User Manual for Machine Vision Cameras

20240508

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1 Introduction to ToupCam machine vision cameras

1.1 Product Description

The cameras mentioned in this manual are imaging capture devices which use USB3.0 / GigE / CL to transmit uncompressed images in real time. They support image acquisition and parameter setting (such as working mode, image parameter adjustment etc.) through client-side user-friendly software.

SWIR series is a TE-Cooling USB3.0 / GigE / CL interface visible+short-wave infrared camera which adopts SONY SenSWIR InGaAs sensor. With 400nm-1800nm wide band response or 900nm-1700nm short wave infrared response. This camera has high quantum efficiency and high sensitivity;

IUX series is USB3.0 interface cameras for industrial applications. It includes IUA，IUB， IUC and IUD. KMA means black/white camera and KPA means color camera which having built-in hardware ISP to ensure color reproduction and higher video speed. The resolution coverage is from 1.7MP to 43MP;

IUA is mainly for the 1/2.8”~1.1”sensor;

IUB is mainly for the GSENSE sensor with sensor size 1/1.1” ~1.7” , has stopped production, products for the corresponding sensor can be found in the IUA series;

IUC is for the APS and full frame sensor;

IUD is a USB3 series camera with near-infrared enhanced global shutter, it can be used for OCT fundus imaging. It is expected to replace foreign GigE interface competing products

I3ISPM series is USB3.0 interface color camera for industrial applications, having built-in hardware ISP to ensure color reproduction and higher video speed. The resolution coverage is from 0.5MP to 20MP;

I3CMOS series is USB3.0 interface monochrome camera for industrial applications. The resolution coverage is from 0.5MP to 20MP.

1.2 Characteristics

- Sony Exmor back-illuminated CMOS sensor; Some cameras also use GPixel series sensors and domestic sensors.
- USB 3.0 / GigE /CL data transmission interface compatible with USB2.0 protocol;
- Provides advanced video and image processing application software ToupView, compatible with Windows/Linux/OSX multi-platform SDK, support native C/C++, C#/VB.Net, DirectShow, Twain API;
- Supports external triggering, software and capture modes;
- Supports ROI, flip, bit-depth switching and other features;
- Supports firmware worksite upgrading;
- Compliant with CE, FCC requirements.

1.3 SWIR Sony Series Camera Specifications(SWIR, 17)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity/Dark Signal	Data Interface	FPS/Resolution	Binning	Exposure Time Dimensions
SWIR1300KMA	1.3M/IMX990(M) 1/2”(6.40x5.12) Buit-in TEC	5x5	121mV with 1/30s 1.0mV with 1/30s	USB3	200@1280x1024 392@640x512	1x1 1x1	15us~60s 80mm
SWIR1300KMB	1.3M/IMX990(M) 1/2”(6.40x5.12) External TEC	5x5	121mV with 1/30s 1.0mV with 1/30s	USB3	200@1280x1024 392@640x512	1x1 1x1	15us~60s 80mm

SWIR330KMA	0.33M/IMX991(M) 1/4"(3.20x2.56) Buit-in TEC	5x5	121mV with 1/30s 1.0mV with 1/30s	USB3	400@640x512 753@320x256	1x1 1x1	15us~60s 80mm
SWIR330KMB	0.33M/IMX991(M) 1/4"(3.20x2.56) External TEC	5x5	121mV with 1/30s 1.0mV with 1/30s	USB3	400@640x512 753@320x256	1x1 1x1	15us~60s 80mm
SWIR5000KMA 20240308	5.0M/IMX992(M,GS) 1/1.4"(8.94x7.09) Buit-in TEC	3.45x3.45	TBD	USB3	61.9@2560x2048 135.7@1280x1024	1x1 1x1	15us~60s 80mm
SWIR5000KMB 20240308	5.0M/IMX992(M,GS) 1/1.4" External TEC	3.45x3.45	TBD	USB3	61.9@2560x2048 135.7@1280x1024	1x1 1x1	15us ~60s 80mm
SWIR1300KMB-UMV 20230825	1.3M/IMX990(M,GS) 1/2"(6.40x5.12)	5x5	121mV with 1/30s 1.0mV with 1/30s	USB3	223@1280x1024 428@640x512	1x1 1x1	15us~60s 33mm
SWIR330KMB-UMV 20230825	0.33M/IMX991(M,GS) 1/4"(3.20x2.56)	5x5	121mV with 1/30s 1.0mV with 1/30s	USB3	428@640x512 807@320x256	1x1 1x1	15us~60s 33mm
SWIR5000KMB-UMV 20240308	5.0M/IMX992(M,GS) 1/1.4"	3.45x3.45	TBD	USB3	61.9@2560x2048 135.7@1280x1024	1x1 1x1	15us~60s 33mm
SWIR1300KMA-G	1.3M/IMX990(M) 1/2"(6.40x5.12) Buit-in TEC	5x5	121mV with 1/30s 1.0mV with 1/30s	GigE	90@1280x1024 253@640x512	1x1 1x1	15us~60s 80mm
SWIR1300KMB-G	1.3M/IMX990(M) 1/2"(6.40x5.12) External TEC	5x5	121mV with 1/30s 1.0mV with 1/30s	GigE	90@1280x1024 253@640x512	1x1 1x1	15us~60s 80mm
SWIR330KMA-G	0.33M/IMX991(M) 1/4"(3.20x2.56) Buit-in TEC	5x5	121mV with 1/30s 1.0mV with 1/30s	GigE	258.8@640x512 486.1@320x256	1x1 1x1	50us~60s 80mm
SWIR330KMB-G	0.33M/IMX991(M) 1/4"(3.20x2.56) External TEC	5x5	121mV with 1/30s 1.0mV with 1/30s	GigE	258.8@640x512 486.1@320x256	1x1 1x1	50us~60s 80mm
SWIR5000KMA-G 20240308	5.0M/IMX992(M,GS) 1/1.4" Buit-in TEC	3.45x3.45	TBD	GigE	22@2560x2048 88@1280x1024	1x1 1x1	15us~60s 80mm
SWIR5000KMB-G 20240308	5.0M/IMX992(M,GS) 1/1.4" External TEC	3.45x3.45	TBD	GigE	22@2560x2048 88@1280x1024	1x1 1x1	15us~60s 80mm
SWIR5000KMA-10G 20240313	5.0M/IMX992(M,GS) 1/1.4" Buit-in TEC	3.45x3.45	TBD	GigE	131.9@2560x2048	1x1	15us~60s 80mm
SWIR5000KMB-10G 20240313	5.0M/IMX992(M,GS) 1/1.4" External TEC	3.45x3.45	TBD	GigE	131.9@2560x2048	1x1	15us~60s 80mm

1.4 SWIR331 Series Camera Specifications(SWIR, 7)

Order Code	Sensor type and size	Pixel size(um)	Data Interface	Camera Type	FPS/Resolution	Exposure Time
SWIR331KMA-CL500	0.33M / 640x512 3/4" (9.60x7.68) Buit-in TEC	15x15	CameraLink	China produced devices	517@640x512	31.25us~1s
SWIR331KMA-CL700				China produced devices	724@640x512	23.81us ~1s
SWIR331KMB-CL500				Global procurement of key chips	517@640x512	31.25us~1s
SWIR331KMB-CL700				Global procurement of key chips	724@640x512	23.81us ~1s
SWIR331KMB-G125			GigE	Global procurement of key chips	125@640x512	50us ~5s
SWIR331KMB-G350				Global procurement of key chips	350@640x512	25us ~5s
SWIR331KMB-G700				Global procurement of key chips	360@640x512 700@320x256	50us ~5s

*Frame rate of SWIR331KMB-G700 is limited by network interface and can only reach 360fps at full resolution. Frame rate can be improved through ROI.

1.5 IUA Series Camera Specifications(Moderate sensor size, general or special wavelength, 50)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure Time

IUA390KMA	0.4M/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 20230825	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 20230825	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@3200×2200 133.8fps@1584×1100	1x1 1x1	6us~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 20231019	8.3M/IMX585-AAMJ1-C(M,RS) 1/1.2“ (11.14x6.26)	2.9x2.9	9560mv 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 20231207	8.3M/IMX678-AAMR1-C(M,GS) 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 20240508	8.3M/IMX678-AAQR1-C(C,GS) 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
IUA12000KPA 20231019	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,RS) 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 20230712	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	1x1 2x2	30us~15s

				46.3fps@1024x750	4x4	
IUA12300KPB 20230712	12.3M/IMX304LQR-C(C,RS) 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@5440×3684 49.9fps@2736×1824 59.5fps@1824×1216	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@5440×3684 48.8fps@2736×1824 59.4fps@1824×1216	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@4496×4496 64.4fps@2240×2240 64.4fps@1120×1120	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@4496×4496 64.4fps@2240×2240 64.4fps@1120×1120	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@5320×4600 54.3fps@2660×2300	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@5320×4600 54.4fps@2660×2300	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@5120×5120 27fps@2560×2560 54fps@1280×1280	1x1 2x2 4x4	150us~15s
IUA25000KPA	25M/GMAX0505(C, GS) 1.1“ (12.8x12.8)	2.5x2.5	QE@520nm: 58.0% 2.4e-/pixel/s	13fps@5120×5120 27fps@2560×2560 54fps@1280×1280	1x1 2x2 4x4	150us~15s
IUA45000KMA	45M/IMX492LLJ-C (M) 4/3“ (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
IUA- Special wavelength（UV，NIR）						
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@2688 x 1520	1x1	11us~15s
IUA500KMA (GPixel UV)	0.5M/GLUX1605BSI(M,UV,RS) 1“(12.8x9.6)	16x16	$6.4x10^8$(e-/((W/m2).s)) QE91%@550nm 50(e-/s/pix)	60fps@800×600 60fps@400×300	1x1 2x2	27us~60s
IUA1300KMA (GPixel UV)	1.3M/GLUX9701BSI(M,UV,RS) 1“(12.49x9.99)	9.76x9.76	$2.57x10^8$(e-/((W/m2).s)) QE89%@610nm 40(e-/s/pix)	30fps@1280×1024 30fps@640×512	1x1 2x2	63us~60s
IUA4200KMA (GPixel NIR)	4.2M/GSENSE2020e(M,NIR,RS) 1.2“(13.31x13.31)	6.5x6.5	$8.1x10^7$(e-/((W/m2).s)) QE73%@595nm 13(e-/s/pix)	45fps@2048×2048 45fps@1024×1024	1x1 2x2	21us~60s
IUA4200KMB (GPixel UV)	4.2M/GSENSE2020BSI(M,UV,RS) 1.2“(13.31x13.31)	6.5x6.5	$1.1x10^8$(e-/((W/m2).s)) QE93.7%@550nm 80(e-/s/pix)	32fps@2048×2048 32fps@1024×1024	1x1 2x2	21us~60s
IUA4200KME (GPixel UV)	4.2M/GSENSE400BSI(M,UV,RS) 2.0“(22.53x22.53)	11.0x11.0	$3.25x10^8$(e-/((W/m2).s)) QE95.3%@560nm 345(e-/s/pix)	37fps@2048×2048 37fps@1024×1024	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@2840×2840 198fps@1420×1420	1x1 2x2	30us~15s

M: Monochromatic; C: Color; UV: Ultra Violet; RS: Rolling Shutter; GS: Global Shutter; NIR: NIR Up.

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

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure Time

~~IUB4200KMA~~ ~~EOL~~	4.2M/GSENSE2020e(M,RS) 1.2“ (13.31x13.3)	6.5x6.5	8.11x10^7e-/((W/m2)·s) 7e-/s/pix	45fps@2048×2046 45fps@1024×1022	1x1 2x2	TBD
~~IUB4200KMB~~ ~~NRND~~	4.2M/GSENSE2020BSI(M, UV,RS) 1.2“ (13.31x13.3)	6.5x6.5	1.1x10^8e-/((W/m2)·s) 80e-/s/pix	43.6fps@2048×2046 43.6fps@1024×1022	1x1 2x2	150us-60s
~~IUB43000KMA~~ ~~EOL~~	43.0M/GMAX0806 (M,GS) 1.7“ (22.13x15.21, APS-C)	2.8x2.8	1.19x10^7e-/((W/m2)·s) 1e-/s/pix	8.5fps@7904×5432	1x1	15us-15s

M: Monochromatic; C: Color; 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.

1.7 IUC Series Camera Specifications (APS or full frame, 7)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure Time
IUC24000KPA 20231019	24.0M/IMX410CQK-C(C, RS) 2.7“ (36.02x24.00, Full Frame)	5.94x5.94	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)	3.76x3.76	870.9mv with 1/30s 0.07mv with 1/30s	14fps@6224×4168(16bit) 37fps@3104×2084 110fps@2064×1388	1x1 2x2 3x3	150us~15s
IUC26000KPA	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	14fps@6224×4168(16bit) 37fps@3104×2084 110fps@2064×1388	1x1 2x2 3x3	150us~15s
IUC31000KMA	31.0M/IMX342LLA(M, GS) 1.8“ (22.3x16.74, APS-C)	3.45x3.45	1830mv with 1/30s 0.15mv with 1/30s	12.0fps@6464×4852 45.9fps@3216×2426	1x1 2x2	31us~15s
IUC31000KPA	31.0M/IMX342LQA(C, GS) 1.8“ (22.3x16.74, APS-C)	3.45x3.45	1146mv with 1/30s 0.15mv with 1/30s	12.0fps@6464×4852 45.9fps@3216×2426	1x1 1x1	31us~15s
IUC60000KMA	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	6.1fps@9568×6380(16bit) 24.6fps@4784×3190 55.8fps@3184×2124 191.0fps@1040×706	1x1 2x2 3x3 9x9	150us~15s
IUC60000KPA	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	6.1fps@9568×6380(16bit) 24.6fps@4784×3190 55.8fps@3184×2124 191.0fps@1040×706	1x1 2x2 3x3 9x9	150us~15s

M: Monochromatic; C: Color; RS: Rolling Shutter; GS: Global Shutter.

1.8 IUD Series Camera Specifications(NIRE 2)

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure Time
IUD16000KMA 20240313	16.0M/PYTHON 16K (M, GS) (18.43x18.43)	4.5x4.5	TBD	22.5@4096x4096	1x1	1us~60s
IUD25000KMA 20240228	25.0M/PYTHON 25K (M, GS) 2.04“ (23.04x23.04)	4.5x4.5	<1/5000 3.9 e^-/s@ 20°C	14.8@5120x5120 14.8@2560x2560 14.8@1664x1664	1x1 2x2 3x3	1us~60s

M: Monochromatic; C: Color; RS: Rolling Shutter; GS: Global Shutter.

1.9 I3 Series Camera Specifications(GS or RS, 36)

1.9.1 I3ISPM Series Color Camera Specifications

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure Time Dimensions
I3ISPM with 33mm x 33mm x 33mm housing						
I3ISPM00500KPA IP800500A	0.5M/IMX433LQJ(C,GS) 1/1.7“ (7.31x5.58)	9.0x9.0	4910mv with 1/30s 0.3mv with 1/30s	166.5fps@812×620	1x1	6us~15s 33mm
I3ISPM01500KPA IP801500A	1.5M/IMX273LQR(C,GS) 1/2.9“ (4.97x3.73)	3.45×3.45	1146mv with 1/30s 0.15mv with 1/30s	227.2fps@1440×1080 382.7fps@720×540	1x1 1x1	15us~15s 33mm

I3ISPM02300KPA IP802300A	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 33mm
I3ISPM02300KPB IP802300B	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 33mm
I3ISPM03100KPA IP803100A	3.1M/IMX252LQR(C,GS) 1/1.8“ (7.07x5.30)	3.45×3.45	1146mv with 1/30s 0.15mv with 1/30s	115fps@2048×1536 230.3fps@1024×768	1x1 1x1	15us~15s 33mm
I3ISPM03100KPB IP803100B	3.1M/IMX265LQR(C,GS) 1/1.8“ (7.07x5.30)	3.45×3.45	1146mv with 1/30s 0.15mv with 1/30s	55.4fps@2048×1536 115.1fps@1024×768	1x1 1x1	15us~15s 33mm
I3ISPM04100KPA IP804100A 20240313	4.1M/IMX664AAQR1(C, RS) 1/1.8“(7.80x4.41)	2.9×2.9	5970mv with 1/30s 0.13mv with 1/30s	90fps@2688×1520	1x1	15us~15s 33mm
I3ISPM05000KPA IP805000A	5.0M/IMX250LQR(C,GS) 2/3“ (8.45x7.07)	3.45×3.45	1146mv with 1/30s 0.15mv with 1/30s	71.2fps@2448×2048 175.2fps@1224×1024	1x1 1x1	15us~15s 33mm
I3ISPM05000KPB IP805000B	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@2448×1536 87.6fps@1224×1024	1x1 1x1	15us~15s 33mm
I3ISPM06300KPA IP806300A	6.3M/IMX178LQJ(C, RS) 1/1.8“ (7.37x4.92)	2.4x2.4	425mv with 1/30s 0.15mv with 1/30s	58.7fps@3072×2048 59.5fps@1536×1024	1x1 2x2	17us~15s 33mm
I3ISPM12000KPA IP812000A	12M/IMX226CQJ(C, RS) 1/1.7“(7.52x5.64)	1.85x1.85	3637mv with 1/30s 0.15mv with 1/30s	29.97fps@4064×3046 59.94fps@2048×1080	1x1 2x2	400us~15s 33mm
I3ISPM12000KPB IP812000B	12M/IMX676-AACR(C, RS) 1/1.6“(7.07x7.07)	2.0x2.0	280mv with 1/30s 0.1mv with 1/30s	27.7fps@3536×3536 65.8fps@1760×1760	1x1 2x2	13us~15s 33mm
I3ISPM with 38mm x 38mm x 33mm housing						
I3ISPM01700KPA IP801700A 20230731	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 38mm
I3ISPM01700KPB IP801700B 20230825	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 38mm
I3ISPM02000KPA IP802000A 20240313	2.0M/IMX430LQJ(C, GS) 1/1.7“(7.31x5.58)	4.5x4.5	2058mv with 1/30s 0.15mv with 1/30s	132fps@1624×1240	1x1	6us~15s 38mm
I3ISPM02800KPA IP802800A 20230731	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 38mm
I3ISPM07100KPA IP807100A 20230731	7.1M/IMX428LQJ(C,GS) 1.1“ (14.4x9.9)	4.5x4.5	2058mv with 1/30s 0.15mv with 1/30s	51.4fps@3200×2200 133.8fps@1584×1100	1x1 1x1	6us~15s 38mm
I3ISPM12300KPA IP812300A 20231019	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 38mm

1.9.2 I3CMOS Series Mono Camera Specifications

Model Number	Image Sensor	Pixel Size(μm)	G Sensitivity/Dark Signal	FPS/Resolution	Binning	Exposure Time Dimensions
I3CMOIS with 33mm x 33mm x 33mm with housing						
I3CMOS00500KMA IM700500A	0.5M/IMX433LLJ(M,GS) 1/1.7“ (7.31x5.58)	9.0x9.0	8100mv with 1/30s 0.30mv with 1/30s	166.5fps@812×620	1x1	6us~15s 33mm
I3CMOS01500KMA IM701500A	1.5M/IMX273LLR(M,GS) 1/2.9“ (4.97x3.73)	3.45×3.45	1830mv with 1/30s 0.19mv with 1/30s	226.5fps@1440×1080 506fps@720×540	1x1 2x2	15us~15s 33mm
I3CMOS02300KMA IM702300A	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 33mm
I3CMOS02300KMB IM702300B	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 33mm
I3CMOS03100KMA IM703100A	3.1M/IMX252LLR(M,GS) 1/1.8“ (7.07x5.30)	3.45×3.45	1830mv with 1/30s 0.15mv with 1/30s	110.6fps@2048×1536 233.8fps@1024×768	1x1 1x1	15us~15s 33mm
I3CMOS04100KMA IM704100A 20230313	4.1M/IMX664AAMR1(M,RS) 1/1.8“(7.80x4.41)	2.9×2.9	TBD	90fps@2688×1520	1x1	15us~15s 33mm
I3CMOS03100KMB IM703100B	3.1M/IMX265LLR(M,GS) 1/1.8“ (7.07x5.30)	3.45×3.45	1830mv with 1/30s 0.15mv with 1/30s	55.4fps@2048×1536 115.1fps@1024×768	1x1 1x1	15us~15s 33mm
I3CMOS05000KMA IM705000A	5.0M/IMX250LLR(M,GS) 2/3“ (8.45x7.07)	3.45×3.45	1830mv with 1/30s 0.15mv with 1/30s	70.9fps@2448×2048 175.2fps@1224×1024	1x1 1x1	15us~15s 33mm
I3CMOS05000KMB IM705000B	5.0M/IMX264LLR(M,GS) 2/3“ (8.45x7.07)	3.45×3.45	1830mv with 1/30s	35.6fps@2448×2048 87.6fps@1224×768	1x1 1x1	15us~15s 33mm

			0.15mv with 1/30s			
I3CMOS05000KMC IM705000C 20230725	5.0M/IMX250MZR(M,GS) 2/3“ (8.45x7.07) Polarsens	3.45×3.45	684mv with 1/30s 0.15mv with 1/30s	35.6fps@2448×2048 87.6fps@1224×768	1x1 1x1	15us~15s 33mm
I3CMOS06300KMA IM706300A	6.3M/IMX178LLJ(M, RS) 1/1.8“ (7.37x4.92)	2.4x2.4	760mv with 1/30s 0.15mv with 1/30s	58.7fps@3072×2048 59.5fps@1536×1024	1x1 2x2	17us~15s 33mm
I3CMOS with 38mm x 38mm x 33mm housing						
I3CMOS01300KMA IM701300A 20240508	1.3M/GLUX9701BSI(M,UV,RS) 1“(12.49x9.99)	9.76x9.76	2.57x10^8(e-/((W/m2).s)) QE89%@610nm 40(e-/s/pix)	30fps@1280×1024 30fps@640×512	1x1 2x2	63us~60s 38mm
I3CMOS01700KMA IM701700A 20230731	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 38mm
I3CMOS01700KMB IM701700B 20230825	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 38mm
I3CMOS02000KMA IM702000A 20240313	2.0M/IMX430LLJ(M, GS) 1/1.7“(7.31x5.58)	4.5x4.5	3354mv with 1/30s 0.15mv with 1/30s	132fps@1624×1240	1x1	6us~15s 38mm
I3CMOS02800KMA IM702800A 20230731	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 38mm
I3CMOS07100KMA IM707100A 20230731	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 38mm
I3CMOS12300KMA IM712300A 20231019	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 38mm

M: Monochromatic; C: Color; RS: Rolling Shutter; GS: Global Shutter.

2 SWIR Sony Series Camera Specification(17)

2.1 Application of SWIR Camera

SWIR series are TE-Cooling USB3.0 / GigE / MIPI(developing) / CameraLink(developing) InGaAs SWIR cameras, which adopts Sony IMX990 / IMX991 /IMX992 Short-Wavelength Infrared (SWlR) Image Sensor. It is suitable to capture images in both visible range and SWlR range, covering 400nm to 1800nm. With smaller pixel size of 5um, imaging shows higher precision for quantitative researches.

Electronic board inspection, solar cellinspection， semiconduction inspection,transmission observation,produce inspec-tion, identifying and sorting, water visu-alization, temperature observation, surveil-lance, anti-counterfeiting Short wave infrared high-end night vision security applications are also the best choice.

2.2 SWIR1300KMA

Table 2-1 SWIR1300KMA camera specifications

Model / Parameter	SWIR1300KMA
	1.31M pixels 1/2" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX990-AABA-C
Sensor Type	InGaAs
Spectral Range	400nm-1700nm
Pixel size	5.0 μm x 5.0 μm
Sensor size	1/2"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：200fps@1280 x 1024、392fps@640 x 512 12 Bit：108fps@1280 x 1024、209fps@640 x 512
Image Buffer	512MByte
Conversion Gain	44.3e/ADU
Dynamic range	58.7dB
Readout Noise	211e
Full Well	181.6ke
SNRmax	52.6dB
Sensitivity	121mV
Dark current	383e/s(0°C) 510e/s(10°C) 638e/s(20°C)
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	25°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	Power with USB3.0 or 12V Power adapter
Power consumption	<2.1W(without cooling) / <25W(cooling)
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

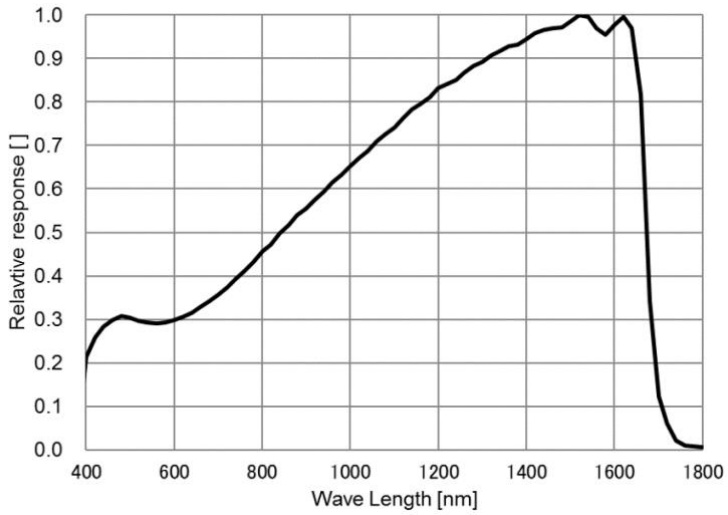


Figure 2-1 SWIR1300KMA spectral response curve

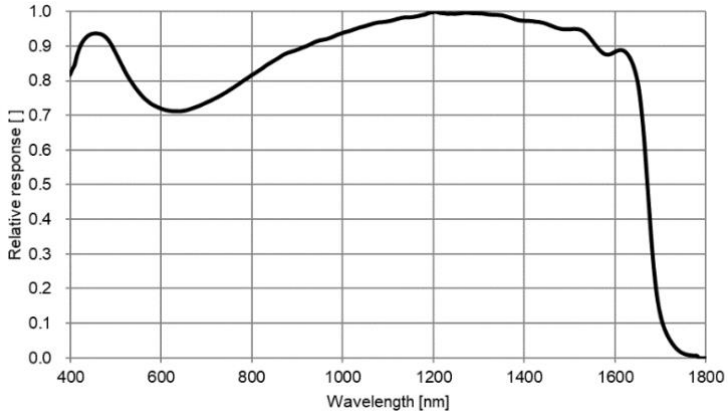


Figure 2-2 SWIR1300KMA relative quantum efficiency

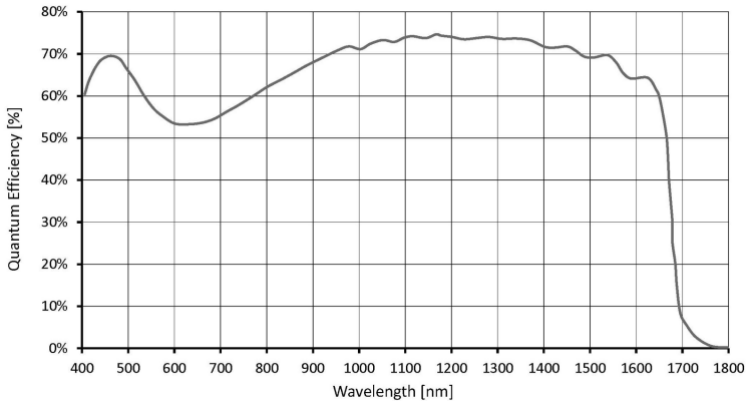


Figure 2-3 SWIR1300KMA absolute quantum efficiency

2.3 SWIR1300KMB

Table 2-2 SWIR1300KMB camera specifications

Model / Parameter	SWIR1300KMB
	1.3M pixels 1/2" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX990-AABJ-C
Sensor Type	InGaAs
Spectral Range	400nm-1700nm
Pixel size	5.0 μm x 5.0 μm
Sensor size	1/2"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：200fps@1280 x 1024、392fps@640 x 512 12 Bit：108fps@1280 x 1024、209fps@640 x 512
Image Buffer	512MByte
Conversion Gain	42.8e/ADU
Dynamic range	58.7dB
Readout Noise	197.6e
Full Well	175.4ke
SNRmax	52.4dB
Sensitivity	121mV
Dark current	638e/s(20°C)
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	10°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	Power with USB3.0 or 12V Power adapter
Power consumption	<2.1W(without cooling) / <25W(cooling)
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

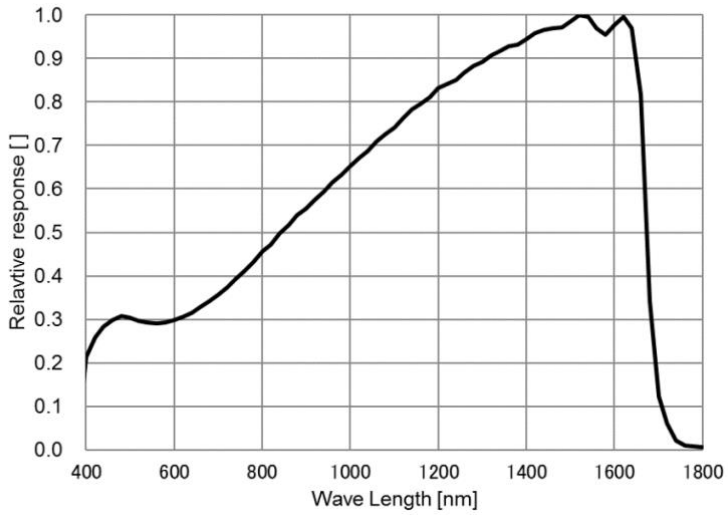


Figure 2-4 SWIR1300KMB spectral response curve

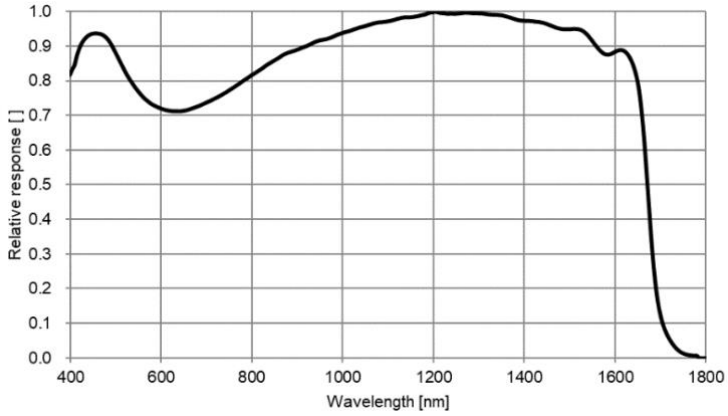


Figure 2-5 SWIR1300KMB relative quantum efficiency

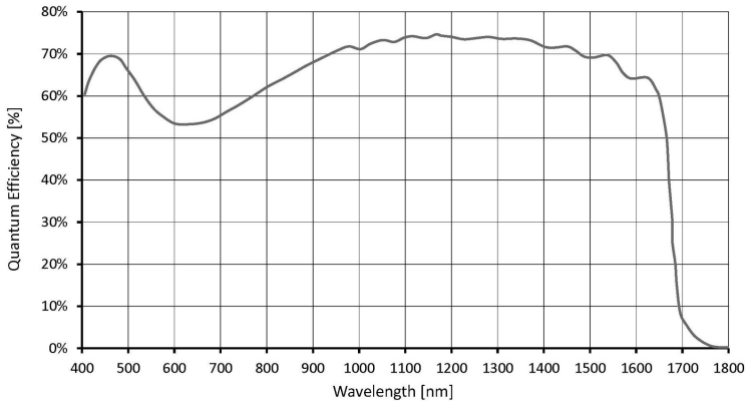


Figure 2-6 SWIR1300KMB absolute quantum efficiency

2.4 SWIR330KMA

Table 2-3 SWIR330KMA camera specifications

Model / Parameter	SWIR330KMA
	0.33M pixels 1/4" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX991-AABA-C
Sensor Type	InGaAs
Spectral Range	400nm-1700nm
Pixel size	5.0 μm x 5.0 μm
Sensor size	1/4"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：400fps@640 x 512、753fps@320 x 256 12 Bit：212fps@640 x 512、400fps@320 x 256
Image Buffer	512MByte
Conversion Gain	42.29e/ADU
Dynamic range	59.7dB
Readout Noise	176.7e
Full Well	173.23ke
SNRmax	52.39dB
Sensitivity	121mV
Dark current	383e/s(0°C) 510e/s(10°C) 638e/s(20°C)
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	25°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	Power with USB3.0 or 12V Power adapter
Power consumption	<2.1W(without cooling) / <25W(cooling)
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

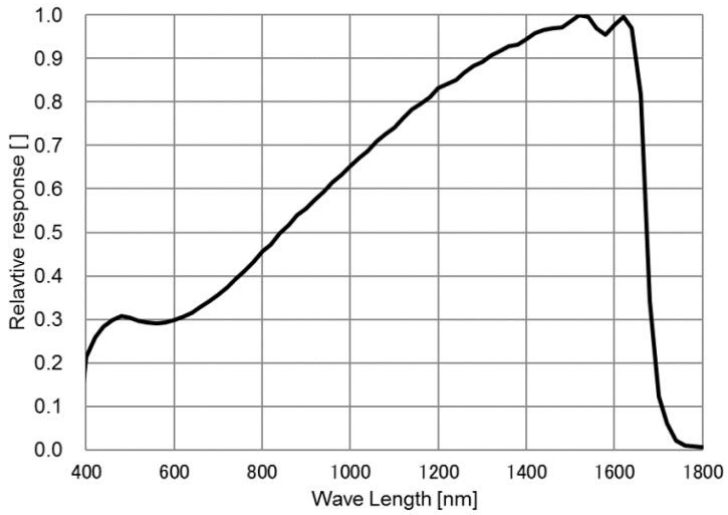


Figure 2-7 SWIR330KMA spectral response curve

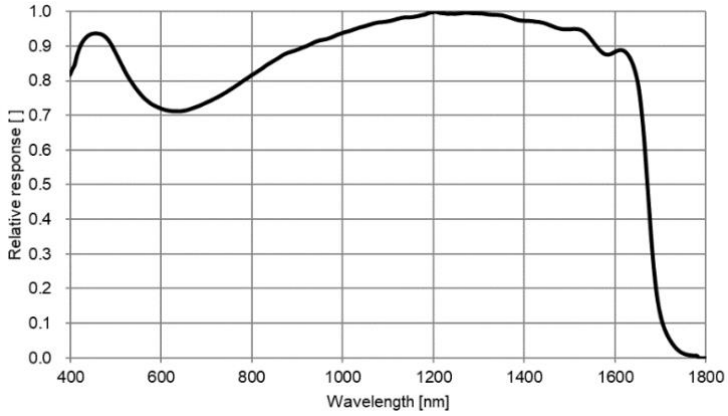


Figure 2-8 SWIR330KMA relative quantum efficiency

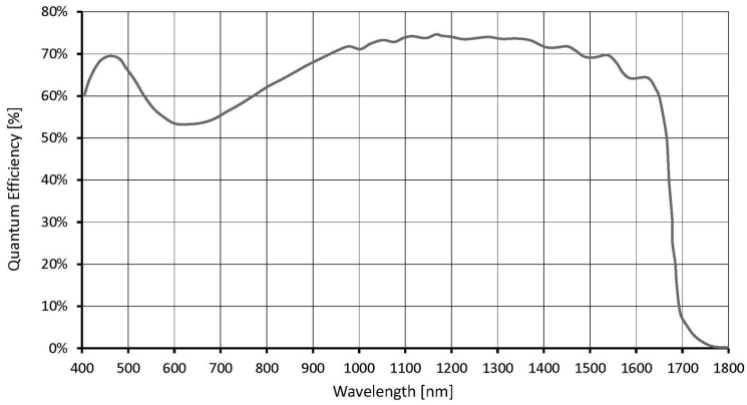


Figure 2-9 SWIR330KMA absolute quantum efficiency

2.5 SWIR330KMB

Table 2-4 SWIR330KMB camera specifications

Model / Parameter	SWIR330KMB
	0.33M pixels 1/4" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX991-AABJ-C
Sensor Type	InGaAs
Spectral Range	400nm-1700nm
Pixel size	5.0 μm x 5.0 μm
Sensor size	1/4"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：400fps@640 x 512、753fps@320 x 256 12 Bit：212fps@640 x 512、400fps@320 x 256
Image Buffer	512MByte
Conversion Gain	43.0e/ADU
Dynamic range	59.6dB
Readout Noise	178.8e
Full Well	176.2ke
SNRmax	52.5dB
Sensitivity	121mV
Dark current	638e/s(20°C)
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	10°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	Power with USB3.0 or 12V Power adapter
Power consumption	<2.1W(without cooling) / <25W(cooling)
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

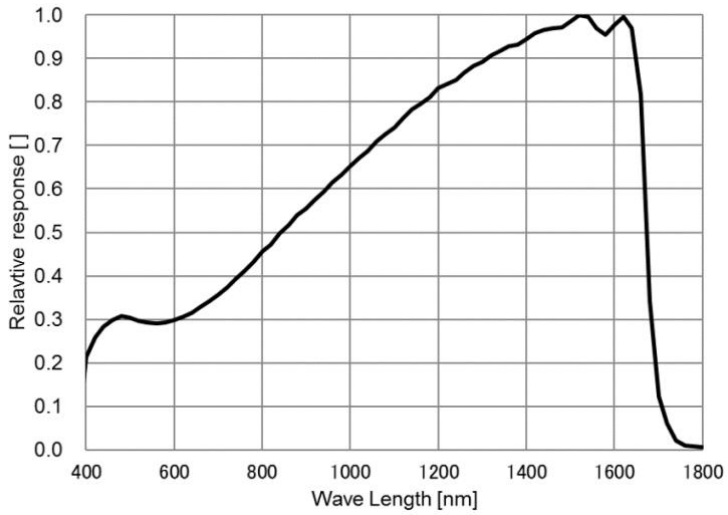


Figure 2-10 SWIR330KMB spectral response curve

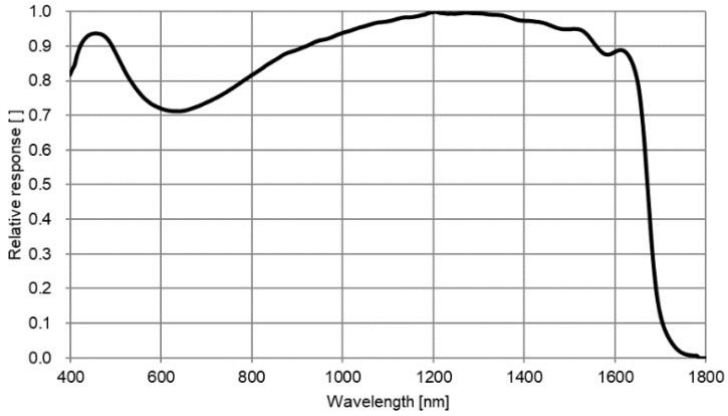


Figure 2-11 SWIR330KMB relative quantum efficiency

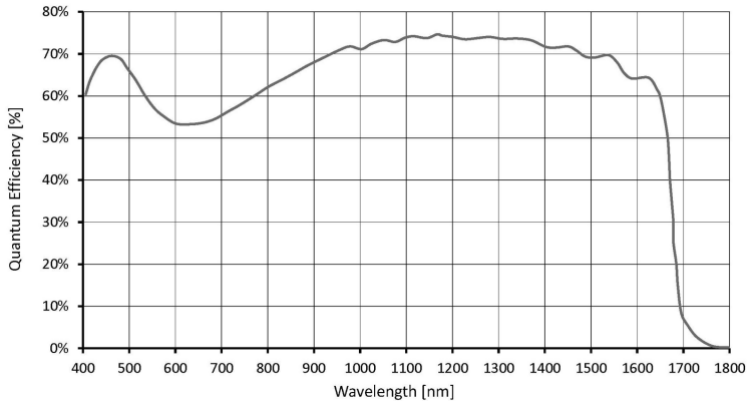


Figure 2-12 SWIR330KMB absolute quantum efficiency

2.6 SWIR5000KMA(20240308)

Table 2-5 SWIR5000KMA camera specifications

Model / Parameter	SWIR5000KMA
	5.0M pixels 1/1.4" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX992-AABA-C
Sensor Type	InGaAs
Spectral Range	400nm-1700nm
Pixel size	3.45 μm x 3.45 μm
Sensor size	1/1.4"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：61.9fps@2560x2048、135.7fps@1280x1024 12 Bit：35.5fps@2560x2048、135.7fps@1280x1024
Image Buffer	512MByte
Conversion Gain	10.3e/ADU（HCG）17.29e/ADU（LCG）
Dynamic range	51.36dB（HCG）51.47dB（LCG）
Readout Noise	111.88e（HCG）186.61e（LCG）
Full Well	41.39ke（HCG）69.92ke（LCG）
SNRmax	46.17dB（HCG）48.45dB（LCG）
Sensitivity	TBD
Dark current	TBD
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	25°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	Power with USB3.0 or 12V Power adapter
Power consumption	<2.1W(without cooling) / <25W(cooling)
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

2.7 SWIR5000KMB(20240308)

Table 2-6 SWIR5000KMB camera specifications

Model / Parameter	SWIR5000KMB
	5.0M pixels 1/1.4" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX992-AABJ-C
Sensor Type	InGaAs
Spectral Range	400nm-1700nm
Pixel size	3.45 μm x 3.45 μm
Sensor size	1/1.4"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：61.9fps@2560x2048、135.7fps@1280x1024 12 Bit：35.5fps@2560x2048、135.7fps@1280x1024
Image Buffer	512MByte
Conversion Gain	10.3e/ADU（HCG）17.29e/ADU（LCG）
Dynamic range	51.36dB（HCG）51.47dB（LCG）
Readout Noise	111.88e（HCG）186.61e（LCG）
Full Well	41.39ke（HCG）69.92ke（LCG）
SNRmax	46.17dB（HCG）48.45dB（LCG）
Sensitivity	TBD
Dark current	TBD
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	10°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	Power with USB3.0 or 12V Power adapter
Power consumption	<2.1W(without cooling) / <25W(cooling)
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

2.8 SWIR1300KMB-UMV(20230825)

Table 2-7 SWIR1300KMB-UMV camera specifications

Model / Parameter	SWIR1300KMB-UMV
	1.3M pixels 1/2" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX990-AABJ-C
Sensor Type	InGaAs
Spectral Range	400nm-1700nm
Pixel size	5.0 μm x 5.0 μm
Sensor size	1/2"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：223fps@1280 x 1024、428fps@640 x 512 12 Bit：118.7fps@1280 x 1024、227.7fps@640 x 512
Image Buffer	512MByte
Conversion Gain	42.8e/ADU
Dynamic range	58.7dB
Readout Noise	197.6e
Full Well	175.4ke
SNRmax	52.4dB
Sensitivity	121mV
Dark current	638e/s(20°C)
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	10°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	Power with USB3.0
Power consumption	<2.11W
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×38mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

When the ambient temperature is 25.5 degrees, the camera is placed on a wooden table, and the exposure time is 1.5ms in 8bit mode.

Resolution	Overclock	Frame rate	Power consumption	Sensor temperature
1280*1024	Off	135fps	1.75W	42.3
1280*1024	On	223fps	2.11W	43.2
640*512	Off	258fps	1.51W	38.1
640*512	On	428fps	1.75W	40

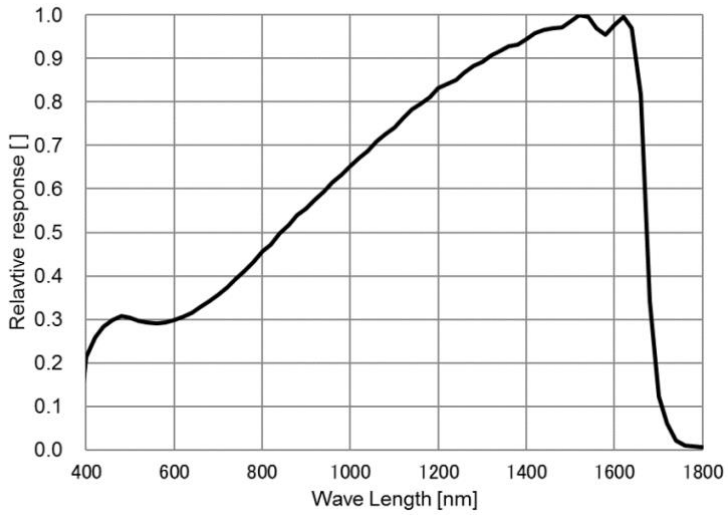


Figure 2-13 SWIR1300KMB-UMV spectral response curve

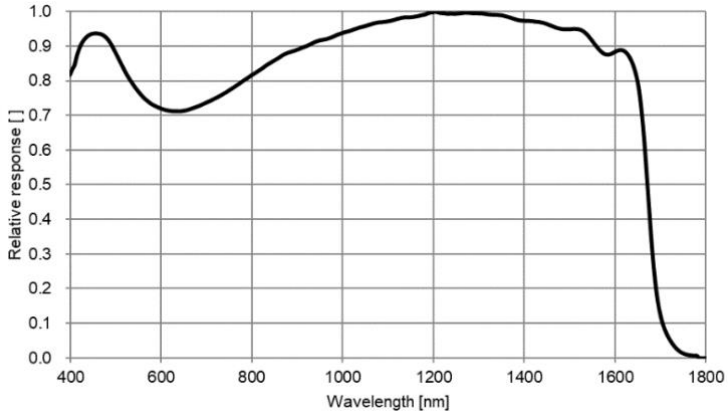


Figure 2-14 SWIR1300KMB-UMV relative quantum efficiency

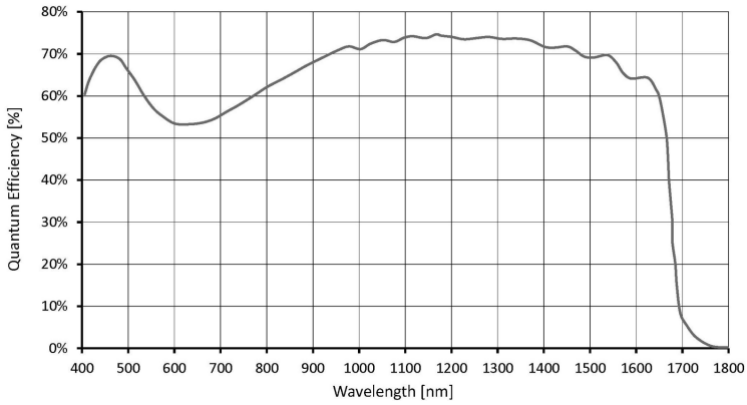


Figure 2-15 SWIR1300KMB-UMV absolute quantum efficiency

2.9 SWIR330KMB-UMV(20230825)

Table 2-8 SWIR330KMB-UMV camera specifications

Model / Parameter	SWIR330KMB-UMV
	0.33M pixels 1/4" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX991-AABJ-C
Sensor Type	InGaAs
Spectral Range	400nm-1700nm
Pixel size	5.0 μm x 5.0 μm
Sensor size	1/4"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：428.1fps@640 x 512、807fps@320 x 256 12 Bit：227.7fps@640 x 512、429.3fps@320 x 256
Image Buffer	512MByte
Conversion Gain	43.0e/ADU
Dynamic range	59.6dB
Readout Noise	178.8e
Full Well	176.2ke
SNRmax	52.5dB
Sensitivity	121mV
Dark current	638e/s(20°C)
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	10°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	Power with USB3.0
Power consumption	<2.11W
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×38mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

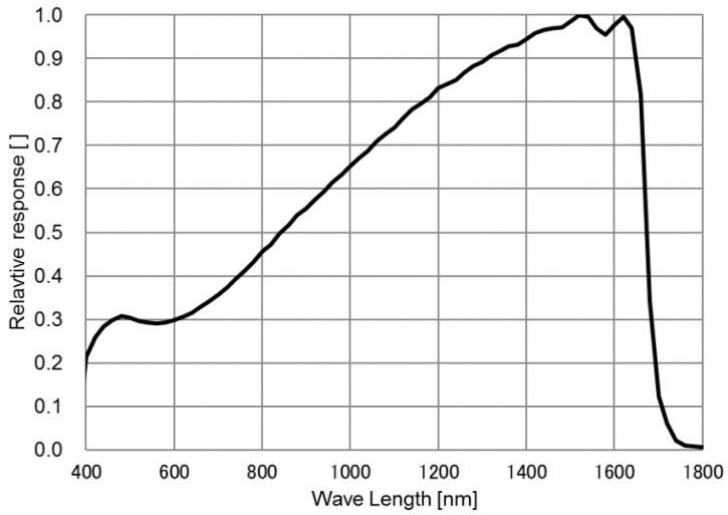


Figure 2-16 SWIR330KMB-UMV spectral response curve

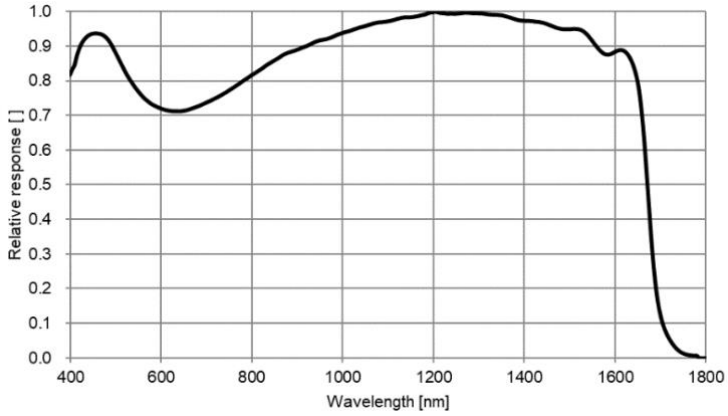


Figure 2-17 SWIR330KMB-UMV relative quantum efficiency

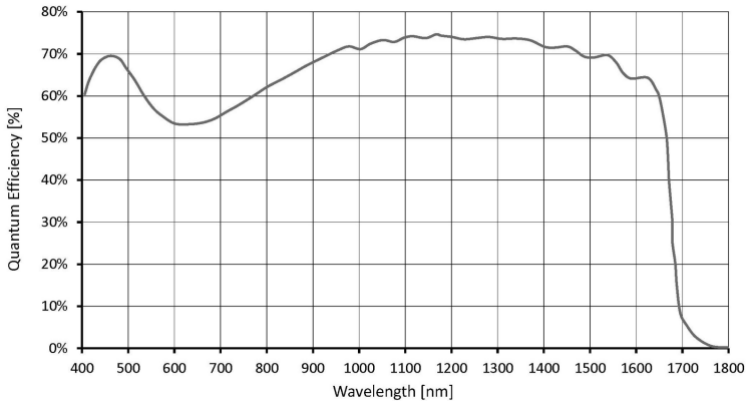


Figure 2-18 SWIR330KMB-UMV absolute quantum efficiency

2.10 SWIR5000KMB-UMV(20240308)

Table 2-9 SWIR5000KMB-UMV camera specifications

Model / Parameter	SWIR5000KMB-UMV
	5.0M pixels 1/1.4" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX992-AABJ-C
Sensor Type	InGaAs
Spectral Range	400nm-1700nm
Pixel size	3.45 μm x 3.45 μm
Sensor size	1/1.4"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：61.9fps@2560x2048、135.7fps@1280x1024 12 Bit：35.5fps@2560x2048、135.7fps@1280x1024
Image Buffer	512MByte
Conversion Gain	TBD
Dynamic range	TBD
Readout Noise	TBD
Full Well	TBD
SNRmax	TBD
Sensitivity	TBD
Dark current	TBD
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	USB3.0
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, one non-isolated input and output
Data Format	8bit / 12bit
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	Power with USB3.0
Power consumption	<2.11W
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×38mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

