	1/2"	4.65µm	1384 x 1032	18 fps	
	FL3-GE-20S4C/M-C	GiGE	Sony ICX274 CCD	1/1.8"	4.4µm	1624 x 1224	15 fps	
	FL3-GE-28S4C/M-C	GiGE	Sony ICX687 CCD	1/1.8"	3.69µm	1928 x 1448	15 fps	
	FL3-GE-50S5C/M-C	GiGE	Sony ICX655 CCD	2/3"	3.45µm	2448 x 2048	8 fps	
	GRASSHOPPER3 Page 7	GS3-PGE-23S6C/M-C	GiGE-PoE	Sony IMX174 CMOS	1/1.2"	5.86µm	1920 x 1200	45 fps
GS3-PGE-50S5C/M-C		GiGE-PoE	Sony ICX625 CCD	2/3"	3.45 µm	2448 x 2048	15 fps	
GS3-PGE-60S6C/M-C		GiGE-PoE	Sony ICX694 CCD	1"	4.54µm	2736 x 2192	13 fps	
GS3-PGE-91S6C/M-C		GiGE-PoE	Sony ICX814 CCD	1"	3.69µm	3376 x 2704	9 fps	
 Page 8 CHAMELEON		CMLN-13S2C/M-CS	USB 2.0	Sony ICX445 CCD	1/3"	3.75µm	1296x964	18 fps
	FIREFLY MV Page 8	FMVU-03MTC/M-CS	USB 2.0	Micron MT9V022 CMOS	1/3"	6.0µm	752x480	60 fps
		FMVU-13S2C-CS	USB 2.0	Sony IMX035 CMOS	1/3"	3.63µm	1328x1048	23 fps
 FLEA3 Page 9	FL3-FW-03S1C/M-C	IEEE 1394b	Sony ICX618 CCD	1/4"	5.6µm	648x488	120 fps	
	FL3-FW-03S3C/M-C	IEEE 1394b	Sony ICX414 CCD	1/2"	9.9µm	648x488	76 fps	
	FL3-FW-14S3C/M-C	IEEE 1394b	Sony ICX274 CCD	1/2"	4.65µm	1384x1032	16 fps	
	FL3-FW-20S4C/M-C	IEEE 1394b	Sony ICX274 CCD	1/1.8"	4.4µm	1624x1224	15 fps	
	BUMBLEBEE2 & XB3 Page 12	BB2-03S2C/M (25/38/60)	IEEE 1394a	Sony ICX424 CCD	1/3"	7.4µm	648x488	48 fps
BB2-08S2C/M (25/38/60)		IEEE 1394a	Sony ICX204 CCD	1/3"	4.65µm	1032x776	20 fps	
BBX3-13S2C/M (38/60)		IEEE 1394b	Sony ICX445 CCD	1/3"	3.75µm	1280x960	16 fps	
Page 13 LADYBUGS	LD3-20S4C-33	IEEE 1394b	Sony ICX274 CCD	1/1.8"	4.4µm	1600x1200 (x6)	16 fps	
	LD5-U3-51S5C-44	USB 3.0	Sony ICX655 CCD	2/3"	3.45µm	2048x2448 (x6)	10 fps	

SHUTTER	GPIO	LENS MOUNT	A/D CONVERTER	IMAGE DATA OUTPUT	ON-BOARD MEMORY	SIZE	OPERATING TEMP	WARRANTY
Global	6-pin Hirose HR10A-7R-6PB	C	10-bit ADC	8, 12, 16, 24-bit	240 MB frame buffer 6 MB flash memory	29 x 29 x 30 mm	0° to 50° C	3 years
Global		C	12-bit ADC					
Global		C	10/12-bit ADC					
Rolling/Global Reset		C	10/14-bit ADC					
Global		C	10/12-bit ADC					
Global		C	10/12-bit ADC					
Rolling/Global Reset	C	10/12-bit ADC						
Global	9-pin JST	CS	12-bit ADC	8, 12, 16, 24-bit	16 MB frame buffer 1 MB flash memory	44 x 35 x 19.5 mm	0° to 45° C	3 years
Global		CS	12-bit ADC					
Global		CS	12-bit ADC					
Global		CS	12-bit ADC					
Global		CS	12-bit ADC					
Global	6-pin Hirose HR10A-7R-6PB	CS	12-bit ADC	8, 12, 16, 24-bit	16 MB frame buffer 1 MB flash memory	29 x 29 x 30 mm	0° to 45° C	3 years
Global		CS	12-bit ADC					
Global		CS	12-bit ADC					
Global		CS	12-bit ADC					
Global		C	10/12-bit ADC					
Global		C	12-bit ADC					
Rolling	8-pin Hirose HR25	C	12-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer 1 MB flash memory	29 x 29 x 30 mm	0° to 45° C	3 years
Global		CS	12-bit ADC					
Global		C	10-bit ADC					
Global		C	10-bit ADC					
Rolling/Global Reset		C	10-bit ADC					
Rolling/Global Reset		C	12-bit ADC					
Global	8-pin Hirose HR25	C	14-bit ADC	8, 12, 16, 24-bit	128 MB frame buffer 2 MB flash memory	44 x 29 x 58 mm	0° to 50° C	3 years
Global		C	14-bit ADC					
Global		C	10/12-bit ADC					
Global		C	14-bit ADC					
Global		C	14-bit ADC					
Global		C	10/12-bit ADC					
Global		C	14-bit ADC					
Global		C	10-bit ADC					
Global		C	10-bit ADC					
Global		C	14-bit ADC					
Global		C	10/12-bit ADC					
Global		C	14-bit ADC					
Global		C	10/12-bit ADC					
Global		C	14-bit ADC					
Global		C	10/12-bit ADC					
Global	6-pin Hirose HR10A-7R-6PB	C	10-bit ADC	8, 12, 16, 24-bit	240 MB frame buffer 6 MB flash memory	29 x 29 x 30 mm	0° to 50° C	3 years
Global		C	12-bit ADC					
Global		C	12-bit ADC					
Global	6-pin Hirose HR10A-7R-6PB	CS	12-bit ADC	8, 12, 16, 24-bit	16 MB frame buffer 512 KB flash memory	29 x 29 x 30 mm	0° to 45° C	3 years
Global		CS	12-bit ADC					
Global		CS	12-bit ADC					
Global		CS	12-bit ADC					
Global		CS	12-bit ADC					
Global		CS	12-bit ADC					
Global		CS	12-bit ADC					
Global		CS	10-bit ADC					
Rolling		CS	12-bit ADC					
Global		CS	10-bit ADC					
Rolling		CS	12-bit ADC					
Global		C	10/12-bit ADC					
Global		CS	12-bit ADC					
Rolling/Global Reset		CS	12-bit ADC					
Global	C	12-bit ADC						
Global	C	12-bit ADC						
Global	8-pin Hirose HR25	C	12-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer 1 MB flash memory	29 x 29 x 30 mm	0° to 45° C	3 years
Global		C						
Global		C						
Global		C / CS						
Global		C						
Global		C						
Global		C						
Global	8-pin Hirose HR25	C	10/12-bit ADC	8, 12, 16, 24-bit	128 MB frame buffer 2 MB flash memory	44 x 29 x 58 mm	0° to 50° C	3 years
Global		C	14-bit ADC					
Global		C	14-bit ADC					
Global		C	14-bit ADC					
Global	7-pin JST	CS	12-bit ADC	8, 16-bit	256 KB flash memory	44 x 41 x 25.5 mm	0° to 45° C	1 year
Global		CS						
Global	7-pin JST	CS	10-bit ADC	8, 16-bit	N/A	44 x 34 x 24.4 mm	0° to 45° C	1 year
Rolling		CS	12-bit ADC					
Global	8-pin Hirose HR25	C	12-bit ADC	8, 12, 16, 24-bit	32 MB frame buffer 1 MB flash memory	29 x 29 x 30 mm	0° to 45° C	3 years
Global		C						
Global		C						
Global		C						
Global	4-pin GPIO	2 x M12	12-bit ADC	8, 16-bit	N/A	157x 36 x 47.4 mm	0° to 45° C	2 years
Global		2 x M12						
Global		3 x M12						
Global	8-pin GPIO	N/A	12-bit ADC	8-bit	N/A	122 x 141 mm	0° to 45° C	1 year
Global		12-pin GPIO	N/A					

ACCESSORY LIST

MAXIMIZE THE EFFECTIVENESS OF YOUR IMAGING PIPELINE
For the most up to date list, please visit ptgrey.com/products/accessories

Model#	TRIPOD MOUNT / ENCLOSURES	BFLY-PGE	BFS-U3 BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-0003	Tripod Mount Adapter-3																								
ACC-01-0005	Tripod Mount Adapter-5																								
ACC-01-0011	Tripod Mount Adapter-11																								
ACC-01-0010	Metal Camera Enclosure for CS-Mount FFMV only																								
ACC-01-0012	Ladybug3 Desktop Mount																								
ACC-01-0013	Ladybug3 Tripod Mount Adapter and Plugs																								
ACC-01-0014	Zebra2 Tripod Mount Adapter																								

Model#	HOST ADAPTER CARDS	BFLY-PGE	BFS-U3 BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-1000	IEEE 1394a OHCI PCI Host Adapter 3 Port																								
ACC-01-1001	IEEE 1394b OHCI PCI Host Adapter 2 Port																								
ACC-01-1100	Intel PRO 1000 CT Gigabit Ethernet PCIe																								
GIGE-PCIE2-2P02	Gigabit Ethernet PCIe PoE, 2 Port, Intel																								
ACC-01-1201	Generic USB 3.0 PCIe 2.0 x1 2 Port Card																								
ACC-01-1202	Generic USB 3.0 PCIe 2.0 x1 4 Port Card																								
U3-PCIE2-2P01X	PGR USB 3.0 PCIe 2.0 x1 Card, Fresco, 2-port																								

