

## User Manual for Machine Vision Cameras



20250329

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# 1 Product List

## 1.1 Product Description

- Sony / Gpixel / ONSEMI and other high-quality imaging chips;
- Supports multiple interfaces such as USB3 / GigE / CameraLink / CXP;
- Built-in hardware image processing engine to ensure image restoration and camera speed;
- Supports external triggering, software and capture modes;
- Supports ROI, flip, bit-depth switching and other features;
- Suitable for wide temperature range, low power consumption, stable performance;
- Supports firmware worksite upgrading;
- Provides advanced video and image processing application software TouView, compatible with Windows/Linux/OSX multi-platform SDK, support native C/C++, C#/VB.Net, DirectShow, Twain API;
- Compliant with CE, FCC requirements.

Camera series	Main feature
MAX	Equipped with Sony Exmor CMOS or GSENSE series high-performance large pixel or full-frame image sensor. Data interfaces support USB3, CXP, and 10 Gigabit Ethernet. Resolution covering 4.2M~251M, chip size across 1.2"~4.2". The response spectrum supports visible light, NIR, UV. Cooling: 40 degrees lower than the ambient temperature.
ITR3CMOS	Resolution covering 0.5M~45M, chip size across 1"~1.8". The response spectrum supports visible light and UV. Cooling: 40 degrees lower than the ambient temperature.
CTR3CMOS	Resolution covering 0.39M~20M, chip size across 1/2.9"~4/3". Cooling: 10 degrees lower than the ambient temperature.
I3	Compact structure. Resolution covering 0.5M~20.4M, chip size across 1/2.9 "~1.1". The response spectrum supports visible light and UV.
IUA	High performance cost ratio. Resolution covering 0.39M~45M, chip size across 1/2.9"~4/3". The response spectrum supports visible light, NIR, UV. Various OEM structure sizes, suitable for various scenarios.
IUB	Select G-Pixel chip, chip size across 1/1.1"~1.7", has stopped production, products for the corresponding sensor can be found in the IUA series;
IUC	Resolution covering 1.7M~60M, chip size across 1.1"~2.7" Data interfaces support USB3, CameraLink, 10 Gigabit Ethernet. The AF version accommodates the Canon EF lens autofocus function.
IUD	Choose ONSEMI chip, resolution of 16M/25M two options.

IUE	The large array flat panel detector is suitable for protein detection and chemiluminescence applications.
AVCAM	Analog camera, output interface is CVBS(PAL-N).

## 1.2 MAX Series Camera Specifications(18)

### 1.2.1 MAX Series USB3 Camera(12)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity Dark Signal Dynamic range /SNR	FPS/Resolution Bit depth	Binning	Exposure Time
MAX251AM-U3	251M/IMX811ALR(M,RS) 4.1"(66.24x44.16)	2.81x2.81	TBD	1.5@19200x12800	1x1	15us ~3600s
MAX251AC-U3	251M/IMX811AQR(C,RS) 4.1"(66.24x44.16)	2.81x2.81	TBD	1.5@19200x12800	1x1	15us ~3600s
MAX151AM-U3	151M/IMX411ALR(M,RS) 4.2"(53.30x40.01)	3.76x3.76	871mV with 1/30s 0.04mV with 1/30s	2.4@14176x10640 6.9@7072x5320 20.8@4704x3546 61.9@1568x1178	1x1 2x2 3x3 9x9	15us ~3600s
MAX151AC-U3	151M/IMX411AQR(C,RS) 4.2"(53.30x40.01)	3.76x3.76	485mV with 1/30s 0.04mV with 1/30s	2.4@14176x10640 6.9@7072x5320 20.8@4704x3546 61.9@1568x1178	1x1 2x2 3x3 9x9	15us ~3600s
MAX102AM-U3	102M/IMX461ALR(M,RS) 3.4"(43.80x32.87)	3.76x3.76	871mV with 1/30s 0.04mV with 1/30s	3.5@11648x8742 8.7@5824x4370 27.8@3872x2912 82.5@1280x970	1x1 2x2 3x3 9x9	15us ~3600s
MAX102AC-U3	102M/IMX461AQR(C,RS) 3.4"(43.80x32.87)	3.76x3.76	485mV with 1/30s 0.04mV with 1/30s	3.5@11648x8742 8.7@5824x4370 27.8@3872x2912 82.5@1280x970	1x1 2x2 3x3 9x9	15us ~3600s
MAX62AM MM1062A	61M/IMX455(M, RS) 2.7"(35.98x23.99) Full Frame	3.76x3.76	871mv with 1/30s 0.039mv with 1/30s 88.3dB/47.1dB	6.1@9568x6380(16bit) 19.1@4784x3190 55.6@3184x2124 191@1040x706 8 Bit / 16 Bit	1x1 2x2 3x3 9x9	0.1ms~1000s
MAX62AC MP1062AC	61M/IMX455(C, RS) 2.7"(35.98x23.99) Full Frame	3.76x3.76	485mv with 1/30s 0.04mv with 1/30s 85.8dB/47.0dB	6.1@9568x6380(16bit) 19.1@4784x3190 55.6@3184x2124 191@1040x706 8 Bit / 16 Bit	1x1 2x2 3x3 9x9	0.1ms~1000s
MAX24AC MP1024A	24M/IMX410(C, RS) 2.7"(36.02x24.00) Full Frame	5.94x5.94	573mv with 1/30s 0.04mv with 1/30s 87.3dB/50.2dB	15.3@6064x4040(14bit) 41@3024x2012 114@2016x1342 8 Bit / 14 Bit	1x1 2x2 3x3	0.1ms~1000s
MAX04AM MM1004A	4.2M/GSENSE2020e(M,NIR ,RS) 1.2"(13.31x13.31)	6.5x6.5	$8.1 \times 10^7$ (e- /((W/m <sup>2</sup> ).s)) Peak QE 64.2% @595nm 0.12(e-/s/pix) @- 10C° 81.6dB/46.5dB	45@2048x2048 45@1024 x 1024 8 Bit / HDR 16 Bit	1x1 2x2	0.1ms~1000s
MAX04BM MM1004B	4.2M/GSENSE2020BSI(M, UV,RS) 1.2"(13.31x13.31)	6.5x6.5	$1.1 \times 10^8$ (e- /((W/m <sup>2</sup> ).s)) Peak QE 93.7% @550nm 0.15(e-/s/pix) @- 15C° 79.1dB/47dB	45@2048 x2048 45@1024 x1024 8 Bit / HDR 16 Bit	1x1 2x2	0.1ms~1000s
MAX04CM MM1004C	4.2M/GSENSE400BSI(M,U V,RS) 2.0"(22.53x22.53)	11x11	$3.25 \times 10^8$ (e- /((W/m <sup>2</sup> ).s)) Peak QE 95.3% @560nm 1.5(e-/s/pix) @- 10C° 93.9dB/48.8dB	44@2048 x2048 44@1024 x1024 8 Bit / HDR 16 Bit	1x1 2x2	0.1ms~1000s

\*C: Color; M: Mono; UV: Ultraviolet; NIR: Near Infrared Ray; RS: Rolling shutter; GS: Global shutter; U3: USB3 port.

### 1.2.2 MAX Series GigE Camera(6)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity Dark Signal Dynamic range/SNR	FPS/Resolution Bit depth	Binning	Exposure Time
MAX251AM-10G	251M/IMX811ALR(M,RS) 4.1”	2.81x2.81	TBD	1.5@19200x12800	1x1	15us ~3600s
MAX251AC-10G	251M/IMX811AQR(M,RS) 4.1”	2.81x2.81	TBD	1.5@19200x12800	1x1	15us ~3600s
MAX151AM-10G	151M/IMX411ALR(M,RS) 4.2”(53.30x40.01)	3.76x3.76	871mV with 1/30s 0.04mV with 1/30s	6.1@14176x10640 6.9@7072x5320 20.8@4704x3546 61.9@1568x1178	1x1 2x2 3x3 9x9	15us ~3600s
MAX151AC-10G	151M/IMX411AQR(C,RS) 4.2”(53.30x40.01)	3.76x3.76	485mV with 1/30s 0.04mV with 1/30s	6.1@14176x10640 6.9@7072x5320 20.8@4704x3546 61.9@1568x1178	1x1 2x2 3x3 9x9	15us ~3600s
MAX102AM-10G	102M/IMX461ALR(M,RS) 3.4”(43.80x32.87)	3.76x3.76	871mV with 1/30s 0.04mV with 1/30s	8.7@11648x8742 8.7@5824x4370 27.8@3872x2912 82.5@1280x970	1x1 2x2 3x3 9x9	15us ~3600s
MAX102AC-10G	102M/IMX461AQR(C,RS) 3.4”(43.80x32.87)	3.76x3.76	485mV with 1/30s 0.04mV with 1/30s	8.7@11648x8742 8.7@5824x4370 27.8@3872x2912 82.5@1280x970	1x1 2x2 3x3 9x9	15us ~3600s

\*C: Color; M: Mono; RS: Rolling shutter; GS: Global shutter; 10G: 10 Gigabit Ethernet port.

## 1.3 ITR3CMOS Series Camera Specifications(23)

### 1.3.1 ITR3CMOS Series USB3 Camera (17)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity Dark Signal	FPS/Resolution Bit depth	Binning	Exposure Time
ITR3CMOS45000KMA ITRM145000A	45M/IMX492(M,RS) 1.4"(18.93x13.00)	2.315x2.315	175mV with 1/30s 0.03mV with 1/30s	8.1@8176x5616 30.0@4080x2808 8.1@7408x5556 33.0@3696x2778 10.4@8176x4320 34.7@4096x2160 62.5@2048x1080 86.5@1360x720 8 Bit / 12 Bit	1x1(3:2) 2x2(3:2) 1x1(4:3) 2x2(4:3) 1x1(17:9) 2x2(17:9) 3x3(17:9) 4x4(17:9)	100μm~15 s
ITR3CMOS26000KPA ITRP126000A	26M/IMX571(C, RS) 1.8"(23.48x15.67) APS-C	3.76x3.76	485mv with 1/30s 0.07mv with 1/30s	14@6224x4168 37@3104x2084 110@2064x1386 8 Bit / 16 Bit	1x1 2x2 3x3	150μm~15 s
ITR3CMOS26000KMA ITRM126000A	26M/IMX571(M, RS) 1.8 "(23.48x15.67) APS-C	3.76x3.76	871mv with 1/30s 0.07mv with 1/30s	14@6224x4168 37@3104x2084 110@2064x1386 8 Bit / 16 Bit	1x1 2x2 3x3	150μm~15 s
ITR3CMOS21000KPA ITRP121000A	21M/IMX269(C) 4/3"(17.4x13.1)	3.3x3.3	400mv with 1/30s 0.1mv with 1/30s	17@5280x3954 17@3952x3952 56@2640x1976 67@1760x1316 192@584x438 8 Bit / 12 Bit	1x1 1x1 2x2 3x3 9x9	100μm~15 s
ITR3CMOS20000KPA ITRP120000A	20M/IMX183(C,RS) 1 "(13.056x8.755)	2.4x2.4	462mv with 1/30s 0.21mv with 1/30s	19.0@5440x3648 48.8@2736x1824 59.4@1824x1216 8 Bit / 12 Bit	1x1 2x2 3x3	53μm~15s
ITR3CMOS20000KMA ITRM120000A	20M/IMX183(M,RS) 1 "(13.056x8.755)	2.4x2.4	777mv with 1/30s 0.21mv with 1/30s (F8.0)	19.0@5440x3648 48.8@2736x1824 59.4@1824x1216 8 Bit / 12 Bit	1x1 2x2 3x3	53μm~15s
ITR3CMOS10300KPA ITRP110300A	10.3M/IMX294(C,RS) 4/3 "(9.56x6.5)	2.315x2.315	419mv with 1/30s 0.12mv with 1/30s	30.0@4128x2808 38.5 @4096x2160 59.8@2048x1080 87.2@1360x720 8 Bit / 14 Bit	1x1 1x1 2x2 3x3	150μm~15 s
ITR3CMOS10300KMA ITRM110300A	10.3M/IMX492(M,RS) 1.4 "(9.56x6.5)	2.315x2.315	175mv with 1/30s 0.12mv with 1/30s	30.0@4128*2808 38.5 @4096*2160 59.8@2048*1080 87.2@1360*720 8 Bit / 14 Bit	1x1 1x1 2x2 3x3	150μm~15 s
ITR3CMOS09000KPA ITRP109000A	9M/IMX533(C,RS) 1"(11.28x11.28)	3.76x3.76	534mv with 1/30s 0.04mv with 1/30s	40@2992x3000 62@1488x1500 186@992x998 8 Bit / 14 Bit	1x1 2x2 3x3	100μm~15 s
ITR3CMOS09000KMA ITRM109000A	9M/IMX533(M,RS) 1"(11.28x11.28)	3.76x3.76	877mv with 1/30s 0.04mv with 1/30s	40@2992x3000 62@1488x1500 186@992x998 8 Bit / 14 Bit	1x1 2x2 3x3	100μm~15 s
ITR3CMOS08300KPA ITRP108300A	8.3M/IMX585(C,RS) 1/1.2"(11.14x6.26)	2.9x2.9	5970mv with 1/30s 0.13mv with 1/30s	45@3840x2160 70@1920x1080 8 Bit / 12 Bit	1x1 2x2	30μm~15s
ITR3CMOS07100KPA ITRP107100A	7.0M/IMX428(C,GS) 1.1 "(14.4x9.9)	4.5x4.5	2058mv with 1/30s 0.15mv with 1/30s	51.3@3200x2200 133.8@1584x1100 8 Bit / 12 Bit	1x1 1x1	6μm~15s
ITR3CMOS07100KMA ITRM107100A	7.0M/IMX428(M,GS) 1.1 "(14.4x9.9)	4.5x4.5	3354mv with 1/30s 0.15mv with 1/30s	51.3@3200x2200 133.8@1584x1100 8 Bit / 12 Bit	1x1 1x1	6μm~15s
ITR3CMOS01700KPA ITRP101700A	1.7M/IMX432(C,GS) 1.1 "(14.4x9.9)	9.0x9.0	4910mv with 1/30s 0.3mv with 1/30s	98.6@1600x1100 8 Bit / 12 Bit	1x1	6μm~15s
ITR3CMOS01700KMA ITRM101700A	1.7M/IMX432(M,GS) 1.1 "(14.4x9.9)	9.0x9.0	8100mv with 1/30s 0.3mv with 1/30s	98.6@1600x1100 8 Bit / 12 Bit	1x1	6μm~15s
ITR3CMOS01300KMA ITRM101300A	1.3M/GLUX9701BSI (M,UV,RS) 1 "(12.493x9.994)	9.76x9.76	2.57x10 <sup>6</sup> (e- /(W/m <sup>2</sup> ).s)) QE89%@610nm 0.08(e-/s/pix) @-	30fps@1280x1024 30fps@640x512 8 Bit / HDR 16 Bit	1x1 2x2	63μm~60s

			28C			
ITR3CMOS00500KMA ITRM100500A	0.5M/GLUX1605BSI (M,UV,RS) 1 "(12.8x9.6)	16.0x16.0	6.4x108e- /((W/m <sup>2</sup> ).s)) QE95%@560nm 50(e-/s/pix)	60.0@800x600 60.0@400x300 8 Bit / HDR 16 Bit	1x1 2x2	27μm~60s

\*C: Color; M: Mono; UV: Ultraviolet; RS: Rolling shutter; GS: Global shutter.

### 1.3.2 ITR3CMOS Series GigE Camera (6)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity Dark Signal	FPS/Resolution Bit depth	Binning	Exposure Time
ITR3CMOS20000KMA-G	20M/IMX183(M,RS) 1 "(13.056x8.755)	2.4x2.4	777mv with 1/30s 0.21mv with 1/30s	4.5@5440x3648 18.5@2736x1824 41.7@1824x1216 8 Bit / 12 Bit	1x1 2x2 3x3	53us~15s
ITR3CMOS20000KPA-G	20M/IMX183(C,RS) 1 "(13.056x8.755)	2.4x2.4	462mv with 1/30s 0.21mv with 1/30s	4.5@5440x3648 18.5@2736x1824 41.7@1824x1216 8 Bit / 12 Bit	1x1 2x2 3x3	53us~15s
ITR3CMOS07100KMA-G	7.0M/IMX428(M,GS) 1.1 "(14.4x9.9)	4.5x4.5	3354mv with 1/30s 0.15mv with 1/30s	16.4fps@3200×2200 66fps@1600×1100 8 Bit / 12 Bit	1x1 1x1	6us~15s
ITR3CMOS07100KPA-G	7.0M/IMX428(C,GS) 1.1 "(14.4x9.9)	4.5x4.5	2058mv with 1/30s 0.15mv with 1/30s	16.4fps@3200×2200 66fps@1600×1100 8 Bit / 12 Bit	1x1 1x1	6us~15s
ITR3CMOS01700KMA-G	1.7M/IMX432(M,GS) 1.1 "(14.4x9.9)	9.0x9.0	8100mv with 1/30s 0.3mv with 1/30s	66fps@1600×1100 8 Bit / 12 Bit	1x1	6us~15s
ITR3CMOS01700KPA-G	1.7M/IMX432(C,GS) 1.1 "(14.4x9.9)	9.0x9.0	4910mv with 1/30s 0.3mv with 1/30s	66fps@1600×1100 8 Bit / 12 Bit	1x1	6us~15s

\*C: Color; M: Mono; RS: Rolling shutter; GS: Global shutter; G: 1 Gigabit Ethernet port.

## 1.4 CTR3CMOS Series Camera Specifications(15)

### 1.4.1 CTR3CMOS Series USB3 Camera (9)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity Dark Signal	FPS/Resolution Bit depth	Binning	Exposure Time
CTR3CMOS00390KMA CTRM100390A	0.39M/IMX287(M,GS) 1/2.9"(4.97x3.73)	6.9x6.9	7320mV with 1/30s 0.76mV with 1/30s	20fps@720x540 8 Bit / 12 Bit	1x1	6us~300s
CTR3CMOS00503KMA CTRM100503A	0.5M/IMX426(M,GS) 1/1.7"(7.2x5.58)	9.0x9.0	8100mV with 1/30s 0.3mV with 1/30s	20fps@800x620 8 Bit / 12 Bit	1x1	6us~300s
CTR3CMOS01700KPA CTRP101700A	1.7M/IMX432(C,GS) 1.1 "(14.4x9.9)	9.0x9.0	4910mv with 1/30s 0.3mv with 1/30s	98.6fps@1600x1100 8 Bit / 12 Bit	1x1	6us~300s
CTR3CMOS01700KMA CTRM101700A	1.7M/IMX432(M,GS) 1.1 "(14.4x9.9)	9.0x9.0	8100mv with 1/30s 0.3mv with 1/30s	98.6fps@1600x1100 8 Bit / 12 Bit	1x1	6us~300s
CTR3CMOS07100KPA CTRP107100A	7.0M/IMX428(C,GS) 1.1 "(14.4x9.9)	4.5x4.5	2058mv with 1/30s 0.15mv with 1/30s	51.3fps@3200x2200 133.8fps@1584x1100 8 Bit / 12 Bit	1x1 1x1	6us~300s
CTR3CMOS07100KMA CTRM107100A	7.0M/IMX428(M,GS) 1.1 "(14.4x9.9)	4.5x4.5	3354mv with 1/30s 0.15mv with 1/30s	51.3fps@3200x2200 133.8fps@1584x1100 8 Bit / 12 Bit	1x1 1x1	6us~300s
CTR3CMOS20000KPA CTRP120000A	20M/IMX183(C,RS) 1 "(13.056x8.755)	2.4x2.4	462mv with 1/30s 0.21mv with 1/30s	19.0@5440x3648 48.8@2736x1824 59.4@1824x1216 8 Bit / 12 Bit	1x1 2x2 3x3	53us~300s
CTR3CMOS20000KMA CTRM120000A	20M/IMX183(M,RS) 1 "(13.056x8.755)	2.4x2.4	776mv with 1/30s 0.21mv with 1/30s	19.0@5440x3648 48.8@2736x1824 59.4@1824x1216 8 Bit / 12 Bit	1x1 2x2 3x3	53us~300s
CTR3CMOS45000KMA CTRM145000A	45M/IMX492(M,RS) 1.4"(18.93x13.00)	2.315x2.315	175mV with 1/30s 0.03mV with 1/30s	8.1@8176x5616 30.0@4080x2808 8.1@7408x5556 33.0@3696x2778 10.4@8176x4320 34.7@4096x2160 62.5@2048x1080 86.5@1360x720 8 Bit / 12 Bit	1x1(3:2) 2x2(3:2) 1x1(4:3) 2x2(4:3) 1x1(17:9) 2x2(17:9) 3x3(17:9) 4x4(17:9)	0.1ms~300s

\*C: Color; M: Mono; RS: Rolling shutter; GS: Global shutter.

### 1.4.2 CTR3CMOS Series GigE Camera (6)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity Dark Signal	FPS/Resolution Bit depth	Binning	Exposure Time
CTR3CMOS01700KPA-G	1.7M/IMX432(C,GS) 1.1 "(14.4x9.9)	9.0x9.0	4910mv with 1/30s 0.3mv with 1/30s	66fps@1600x1100 8 Bit / 12 Bit	1x1	6us~300s
CTR3CMOS01700KMA-G	1.7M/IMX432(M,GS) 1.1 "(14.4x9.9)	9.0x9.0	8100mv with 1/30s 0.3mv with 1/30s	66fps@1600x1100 8 Bit / 12 Bit	1x1	6us~300s
CTR3CMOS07100KPA-G	7.0M/IMX428(C,GS) 1.1 "(14.4x9.9)	4.5x4.5	2058mv with 1/30s 0.15mv with 1/30s	16.4fps@3200x2200 66fps@1600x1100 8 Bit / 12 Bit	1x1 1x1	6us~300s
CTR3CMOS07100KMA-G	7.0M/IMX428(M,GS) 1.1 "(14.4x9.9)	4.5x4.5	3354mv with 1/30s 0.15mv with 1/30s	16.4fps@3200x2200 66fps@1600x1100 8 Bit / 12 Bit	1x1 1x1	6us~300s
CTR3CMOS20000KPA-G	20M/IMX183(C,RS) 1 "(13.056x8.755)	2.4x2.4	462mv with 1/30s 0.21mv with 1/30s	4.5@5440x3648 18.5@2736x1824 41.7@1824x1216 8 Bit / 12 Bit	1x1 2x2 3x3	53us~300s
CTR3CMOS20000KMA-G	20M/IMX183(M,RS) 1 "(13.056x8.755)	2.4x2.4	776mv with 1/30s 0.21mv with 1/30s	4.5@5440x3648 18.5@2736x1824 41.7@1824x1216 8 Bit / 12 Bit	1x1 2x2 3x3	53us~300s

\*C: Color; M: Mono; RS: Rolling shutter; GS: Global shutter; G: 1 Gigabit Ethernet port.





### 1.5.3 I3 Series CoaXPress Camera

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure Time
I3CMOS05100KMB-CXP	5.1M/IMX547-AAMJ-C(M,GS) 1/1.8"(6.71x5.61)	2.74x2.74	2252mv with 1/30s 0.15mv with 1/30s	109fps@2432x2048(8bit) 74fps@2432x2048(12bit)	2x2 3x3 4x4	30μs~15s

C: Color; M: Mono; RS: Rolling shutter; GS: Global shutter; CXP:CoaXPress Interface.

## 1.6 IUA Series Camera Specifications(Small size, common visible and special bands, 55)

### 1.6.1 IUA Series USB3 Camera (55)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure Time
IUA390KMA	0.39M/IMX287LLR(M,GS) 1/2.9“(4.97x3.73)	6.9x6.9	7320mv with 1/30s 0.76mv with 1/30s	101.5fps@720×540	1x1	6us~15s
IUA503KMA	0.5M/IMX426LLJ(M,GS) 1/1.7“(7.2x5.58)	9.0x9.0	8100mv with 1/30s 0.3mv with 1/30s	79.8fps@800×620	1x1	6us~15s
IUA503KMB	0.5M/IMX433LLJ(M,GS) 1/1.7“(7.2x5.58)	9.0x9.0	8100mv with 1/30s 0.3mv with 1/30s	79.8fps@800×620	1x1	6us~15s
IUA1500KMA	1.5M/IMX273LLR(C,GS) 1/2.9“(4.97x3.73)	3.45×3.45	1830mv with 1/30s 0.15mv with 1/30s	235.5fps@1440×1080 523fps@720×540	1x1 1x1	15us~15s
IUA1500KPA	1.5M/IMX273LQR(C,GS) 1/2.9“(4.97x3.73)	3.45×3.45	1146mv with 1/30s 0.15mv with 1/30s	235.5fps@1440×1080 523fps@720×540	1x1 1x1	15us~15s
IUA1700KMA	1.7M/IMX432LLJ(M,GS) 1.1“(14.4x9.9)	9.0x9.0	8100mv with 1/30s 0.3mv with 1/30s	98.6fps@1600×1100	1x1	6us~15s
IUA1700KPA	1.7M/IMX432LQJ(C,GS) 1.1“(14.4x9.9)	9.0x9.0	4910mv with 1/30s 0.3mv with 1/30s	98.6fps@1600×1100	1x1	6us~15s
IUA1700KMB	1.7M/IMX425LLJ(M,GS) 1.1“(14.4x9.9)	9.0x9.0	8100mv with 1/30s 0.3mv with 1/30s	210fps@1600×1100	1x1	6us~15s
IUA1700KPB	1.7M/IMX425LQJ(C,GS) 1.1“(14.4x9.9)	9.0x9.0	4910mv with 1/30s 0.3mv with 1/30s	210fps@1600×1100	1x1	6us~15s
IUA2300KMA	2.3M/IMX174LLJ(M,GS) 1/1.2“(11.25x7.03)	5.86x5.86	1650mv with 1/30s 0.15mv with 1/30s	164.5fps@1920×1200	1x1	15us~15s
IUA2300KPA	2.3M/IMX174LQJ(C,GS) 1/1.2“(11.25x7.03)	5.86x5.86	1016mv with 1/30s 0.15mv with 1/30s	164.5fps@1920×1200	1x1	15us~15s
IUA2300KMB	2.3M/IMX249LLJ(M,GS) 1/1.2“(11.25x7.03)	5.86x5.86	1650mv with 1/30s 0.15mv with 1/30s	30fps@1920×1200	1x1	42us~15s
IUA2300KPB	2.3M/IMX249LQJ(C,GS) 1/1.2“(11.25x7.03)	5.86x5.86	1016mv with 1/30s 0.15mv with 1/30s	30fps@1920×1200	1x1	42us~15s
IUA2800KMA	2.8M/IMX421LLJ(M,GS) 2/3“(8.71x6.59)	4.5x4.5	3354mv with 1/30s 0.15mv with 1/30s	121fps@1936×1464 425fps@968×732	1x1 1x1	6us~15s
IUA2800KPA	2.8M/IMX421LQJ(C,GS) 2/3“(8.71x6.59)	4.5x4.5	2058mv with 1/30s 0.15mv with 1/30s	121fps@1936×1464 425fps@968×732	1x1 1x1	6us~15s
IUA5000KMA	5.0M/IMX264LLR(M,GS) 2/3“(8.45x7.07)	3.45×3.45	1830mv with 1/30s 0.15mv with 1/30s	35.6fps@2448×2048 87.6fps@1224×1024	1x1 1x1	15us~15s
IUA5000KPA	5.0M/IMX264LQR(C,GS) 2/3“(8.45x7.07)	3.45×3.45	1146mv with 1/30s 0.15mv with 1/30s	35.6fps@2448×2048 87.6fps@1224×1024	1x1 1x1	15us~15s
IUA5100KMA	5.1M/IMX547-AAMJ-C(M,GS) 1/1.8“(6.71x5.61)	2.74x2.74	2252mv with 1/30s 0.15mv with 1/30s	63fps@2448×2048 208.4fps@1224×1024	1x1 2x2	30us~15s
IUA5100KPA	5.1M/IMX547-AAQJ-C(C,GS) 1/1.8“(6.71x5.61)	2.74x2.74	1337mv with 1/30s 0.15mv with 1/30s	63fps@2448×2048 159fps@1224×1024	1x1 2x2	30us~15s
IUA6300KMA	6.3M/IMX178LLJ(M,RS) 1/1.8“(7.37x4.92)	2.4x2.4	760mv with 1/30s 0.15mv with 1/30s	59.9fps@3072×2048 59.9fps@1536×1024	1x1 2x2	17us~15s
IUA6300KPA	6.3M/IMX178LQJ(C,RS) 1/1.8“(7.37x4.92)	2.4x2.4	425mv with 1/30s 0.15mv with 1/30s	59.8fps@3072×2048 59.5fps@1536×1024	1x1 2x2	17us~15s
IUA7100KMA	7.1M/IMX428LLJ(M,GS) 1.1“(14.4x9.9)	4.5x4.5	3354mv with 1/30s 0.15mv with 1/30s	51.3fps@3200×2200 133.8fps@1584×1100	1x1 1x1	6us~15s

IUA7100KPA	7.1M/IMX428LQJ(C,GS) 1.1“(14.4x9.9)	4.5x4.5	2058mv with 1/30s 0.15mv with 1/30s	51.4fps@3200x2200 133.8fps@1584x1100	1x1 1x1	6us~15s
IUA8000KMB	8.0M/IMX546-AAMJ(M,GS) 2/3“ (7.78x7.78)	2.74x2.74	2649mv/lx/s 0.25mv with 1/30s	41fps@2840x2840 118fps@1420x1420	1x1 1x1	30us~15s
IUA8000KPB	8.0M/IMX546-AAQJ(C,GS) 2/3“ (7.78x7.78)	2.74x2.74	1574mv/lx/s 0.15mv with 1/30s	41fps@2840x2840 118fps@1420x1420	1x1 1x1	30us~15s
IUA8300KPA	8.3M/IMX485LQJ-C(C,RS) 1/1.2“ (11.14x6.26)	2.9x2.9	2188mv with 1/30s 0.15mv with 1/30s	45fps@3840x2160 70fps@1920x1080	1x1 1x1	30us~15s
IUA8300KMB	8.3M/IMX585-AAMJ1-C(M,RS) 1/1.2“ (11.14x6.26)	2.9x2.9	19120mv with 1/30s 0.13mv with 1/30s	45fps@3840x2160 70fps@1920x1080	1x1 1x1	30us~15s
IUA8300KPB	8.3M/IMX585-AAQJ1-C(C,RS) 1/1.2“ (11.14x6.26)	2.9x2.9	5970mv with 1/30s 0.13mv with 1/30s	45fps@3840x2160 70fps@1920x1080	1x1 1x1	30us~15s
IUA8300KME	8.3M/IMX678-AAMR1-C(M, RS) 1/1.8“ (7.68x4.32)	2.0x2.0	11288mv with 1/30s 0.15mv with 1/30s	45fps@3840x2160 70fps@1920x1080	1x1 1x1	30us~15s
IUA8300KPE	8.3M/IMX678-AAQR1-C(C, RS) 1/1.8“ (7.68x4.32)	2.0x2.0	3541mv with 1/30s 0.15mv with 1/30s	45fps@3840x2160 70fps@1920x1080	1x1 1x1	30us~15s
IUA10300KPA	10.3M/IMX294(C,RS) 4/3 “(9.56x6.5)	2.315x2.315	419mv with 1/30s 0.12mv with 1/30s	30.0@4128x2808 38.5 @4096x2160 59.8 @2048x1080 87.2 @1360x720 8 Bit / 14 Bit	1x1 1x1 2x2 3x3	150us~15s
IUA12000KPA	12M/IMX676-AACR1-C(C,RS) 1/1.6“ (7.07x7.07)	2.0x2.0	3637mv 0.15mv with 1/30s	27@3536x3536 60@1768x1768	1x1 2x2	30us~15s
IUA12300KMA	12.3M/IMX545-AAMJ-C(M,GS) 1/1.1“ (11.22x8.22)	2.74x2.74	2252mv with 1/30s 0.15mv with 1/30s	28.2fps@4096x3000 100.9fps@2048x1500 100.9fps@1024x750	1x1 2x2 4x4	30us~15s
IUA12300KPA	12.3M/IMX545-AAQJ-C(C, GS) 1/1.1“ (11.22x8.22)	2.74x2.74	1337mv with 1/30s 0.15mv with 1/30s	28.2fps@4096x3000 100.9fps@2048x1500 100.9fps@1024x750	1x1 2x2 4x4	30us~15s
IUA12300KMB	12.3M/IMX304LLR-C(M,GS) 1.1“(14.13x10.35)	3.45×3.45	1830mv with 1/30s 0.15mv with 1/30s	23.4fps@4096x3000 46.3fps@2048x1500 46.3fps@1024x750	1x1 2x2 4x4	30us~15s
IUA12300KPB	12.3M/IMX304LQR-C(C, GS) 1.1“(14.13x10.35)	3.45×3.45	1146mv with 1/30s 0.15mv with 1/30s	23.4fps@4096x3000 46.3fps@2048x1500 46.3fps@1024x750	1x1 2x2 4x4	30us~15s
IUA20000KMA	20.0M/IMX183CLK(M,RS) 1“(13.06x8.84)	2.4x2.4	777mv with 1/30s 0.2mv with 1/30s	19.0fps@5440x3684 49.9fps@2736x1824 59.5fps@1824x1216	1x1 2x2 3x3	53us~15s
IUA20000KPA	20.0M/IMX183CQK(C,RS) 1“ (13.06x8.84)	2.4x2.4	462mv with 1/30s 0.2mv with 1/30s	19.0fps@5440x3684 48.8fps@2736x1824 59.4fps@1824x1216	1x1 2x2 3x3	53us~15s
IUA20400KMA	20.4M/IMX541-AAMJ-C(M,GS) 1.1“(12.32x12.32)	2.74x2.74	2649mv with 1/30s 0.15mv with 1/30s	17.5fps@4496x4496 64.4fps@2240x2240 64.4fps@1120x1120	1x1 2x2 4x4	30us~15s
IUA20400KPA	20.4M/IMX541-AAQJ-C(C,GS) 1.1“(12.32x12.32)	2.74x2.74	1574mv with 1/30s 0.15mv with 1/30s	17.5fps@4496x4496 64.4fps@2240x2240 64.4fps@1120x1120	1x1 2x2 4x4	30us~15s
IUA24500KMA	24.5M/IMX540-AAMJ-C(M,GS) 1.2“(14.58x12.60)	2.74x2.74	2649mv with 1/30s 0.15mv with 1/30s	14.7fps@5320x4600 54.3fps@2660x2300	1x1 2x2 4x4	30us~15s
IUA24500KPA	24.5M/IMX540-AAQJ-C(C,GS) 1.2“(14.58x12.60)	2.74x2.74	1574mv with 1/30s 0.15mv with 1/30s	14.7fps@5320x4600 54.4fps@2660x2300	1x1 2x2 4x4	30us~15s
IUA25000KMA	25M/GMAX0505(M, GS) 1.1“ (12.8x12.8)	2.5x2.5	QE@500nm: 65.8% 2.4e-/pixel/s	13fps@5120x5120 27fps@2560x2560 54fps@1280x1280	1x1 2x2 4x4	15us~15s
IUA25000KPA	25M/GMAX0505(C, GS) 1.1“ (12.8x12.8)	2.5x2.5	QE@520nm: 58.0% 2.4e-/pixel/s	13fps@5120x5120 27fps@2560x2560 54fps@1280x1280	1x1 2x2 4x4	15us~15s
IUA45000KMA	45M/IMX492LLJ-C(M,RS) 1.4“(19.11x13.00)	2.315x2.315	176mv with 1/30s 0.03mv with 1/30s	8.1@8176x5616 30.0@4080x2808 8.1@7408x5556 33.0@3696x2778 10.4@8176x4320 34.7@4096x2160 62.5@2048x1080 86.5@1360x720	1x1 2x2 1x1 2x2 1x1 2x2 3x3 4x4	100us~15s

IUA4500KPB	45M/IMX492LQJ-C(C,RS) 1.4“(19.11x13.00)	2.315x2.315	176mv with 1/30s 0.03mv with 1/30s	8.1@8176x5616 8.1@7408x5556 10.4@8176x4320	1x1 2x2 1x1 2x2 1x1 2x2 3x3 4x4	100us~15s
<b>IUA - Special Bands (UV, NIR)</b>						
IUA2100KPA (NIR)	2.1M/IMX462LQR(C,RS,NIR) 1/2.8“(5.57x3.13)	2.9x2.9	2376mv with 1/30s 0.15mv with 1/30s	120.3fps@1920x1080	1x1	11us~15s
IUA4100KPA (NIR)	4.1M/IMX464LQR(C,RS,NIR) 1/1.8“(7.8x4.41)	2.9x2.9	2376mv with 1/30s 0.15mv with 1/30s	90fps@2688x1520	1x1	11us~15s
IUA500KMA (GPixel UV)	0.5M/GLUX1605BSI(M,UV,RS) 1“(12.8x9.6)	16x16	6.4x10 <sup>8</sup> (e-/(W/m <sup>2</sup> ).s)) QE91%@550nm 50(e-/s/pix)	60fps@800x600 60fps@400x300	1x1 2x2	27us~60s
IUA1300KMA (GPixel UV)	1.3M/GLUX9701BSI(M,UV,RS) 1“(12.49x9.99)	9.76x9.76	2.57x10 <sup>8</sup> (e-/(W/m <sup>2</sup> ).s)) QE89%@610nm 40(e-/s/pix)	30fps@1280x1024 30fps@640x512	1x1 2x2	63us~60s
IUA4200KMA (GPixel NIR)	4.2M/GSENSE2020e(M,NIR,RS) 1.2“(13.31x13.31)	6.5x6.5	8.1x10 <sup>7</sup> (e-/(W/m <sup>2</sup> ).s)) QE73%@595nm 13(e-/s/pix)	45fps@2048x2048 45fps@1024x1024	1x1 2x2	21us~60s
IUA4200KPA (GPixel NIR)	4.2M/GSENSE2020s(C,NIR,RS) 1.2“(13.31x13.31)	6.5x6.5	8.1x10 <sup>7</sup> (e-/(W/m <sup>2</sup> ).s)) QE64%@595nm 13(e-/s/pix)	45fps@2032x2046 45fps@1008x1022	1x1 2x2	50us~3600s
IUA4200KMB (GPixel UV)	4.2M/GSENSE2020BSI(M,UV,RS) 1.2“(13.31x13.31)	6.5x6.5	1.1x10 <sup>8</sup> (e-/(W/m <sup>2</sup> ).s)) QE93.7%@550nm 80(e-/s/pix)	32fps@2048x2048 32fps@1024x1024	1x1 2x2	12us~60s
IUA4200KME (GPixel UV)	4.2M/GSENSE400BSI(M,UV,RS) 2.0“(22.53x22.53)	11.0x11.0	3.25x10 <sup>8</sup> (e-/(W/m <sup>2</sup> ).s)) QE95.3%@560nm 345(e-/s/pix)	37fps@2048x2048 37fps@1024x1024	1x1 2x2	21us~60s
IUA8000KMA (GS-UV)	8.0M/IMX487-AAMJ(M,UV,GS) 2/3“(7.78x7.78)	2.74x2.74	145mv with 1/30s 0.15mv with 1/30s	45fps@2840x2840 198fps@1420x1420	1x1 2x2	30us~15s

\*C: Color; M: Mono; UV: Ultraviolet; RS: Rolling shutter; GS: Global shutter; NIR: Near Infrared Ray.

\* UV cameras can be removed from the glass, of which IUA8000KMA RG version please see 6.1.53.

## 1.6.2 IUA Series GIgE Camera (3)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure Time
IUA4200KMA-10G	4.2M/GSENSE2020e(M,NIR,RS) 1.2“(13.31x13.31)	6.5x6.5	8.1x10 <sup>7</sup> (e-/(W/m <sup>2</sup> ).s)) QE73%@595nm 13(e-/s/pix)	45fps@2048x2048 45fps@1024x1024	1x1 2x2	21μs~60s
IUA4200KMB-10G	4.2M/GSENSE2020BSI(M,UV,RS) 1.2“(13.31x13.31)	6.5x6.5	1.1x10 <sup>8</sup> (e-/(W/m <sup>2</sup> ).s)) QE93.7%@550nm 80(e-/s/pix)	100fps@2048x2048 100fps@1024x1024	1x1 2x2	12μs~60s
IUA4200KME-10G	4.2M/GSENSE400BSI(M,UV,RS) 2.0“(22.53x22.53)	11.0x11.0	3.25x10 <sup>8</sup> (e-/(W/m <sup>2</sup> ).s)) QE95.3%@560nm 345(e-/s/pix)	37fps@2048x2048 37fps@1024x1024	1x1 2x2	21μs~60s

\*C: Color; M: Mono; UV: Ultraviolet; RS: Rolling shutter; GS: Global shutter; 10G:10 Gigabit Ethernet shutter;

## 1.7 IUB Series Camera Specifications (End of life, not recommended 3)

### 1.7.1 IUB Series USB3 Camera(3)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure Time
IUB4200KMA <b>EOL</b>	4.2M/GSENSE2020e(M,RS) 1.2" (13.31x13.3)	6.5x6.5	8.11x10 <sup>7</sup> e-/(W/m <sup>2</sup> )·s 7e-/s/pix	45fps@2048×2046 45fps@1024×1022	1x1 2x2	TBD
IUB4200KMB <b>NRND</b>	4.2M/GSENSE2020BSI(M, UV,RS) 1.2" (13.31x13.3)	6.5x6.5	1.1x10 <sup>8</sup> e-/(W/m <sup>2</sup> )·s 80e-/s/pix	43.6fps@2048×2046 43.6fps@1024×1022	1x1 2x2	150us-60s
IUB43000KMA <b>EOL</b>	43.0M/GMAX0806 (M,GS) 1.7" (22.13x15.21, APS-C)	2.8x2.8	1.19x10 <sup>7</sup> e-/(W/m <sup>2</sup> )·s 1e-/s/pix	8.5fps@7904×5432	1x1	15us-15s

\*C: Color; M: Mono; UV: Ultraviolet; RS: Rolling shutter; GS: Global shutter.

\* EOL: End of life. NRND: Not recommended for new designs. The corresponding products can be found in the IUA series.

## 1.8 IUC Series Camera Specifications (APS or full frame, 210)

### 1.8.1 IUC Series USB3 Camera(124)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure Time
IUC21000KPA	21M/SonyIMX472AAJK-C(C,RS) 4/3"(17.3 x13.0)	3.3x3.3	491.4mv with 1/30s 0.55mv with 1/30s	14.5fps@5280x3956 33fps@2640x1978 96fps@1760x1318	1x1 2x2 3x3	150us~15s
IUC24000KPA	24.0M/IMX410CQK-C(C, RS) 2.7“ (36.02x24.00, Full Frame)	5.94x5.9 4	572.8mv with 1/30s 0.037mv with 1/30s	15.3@6064x4040(14bit) 41@3024x2012 114@2016x1342	1x1 2x2 3x3	150us~15s
IUC26000KMA	26.0M/IMX571BLR(M, RS) 1.8“ (23.48x15.67, APS-C)	3.76x3.7 6	870.9mv with 1/30s 0.07mv with 1/30s	14fps@6224x4168(16bit) 37fps@3104x2084 110fps@2064x1388	1x1 2x2 3x3	150us~15s
IUC26000KPA	26.0M/IMX571BQR(C, RS) 1.8“ (23.48x15.67, APS-C)	3.76x3.7 6	484.5mv with 1/30s 0.07mv with 1/30s	14fps@6224x4168(16bit) 37fps@3104x2084 110fps@2064x1388	1x1 2x2 3x3	150us~15s
IUC26000KMA-AFU	26.0M/IMX571BLR(M, RS) 1.8“ (23.48x15.67, APS-C)	3.76x3.7 6	870.9mv with 1/30s 0.07mv with 1/30s	14fps@6224x4168(16bit) 37fps@3104x2084 110fps@2064x1388	1x1 2x2 3x3	150us~15s
IUC26000KPA-AFU	26.0M/IMX571BQR(C, RS) 1.8“ (23.48x15.67, APS-C)	3.76x3.7 6	484.5mv with 1/30s 0.07mv with 1/30s	14fps@6224x4168(16bit) 37fps@3104x2084 110fps@2064x1388	1x1 2x2 3x3	150us~15s
IUC31000KMA	31.0M/IMX342LLA(M, GS) 1.8“ (22.3x16.74, APS-C)	3.45x3.4 5	1830mv with 1/30s 0.15mv with 1/30s	12.0fps@6464x4852 45.9fps@3216x2426	1x1 2x2	31us~15s
IUC31000KPA	31.0M/IMX342LQA(C, GS) 1.8“ (22.3x16.74, APS-C)	3.45x3.4 5	1146mv with 1/30s 0.15mv with 1/30s	12.0fps@6464x4852 45.9fps@3216x2426	1x1 1x1	31us~15s
IUC60000KMA	60.0M/IMX455ALK (M, RS) 2.7“ (35.96x23.99, Full Frame)	3.76x3.7 6	870.9mv with 1/30s 0.04mv with 1/30s	6.1fps@9568x6380(16bit) 24.6fps@4784x3190 55.8fps@3184x2124 191.0fps@1040x706	1x1 2x2 3x3 9x9	150us~15s
IUC60000KPA	60.0M/IMX455AQK (C, RS) 2.7“ (35.96x23.99, Full Frame)	3.76x3.7 6	484.5mv with 1/30s 0.07mv with 1/30s	6.1fps@9568x6380(16bit) 24.6fps@4784x3190 55.8fps@3184x2124 191.0fps@1040x706	1x1 2x2 3x3 9x9	150us~15s
IUC60000KMA-AFU	60.0M/IMX455ALK (M, RS) 2.7“ (35.96x23.99, Full Frame)	3.76x3.7 6	870.9mv with 1/30s 0.04mv with 1/30s	6.1fps@9568x6380(16bit) 24.6fps@4784x3190 55.8fps@3184x2124 191.0fps@1040x706	1x1 2x2 3x3 9x9	150us~15s
IUC60000KPA-AFU	60.0M/IMX455AQK (C, RS) 2.7“ (35.96x23.99, Full Frame)	3.76x3.7 6	484.5mv with 1/30s 0.07mv with 1/30s	6.1fps@9568x6380(16bit) 24.6fps@4784x3190 55.8fps@3184x2124 191.0fps@1040x706	1x1 2x2 3x3 9x9	150us~15s

\*C: Color; M: Mono; RS: Rolling shutter; GS: Global shutter; AFU: Automatic Focusing+USB3 port.

### 1.8.2 IUC Series GigE Camera (8)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure Time
IUC26000KMA-10G	26.0M/IMX571BLR(M, RS) 1.8“ (23.48x15.67, APS-C)	3.76x3.76	870.9mv with 1/30s 0.07mv with 1/30s	45fps@6224x4168(16bit) 37fps@3104x2084 110fps@2064x1388	1x1 2x2 3x3	150us~15s
IUC26000KPA-10G	26.0M/IMX571BQR(C, RS) 1.8“ (23.48x15.67, APS-C)	3.76x3.76	484.5mv with 1/30s 0.07mv with 1/30s	45fps@6224x4168(16bit) 37fps@3104x2084 110fps@2064x1388	1x1 2x2 3x3	150us~15s
IUC26000KMA-AF10G	26.0M/IMX571BLR(M, RS) 1.8“ (23.48x15.67, APS-C)	3.76x3.76	870.9mv with 1/30s 0.07mv with 1/30s	45fps@6224x4168(16bit) 37fps@3104x2084 110fps@2064x1388	1x1 2x2 3x3	150us~15s
IUC26000KPA-AF10G	26.0M/IMX571BQR(C, RS) 1.8“ (23.48x15.67, APS-C)	3.76x3.76	484.5mv with 1/30s 0.07mv with 1/30s	45fps@6224x4168(16bit) 37fps@3104x2084 110fps@2064x1388	1x1 2x2 3x3	150us~15s
IUC60000KMA-10G	60.0M/IMX455ALK (M, RS) 2.7“ (35.96x23.99, Full Frame)	3.76x3.76	870.9mv with 1/30s 0.04mv with 1/30s	20fps@9568x6380(16bit) 40fps@4784x3190 57.52fps@3184x2124 199.37fps@1040x706	1x1 2x2 3x3 9x9	150us~15s
IUC60000KPA-10G	60.0M/IMX455AQK (C, RS) 2.7“ (35.96x23.99, Full Frame)	3.76x3.76	484.5mv with 1/30s 0.07mv with 1/30s	20fps@9568x6380(16bit) 40fps@4784x3190 57.52fps@3184x2124 199.37fps@1040x706	1x1 2x2 3x3 9x9	150us~15s
IUC60000KMA-AF10G	60.0M/IMX455ALK (M, RS) 2.7“ (35.96x23.99, Full Frame)	3.76x3.76	870.9mv with 1/30s 0.04mv with 1/30s	20fps@9568x6380(16bit) 40fps@4784x3190 57.52fps@3184x2124	1x1 2x2 3x3	150us~15s

				199.37fps@1040×706	9x9	
IUC60000KPA-AF10G	60.0M/IMX455AQK (C, RS) 2.7“ (35.96x23.99, Full Frame)	3.76x3.76	484.5mv with 1/30s 0.07mv with 1/30s	20fps@9568×6380(16bit) 40fps@4784×3190 57.52fps@3184×2124 199.37fps@1040×706	1x1 2x2 3x3 9x9	150us~15s

\*C: Color; M: Mono; RS: Rolling shutter; GS: Global shutter; 10G: 10 Gigabit Ethernet port; AFU: Automatic Focusing+USB3 port.

### 1.8.3 IUC Series CameraLink Camera (1)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity Dark Signal	FPS/Resolution	Binning	Exposure Time
IUC1700KMA-CL480	1.7M/IMX425LLJ(M,GS) 1.1“ (14.4x9.9)	9.0x9.0	8100mv with 1/30s 0.3mv with 1/30s	302@1600×1100	1x1	6us~15s

\*C: Color; M: Mono; RS: Rolling shutter; GS: Global shutter; CL: CamerLink port.

## 1.9 IUD Series Camera Specifications(2)

### 1.9.1 IUD Series USB3 Camera(2)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure Time
IUD16000KMA (NIR)	16.0M/PYTHON 16K (M, GS) (18.43x18.43)	4.5x4.5	TBD	22.5@4096x4096	1x1	1us~60s
IUD25000KMA (NIR)	25.0M/PYTHON 25K (M, GS) 2.04" (23.04x23.04)	4.5x4.5	<1/5000 3.9 e <sup>-</sup> /s@ 20°C	14.8@5120x5120 14.8@2560x2560 14.8@1664x1664	1x1 2x2 3x3	1us~60s

\*C: Color; M: Mono; RS: Rolling shutter; GS: Global shutter; NIR: Near Infrared Ray.

## 1.10 IUE Series Camera Specifications(1)

### 1.10.1 IUE Series USB3 Camera(1)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure Time
IUE1800KMA	1.8M/CMOS Sensor(M,RS) (115.2x147.5)	96.0x96.0	TBD 2200e/s/pixel@25°C	120fps@1200x1536	1x1	10us-15s

\*M: Mono; RS: Rolling shutter.

## 1.11 AVCAM Series Camera Specifications(1)

Model Number	Image Sensor	Pixel Size( $\mu\text{m}$ )	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure Time
AVCAM290A	0.4M/IMX307 (M, RS) 1/2.8"(2.08x1.67)	2.9x2.9	CVBS(PAL-N)	25fps@720 × 576	2x2	105 $\mu\text{s}$ - 20ms

\*M: Mono; RS: Rolling shutter.

## 2 MAX Series Camera Specification(18)

### 2.1 MAX251AM

Table 2- 1 MAX251AM camera specifications

Parameter \ Model	MAX251AM-U3	
	251M pixels 4.1" CMOS USB3.0 / 10GigE industrial camera	
Camera Parameters		
Data interface	USB3.0	10GigE
Sensor model	Sony IMX811ALR	
Pixel size	2.81 μm x 2.81 μm	
Sensor size	4.1"	
Frame rate	1.5fps@19200 x 12800	
Conversion Gain	TBD	
Readout Noise	TBD	
Full Well	TBD	
Dynamic range	TBD	
SNRmax	TBD	
Sensitivity	TBD	
Dark current	TBD	
Gain range	1x-50x	
Exposure time	15μs-3600sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 19V Power adapter	19V Power adapter
Power consumption	TBD	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	110mm×110mm×123.8mm	110mm x 110mm x 129.8mm
Weight	1.44kg	
Lens mount	M72-mount	
Software	ToupView/ SDK	
Platform and architecture	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

## 2.2 MAX251AC

Table 2- 2 MAX251AC camera specifications

Parameter	Model	
	MAX251AC-U3 251M pixels 4.1" CMOS USB3.0 / 10GigE industrial camera	MAX251AC-10G
Camera Parameters		
Data interface	USB3.0	10GigE
Sensor model	Sony IMX811AQR	
Pixel size	2.81 μm x 2.81 μm	
Sensor size	4.1"	
Frame rate	1.5fps@19200 x 12800	
Conversion Gain	TBD	
Readout Noise	TBD	
Full Well	TBD	
Dynamic range	TBD	
SNRmax	TBD	
Sensitivity	TBD	
Dark current	TBD	
Gain range	1x-50x	
Exposure time	15μs-3600sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 19V Power adapter	19V Power adapter
Power consumption	TBD	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	110mm x 110mm x 123.8mm	110mm x 110mm x 129.8mm
Weight	1.44kg	
Lens mount	M72-mount	
Software	ToupView/ SDK	
Platform architecture	and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64
Certification		CE, FCC

## 2.3 MAX151AM

Table 2- 3 MAX151AM camera specifications

Parameter	Model	
	MAX151AM-U3 151M pixels 4.2" CMOS USB3.0 / 10GigE industrial camera	MAX151AM-10G
Camera Parameters		
Data interface	USB3.0	10GigE
Sensor model	Sony IMX411ALR	
Pixel size	3.76 $\mu\text{m}$ x 3.76 $\mu\text{m}$	
Sensor size	4.2"	
Frame rate	2.4@14176x10640 6.9@7072x5320 20.8@4704x3546 61.9@1568x1178	6.1@14176x10640 6.9@7072x5320 20.8@4704x3546 61.9@1568x1178
Conversion Gain	0.78e/ADU	
Readout Noise	2.8e	
Full Well	50873.9e	
Dynamic range	84.9dB	
SNRmax	47dB	
Sensitivity	871mV with 1/30s	
Dark current	0.04mV with 1/30s	
Gain range	1x-50x	
Exposure time	15 $\mu\text{s}$ -3600sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 19V Power adapter	19V Power adapter
Power consumption	TBD	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	110mm x 110mm x 123.8mm	110mm x 110mm x 129.8mm
Weight	1.44kg	
Lens mount	M72 mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

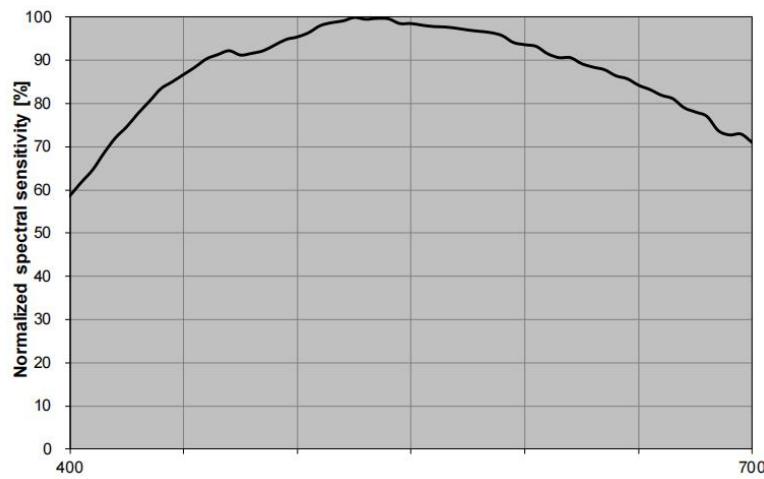


Figure 2- 1 MAX151AM spectral response curve

## 2.4 MAX151AC

Table 2- 4 MAX151AC camera specifications

Parameter	Model	
	MAX151AC-U3 151M pixels 4.2" CMOS USB3.0 / 10GigE industrial camera	MAX151AC-10G
Camera Parameters		
Data interface	USB3.0	10GigE
Sensor model	Sony IMX411AQR	
Pixel size	3.76 μm x 3.76 μm	
Sensor size	4.2"	
Frame rate	2.4@14176x10640 6.9@7072x5320 20.8@4704x3546 61.9@1568x1178	6.1@14176x10640 6.9@7072x5320 20.8@4704x3546 61.9@1568x1178
Conversion Gain	0.78e/ADU	
Readout Noise	2.8e	
Full Well	50873.9e	
Dynamic range	84.9dB	
SNRmax	47dB	
Sensitivity	485mV with 1/30s	
Dark current	0.04mV with 1/30s	
Gain range	1x-50x	
Exposure time	15μs-3600sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 19V Power adapter	19V Power adapter
Power consumption	TBD	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	110mm x 110mm x 123.8mm	110mm x 110mm x 129.8mm
Weight	1.44kg	
Lens mount	M72 mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

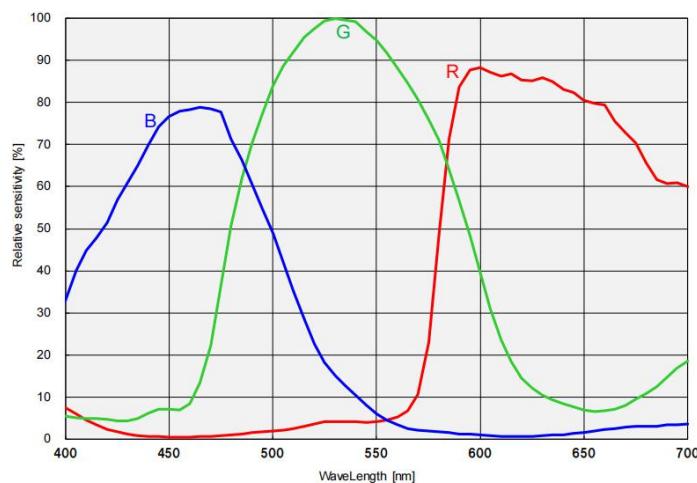


Figure 2- 2 MAX151AC spectral response curve

## 2.5 MAX102AM

Table 2- 5 MAX102AM camera specifications

Parameter	Model	
	MAX102AM-U3	MAX102AM-10G
102M pixels 3.4" CMOS USB3.0 / 10GigE industrial camera		
Camera Parameters		
Data interface	USB3.0	10GigE
Sensor model	Sony IMX461ALR	
Pixel size	3.76 μm x 3.76 μm	
Sensor size	3.4"	
Frame rate	3.5@11648x8742 8.7@5824x4370 27.8@3872x2912 82.5@1280x970	8.7@11648x8742 8.7@5824x4370 27.8@3872x2912 82.5@1280x970
Conversion Gain	0.75e/ADU	
Readout Noise	3.57e	
Full Well	49.09ke	
Dynamic range	82.8dB	
SNRmax	46.9dB	
Sensitivity	871mV with 1/30s	
Dark current	0.04mV with 1/30s	
Gain range	1x-50x	
Exposure time	15μs-3600sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 19V Power adapter	19V Power adapter
Power consumption	Cooled 58.86W / Uncooled 14.95W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	110mm x 110mm x 123.8mm	110mm x 110mm x 129.8mm
Weight	1.44kg	
Lens mount	M72 mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

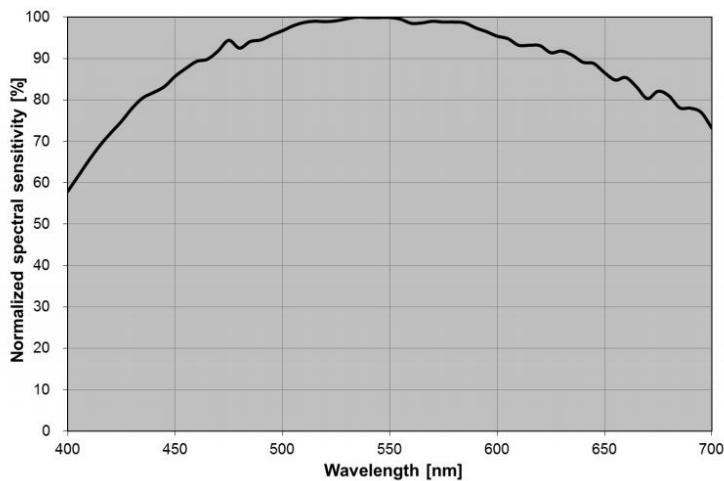


Figure 2- 3 MAX102AM spectral response curve

## 2.6 MAX102AC

Table 2- 6 MAX102AC camera specifications

Parameter	Model	
	MAX102AC-U3 102M pixels 3.4" CMOS USB3.0 / 10GigE industrial camera	MAX102AC-10G
Camera Parameters		
Data interface	USB3.0	10GigE
Sensor model	Sony IMX461AQR	
Pixel size	3.76 μm x 3.76 μm	
Sensor size	3.4"	
Frame rate	3.5@11648x8742 8.7@5824x4370 27.8@3872x2912 82.5@1280x970	8.7@11648x8742 8.7@5824x4370 27.8@3872x2912 82.5@1280x970
Conversion Gain	0.75e/ADU	
Readout Noise	3.57e	
Full Well	49.09ke	
Dynamic range	82.8dB	
SNRmax	46.9dB	
Sensitivity	485mV with 1/30s	
Dark current	0.04mV with 1/30s	
Gain range	1x-50x	
Exposure time	15μs-3600sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 19V Power adapter	19V Power adapter
Power consumption	Cooled 58.86W / Uncooled 14.95W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	110mm x 110mm x 123.8mm	110mm x 110mm x 129.8mm
Weight	1.44kg	
Lens mount	M72 mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

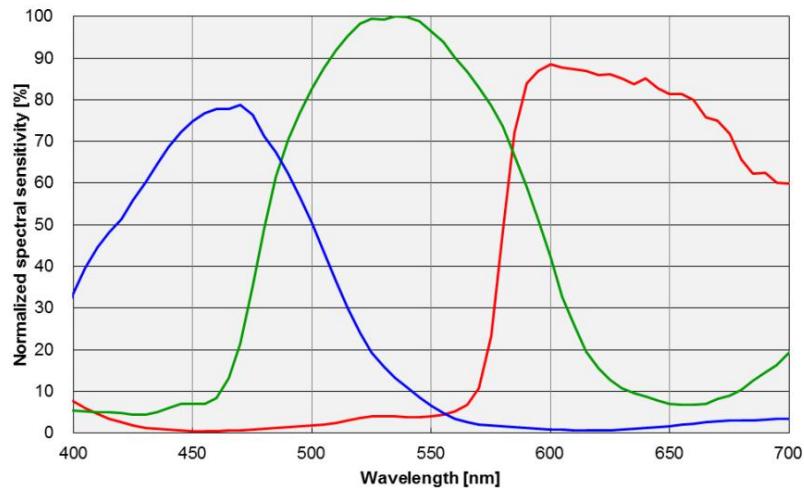


Figure 2- 4 MAX102AC spectral response curve

## 2.7 MAX62AM

Table 2- 7 MAX62AM camera specifications

Parameter	Model	MAX62AM
		61M pixels 2.7" CMOS USB3.0 industrial camera
		Camera Parameters
Sensor model	Sony IMX455ALK	
Pixel size	3.76 μm x 3.76 μm	
Sensor size	2.7"	
Frame rate	6.1@9568x6380(16bit) 19.1@4784x3190 55.6@3184x2124 191@1040x706	
Conversion Gain	0.79e-(HCG) 1.62e-(LCG)	
Readout Noise	3.51e-(HCG) 5.39e-(LCG)	
Full Well	51550.45e-(HCG) 87353.34e-(LCG)	
Dynamic range	83.34dB (HCG) 84.18dB (LCG)	
SNRmax	47.12dB(HCG) 49.41dB(LCG)	
Sensitivity	871mV with 1/30s	
Dark current	0.04mV with 1/30s	
Gain range	1x-50x	
Exposure time	100μs-1000sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 16bit	
General specification		
Power supply	Power with USB3.0 or 19V Power adapter	
Power consumption	TBD	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	110mm×110mm×121.5mm	
Weight	1.7kg	
Lens mount	M52 mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

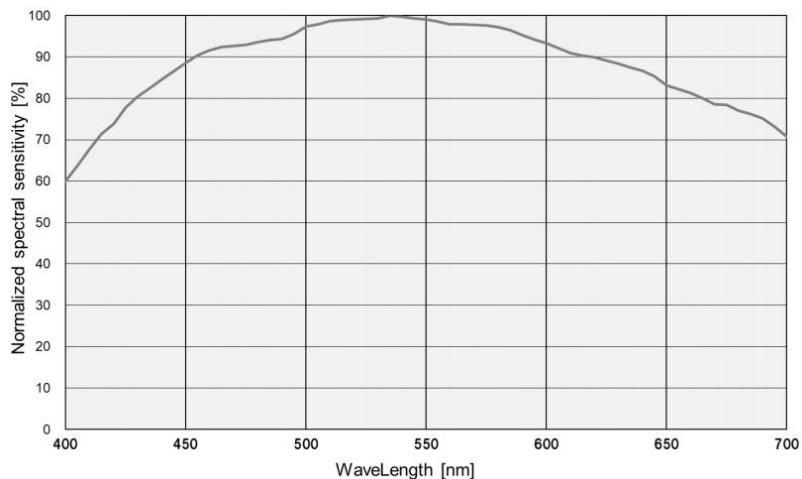


Figure 2- 5 MAX62AM spectral response curve

## 2.8 MAX62AC

Table 2- 8 MAX62AC camera specifications

Parameter	Model	MAX62AC
		61M pixels 2.7" CMOS USB3.0 industrial camera
		Camera Parameters
Sensor model	Sony IMX455AQK	
Pixel size	3.76 μm x 3.76 μm	
Sensor size	2.7"	
Frame rate	6.1@9568x6380(16bit) 19.1@4784x3190 55.6@3184x2124 191@1040x706	
Conversion Gain	0.79e-(HCG) 1.62e-(LCG)	
Readout Noise	3.51e-(HCG) 5.39e-(LCG)	
Full Well	51550.45e-(HCG) 87353.34e-(LCG)	
Dynamic range	83.34dB (HCG) 84.18dB (LCG)	
SNRmax	47.12dB(HCG) 49.41dB(LCG)	
Sensitivity	485mV with 1/30s	
Dark current	0.04mV with 1/30s	
Gain range	1x-50x	
Exposure time	100μs-1000sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 16bit	
<b>General specification</b>		
Power supply	Power with USB3.0 or 19V Power adapter	
Power consumption	TBD	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	110mm×110mm×121.5mm	
Weight	1.7kg	
Lens mount	M52 mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

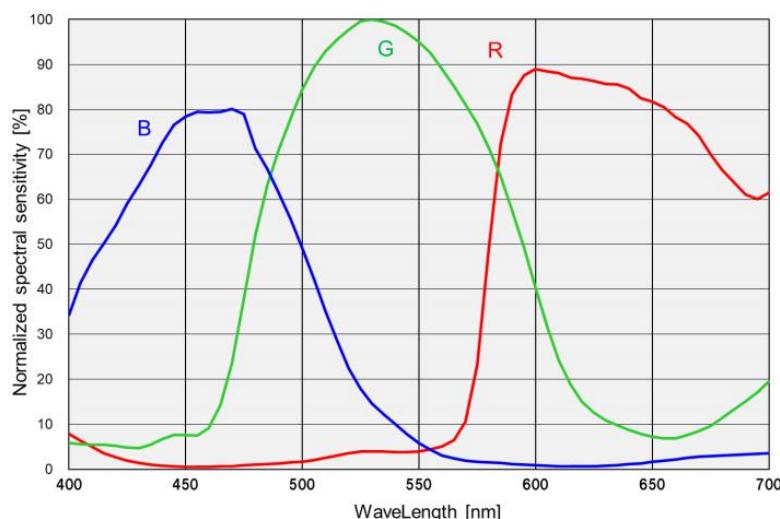


Figure 2- 6 MAX62AC spectral response curve

## 2.9 MAX24AC

Table 2- 9 MAX24AC camera specifications

Parameter	Model	MAX24AC
		24M pixels 2.7" CMOS USB3.0 industrial camera
		Camera Parameters
Sensor model	Sony IMX410CQK	
Pixel size	5.94 μm x 5.94 μm	
Sensor size	2.7"	
Frame rate	15.3@6064x4040(14bit) 41@3024x2012 114@2016x1342	
Conversion Gain	1.2e-(HCG) 6.19e-(LCG)	
Readout Noise	0.58e-(HCG) 4.56e-(LCG)	
Full Well	19653.77e-(HCG) 101464.01e-(LCG)	
Dynamic range	84dB (HCG) 84dB (LCG)	
SNRmax	42.93dB(HCG) 50.06dB(LCG)	
Sensitivity	573mV with 1/30s	
Dark current	0.04mV with 1/30s	
Gain range	1x-50x	
Exposure time	100μs-1000sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 14bit	
General specification		
Power supply	Power with USB3.0 or 19V Power adapter	
Power consumption	TBD	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	110mm×110mm×121.5mm	
Weight	1.7kg	
Lens mount	M52 mount	
Software	ToupView/ SDK	
Platform and architecture	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

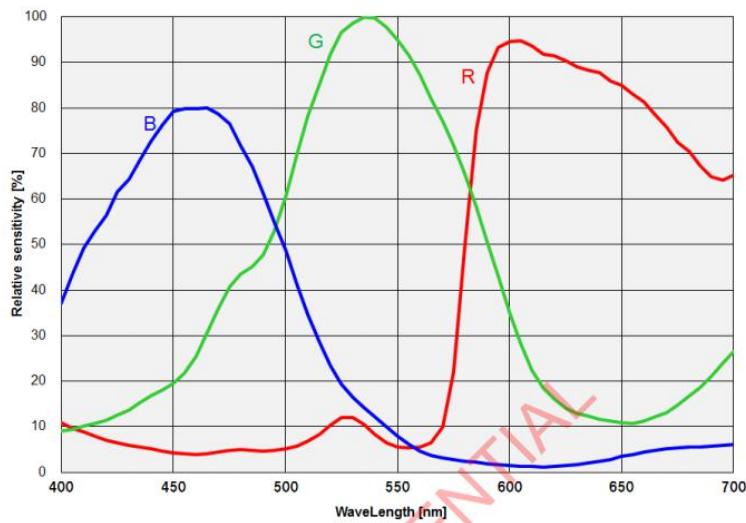


Figure 2- 7 MAX24AC spectral response curve

## 2.10 MAX04AM

Table 2- 10 MAX04AM camera specifications

Parameter	Model	MAX04AM
		4.2M pixels 1.2" CMOS USB3.0 industrial camera
		Camera Parameters
Sensor model	GPixel GSENSE2020e	
Pixel size	6.5 μm x 6.5 μm	
Sensor size	1.2"	
Frame rate	45@2048x2048 45@1024 x 1024	
Conversion Gain	1.17(HCG) 3.62(LCG)0.69(HDR)	
Readout Noise	2.06e-(HCG) 10.39e-(LCG)3.62e-(HDR)	
Full Well	19.17ke-(HCG)59.30ke-(LCG)45.02ke-(HDR)	
Dynamic range	66.72dB(HCG) 66.36dB(LCG)81.6dB(HDR)	
SNRmax	42.83dB(HCG)47.73dB(LCG)46.53dB(HDR)	
Sensitivity	8.1x107 (e-/(W/m2.s))	
Peak QE	64.2% @595nm	
Dark current	0.12(e-/s/pix) @-10C°	
Gain range	1x-50x	
Exposure time	100μs-1000sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4, hardware2x2	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 16bit	
<b>General specification</b>		
Power supply	Power with USB3.0 or 19V Power adapter	
Power consumption	Cooled 44.8W / Uncooled 6.65W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	110mm×110mm×121.5mm	
Weight	1.7kg	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

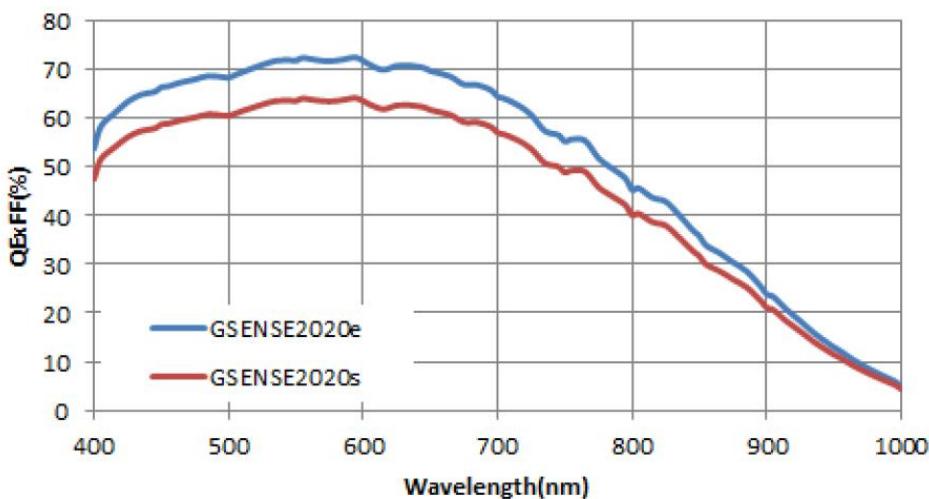


Figure 2- 8 MAX04AM spectral response curve

## 2.11 MAX04BM

Table 2- 11 MAX04BM camera specifications

Parameter	Model	MAX04BM
		4.2M pixels 1.2" CMOS USB3.0 industrial camera
		Camera Parameters
Sensor model	GPixel GSENSE2020BSI	
Pixel size	6.5 μm x 6.5 μm	
Sensor size	1.2"	
Frame rate	45@2048x2048 45@1024 x 1024	
Conversion Gain	3.23e-(HCG) 12.42e-(LCG) 0.76e-(HDR)	
Readout Noise	6.78e-(HCG) 29.07e-(LCG) 5.33e-( HDR)	
Full Well	13210.49e-(HCG) 50873.17e-(LCG) 49863.77e-( HDR)	
Dynamic range	65.58dB (HCG) 64.62dB (LCG) 79.14dB (HDR)	
SNRmax	41.21dB(HCG) 47.06dB(LCG) 46.98dB(LCG)	
Sensitivity	1.1x108 (e-/(W/m2.s))	
Peak QE	93.7% @550nm	
Dark current	0.15(e-/s/pix) @-15C°	
Gain range	1x-50x	
Exposure time	100μs-1000sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4, hardware2x2	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 16bit	
<b>General specification</b>		
Power supply	Power with USB3.0 or 19V Power adapter	
Power consumption	Cooled 48.26W / Uncooled 8.17W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	110mm×110mm×121.5mm	
Weight	1.7kg	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

Spectral Response

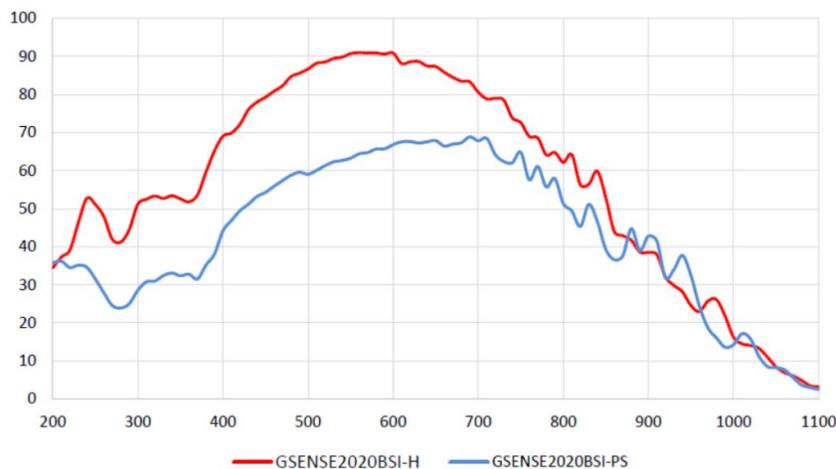


Figure 2- 9 MAX04BM spectral response curve

## 2.12 MAX04CM

Table 2- 12 MAX04CM camera specifications

Parameter	Model	MAX04CM
		4.2M pixels 2.0" CMOS USB3.0 industrial camera
		Camera Parameters
Sensor model	GPixel GSENSE400BSI	
Pixel size	11 μm x 11 μm	
Sensor size	2.0"	
Frame rate	44@2048x2048 44@1024 x 1024	
Conversion Gain	2.46e-(HCG) 19.88e-(LCG) 0.46e-(HDR)	
Readout Noise	6.75e-(HCG) 33.37e-(LCG) 5.52e-( HDR)	
Full Well	10086.89e-(HCG) 81427.2e-(LCG) 30471.53e-( HDR)	
Dynamic range	63.24dB (HCG) 67.5dB (LCG) 74.58dB (HDR)	
SNRmax	40.04dB(HCG) 49.11dB(LCG) 44.84dB(LCG)	
Sensitivity	3.25x108 (e-/(W/m <sup>2</sup> ).s))	
Peak QE	95.3% @560nm	
Dark current	1.5(e-/s/pix) @-10C°	
Gain range	1x-50x	
Exposure time	100μs-1000sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4, hardware2x2	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 16bit	
<b>General specification</b>		
Power supply	Power with USB3.0 or 19V Power adapter	
Power consumption	Cooled 50.2W / Uncooled 7.33W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	110mm×110mm×121.5mm	
Weight	1.7kg	
Lens mount	M42 mount	
Software	ToupView/ SDK	
Platform and architecture	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

### Spectral Response

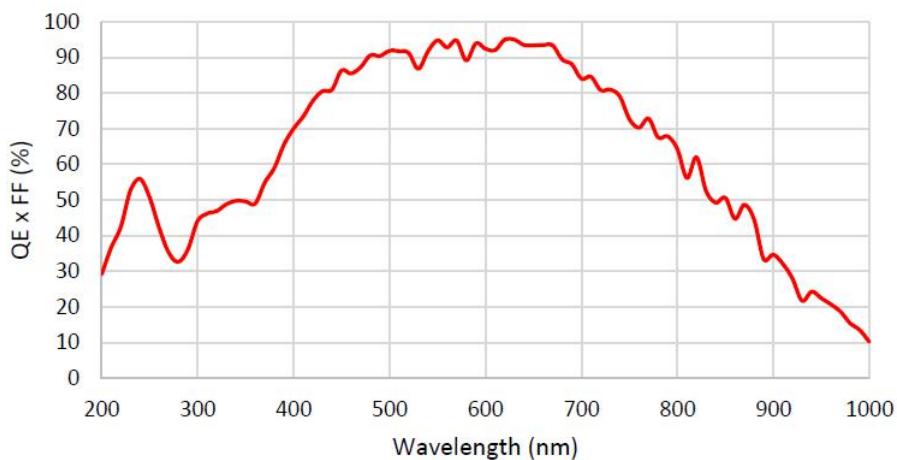


Figure 2- 10 MAX04CM spectral response curve

### 3 ITR3CMOS Series Camera Specification(22)

#### 3.1 ITR3CMOS45000KMA

Table 3- 1 ITR3CMOS45000KMA camera specifications

Parameter \ Model	ITR3CMOS45000KMA 45M pixels 1.4" CMOS USB3.0 industrial camera Camera Parameters
Sensor model	Sony IMX492LLJ-C
Pixel size	2.315 μm x 2.315μm
Sensor size	1.4"
Frame rate	8.1@8176x5616 30.0@4080x2808 8.1@7408x5556 33.0@3696x2778 10.4@8176x4320 34.7@4096x2160 62.5@2048x1080 86.5@1360x720
Readout Noise	2.67e-(HCG) 2.74e-(LCG)
Full Well	14796.69e-(HCG) 14859.92e-(LCG)
Dynamic range	72dB (HCG) 72dB (LCG)
SNRmax	41.7dB(HCG) 41.72dB(LCG)
Sensitivity	175mV
Dark current	0.03mV
Gain range	1x-50x
Exposure time	100μs-15sec
Shutter	Rolling shutter
Binning	Software2x2, 3x3, 4x4, hardware2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
<b>General specification</b>	
Power supply	Power with USB3.0 or 12V Power adapter
Power consumption	24.12w
Temperature	Working temperature -10~50°C, storage temperature -30~70°C
Humidity	20%-80%, no condensation
Size	80mm x 80mm x 102mm
Weight	860g
Lens mount	C mount
Software	ToupView/ SDK
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64
Certification	CE, FCC

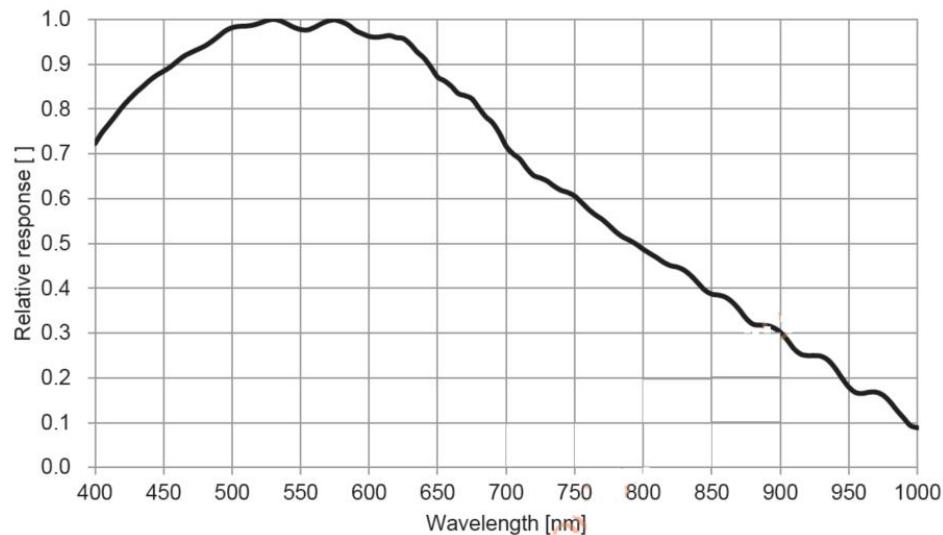


Figure 3- 1 ITR3CMOS45000KMA spectral response curve

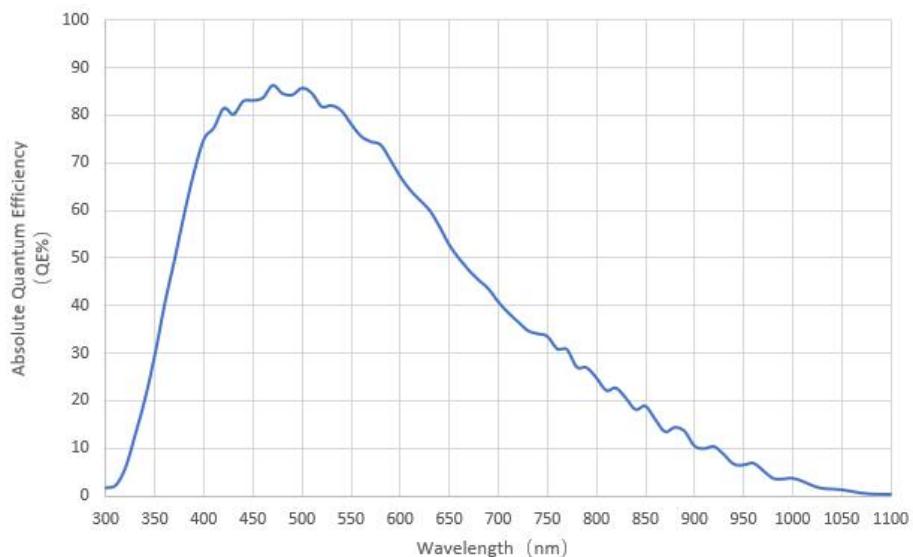


Figure 3- 2 ITR3CMOS45000KMA spectral absolute quantum efficiency

## 3.2 ITR3CMOS26000KPA

Table 3- 2 ITR3CMOS26000KPA camera specifications

Parameter	Model	ITR3CMOS26000KPA 26M pixels 1.8" CMOS USB3.0 industrial camera
		Camera Parameters
Sensor model	Sony IMX571BQR-C	
Pixel size	3.76 μm x 3.76 μm	
Sensor size	1.8"	
Frame rate	14fps@6224x4168 37fps@3104x2084 110fps@2064x1388	
Readout Noise	1.31e-(HCG) 3.15e-(LCG)	
Full Well	16569.55e-(HCG) 51591.91e-(LCG)	
Dynamic range	81.78dB (HCG) 84dB (LCG)	
SNRmax	42.19dB(HCG) 47.13dB(LCG)	
Sensitivity	485mv	
Dark current	0.07mv	
Gain range	1x-50x	
Exposure time	100μs-15sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4, hardware2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 16bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	
Power consumption	28.32w	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

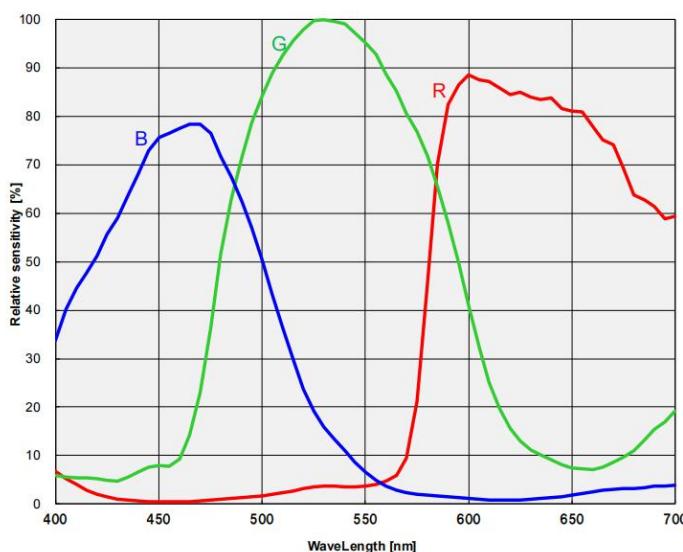


Figure 3- 3 ITR3CMOS26000KPA spectral response curve

### 3.3 ITR3CMOS26000KMA

Table 3- 3 ITR3CMOS26000KMA camera specifications

Parameter	Model	ITR3CMOS26000KMA 26M pixels 1.8" CMOS USB3.0 industrial camera
	Camera Parameters	
	Sensor model	Sony IMX571BLR-J
Pixel size	3.76 μm x 3.76 μm	
Sensor size	1.8"	
Frame rate	14fps@6224x4168 37fps@3104x2084 110fps@2064x1388	
Readout Noise	0.94e-(HCG) 2.23e-(LCG)	
Full Well	16770.94e-(HCG) 51081.55e-(LCG)	
Dynamic range	84.72dB (HCG) 86.88dB (LCG)	
SNRmax	42.25dB(HCG) 47.08dB(LCG)	
Sensitivity	871mv	
Dark current	0.07mv	
Gain range	1x-50x	
Exposure time	100μs-15sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4, hardware2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 16bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	
Power consumption	25.08w	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

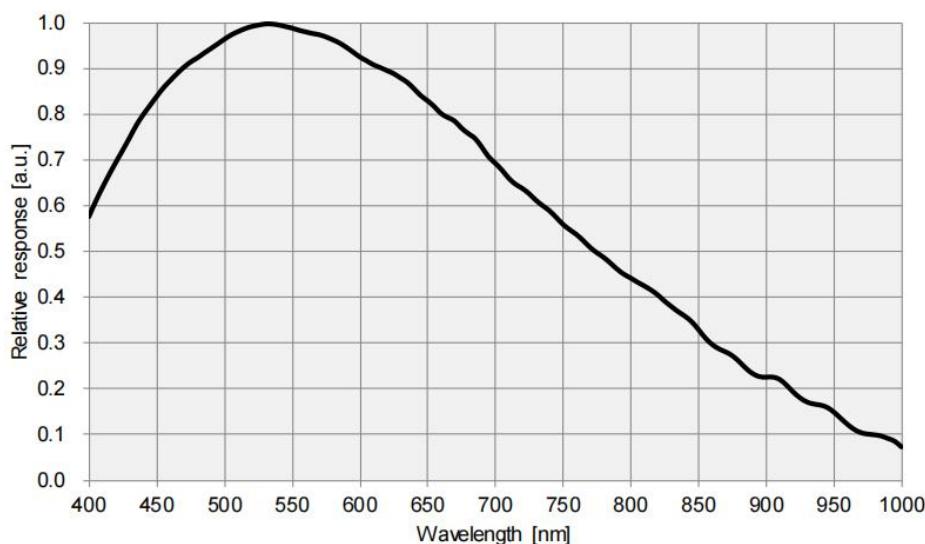


Figure 3- 4 ITR3CMOS26000KMA spectral response curve

### 3.4 ITR3CMOS21000KPA

Table 3- 4 ITR3CMOS21000KPA camera specifications

Parameter	Model	ITR3CMOS21000KPA 21M pixels 4/3" CMOS USB3.0 industrial camera
		Camera Parameters
Sensor model	Sony IMX269AQR	
Pixel size	3.3 μm x 3.3 μm	
Sensor size	4/3"	
Frame rate	17@5280x3954 17@3952x3952 56@2640x1976 67@1760x1316 192@584x438	
Readout Noise	0.91e-(HCG) 0.61e-(LCG)	
Full Well	11356.85e-(HCG) 23015.4e-(LCG)	
Dynamic range	72dB (HCG) 72dB (LCG)	
SNRmax	40.55dB(HCG) 43.62dB(LCG)	
Sensitivity	400mv	
Dark current	0.1mv	
Gain range	1x-50x	
Exposure time	100μs-15sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, hardware2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
<b>General specification</b>		
Power supply	Power with USB3.0 or 12V Power adapter	
Power consumption	Cooled 24.4W / Uncooled 5.81W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