2.11 SWIR1300KMA-G

Table 2-10 SWIR1300KMA-G camera specifications

Model / Parameter	SWIR1300KMA-G
	1.31M pixels 1/2" CMOS GigE industrial camera
Camera	
Sensor model	Sony IMX990-AABA-C
Sensor Type	InGaAs
Spectral Range	400nm-1800nm
Pixel size	5.0 μm x 5.0 μm
Sensor size	1/2"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：90fps@1280 x 1024、253fps@640 x 512 12 Bit：45fps@1280 x 1024、135fps@640 x 512
Image Buffer	512MByte
Conversion Gain	44.3e/ADU
Dynamic range	58.7dB
Readout Noise	211e
Full Well	181.6ke
SNRmax	52.6dB
Sensitivity	121mV
Dark current	383e/s(0°C) 510e/s(10°C) 638e/s(20°C)
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	GigE
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	25°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	12V Power adapter
Power consumption	<2.1W(without cooling) / <25W(cooling)
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

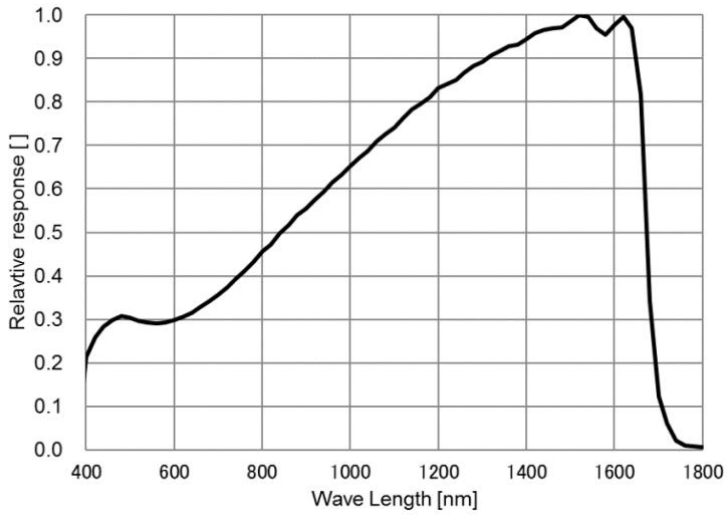


Figure 2-19 SWIR1300KMA-G spectral response curve

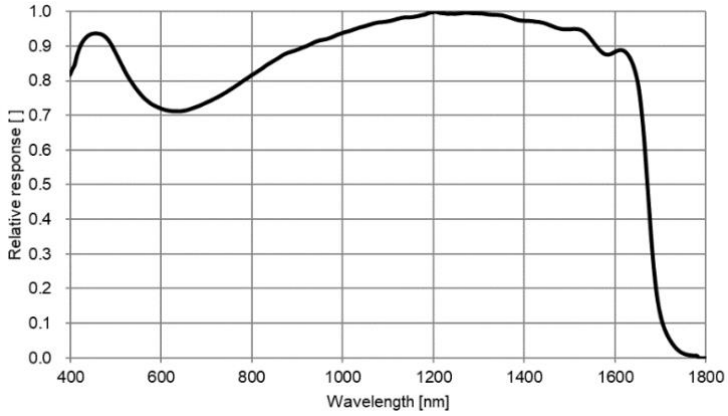


Figure 2-20 SWIR1300KMA-G relative quantum efficiency

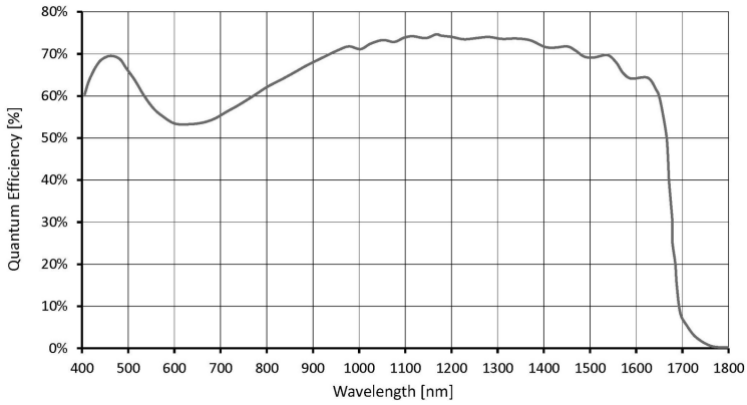


Figure 2-21 SWIR1300KMA-G absolute quantum efficiency

2.12 SWIR1300KMB-G

Table 2-11 SWIR1300KMB-G camera specifications

Model / Parameter	SWIR1300KMB-G
	1.3M pixels 1/2" CMOS GigE industrial camera
Camera	
Sensor model	Sony IMX990-AABJ-C
Sensor Type	InGaAs
Spectral Range	400nm-1800nm
Pixel size	5.0 μm x 5.0 μm
Sensor size	1/2"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：90fps@1280 x 1024、253fps@640 x 512 12 Bit：45fps@1280 x 1024、135fps@640 x 512
Image Buffer	512MByte
Conversion Gain	42.8e/ADU
Dynamic range	58.7dB
Readout Noise	197.6e
Full Well	175.4ke
SNRmax	52.4dB
Sensitivity	121mV
Dark current	638e/s(20°C)
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	GigE
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	10°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	12V Power adapter
Power consumption	<2.1W(without cooling) / <25W(cooling)
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

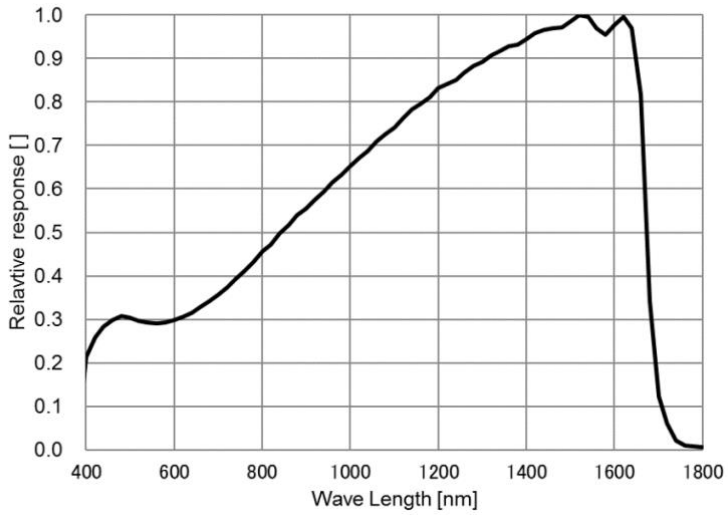


Figure 2-22 SWIR1300KMB-G spectral response curve

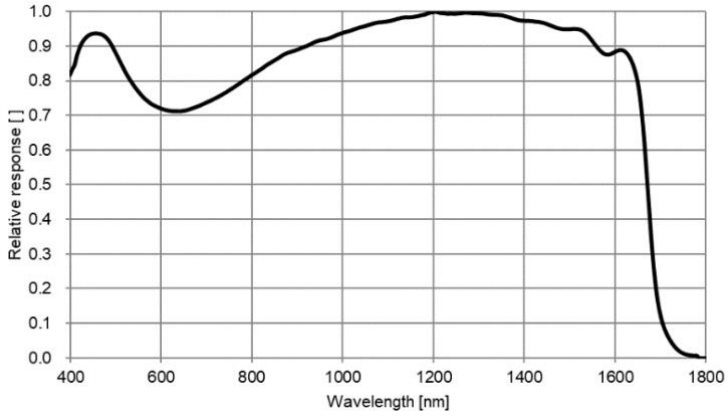


Figure 2-23 SWIR1300KMB-G relative quantum efficiency

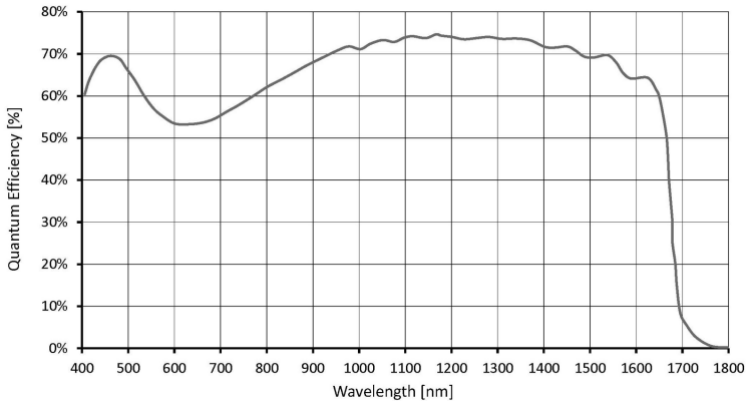


Figure 2-24 SWIR1300KMB-G absolute quantum efficiency

2.13 SWIR330KMA-G

Table 2-12 SWIR330KMA-G camera specifications

Model / Parameter	SWIR330KMA-G
	0.33M pixels 1/4" CMOS GigE industrial camera
Camera	
Sensor model	Sony IMX991-AABA-C
Sensor Type	InGaAs
Spectral Range	400nm-1800nm
Pixel size	5.0 μm x 5.0 μm
Sensor size	1/4"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：257.8fps@640 x 512、486.1fps@320 x 256 12 Bit：137.1fps@640 x 512、258.6fps@320 x 256
Image Buffer	512MByte
Conversion Gain	42.29e/ADU
Dynamic range	59.7dB
Readout Noise	176.7e
Full Well	173.23ke
SNRmax	52.39dB
Sensitivity	121mV
Dark current	383e/s(0°C) 510e/s(10°C) 638e/s(20°C)
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	GigE
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	25°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	12V Power adapter
Power consumption	<2.1W(without cooling) / <25W(cooling)
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

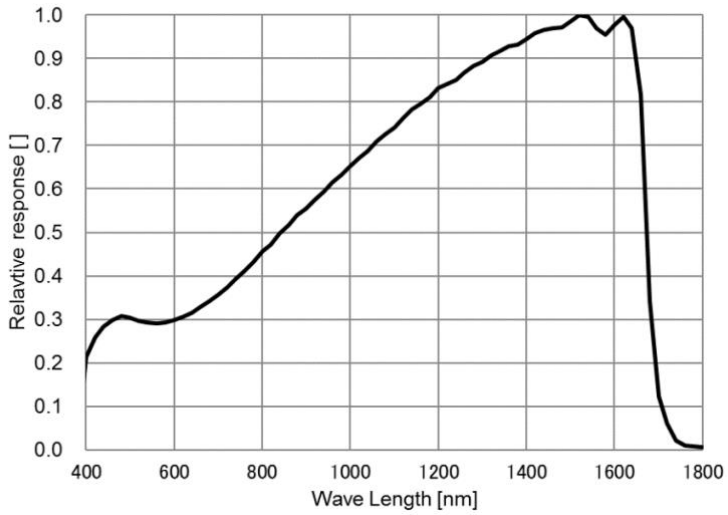


Figure 2-25 SWIR330KMA-G spectral response curve

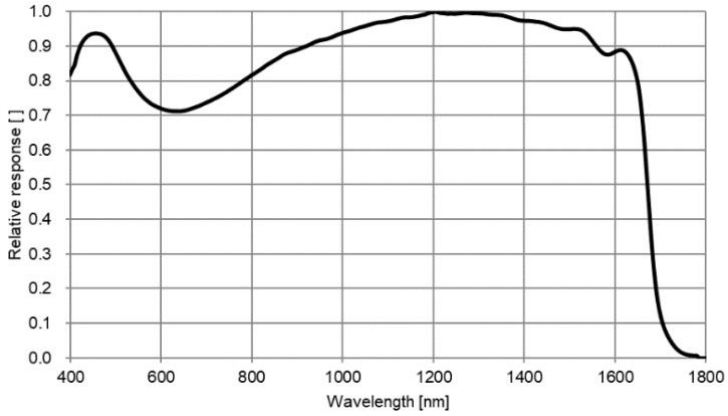


Figure 2-26 SWIR330KMA-G relative quantum efficiency

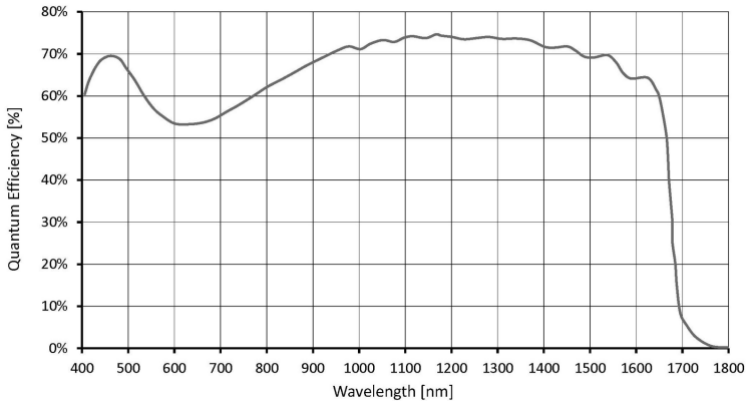


Figure 2-27 SWIR330KMA-G absolute quantum efficiency

2.14 SWIR330KMB-G

Table 2-13 SWIR330KMB-G camera specifications

Model / Parameter	SWIR330KMB-G
	0.33M pixels 1/4" CMOS GigE industrial camera
Camera	
Sensor model	Sony IMX991-AABJ-C
Sensor Type	InGaAs
Spectral Range	400nm-1800nm
Pixel size	5.0 μm x 5.0 μm
Sensor size	1/4"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：257.8fps@640 x 512、486.1fps@320 x 256 12 Bit：137.1fps@640 x 512、258.6fps@320 x 256
Image Buffer	512MByte
Conversion Gain	43.0e/ADU
Dynamic range	59.6dB
Readout Noise	178.8e
Full Well	176.2ke
SNRmax	52.5dB
Sensitivity	121mV
Dark current	638e/s(20°C)
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	GigE
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	10°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	12V Power adapter
Power consumption	<2.1W(without cooling) / <25W(cooling)
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

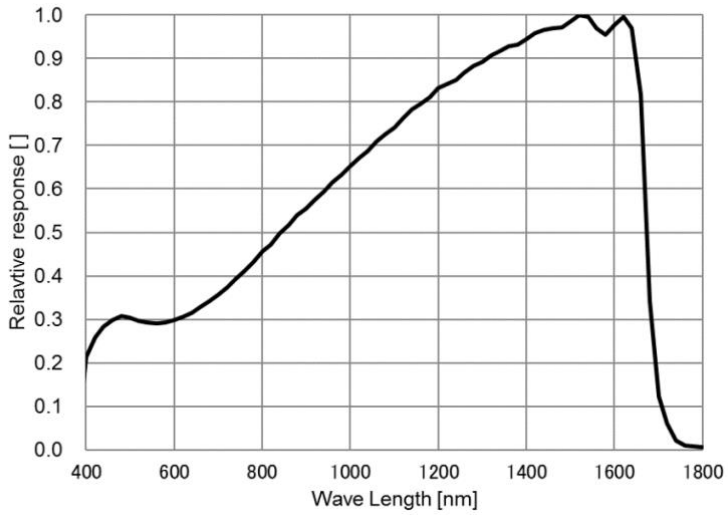


Figure 2-28 SWIR330KMB-G spectral response curve

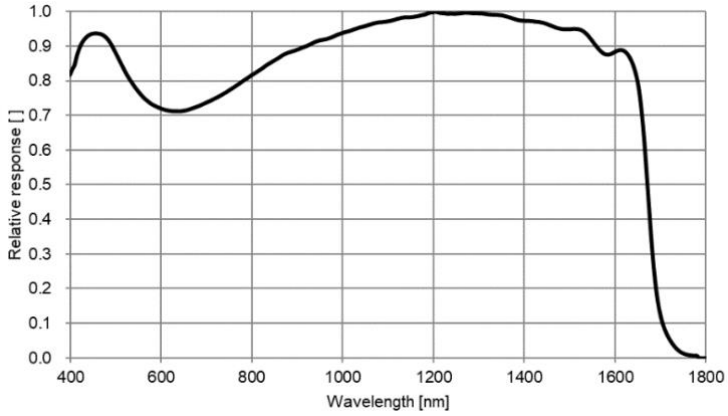


Figure 2-29 SWIR330KMB-G relative quantum efficiency

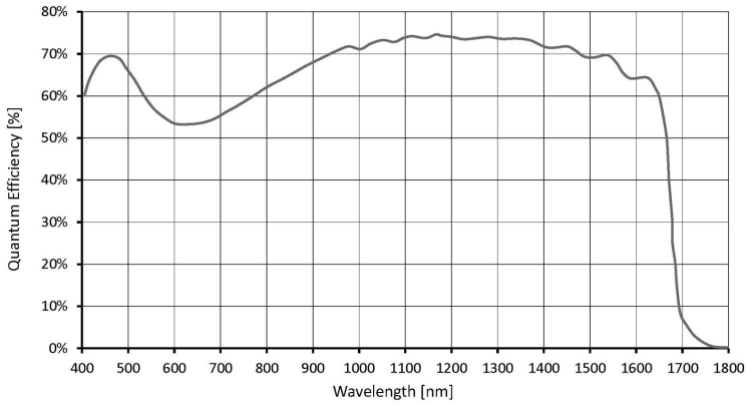


Figure 2-30 SWIR330KMB-G absolute quantum efficiency

2.15 SWIR5000KMA-G(20240308)

Table 2-14 SWIR5000KMA-G camera specifications

Model / Parameter	SWIR5000KMA-G
	5.0M pixels 1/1.4" CMOS GigE industrial camera
Camera	
Sensor model	Sony IMX992-AABA-C
Sensor Type	InGaAs
Spectral Range	400nm-1800nm
Pixel size	3.45 μm x 3.45 μm
Sensor size	1/1.4"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：22fps@2560x2048、88fps@1280x1024 12 Bit：11fps@2560x2048、44fps@1280x1024
Image Buffer	512MByte
Conversion Gain	TBD
Dynamic range	TBD
Readout Noise	TBD
Full Well	TBD
SNRmax	TBD
Sensitivity	TBD
Dark current	TBD
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	GigE
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	25°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	12V Power adapter
Power consumption	TBD
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

2.16 SWIR5000KMB-G(20240308)

Table 2-15 SWIR5000KMB-G camera specifications

Model / Parameter	SWIR5000KMB-G
	5.0M pixels 1/1.4" CMOS GigE industrial camera
Camera	
Sensor model	Sony IMX990-AABJ-C
Sensor Type	InGaAs
Spectral Range	400nm-1800nm
Pixel size	3.45 μm x 3.45 μm
Sensor size	1/1.4"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：22fps@2560x2048、88fps@1280x1024 12 Bit：11fps@2560x2048、44fps@1280x1024
Image Buffer	512MByte
Conversion Gain	TBD
Dynamic range	TBD
Readout Noise	TBD
Full Well	TBD
SNRmax	TBD
Sensitivity	TBD
Dark current	TBD
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	GigE
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	10°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	12V Power adapter
Power consumption	TBD
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

2.17 SWIR5000KMA-10G(20240313)

Table 2-16 SWIR5000KMA-10G camera specifications

Model / Parameter	SWIR5000KMA-10G
	5.0M pixels 1/1.4" CMOS 10GigE industrial camera
Camera	
Sensor model	Sony IMX992-AABA-C
Sensor Type	InGaAs
Spectral Range	400nm-1800nm
Pixel size	3.45 μm x 3.45 μm
Sensor size	1/1.4"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：131.9fps@2560x2048 12 Bit：70.9fps@2560x2048
Image Buffer	512MByte
Conversion Gain	TBD
Dynamic range	TBD
Readout Noise	TBD
Full Well	TBD
SNRmax	TBD
Sensitivity	TBD
Dark current	TBD
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	10GigE
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	25°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	12V Power adapter
Power consumption	TBD
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

2.18 SWIR5000KMB-10G(20240313)

Table 2-17 SWIR5000KMB-10G camera specifications

Model / Parameter	SWIR5000KMB-10G
	5.0M pixels 1/1.4" CMOS 10GigE industrial camera
Camera	
Sensor model	Sony IMX992-AABA-C
Sensor Type	InGaAs
Spectral Range	400nm-1800nm
Pixel size	3.45 μm x 3.45 μm
Sensor size	1/1.4"
ADC	12 Bit / 8 Bit
Frame rate	8 Bit：131.9fps@2560x2048 12 Bit：70.9fps@2560x2048
Image Buffer	512MByte
Conversion Gain	TBD
Dynamic range	TBD
Readout Noise	TBD
Full Well	TBD
SNRmax	TBD
Sensitivity	TBD
Dark current	TBD
Gain range	1x-15x
Exposure time	15μs-60sec
Shutter	Global shutter
Binning	Software2x2, 3x3, 4x4
Data interface	10GigE
Digital I/O	One optical-coupling isolated input, one optical-coupling isolated output, two non-isolated input and output
Data Format	8bit / 12bit
Cooling performance	10°C below ambient temperature
Optical filter	400-1800nm(default); 1030-1800nm(optional)
CRA	2.35 Deg
General specification	
Power supply	12V Power adapter
Power consumption	TBD
Temperature	Working temperature -20~60℃, storage temperature -40~85℃
Humidity	20%-80%, no condensation
Size	80mm×80mm×45.5mm
Weight	<390g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

2.19 Packing List of SWIR Series Camera

2.19.1 USB Port Camera

Standard Package	
B	3-A safety equipment case: L:28cm W:23cm H:15.5cm (1pcs, 2.8Kg/ box); Carton size: L:28.2cm W:25.2cm H:16.7cm(TBD)
C	One SWIR /SWIR-UMV series USB3.0 camera(C-mount)
D	D1, D2, D3 and D4 are national standard, American Standard, European standard, and British standard power lines respectively
E	Power adapter: input: AC 100~240V 50Hz/60Hz, output: DC12 V 3A
F	High-Speed USB3.0 A male to B male gold-plated connectors cable /1.5m
G	One external trigger control cable
H	USB flash driver (Driver & utilities software)

2.19.2 GigE Port Camera

Standard Package	
A	External box for B(not shown in this figure) Carton size: L:28.2cm W:25.2cm H:16.7cm
B	3-A safety equipment case: L:28cm W:23cm H:15.5cm (1pcs, 2.8Kg/ box)
C	One SWIR series GigE camera
D	Power cord. National standard, American standard, European standard, British standard power cord (D1, D2, D3, D4) for choosing
E	Power adapter: Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 3A
F	One external trigger control cable
G	GigE cable: G1:3m G2:5m G3:10m(G4：50m not shown in this figure)
H	USB flash disk (with driver and application software in it)

3 SWIR331 Series Camera Specification(7)

3.1 Application of SWIR331 Camera

SWIR331 Short-Wavelength Infrared Camera is a C-mount short-wave infrared cooling camera using a nationally produced 640 x 512 InGaAs image sensor, which have CameraLink / USB3 (under development) / GigE (under development) and other data transmission methods. It has the advantages of 900 - 1700nm short-wave infrared wide spectral response, 330,000 resolution, high quantum efficiency and low noise.

SWIR331 Short-Wavelength Infrared Camera can be widely used in short-wave infrared imaging, spectral imaging, monitoring (night vision), semiconductor detection, medicine and biology, optical fiber communication, astronomy, high temperature imaging, humidity distribution imaging and other applications.

3.2 SWIR331-CL(20240313)

Table 3-1 SWIR331-CL camera specification

Model / Parameter	SWIR331KMA-CL500	SWIR331KMA-CL700	SWIR331KM B-CL500	SWIR331KM B-CL700
	330,000 pixels 3/4 " InGaAs CameraLink Camera			
Camera				
Sensor model	National production			
Sensor type	InGaAs CMOS image sensor			
Spectral range	900nm - 1700nm			
pixel size	15 μm x 15 μm			
Target size	3/4"			
ADC	12-bit output /14-bit output (14-bit ADC)			
Frame Rate & Resolution	517 fps @ 640 x 512	724 fps@640 x 512	517 fps @ 640 x 512	724 fps@640 x 512
Memory	512MB			
QE	75%@ 1350nm			
Conversion gain	970.01e-/DN(LG), 18.02e-/DN(MG), 3.31e-/DN (HG)			
Dynamic Range	69.2dB(LG), 63.2dB(MG), 57.4dB(HG) *1			
Read noise	1.3DN(LG), 2.7DN(MG), 5.0DN(HG)			
Full well charge	3.5Me(LG), 70Ke(MG), 12Ke(HG) *1			
Maximum SNR	65.4dB(LG), 48.5dB(MG), 40.7dB(HG)			
Dark current	30fa@0.1V&18℃			
Exposure time range	31.25us~1s	23.81us~1s	31.25us~1s	23.81us~1s
Shutter mode	Global shutter			
Data interface	CameraLink Full			
Digital I/O	1 optocoupler isolated input, 1 optocoupler isolated output			
Data Format	Mono 12 / Mono 14			
Cooling temperature difference	Below room temperature 40 degrees Celsius			
Camera type	Nationally produced devices	Nationally produced devices	High performance	High performance
General parameters				
Power supply	DC12V power supply			
Power consumption	8.4W (TEC OFF) / <16W (TEC ON)			
Temperature	Working temperature -30 ~ 60 ℃, storage temperature - 40 ~ 85 ℃			
Humidity	20%-80% , non-condensing			
Size	68mm×68mm×90.3mm			
Weight	485g			
Lens mount	C-mount interface			
Software	Provide SDK development kit and CL View software based on Delsa acquisition card			

*1： LG: CDS-OFF, DeNoise-ON; MG: CDS-ON, DeNoise-OFF; HG: CDS-ON, DeNoise-OFF.

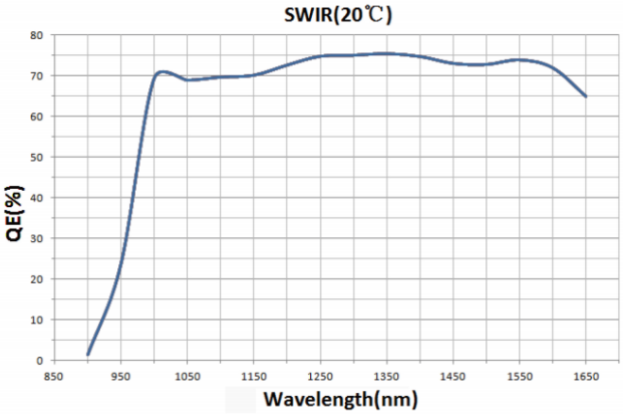


Figure 3-1 The spectral QE of SWIR331 Short-Wavelength Infrared Camera

3.3 SWIR331-GigE(20240313)

Table 3-2 SWIR331-GigE camera specification

Model / Parameter	SWIR331KMB-G125	SWIR331KMB-G350	SWIR331KM B-G700
	330,000 pixels 3/4 " InGaAs CameraLink Camera		
Camera			
Sensor model	National production		
Sensor type	InGaAs CMOS image sensor		
Spectral range	900nm - 1700nm		
pixel size	15 μm x 15 μm		
Target size	3/4"		
ADC	8-bit output /14-bit output (14-bit ADC)		
Frame Rate & Resolution	125@640x512	350@640x512	360@640x512，700@320x256
Memory	512MB		
QE	75%@ 1350nm		
Conversion gain	138.6e-/ADU(LG)，5.54e-/ADU(MG)，1.2e-/ADU (HG)		
Dynamic Range	70.59dB(LG)，67.96dB(MG)，47.98dB(HG) *1		
Read noise	586.82e(LG)，35.05e(MG)，68.44e(HG)		
Full well charge	1986426.78e(LG)，87649.83Ke(MG)，17147.351e(HG) *1		
Maximum SNR	62.98dB(LG)，49.43dB(MG)，42.34dB(HG)		
Dark current			
Exposure time range	50us~5s	25us~5s	50us~5s
Shutter mode	Global shutter		
Data interface	GigE		
Digital I/O	1 optocoupler isolated input, 1 optocoupler isolated output		
Data Format	Mono 8 / Mono 14		
Cooling temperature difference	Below room temperature 40 degrees Celsius		
General parameters			
Power supply	DC12V power supply		
Power consumption			
Temperature	Working temperature -30 ~ 60 ℃, storage temperature - 40 ~ 85 ℃		
Humidity	20%-80% , non-condensing		
Size	68mm×68mm×90.3mm		
Weight	485g		
Lens mount	C-mount interface		
Software	Provide SDK development kit and CL View software based on Delsa acquisition card		

*1： LG: CDS-OFF, DeNoise-ON; MG: CDS-ON, DeNoise-OFF; HG: CDS-ON, DeNoise-OFF.

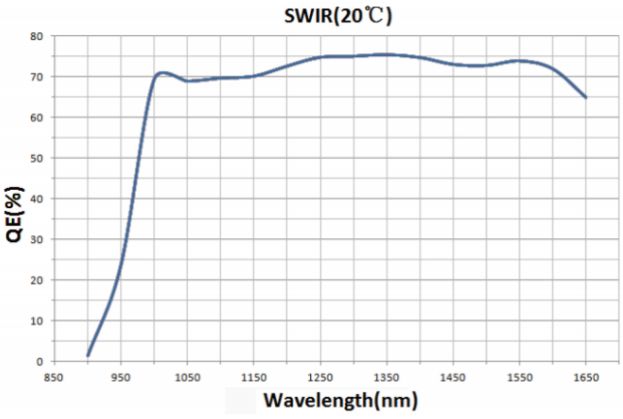


Figure 3-2 The spectral QE of SWIR331 Short-Wavelength Infrared Camera

3.4 Packing List of SWIR Series Camera

3.4.1 CL Port Camera

Figure 3-3 The packing information of the SWIR331series camera

Table 3-3 The packing information of the SWIR331series camera

Standard Packing information	
A	3-A equipment case: L:28cm W:23cm H:15.5cm (1pcs, 2.8Kg/ box)
B	SWIR331 Short-Wavelength Infrared Camera
C	2 CameraLink cables
D	12V/3A 6 PIN air plug power adapter
E	Power cord. National standard, American standard, European standard, British standard power cord (E1, E2, E3, E4) for choosing
F	One external trigger control cable

3.4.2 GigE Port Camera

Figure 3-4 The packing information of the SWIR331series camera

Table 3-4 The packing information of the SWIR331series camera

Standard Packing information	
B	3-A equipment case: L:28cm W:23cm H:15.5cm (1pcs, 2.8Kg/ box)
C	SWIR331 Short-Wavelength Infrared Camera
D	2 CameraLink cables12V/3A 6 PIN air plug power adapter
E	Power cord. National standard, American standard, European standard, British standard power cord (E1, E2, E3, E4. Not shown in the figure) for choosing
F	One external trigger control cable
G	GigE cables：G1:3m G2:5m G3:10m (G4:50m. Not shown in the figure)
H	USB flash driver (Driver & utilities software)

4 IUA Series Technical Specifications(50)

4.1 IUA390KMA

Table 4-1 IUA390KMA camera specifications

Parameter \ Model	IUA390KMA
	0.39M pixel 1/2.9 "CMOS USB3.0 industrial camera
Camera	
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℃; Storage temperature -30~70℃
Humidity	20% - 80% No condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

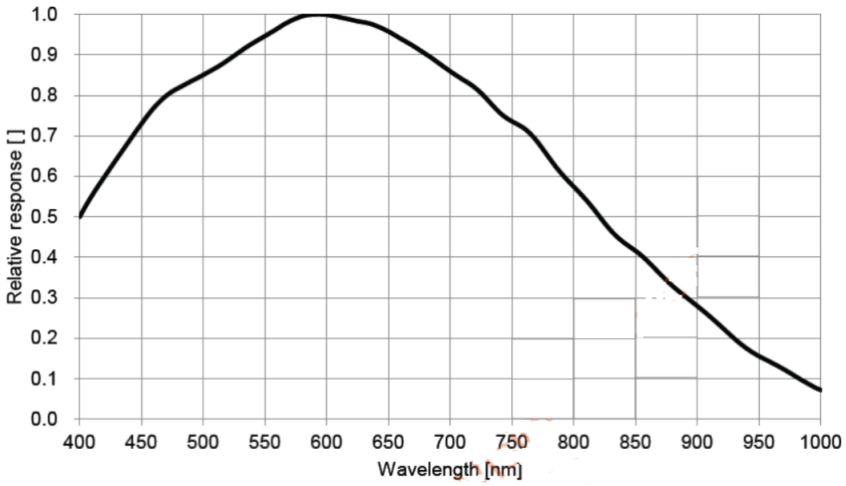


Figure 4-1 IUA390KMA spectral response curve

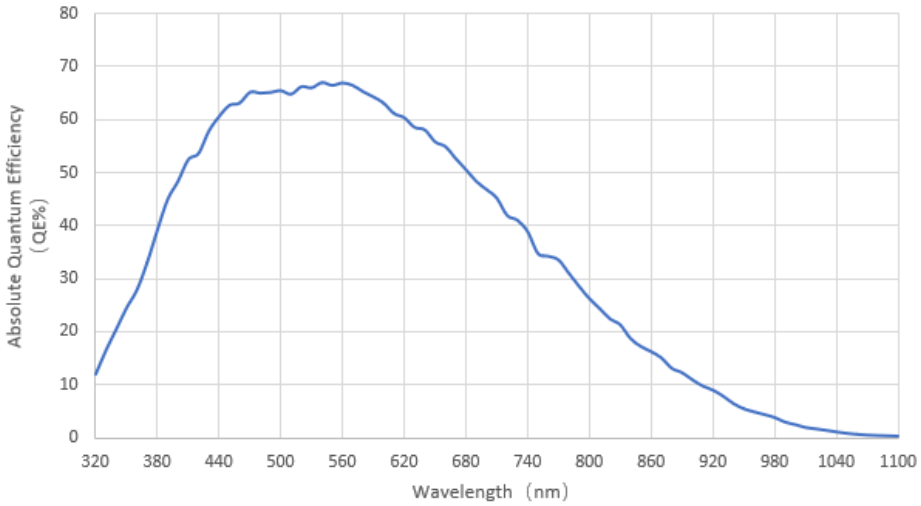


Figure 4-2 IUA390KMA absolute quantum efficiency

4.2 IUA503KMA

Table 4-2 IUA503KMA camera specifications

Model / Parameter	IUA503KMA
	0.5M pixel 1/1.7 "CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX426LLJ
Pixel size	9.0 μm x 9.0 μm
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	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	<3.0W
Temperature	Working temperature -10~50℃; Storage temperature -30~70℃
Humidity	20% - 80% No condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

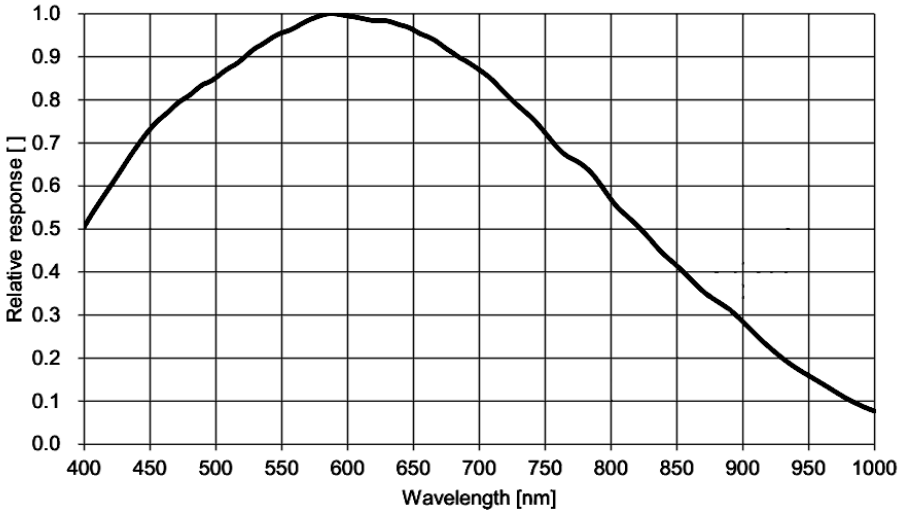


Figure 4-3 IUA503KMA spectral response curve

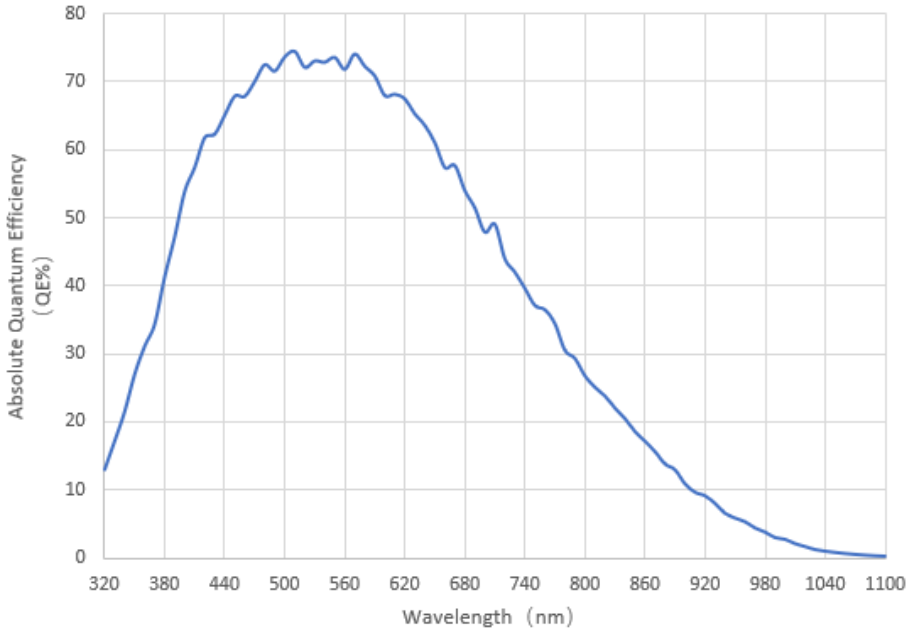


Figure 4-4 IUA503KMA absolute quantum efficiency

4.3 IUA503KMB

Table 4-3 IUA503KMB camera specifications

Parameter \ Model	IUA503KMB
	0.5M pixel 1/1.7 "CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX433LLJ
Pixel size	9.0 μm x 9.0 μm
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	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	<3.0W
Temperature	Working temperature -10~50℃; Storage temperature -30~70℃
Humidity	20% - 80% No condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

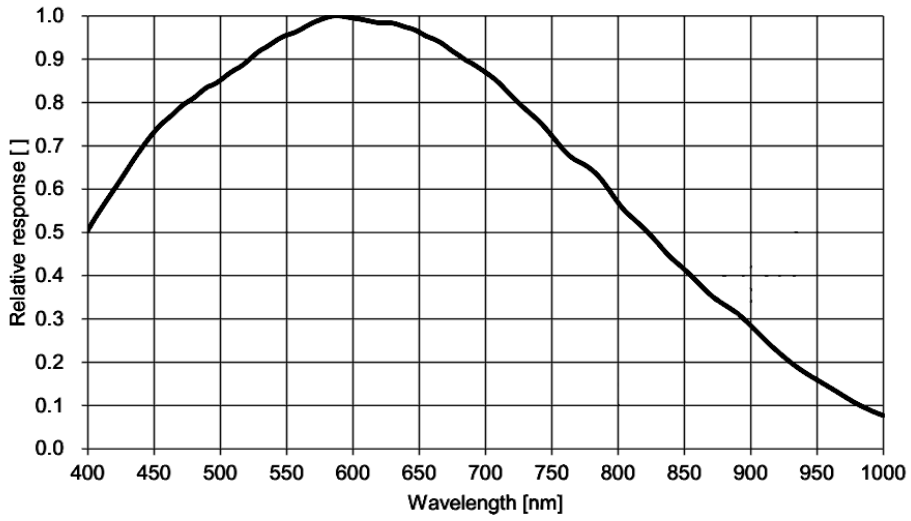


Figure 4-5 IUA503KMB spectral response curve

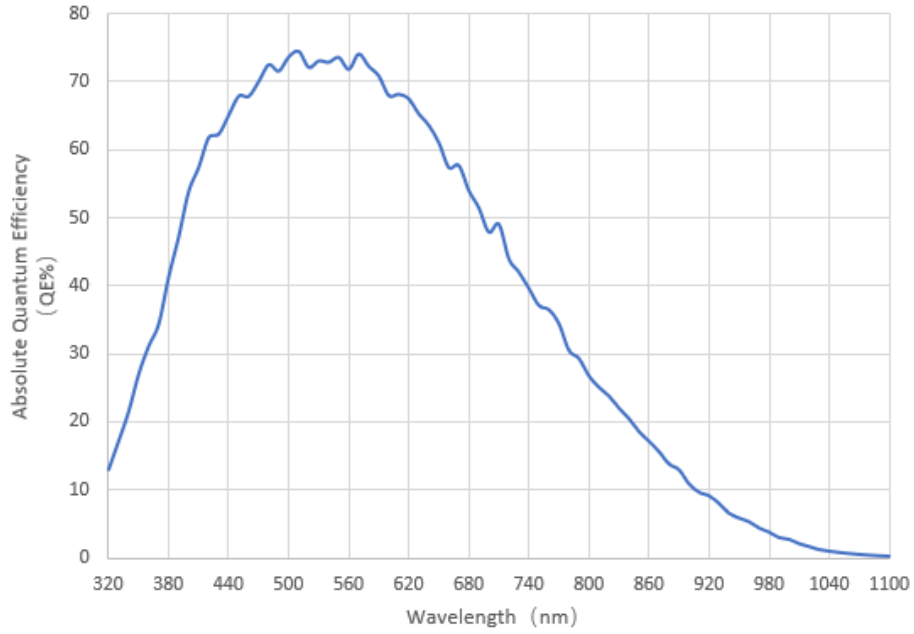


Figure 4-6 IUA503KMB absolute quantum efficiency

4.4 IUA1500KMA

Table 4-4 IUA1500KMA camera specifications

Parameter \ Model	IUA1500KMA
	1.5M pixels 1/2.9" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX273LLR
Pixel size	3.45 μm × 3.45 μm
Sensor size	1/2.9"
Frame rate	235.5fps@1440 × 1080，523fps@720 × 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	<2.2W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	219g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC, RoHS

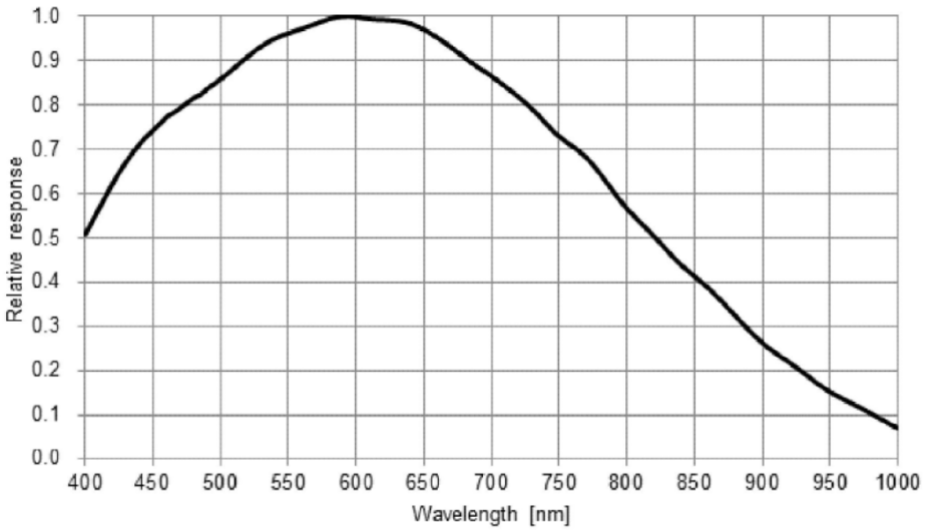


Figure 4-7 IUA1500KMA spectral response curve

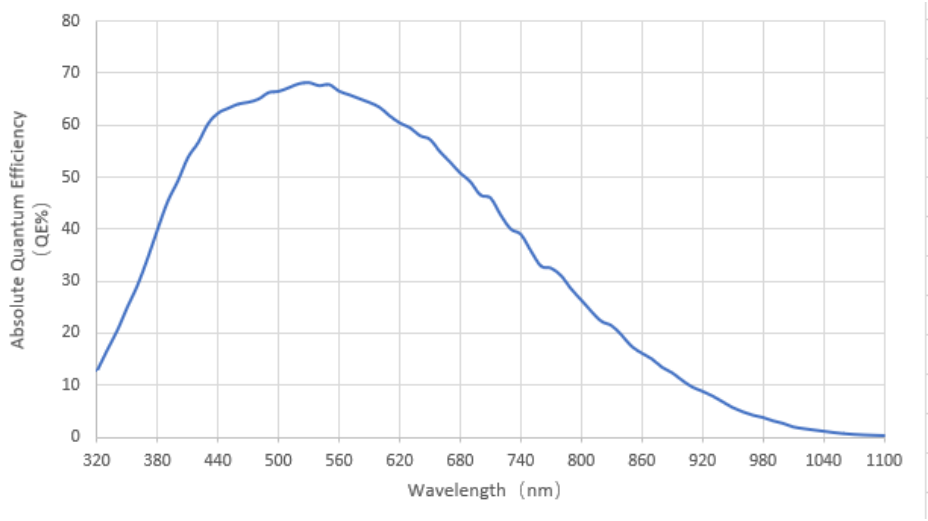


Figure 4-8 IUA1500KMA absolute quantum efficiency

4.5 IUA1500KPA

Table 4-5 IUA1500KPA camera specifications

Parameter \ Model	IUA1500KPA
	1.5M pixels 1/2.9" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX273LQR
Pixel size	3.45 μm × 3.45 μm
Sensor size	1/2.9"
Frame rate	235.5fps@1440 × 1080，523fps@720 × 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	<2.2W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	219g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC, RoHS

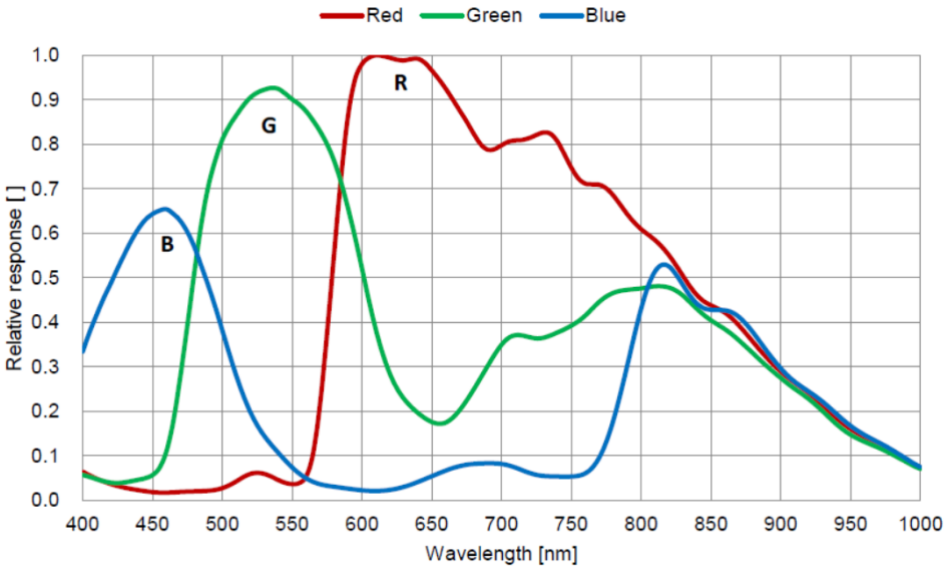


Figure 4-9 IUA1500KPA spectral response curve

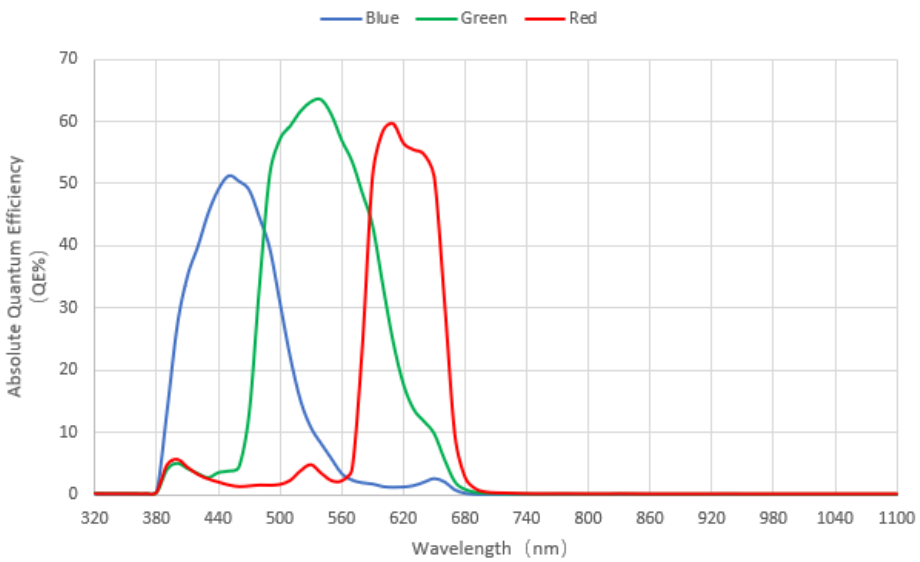


Figure 4-10 IUA1500KPA absolute quantum efficiency

4.6 IUA1700KMA

Table 4-6 IUA1700KMA camera specifications

Parameter \ Model	IUA1700KMA
	1.7M pixel 1.1 "CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX432LLJ
Pixel size	9.0 μm x 9.0 μm
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	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	<2.4W
Temperature	Working temperature -10~50℃; Storage temperature -30~70℃
Humidity	20% - 80% No condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