Model#	CABLES	BFLY-PGE	BFS-U3 BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-2000	4.5 m, 6-pin to 6-pin, 1394a																								
ACC-01-2004	0.3-m, 6-pin to 6-pin, Ultra Thin 1394a (10moq)																								
ACC-01-2003	1.0 m, 6-pin to 6-pin, Ultra Thin 1394a (10moq)																								
ACC-01-2002	2.0 m, 6-pin to 6-pin, Ultra Thin 1394a (10moq)																								
ACC-01-2013	4.5 m, 4-pin to 9-pin, 1394a to 1394b																								
ACC-01-2007	4.5 m, 6-pin to 9-pin, Locking 1394a to 1394b																								
ACC-01-2016	0.3 m, 9-pin to 9-pin, Locking 1394b																								
ACC-01-2015	1.0 m, 9-pin to 9-pin, Locking 1394b																								
ACC-01-2005	4.5 m, 9-pin to 9-pin, 1394b																								
ACC-01-2006	4.5 m, 9-pin to 9-pin, Locking 1394b																								
ACC-01-2012	4.5 m, 9-pin to 9-pin, Locking 1394b High Flex OKI																								
ACC-01-2017	FirePRO 10-m 9-pin to 9-pin, Locking 1394b																								
ACC-01-2008	10 m Ladybug2 Data																								
ACC-01-2010	10 m Ladybug2 Power																								
ACC-01-2011	50 m Ladybug2 Power																								
ACC-01-2100	5 m CAT 5e Ethernet Locking Cable, High Flex																								
ACC-01-2101	4.5 meter CAT 5e Ethernet Cable																								
ACC-01-2200	3 m 85 MHz Camera Link, 1x MDR, 1x SDR mini																								
ACC-01-2300	3 m USB 3.0 Cable, Type-A to Micro-B (Locking)																								
ACC-01-2301	5 m USB 3.0 Cable, Type-A to Micro-B (Locking)																								

Model#	GPIO CONNECTORS	BFLY-PGE	BFS-U3 BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-3000	1.0 m, Circular 8-pin Prewired GPIO Hirose Conn.																								
ACC-01-3005	4.5 m, Circular 8-pin Prewired GPIO Hirose Conn.																								
ACC-01-3001	Circular 12PIN Prewired GPIO Hirose Connector																								
ACC-01-3002	7-pin Prewired GPIO JST Connector																								
ACC-01-3013	9-pin Prewired GPIO JST Connector																								
ACC-01-3004	8-pin Phoenix Contact GPIO Connector																								
ACC-01-3006	8-pin Circular Hirose HR25 GPIO Connector																								
ACC-01-3007	4-pin Phoenix Contact Power Connector																								
ACC-01-3008	6-pin Phoenix Contact GPIO Connector																								
ACC-01-3009	1.0m, Circular 6-pin Prewired GPIO Hirose Conn.																								
ACC-01-3010	4.5m, Circular 6-pin Prewired GPIO Hirose Conn.																								
ACC-01-3011	6-pin Circular Hirose HR10 GPIO Connector																								
ACC-01-3012	12-pin Circular Hirose GPIO Cable with Power Jack																								

Model#	GENERIC OPTICS	BFLY-PGE	BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-4000	M12 MicroLens 4MM (Boowon BW38BLF)																								
ACC-01-4001	M12 MicroLens 6MM (Boowon BW60BLF)																								
ACC-01-4002	M12 MicroLens 8MM (Boowon BW80H1000)																								
ACC-01-4003	Auto Iris CS-Mount Lens 1/3" 3.5-8MM																								

Model#	OPTIC MOUNTS	BFLY-PGE	BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-5004	C to CS-Mount Mount 5mm Spacer Adapter																								
ACC-01-5005	CS- to M12 MicroLens Adapter																								
ACC-01-5006	Cast Metal M12 MicroLens Holder																								
ACC-01-5007	Cast Metal M12 MicroLens Holder with IR Filter																								

Model#	HUBS	BFLY-PGE	BFS-U3 BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-6000	4-Port USB 3.0 Hub, Screw Locks, Ext Power Adap.																								
ACC-01-6001	USB 3.0 Hub, VIA VL812, Micro B to Standard A, 1-port with screw locks																								
FWB-HUB-2PORT	FirePRO 1394b 2-Port Repeater																								
FWB-HUB-3PORT	FirePRO 1394b 3-Port Hub																								
FWB-HUB-5PORT	FirePRO 1394b 5-Port Repeater																								

Model#	POWER SUPPLY (PS) / MISC	BFLY-PGE	BFLY-U3	BB2	BBX3	CMLN	CM3-U3	DR2	FL3-FW	FL3-GE	FL3-U3	FL2	FFMV	FMVU	GRAS	GS2-GE	GS3-PGE	GS2-FW	GS3-U3	GX-FW	GZL-CL	LD2	LD3	LD5	ZBR2
ACC-01-9001	24V 2.5A 60W PS, Standard DC Barrel Connector																								
ACC-01-9007	20V 2A 40W PS, Standard DC Barrel Connector																								
ACC-01-9008	12V 1.5A (18W) Wall Mount PS, 4-Pin Phoenix Contact																								
ACC-01-9009	12V 1.5A Wall-Mount PS, Plug Adapters, HR25 GPIO Harness																								
ACC-01-9010	12V 2.0A Wall Mount PS for FWB-EC2PORT																								
ACC-01-9011	12V 1.5A Wall-Mount PS, Plug Adapters, HR10 GPIO Harness																								
ACC-01-9012	19.6W Single Port PoE Injector with NA power cord																								

Model#	REGULAR LENS
LENS-V130F3C	Fujinon 3.8-13mm Varifocal C-mount lens, for 1/2" sensors (DV3.4x3.8SA-1)
LENS-V130F3C-DC	Fujinon 3.8-13mm Varifocal C-mount lens, for 1/2" sensors, DC Iris (DV3.4x3.8SA-SA1)
LENS-15F5-125C	Fujinon fixed focal length 12.5mm C-mount lens for 2/3" sensors (HF12.5HA-1B)
LENS-15F5-250C	Fujinon fixed focal length 25mm C-mount lens for 2/3" sensors (HF25HA-1B)
LENS-15F3-60C	Fujinon fixed focal length 6mm C-mount lens for 1/2" sensors (DF6HA-1B)
LENS-30F2-V80C	Fujinon vari-focal 2.8-8mm CS-mount lens, for 1/3" sensors (YV2.8x2.8SA-2)
LENS-V500F2CS	Fujinon vari-focal 15-50mm CS-mount lens, for 1/3" sensors (YV3.3x15SA-2)
LENS-V80F2CS-DC	Fujinon vari-focal 2.8-8mm CS-mount DC iris lens, for 1/3" sensors (YV2.8x2.8SA-SA2)
LENS-V500F2CS-DC	Fujinon vari-focal 15-50mm CS-mount DC iris lens, for 1/3" sensors (YV3.3x15SA-SA2)

Model#	HIGH RESOLUTION LENS
LENS-50F5-125C	Fujinon fixed focal length 12.5mm C-mount lens for 2/3" sensors (HF12.5SA-1)
LENS-160T5C	Tamron fixed focal length 16mm C-mount lens for 2/3" sensors (23FM16SP)
LENS-250T5C	Tamron fixed focal length 25mm C-mount lens for 2/3" sensors (23FM25SP)
LENS-80T4C	Tamron fixed focal length 8mm C-mount lens for 1/1.8" sensors (MF118FM08)
LENS-80T6C	Tamron fixed focal length 8mm C-mount lens for 1.1" sensors (MF111FM08)
LENS-160T4C	Tamron fixed focal length 16mm C-mount lens for 1/1.8" sensors (MF118FM16)
LENS-160E6C	Edmund Optics fixed focal length 16mm C-mount lens for 1" sensors (86-571)
LENS-3056-250C	Spacecom fixed focal length 25mm C-mount lens for 1" sensors (VF25095M)
LENS-125F6C	Fujinon fixed focal length 12.5mm C-mount lens for 1" sensors (CF12.5HA-1)
LENS-250F6C	Fujinon fixed focal length 25mm C-mount lens for 1" sensors (CF25HA-1)