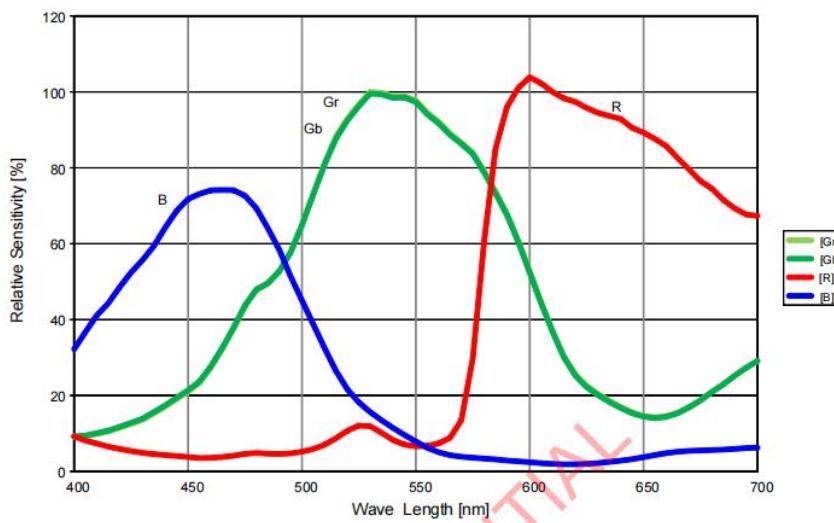


Figure 3- 5 ITR3CMOS21000KPA spectral response curve

### 3.5 ITR3CMOS20000KPA

Table 3- 5 ITR3CMOS20000KPA camera specifications

Parameter	Model	
	ITR3CMOS20000KPA	ITR3CMOS20000KPA -G
Camera Parameters		
Data interface	USB3.0	GigE
Sensor model	Sony IMX183CQK	
Pixel size	2.4 $\mu\text{m}$ x 2.4 $\mu\text{m}$	
Sensor size	1"	
Frame rate	19.0fps@5440 x 3684 48.8fps@2736 x 1824 59.4fps@1824 x 1216	4.5fps@5440 x 3684 18.5fps@2736 x 1824 41.7fps@1824 x 1216
Readout Noise	3.38e-	
Full Well	15929.69e-	
Dynamic range	72dB	
SNRmax	42.02dB	
Sensitivity	462mV	
Dark current	0.21mV	
Gain range	1x-50x	
Exposure time	53 $\mu\text{s}$ -15sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, hardware2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	12V Power adapter
Power consumption	14.64W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

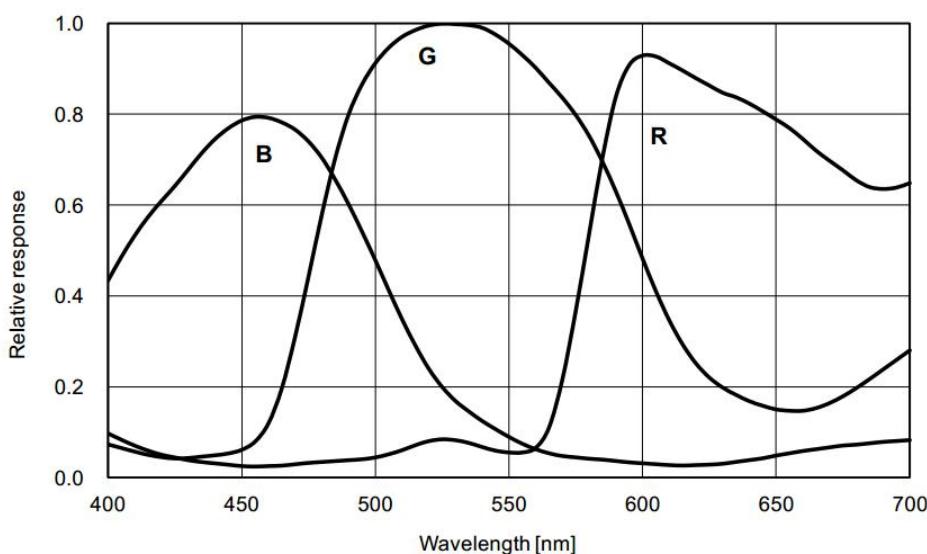


Figure 3- 6 ITR3CMOS20000KPA spectral response curve

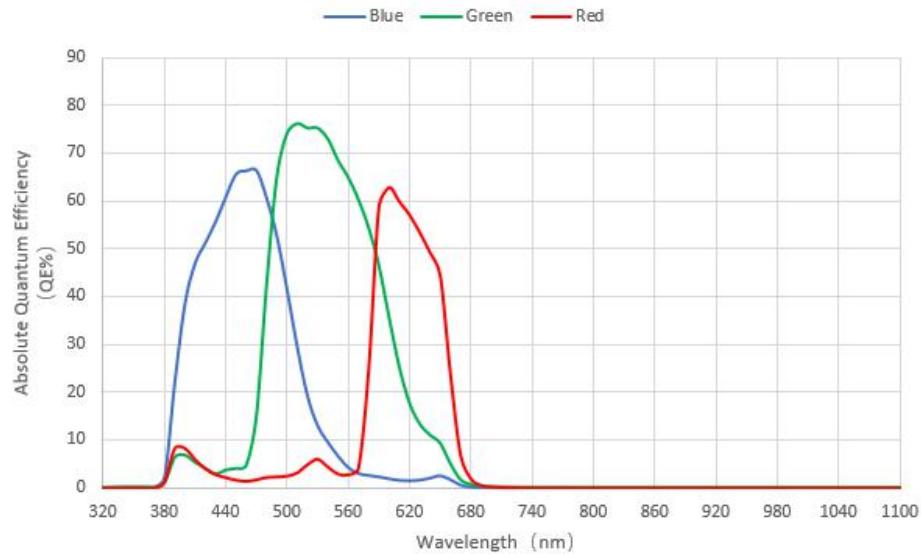


Figure 3- 7 ITR3CMOS20000KPA spectral absolute quantum efficiency

## 3.6 ITR3CMOS20000KMA

Table 3- 6 ITR3CMOS20000KMA camera specifications

Parameter	Model	
	ITR3CMOS20000KMA	
	20M pixels 1" CMOS USB3.0 / GigE industrial camera	
Camera Parameters		
Data interface	USB3.0	GigE
Sensor model	Sony IMX183CQK	
Pixel size	2.4 $\mu\text{m}$ x 2.4 $\mu\text{m}$	
Sensor size	1"	
Frame rate	19.0fps@5440 x 3684 48.8fps@2736 x 1824 59.4fps@1824 x 1216	4.5fps@5440 x 3684 18.5fps@2736 x 1824 41.7fps@1824 x 1216
Readout Noise	3.38e-	
Full Well	15929.69e-	
Dynamic range	72dB	
SNRmax	42.02dB	
Sensitivity	462mV	
Dark current	0.21mV	
Gain range	1x-50x	
Exposure time	53 $\mu\text{s}$ -15sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, hardware2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	12V Power adapter
Power consumption	14.64W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

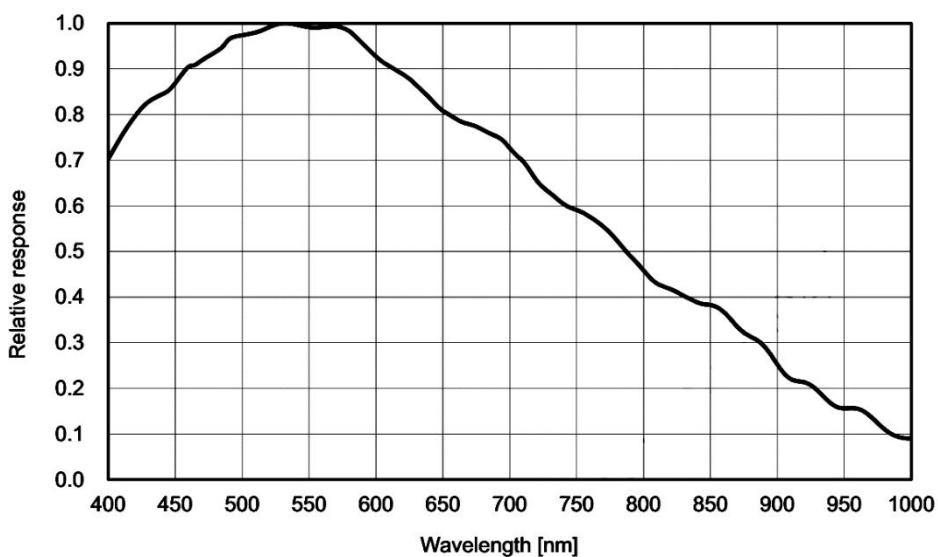


Figure 3- 8 ITR3CMOS20000KMA spectral response curve

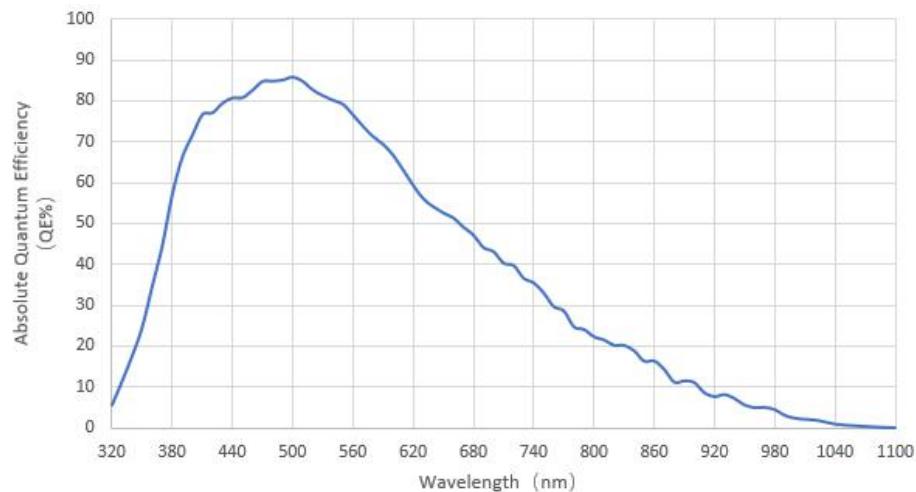


Figure 3- 9 ITR3CMOS20000KMA spectral absolute quantum efficiency

### 3.7 ITR3CMOS10300KPA

Table 3- 7 ITR3CMOS10300KPA camera specifications

Parameter	Model	ITR3CMOS10300KPA
		10.3M pixels 1.4" CMOS USB3.0 industrial camera
	Camera Parameters	
Sensor model	Sony IMX294CJK	
Pixel size	2.315 μm x 2.315 μm	
Sensor size	4/3"	
Frame rate	30.0@4128x2808 38.5 @4096x2160 59.8@2048x1080 87.2@1360x720	
Readout Noise	0.26e-(HCG) 2.51e-(LCG)	
Full Well	15017.21e-(HCG) 64919.86e-(LCG)	
Dynamic range	84dB (HCG) 84dB (LCG)	
SNRmax	41.77dB(HCG) 48.12dB(LCG)	
Sensitivity	419mv	
Dark current	0.12mV	
Gain range	1x-50x	
Exposure time	150μs-15sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, hardware2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 14bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	
Power consumption	Cooled 30.9W / Uncooled 11.82W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 102mm	
Weight	860g	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

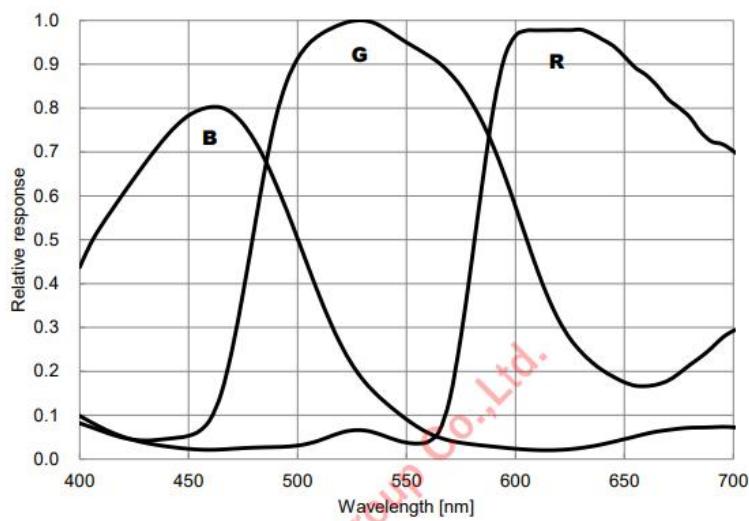


Figure 3- 10 ITR3CMOS10300KPA spectral response curve

## 3.8 ITR3CMOS10300KMA

Table 3- 8 ITR3CMOS10300KMA camera specifications

Parameter	Model	ITR3CMOS10300KMA 10.3M pixels 1.4" CMOS USB3.0 industrial camera Camera Parameters
Sensor model	Sony IMX492LLJ-C	
Pixel size	2.315 μm x 2.315μm	
Sensor size	1.4"	
Frame rate	30.0@4128x2808 38.5 @4096x2160 59.8@2048x1080 87.2@1360x720	
Readout Noise	0.26e-(HCG) 2.51e-(LCG)	
Full Well	15017.21e-(HCG) 64919.86e-(LCG)	
Dynamic range	84dB (HCG) 84dB (LCG)	
SNRmax	41.77dB(HCG) 48.12dB(LCG)	
Sensitivity	175mv	
Dark current	0.03mV	
Gain range	1x-50x	
Exposure time	150μs-15sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, hardware2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 14bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	
Power consumption	Cooled 30.9W / Uncooled 11.82W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 102mm	
Weight	860g	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

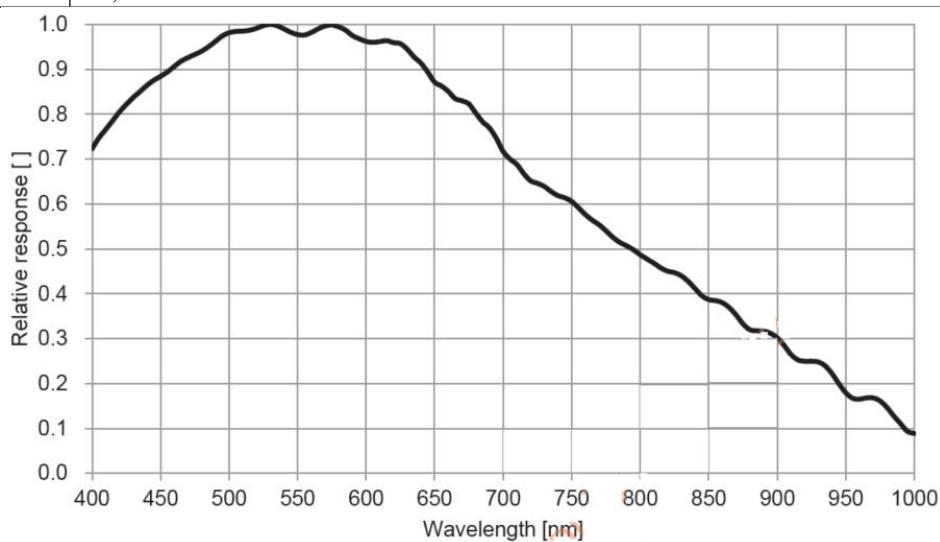


Figure 3- 11 ITR3CMOS10300KMA spectral response curve

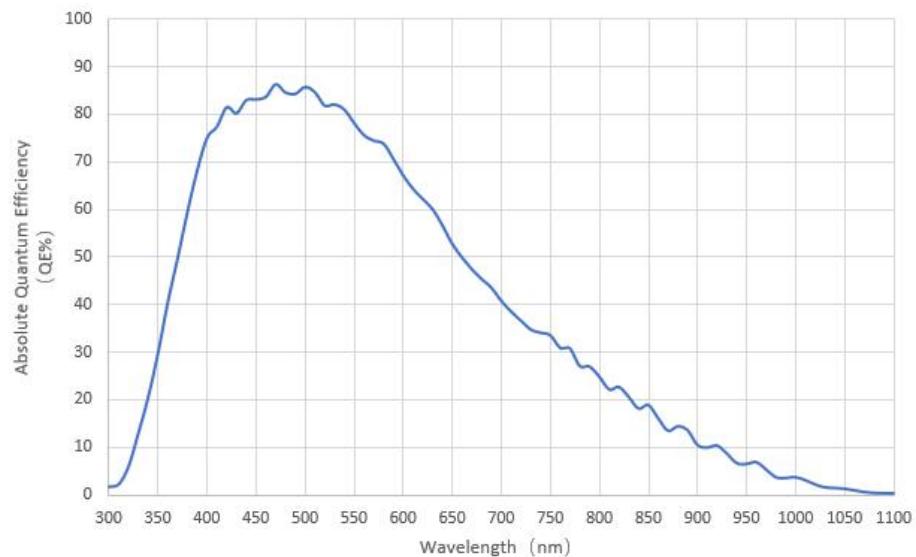


Figure 3- 12 ITR3CMOS10300KMA spectral absolute quantum efficiency

## 3.9 ITR3CMOS09000KPA

Table 3- 9 ITR3CMOS09000KPA camera specifications

Parameter	Model	ITR3CMOS09000KPA 9M pixels 1" CMOS USB3.0 industrial camera
	Camera Parameters	
Sensor model	Sony IMX533CQK-C	
Pixel size	3.76 μm x 3.76 μm	
Sensor size	1"	
Frame rate	40@2992x3000 62@1488x1500 186@992x998	
Readout Noise	1.47e-(HCG) 3.8e-(LCG)	
Full Well	16745.76e-(HCG) 51073.49e -(LCG)	
Dynamic range	81.12dB (HCG) 82.56dB (LCG)	
SNRmax	42.24dB(HCG) 47.08dB(LCG)	
Sensitivity	534mv	
Dark current	0.04mV	
Gain range	1x-50x	
Exposure time	100μs-15sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, hardware2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 14bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	
Power consumption	Cooled 22.37W / Uncooled 7.27W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

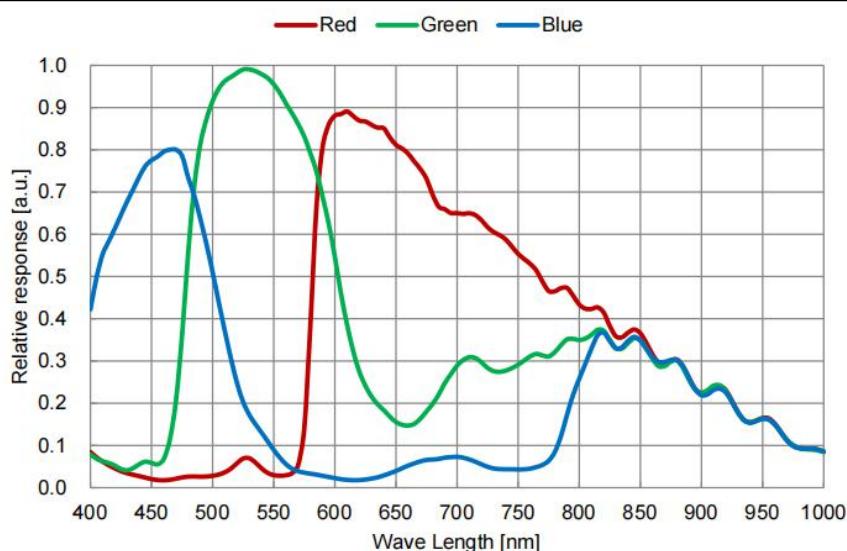


Figure 3- 13 ITR3CMOS09000KPA spectral response curve

## 3.10 ITR3CMOS09000KMA

Table 3- 10 ITR3CMOS09000KMA camera specifications

Parameter	Model	ITR3CMOS09000KMA 9M pixels 1" CMOS USB3.0 industrial camera
	Camera Parameters	
Sensor model	Sony IMX533CLK-D	
Pixel size	3.76 μm x 3.76 μm	
Sensor size	1"	
Frame rate	40@2992x3000 62@1488x1500 186@992x998	
Readout Noise	1.47e-(HCG) 3.8e-(LCG)	
Full Well	16745.76e-(HCG) 51073.49e -(LCG)	
Dynamic range	81.12dB (HCG) 82.56dB (LCG)	
SNRmax	42.24dB(HCG) 47.08dB(LCG)	
Sensitivity	877mv	
Dark current	0.04mV	
Gain range	1x-50x	
Exposure time	100μs-15sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, hardware2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 14bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	
Power consumption	Cooled 22.37W / Uncooled 7.27W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

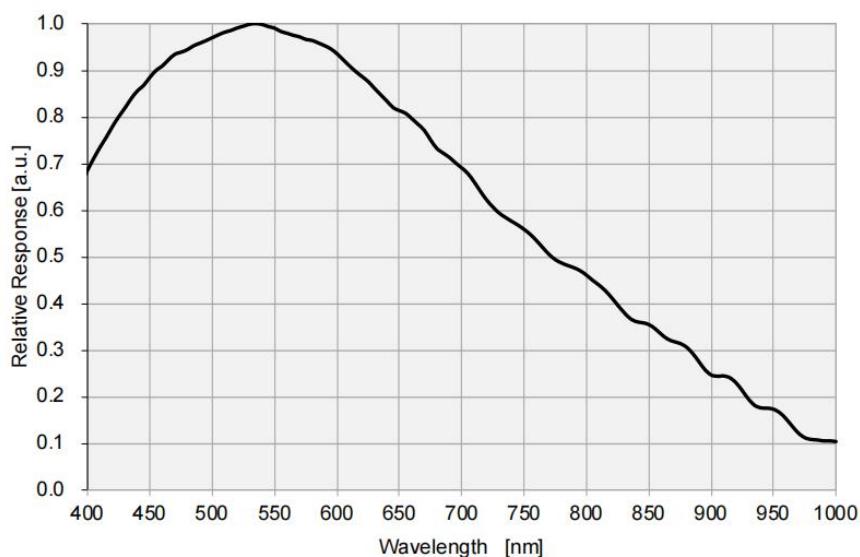


Figure 3- 14 ITR3CMOS09000KMA spectral response curve

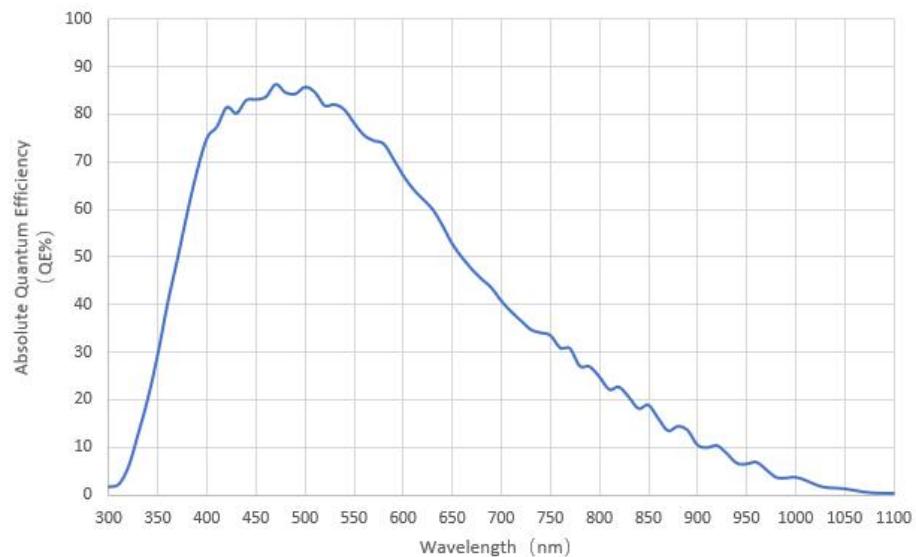


Figure 3- 15 ITR3CMOS09000KMA spectral absolute quantum efficiency

### 3.11 ITR3CMOS08300KPA

Table 3- 11 ITR3CMOS08300KPA camera specifications

Parameter	Model	ITR3CMOS08300KPA 8.3M pixels 1/1.2" CMOS USB3.0 industrial camera Camera Parameters
Sensor model	Sony IMX585-AAQJ1-C	
Pixel size	2.9 μm x 2.9 μm	
Sensor size	1/1.2"	
Frame rate	45fps@3840 x2160 70fps@1920 x 1080	
Readout Noise	2.81e-(LCG) 0.42e-(HCG)	
Full Well	40029.57e-(LCG) 4152.75e-(HCG)	
Dynamic range	72dB (LCG) 72dB (HCG)	
SNRmax	46.02dB(LCG) 36.18dB(HCG)	
Sensitivity	5970mV	
Dark current	0.13mV	
Gain range	1x-50x	
Exposure time	30μs-15sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
<b>General specification</b>		
Power supply	Power with USB3.0 or 12V Power adapter	
Power consumption	Cooled 26.88W / Uncooled 10.26W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

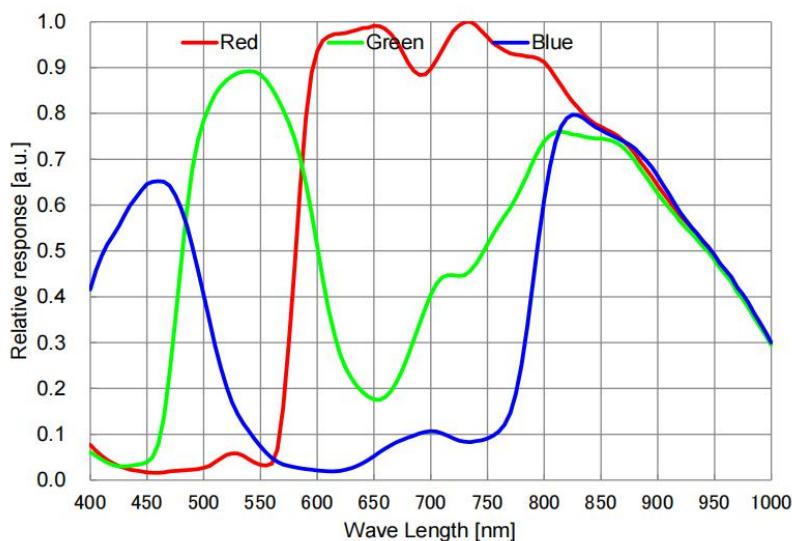


Figure 3- 16 ITR3CMOS08300KPA spectral response curve

## 3.12 ITR3CMOS07100KPA

Table 3- 12 ITR3CMOS07100KPA camera specifications

Parameter	Model	
	ITR3CMOS07100KPA	ITR3CMOS07100KPA-G
Camera Parameters		
Data interface	USB3.0	GigE
Sensor model	Sony IMX428LQJ	
Pixel size	4.5 μm x 4.5 μm	
Sensor size	1.1"	
Frame rate	51.4fps@3200 x 2200 133.8fps@1584 x 1100	16.4fps@3200 x 2200 66fps@1584 x 1100
Readout Noise	2.38e-	
Full Well	11154.09e-	
Dynamic range	72dB	
SNRmax	40.47dB	
Sensitivity	2058mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	6μs-15sec	
Shutter	Global shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	12V Power adapter
Power consumption	25.2W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform architecture and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

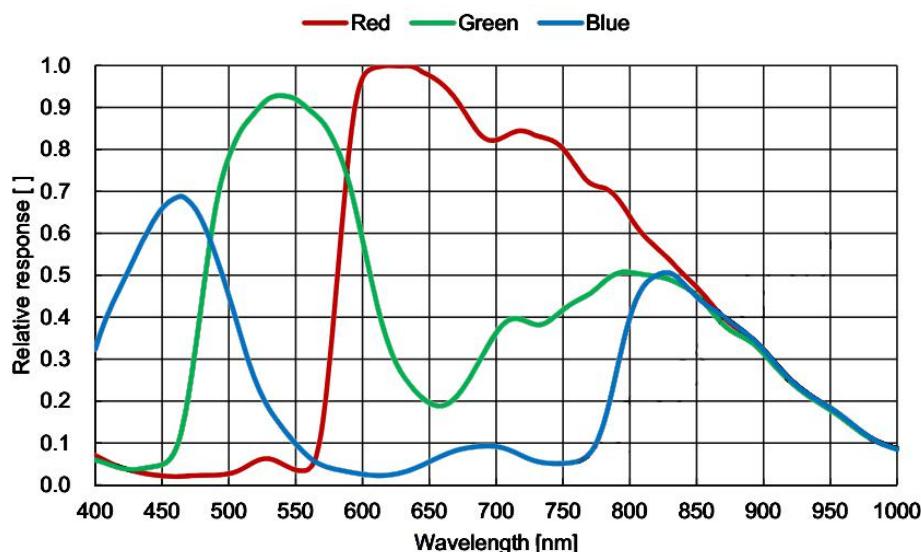


Figure 3- 17 ITR3CMOS07100KPA spectral response curve

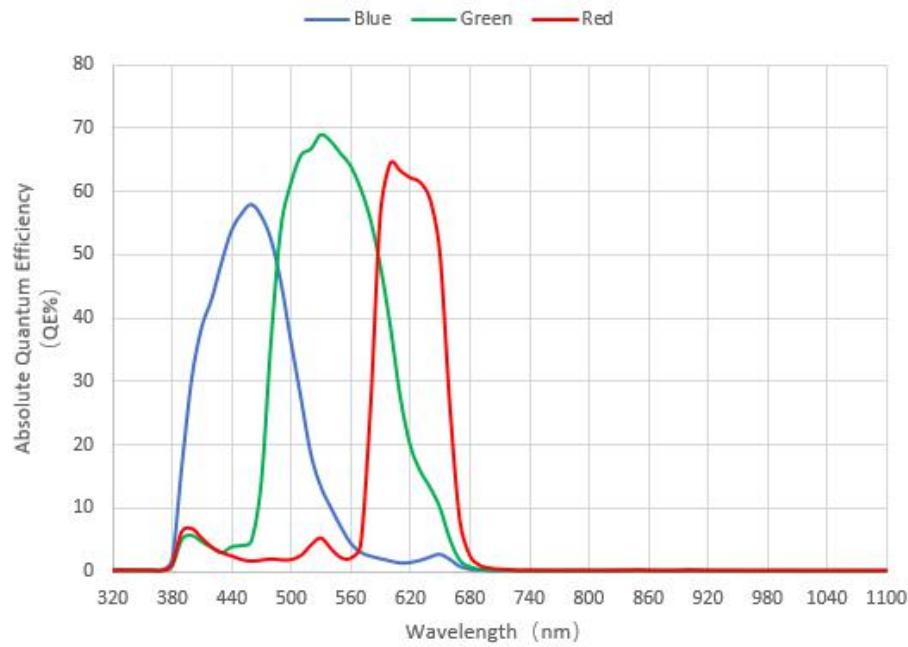


Figure 3-18 ITR3CMOS07100KPA spectral absolute quantum efficiency

### 3.13 ITR3CMOS07100KMA

Table 3- 13 ITR3CMOS07100KMA camera specifications

Parameter	Model	
	ITR3CMOS07100KMA	ITR3CMOS07100KMA-G
Camera Parameters		
Data interface	USB3.0	GigE
Sensor model	Sony IMX428LLJ	
Pixel size	4.5 μm x 4.5 μm	
Sensor size	1.1"	
Frame rate	51.4fps@3200 x 2200 133.8fps@1584 x 1100	16.4fps@3200 x 2200 66fps@1584 x 1100
Readout Noise	2.38e-	
Full Well	11154.09e-	
Dynamic range	72dB	
SNRmax	40.47dB	
Sensitivity	3354mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	6μs-15sec	
Shutter	Global shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	12V Power adapter
Power consumption	25.2W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform architecture	and	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64
Certification		CE, FCC

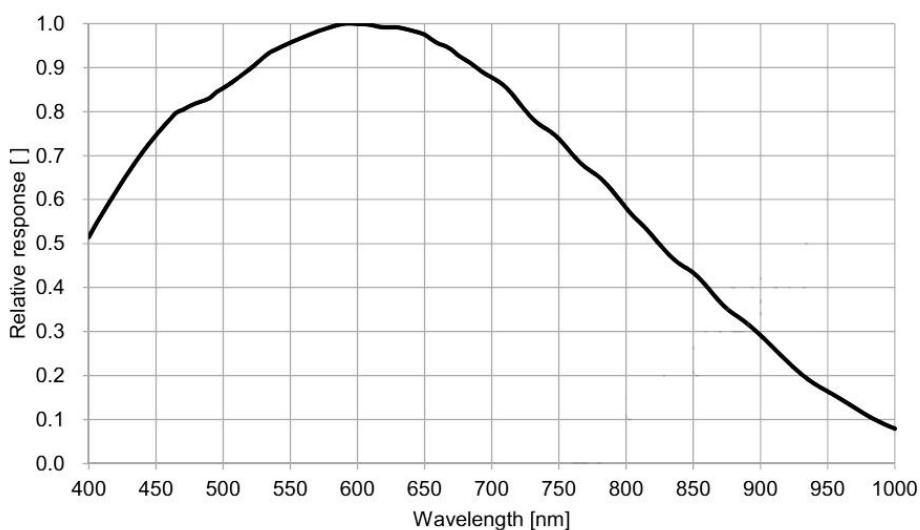


Figure 3- 19 ITR3CMOS07100KMA spectral response curve

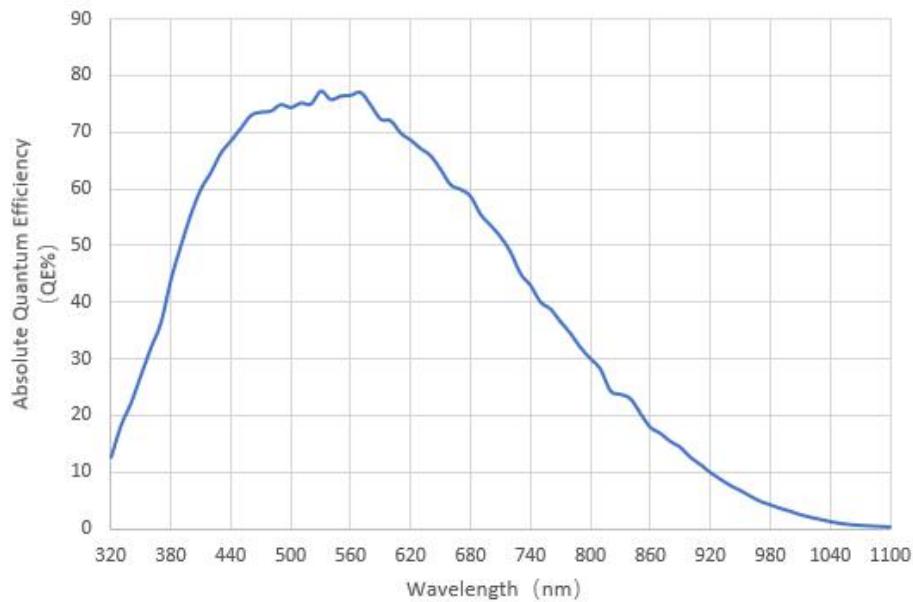


Figure 3- 20 ITR3CMOS07100KMA spectral absolute quantum efficiency

## 3.14 ITR3CMOS01700KPA

Table 3- 14 ITR3CMOS01700KPA camera specifications

Parameter	Model	
	ITR3CMOS01700KPA	ITR3CMOS01700KPA-G
Camera Parameters		
Data interface	USB3.0	GigE
Sensor model	Sony IMX432LQJ	
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	98.6fps@1600 x 1100	66fps@1600 x 1100
Readout Noise	TBD	
Full Well	TBD	
Dynamic range	TBD	
SNRmax	TBD	
Sensitivity	4910mV	
Dark current	0.3mV	
Gain range	1x-50x	
Exposure time	6 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	12V Power adapter
Power consumption	<25W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform architecture	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

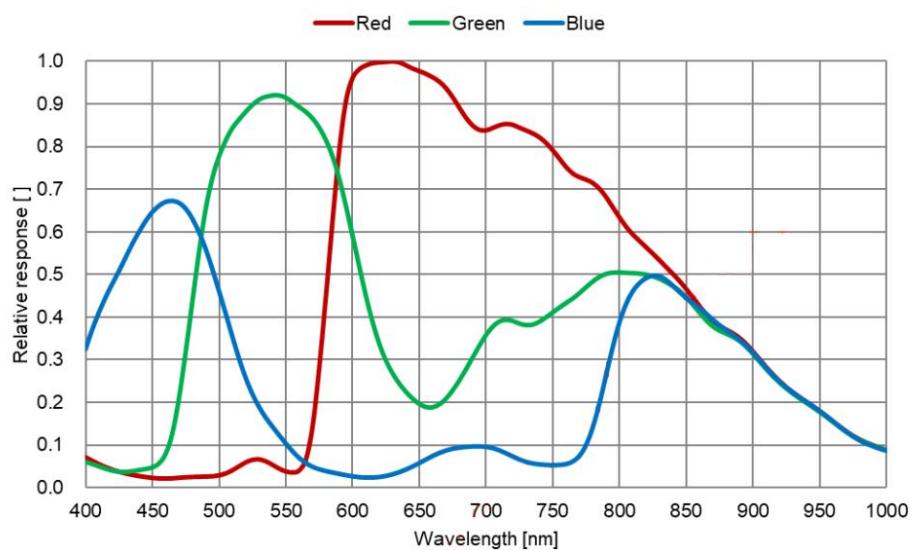


Figure 3- 21 ITR3CMOS01700KPA spectral response curve

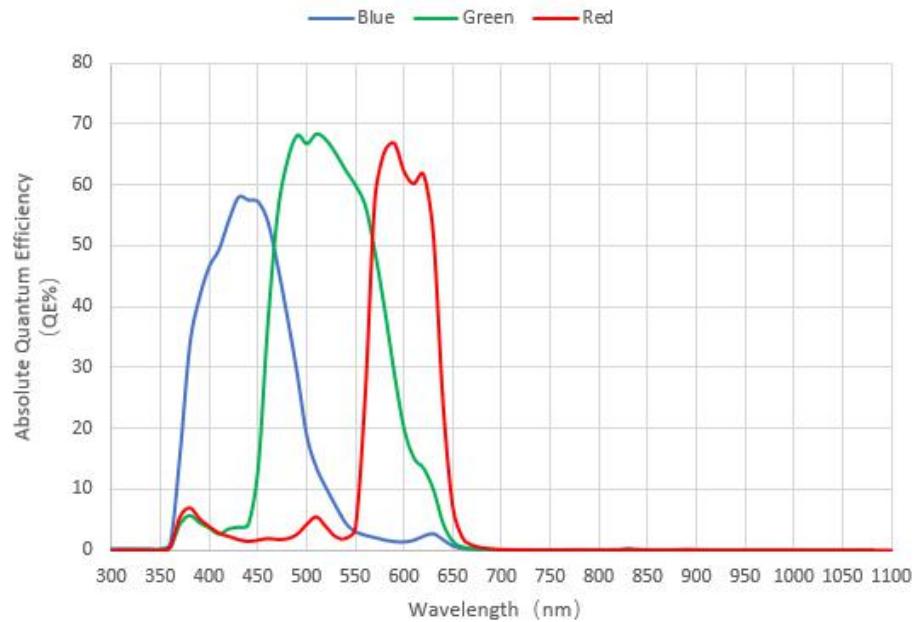


Figure 3- 22 ITR3CMOS01700KPA spectral absolute quantum efficiency

### 3.15 ITR3CMOS01700KMA

Table 3- 15 ITR3CMOS01700KMA camera specifications

Parameter \ Model	ITR3CMOS01700KMA	
	1.7M pixels 1.1" CMOS USB3.0 / GigE industrial camera	
	Camera Parameters	
Data interface	USB3.0	GigE
Sensor model	Sony IMX432LLJ	
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	98.6fps@1600 x 1100	66fps@1600 x 1100
Readout Noise	TBD	
Full Well	TBD	
Dynamic range	TBD	
SNRmax	TBD	
Sensitivity	8100mV	
Dark current	0.3mV	
Gain range	1x-50x	
Exposure time	6 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
	General specification	
Power supply	Power with USB3.0 or 12V Power adapter	12V Power adapter
Power consumption	<25W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform architecture	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

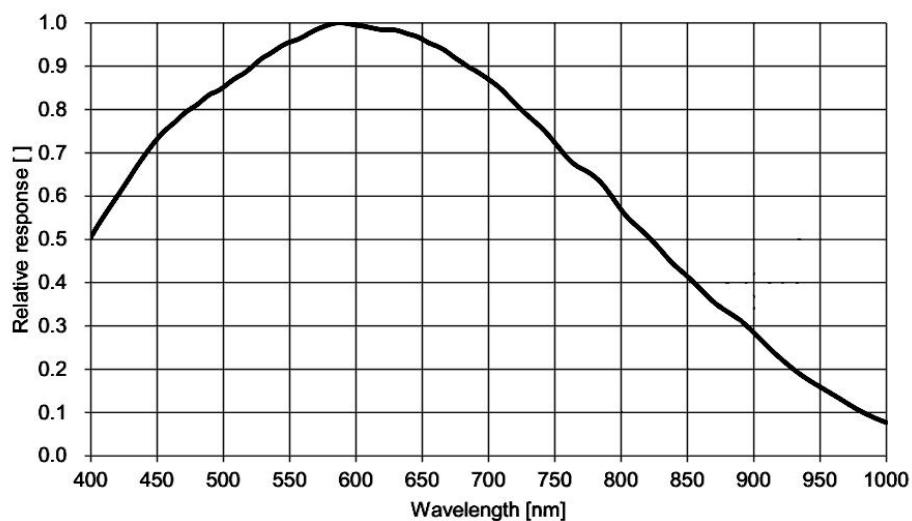


Figure 3- 23 ITR3CMOS01700KMA spectral response curve

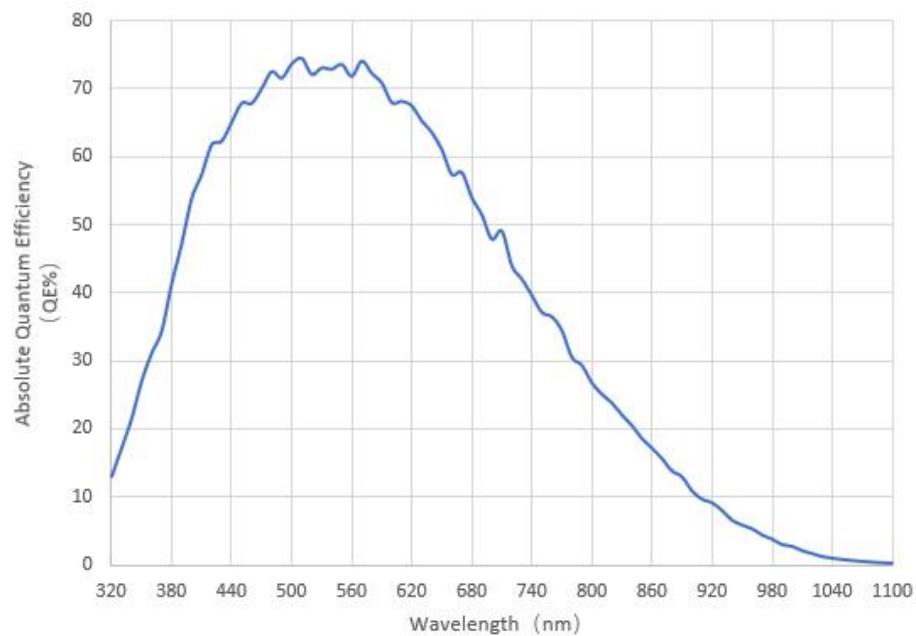


Figure 3- 24 ITR3CMOS01700KMA spectral absolute quantum efficiency

## 3.16 ITR3CMOS01300KMA

Table 3- 16 ITR3CMOS01300KMA camera specifications

Parameter	Model	ITR3CMOS01300KMA 1.3M pixels 1" CMOS USB3.0 industrial camera
	Camera Parameters	
	Sensor model	GPixel GLUX9701BSI
Pixel size	9.76 μm x 9.76 μm	
Sensor size	1"	
Frame rate	30fps@1280 x 1024 30fps@640 x 512	
Readout Noise	5.28e-(HCG) 35.19e-(LCG) 1.79e-(HDR)	
Full Well	12927.7e-(HCG) 89855.19e-(LCG) 20205.74e-(HDR)	
Dynamic range	67.78dB (HCG) 68.14dB (LCG) 81.08dB (HDR)	
SNRmax	41.12dB(HCG) 49.54dB(LCG) 43.06dB(HDR)	
Peak QE	89%@610nm	
Sensitivity	2.57x10 <sup>8</sup> (e-/(W/m <sup>2</sup> .s))@610nm	
Dark current	2.07e-/s/pix@ -10°C die temp	
Gain range	1x-50x	
Exposure time	63μs-60sec	
Shutter	Rolling shutter	
Binning	Software 2x2, 3x3, 4x4, Hardware 2x2	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / HDR16bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	
Power consumption	<20W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Win32/WinRT/Linux/macOS/Android; X86/X64/armhf/armel/arm64	
Certification	CE, FCC	

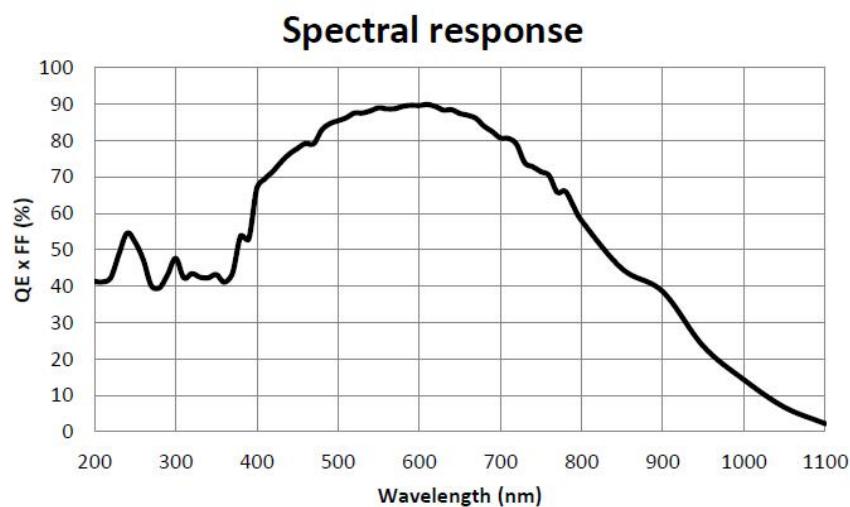


Figure 3- 25 ITR3CMOS01300KMA spectral response curve

### 3.17 ITR3CMOS00500KMA

Table 3- 17 ITR3CMOS00500KMA camera specifications

Parameter	Model	ITR3CMOS00500KMA
		0.5M pixels 1" CMOS USB3.0 industrial camera
	Camera Parameters	
Sensor model	GPixel GLUX1605BSI	
Pixel size	16 μm x 16 μm	
Sensor size	1"	
Frame rate	60fps@800 x 600 60fps@400 x 300	
Readout Noise	5.88e-(HCG) 36.5e-(LCG) 2.71e-(HDR)	
Full Well	13541.8e-(HCG) 89258.25e-(LCG) 46604.55e-(HDR)	
Dynamic range	67.24dB (HCG) 67.77dB (LCG) 84.72dB (HDR)	
SNRmax	41.32dB(HCG) 49.51dB(LCG) 46.68dB(HDR)	
Peak QE	95%@560nm	
Sensitivity	6.4x10 <sup>8</sup> (e-/(W/m <sup>2</sup> ).s))	
Dark current	3.71e-/s/pix@ -10°C die temp	
Gain range	1x-50x	
Exposure time	27μs-60sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4, Hardware 2x2	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / HDR16bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	
Power consumption	<20W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 101.5mm	
Weight	860g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform architecture	and Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

### Spectral response

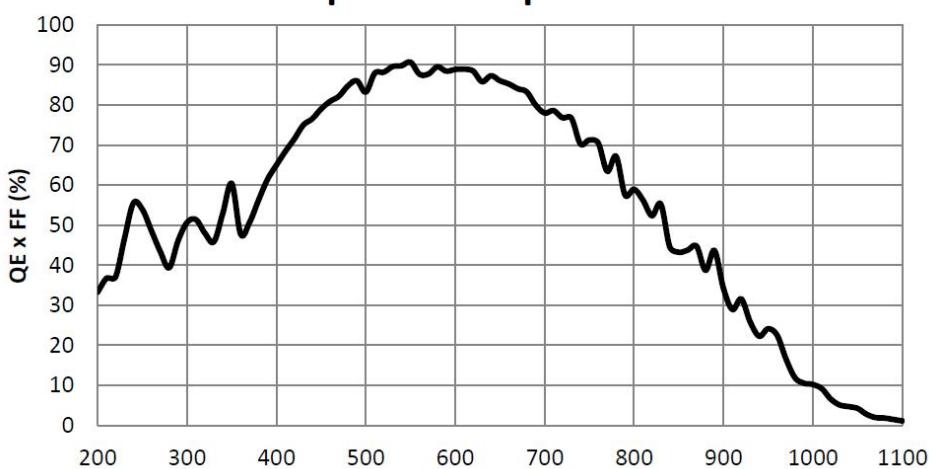


Figure 3- 26 ITR3CMOS00500KMA spectral response curve

## 4 CTR3CMOS Series Camera Specification(15)

### 4.1 CTR3CMOS00390KMA

Table 4- 1 CTR3CMOS00390KMA camera specifications

Parameter \ Model	CTR3CMOS00390KMA 0.39M pixels 1/2.9" CMOS USB3.0 industrial camera Camera Parameters
Sensor model	Sony IMX287LLR
Pixel size	6.9 $\mu\text{m}$ x 6.9 $\mu\text{m}$
Sensor size	1/2.9"
Frame rate	20fps@720 x 540
Conversion Gain	2.66e-/ADU
Readout Noise	0.76e-
Full Well	10877.21e-
Dynamic range	72dB
SNRmax	40.37dB
Peak QE	71%@575nm
Sensitivity	7320mV
Dark current	0.76mV
Gain range	1x-50x
Exposure time	6 $\mu\text{s}$ -300sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
<b>General specification</b>	
Power supply	Power with USB3.0 or 12V Power adapter
Power consumption	Cooled 3.12W / Uncooled 3.06W
Temperature	Working temperature -10~50°C, storage temperature -30~70°C
Humidity	20%-80%, no condensation
Size	80mm x 80mm x 45.5mm
Weight	396.6g
Lens mount	C-mount
Software	ToupView/ SDK
Platform architecture and	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

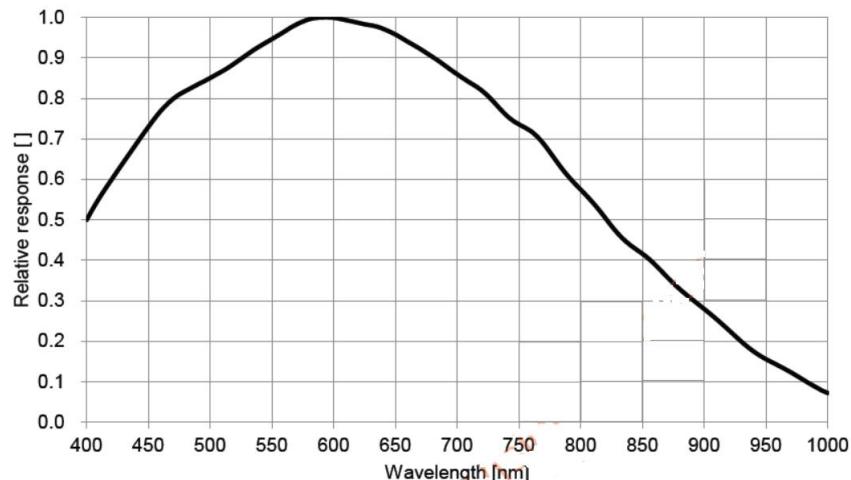


Figure 4- 1 CTR3CMOS00390KMA spectral response curve

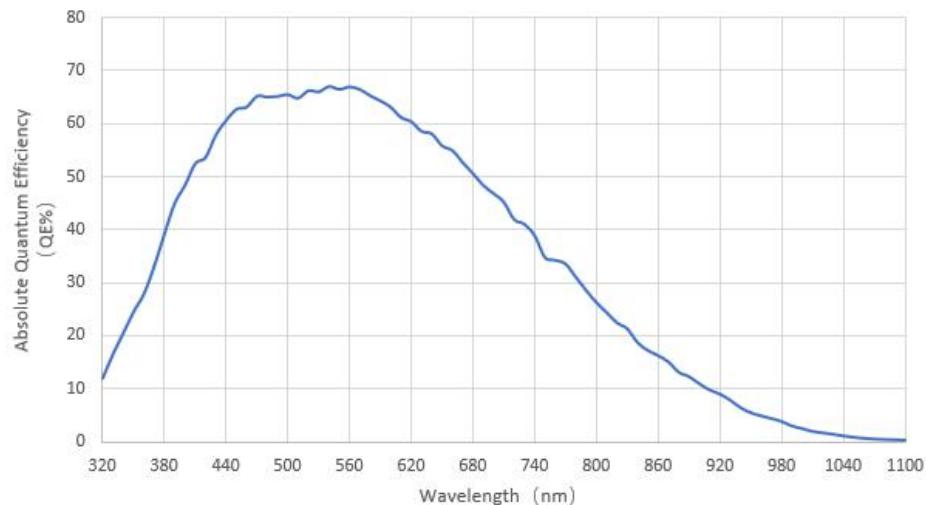


Figure 4- 2 CTR3CMOS00390KMA spectral absolute quantum efficiency

## 4.2 CTR3CMOS00503KMA

Table 4- 2 CTR3CMOS00503KMA camera specifications

Parameter	Model	CTR3CMOS00503KMA 0.503M pixels 1/1.7" CMOS USB3.0 industrial camera Camera Parameters
Sensor model	Sony IMX426LLJ	
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$	
Sensor size	1/1.7"	
Frame rate	20fps@800 x 620	
Conversion Gain	4.83e-/ADU	
Readout Noise	0.76e-	
Full Well	19768.75e-	
Dynamic range	72dB	
SNRmax	42.96dB	
Peak QE	78%@575nm	
Sensitivity	8100mV	
Dark current	0.3mV	
Gain range	1x-50x	
Exposure time	6 $\mu\text{s}$ -300sec	
Shutter	Global shutter	
Binning	Software2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
<b>General specification</b>		
Power supply	Power with USB3.0 or 12V Power adapter	
Power consumption	Cooled 3.65W / Uncooled 3.22W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 45.5mm	
Weight	396.6g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform architecture and	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

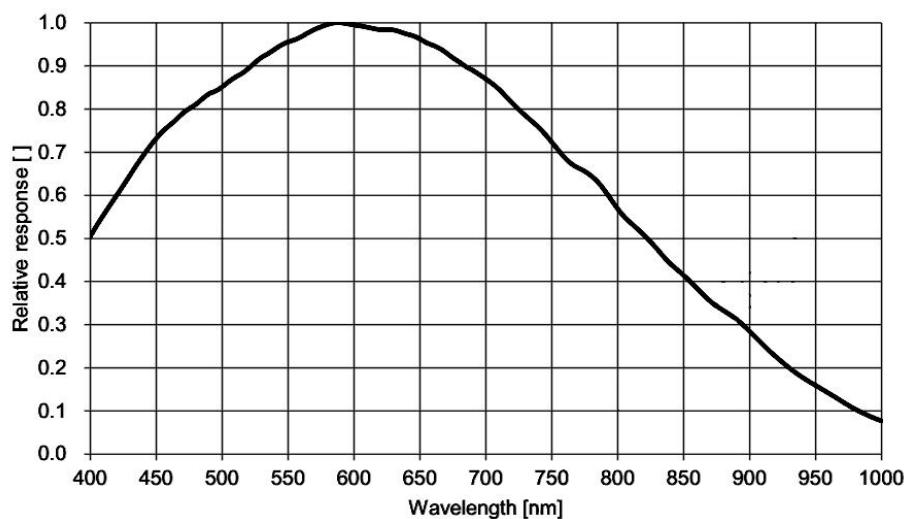


Figure 4- 3 CTR3CMOS00503KMA spectral response curve

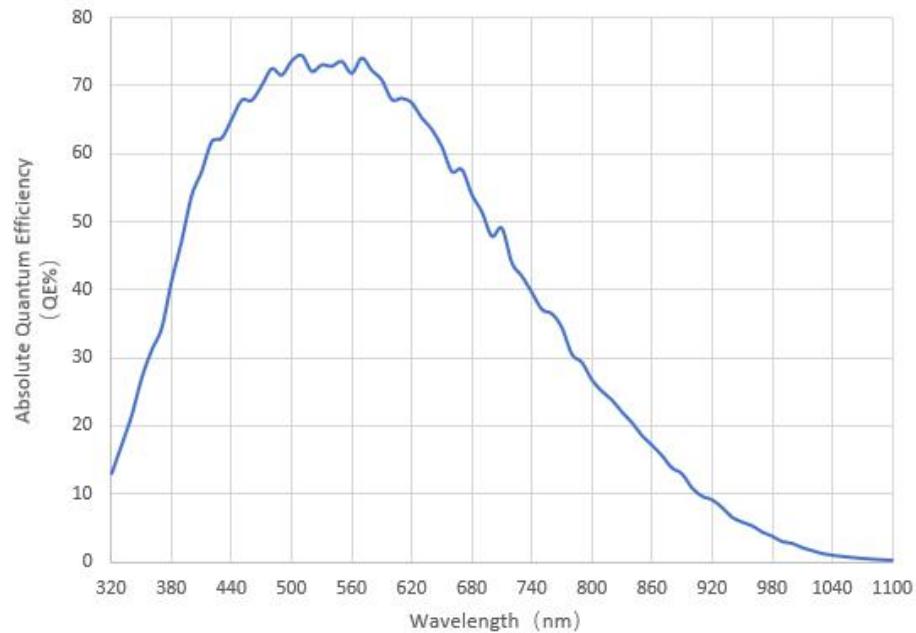


Figure 4- 4 CTR3CMOS00503KMA spectral absolute quantum efficiency

## 4.3 CTR3CMOS01700KPA

Table 4- 3 CTR3CMOS01700KPA camera specifications

Parameter	Model	
	CTR3CMOS01700KPA	
	1.7M pixels 1.1" CMOS USB3.0/GigE industrial camera	
Camera Parameters		
Data interface	USB3.0	GigE
Sensor model	Sony IMX432LQJ	
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	98.6fps@1600 x 1100	66fps@1600 x 1100
Readout Noise	TBD	
Full Well	TBD	
Dynamic range	TBD	
SNRmax	TBD	
Sensitivity	4910mV	
Dark current	0.3mV	
Gain range	1x-50x	
Exposure time	6 $\mu\text{s}$ -300sec	
Shutter	Global shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	12V Power adapter
Power consumption	<25W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 45.5mm	
Weight	396.6g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

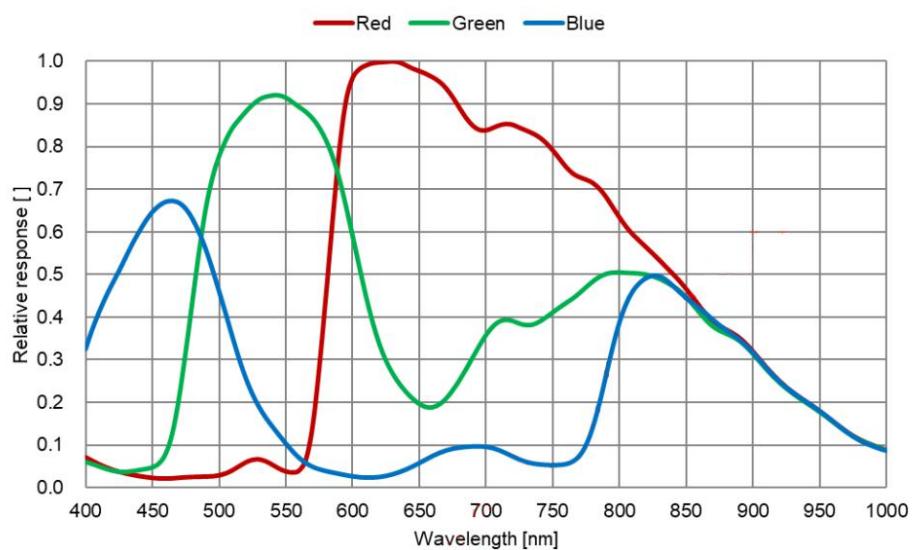


Figure 4- 5 CTR3CMOS01700KPA spectral response curve

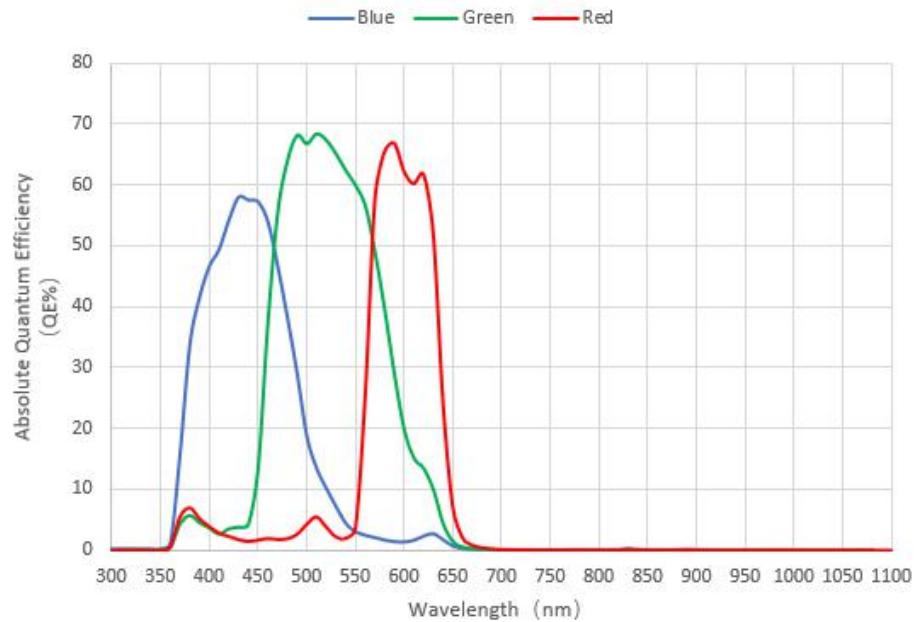


Figure 4- 6 CTR3CMOS01700KPA spectral absolute quantum efficiency

## 4.4 CTR3CMOS01700KMA

Table 4- 4 CTR3CMOS01700KMA camera specifications

Parameter	Model	
	CTR3CMOS01700KMA	CTR3CMOS01700KMA-G
Camera Parameters		
Data interface	USB3.0	GigE
Sensor model	Sony IMX432LLJ	
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	98.6fps@1600 x 1100	66fps@1600 x 1100
Readout Noise	TBD	
Full Well	TBD	
Dynamic range	TBD	
SNRmax	TBD	
Sensitivity	8100mV	
Dark current	0.3mV	
Gain range	1x-50x	
Exposure time	6 $\mu\text{s}$ -300sec	
Shutter	Global shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	12V Power adapter
Power consumption	<25W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 45.5mm	
Weight	396.6g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

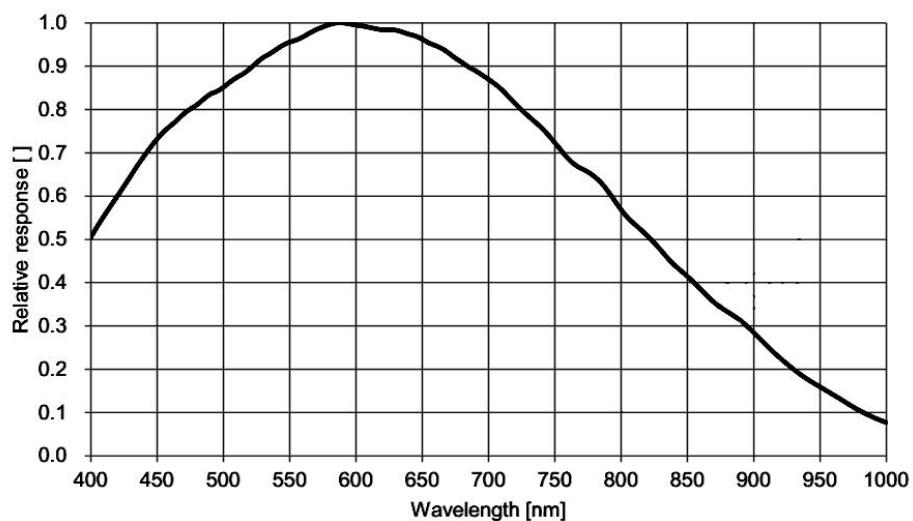


Figure 4- 7 CTR3CMOS01700KMA spectral response curve

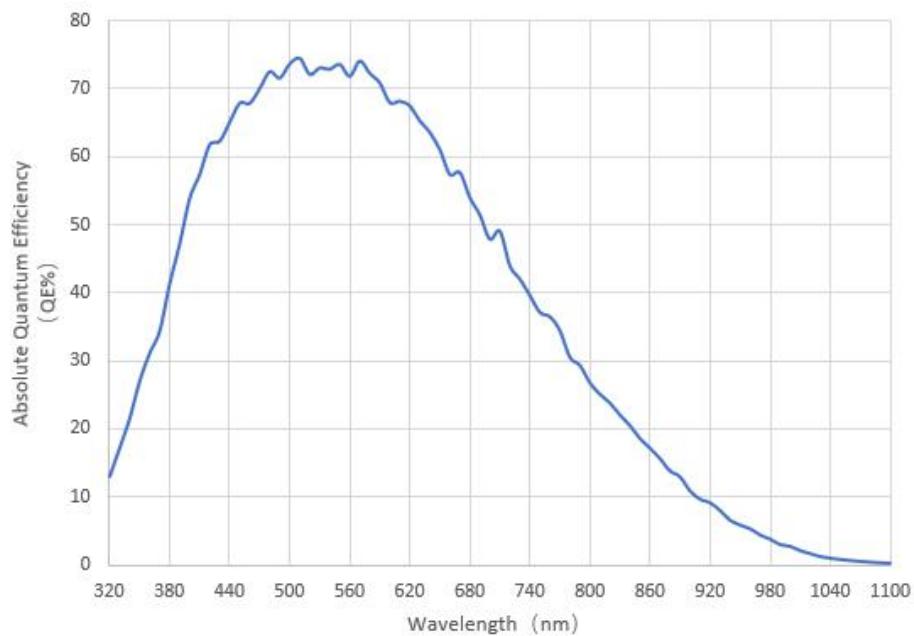


Figure 4- 8 CTR3CMOS01700KMA spectral absolute quantum efficiency

## 4.5 CTR3CMOS07100KPA

Table 4- 5 CTR3CMOS07100KPA camera specifications

Parameter	Model	
	CTR3CMOS07100KPA	CTR3CMOS07100KPA-G
Camera Parameters		
Data interface	USB3.0	GigE
Sensor model	Sony IMX428LQJ	
Pixel size	4.5 $\mu\text{m}$ x 4.5 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	51.4fps@3200 x 2200 133.8fps@1584 x 1100	16.4fps@3200 x 2200 66fps@1600 x 1100
Readout Noise	2.38e-	
Full Well	11154.09e-	
Dynamic range	72dB	
SNRmax	40.47dB	
Sensitivity	2058mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	6 $\mu\text{s}$ -300sec	
Shutter	Global shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	12V Power adapter
Power consumption	25.2W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 45.5mm	
Weight	396.6g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform architecture	and	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification		CE, FCC

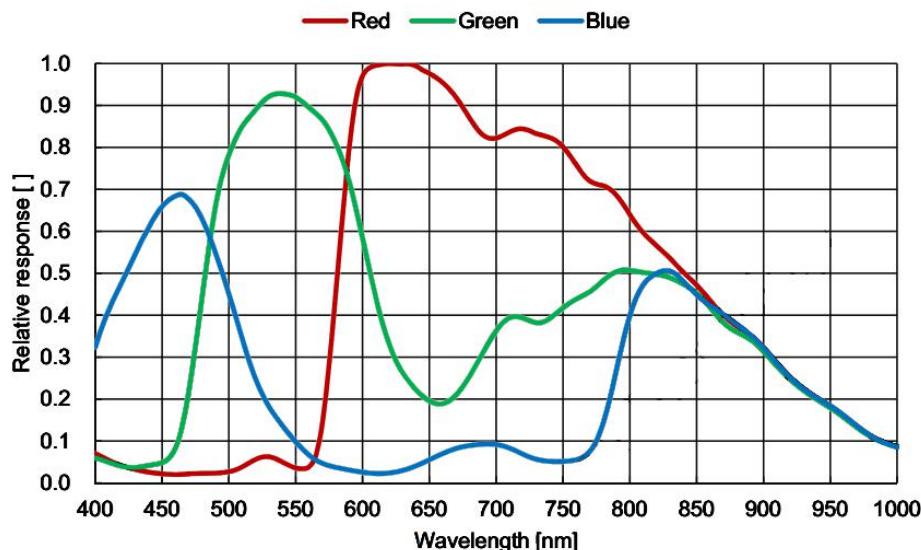


Figure 4- 9 CTR3CMOS07100KPA spectral response curve

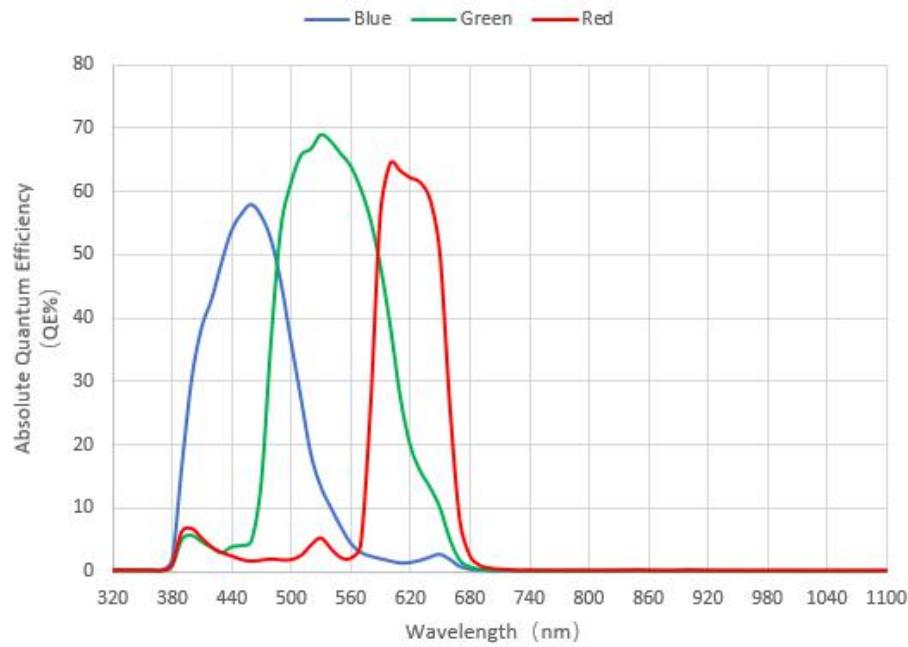


Figure 4- 10 CTR3CMOS07100KPA spectral absolute quantum efficiency

## 4.6 CTR3CMOS07100KMA

Table 4- 6 CTR3CMOS07100KMA camera specifications

Parameter	Model	
	CTR3CMOS07100KMA	CTR3CMOS07100KMA-G
Camera Parameters		
Data interface	USB3.0	GigE
Sensor model	Sony IMX428LLJ	
Pixel size	4.5 μm x 4.5 μm	
Sensor size	1.1"	
Frame rate	51.4fps@3200 x 2200 133.8fps@1584 x 1100	16.4fps@3200 x 2200 66fps@1600 x 1100
Readout Noise	2.38e-	
Full Well	11154.09e-	
Dynamic range	72dB	
SNRmax	40.47dB	
Sensitivity	3354mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	6μs-300sec	
Shutter	Global shutter	
Binning	Software2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	12V Power adapter
Power consumption	25.2W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 45.5mm	
Weight	396.6g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform architecture	and	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification		CE, FCC

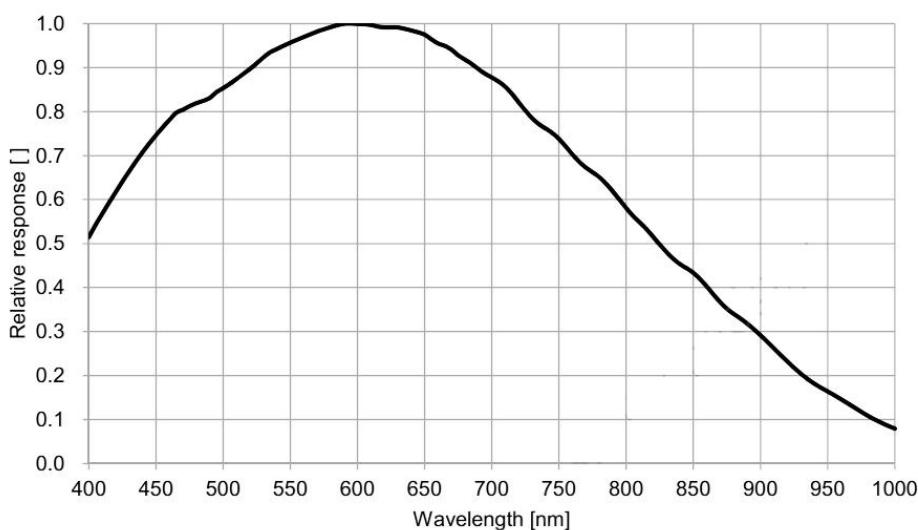


Figure 4- 11 CTR3CMOS07100KMA spectral response curve

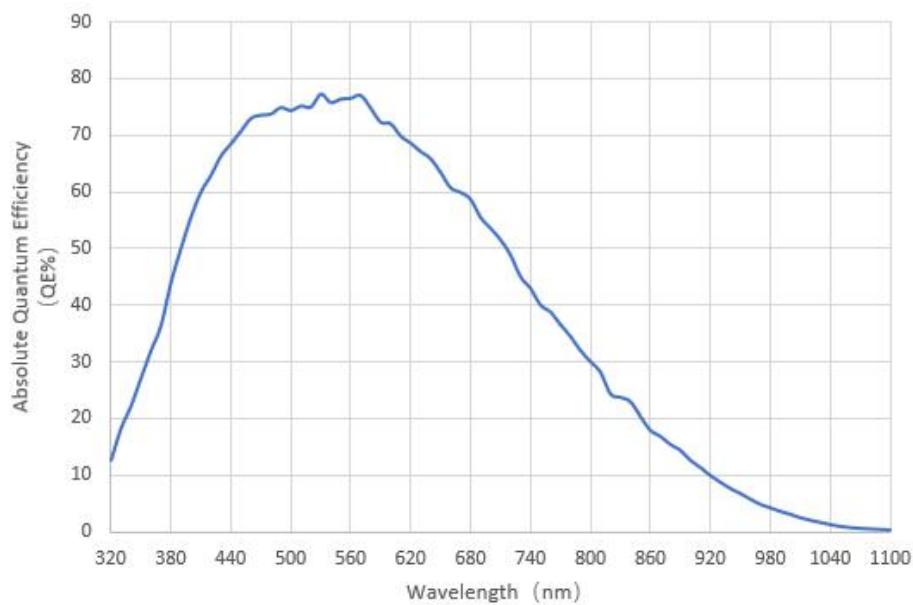


Figure 4- 12 CTR3CMOS07100KMA spectral absolute quantum efficiency

## 4.7 CTR3CMOS20000KPA

Table 4- 7 CTR3CMOS20000KPA camera specifications

Parameter	Model	
	CTR3CMOS20000KPA	
	20M pixels 1" CMOS USB3.0 / GigE industrial camera	
Camera Parameters		
Data interface	USB3.0	GigE
Sensor model	Sony IMX183CQK	
Pixel size	2.4 $\mu\text{m}$ x 2.4 $\mu\text{m}$	
Sensor size	1"	
Frame rate	19.0fps@5440 x 3684 48.8fps@2736 x 1824 59.4fps@1824 x 1216	4.5fps@5440 x 3684 18.5fps@2736 x 1824 41.7fps@1824 x 1216
Readout Noise	3.38e-	
Full Well	15929.69e-	
Dynamic range	72dB	
SNRmax	42.02dB	
Sensitivity	462mV	
Dark current	0.21mV	
Gain range	1x-50x	
Exposure time	53 $\mu\text{s}$ -300sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, hardware2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	12V Power adapter
Power consumption	14.64W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 45.5mm	
Weight	396.6g	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

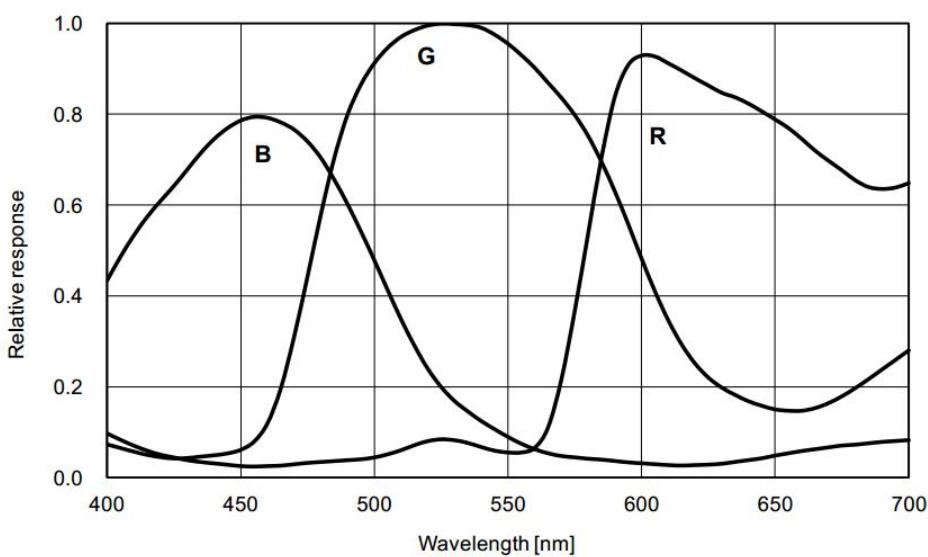


Figure 4- 13 CTR3CMOS20000KPA spectral response curve

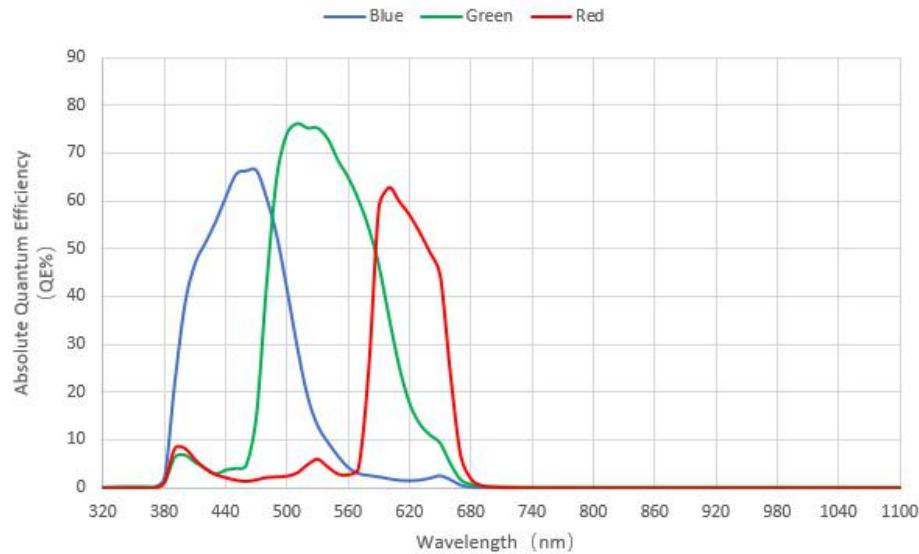


Figure 4- 14 CTR3CMOS20000KPA spectral absolute quantum efficiency

## 4.8 CTR3CMOS20000KMA

Table 4- 8 CTR3CMOS20000KMA camera specifications

Parameter	Model	
	CTR3CMOS20000KMA	CTR3CMOS20000KMA -G
Camera Parameters		
Data interface	USB3.0	GigE
Sensor model	Sony IMX183CQK	
Pixel size	2.4 μm x 2.4 μm	
Sensor size	1"	
Frame rate	19.0fps@5440 x 3684 48.8fps@2736 x 1824 59.4fps@1824 x 1216	4.5fps@5440 x 3684 18.5fps@2736 x 1824 41.7fps@1824 x 1216
Readout Noise	3.38e-	
Full Well	15929.69e-	
Dynamic range	72dB	
SNRmax	42.02dB	
Sensitivity	462mV	
Dark current	0.21mV	
Gain range	1x-50x	
Exposure time	53μs-300sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, hardware2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	12V Power adapter
Power consumption	14.64W	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 45.5mm	
Weight	396.6g	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform architecture and	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

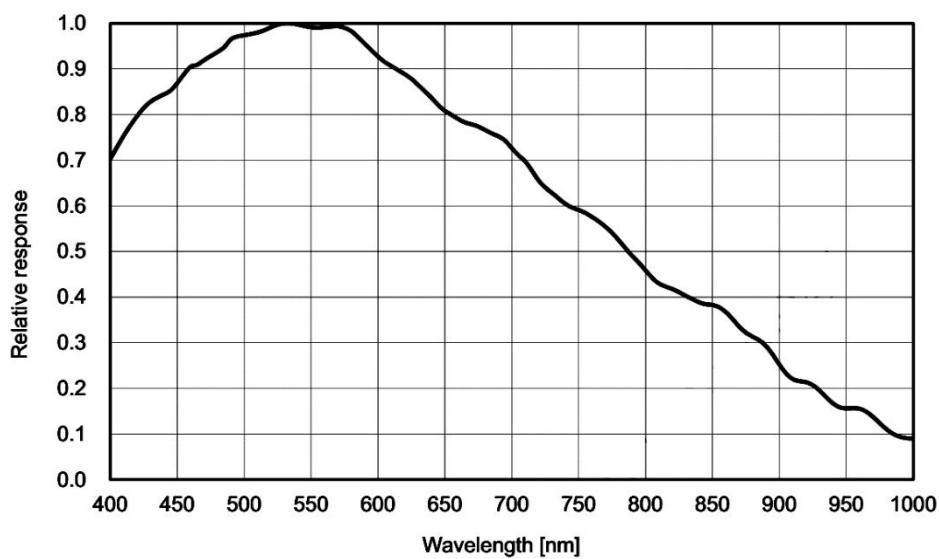


Figure 4- 15 CTR3CMOS20000KMA spectral response curve

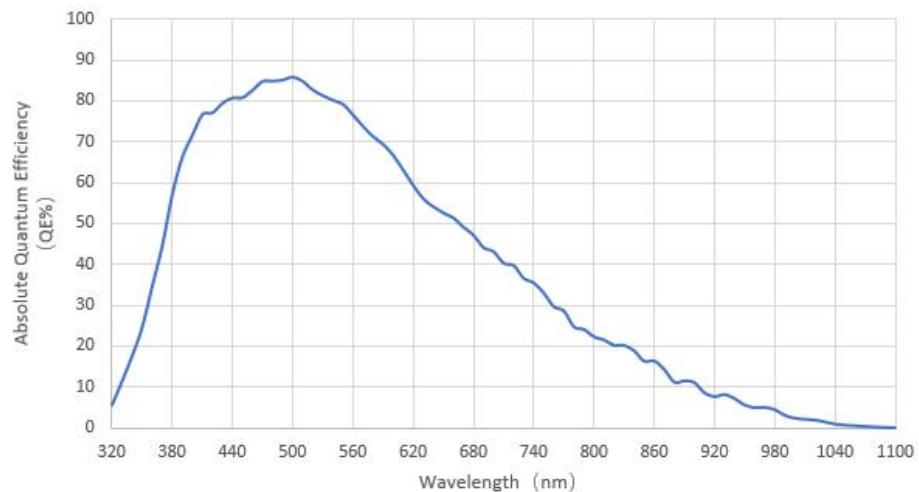


Figure 4- 16 CTR3CMOS20000KMA spectral absolute quantum efficiency

## 4.9 CTR3CMOS45000KMA

Table 4- 9 CTR3CMOS45000KMA camera specifications

Parameter	Model	CTR3CMOS45000KMA 45M pixels 1.4" CMOS USB3.0 industrial camera
	Camera Parameters	
	Sensor model	Sony IMX492LLJ-C
Pixel size	2.315 μm x 2.315μm	
Sensor size	1.4"	
Frame rate	8.1@8176x5616 30.0@4080x2808 8.1@7408x5556 33.0@3696x2778 10.4@8176x4320 34.7@4096x2160 62.5@2048x1080 86.5@1360x720	
Readout Noise	2.67e-(HCG) 2.74e-(LCG)	
Full Well	14796.69e-(HCG) 14859.92e-(LCG)	
Dynamic range	72dB (HCG) 72dB (LCG)	
SNRmax	41.7dB(HCG) 41.72dB(LCG)	
Sensitivity	175mV	
Dark current	0.03mV	
Gain range	1x-50x	
Exposure time	100μs-300sec	
Shutter	Rolling shutter	
Binning	Software2x2, 3x3, 4x4, hardware2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General specification		
Power supply	Power with USB3.0 or 12V Power adapter	
Power consumption	24.12w	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	80mm x 80mm x 45.5mm	
Weight	396.6g	
Lens mount	C mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