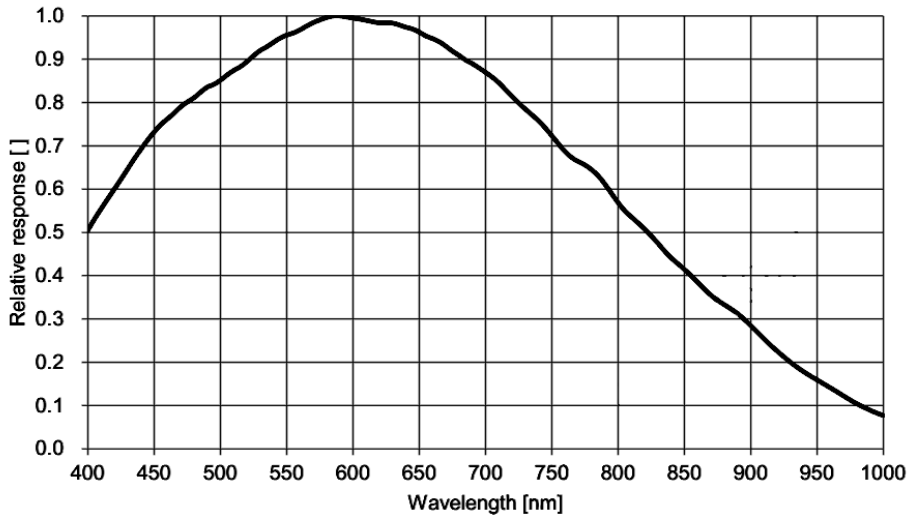


Figure 4-11 IUA1700KMA spectral response curve

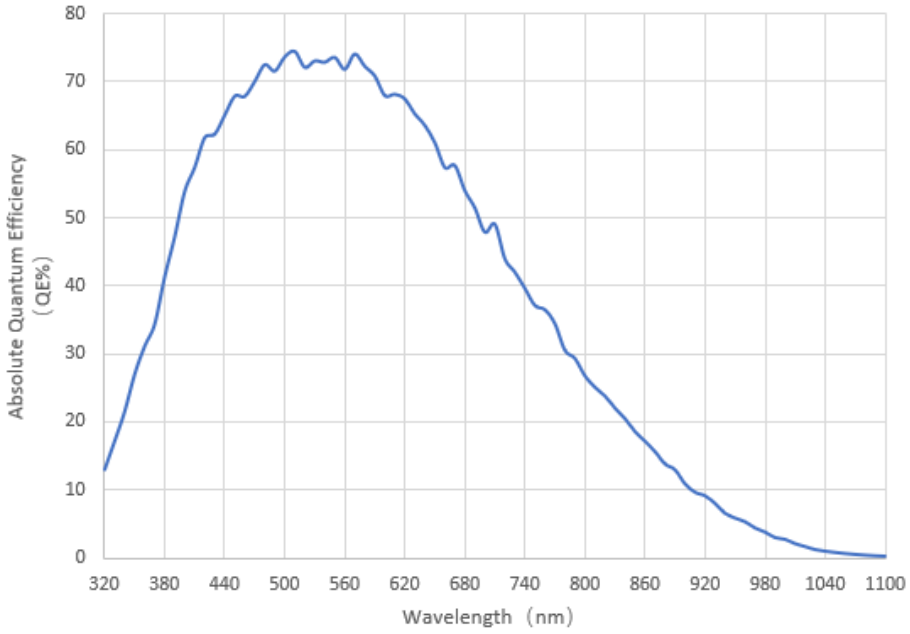


Figure 4-12 IUA1700KMA absolute quantum efficiency

4.7 IUA1700KPA

Table 4-7 IUA1700KPA camera specifications

Parameter \ Model	IUA1700KPA
	1.7M pixels 1.1" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX432LQJ
Pixel size	9.0 μm x 9.0 μm
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	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	2.4W
Temperature	Working temperature -10~50℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

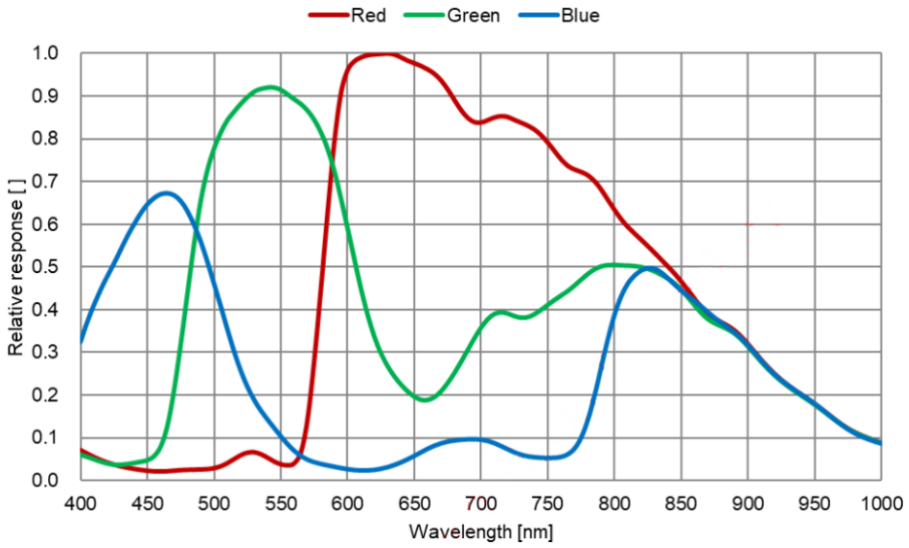


Figure 4-13 IUA1700KPA spectral response curve

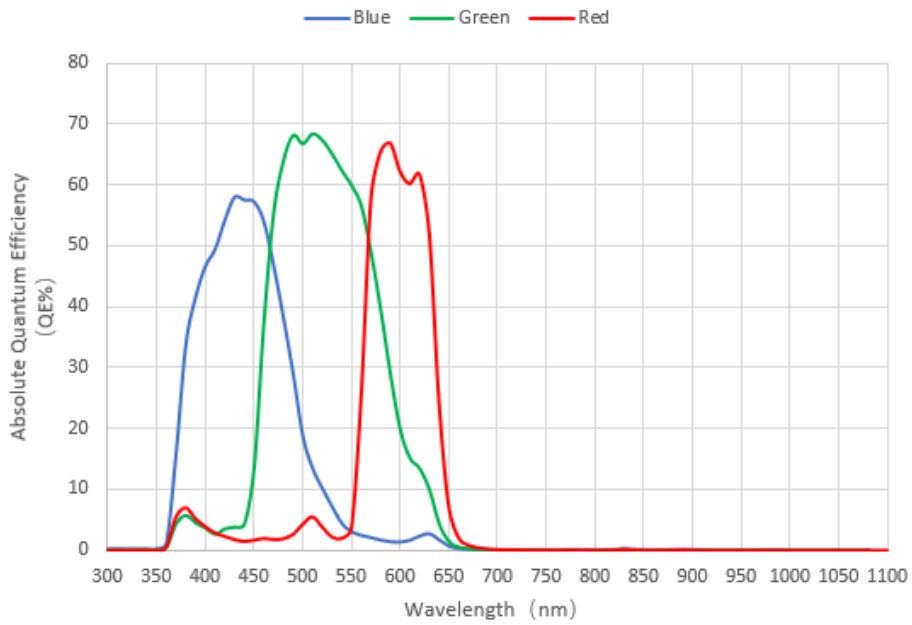


Figure 4-14 IUA1700KPA absolute quantum efficiency

4.8 IUA1700KMB(20230825)

Table 4-8 IUA1700KMB camera specifications

Parameter \ Model	IUA1700KMB
	1.7M pixel 1.1 "CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX425LLJ
Pixel size	9.0 μm x 9.0 μm
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	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	<2.4W
Temperature	Working temperature -10~50℃; Storage temperature -30~70℃
Humidity	20% - 80% No condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

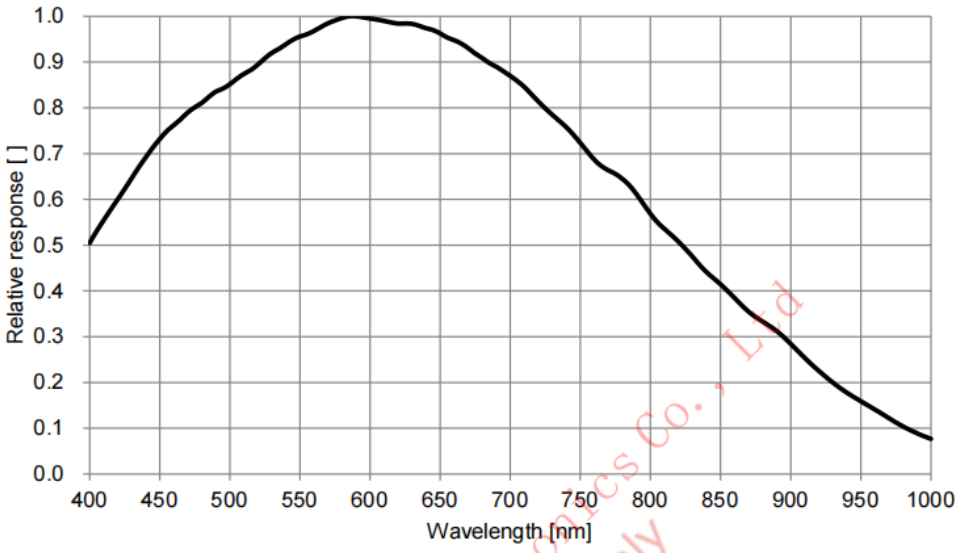


Figure 4-15 IUA1700KMB spectral response curve

4.9 IUA1700KPB(20230825)

Table 4-9 IUA1700KPB camera specifications

Parameter \ Model	IUA1700KPB
	1.7M pixels 1.1" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX425LQJ
Pixel size	9.0 μm x 9.0 μm
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	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	2.4W
Temperature	Working temperature -10~50℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

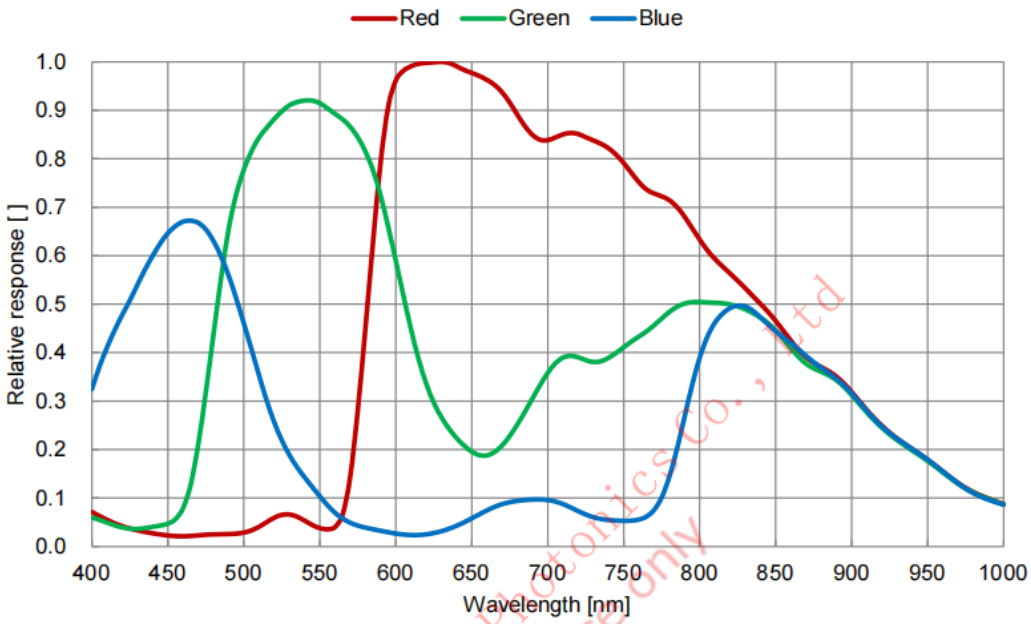


Figure 4-16 IUA1700KPB spectral response curve

4.10 IUA2300KMA

Table 4-10 IUA2300KMA camera specifications

Parameter \ Model	IUA2300KMA
	2.3M pixels 1/1.2" CMOS USB3.0 industrial camera
Camera	
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	42μs-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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	217g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE，FCC

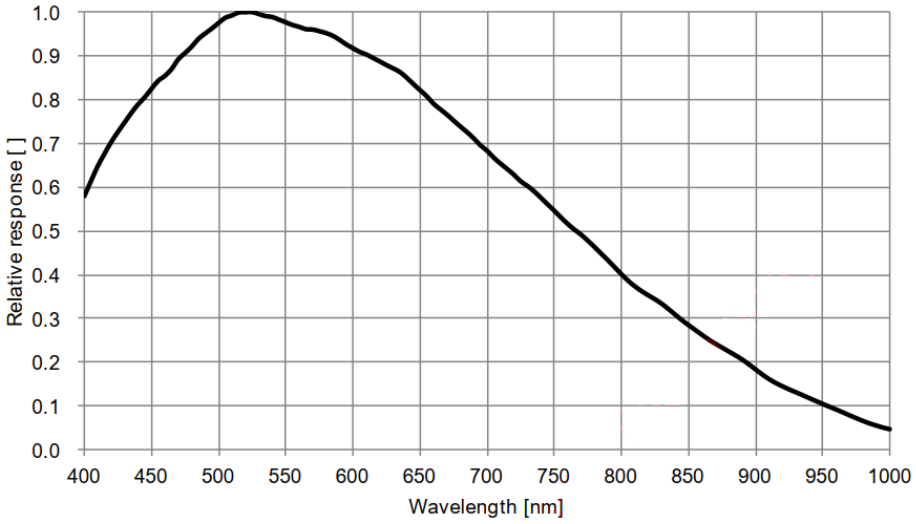


Figure 4-17 IUA2300KMA spectral response curve

4.11 IUA2300KPA

Table 4-11 IUA2300KPA camera specifications

Parameter \ Model	IUA2300KPA
	2.3M pixels 1/1.2" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX174LQJ
Pixel size	5.86 μm x 5.86 μm
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	42μs-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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	217g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

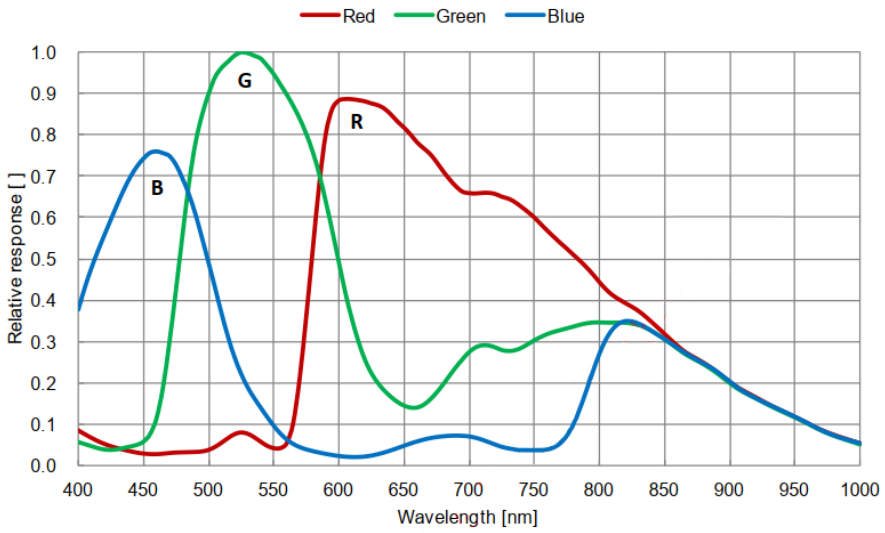


Figure 4-18 IUA2300KPA spectral response curve

4.12 IUA2300KMB

Table 4-12 IUA2300KMB camera specifications

Parameter \ Model	IUA2300KMB
	2.3M pixels 1/1.2" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX249LLJ
Pixel size	5.86 μm x 5.86 μm
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	42μs-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	<1.9W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	217g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

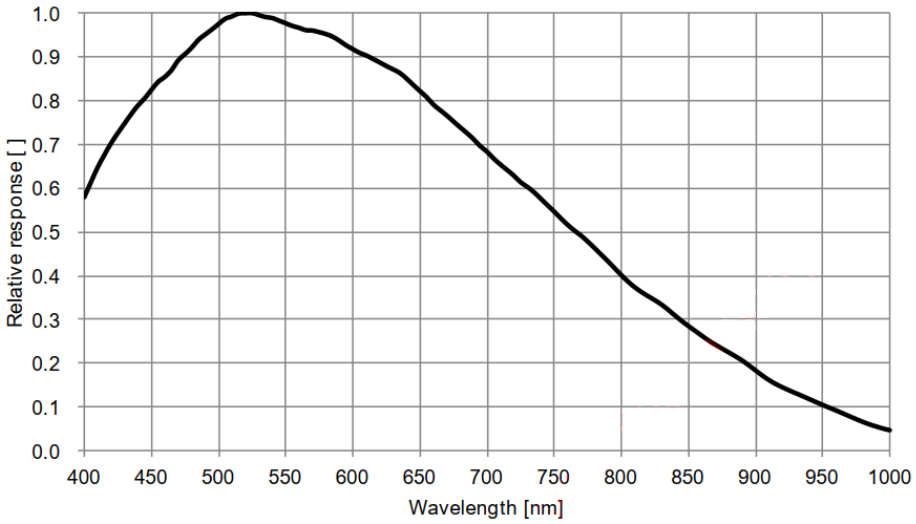


Figure 4-19 IUA2300KMB spectral response curve

4.13 IUA2300KPB

Table 4-13 IUA2300KPB camera specifications

Parameter \ Model	IUA2300KPB
	2.3M pixels 1/1.2" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX249LQJ
Pixel size	5.86 μm x 5.86 μm
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	42μs-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	<1.9W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	217g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

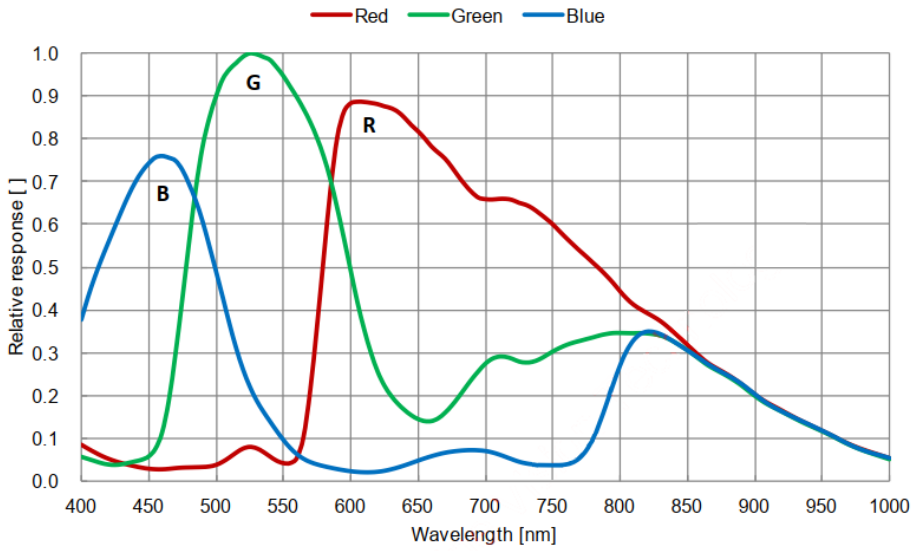


Figure 4-20 IUA2300KPB spectral response curve

4.14 IUA2800KMA

Table 4-14 IUA2800KMA camera specifications

Parameter \ Model	IUA2800KMA
	2.8M pixels 2/3" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX421LLJ
Pixel size	4.5 μm x4.5 μm
Sensor size	2/3"
Frame rate	121fps@1936 × 1464, 425fps@968 × 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	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, 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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

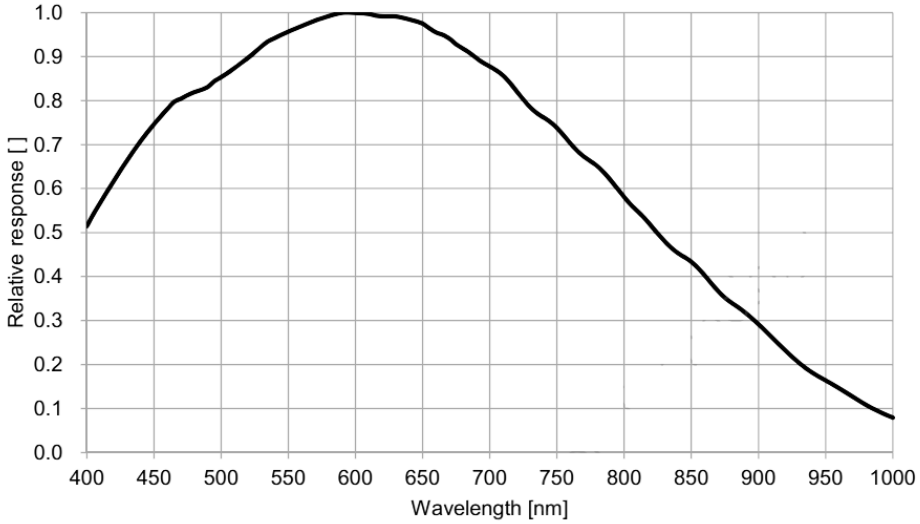


Figure 4-21 IUA2800KMA spectral response curve

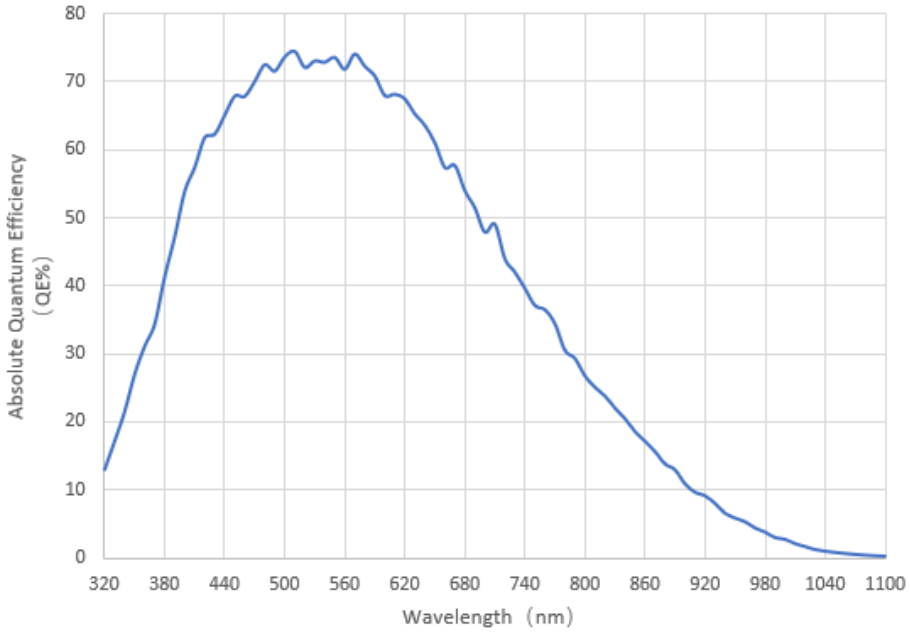


Figure 4-22 IUA2800KMA absolute quantum efficiency

4.15 IUA2800KPA

Table 4-15 IUA2800KPA camera specifications

Parameter \ Model	IUA2800KPA
	2.8M pixels 2/3" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX421LQJ
Pixel size	4.5 μm x 4.5 μm
Sensor size	2/3"
Frame rate	121fps@1936 × 1464, 425fps@968 × 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	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, 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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

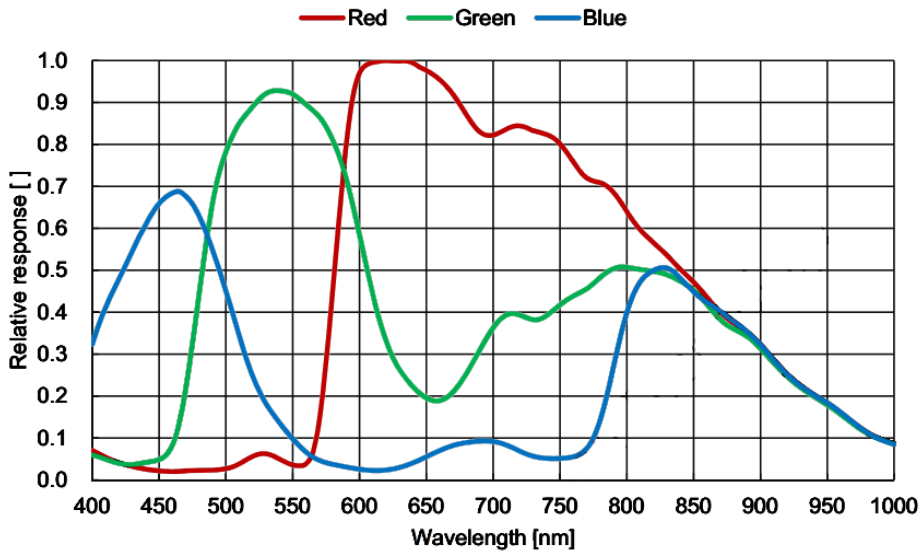


Figure 4-23 IUA2800KPA spectral response curve

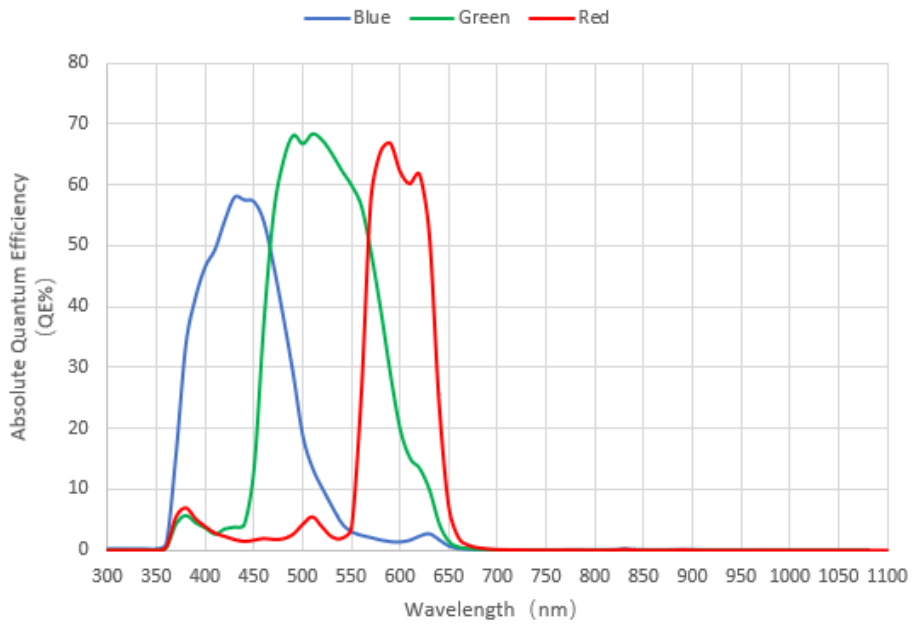


Figure 4-24 IUA2800KPA absolute quantum efficiency

4.16 IUA5000KMA

Table 4-16 IUA5000KMA camera specifications

Parameter \ Model	IUA5000KMA
	5.0M pixels 2/3" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX264LLR
Pixel size	3.45 μm × 3.45 μm
Sensor size	2/3"
Frame rate	35.6fps@2448 × 2048, 87.6fps@1224 × 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	<2.1W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	219g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC, RoHS

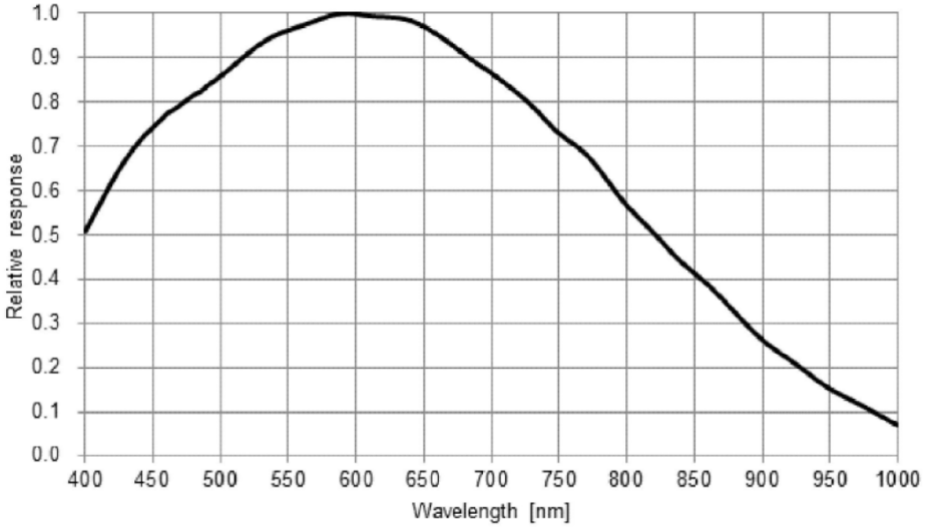


Figure 4-25 IUA5000KMA spectral response curve

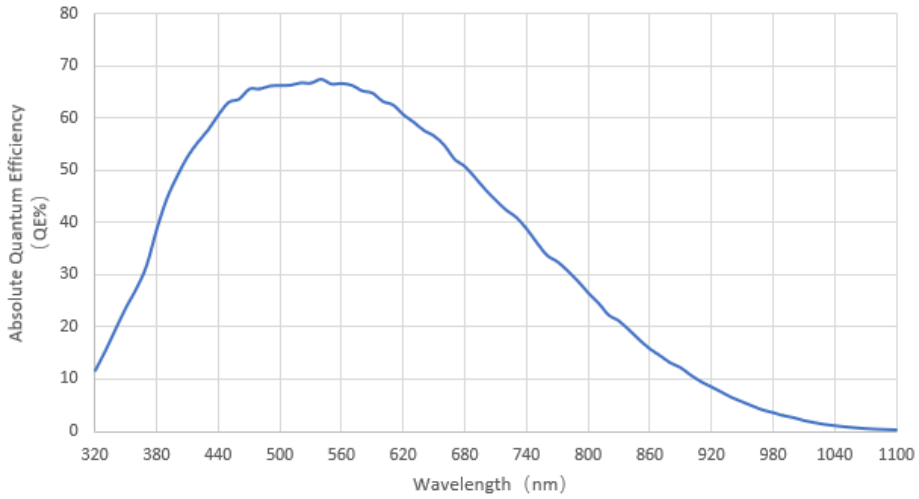


Figure 4-26 IUA5000KMA absolute quantum efficiency

4.17 IUA5000KPA

Table 4-17 IUA5000KPA camera specifications

Parameter \ Model	IUA5000KPA
	5.0M pixels 2/3" CMOS USB3.0 industrial camera
Camera	
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
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	<2.1W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	219g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC, RoHS

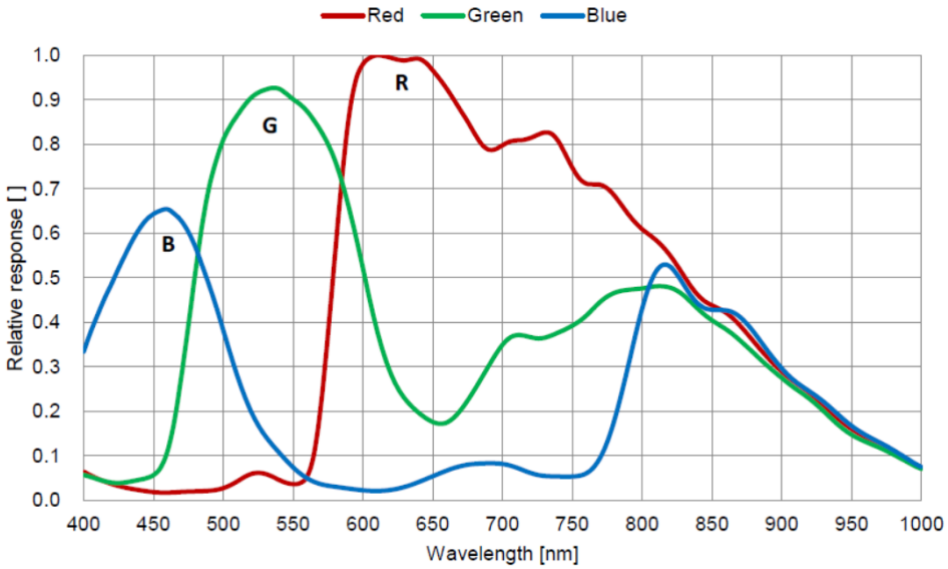


Figure 4-27 IUA5000KPA spectral response curve

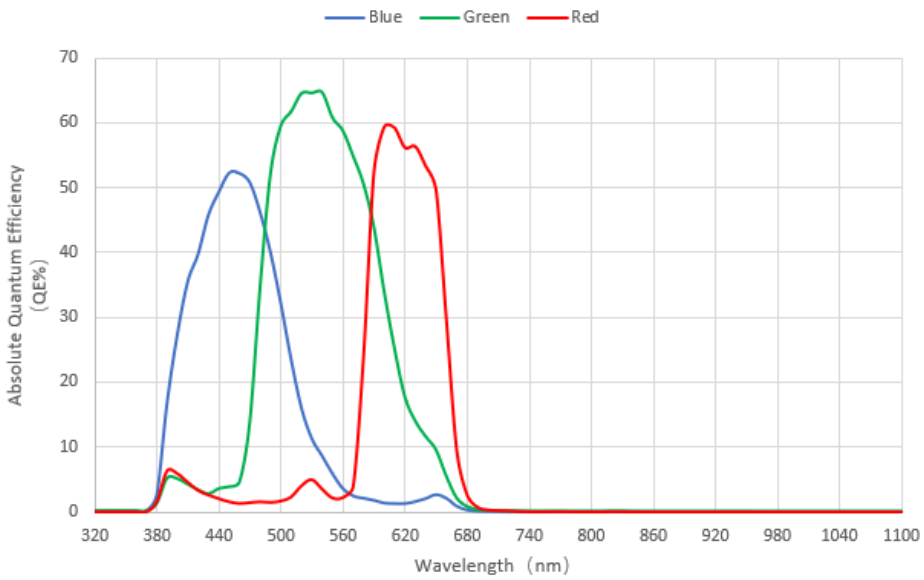


Figure 4-28 IUA5000KPA absolute quantum efficiency

4.18 IUA5100KMA

Table 4-18 IUA5100KMA camera specifications

Parameter \ Model	IUA5100KMA
	5.1M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX547-AAMJ-C
Pixel size	2.74 μm × 2.74 μm
Sensor size	1/1.8"
Frame rate	63fps@2448 × 2048, 208.4fps@1224 × 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	<2.8W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

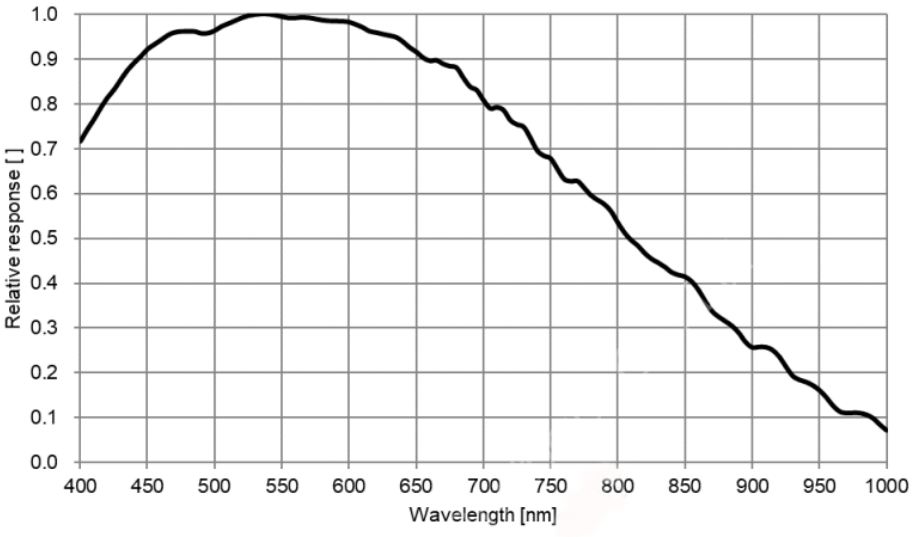


Figure 4-29 IUA5100KMA spectral response curve

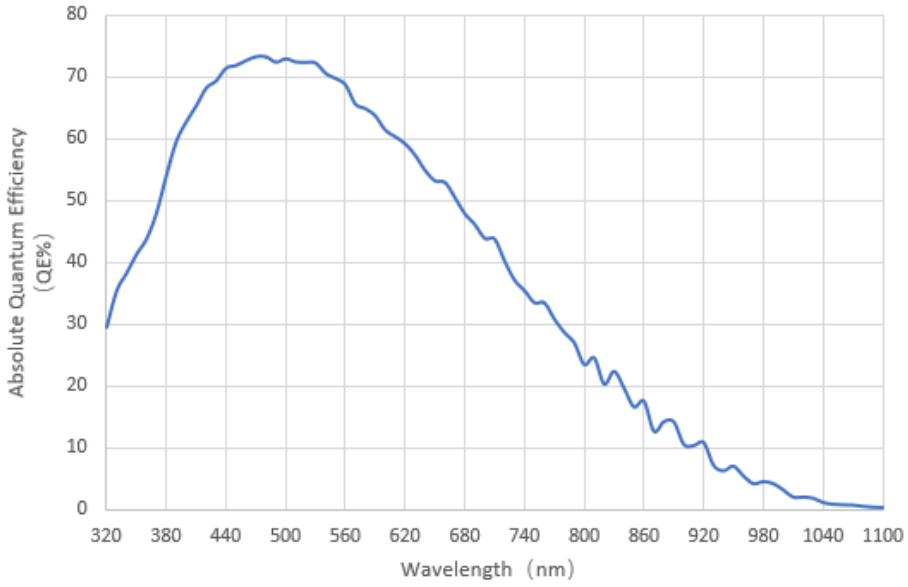


Figure 4-30 IUA5100KMA absolute quantum efficiency

4.19 IUA5100KPA

Table 4-19 IUA5100KPA camera specifications

Parameter \ Model	IUA5100KPA
	5.1M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX547-AAQJ-C
Pixel size	2.74 μm × 2.74 μm
Sensor size	1/1.8"
Frame rate	63fps@2448 × 2048, 159fps@1224 × 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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

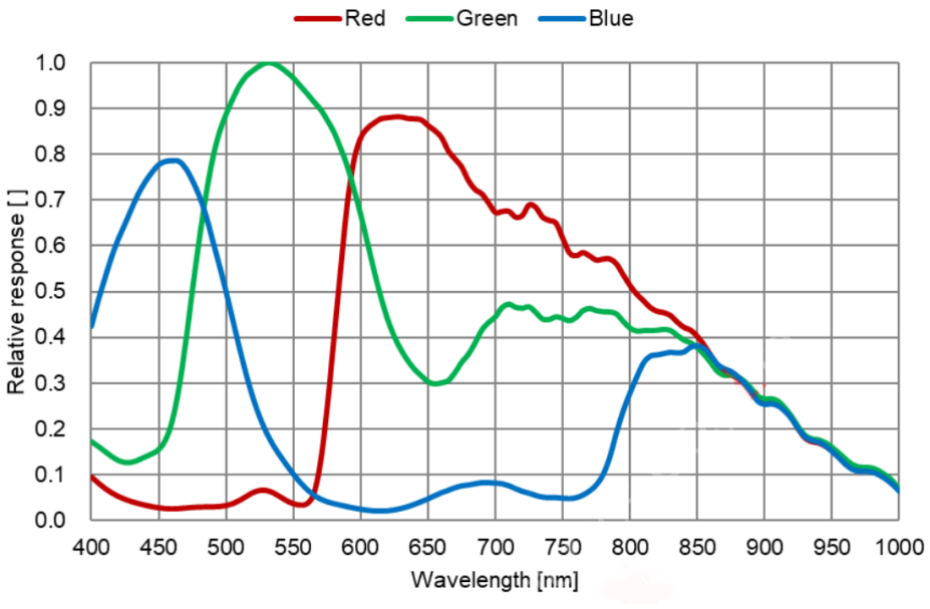


Figure 4-31 IUA5100KPA spectral response curve

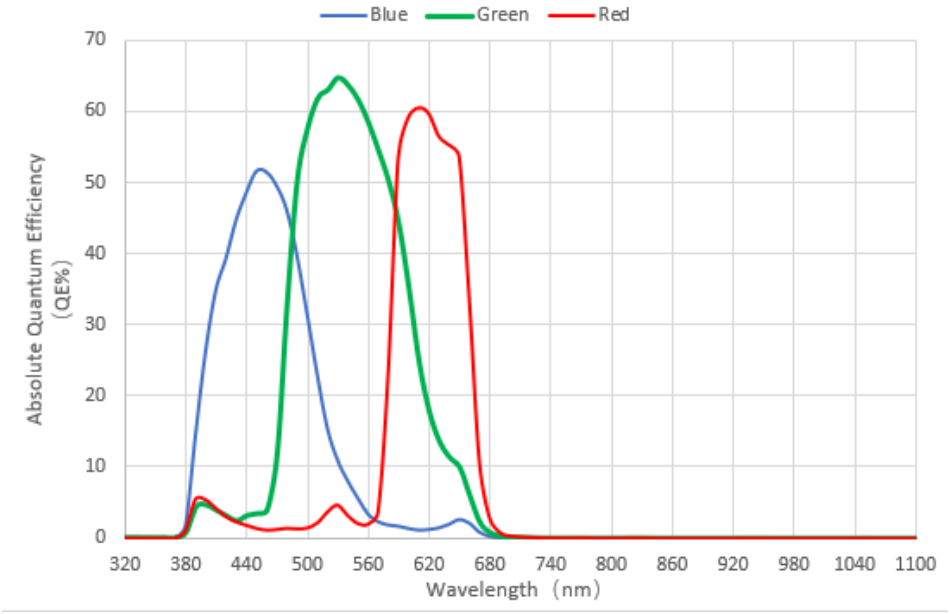


Figure 4-32 IUA5100KPA absolute quantum efficiency

4.20 IUA6300KMA

Table 4-20 IUA6300KMA camera specifications

Parameter \ Model	IUA6300KMA
	6.3M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX178LLJ
Pixel size	2.4 μm x 2.4 μm
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	17μs-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	<1.9W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	217g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

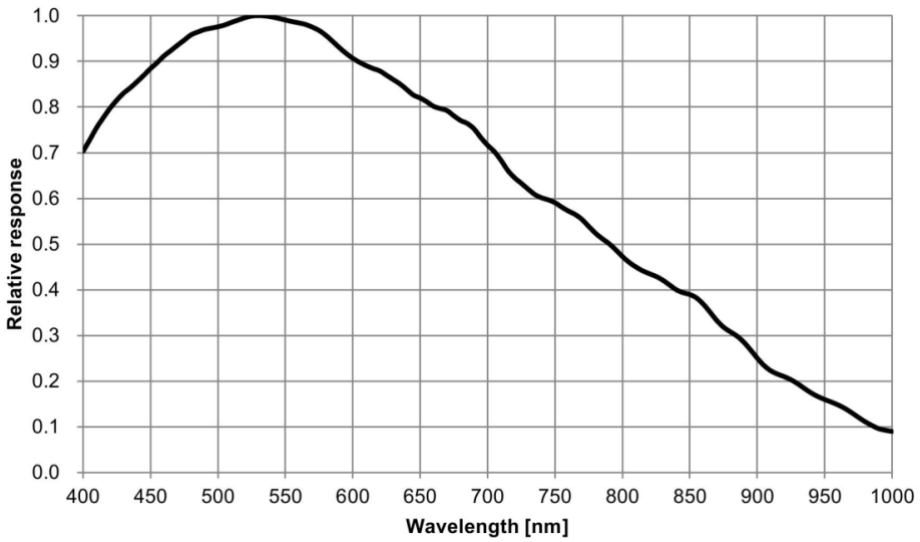


Figure 4-33 IUA6300KMA spectral response curve

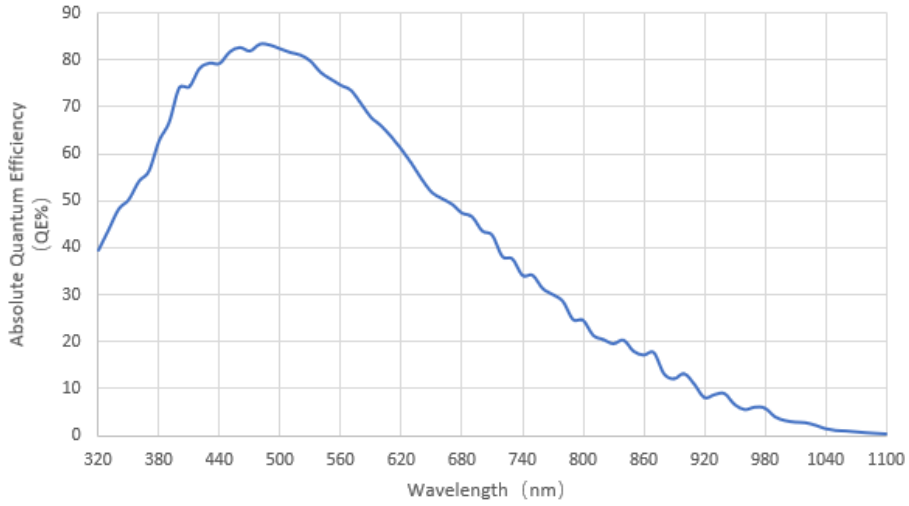


Figure 4-34 IUA6300KMA absolute quantum efficiency

4.21 IUA6300KPA

Table 4-21 IUA6300KPA camera specifications

Parameter \ Model	IUA6300KPA
	6.3M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX178LQJ
Pixel size	2.4 μm x 2.4 μm
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	17μs-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	<3.6W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	217g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

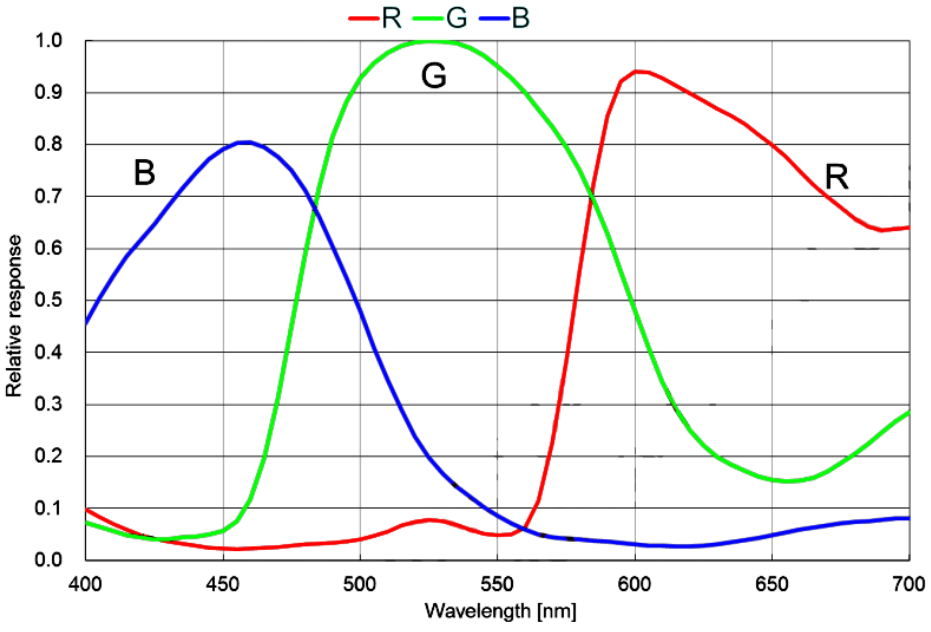


Figure 4-35 IUA6300KPA spectral response curve

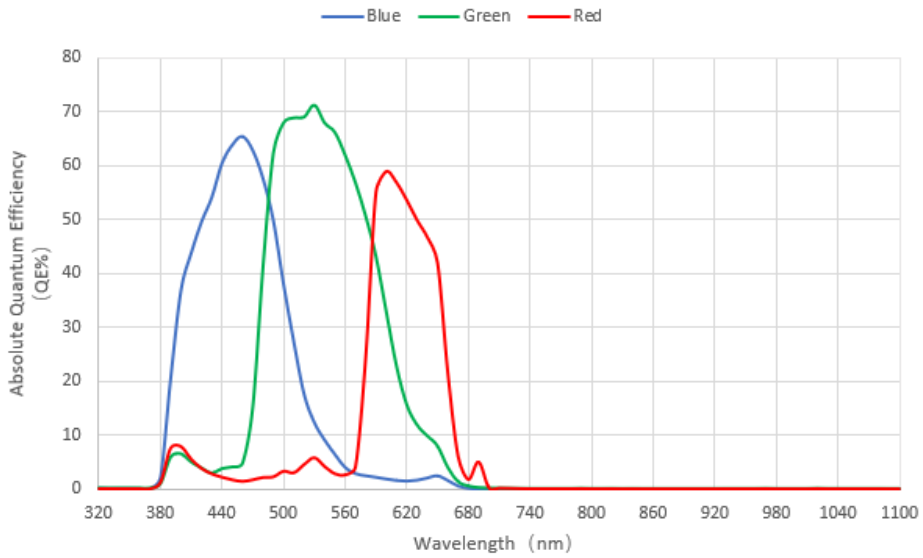


Figure 4-36 IUA6300KPA absolute quantum efficiency

4.22 IUA7100KMA

Table 4-22 IUA7100KMA camera specifications

Parameter \ Model	IUA7100KMA
	7.1M pixels 1.1" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX428LLJ
Pixel size	4.5 μm x4.5 μm
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	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, 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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

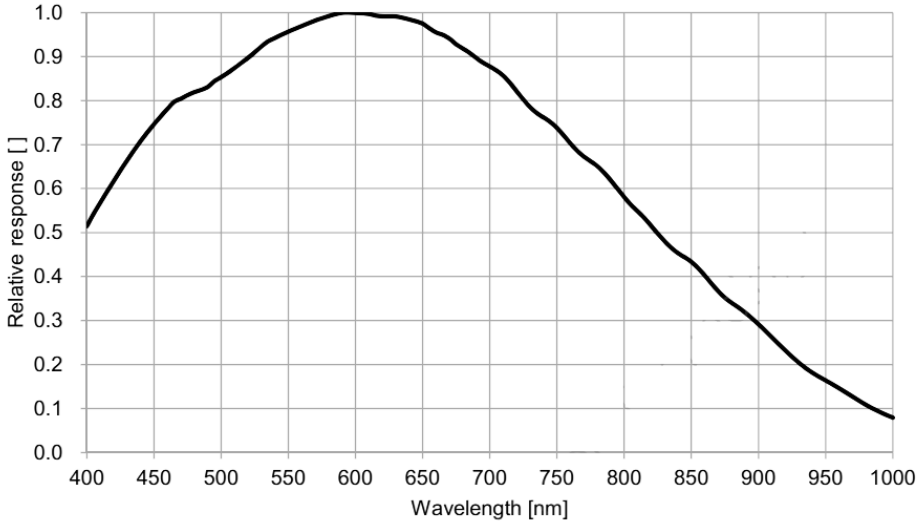


Figure 4-37 IUA7100KMA spectral response curve

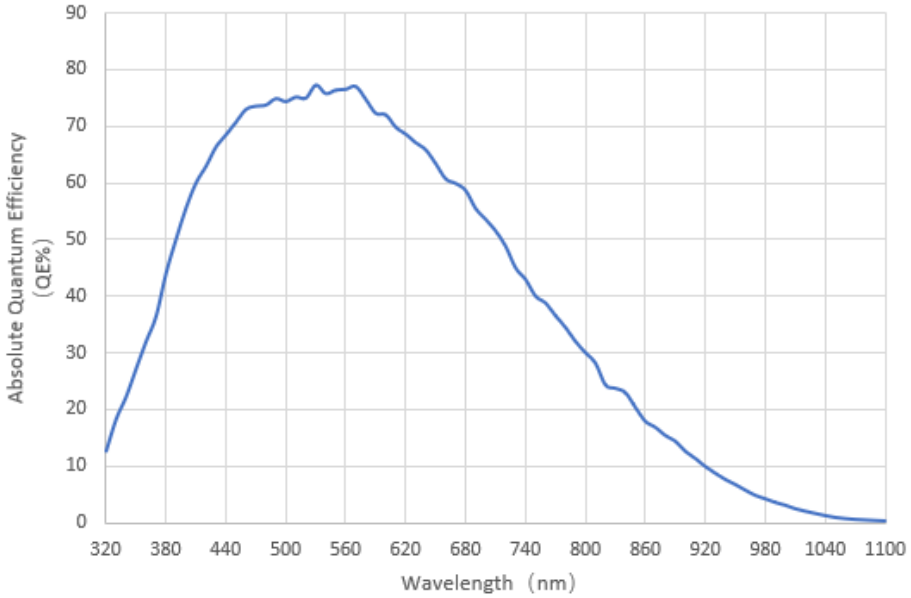


Figure 4-38 IUA7100KMA absolute quantum efficiency

4.23 IUA7100KPA

Table 4-23 IUA7100KPA camera specifications

Parameter \ Model	IUA7100KPA
	7.1M pixels 1.1" CMOS USB3.0 industrial camera
Camera	
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
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	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, 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℃, storage temperature 30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