MONO CAMERA SENSOR REVIEW SORTED BY SENSOR TYPE (CCD/CMOS) AND RESOLUTION

CCD

CMOS

MODEL ID	Sensor	Sensor Size	Interface	Sensor Type	Shutter	Max Resolution	Max Frame Rate	Pixel Size
BFLY-PGE-03S2M-CS	Sony ICX424	1/3"	PoE GigE	CCD	Global	648 x 488	84	7.4 µm
BFLY-U3-03S2M-CS	Sony ICX424	1/3"	USB 3.0	CCD	Global	648 x 488	84	7.4 µm
BFLY-PGE-03S3M-CS	Sony ICX414	1/2"	PoE GigE	CCD	Global	648 x 488	90	9.9 µm
FL3-GE-03S1M-C	Sony ICX618	1/4"	GigE	CCD	Global	648 x 488	120	5.6 µm
BFLY-PGE-05S2M-CS	Sony ICX693	1/3"	PoE GigE	CCD	Global	808 x 608	50	6.0 µm
FL3-GE-08S2M-C	Sony ICX204	1/3"	GigE	CCD	Global	1032 x 776	31	4.65 µm
BFLY-PGE-09S2M-CS	Sony ICX692	1/3"	PoE GigE	CCD	Global	1288 x 728	30	4.08 µm
BFLY-U3-13S2M-CS	Sony ICX445	1/3"	USB 3.0	CCD	Global	1288 x 964	30	3.75 µm
BFLY-PGE-13S2M-CS	Sony ICX445	1/3"	PoE GigE	CCD	Global	1288 x 964	30	3.75 µm
BFLY-PGE-13H2M-CS	Sharp RJ33J4CA3DE	1/3"	PoE GigE	CCD	Global	1288 x 964	30	3.75 µm
CM3-U3-13S2M-CS	Sony ICX445	1/3"	USB 3.0	CCD	Global	1288 X 964	30	3.75 µm
FL3-GE-13S2M-C	Sony ICX445	1/3"	PoE GigE	CCD	Global	1288 x 964	31	3.75 µm
FL3-GE-14S3M-C	Sony ICX267	1/2"	GigE	CCD	Global	1384 x 1032	18	4.65 µm
GS3-U3-15S5M-C	Sony ICX825	2/3"	USB 3.0	CCD	Global	1384 x 1032	45	6.45 µm
GS3-U3-14S5M-C	Sony ICX285	2/3"	USB 3.0	CCD	Global	1384 x 1036	30	6.45 µm
FL3-GE-20S4M-C	Sony ICX274	1/1.8"	GigE	CCD	Global	1624 x 1224	15	4.4 µm
GS3-U3-28S5M-C	Sony ICX674	2/3"	USB 3.0	CCD	Global	1920 x 1440	26	4.54 µm
CM3-U3-28S4M-CS	Sony ICX818	1/1.8"	USB 3.0	CCD	Global	1928 X 1448	13	3.69 µm
FL3-GE-28S4M-C	Sony ICX687	1/1.8"	GigE	CCD	Global	1928 x 1448	15	3.69 µm
GS3-U3-28S4M-C	Sony ICX687	1/1.8"	USB 3.0	CCD	Global	1928 x 1448	26	3.69 µm
GS3-U3-41S4M-C	Sony ICX808	1/1.8"	USB 3.0	CCD	Global	2024 x 2024	18	3.1 µm
FL3-GE-50S5M-C	Sony ICX655	2/3"	GigE	CCD	Global	2448 x 2048	8	3.45 µm
GS3-U3-50S5M-C	Sony ICX625	2/3"	USB 3.0	CCD	Global	2448 x 2048	15	3.45 µm
GS3-PGE-50S5M-C	Sony ICX625	2/3"	PoE GigE	CCD	Global	2448 x 2048	15	3.45 µm
BFLY-PGE-50H5M-C	Sharp RJ32S4AA0DT	2/3"	PoE GigE	CCD	Global	2448 x 2048	7.5	3.45 µm
GS3-U3-60S6M-C	Sony ICX694	1"	USB 3.0	CCD	Global	2736 x 2192	13	4.54 µm
GS3-U3-60QS6M-C	Sony ICX694	1"	USB 3.0	CCD	Global	2736 x 2192	25	4.54 µm
GS3-PGE-60S6M-C	Sony ICX694	1"	PoE GigE	CCD	Global	2736 x 2192	13	4.54 µm
GS3-U3-91S6M-C	Sony ICX814	1"	USB 3.0	CCD	Global	3376 x 2704	9	3.69 µm
GS3-U3-120S6M-C	Sony ICX834	1"	USB 3.0	CCD	Global	4240 x 2824	7	3.1 µm
BFLY-PGE-12A2M-CS	Aptina AR0134	1/3"	PoE GigE	CMOS	Global	1280 x 960	52	3.75 µm
FL3-U3-13E4M-C	e2v EV76C560	1/1.8"	USB 3.0	CMOS	Global	1280 x 1024	60	5.3 µm
BFLY-PGE-13E4M-CS	e2v EV76C560	1/1.8"	PoE GigE	CMOS	Global	1280 x 1024	60	5.3 µm
FL3-U3-13Y3M-C	ON Semi VITA1300	1/2"	USB 3.0	CMOS	Global	1280 x 1024	150	4.8 µm
CM3-U3-13Y3M-CS	ON Semi PYTHON 1300	1/2"	USB 3.0	CMOS	Global	1280 x 1024	149	4.8 µm
BFS-U3-13Y3M-C	ON Semi PYTHON 1300	1/2"	USB 3.0	CMOS	Global	1280 x 1024	170	4.8 µm
FL3-U3-13S2M-CS	Sony IMX035	1/3"	USB 3.0	CMOS	Rolling	1328 x 1048	120	3.63 µm
BFLY-PGE-20E4M-CS	e2v EV76C570	1/1.8"	PoE GigE	CMOS	Global	1600 x 1200	50	4.5 µm
FL3-U3-20E4M-C	e2v EV76C570	1/1.8"	USB 3.0	CMOS	Global	1600 x 1200	60	4.5 µm
GS3-U3-23S6M-C	Sony IMX174	1/1.2"	USB 3.0	CMOS	Global	1920 x 1200	162	5.86 µm
GS3-PGE-23S6M-C	Sony IMX174	1/1.2"	PoE GigE	CMOS	Global	1920 x 1200	46	5.86 µm
BFLY-PGE-23S6M-C	Sony IMX249	1/1.2"	PoE GigE	CMOS	Global	1920 x 1200	41	5.86 µm
GS3-U3-32S3M-C	Sony IMX252	1/1.8"	USB 3.0	CMOS	Global	2038 x 1536	121	3.45 µm
BFLY-PGE-31S4M-C	Sony IMX265	1/1.8"	PoE GigE	CMOS	Global	2048 X 1536	35	3.45 µm
CM3-U3-31S4M-CS	Sony IMX265	1/1.8"	USB 3.0	CMOS	Global	2048 X 1536	55	3.45 µm
GS3-U3-41C6M-C	CMOSIS CMV4000	1"	USB 3.0	CMOS	Global	2048 x 2048	90	5.5 µm
GS3-U3-41C6NIR-C	CMOSIS CMV4000 NIR	1"	USB 3.0	CMOS	Global	2048 x 2048	90	5.5 µm
BFLY-PGE-50S5M-C	Sony IMX264	2/3"	PoE GigE	CMOS	Global	2448 X 2048	22	3.45 µm
CM3-U3-50S5M-CS	Sony IMX264	2/3"	USB 3.0	CMOS	Global	2448 X 2048	35	3.45 µm
BFS-U3-51S5M-C	Sony IMX250	2/3"	USB 3.0	CMOS	Global	2448 x 2048	75	3.45 µm
GS3-U3-51S5M-C	Sony IMX250	2/3"	USB 3.0	CMOS	Global	2448 x 2048	75	3.45 µm
BFLY-PGE-50A2M-CS	Aptina MT9P031	1/2.5"	PoE GigE	CMOS	Rolling	2592 x 1944	13	2.2 µm
GS3-U3-89S6M-C	Sony IMX255	1"	USB 3.0	CMOS	Global	4096 x 2160	43	3.45 µm
GS3-U3-123S6M-C	Sony IMX253	1.1"	USB 3.0	CMOS	Global	4096 x 3000	30	3.45 µm