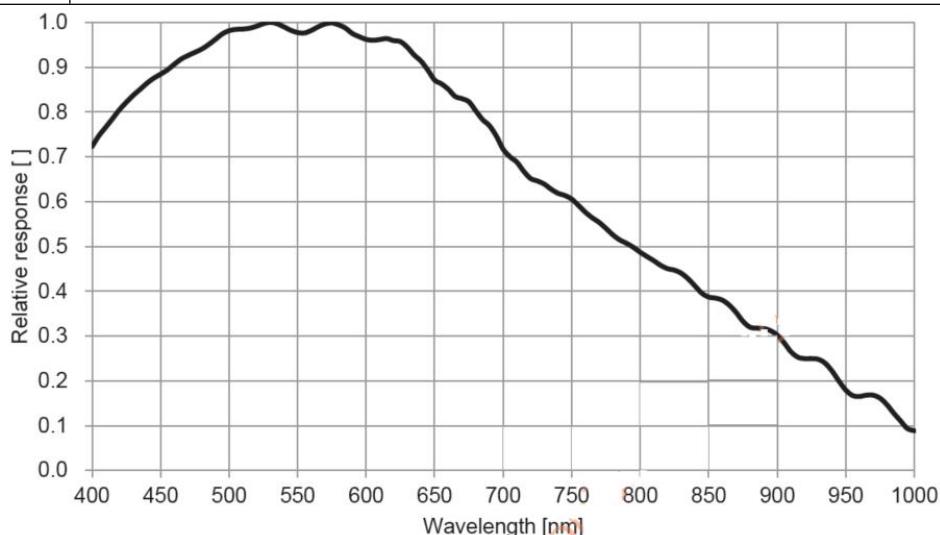


Figure 4- 17 CTR3CMOS45000KMA spectral response curve

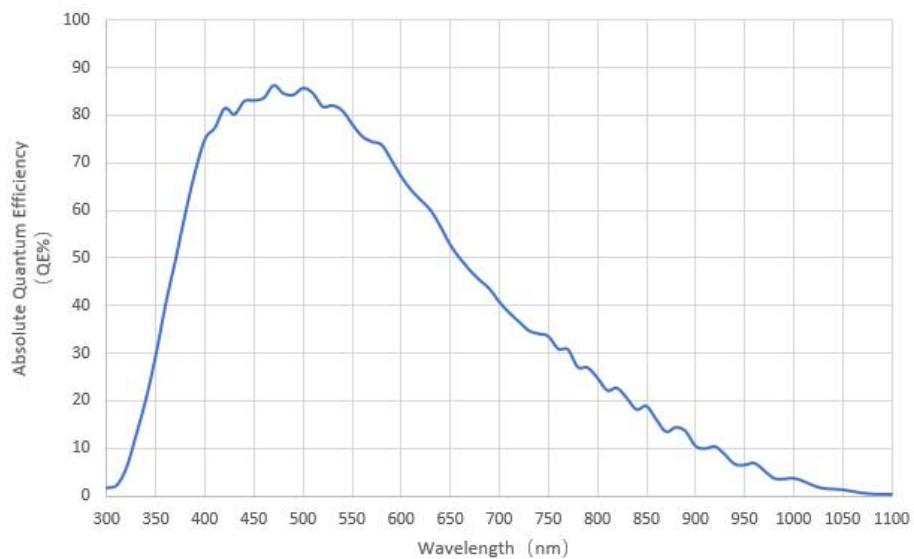


Figure 4- 18 CTR3CMOS45000KMA spectral absolute quantum efficiency

## 5 I3 Series Camera Specification(54)

### 5.1 I3ISPM00500KPA

Table 5- 1 I3ISPM00500KPA camera specifications

Parameter	Model	I3ISPM00500KPA
		0.5M 1/1.7" CMOS USB3.0 industrial camera
	Camera Parameters	
Sensor model	Sony IMX433LQJ	
Pixel size	9.0 $\mu\text{m} \times 9.0 \mu\text{m}$	
Sensor size	1/1.7"	
Frame rate	166.5fps@812×620	
Dynamic range	72.3dB	
Signal-to-Noise ratio	50.0dB	
Sensitivity	4910mV	
Dark current	0.3mV	
Gain range	1x-50x	
Exposure time	6 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input, one non-isolated output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

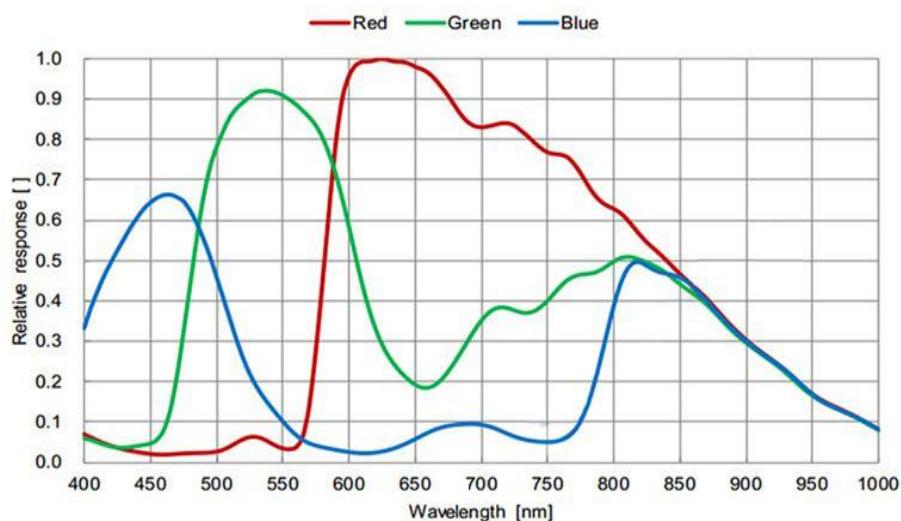


Figure 5- 1 I3ISPM00500KPA spectral response curve

## 5.2 I3ISPM01500KPA

Table 5- 2 I3ISPM01500KPA camera specifications

Parameter	Model	I3ISPM01500KPA
		1.5M pixels 1/2.9" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX273LQR	
Pixel size	3.45 $\mu\text{m} \times 3.45 \mu\text{m}$	
Sensor size	1/2.9"	
Frame rate	227.2fps@1440×1080 382.7fps@720×540	
Dynamic range	73.6dB	
Signal-to-Noise ratio	40.4dB	
Sensitivity	1146mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	15 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 10bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

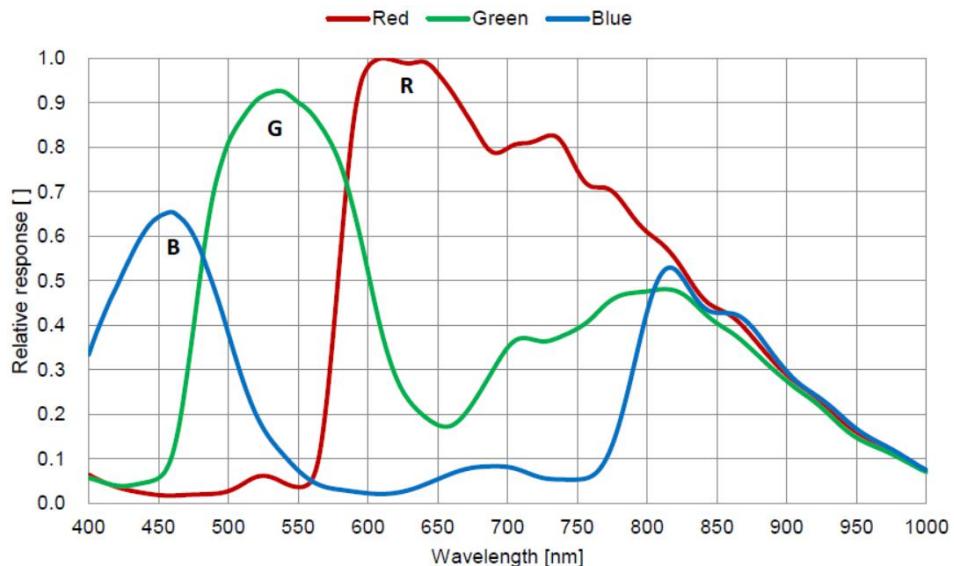


Figure 5- 2 I3ISPM01500KPA spectral response curve

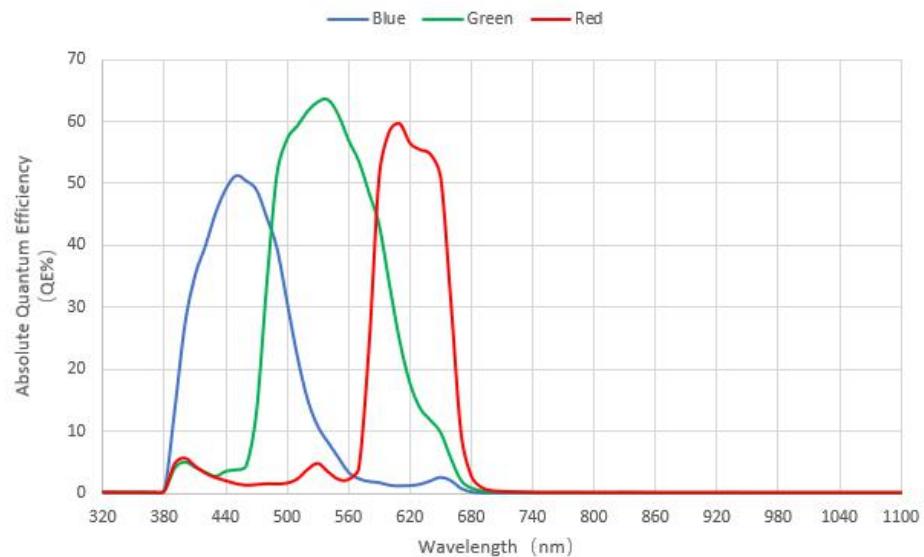


Figure 5- 3 I3ISPM01500KPA absolute quantum efficiency

## 5.3 I3ISPM02300KPA

Table 5- 3 I3ISPM02300KPA camera specifications

Parameter	Model	I3ISPM02300KPA
		2.3M pixels 1/1.2" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX174LQJ	
Pixel size	5.86 $\mu\text{m}$ x 5.86 $\mu\text{m}$	
Sensor size	1/1.2"	
Frame rate	164.5fps@1920 x 1200	
Dynamic range	73.6dB	
Signal-to-Noise ratio	44.8dB	
Sensitivity	1016mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	15 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software 2 $\times$ 2, 3 $\times$ 3, 4 $\times$ 4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 10bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

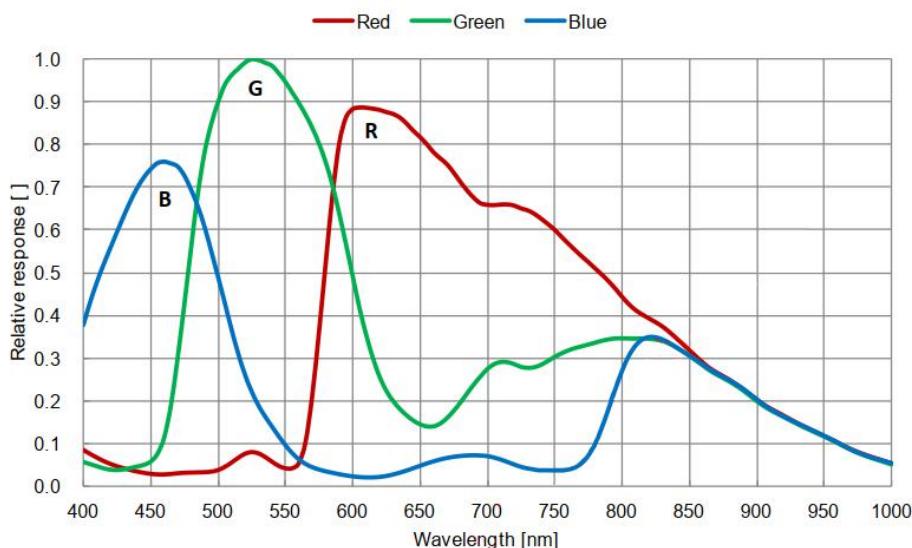


Figure 5- 4 I3ISPM02300KPA spectral response curve

## 5.4 I3ISPM02300KPB

Table 5- 4 I3ISPM02300KPB camera specifications

Parameter	Model	I3ISPM02300KPB
		2.3M pixels 1/1.2" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX249LQJ	
Pixel size	5.86 $\mu\text{m}$ x 5.86 $\mu\text{m}$	
Sensor size	1/1.2"	
Frame rate	30fps@1920 x 1200	
Dynamic range	73.6dB	
Signal-to-Noise ratio	44.8dB	
Sensitivity	1016mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	42 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software 2 $\times$ 2, 3 $\times$ 3, 4 $\times$ 4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 10bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.2W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

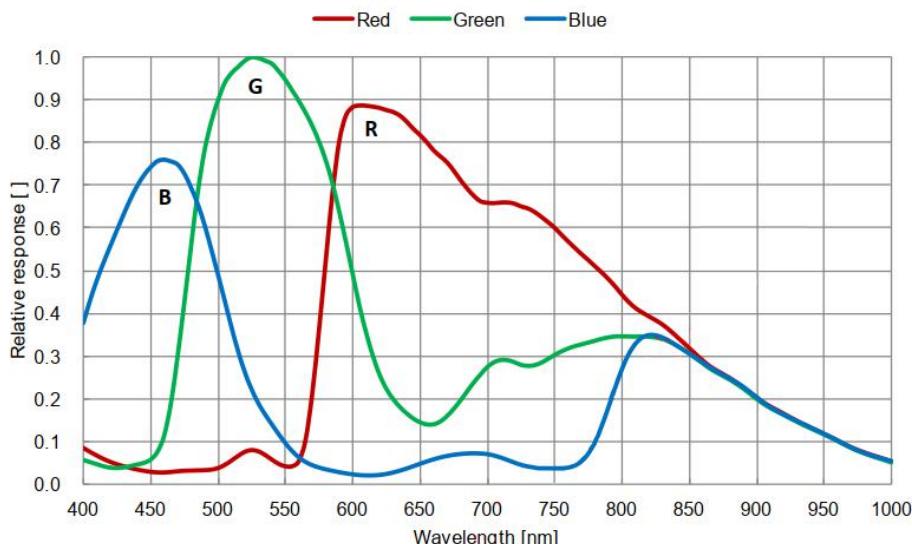


Figure 5- 5 I3ISPM02300KPB spectral response curve

## 5.5 I3ISPM02400KPA

Table 5- 5 I3ISPM02400KPA camera specifications

Parameter	Model	I3ISPM02400KPA
		2.4M pixels 1/1.7" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Gpixel GMAX4002	
Pixel size	4.0 $\mu\text{m}$ x 4.0 $\mu\text{m}$	
Sensor size	1/1.7"	
Frame rate	155fps@2048x1200 620fps@1024x600	
Dynamic range	TBD	
Signal-to-Noise ratio	TBD	
Sensitivity	$3.26 \times 10^7 \text{ e-}/((\text{W}/\text{m}^2) \cdot \text{s})$	
Dark current	8.3e-/s	
Gain range	1x-50x	
Exposure time	55 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 10bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.2W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

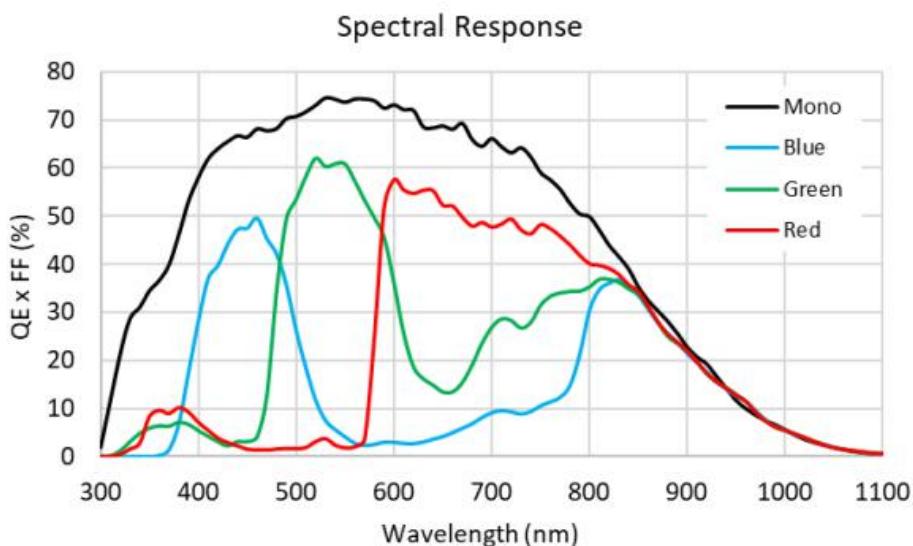


Figure 5- 6 I3ISPM02400KPA spectral response curve

## 5.6 I3ISPM03100KPA

Table 5- 6 I3ISPM03100KPA camera specifications

Parameter	Model	I3ISPM03100KPA
		3.1M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX252LQR	
Pixel size	3.45 μm×3.45 μm	
Sensor size	1/1.8"	
Frame rate	115fps@2048×1536 230.3fps@1024×768	
Dynamic range	73.6dB	
Signal-to-Noise ratio	40.4dB	
Sensitivity	1146mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	15μs-15sec	
Shutter	Global shutter	
Binning	Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	2.65W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

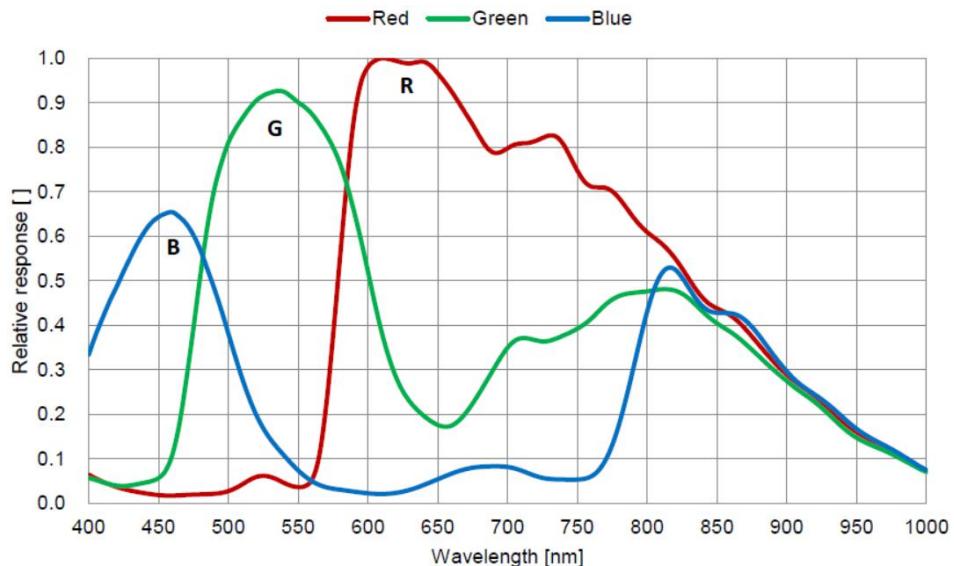


Figure 5- 7 I3ISPM03100KPA spectral response curve

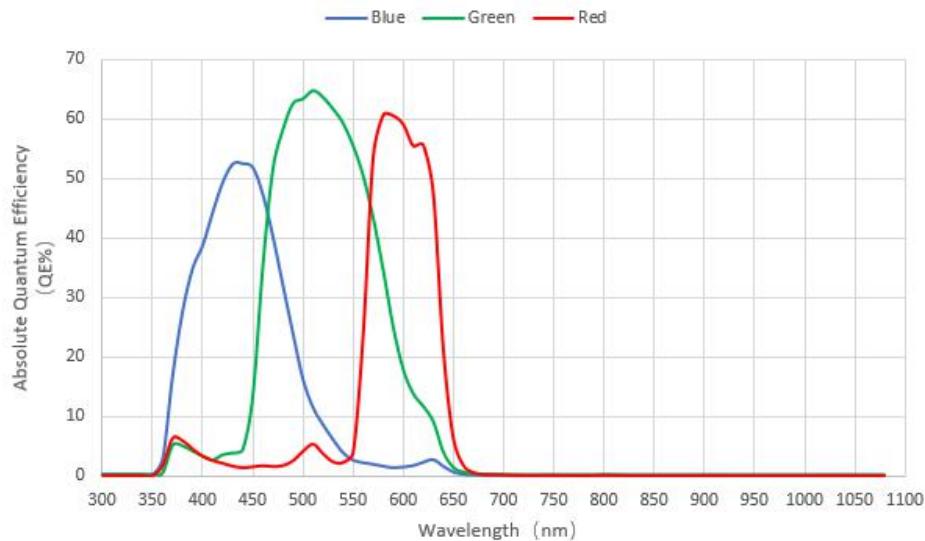


Figure 5- 8 I3ISPM03100KPA absolute quantum efficiency

## 5.7 I3ISPM03100KPB

Table 5- 7 I3ISPM03100KPB camera specifications

Parameter	Model	I3ISPM03100KPB
		3.1M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX265LQR	
Pixel size	3.45 $\mu\text{m} \times 3.45 \mu\text{m}$	
Sensor size	1/1.8"	
Frame rate	55.4fps@2048×1536 115.1fps@1024×768	
Dynamic range	73.6dB	
Signal-to-Noise ratio	40.4dB	
Sensitivity	1146mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	15 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	2.55W	
Temperature	Working temperature -10~50°C, storage temperature30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

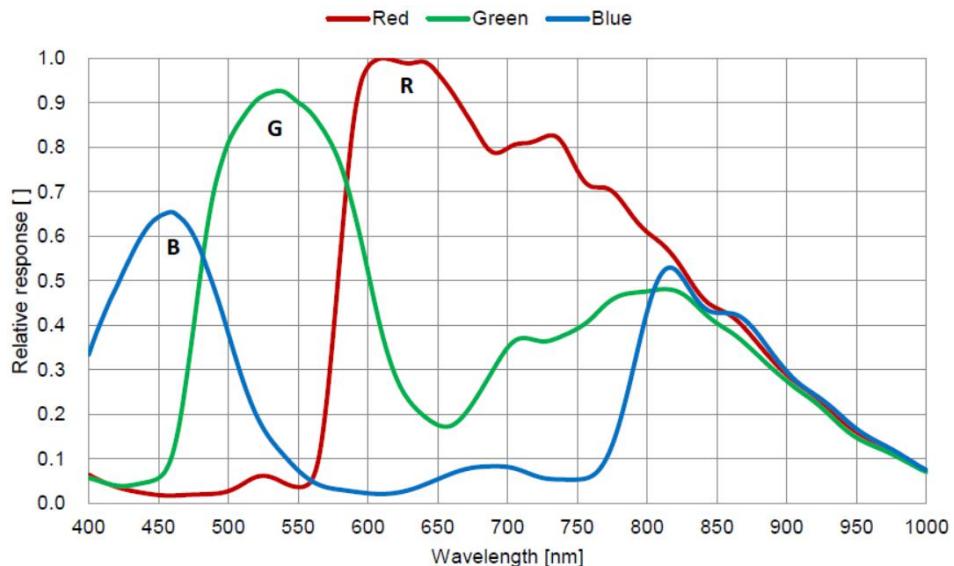


Figure 5- 9 I3ISPM03100KPB spectral response curve

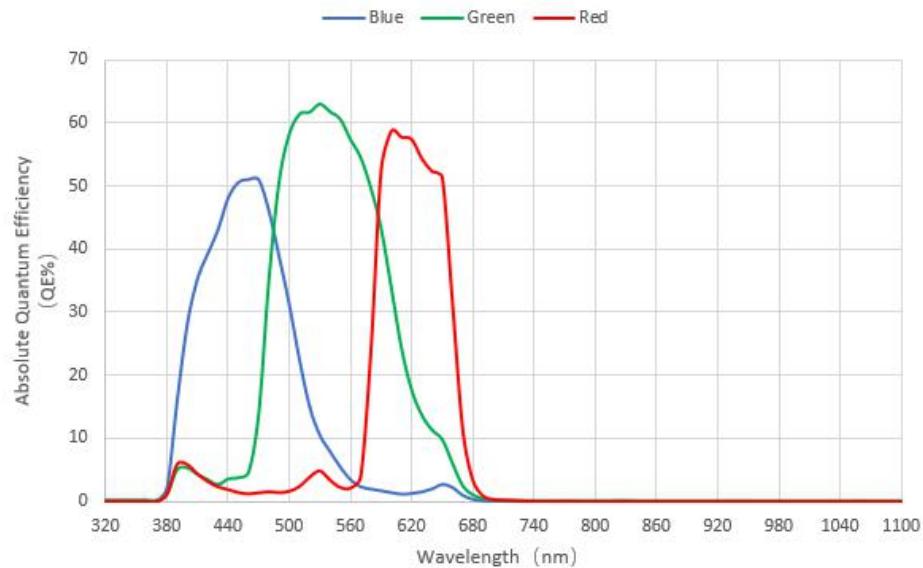


Figure 5- 10 I3ISPM03100KPB absolute quantum efficiency

## 5.8 I3ISPM03200KPA

Table 5- 8 I3ISPM03200KPA camera specifications

Parameter	Model	I3ISPM03200KPA 3.2M pixels 1/3.1" CMOS USB3.0 industrial camera
<b>Camera Parameters</b>		
Sensor model	Sony IMX900AQR	
Pixel size	2.25 $\mu\text{m} \times 2.25 \mu\text{m}$	
Sensor size	1/3.1"	
Frame rate	55.4fps@2048 $\times$ 1536 126.8fps@1024 $\times$ 768	
Dynamic range	TBD	
Signal-to-Noise ratio	TBD	
Sensitivity	1162mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	11 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software 2 $\times$ 2, 3 $\times$ 3, 4 $\times$ 4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
<b>General Specifications</b>		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm $\times$ 33mm $\times$ 33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

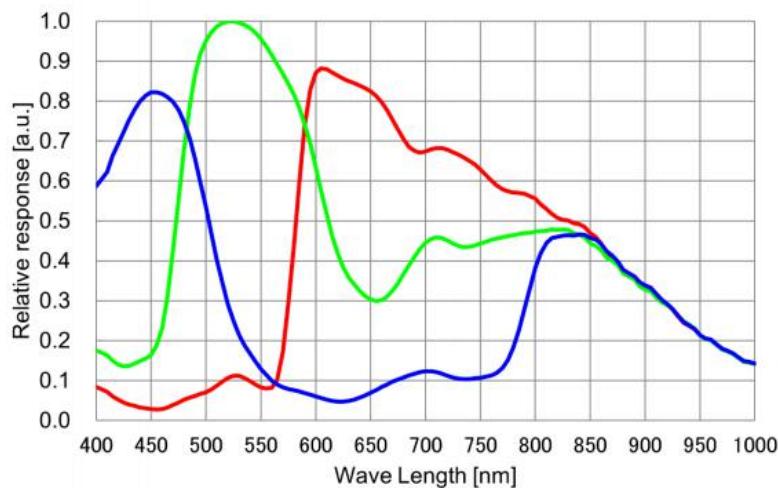


Figure 5- 11 I3ISPM03200KPA spectral response curve

## 5.9 I3ISPM04200KPA

Table 5- 9 I3ISPM04200KPA camera specifications

Parameter	Model	I3ISPM04200KPA
		4.2M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX664-AAQR1	
Pixel size	2.9 $\mu\text{m} \times 2.9 \mu\text{m}$	
Sensor size	1/1.8"	
Frame rate	88.1fps@2688×1520 116.1fps@1344×760	
Dynamic range	TBD	
Signal-to-Noise ratio	TBD	
Sensitivity	5970mV	
Dark current	0.13mV	
Gain range	1x-50x	
Exposure time	13 $\mu\text{s}$ -15sec	
Shutter	Rolling shutter	
Binning	Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

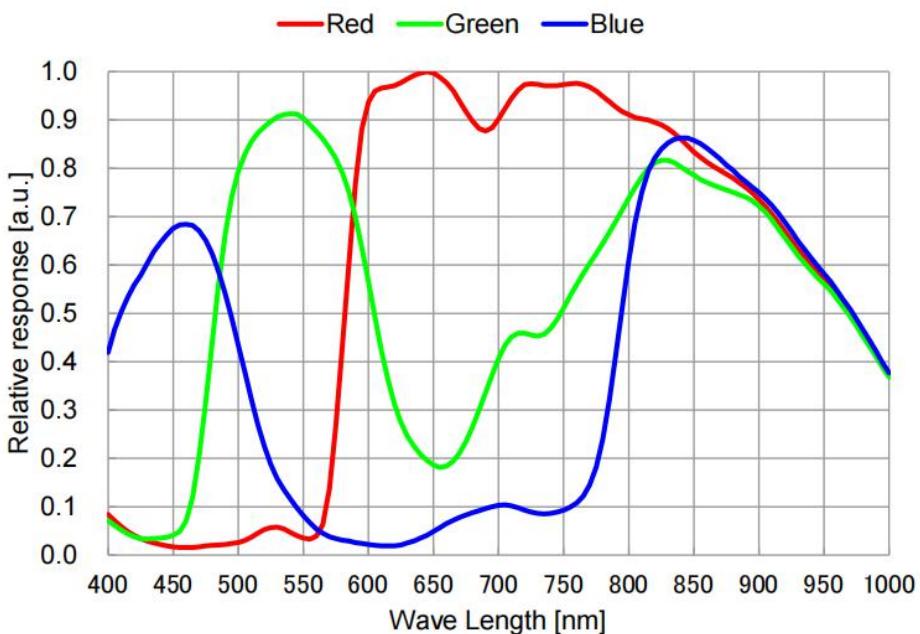


Figure 5- 12 I3ISPM04200KPA spectral response curve

## 5.10 I3ISPM05000KPA

Table 5- 10 I3ISPM05000KPA camera specifications

Parameter	Model	I3ISPM05000KPA
		5M pixels 2/3" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX250LQR	
Pixel size	3.45 $\mu\text{m} \times 3.45 \mu\text{m}$	
Sensor size	2/3"	
Frame rate	71.2fps@2448×2048 175.2fps@1224×1024	
Dynamic range	73.6dB	
Signal-to-Noise ratio	40.4dB	
Sensitivity	1146mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	15 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	3.05W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

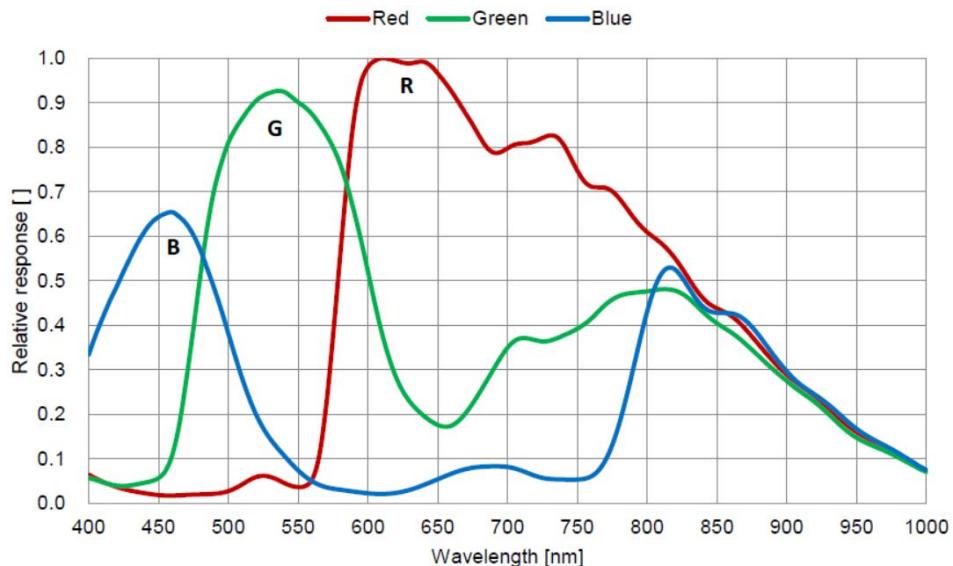


Figure 5- 13 I3ISPM05000KPA spectral response curve

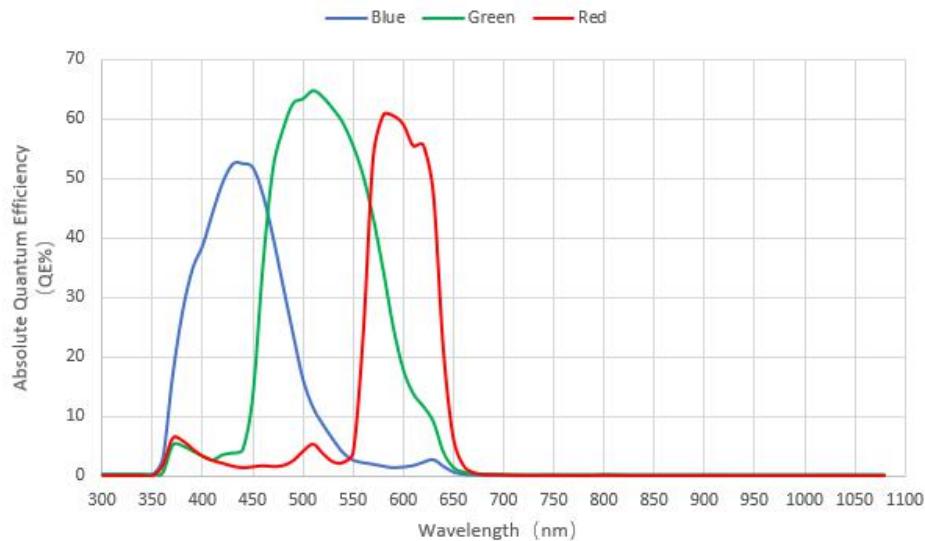


Figure 5- 14 I3ISPM05000KPA absolute quantum efficiency

## 5.11 I3ISPM05000KPB

Table 5- 11 I3ISPM05000KPB camera specifications

Parameter \ Model	I3ISPM05000KPB	I3ISPM05000KPB-G
5M pixels 2/3" CMOS USB3.0 / GigE industrial camera		
Camera Parameters		
Data interface	USB3.0	GigE
Sensor model	Sony IMX264LQR	
Pixel size	3.45 μm×3.45 μm	
Sensor size	2/3"	
Frame rate	35.6fps@2448×2048 87.6fps@1224×1024	24.3fps@2448 × 2048 87.7fps@1224 × 1024
Dynamic range	73.6dB	
Signal-to-Noise ratio	40.4dB	
Sensitivity	1146mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	15μs-1sec	
Shutter	Global shutter	
Binning	Software 2×2, 3×3, 4×4	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	One opto-coupling isolated input, one opto-coupling isolated output, two non-isolated input/output
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	12V Power adapter
Power consumption	<3.5W	TBD
Temperature	Working temperayure-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	33mm×33mm×42mm
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

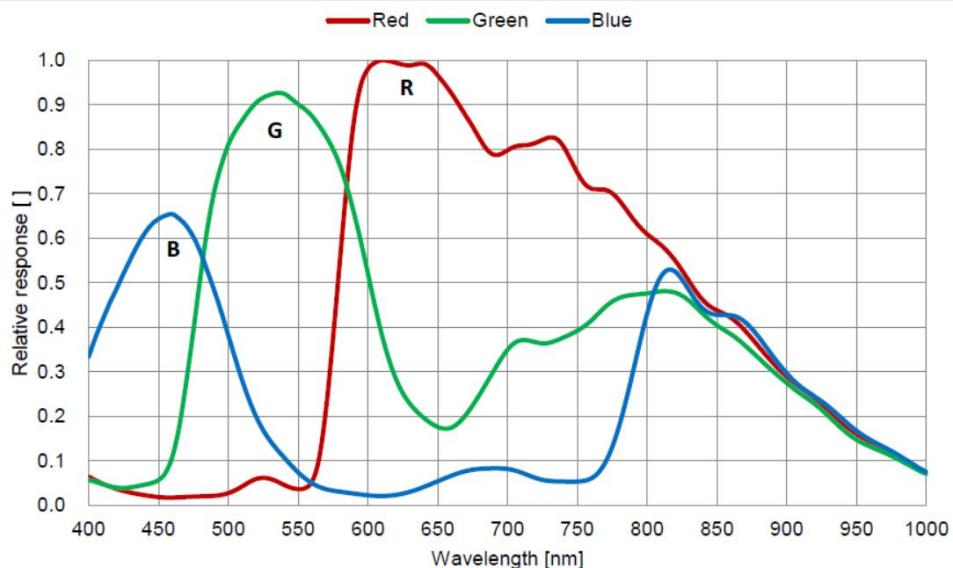


Figure 5- 15 I3ISPM05000KPB spectral response curve

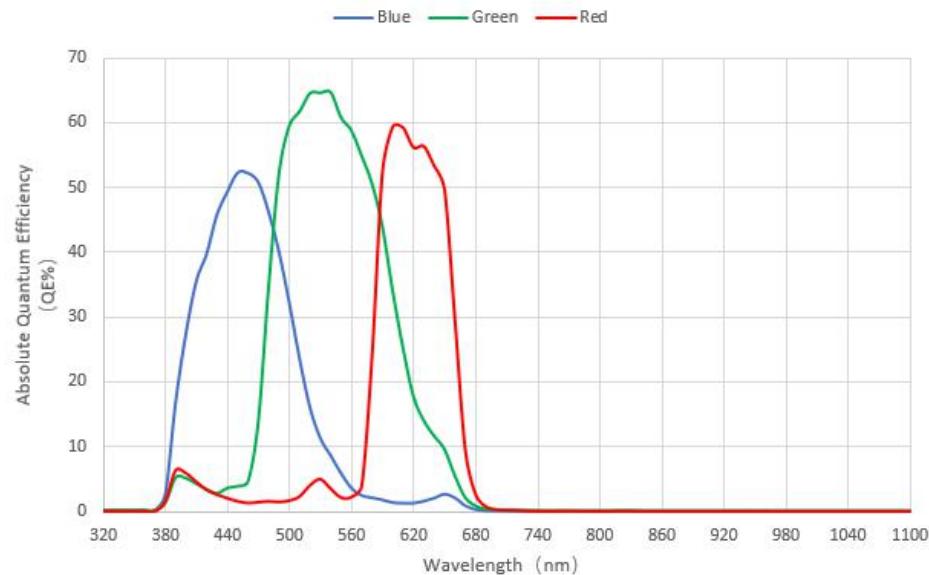


Figure 5- 16 I3ISPM05000KPB absolute quantum efficiency

## 5.12 I3ISPM05100KPA

Table 5- 12 I3ISPM05100KPA camera specifications

Parameter	Model	I3ISPM05100KPA
		5.1M pixels 2/3" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Gpixel GMAX3405	
Pixel size	3.4 $\mu\text{m} \times 3.4 \mu\text{m}$	
Sensor size	2/3"	
Frame rate	71fps@2448 $\times$ 2048 100fps@1224 $\times$ 1024	
Dynamic range	66.9dB	
Signal-to-Noise ratio	40dB	
Sensitivity	2.36e10 <sup>7</sup> e-/(W/m <sup>2</sup> )·s)	
Dark current	4.4e- $\text{s}$	
Gain range	1x-50x	
Exposure time	10 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software 2 $\times$ 2, 3 $\times$ 3, 4 $\times$ 4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm $\times$ 33mm $\times$ 33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

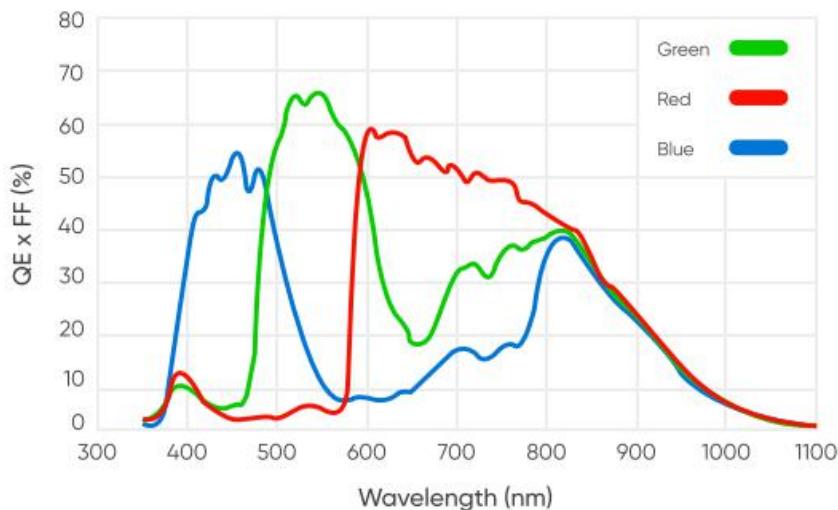


Figure 5- 17 I3ISPM05100KPAspectral response curve

## 5.13 I3ISPM06300KPA

Table 5- 13 I3ISPM06300KPA camera specifications

Parameter	Model	I3ISPM06300KPA 6.3M pixels 1/1.8" CMOS USB3.0 industrial camera
<b>Camera Parameters</b>		
Sensor model	Sony IMX178LQJ	
Pixel size	2.4 $\mu\text{m} \times 2.4 \mu\text{m}$	
Sensor size	1/1.8"	
Frame rate	58.7fps@3072×2048 59.5fps@1536×1024	
Dynamic range	71dB	
Signal-to-Noise ratio	40dB	
Sensitivity	425mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	17 $\mu\text{s}$ -15sec	
Shutter	Rolling shutter	
Binning	Hardware 2x2; Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
<b>General Specifications</b>		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

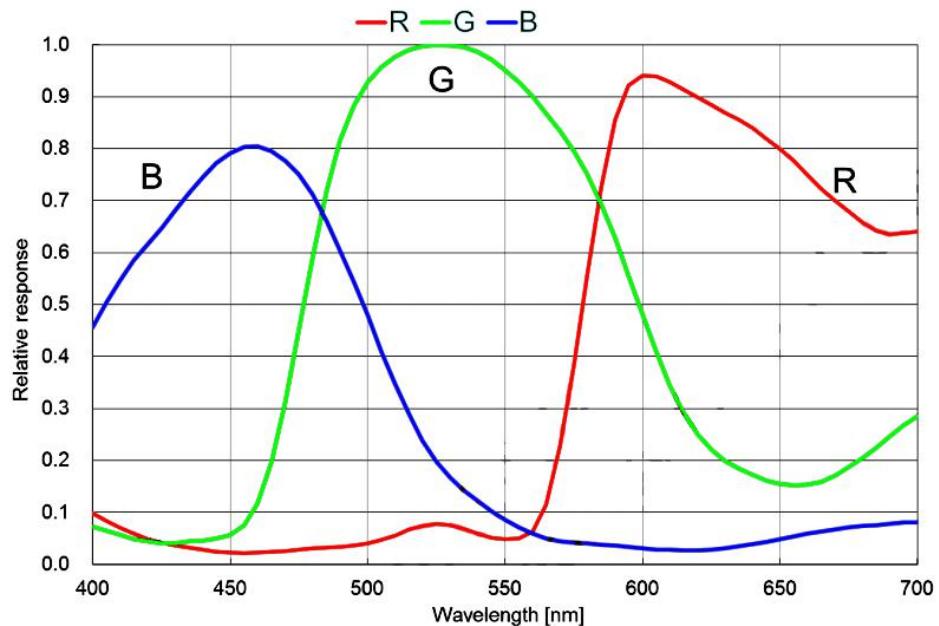


Figure 5- 18 I3ISPM06300KPA spectral response curve

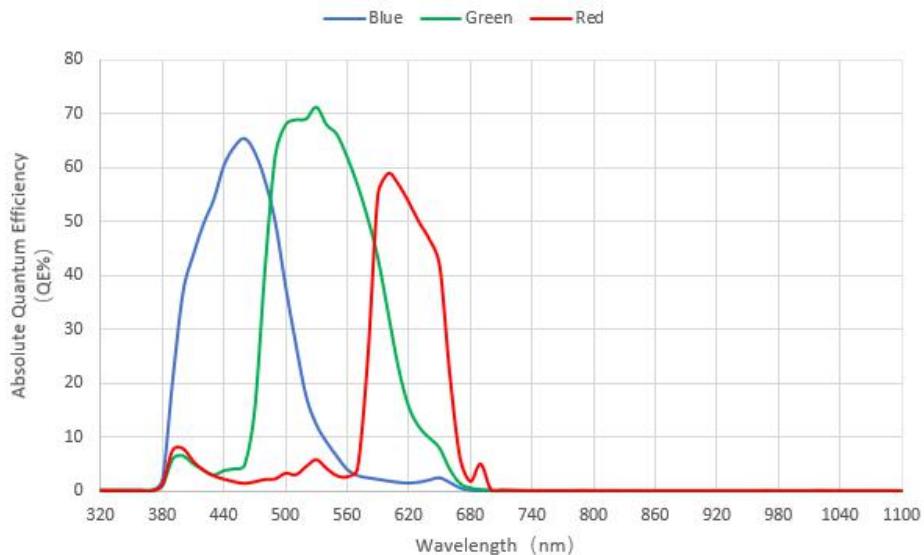


Figure 5- 19 I3ISPM06300KPA absolute quantum efficiency

## 5.14 I3ISPM08000KPA

Table 5- 14 I3ISPM08000KPA camera specifications

Parameter	Model	I3ISPM08000KPA
		8M pixels 2/3" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX546-AAQJ	
Pixel size	2.74 $\mu\text{m}$ x 2.74 $\mu\text{m}$	
Sensor size	2/3"	
Frame rate	41fps@2840x2840 118fps@1420x1420	
Dynamic range	70dB	
Signal-to-Noise ratio	40dB	
Sensitivity	1574mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	30 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

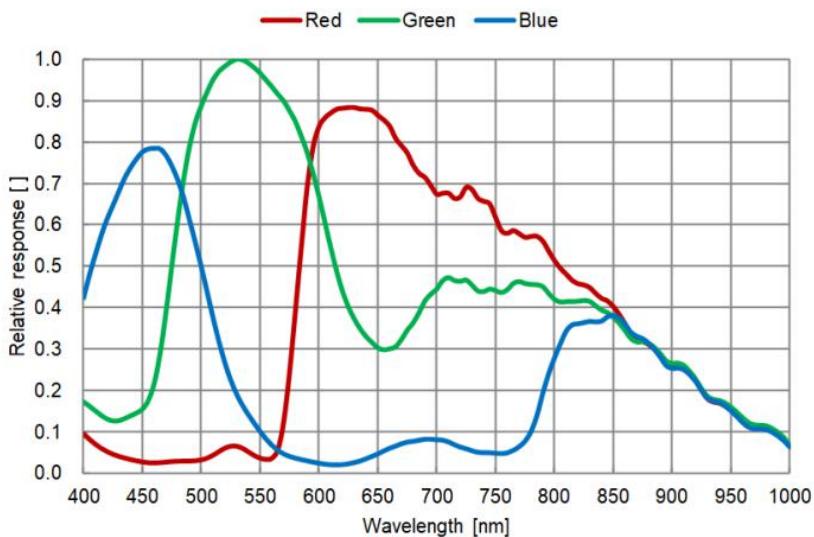


Figure 5- 20 I3ISPM08000KPA spectral response curve

## 5.15 I3ISPM08300KPA

Table 5- 15 I3ISPM08300KPA camera specifications

Parameter	Model	I3ISPM08300KPA
		8.3M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX678-AAQR	
Pixel size	2.0 $\mu\text{m}$ x 2.0 $\mu\text{m}$	
Sensor size	1/1.8"	
Frame rate	45fps@3840x2160 70fps@1920x1080	
Dynamic range	TBD	
Signal-to-Noise ratio	TBD	
Sensitivity	3541mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	30 $\mu\text{s}$ -15sec	
Shutter	Rolling shutter	
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

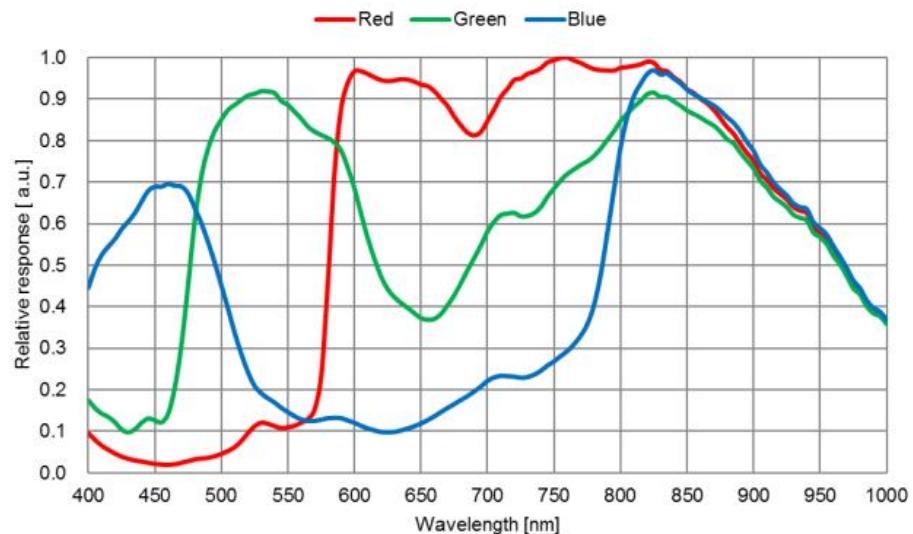


Figure 5- 21 I3ISPM08300KPA spectral response curve

## 5.16 I3ISPM08300KPB

Table 5- 16 I3ISPM08300KPB camera specifications

Parameter	Model	I3ISPM08300KPB
		8.3M pixels 1/1.2" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX585-AAQJ1-C	
Pixel size	2.9 $\mu\text{m}$ x 2.9 $\mu\text{m}$	
Sensor size	1/1.2"	
Frame rate	45fps@3840 x2160 70fps@1920 x 1080	
Dynamic range	TBD	
Signal-to-Noise ratio	TBD	
Sensitivity	5970mV	
Dark current	0.13mV	
Gain range	1x-50x	
Exposure time	30 $\mu\text{s}$ -15sec	
Shutter	Rolling shutter	
Binning	Software 2 $\times$ 2, 3 $\times$ 3, 4 $\times$ 4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<2.3W	
Temperature	Working temperature-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

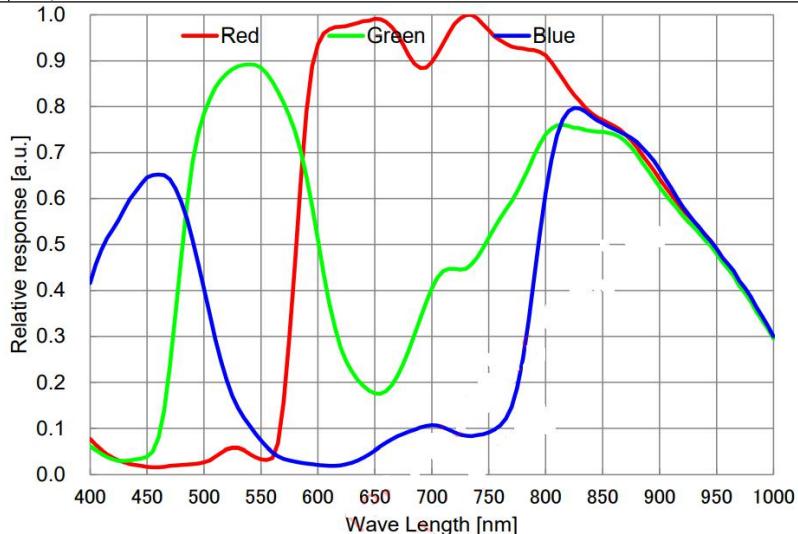


Figure 5- 22 I3ISPM08300KPB spectral response curve

## 5.17 I3ISPM12000KPA

Table 5- 17 I3ISPM12000KPA camera specifications

Parameter	Model	I3ISPM12000KPA 12M pixels 1/1.7" CMOS USB3.0 industrial camera
<b>Camera Parameters</b>		
Sensor model	Sony IMX226CQJ	
Pixel size	1.85 $\mu\text{m}$ x 1.85 $\mu\text{m}$	
Sensor size	1/1.7"	
Frame rate	29.9fps@4064×3046 59.9fps@2048×1080	
Dynamic range	70dB	
Signal-to-Noise ratio	40dB	
Sensitivity	3637mV	
Dark current	0.5mV	
Gain range	1x-50x	
Exposure time	400 $\mu\text{s}$ -15sec	
Shutter	Rolling shutter	
Binning	Hardware 2x2; Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
<b>General Specifications</b>		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

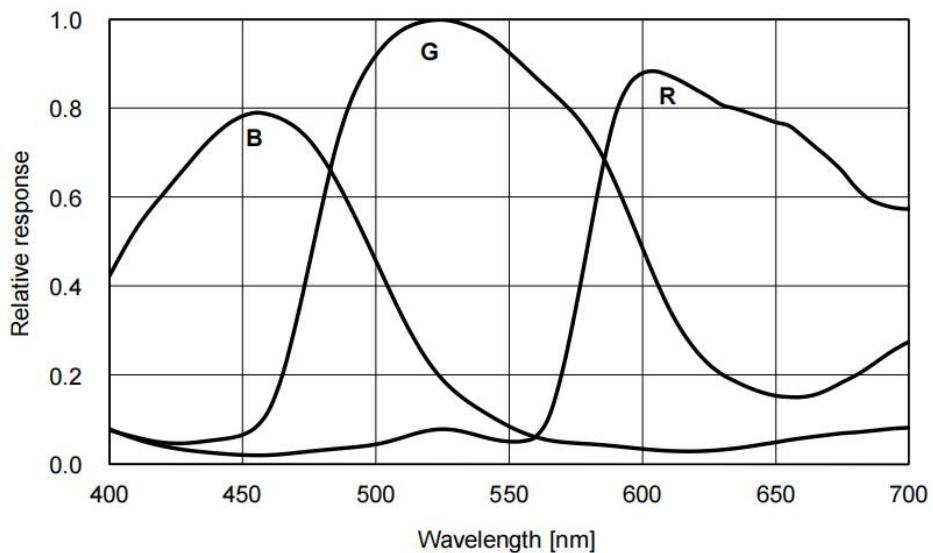


Figure 5- 23 I3ISPM12000KPA spectral response curve

## 5.18 I3ISPM12000KPB

Table 5- 18 I3ISPM12000KPB camera specifications

Parameter \ Model	I3ISPM12000KPB
12M pixels 1/1.6" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX676-AACR
Pixel size	2.0 $\mu\text{m}$ x 2.0 $\mu\text{m}$
Sensor size	1/1.6"
Frame rate	27.7fps@3536x3536 65.8fps@1760x1760
Dynamic range	TBD
Signal-to-Noise ratio	TBD
Sensitivity	280mV
Dark current	0.1mV
Gain range	1x-50x
Exposure time	13 $\mu\text{s}$ -15sec
Shutter	Rolling shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0(USB3.1 GEN1)
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0
Power consumption	<3.5W
Temperature	Working temperature-10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

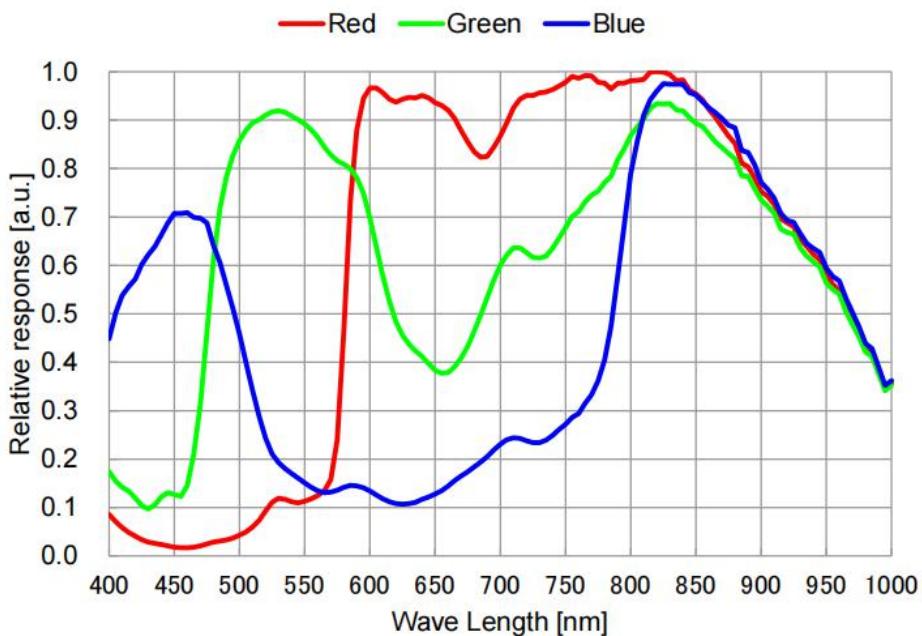


Figure 5- 24 I3ISPM12000KPB spectral response curve

## 5.19 I3ISPM01700KPA

Table 5- 19 I3ISPM01700KPA camera specifications

Parameter	Model	I3ISPM01700KPA
		1.7M pixels 1.1" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX432LQJ	
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	98.6fps@1600 x 1100	
Conversion Gain	4.9 (e-/ADU)	
Readout Noise	4.53 (e-)	
Full Well	20.1 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	43dB	
Sensitivity	4910mV	
Dark current	0.3mV	
Gain range	1x-50x	
Exposure time	6us-15sec	
Shutter	Global shutter	
Binning	Software2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<2.4W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	38mmx38mmx33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

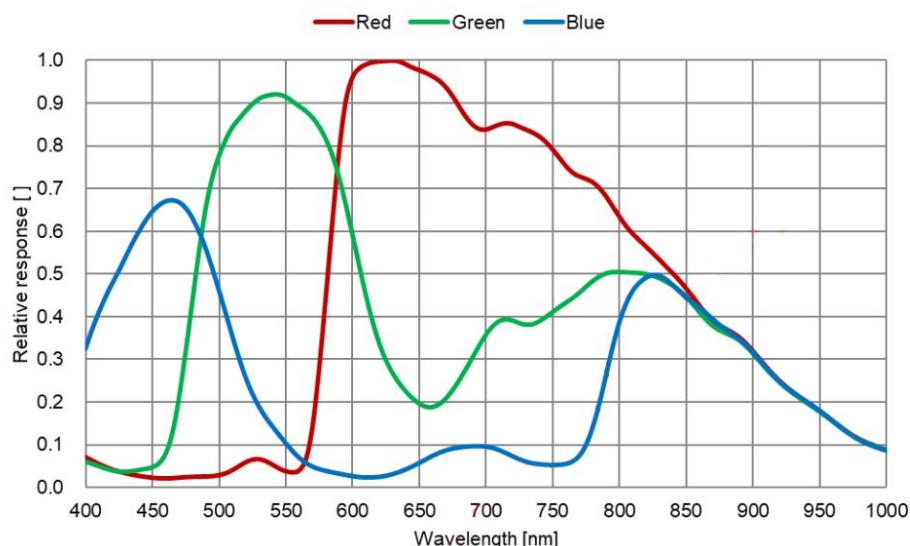


Figure 5- 25 I3ISPM01700KPA spectral response curve

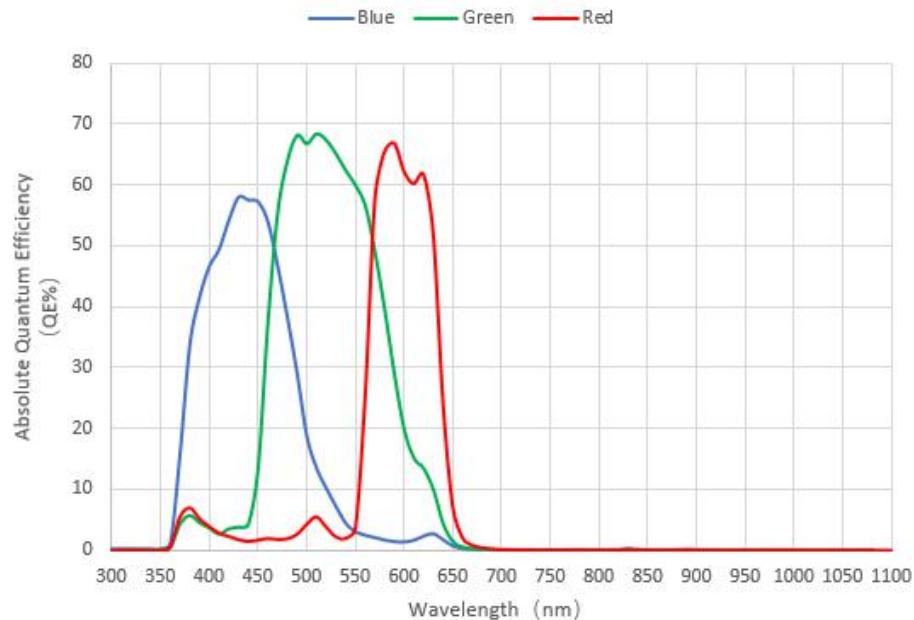


Figure 5- 26 I3ISPM01700KPA absolute quantum efficiency

## 5.20 I3ISPM01700KPB

Table 5- 20 I3ISPM01700KPB camera specifications

Parameter	Model	I3ISPM01700KPB
		1.7M pixels 1.1" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX425LQJ	
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	180fps@1600 x 1100	
Conversion Gain	4.9 (e-/ADU)	
Readout Noise	4.53 (e-)	
Full Well	20.1 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	43dB	
Sensitivity	4910mV	
Dark current	0.3mV	
Gain range	1x-50x	
Exposure time	6us-15sec	
Shutter	Global shutter	
Binning	Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	3.5W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	38mm×38mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

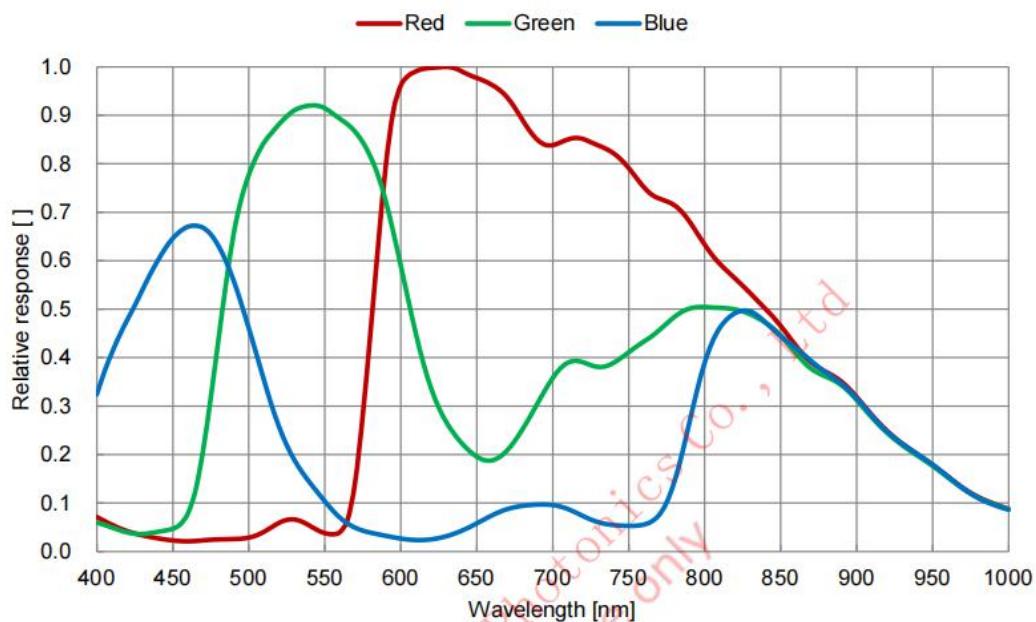


Figure 5- 27 I3ISPM01700KPB spectral response curve

## 5.21 I3ISPM02000KPA

Table 5- 21 I3ISPM02000KPA camera specifications

Parameter	Model	I3ISPM02000KPA
		2.0M pixels 1/1.7" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX430LQJ	
Pixel size	4.5 μm x 4.5 μm	
Sensor size	1/1.7"	
Frame rate	132fps@1624×1240	
Conversion Gain	TBD	
Readout Noise	TBD	
Full Well	TBD	
Dynamic range	TBD	
Signal-to-Noise ratio	TBD	
Sensitivity	2058mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	6μs-15sec	
Shutter	Global shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.0W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	38mmx38mmx33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

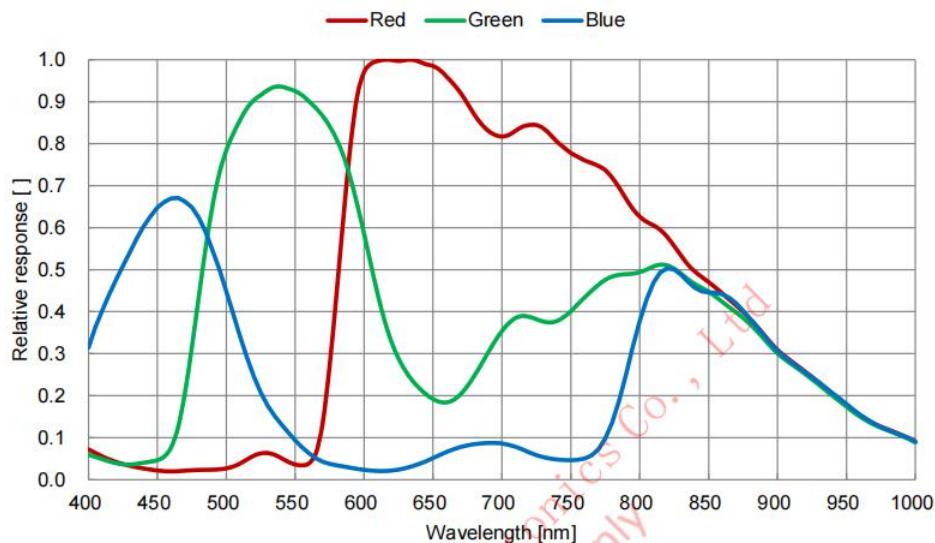


Figure 5- 28 I3ISPM02000KPA spectral response curve

## 5.22 I3ISPM02800KPA

Table 5- 22 I3ISPM02800KPA camera specifications

Parameter \ Model	I3ISPM02800KPA
2.8M pixels 2/3" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX421LQJ
Pixel size	4.5 $\mu\text{m}$ x 4.5 $\mu\text{m}$
Sensor size	2/3"
Frame rate	121fps@1936 x 1464 425fps@968 x 732
Conversion Gain	2.69 (e-/ADU)
Readout Noise	2.55 (e-)
Full Well	11.0 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.4dB
Sensitivity	2058mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	6 $\mu\text{s}$ -15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0
Power consumption	<3.0W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

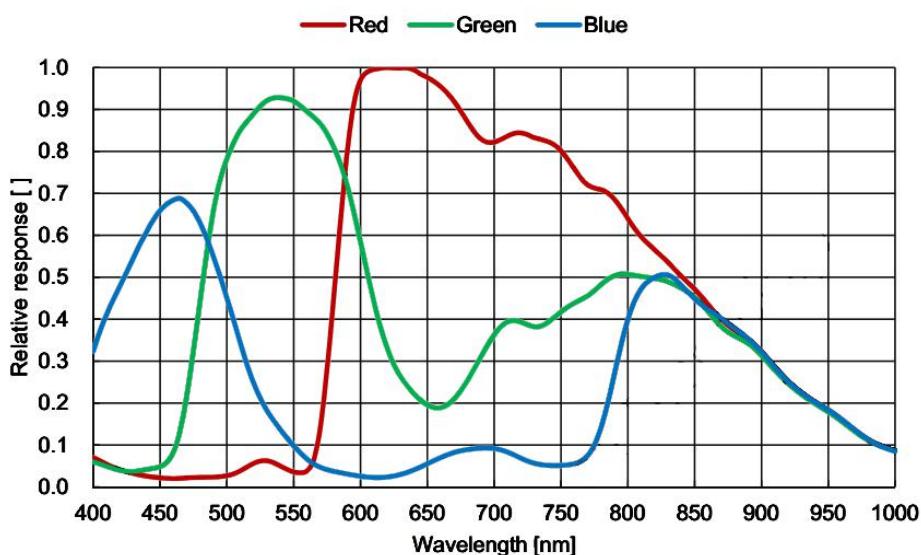


Figure 5- 29 I3ISPM02800KPA spectral response curve

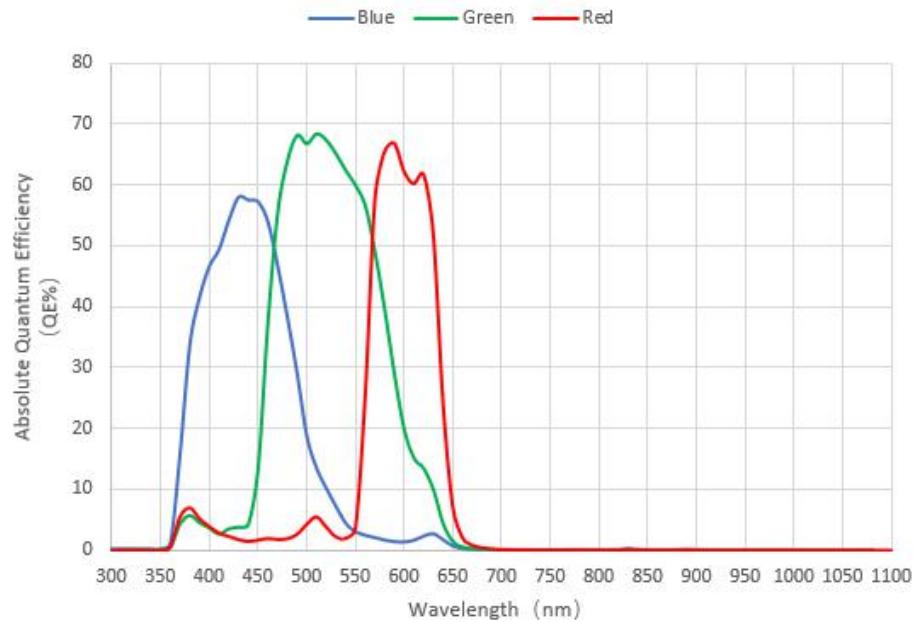


Figure 5- 30 I3ISPM02800KPA absolute quantum efficiency

## 5.23 I3ISPM07100KPA

Table 5- 23 I3ISPM07100KPA camera specifications

Parameter	Model	I3ISPM07100KPA
		7.1M pixels 1.1" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX428LQJ	
Pixel size	4.5 $\mu\text{m}$ x 4.5 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	51.4fps@3200 x 2200 133.8fps@1584 x 1100	
Conversion Gain	2.74 (e-/ADU)	
Readout Noise	2.54 (e-)	
Full Well	11.2 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	40.5dB	
Sensitivity	2058mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	6 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.0W	
Temperature	Working temperature -10~50°C, storage temperature 30~70°C	
Humidity	20%-80%, no condensation	
Size	38mmx38mmx33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

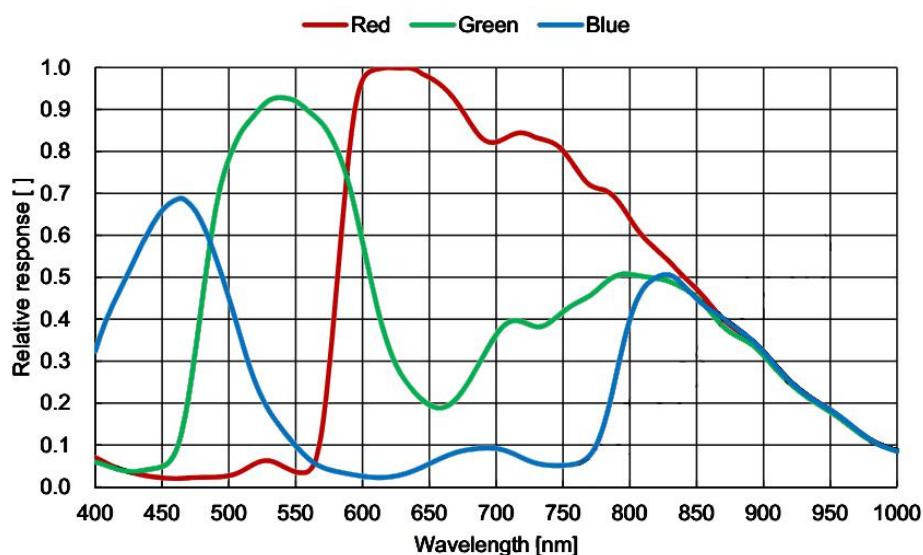


Figure 5- 31 I3ISPM07100KPA spectral response curve

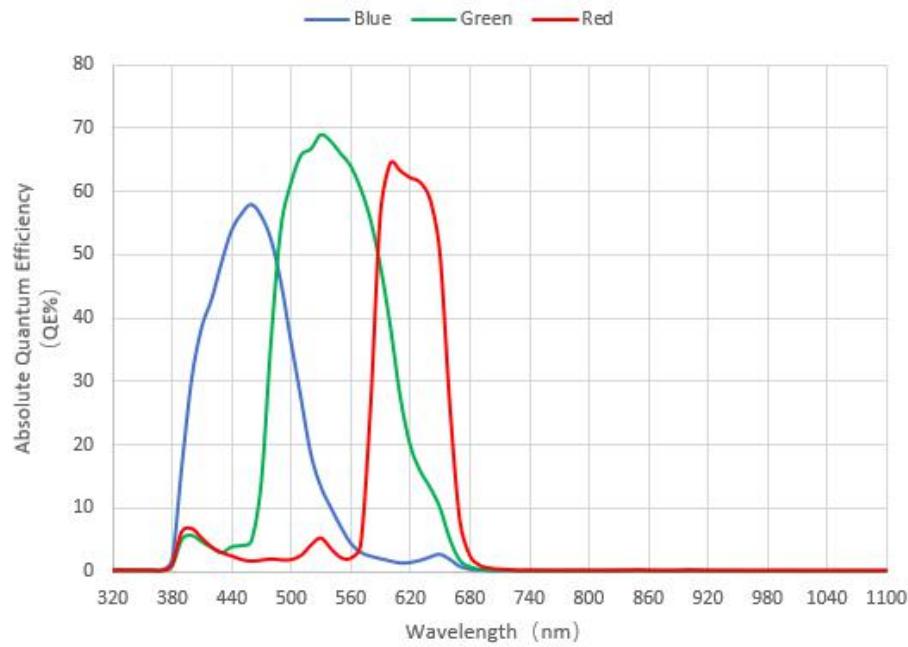


Figure 5- 32 I3ISPM07100KPA absolute quantum efficiency

## 5.24 I3ISPM12300KPA

Table 5- 24 I3ISPM12300KPA camera specifications

Parameter \ Model	I3ISPM12300KPA
12.3M pixels 1.1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX304LQR-C
Pixel size	3.45 μm x 3.45 μm
Sensor size	1.1"
Frame rate	23.4fps@4096 x 3000 46.3ps@2048 x 1500 46.3fps@1024 x 750
Conversion Gain	2.68 (e-/ADU)
Readout Noise	2.11 (e-)
Full Well	11.0 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.4dB
Sensitivity	1146mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	30μs-15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0
Power consumption	<3.0W
Temperature	Working temperature -10~50°C, storage temperature 30~70°C
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

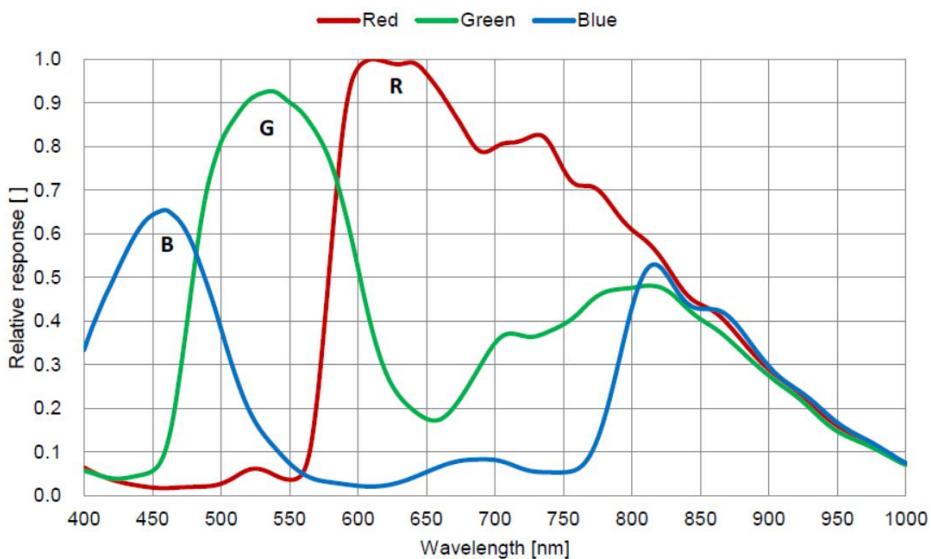


Figure 5- 33 I3ISPM12300KPA spectral response curve

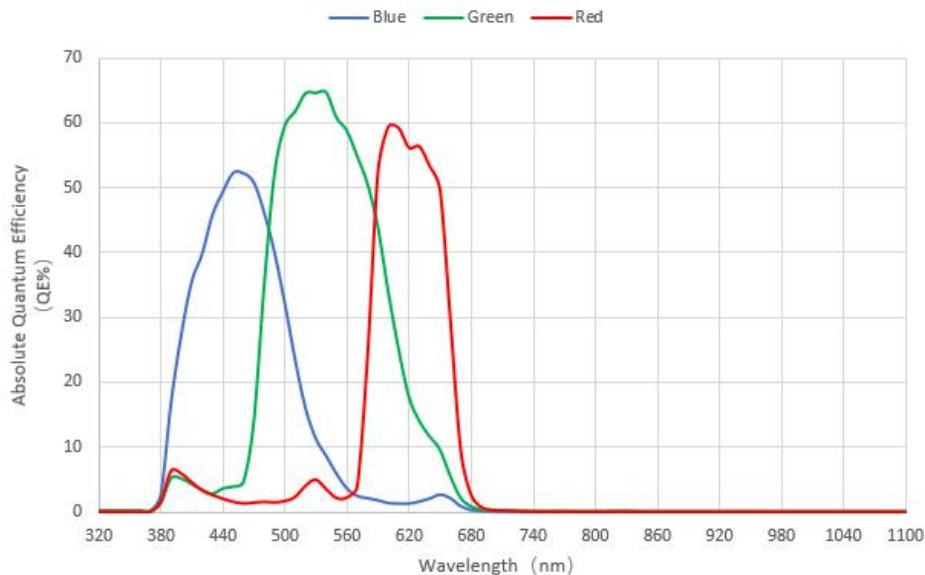


Figure 5- 34 I3ISPM12300KPA absolute quantum efficiency

## 5.25 I3ISPM12500KPA

Table 5- 25 I3ISPM12500KPA camera specifications

Parameter	Model	I3ISPM12500KPA
		12.5M pixels 1.1" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Gpixel GMAX3412	
Pixel size	3.4 μm x 3.4 μm	
Sensor size	1.1"	
Frame rate	30fps@4096x3072 60fps@2048x1536	
Readout Noise	1.5 (e-)	
Full Well	10 (ke-)	
Dynamic range	68.8dB	
Signal-to-Noise ratio	40dB	
Sensitivity	2.36x10 <sup>7</sup> e-/(W/m <sup>2</sup> ·s)	
Dark current	81.6e-/s	
Gain range	1x-50x	
Exposure time	15μs-15sec	
Shutter	Global shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.0W	
Temperature	Working temperature -10~50°C, storage temperature 30~70°C	
Humidity	20%-80%, no condensation	
Size	38mmx38mmx33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

## 5.26 I3ISPM20400KPA

Table 5- 26 I3ISPM20400KPA camera specifications

Parameter \ Model	I3ISPM20400KPA
20.4M pixels 1.1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX541-AAQJ
Pixel size	2.74 $\mu\text{m}$ x 2.74 $\mu\text{m}$
Sensor size	1.1"
Frame rate	17.5fps@4496x4496 64.4fps@2240x2240 64.4fps@1120x1120
Dynamic range	70.72dB
Signal-to-Noise ratio	39.7dB
Sensitivity	1574mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	30us-15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0
Power consumption	<3.0W
Temperature	Working temperature -10~50°C, storage temperature 30~70°C
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

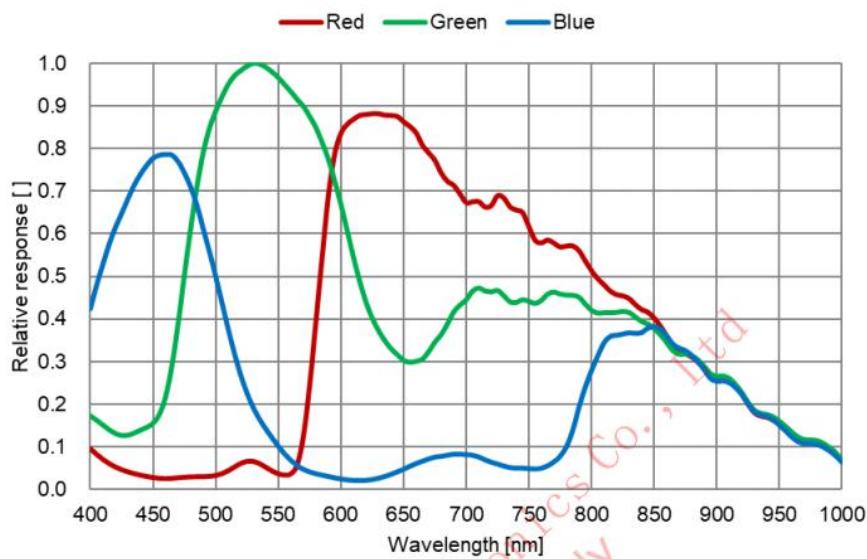


Figure 5- 35 I3ISPM20400KPA spectral response curve

## 5.27 I3CMOS00500KMA

Table 5- 27 I3CMOS00500KMA camera specifications

Parameter \ Model	I3CMOS00500KMA
	0.5M pixel 1 / 1.7 "CMOS USB3.0 industrial camera
	Camera Parameters
Sensor model	Sony IMX433LLJ
Pixel size	9.0 $\mu\text{m} \times 9.0 \mu\text{m}$
Sensor size	1/1.7"
Frame rate	166.5fps@812×620
Dynamic range	72.3dB
Signal-to-Noise ratio	50.0dB
Peak QE	78%@575nm
Sensitivity	8100mV
Dark current	0.3mV
Gain range	1x-50x
Exposure time	6 $\mu\text{s}$ -15sec
Shutter	Global Shutter
Binning	software2×2, 3×3, 4×4
Data interface	USB3.0(USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input, one non-isolated output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0
Power consumption	<3.5W
Temperature	Working temperature -10~50°C; Storage temperature -30~70°C
Humidity	20% - 80% No condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

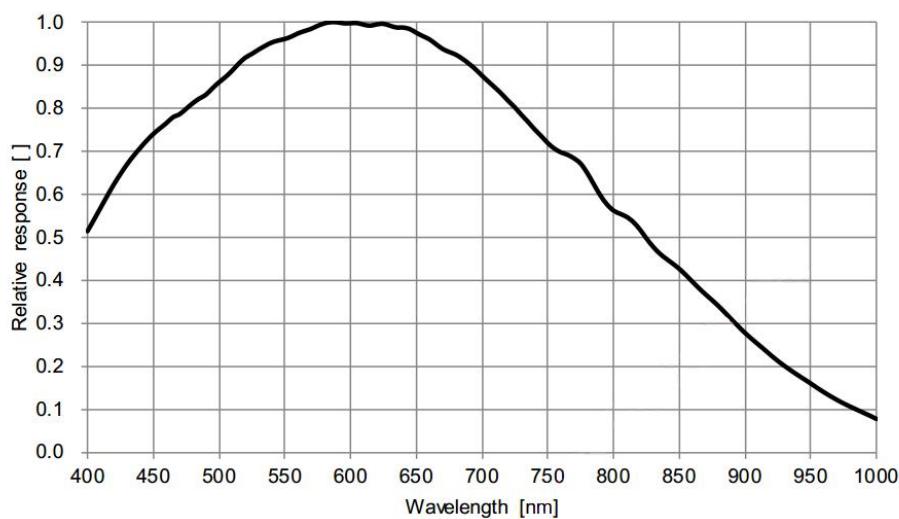


Figure 5- 36 I3CMOS00500KMA spectral response curve

## 5.28 I3CMOS01500KMA

Table 5- 28 I3CMOS01500KMA camera specifications

Parameter	Model	I3CMOS01500KMA
		1.5M pixels 1/2.9" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX273LLR	
Pixel size	3.45 $\mu\text{m} \times 3.45 \mu\text{m}$	
Sensor size	1/2.9"	
Frame rate	226.5fps@1440×1080 506fps@720×540	
Dynamic range	73.6dB	
Signal-to-Noise ratio	40.4dB	
Peak QE	71%@575nm	
Sensitivity	1830mV	
Dark current	0.19mV	
Gain range	1x-50x	
Exposure time	15 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	hardware2×2; software2×2, 3×3, 4×4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 10bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

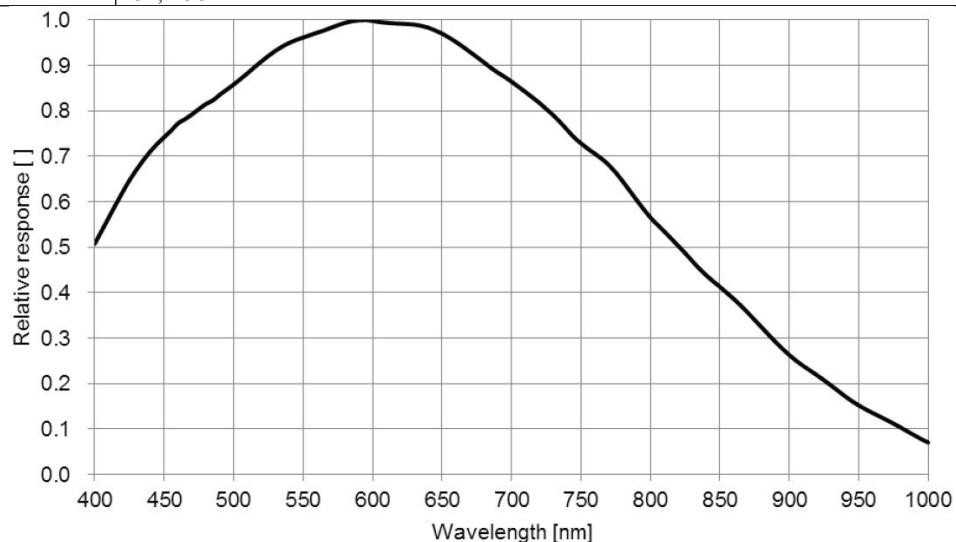


Figure 5- 37 I3CMOS01500KMA spectral response curve

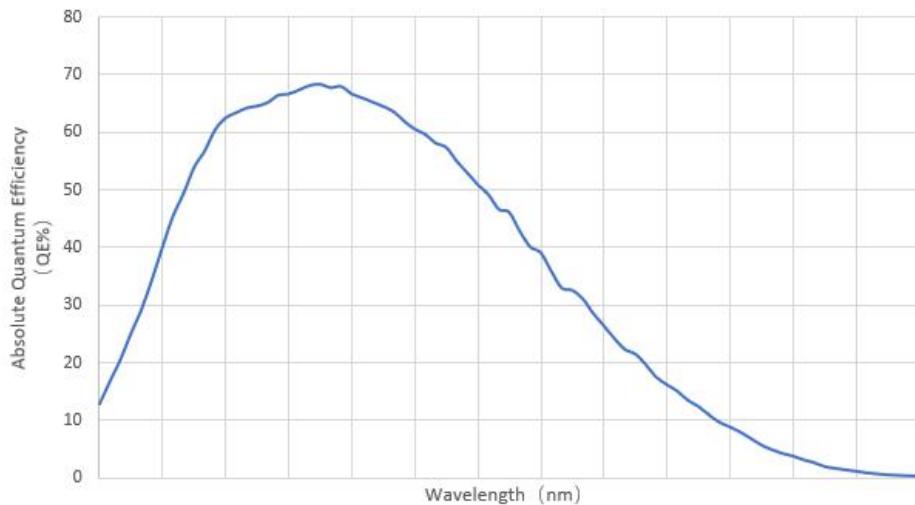


Figure 5- 38 I3CMOS01500KMA absolute quantum efficiency

## 5.29 I3CMOS02300KMA

Table 5- 29 I3CMOS02300KMA camera specifications

Parameter	Model	I3CMOS02300KMA
		2.3M pixels 1/1.2" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX174LLJ	
Pixel size	5.86 $\mu\text{m}$ x 5.86 $\mu\text{m}$	
Sensor size	1/1.2"	
Frame rate	164.5fps@1920 x 1200	
Dynamic range	73.6dB	
Signal-to-Noise ratio	44.8dB	
Peak QE	78%@575nm	
Sensitivity	1650mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	42 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	software2 $\times$ 2, 3 $\times$ 3, 4 $\times$ 4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.2W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

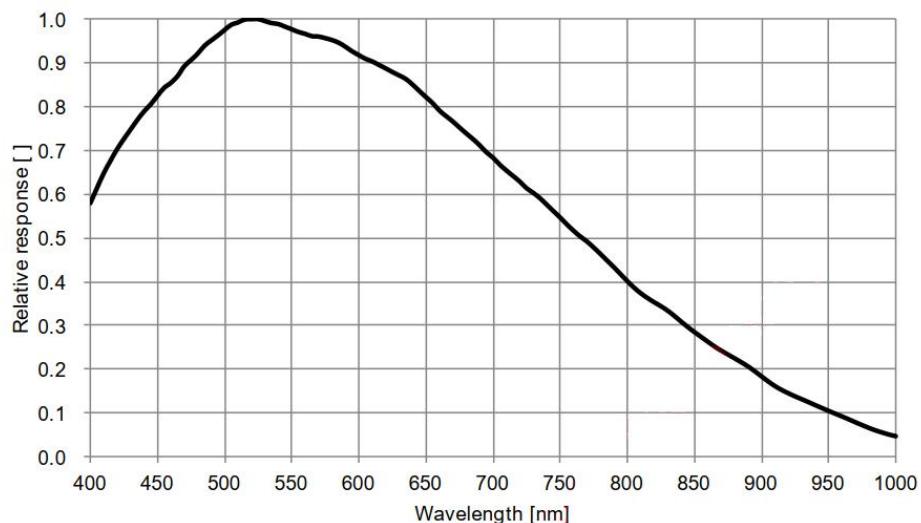


Figure 5- 39 I3CMOS02300KMA spectral response curve

## 5.30 I3CMOS02300KMB

Table 5- 30 I3CMOS02300KMB camera specifications

Parameter	Model	I3CMOS02300KMB
		2.3M pixels 1/1.2" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX249LLJ	
Pixel size	5.86 $\mu\text{m}$ x 5.86 $\mu\text{m}$	
Sensor size	1/1.2"	
Frame rate	30fps@1920 x 1200	
Conversion Gain	73.6dB	
Readout Noise	44.8dB	
Peak QE	78%@575nm	
Sensitivity	1650mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	42 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	software2 $\times$ 2, 3 $\times$ 3, 4 $\times$ 4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 10bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.2W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm $\times$ 33mm $\times$ 33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