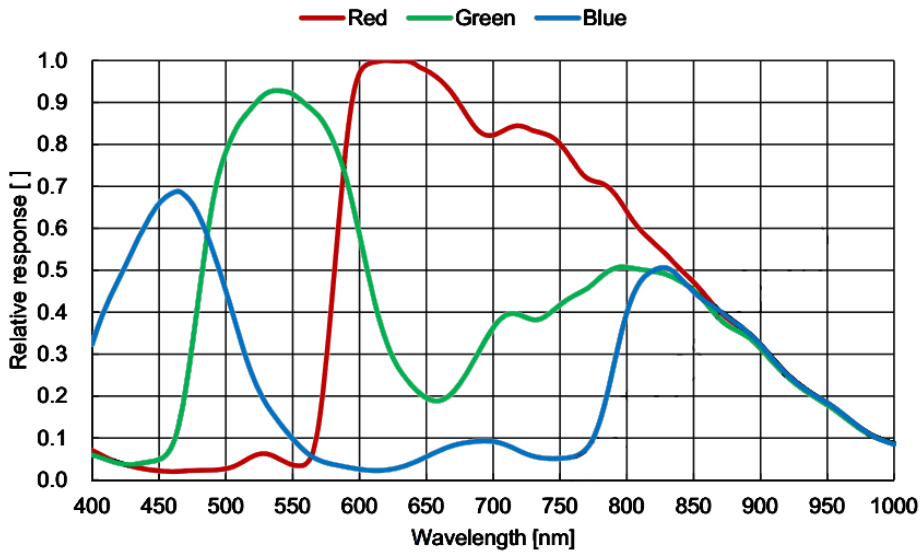


Figure 4-39 IUA7100KPA spectral response curve

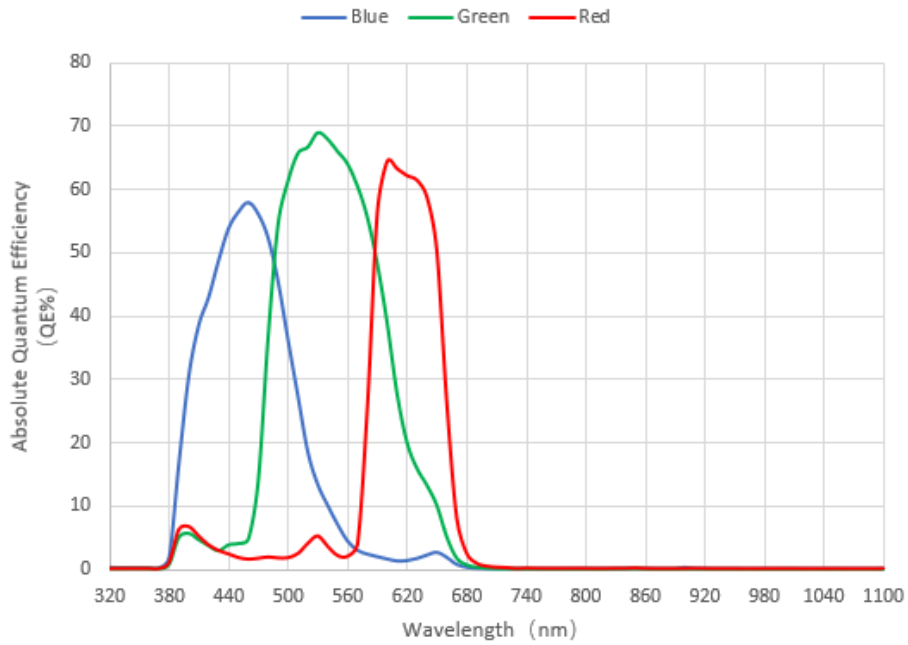


Figure 4-40 IUA7100KPA absolute quantum efficiency

4.24 IUA8300KPA

Table 4-24 IUA8300KPA camera specifications

Parameter \ Model	IUA8300KPA
	8.3M pixels 1/1.2" CMOS USB3.0industrial camera
Camera	
Sensor model	Sony IMX485LQJ-C
Pixel size	2.9 μm x 2.9 μm
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	20μs-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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

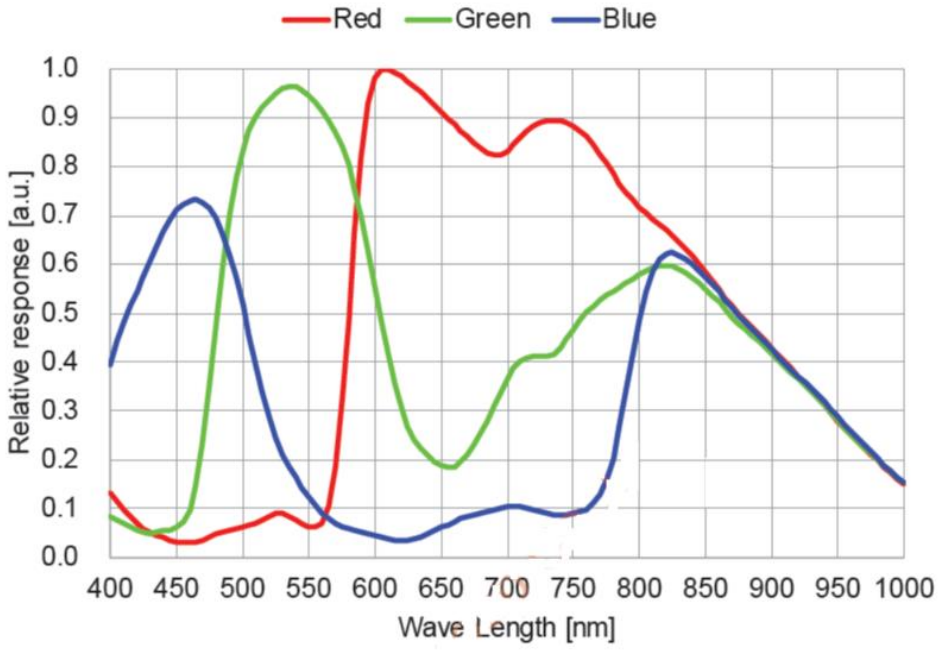


Figure 4-41 IUA8300KPA spectral response curve

4.25 IUA8300KMB(20231019)

Table 4-25 IUA8300KMB camera specifications

Parameter \ Model	IUA8300KMB
	8.3M pixels 1/1.2" CMOS USB3.0industrial camera
Camera	
Sensor model	Sony IMX585-AAMJ1-C
Pixel size	2.9 μm x 2.9 μm
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	9560mV
Dark current	0.13mV
Gain range	1x-50x
Exposure time	20μs-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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

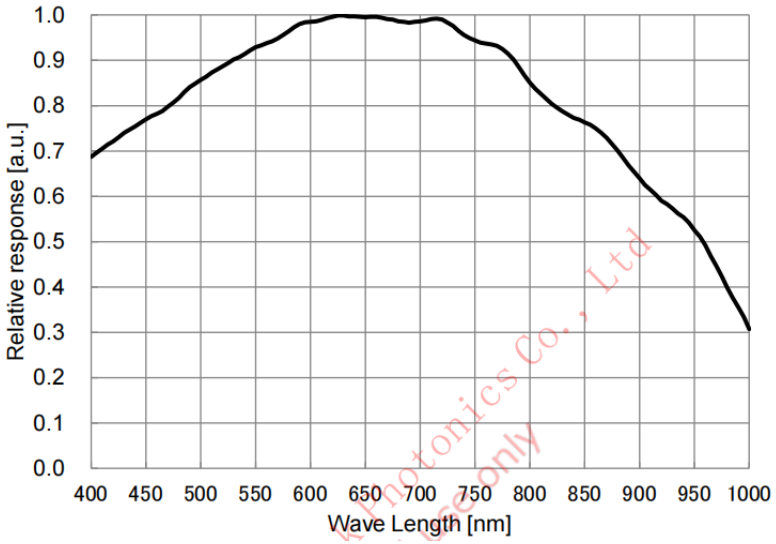


Figure 4-42 IUA8300KMB spectral response curve

4.26 IUA8300KPB

Table 4-26 IUA8300KPB camera specifications

Parameter \ Model	IUA8300KPB
	8.3M pixels 1/1.2" CMOS USB3.0industrial camera
Camera	
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
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	20μs-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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

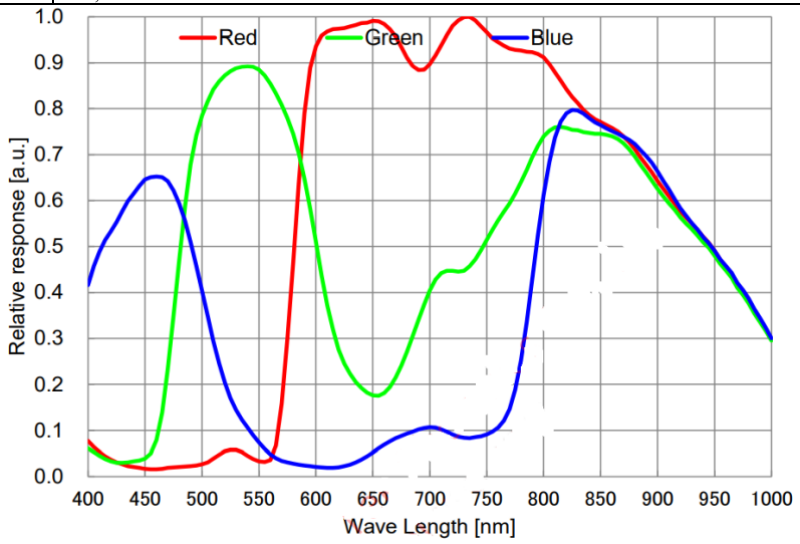


Figure 4-43 IUA8300KPB spectral response curve

4.27 IUA8300KME

Table 4-27 IUA8300KME camera specifications

Parameter \ Model	IUA8300KME
	8.3M pixels 1/1.8" CMOS USB3.0industrial camera
Camera	
Sensor model	Sony IMX678-AAMR1-C
Pixel size	2.0 μm x 2.0 μm
Sensor size	1/1.8"
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	11288mV
Dark current	0.15mV
Gain range	1-50 倍
Exposure time	20μs-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	<2.3W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

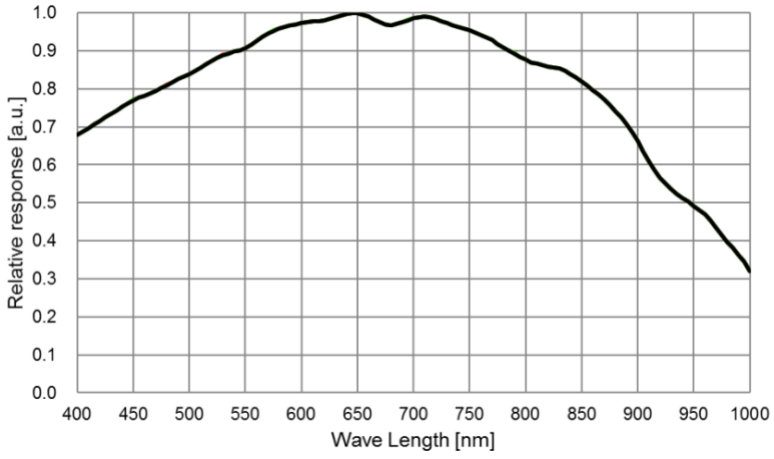


Figure 4-44 IUA8300KME spectral response curve

4.28 IUA8300KPE(20240508)

Table 4-28 IUA8300KPE camera specifications

Parameter \ Model	IUA8300KPE
	8.3M pixels 1/1.8" CMOS USB3.0industrial camera
Camera	
Sensor model	Sony IMX678-AAQR1-C
Pixel size	2.0 μm x 2.0 μm
Sensor size	1/1.8"
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	3541mV
Dark current	0.15mV
Gain range	1-50 倍
Exposure time	20μs-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	<2.3W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

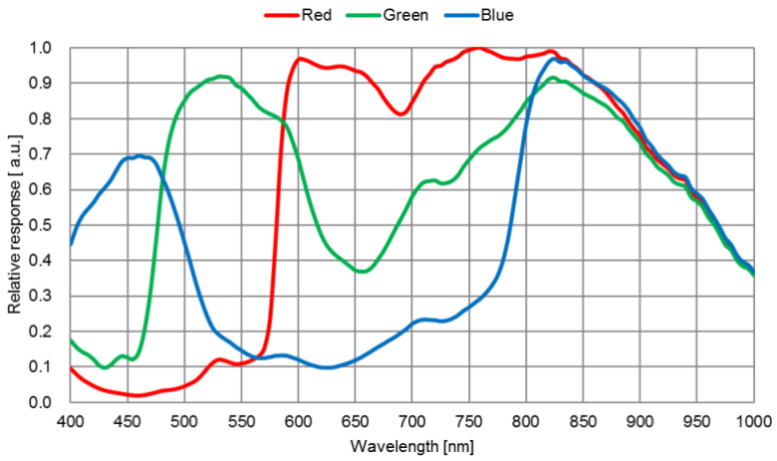


Figure 4-45 IUA8300KPE spectral response curve

4.29 IUA12000KPA(20231019)

Table 4-29 IUA12000KPA camera specifications

Parameter \ Model	IUA12000KPA
	12.0M pixels 1/1.6" CMOS USB3.0industrial camera
Camera	
Sensor model	Sony IMX676-AACR1-C
Pixel size	2.0 μm x 2.0 μm
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	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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

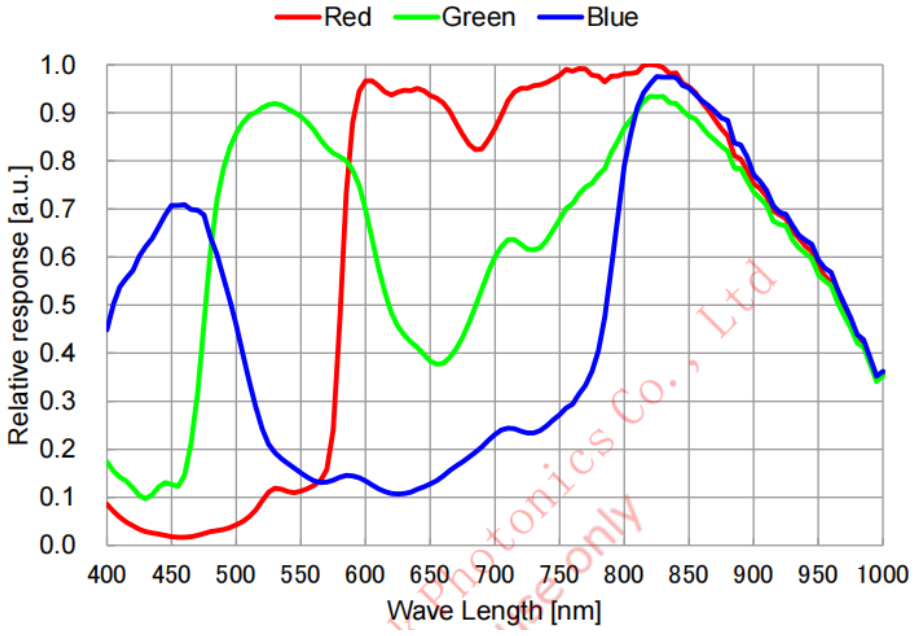


Figure 4-46 IUA12000KPA spectral response curve

4.30 IUA12300KMA

Table 4-30 IUA12300KMA camera specifications

Parameter \ Model	IUA12300KMA
	12.3M pixels 1/1.1" CMOS USB3.0industrial camera
Camera	
Sensor model	Sony IMX545-AAMJ-C
Pixel size	2.74 μm x 2.74 μm
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	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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

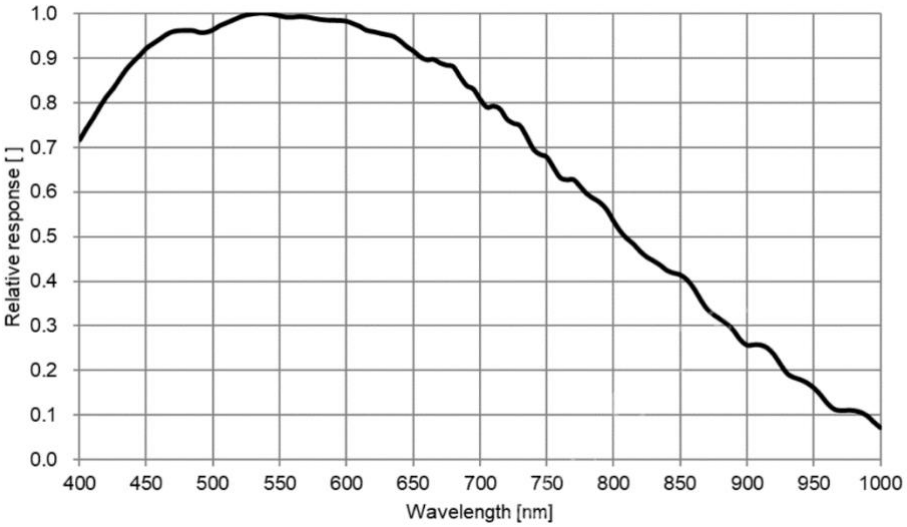


Figure 4-47 IUA12300KMA spectral response curve

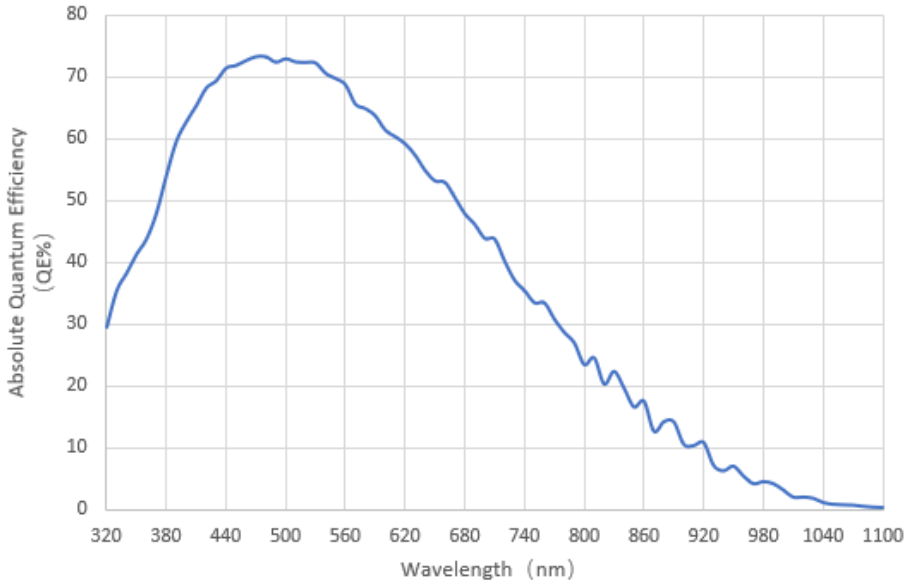


Figure 4-48 IUA12300KMA absolute quantum efficiency

4.31 IUA12300KPA

Table 4-31 IUA12300KPA camera specifications

Parameter \ Model	IUA12300KPA
	12.3M pixels 1/1.1" CMOS USB3.0industrial camera
Camera	
Sensor model	Sony IMX545-AAQJ-C
Pixel size	2.74 μm x 2.74 μm
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	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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

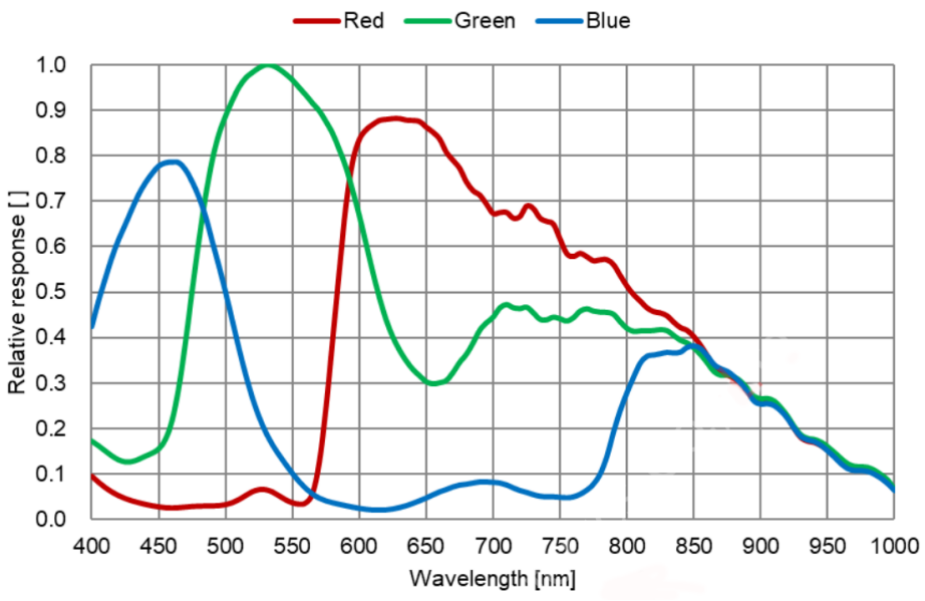


Figure 4-49 IUA12300KPA spectral response curve

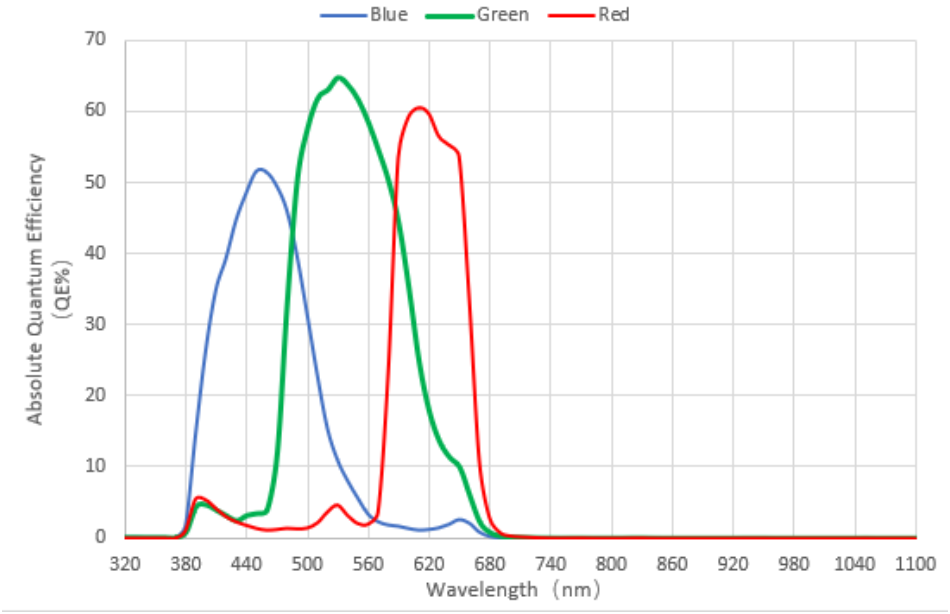


Figure 4-50 IUA12300KPA absolute quantum efficiency

4.32 IUA12300KMB

Table 4-32 IUA12300KMB camera specifications

Parameter \ Model	IUA12300KMB
	12.3M pixels 1.1" CMOS USB3.0industrial camera
Camera	
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	<2.8W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

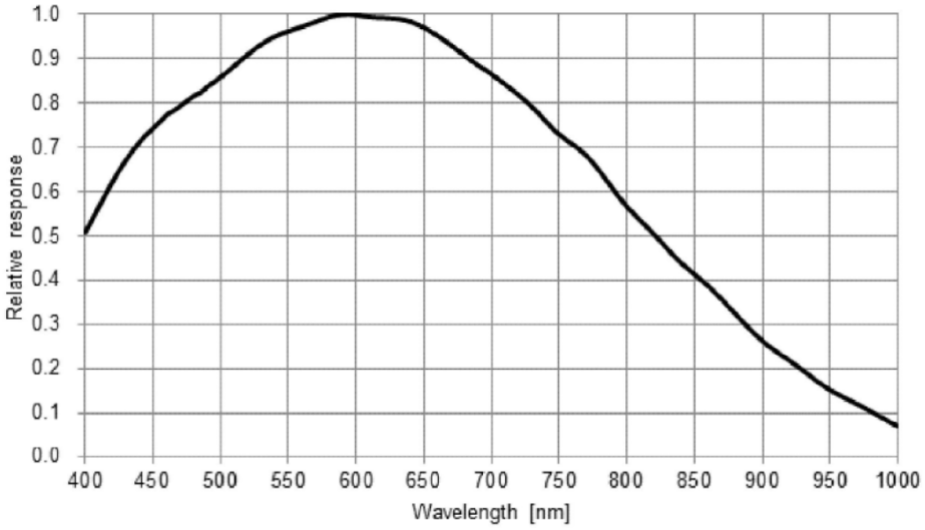


Figure 4-51 IUA12300KMB spectral response curve

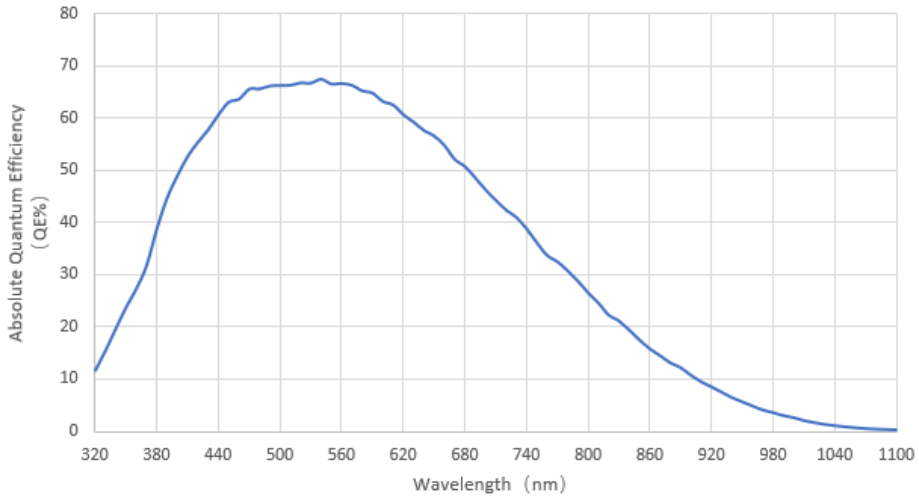


Figure 4-52 IUA12300KMB absolute quantum efficiency

4.33 IUA12300KPB

Table 4-33 IUA12300KPB camera specifications

Parameter \ Model	IUA12300KPB
	12.3M pixels 1.1" CMOS USB3.0industrial camera
Camera	
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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

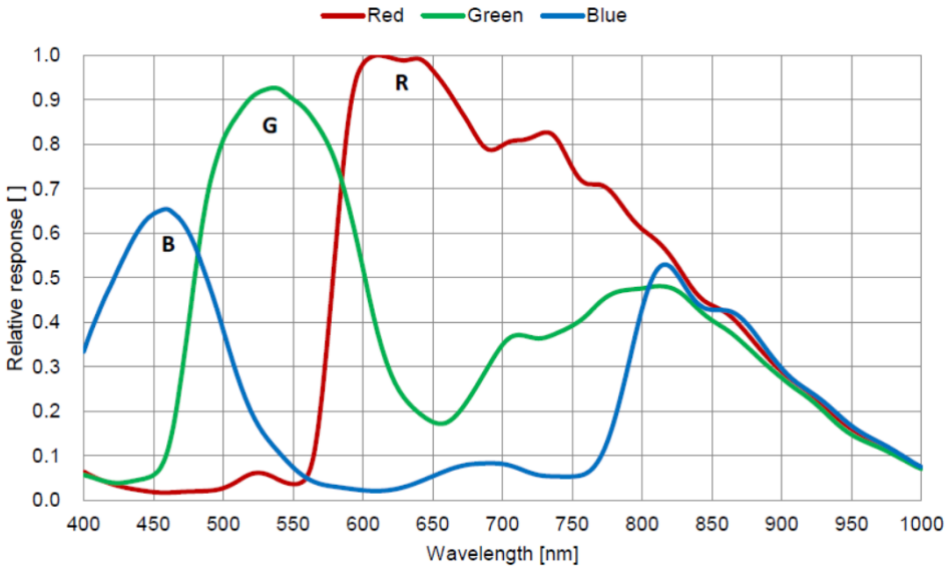


Figure 4-53 IUA12300KPB spectral response curve

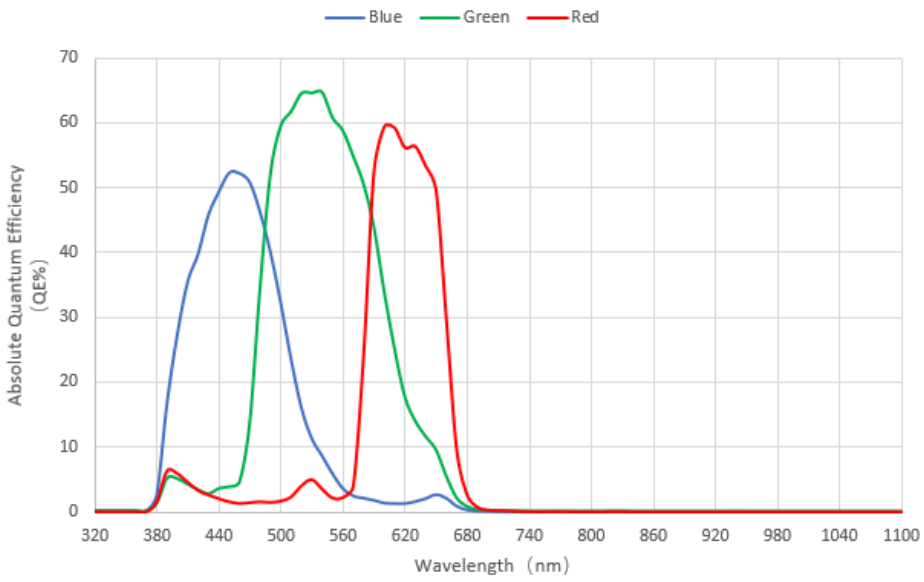


Figure 4-54 IUA12300KPB absolute quantum efficiency

4.34 IUA20000KMA

Table 4-34 IUA20000KMA camera specifications

Parameter \ Model	IUA20000KMA
	20.0M pixels 1" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX183CLK
Pixel size	2.4 μm x 2.4 μm
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	53μs-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℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

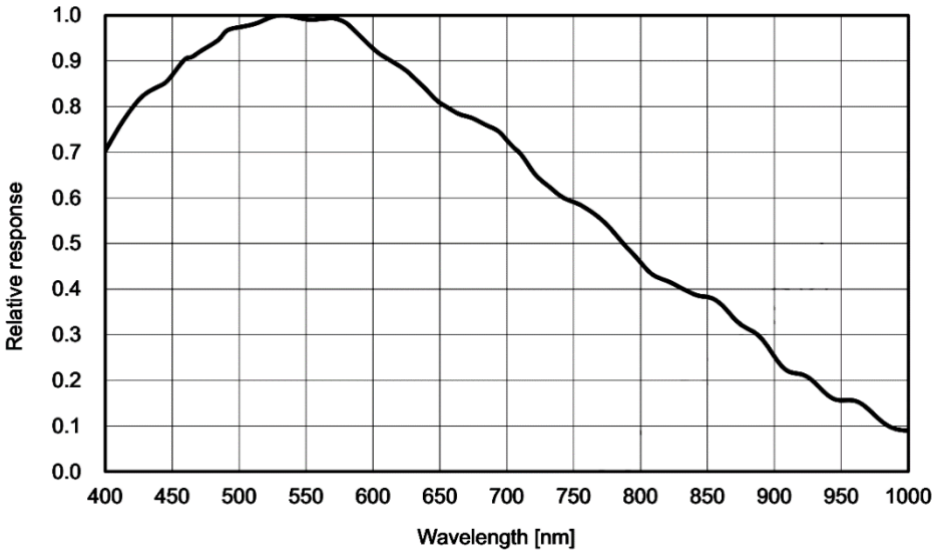


Figure 4-55 IUA20000KMA spectral response curve

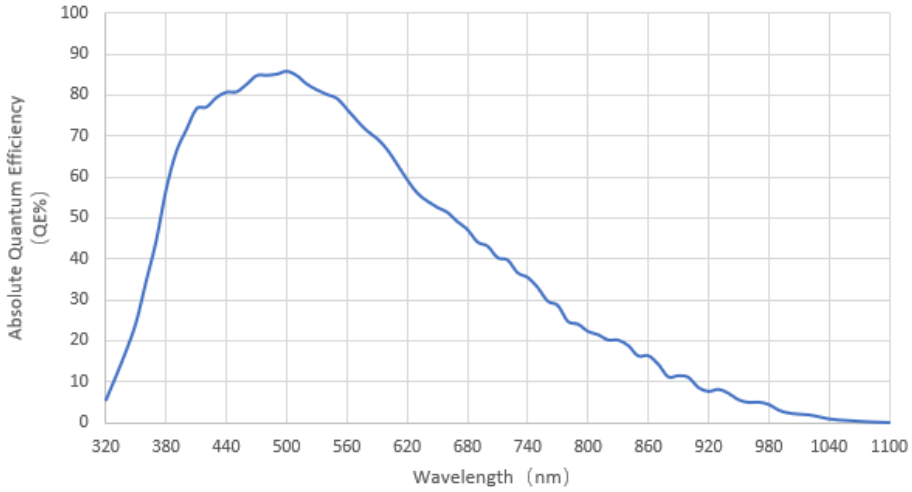


Figure 4-56 IUA20000KMA absolute quantum efficiency

4.35 IUA20000KPA

Table 4-35 IUA20000KPA camera specifications

Parameter \ Model	IUA20000KPA
	20.0M pixels 1" CMOS USB3.0industrial camera
Camera	
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
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	53μs-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	<3.5W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

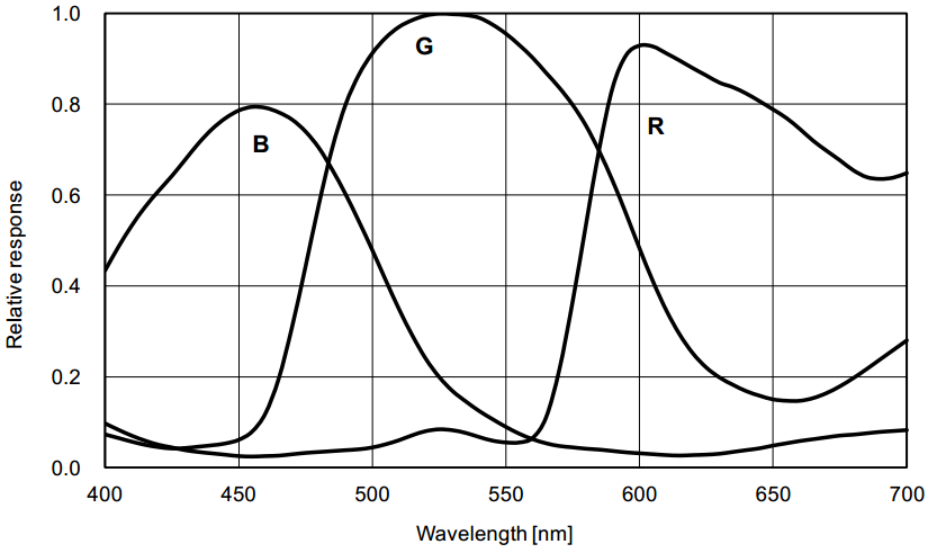


Figure 4-57 IUA20000KPA spectral response curve

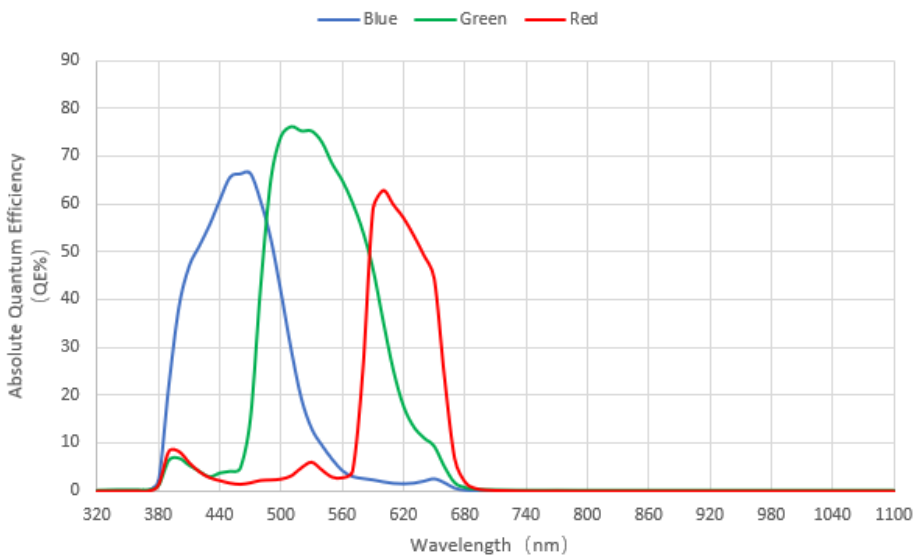


Figure 4-58 IUA20000KPA absolute quantum efficiency

4.36 IUA20400KMA

Table 4-36 IUA20400KMA camera specifications

Parameter \ Model	IUA20400KMA
	20.4M pixels 1.1" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX541-AAMJ-C
Pixel size	2.74 μm x2.74 μm
Sensor size	1.1"
Frame rate	17.5fps@4496 × 4496，64.4fps@2240 × 2240，64.4fps@1120 × 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	30μs-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	<2.8W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

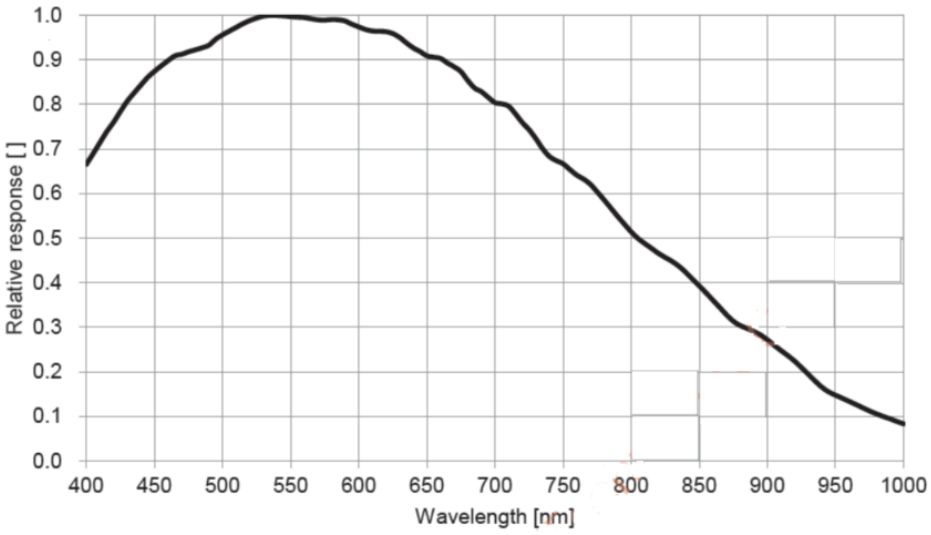


Figure 4-59 IUA20400KMA spectral response curve

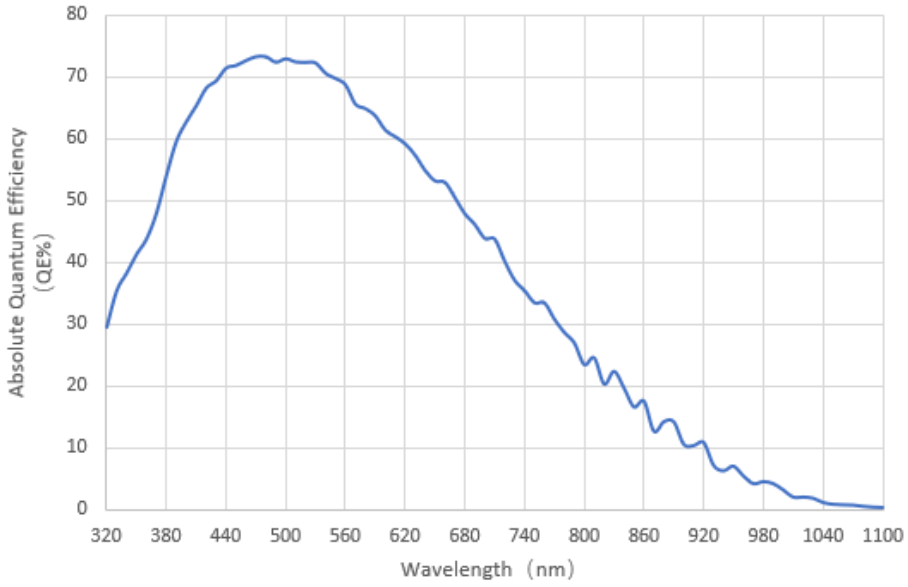


Figure 4-60 IUA20400KMA absolute quantum efficiency

4.37 IUA20400KPA

Table 4-37 IUA20400KPA camera specifications

Parameter \ Model	IUA20400KPA
	20.4M pixels 1.1" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX541-AAQJ-C
Pixel size	2.74 μm x2.74 μm
Sensor size	1.1"
Frame rate	17.5fps@4496 × 4496，64.4fps@2240 × 2240，64.4fps@1120 × 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	30μs-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	<3.2W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

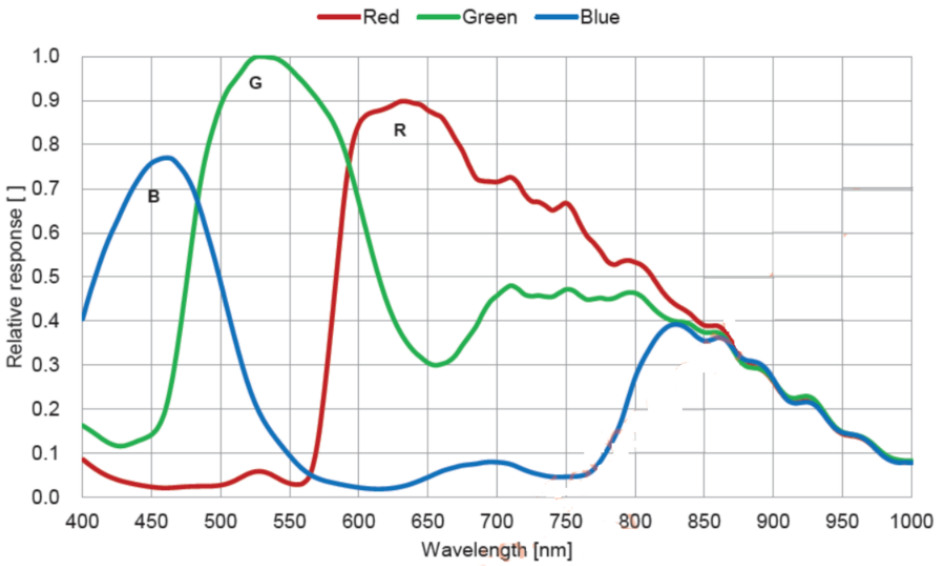


Figure 4-61 IUA20400KPA spectral response curve

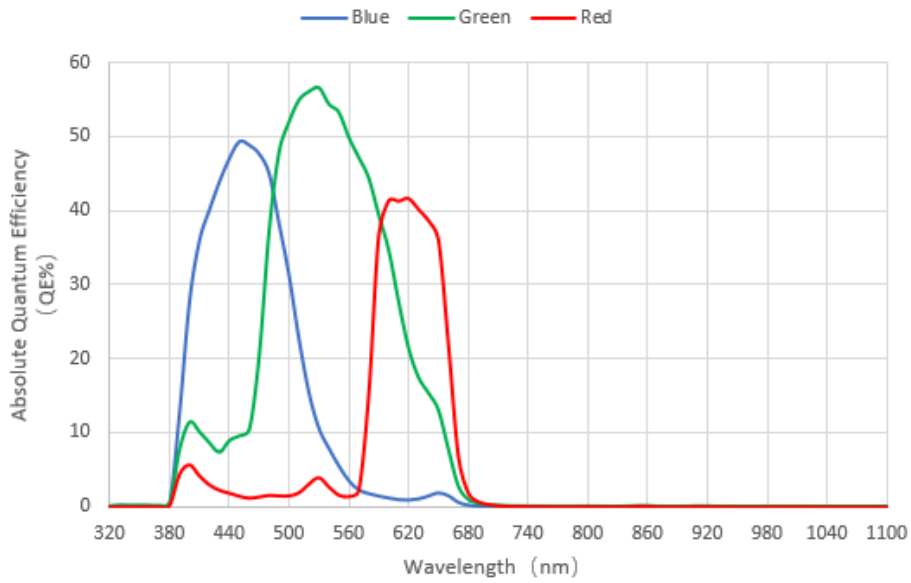


Figure 4-62 IUA20400KPA absolute quantum efficiency

4.38 IUA24500KMA

Table 4-38 IUA24500KMA camera specifications

Parameter \ Model	IUA24500KMA
	24.5M pixels 1.2" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX540-AAMJ-C
Pixel size	2.74 μm x2.74 μm
Sensor size	1.2"
Frame rate	14.7fps@5320×4600, 54.3fps@2660×2300
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	30μs-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	TBD
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

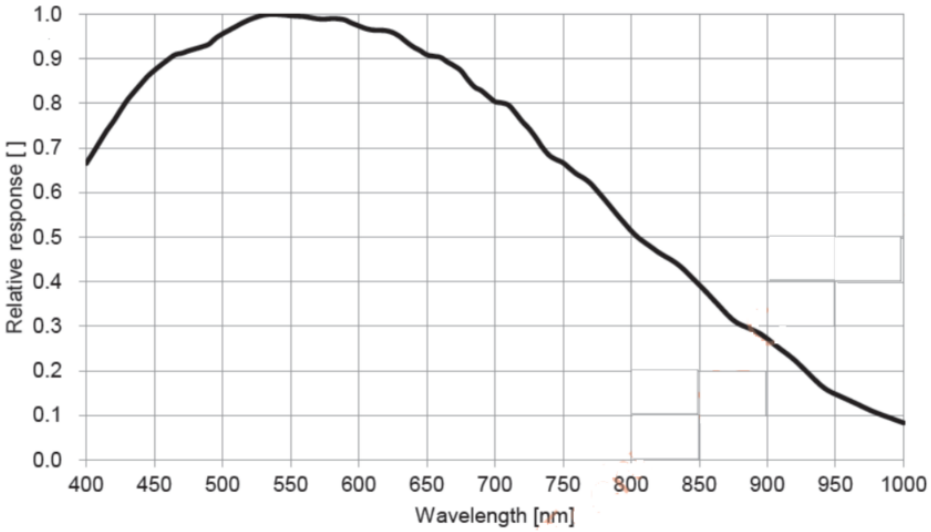


Figure 4-63 IUA24500KMA spectral response curve

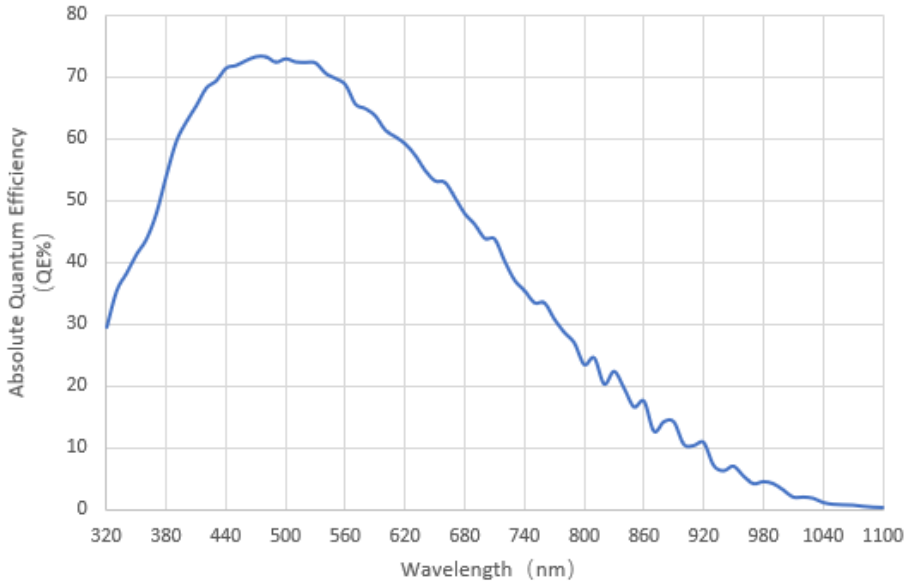


Figure 4-64 IUA24500KMA absolute quantum efficiency

4.39 IUA24500KPA

Table 4-39 IUA24500KPA camera specifications

Parameter \ Model	IUA24500KPA
	24.5M pixels 1.2" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX540-AAQJ-C
Pixel size	2.74 μm x2.74 μm
Sensor size	1.2"
Frame rate	14.7fps@5320×4600, 54.3fps@2660×2300
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	30μs-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	TBD
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