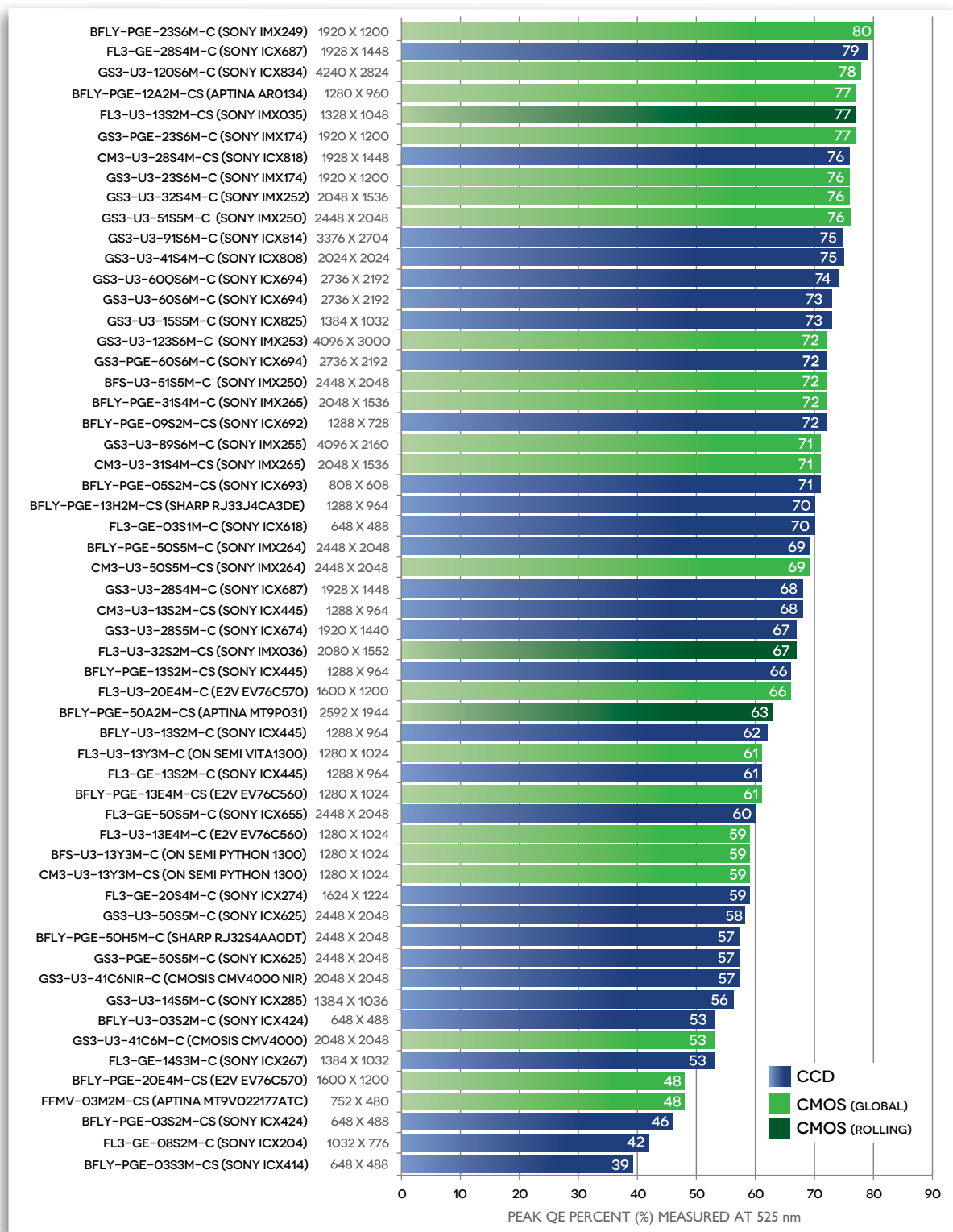
QE 525nm %	QE Near IR 850nm / 950nm %	Temporal Dark Noise e ⁻	S/N Ratio Max dB	S/N Ratio Max Bits	Absolute Sensitivity Threshold	Saturation Capacity e ⁻	Dynamic Range dB	Dynamic Range Bits	Gain e ⁻ /ADU
46	7/2	12.86	41.44	6.88	29.74	13932	60.37	10.03	0.22
53	8/3	12.03	41.37	6.87	24.76	13701	60.78	10.10	0.22
39	7/2	19.43	44.14	7.33	51.72	25949	62.29	10.35	0.41
70	21/8	11.73	41.62	6.91	17.57	14508	61.49	10.21	0.22
71	14/4	11.22	43.02	7.14	16.97	20024	64.66	10.74	0.36
42	6/2	12.13	40.77	6.77	30.70	11944	59.51	9.89	0.19
72	15/5	8.56	40.63	6.75	12.76	11551	62.11	10.32	0.24
62	16/5	10.30	39.86	6.62	17.78	9686	59.06	9.81	0.15
66	16/5	9.23	39.64	6.58	15.00	9196	59.51	9.88	0.15
70	17/5	5.37	38.68	6.43	8.55	7384	61.99	10.30	0.12
68	17/5	10.09	39.65	6.59	15.67	9231	58.81	9.77	0.15
61	15/4	7.61	38.66	6.42	13.63	7347	59.14	9.82	0.12
53	7/2	11.48	40.16	6.67	23.63	10366	58.75	9.76	0.18
73	22/7	8.31	43.59	7.24	12.15	22856	68.28	11.34	0.37
56	9/3	11.9	42.15	7.00	23.19	16408	62.43	10.37	0.28
59	7/2	8.35	39.01	6.48	15.77	7969	59.09	9.82	0.13
67	17/5	9.39	41.67	6.92	14.86	14693	63.43	10.54	0.24
76	16/5	10.48	40.39	6.71	14.67	10936	59.96	9.96	0.18
79	17/6	9.68	40.64	6.78	13.13	11586	61.12	10.15	0.19
68	15/5	10.17	39.56	6.57	15.78	9039	58.56	9.73	0.15
75	14/4	9.29	38.10	6.33	13.32	6459	56.39	9.37	0.10
60	9/4	9.43	37.68	6.26	17.23	5856	55.42	9.20	0.09
58	9/3	8.73	37.90	6.30	16.30	6168	56.50	9.38	0.10
57	8/3	8.18	37.71	6.26	15.69	5903	56.66	9.41	0.10
57	8/2	5.48	39.08	6.49	10.67	8086	62.61	10.4	0.13
73	16/5	10.54	41.60	6.91	15.22	14446	62.34	10.35	0.23
74	16/5	10.88	41.53	6.90	15.43	14227	61.94	10.29	0.23
72	16/5	10.87	41.56	6.93	13.87	14959	63.40	10.53	0.24
75	16/4	9.43	40.00	6.64	13.53	9996	60.06	9.98	0.16
78	13/4	10.87	37.87	6.29	14.82	6125	54.63	9.07	0.10
77	21/7	6.58	37.44	6.22	9.30	5542	57.87	9.61	0.10
59	22/4	25.14	39.24	6.52	43.18	8384	50.29	8.35	0.16
61	22/8	25.32	38.76	6.44	43.00	7506	49.27	8.18	0.16
61	21/8	26.26	40.10	6.66	44.13	10226	51.64	8.58	0.21
59	20/8	9.28	37.82	6.28	16.14	6057	55.84	9.28	0.15
59	21/7	9.24	37.62	6.25	16.54	5779	55.47	9.21	0.14
77	12/4	6.00	41.90	6.96	8.72	15491	67.55	11.22	0.27
48	15/6	21.28	38.94	6.47	42.26	7836	51.12	8.49	0.13
66	22/9	24.17	38.92	6.46	37.84	7788	49.99	8.30	0.13
76	13/4	6.83*	45.12	7.49	9.77*	32513	72.94*	12.11	0.52
77	14/4	6.83*	45.14	7.50	9.75*	32691	72.99*	12.12	0.51
80	15/5	7.11*	45.19	7.50	9.45*	33105	72.77*	12.08	0.52
76	19/6	2.34*	40.20	6.68	3.98*	10482	71.34*	11.85	0.17
72	19/6	2.31	40.14	6.67	3.93	10326	71.31	11.84	0.17
71	19/7	2.89	39.90	6.63	4.80	9777	69.19	11.49	0.17
53	18/7	16.81	38.82	6.45	33.38	7620	52.87	8.78	0.15
57	32/13	17.99	39.59	6.58	31.01	9094	53.84	8.94	0.15
69	18/6	3.36	39.96	6.64	4.10	9909	70.78	11.76	0.17
69	18/6	2.29	39.94	6.63	4.03	9869	70.97	11.79	0.17
72	19/6	2.31	40.06	6.65	3.90	10141	71.13	11.82	0.17
76	19/6	2.37*	40.15	6.67	4.03*	10361	71.15*	11.82	0.17
63	14/5	7.64	38.26	6.35	13.00	6693	58.30	9.68	0.11
71	20/6	2.43*	40.19	6.67	4.13*	10435	71.03*	11.8	0.17
72	20/6	2.43*	40.24	6.68	4.12*	10563	71.04*	11.8	0.17

*Mode 7 (Low Noise Imaging Mode)

MONO SINGLE LENS CAMERAS

QUANTUM EFFICIENCY (%) AT 525 nm (HIGHER IS BETTER)

Quantum efficiency (QE) is the ability of the sensor to turn photons into electrons, or in other words, turn incoming light into an electrical signal for imaging. A higher QE % means greater sensitivity for detecting light. A sensor with a measurement of 79% means that for every 100 photons that hit the sensor an average of 79 will be detected. Please note that the results below are taken at the wavelength of 525nm.