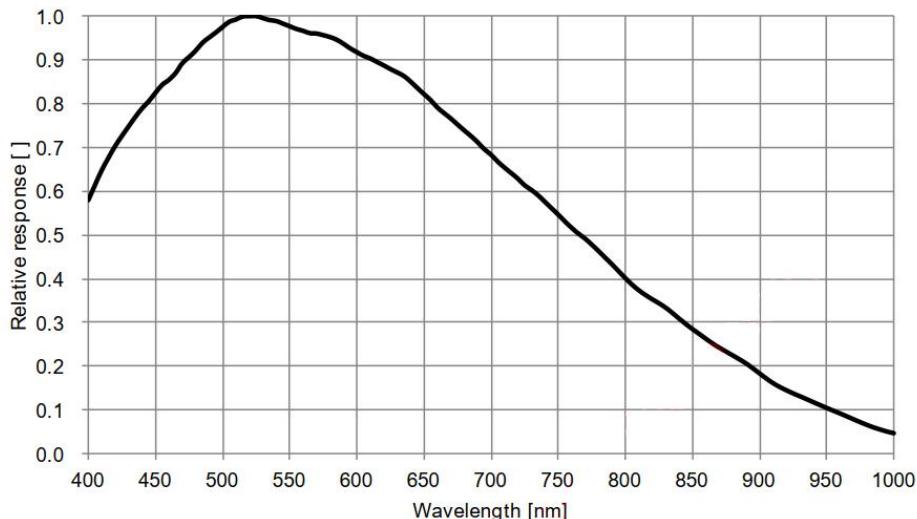


Figure 5- 40 I3CMOS02300KMB spectral response curve

## 5.31 I3CMOS02400KMA

Table 5- 31 I3CMOS02400KMA camera specifications

Parameter	Model	I3CMOS02400KMA
		2.4M pixels 1/1.7" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Gpixel GMAX4002	
Pixel size	4.0 $\mu\text{m}$ x 4.0 $\mu\text{m}$	
Sensor size	1/1.7"	
Frame rate	155fps@2048x1200 620fps@1024x600	
Dynamic range	TBD	
Signal-to-Noise ratio	TBD	
Sensitivity	$3.26 \times 10^7 \text{ e-}/((\text{W}/\text{m}^2) \cdot \text{s})$	
Dark current	8.3e-/s	
Gain range	1x-50x	
Exposure time	55 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 10bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.2W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

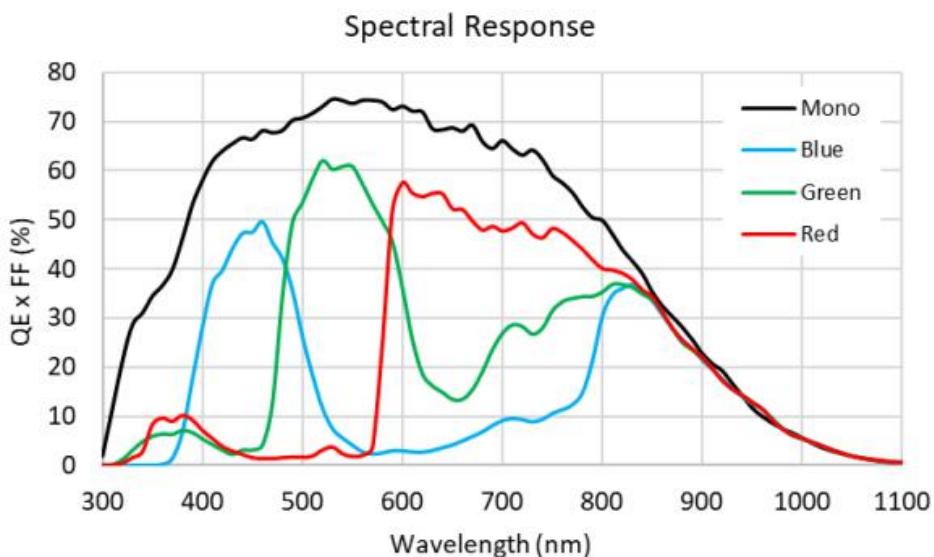


Figure 5- 41 I3CMOS02400KMA spectral response curve

## 5.32 I3CMOS03100KMA

Table 5- 32 I3CMOS03100KMA camera specifications

Parameter	Model	I3CMOS03100KMA
		3.1M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX252LLR	
Pixel size	3.45 μm×3.45 μm	
Sensor size	1/1.8"	
Frame rate	110.6fps@2048×1536 233.8fps@1024×768	
Dynamic range	73.6dB	
Signal-to-Noise ratio	40.4dB	
Peak QE	71%@575nm	
Sensitivity	1830mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	15μs-15sec	
Shutter	Global shutter	
Binning	Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

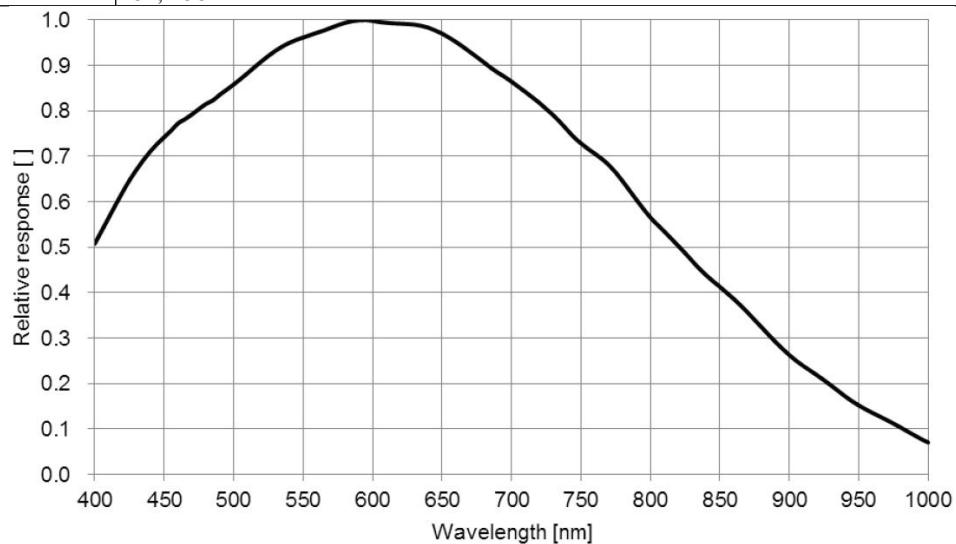


Figure 5- 42 I3CMOS03100KMA spectral response curve

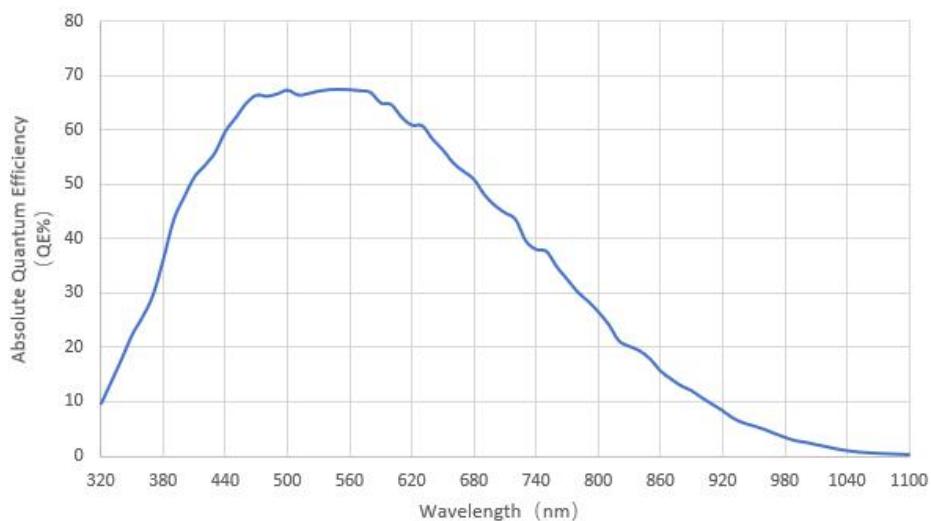


Figure 5- 43 I3CMOS03100KMA absolute quantum efficiency

## 5.33 I3CMOS03100KMB

Table 5- 33 I3CMOS03100KMB camera specifications

Parameter	Model	I3CMOS03100KMB	I3CMOS03100KMB-G
		3.1M pixels 1/1.8" CMOS USB3.0 / GigE industrial camera	
Camera Parameters			
Data interface		USB3.0	
Sensor model	Sony IMX265LLR		
Pixel size	3.45 μm×3.45 μm		
Sensor size	1/1.8"		
Frame rate	55.4fps@2048×1536 115.1fps@1024×768		36.9fps@2048 × 1536 115.1fps@1024 × 768
Dynamic range	73.6dB		
Signal-to-Noise ratio	40.4dB		
Peak QE	71%@575nm		
Sensitivity	1830mV		
Dark current	0.15mV		
Gain range	1x-50x		
Exposure time	15μs-15sec		
Shutter	Global shutter		
Binning	Software 2×2, 3×3, 4×4		
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output		One opto-coupling isolated input, one opto-coupling isolated output, two non-isolated input/output
Data Format	8bit / 12bit		
General Specifications			
Power supply	Power with USB3.0		12V Power adapter
Power consumption	<3.5W		TBD
Temperature	Working temperature -10~50°C, storage temperature-30~70°C		
Humidity	20%-80%, no condensation		
Size	33mm×33mm×33mm		33mm×33mm×42mm
Weight	70g		
Lens mount	C-mount		
Software	ToupView/ SDK		
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64		
Certification	CE, FCC		

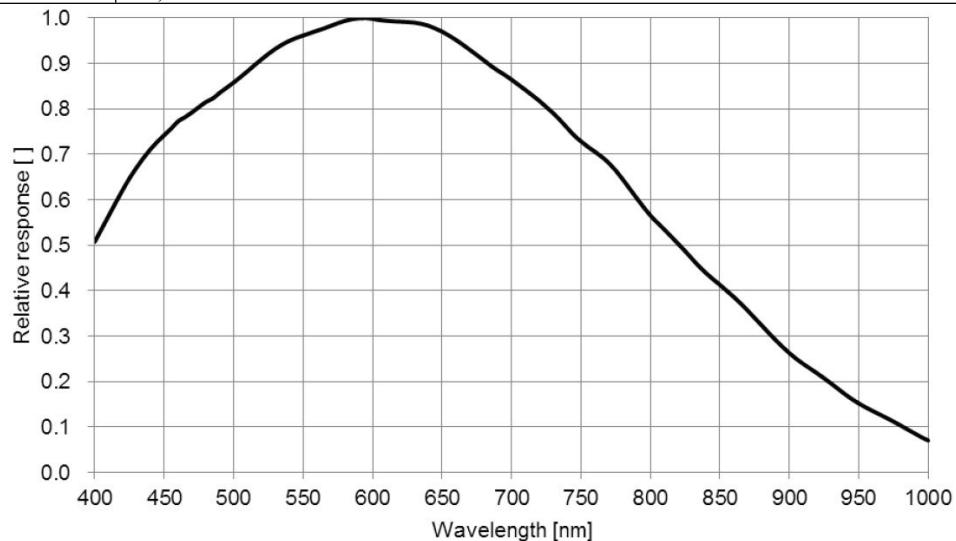


Figure 5- 44 I3CMOS03100KMB spectral response curve

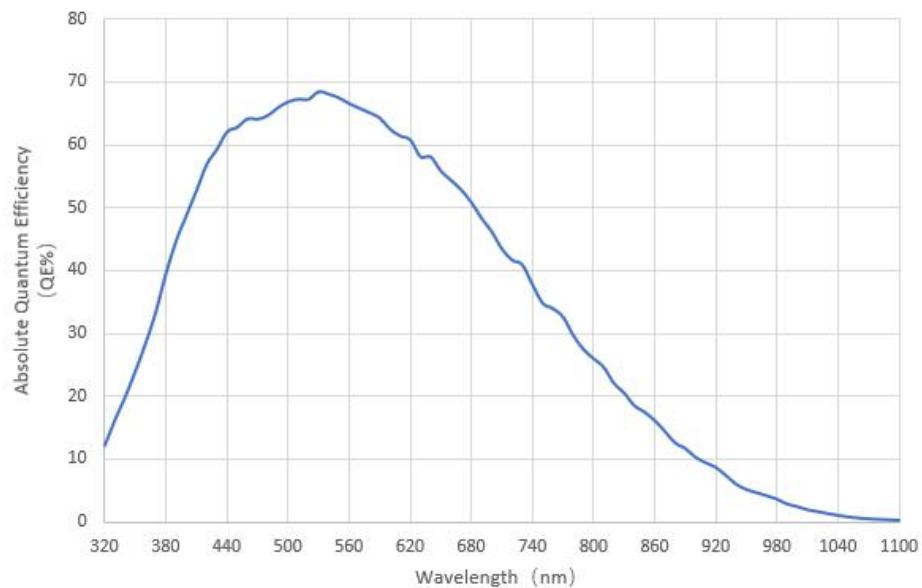


Figure 5- 45 I3CMOS03100KMB absolute quantum efficiency

## 5.34 I3CMOS03200KMA

Table 5- 34 I3CMOS03200KMA camera specifications

Parameter	Model	I3CMOS03200KMA	I3CMOS03200KMA-G
		3.2M pixels 1/3.1" CMOS USB3.0 / GigE industrial camera	
Camera Parameters			
Data interface		USB3.0	GigE
Sensor model	Sony IMX900AMR		
Pixel size	2.25 $\mu\text{m} \times 2.25 \mu\text{m}$		
Sensor size	1/3.1"		
Frame rate	53.4fps@2048×1536 126.8fps@1024×768		16.9fps@2048×1536 66fps@1024×768
Dynamic range	TBD		
Signal-to-Noise ratio	TBD		
Sensitivity	1807mV		
Dark current	0.15mV		
Gain range	1x-50x		
Exposure time	11 $\mu\text{s}$ -15sec		
Shutter	Global shutter		
Binning	Software 2×2, 3×3, 4×4		
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	One opto-coupling isolated input, one opto-coupling isolated output, two non-isolated input/output	
Data Format	8bit / 12bit		
General Specifications			
Power supply	Power with USB3.0	12V Power adapter	
Power consumption	<3.5W	TBD	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C		
Humidity	20%-80%, no condensation		
Size	33mm×33mm×33mm	33mm×33mm×42mm	
Weight	70g		
Lens mount	C-mount		
Software	ToupView/ SDK		
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64		
Certification	CE, FCC		

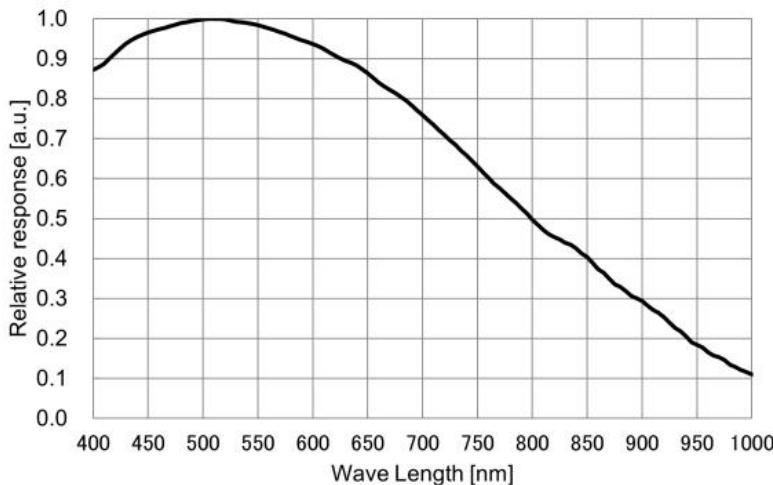


Figure 5- 46 I3CMOS03200KMA spectral response curve

## 5.35 I3CMOS04200KMA

Table 5- 35 I3CMOS04200KMA camera specifications

Parameter	Model	I3CMOS04200KMA
		4.2M pixels 1/1.8" CMOS USB3.0 industrial camera
<b>Camera Parameters</b>		
Sensor model	Sony IMX664-AAMR1	
Pixel size	2.9 $\mu\text{m} \times 2.9 \mu\text{m}$	
Sensor size	1/1.8"	
Frame rate	90fps@2688×1520	
Dynamic range	TBD	
Signal-to-Noise ratio	TBD	
Sensitivity	TBD	
Dark current	TBD	
Gain range	1x-50x	
Exposure time	15 $\mu\text{s}$ -15sec	
Shutter	Rolling shutter	
Binning	Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
<b>General Specifications</b>		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

## 5.36 I3CMOS05000KMA

Table 5- 36 I3CMOS05000KMA camera specifications

Parameter	Model	I3CMOS05000KMA
		5M pixels 2/3" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX250LLR	
Pixel size	3.45 μm×3.45 μm	
Sensor size	2/3"	
Frame rate	70.9fps@2448×2048 175.2fps@1224×1024	
Dynamic range	73.6dB	
Signal-to-Noise ratio	40.4dB	
Peak QE	71%@575nm	
Sensitivity	1830mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	15μs-15sec	
Shutter	Global shutter	
Binning	software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

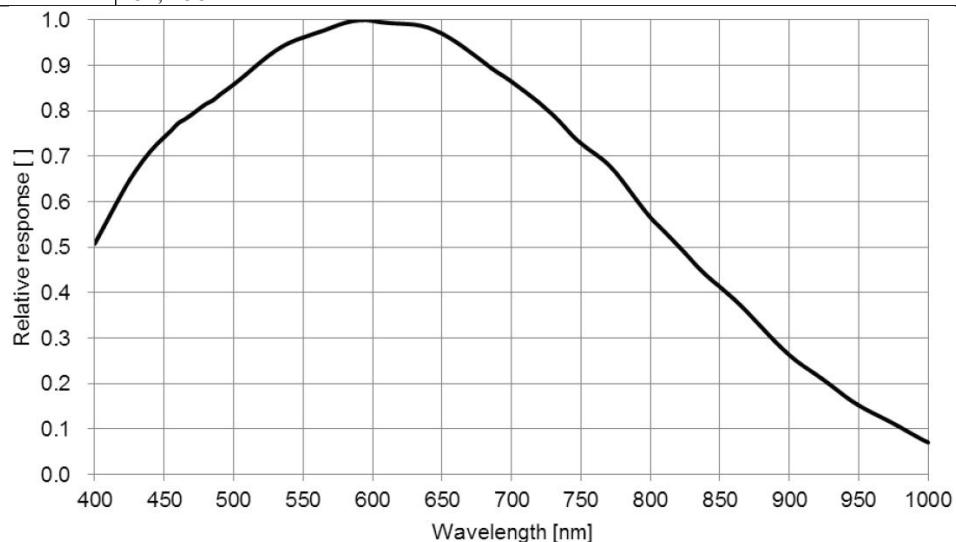


Figure 5- 47 I3CMOS05000KMA spectral response curve

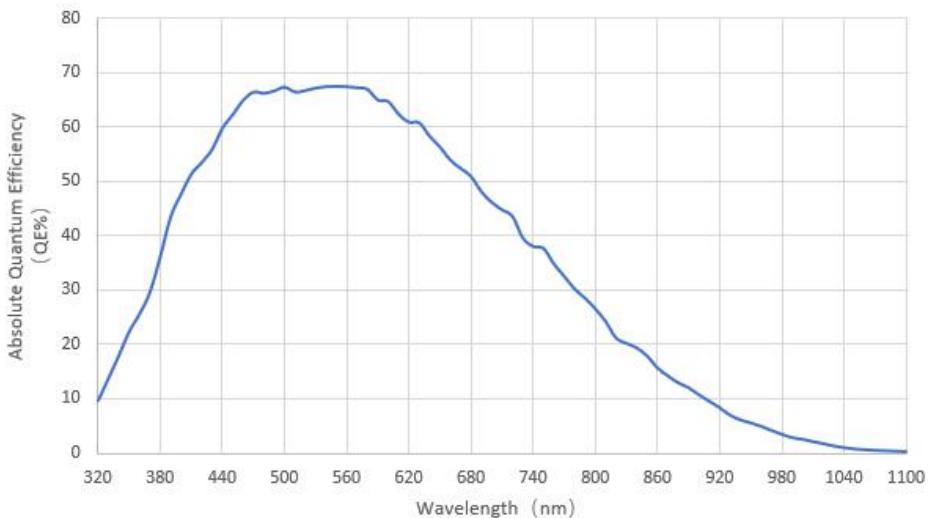


Figure 5- 48 I3CMOS05000KMA absolute quantum efficiency

## 5.37 I3CMOS05000KMB

Table 5- 37 I3CMOS05000KMB camera specifications

Parameter	Model	I3CMOS05000KMB
		5M pixels 2/3" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX264LLR	
Pixel size	3.45 $\mu\text{m} \times 3.45 \mu\text{m}$	
Sensor size	2/3"	
Frame rate	35.6fps@2448×2048 87.6fps@1224×1024	
Dynamic range	73.6dB	
Signal-to-Noise ratio	40.4dB	
Peak QE	71%@575nm	
Sensitivity	1830mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	15 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature -10~50°C, storage temperature 30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

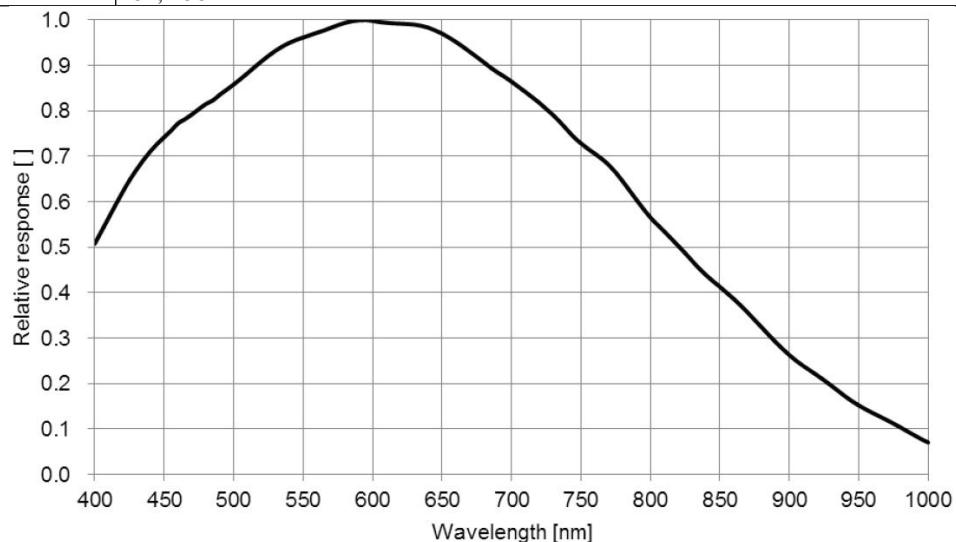


Figure 5- 49 I3CMOS05000KMB spectral response curve

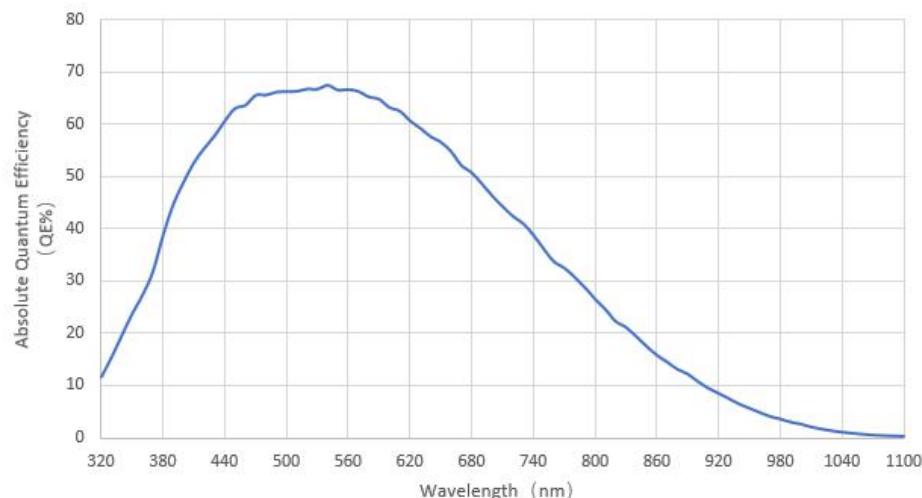


Figure 5- 50 I3CMOS05000KMB absolute quantum efficiency

## 5.38 I3CMOS05000KMC(Polarsens)

Table 5- 38 I3CMOS05000KMC camera specifications

Parameter	Model	I3CMOS05000KMC
		5M pixels 2/3" CMOS USB3.0 industrial camera
<b>Camera Parameters</b>		
Sensor model	Sony IMX250MZ (Polarsens)	
Pixel size	3.45 $\mu\text{m} \times 3.45 \mu\text{m}$	
Sensor size	2/3"	
Frame rate	35.6fps@2448×2048 87.6fps@1224×1024	
Dynamic range	73.6dB	
Signal-to-Noise ratio	40.4dB	
Peak QE	71%@575nm	
Sensitivity	684mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	15 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
<b>General Specifications</b>		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature -10~50°C, storage temperature 30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

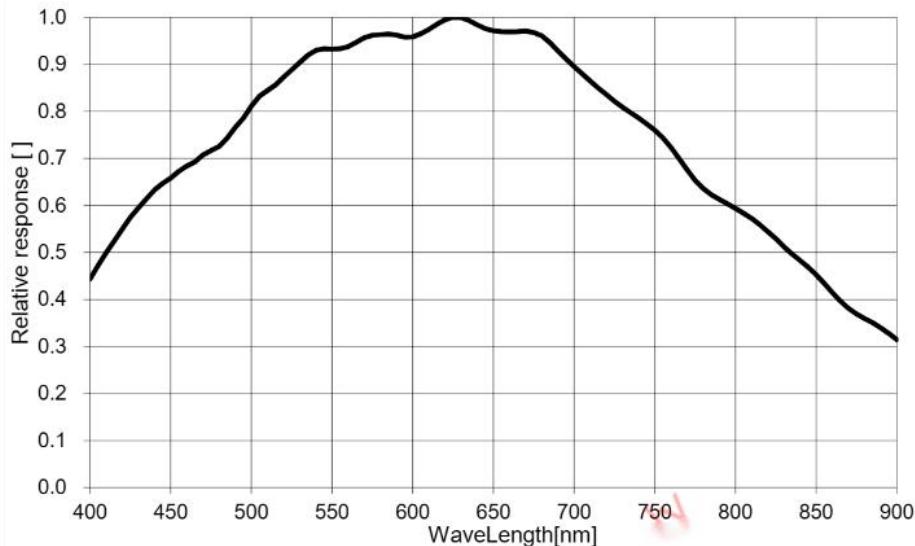


Figure 5- 51 I3CMOS05000KMC spectral response curve

The four-directional Polarizations of this image sensor are arranged to get transmitted light in the layout shown in the figure below. The 90° signal and 45° signal lines and the 135° signal and 0° signal lines are output successively.

135	0	135	0
90	45	90	45
135	0	135	0
90	45	90	45

Figure 5- 52 Polarization Coding Diagram

The polarization camera can effectively eliminate the reflection of the plastic surface, the reflection of the metal surface, and increase the three-dimensional sense of the metal surface. The comparison of the effect of ordinary camera and polarization camera is shown below.



Figure 5- 53 Comparison of plastic surface effects between ordinary camera (left) and polarizing camera (right)



Figure 5- 54 Plastic surface detail comparison



Figure 5- 55 Ordinary camera (left) compared with polarizing camera (right) metal surface effect

## 5.39 I3CMOS05100KMA

Table 5- 39 I3CMOS05100KMA camera specifications

Parameter	Model	I3CMOS05100KMA
		5.1M pixels 2/3" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Gpixel GMAX3405	
Pixel size	3.4 μm × 3.4 μm	
Sensor size	2/3"	
Frame rate	71fps@2448×2048 100fps@1224×1024	
Dynamic range	73.6dB	
Signal-to-Noise ratio	40.4dB	
Sensitivity	2.36x10 <sup>7</sup> e-/(W/m <sup>2</sup> ·s)	
Dark current	4.4e-/s	
Gain range	1x-50x	
Exposure time	10μs-15sec	
Shutter	Global shutter	
Binning	Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature -10~50°C, storage temperature 30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

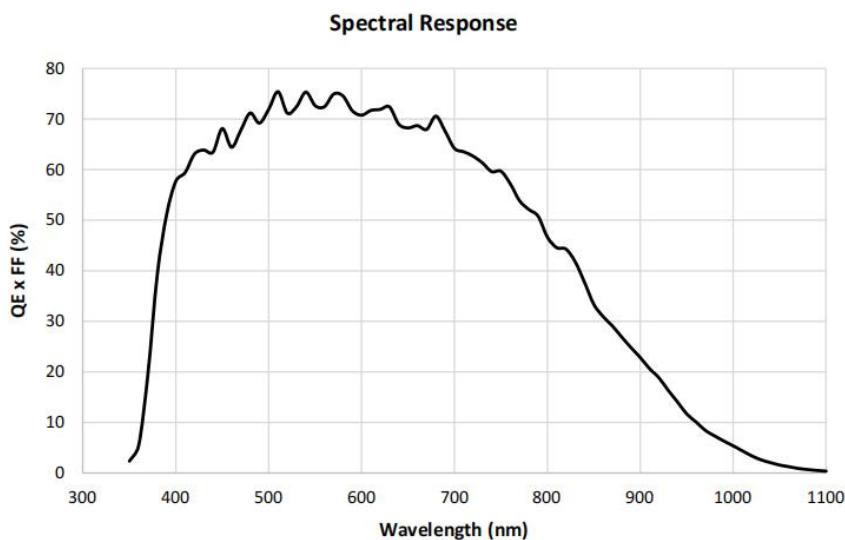


Figure 5- 56 I3CMOS05100KMA spectral response curve

## 5.40 I3CMOS05100KMB-CXP

Table 5- 40 I3CMOS05100KMB-CXP camera specifications

Parameter	Model	I3CMOS05100KMB-CXP
		5.0M pixels 2/3" CMOS CoaXPress industrial camera
		Camera Parameters
Sensor model	Sony IMX547-AAMJ-C	
Pixel size	2.74 $\mu\text{m} \times 2.74 \mu\text{m}$	
Sensor size	1/1.8"	
Frame rate	8 Bit: 109fps@2432 x 2048 10 Bit: 88fps@2432 x 2048 12Bit: 74fps@2432 x 2048	
Conversion Gain	2.35 (e-/ADU)	
Readout Noise	2.19 (e-)	
Full Well	9.6 (ke-)	
Dynamic range	72.0dB	
Signal-to-Noise ratio	40.0dB	
Sensitivity	2252mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	30us-15sec	
Shutter	Global shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	CXP-6	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0/ DC12V	
Power consumption	1.95W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	68mmx68mmx28.1mm	
Weight	227g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

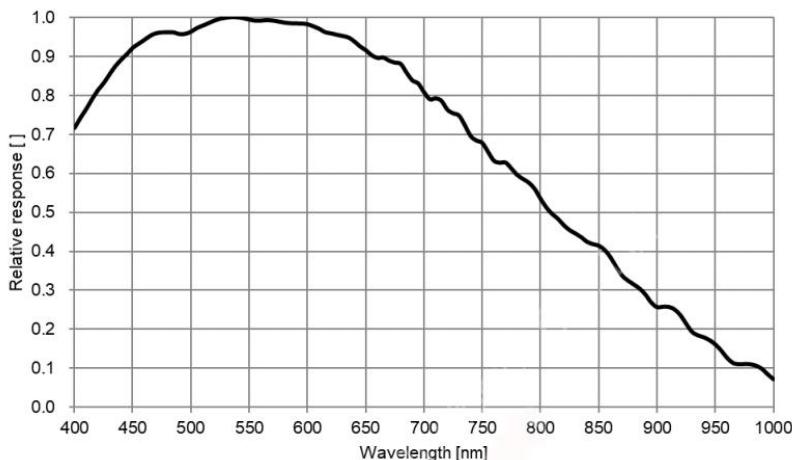


Figure 5- 57 I3CMOS05100KMB-CXP spectral response curve

## 5.41 I3CMOS06300KMA

Table 5- 41 I3CMOS06300KMA camera specifications

Parameter	Model	I3CMOS06300KMA 6.3M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX178LLJ	
Pixel size	2.4 $\mu\text{m} \times 2.4 \mu\text{m}$	
Sensor size	1/1.8"	
Frame rate	58.7fps@3072×2048 59.5fps@1536×1024	
Dynamic range	71dB	
Signal-to-Noise ratio	40dB	
Sensitivity	760mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	17 $\mu\text{s}$ -15sec	
Shutter	Rolling shutter	
Binning	Hardware 2x2; Software 2×2, 3×3, 4×4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.5W	
Temperature	Working temperature -10~50°C, storage temperature 30~70°C	
Humidity	20%-80%, no condensation	
Size	33mm×33mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

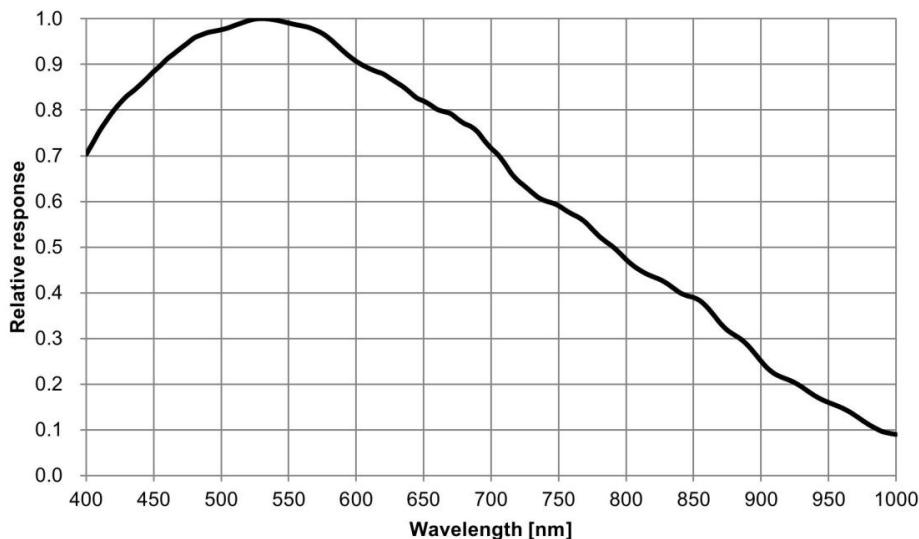


Figure 5- 58 I3CMOS06300KMA spectral response curve

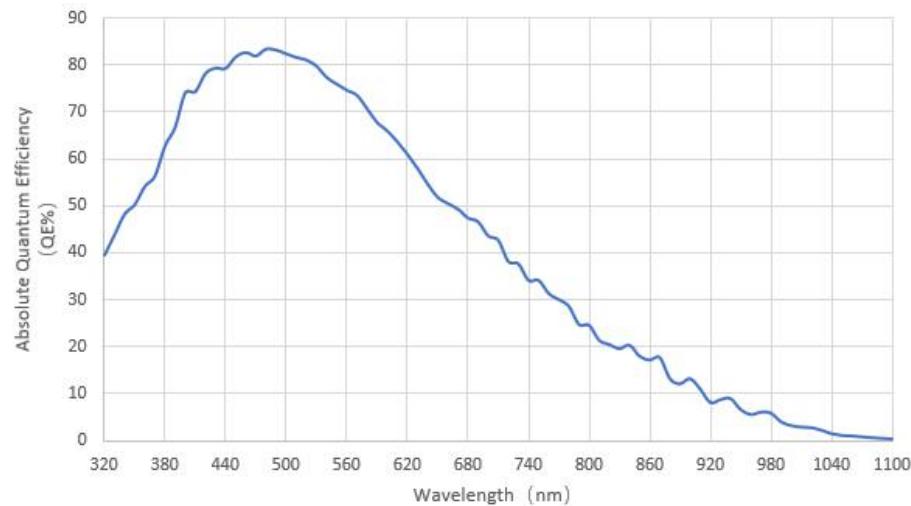


Figure 5- 59 I3CMOS06300KMA absolute quantum efficiency

## 5.42 I3CMOS08000KMA

Table 5- 42 I3CMOS08000KMA camera specifications

Parameter \ Model	I3CMOS08000KMA 8M pixel 2/3 "CMOS USB3.0 industrial camera
Parameter	Camera Parameters
Sensor model	Sony IMX546-AAMJ
Pixel size	2.74 $\mu\text{m}$ x 2.74 $\mu\text{m}$
Sensor size	2/3"
Frame rate	41fps@2840x2840 118fps@1420x1420
Dynamic range	70dB
Signal-to-Noise ratio	40dB
Sensitivity	2649mV
Dark current	0.25mV
Gain range	1x-50x
Exposure time	30 $\mu\text{s}$ -15sec
Shutter	Global Shutter
Binning	Hardware2x2; Software2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0
Power consumption	<3.5W
Temperature	Working temperature -10~50°C; Storage temperature -30~70°C
Humidity	20% - 80% No condensation
Size	33mmx33mmx33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

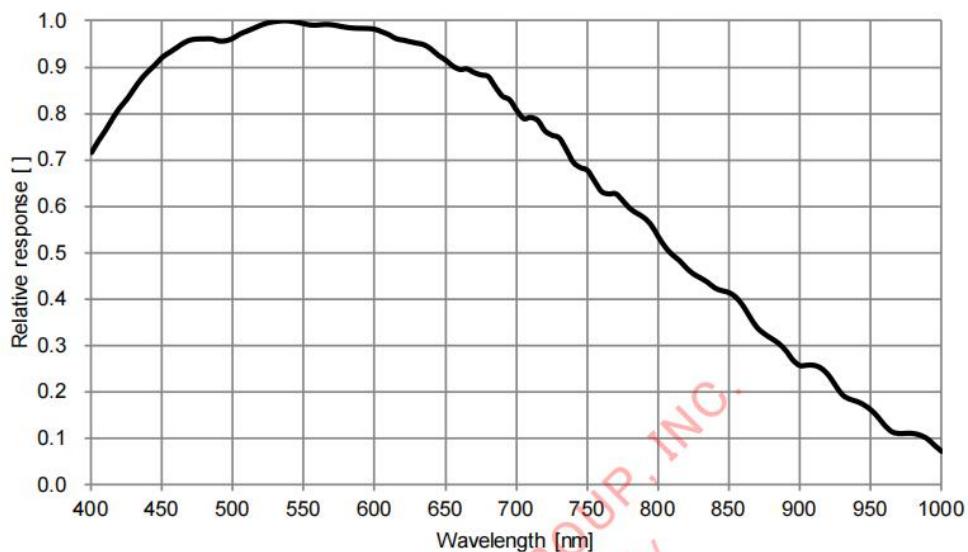


Figure 5- 60 I3CMOS08000KMA spectral response curve

## 5.43 I3CMOS01300KMA

Table 5- 43 I3CMOS01300KMA camera specifications

Parameter \ Model	I3CMOS01300KMA 1.3M pixel 1 "CMOS USB3.0 industrial camera
Camera Parameters	
Sensor model	GPixel GLUX9701BSI (UV)
Pixel size	9.76 μm x 9.76 μm
Sensor size	1"
Frame rate	30fps@1280 x 1024 30fps@640 x 512
Conversion Gain	TBD
Readout Noise	TBD
Full Well	TBD
Dynamic range	TBD
Signal-to-Noise ratio	TBD
Sensitivity	2.57x10 <sup>8</sup> (e-/(W/m <sup>2</sup> ).s))
Dark current	11e-/s/pix
Gain range	1x-8x
Exposure time	63μs-60sec
Shutter	Rolling Shutter
Binning	Hardware2x2; Software2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output
Data Format	8bit / 12bit / HDR16
General Specifications	
Power supply	Power with USB3.0
Power consumption	<2.4W
Temperature	Working temperature -10~50°C; Storage temperature -30~70°C
Humidity	20% - 80% No condensation
Size	38mmx38mmx33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

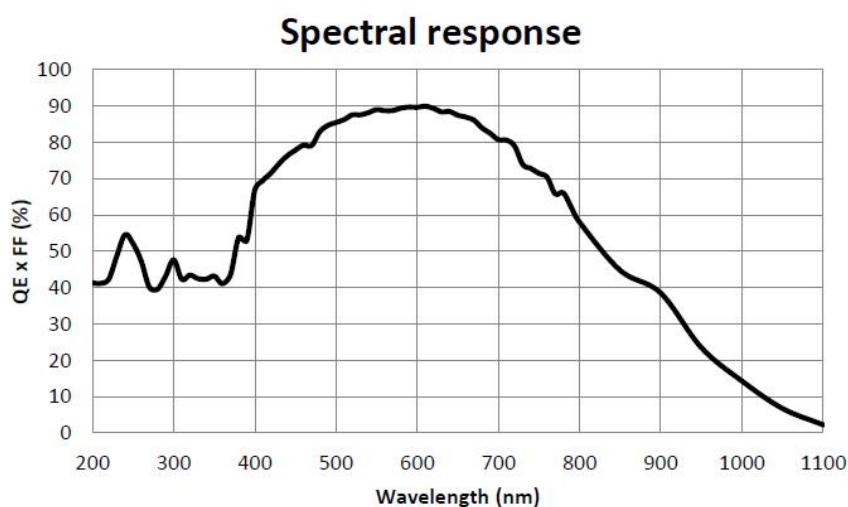


Figure 5- 61 I3CMOS01300KMA spectral response curve

## 5.44 I3CMOS01700KMA

Table 5- 44 I3CMOS01700KMA camera specifications

Parameter	Model	I3CMOS01700KMA 1.7M pixel 1.1 "CMOS USB3.0 industrial camera
	Camera Parameters	
Sensor model	Sony IMX432LLJ	
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	98.6fps@1600 x 1100	
Conversion Gain	4.97 (e-/ADU)	
Readout Noise	4.76 (e-)	
Full Well	20.4 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	43dB	
Peak QE	78%@575nm	
Sensitivity	8100mV	
Dark current	0.3mV	
Gain range	1x-50x	
Exposure time	6 $\mu\text{s}$ -15sec	
Shutter	Global Shutter	
Binning	Software2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<2.4W	
Temperature	Working temperature -10~50°C; Storage temperature -30~70°C	
Humidity	20% - 80% No condensation	
Size	38mmx38mmx33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

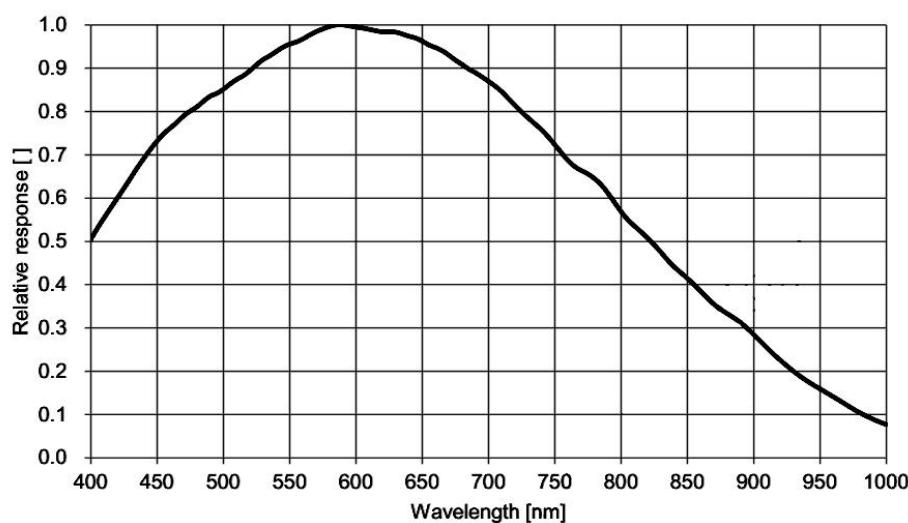


Figure 5- 62 I3CMOS01700KMA spectral response curve

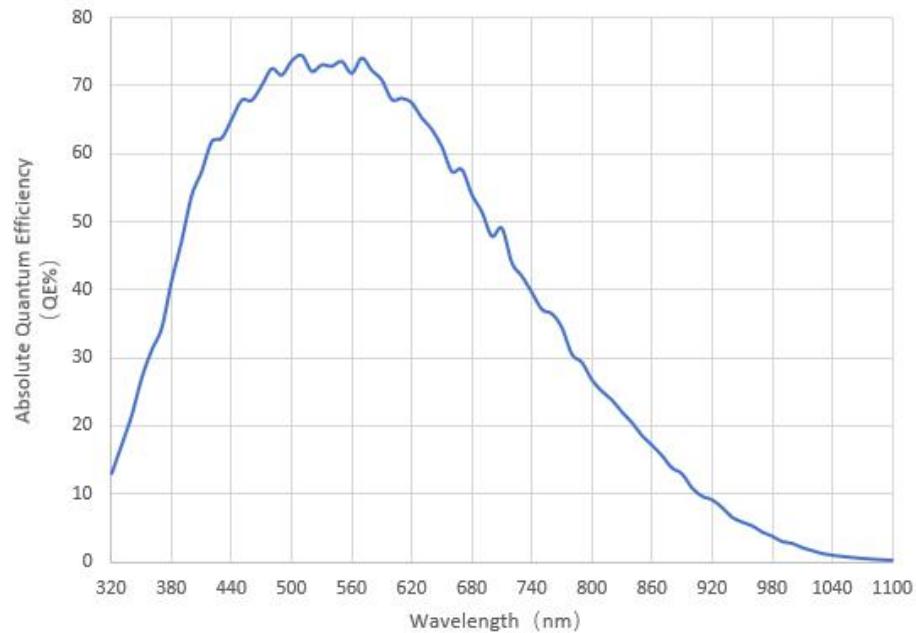


Figure 5- 63 I3CMOS01700KMA absolute quantum efficiency

## 5.45 I3CMOS01700KMB

Table 5- 45 I3CMOS01700KMB camera specifications

Parameter	Model	I3CMOS01700KMB
		1.7M pixels 1.1" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX425LLJ	
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	210fps@1600 x 1100	
Conversion Gain	4.97 (e-/ADU)	
Readout Noise	4.76 (e-)	
Full Well	20.4 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	43dB	
Sensitivity	8100mV	
Dark current	0.3mV	
Gain range	1x-50x	
Exposure time	6us-15sec	
Shutter	Global shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, one non-isolated input/output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<2.4W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	38mm×38mm×33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

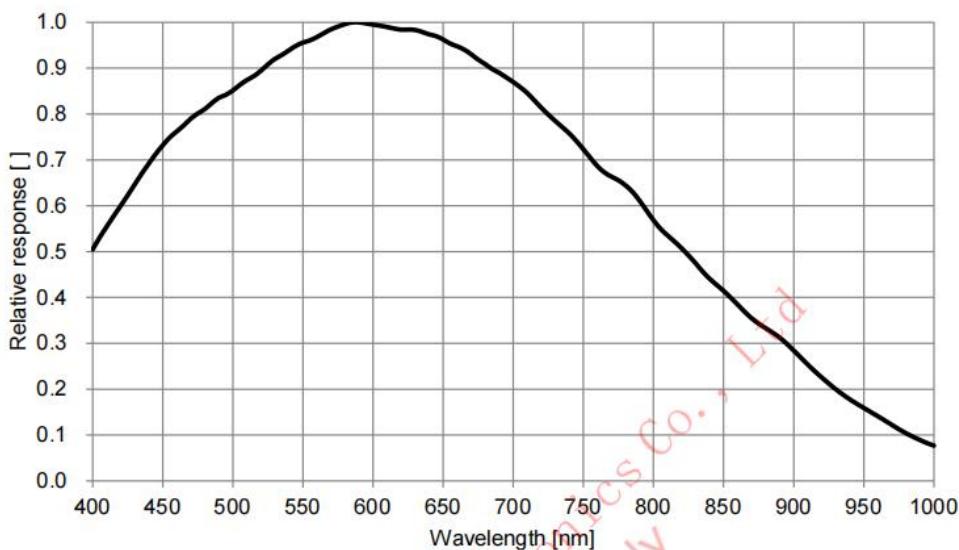


Figure 5- 64 I3CMOS01700KMB spectral response curve

## 5.46 I3CMOS08300KMB

Table 5- 46 I3CMOS08300KMB camera specifications

Parameter \ Model	I3CMOS08300KMB
	8.3M pixels 1/1.2" CMOS USB3.0 industrial camera
<b>Camera Parameters</b>	
Sensor model	Sony IMX585-AAMJ1-C
Pixel size	2.9 $\mu\text{m}$ x 2.9 $\mu\text{m}$
Sensor size	1/1.2"
Frame rate	45fps@3840 x2160 70fps@1920 x 1080
Dynamic range	TBD
Signal-to-Noise ratio	TBD
Sensitivity	19120mV
Dark current	0.13mV
Gain range	1x-50x
Exposure time	30 $\mu\text{s}$ -15sec
Shutter	Rolling shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output
Data Format	8bit / 12bit
<b>General Specifications</b>	
Power supply	Power with USB3.0
Power consumption	<2.3W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

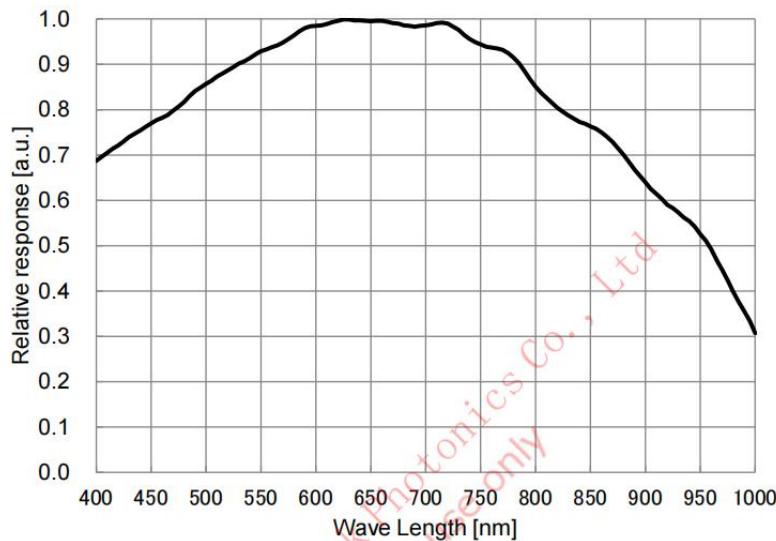


Figure 5- 65 I3CMOS08300KMB spectral response curve

## 5.47 I3CMOS02000KMA

Table 5- 47 I3CMOS02000KMA camera specifications

Parameter	Model	I3CMOS02000KMA
		2.0M pixels 1/1.7" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX430LLJ	
Pixel size	4.5 $\mu\text{m}$ x 4.5 $\mu\text{m}$	
Sensor size	1/1.7"	
Frame rate	132fps@1624x1240	
Conversion Gain	TBD	
Readout Noise	TBD	
Full Well	TBD	
Dynamic range	TBD	
Signal-to-Noise ratio	TBD	
Sensitivity	3354mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	6us-15sec	
Shutter	Global shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.0W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	38mmx38mmx33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

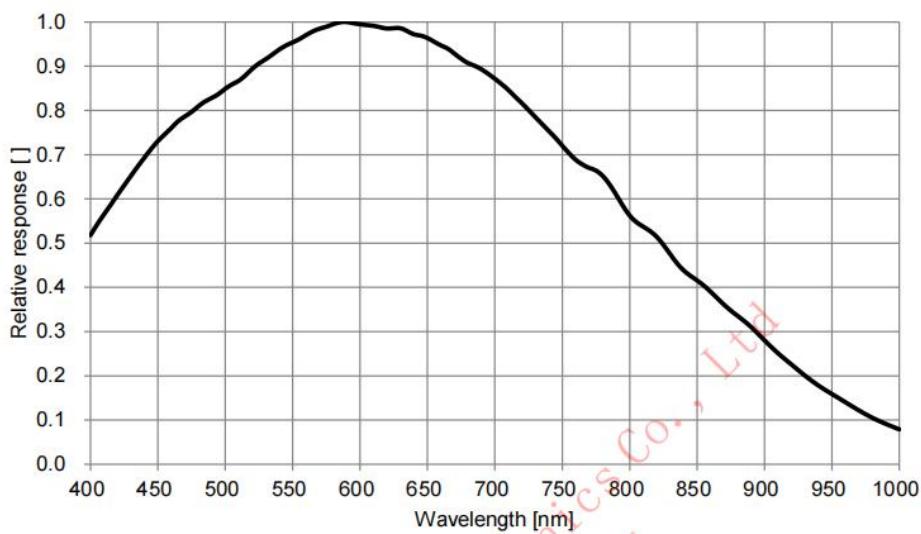


Figure 5- 66 I3CMOS02000KMA spectral response curve

## 5.48 I3CMOS02800KMA

Table 5- 48 I3CMOS02800KMA camera specifications

Parameter	Model	I3CMOS02800KMA
		2.8M pixels 2/3" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX421LLJ	
Pixel size	4.5 $\mu\text{m}$ x 4.5 $\mu\text{m}$	
Sensor size	2/3"	
Frame rate	121fps@1936 x 1464 425fps@968 x 732	
Conversion Gain	2.73 (e-/ADU)	
Readout Noise	2.56 (e-)	
Full Well	11.2 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	40.5dB	
Peak QE	78%@575nm	
Sensitivity	3354mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	6us-15sec	
Shutter	Global shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.0W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	38mmx38mmx33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

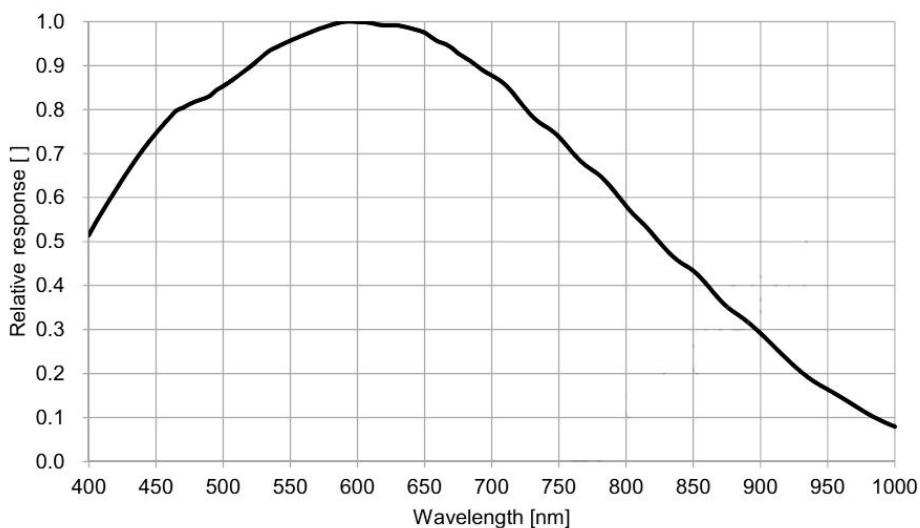


Figure 5- 67 I3CMOS02800KMA spectral response curve

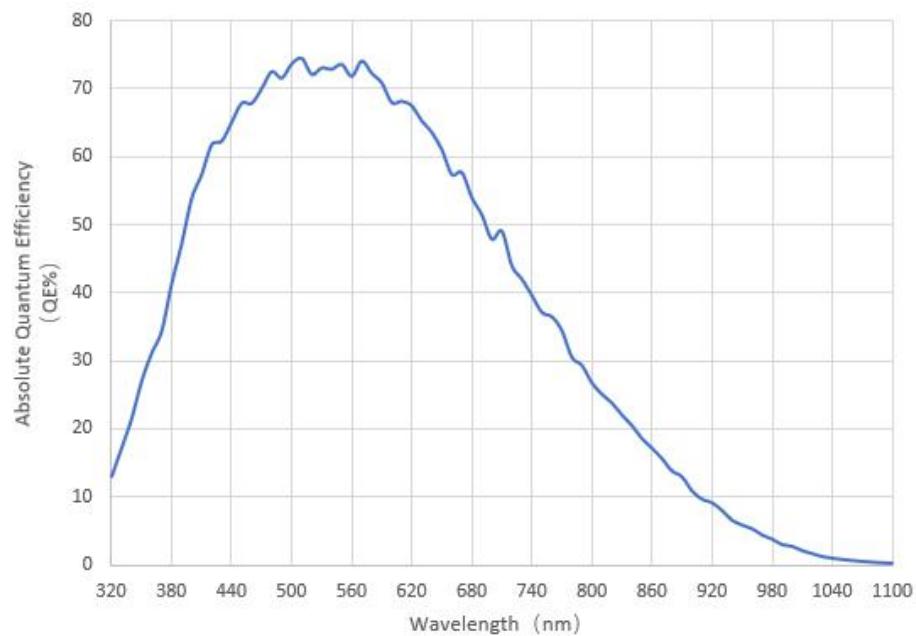


Figure 5- 68 I3CMOS02800KMA absolute quantum efficiency

## 5.49 I3CMOS07100KMA

Table 5- 49 I3CMOS07100KMA camera specifications

Parameter	Model	I3CMOS07100KMA
		7.1M pixels 1.1" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX428LLJ	
Pixel size	4.5 $\mu\text{m}$ x 4.5 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	51.3fps@3200 x 2200 133.8fps@1584 x 1100	
Conversion Gain	2.77 (e-/ADU)	
Readout Noise	2.63 (e-)	
Full Well	11.3 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	40.6dB	
Peak QE	78%@575nm	
Sensitivity	3354mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	6us-15sec	
Shutter	Global shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.0W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	38mmx38mmx33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

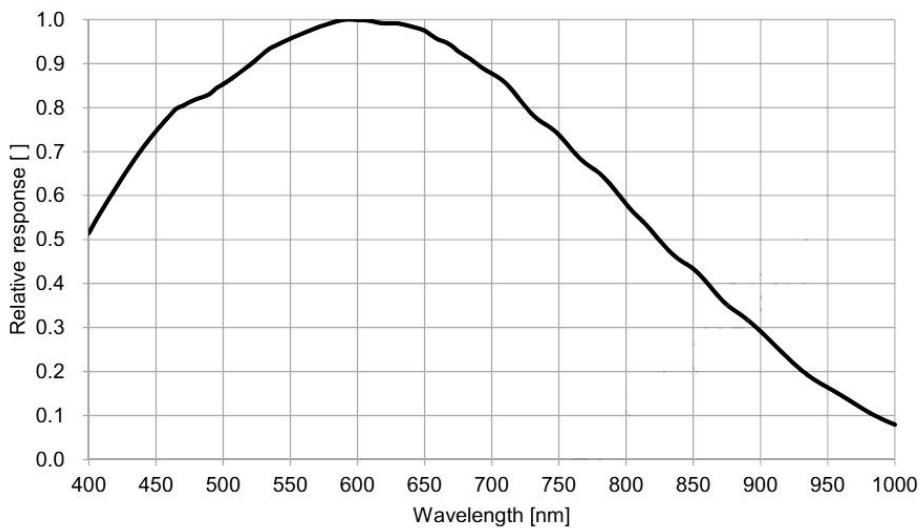


Figure 5- 69 I3CMOS07100KMA spectral response curve

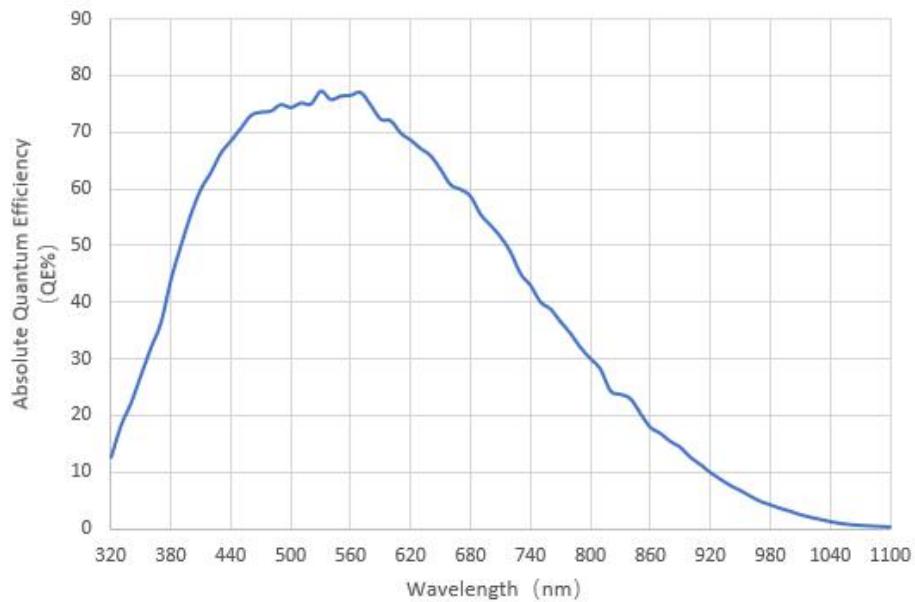


Figure 5- 70 I3CMOS07100KMA absolute quantum efficiency

## 5.50 I3CMOS12300KMA

Table 5- 50 I3CMOS12300KMA camera specifications

Parameter	Model	I3CMOS12300KMA
		12.3M pixels 1.1" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX304LLR-C	
Pixel size	3.45 μm x 3.45 μm	
Sensor size	1.1"	
Frame rate	23.4fps@4096 x3000 46.3fps@2048 x 1500 46.3fps@1024 x 750	
Conversion Gain	2.71 (e-/ADU)	
Readout Noise	2.12 (e-)	
Full Well	11.1 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	40.5dB	
Sensitivity	1830mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	30μs-15sec	
Shutter	Global shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	<3.0W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	38mmx38mmx33mm	
Weight	70g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

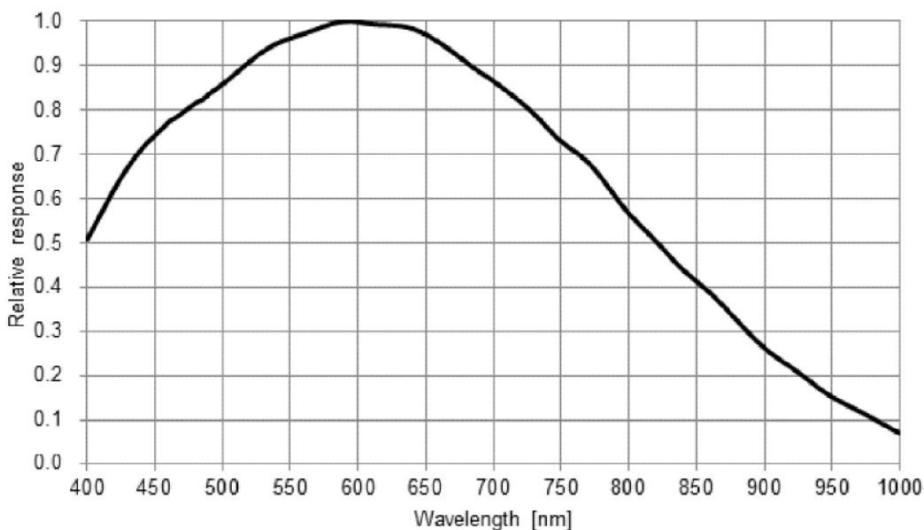


Figure 5- 71 I3CMOS12300KMA spectral response curve

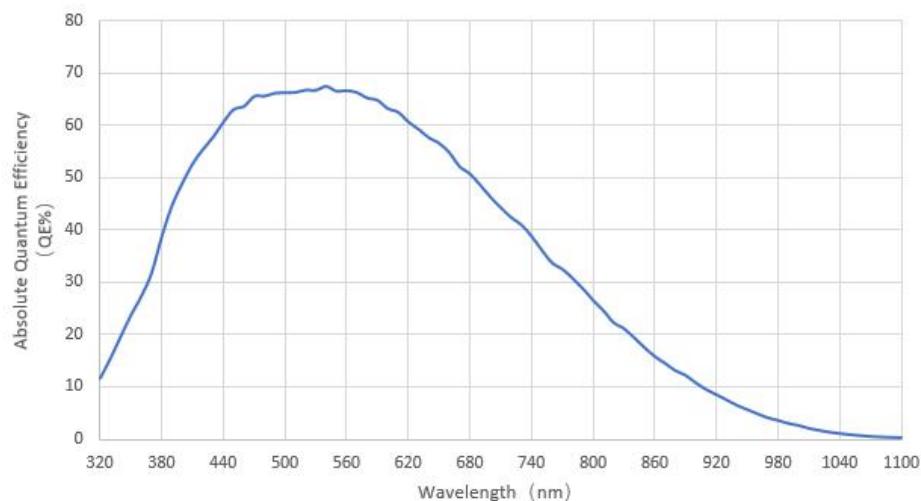


Figure 5- 72 I3CMOS12300KMA absolute quantum efficiency

## 5.51 I3CMOS12500KMA

Table 5- 51 I3CMOS12500KMA camera specifications

Parameter \ Model	I3CMOS12500KMA 12.5M pixels 1.1" CMOS USB3.0 industrial camera
Parameter	Camera Parameters
Sensor model	Gpixel GMAX3412
Pixel size	3.4 μm x 3.4 μm
Sensor size	1.1"
Frame rate	30fps@4096x3072 60fps@2048x1536
Readout Noise	1.5 (e-)
Full Well	10 (ke-)
Dynamic range	68.8dB
Signal-to-Noise ratio	40dB
Sensitivity	2.36x10 <sup>7</sup> e-/(W/m <sup>2</sup> ·s)
Dark current	81.6e-/s
Gain range	1x-50x
Exposure time	15μs-15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0
Power consumption	<3.0W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

Spectral Response

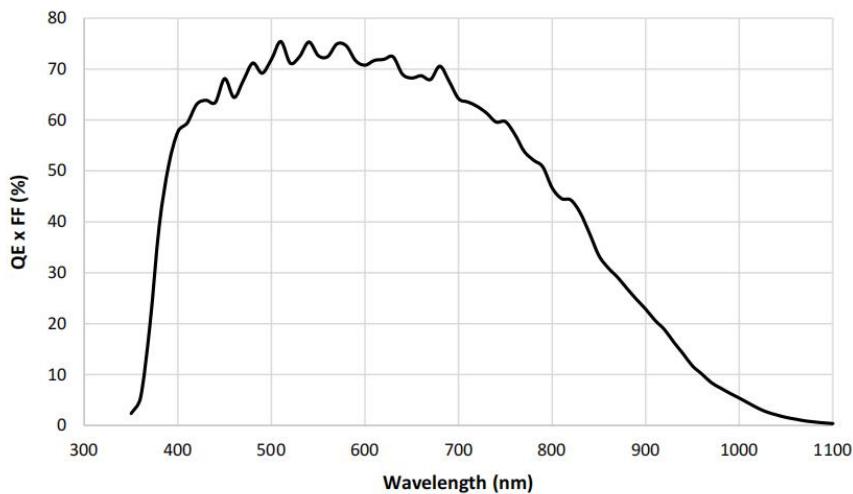


Figure 5- 73 I3CMOS12500KMA spectral response curve

## 5.52 I3CMOS20400KMA

Table 5- 52 I3CMOS20400KMA camera specifications

Parameter \ Model	I3CMOS20400KMA 20.4M pixels 1.1" CMOS USB3.0 industrial camera
Parameter	Camera Parameters
Sensor model	Sony IMX541-AAMJ
Pixel size	2.74 $\mu\text{m}$ x 2.74 $\mu\text{m}$
Sensor size	1.1"
Frame rate	17.5fps@4496x4496 64.4fps@2240x2240 64.4fps@1120x1120
Dynamic range	70.8dB
Signal-to-Noise ratio	39.8dB
Sensitivity	2649mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	30us-15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0
Power consumption	<3.0W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

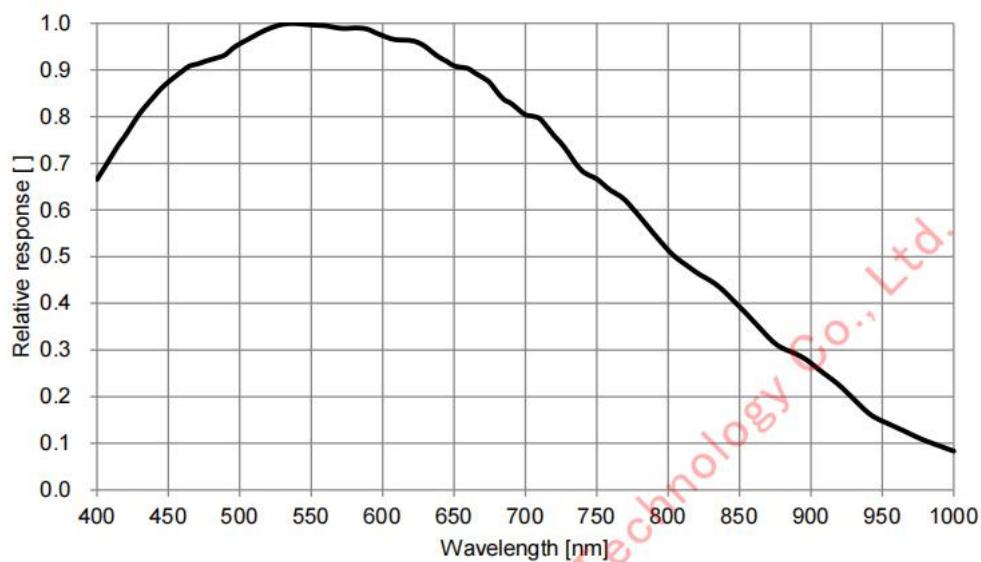


Figure 5- 74 I3CMOS20400KMA spectral response curve

## 6 IUA Series Technical Specifications(55)

### 6.1 IUA390KMA

Table 6- 1 IUA390KMA camera specifications

Parameter \ Model	IUA390KMA
	0.39M pixel 1/2.9 "CMOS USB3.0 industrial camera
Camera Parameters	
Sensor model	Sony IMX287LLR
Pixel size	6.9 μm x 6.9 μm
Sensor size	1/2.9"
Frame rate	101.5fps@720 x 540
Conversion Gain	2.73 (e-/ADU)
Readout Noise	0.79 (e-)
Full Well	11.2 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.5dB
Peak QE	71%@575nm
Sensitivity	7320mV
Dark current	0.76mV
Gain range	1x-50x
Exposure time	6μs-15sec
Shutter	Global Shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	1.4W
Temperature	Working temperature -10~50°C; Storage temperature -30~70°C
Humidity	20% - 80% No condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android: x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

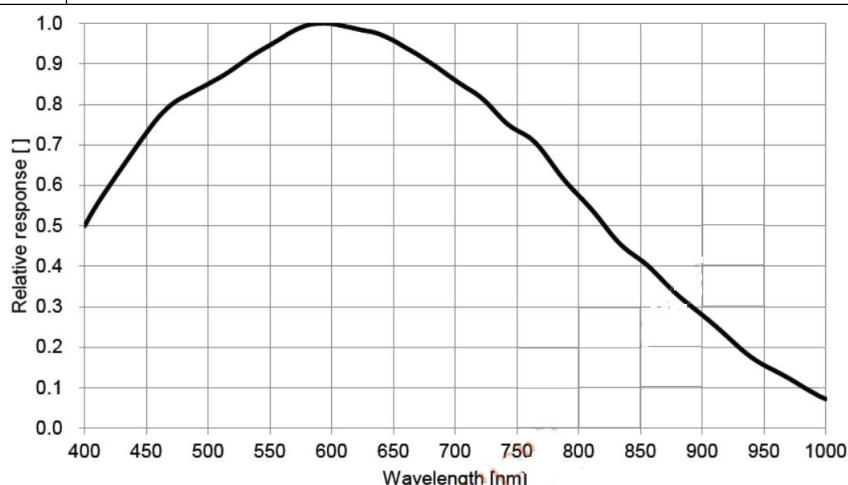


Figure 6- 1 IUA390KMA spectral response curve

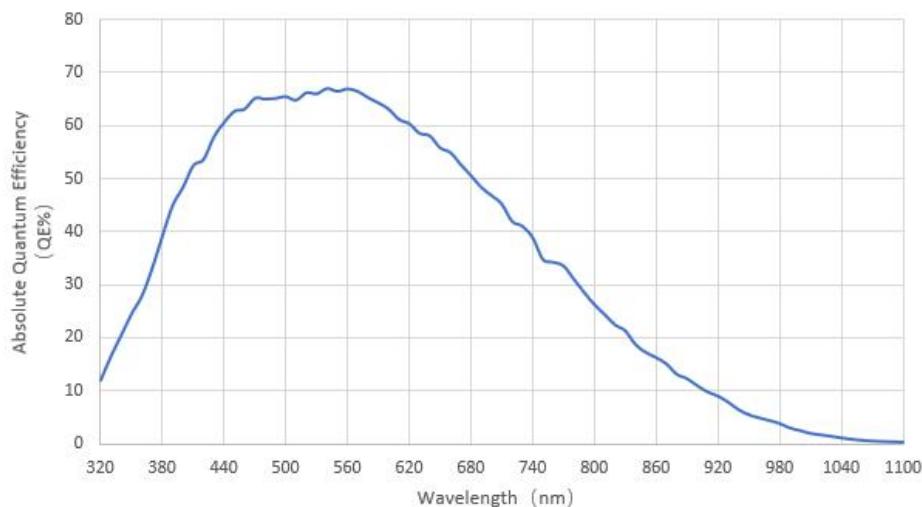


Figure 6- 2 IUA390KMA absolute quantum efficiency

## 6.2 IUA503KMA

Table 6- 2 IUA503KMA camera specifications

Parameter	Model	IUA503KMA 0.5M pixel 1/1.7"CMOS USB3.0 industrial camera
	Camera Parameters	
Sensor model	Sony IMX426LLJ	
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$	
Sensor size	1/1.7"	
Frame rate	79.8fps@800 x 620	
Conversion Gain	4.9 (e-/ADU)	
Readout Noise	1.41 (e-)	
Full Well	20.1 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	43dB	
Peak QE	78%@575nm	
Sensitivity	8100mV	
Dark current	0.3mV	
Gain range	1x-50x	
Exposure time	6 $\mu\text{s}$ -15sec	
Shutter	Global Shutter	
Binning	Software2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0/ DC12V	
Power consumption	1.6W	
Temperature	Working temperature -10~50°C; Storage temperature -30~70°C	
Humidity	20% - 80% No condensation	
Size	68mmx68mmx28.1mm	
Weight	228g	
Lens mount	C-mount	
Software	ToupView/SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

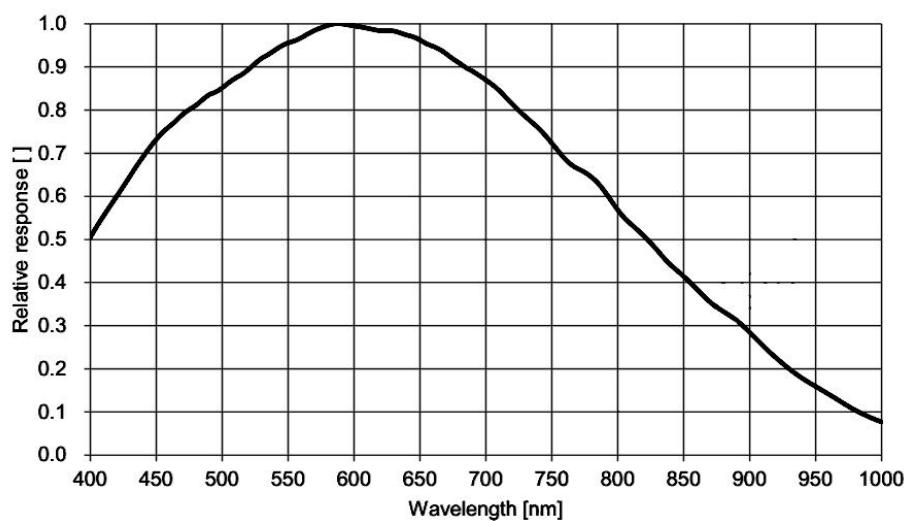


Figure 6- 3 IUA503KMA spectral response curve

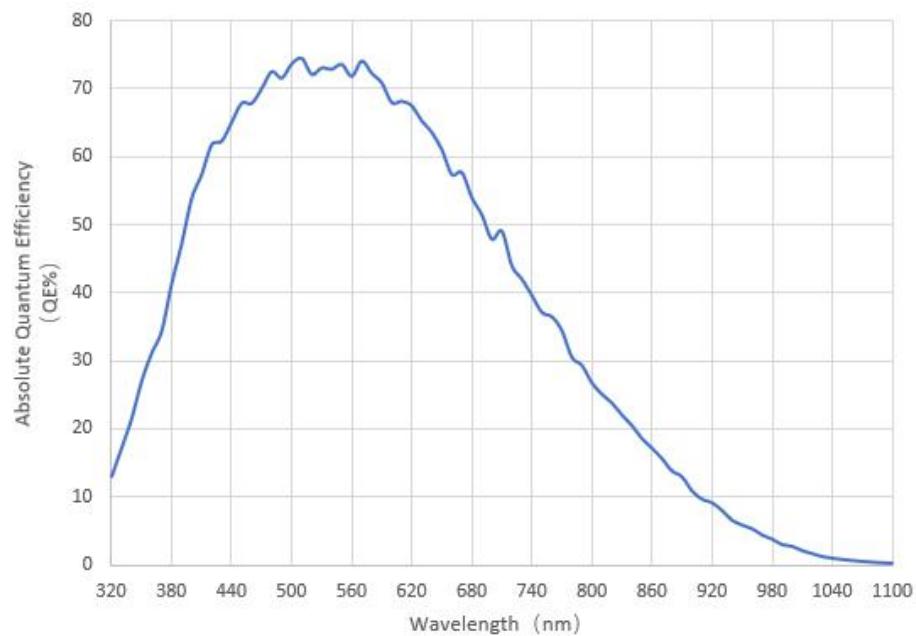


Figure 6- 4 IUA503KMA absolute quantum efficiency

## 6.3 IUA503KMB

Table 6- 3 IUA503KMB camera specifications

Parameter	Model	IUA503KMB
	0.5M pixel 1/1.7"CMOS USB3.0 industrial camera	
Camera Parameters		
Sensor model	Sony IMX433LLJ	
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$	
Sensor size	1/1.7"	
Frame rate	79.8fps@800 x 620	
Conversion Gain	4.9 (e-/ADU)	
Readout Noise	1.41 (e-)	
Full Well	20.1 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	43dB	
Peak QE	78%@575nm	
Sensitivity	8100mV	
Dark current	0.3mV	
Gain range	1x-50x	
Exposure time	6 $\mu\text{s}$ -15sec	
Shutter	Global Shutter	
Binning	Software2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0/ DC12V	
Power consumption	<3.0W	
Temperature	Working temperature -10~50°C; Storage temperature -30~70°C	
Humidity	20% - 80% No condensation	
Size	68mmx68mmx28.1mm	
Weight	228g	
Lens mount	C-mount	
Software	ToupView/SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

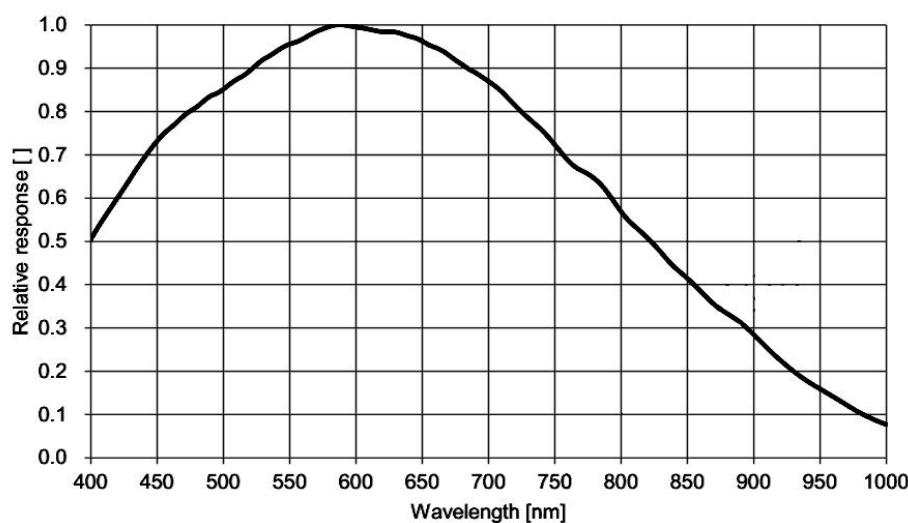


Figure 6- 5 IUA503KMB spectral response curve

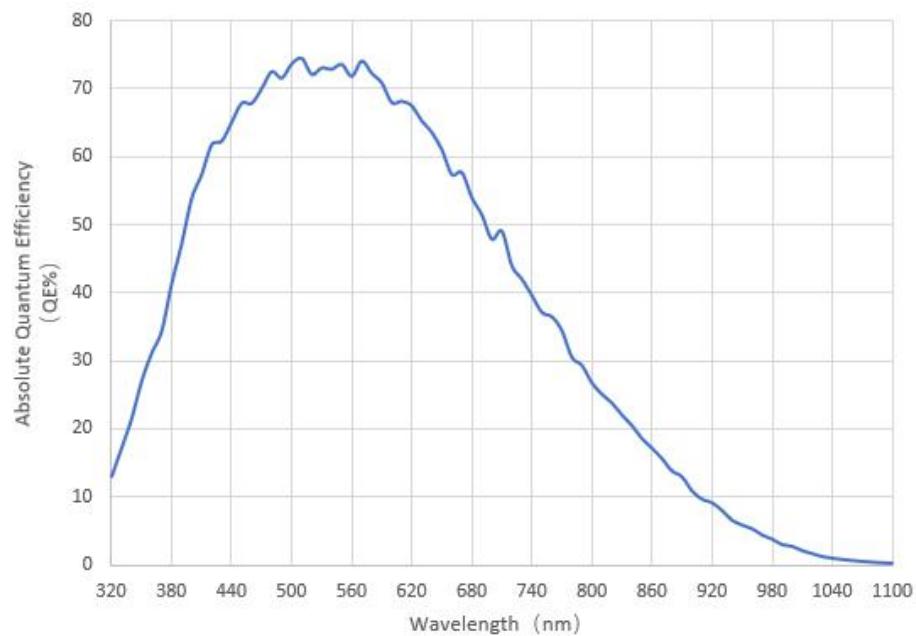


Figure 6- 6 IUA503KMB absolute quantum efficiency

## 6.4 IUA1500KMA

Table 6- 4 IUA1500KMA camera specifications

Parameter \ Model	IUA1500KMA
1.5M pixels 1/2.9" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX273LLR
Pixel size	3.45 $\mu\text{m} \times 3.45 \mu\text{m}$
Sensor size	1/2.9"
Frame rate	235.5fps@1440 $\times$ 1080 523fps@720 $\times$ 540
Conversion Gain	2.68 (e-/ADU)
Readout Noise	2.24 (e-)
Full Well	10.96 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.4dB
Peak QE	71%@575nm
Sensitivity	1830mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	15us-15sec
Shutter	Global shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.1W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	219g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

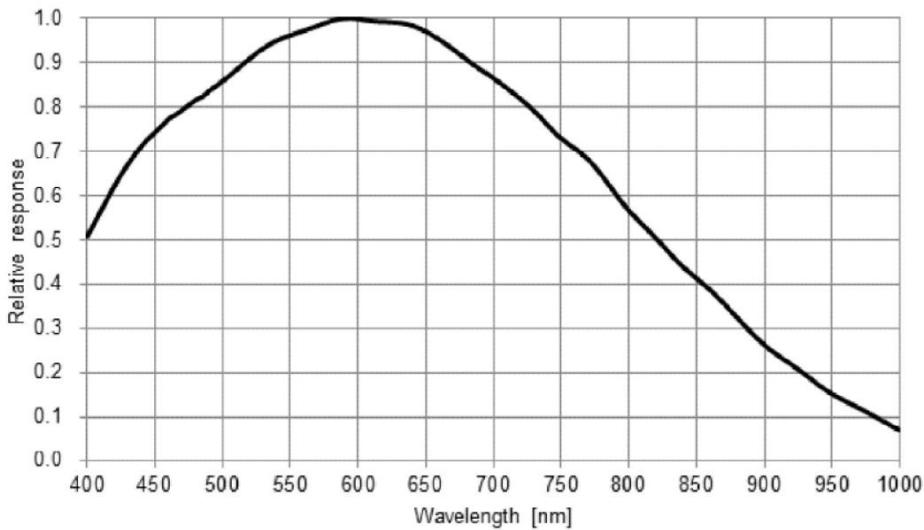


Figure 6- 7 IUA1500KMA spectral response curve

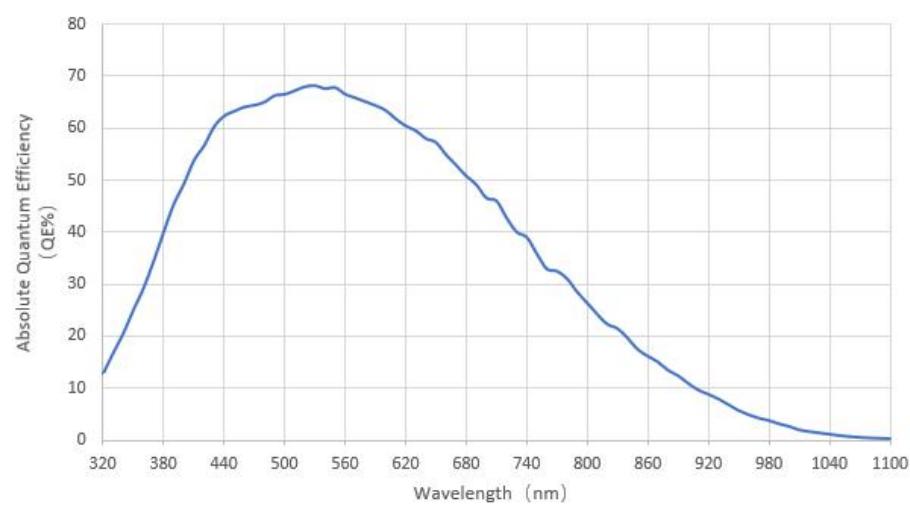


Figure 6- 8 IUA1500KMA absolute quantum efficiency

## 6.5 IUA1500KPA

Table 6- 5 IUA1500KPA camera specifications

Parameter \ Model	IUA1500KPA
1.5M pixels 1/2.9" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX273LQR
Pixel size	3.45 $\mu\text{m} \times 3.45 \mu\text{m}$
Sensor size	1/2.9"
Frame rate	235.5fps@1440 $\times$ 1080 523fps@720 $\times$ 540
Conversion Gain	2.67 (e-/ADU)
Readout Noise	2.27 (e-)
Full Well	10.94 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.4dB
Sensitivity	1146mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	15us-15sec
Shutter	Global shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.1W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	219g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