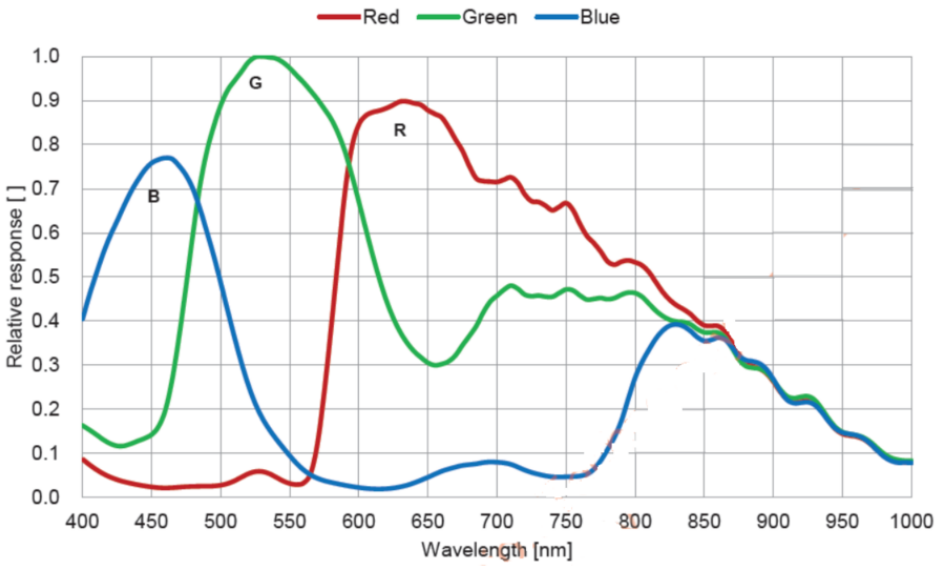


Figure 4-65 IUA24500KPA spectral response curve

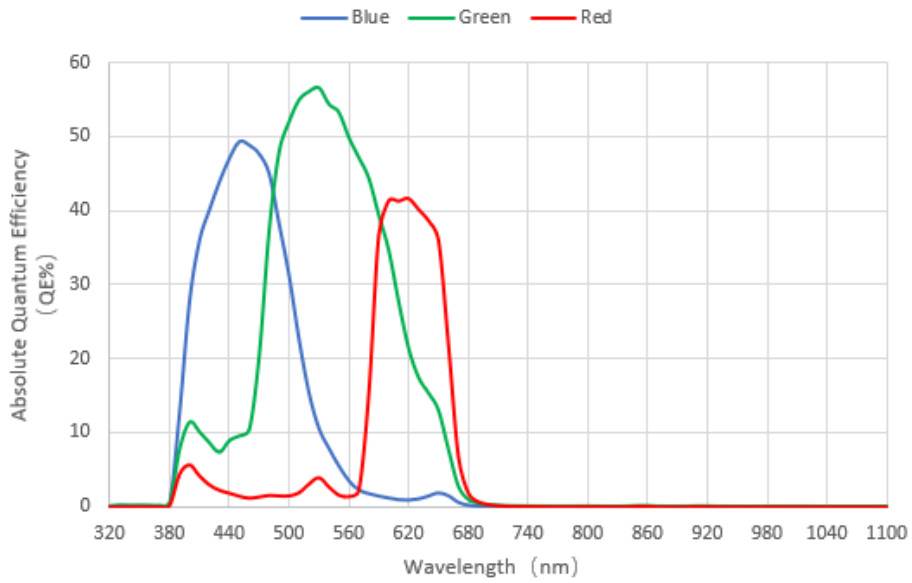


Figure 4-66 IUA24500KPA absolute quantum efficiency

4.40 IUA25000KMA

Table 4-40 IUA25000KMA camera specifications

Parameter \ Model	IUA25000KMA
	25.0M 1.1" CMOS USB3.0 industrial camera
Camera	
Sensor model	GMAX0505
Pixel size	2.5 μm x 2.5 μm
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
General specification	
Power supply	Power with USB3.0/ DC12V
Power consumption	<2.5W
Temperature	Working temperature -10~50℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

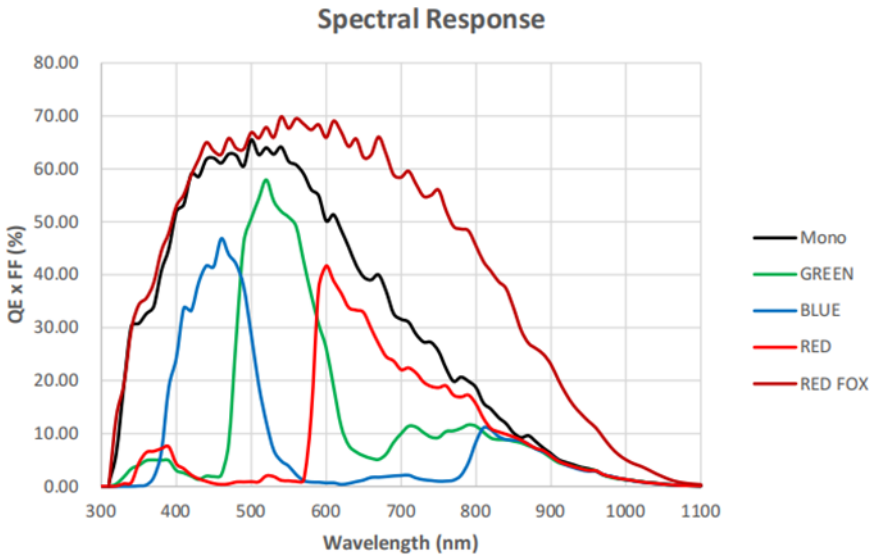


Figure 4-67 IUA25000KMA spectral response curve

4.41 IUA25000KPA

Table 4-41 IUA25000KPA camera specifications

Parameter \ Model	IUA25000KPA
	25.0M 1.1" CMOS USB3.0 industrial camera
Camera	
Sensor model	GMAX0505
Pixel size	2.5 μm x 2.5 μm
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
General specification	
Power supply	Power with USB3.0/ DC12V
Power consumption	<2.95W
Temperature	Working temperature -10~50℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

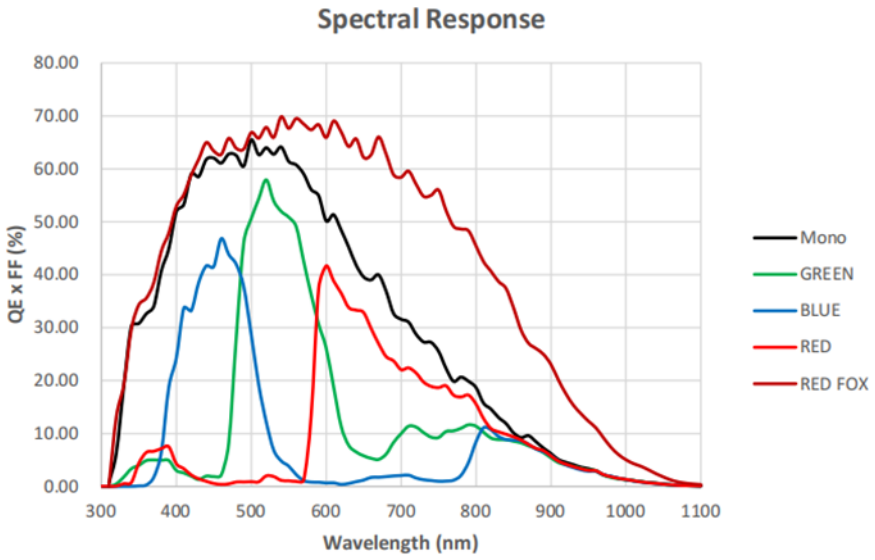


Figure 4-68 IUA25000KPA spectral response curve

4.42 IUA45000KMA

Table 4-42 IUA45000KMA camera specifications

Parameter \ Model	IUA45000KMA
	45.0M 4/3" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX492LLJ-C
Pixel size	2.315 μm x 2.315μm
Sensor size	4/3"
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	0.1ms-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	<2.1W
Temperature	Working temperature -10~50℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	214g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

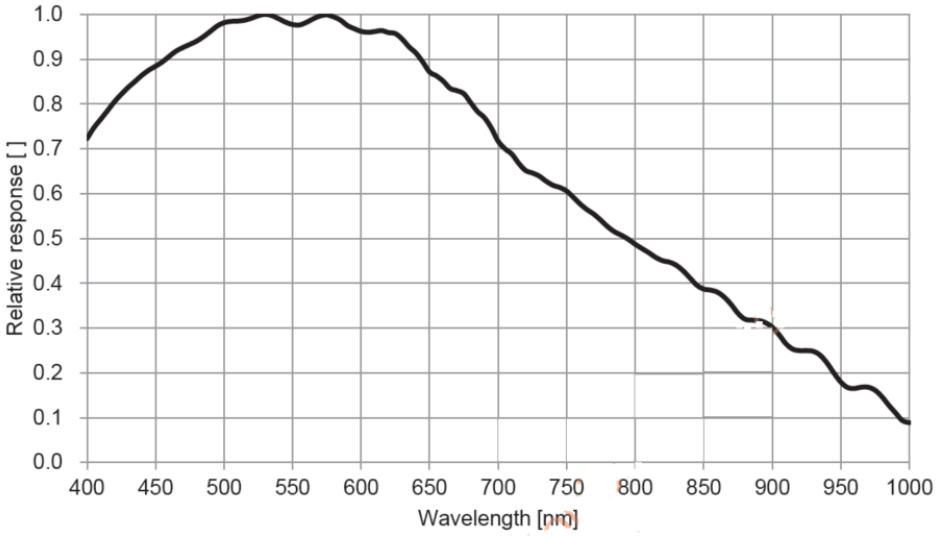


Figure 4-69 IUA45000KMA spectral response curve

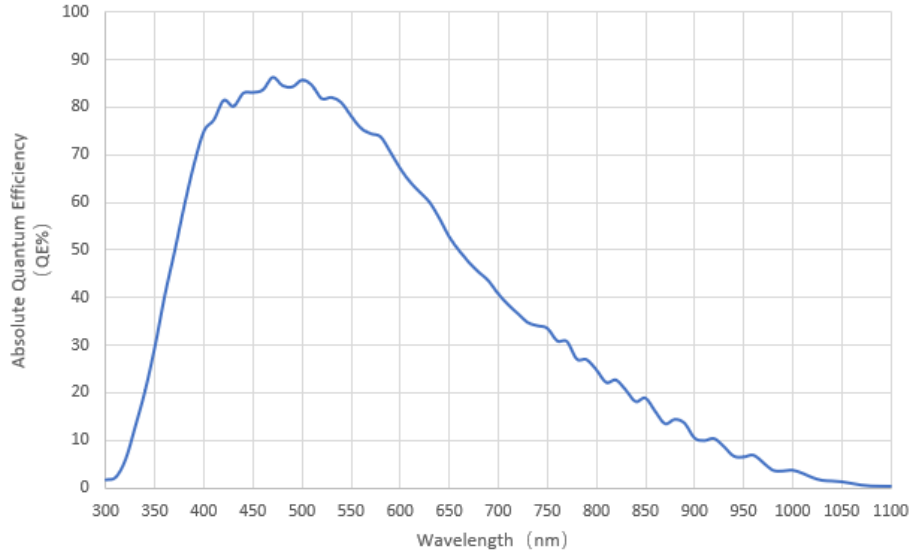


Figure 4-70 IUA45000KMA absolute quantum efficiency

4.43 IUA2100KPA(NIR)

Table 4-43 IUA2100KPA camera specifications

Parameter \ Model	IUA2100KPA
	2.1M pixels 1/2.8" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX462LQR
Pixel size	2.9 μm x 2.9 μm
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	11μs-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℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

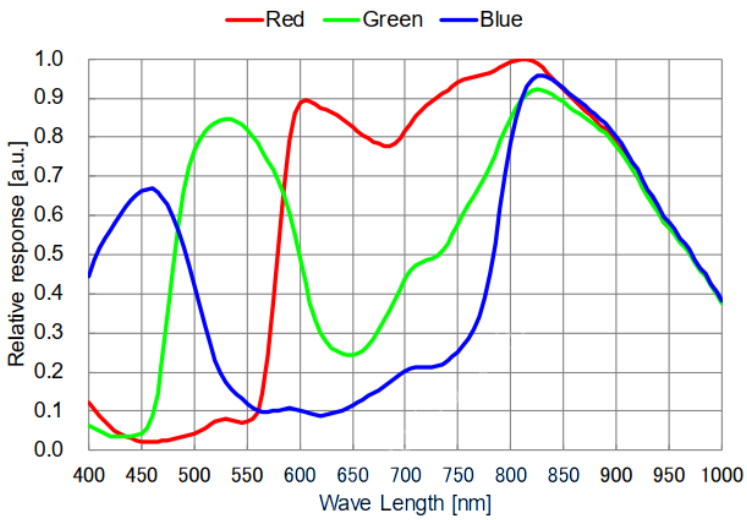


Figure 4-71 IUA2100KPA spectral response curve

4.44 IUA4100KPA(NIR)

Table 4-44 IUA4100KPA camera specifications

Parameter \ Model	IUA4100KPA
	4.1M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX464LQR
Pixel size	2.9 μm x 2.9 μm
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	11μs-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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	228g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

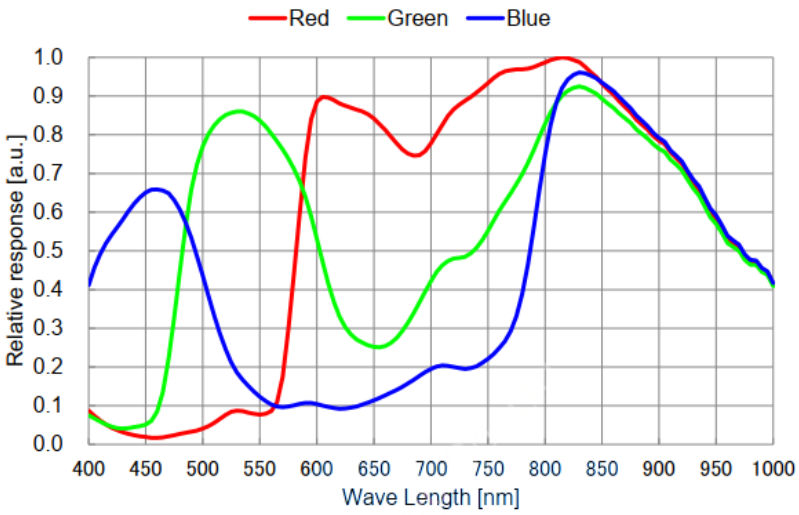


Figure 4-72 IUA4100KPA spectral response curve

4.45 IUA500KMA(GPixel UV)

Table 4-45 IUA500KMA camera specifications

Parameter \ Model	IUA500KMA
	0.5M pixels 1" CMOS USB3.0 industrial camera
Camera	
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)
Peak QE	89%@610nm
Sensitivity	$6.4x10^8$(e-/((W/m2).s))
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	<2.3W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	270g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

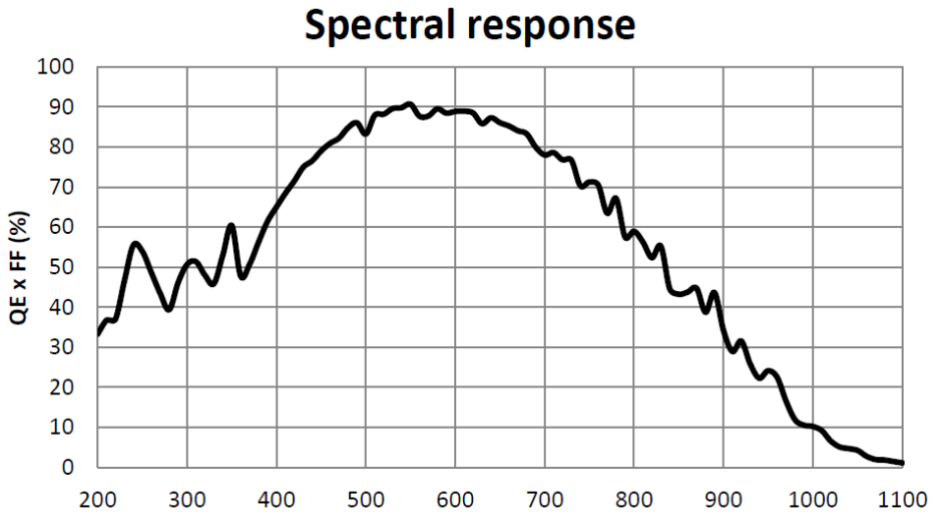


Figure 4-73 IUA5000KMA spectral response curve

4.46 IUA1300KMA(GPixel UV)

Table 4-46 IUA1300KMA camera specifications

Parameter \ Model	IUA1300KMA
	1.3M pixels 1" CMOS USB3.0 industrial camera
Camera	
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	$2.57x10^8$(e-/((W/m2).s))
Sensitivity	89%@610nm
Dark current	11e-/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	<2.3W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	270g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android； X86/X64/armhf/armel/arm64
Certification	CE, FCC, RoHS

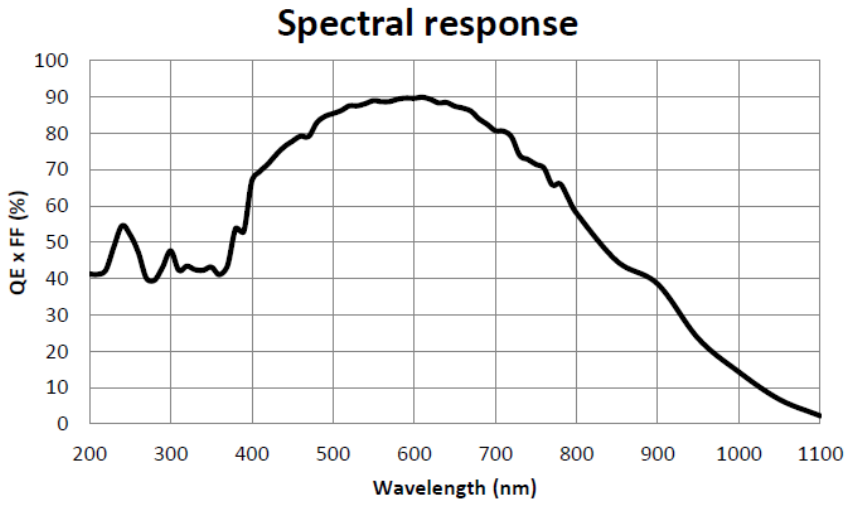


Figure 4-74 IUA1300KMA spectral response curve

4.47 IUA4200KMA(GPixel NIR)

Table 4-47 IUA4200KMA camera specifications

Parameter \ Model	IUA4200KMA
	4.2M pixels 1.2" CMOS USB3.0 industrial camera
Camera	
Sensor model	GPixel GSENSE2020e (NIR)
Pixel size	6.5 μm x 6.5 μm
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	$8.1x10^7$(e-/((W/m2).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	<2.3W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	270g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC, RoHS

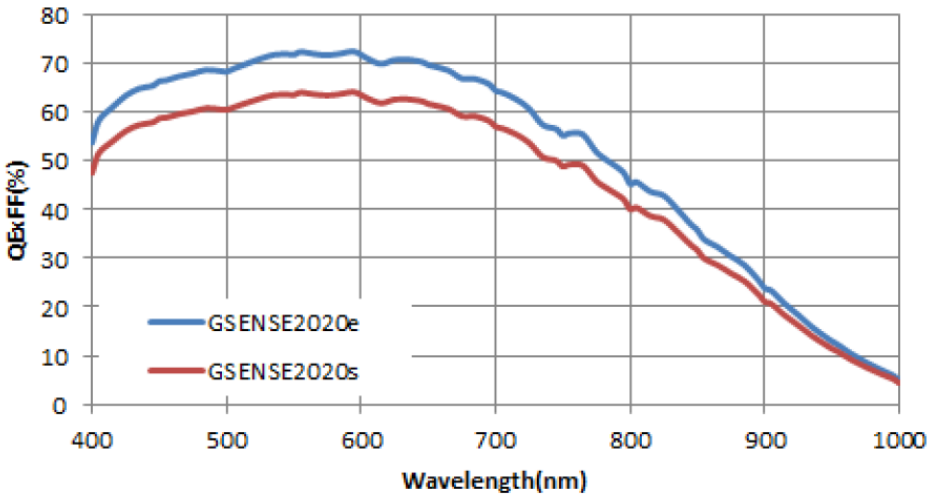


Figure 4-75 IUA4200KMA spectral response curve

4.48 IUA4200KMB(GPixel UV)

Table 4-48 IUA4200KMB camera specifications

Parameter \ Model	IUA4200KMB
	4.2M pixels 1.2" CMOS USB3.0 industrial camera
Camera	
Sensor model	GPixel GSENSE2020BSI -H (UV)
Pixel size	6.5 μm x 6.5 μm
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	$1.1x10^8$(e-/((W/m2).s))
Sensitivity	93.7%@550nm
Dark current	80e-/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	<2.3W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	270g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC, RoHS

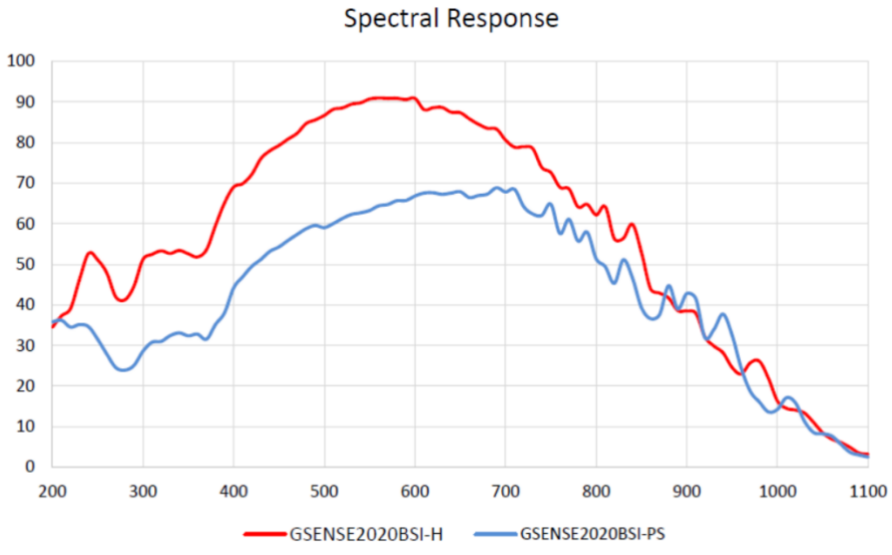


Figure 4-76 IUA4200KMB spectral response curve

4.49 IUA4200KME(GPixel UV)

Table 4-49 IUA4200KME camera specifications

Parameter \ Model	IUA4200KME
	4.2M pixels 2.0" CMOS USB3.0 industrial camera
Camera	
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	$3.25x10^{8}$(e-/((W/m2).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	<2.3W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	270g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC, RoHS

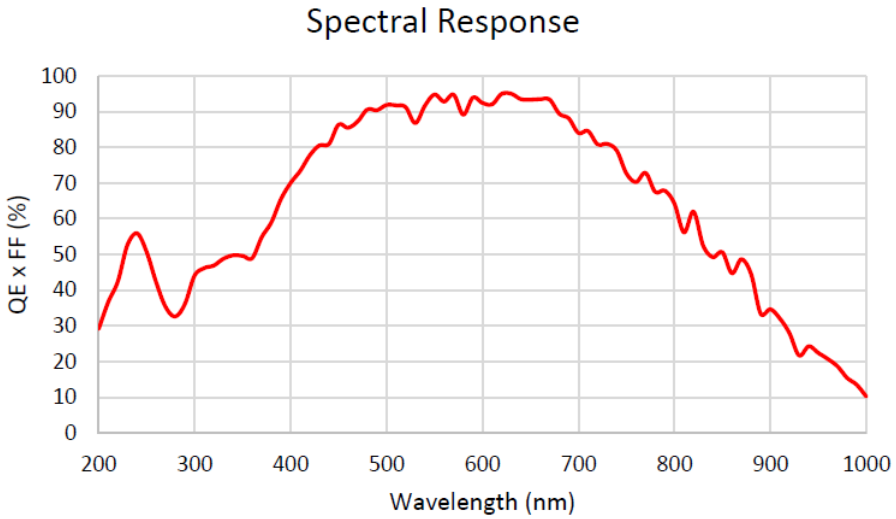


Figure 4-77 IUA4200KME spectral response curve

4.50 IUA8000KMA(GS-UV)

Table 4-50 IUA8000KMA camera specifications

Parameter \ Model	IUA8000KMA
	8.0M pixels 2/3" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX487-AAMJ-C
Pixel size	2.74 μm x2.74 μm
Sensor size	2/3"
Frame rate	45fps@2840 × 2840，198fps@1420 × 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
Peak QE	51%@500nm
Sensitivity	145mV
Dark current	0.15mV
Gain range	1x-50x
Exposure time	30μs-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	<3.8W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	68mmx68mmx28.1mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

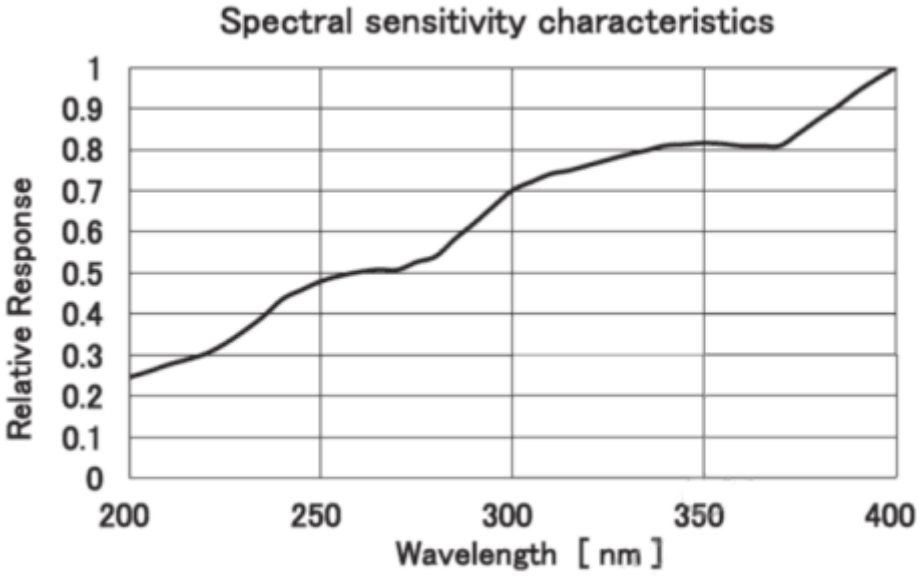


Figure 4-78 IUA8000KMA spectral response curve

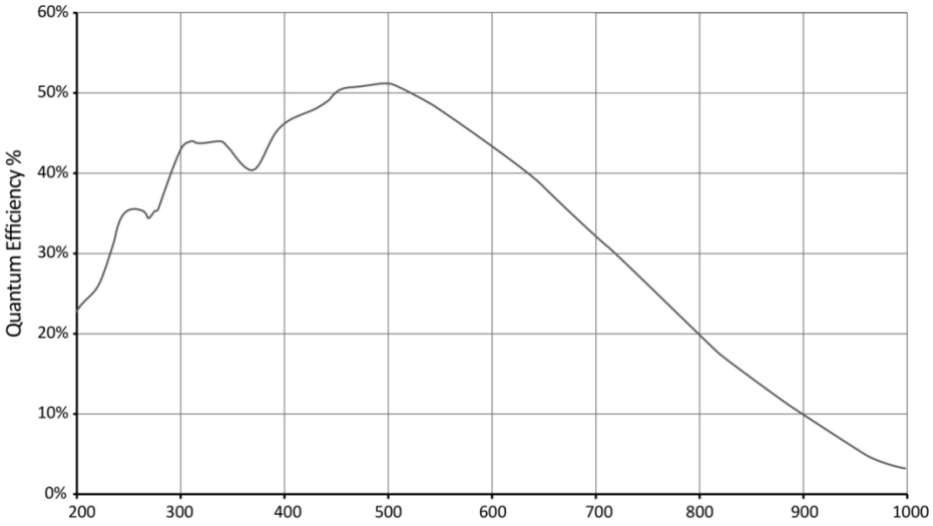


Figure 4-79 IUA8000KMA absolute quantum efficiency

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

5.1 IUB4200KMA

Table 5-1 IUB4200KMA camera specifications

Parameter \ Model	IUB4200KMA
	4.2M pixels 1.2" CMOS USB3.0 industrial camera
Camera	
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	$8.11x10^7$(e-/((W/m2)·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
General Specifications	
Power supply	Power with USB3.0/ 12V Power adapter
Power consumption	<3.7W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	118mmx68mmx23.2mm
Weight	633g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

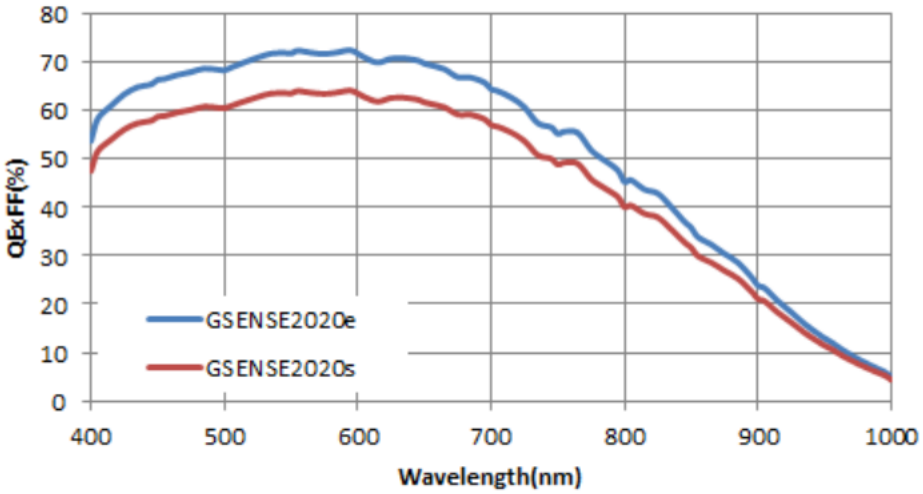


Figure 5-1 IUB4200KMA spectral response curve

5.2 IUB4200KMB

Table 5-2 IUB4200KMB camera specifications

Parameter \ Model	IUB4200KMB
	4.2M pixels 1.2" CMOS USB3.0 industrial camera
Camera	
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	$1.1x10^8$e-/((W/m2)·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
General Specifications	
Power supply	Power with USB3.0/ 12V Power adapter
Power consumption	<3.7W
Temperature	Working temperature -10~50℃, storage temperature30~70℃
Humidity	20%-80%, no condensation
Size	118mmx68mmx23.2mm
Weight	633g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

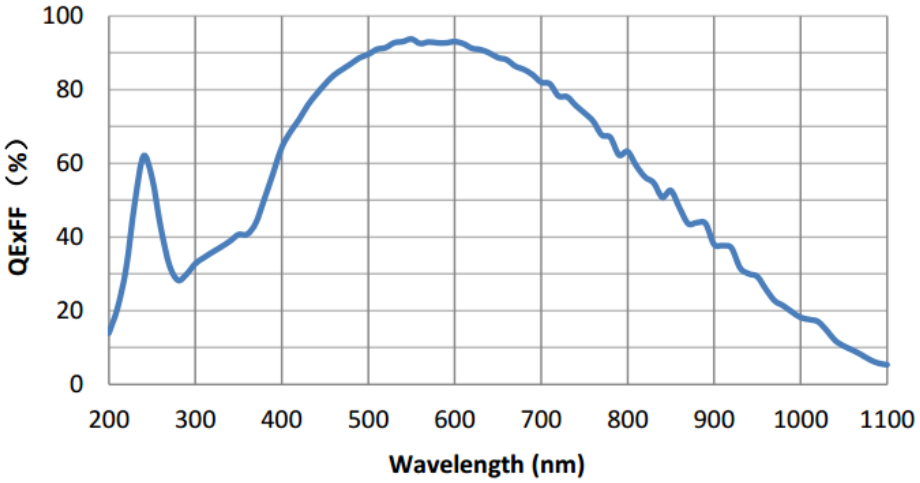


Figure 5-2 IUB4200KMB spectral response curve

5.3 IUB43000KMA

Table 5-3 IUB43000KMA camera specifications

Parameter \ Model	IUB43000KMA
	43.0M pixels 1.7" (APS-C) CMOS USB3.0 industrial camera
Camera	
Sensor model	Gpixel GMAX0806
Pixel size	2.8 μm x 2.8 μm
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	$1.19x10^7$(e-/((W/m2)·s)
Dark current	1e-/s/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
General Specifications	
Power supply	Power with USB3.0/ 12V Power adapter
Power consumption	<5.0W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	118mmx68mmx23.2mm
Weight	633g
Lens mount	M42 Interface
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android； X86/X64/armhf/armel/arm64
Certification	CE, FCC

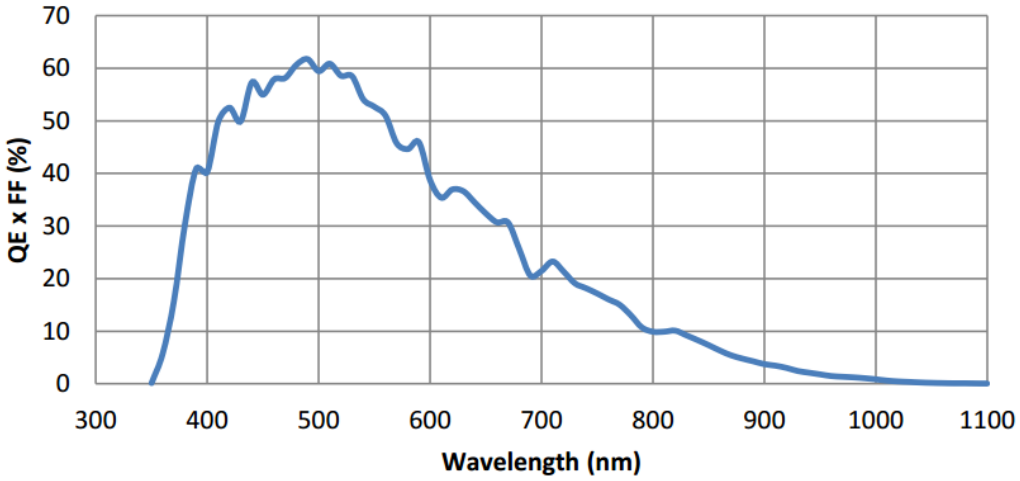


Figure 5-3 IUB43000KMA spectral response curve

6 IUC Series Technical Specifications(7)

6.1 IUC24000KPA(20231019)

Table 6-1 IUC24000KPA camera specifications

Parameter \ Model	IUC24000KPA
	24.0M pixels 2.7" (Full Frame) CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX410CQK-C
Pixel size	5.94 μm x 5.94 μm
Sensor size	2.7"(Full Frame)
Frame rate	15.3fps@6064x4040（14bit）、41fps@3024x2012、114fps@2016x1342
Dynamic range	TBD
Signal-to-Noise ratio	TBD
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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	88mmx88mmx21.2mm
Weight	540g
Lens mount	M42 Interface
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

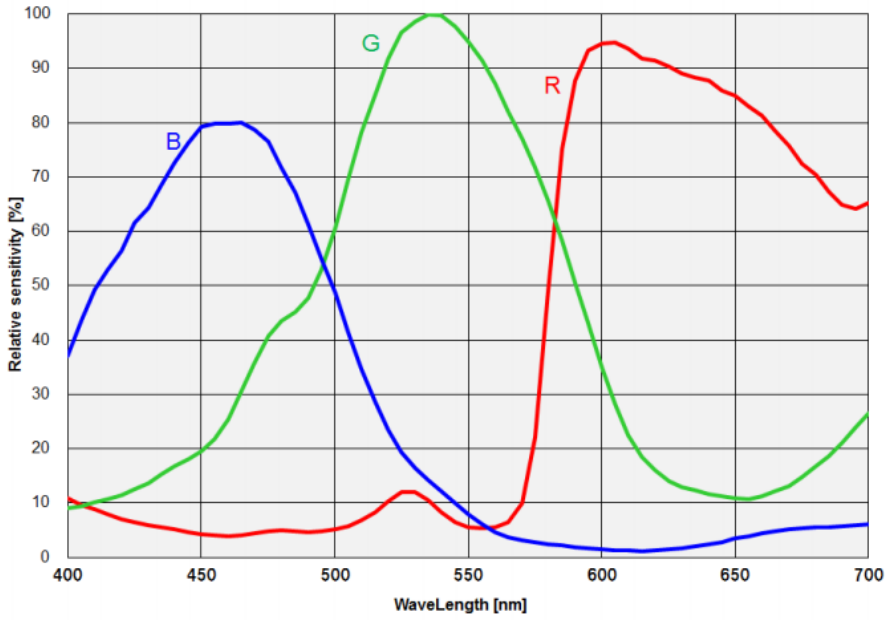


Figure 6-1 IUC24000KPA spectral response curve

6.2 IUC26000KMA

Table 6-2 IUC26000KMA camera specifications

Parameter \ Model	IUC26000KMA
	26.0M pixels 1.8" (APS-C) CMOS USB3.0 industrial camera
Camera	
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
Dynamic range	86.8dB
Signal-to-Noise ratio	47.1dB
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
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 Specifications	
Power supply	12V Power adapter
Power consumption	<5.0W
Temperature	Working temperayure-10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	88mmx88mmx21.2mm
Weight	540g
Lens mount	M42 Interface
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

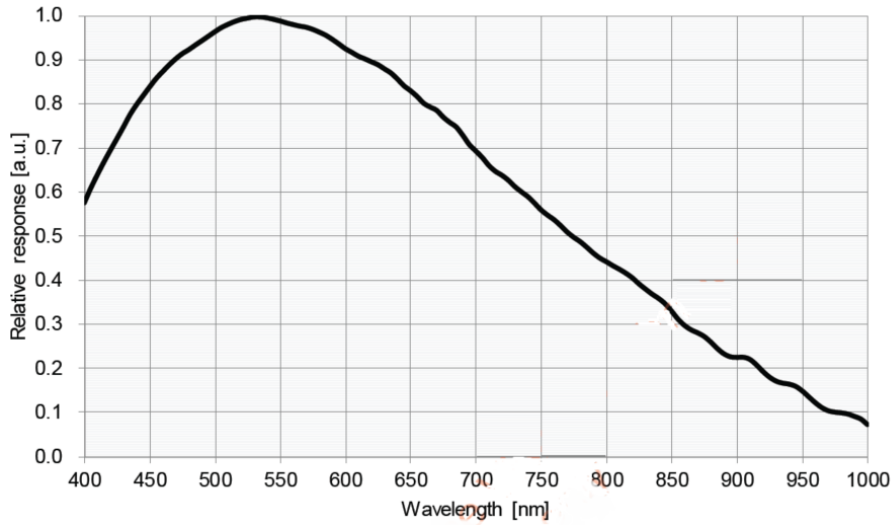


Figure 6-2 IUC26000KMA spectral response curve

6.3 IUC26000KPA

Table 6-3 IUC26000KPA camera specifications

Parameter \ Model	IUC26000KPA
	26.0M pixels 1.8" (APS-C) CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX571BQR-C
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
Dynamic range	86.8dB
Signal-to-Noise ratio	47.1dB
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
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 Specifications	
Power supply	12V Power adapter
Power consumption	<5.0W
Temperature	Working temperayure-10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	88mmx88mmx21.2mm
Weight	540g
Lens mount	M42 Interface
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

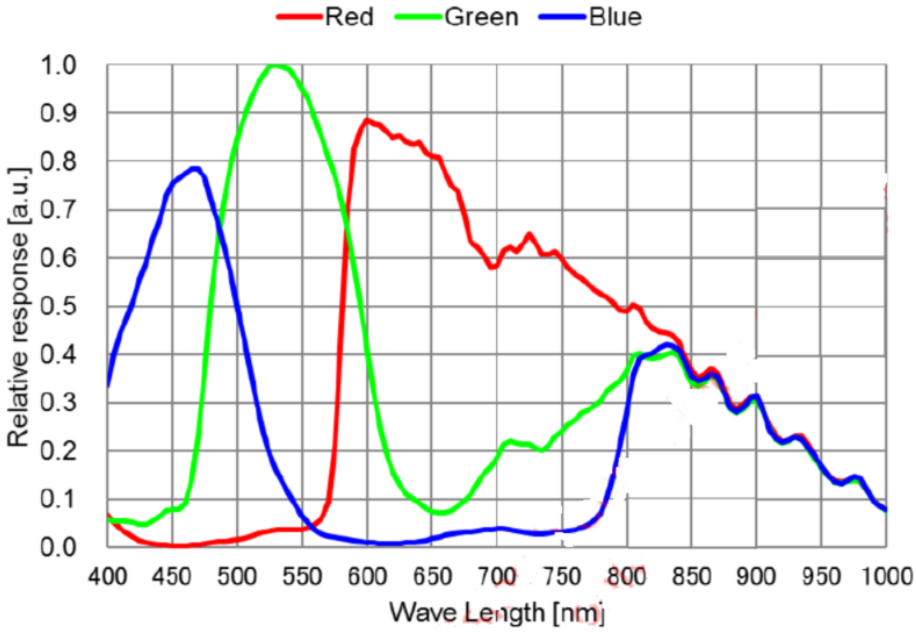


Figure 6-3 IUC26000KPA spectral response curve

6.4 IUC31000KMA

Table 6-4 IUC31000KMA camera specifications

Parameter \ Model	IUC31000KMA
	31.0M pixels 1.8" (APS-C) CMOS USB3.0 industrial camera
Camera	
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
General Specifications	
Power supply	12V Power adapter
Power consumption	<7.7w
Temperature	Working temperayure-10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	88mmx88mmx21.2mm
Weight	545g
Lens mount	M42 Interface
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

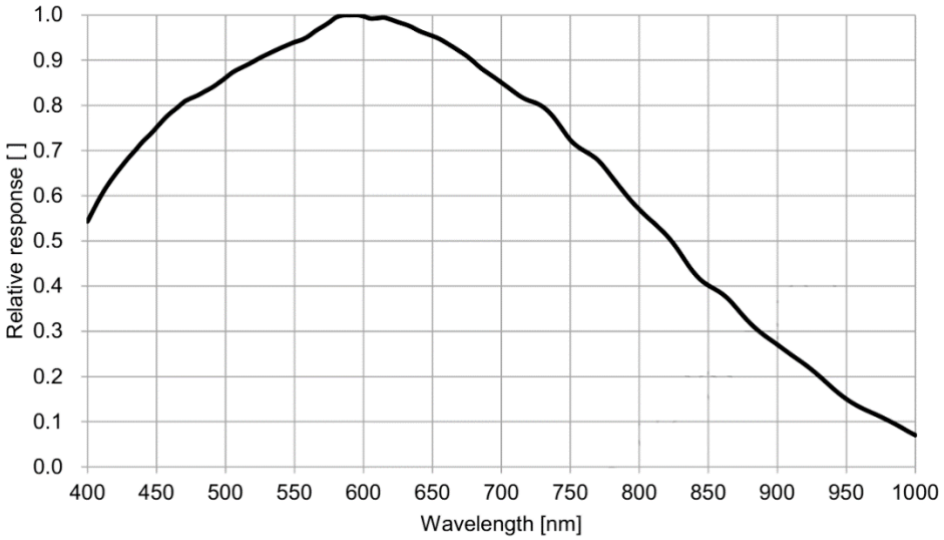


Figure 6-4 IUC31000KMA spectral response curve

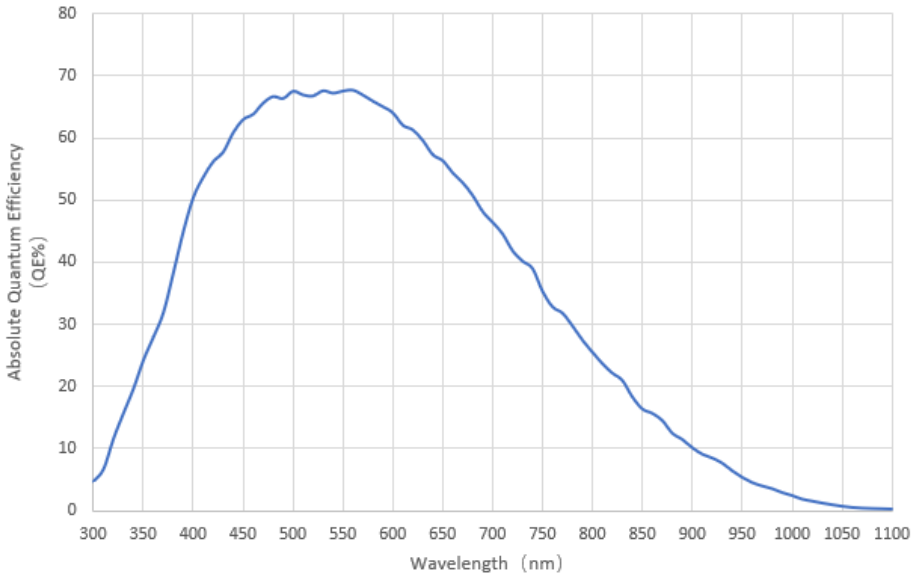


Figure 6-5 IUC31000KMA absolute quantum efficiency

6.5 IUC31000KPA

Table 6-5 IUC31000KPA camera specifications

Parameter \ Model	IUC31000KPA
	31.0M pixels 1.8" (APS-C) CMOS USB3.0 industrial camera
Camera	
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
General Specifications	
Power supply	12V Power adapter
Power consumption	<7.7w
Temperature	Working temperayure-10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	88mmx88mmx21.2mm
Weight	545g
Lens mount	M42 Interface
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

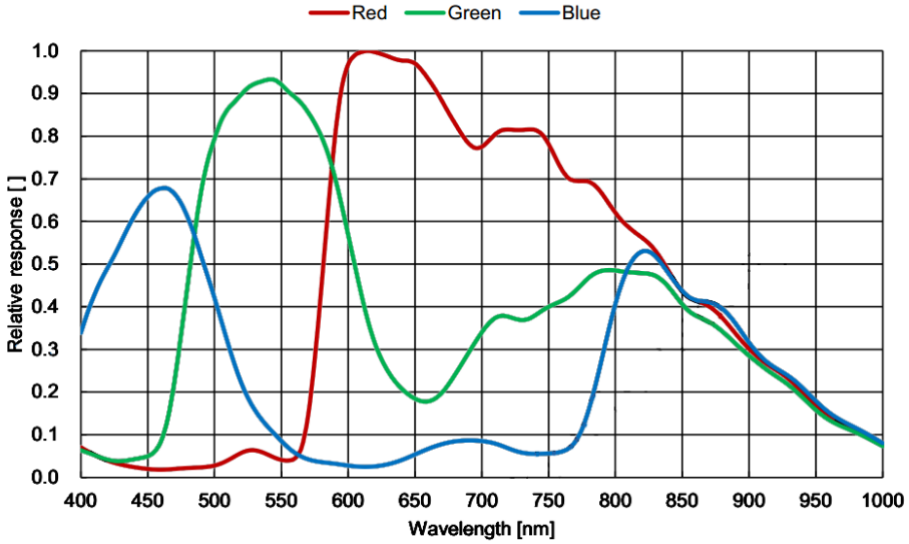


Figure 6-6 IUC31000KPA spectral response curve

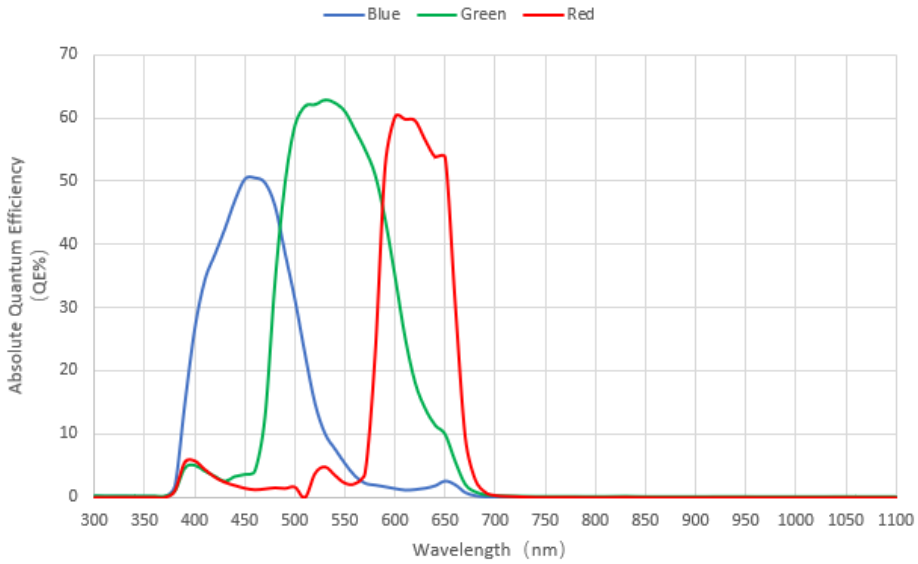


Figure 6-7 IUC31000KPA absolute quantum efficiency

6.6 IUC60000KMA

Table 6-6 IUC60000KMA camera specifications

Parameter \ Model	IUC60000KMA
	60.0M pixels 2.7" (Full Frame) CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX455ALK
Pixel size	3.76 μm x 3.76 μm
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
Dynamic range	88.3dB
Signal-to-Noise ratio	47.1dB
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
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 Specifications	
Power supply	12V Power adapter
Power consumption	<5.5W
Temperature	Working temperayure-10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	88mmx88mmx21.2mm
Weight	540g
Lens mount	M52 Interface
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

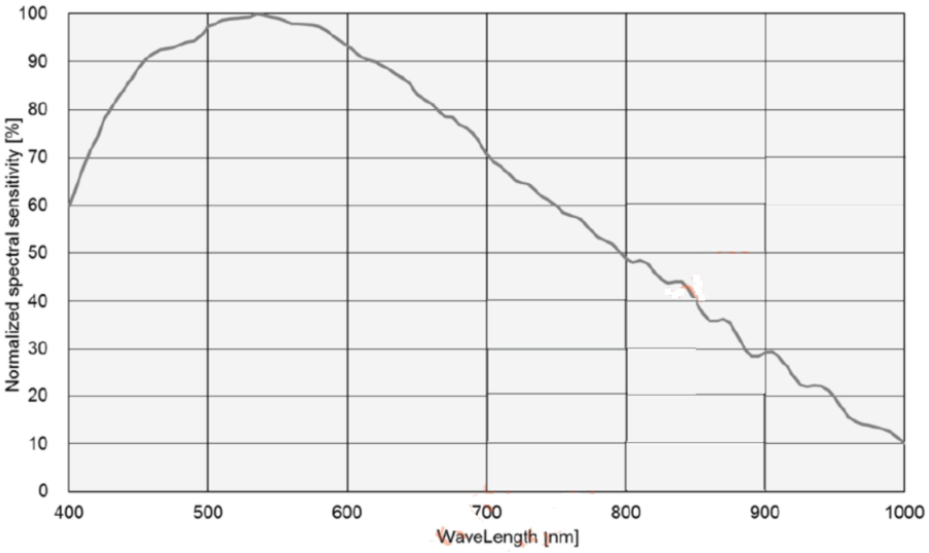


Figure 6-8 IUC60000KMA spectral response curve

6.7 IUC60000KPA

Table 6-7 IUC60000KPA camera specifications

Parameter \ Model	IUC60000KPA
	60.0M pixels 2.7" (Full Frame) CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX455AQK
Pixel size	3.76 μm x 3.76 μm
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
Dynamic range	85.8dB
Signal-to-Noise ratio	47.0dB
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
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 Specifications	
Power supply	12V Power adapter
Power consumption	<5.5W
Temperature	Working temperayure-10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	88mmx88mmx21.2mm
Weight	540g
Lens mount	M52 Interface
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