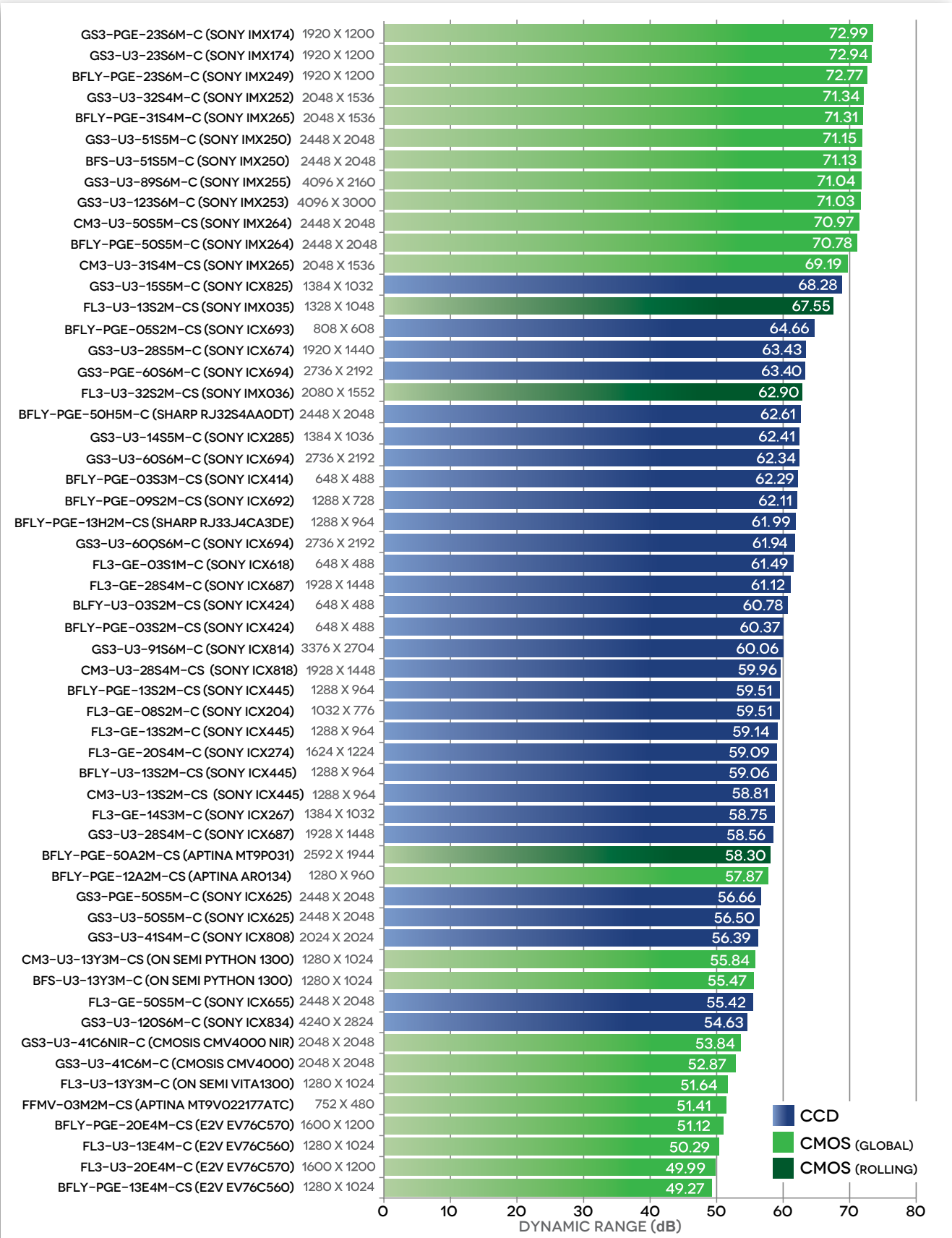


Please note that all measurements are taken based on guidelines in the EMVA 1288 standard. Camera settings are at maximum exposure time and bit depth unless otherwise noted. The pixel format is Mono 16 for mono cameras except for the last two Bandwidth and Throughput graphs which are done at Mono 8. Results are captured at room temperature (20°C). For more information on the EMVA 1288 standard please visit EMVA.org. Thanks for considering FLIR and please enjoy our mono camera sensor review.

MONO SINGLE LENS CAMERAS

DYNAMIC RANGE dB (HIGHER IS BETTER)

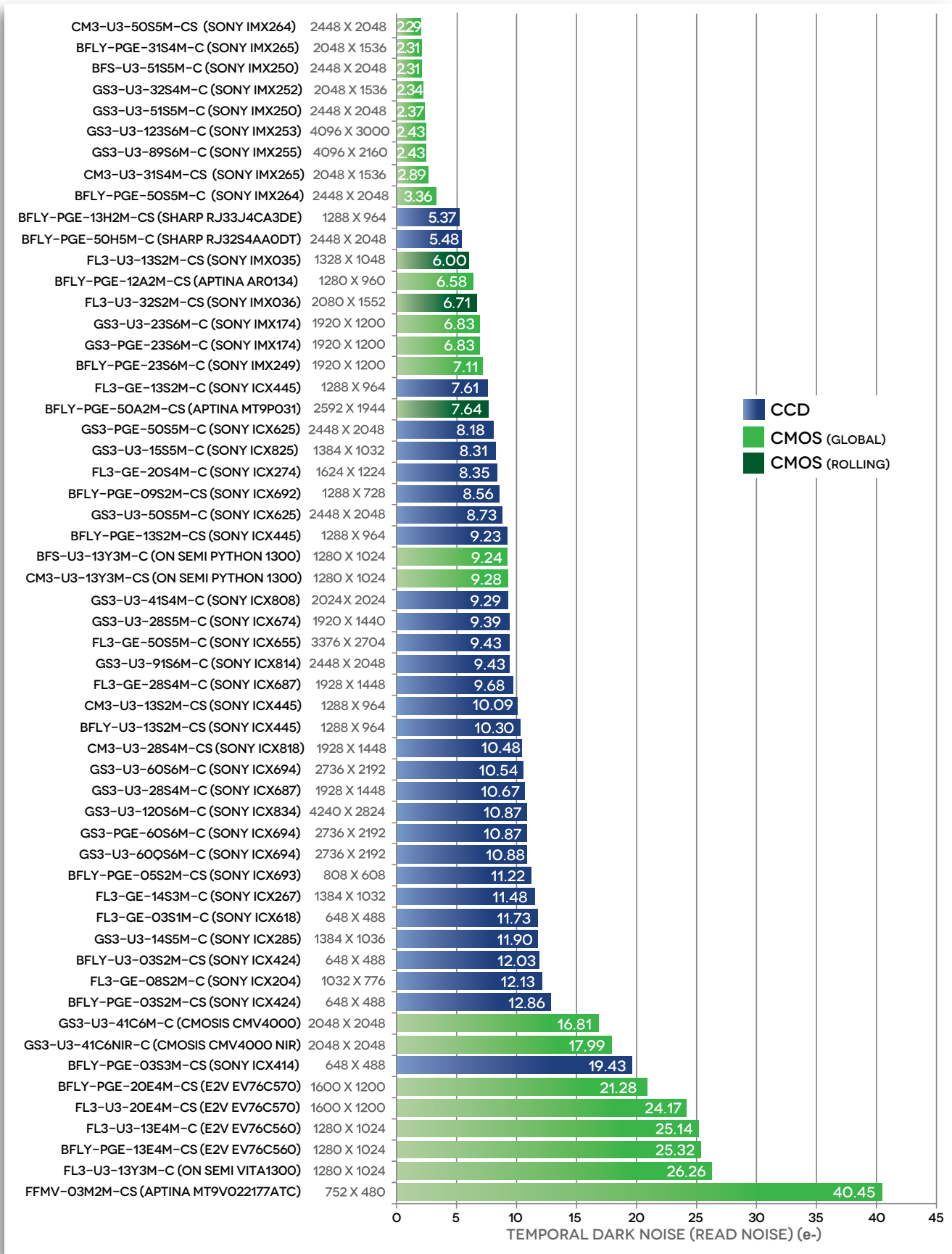
Dynamic range describes the camera model's ability to detect the maximum and minimum of light intensities (shadows and highlights). Models with higher dynamic range can detect more detail in the darks and lights.



MONO SINGLE LENS CAMERAS

TEMPORAL DARK NOISE / READ NOISE e- (LOWER IS BETTER)

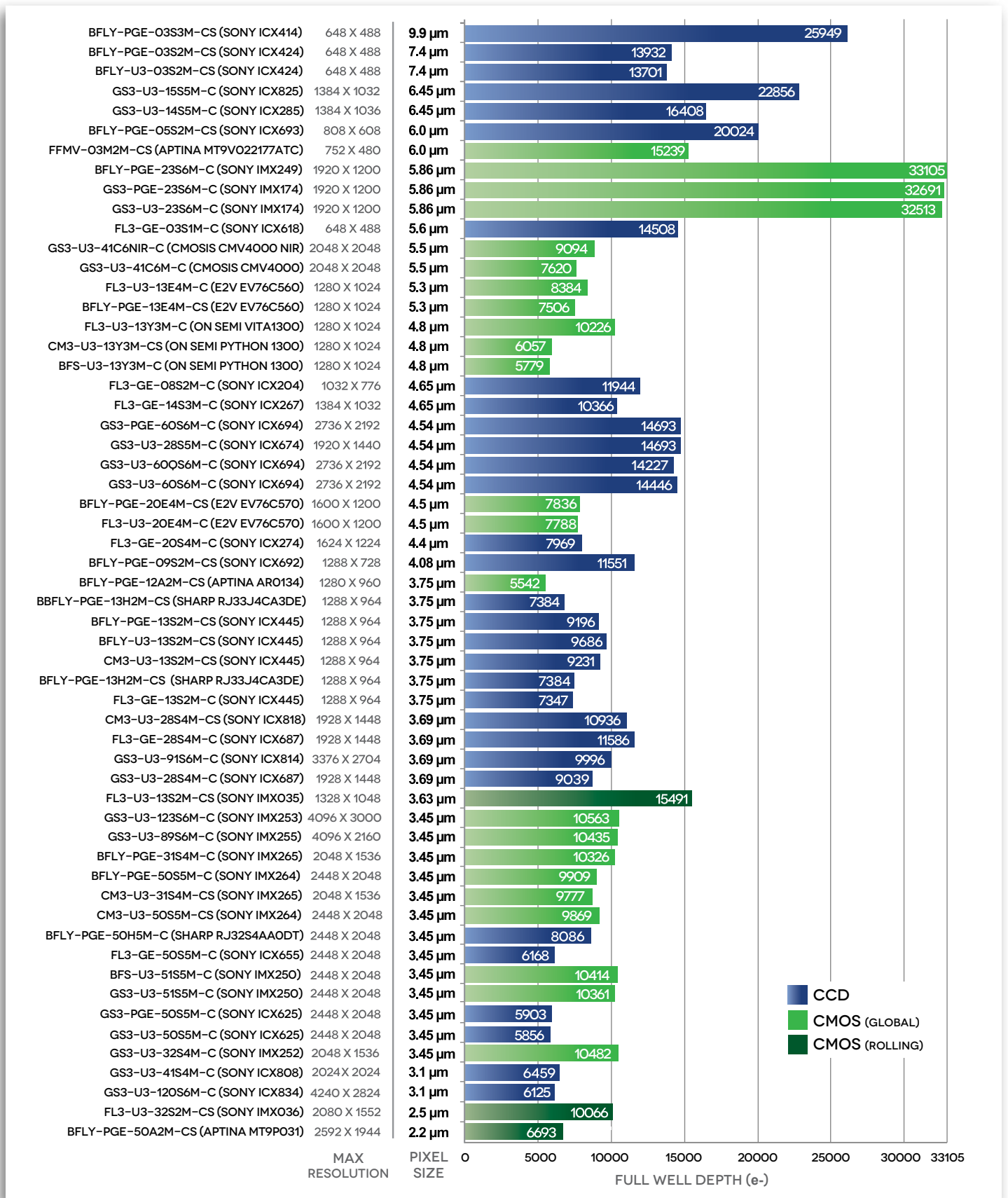
Temporal dark noise (also known as read noise) comes from energy within the sensor and the surrounding sensor electronics. Over time, random electrons are created that fall into the sensor wells and are detected and turned into signal. Models with lower read noise measurements produce cleaner images.