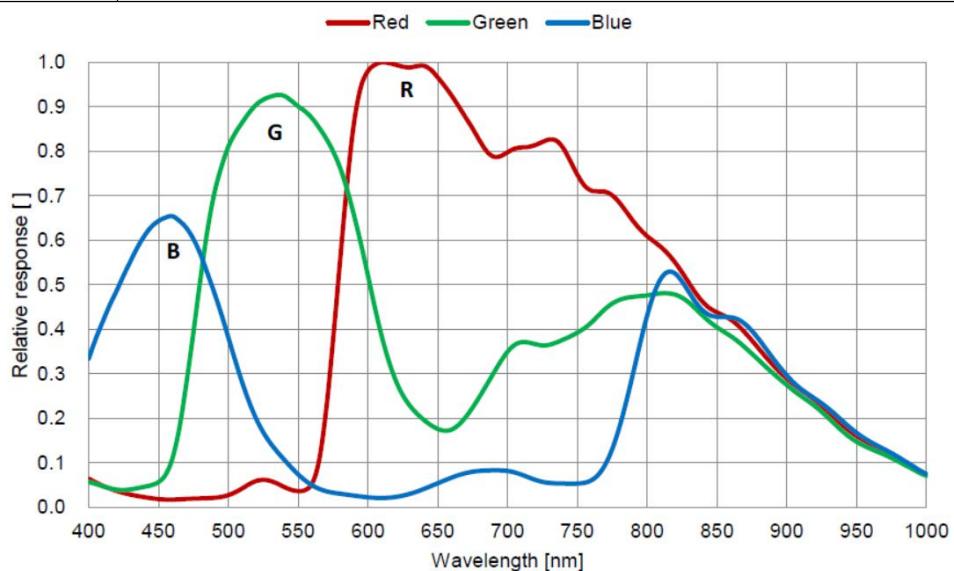


Figure 6- 9 IUA1500KPA spectral response curve

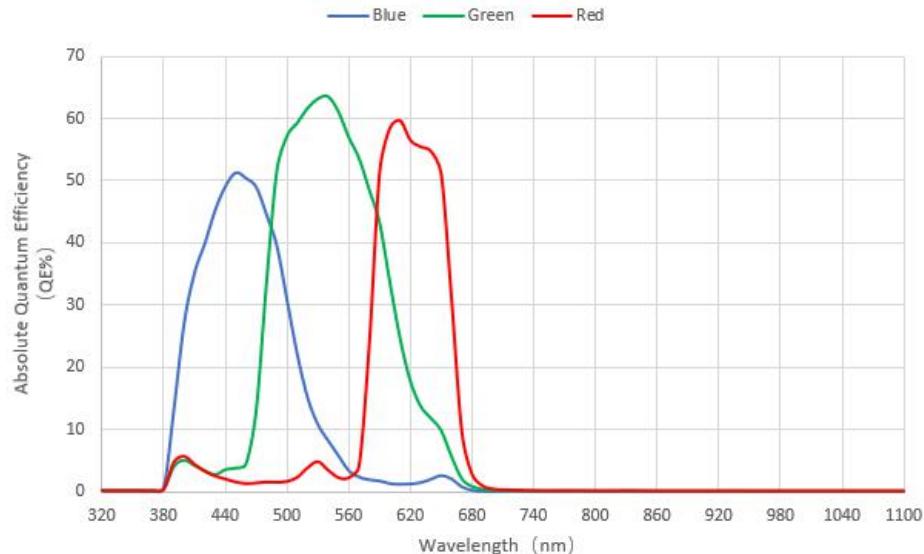


Figure 6- 10 IUA1500KPA absolute quantum efficiency

## 6.6 IUA1700KMA

Table 6- 6 IUA1700KMA camera specifications

Parameter \ Model	IUA1700KMA 1.7M pixel 1.1 "CMOS USB3.0 industrial camera
<b>Camera Parameters</b>	
Sensor model	Sony IMX432LLJ
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$
Sensor size	1.1"
Frame rate	98.6fps@1600 x 1100
Conversion Gain	4.97 (e-/ADU)
Readout Noise	4.76 (e-)
Full Well	20.4 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	43dB
Peak QE	78%@575nm
Sensitivity	8100mV
Dark current	0.3mV
Gain range	1x-50x
Exposure time	6 $\mu\text{s}$ -15sec
Shutter	Global Shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
<b>General Specifications</b>	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.5W
Temperature	Working temperature -10~50°C; Storage temperature -30~70°C
Humidity	20% - 80% No condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

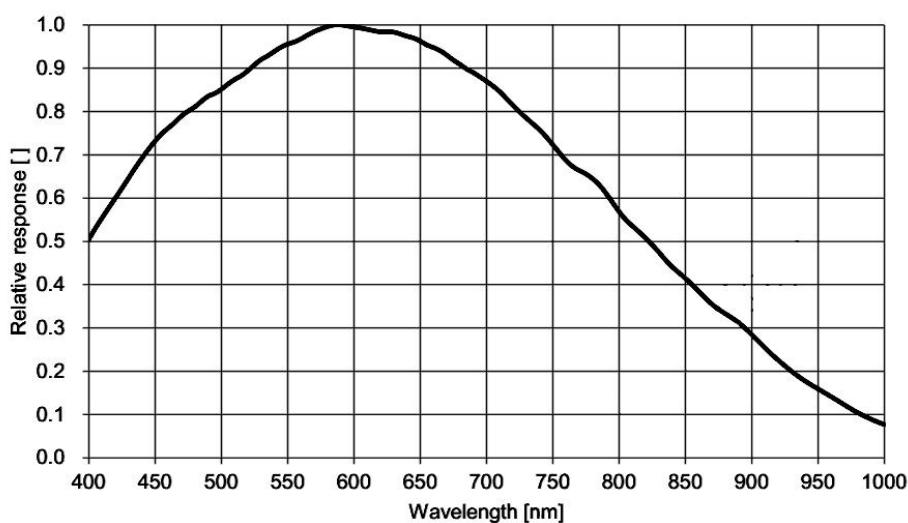


Figure 6- 11 IUA1700KMA spectral response curve

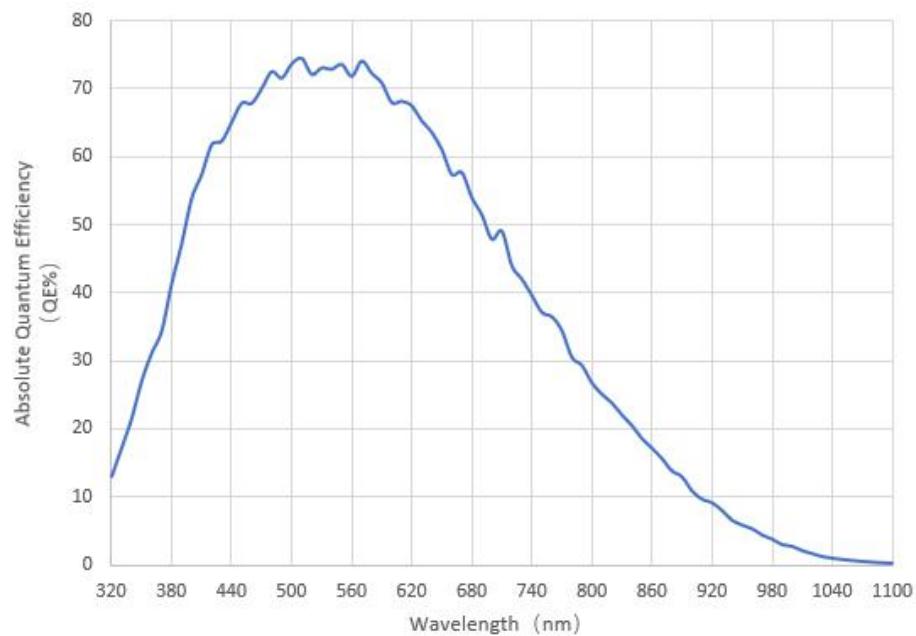


Figure 6- 12 IUA1700KMA absolute quantum efficiency

## 6.7 IUA1700KPA

Table 6- 7 IUA1700KPA camera specifications

Parameter \ Model	IUA1700KPA
1.7M pixels 1.1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX432LQJ
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$
Sensor size	1.1"
Frame rate	98.6fps@1600 x 1100
Conversion Gain	4.9 (e-/ADU)
Readout Noise	4.53 (e-)
Full Well	20.1 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	43dB
Sensitivity	4910mV
Dark current	0.3mV
Gain range	1x-50x
Exposure time	6us-15sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.5W
Temperature	Working temperature -10~50°C, storage temperature -30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

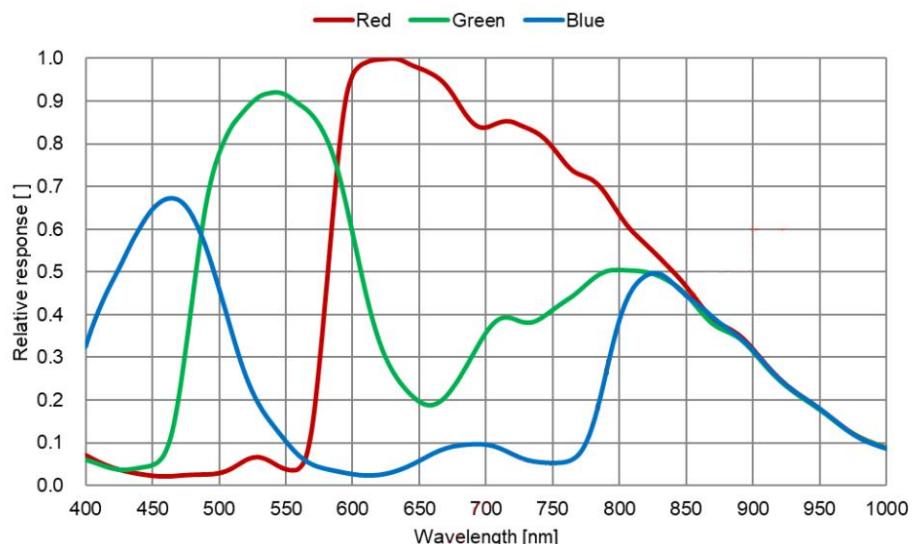


Figure 6- 13 IUA1700KPA spectral response curve

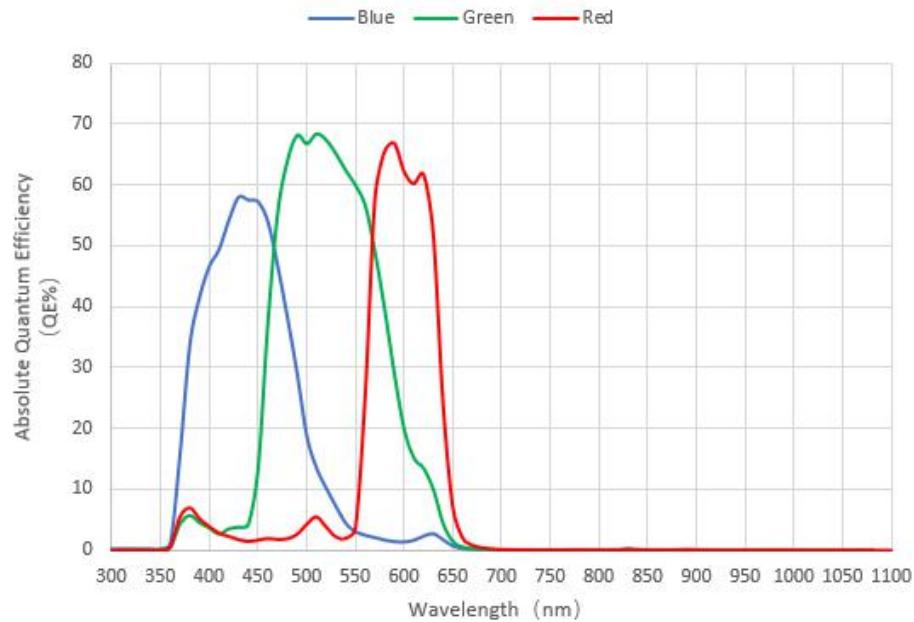


Figure 6- 14 IUA1700KPA absolute quantum efficiency

## 6.8 IUA1700KMB

Table 6- 8 IUA1700KMB camera specifications

Parameter \ Model	IUA1700KMB 1.7M pixel 1.1 "CMOS USB3.0 industrial camera
Camera Parameters	
Sensor model	Sony IMX425LLJ
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$
Sensor size	1.1"
Frame rate	210fps@1600 x 1100
Conversion Gain	4.97 (e-/ADU)
Readout Noise	4.76 (e-)
Full Well	20.4 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	43dB
Sensitivity	8100mV
Dark current	0.3mV
Gain range	1x-50x
Exposure time	6 $\mu\text{s}$ -15sec
Shutter	Global Shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	<2.4W
Temperature	Working temperature -10~50°C; Storage temperature -30~70°C
Humidity	20% - 80% No condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

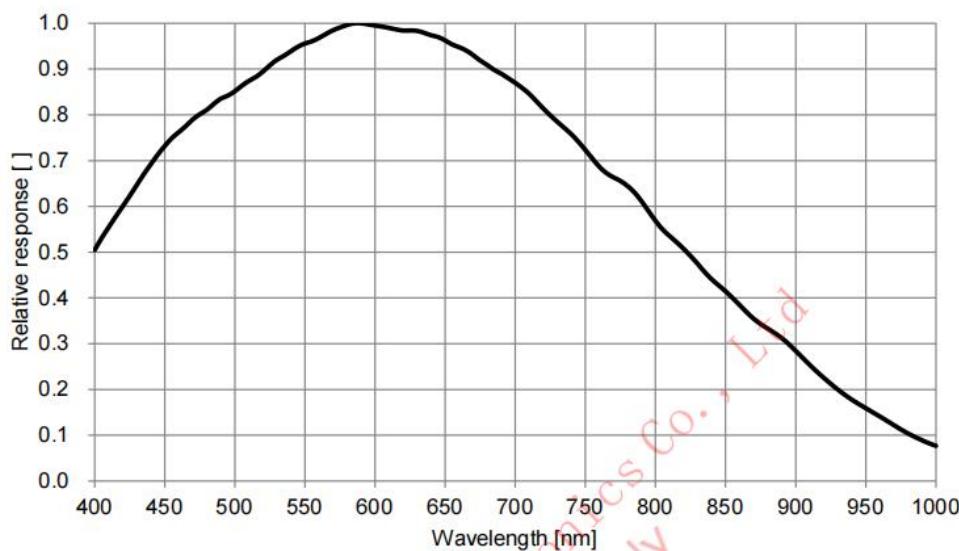


Figure 6- 15 IUA1700KMB spectral response curve

## 6.9 IUA1700KPB

Table 6- 9 IUA1700KPB camera specifications

Parameter \ Model	IUA1700KPB
1.7M pixels 1.1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX425LQJ
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$
Sensor size	1.1"
Frame rate	210fps@1600 x 1100
Conversion Gain	4.9 (e-/ADU)
Readout Noise	4.53 (e-)
Full Well	20.1 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	43dB
Sensitivity	4910mV
Dark current	0.3mV
Gain range	1x-50x
Exposure time	6us-15sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	<2.4W
Temperature	Working temperature -10~50°C, storage temperature -30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

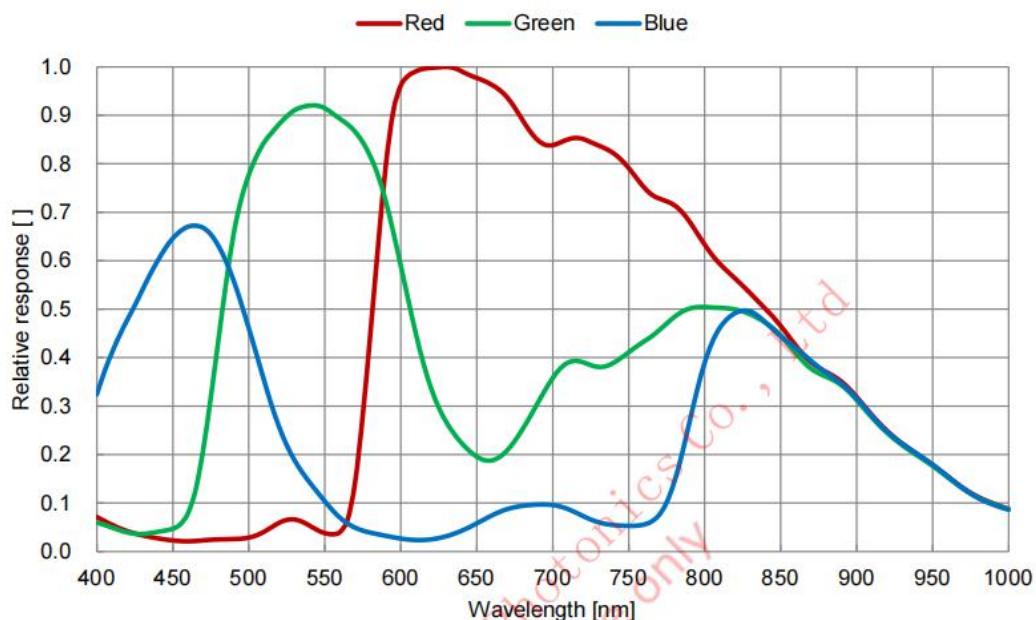


Figure 6- 16 IUA1700KPB spectral response curve

## 6.10 IUA2300KMA

Table 6- 10 IUA2300KMA camera specifications

Parameter \ Model	IUA2300KMA
2.3M pixels 1/1.2" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX174LLJ
Pixel size	5.86 μm x 5.86 μm
Sensor size	1/1.2"
Frame rate	164.5fps@1920 x 1200
Conversion Gain	8.33 (e-/ADU)
Readout Noise	7.12 (e-)
Full Well	34.1 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	45.3dB
Peak QE	78%@575nm
Sensitivity	1650mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	15μs-1sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0(USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.35W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

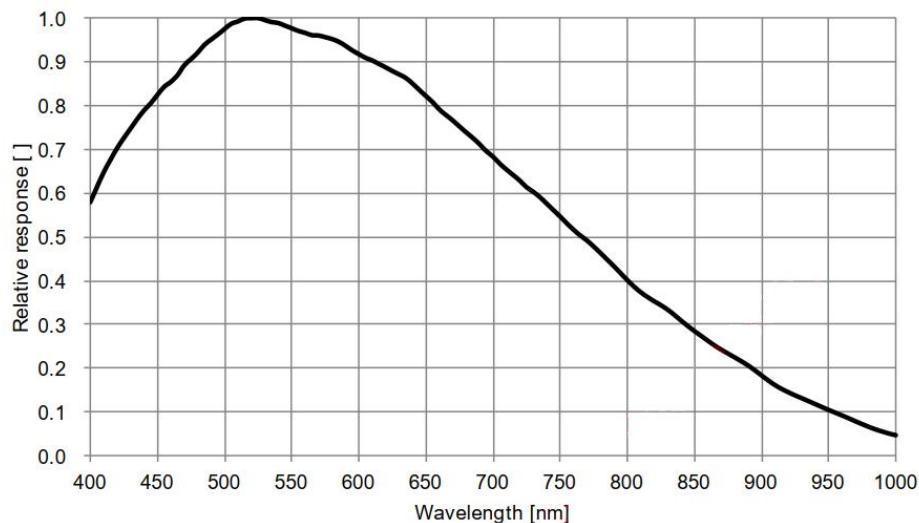


Figure 6- 17 IUA2300KMA spectral response curve

## 6.11 IUA2300KPA

Table 6- 11 IUA2300KPA camera specifications

Parameter	Model	IUA2300KPA
		2.3M pixels 1/1.2" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX174LQJ	
Pixel size	5.86 $\mu\text{m}$ x 5.86 $\mu\text{m}$	
Sensor size	1/1.2"	
Frame rate	164.5fps@1920 x 1200	
Conversion Gain	8.37 (e-/ADU)	
Readout Noise	7.13 (e-)	
Full Well	34.3 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	45.4dB	
Sensitivity	1016mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	15us-15sec	
Shutter	Global shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0/ DC12V	
Power consumption	2.35W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	68mmx68mmx28.1mm	
Weight	217g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

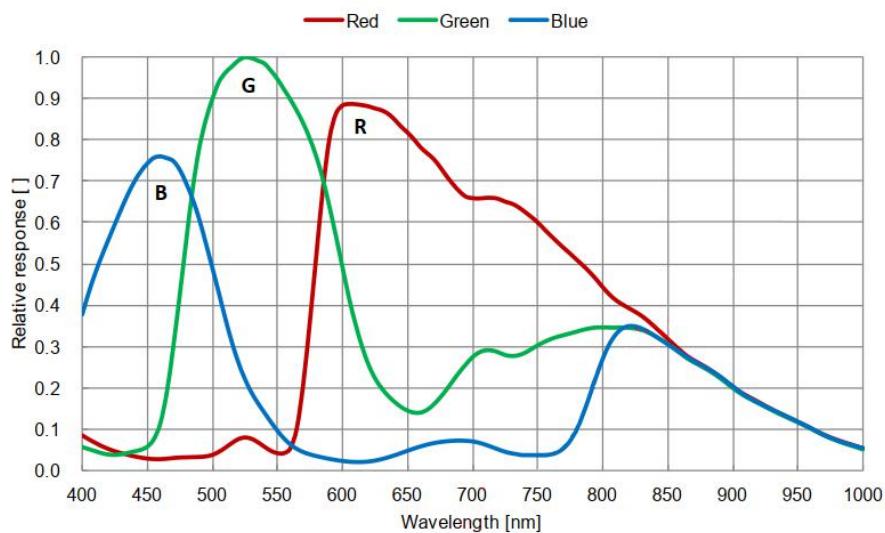


Figure 6- 18 IUA2300KPA spectral response curve

## 6.12 IUA2300KMB

Table 6- 12 IUA2300KMB camera specifications

Parameter \ Model	IUA2300KMB
2.3M pixels 1/1.2" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX249LLJ
Pixel size	5.86 $\mu\text{m}$ x 5.86 $\mu\text{m}$
Sensor size	1/1.2"
Frame rate	30fps@1920 x 1200
Conversion Gain	8.5 (e-/ADU)
Readout Noise	8.21 (e-)
Full Well	34.8 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	45.4dB
Peak QE	78%@575nm
Sensitivity	1650mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	42 $\mu\text{s}$ -15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	1.75W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	217g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

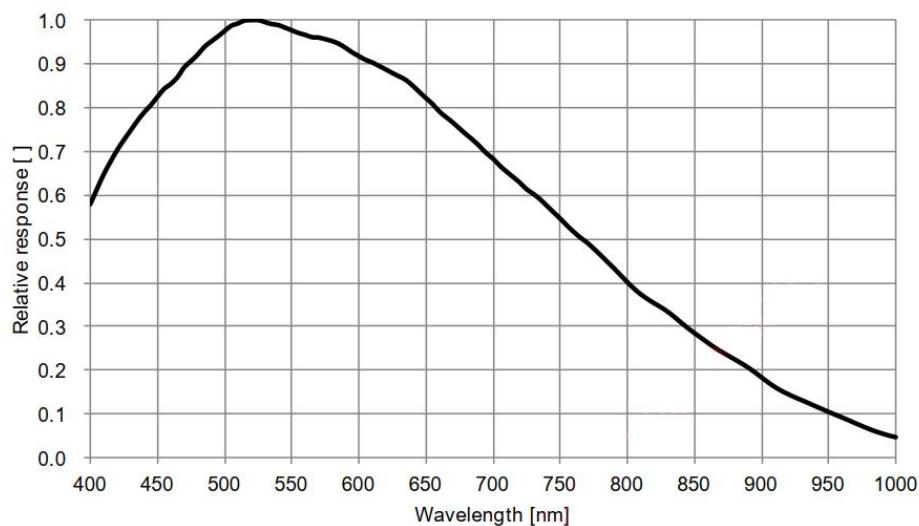


Figure 6- 19 IUA2300KMB spectral response curve

## 6.13 IUA2300KPB

Table 6- 13 IUA2300KPB camera specifications

Parameter \ Model	IUA2300KPB
2.3M pixels 1/1.2" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX249LQJ
Pixel size	5.86 $\mu\text{m}$ x 5.86 $\mu\text{m}$
Sensor size	1/1.2"
Frame rate	30fps@1920 x 1200
Conversion Gain	8.22 (e-/ADU)
Readout Noise	7.72 (e-)
Full Well	33.7 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	45.3dB
Sensitivity	1016mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	42 $\mu\text{s}$ -15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	1.75W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	217g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

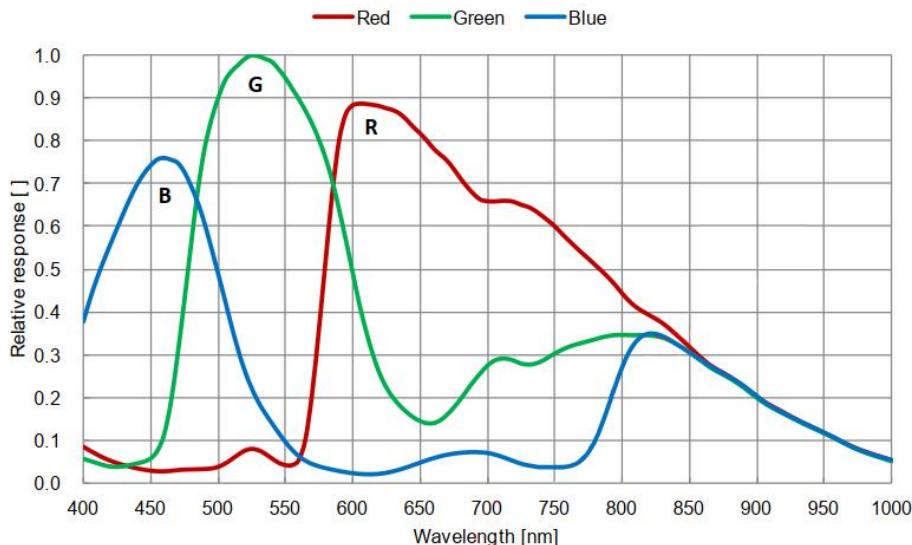


Figure 6- 20 IUA2300KPB spectral response curve

## 6.14 IUA2800KMA

Table 6- 14 IUA2800KMA camera specifications

Parameter \ Model	IUA2800KMA
2.8M pixels 2/3" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX421LLJ
Pixel size	4.5 $\mu\text{m}$ x 4.5 $\mu\text{m}$
Sensor size	2/3"
Frame rate	121fps@1936 x 1464 425fps@968 x 732
Conversion Gain	2.73 (e-/ADU)
Readout Noise	2.56 (e-)
Full Well	11.2 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.5dB
Peak QE	78%@575nm
Sensitivity	3354mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	6us-15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.85W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

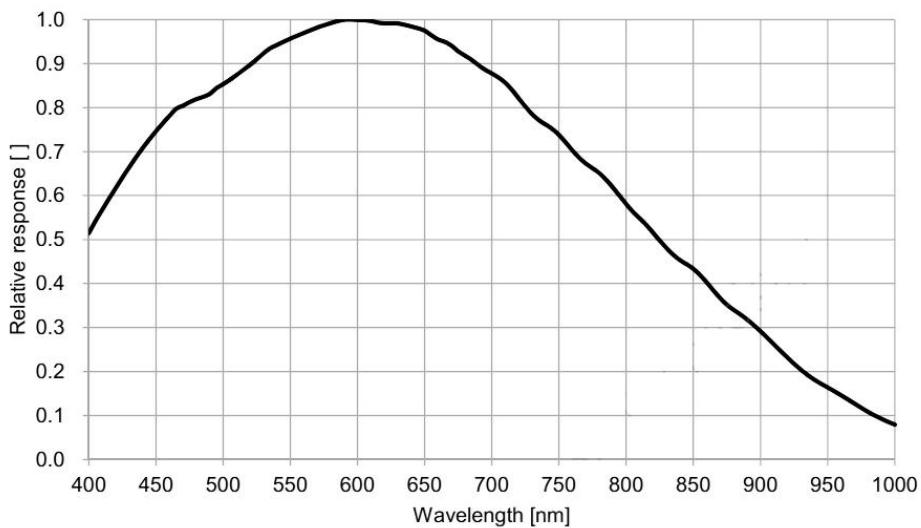


Figure 6- 21 IUA2800KMA spectral response curve

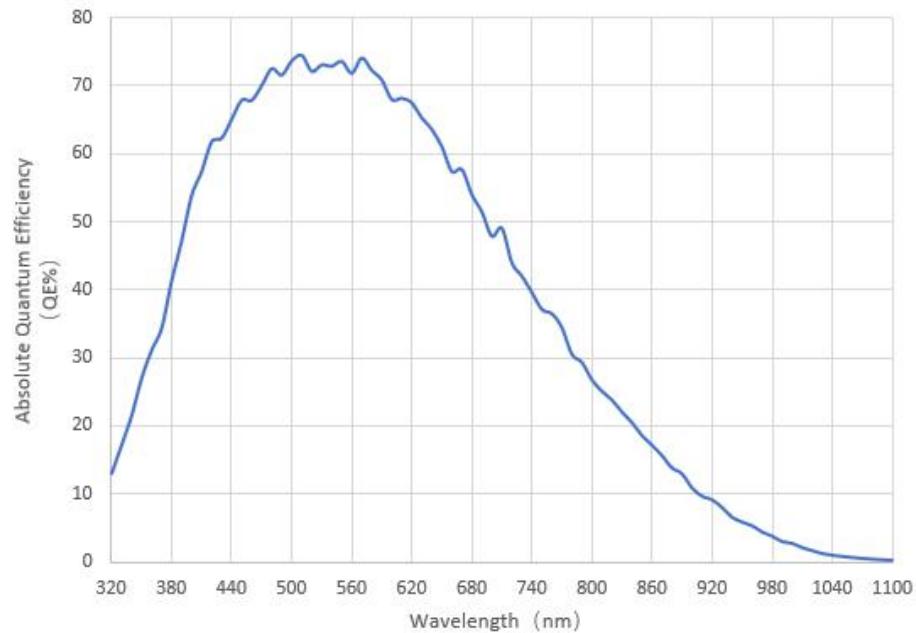


Figure 6- 22 IUA2800KMA absolute quantum efficiency

## 6.15 IUA2800KPA

Table 6- 15 IUA2800KPA camera specifications

Parameter \ Model	IUA2800KPA
2.8M pixels 2/3" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX421LQJ
Pixel size	4.5 $\mu\text{m}$ x 4.5 $\mu\text{m}$
Sensor size	2/3"
Frame rate	121fps@1936 x 1464 425fps@968 x 732
Conversion Gain	2.69 (e-/ADU)
Readout Noise	2.55 (e-)
Full Well	11.0 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.4dB
Sensitivity	2058mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	6 $\mu\text{s}$ -15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.85W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

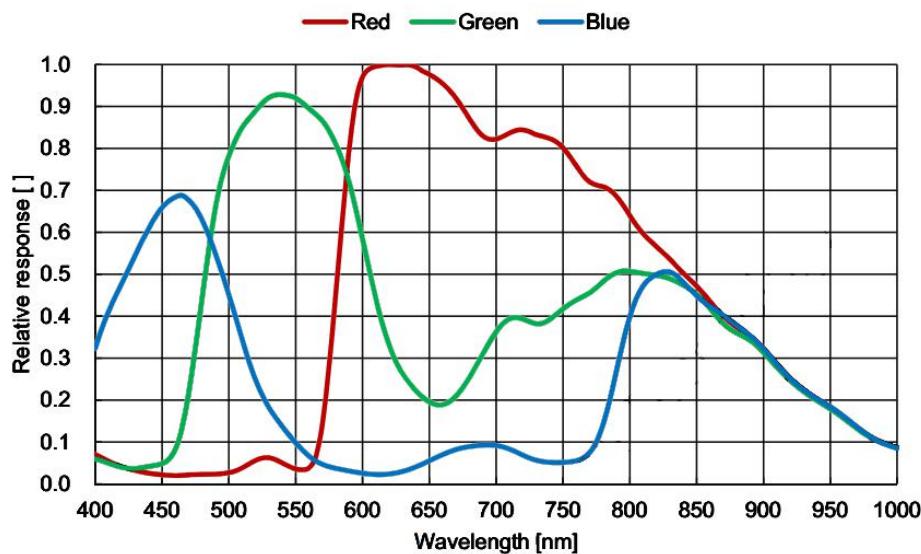


Figure 6- 23 IUA2800KPA spectral response curve

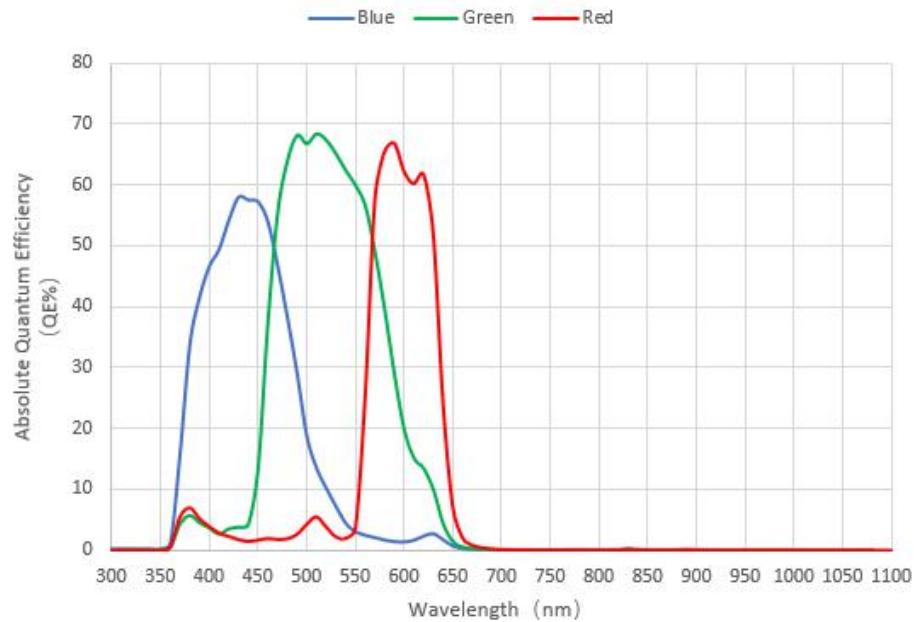


Figure 6- 24 IUA2800KPA absolute quantum efficiency

## 6.16 IUA5000KMA

Table 6- 16 IUA5000KMA camera specifications

Parameter \ Model	IUA5000KMA
5.0M pixels 2/3" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX264LLR
Pixel size	3.45 $\mu\text{m} \times 3.45 \mu\text{m}$
Sensor size	2/3"
Frame rate	35.6fps@2448 $\times$ 2048 87.6fps@1224 $\times$ 1024
Conversion Gain	2.71 (e-/ADU)
Readout Noise	2.12 (e-)
Full Well	11.1 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.5dB
Peak QE	71%@575nm
Sensitivity	1830mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	15us-15sec
Shutter	Global shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.05W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	219g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

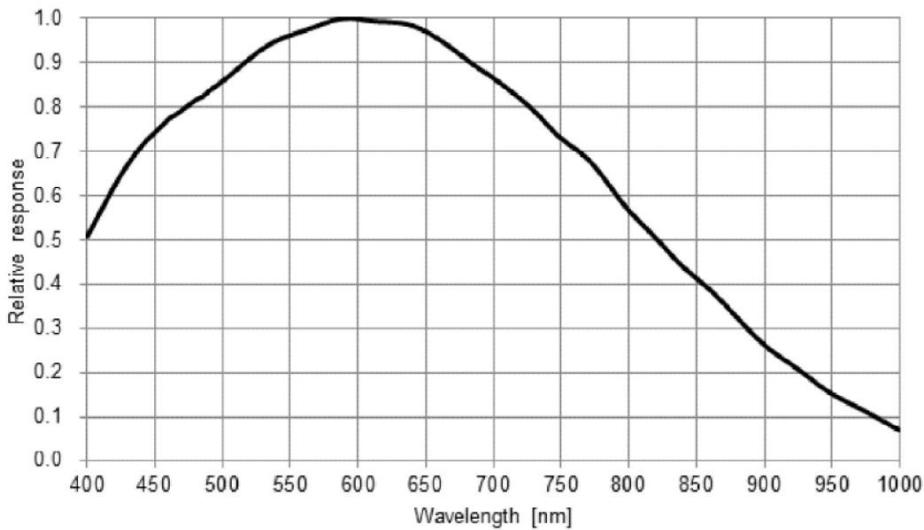


Figure 6- 25 IUA5000KMA spectral response curve

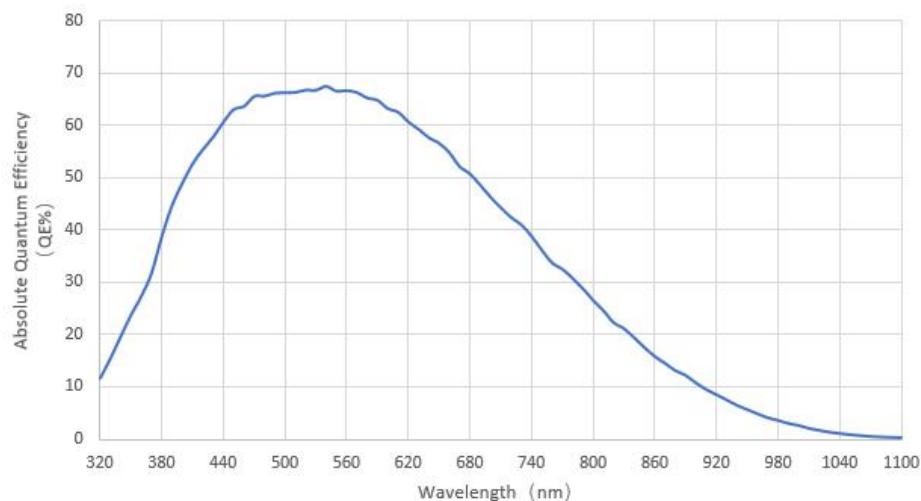


Figure 6- 26 IUA5000KMA absolute quantum efficiency

## 6.17 IUA5000KPA

Table 6- 17 IUA5000KPA camera specifications

Parameter	Model	IUA5000KPA
		5.0M pixels 2/3" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX264LQR	
Pixel size	3.45 $\mu\text{m} \times 3.45 \mu\text{m}$	
Sensor size	2/3"	
Frame rate	35.6fps@2448 $\times$ 2048 87.6fps@1224 $\times$ 1024	
Conversion Gain	2.68 (e-/ADU)	
Readout Noise	2.11 (e-)	
Full Well	11.0 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	40.4dB	
Sensitivity	1146mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	15us-15sec	
Shutter	Global shutter	
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0/ DC12V	
Power consumption	2.05W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	68mmx68mmx28.1mm	
Weight	219g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

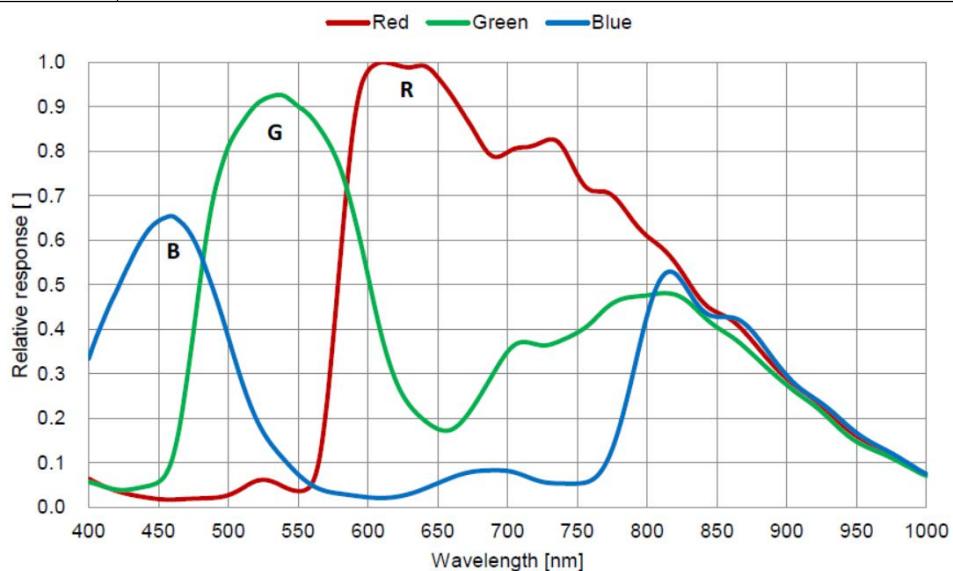


Figure 6- 27 IUA5000KPA spectral response curve

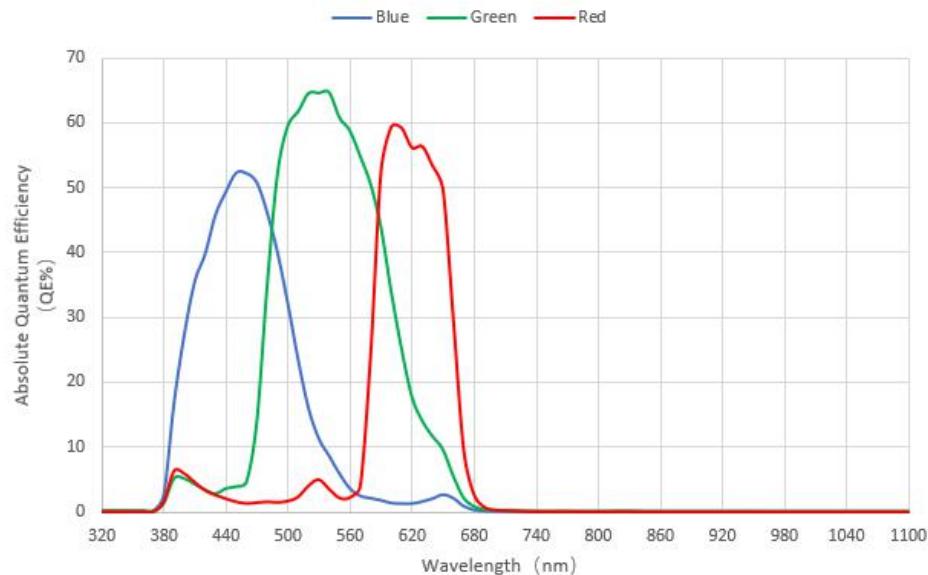


Figure 6- 28 IUA5000KPA absolute quantum efficiency

## 6.18 IUA5100KMA

Table 6- 18 IUA5100KMA camera specifications

Parameter \ Model	IUA5100KMA
5.1M pixels 1/1.8" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX547-AAMJ-C
Pixel size	2.74 $\mu\text{m} \times 2.74 \mu\text{m}$
Sensor size	1/1.8"
Frame rate	63fps@2448 $\times$ 2048 208.4fps@1224 $\times$ 1024
Conversion Gain	2.35 (e-/ADU)
Readout Noise	2.19 (e-)
Full Well	9.6 (ke-)
Dynamic range	72.0dB
Signal-to-Noise ratio	40.0dB
Sensitivity	2252mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	30us-15sec
Shutter	Global shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	1.95W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

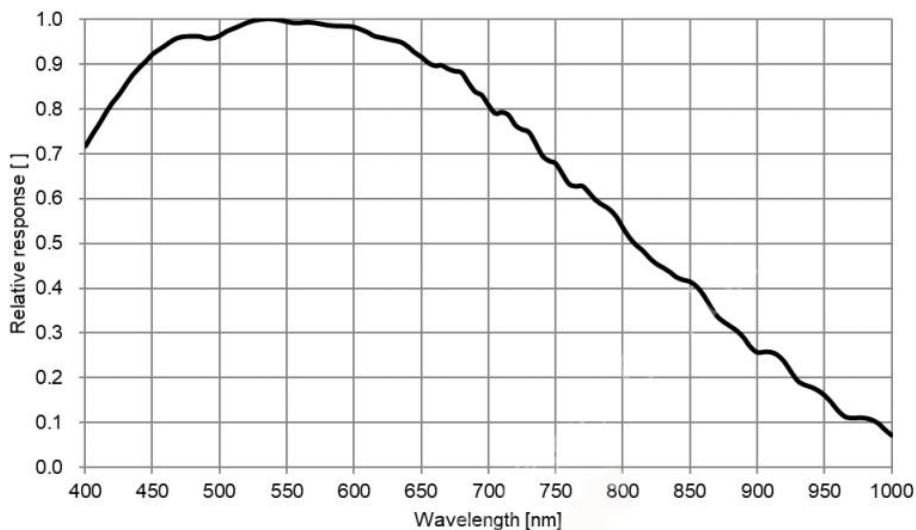


Figure 6- 29 IUA5100KMA spectral response curve

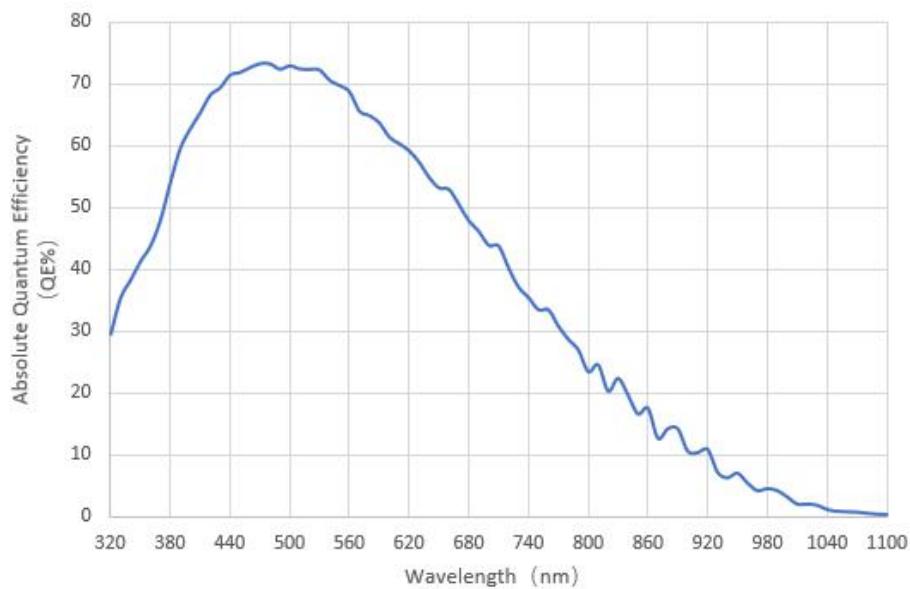


Figure 6- 30 IUA5100KMA absolute quantum efficiency

## 6.19 IUA5100KPA

Table 6- 19 IUA5100KPA camera specifications

Parameter \ Model	IUA5100KPA
5.1M pixels 1/1.8" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX547-AAQJ-C
Pixel size	2.74 $\mu\text{m} \times 2.74 \mu\text{m}$
Sensor size	1/1.8"
Frame rate	63fps@2448 $\times$ 2048 159fps@1224 $\times$ 1024
Conversion Gain	2.44 (e-/ADU)
Readout Noise	2.22 (e-)
Full Well	10.0 (ke-)
Dynamic range	72.0dB
Signal-to-Noise ratio	40.0dB
Sensitivity	1337mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	30us-15sec
Shutter	Global shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.8W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

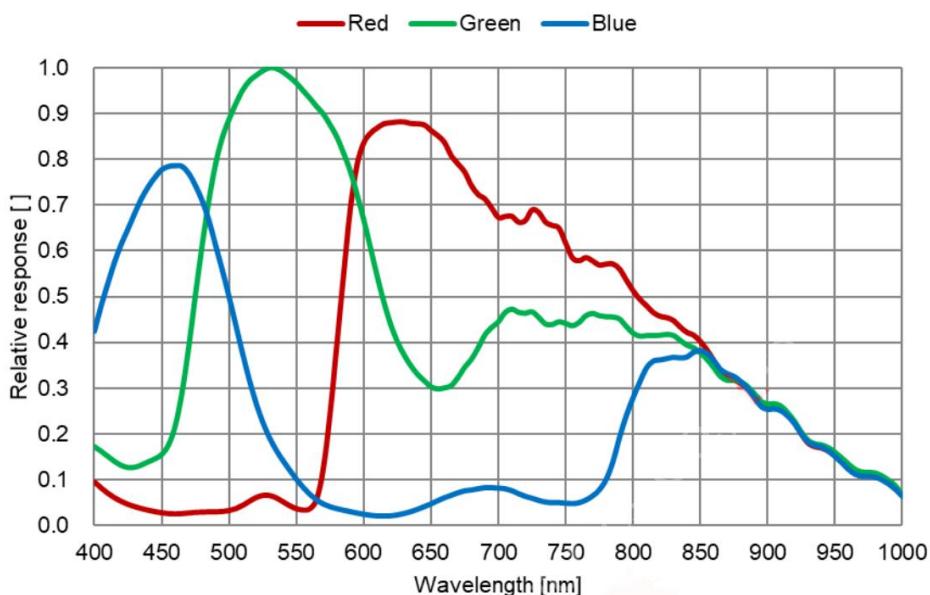


Figure 6- 31 IUA5100KPA spectral response curve

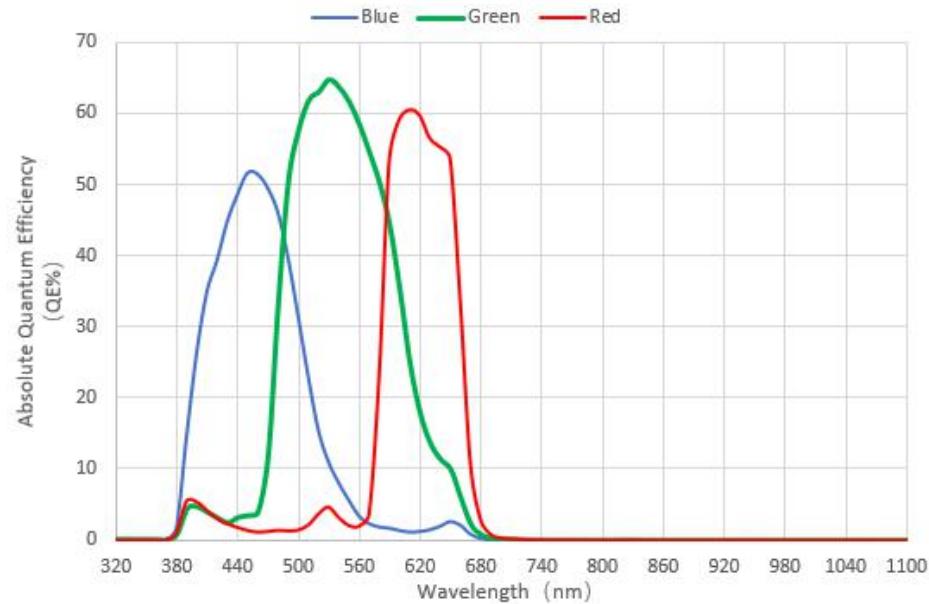


Figure 6- 32 IU5100KPA absolute quantum efficiency

## 6.20 IUA6300KMA

Table 6- 20 IUA6300KMA camera specifications

Parameter \ Model	IUA6300KMA
6.3M pixels 1/1.8" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX178LLJ
Pixel size	2.4 $\mu\text{m}$ x 2.4 $\mu\text{m}$
Sensor size	1/1.8"
Frame rate	59.9fps@3072 x 2048 59.9fps@1536 x 1024
Conversion Gain	2.54 (e-/ADU)
Readout Noise	2.14 (e-)
Full Well	10.4 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.2dB
Sensitivity	760mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	17 $\mu\text{s}$ -15sec
Shutter	Rolling shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.05W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	217g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

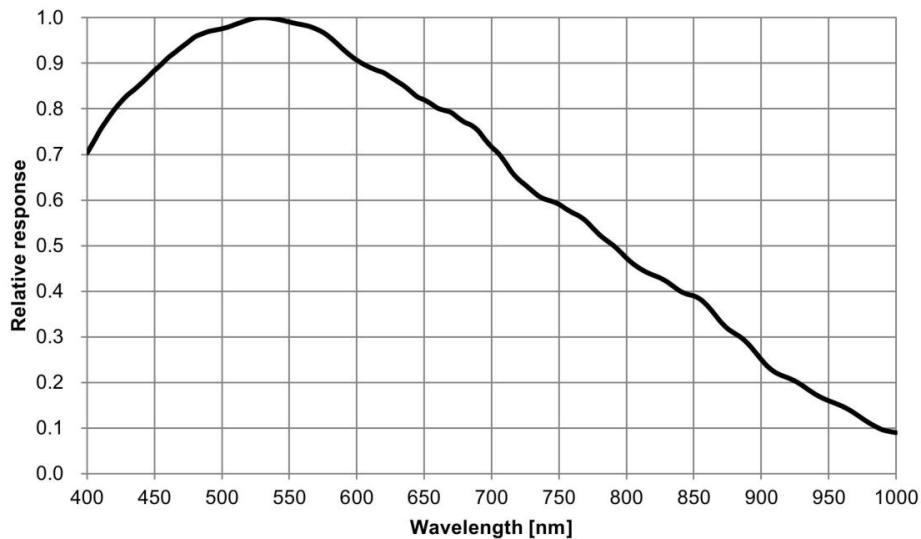


Figure 6- 33 IUA6300KMA spectral response curve

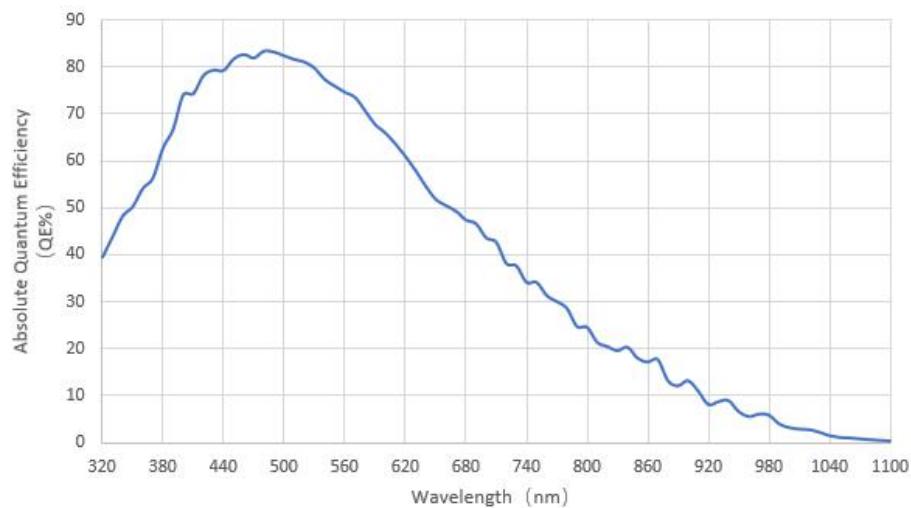


Figure 6- 34 IUA6300KMA absolute quantum efficiency

## 6.21 IUA6300KPA

Table 6- 21 IUA6300KPA camera specifications

Parameter \ Model	IUA6300KPA
6.3M pixels 1/1.8" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX178LQJ
Pixel size	2.4 $\mu\text{m}$ x 2.4 $\mu\text{m}$
Sensor size	1/1.8"
Frame rate	59.8fps@3072 x 2048 59.5fps@1536 x 1024
Conversion Gain	2.64 (e-/ADU)
Readout Noise	2.12 (e-)
Full Well	10.8 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.3dB
Sensitivity	425mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	17 $\mu\text{s}$ -15sec
Shutter	Rolling shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.05W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	217g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

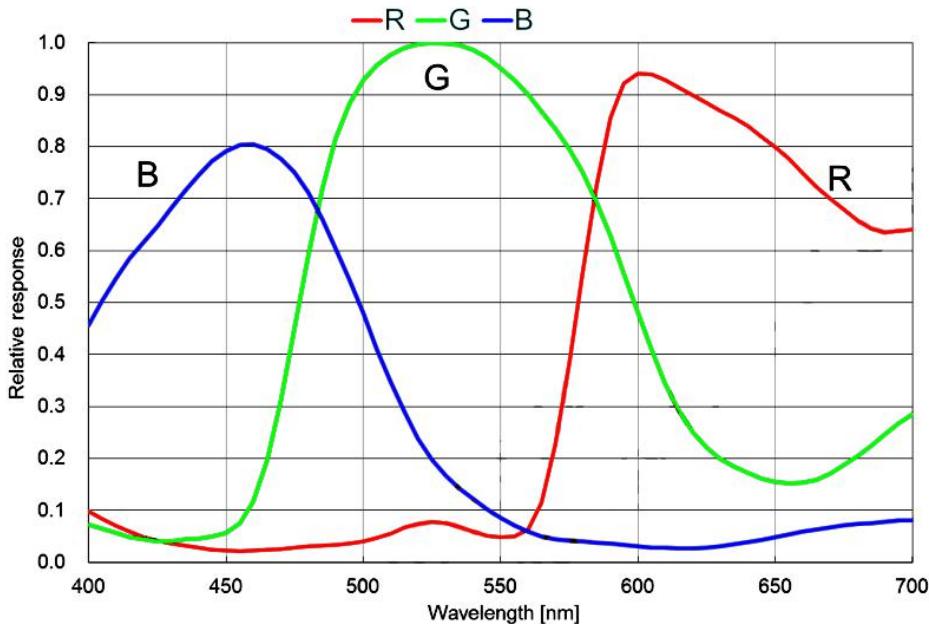


Figure 6- 35 IUA6300KPA spectral response curve

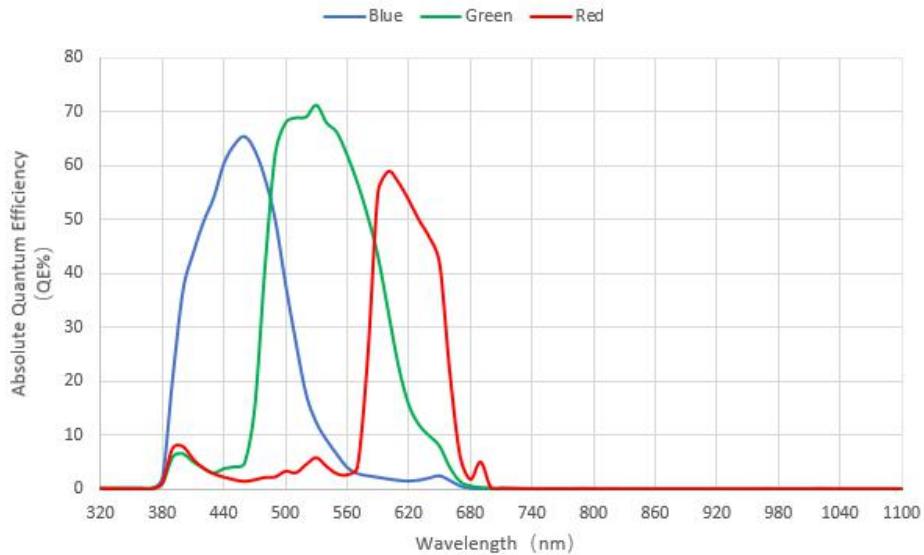


Figure 6- 36 IUA6300KPA absolute quantum efficiency

## 6.22 IUA7100KMA

Table 6- 22 IUA7100KMA camera specifications

Parameter \ Model	IUA7100KMA
7.1M pixels 1.1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX428LLJ
Pixel size	4.5 $\mu\text{m}$ x 4.5 $\mu\text{m}$
Sensor size	1.1"
Frame rate	51.3fps@3200 x 2200 133.8fps@1584 x 1100
Conversion Gain	2.77 (e-/ADU)
Readout Noise	2.63 (e-)
Full Well	11.3 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.6dB
Peak QE	78%@575nm
Sensitivity	3354mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	6us-15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.75W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

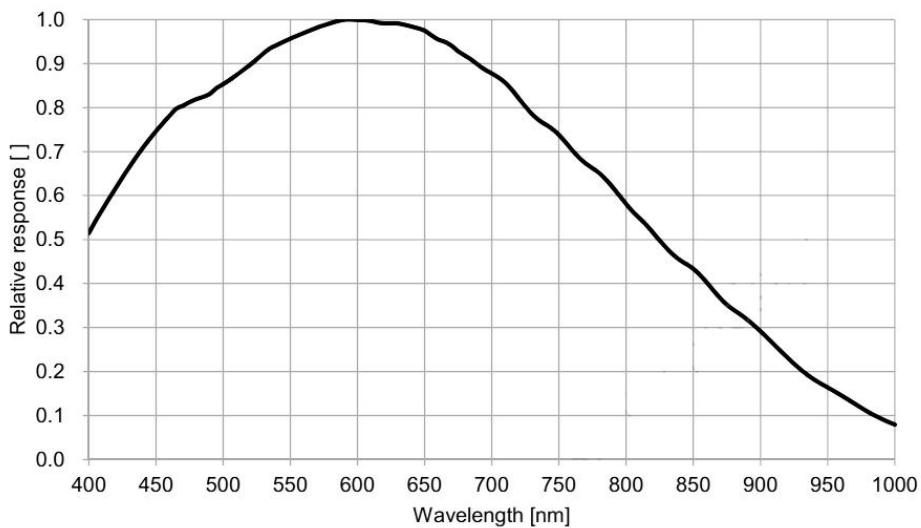


Figure 6- 37 IUA7100KMA spectral response curve

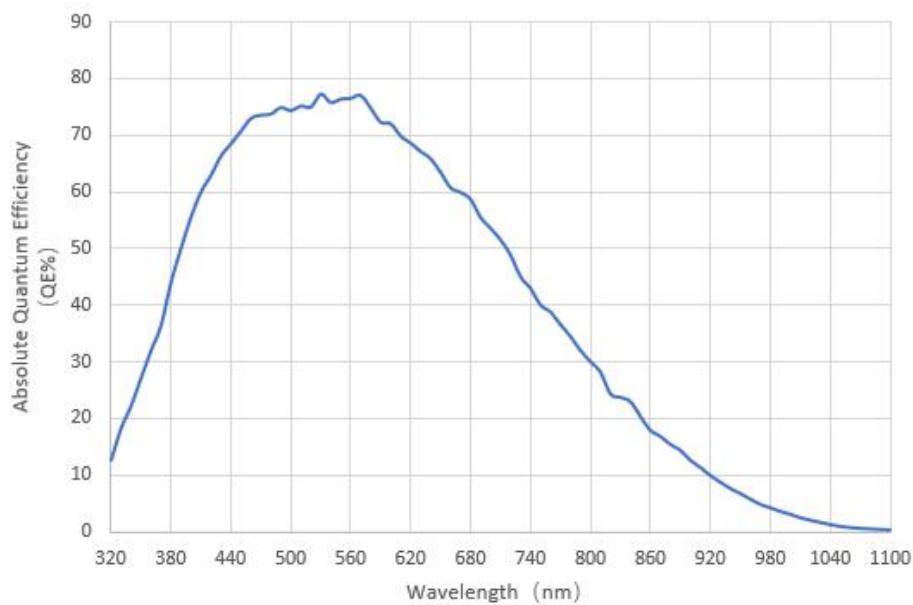


Figure 6- 38 IUA7100KMA absolute quantum efficiency

## 6.23 IUA7100KPA

Table 6- 23 IUA7100KPA camera specifications

Parameter \ Model	IUA7100KPA
7.1M pixels 1.1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX428LQJ
Pixel size	4.5 $\mu\text{m}$ x 4.5 $\mu\text{m}$
Sensor size	1.1"
Frame rate	51.4fps@3200 x 2200 133.8fps@1584 x 1100
Conversion Gain	2.74 (e-/ADU)
Readout Noise	2.54 (e-)
Full Well	11.2 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.5dB
Sensitivity	2058mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	6 $\mu\text{s}$ -15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.75W
Temperature	Working temperature -10~50°C, storage temperature 30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

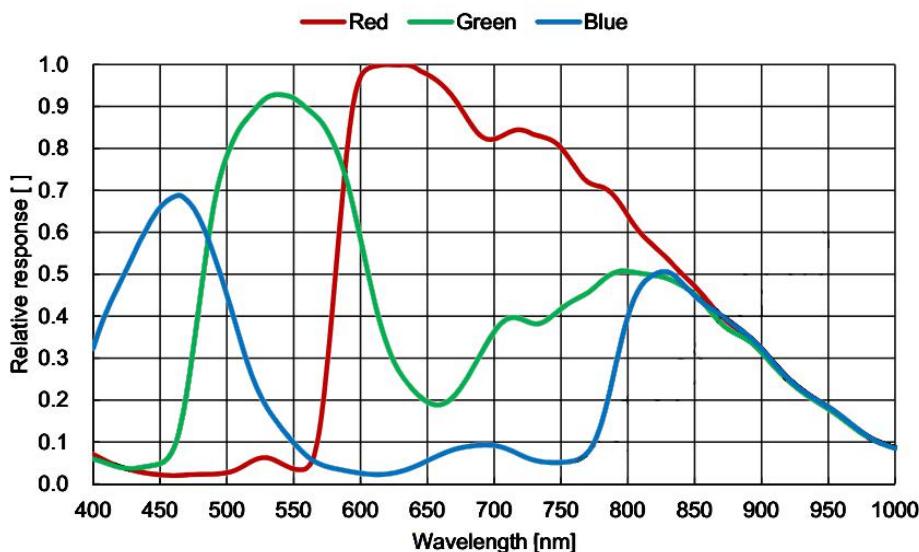


Figure 6- 39 IUA7100KPA spectral response curve

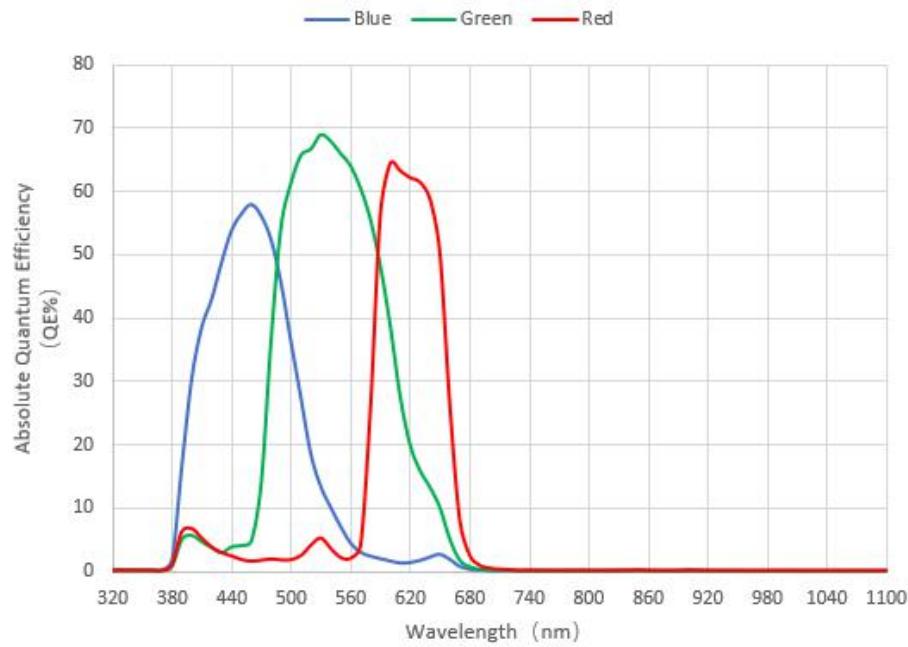


Figure 6- 40 IU7100KPA absolute quantum efficiency

## 6.24 IUA8000KMB

Table 6- 24 IUA8000KMB camera specifications

Parameter \ Model	IUA8000KMB 8M pixel 2/3 "CMOS USB3.0 industrial camera
Camera Parameters	
Sensor model	Sony IMX546-AAMJ
Pixel size	2.74 $\mu\text{m}$ x 2.74 $\mu\text{m}$
Sensor size	2/3"
Frame rate	41fps@2840x2840 118fps@1420x1420
Dynamic range	70dB
Signal-to-Noise ratio	40dB
Sensitivity	2649mV
Dark current	0.25mV
Gain range	1x-50x
Exposure time	30 $\mu\text{s}$ -15sec
Shutter	Global Shutter
Binning	Hardware2x2; Software2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	<3.5W
Temperature	Working temperature -10~50°C; Storage temperature -30~70°C
Humidity	20% - 80% No condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

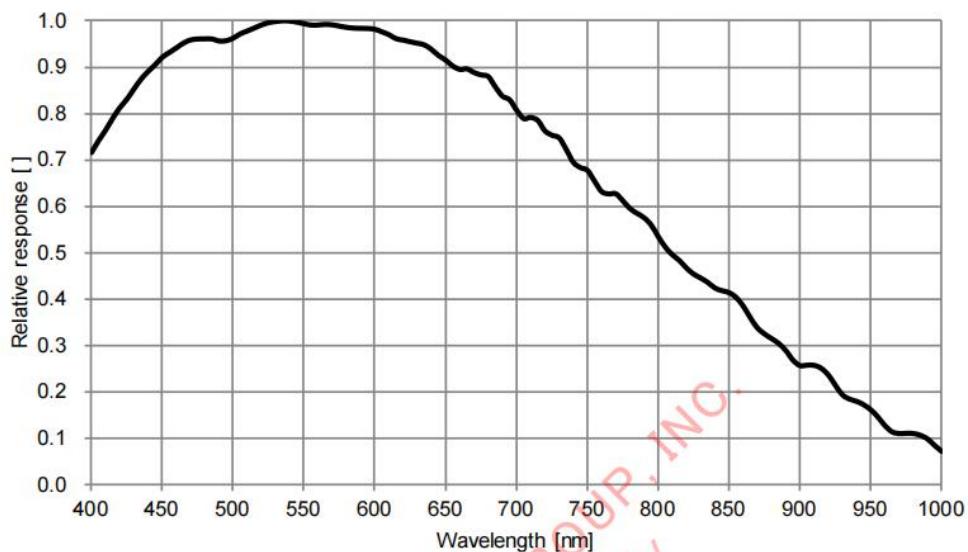


Figure 6- 41 IUA8000KMB spectral response curve

## 6.25 IUA8000KPB

Table 6- 25 IUA8000KPB camera specifications

Parameter	Model	IUA8000KPB
		8M pixels 2/3" CMOS USB3.0 industrial camera
<b>Camera Parameters</b>		
Sensor model	Sony IMX546-AAQJ	
Pixel size	2.74 $\mu\text{m}$ x 2.74 $\mu\text{m}$	
Sensor size	2/3"	
Frame rate	41fps@2840x2840 118fps@1420x1420	
Dynamic range	70dB	
Signal-to-Noise ratio	40dB	
Sensitivity	1574mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	30 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One opto-coupling isolated input, one opto-coupling isolated output, two non-isolated input/output	
Data Format	8bit / 12bit	
<b>General Specifications</b>		
Power supply	Power with USB3.0/ DC12V	
Power consumption	<3.5W	
Temperature	Working temperature-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	68mmx68mmx28.1mm	
Weight	214g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

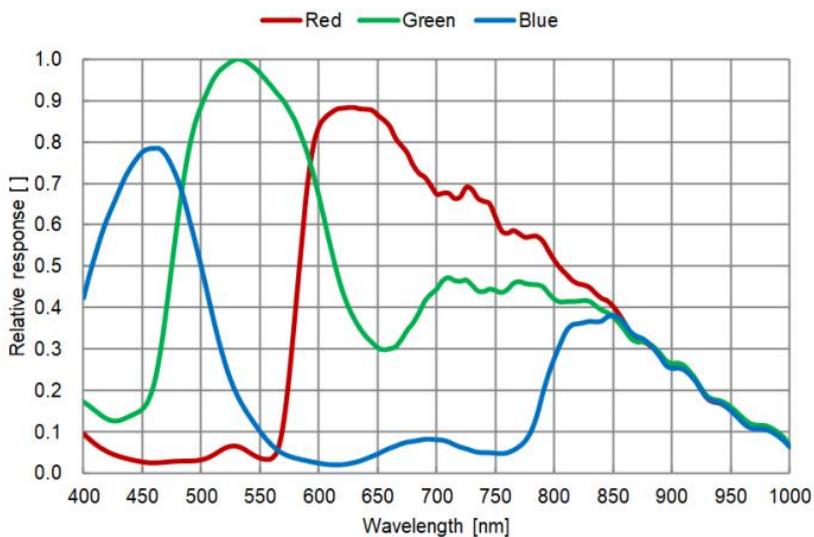


Figure 6- 42 IUA8000KPB spectral response curve

## 6.26 IUA8300KPA

Table 6- 26 IUA8300KPA camera specifications

Parameter	Model	IUA8300KPA
		8.3M pixels 1/1.2" CMOS USB3.0 industrial camera
<b>Camera Parameters</b>		
Sensor model	Sony IMX485LQJ-C	
Pixel size	2.9 $\mu\text{m}$ x 2.9 $\mu\text{m}$	
Sensor size	1/1.2"	
Frame rate	45fps@3840 x2160 70fps@1920 x 1080	
Conversion Gain	HCG: 1.21 / LCG: 3.28 (e-/ADU)	
Readout Noise	HCG: 1.15 / LCG: 3.0 (e-)	
Full Well	HCG: 4.97 / LCG: 13.4 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	HCG: 37.0 / LCG: 41.3 (dB)	
Sensitivity	2188mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	30 $\mu\text{s}$ -15sec	
Shutter	Rolling shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
<b>General Specifications</b>		
Power supply	Power with USB3.0/ DC12V	
Power consumption	2.65W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	68mmx68mmx28.1mm	
Weight	214g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

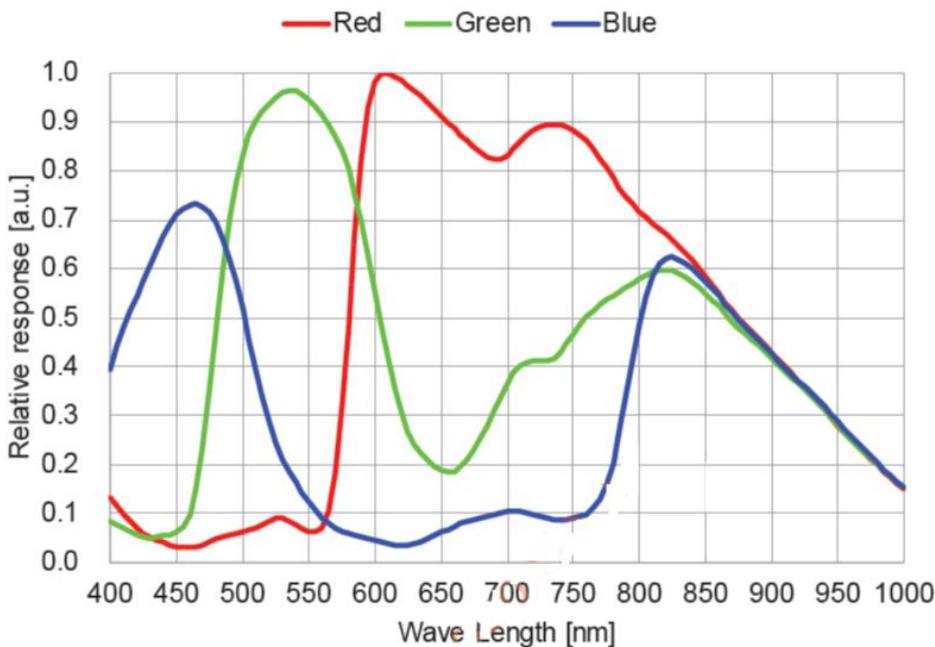


Figure 6- 43 IUA8300KPA spectral response curve

## 6.27 IUA8300KMB

Table 6- 27 IUA8300KMB camera specifications

Parameter \ Model	IUA8300KMB
8.3M pixels 1/1.2" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX585-AAMJ1-C
Pixel size	2.9 $\mu\text{m}$ x 2.9 $\mu\text{m}$
Sensor size	1/1.2"
Frame rate	45fps@3840 x2160 70fps@1920 x 1080
Conversion Gain	TBD
Readout Noise	TBD
Full Well	TBD
Dynamic range	TBD
Signal-to-Noise ratio	TBD
Sensitivity	19120mV
Dark current	0.13mV
Gain range	1x-50x
Exposure time	30us-15sec
Shutter	Rolling shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	<2.3W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

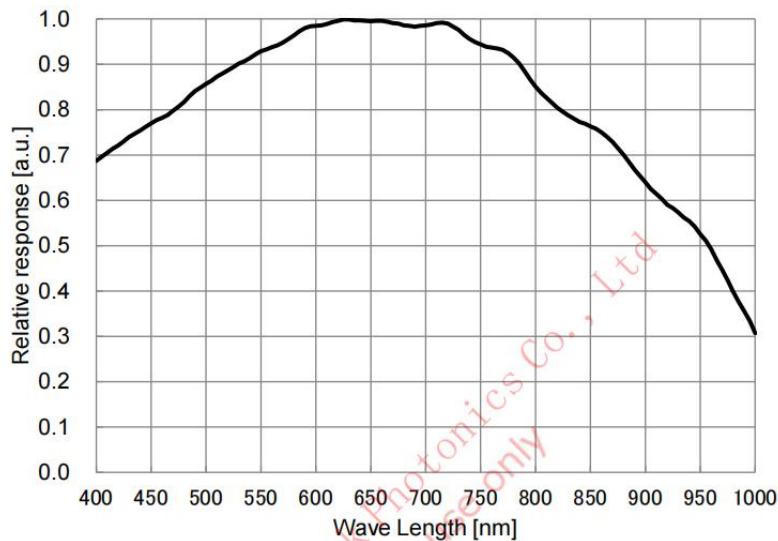


Figure 6- 44 IUA8300KMB spectral response curve

## 6.28 IUA8300KPB

Table 6- 28 IUA8300KPB camera specifications

Parameter \ Model	IUA8300KPB
8.3M pixels 1/1.2" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX585-AAQJ1-C
Pixel size	2.9 $\mu\text{m}$ x 2.9 $\mu\text{m}$
Sensor size	1/1.2"
Frame rate	45fps@3840 x2160 70fps@1920 x 1080
Conversion Gain	HCG: 1.01 / LCG: 9.29 (e-/ADU)
Readout Noise	HCG: 0.37 / LCG: 2.68 (e-)
Full Well	HCG: 4.12 / LCG: 38.1 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	HCG: 36.2 / LCG: 45.8 (dB)
Sensitivity	5970mV
Dark current	0.13mV
Gain range	1x-50x
Exposure time	30us-15sec
Shutter	Rolling shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	<2.3W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

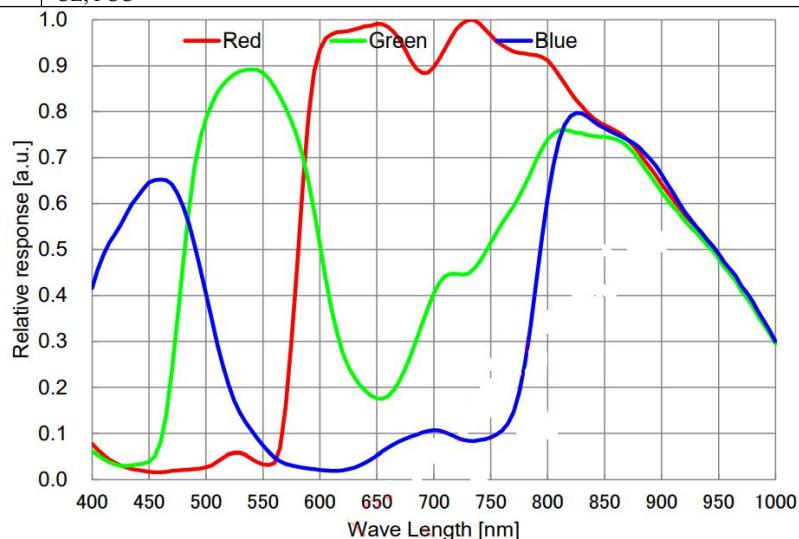


Figure 6- 45 IUA8300KPB spectral response curve

## 6.29 IUA8300KME

Table 6- 29 IUA8300KME camera specifications

Parameter \ Model	IUA8300KME
8.3M pixels 1/1.8" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX678-AAMR1-C
Pixel size	2.0 $\mu\text{m}$ x 2.0 $\mu\text{m}$
Sensor size	1/1.8"
Frame rate	45fps@3840 x2160 70fps@1920 x 1080
Conversion Gain	HCG: 0.65 / LCG: 2.87 (e-/ADU)
Readout Noise	HCG: 1.16 / LCG: 4.17 (e-)
Full Well	HCG: 2.67 / LCG: 11.76 (ke-)
Dynamic range	HCG: 67.08 / LCG: 68.76 (dB)
Signal-to-Noise ratio	HCG: 34.27 / LCG: 40.7 (dB)
Sensitivity	11288mV
Dark current	0.15mV
Gain range	1-50 倍
Exposure time	30 $\mu\text{s}$ -15sec
Shutter	Rolling shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	1.75W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

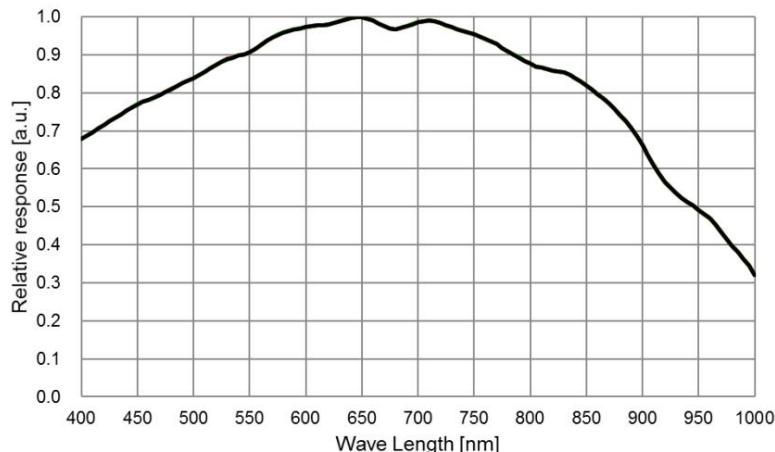


Figure 6- 46 IUA8300KME spectral response curve

## 6.30 IUA8300KPE

Table 6- 30 IUA8300KPE camera specifications

Parameter \ Model	IUA8300KPE
8.3M pixels 1/1.8" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX678-AAQR1-C
Pixel size	2.0 $\mu\text{m}$ x 2.0 $\mu\text{m}$
Sensor size	1/1.8"
Frame rate	45fps@3840 x2160 70fps@1920 x 1080
Conversion Gain	HCG: 0.65 / LCG: 2.87 (e-/ADU)
Readout Noise	HCG: 1.16 / LCG: 4.17 (e-)
Full Well	HCG: 2.67 / LCG: 11.76 (ke-)
Dynamic range	HCG: 67.08 / LCG: 68.76 (dB)
Signal-to-Noise ratio	HCG: 34.27 / LCG: 40.7 (dB)
Sensitivity	3541mV
Dark current	0.15mV
Gain range	1-50 倍
Exposure time	30 $\mu\text{s}$ -15sec
Shutter	Rolling shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	1.75W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

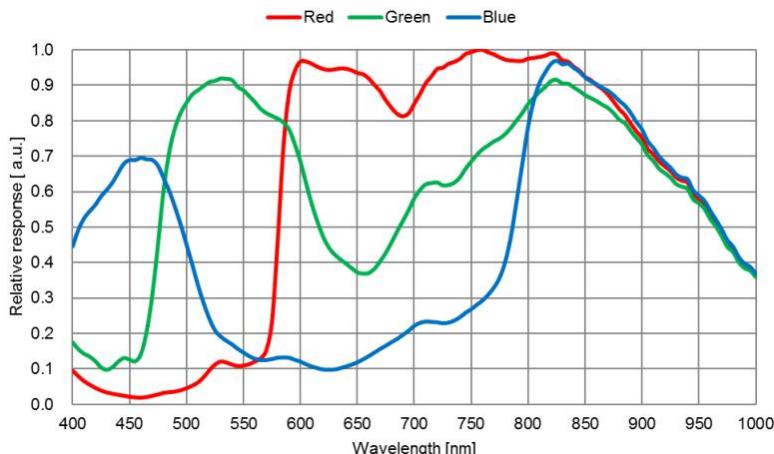


Figure 6- 47 IUA8300KPE spectral response curve

## 6.31 IUA10300KPA

Table 6- 31 IUA10300KPA camera specifications

Parameter \ Model	IUA10300KPA
10.3M pixels 4/3" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX294CJK
Pixel size	2.315 $\mu\text{m}$ x 2.315 $\mu\text{m}$
Sensor size	4/3"
Frame rate	30.0@4128x2808 38.5 @4096x2160 59.8@2048x1080 87.2@1360x720
Conversion Gain	TBD
Readout Noise	TBD
Full Well	TBD
Dynamic range	TBD
Signal-to-Noise ratio	TBD
Sensitivity	419mv
Dark current	0.12mV
Gain range	1x-50x
Exposure time	150 $\mu\text{s}$ -15sec
Shutter	Rolling shutter
Binning	Software 2x2, 3x3, 4x4; Hardware 2x2
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 14bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.8W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

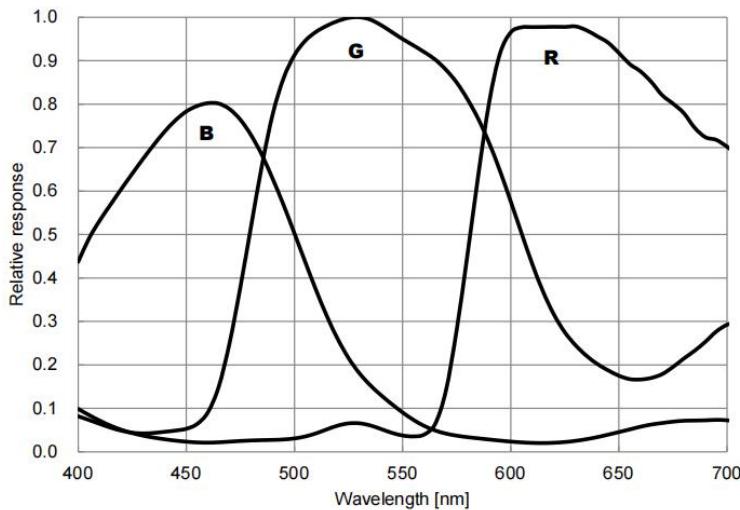


Figure 6- 48 IUA10300KPA spectral response curve

## 6.32 IUA12000KPA

Table 6- 32 IUA12000KPA camera specifications

Parameter \ Model	IUA12000KPA
12.0M pixels 1/1.6" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX676-AACR1-C
Pixel size	2.0 $\mu\text{m}$ x 2.0 $\mu\text{m}$
Sensor size	1/1.6"
Frame rate	27fps@3536 x3536 60fps@1768 x 1768
Conversion Gain	HCG: 1.07 / LCG: 2.86(e-/ADU)
Readout Noise	HCG: 1.48 / LCG: 3.82(e-)
Full Well	HCG: 4.4 / LCG: 11.7(ke-)
Dynamic range	HCG: 69.24 / LCG: 69.8(dB)
Signal-to-Noise ratio	HCG: 36.4 / LCG: 40.7(dB)
Sensitivity	3637mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	30 $\mu\text{s}$ -15sec
Shutter	Rolling shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.2W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

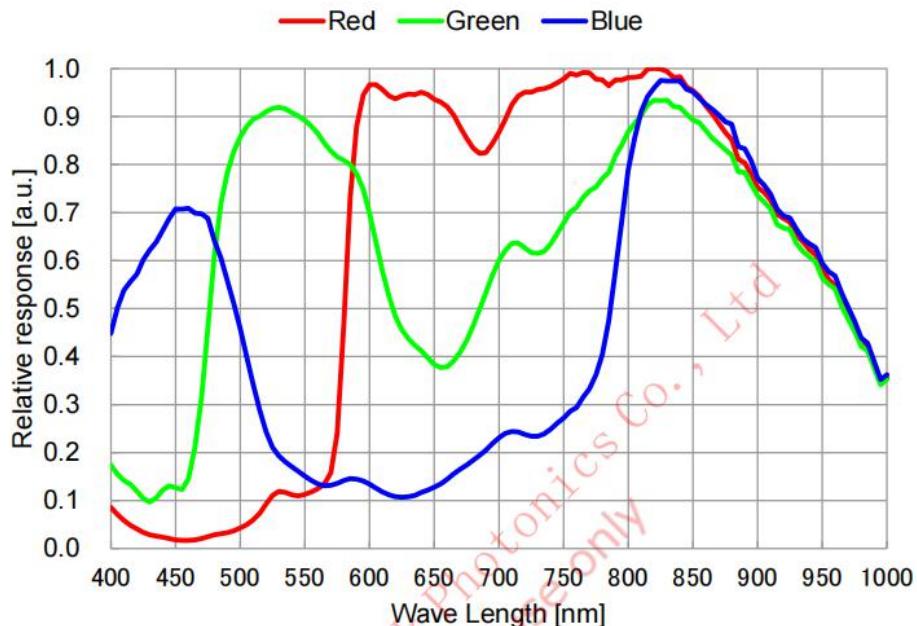


Figure 6- 49 IUA12000KPA spectral response curve

## 6.33 IUA12300KMA

Table 6- 33 IUA12300KMA camera specifications

Parameter \ Model	IUA12300KMA
12.3M pixels 1/1.1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX545-AAMJ-C
Pixel size	2.74 $\mu\text{m}$ x 2.74 $\mu\text{m}$
Sensor size	1/1.1"
Frame rate	28.2fps@4096 x3000 100.9fps@2048 x 1500 100.9fps@1024 x 750
Conversion Gain	2.35 (e-/ADU)
Readout Noise	2.19 (e-)
Full Well	9.6 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40 (dB)
Sensitivity	2252mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	30 $\mu\text{s}$ -15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.5W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