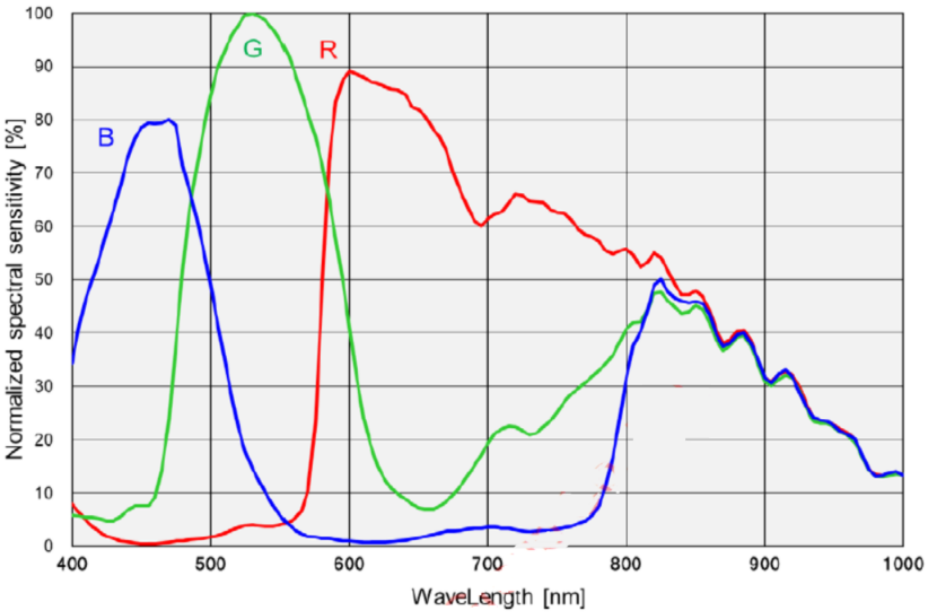


Figure 6-9 IUC60000KPA spectral response curve

7 IUD Series Technical Specifications(2)

7.1 IUD16000KMA(NIRE, 20240313)

Table 7-1 IUD16000KMA camera specifications

Parameter \ Model	IUD16000KMA
	16M CMOS USB3.0 industrial camera
Camera	
Sensor model	PYTHON 16K
Pixel size	4.5 μm x 4.5 μm
Sensor size	
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℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	59mm×59mm×27.2mm
Weight	139.3g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

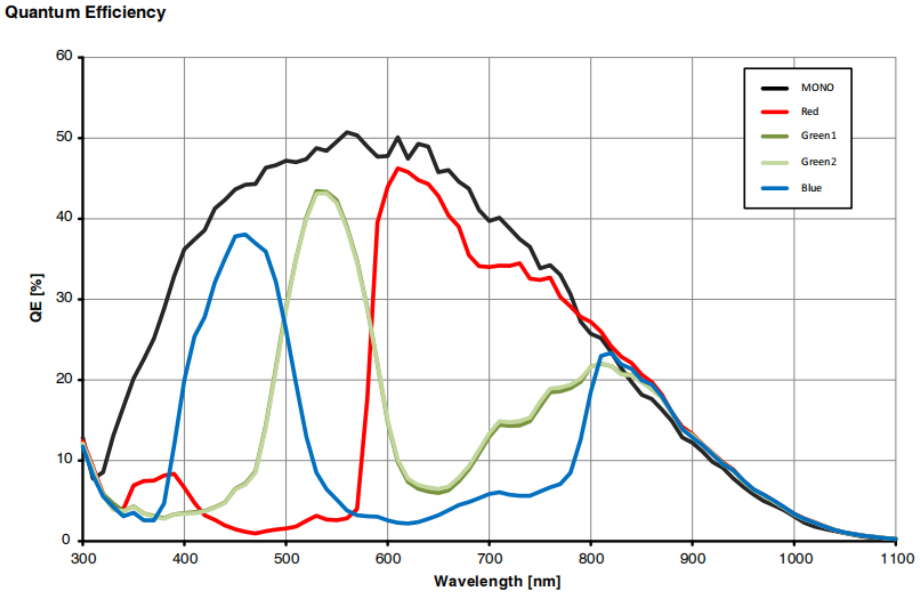


Figure 7-1 IUD16000KMA spectral response curve

7.2 IUD25000KMA(NIRE, 20240228)

Table 7-2 IUD25000KMA camera specifications

Parameter \ Model	IUD25000KMA
	25M 2.04" CMOS USB3.0 industrial camera
Camera	
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
General Specifications	
Power supply	Power with USB3.0
Power consumption	TBD
Temperature	Working temperature -10~50℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	59mm×59mm×27.2mm
Weight	139.3g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

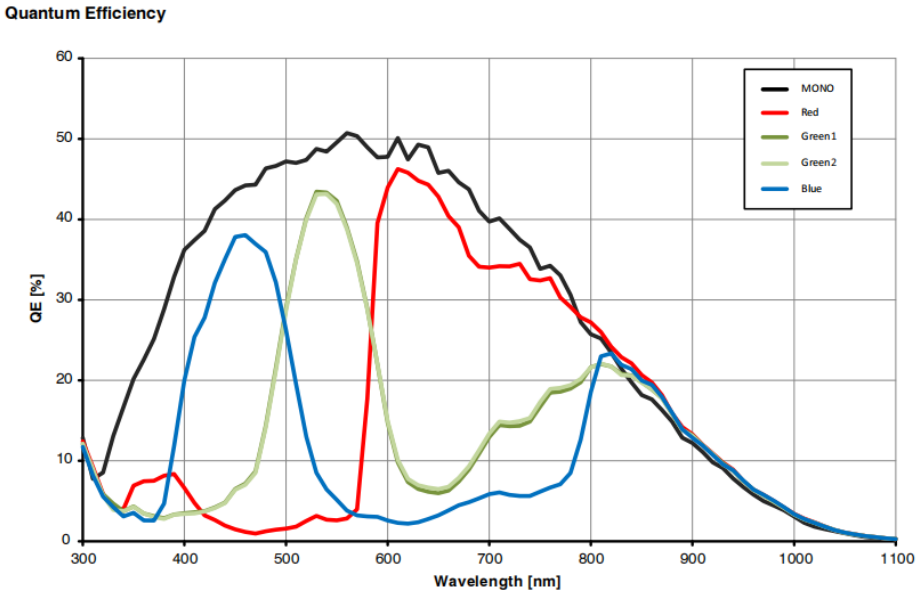


Figure 7-2 IUD25000KMA spectral response curve

8 I3 Series Technical Specifications(36)

8.1 I3ISPM00500KPA(33mm)

Table 8-1 I3ISPM00500KPA camera specifications

Parameter \ Model	I3ISPM00500KPA
	0.5M 1/1.7" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX433LQJ
Pixel size	9.0 μm×9.0 μm
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	6μs-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℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

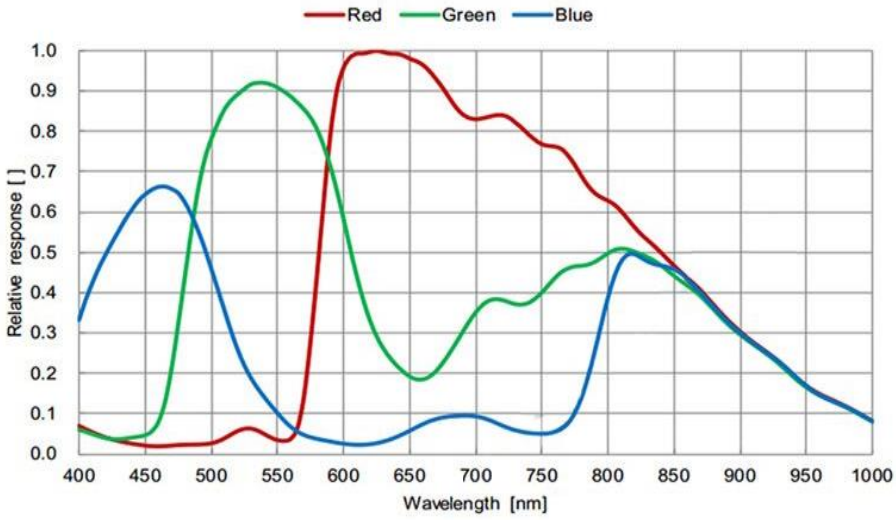


Figure 8-1 I3ISPM00500KPA spectral response curve

8.2 I3ISPM01500KPA(33mm)

Table 8-2 I3ISPM01500KPA camera specifications

Parameter \ Model	I3ISPM01500KPA
	1.5M pixels 1/2.9" CMOS USB3.0industrial camera
Camera	
Sensor model	Sony IMX273LQR
Pixel size	3.45 μm×3.45 μm
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	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 / 10bit
General Specifications	
Power supply	Power with USB3.0
Power consumption	<3.5W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

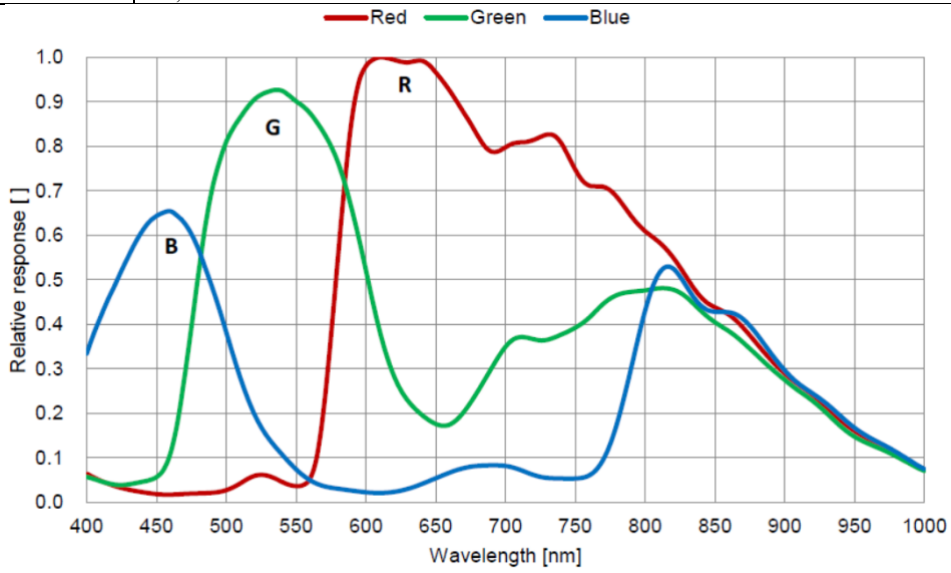


Figure 8-2 I3ISPM01500KPA spectral response curve

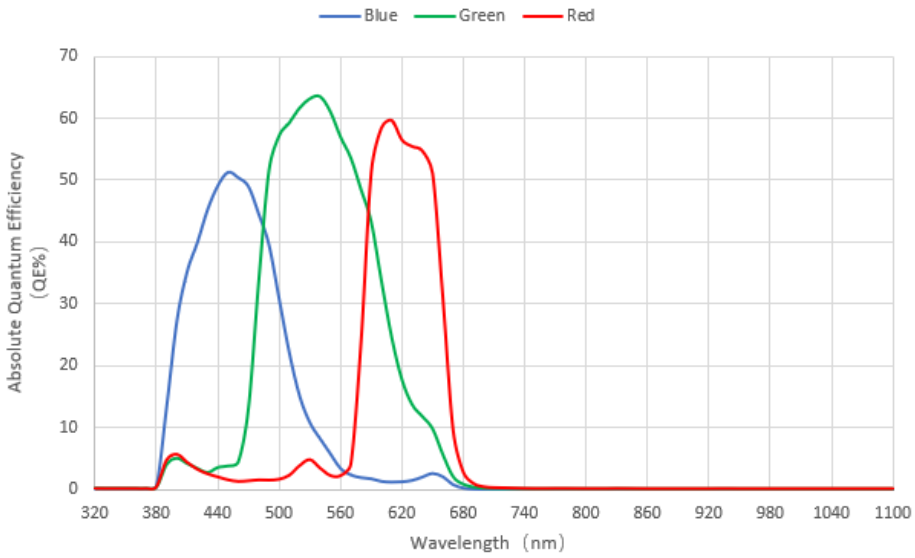


Figure 8-3 I3ISPM01500KPA absolute quantum efficiency

8.3 I3ISPM02300KPA(33mm)

Table 8-3 I3ISPM02300KPA camera specifications

Parameter \ Model	I3ISPM02300KPA
	2.3M pixels 1/1.2" CMOS USB3.0industrial camera
Camera	
Sensor model	Sony IMX174LQJ
Pixel size	5.86 μm x 5.86 μm
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	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 / 10bit
General Specifications	
Power supply	Power with USB3.0
Power consumption	<3.5W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android； X86/X64/armhf/armel/arm64
Certification	CE, FCC

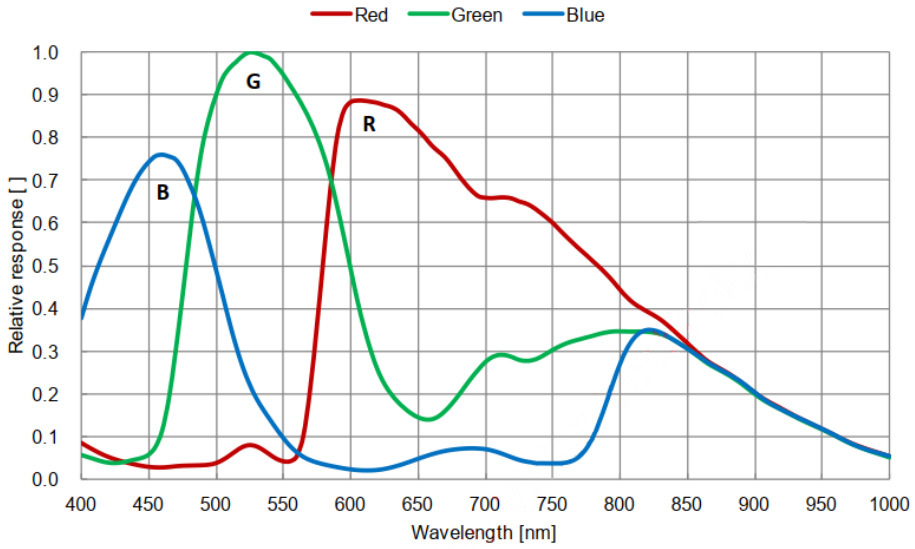


Figure 8-4 I3ISPM02300KPA spectral response curve

8.4 I3ISPM02300KPB(33mm)

Table 8-4 I3ISPM02300KPB camera specifications

Parameter \ Model	I3ISPM02300KPB
	2.3M pixels 1/1.2" CMOS USB3.0industrial camera
Camera	
Sensor model	Sony IMX249LQJ
Pixel size	5.86 μm x 5.86 μm
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	42μs-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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android； X86/X64/armhf/armel/arm64
Certification	CE, FCC

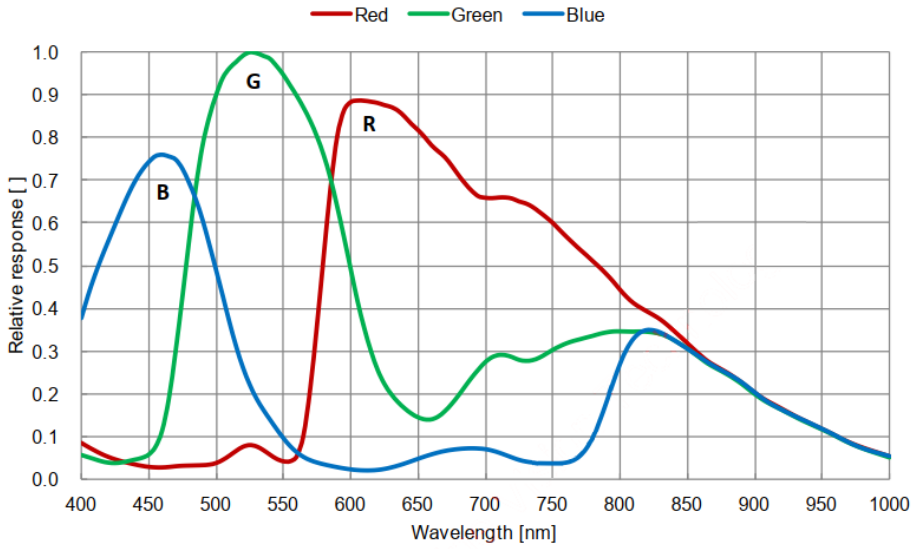


Figure 8-5 I3ISPM02300KPB spectral response curve

8.5 I3ISPM03100KPA(33mm)

Table 8-5 I3ISPM03100KPA camera specifications

Parameter \ Model	I3ISPM03100KPA
	3.1M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera	
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	<3.5W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

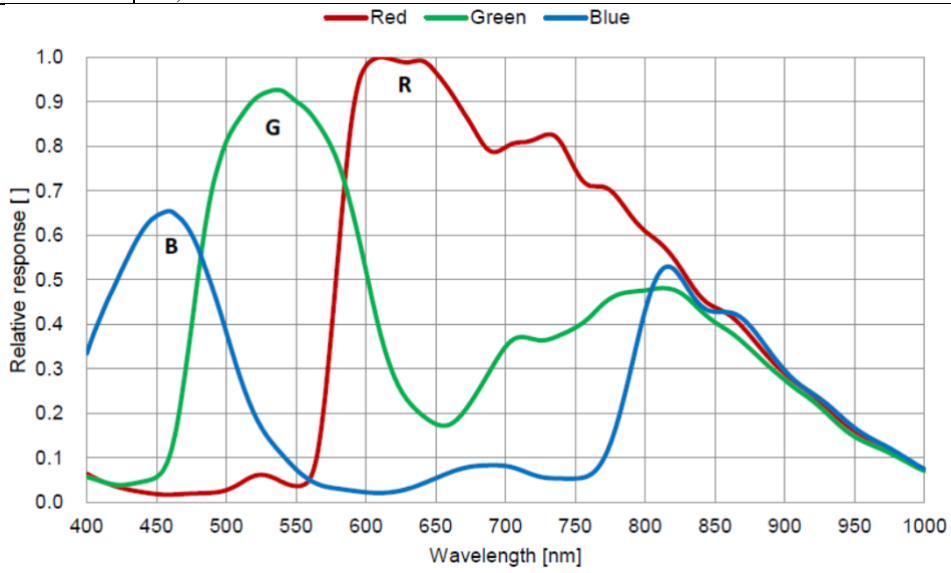


Figure 8-6 I3ISPM03100KPA spectral response curve

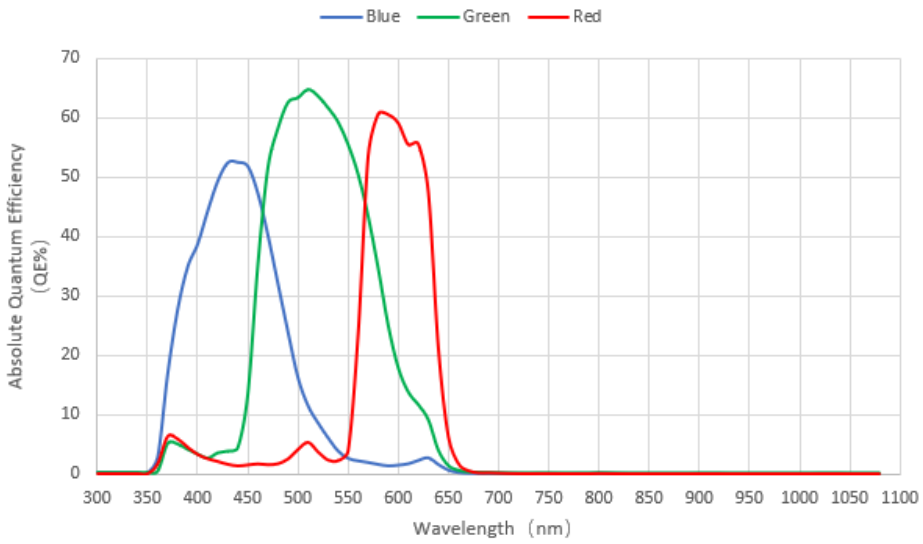


Figure 8-7 I3ISPM03100KPA absolute quantum efficiency

8.6 I3ISPM03100KPB(33mm)

Table 8-6 I3ISPM03100KPB camera specifications

Parameter \ Model	I3ISPM03100KPB
	3.1M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX265LQR
Pixel size	3.45 μm×3.45 μm
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	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℃, storage temperature30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

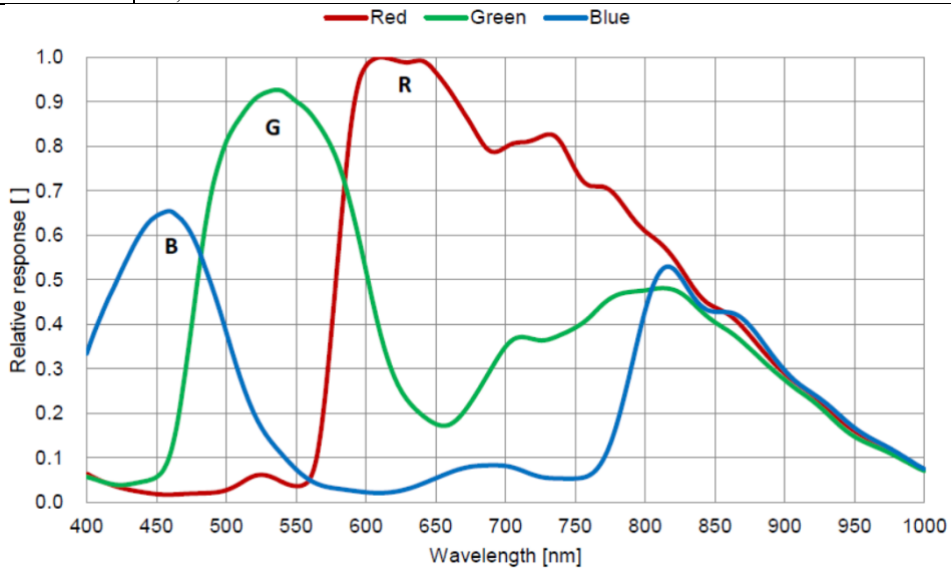


Figure 8-8 I3ISPM03100KPB spectral response curve

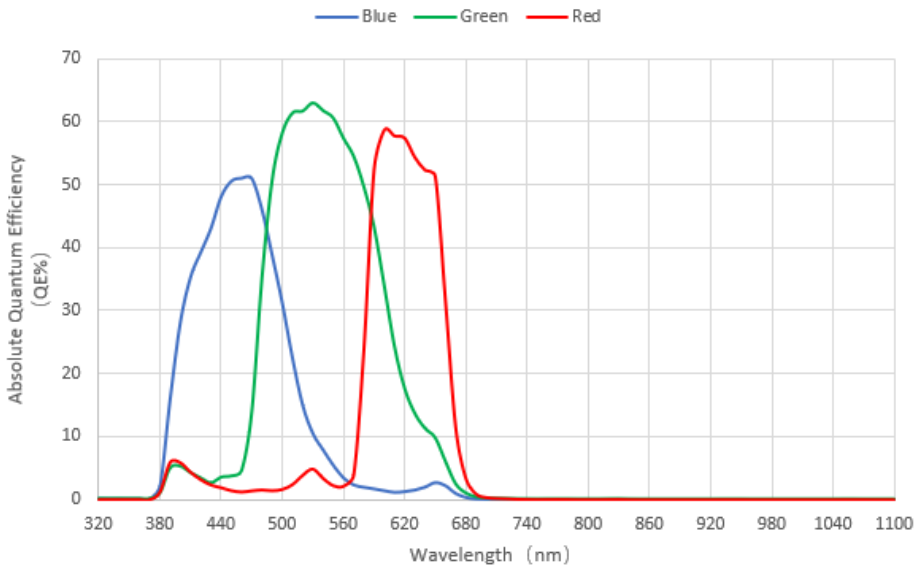


Figure 8-9 I3ISPM03100KPB absolute quantum efficiency

8.7 I3ISPM04100KPA(33mm, 20240313)

Table 8-7 I3ISPM04100KPA camera specifications

Parameter \ Model	I3ISPM04100KPA
	4.1M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX664-AAQR1
Pixel size	2.9 μm × 2.9 μm
Sensor size	1/1.8"
Frame rate	90fps@2688×1520
Dynamic range	TBD
Signal-to-Noise ratio	TBD
Sensitivity	5970mV
Dark current	0.13mV
Gain range	1x-50x
Exposure time	15μs-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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

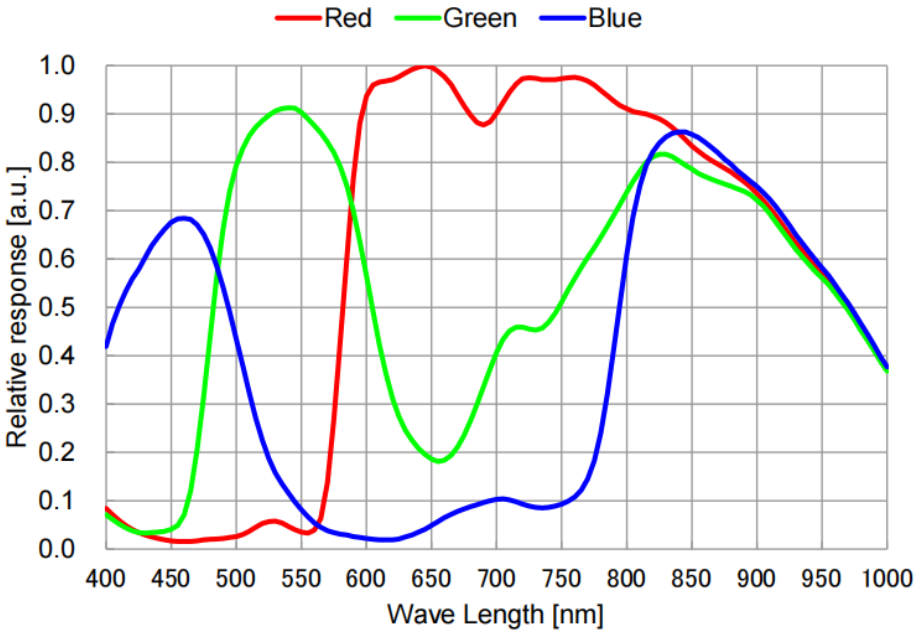


Figure 8-10 I3ISPM04100KPA spectral response curve

8.8 I3ISPM05000KPA(33mm)

Table 8-8 I3ISPM05000KPA camera specifications

Parameter \ Model	I3ISPM05000KPA
	5M pixels 2/3" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX250LQR
Pixel size	3.45 μm×3.45 μm
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	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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

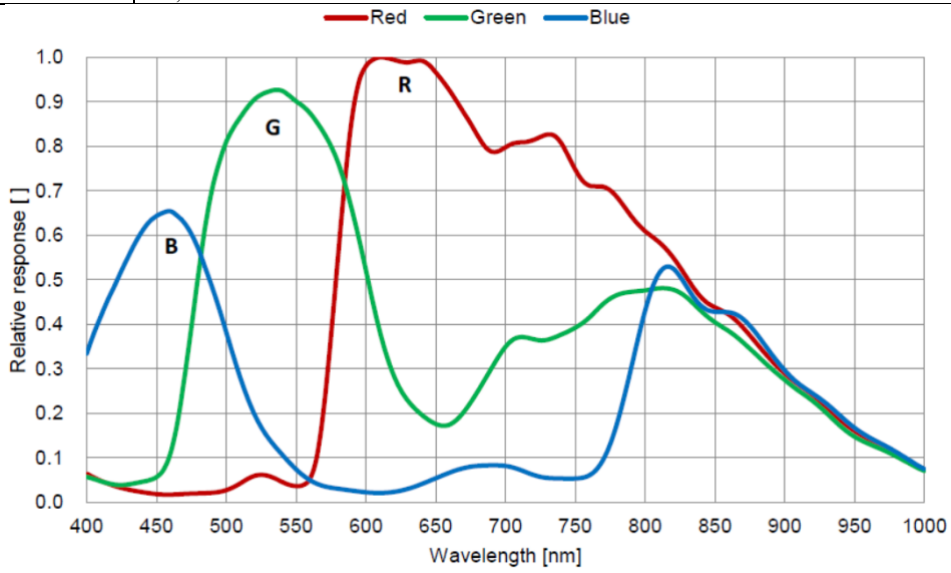


Figure 8-11 I3ISPM05000KPA spectral response curve

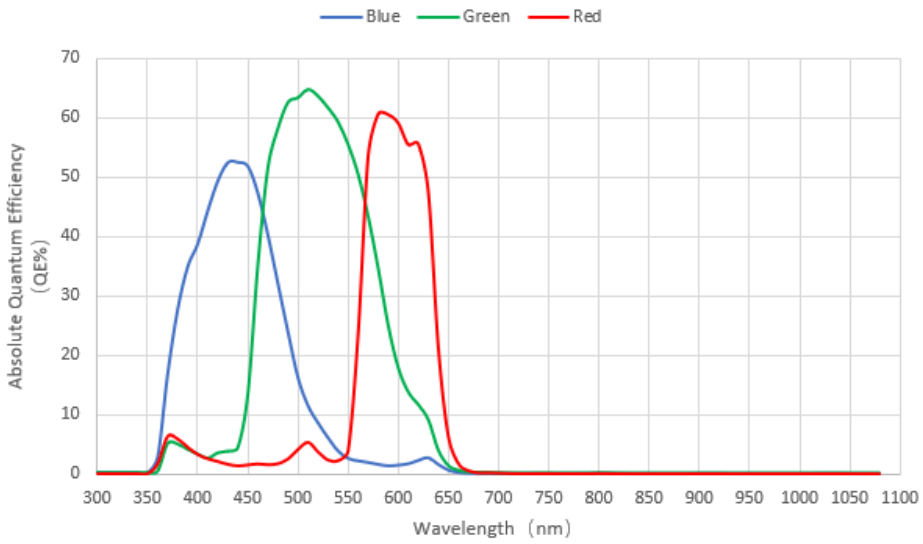


Figure 8-12 I3ISPM05000KPA absolute quantum efficiency

8.9 I3ISPM05000KPB(33mm)

Table 8-9 I3ISPM05000KPB camera specifications

Parameter \ Model	I3ISPM05000KPB
	5M pixels 2/3" CMOS USB3.0 industrial camera
Camera	
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
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	<3.5W
Temperature	Working temperayure-10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

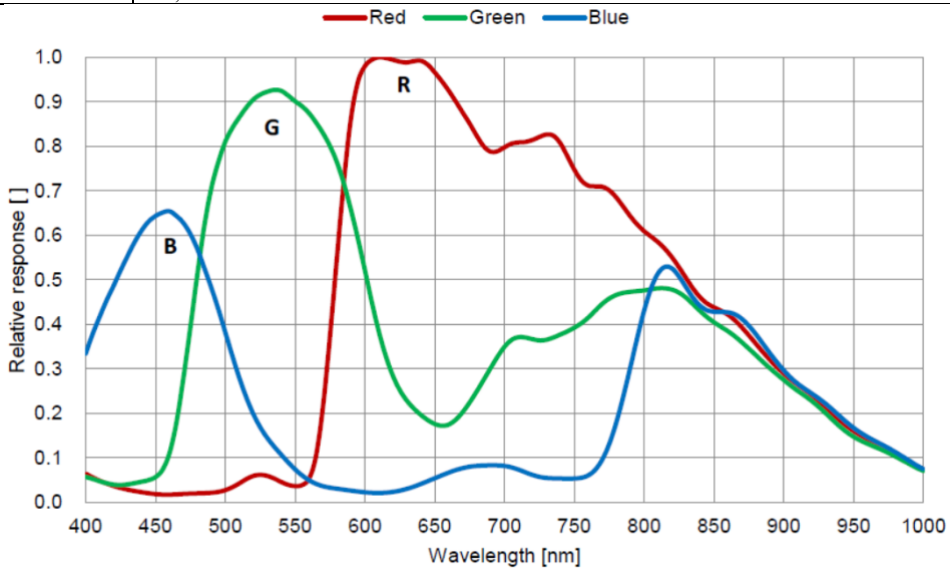


Figure 8-13 I3ISPM05000KPB spectral response curve

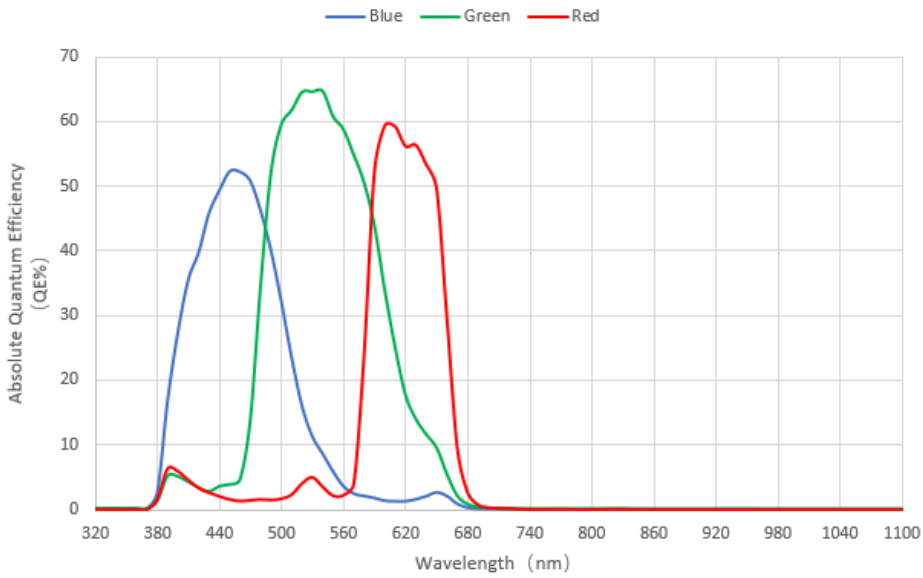


Figure 8-14 I3ISPM05000KPB absolute quantum efficiency

8.10 I3ISPM06300KPA(33mm)

Table 8-10 I3ISPM06300KPA camera specifications

Parameter \ Model	I3ISPM06300KPA
	6.3M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX178LQJ
Pixel size	2.4 μm×2.4 μm
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	17μs-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 temperayure-10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

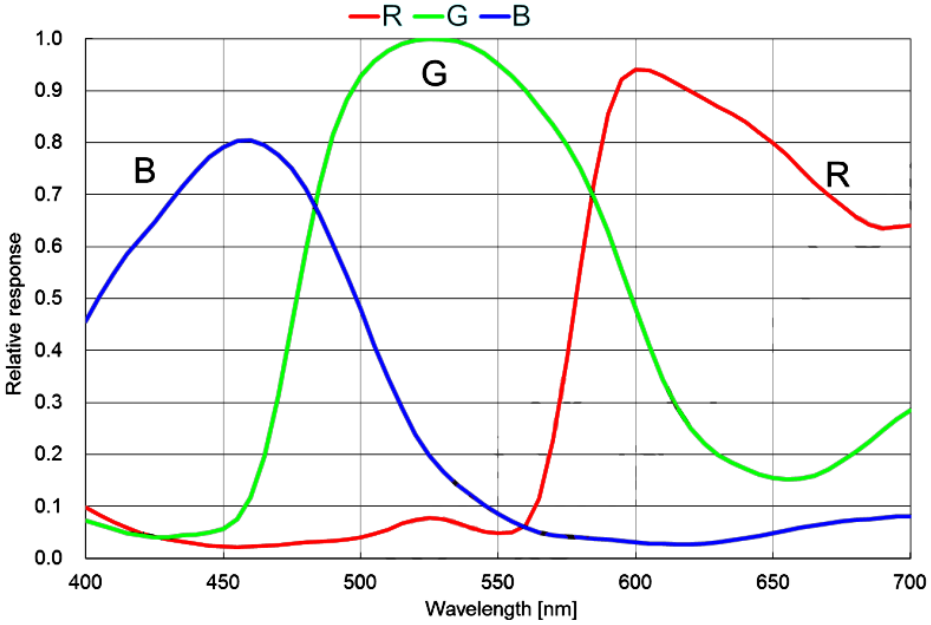


Figure 8-15 I3ISPM06300KPA spectral response curve

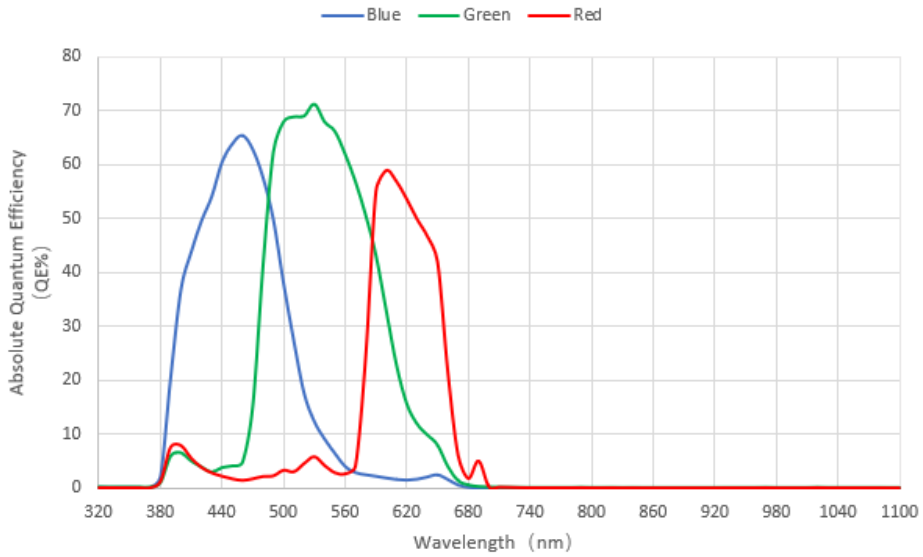


Figure 8-16 I3ISPM06300KPA absolute quantum efficiency

8.11 I3ISPM12000KPA(33mm)

Table 8-11 I3ISPM12000KPA camera specifications

Parameter \ Model	I3ISPM12000KPA
	12M pixels 1/1.7" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX226CQJ
Pixel size	1.85 μm x 1.85 μm
Sensor size	1/1.7"
Frame rate	
Dynamic range	
Signal-to-Noise ratio	
Sensitivity	3637mV
Dark current	0.5mV
Gain range	1x-50x
Exposure time	400μs-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 temperayure-10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

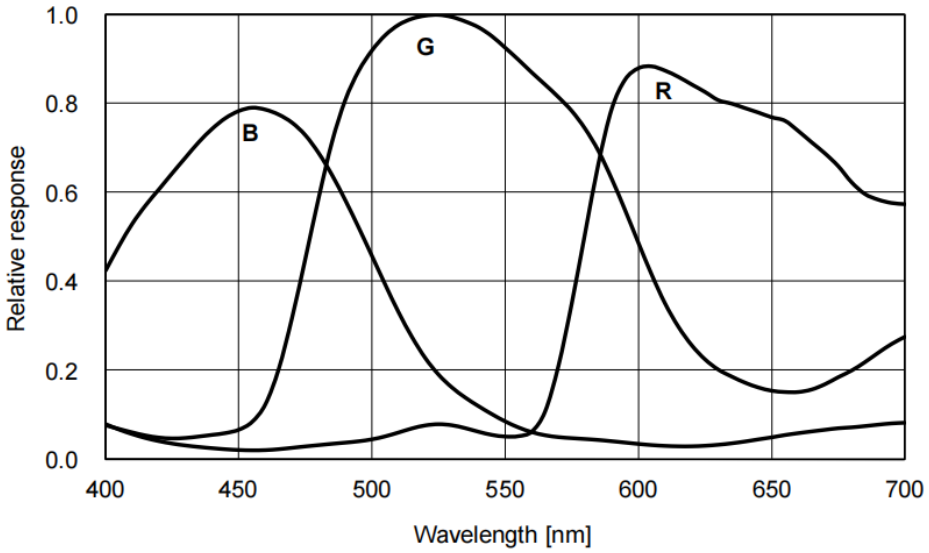


Figure 8-17 I3ISPM12000KPA spectral response curve

8.12 I3ISPM12000KPB(33mm)

Table 8-12 I3ISPM12000KPB camera specifications

Parameter \ Model	I3ISPM12000KPB
	12M pixels 1/1.6" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX676-AACR
Pixel size	2.0 μm x 2.0 μm
Sensor size	1/1.6"
Frame rate	
Dynamic range	
Signal-to-Noise ratio	
Sensitivity	280mV
Dark current	0.1mV
Gain range	1x-50x
Exposure time	13μs-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 temperayure-10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

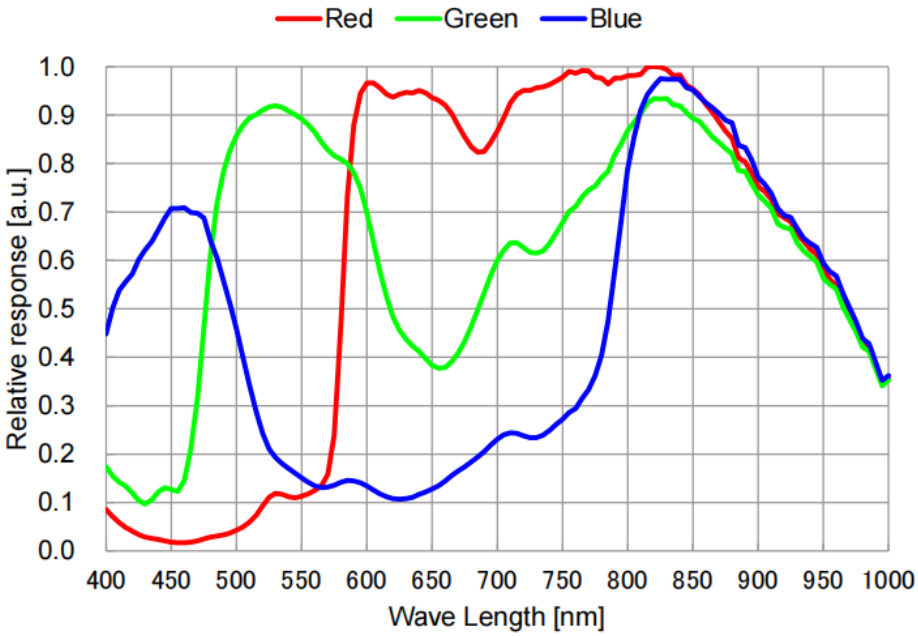


Figure 8-18 I3ISPM12000KPB spectral response curve

8.13 I3ISPM01700KPA(38mm)

Table 8-13 I3ISPM01700KPA camera specifications

Parameter \ Model	I3ISPM01700KPA
	1.7M pixels 1.1" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX432LQJ
Pixel size	9.0 μm x 9.0 μm
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	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
Power consumption	2.4W
Temperature	Working temperature -10~50℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	228g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

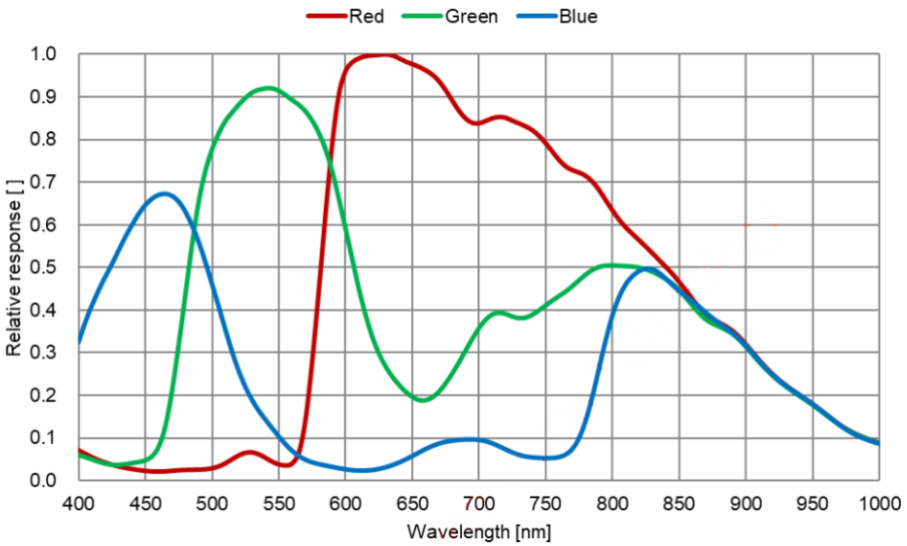


Figure 8-19 I3ISPM01700KPA spectral response curve

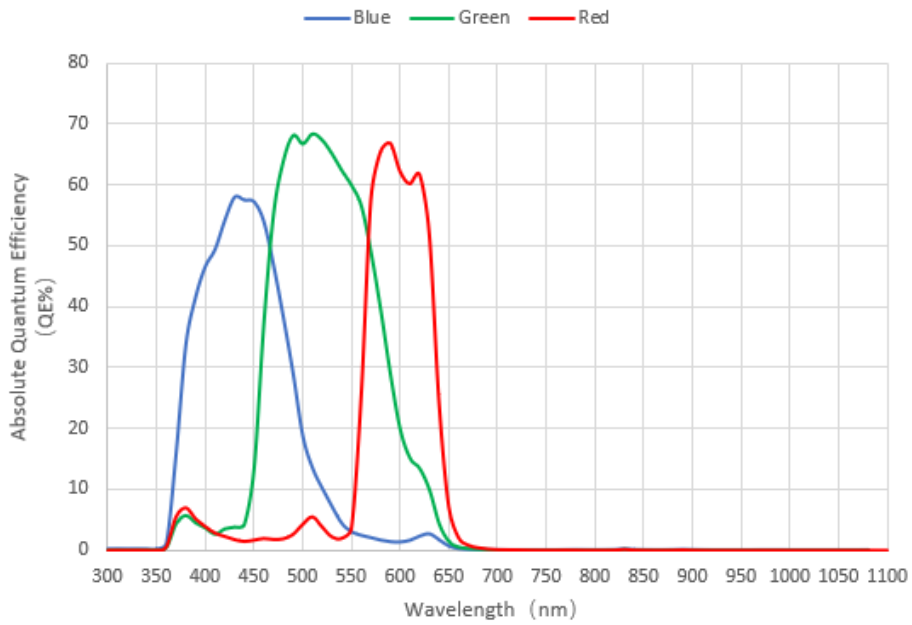


Figure 8-20 I3ISPM01700KPA absolute quantum efficiency

8.14 I3ISPM01700KPB(38mm, 20230825)

Table 8-14 I3ISPM01700KPB camera specifications

Parameter \ Model	I3ISPM01700KPB
	1.7M pixels 1.1" CMOS USB3.0industrial camera
Camera	
Sensor model	Sony IMX425LQJ
Pixel size	9.0 μm x 9.0 μm
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	6μs-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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	38mm×38mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

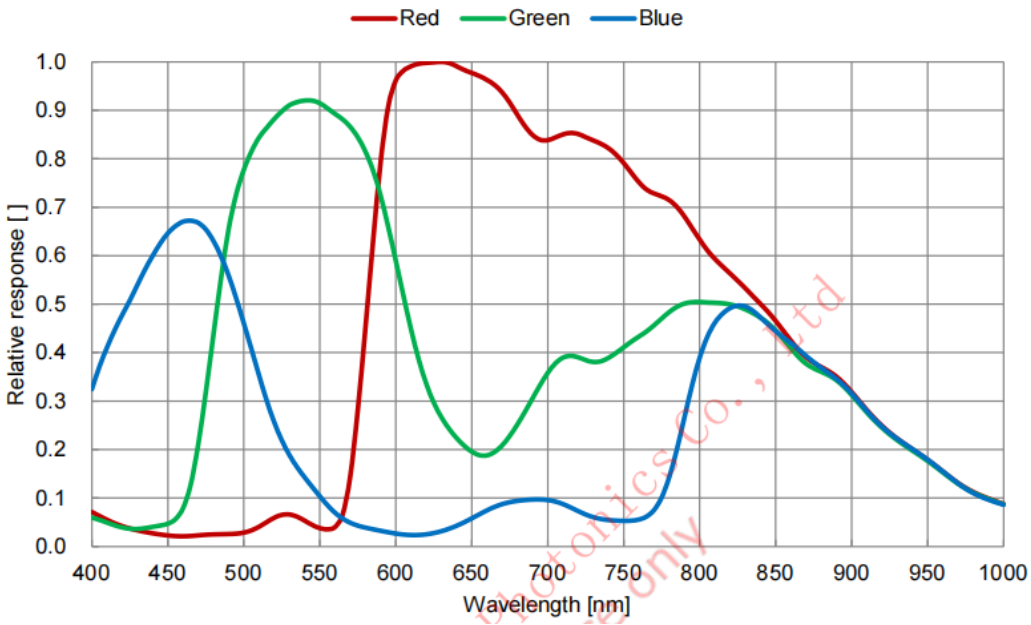


Figure 8-21 I3ISPM01700KPB spectral response curve

8.15 I3ISPM02000KPA(38mm, 20240313)

Table 8-15 I3ISPM02000KPA camera specifications

Parameter \ Model	I3ISPM02000KPA
	2.0M pixels 1/1. 7" CMOS USB3.0 industrial camera
Camera	
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, two 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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

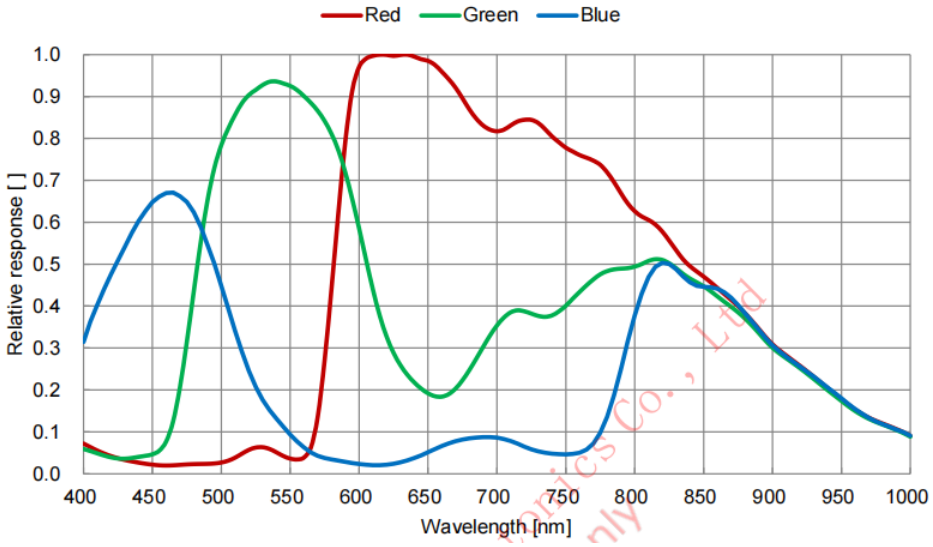


Figure 8-22 I3ISPM02000KPA spectral response curve

8.16 I3ISPM02800KPA(38mm)

Table 8-16 I3ISPM02800KPA camera specifications

Parameter \ Model	I3ISPM02800KPA
	2.8M pixels 2/3" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX421LQJ
Pixel size	4.5 μm x 4.5 μm
Sensor size	2/3"
Frame rate	121fps@1936 × 1464, 425fps@968 × 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	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, two 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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