MONO SINGLE LENS CAMERAS

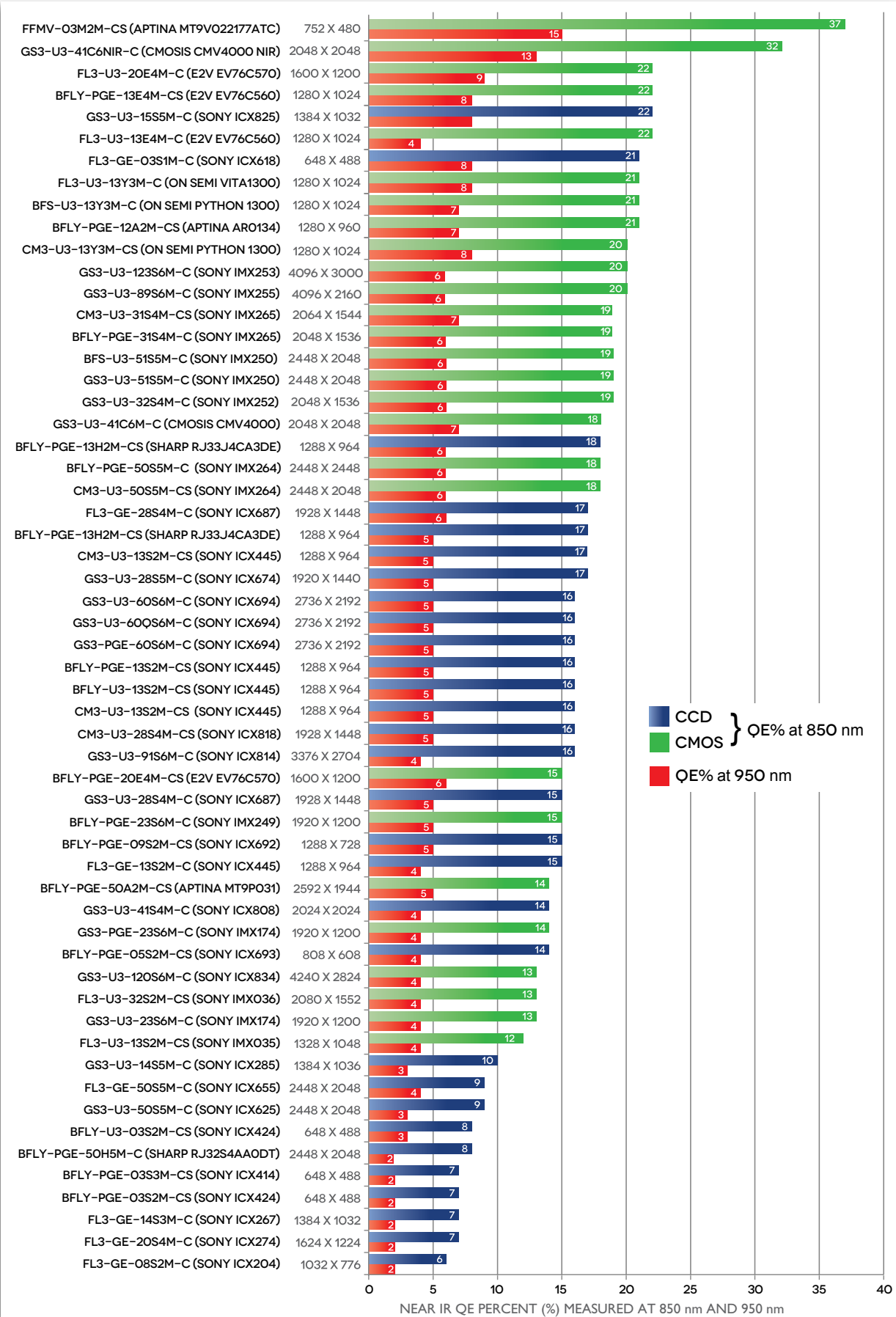
SATURATION CAPACITY (WELL DEPTH) e- (HIGHER IS BETTER, SORTED BY PIXEL SIZE)

The saturation capacity (well depth) is the largest charge a pixel can hold before over-saturation occurs and signal degradation begins. Saturation must be avoided because it diminishes the quantitative ability of the sensor and in the case of CCDs produces image smearing due to a phenomenon known as blooming.



MONO SINGLE LENS CAMERAS

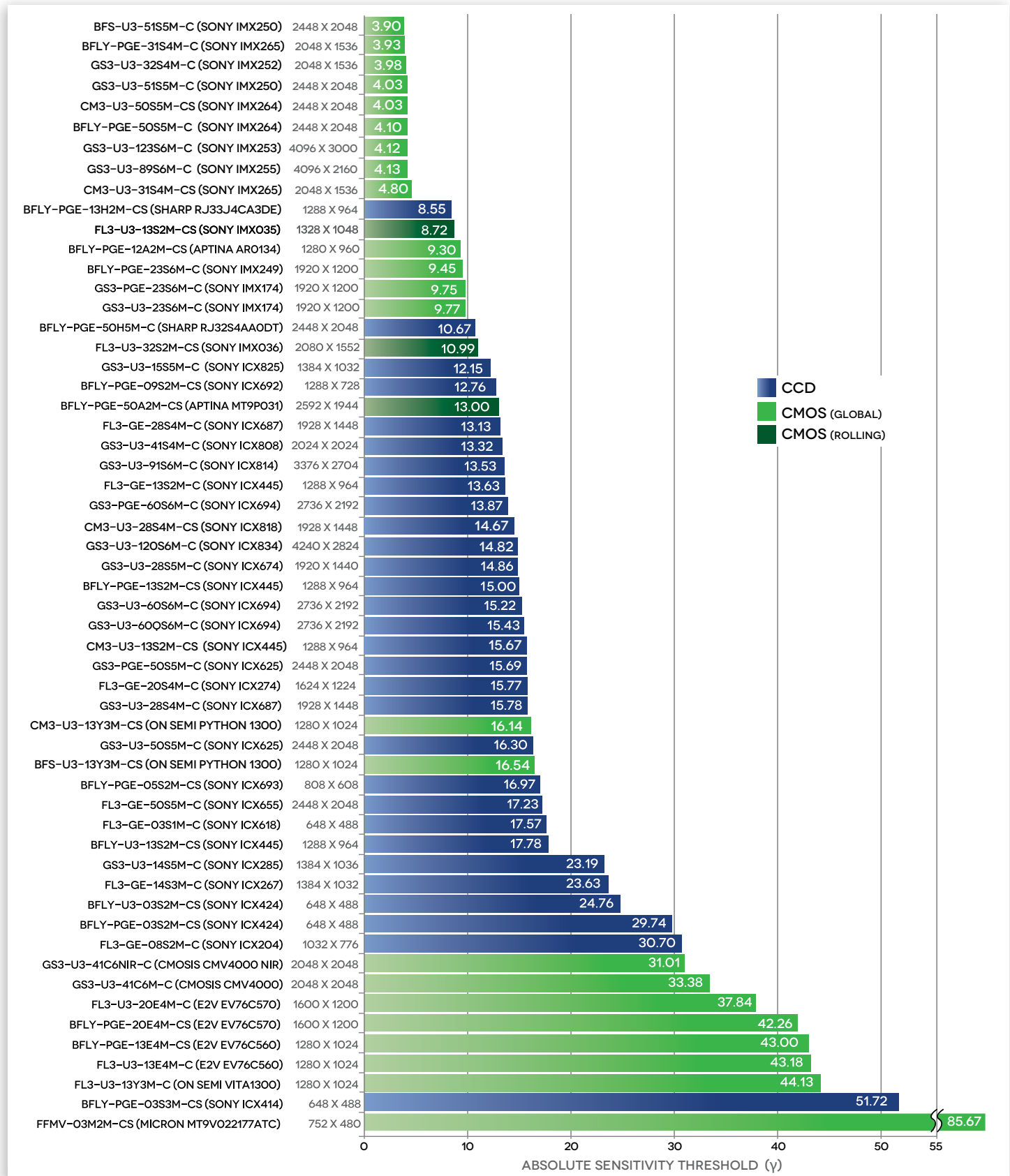
NEAR IR QE (%) (HIGHER IS BETTER)