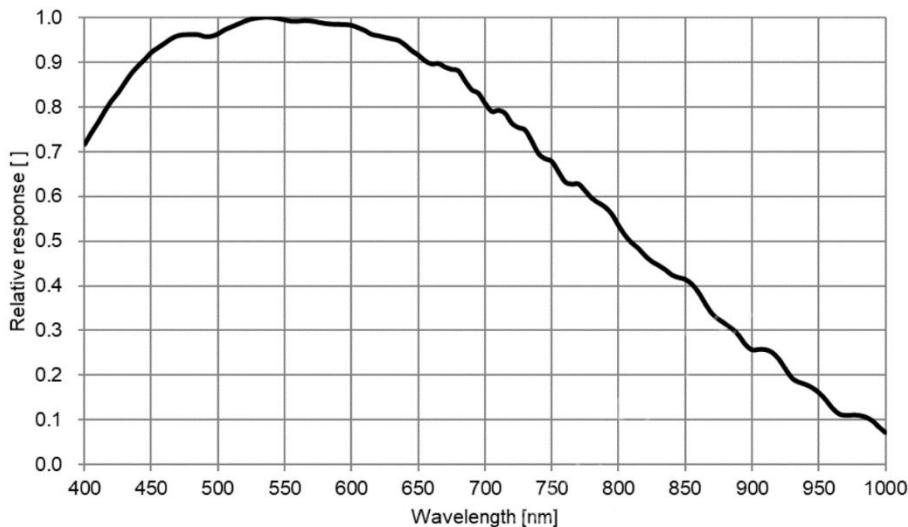


Figure 6- 50 IUA12300KMA spectral response curve

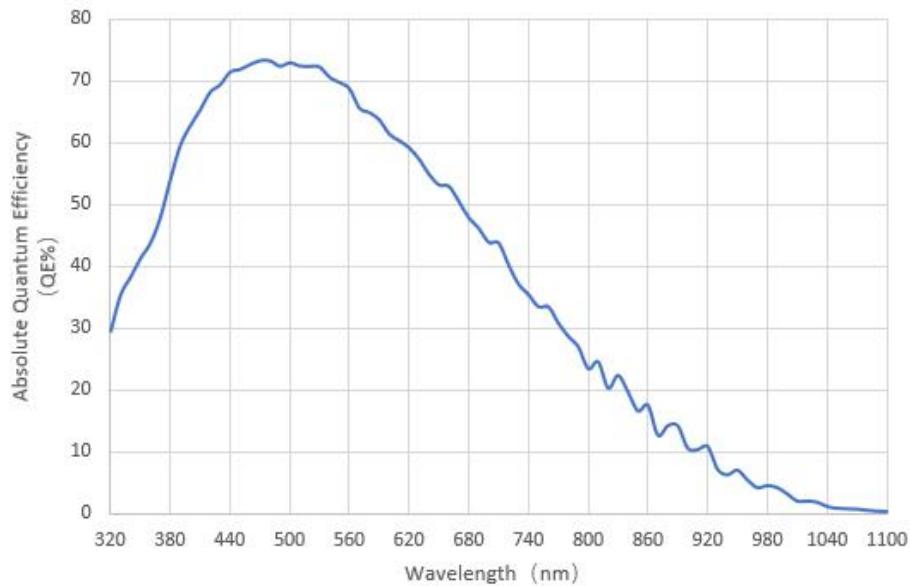


Figure 6- 51 IUA12300KMA absolute quantum efficiency

## 6.34 IUA12300KPA

Table 6- 34 IUA12300KPA camera specifications

Parameter \ Model	IUA12300KPA
12.3M pixels 1/1.1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX545-AAQJ-C
Pixel size	2.74 $\mu\text{m}$ x 2.74 $\mu\text{m}$
Sensor size	1/1.1"
Frame rate	28.2fps@4096 x 3000 100.9fps@2048 x 1500 100.9fps@1024 x 750
Conversion Gain	2.44 (e-/ADU)
Readout Noise	2.22 (e-)
Full Well	10.0 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40 (dB)
Sensitivity	1337mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	30 $\mu\text{s}$ -15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.8W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

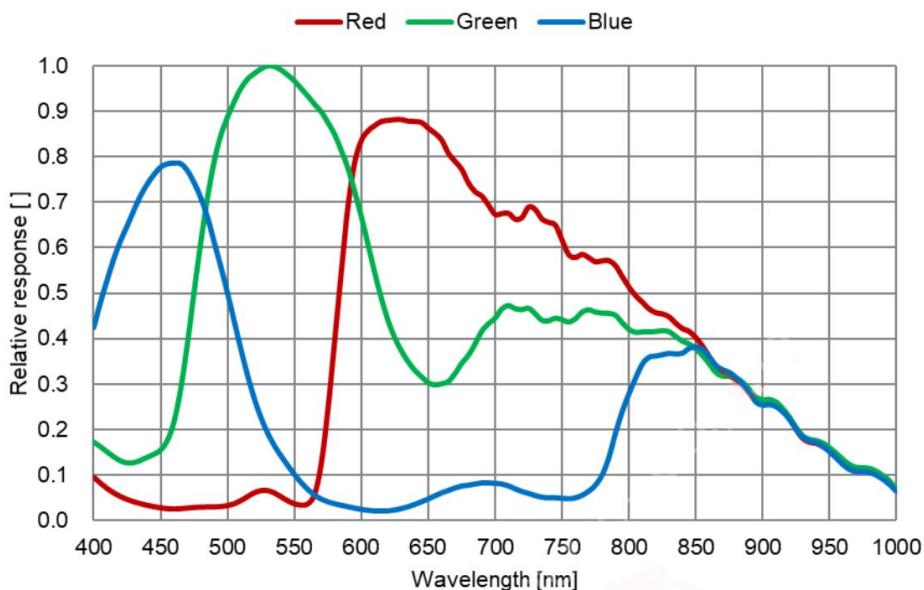


Figure 6- 52 IUA12300KPA spectral response curve

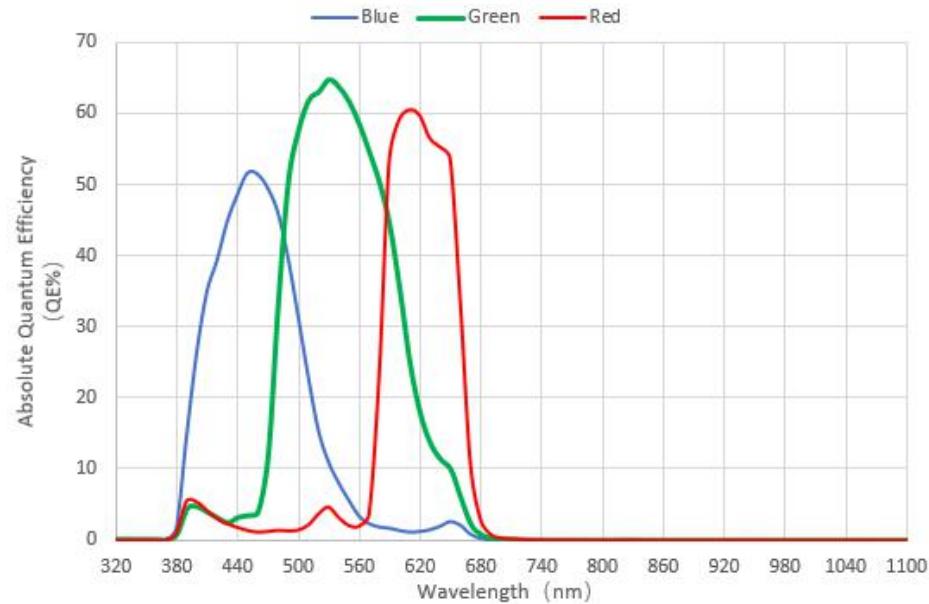


Figure 6-53 IUA12300KPA absolute quantum efficiency

## 6.35 IUA12300KMB

Table 6- 35 IUA12300KMB camera specifications

Parameter \ Model	IUA12300KMB
12.3M pixels 1.1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX304LLR-C
Pixel size	3.45 μm x 3.45 μm
Sensor size	1.1"
Frame rate	23.4fps@4096 x3000 46.3fps@2048 x 1500 46.3fps@1024 x 750
Conversion Gain	2.71 (e-/ADU)
Readout Noise	2.12 (e-)
Full Well	11.1 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.5dB
Sensitivity	1830mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	30μs-15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.25W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

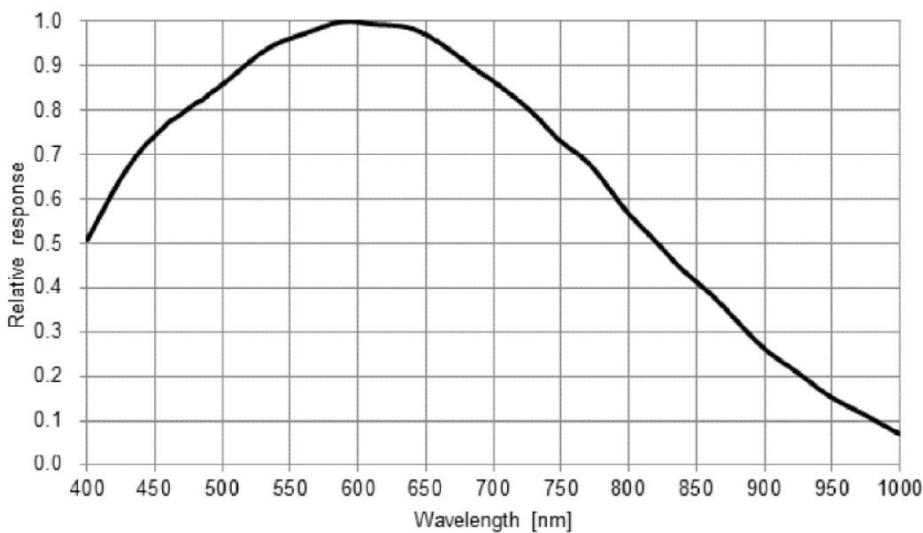


Figure 6- 54 IUA12300KMB spectral response curve

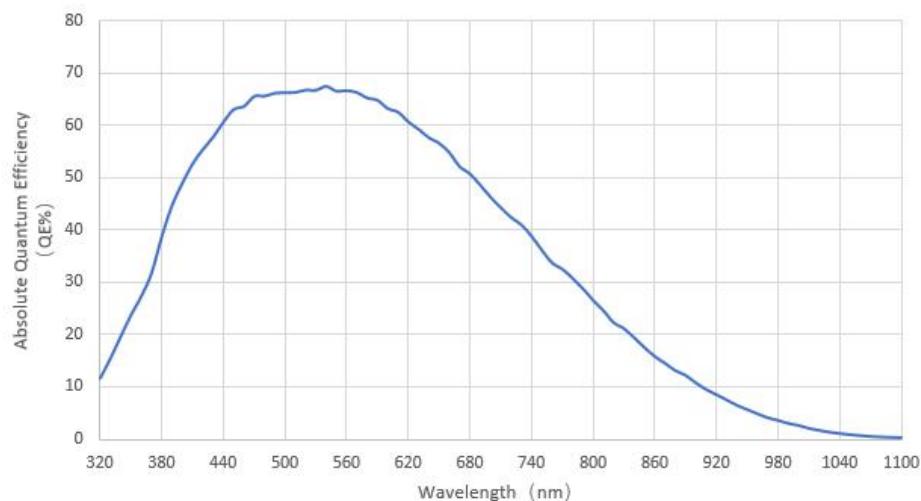


Figure 6- 55 IUA12300KMB absolute quantum efficiency

## 6.36 IUA12300KPB

Table 6- 36 IUA12300KPB camera specifications

Parameter \ Model	IUA12300KPB
12.3M pixels 1.1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX304LQR-C
Pixel size	3.45 μm x 3.45 μm
Sensor size	1.1"
Frame rate	23.4fps@4096 x 3000 46.3fps@2048 x 1500 46.3fps@1024 x 750
Conversion Gain	2.68 (e-/ADU)
Readout Noise	2.11 (e-)
Full Well	11.0 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	40.4dB
Sensitivity	1146mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	30μs-15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.8W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

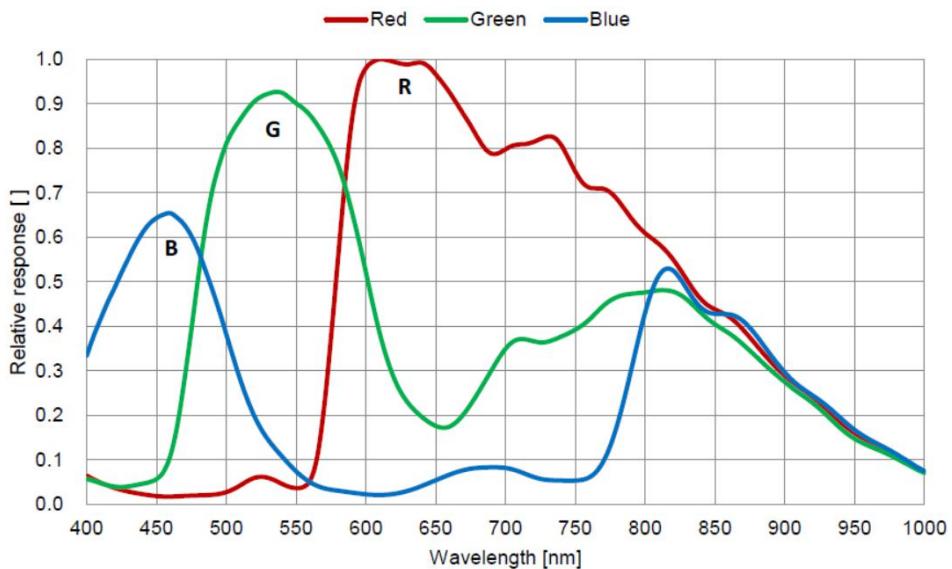


Figure 6- 56 IUA12300KPB spectral response curve

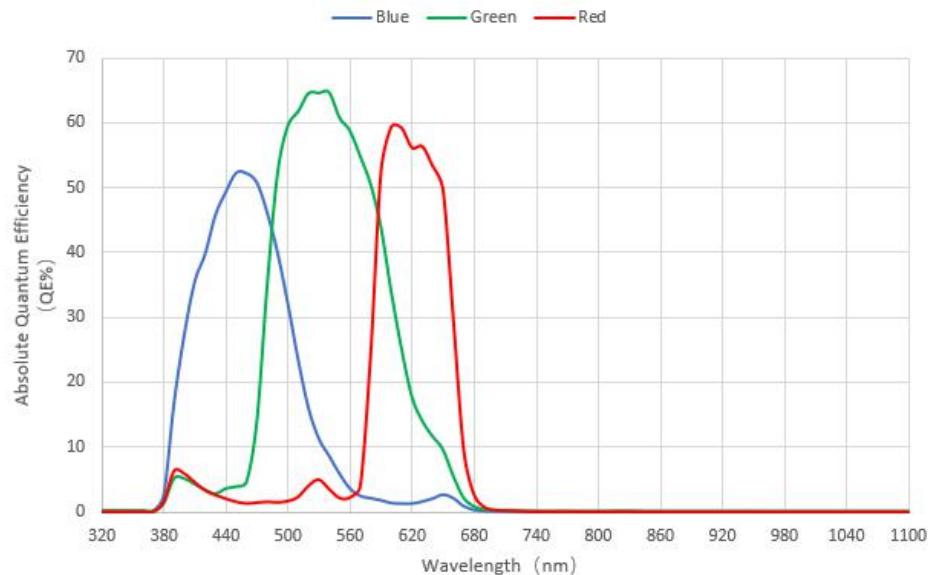


Figure 6-57 IUA12300KPB absolute quantum efficiency

## 6.37 IUA20000KMA

Table 6- 37 IUA20000KMA camera specifications

Parameter \ Model	IUA20000KMA
2.0M pixels 1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX183CLK
Pixel size	2.4 $\mu\text{m}$ x 2.4 $\mu\text{m}$
Sensor size	1"
Frame rate	19.0fps@5440 x 3684 49.9fps@2736 x 1824 59.5fps@1824 x 1216
Conversion Gain	3.78 (e-/ADU)
Readout Noise	3.25 (e-)
Full Well	15.5 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	41.9dB
Sensitivity	777mV
Dark current	0.2mV
Gain range	1x-50x
Exposure time	53 $\mu\text{s}$ -15sec
Shutter	Rolling shutter
Binning	Hardware 2x2, 3x3; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	3.0W
Temperature	Working temperature -10~50°C, storage temperature -30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

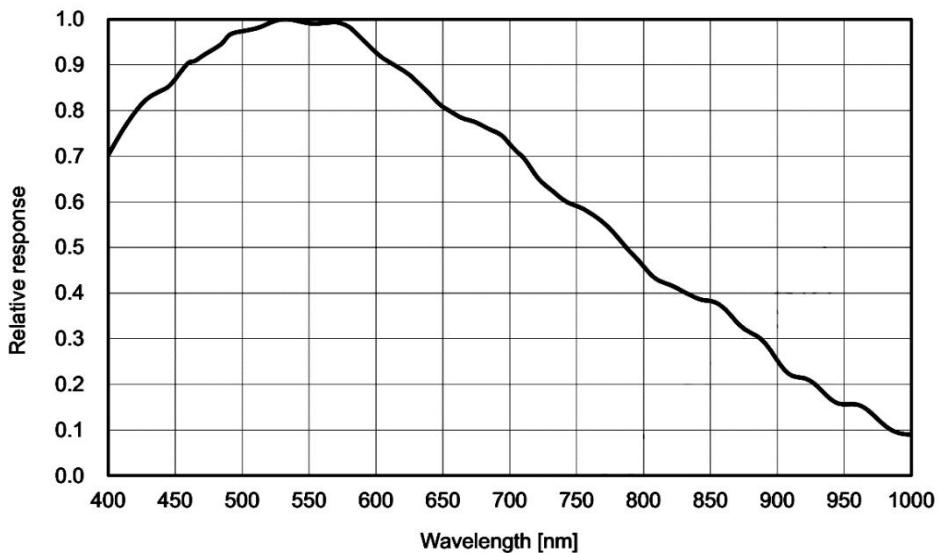


Figure 6- 58 IUA20000KMA spectral response curve

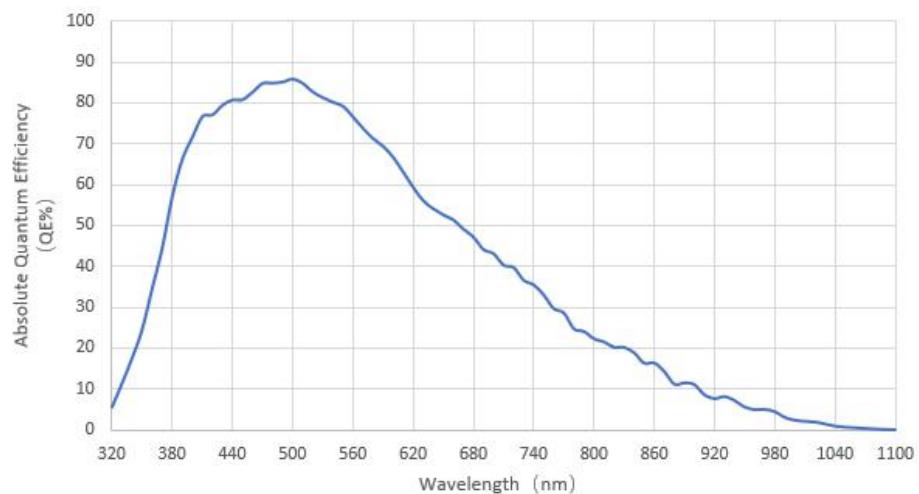


Figure 6- 59 IUA20000KMA absolute quantum efficiency

## 6.38 IUA20000KPA

Table 6- 38 IUA20000KPA camera specifications

Parameter \ Model	IUA20000KPA
2.0M pixels 1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX183CQK
Pixel size	2.4 $\mu\text{m}$ x 2.4 $\mu\text{m}$
Sensor size	1"
Frame rate	19.0fps@5440 x 3684 48.8fps@2736 x 1824 59.4fps@1824 x 1216
Conversion Gain	3.73 (e-/ADU)
Readout Noise	3.14 (e-)
Full Well	15.3 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	41.8dB
Sensitivity	462mV
Dark current	0.2mV
Gain range	1x-50x
Exposure time	53 $\mu\text{s}$ -15sec
Shutter	Rolling shutter
Binning	Hardware 2x2, 3x3; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	3.0W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

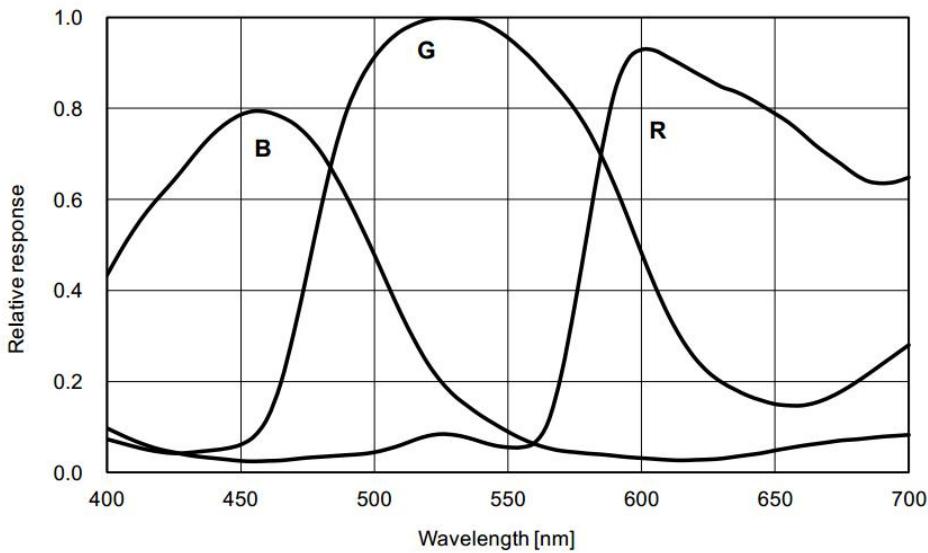


Figure 6- 60 IUA20000KPA spectral response curve

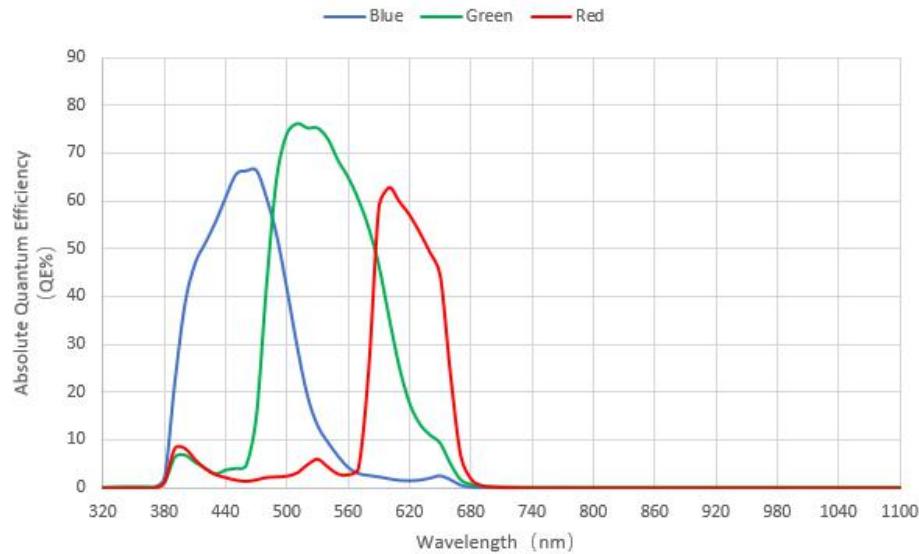


Figure 6- 61 IUA20000KPA absolute quantum efficiency

## 6.39 IUA20400KMA

Table 6- 39 IUA20400KMA camera specifications

Parameter \ Model	IUA20400KMA
20.4M pixels 1.1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX541-AAMJ-C
Pixel size	2.74 $\mu\text{m}$ x 2.74 $\mu\text{m}$
Sensor size	1.1"
Frame rate	17.5fps@4496 $\times$ 4496 64.4fps@2240 $\times$ 2240 64.4fps@1120 $\times$ 1120
Conversion Gain	2.35 (e-/ADU)
Readout Noise	2.19 (e-)
Full Well	9.6 (ke-)
Dynamic range	72.0dB
Signal-to-Noise ratio	40.0dB
Peak QE	86%@520nm
Sensitivity	2649mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	30 $\mu\text{s}$ -15sec
Shutter	Global shutter
Binning	Hardware 2x2, 4x4; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.6W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

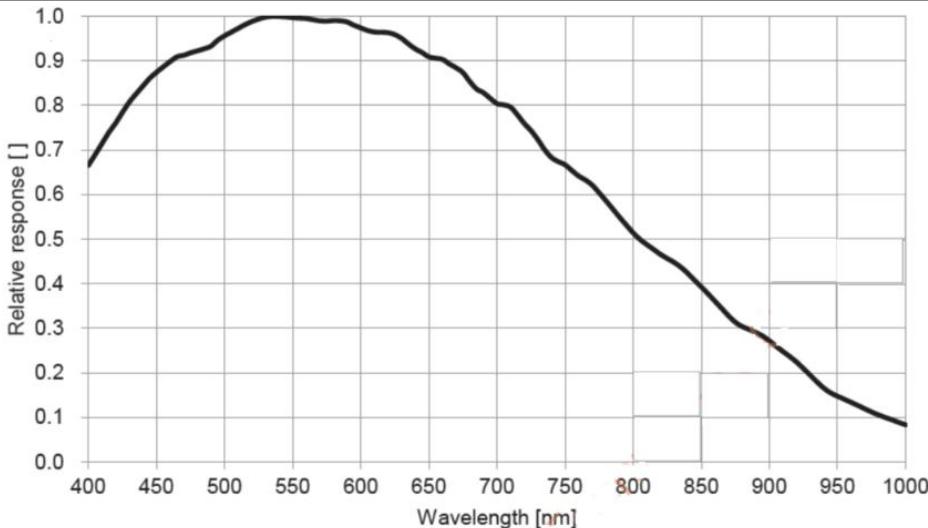


Figure 6- 62 IUA20400KMA spectral response curve

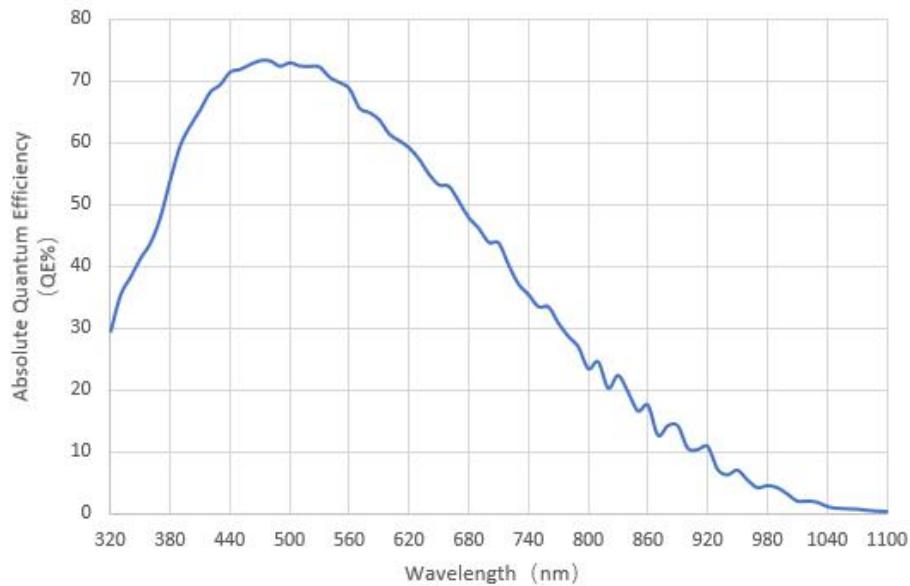


Figure 6- 63 IUA20400KMA absolute quantum efficiency

## 6.40 IUA20400KPA

Table 6- 40 IUA20400KPA camera specifications

Parameter	Model	IUA20400KPA
		20.4M pixels 1.1" CMOS USB3.0 industrial camera
Camera Parameters		
Sensor model	Sony IMX541-AAQJ-C	
Pixel size	2.74 $\mu\text{m}$ x 2.74 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	17.5fps@4496 $\times$ 4496 64.4fps@2240 $\times$ 2240 64.4fps@1120 $\times$ 1120	
Conversion Gain	2.44 (e-/ADU)	
Readout Noise	2.22 (e-)	
Full Well	10.0 (ke-)	
Dynamic range	72.0dB	
Signal-to-Noise ratio	40.0dB	
Sensitivity	1574mV	
Dark current	0.15mV	
Gain range	1x-50x	
Exposure time	30 $\mu\text{s}$ -15sec	
Shutter	Global shutter	
Binning	Hardware 2x2, 4x4; Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0/ DC12V	
Power consumption	2.6W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	68mmx68mmx28.1mm	
Weight	227g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

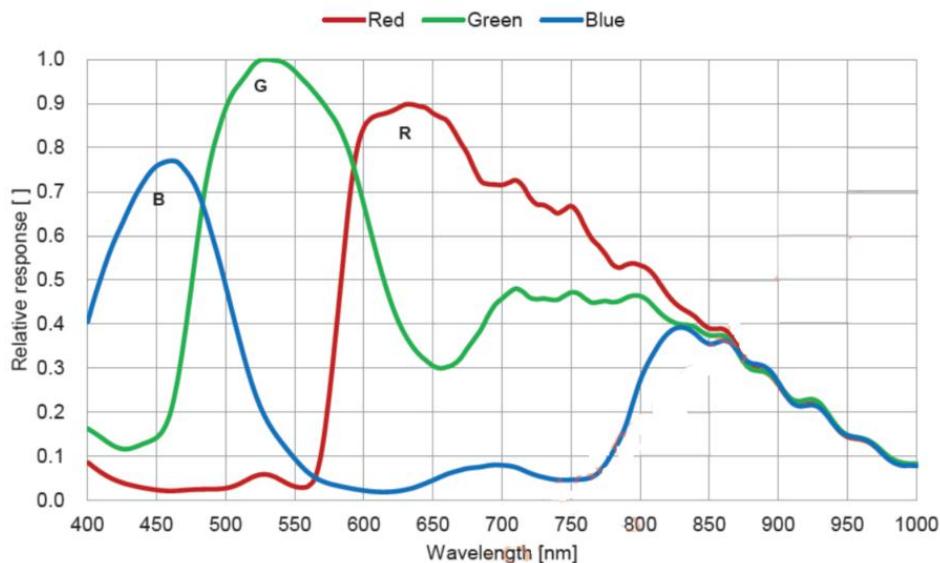


Figure 6- 64 IUA20400KPA spectral response curve

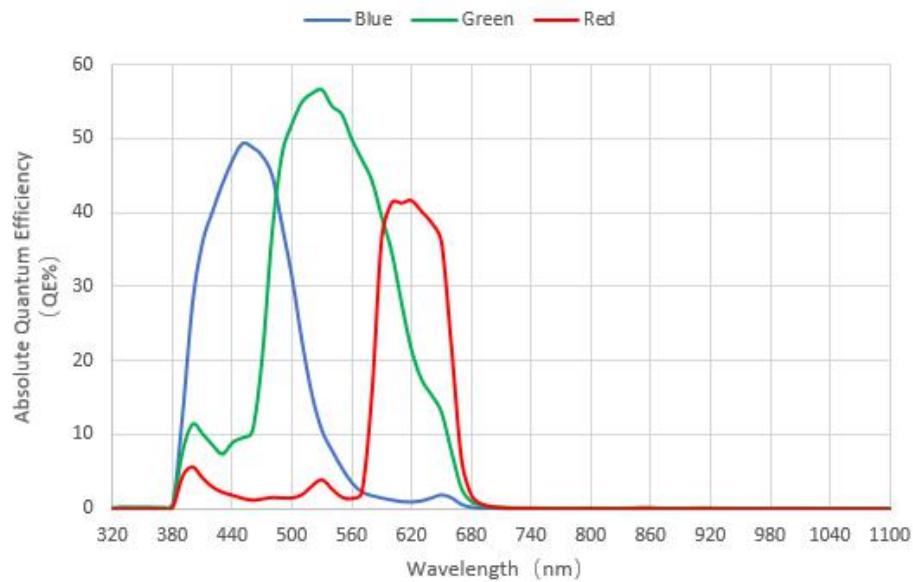


Figure 6- 65 IUA20400KPA absolute quantum efficiency

## 6.41 IUA24500KMA

Table 6- 41 IUA24500KMA camera specifications

Parameter \ Model	IUA24500KMA
24.5M pixels 1.2" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX540-AAMJ-C
Pixel size	2.74 $\mu\text{m}$ x 2.74 $\mu\text{m}$
Sensor size	1.2"
Frame rate	14.7fps@5320x4600 54.3fps@2660x2300
Conversion Gain	2.35 (e-/ADU)
Readout Noise	2.19 (e-)
Full Well	9.6 (ke-)
Dynamic range	72.0dB
Signal-to-Noise ratio	40.0dB
Peak QE	2649mV
Sensitivity	0.15mV
Dark current	1-50 倍
Gain range	30 $\mu\text{s}$ -15sec
Shutter	Global shutter
Binning	Hardware 2x2, 4x4; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.65W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

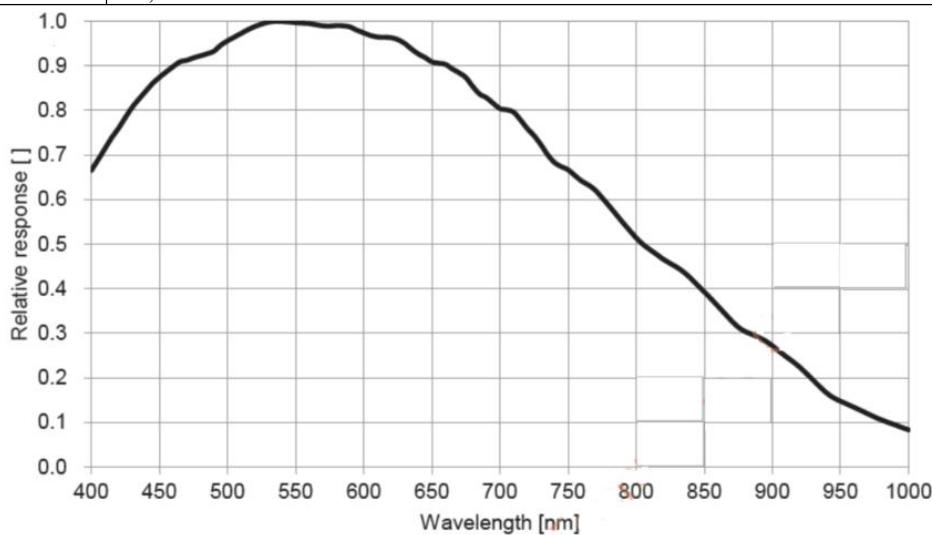


Figure 6- 66 IUA24500KMA spectral response curve

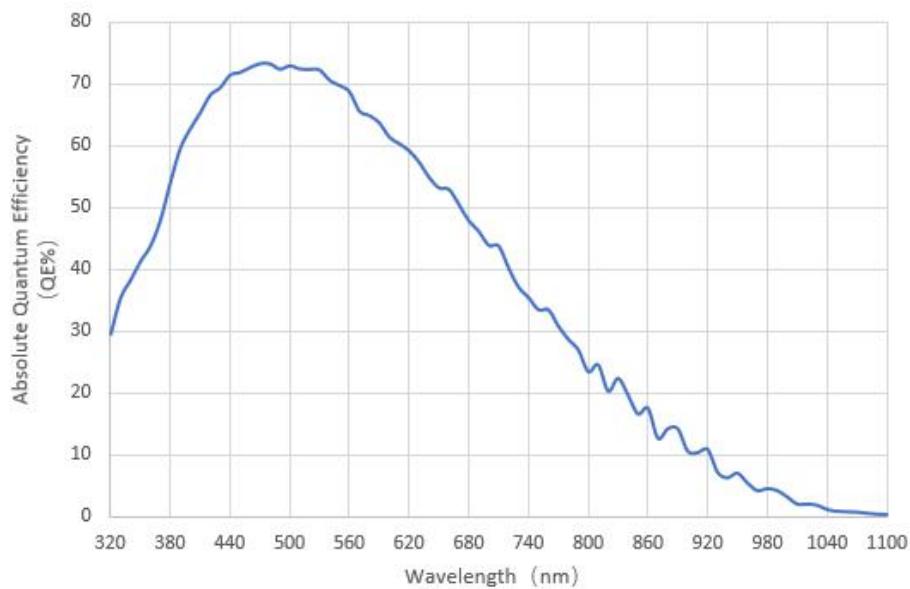


Figure 6- 67 IUA24500KMA absolute quantum efficiency

## 6.42 IUA24500KPA

Table 6- 42 IUA24500KPA camera specifications

Parameter \ Model	IUA24500KPA
24.5M pixels 1.2" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX540-AAQJ-C
Pixel size	2.74 $\mu\text{m}$ x 2.74 $\mu\text{m}$
Sensor size	1.2"
Frame rate	14.7fps@5320x4600 54.3fps@2660x2300
Conversion Gain	2.44 (e-/ADU)
Readout Noise	2.22 (e-)
Full Well	10.0 (ke-)
Dynamic range	72.0dB
Signal-to-Noise ratio	40.0dB
Sensitivity	1574mV
Dark current	0.15mV
Gain range	1-50 倍
Exposure time	30 $\mu\text{s}$ -15sec
Shutter	Global shutter
Binning	Hardware 2x2, 4x4; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.65W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

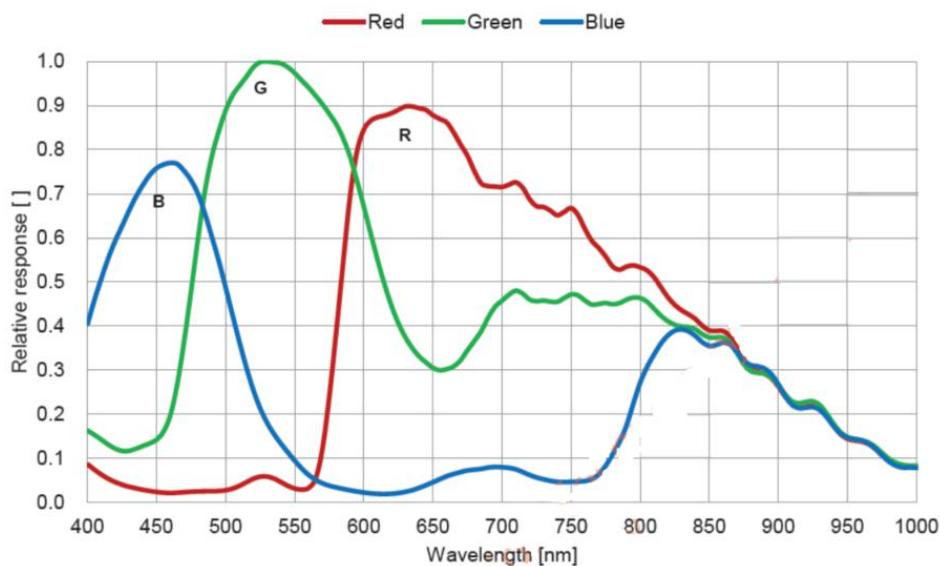


Figure 6- 68 IUA24500KPA spectral response curve

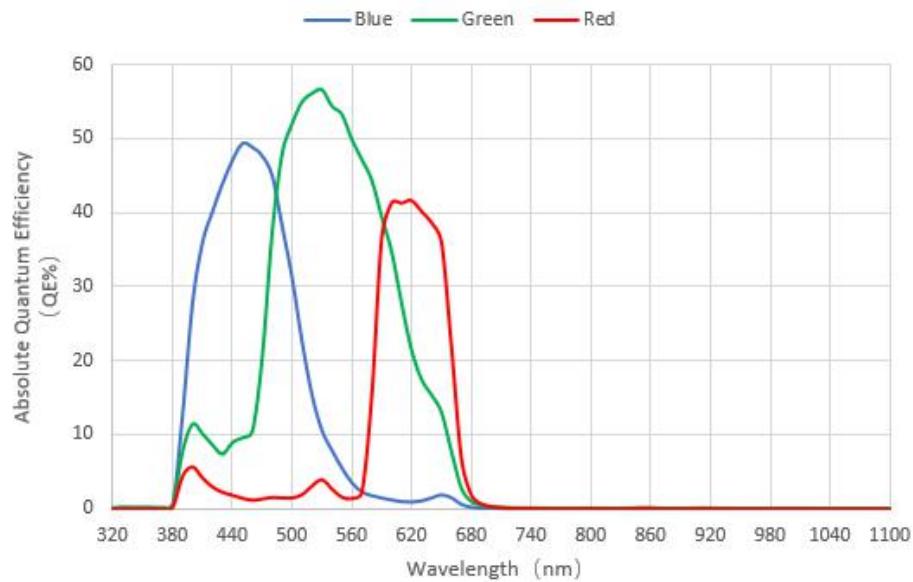


Figure 6- 69 IUA24500KPA absolute quantum efficiency

## 6.43 IUA25000KMA

Table 6- 43 IUA25000KMA camera specifications

Parameter	Model	IUA25000KMA 25.0M 1.1" CMOS USB3.0 industrial camera
<b>Camera Parameters</b>		
Sensor model	GMAX0505	
Pixel size	2.5 $\mu\text{m}$ x 2.5 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	13@5120x5120 27@2560x2560 54@1280x1280	
Conversion Gain	1.37 (e-/ADU)	
Readout Noise	2.9 (e-)	
Full Well	5.59(ke-)	
Dynamic range	65.7dB	
Signal-to-Noise ratio	37.5dB	
Peak QE	65.5%@500nm	
Dark current	2.4 e-/pixel/s @ 25 room temperature	
Gain range	1x-5x	
Exposure time	0.15ms-15sec	
Shutter	Global shutter	
Binning	Hardware 2x2, 4x4; Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data format	8bit / 12bit	
<b>General specification</b>		
Power supply	Power with USB3.0/ DC12V	
Power consumption	2.5W	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	68mmx68mmx28.1mm	
Weight	214g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

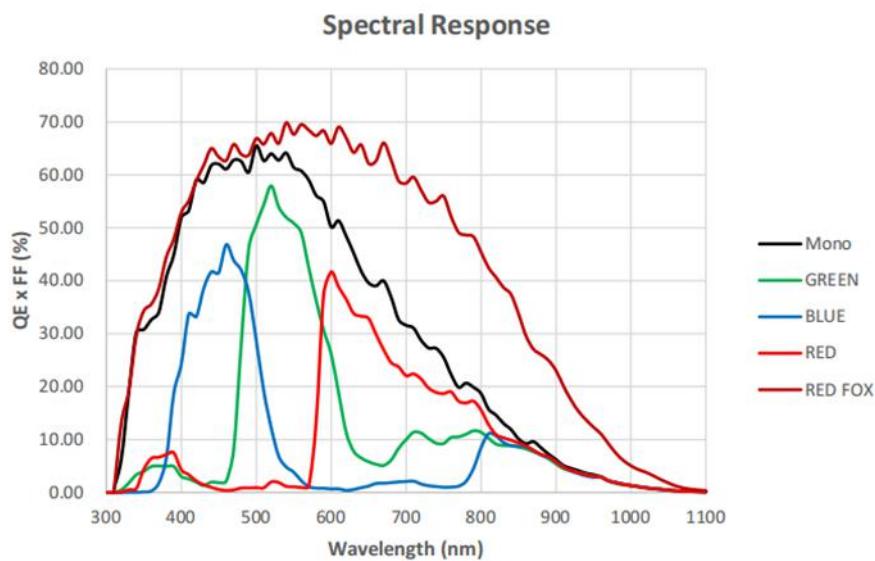


Figure 6- 70 IUA25000KMA spectral response curve

## 6.44 IUA25000KPA

Table 6- 44 IUA25000KPA camera specifications

Parameter \ Model	IUA25000KPA
25.0M 1.1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	GMAX0505
Pixel size	2.5 $\mu\text{m}$ x 2.5 $\mu\text{m}$
Sensor size	1.1"
Frame rate	13@5120x5120 27@2560x2560 54@1280x1280
Conversion Gain	1.37 (e-/ADU)
Readout Noise	2.9 (e-)
Full Well	5.59(ke-)
Dynamic range	65.7dB
Signal-to-Noise ratio	37.5dB
Peak QE	58%@520nm
Dark current	2.4 e-/pixel/s @ 25 room temperature
Gain range	1x-5x
Exposure time	15us-15sec
Shutter	Global shutter
Binning	Hardware 2x2, 4x4; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data format	8bit / 12bit
General specification	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.5W
Temperature	Working temperature -10~50°C, storage temperature -30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

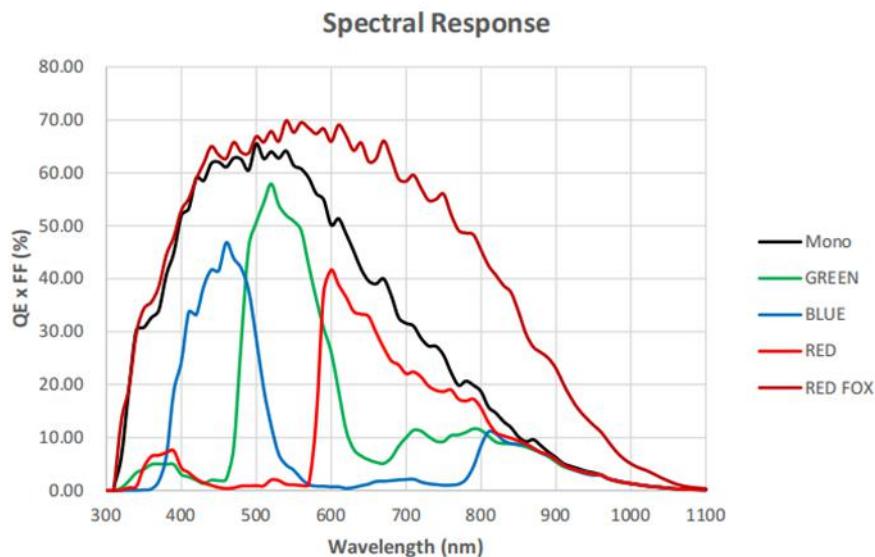


Figure 6- 71 IUA25000KPA spectral response curve

## 6.45 IUA45000KMA

Table 6- 45 IUA45000KMA camera specifications

Parameter \ Model	IUA45000KMA 45.0M 1.4" CMOS USB3.0 industrial camera
Camera Parameters	
Sensor model	Sony IMX492LLJ-C
Pixel size	2.315 $\mu\text{m}$ x 2.315 $\mu\text{m}$
Sensor size	1.4"
Frame rate	8.1@8176x5616(3:2) 30.0@4080x2808(3:2) 8.1@7408x5556(4:3) 33.0@3696x2778(4:3) 10.4@8176x4320(17:9) 34.7@4096x2160(17:9) 62.5@2048x1080(17:9) 86.5@1360x720(17:9)
Conversion Gain	3.59 (e-/ADU)
Readout Noise	2.70 (e-)
Full Well	14.7 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	41.7dB
Sensitivity	176mV
Dark current	0.03mV
Gain range	1x-50x
Exposure time	100us-15sec
Shutter	Rolling shutter
Binning	Hardware 2x2, 3x3, 4x4; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.05W
Temperature	Working temperature -10~50°C, storage temperature -30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

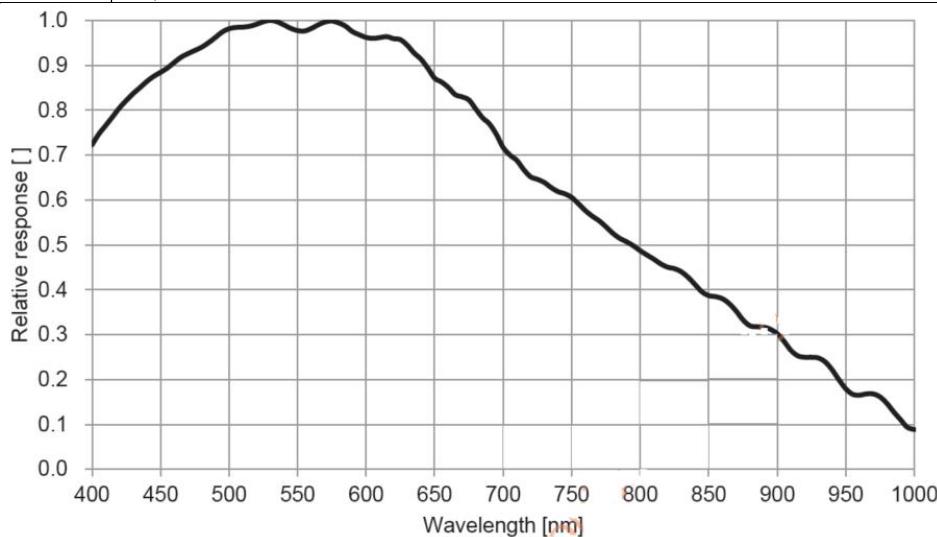


Figure 6- 72 IUA45000KMA spectral response curve

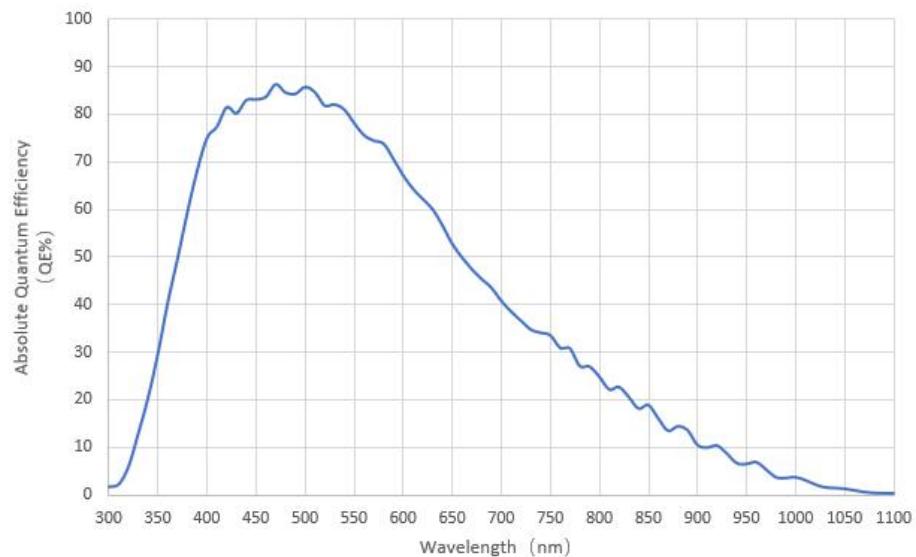


Figure 6- 73 IUA45000KMA absolute quantum efficiency

## 6.46 IUA45000KPB

Table 6- 46 IUA45000KPB camera specifications

Parameter \ Model	IUA45000KPB
45M pixels 1.4" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX492LQJ-C
Pixel size	2.315 $\mu\text{m}$ x 2.315 $\mu\text{m}$
Sensor size	1.4"
Frame rate	8.1@8176x5616 8.1@7408x5556 10.4@8176x4320
Conversion Gain	3.59 (e-/ADU)
Readout Noise	2.70 (e-)
Full Well	14.7 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	41.7dB
Sensitivity	107mV
Dark current	0.03mV
Gain range	1x-50x
Exposure time	100 $\mu\text{s}$ -15sec
Shutter	Rolling shutter
Binning	Software 2x2, 3x3, 4x4; Hardware 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.05W
Temperature	Working temperature -10~50°C, storage temperature -30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

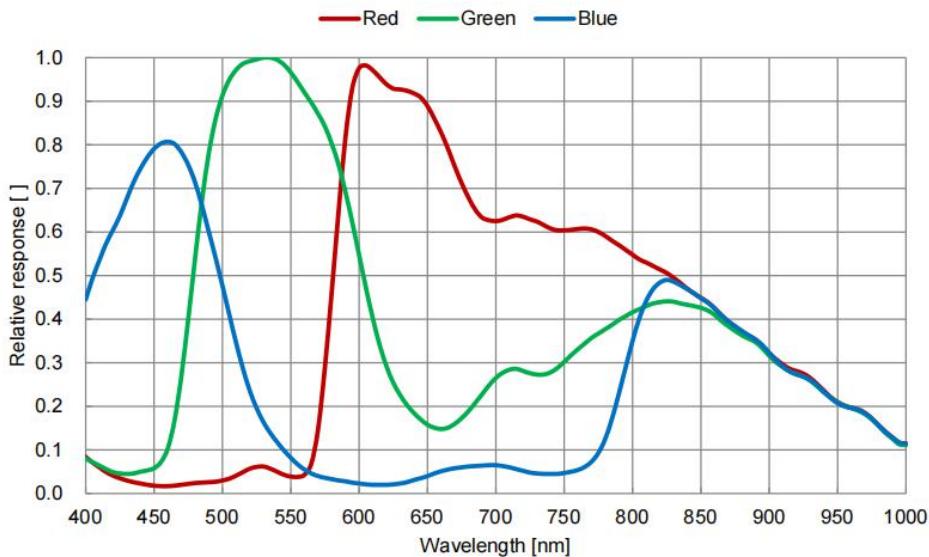


Figure 6- 74 IUA45000KPB spectral response curve

## 6.47 IUA2100KPA(NIR)

Table 6- 47 IUA2100KPA camera specifications

Parameter \ Model	IUA2100KPA
2.1M pixels 1/2.8" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX462LQR
Pixel size	2.9 $\mu\text{m}$ x 2.9 $\mu\text{m}$
Sensor size	1/2.8"
Frame rate	120.3fps@1920 x 1080
Conversion Gain	HCG: 4.71 / LCG: 12.29 (e-/ADU)
Readout Noise	HCG: 3.49 / LCG: 12.35 (e-)
Full Well	HCG: 19.3 / LCG: 50.4 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	HCG: 42.8 / LCG: 47.0 (dB)
Sensitivity	2376mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	11 $\mu\text{s}$ -15sec
Shutter	Rolling shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	<1.9W
Temperature	Working temperature -10~50°C, storage temperature -30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

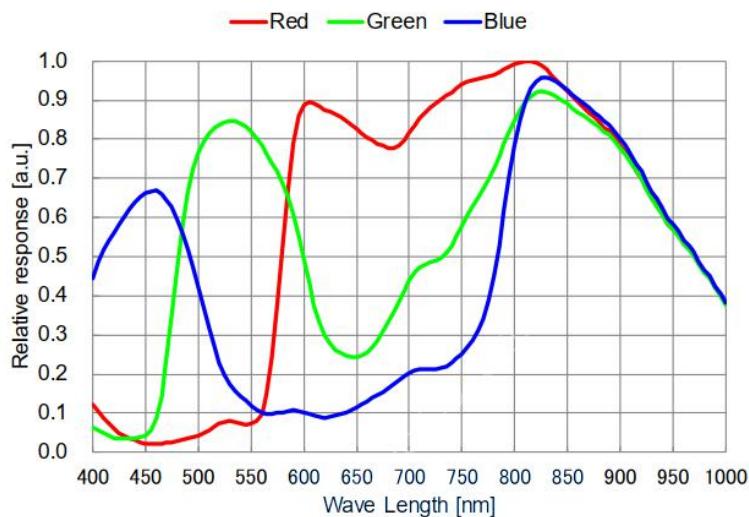


Figure 6- 75 IUA2100KPA spectral response curve

## 6.48 IUA4100KPA(NIR)

Table 6- 48 IUA4100KPA camera specifications

Parameter \ Model	IUA4100KPA
4.1M pixels 1/1.8" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX464LQR
Pixel size	2.9 $\mu\text{m}$ x 2.9 $\mu\text{m}$
Sensor size	1/1.8"
Frame rate	90fps@2688 x 1520
Conversion Gain	HCG: 4.71 / LCG: 12.29 (e-/ADU)
Readout Noise	HCG: 3.49 / LCG: 12.35 (e-)
Full Well	HCG: 19.3 / LCG: 50.4 (ke-)
Dynamic range	72dB
Signal-to-Noise ratio	HCG: 42.8 / LCG: 47.0 (dB)
Sensitivity	2376mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	11 $\mu\text{s}$ -15sec
Shutter	Rolling shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	1.9W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

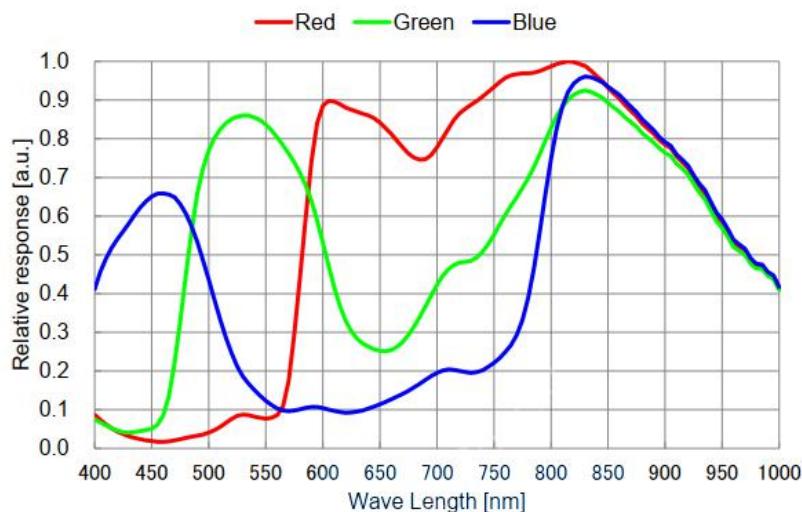


Figure 6- 76 IUA4100KPA spectral response curve

## 6.49 IUA500KMA(GPixel UV)

Table 6- 49 IUA500KMA camera specifications

Parameter \ Model	IUA500KMA
0.5M pixels 1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	GPixel GLUX1605BSI (UV)
Pixel size	16 μm x 16 μm
Sensor size	1"
Frame rate	60fps@800 x 600 60fps@400 x 300
Conversion Gain	HCG(16x): 0.016 / LCG(1.5x): 0.83 / HDR: 0.71 (e-/ADU)
Readout Noise	HCG(16x): 1.96 / LCG(1.5x): 24.06 / HDR: 2.71 (e-)
Full Well	HCG(16x): 1.02 / LCG(1.5x): 53.31 / HDR: 46.60 (ke-)
Dynamic range	HCG(16x): 54.29 / LCG(1.5x): 66.91 / HDR: 84.72 (dB)
Signal-to-Noise ratio	HCG(16x): 30.08 / LCG(1.5x): 47.27 / HDR: 46.68 (dB)
Sensitivity	6.4x10 <sup>8</sup> (e-/(W/m <sup>2</sup> ).s))
Peak QE	91%@550nm
Dark current	50(e-/s/pix)
Gain range	1x-8x
Exposure time	27μs-60sec
Shutter	Rolling shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit / HDR16
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	1.15W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	270g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

### Spectral response

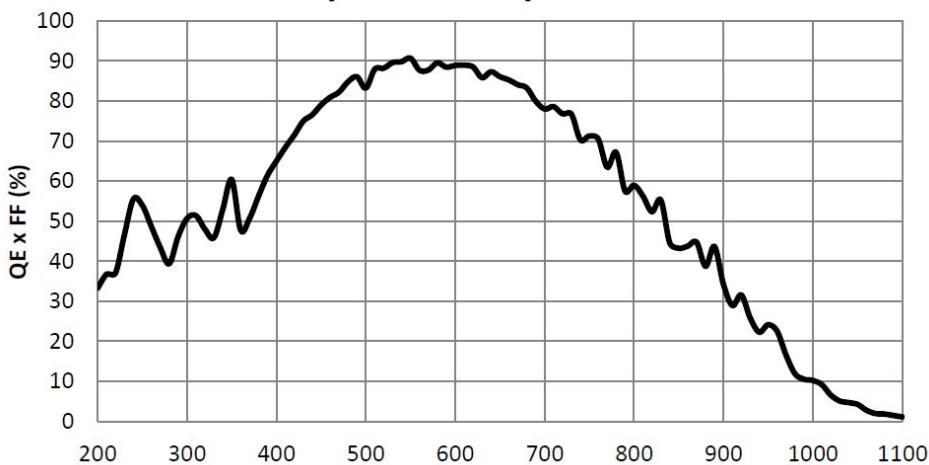


Figure 6- 77 IUA5000KMA spectral response curve

## 6.50 IUA1300KMA(GPixel UV)

Table 6- 50 IUA1300KMA camera specifications

Parameter \ Model	IUA1300KMA
1.3M pixels 1" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	GPixel GLUX9701BSI (UV)
Pixel size	9.76 μm x 9.76 μm
Sensor size	1"
Frame rate	30fps@1280 x 1024 30fps@640 x 512
Conversion Gain	HCG(16x): 0.26 / LCG(1.5x): 12.98 / HDR: 0.32 (e-/ADU)
Readout Noise	HCG(16x): 1.5 / LCG(1.5x): 22.36 / HDR: 1.83 (e-)
Full Well	HCG(16x): 1.05 / LCG(1.5x): 51.88 / HDR: 21.03 (ke-)
Dynamic range	HCG(16x): 56.9 / LCG(1.5x): 67.3 / HDR: 81.2 (dB)
Signal-to-Noise ratio	HCG(16x): 30.2 / LCG(1.5x): 47.2 / HDR: 43.2 (dB)
Peak QE	2.57x10 <sup>8</sup> (e-/(W/m <sup>2</sup> ).s))
Sensitivity	89%@610nm
Dark current	40e-·s/pix
Gain range	1x-8x
Exposure time	63μs-60sec
Shutter	Rolling shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit / HDR16
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	1.2W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	270g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC, RoHS

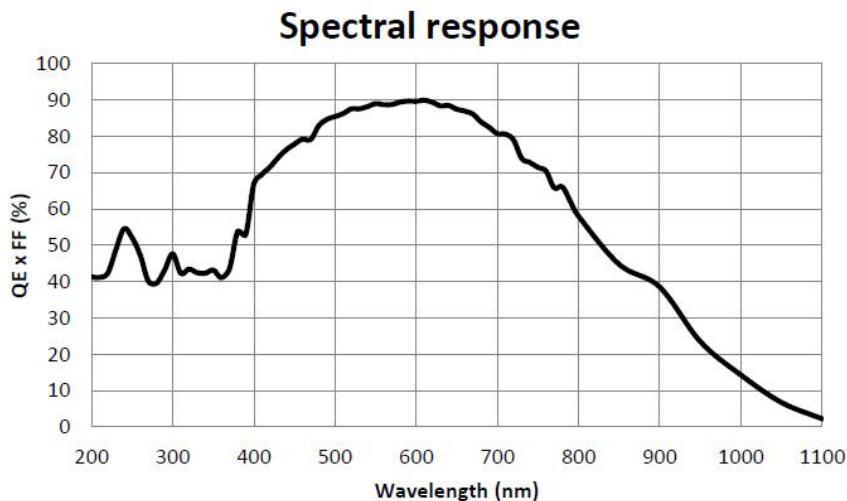


Figure 6- 78 IUA1300KMA spectral response curve

## 6.51 IUA4200KMA(GPixel NIR)

Table 6- 51 IUA4200KMA camera specifications

Parameter \ Model	IUA4200KMA
4.2M pixels 1.2" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	GPixel GSENSE2020e (NIR)
Pixel size	6.5 $\mu\text{m}$ x 6.5 $\mu\text{m}$
Sensor size	1.2"
Frame rate	45fps@2048 x 2048 45fps@1024 x 1024
Conversion Gain	HCG: 0.83 / LCG: 5.23 / HDR: 0.70 (e-/ADU)
Readout Noise	HCG: 6.19 / LCG: 37.48 / HDR: 2.80 (e-)
Full Well	HCG: 13.5 / LCG: 85.7 / HDR: 46.0 (ke-)
Dynamic range	HCG: 66.5 / LCG: 67.0 / HDR: 84.0 (dB)
Signal-to-Noise ratio	HCG: 41.3 / LCG: 49.3 / HDR: 46.6 (dB)
Peak QE	$8.1 \times 10^7 (\text{e-}/((\text{W}/\text{m}^2).\text{s}))$
Sensitivity	73%@595nm
Dark current	13e-·s/pix
Gain range	1x-8x
Exposure time	21μs-60sec
Shutter	Rolling shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit / HDR16
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	3.0W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	270g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC, RoHS

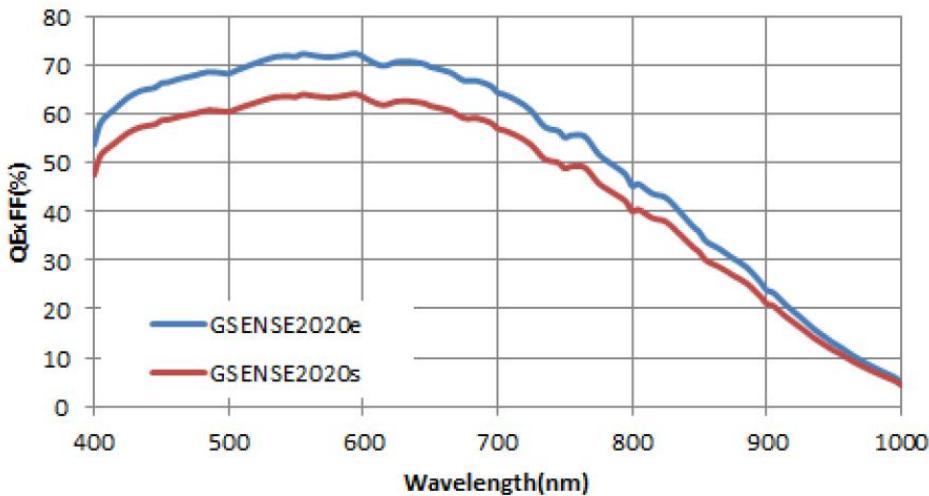


Figure 6- 79 IUA4200KMA spectral response curve

## 6.52 IUA4200KPA(GPixel NIR)

Table 6- 52 IUA4200KPA camera specifications

Parameter \ Model	IUA4200KPA
4.2M pixels 1.2" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	GPixel GSENSE2020s (NIR)
Pixel size	6.5 $\mu\text{m}$ x 6.5 $\mu\text{m}$
Sensor size	1.2"
Frame rate	45fps@2048 x 2048 45fps@1024 x 1024
Conversion Gain	HCG: 5.60 / LCG: 16.16 (e-/ADU)
Readout Noise	HCG: 11.12 / LCG: 51.29 (e-)
Full Well	HCG: 22.60 / LCG: 62.89 (ke-)
Dynamic range	HCG: 66.2 / LCG: 61.8 (dB)
Signal-to-Noise ratio	HCG: 43.5 / LCG: 48 (dB)
Peak QE	$8.1 \times 10^7 (\text{e-}/((\text{W}/\text{m}^2).\text{s}))$
Sensitivity	64%@595nm
Dark current	13e-/s/pix
Gain range	1x-21x
Exposure time	50 $\mu\text{s}$ -3600sec
Shutter	Rolling shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit / HDR16
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	<2.3W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	270g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC, RoHS

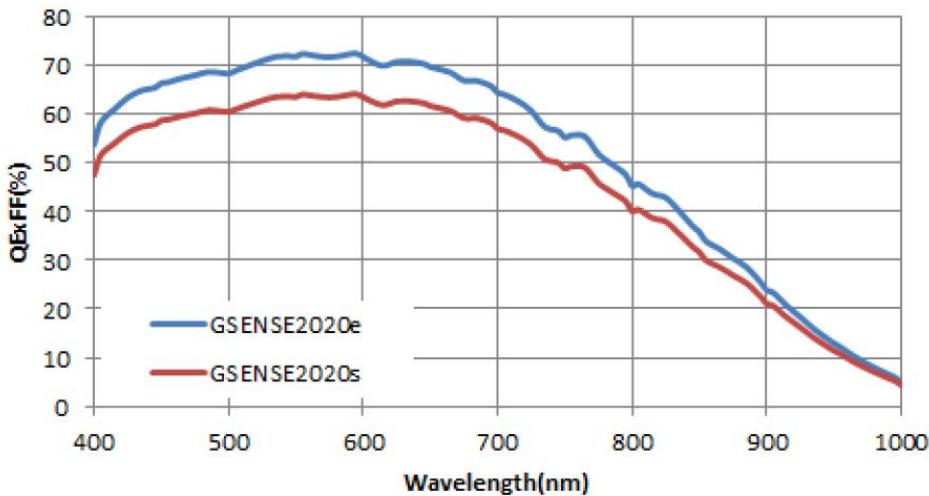


Figure 6- 80 IUA4200KPA spectral response curve

## 6.53 IUA4200KMB(GPixel UV)

Table 6- 53 IUA4200KMB camera specifications

Parameter \ Model	IUA4200KMB
4.2M pixels 1.2" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	GPixel GSENSE2020BSI -H (UV)
Pixel size	6.5 $\mu\text{m}$ x 6.5 $\mu\text{m}$
Sensor size	1.2"
Frame rate	32fps@2048 x 2048 32fps@1024 x 1024
Conversion Gain	HCG: 2.69 / LCG: 15.49 / HDR:0.55 (e-/ADU)
Readout Noise	HCG:5.4 / LCG:21.02 / HDR:2.89 (e-)
Full Well	HCG: 12.1 / LCG: 46.4 / HDR:35.8 (ke-)
Dynamic range	HCG: 66.8 / LCG: 66.7 / HDR: 81.6 (dB)
Signal-to-Noise ratio	HCG: 40.8 / LCG: 46.7 / HDR: 45.5 (dB)
Peak QE	$1.1 \times 10^8$ (e-/(W/m <sup>2</sup> ).s))
Sensitivity	93.7%@550nm
Dark current	80e- s/pix
Gain range	1x-8x
Exposure time	12μs-60sec
Shutter	Rolling shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit / HDR16
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	<2.3W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	270g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

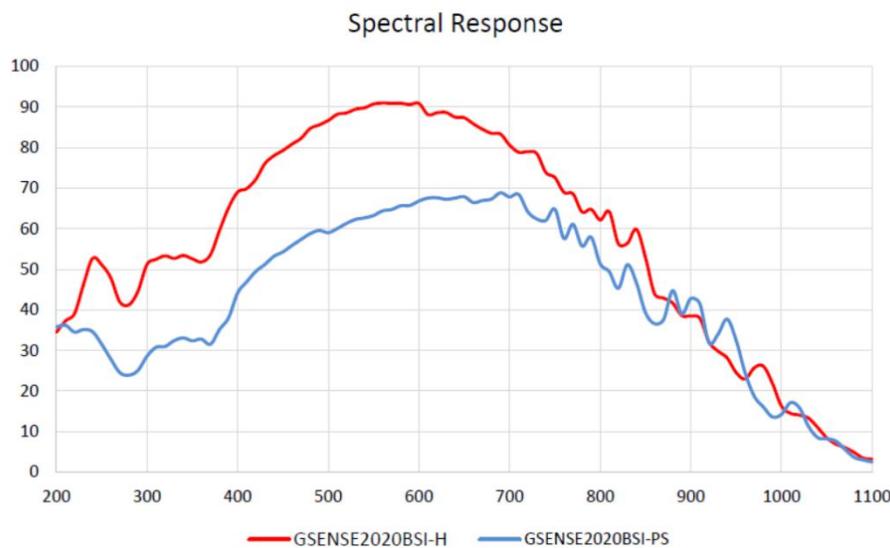


Figure 6- 81 IUA4200KMB spectral response curve

## 6.54 IUA4200KME(GPixel UV)

Table 6- 54 IUA4200KME camera specifications

Parameter \ Model	IUA4200KME
4.2M pixels 2.0" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	GPixel GSENSE400BSI (UV)
Pixel size	11 μm x 11 μm
Sensor size	2.0"
Frame rate	37fps@2048 x 2048 37fps@1024 x 1024
Conversion Gain	HCG: 2.33 / LCG: 19.93 (e-/ADU)
Readout Noise	HCG: 3.57 / LCG: 31.26 (e-)
Full Well	HCG: 46.4 / LCG: 35.8 (ke-)
Dynamic range	HCG: 68.3 / LCG: 68.1 (dB)
Signal-to-Noise ratio	HCG: 39.8 / LCG: 49.1 (dB)
Sensitivity	3.25x10 <sup>8</sup> (e-/(W/m <sup>2</sup> ).s))
Dark current	345e-/s/pix
Gain range	1x-8x
Exposure time	21μs-60sec
Shutter	Rolling shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.25W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	270g
Lens mount	M42 Interface
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC, RoHS

### Spectral Response

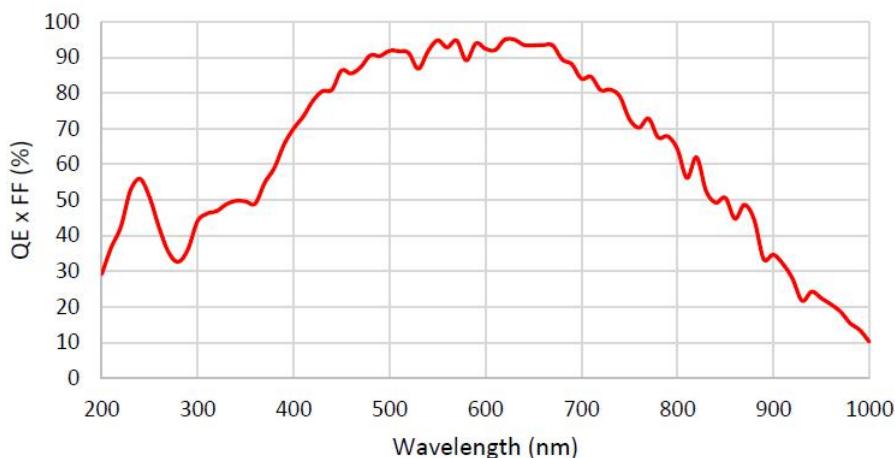


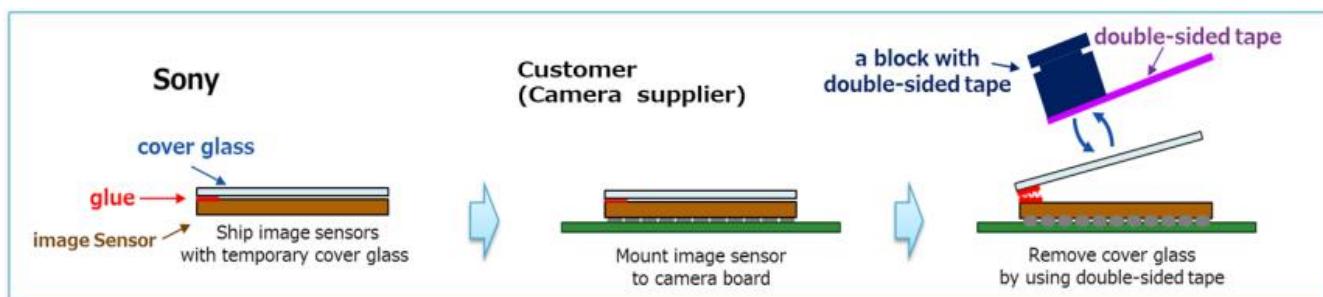
Figure 6- 82 IUA4200KME spectral response curve

## 6.55 IUA8000KMA(Sony GS-UV)

Table 6- 55 IUA8000KMA camera specifications

Parameter \ Model	IUA8000KMA
8.0M pixels 2/3" CMOS USB3.0 industrial camera	
Camera Parameters	
Sensor model	Sony IMX487-AAMJ-C
Pixel size	2.74 $\mu\text{m}$ x 2.74 $\mu\text{m}$
Sensor size	2/3"
Frame rate	45fps@2840 $\times$ 2840 198fps@1420 $\times$ 1420
Conversion Gain	2.42 (e-/ADU)
Readout Noise	2.66 (e-)
Full Well	9.9 (ke-)
Dynamic range	71.2dB
Signal-to-Noise ratio	40.0dB
Sensitivity	145mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	30 $\mu\text{s}$ -15sec
Shutter	Global shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
General Specifications	
Power supply	Power with USB3.0/ DC12V
Power consumption	2.35W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

The IUA8000KMA is available in RG (Removing Glass) versions, as shown in the figure below.