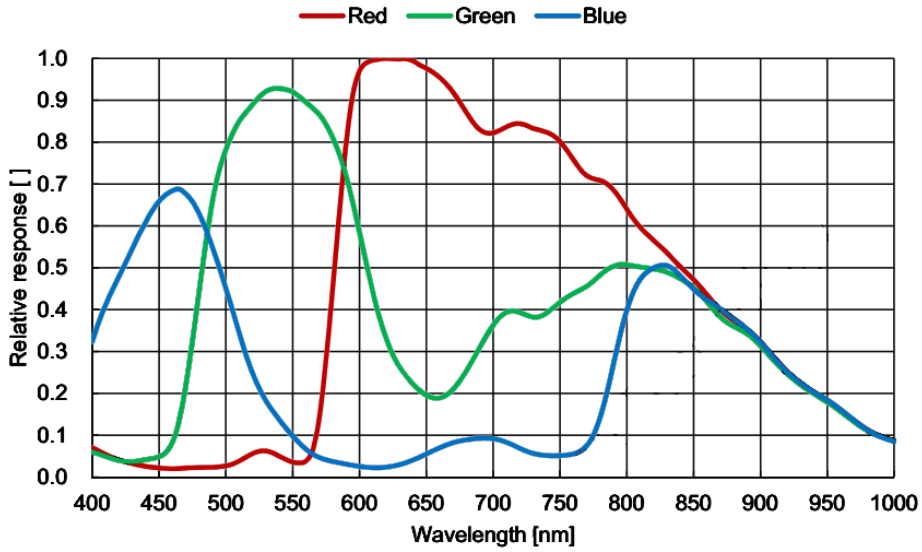


Figure 8-23 I3ISPM02800KPA spectral response curve

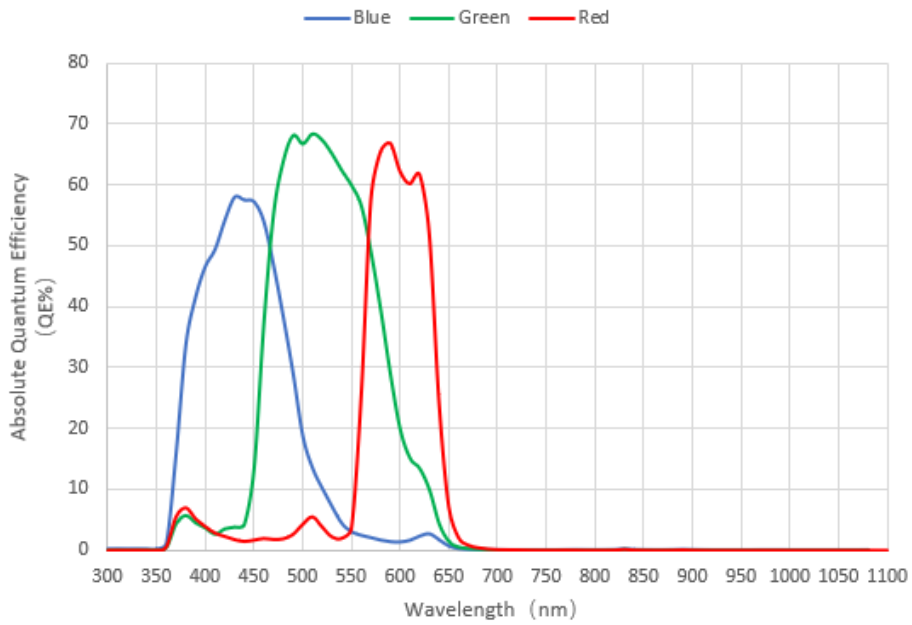


Figure 8-24 I3ISPM02800KPA absolute quantum efficiency

8.17 I3ISPM07100KPA(38mm)

Table 8-17 I3ISPM07100KPA camera specifications

Parameter \ Model	I3ISPM07100KPA
	7.1M pixels 1.1" CMOS USB3.0 industrial camera
Camera	
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
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	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, two 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℃, storage temperature 30~70℃
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

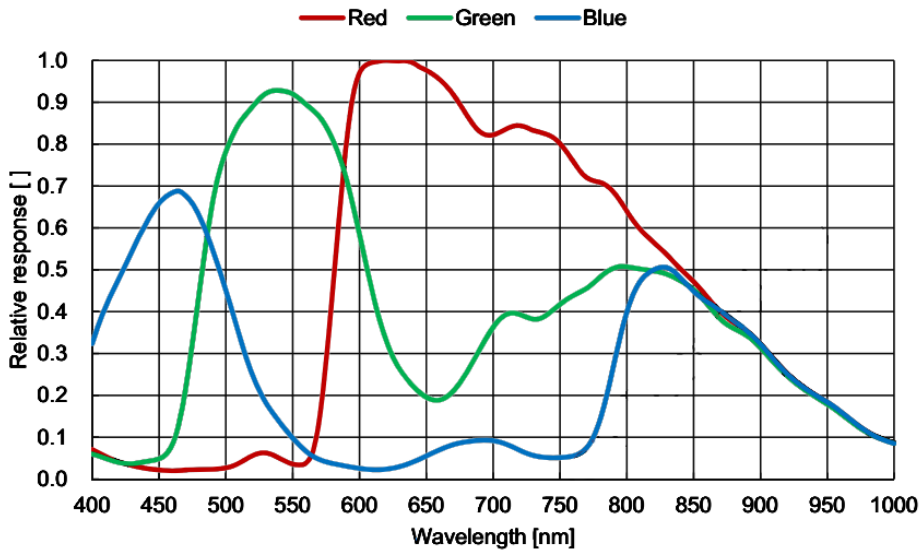


Figure 8-25 I3ISPM07100KPA spectral response curve

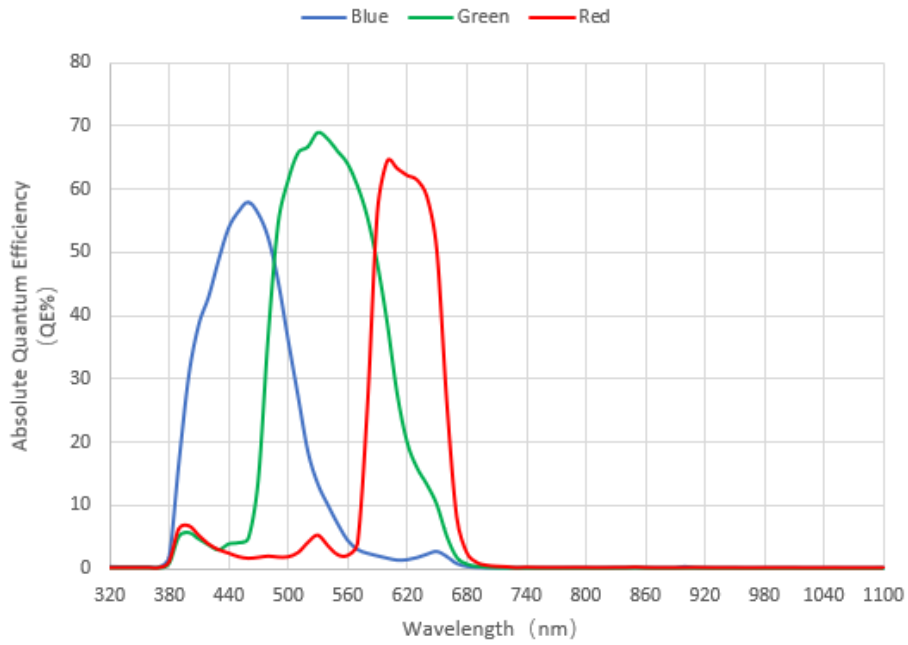


Figure 8-26 I3ISPM07100KPA absolute quantum efficiency

8.18 I3ISPM12300KPA(38mm, 20231019)

Table 8-18 I3ISPM12300KPA camera specifications

Parameter \ Model	I3ISPM12300KPA
	12.3M pixels 1.1" CMOS USB3.0 industrial camera
Camera	
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	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, two 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℃, storage temperature 30~70℃
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

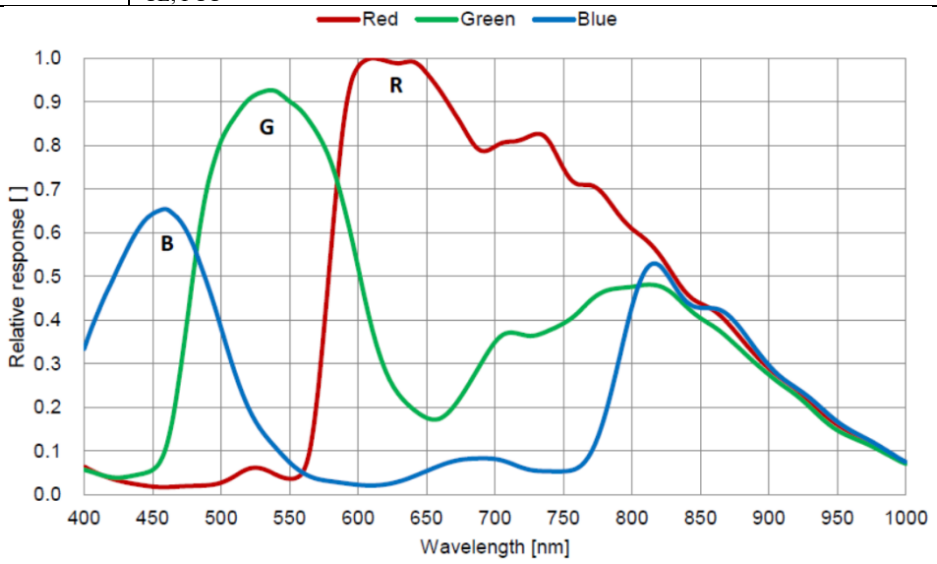


Figure 8-27 I3ISPM12300KPA spectral response curve

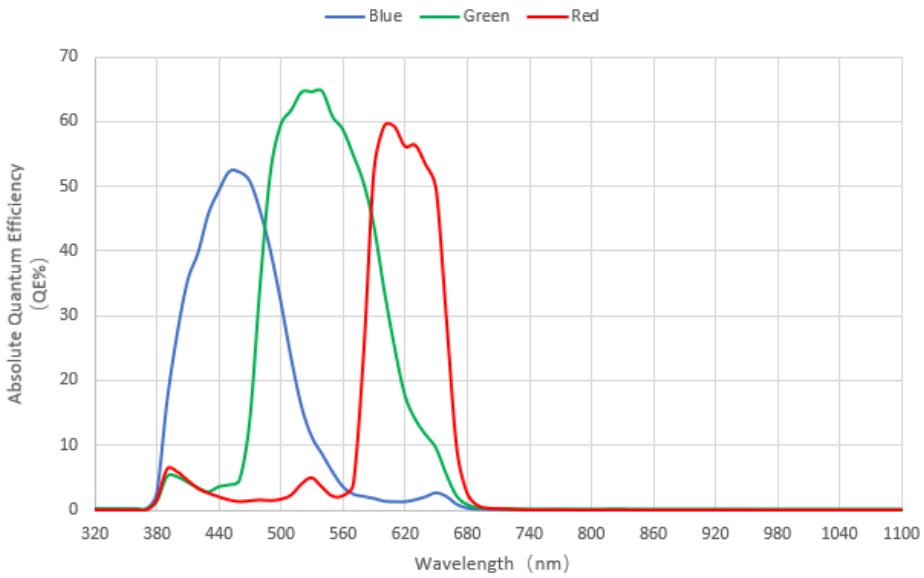


Figure 8-28 I3ISPM12300KPA absolute quantum efficiency

8.19 I3CMOS00500KMA(33mm)

Table 8-19 I3CMOS00500KMA camera specifications

Parameter \ Model	I3CMOS00500KMA
	0.5M pixel 1 / 1.7 "CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX433LLJ
Pixel size	9.0 μm×9.0 μm
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	6μs-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℃; Storage temperature -30~70℃
Humidity	20% - 80% No condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

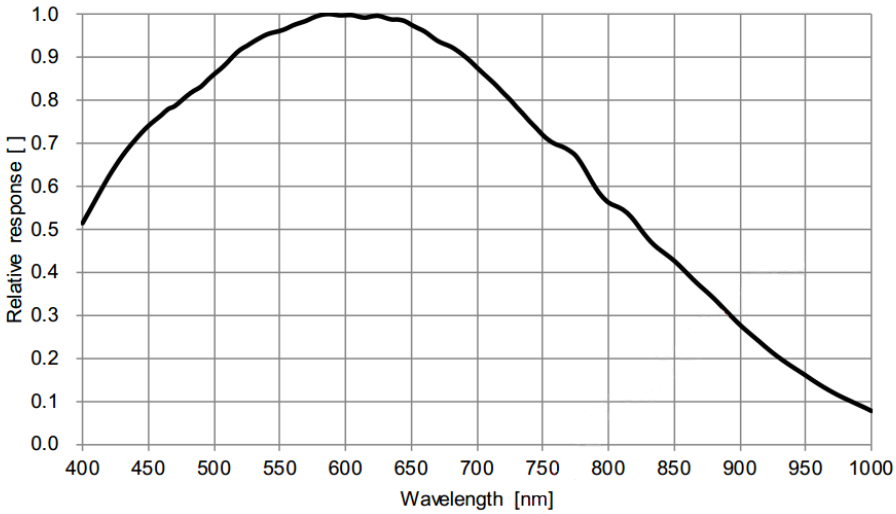


Figure 8-29 I3CMOS00500KMA spectral response curve

8.20 I3CMOS01500KMA(33mm)

Table 8-20 I3CMOS01500KMA camera specifications

Parameter \ Model	I3CMOS01500KMA
	1.5M pixels 1/2.9" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX273LLR
Pixel size	3.45 μm×3.45 μm
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	15μs-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℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

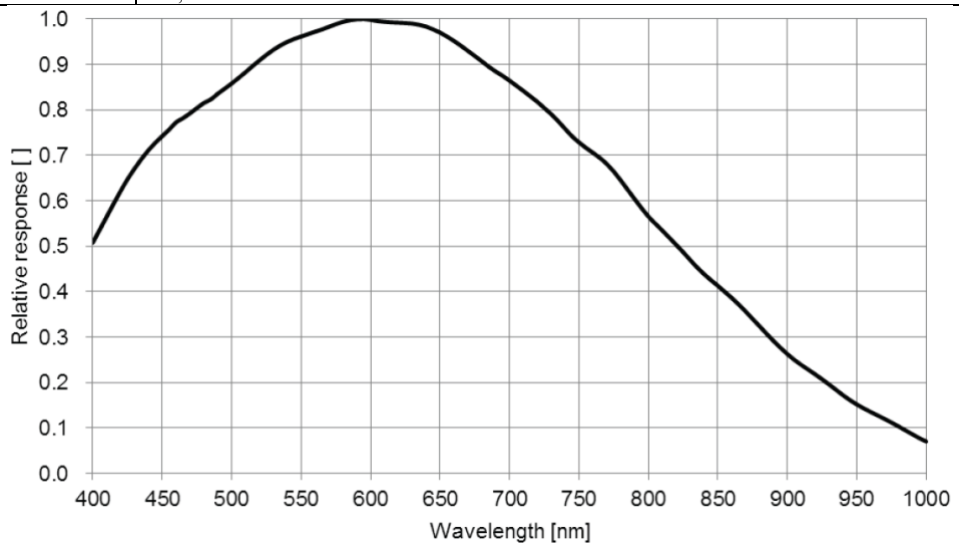


Figure 8-30 I3CMOS01500KMA spectral response curve

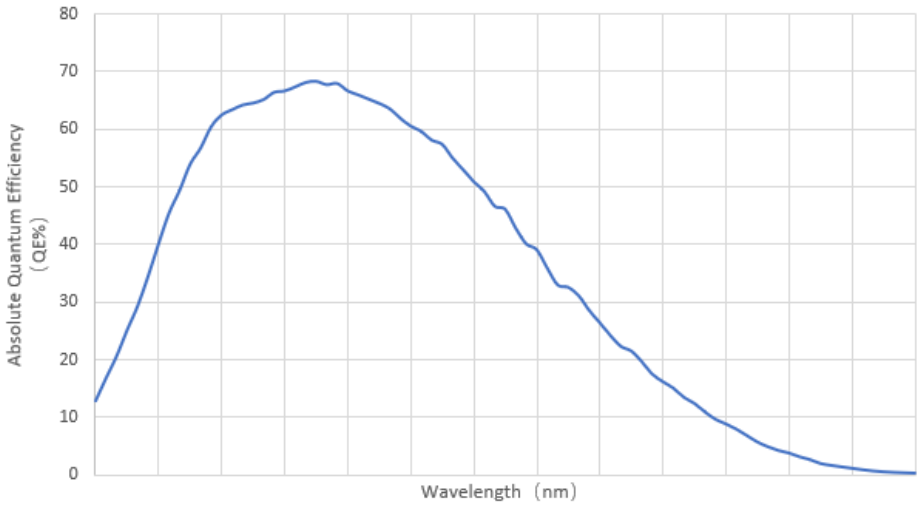


Figure 8-31 I3CMOS01500KMA absolute quantum efficiency

8.21 I3CMOS02300KMA(33mm)

Table 8-21 I3CMOS02300KMA camera specifications

Parameter \ Model	I3CMOS02300KMA
	2.3M pixels 1/1.2" CMOS USB3.0 industrial camera
Camera	
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
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	15μs-15sec
Shutter	Global shutter
Binning	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℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

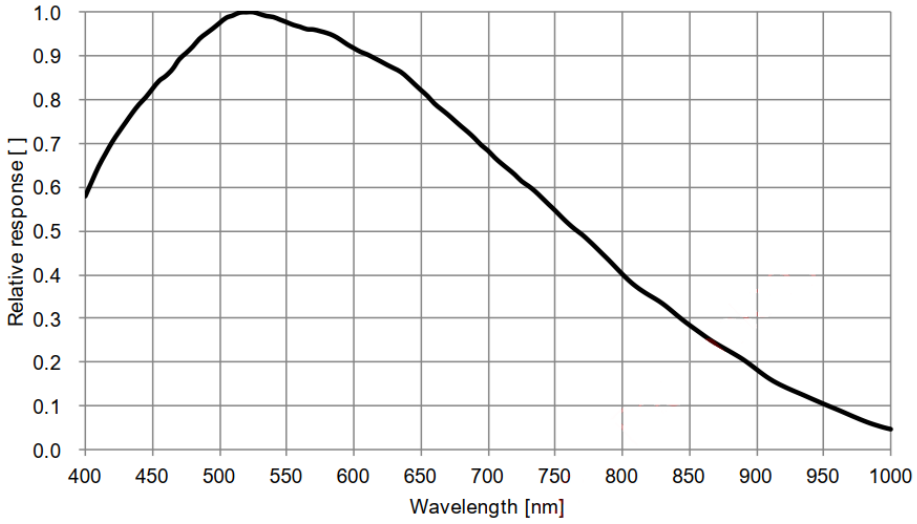


Figure 8-32 I3CMOS02300KMA spectral response curve

8.22 I3CMOS02300KMB(33mm)

Table 8-22 I3CMOS02300KMB camera specifications

Parameter \ Model	I3CMOS02300KMB
	2.3M pixels 1/1.2" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX249LLJ
Pixel size	5.86 μm x 5.86 μm
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	42μs-15sec
Shutter	Global shutter
Binning	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℃, storage temperature -30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

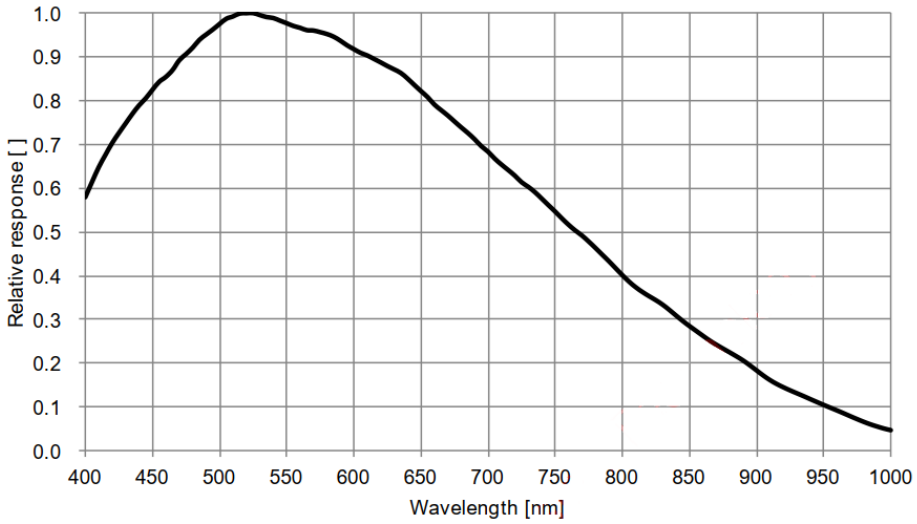


Figure 8-33 I3CMOS02300KMB spectral response curve

8.23 I3CMOS03100KMA(33mm)

Table 8-23 I3CMOS03100KMA camera specifications

Parameter \ Model	I3CMOS03100KMA
	3.1M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera	
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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

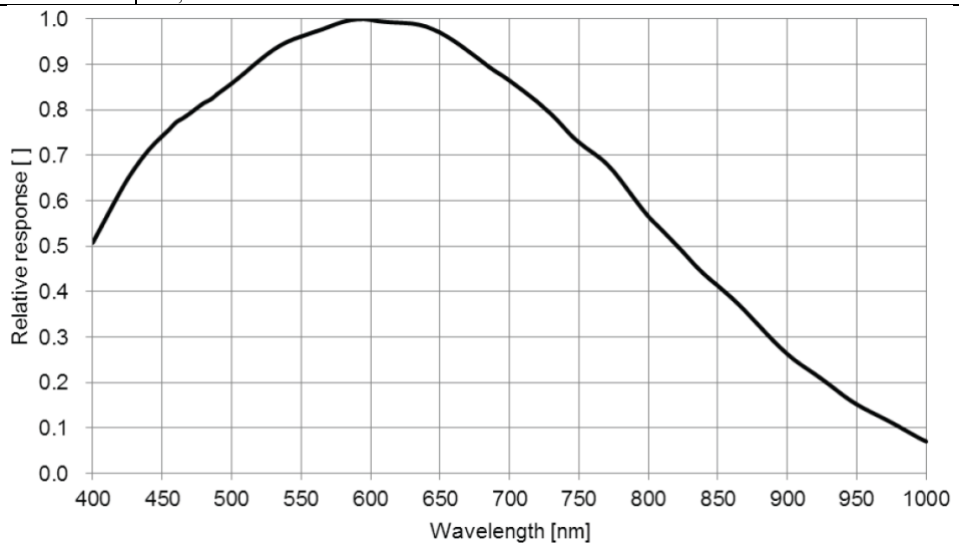


Figure 8-34 I3CMOS03100KMA spectral response curve

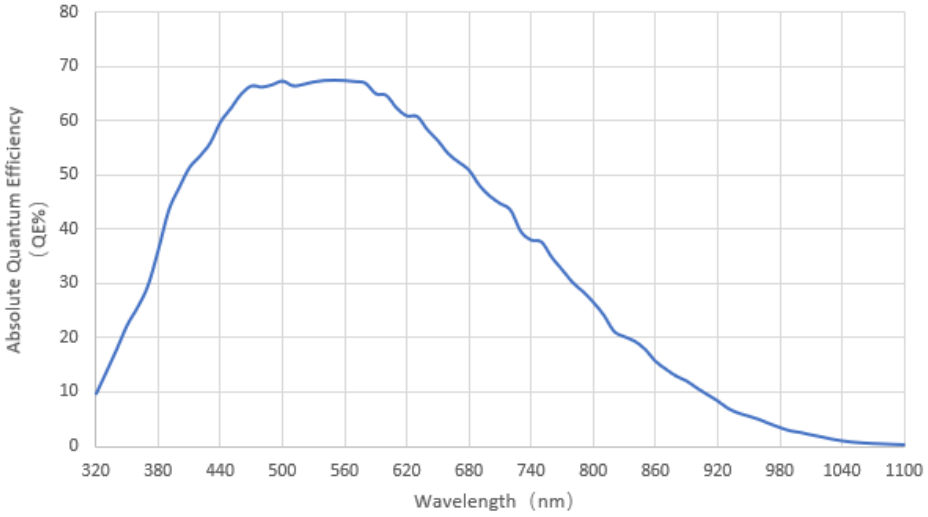


Figure 8-35 I3CMOS03100KMA absolute quantum efficiency

8.24 I3CMOS03100KMB(33mm)

Table 8-24 I3CMOS03100KMB camera specifications

Parameter \ Model	I3CMOS03100KMB
	3.1M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera	
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
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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

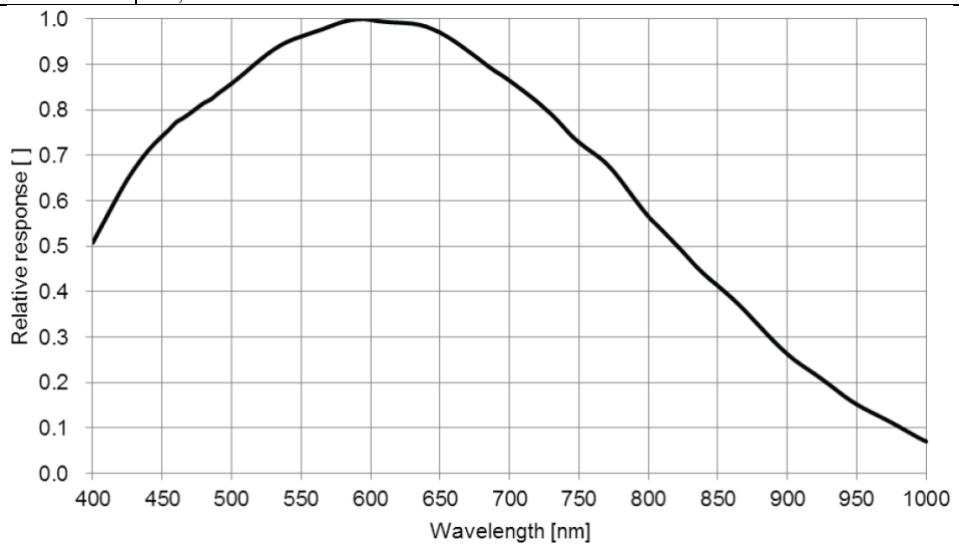


Figure 8-36 I3CMOS03100KMB spectral response curve

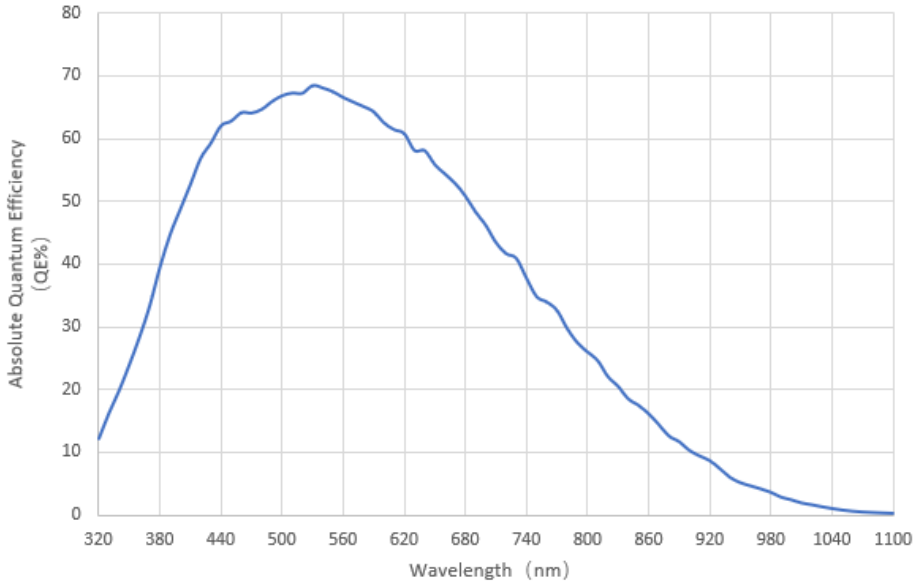


Figure 8-37 I3CMOS03100KMB absolute quantum efficiency

8.25 I3CMOS04100KMA(33mm, 20240313)

Table 8-25 I3CMOS04100KMA camera specifications

Parameter \ Model	I3CMOS04100KMA
	4.1M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX664-AAMR1
Pixel size	2.9 μm × 2.9 μm
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	15μs-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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

8.26 I3CMOS05000KMA(33mm)

Table 8-26 I3CMOS05000KMA camera specifications

Parameter \ Model	I3CMOS05000KMA
	5M pixels 2/3" CMOS USB3.0 industrial camera
Camera	
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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

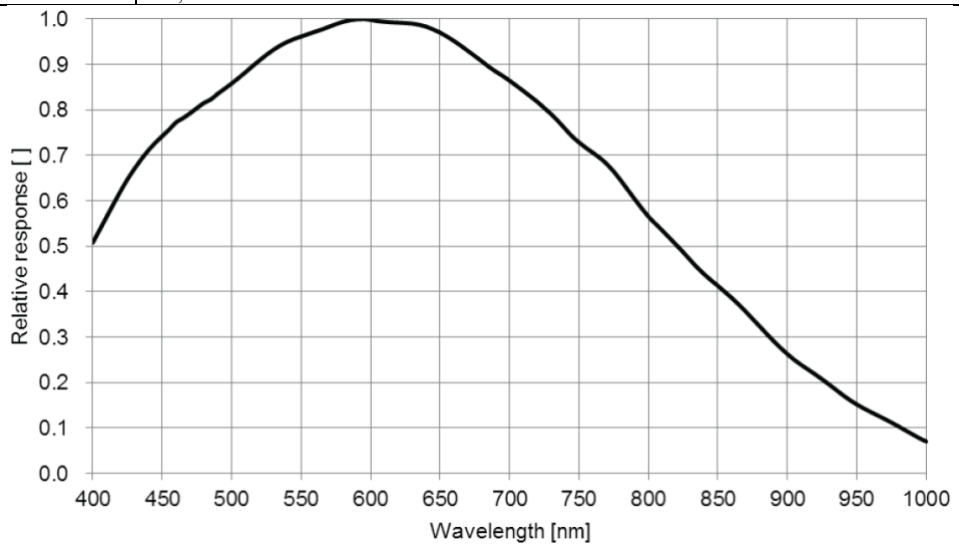


Figure 8-38 I3CMOS05000KMA spectral response curve

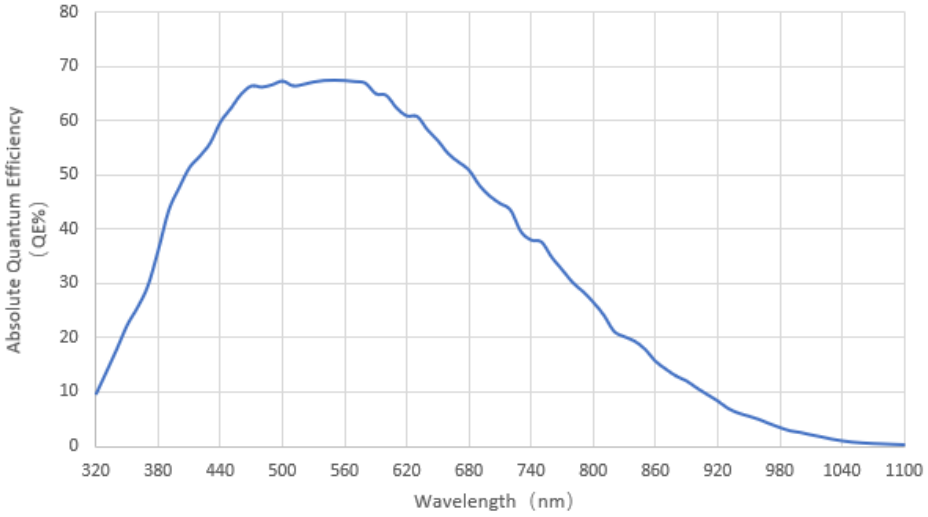


Figure 8-39 I3CMOS05000KMA absolute quantum efficiency

8.27 I3CMOS05000KMB(33mm)

Table 8-27 I3CMOS05000KMB camera specifications

Parameter \ Model	I3CMOS05000KMB
	5M pixels 2/3" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX264LLR
Pixel size	3.45 μm×3.45 μm
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	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℃, storage temperature 30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

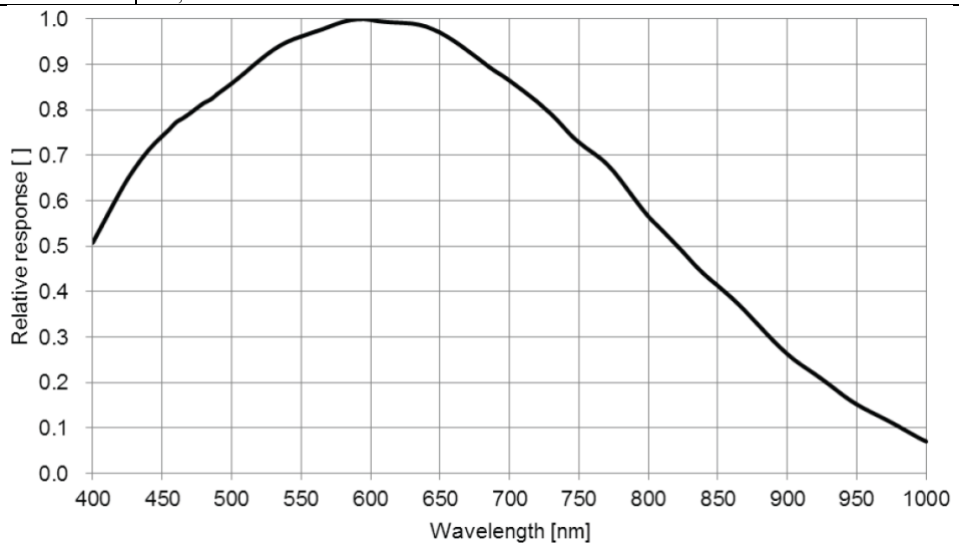


Figure 8-40 I3CMOS05000KMB spectral response curve

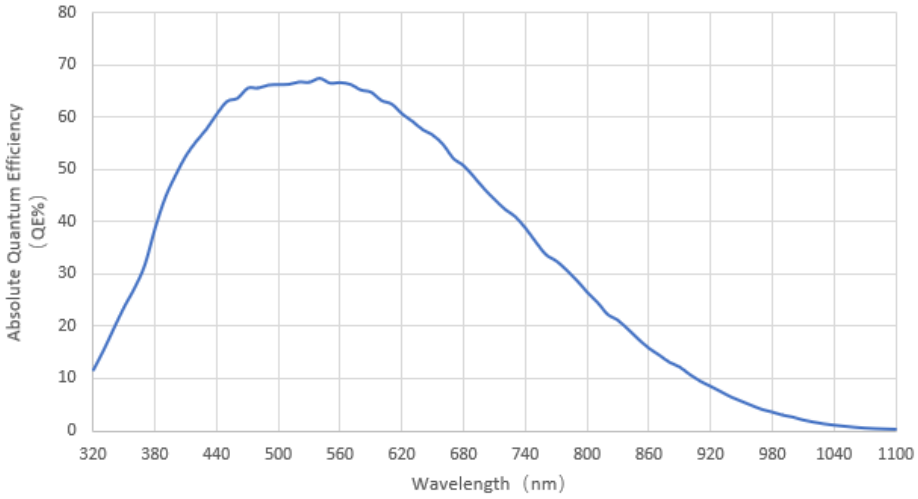


Figure 8-41 I3CMOS05000KMB absolute quantum efficiency

8.28 I3CMOS05000KMC(Polarsens, 33mm)

Table 8-28 I3CMOS05000KMC camera specifications

Parameter \ Model	I3CMOS05000KMC
	5M pixels 2/3" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX250MZR（Polarsens）
Pixel size	3.45 μm×3.45 μm
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	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℃, storage temperature 30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

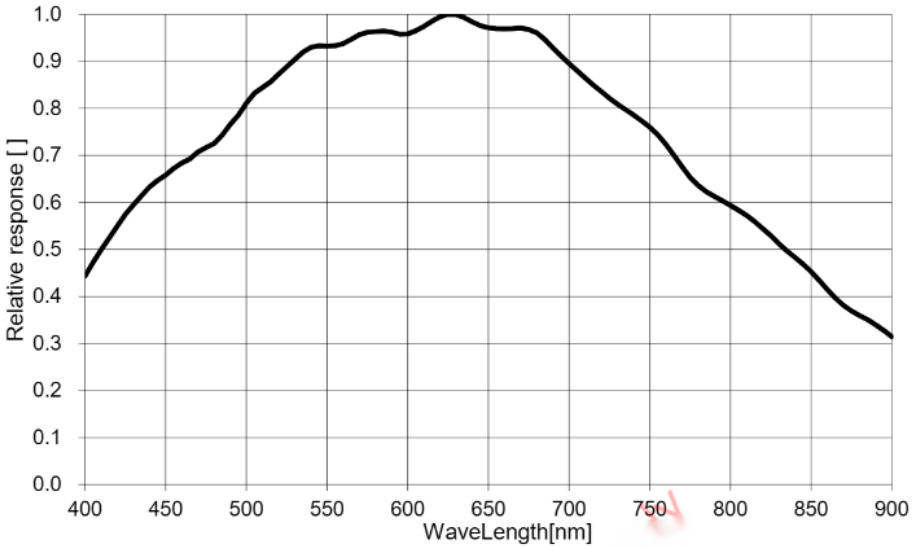


Figure 8-42 I3CMOS05000KMB spectral response curve

The four-directional Polarizations of this image sensor are arranged to get transmitted litght 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 successsively.

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

Figure 8-43 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 8-44 Comparison of plastic surface effects between ordinary camera (left) and polarizing camera (right)

Figure 8-45 Plastic surface detail comparison

Figure 8-46 Ordinary camera (left) compared with polarizing camera (right) metal surface effect

8.29 I3CMOS06300KMA(33mm)

Table 8-29 I3CMOS06300KMA camera specifications

Parameter \ Model	I3CMOS06300KMA
	6.3M pixels 1/1.8" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX178LLJ
Pixel size	2.4 μm×2.4 μm
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	17μs-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℃, storage temperature 30~70℃
Humidity	20%-80%, no condensation
Size	33mm×33mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

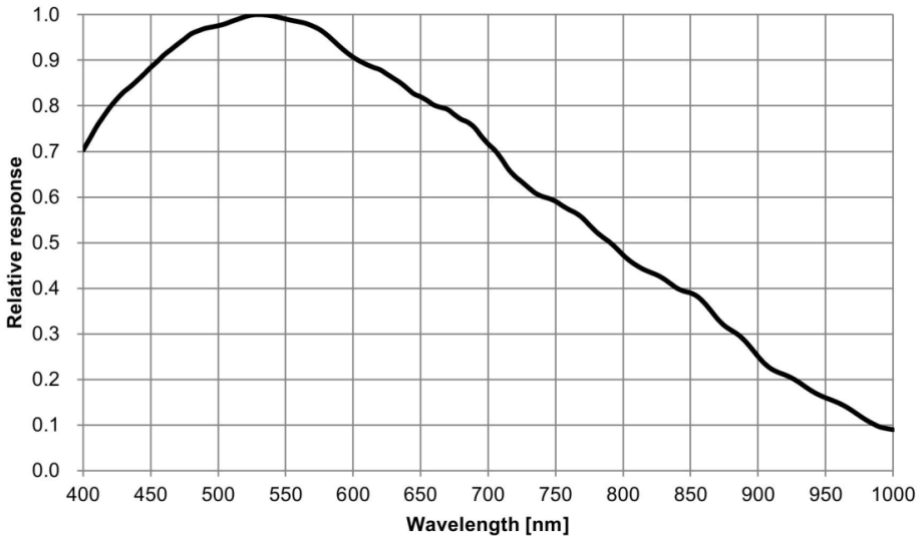


Figure 8-47 I3CMOS06300KMA spectral response curve

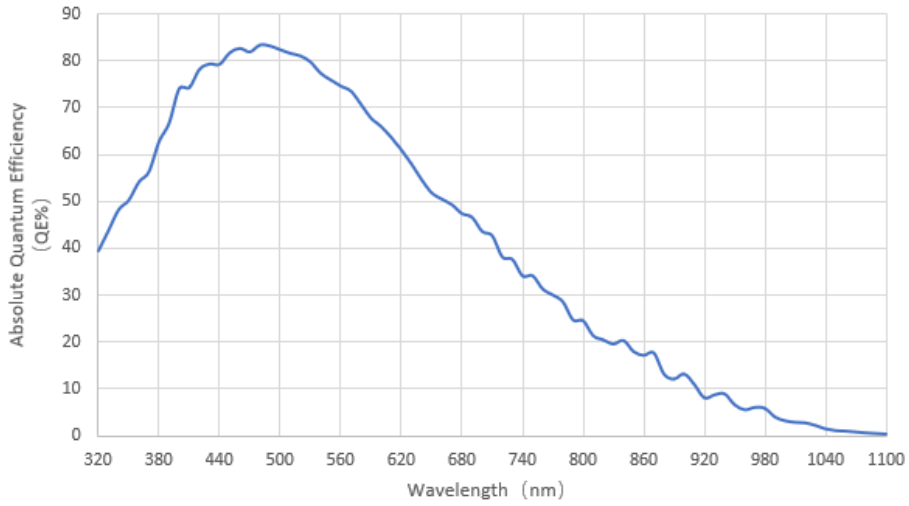


Figure 8-48 I3CMOS06300KMA absolute quantum efficiency

8.30 I3CMOS01300KMA(38mm, 20240508)

Table 8-30 I3CMOS01300KMA camera specifications

Parameter \ Model	I3CMOS01300KMA
	1.3M pixel 1 "CMOS USB3.0 industrial camera
Camera	
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	$2.57x10^{8}$(e-/((W/m2).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℃; Storage temperature -30~70℃
Humidity	20% - 80% No condensation
Size	38mmx38mmx33mm
Weight	228g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

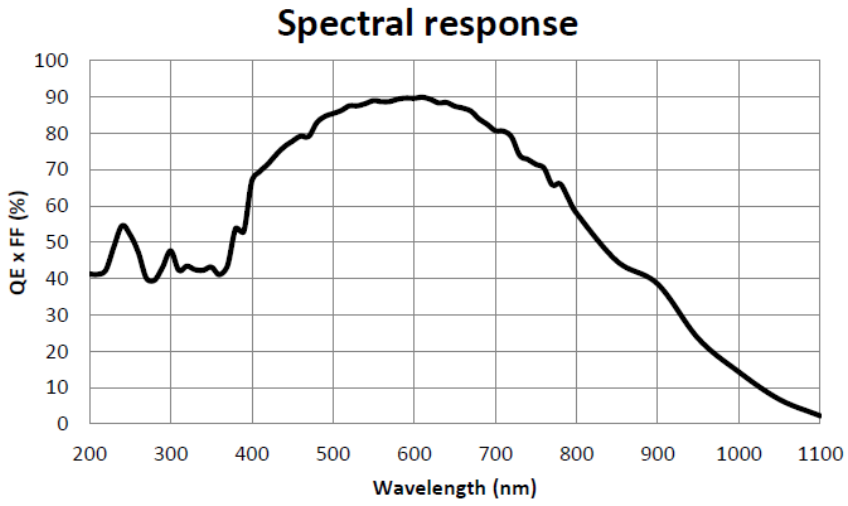


Figure 8-49 I3CMOS01300KMA spectral response curve

8.31 I3CMOS01700KMA(38mm)

Table 8-31 I3CMOS01700KMA camera specifications

Parameter \ Model	I3CMOS01700KMA
	1.7M pixel 1.1 "CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX432LLJ
Pixel size	9.0 μm x 9.0 μm
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	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, 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℃; Storage temperature -30~70℃
Humidity	20% - 80% No condensation
Size	38mmx38mmx33mm
Weight	228g
Lens mount	C-mount
Software	ToupView/SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

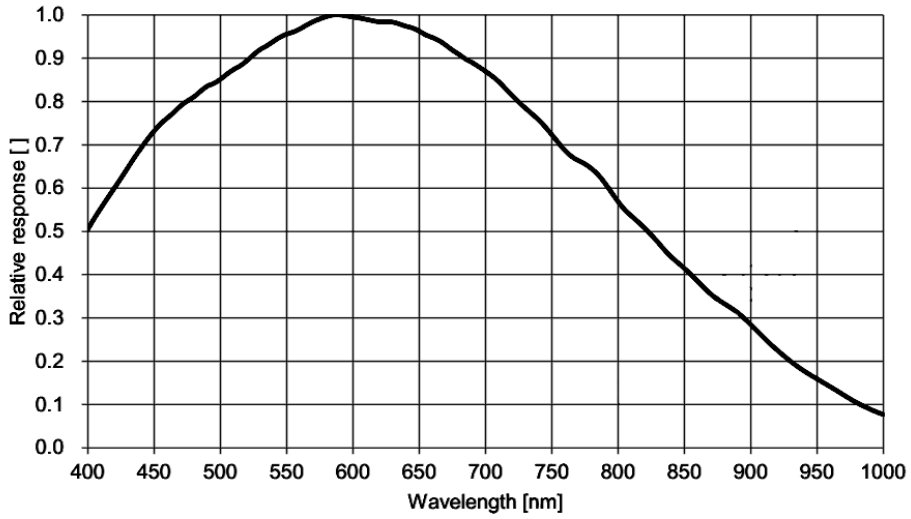


Figure 8-50 I3CMOS01700KMA spectral response curve

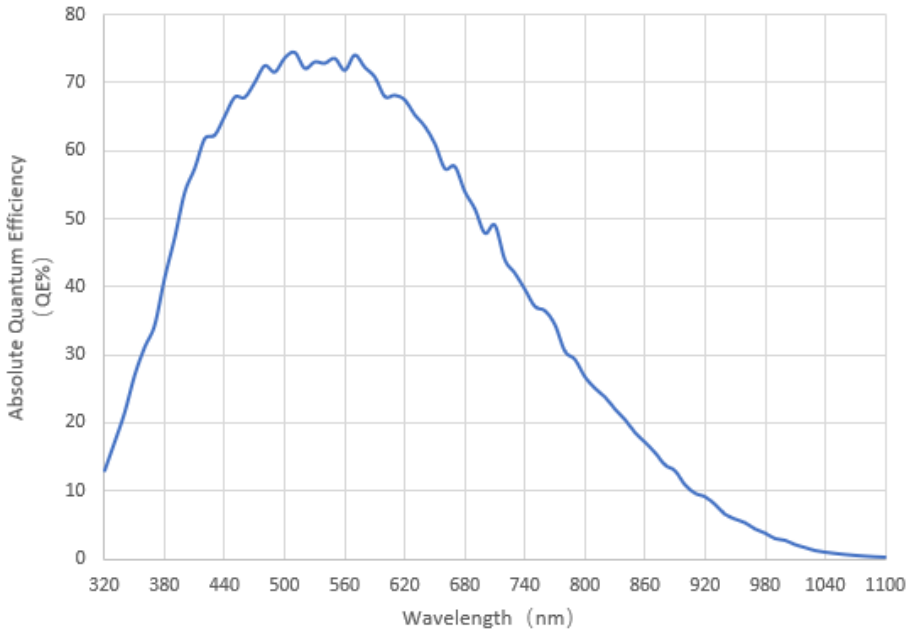


Figure 8-51 I3CMOS01700KMA absolute quantum efficiency

8.32 I3CMOS01700KMB(38mm, 20231019)

Table 8-32 I3CMOS01700KMB camera specifications

Parameter \ Model	I3CMOS01700KMB
	1.7M pixels 1.1" CMOS USB3.0industrial camera
Camera	
Sensor model	Sony IMX425LLJ
Pixel size	9.0 μm x 9.0 μm
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	6μs-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	<2.4W
Temperature	Working temperature -10~50℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	38mm×38mm×33mm
Weight	70g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

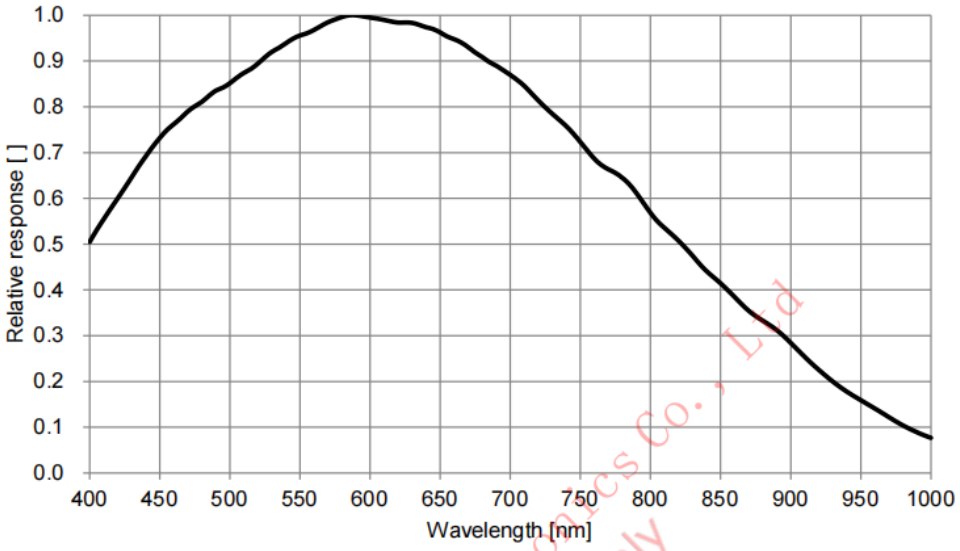


Figure 8-52 I3CMOS01700KMB spectral response curve

8.33 I3CMOS02000KMA(38mm, 20240313)

Table 8-33 I3CMOS02000KMA camera specifications

Parameter \ Model	I3CMOS02000KMA
	2.0M pixels 1/1. 7" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX430LLJ
Pixel size	4.5 μm x4.5 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	3354mV
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, two 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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

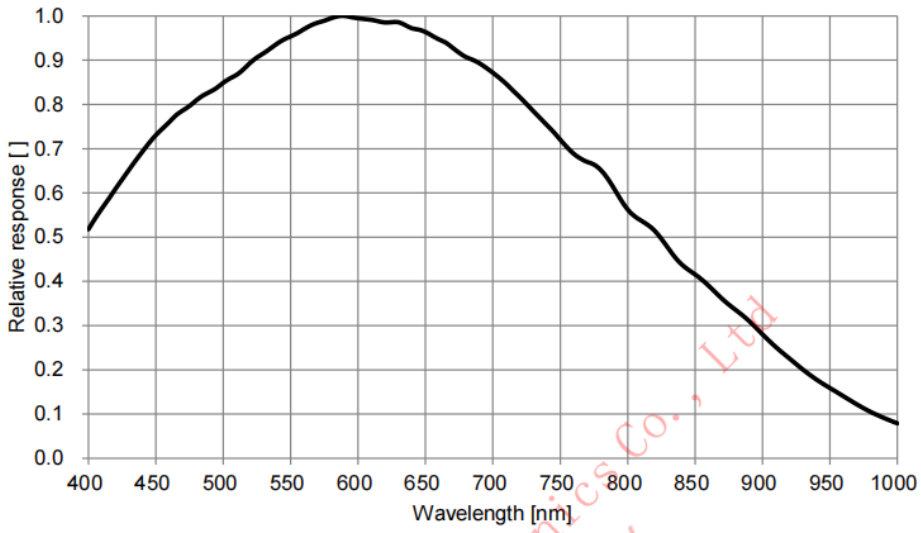


Figure 8-53 I3CMOS02000KMA spectral response curve

8.34 I3CMOS02800KMA(38mm)

Table 8-34 I3CMOS02800KMA camera specifications

Parameter \ Model	I3CMOS02800KMA
	2.8M pixels 2/3" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX421LLJ
Pixel size	4.5 μm x4.5 μm
Sensor size	2/3"
Frame rate	121fps@1936 × 1464, 425fps@968 × 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	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, two 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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