MONO SINGLE LENS CAMERAS

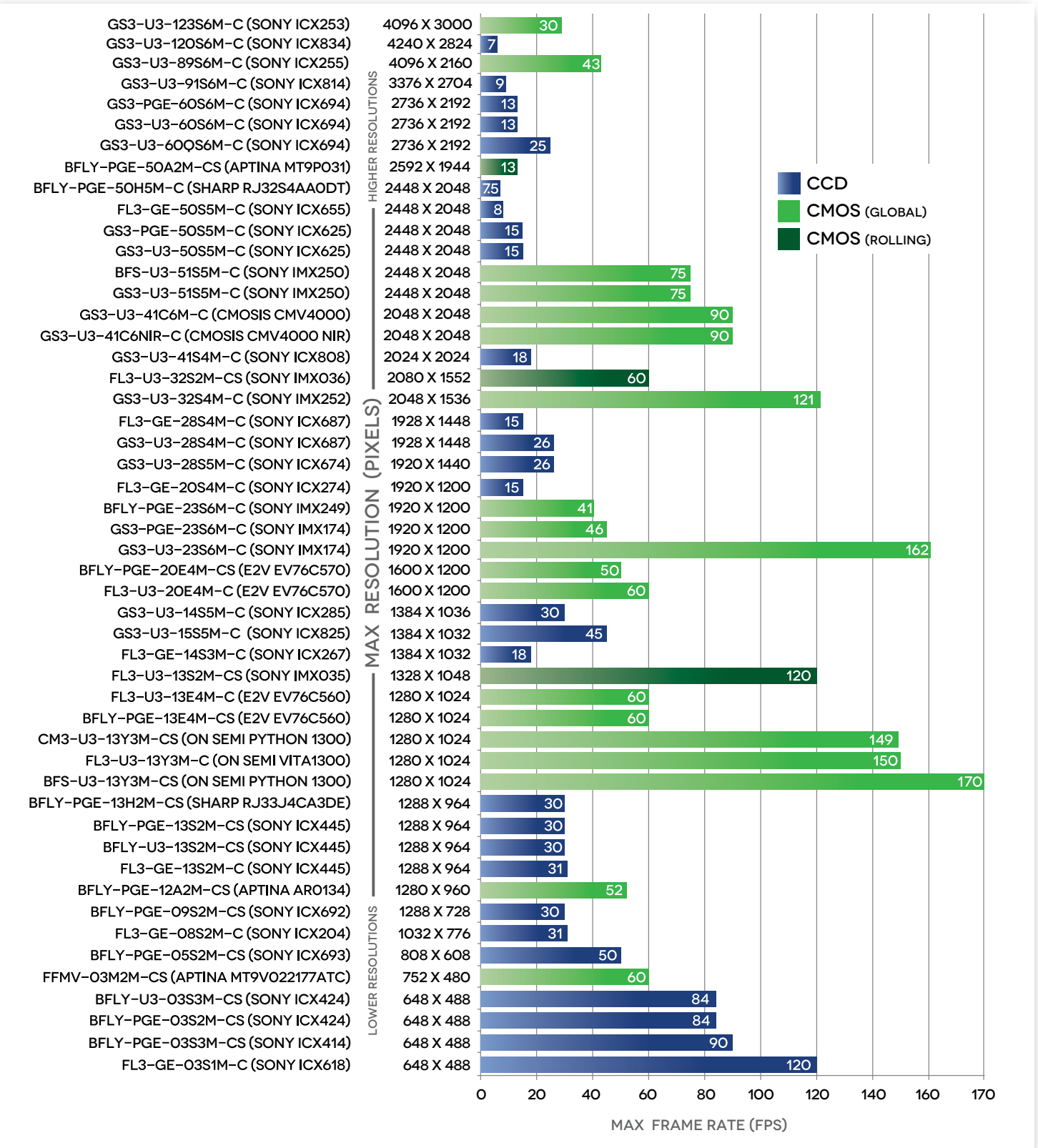
ABSOLUTE SENSITIVITY THRESHOLD (γ) (LESS IS BETTER)

Absolute sensitivity threshold is the minimum number of photons needed to equal the noise level. The lower the number the less light is needed to detect useful imaging data.