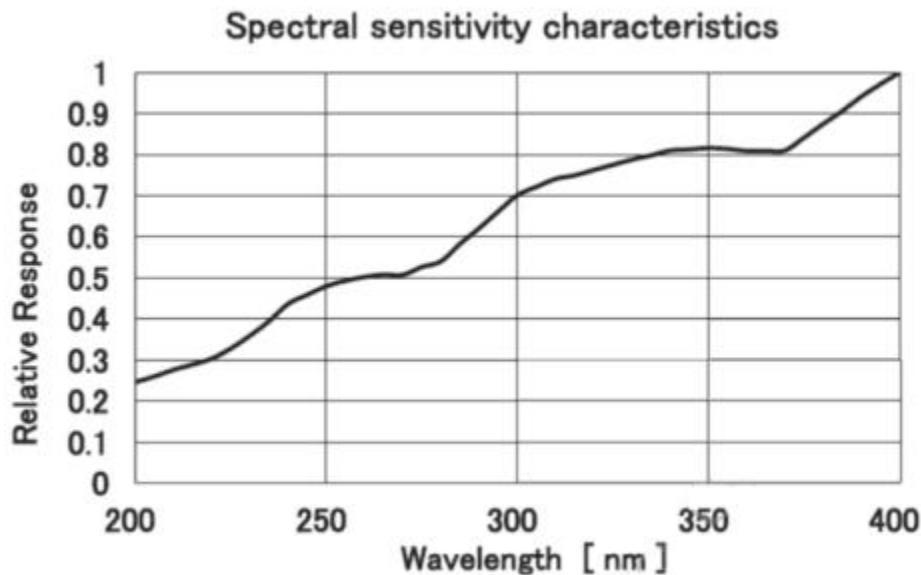


Figure 6- 83 IUA8000KMA spectral response curve

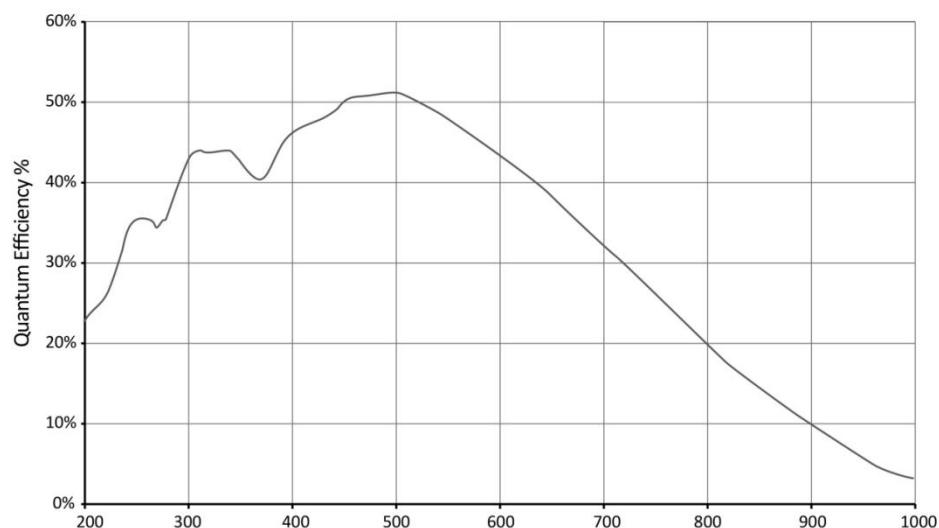


Figure 6- 84 IUA8000KMA absolute quantum efficiency



## 7 IUB Series Technical Specifications(End of life, not recommended,3)

### 7.1 IUB4200KMA

Table 7- 1 IUB4200KMA camera specifications

Parameter	Model	IUB4200KMA
	4.2M pixels 1.2" CMOS USB3.0 industrial camera	
<b>Camera Parameters</b>		
Sensor model	Gpixel GSENSE2020e	
Pixel size	6.5 μm x 6.5 μm	
Sensor size	1.2"	
Frame rate	45fps@2048 x 2046 45fps@1024 x 1022	
Dynamic range	66.6dB (LG), 59.5dB (HG), 87.5dB (HDR)	
Signal-to-Noise ratio	46dB (LG), 32dB (HG)	
Sensitivity	8.11x10 <sup>7</sup> (e-/(W/m <sup>2</sup> )·s)	
Dark current	7e-/s/pix	
Gain range	1x-22x	
Exposure time	150us-60sec	
Shutter	Rolling shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit / HDR16	
<b>General Specifications</b>		
Power supply	Power with USB3.0/ 12V Power adapter	
Power consumption	<3.7W	
Temperature	Working temperature -10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	118mmx68mmx23.2mm	
Weight	633g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

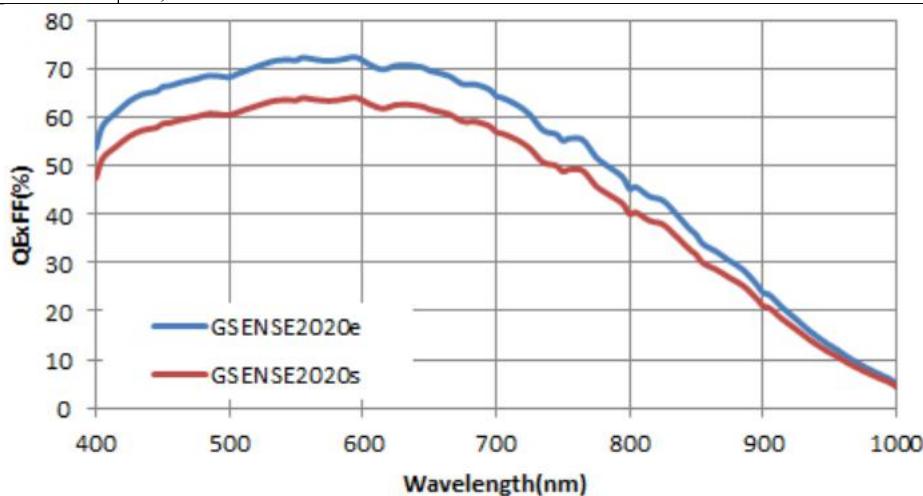


Figure 7- 1 IUB4200KMA spectral response curve

## 7.2 IUB4200KMB

Table 7- 2 IUB4200KMB camera specifications

Parameter	Model	IUB4200KMB
	4.2M pixels 1.2" CMOS USB3.0 industrial camera	
<b>Camera Parameters</b>		
Sensor model	Gpixel GSENSE2020BSI (UV)	
Pixel size	6.5 μm x 6.5 μm	
Sensor size	1.2"	
Frame rate	43.6fps@2048 x 2046 43.6fps@1024 x 1022	
Dynamic range	67.5dB (LG), 61dB (HG), 90.7dB (HDR)	
Signal-to-Noise ratio	47dB (LG), 32dB (HG)	
Sensitivity	1.1x10 <sup>8</sup> e-/(W/m <sup>2</sup> ·s)	
Dark current	80e-/s/pix	
Gain range	1x-50x	
Exposure time	150us-60sec	
Shutter	Rolling shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit / HDR16	
<b>General Specifications</b>		
Power supply	Power with USB3.0/ 12V Power adapter	
Power consumption	<3.7W	
Temperature	Working temperature -10~50°C, storage temperature30~70°C	
Humidity	20%-80%, no condensation	
Size	118mmx68mmx23.2mm	
Weight	633g	
Lens mount	C-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

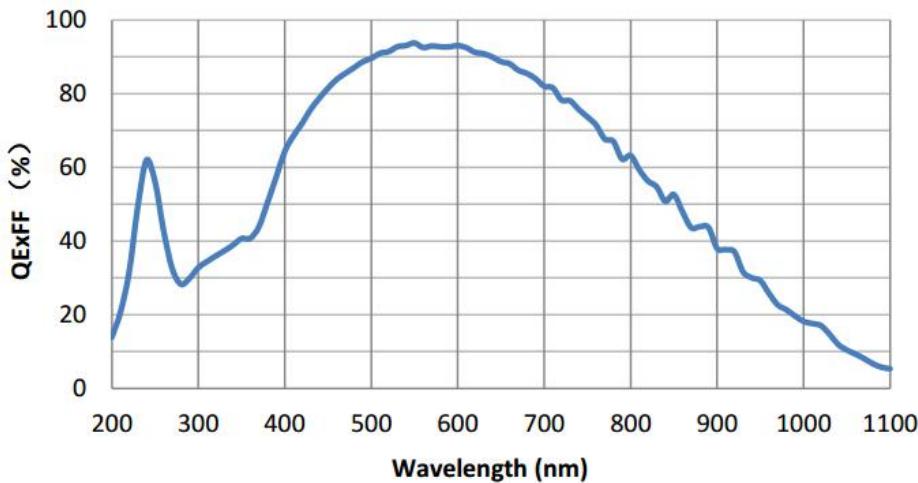


Figure 7- 2 IUB4200KMB spectral response curve

## 7.3 IUB43000KMA

Table 7- 3 IUB43000KMA camera specifications

Parameter \ Model	IUB43000KMA
<b>43.0M pixels 1.7" (APS-C) CMOS USB3.0 industrial camera</b>	
<b>Camera Parameters</b>	
Sensor model	Gpixel GMAX0806
Pixel size	2.8 $\mu\text{m}$ x 2.8 $\mu\text{m}$
Sensor size	1.7"(APS-C)
Frame rate	8.5fps@7904x5432
Dynamic range	66dB (2G), 63dB (6G)
Signal-to-Noise ratio	38.5dB (2G), 34dB (6G)
Sensitivity	1.19x10 <sup>7</sup> (e-/(W/m <sup>2</sup> )·s)
Dark current	1e-/pix
Gain range	1x-6x
Exposure time	15us-15sec
Shutter	Global shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
<b>General Specifications</b>	
Power supply	Power with USB3.0/ 12V Power adapter
Power consumption	<5.0W
Temperature	Working temperature -10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	118mmx68mmx23.2mm
Weight	633g
Lens mount	M42 Interface
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

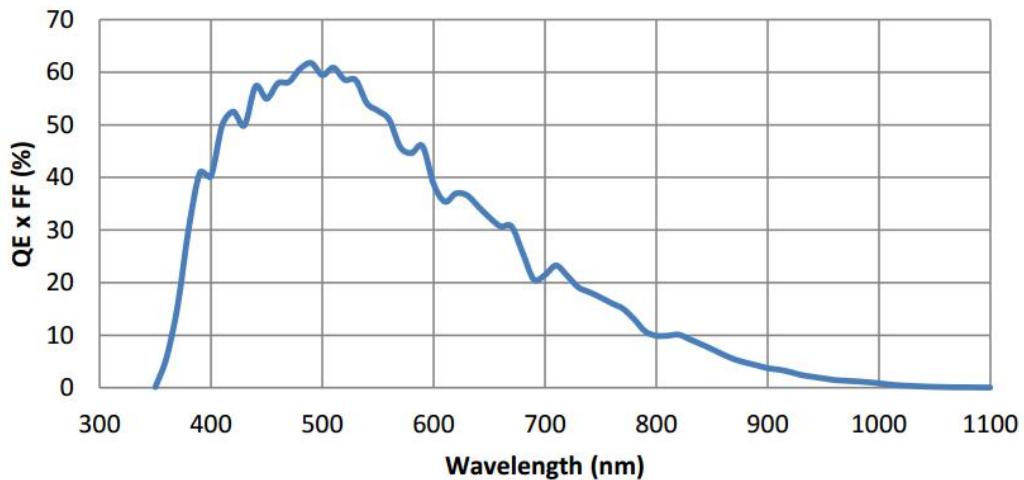


Figure 7- 3 IUB43000KMA spectral response curve

## 8 IUC Series Technical Specifications(21)

### 8.1 IUC1700KMA-CL480

Table 8- 1 IUC1700KMA-CL480 camera specifications

Parameter	Model	IUC1700KMA-CL480
		1.7M pixels 1.1" CMOS Camera Parameters
	Link industrial camera	
Sensor model	Sony IMX425LLJ	Camera Parameters
Pixel size	9.0 $\mu\text{m}$ x 9.0 $\mu\text{m}$	
Sensor size	1.1"	
Frame rate	302fps@1600 x 1100	
Conversion Gain	4.97 (e-/ADU)	
Readout Noise	4.76 (e-)	
Full Well	20.4 (ke-)	
Dynamic range	72dB	
Signal-to-Noise ratio	43dB	
Sensitivity	8100mV	
Dark current	0.3mV	
Gain range	1-50 倍	
Exposure time	6us-15sec	
Shutter	Global shutter	
Binning	Software 2x2, 3x3, 4x4	
Data interface	CameraLink	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	12V Power adapter	
Power consumption	<5W	
Temperature	Working temperayure-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	88mmx88mmx21.2mm	
Weight	540g	
Lens mount	M42 Interface	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

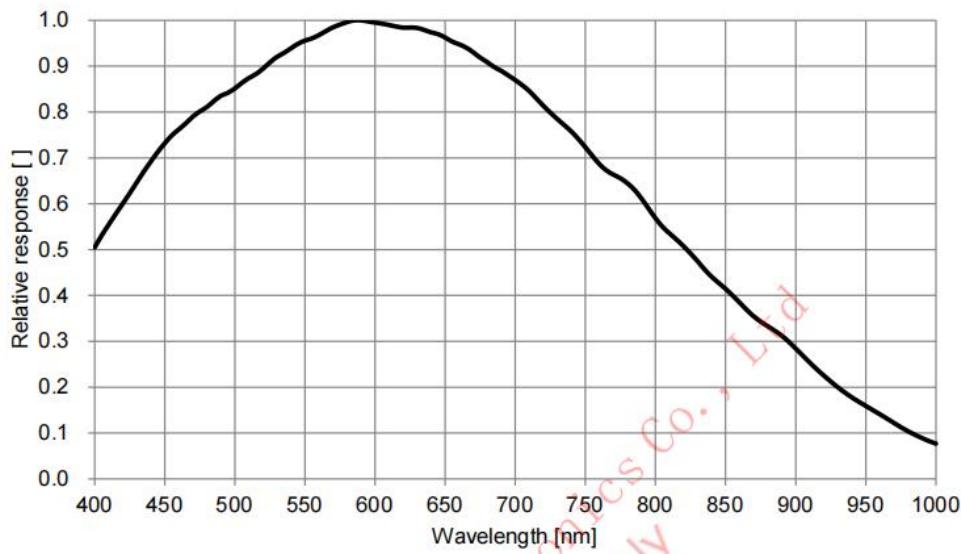


Figure 8- 1 IUC1700KMA-CL480 spectral response curve

## 8.2 IUC21000KPA

Table 8- 2 IUC21000KPA camera specifications

Parameter \ Model	IUC21000KPA
<b>21 million pixels 4/3" CMOS USB3.0 industrial camera</b>	
<b>Camera Parameters</b>	
Sensor model	Sony IMX472AAJK-C
Pixel size	3.3 μm x 3.3 μm
Sensor size	4/3"
Frame rate	14.5fps@5280x3956 33fps@2640x1978 96fps@1760x1318
Conversion Gain	TBD
Readout Noise	TBD
Full Well	TBD
Dynamic range	TBD
Signal-to-Noise ratio	TBD
Sensitivity	491.4mv
Dark current	0.55mv
Gain range	1-100 倍
Exposure time	150us-15sec
Shutter	Rolling shutter
Binning	Hardware 2x2, 3x3; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 14bit
<b>General Specifications</b>	
Power supply	12V Power adapter
Power consumption	<5.0W
Temperature	Working temperature -10~50°C, storage temperature -30~70°C
Humidity	20%-80%, no condensation
Size	88mmx88mmx36.3mm
Weight	564g
Lens mount	C interface
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

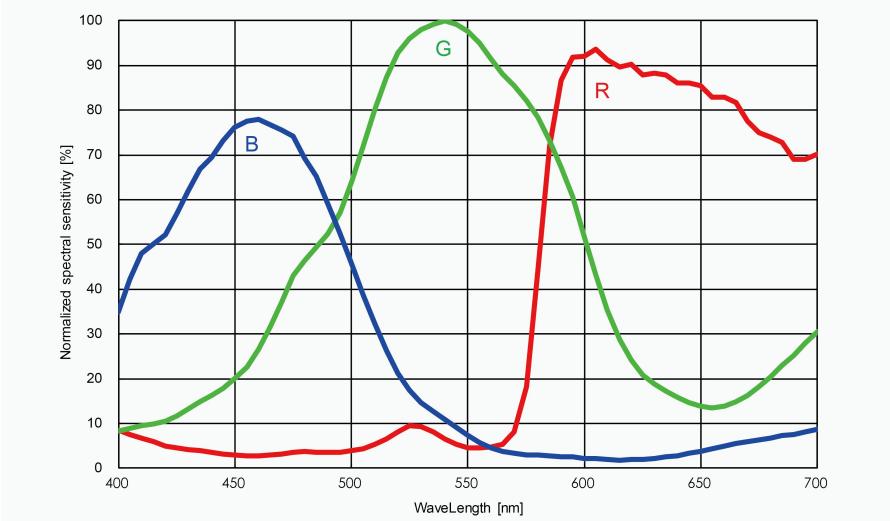


Figure 8- 2 IUC21000KPA spectral response curve

## 8.3 IUC24000KPA

Table 8- 3 IUC24000KPA camera specifications

Parameter	Model	IUC24000KPA
	24.0M pixels 2.7" (Full Frame) CMOS USB3.0 industrial camera	
Camera Parameters		
Sensor model	Sony IMX410CQK-C	
Pixel size	5.94 $\mu\text{m}$ x 5.94 $\mu\text{m}$	
Sensor size	2.7"(Full Frame)	
Frame rate	15.3fps@6064x4040(14bit) 41fps@3024x2012 114fps@2016x1342	
Conversion Gain	1.2e-(HCG) 6.19e-(LCG)	
Readout Noise	0.58e-(HCG) 4.56e-(LCG)	
Full Well	19653.77e-(HCG) 101464.01e-(LCG)	
Dynamic range	84dB (HCG) 84dB (LCG)	
Signal-to-Noise ratio	42.93dB(HCG) 50.06dB(LCG)	
Sensitivity	572.8mv	
Dark current	0.037mv	
Gain range	1-50 倍	
Exposure time	150us-15sec	
Shutter	Rolling shutter	
Binning	Hardware 2x2, 3x3; Software 2x2, 3x3, 4x4	
Data interface	USB3.0 (USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 14bit	
General Specifications		
Power supply	12V Power adapter	
Power consumption	<5.0W	
Temperature	Working temperayure-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	88mmx88mmx21.2mm	
Weight	540g	
Lens mount	M42 Interface	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

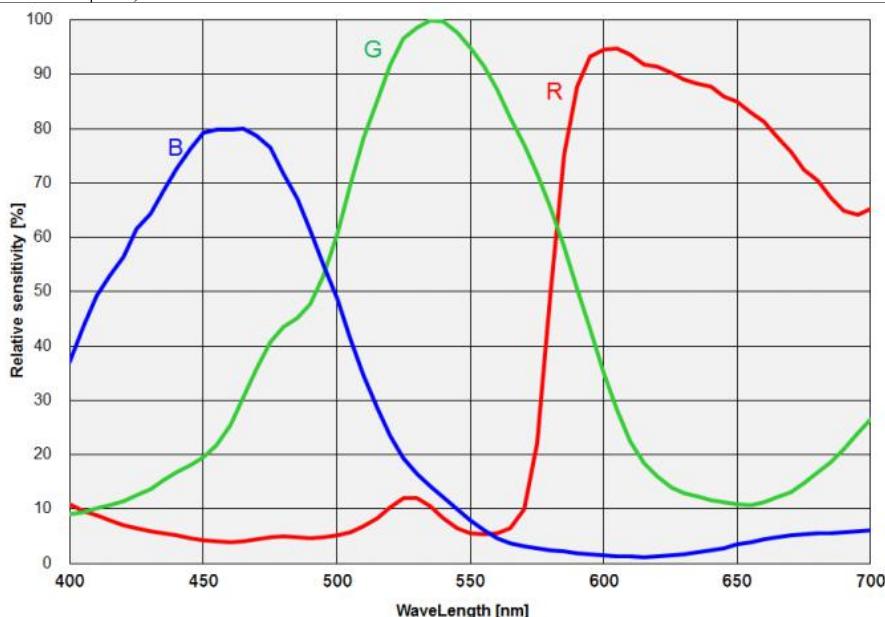


Figure 8- 3 IUC24000KPA spectral response curve

## 8.4 IUC26000KMA

Table 8- 4 IUC26000KMA camera specifications

Parameter \ Model	IUC26000KMA / IUC26000KMA-AFU	IUC26000KMA-10G / IUC26000KMA-AF10G
	26.0M pixels 1.8" (APS-C) CMOS USB3.0 / 10GigE industrial camera	
<b>Camera Parameters</b>		
Data interface	USB3.0	10GigE
Sensor model	Sony IMX571BLR-J	
Pixel size	3.76 μm x 3.76 μm	
Sensor size	1.8" (APS-C)	
Frame rate	14fps@6224 x 4168(16bit) 37fps@3104 x 2084 110fps@2064 x 1388	45fps@6224x4168(16bit) 37fps@3104x2084 110fps@2064x1388
Conversion Gain	0.26e-(HCG) 0.78e-(LCG)	
Readout Noise	1.03e-(HCG) 2.4e-(LCG)	
Full Well	17022.88e-(HCG) 51129.19e-(LCG)	
Dynamic range	84.42dB (HCG) 86.58dB (LCG)	
Signal-to-Noise ratio	42.31dB(HCG) 47.09dB(LCG)	
Sensitivity	870.9mv	
Dark current	0.07mv	
Gain range	1x-50x	
Exposure time	150us-15sec	
Shutter	Rolling shutter	
Binning	Hardware 2x2, 3x3; Software 2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 16bit	
<b>General Specifications</b>		
Power supply	12V Power adapter	
Power consumption	4.15W	TBD
Temperature	Working temperayure-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	88mmx88mmx36.3mm	88mmx88mmx51.3mm
Weight	540g	
Lens mount	M42 Interface	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

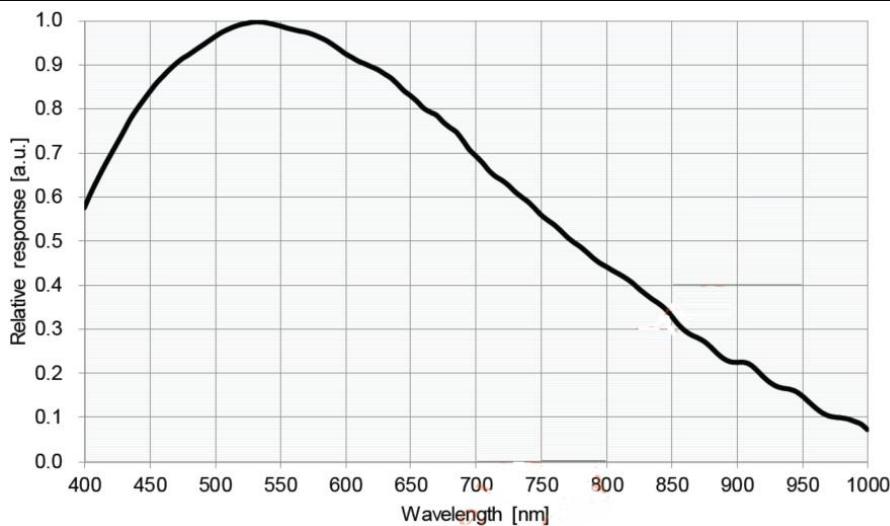


Figure 8- 4 IUC26000KMA spectral response curve

## 8.5 IUC26000KPA

Table 8- 5 IUC26000KPA camera specifications

Parameter \ Model	IUC26000KPA/IUC26000KPA-AFU	IUC26000KPA-10G/IUC26000KPA-AF10G
	26.0M pixels 1.8" (APS-C) CMOS USB3.0 / 10GigE industrial camera	
Camera Parameters		
Data interface	USB3.0	10GigE
Sensor model	Sony IMX571BQR-C	
Pixel size	3.76 $\mu\text{m}$ x 3.76 $\mu\text{m}$	
Sensor size	1.8" (APS-C)	
Frame rate	14fps@6224 x 4168(16bit) 37fps@3104 x 2084 110fps@2064 x 1388	45fps@6224x4168(16bit) 37fps@3104x2084 110fps@2064x1388
Conversion Gain	0.26e-(HCG) 0.78e-(LCG)	
Readout Noise	1.03e-(HCG) 2.4e-(LCG)	
Full Well	17022.88e-(HCG) 51129.19e-(LCG)	
Dynamic range	84.42dB (HCG) 86.58dB (LCG)	
Signal-to-Noise ratio	42.31dB(HCG) 47.09dB(LCG)	
Sensitivity	484.5mv	
Dark current	0.07mv	
Gain range	1x-50x	
Exposure time	150us-15sec	
Shutter	Rolling shutter	
Binning	Hardware 2x2, 3x3; Software 2x2, 3x3, 4x4	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 16bit	
General Specifications		
Power supply	12V Power adapter	
Power consumption	4.15W	TBD
Temperature	Working temperayure-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	88mmx88mmx36.3mm	88mmx88mmx51.3mm
Weight	540g	
Lens mount	M42 Interface	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

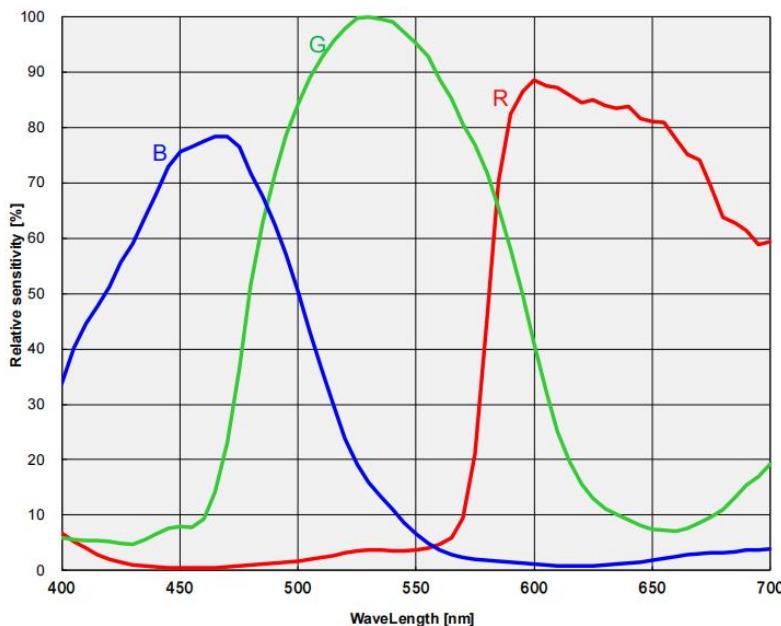


Figure 8- 5 IUC26000KPA spectral response curve

## 8.6 IUC31000KMA

Table 8- 6 IUC31000KMA camera specifications

Parameter \ Model	IUC31000KMA
<b>31.0M pixels 1.8" (APS-C) CMOS USB3.0 industrial camera</b>	
<b>Camera Parameters</b>	
Sensor model	Sony IMX342LLA
Pixel size	3.45 μm x 3.45 μm
Sensor size	1.8" (APS-C)
Frame rate	12.0fps@6464 x 4852 45.9fps@3216 x 2426
Dynamic range	73.6dB
Signal-to-Noise ratio	40.4dB
Peak QE	71%@575nm
Sensitivity	1830mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	31μs-15sec
Shutter	Global shutter
Binning	Hardware 2x2; Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
<b>General Specifications</b>	
Power supply	12V Power adapter
Power consumption	<7.7w
Temperature	Working temperayure-10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	88mmx88mmx36.3mm
Weight	545g
Lens mount	M42 Interface
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

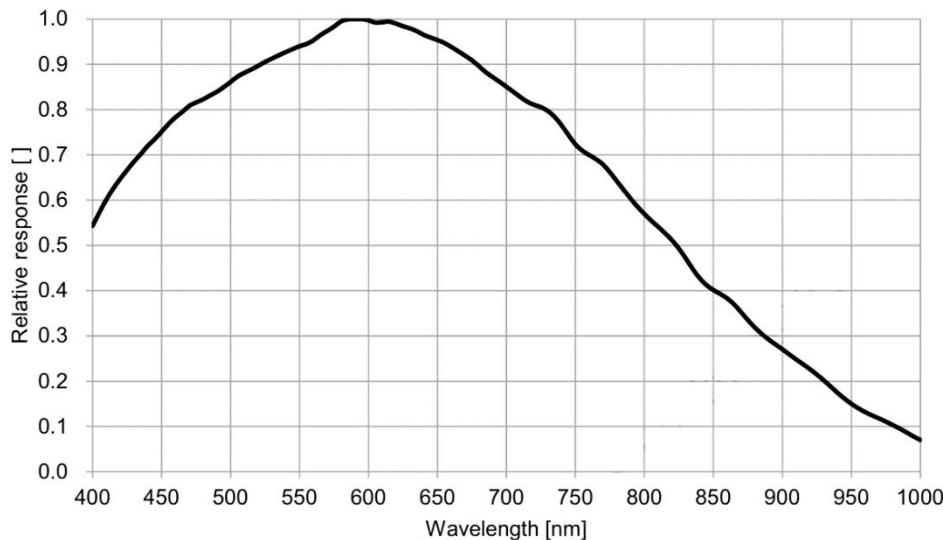


Figure 8- 6 IUC31000KMA spectral response curve

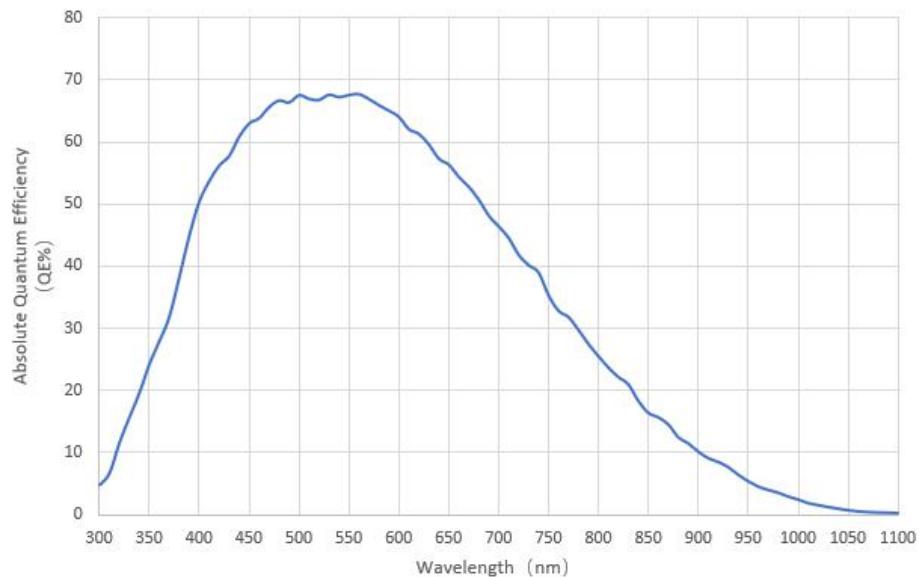


Figure 8- 7 IUC31000KMA absolute quantum efficiency

## 8.7 IUC31000KPA

Table 8- 7 IUC31000KPA camera specifications

Parameter \ Model	IUC31000KPA
<b>31.0M pixels 1.8" (APS-C) CMOS USB3.0 industrial camera</b>	
<b>Camera Parameters</b>	
Sensor model	Sony IMX342LQA
Pixel size	3.45 μm x 3.45 μm
Sensor size	1.8" (APS-C)
Frame rate	12.0fps@6464 x 4852 45.9fps@3216 x 2426
Dynamic range	73.6dB
Signal-to-Noise ratio	40.4dB
Sensitivity	1146mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	31μs-15sec
Shutter	Global shutter
Binning	Software 2x2, 3x3, 4x4
Data interface	USB3.0 (USB3.1 GEN1)
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
<b>General Specifications</b>	
Power supply	12V Power adapter
Power consumption	<7.7w
Temperature	Working temperayure-10~50°C, storage temperature-30~70°C
Humidity	20%-80%, no condensation
Size	88mmx88mmx36.3mm
Weight	545g
Lens mount	M42 Interface
Software	ToupView/ SDK
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

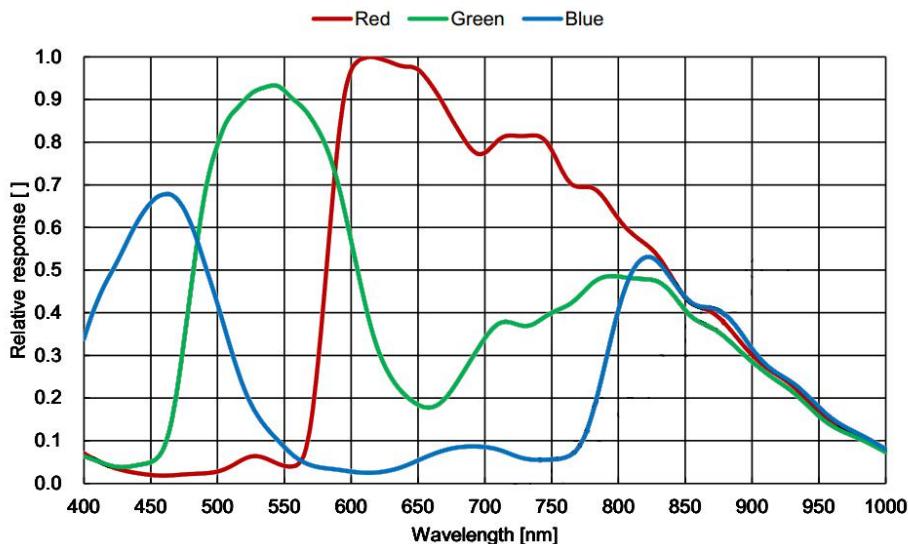


Figure 8- 8 IUC31000KPA spectral response curve

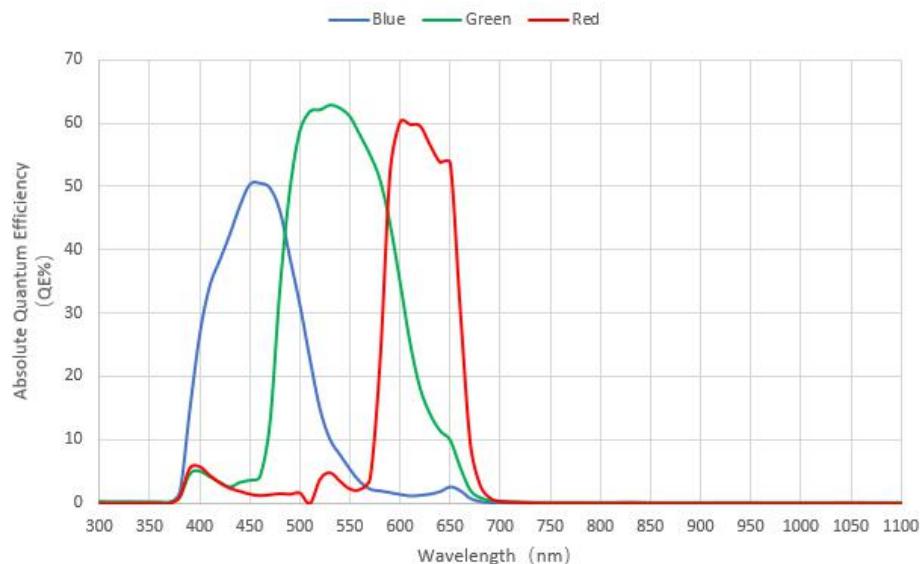


Figure 8- 9 IUC31000KPA absolute quantum efficiency

## 8.8 IUC60000KMA

Table 8- 8 IUC60000KMA camera specifications

Parameter \ Model	IUC60000KMA / IUC60000KMA-AFU	IUC60000KMA-10G / IUC60000KMA-AF10G
	60.0M pixels 2.7" (Full Frame) CMOS USB3.0 / 10GigE industrial camera	
<b>Camera Parameters</b>		
Data interface	USB3.0	10GigE
Sensor model	Sony IMX455ALK	
Pixel size	3.76 $\mu\text{m}$ x 3.76 $\mu\text{m}$	
Sensor size	2.7" (Full Frame)	
Frame rate	6.1fps@9568 x 6380(16bit) 24.6fps@4784 x 3190 55.8fps@3184 x 2124 191.0@1040 x 706	20fps@9568x6380(16bit) 40fps@4784x3190 57.52fps@3184x2124 199.37@1040x706
Conversion Gain	0.79e-(HCG) 1.62e-(LCG)	
Readout Noise	3.51e-(HCG) 5.39e-(LCG)	
Full Well	51550.45e-(HCG) 87353.34e-(LCG)	
Dynamic range	83.34dB (HCG) 84.18dB (LCG)	
Signal-to-Noise ratio	47.12dB(HCG) 49.41dB(LCG)	
Sensitivity	870.9mV	
Dark current	0.04mV	
Gain range	1x-50x	
Exposure time	150us-15sec	
Shutter	Rolling shutter	
Binning	Hardware 2x2, 3x3, 9x9; Software 2x2, 3x3, 9x9	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 16bit	
<b>General Specifications</b>		
Power supply	12V Power adapter	
Power consumption	<5.5W	TBD
Temperature	Working temperayure-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	88mmx88mmx36.3mm	88mmx88mmx51.3mm
Weight	540g	
Lens mount	M52 Interface	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

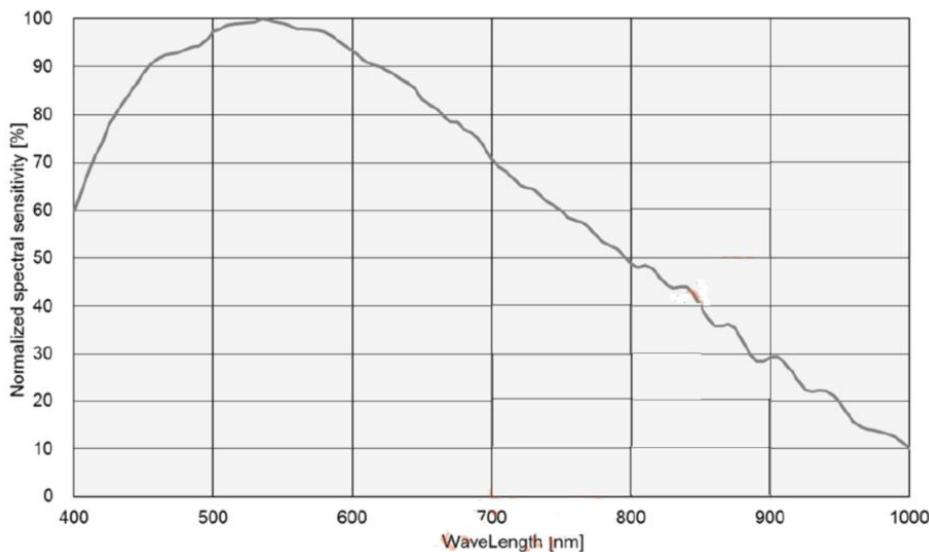


Figure 8- 10 IUC60000KMA spectral response curve

## 8.9 IUC60000KPA

Table 8- 9 IUC60000KPA camera specifications

Parameter \ Model	IUC60000KPA / IUC60000KPA-AFU	IUC60000KPA-10G / IUC60000KPA-AF10G
	60.0M pixels 2.7" (Full Frame) CMOS USB3.0 / 10GigE industrial camera	
Camera Parameters		
Data interface	USB3.0	10GigE
Sensor model	Sony IMX455AQK	
Pixel size	3.76 $\mu\text{m}$ x 3.76 $\mu\text{m}$	
Sensor size	2.7" (Full Frame)	
Frame rate	6.1fps@9568 x 6380(16bit) 24.6fps@4784 x 3190 55.8fps@3184 x 2124 191.0@1040 x 706	20fps@9568x6380(16bit) 40fps@4784x3190 57.52fps@3184x2124 199.37@1040x706
Conversion Gain	0.79e-(HCG) 1.62e-(LCG)	
Readout Noise	3.51e-(HCG) 5.39e-(LCG)	
Full Well	51550.45e-(HCG) 87353.34e-(LCG)	
Dynamic range	83.34dB (HCG) 84.18dB (LCG)	
Signal-to-Noise ratio	47.12dB(HCG) 49.41dB(LCG)	
Sensitivity	484.5mV	
Dark current	0.07mV	
Gain range	1x-50x	
Exposure time	150us-15sec	
Shutter	Rolling shutter	
Binning	Hardware 2x2, 3x3, 9x9; Software 2x2, 3x3, 9x9	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 16bit	
General Specifications		
Power supply	12V Power adapter	
Power consumption	<5.5W	TBD
Temperature	Working temperayure-10~50°C, storage temperature-30~70°C	
Humidity	20%-80%, no condensation	
Size	88mmx88mmx36.3mm	88mmx88mmx51.3mm
Weight	540g	
Lens mount	M52 Interface	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

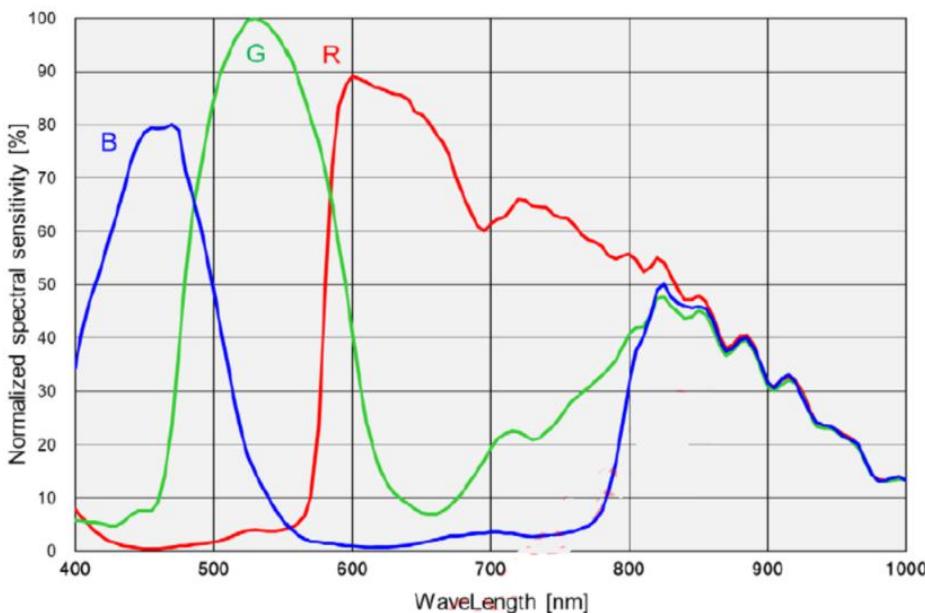


Figure 8- 11 IUC60000KPA spectral response curve

## 9 IUD Series Technical Specifications(2)

### 9.1 IUD16000KMA(NIR)

Table 9- 1 IUD16000KMA camera specifications

Parameter	Model	IUD16000KMA
	16M pixels 1.8" CMOS USB3.0 industrial camera	
Camera Parameters		
Sensor model	PYTHON 16K	
Pixel size	4.5 $\mu\text{m}$ x 4.5 $\mu\text{m}$	
Sensor size	1.8"	
Frame rate	22.5@4096x4096	
Dynamic range	TBD	
Signal-to-Noise ratio	TBD	
Sensitivity	TBD	
Dark current	TBD	
Gain range	1x-50x	
Exposure time	1us-60s	
Shutter	Global shutter	
Binning	Hardware 1x1, 2x2, 3x3	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	Two non-isolated input, Three non-isolated output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	TBD	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	59mm×59mm×27.2mm	
Weight	139.3g	
Lens mount	M42-mount	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

Quantum Efficiency

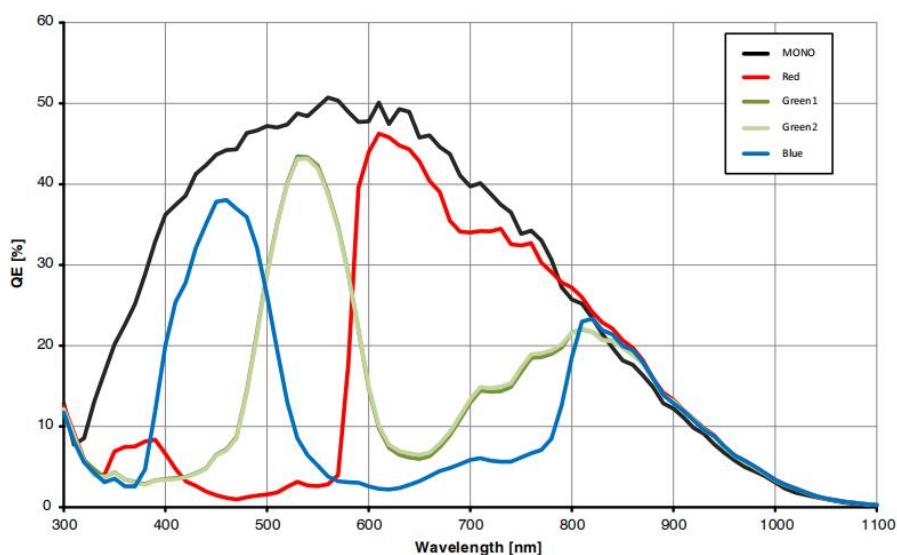


Figure 9- 1 IUD16000KMA spectral response curve

## 9.2 IUD25000KMA(NIR)

Table 9- 2 IUD25000KMA camera specifications

Parameter \ Model	IUD25000KMA
	25M 2.04" CMOS USB3.0 industrial camera
<b>Camera Parameters</b>	
Sensor model	PYTHON 25K
Pixel size	4.5 μm x 4.5 μm
Sensor size	2.04"
Frame rate	14.8fps@5120x5120 14.8fps@2560x2560 14.8fps@1664x1664
Dynamic range	59dB
Signal-to-Noise ratio	41dB
Sensitivity	<1/5000
Dark current	3.9e-/s@ 20°C
Gain range	1x-50x
Exposure time	1us-60s
Shutter	Global shutter
Binning	Hardware 1x1, 2x2, 3x3
Data interface	USB3.0(USB3.1 GEN1)
Digital I/O	Two non-isolated input, Three non-isolated output
Data Format	8bit / 12bit
<b>General Specifications</b>	
Power supply	Power with USB3.0
Power consumption	TBD
Temperature	Working temperature -10~50°C, storage temperature -30~70°C
Humidity	20%-80%, no condensation
Size	59mm×59mm×27.2mm
Weight	139.3g
Lens mount	M42-mount
Software	TouView/ SDK
Platform architecture and	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64
Certification	CE, FCC

Quantum Efficiency

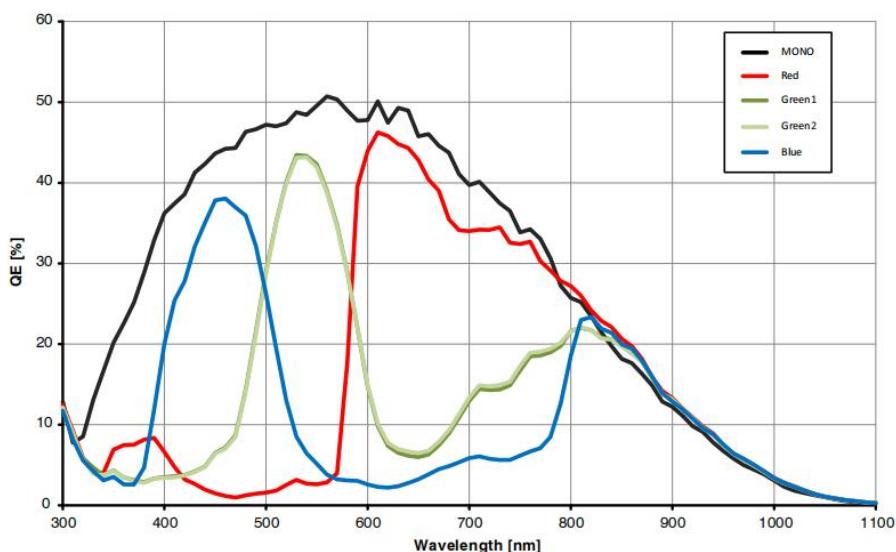


Figure 9- 2 IUD25000KMA spectral response curve

## 10 IUE Series Technical Specifications(1)

### 10.1 IUE1800KMA

Table 10- 1 IUE1800KMAcamera specifications

Parameter	Model	IUE1800KMA
	1.8M CMOS USB3.0 industrial camera	
Camera Parameters		
Sensor model	CMOS Sensor	
Pixel size	96 $\mu\text{m}$ x 96 $\mu\text{m}$	
Sensor size	TBD	
Frame rate	120fps@1200x1536	
Dynamic range	TBD	
Signal-to-Noise ratio	TBD	
Sensitivity	TBD	
Dark current	2200e/s/pixel@25°C	
Gain range	1x-50x	
Exposure time	10us-15s	
Shutter	Rolling shutter	
Binning	Hardware 1x1, 2x2, 3x3	
Data interface	USB3.0(USB3.1 GEN1)	
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB3.0	
Power consumption	TBD	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	220mmx160mmx28.6mm	
Weight	TBD	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

## 11 AVCAM Series Technical Specifications(1)

### 11.1 AVCAM290A

Table 11- 1 AVCAM290A camera specifications

Parameter	Model	AVCAM290A
		4.0M pixels 1/2.8" CMOS CVBS industrial camera
	Camera Parameters	
Sensor model	Sony IMX307	
Pixel size	2.9 μm x 2.9 μm	
Sensor size	1/2.8"	
Frame rate	25fps@720 × 576	
Dynamic range	TBD	
Signal-to-Noise ratio	TBD	
Sensitivity	TBD	
Dark current	2200e/s/pixel@25°C	
Gain range	1x-100x	
Exposure time	105us-20ms	
Shutter	Rolling shutter	
Binning	Hardware 1x1, 2x2, 3x3	
Data interface	CVBS(PAL-N)	
Data Format	8bit / 12bit	
General Specifications		
Power supply	Power with USB2.0	
Power consumption	TBD	
Temperature	Working temperature -10~50°C, storage temperature -30~70°C	
Humidity	20%-80%, no condensation	
Size	45mmx58.5mm	
Weight	TBD	
Lens mount	M12	
Software	ToupView/ SDK	
Platform and architecture	Windows 32-bit/Windows RT/Linux/macOS/Android; x86/x64/ARM HF/ARM EL/ARM64	
Certification	CE, FCC	

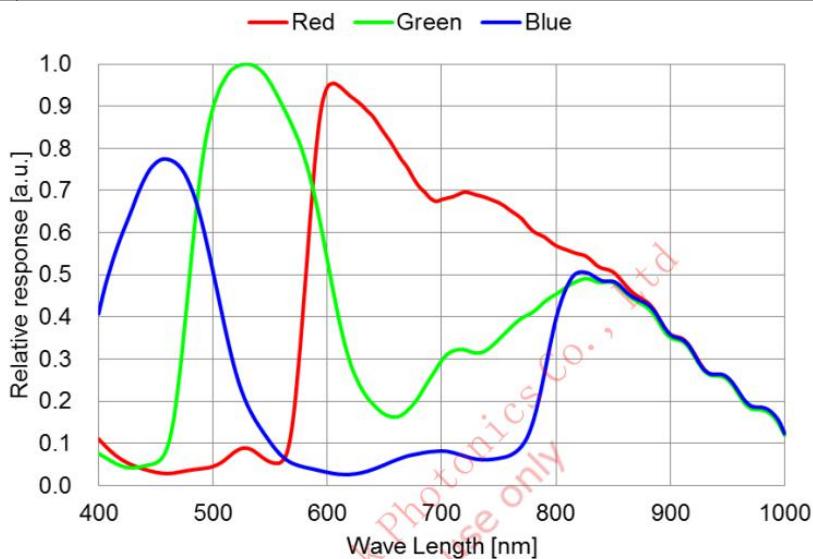


Figure 11- 1 AVCAM290A spectral response curve

## 12 Camera Dimension and Interface

### 12.1 MAX Series USB3 Camera

#### 12.1.1 Mechanical Housing Dimensions

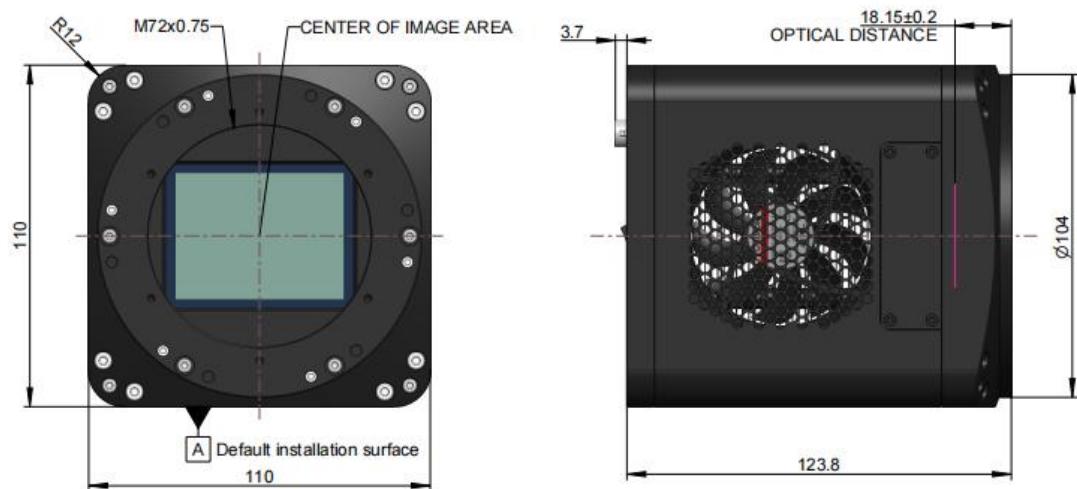


Figure 12- 1 MAX251& MAX151 dimensions (mm)

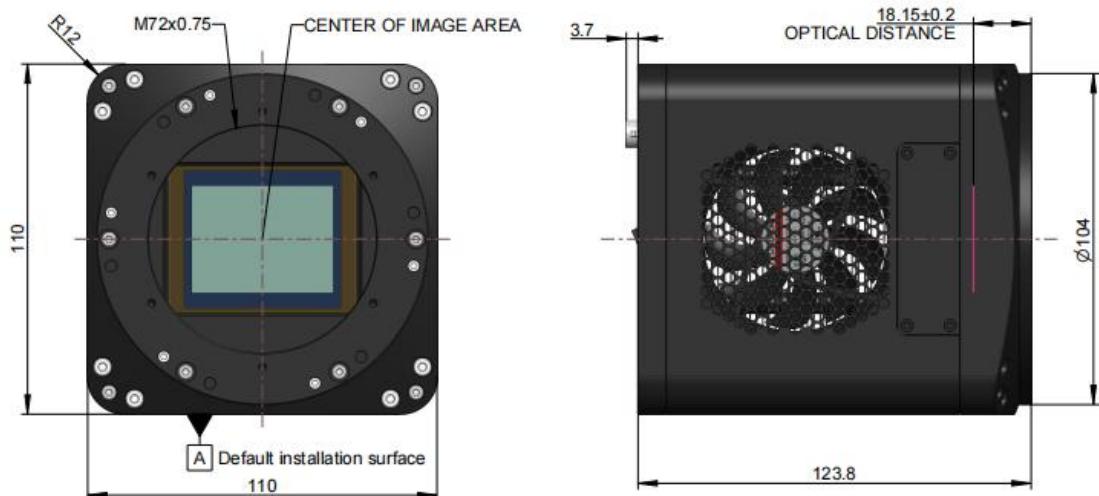


Figure 12- 2 MAX102 dimensions (mm)

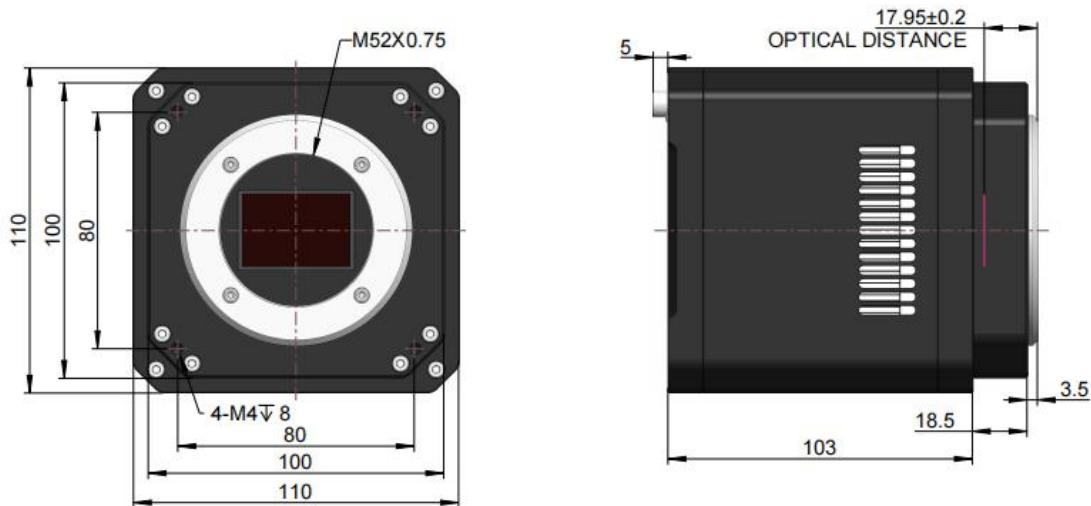


Figure 12- 3 MAX62& MAX24 dimensions (mm)

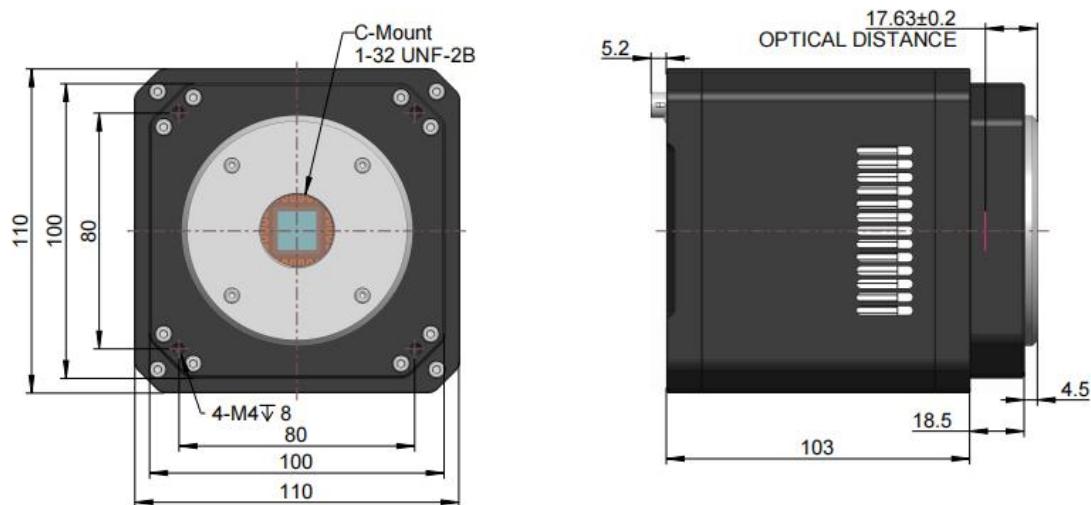


Figure 12- 4 MAX04AM& MAX04AM dimensions (mm)

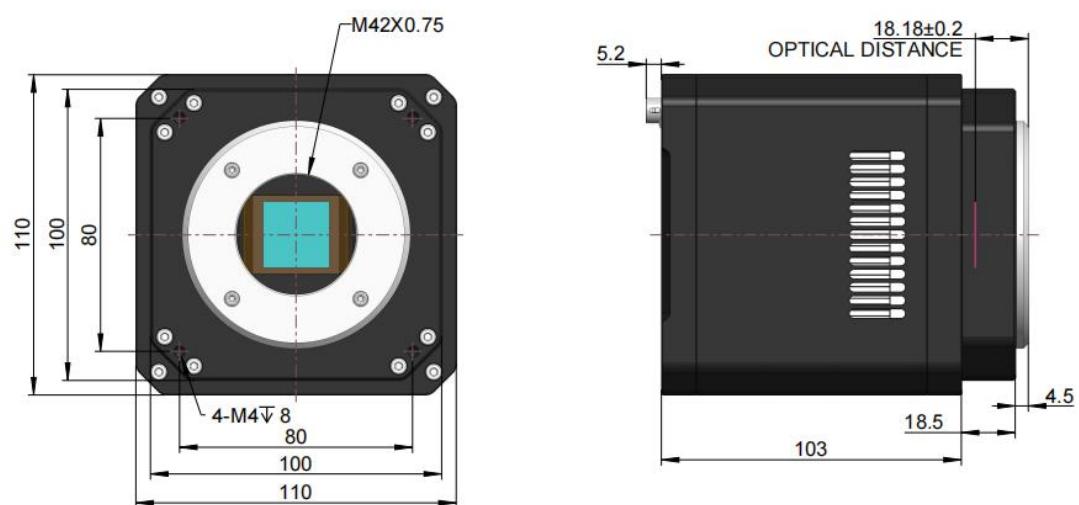


Figure 12- 5 MAX04CM dimensions (mm)

### 12.1.2 Interface Description



Figure 12- 6 MAX251&amp; MAX151&amp;MAX102 Camera interface diagram

Table 12- 1 MAX251&amp; MAX151&amp;MAX102 Camera interface definition

Item	Specification
1	DC 19V power port
2	Trigger 7PIN
3	USB 3.0 port
4	Power switch
5	Power LED indicators
6	System LED indicators
7	TEC LED indicators
8	FAN LED indicators



Figure 12- 7 MAX62&amp; MAX24&amp;MAX04 Camera interface diagram

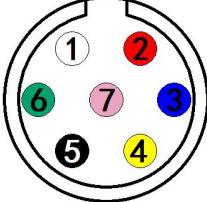
Table 12- 2 MAX62&amp; MAX24&amp;MAX04 Camera interface definition

Item	Specification
1	Trigger 7PIN
2	USB 3.0/ USB 2.0 port
3	DC 19V power port

4	FAN LED indicators
5	TEC LED indicators
6	System LED indicators
7	Power LED indicators

### 12.1.3 Power Supply and I/O Connector

Table 12- 3 MAX series pin signal definition



Color	Pin	Signal	Signal description
White	1	GND	Direct-coupled signal ground
Red	2	19V	19VDC power input or output
Blue	3	OPTO_GND	Opto-isolated signal ground
Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)
Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)
Green	6	OPTO_IN	Opto-isolated input signal (line0)
Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

### 12.1.4 Packing Information

Table 12- 4 Recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
	Power adapter	1	Input: AC 100~240V 50Hz/60Hz, output: DC 19V 4A
2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	USB3.0 or Micro USB3.0 cable
4	Lens (optional)	1	M72 or M52 or M42 or C-mount lens

## 12.2 MAX Series GigE Camera

### 12.2.1 Mechanical Housing Dimensions

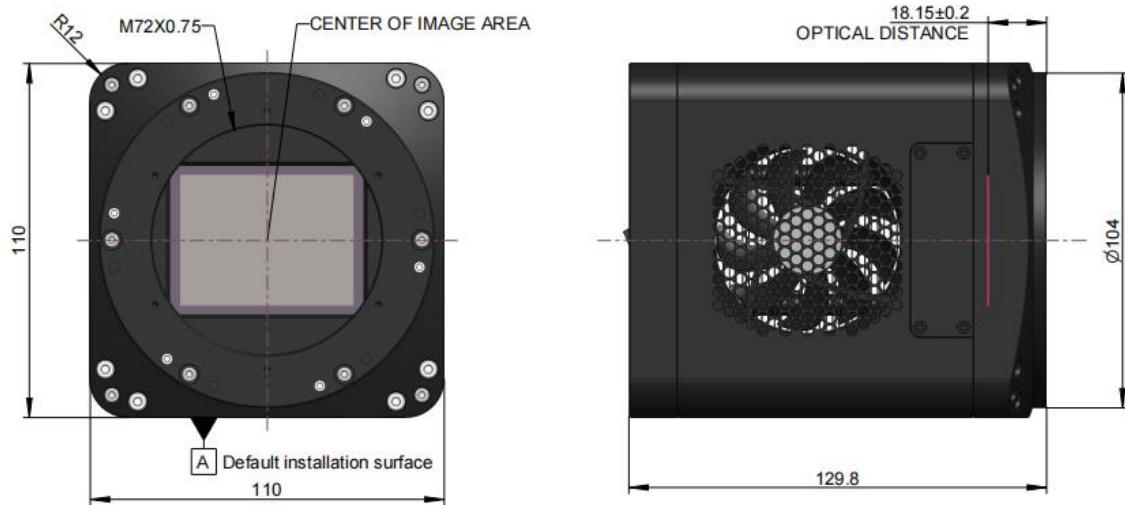


Figure 12- 8 MAX251& MAX151 dimensions (mm)

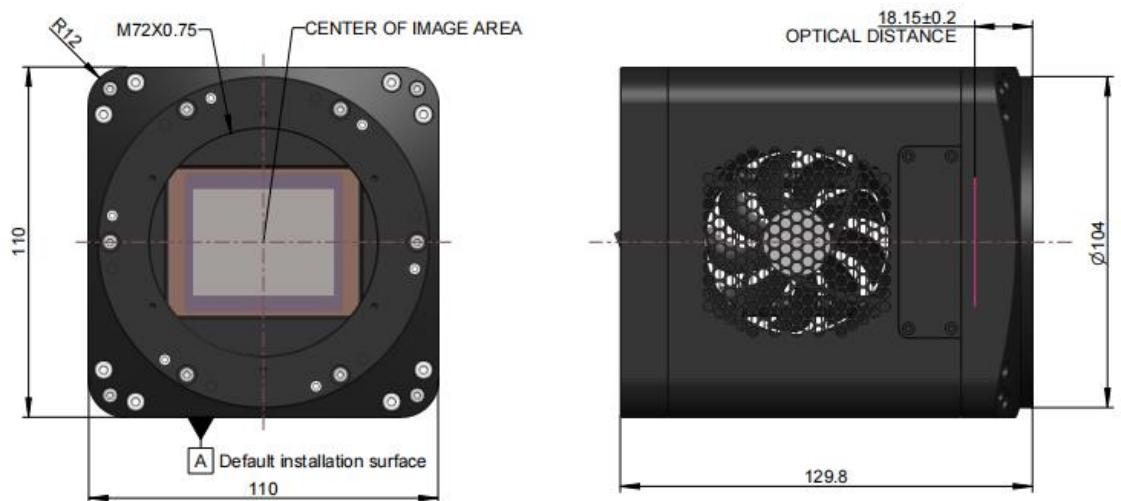


Figure 12- 9 MAX102 dimensions (mm)

### 12.2.2 Interface Description



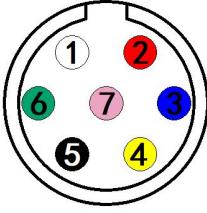
Figure 12- 10 MAX251&amp; MAX151&amp;MAX102 Camera interface diagram

Table 12- 5 MAX251&amp; MAX151&amp;MAX102 Camera interface definition

Item	Specification
1	DC 19V power port
2	Trigger 7PIN
3	10GigE port
4	Power switch
5	Power LED indicators
6	System LED indicators
7	TEC LED indicators
8	FAN LED indicators

### 12.2.3 Power Supply and I/O Connector

Table 12- 6 MAX series pin signal definition



Color	Pin	Signal	Signal description
White	1	GND	Direct-coupled signal ground
Red	2	19V	19VDC power input or output
Blue	3	OPTO_GND	Opto-isolated signal ground
Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)
Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)
Green	6	OPTO_IN	Opto-isolated input signal (line0)
Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

### 12.2.4 Packing Information

Table 12- 7 Recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
	Power adapter	1	Input: AC 100~240V 50Hz/60Hz, output: DC 19V 4A
2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	GigE cable
4	Lens (optional)	1	M72 or M52 or M42 or C-mount lens

## 12.3 ITR3CMOS Series USB3 Camera

### 12.3.1 Mechanical Housing Dimensions

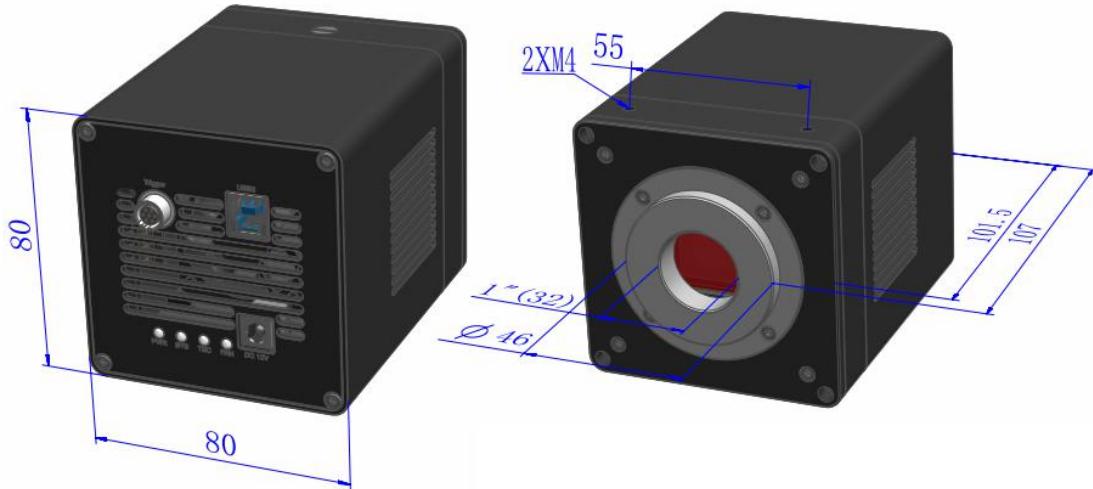


Figure 12- 11 ITR3CMOS dimensions (mm)

### 12.3.2 Interface Description

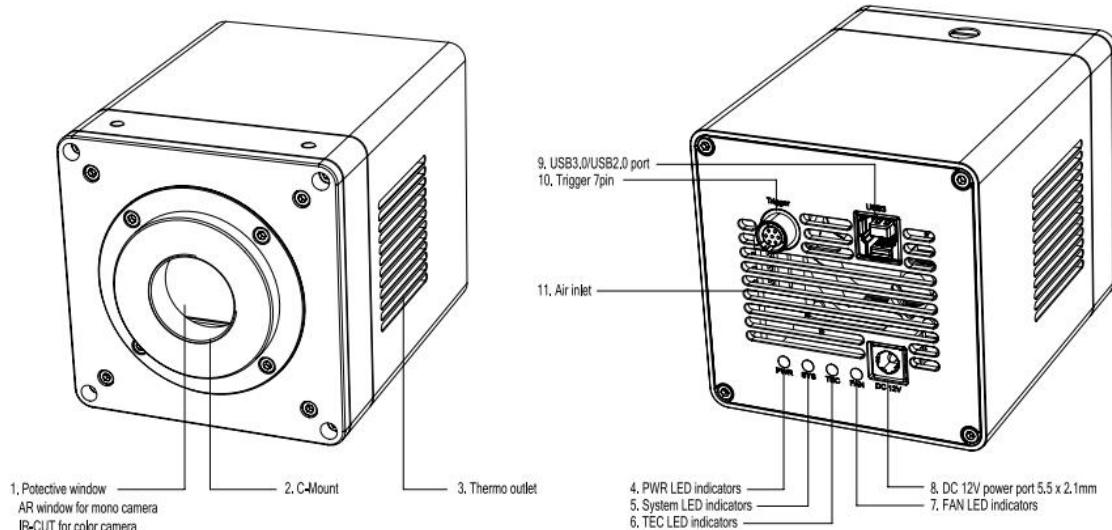


Figure 12- 12 ITR3CMOS Camera interface diagram

Table 12- 8 ITR3CMOS Camera interface definition

Item	Specification
1	Protective window: AR window for mono camera; IR-CUT for color camera
2	C mount
3	Thermo outlet
4	Power LED indicators
5	System LED indicators
6	TEC LED indicators
7	FAN LED indicators
8	DC 12V power port
9	USB 3.0/ USB 2.0 port
10	Trigger 7PIN

### 12.3.3 Power Supply and I/O Connector

Table 12- 9 MAX series pin signal definition

Color	Pin	Signal	Signal description
White	1	GND	Direct-coupled signal ground
Red	2	12V	12VDC power input or output
Blue	3	OPTO_GND	Opto-isolated signal ground
Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)
Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)
Green	6	OPTO_IN	Opto-isolated input signal (line0)
Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

### 12.3.4 Packing Information

Table 12- 10 Recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
	Power adapter	1	Input: AC 100~240V 50Hz/60Hz, output: DC 12V 3A
2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	USB3.0 cable
4	Lens (optional)	1	C-mount lens

## 12.4 ITR3CMOS Series GigE Camera

### 12.4.1 Mechanical Housing Dimensions

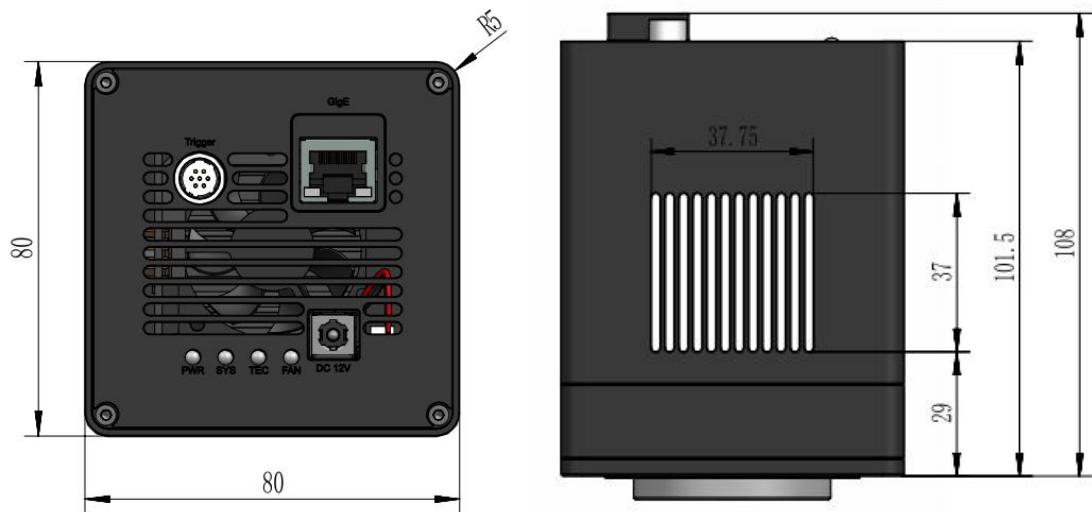


Figure 12- 13 ITR3CMOS dimensions (mm)

### 12.4.2 Interface Description

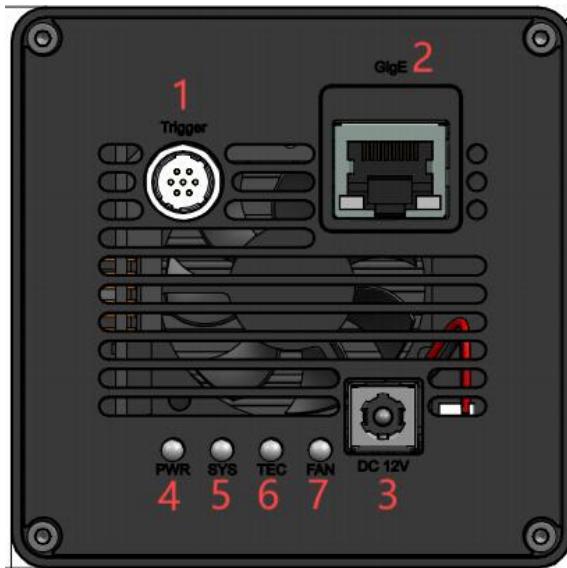


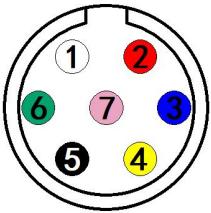
Figure 12- 14 ITR3CMOS Camera interface diagram

Table 12- 11 ITR3CMOS Camera interface definition

Item	Specification
1	Trigger 7PIN
2	GigE port
3	DC 12V power port
4	Power LED indicators
5	System LED indicators
6	TEC LED indicators
7	FAN LED indicators

### 12.4.3 Power Supply and I/O Connector

Table 12- 12 ITR3CMOS series pin signal definition



Color	Pin	Signal	Signal description
White	1	GND	Direct-coupled signal ground
Red	2	12V	12VDC power input or output
Blue	3	OPTO_GND	Opto-isolated signal ground
Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)
Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)
Green	6	OPTO_IN	Opto-isolated input signal (line0)
Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

#### 12.4.4 Packing Information

Table 12- 13 Recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
	Power adapter	1	Input: AC 100~240V 50Hz/60Hz, output: DC 12V 3A
2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	GigE cable
4	Lens (optional)	1	C-mount lens

## 12.5 CTR3CMOS Series USB3 Camera

### 12.5.1 Mechanical Housing Dimensions



Figure 12-15 CTR3CMOS dimensions (mm)

### 12.5.2 Interface Description

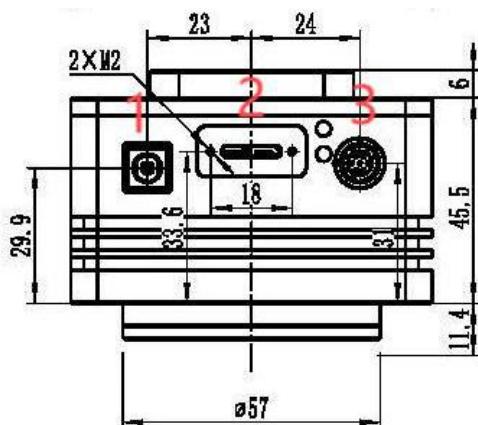


Figure 12-16 CTR3CMOS Camera interface diagram

Table 12-14 CTR3CMOS Camera interface definition

Item	Specification
1	DC 12V power port
2	USB 3.0 port
3	Trigger 7PIN

### 12.5.3 Power Supply and I/O Connector

Table 12-15 CTR3CMOS series pin signal definition

Color	Pin	Signal	Signal description
White	1	GND	Direct-coupled signal ground
Red	2	12V	12VDC power input or output
Blue	3	OPTO_GND	Opto-isolated signal ground
Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)
Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)
Green	6	OPTO_IN	Opto-isolated input signal (line0)
Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

### 12.5.4 Packing Information

Table 12- 16 Recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
	Power adapter	1	Input: AC 100~240V 50Hz/60Hz, output: DC 12V 3A
2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	Micro USB3.0 cable
4	Lens (optional)	1	C-mount lens

## 12.6 CTR3CMOS Series GigE Camera

### 12.6.1 Mechanical Housing Dimensions

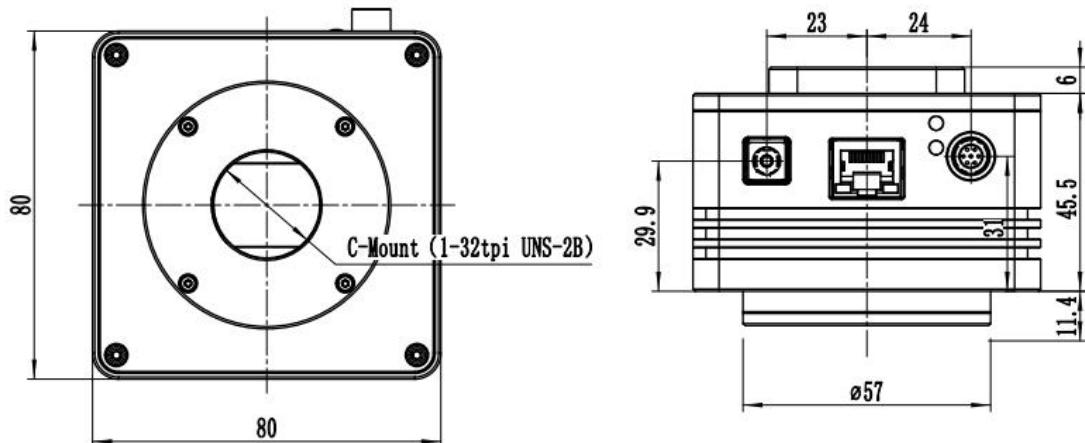


Figure 12-17 CTR3CMOS dimensions (mm)

### 12.6.2 Interface Description

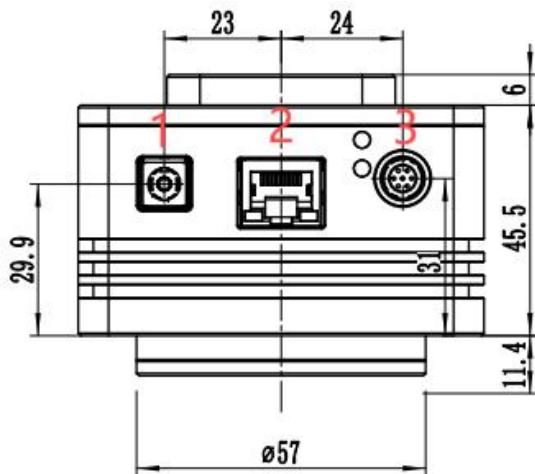


Figure 12-18 CTR3CMOS Camera interface diagram

Table 12-17 CTR3CMOS Camera interface definition

Item	Specification
1	DC 12V power port
2	GigE port
3	Trigger 7PIN

### 12.6.3 Power Supply and I/O Connector

Table 12-18 CTR3CMOS series pin signal definition

Color	Pin	Signal	Signal description
White	1	GND	Direct-coupled signal ground
Red	2	12V	12VDC power input or output
Blue	3	OPTO_GND	Opto-isolated signal ground
Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)
Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)
Green	6	OPTO_IN	Opto-isolated input signal (line0)
Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

## 12.6.4 Packing Information

Table 12- 19 Recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
	Power adapter	1	Input: AC 100~240V 50Hz/60Hz, output: DC 12V 3A
2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	GigE cable
4	Lens (optional)	1	C-mount lens

## 12.7 I3 Series USB3 Camera

### 12.7.1 33mm Mechanical Housing Dimensions

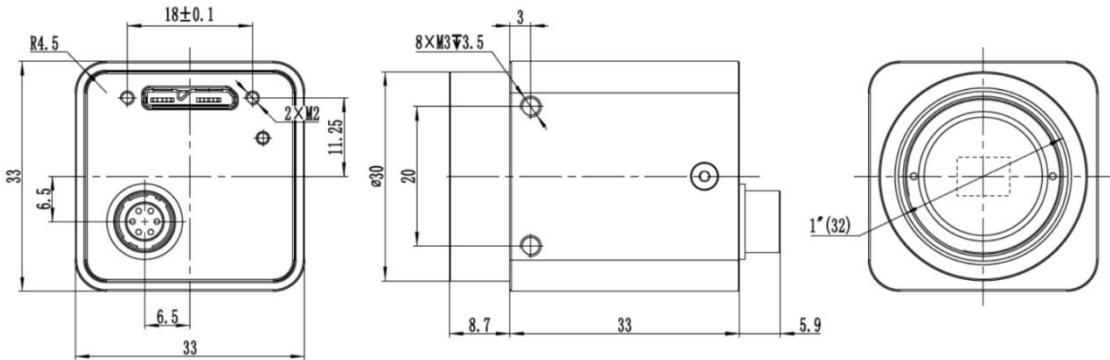


Figure 12- 19 Dimensions of camera housing(mm)

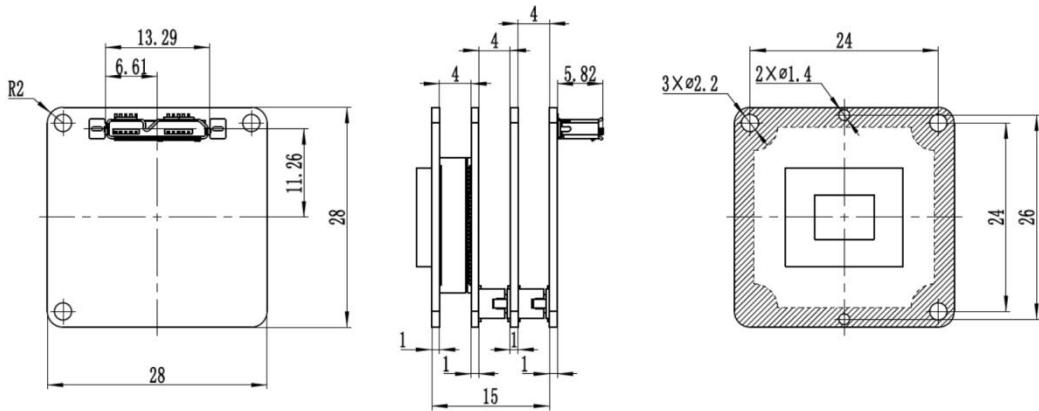


Figure 12- 20 Dimensions of circuit board(mm)

### 12.7.2 38mm Mechanical Housing Dimensions

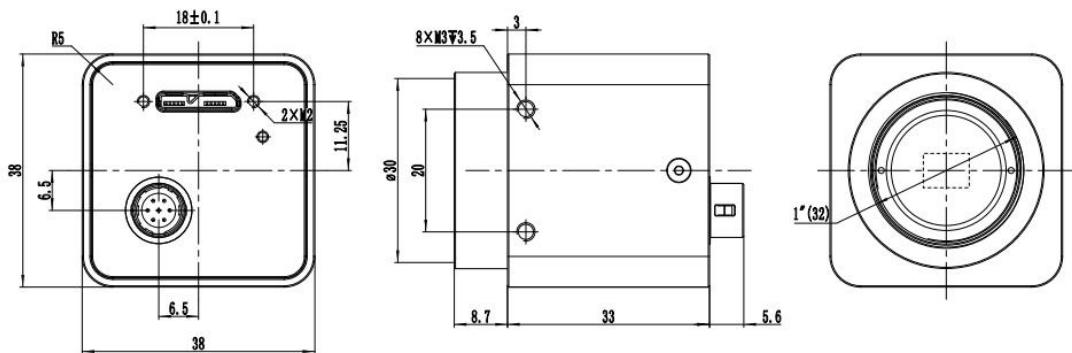


Figure 12- 21 Dimensions of camera housing(mm)

### 12.7.3 Interface Description

The back of the industrial camera is shown in Figure 12-22. It has standard USB3.0 output, 6 Pin I/O port (aviation head) and on/off indicator. It has two M2 screw holes on both sides of USB 3.0 port to fix the cable. The holes reduce cable loosening caused by field vibration.

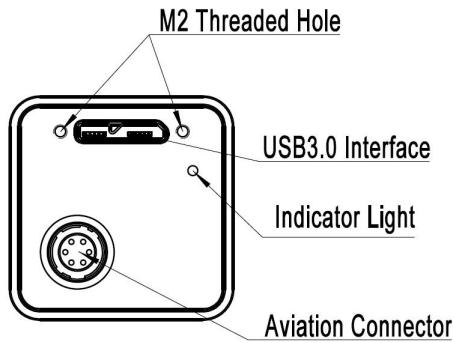


Figure 12- 22 Schematic diagram of camera back panel

#### 12.7.4 Power Supply and I/O Connector

The hardware version number of model I3CMOS00500KMA and I3ISPM00500KPA is V1, and the other models is V2.

The pin signal definition for the camera 6 Pin I/O connector of hardware version V1 is shown in Table 12- 20.

Table 12- 20 Pin signal definition

Color	Pin	Signal	Signal description
red	1	DIR_IN	Direct-coupled input signal (line2)
white	2	OPTO_GND	Opto-isolated signal ground
blue	3	OPTO_OUT	Opto-isolated output signal(line1)
green	4	OPTO_IN	Opto-isolated input signal(line0)
black	5	GND	Direct-coupled signal ground
yellow	6	DIR_OUT	Direct-coupled output signal(line3)

The pin signal definition for the camera 6 Pin I/O connector with hardware version number V2 and above is shown in Table 12- 21.

Table 12- 21 V2.0 and above pin signal definitions

Color	Pin	Signal	Signal description
red	1	DIR_GPIO	Direct-coupled General Purpose I/O (Software configurable input / output) (line2)
white	2	OPTO_GND	Opto-isolated signal ground
blue	3	OPTO_OUT	Opto-isolated output signal(line1)
green	4	OPTO_IN	Opto-isolated input signal(line0)
black	5	GND	Direct-coupled signal ground
yellow	6	5V	5 VDC power input

#### 12.7.5 Packing Information

Table 12- 22 Packing information and recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
2	I/O cable	1	6 Pin cable or extended cable
3	Cable	1	Micro USB3.0 cable
4	Lens (optional)	1	C-mount lens

## 12.8 I3 Series GigE Camera

### 12.8.1 Mechanical Housing Dimensions

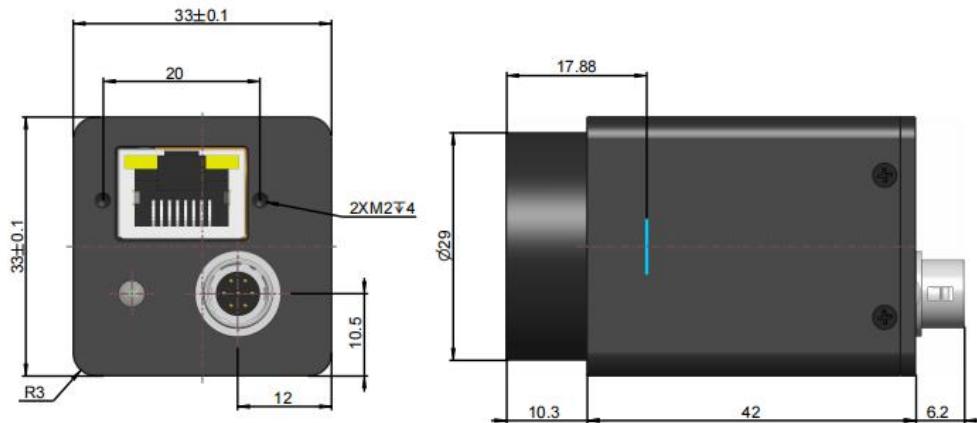


Figure 12- 23 Dimensions of camera housing(mm)

### 12.8.2 Interface Description

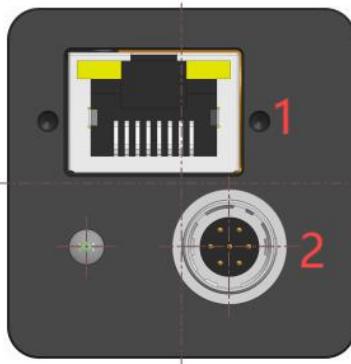


Figure 12- 24 Schematic diagram of camera back panel

Table 12- 23 I3 Camera interface definition

Item	Specification
1	GigE port
2	Trigger 7PIN

### 12.8.3 Power Supply and I/O Connector

Table 12- 24 Pin signal definition

	Color	Pin	Signal	Signal description
	White	1	GND	Direct-coupled signal ground
	Red	2	12V	12VDC power input or output
	Blue	3	OPTO_GND	Opto-isolated signal ground
	Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)
	Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)
	Green	6	OPTO_IN	Opto-isolated input signal (line0)
	Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

### 12.8.4 Packing Information

Table 12- 25 Packing information and recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	GigE cable

4	Lens (optional)	1	C-mount lens
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## 12.9 I3 Series CoaXPress Camera

### 12.9.1 Mechanical Housing Dimensions

Figure 12- 25 Dimensions of camera housing(mm)

### 12.9.2 Interface Description

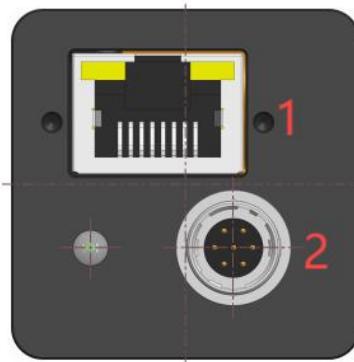


Figure 12- 26 Schematic diagram of camera back panel

Table 12- 26 I3 Camera interface definition

Item	Specification
1	CoaXPress Interface
2	Trigger 7PIN

### 12.9.3 Power Supply and I/O Connector

Table 12- 27 Pin signal definition

Color	Pin	Signal	Signal description
White	1	GND	Direct-coupled signal ground
Red	2	12V	12VDC power input or output
Blue	3	OPTO_GND	Opto-isolated signal ground
Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)
Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)
Green	6	OPTO_IN	Opto-isolated input signal (line0)
Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

#### 12.9.4 Packing Information

Table 12- 28 Packing information and recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	CoaXPress cable
4	Lens (optional)	1	C-mount lens

## 12.10 IUA Series USB3 Camera

### 12.10.1 Mechanical Housing Dimensions

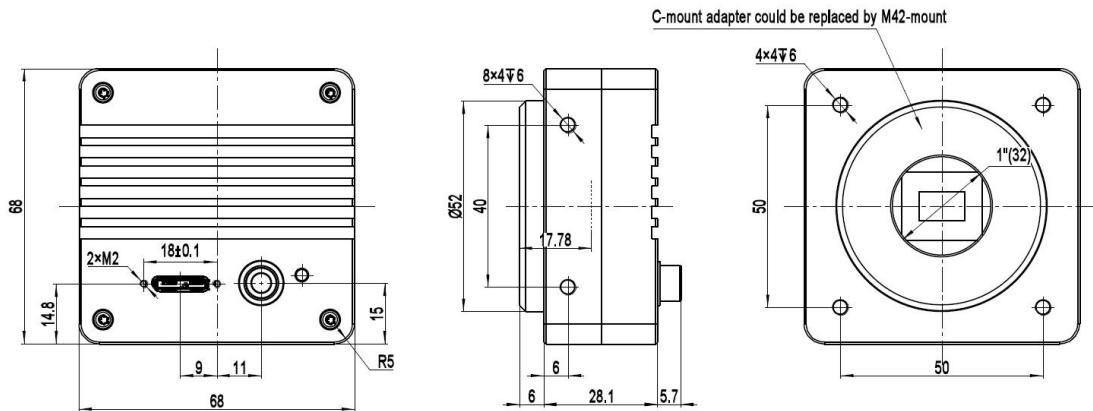


Figure 12- 27 Dimensions of IUA camera housing (mm)

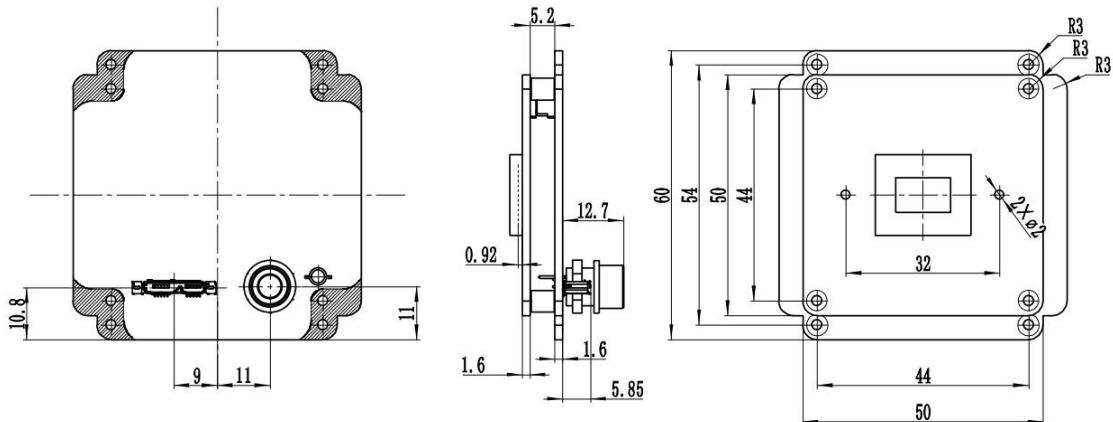


Figure 12- 28 Dimensions of IUA circuit board (mm)

### 12.10.2 Interface Description

The back of the industrial camera is shown in Figure 12-27. It has standard USB3.0 output, 7 Pin I/O port (aviation head) and on/off indicator. It has two M2 screw holes on both sides of USB 3.0 port to fix the cable. The holes reduce cable loosening caused by field vibration.

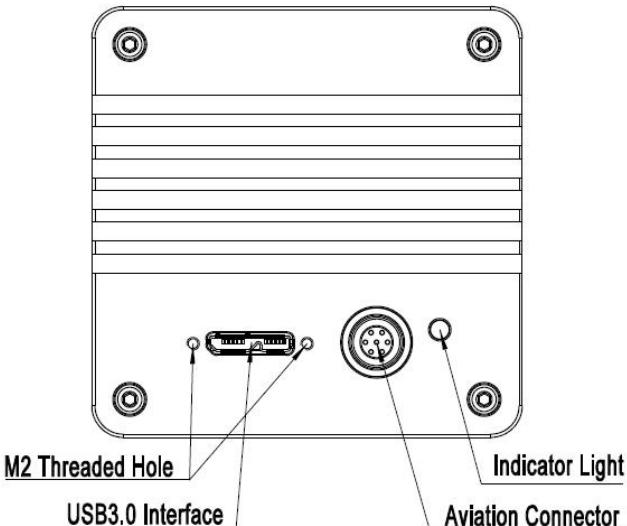


Figure 12- 29 Schematic diagram of IUA camera back panel

### 12.10.3 Power Supply and I/O Connector

Table 12- 29 IUA series pin signal definition

Color	Pin	Signal	Signal description
White	1	GND	Direct-coupled signal ground
Red	2	12V	12VDC power input or output
Blue	3	OPTO_GND	Opto-isolated signal ground
Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)
Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)
Green	6	OPTO_IN	Opto-isolated input signal (line0)
Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

### 12.10.4 Packing Information

Table 12- 30 Recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	Micro USB3.0 cable
4	Lens (optional)	1	C-mount lens

## 12.11 IUB Series USB3 Camera

### 12.11.1 Mechanical Housing Dimensions

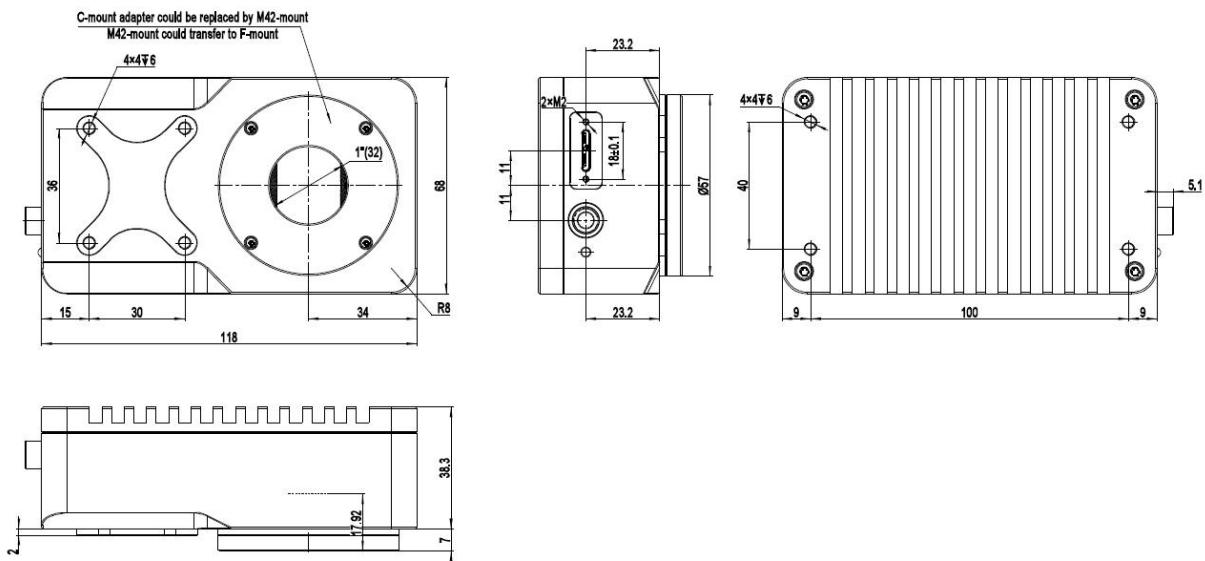


Figure 12- 30 Dimensions of IUB camera housing (mm)

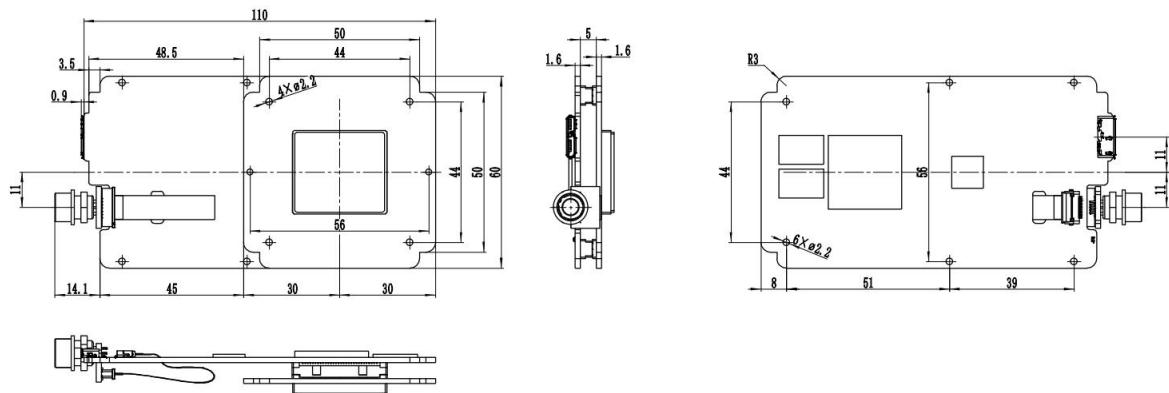


Figure 12- 31 Dimensions of IUB circuit board (mm)

### 12.11.2 Interface Description

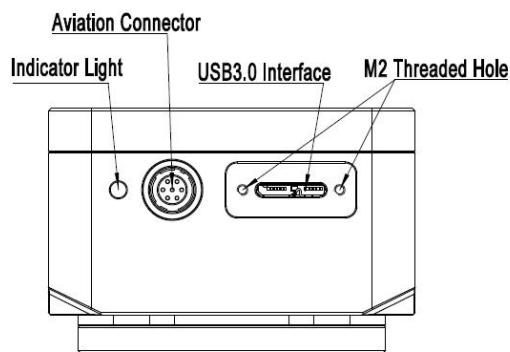


Figure 12- 32 Schematic diagram of IUB camera back panel

### 12.11.3 Power Supply and I/O Connector

Table 12- 31 IUB series pin signal definitions

Icon	Color	Pin	Signal	Signal description
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White	1	GND	Direct-coupled signal ground
Red	2	12V	12VDC power input or output
Blue	3	OPTO_GND	Opto-isolated signal ground
Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)
Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)
Green	6	OPTO_IN	Opto-isolated input signal (line0)
Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

## 12.11.4 Packing Information

Table 12- 32 Recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	Micro USB3.0 cable
4	Power	1	12V/3A air plug power adapter
5	Lens (optional)	1	C-mount lens

## 12.12 IUC Series USB3 Camera

### 12.12.1 Mechanical Housing Dimensions

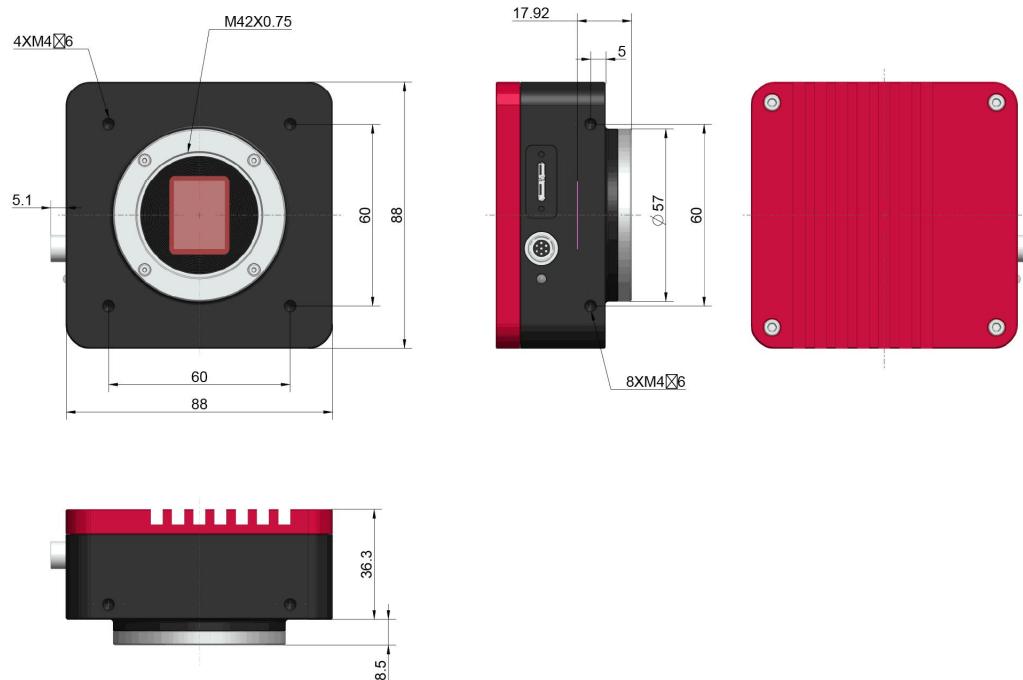


Figure 12- 33 Dimensions of IUC camera housing (mm)

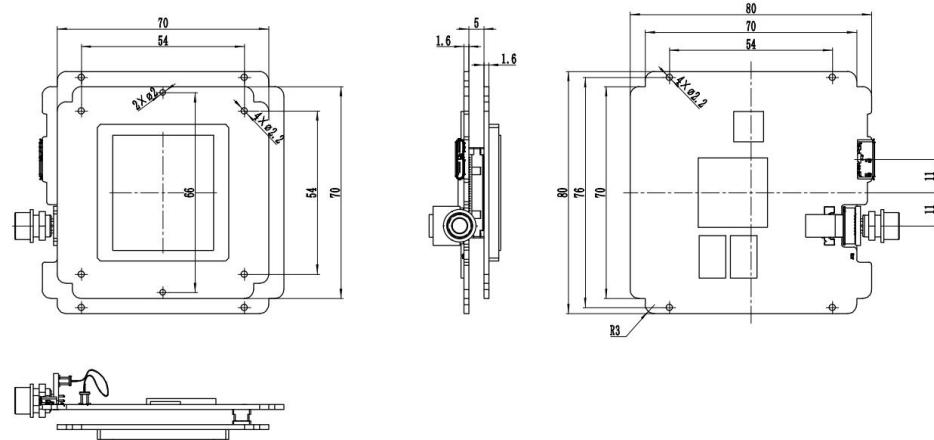


Figure 12- 34 Dimensions of IUC circuit board (mm)

## 12.12.2 Interface Description

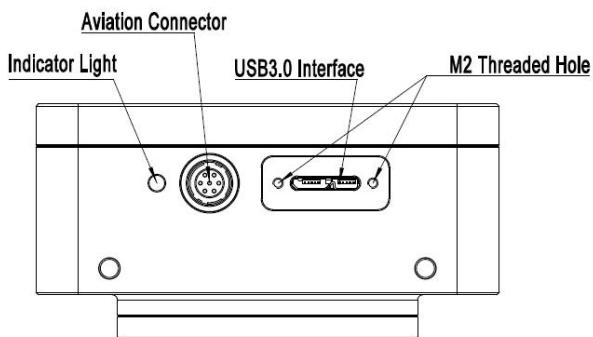


Figure 12- 35 Schematic diagram of IUC camera

## 12.12.3 Power Supply and I/O Connector

Table 12- 33 IUC series pin signal definitions

Color	Pin	Signal	Signal description
White	1	GND	Direct-coupled signal ground
Red	2	12V	12VDC power input or output
Blue	3	OPTO_GND	Opto-isolated signal ground
Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)
Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)
Green	6	OPTO_IN	Opto-isolated input signal (line0)
Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

## 12.12.4 Packing Information

Table 12- 34 Recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	Micro USB3.0 cable
4	Power	1	12V/3A air plug power adapter
5	Lens (optional)	1	C-mount lens

## 12.13 IUC Series GigE Camera

### 12.13.1 Mechanical Housing Dimensions

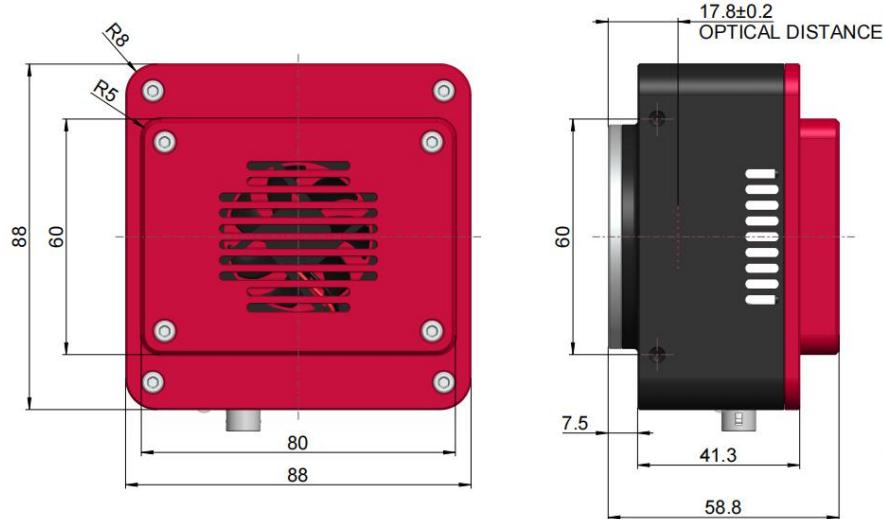


Figure 12- 36 Dimensions of IUC camera housing (mm)

### 12.13.2 Interface Description

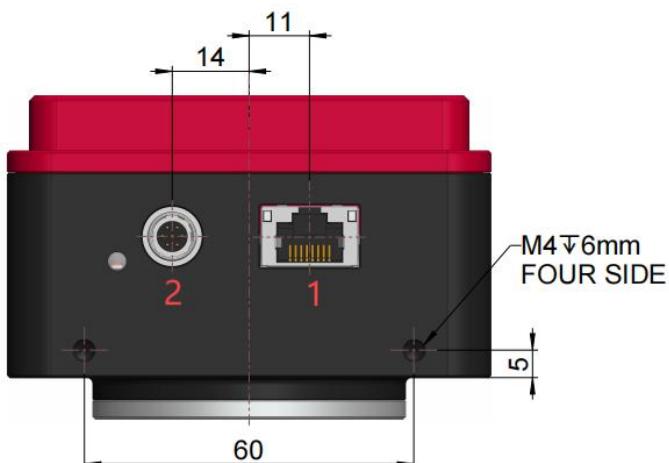


Figure 12- 37 Schematic diagram of IUC camera

Table 12- 35 IUC Camera interface definition

Item	Specification
1	10GigE port
2	Trigger 7PIN

### 12.13.3 Power Supply and I/O Connector

Table 12- 36 IUC series pin signal definitions

Color	Pin	Signal	Signal description
White	1	GND	Direct-coupled signal ground
Red	2	12V	12VDC power input or output
Blue	3	OPTO_GND	Opto-isolated signal ground
Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)
Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)
Green	6	OPTO_IN	Opto-isolated input signal (line0)

	Pink	7	OPTO_OUT	Opto-isolated output signal (line1)
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### 12.13.4Packing Information

Table 12- 37 Recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	GigE cable
4	Power	1	12V/3A air plug power adapter
5	Lens (optional)	1	M42-mount lens

## 12.14 IUC Series CameraLink Camera

### 12.14.1 Mechanical Housing Dimensions

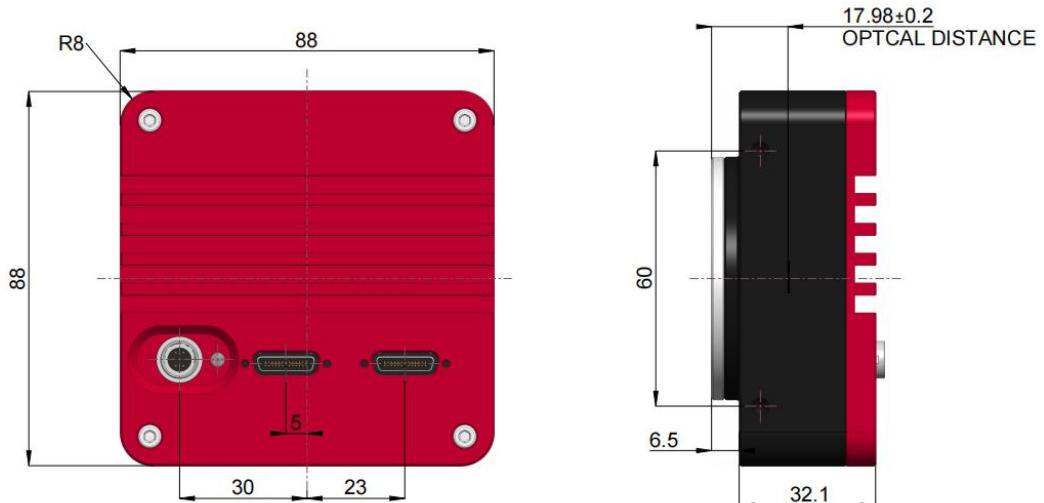


Figure 12- 38 Dimensions of IUC camera housing (mm)

### 12.14.2 Interface Description

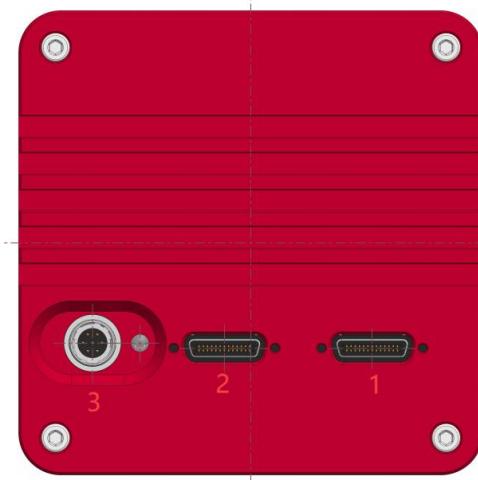


Figure 12- 39 Schematic diagram of IUC camera

Table 12- 38 IUC Camera interface definition

Item	Specification
1	CameraLink1
2	CameraLink2
3	Trigger 7PIN

### 12.14.3 Power Supply and I/O Connector

Table 12- 39 IUC series pin signal definitions

	Color	Pin	Signal	Signal description
	White	1	GND	Direct-coupled signal ground
Red	2	12V	12VDC power input or output	
Blue	3	OPTO_GND	Opto-isolated signal ground	
Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)	
Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)	

	Green	6	OPTO_IN	Opto-isolated input signal (line0)
	Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

## 12.14.4Packing Information

Table 12- 40 Recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	CameraLinkcable
4	Power	1	12V/3A air plug power adapter
5	Lens (optional)	1	C-mount lens

## 12.15 IUD Series USB3 Camera

### 12.15.1 Mechanical Housing Dimensions

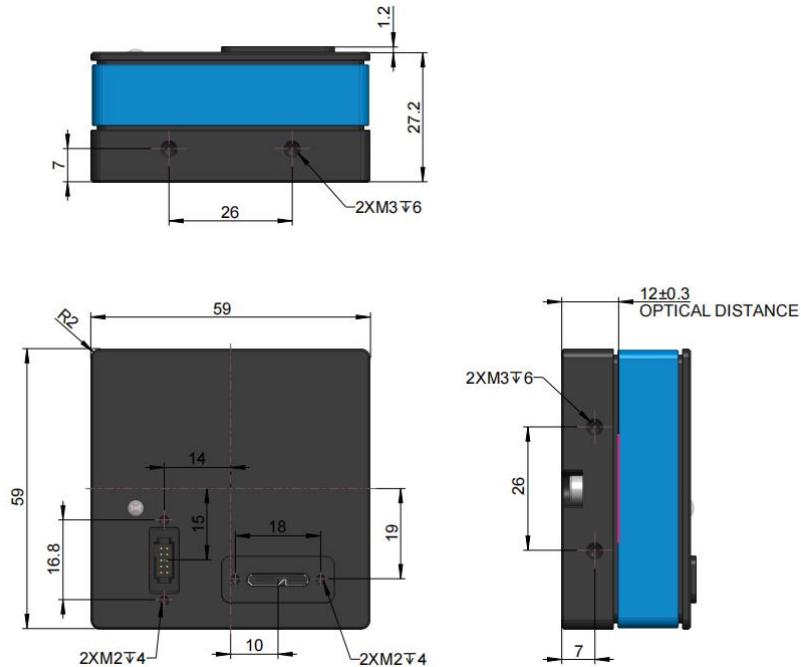


Figure 12- 40 Dimensions of IUD camera housing (mm)

### 12.15.2 Interface Description

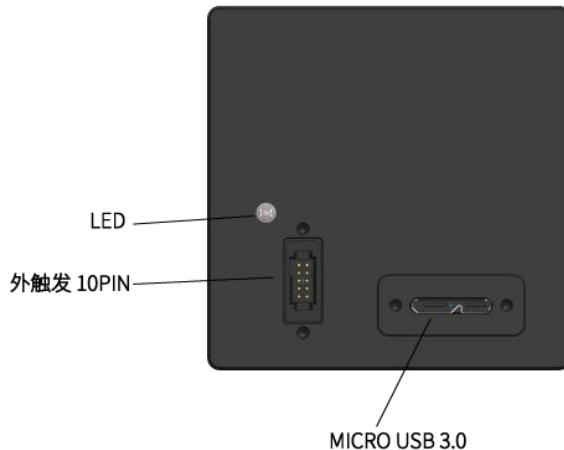


Figure 12- 41 Schematic diagram of IUD camera

### 12.15.3 Power Supply and I/O Connector

Table 12- 41 IUD series pin signal definitions

	Pin	Signal	Signal description	
Chassis	10	GND	Power ground	
GPO 2	8	12V	12VDC power	
GPO 1	6	GPI_GND	General Input Common Ground	
GPO-Power	4	GPO-POWER	General Output Common Power	
PWR-VCC	2	5	GPI1	General External Input 1
		6	GPO1	General External Output 1
		7	GPI2	Opto-isolated output signal
		8	GPO2	General External Output 2

	9	GPO3	General External Output 3
	10	Chassis	Camera Chassis

## 12.15.4Packing Information

Table 12- 42 Recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual
2	I/O cable	1	10 Pin cable or extended cable
3	Cable	1	Micro USB3.0 cable
4	Power	1	Power adapter for IUD series
5	Lens (optional)	1	M42-mount lens

## 12.16 IUE Series USB3 Camera

### 12.16.1 Mechanical Housing Dimensions

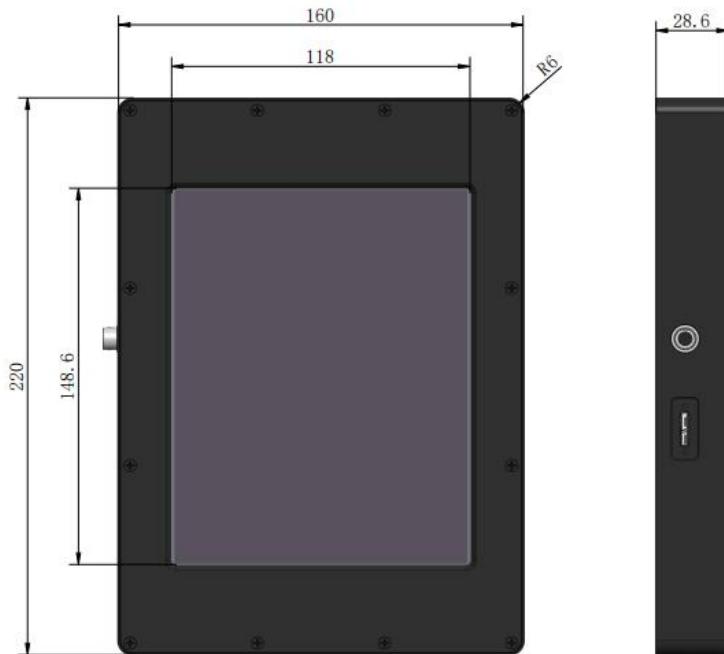


Figure 12- 42 Dimensions of IUE camera housing (mm)

### 12.16.2 Interface Description



Figure 12- 43 Schematic diagram of IUE camera

Table 12- 43 IUE Camera interface definition

Item	Specification
1	USB 3.0 port
2	Trigger 7PIN

### 12.16.3 Power Supply and I/O Connector

Table 12- 44 IUE series pin signal definitions

	Color	Pin	Signal	Signal description
	White	1	GND	Direct-coupled signal ground
	Red	2	12V	12VDC power input or output
	Blue	3	OPTO_GND	Opto-isolated signal ground
	Yellow	4	DIR_GPIO0	Direct-coupled General Purpose I/O (Software configurable input/output) (line2)
	Black	5	DIR_GPIO1	Direct-coupled General Purpose I/O (Software configurable input/output) (line3)
	Green	6	OPTO_IN	Opto-isolated input signal (line0)
	Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

### 12.16.4 Packing Information

Table 12- 45 Recommended accessories

Order number	Accessories name	Quantity	Instruction
1	Camera	1	Camera referred in this manual

2	I/O cable	1	7 Pin cable or extended cable
3	Cable	1	Micro USB3.0 cable
4	Power	1	12V/3A air plug power adapter

## 12.17 AVCAM Series

### 12.17.1 Mechanical Housing Dimensions

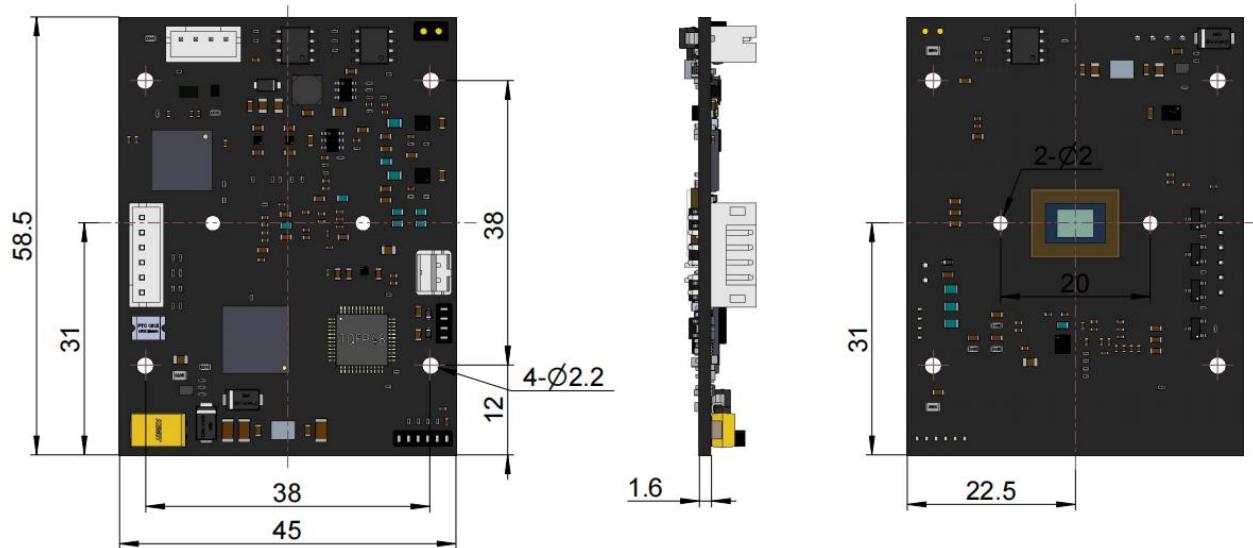


Figure 12- 44 Dimensions of AVCAM(mm)

## 12.18 OEM Series USB3 Camera

### 12.18.1 OEM1 Mechanical Dimensions

The OEM1 camera is provided with a circuit board without a shell, and a flexible PCB is used between the sensor board and the motherboard to facilitate flexible installation of the sensor board.

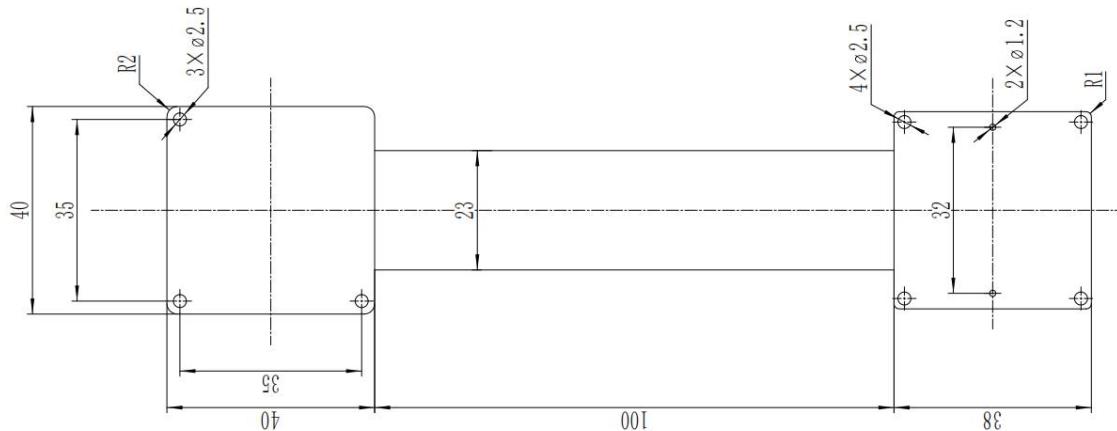


Figure 12- 45 Dimensions of OEM1 circuit board (mm)

### 12.18.2 OEM2 Mechanical Dimensions

The OEM2 camera is provided as a circuit board, has no housing, is 30 x 59 x 8.12(mm) in size, and has a very small width and thickness for use in narrow environments.

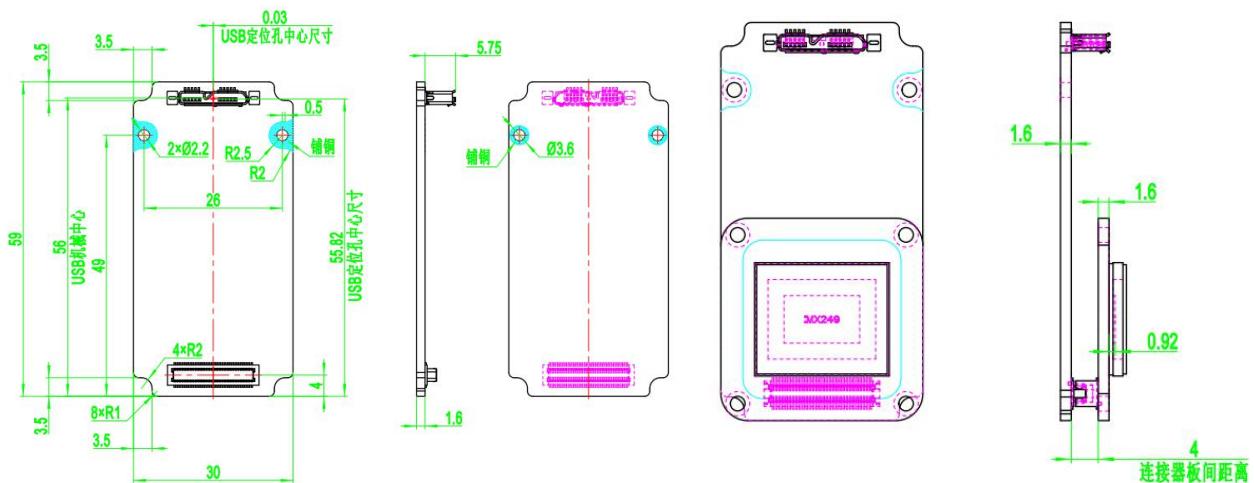


Figure 12- 46 Dimensions of OEM2 circuit board (mm)

### 12.18.3 OEM3 Mechanical Dimensions

The OEM3 camera measures 50 x 50 x 36.1(mm), making it more compact and lighter than the regular IUA series.

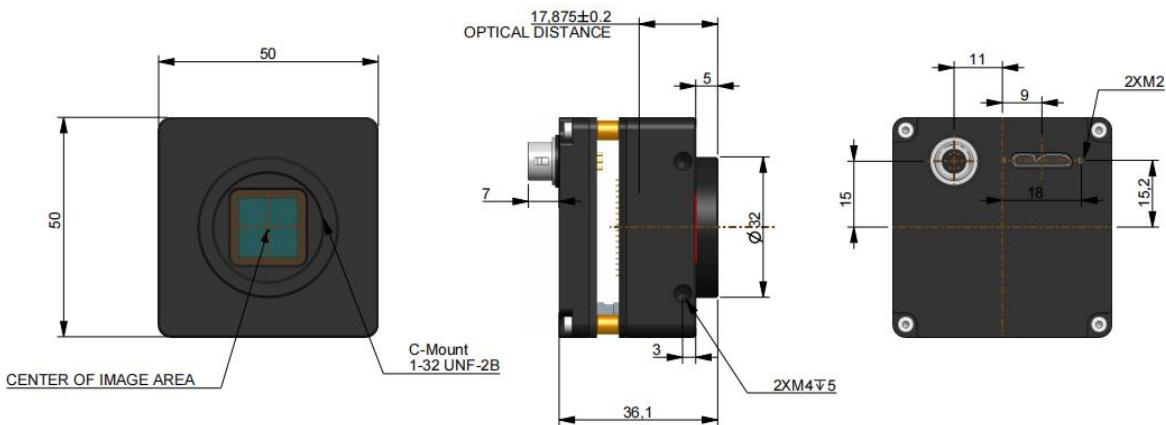


Figure 12- 47 Dimensions of OEM3 camera housing (mm)

### 12.18.4 OEM4 Mechanical Dimensions

The OEM4 camera is provided for the circuit board, no case, the width is extremely narrow, only 19mm, the sensor board and the motherboard are connected with a soft cable, which is easy to install the sensor board flexibly.

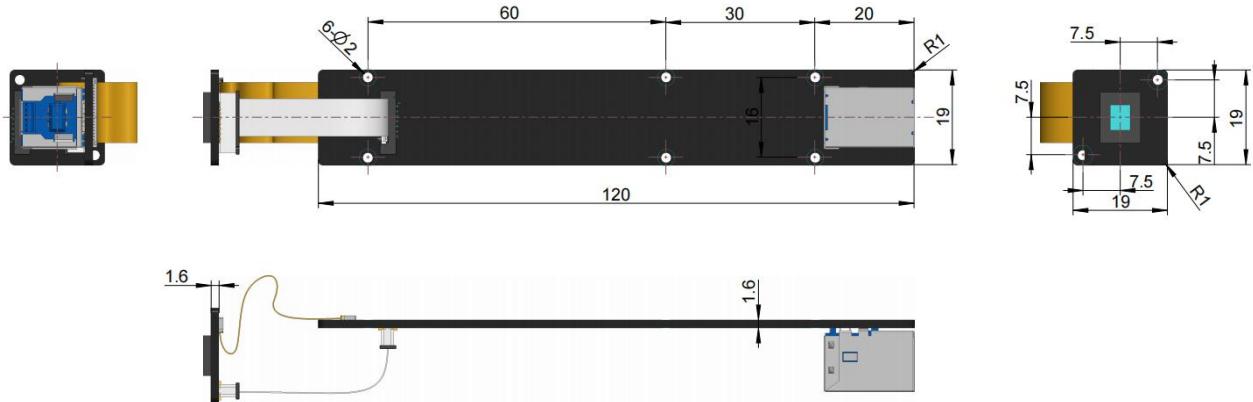


Figure 12- 48 Dimensions of OEM4 circuit board (mm)

## 13 Electrical Characteristics

### 13.1 7PIN I/O Electrical Properties

#### 13.1.1 Opto-isolated Input Circuit (line0)

In the camera I/O control, opto-isolated input circuit is shown in Figure 13- 1.

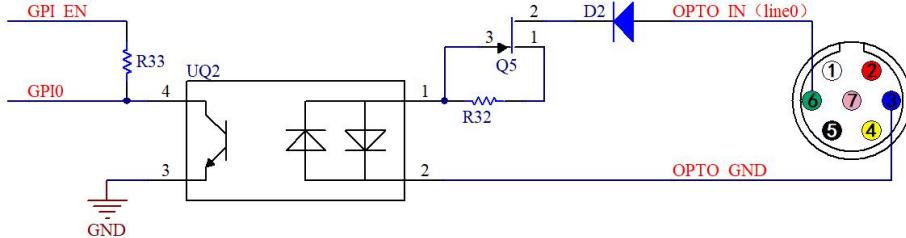


Figure 13- 1 Opto-isolated input circuit

Logic 0 input level: 0~2.2VDC (OPTO\_IN pin)

Logic 1 input level: 3.3~24VDC (OPTO\_IN pin)

Maximum input current: 30mA

The input level is between 2.2V and 3.2V, the circuit action state is uncertain, please avoid the input voltage working in this range.

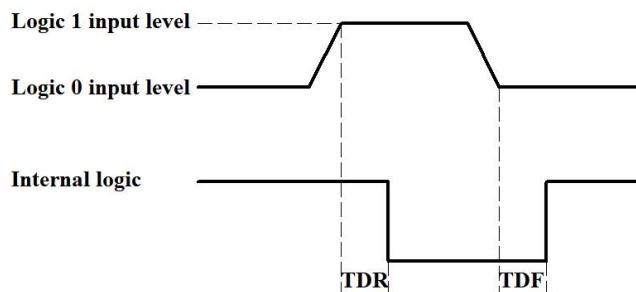


Figure 13- 2 Input logic level

Input rise delay (TDR): 6us

Input drop delay (TDF): 6us

#### 13.1.2 Opto-isolated Output Circuit(line1)

In camera I/O control, opto-isolated output circuit is shown in Figure 13- 3.

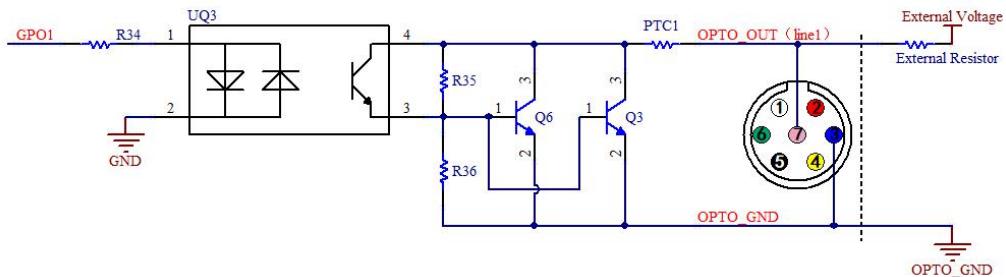


Figure 13- 3 Opto-isolated output circuit

Opto-isolated output maximum current: 30mA

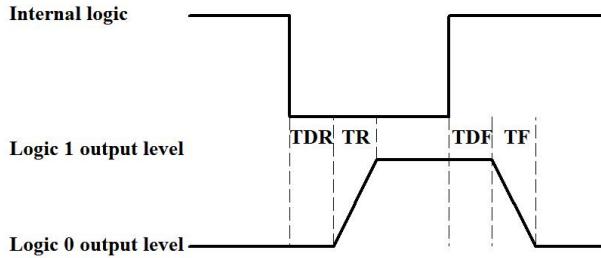


Figure 13-4 Output logic level

The electrical characteristics of the opto-isolated output signal (external voltage 5V, external resistor 1K) are shown in Table 13-1.

Table 13-1 Opto-isolated output signal's electrical characteristics

Parameter name	Parameter symbol	Parameter values
Output logic low level	VL	742mV
Output logic high	VH	4.134V
output rise time	TR	4us
Output downtime	TF	1.8us
Output rising delay	TDR	12us
Output drop delay	TDF	2us

The corresponding current and output logic low level parameters are shown in Table 13-2 when different voltage and resistors are used in external circuit.

Table 13-2 Opto-isolated output logic's low level parameters

External voltage	Non-essential resistance	VL	Output current
3.3V	1KΩ	510mV	2.82mA
5V	1KΩ	742mV	4.31mA
12V	2.4KΩ	795mV	4.68mA
24V	4.7KΩ	850mV	4.97mA

### 13.1.3 Input and Output I/O Circuit(line2/line3)

Non-isolated configurable input, output I/O circuit is shown in Figure 13-5, Figure 13-6.

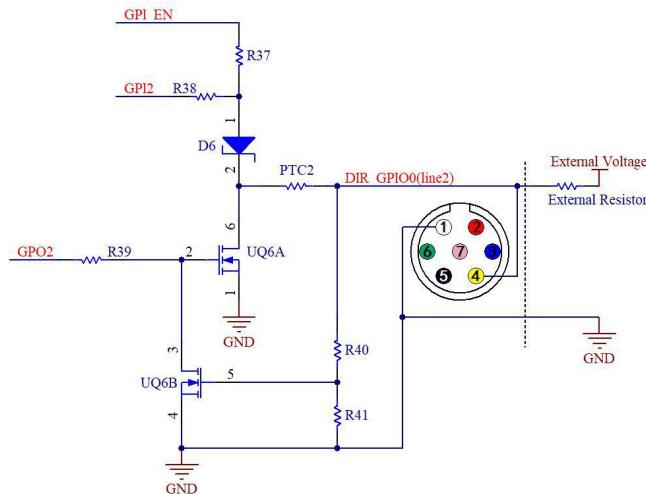


Figure 13-5 Non-isolated configurable input, output I/O circuit (line2)

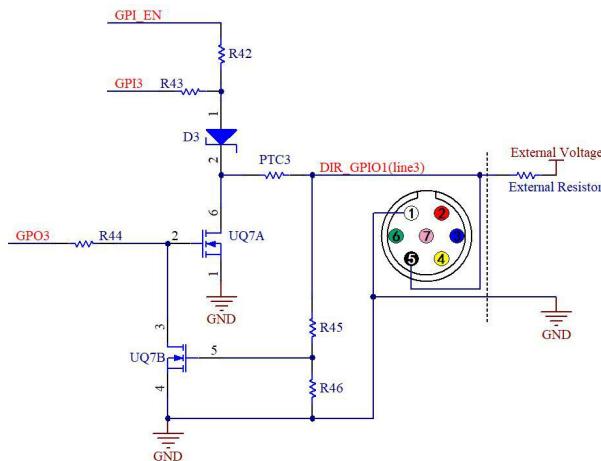


Figure 13- 6 Non-isolated configurable input, output I/ O circuit (line3)

1, Line2/line3 set as input pin:

Logic 0 input level: 0-0.6 VDC (DIR\_GPIO1/DIR\_GPIO2 pin)

Logic 1 input level: 2.0~24VDC (DIR\_GPIO1/DIR\_GPIO2 pin)

Maximum input current: 25mA

The input level is between 0.6V and 2.0V, the circuit action state is uncertain. Please avoid the input voltage working in this range.

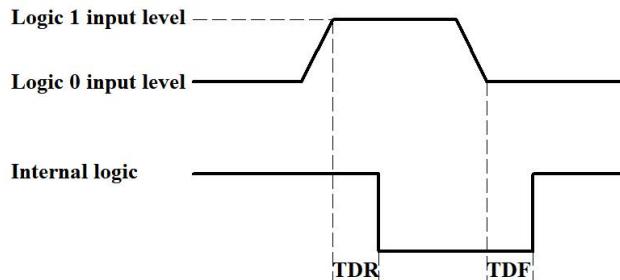


Figure 13- 7 Input logic level

To prevent damage to the GPIO pin, connect the GND pin before entering voltage to the Line2 pin.

Input rise delay (TDR): 0.02us

Input drop delay (TDF): 0.02us

2, Line2/line3 set as output pin

The maximum current allowed through this pin is 25 mA.

When the ambient temperature is 25 degrees Celsius, the relationships between the external voltage, resistance and output low level are shown in Table 13- 3.

Table 13- 3 Non-isolated output logic's low level parameters

External voltage	Non-essential resistance	VL(GPIO)
3.3V	1KΩ	0.11V
5V	1KΩ	0.167V
12V	2.4KΩ	0.184V
24V	4.7KΩ	0.385V

The external pull-up voltage 5V pull-up resistance 1KΩ, GPIO output logic level, electrical characteristics are shown in Figure 13- 8.

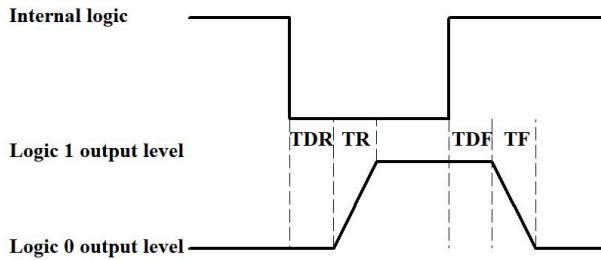


Figure 13-8 Output logic level

Table 13-4 Non-isolated output's electrical characteristics

Parameter name	Parameter symbol	Parameter values
Output rise time	TR	0.08us
Output downtime	TF	0.02us
Output rising delay	TDR	0.1us
Output drop delay	TDF	0.04us

## 13.2 6PIN I/O Electrical Properties

### 13.2.1 Opto-isolated Input Circuit (line0)

In the camera I/O control, opto-isolated input circuit is shown in Figure 13-9.

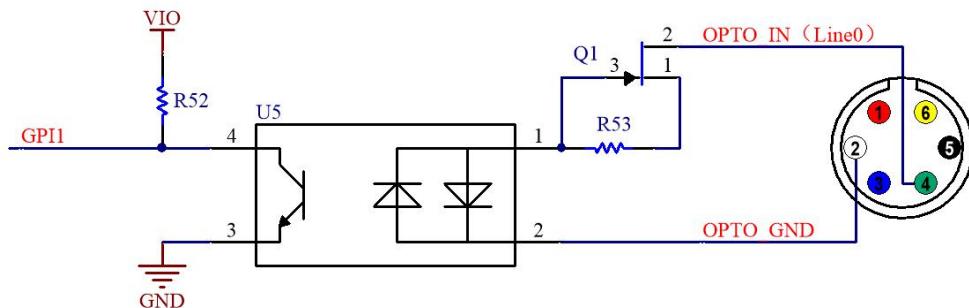


Figure 13-9 Opto-isolated input circuit

Logic 0 input level: 0~1.4VDC (OPTO\_IN pin)

Logic 1 input level: 2.2~24VDC (OPTO\_IN pin)

Maximum input current: 30mA

The input level is between 1.4V and 2.2V, the circuit action state is uncertain, please avoid the input voltage working in this range.

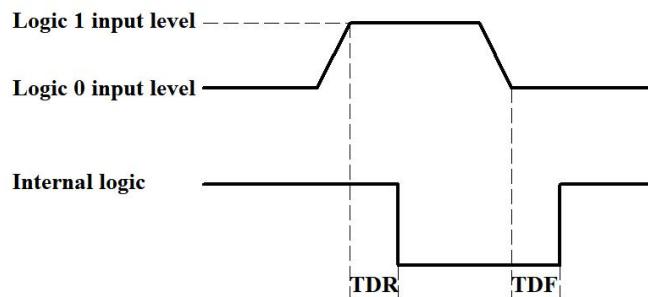


Figure 13-10 Input logic level

Input rise delay (TDR): 5us

Input drop delay (TDF): 25us

### 13.2.2 Opto-isolated Output Circuit(line1)

In camera I/O control, opto-isolated output circuit is shown in Figure 13- 11.

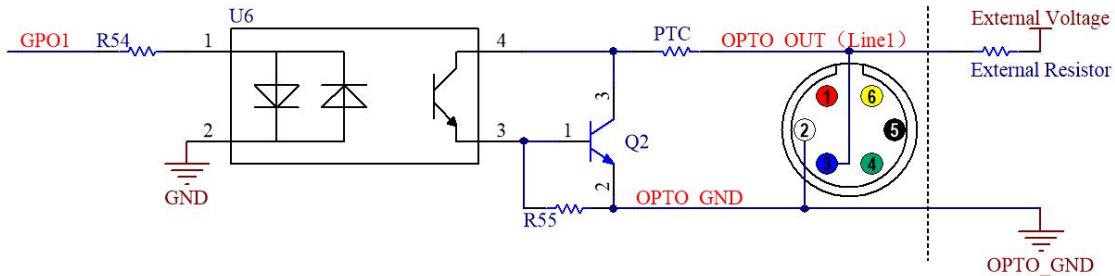


Figure 13- 11 Opto-isolated output circuit

Opto-isolated output maximum current: 30mA

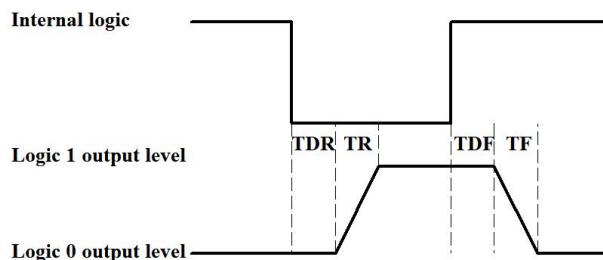


Figure 13- 12 Output logic level

The electrical characteristics of the opto-isolated output signal (external voltage 5V, external resistor 1K) are shown in Table 13- 5.

Table 13- 5 Opto-isolated output signal's electrical characteristics

Parameter name	Parameter symbol	Parameter values
Output logic low level	VL	760mV
Output logic high	VH	5V
output rise time	TR	8.6us
Output downtime	TF	2.2us
Output rising delay	TDR	17.5us
Output drop delay	TDF	4.2us

The corresponding current and output logic low level parameters are shown in Table 13- 6 when different voltage and resistors are used in external circuit.

Table 13- 6 Opto-isolated output logic's low level parameters

External voltage	Non-essential resistance	VL	Output current
3.3V	1KΩ	668mV	2.82mA
5V	1KΩ	760mV	4.31mA
12V	2.4KΩ	798mV	4.68mA
24V	4.7KΩ	833mV	4.97mA

### 13.2.3 Input and Output I/O Circuit(line2/line3, applicable to V1.0 hardware version)

In camera I/O control with hardware version number V1.0, non-isolated input, output I/O circuit is shown in Figure 13- 13.

Figure 13- 13 Non-isolated input, output I/ O circuit(line2)

1, GPI2 input level parameter:

Logic 0 input level: 0~0.9 VDC (DIR\_GPI pin)

Logic 1 input level: 1~20VDC (DIR\_GPI pin)

Figure 13- 14 Input logic level

To prevent damage to the GPI pin, connect the GND pin before entering voltage to the DIR\_GPI pin.

2, GPO2 output level parameter:

The maximum current allowed through this pin is 25 mA.

When the ambient temperature is 25 degrees Celsius, the relationships between the external voltage, resistance and output low level are shown in Table 13- 7.

Table 13- 7 Non-isolated output logic's low level parameters

External voltage	Non-essential resistance	VL(GPO2)
3.3V	1KΩ	0V
5V	1KΩ	0V
12V	2.4KΩ	0V
24V	4.7KΩ	0V

The external pull-up voltage 5V pull-up resistance 1K Ω, GPO2 output logic level, electrical characteristics are shown in Figure 13- 15.

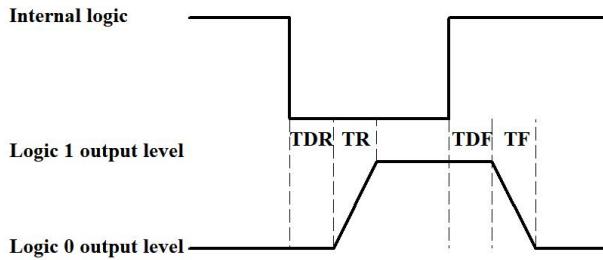


Figure 13- 15 Output logic level

Table 13- 8 Non-isolated output's electrical characteristics

Parameter name	Parameter symbol	Parameter values
Output rise time	TR	0.01us
Output downtime	TF	0.01us
Output rising delay	TDR	0.02us
Output drop delay	TDF	0.04us

### 13.2.4 Input and Output I/O Circuits(line2, the hardware version is V2.0 or later)

Camera with hardware version V2.0 and above, its input and output I/O circuits are shown in Figure 13- 16.

Figure 13- 16 Non-isolated configurable input / output I/O circuits

Line2 is set as input pin

Logic 0 input level: 0~0.6VDC (DIR\_GPIO pin)

Logic 1 input level: 2~24VDC (DIR\_GPIO pin)

Maximum input current: 25mA

When the input level is between 0.6 V and 2 V, the circuit action is uncertain. Please avoid the input voltage working in this range.

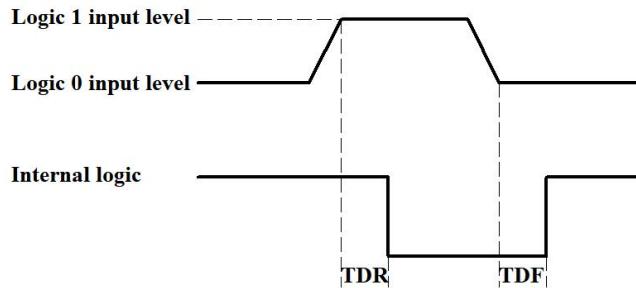


Figure 13-17 Input logic level

To prevent the GPIO pin from being damaged, first connect the ground pin GND and then input the voltage to the Line2 pin.

Input rise delay (TDR): 0.02us

Input drop delay (TDF): 0.02us

Line2 is set as output pin

The maximum current allowed through this pin is 25 mA.

When the ambient temperature is 25 degrees Celsius, the relationships between external voltage, resistance and output low level are shown in Table 13-9.

Table 13-9 Non-isolated output logic low level parameters

External voltage	Non-essential resistance	VL(GPIO)
3.3V	1KΩ	0.11V
5V	1KΩ	0.167V
12V	2.4KΩ	0.184V
24V	4.7KΩ	0.385V

The external pull-up voltage is 5V, the pull-up resistance is 1KΩ, the GPIO is configured as the output logic level and the electrical characteristics are shown in Figure 13-18.

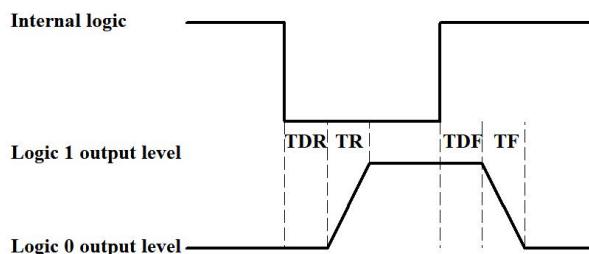


Figure 13-18 Output logic level

Table 13-10 Non-isolated output's electrical characteristics

Parameter name	Parameter symbol	Parameter values
Output rise time	TR	0.08us
Output downtime	TF	0.02us
Output rising delay	TDR	0.1us
Output drop delay	TDF	0.04us

## 14 Description of Functions

### 14.1 Camera Capture Mode

Camera operation mode support: Video Mode or Trigger Mode.

Camera trigger mode supports: Soft Trigger Mode(Software) or External Trigger Mode(Isolated input, GPIO0, GPIO1, Counter or PWM).

### 14.2 ROI Control

Partial cameras supports hardware ROI. The smaller the ROI size, the faster the frame rate.

### 14.3 Bandwidth and Precise Frame Rate Control

#### 14.3.1 Bandwidth

Partial cameras supports bandwidth adjustment from 1% to 100%. As shown in Figure 14- 1, the camera is with 100% bandwidth by default, and you can drag the slider to set the desired bandwidth.

Figure 14- 1 Bandwidth and precise frame rate settings

#### 14.3.2 Precise Frame Rate Control

Partial cameras series supports precise frame rate control. The frame rate range will vary based on bandwidth, bit depth, resolution, ROI. As shown in Figure 14- 1, the current frame rate can be set by dragging the Bandwith or Frame Rate slider bar left or right.

### 14.4 DDR3 Buffer

Camera has a built-in 512MB (4Gb) DDR3 buffer, which can effectively improve the stability of USB3.0 data transmission and ensure that the camera does not lose frames when working.

### 14.5 Binning

Camera supports additive or averaged 1x1 to 8x8 digital binning, and averaged 1x1 to 2x2 hardware binning. Hardware binning can achieve higher frame rates than software binning.

### 14.6 Power Supply and Cooling System

MAX series adopts DC19V power supply, ITR3CMOS series and CTR3CMOS series adopts DC12V power supply. When DC19V or DC12V power supply is plugged in, both the camera cooling system and the imaging system use a unified 19V or 12V power supply.

When the power is disconnected, the camera cooling system stops working, and the imaging system will automatically switch to the USB 5V power supply and the camera can work normally in passive cooling mode.

The cooling system of the camera is TEC cooling, using an external cooling structure and fan assisted cooling, the operating temperature can be adjusted to a specific value, the effective cooling temperature can be lower than the ambient temperature 10-25°C, the efficient cooling system ensures a very low level of dark current.

TEC system adopts PID algorithm to control, so that the TEC can be accurately adjusted to the target temperature, and the temperature deviation is 0.1°C.

There is a Cooling group on the left sidebar in ToupView. To enable the Cooling function, an external 12V power supply is required. By default, the TEC is turned on. One can set the Target Temperature. After entering the value, click "Apply", and the sensor temperature will gradually approach to the Target Temperature. At the same time, ToupView can display the current temperature in real time, as shown in Figure 14- 2.

Figure 14- 2 TEC settings

The Fan has two gears from Off to High. When High, the Fan speed reaches the highest. When Off, the Fan is turned off, the TEC is also turned off, and the power is 0, as shown in Figure 14- 3.

Figure 14- 3 Fan settings

When the TEC is turned on, the Fan will automatically turn on preventing the abnormal situation such as the housing temperature is too high if the Fan stops running when the TEC is working; when the Fan is turned off, the TEC will automatically turn off.

## 15 Trigger Mode and its Configuration

### 15.1 Video Mode and Trigger Mode

The trigger function can be found on the [Capture & Resolution](#) group on the [Camera Sidebar](#) in ToupView. When the camera is opened, it is in [Video Mode](#) as shown in Figure 15- 1 on the left. In [Video Mode](#), [Auto Exposure](#), [Exposure Target](#), [Exposure Time](#) and [Gain](#) can be set. One can switch to [Trigger Mode](#) by checking the [Trigger Mode](#) check box.

Figure 15- 1 Video Mode and Trigger Mode on the Capture & Resolution group in ToupView

After the [Trigger Mode](#) is checked, the [Capture & Resolution](#) group will switch to [Trigger Mode](#) as shown in Figure 15- 1 on the right. Where, the [Trigger Source](#), [Exposure Time](#), [Gain](#), [Single](#), [Loop](#), [Multiple](#), [Frame Box](#), and [Options](#) can be set.

### 15.2 Trigger Sources and Their Capture Style

The [Trigger Source](#) can be any external input signal inputted into the camera which is called [Hardware \(Trigger Source\)](#), it can also be a command from the application which is called [Software \(Trigger Source\)](#). For the [Software Trigger Source](#), it can be [Single](#), [Loop](#), [Multiple](#), or [Sequence](#) style. Figure 15-2 shows the possible [Trigger Sources](#). Table 15- 1 shows the designed [Trigger Source](#) descriptions and possible capture styles for ToupTek camera.

Figure 15- 2 Possible Trigger Sources

Table 15- 1 Description of possible Trigger Sources and their capture styles

Trigger Source	Description
<a href="#">Isolated input</a>	Logic 0 input level: 0~2.2VDC; Logic 1 input level: 3.3~24VDC; Maximum input current: 30mA;
<a href="#">GPIO0</a>	Logic 0 input level: 0~0.6VDC (DIR_GPIO0/DIR_GPIO1 pins); Logic 1 input level: 2.0~24VDC (DIR_GPIO0/DIR_GPIO1 pins); Maximum input current: 25mA; If <a href="#">GPIO0</a> is chosen as <a href="#">Trigger Source</a> , it should be configurated as <a href="#">Input</a> in the <a href="#">GPIO Mode</a> 's combo box on the <a href="#">Options&gt;IO Control</a> page;
<a href="#">GPIO1</a>	Logic 0 input level: 0~0.6VDC (DIR_GPIO0/DIR_GPIO1 pins); Logic 1 input level: 2.0~24VDC (DIR_GPIO0/DIR_GPIO1 pins); Maximum input current: 25mA; If <a href="#">GPIO1</a> is chosen as <a href="#">Trigger Source</a> , it should be configurated as <a href="#">Input</a> in the <a href="#">GPIO Mode</a> 's combo box on the <a href="#">Options&gt;IO Control</a> page;
<a href="#">Counter</a>	<a href="#">Counter</a> refers to the operation mode in which the camera can divide the frequency of the external input trigger signal through the preset <a href="#">Counter Value</a> and perform image acquisition according to

	<p>the customer's logic. For example, when the counter value( ) is set to 3, the camera needs to receive 3 trigger signals to trigger once;</p>
	<p>When <b>Counter</b> is chosen in <b>Trigger Source</b> combo box in the <b>Capture &amp; Resolution</b> group, the <b>Counter Source</b> can be <b>Isolated input</b>, <b>GPIO0</b> or <b>GPIO1</b> which can be chosen on <b>Options&gt;IO Control</b> page;  If <b>GPIO0</b> or <b>GPIO1</b> is chosen in the <b>Counter Source</b> combo box on <b>Options&gt;IO Control</b> page. It should be configured as <b>Input</b> in the <b>GPIO Mode</b> combo box;  Check <b>Options&gt;IO Control</b> page's <b>Line Select</b> related items and <b>Counter</b> related items for details;</p>
<b>PWM</b>	<p><b>PWM</b> refers to the operation mode in which the camera exposure time is controlled by the input trigger signal's pulse width;</p>
	<p><b>PWM Trigger Source</b> can be <b>Isolated input</b>, <b>GPIO0</b> or <b>GPIO1</b>. If <b>GPIO0</b> or <b>GPIO1</b> is chosen in the <b>PWM Source</b> combo box on the <b>Options&gt;IO Control</b> page, it should be configured as <b>Input</b> in the <b>GPIO Mode</b> combo box;  Check <b>Options&gt;IO Control</b> page's <b>Line Select</b> related items and <b>PWM</b> related items for details;</p>
<b>Software</b>	<p>When <b>Software</b> trigger is chosen, the client software can send the command through USB3.0 to trigger, acquire and transfer images, In ToupView, <b>Single</b>, <b>Loop</b>, <b>Multiple</b>, or <b>Sequence</b> can be used to send the <b>Software</b> trigger command;  If the <b>Plan</b> or <b>Hardware</b> is chosen in the <b>Type</b> combo box on the <b>Options&gt;Sequence</b> page, the <b>Multiple</b> button will switch to <b>Sequence</b> button and the camera will use the <b>Exposure Time</b> and <b>Gain</b> in the <b>Sequence table</b> on this page one by one to capture the specified frames.  Check <b>Single</b>, <b>Loop</b>, <b>Multiple</b>, or <b>Sequence</b> on <b>Capture &amp; Resolution</b> group for the <b>Software</b> capture operations;  Check <b>Options&gt;Sequence</b> page and <b>Options&gt;Advanced</b> page for the related <b>Sequence</b> and <b>Software</b> capture setup options;</p>
<b>Single</b>	<p>When <b>Single</b> is clicked, the camera will start to capture the image. At the same time the <b>Single</b> button will switch to <b>Stop</b> button. Clicking <b>Stop</b> button to stop the current <b>Single</b> capture operation, the <b>Stop</b> button will switch to <b>Single</b> button again for the next capture operation;  <b>Note:</b> 1) The captured frames will always <b>Show in the video window</b> to prevent too many captures;  2) Enabled when <b>Software</b> in the <b>Trigger Source</b> combo box is chosen or <b>Always enable software trigger</b> checkbox is checked on the <b>Options&gt;Advanced</b> property page;</p>
<b>Loop</b>	<p>When <b>Loop</b> is clicked, the camera will start to capture the image continuously and the <b>Loop</b> button will switch to <b>Stop</b> button. Clicking <b>Stop</b> button to stop <b>Loop</b> captures and the <b>Stop</b> button will switch to <b>Loop</b> button for the next <b>Loop</b> capture operation;  <b>Note:</b> 1)The captured frames will always <b>Show in the video window</b> to prevent too many captures;  2)Enabled to capture continually when <b>Software</b> in the <b>Trigger Source</b> combo box is chosen or <b>Always enable software trigger</b> checkbox is checked on the <b>Options&gt;Advanced</b> property page;</p>
<b>Multiple</b>	<p><b>Multiple</b> refers to the operation mode in which the camera receives <b>Software</b> trigger signal or command and exports multiple frames of images. An edit box with spin(we call it <b>Frames Box</b>) is designed and affiliated to the <b>Multiple</b> button ( ) for the setting of the frames to be captured;  The <b>Frames Box</b> can be set in the range of 1~ 65535. If the <b>Frames Box</b> is 3, a three-frame image will be captured and exported;</p>
<b>Sequence</b>	<p>When <b>Sequence</b> is clicked, the camera will start to capture the image until the specified frames in the <b>Frames Box</b> are captured. At the same time the <b>Sequence</b> button will switch to <b>Stop</b> button. Clicking <b>Stop</b> button will stop the current <b>Sequence</b> capture and the <b>Stop</b> button will switch to <b>Sequence</b> again for the next <b>Sequence</b> capture operation;</p>

**Note:**

- 1) Switched from **Multiple** to **Sequence** to capture the specified frames in the edit box with spin(**Frames Box**) when **Plan or Hardware** in the **Type** combo box is chosen on the **Options>Sequence** property page;
- 2) If the **Plan or Hardware** is chosen in the **Type** combo box on the **Options>Sequence** page, the **Sequence** button will be enabled and the capture will use the **Exposure Time** and **Gain** in the **Sequence table** list below one by one on the **Options>Sequence** page;
- 3) If the **Plan or Hardware** is chosen in the **Type** combo box on the **Options>Sequence** page and **Always enable software trigger** is checked on the **Options>Advanced** property page, the **Sequence** button will not switch to **Multiple** button and will be enabled only when the still in Sequence enable.
- 4) If the **Plan** is chosen in the **Type** combo box on the **Options>Sequence** page and the **Software** is chosen in the **Trigger Source** combo box, the **Sequence** button will be enabled.
- 5) If the **Hardware** is chosen in the **Trigger Source** combo box, the **Sequence** button will be disabled, but the **Frame Box** will still be enabled and the **Sequence** will switch to the **Hardware Sequence** capture. One **Hardware** trigger signal will capture the specified frames on the **Frame Box** using the **Exposure Time** and **Gain** in the **Sequence table** on **Options>Sequence** page;
- 6) Check **Options>Sequence** page for the related **Sequence** setup options;

## 15.3 The trigger capture and IO Control configurations

Figure 15- 3 Options>Output page

Figure 15- 4 Options>Sequence page

Figure 15- 5 Options>IO Control page

Figure 15- 6 Options>Advanced page

The **Trigger Source** can be **Isolated input**, **GPIO0**, **GPIO1**(when configured as input), **Counter**, or **PWM** which can be configurated on the **Options** property sheet. Also the camera's **Isolated output**, **GPIO0** or **GPIO1**(can be configurated as **Output**) can be used as **Output** or **UART** (**GPIO0**, **GPIO1** only) applications. All of these configurations can be realized on the **Options** property sheet described in Table 15-2 below.

About the captured file operation style, one can find it on the **Option>Output** page;

About the **Sequence** setup, one can find it on the **Option>Sequence** page;

About the camera pin **IO Control** style, one can find it on the **Options>IO Control** page;

About the **Always enable software trigger** and **UART** setup, **Shutter Mode**, and **Exposure Active Mode**, one can find it on the **Options>Advance** page.

Table 15- 2 Options property sheet for Trigger Source or camera pin configuration

Pages	Items	Descriptions
Output page	Output Destination	<p>Used to set the captured frame's <b>Output</b> destination, can be <a href="#">Show in the video window</a>, <a href="#">Show in a new window</a> or <a href="#">Save to disk</a>;</p> <p>When <b>Save to disk</b> is checked, the <b>button</b> will be enabled clicking it to choose the <b>Base</b> directory, clicking the <b>Sub</b> combo box's dropdown button to choose the <b>Sub</b> directory;</p> <p>The <b>File Name Format</b>, <b>File Prefix</b>, <b>File Type</b>, and even <b>The sequence begin with</b> can be chosen, set, or defined.</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>1)Valid only for <b>Sequence</b> or <b>Multiple</b> capture setup;</li> <li>2)For <b>Single</b> or <b>Loop</b> capture, the captured image will be always displayed on the video window;</li> </ul>
Sequence page	Type	<p><b>Disable:</b> If the <b>Disable</b> button is chosen in the <b>Type</b> combo box on the <b>Options&gt;Sequence</b> page, the <b>Sequence</b> button on the <b>Capture &amp; Resolution</b> page will switch to <b>Multiple</b> button;</p> <p><b>Plan:</b> 1)If <b>Plan</b> is chosen in the <b>Type</b> combo box on the <b>Options&gt;Sequence</b> page, the <b>Multiple</b> button on the <b>Capture &amp; Resolution</b> group will switch to <b>Sequence</b> button;      2) If the <b>Software Trigger Source</b> is chosen in the <b>Capture &amp; Resolution</b> group or the <b>Always enable software trigger</b> is checked on the <b>Options&gt;Advanced</b> property page, the <b>Sequence</b> button will be enabled      After the <b>Software</b> trigger signal is arrived(By clicking <b>Single</b>, <b>Loop</b>, or <b>Sequence</b> button), the camera will capture frames specified in the edit box with spin (we call it <b>Frames Box</b>) affiliated to the <b>Sequence</b> button; The whole captures will use the <b>Exposure Time</b>, <b>Gain</b> and <b>Delay</b> in the <b>Sequence table</b> list under one by one by the software;</p> <p>3) If the <b>Disable</b> button is chosen in the <b>Type</b> combo box on the <b>Options&gt;Sequence</b> page, the <b>Sequence</b> button on the <b>Capture &amp; Resolution</b> page will switch to <b>Multiple</b> button;</p> <p>4) The <b>Sequence</b> button will be enabled only when a) the <b>Plan</b> in the <b>Type</b> combo box is chosen on the <b>Options&gt;Sequence</b> page and b) he <b>Software Trigger Source</b> is chosen in the <b>Capture &amp; Resolution</b> group or c) <b>Always enable software trigger</b> is checked on the <b>Options&gt;Advanced</b> property page;</p> <p><b>Hardware:</b> 1) if <b>Hardware</b> is chosen in the <b>Type</b> combo box on the <b>Options&gt;Sequence</b> page, the <b>Multiple</b> button on the <b>Capture &amp; Resolution</b> group will switch to <b>Sequence</b> button and will be disabled for <b>Hardware</b> trigger. But users can still set the frames number in the <b>Frame Box</b> on the <b>Capture &amp; Resolution</b> group;      2) After the <b>Hardware</b> trigger signal arrives, the camera will capture frames specified in the edit box with spin (we call it <b>Frame Box</b>) affiliated to the <b>Sequence</b> button; The whole capture will use the <b>Exposure Time</b>, <b>Gain</b> (<b>Delay</b> is not used) in the <b>Sequence table</b> list under one by one but stored in the camera hardware for the quick operation;</p> <p>3) If the <b>Disable</b> button is chosen in the <b>Type</b> combo box on the <b>Options&gt;Sequence</b> page, the <b>Sequence</b> button on the <b>Capture &amp; Resolution</b> page will switch to <b>Multiple</b> button.</p> <p>4) The <b>Sequence</b> button is always disabled if a) The <b>Hardware</b> is chosen in the <b>Type</b> combo box on the <b>Options&gt;Sequence</b> page and b)the <b>Hardware Trigger Source</b> is chosen in the <b>Capture &amp; Resolution</b> group;</p> <p>5) The <b>Sequence</b> button will be enabled if a) the <b>Software Trigger Source</b> is chosen in the <b>Capture &amp; Resolution</b> group or b) the <b>Always enable software trigger</b> checkbox is checked on the <b>Options&gt;Advanced</b> property page, in this case, both the <b>Plan</b> and <b>Hardware Sequence</b> capture are supported;</p>
	Number	The possible <b>Sequence</b> (capture) frames to be captured. If the <b>Number</b> is larger than the <b>Sequence Number</b> in the <b>Frames Box</b> on the <b>Capture &amp; Resolution</b> group, the other <b>Indices</b> will be executed at the next <b>Sequence</b> operation one by one recycled;
	Index	The order of the <b>Number</b> group;
	Exposure Time	The camera <b>Exposure Time</b> for the specified capture <b>Index</b> in the <b>Sequence</b> capture;
	Gain	The camera <b>Gain</b> for the specified capture <b>Index</b> in the <b>Sequence</b> capture;
	Delay	The <b>Delay</b> time for the specified capture <b>Index</b> in the <b>Plan Sequence</b> capture(Valid for <b>Plan Sequence</b> capture only);
	Preset	Choosing <b>Save</b> to save the current <b>Sequence table</b> 's settings; Clicking <b>Management</b> to <b>Rename</b> the saved <b>Sequence table</b> 's setting files or <b>Remove</b> them from the <b>Management</b> list;
IO Control page	Line Select	Choosing which line to set. Can be <a href="#">Isolated input</a> , <a href="#">Isolated output</a> , <a href="#">GPIO0</a> or <a href="#">GPIO1 et al</a> ;
	GPIO Mode	To configure whether the line selected in <b>Line Select</b> is for <b>Input</b> or <b>Output</b> . Only <a href="#">GPIO0</a> or <a href="#">GPIO1</a> can be configured as either <b>Input</b> or <b>Output</b> ; If <a href="#">Isolated input</a> or <a href="#">Isolated output</a> is chosen, the <b>GPIO Mode</b> will be specified as <b>Input</b> or <b>Output</b> (Not configurable) respectively;
	Format	Specify the current selected signal's <b>Format</b> in the <b>Line Select</b> combo box, can be <a href="#">Opto-coupled(Isolated input, Isolated output)</a> or <a href="#">TTL (GPIO0 or GPIO1)</a> for clarity(Unconfigurable);
	Debouncer Time	Since there may be a glitch in the external trigger input signal if it directly enters into the internal logic circuit of the camera, it will cause false triggering, so the input trigger signal should be debounced. In addition, the effective pulse width of the trigger signal input by the user should be greater than the <b>Debouncer Time</b> , otherwise, the trigger signal will be ignored; When <a href="#">Isolated input</a> , <a href="#">GPIO0</a> or <a href="#">GPIO1</a> is chosen in the <b>Line Select</b> combo box and <a href="#">GPIO0</a> or <a href="#">GPIO1</a> is configured as <b>Input</b> in the <b>GPIO Mode</b> combo box, the <b>Debouncer Time</b> will be enabled for the user to input the <b>Debouncer Time</b> between 0 to

		20000us;
	<b>Input Activation</b>	When <b>Isolated input</b> , <b>GPIO0</b> or <b>GPIO1</b> is chosen in the <b>Line Select</b> combo box and <b>GPIO0</b> or <b>GPIO1</b> is configured as <b>Input</b> in the <b>GPIO Mode</b> combo box; The <b>Input Activation</b> combo box will be enabled to configure the <b>Input Activation</b> as either <b>Rising Edge</b> or <b>Falling Edge</b> ;  Also can be configue as <b>high level</b> or <b>low level</b> . When <b>high level</b> is selectd, the camera keeps triggering the frame when the input signal is high; When <b>low level</b> is selectd, the camera keeps triggering the frame when the input signal is low;
	<b>Trigger Delay</b>	When <b>Isolated input</b> , <b>GPIO0</b> or <b>GPIO1</b> is chosen in the <b>Line Select</b> combo box and <b>GPIO0</b> or <b>GPIO1</b> is configured as <b>Input</b> in the <b>GPIO Mode</b> combo box, the <b>Trigger Delay</b> will be enabled for the user to input the <b>Trigger Delay</b> time between 0 to 5000000us; If the <b>Trigger Delay</b> time is set to 1000000us, the camera will wait for 1s to capture the image after receiving the trigger signal;
	<b>Output Mode</b>	When <b>Isolated output</b> , <b>GPIO0</b> or <b>GPIO1</b> is selected in the <b>Line Select</b> combo box and <b>GPIO0</b> or <b>GPIO1</b> is configured as <b>Output</b> in the <b>GPIO Mode</b> combo box, the <b>Output Mode</b> will be enabled. It can be <b>Frame Trigger Wait</b> , <b>Exposure Active</b> , <b>Strobe</b> , <b>User Output</b> , <b>Counter Output</b> or <b>Timer Output</b> . The chosen mode can be used for diversified applications;  The <b>Frame Trigger Wait</b> signal is pulled low at the start of exposure and pulled high when the last frame of data is read out. The trigger signal input by the user should be in the valid period. If the user inputs a trigger signal when the signal is low, the trigger signal input at this time will be ignored. The following example is the case when Burst Count = 2, as shown below;
		<b>Exposure Active:</b> when this signal is high, it means the sensor is exposing. This signal can be used to control an external mobile device to remain stationary or move at low speed while the camera is at exposure. The timing diagram of the exposure valid signal is shown below;
		When the relative position of the camera and the object to be photographed changes, you can refer to <b>Exposure Active</b> signal to prevent the captured image from being affected by movement and focus adjustment during the exposure process;
		When <b>Strobe</b> is chosen, <b>Strobe Delay Mode</b> , <b>Strobe Delay Time</b> , <b>Strobe Duration</b> will be enabled;
		When <b>User Output</b> is chosen, <b>User Value</b> will be enabled. lines3, line2, line1 are the combination of <b>GPIO1</b> , <b>GPIO0</b> and <b>Isolated output</b> respectively. If <b>User Value</b> is 001, then line <b>GPIO1</b> and <b>GPIO0</b> will be disabled and <b>Isolated output</b> will be enabled;
		When the <b>Counter Output</b> is selectd, when the counter value is “m”, the camera triggers “m” times to output a signal.
		When the <b>Timer Output</b> is selectd, the camera keeps output signals. When the <b>Strobe Delay Time</b> is <b>delay</b> , the pulse width of the high level is determined by the <b>Strobe Duration</b> . The pulse width of low level is determined

		by the <b>Strobe Delay Time</b> .
	<b>Output Inverter</b>	When <b>Isolated output</b> , <b>GPIO0</b> or <b>GPIO1</b> is selected in the <b>Line Select</b> combo box and <b>Output</b> is chosen for <b>GPIO0</b> or <b>GPIO1</b> in the <b>GPIO Mode</b> combo box, the <b>Output Inverter</b> will be enabled to configure the current selected line's output as either inverted or not( <b>Yes</b> or <b>No</b> ).
	<b>Strobe Delay Mode</b>	Strobe can be used to control external devices such as the strobe, and the effective level duration, delay time, and pre-delay time of the strobe signal can be set; When the <b>Output Mode</b> is <b>Strobe</b> , <b>Strobe Delay Mode</b> will be enabled. It can be <b>pre-delay</b> or <b>delay</b> ;
	<b>Strobe Delay Time</b>	When exposure starts, the strobe does not take effect immediately, and the output is delayed according to the value set by <b>Strobe Delay Time</b> which is between 0 to 5000000us. The <b>Strobe Delay Mode</b> can be <b>pre-delay</b> or <b>delay</b> ; It is described below; <b>pre-delay:</b>       <b>delay:</b>       
	<b>Strobe Duration</b>	The high level duration of the strobe is determined by the <b>Strobe Duration</b> which is between 0 to 5000000us as shown below;
	<b>User Value</b>	Users can input a value at <b>User Value</b> edit box with spin to control the line as disable or enable. Enabled when <b>User Output</b> is chosen in the <b>Output Mode</b> combo box. The logical value 0 or 1's combination of <b>GPIO1</b> (line3), <b>GPIO0</b> (line2) and <b>Isolated output</b> (line1); When the output mode is selected as <b>User Output</b> , the user can input a value at <b>User Value</b> edit box to control the corresponding line output with 0 or 1; The value here is only valid for the lower three bits of a binary. For example, when line 1 and line 3 are set to <b>User Output</b> mode, and its <b>User Value</b> is set to 4 ('b100), then line 3 outputs 1, and line 1 outputs 0, as shown below.
	<b>Counter Source</b>	When <b>Counter</b> is chosen in the <b>Trigger Source</b> combo box in the <b>Capture &amp; Resolution</b> group, the <b>Counter Source</b> can be chosen from <b>Isolated input</b> , <b>GPIO0</b> or <b>GPIO1</b> in this combo box on the <b>Option&gt;IO Control</b> page;
	<b>Counter Value</b>	The <b>Counter Value</b> is used to divide the frequency of the external input trigger signal when the <b>Counter Trigger Source</b> is chosen in the <b>Capture &amp; Resolution</b> group; See <b>Counter</b> in Table 15-1 for detail;
	<b>Counter Reset</b>	Click <b>Reset</b> button can clear the current counting process and begin a new one;
	<b>PWM Source</b>	When <b>PWM</b> is chosen in the <b>Trigger Source</b> combo box in the <b>Capture &amp; Resolution</b> group, the <b>PWM Source</b> can be from <b>Isolated input</b> , <b>GPIO0</b> , or <b>GPIO1</b> in this combo box et al. ;
Advanced page	<b>Always enable software trigger</b>	When this button is checked, no matter whether <b>Trigger Source</b> is <b>Software</b> or <b>Hardware</b> , the software trigger buttons( <b>Single</b> , <b>Loop</b> , <b>Multiple</b> ) are always enabled;

		If the <b>Plan</b> or <b>Hardware</b> is chosen in the <b>Type</b> combo box on the <b>Options&gt;Sequence</b> page, the <b>Multiple</b> button will switch to <b>Sequence</b> button; The <b>Sequence</b> button will be enabled if a)the <b>Software Trigger Source</b> is chosen in the <b>Capture &amp; Resolution</b> group or b) the <b>Always enable software trigger</b> checkbox is checked on the <b>Options&gt;Advanced</b> property page, in this case, both the <b>Plan</b> and <b>Hardware Sequence</b> captures are supported;
	<b>UART</b>	There is a serial port function on the <b>Advanced</b> page, which can be used to communicate with external devices via serial port. Check <b>Enable</b> to enable this function. When enabled, <b>GPIO0</b> and <b>GPIO1</b> can only be used as <b>UART</b> transfers; The <b>Baud Rate</b> supports 9600-115200. <b>Cable Select</b> can configure <b>GPIO0</b> and <b>GPIO1</b> , which can be configured as <b>TX</b> or <b>RX</b> respectively. Setting a value at <b>TX</b> , clicking <b>Send</b> to send the set value out; click <b>Accept</b> at <b>RX</b> to receive the value from the external device;
	<b>Shutter Mode</b>	Enabled if the camera supports. Users can select <b>Rolling Shutter</b> or <b>Global Reset</b> ;
	<b>Exposure Active Mode</b>	Enabled if the camera supports. Users can select <b>Specified lines</b> or <b>Common exposure time</b> ;
	<b>Exposure Start Line</b>	Enabled when <b>Specified lines</b> in the <b>Exposure Active Mode</b> combo box is selected. To configure when the Exposure Active signal is valid;
	<b>Exposure End Line</b>	Enabled when <b>Specified lines</b> in the <b>Exposure Active Mode</b> combo box is selected. To configure when the Exposure Active signal is invalid;

## 16 Application

### 16.1 Application installation

In terms of software, customers are welcome to visit our website: <https://touptekphotonics.com/download/> to download the latest ToupView, also be used with ASCOM, DirectShow interface. If the third-party software is compatible with these interfaces, customers can also download software drivers from our website and install them into the third-party software.

### 16.2 Introduction to ToupView

ToupView is a professional software that integrates camera control, image acquisition and processing, image browsing and analysis functions. ToupView has the following characteristics:

- x86: XP SP3 and above ; CPU supports SSE2 and above
- x64: Win7 and above
- Support video mode and Trigger Mode (Raw format or RGB format)
- Automatic capture and quick recording capabilities
- Supports multiple languages
- Hardware ROI and digital binning capabilities
- Rich image processing functions, such as image stitching, real-time overlay, flat field correction, dark field correction, etc.
- Supports all TouTek cameras

#### 16.2.1 User interface design

- The menus and toolbars are properly set to ensure quick operation
- Professionally integrated with 5 sidebars - Camera, Folders, Undo/Redo, Layers, Measure
- Comfortable operation method (double-click or right-click context menu)
- Detailed help manual

Figure 16- 1 ToupView video window

#### 16.2.2 Professional Camera Control Sidebar

Capture & Resolution	Set up live and still capture, snap images, or record video
Exposure & Gain	Auto exposure (preset exposure target value), manual exposure (exposure time can be manually entered and set by slider); gain up to 5 times
White Balance	Advanced one-click smart white balance settings, and you can adjust white balance by manually setting

	color temperature and color
Color Adjustment	Color, saturation, brightness, contrast, gamma initial high-speed adjustment function
Frame Rate Control	For different computer and USB performance, the camera can be super compatible by adjusting the frame rate
Flip	Select "Horizontal" or "Vertical" to adjust the sample orientation to ensure the same orientation as the visual system
Sampling	Neighborhood averaging can improve the signal-to-noise ratio of the video stream; while the sampling extraction mode can ensure the sharpness of the video stream. Supports histogram expansion of video stream, image negative and positive switching, grayscale calibration, and sharpness factor calculation to facilitate video focusing
Bit Depth	8, 12-bit switching, 8-bit is the basic Windows image format. 12-bit has higher image quality but reduces frame rate
Roi	ROI, Region of interest. This function can set the ROI value of the video window. After the ROI group is expanded, a rectangular box will appear in the middle of the video window, and the ROI can be changed. The mouse can adjust the size of the ROI. If there is no problem with the ROI, click "Apply" to set the video to the size of the ROI, and the default value will be restored to the original size.
Dark Field Correction	To enable darkfield correction, you should first capture a field image, then click Enable. Check Enable to enable darkfield correction. Uncheck it to disable darkfield correction
Cooling	Set TEC Target Temperature, fan on/off
Parameter Save	Load, save, overwrite, load, export custom camera panel controls (including calibration information, exposure parameters and color settings information, etc.)

### 16.2.3 Professional and practical image processing functions

Video Function	Various video professional processing functions: video broadcasting, timing capture, video recording, video watermarking, watermark mobile alignment, watermark rotation alignment, video grid overlay, video measurement, video scaling, gray scale calibration, video high dynamic (HDR), video depth of field extension, video image stitching, video scale, date, etc.
Image Processing and Enhancement	Image contrast control and adjustment, image denoising, various image filtering algorithms, image mathematical morphology algorithms, image rotation, image scaling and image printing, etc.
Image Overlay	The TouView image overlay denoising function introduces advanced image matching technology. Users only need to record a short video of the image to be superimposed, and they can superimpose and output high fidelity in the case of displacement, rotation and magnification change between multiple frames of the video. images, easy to use

Figure 16-2 Image overlay denoising

### 16.2.4 Super compatibility

Camera Video Interface	Provide Twain, DirectShow, Labview, SDK installation package (native C++, C#)
Supported Platform and architectures	Compatible with Microsoft® Windows® XP / Vista / 7 / 8 / 10 / 11(32 & 64 bit), Mac OSX, Linux
Language Support	Language support can be added manually, currently supports English, Simplified Chinese, Traditional Chinese, German, Japanese, Russian, French, Italian, Polish, Turkish

### 16.2.5 Basic hardware requirements

PC Basic Configuration Requirements	CPU: Intel Core 2 2.8GHz or higher
	RAM: 2GB or more
	USB Port: USB3.0 / USB 2.0
	Monitor: 17" or higher
	CD-ROM

# 17 Software development instructions

## 17.1 SDK description

The download link of the SDK is as follows:

<https://www.toutekphotonics.com.cn/download/?dlID=6>

### 17.1.1 SDK support platform

- Windows 32-bit:  
x86: Windows XP SP3 and above; the CPU needs to support at least the SSE2 instruction set.  
x64: Windows 7 and above.  
ARM: Windows 10 and above.  
ARM64: Windows 10 and above.
- Windows RT: x86, x64, ARM, ARM64; Windows 10 and above.
- macOS: Universal (x64 + x86); macOS 10.10 and above.
- Linu: core 2.6.27 and above:  
x86: The CPU needs to support at least the SSE3 instruction set; glibc 2.8 and above.  
x64: glibc 2.14 and above.  
armel: glibc 2.17 and above; compiled by toolchain arm-linux-gnueabi (version 4.9.2).  
armhf: glibc 2.17 and above; compiled by toolchain arm-linux-gnueabihf (version 4.9.2).  
arm64: glibc 2.17 and above; compiled by toolchain aarch64-linux-gnu (version 4.9.2).
- Android:  
ARM: armeabi-v7a  
ARM64: arm64-v8a  
x86: x86  
x64: x86\_64  
compiled by Android NDK r18b.

### 17.1.2 Introduction to SDK content

ToupCam series cameras support a variety of APIs, including: Native C/C++, .NET/C#/VB.NET, Python, Java, DirectShow, Twain, LabView, Matlab, etc. Compared with other APIs, Native C/C++ API as a low-level API is characterized by using pure C/C++ development without relying on other runtime libraries. The interface is simple and the control is flexible. This SDK zip package contains all the resources and information needed. The directory is as follows:

- inc:  
toupcam.h, the C/C++ header file.
- win: Microsoft Windows platform file
  - ◆ dotnet:  
toupcam.cs, supports C#. toupcam.cs uses P/Invoke to call toupcam.dll. Please copy toupcam.cs to your C# project for use.
  - ◆ x86:  
toupcam.lib, x86 lib file.  
toupcam.dll, x86 dynamic library file.  
democpp.exe, x86 C++ demo execute the procedure.
  - x64:  
toupcam.lib, x64 lib file.

toupcam.dll, x64 dynamic library file.

democpp.exe, x64 C++ demo execute the procedure.

- arm:  
toupcam.lib, arm lib file.

toupcam.dll, arm dynamic library file.

- arm64:  
toupcam.lib, arm64 lib file.

toupcam.dll, arm64 dynamic library file.

- winrt:

They can be applied for Dynamic library files of WinRT/ UWP (Universal Windows Platform)/ Windows Store App. They are compatible with Windows Runtime and can be referenced by Universal Windows Platform apps. If you use C# to develop UWP, you can use the toupcam.cs wrapper class.

Please pay attention to the Device Capability of uwp. Refer to how to add USB device capabilities to the app manifest. (Microsoft seems to limit the Device entry under DeviceCapability to no more than 100) demouwp.zip is a simple example of uwp. Please modify vid and pid. under DeviceCapability in the file Package.appxmanifest before compiling the run example.

- Drivers: (Cameras produced after 2017.1.1 support WinUSB, and drivers no longer need to be installed on Windows 8 and above)

The x86 folder contains the x86 kernel-mode driver files, including toupcam.cat, toupcam.inf and toupcam.sys.

The x64 folder contains the x64 kernel-mode driver files, including toupcam.cat, toupcam.inf and toupcam.sys.

- samples:

1. democpp, C++ example. This example demonstrates enumerating devices, opening devices, previewing videos, capturing images, setting resolution, triggering, saving images to files in various image formats (.bmp,.jpg,.png, etc.), wmv format video recording, Trigger Mode/Trigger Mode, IO control and so on. This example uses the Pull Mode mechanism. To keep the code clean, the WTL library used by the examples can be downloaded from this link <http://sourceforge.net/projects/wtl/>.

2. demopush, C++ example, using the Push Mode mechanism, StartPushModeV3.

3. demomfc, a simple C++ example, uses MFC as a GUI library, supports opening devices, previewing videos, capturing images, setting resolution, saving images to files in various image formats (.bmp,.jpg,.png, etc.), etc. This example uses the Pull Mode mechanism.

4. demowinformcs1, take C# winform for example, it supports opening devices, previewing videos, capturing images, saving images to files, and setting white balance. This example uses the Pull Mode mechanism, StartPullModeWithWndMsg.

5. demowinformcs2, take C# winform for example, it supports opening devices, previewing videos, capturing images, saving images to files, and setting white balance. This example uses the Pull Mode mechanism, StartPullModeWithCallback.

6. demowinformcs3, take C# winform for example, it supports opening devices, previewing videos, capturing images, saving images to files, and setting white balance. This example uses the Push Mode mechanism, StartPushMode.

7. demowinformvb, take VB.NET winform for example, it supports opening devices, previewing videos, capturing images, saving images to files, and setting white balance. This example uses the Pull Mode mechanism.

- linux: Linux platform files

Udev: 99-toupcam.rules, udev rule file.

Please refer to: [http://reactivated.net/writing\\_udev\\_rules.html](http://reactivated.net/writing_udev_rules.html).

- c#: toupcam.cs, Support. Net Core C#. toupcam.cs uses P/Invoke to call libtoupcam.so. Please copy toupcam.cs to your C# project for use.
- x86: libtoupcam.so, x86 version so file.
- x64: libtoupcam.so, x64 version so file.
- armel: libtoupcam.so, armel version so file, toolchain is arm-linux-gnueabi.
- armhf: libtoupcam.so, armhf version so file, toolchain is arm-linux-gnueabihf.
- arm64: libtoupcam.so, arm64 version so file, toolchain is aarch64-linux-gnu.
- android: libtoupcam.so for four architectures of Android platform arm, arm64, x86, x64.
- mac: macOS platform files.
- python: toupcam.py and example code.
- java: toupcam.java and example code (console and Swing).
- doc: SDK usage documentation, Simplified Chinese, English.
- sample:
- de emosimplest, the simplest example, is about 60 lines of code.
- demoraw, RAW data and still shots, about 120 lines of code.
- extras:
- directshow: DirectShow SDK and demo program.
- twain: TWAIN SDK.
- labview: Labview SDK and demo program.
- matlab: MatLab demo program.