MONO SINGLE LENS CAMERAS

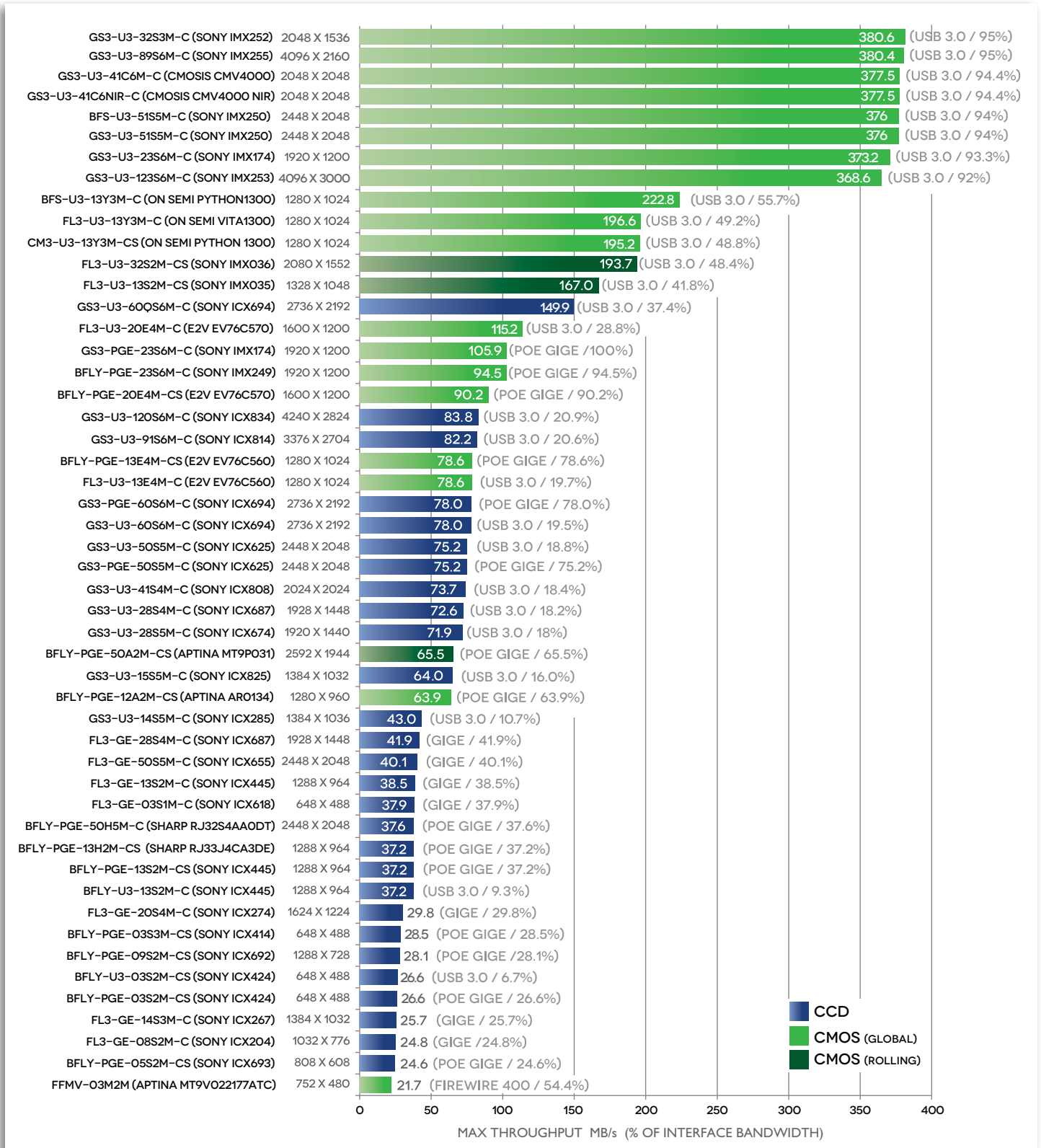
MAX RESOLUTION TO MAX FRAME RATE



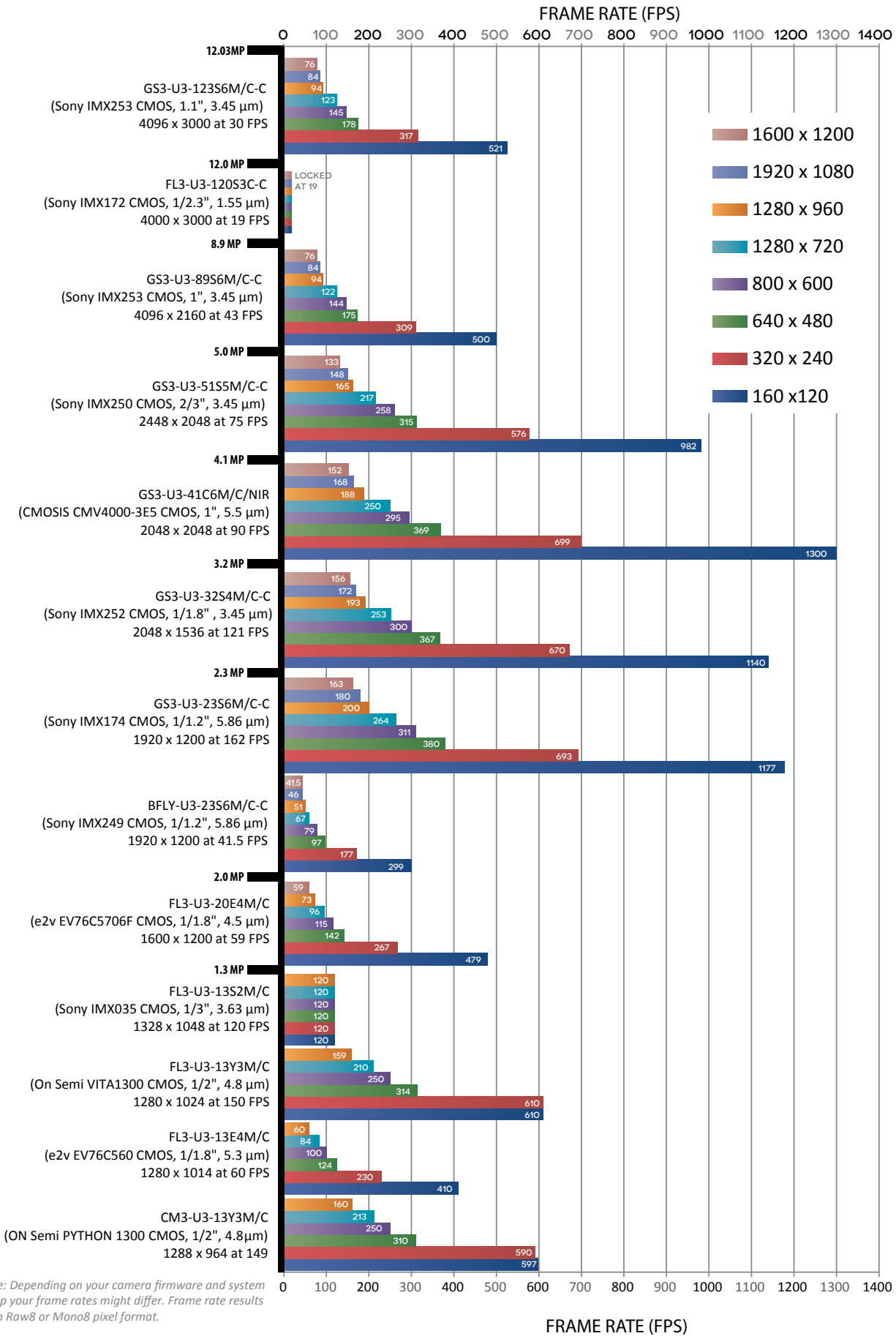
MONO SINGLE LENS CAMERAS

CAMERA THROUGHPUT (MB/s) AND % OF INTERFACE BANDWIDTH

When considering multi-camera setups bandwidth considerations are a must. We calculated the maximum throughput (MB/s) by multiplying the maximum resolution by the maximum frame rate (note: to simplify these calculations an image data format of Mono8 was used). In addition we added the percentage of interface bandwidth which the camera model pumped out. For those calculations we used 400 MB/s for USB 3.0, 100 MB/s for GigE, 80 MB/s for FireWire 800, and 40 MB/s for both FireWire 400 and USB 2.0.

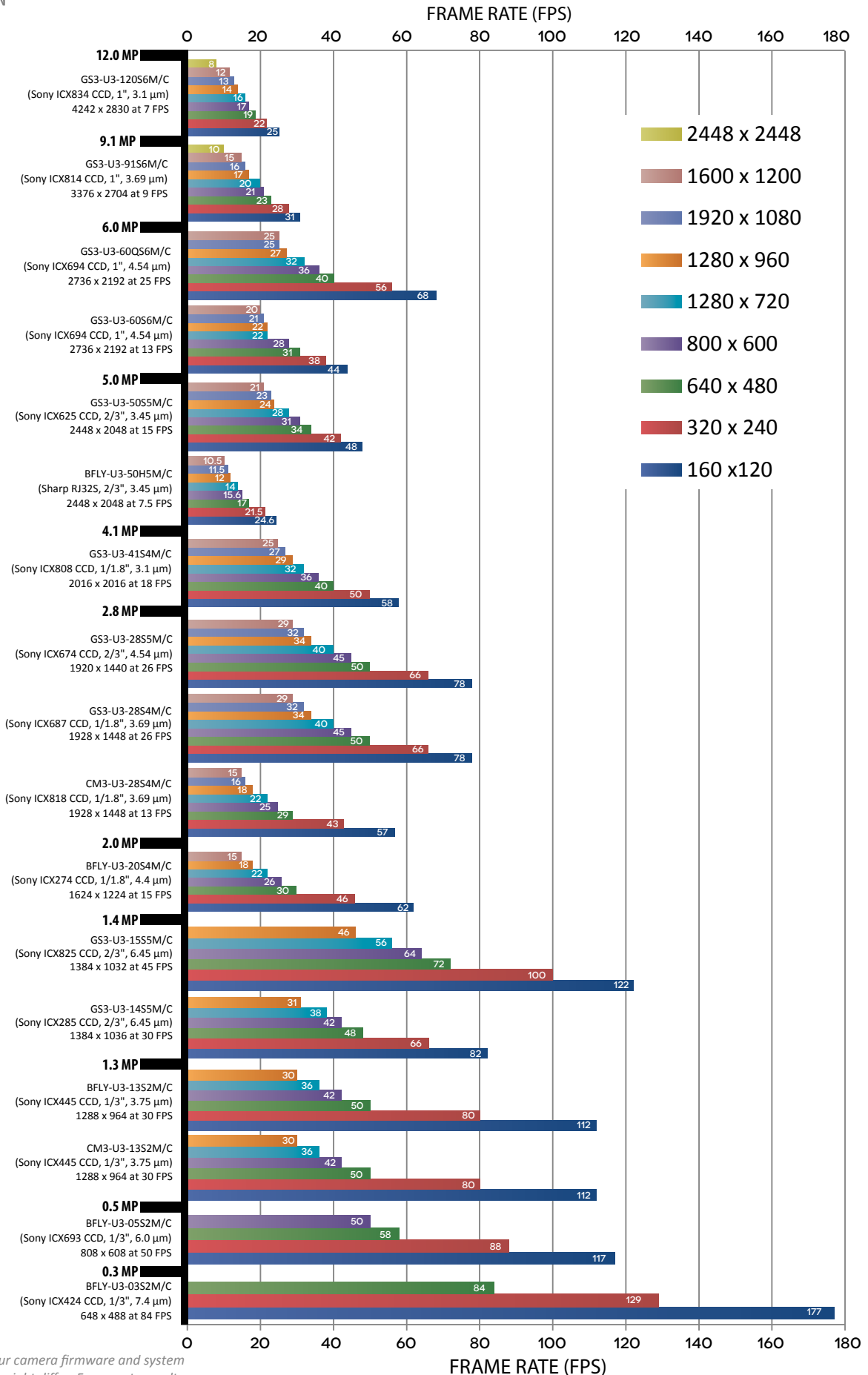


USB 3.0 CMOS Resolution vs Frame Rate Chart

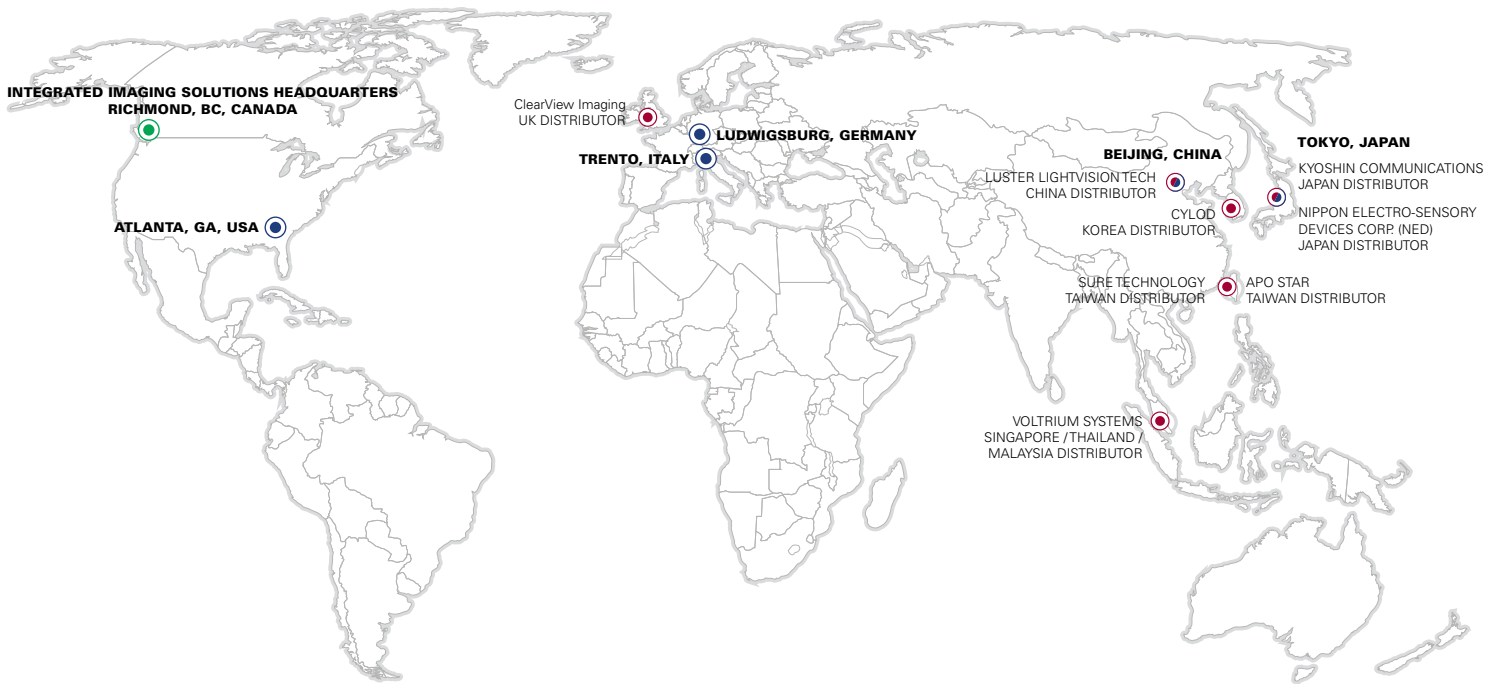


Note: Depending on your camera firmware and system setup your frame rates might differ. Frame rate results from Raw8 or Mono8 pixel format.

USB 3.0 CCD Resolution vs Frame Rate Chart



Note: Depending on your camera firmware and system setup your frame rates might differ. Frame rate results from Raw8 or Mono8 pixel format.



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