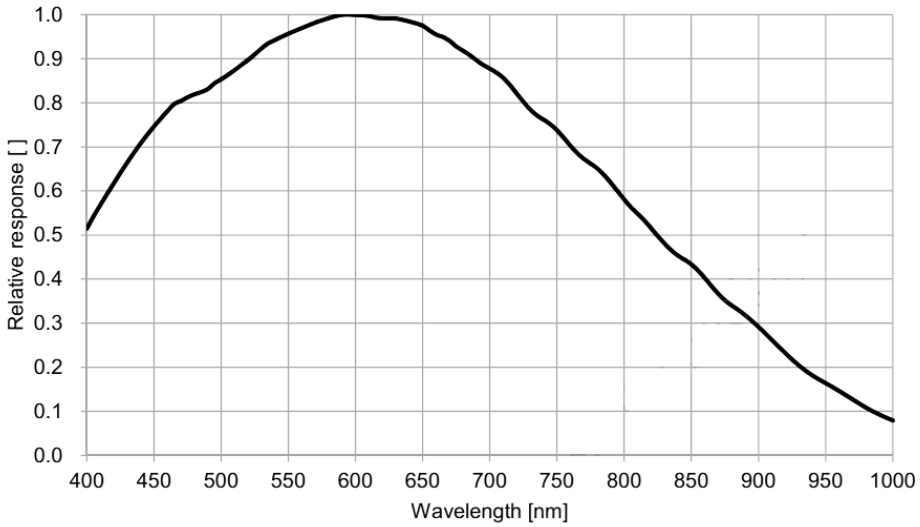


Figure 8-54 I3CMOS02800KMA spectral response curve

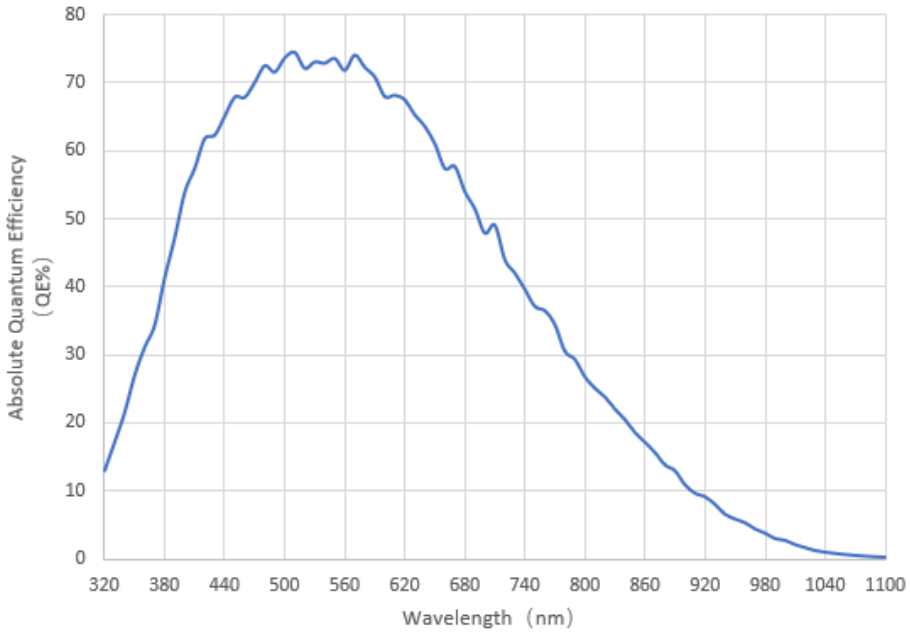


Figure 8-55 I3CMOS02800KMA absolute quantum efficiency

8.35 I3CMOS07100KMA(38mm)

Table 8-35 I3CMOS07100KMA camera specifications

Parameter \ Model	I3CMOS07100KMA
	7.1M pixels 1.1" CMOS USB3.0 industrial camera
Camera	
Sensor model	Sony IMX428LLJ
Pixel size	4.5 μm x4.5 μm
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	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, two 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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

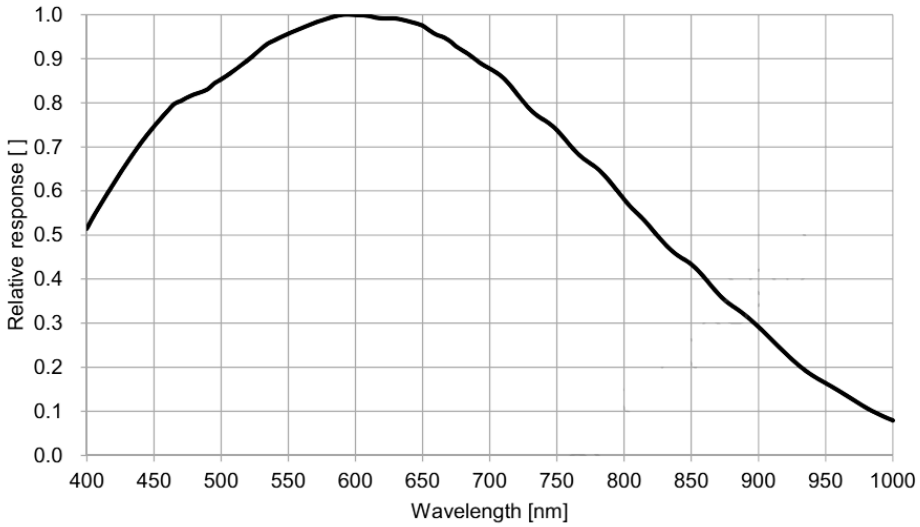


Figure 8-56 I3CMOS07100KMA spectral response curve

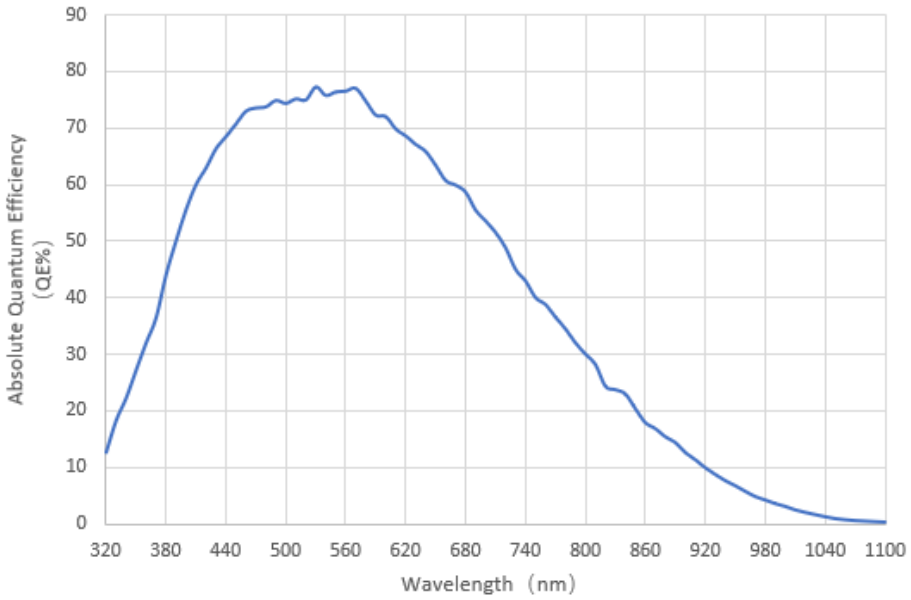


Figure 8-57 I3CMOS07100KMA absolute quantum efficiency

8.36 I3CMOS12300KMA(38mm, 20231019)

Table 8-36 I3CMOS12300KMA camera specifications

Parameter \ Model	I3CMOS12300KMA
	12.3M pixels 1.1" CMOS USB3.0 industrial camera
Camera	
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	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, two 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℃, storage temperature-30~70℃
Humidity	20%-80%, no condensation
Size	38mmx38mmx33mm
Weight	227g
Lens mount	C-mount
Software	ToupView/ SDK
Platform and architecture	Win32/WinRT/Linux/macOS/Android；X86/X64/armhf/armel/arm64
Certification	CE, FCC

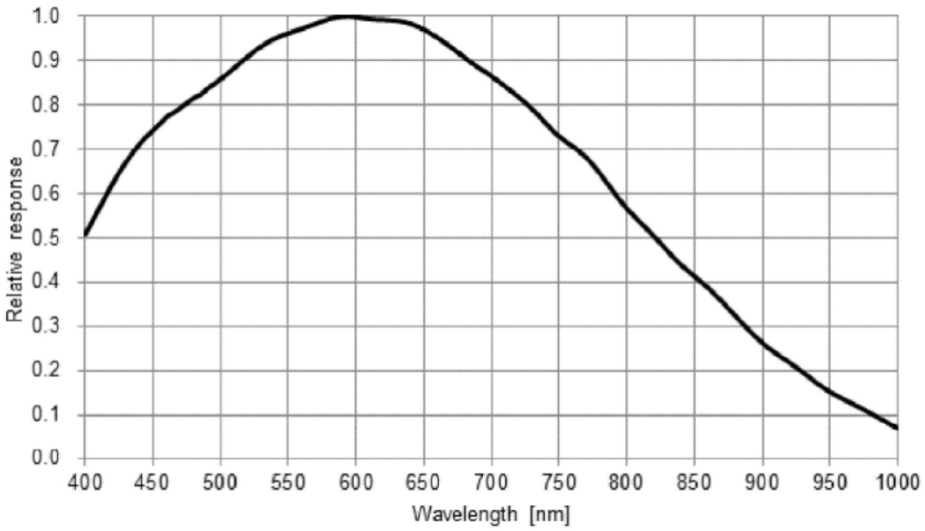


Figure 8-58 I3CMOS12300KMA spectral response curve

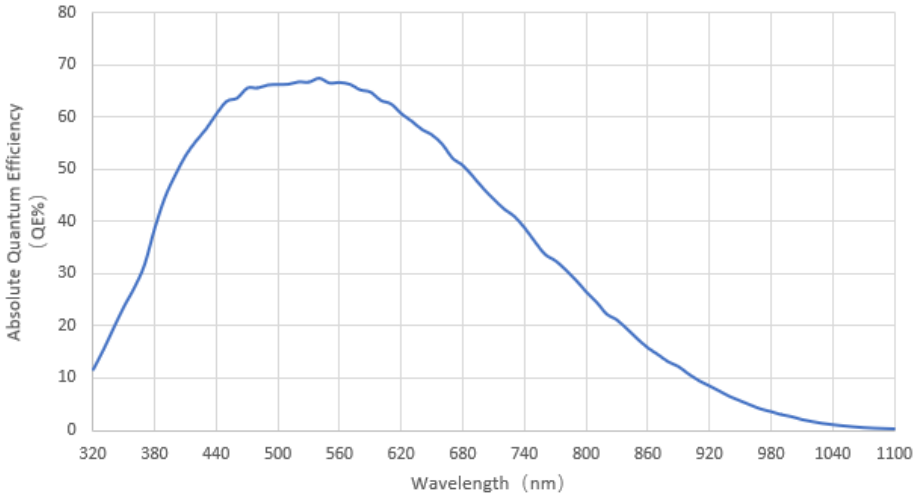


Figure 8-59 I3CMOS12300KMA absolute quantum efficiency

9 Camera Dimension and Interface

9.1 SWIR Series

9.1.1 Camera Mechanical Housing Dimensions

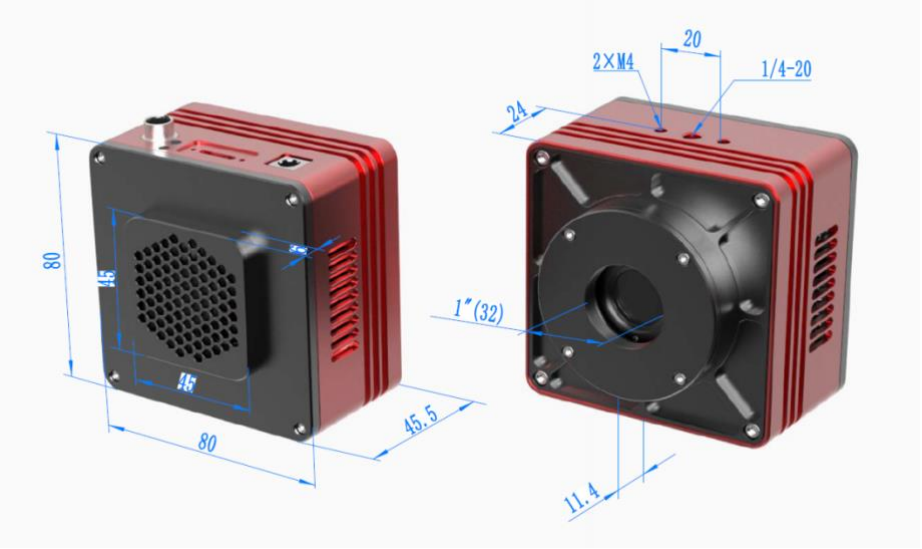


Figure 9-1 SWIR series camera

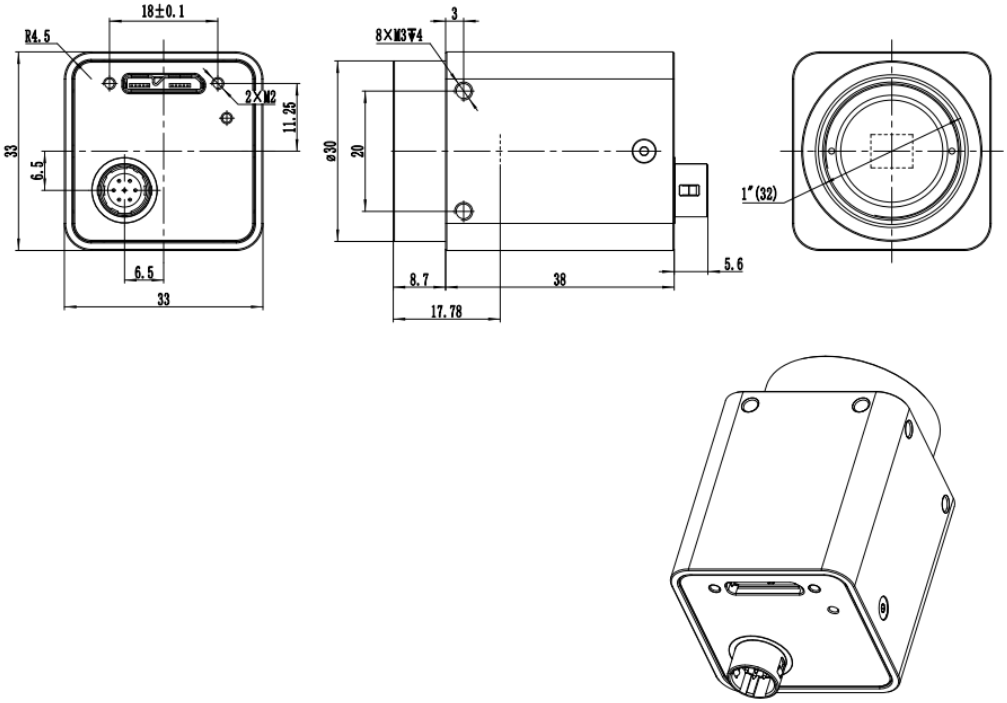


Figure 9-2 SWIR-UMV series camera

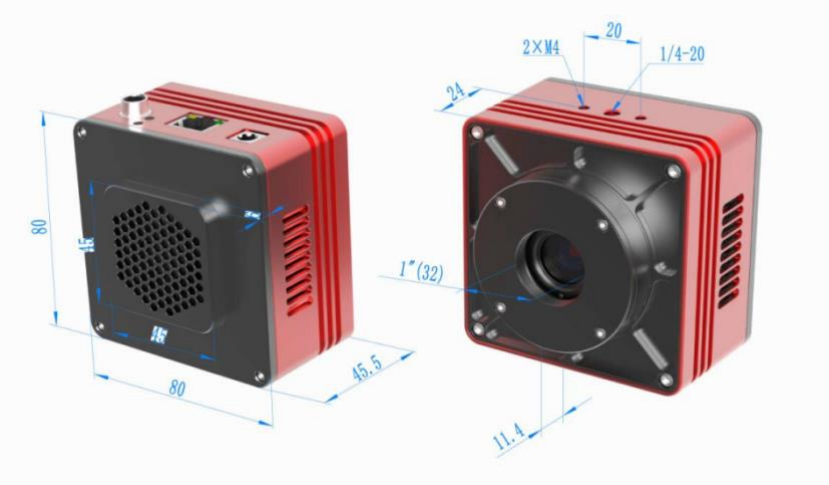


Figure 9-3 SWIR-G series camera

9.1.2 Camera Interface

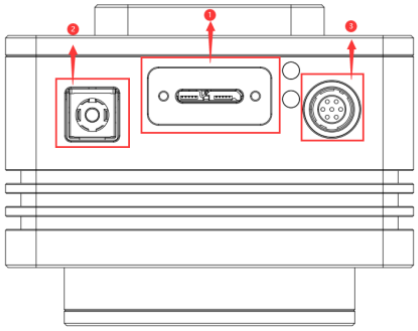


Figure 9-4 SWIR series Camera design and its ports

Table 9-1 SWIR series Camera interface

Item	Specification
1	USB3.0 port
2	DC 12V power slot
3	External IO connection port

Figure 9-5 SWIR-UMV series Camera design and its ports

Table 9-2 SWIR-UMV series Camera interface

Item	Specification

1	USB3.0 port
2	External IO connection port

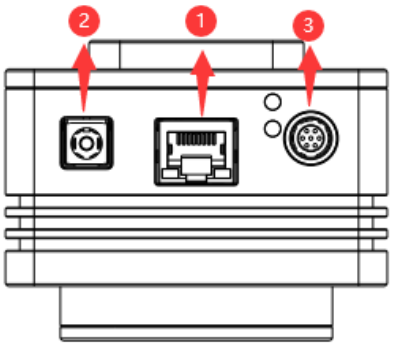


Figure 9-6 SWIR-G series Camera design and its ports

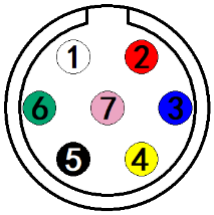
Table 9-3 SWIR-G series Camera interface

Item	Specification
1	GigE port
2	DC 12V power slot
2	External IO connection port

9.1.3 Power Supply and I/O Connector

The pin signal definition for the SWIR and SWIR-G series camera 7 Pin I/O connector is shown in Table 9-4.

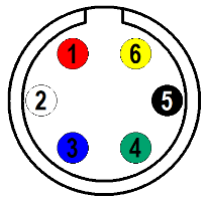
Table 9-4 SWIR and SWIR-G series pin signal definition(



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)

The pin signal definition for the SWIR-UMV series camera 6 Pin I/O connector is shown in Table 9-5.

Table 9-5 SWIR-UMV series pin signal definition



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

9.1.4 Packing Information

For normal use of industrial cameras, please prepare the required accessories as shown in table before installation.

Table 9-6 SWIR series 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	USB3.0 cable	1	Suitable length of Micro USB3.0 cable
4	Power adapter	1	Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 3A
5	Lens (optional)	1	C-mount lens

Table 9-7 SWIR-UMV series 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	USB3.0 cable	1	Suitable length of Micro USB3.0 cable
4	Lens (optional)	1	C-mount lens

Table 9-8 SWIR-G series 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	GigE cable	1	3m / 5m / 10m / 50m GigE cable
4	Power adapter	1	Input: AC 100~240V 50Hz/60Hz, Output: DC 12V 3A
5	Lens (optional)	1	C-mount lens

9.2 SWIR331 Series

9.2.1 The dimension of the SWIR331 series camera(CL and GigE)

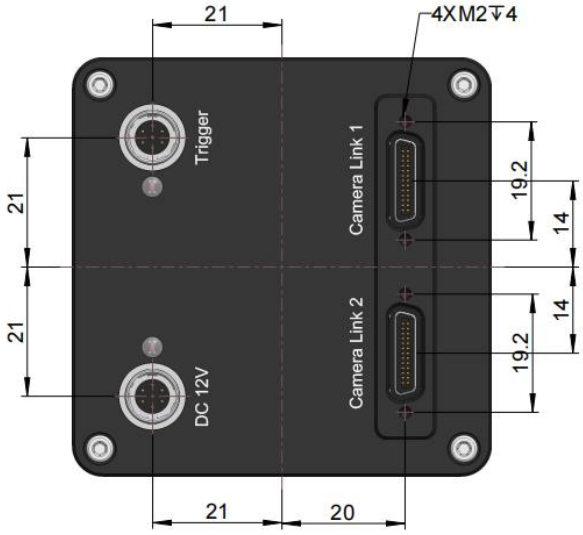


Figure 9-7 The rear cover interface layout of the SWIR331 Short-Wavelength Infrared Camera (CL interface)

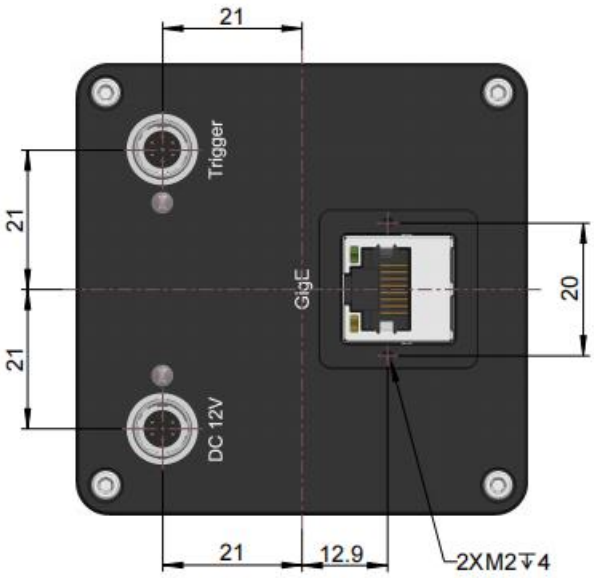


Figure 9-8 The rear cover interface layout of the SWIR331 Short-Wavelength Infrared Camera (GigE interface)

The Front and side view dimensions of the SWIR331 series camera is shown in Figure 9-9.

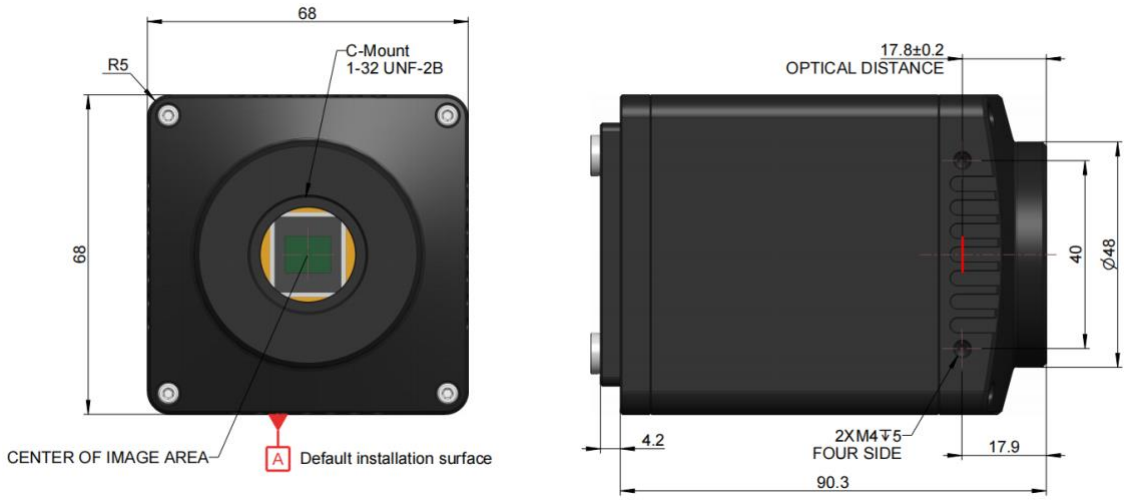


Figure 9-9 The Front and side view dimensions of the SWIR331 series camera

Table 9-9 The Dimension of the SWIR331 series camera

Parameter	Specification
Dimension	68*68*90.3mm
The SWIR331 series camera lens interface	Standard C mount

9.2.2 The back view of the SWIR331 series camera(CL and GigE)

The rear interface of the SWIR331 series camera is shown in Figure 9-10, the description is shown in Table 9-10.

Figure 9-10 The rear interface of the SWIR331 series camera

Table 9-10 The rear interface of the SWIR331 series camera

Order	Specification
1	DC 12V power slot
2	External IO connecter
3	CameraLink1
4	CameraLink2

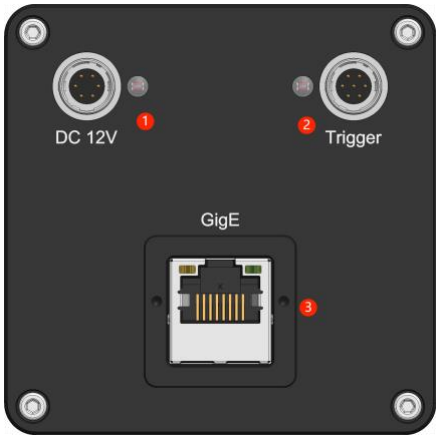


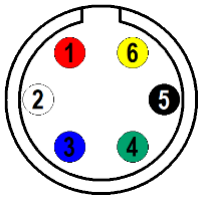
Figure 9-11 The rear interface of the SWIR331 series camera

Table 9-11 The rear interface of the SWIR331 series camera

Order	Specification
1	DC 12V power slot
2	External IO connecter
3	GigE

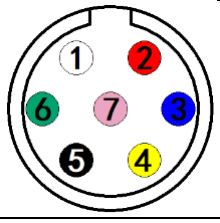
9.2.3 Power Supply and I/O Connector

Table 9-12 The SWIR331 series camera DC12V pin signal definitions



Color	Pin	Signal	Description of the signal
Red	1	12V	12V power supply positive
Yellow	6	12V	
Black	5	12V	
White	2	GND	12V power supply negative
Blue	3	GND	
Green	4	GND	

Table 9-13 SWIR331 series camera Trigger pin signal definitions



颜色	管脚	信号	信号描述说明
Blue	3	OPTO_GND	Opto-isolated signal ground
Green	6	OPTO_IN	Opto-isolated input signal (line0)
Pink	7	OPTO_OUT	Opto-isolated output signal (line1)

9.3 IUA Series

9.3.1 IUA Series Camera Mechanical Housing Dimensions

Figure 9-12 IUA series camera

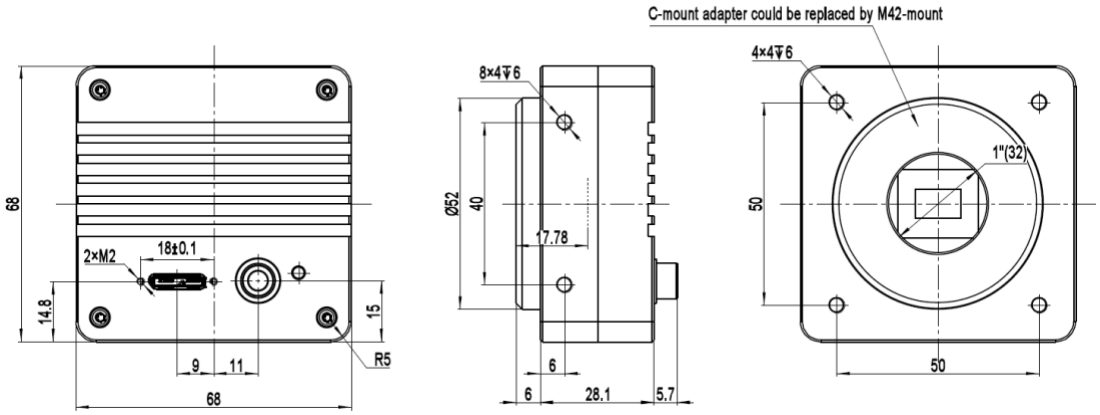


Figure 9-13 Dimensions of IUA camera housing (mm)

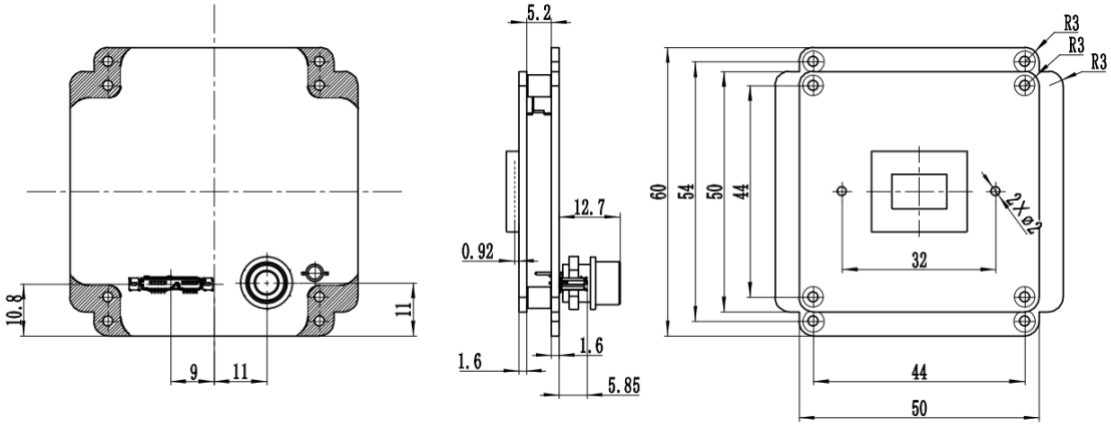


Figure 9-14 Dimensions of IUA circuit board (mm)

9.3.2 IUA Series Camera Interface

The back of the industrial camera is shown in Figure 9-15. 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.

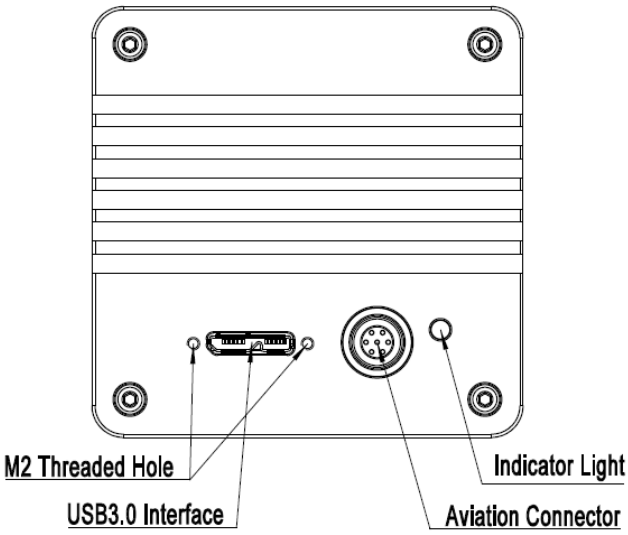
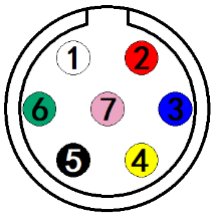


Figure 9-15 Schematic diagram of IUA camera back panel

9.3.3 IUA Series Camera Power Supply and I/O Connector

The pin signal definition for the IUA series camera 7 Pin I/O connector is shown in Table 9-14.

Table 9-14 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)

9.3.4 Packing Information

For normal use of industrial cameras, please prepare the required accessories as shown in Table 9-15 before installation.

Table 9-15 Recommended accessories for IUA series camera

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	USB3.0 cable	1	Suitable length of Micro USB3.0 cable
4	Lens (optional)	1	C-mount lens

9.4 IUB Series

9.4.1 IUB Series Camera Mechanical Housing Dimensions

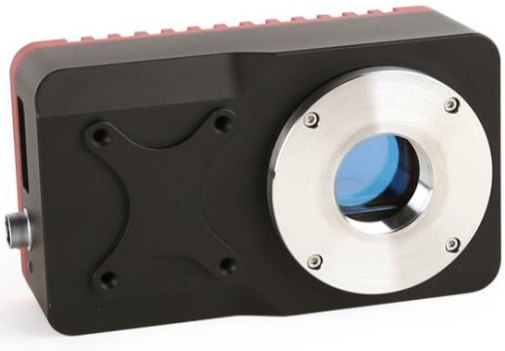


Figure 9-16 IUB series camera

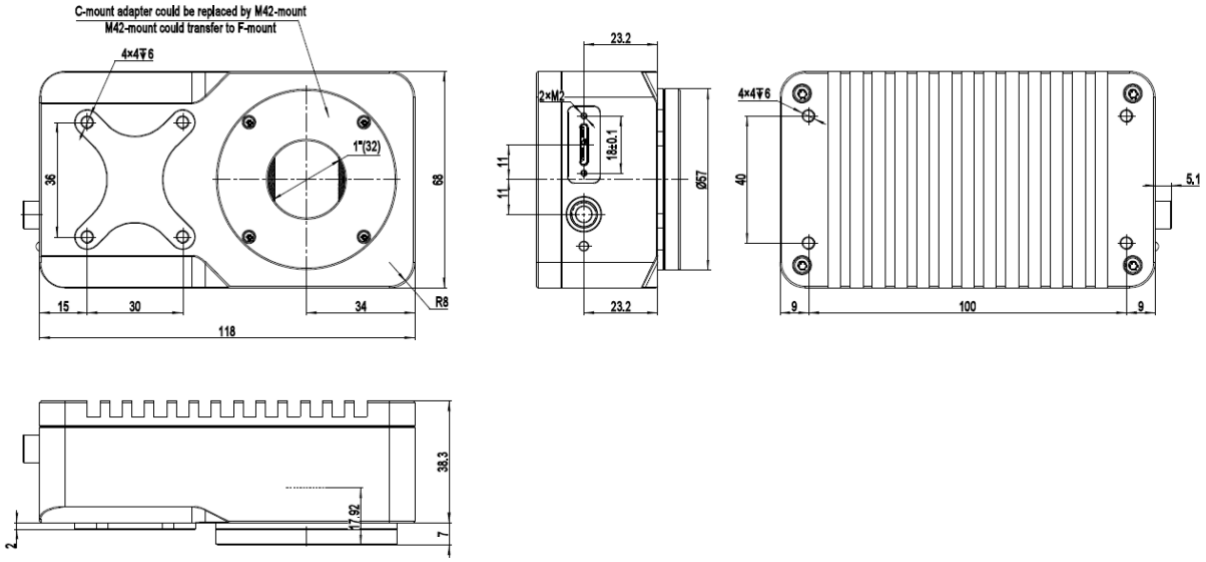


Figure 9-17 Dimensions of IUB camera housing (mm)

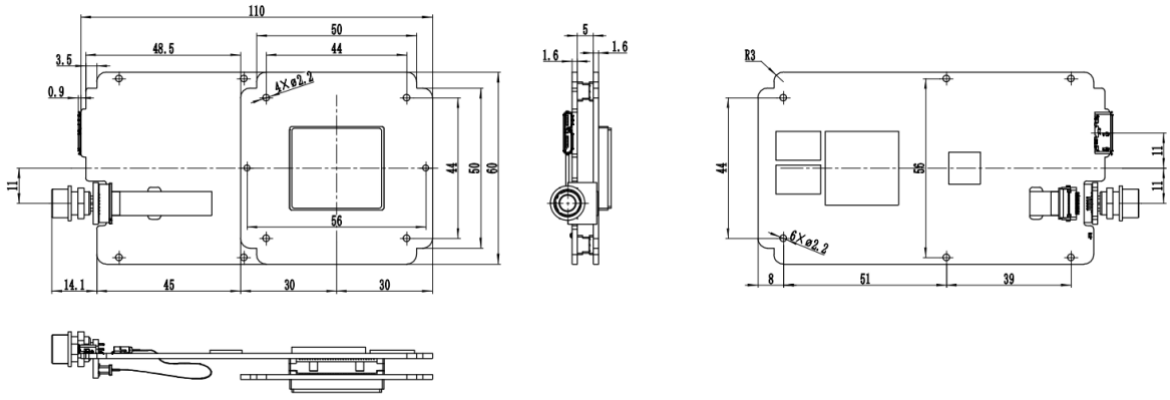


Figure 9-18 Dimensions of IUB circuit board (mm)

9.4.2 IUB Series Camera Interface

The back of the industrial camera is shown in Figure 9-19. It has standard USB3.0 interface, 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.

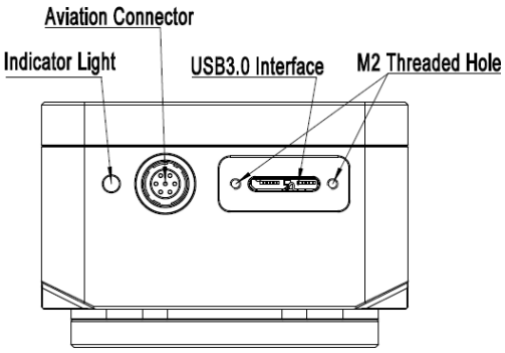
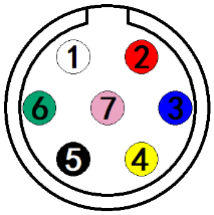


Figure 9-19 Schematic diagram of IUB camera back panel

9.4.3 IUB Series Camera Power Supply and I/O Connector

The pin signal definition for the IUB series camera 7 Pin I/O connector is shown in Table 9-16.

Table 9-16 IUB series pin signal definitions



Color	Pin	Signal	Signal description
White	1	GND	Direct-coupled signal ground
Red	2	12V	5VDC 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)

9.4.4 Packing Information

For normal use of industrial cameras, please prepare the required accessories as shown in Table 9-17 before installation.

Table 9-17 Recommended accessories for IUB series camera

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	USB3.0 cable	1	Suitable length of Micro USB3.0 cable
4	Power (IUB)	1	IUB series of power adapters
5	Lens (optional)	1	C-mount lens

9.5 IUC Series

9.5.1 IUC Series Camera Mechanical Housing Dimensions

Figure 9-20 IUC series camera

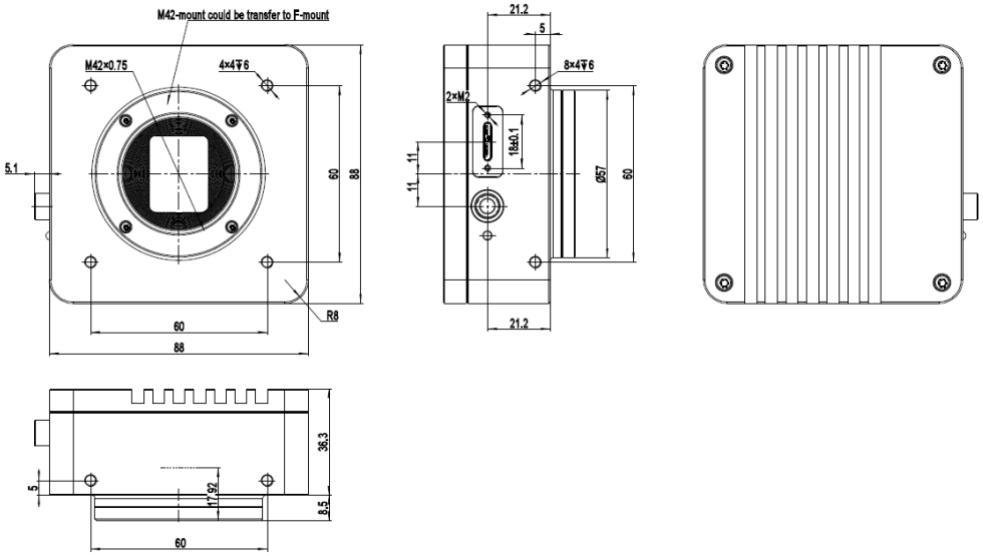


Figure 9-21 Dimensions of IUC camera housing (mm)

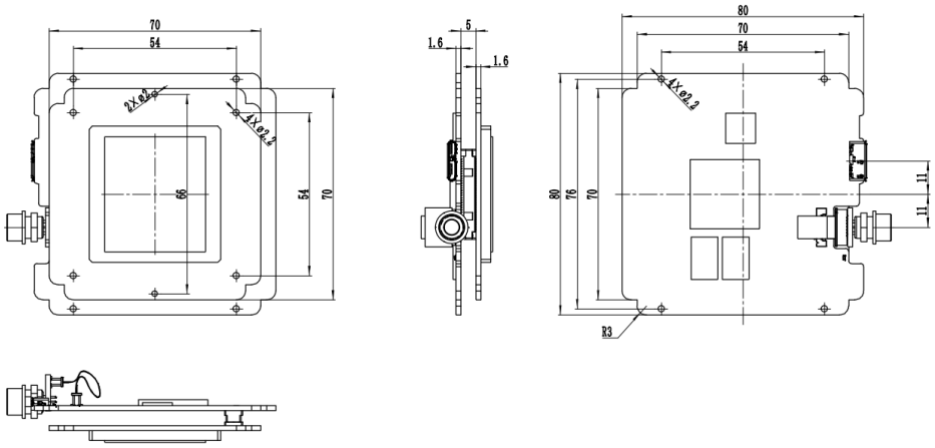


Figure 9-22 Dimensions of IUC circuit board (mm)

9.5.2 IUC Series Camera Interface

The back of the industrial camera is shown in Figure 9-23. 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.

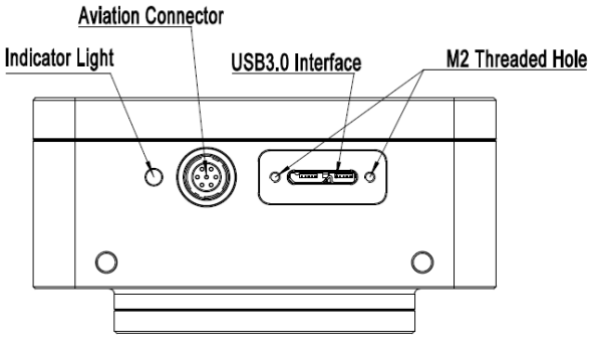
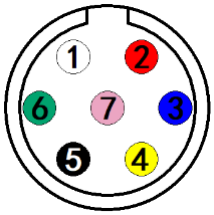


Figure 9-23 Schematic diagram of IUC camera back panel

9.5.3 IUC Series Camera Power Supply and I/O Connector

The pin signal definition for the IUC series camera 7 Pin I/O connector is shown in Table 9-18.

Table 9-18 IUC series pin signal definitions



Color	Pin	Signal	Signal description
White	1	GND	Direct-coupled signal ground
Red	2	12V	5VDC 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)

9.5.4 Packing Information

For normal use of industrial cameras, please prepare the required accessories as shown in Table 9-19 before installation.

Table 9-19 Recommended accessories for IUC series camera

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	USB3.0 cable	1	Suitable length of Micro USB3.0 cable
4	Power (IUC)	1	Power adapter for IUC series
5	Lens (optional)	1	C-mount lens

9.6 IUD Series

9.6.1 IUD Series Camera Mechanical Housing Dimensions

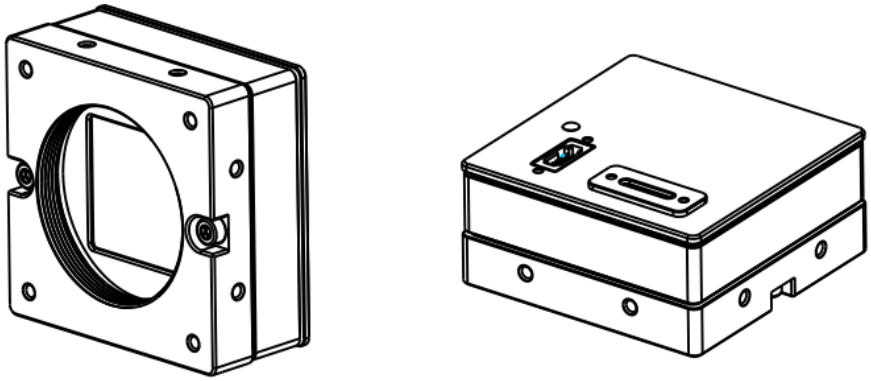


Figure 9-24 IUD series camera

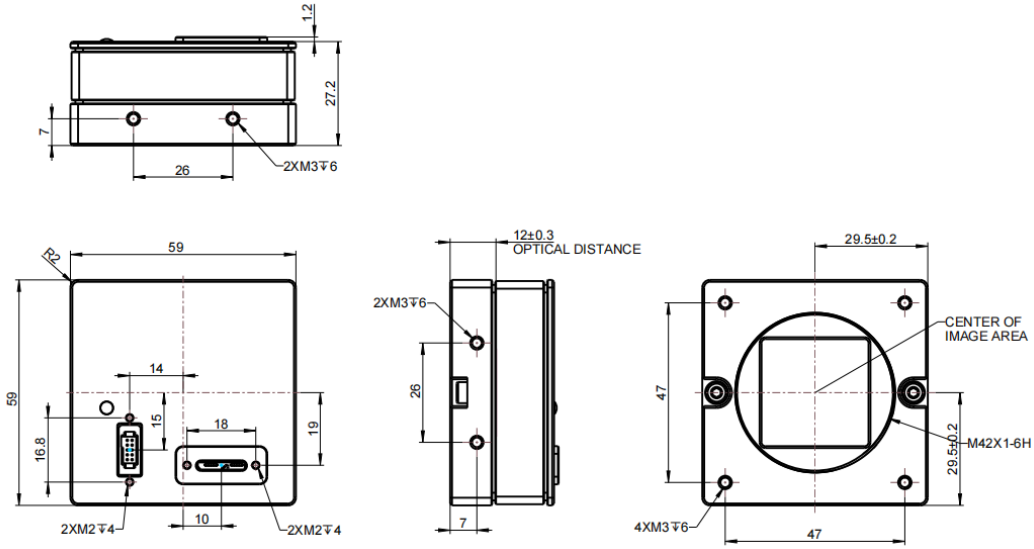


Figure 9-25 Dimensions of IUD camera housing (mm)

9.6.2 IUD Series Camera Interface

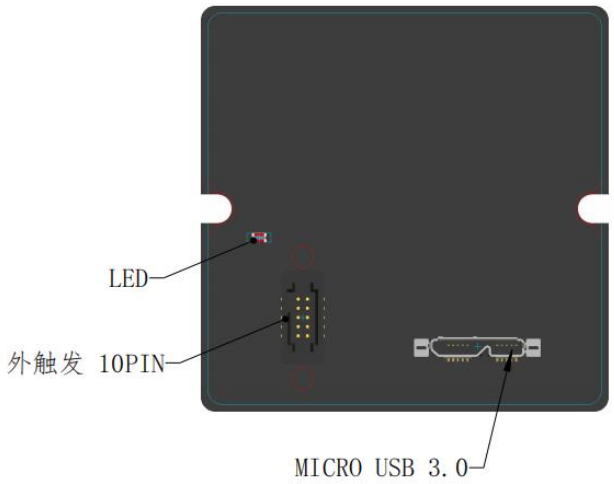
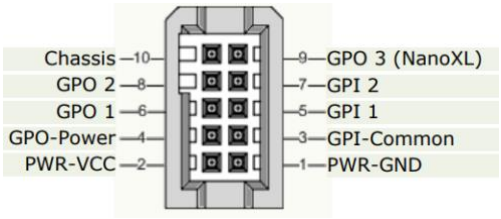


Figure 9-26 Schematic diagram of IUD camera back panel

9.6.3 IUD Series Camera Power Supply and I/O Connector

The pin signal definition for the IUD series camera 10 Pin I/O connector is shown in Table 9-20.

Table 9-20 IUD series pin signal definitions



Pin	Signal	Signal description
1	GND	Power ground
2	12V	12VDC power
3	GPI_GND	General Input Common Ground
4	GPO-POWER	General Output Common Power
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

9.6.4 Packing Information

For normal use of industrial cameras, please prepare the required accessories as shown in Table 9-21 before installation.

Table 9-21 Recommended accessories for IUC series camera

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	USB3.0 cable	1	Suitable length of Micro USB3.0 cable
4	Power (IUD)	1	Power adapter for IUD series
5	Lens (optional)	1	C-mount lens

9.7 I3CMOS and I3ISPM Series

9.7.1 I3CMOS and I3ISPM Series Camera Mechanical Housing Dimensions(33mm)

Figure 9-27 I3CMOS or I3ISPM series camera

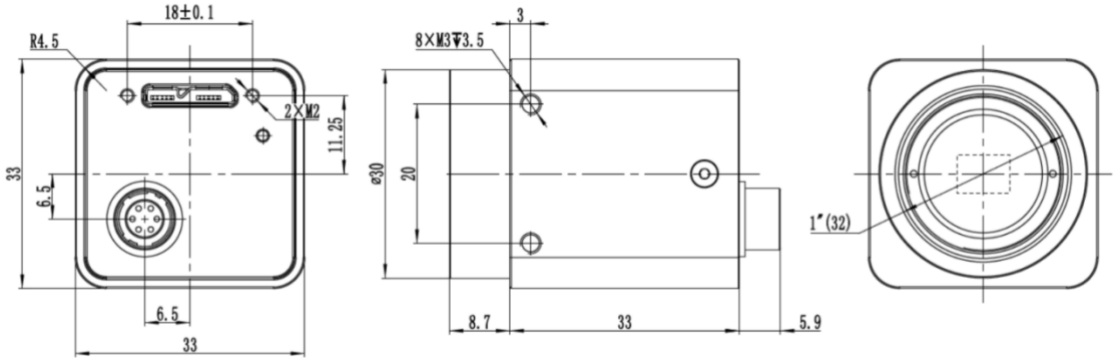


Figure 9-28 Dimensions of camera housing(mm)

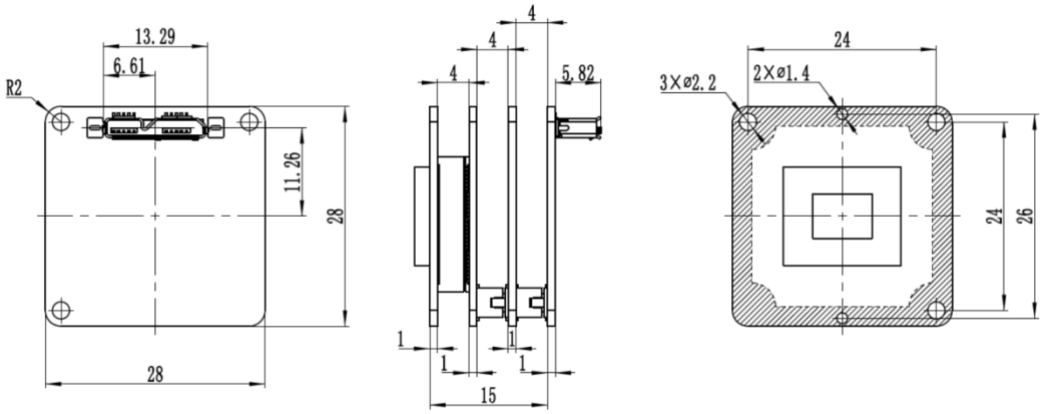


Figure 9-29 Dimensions of circuit board(mm)

9.7.2 I3CMOS and I3ISPM Series Camera Mechanical Housing Dimensions(38mm)

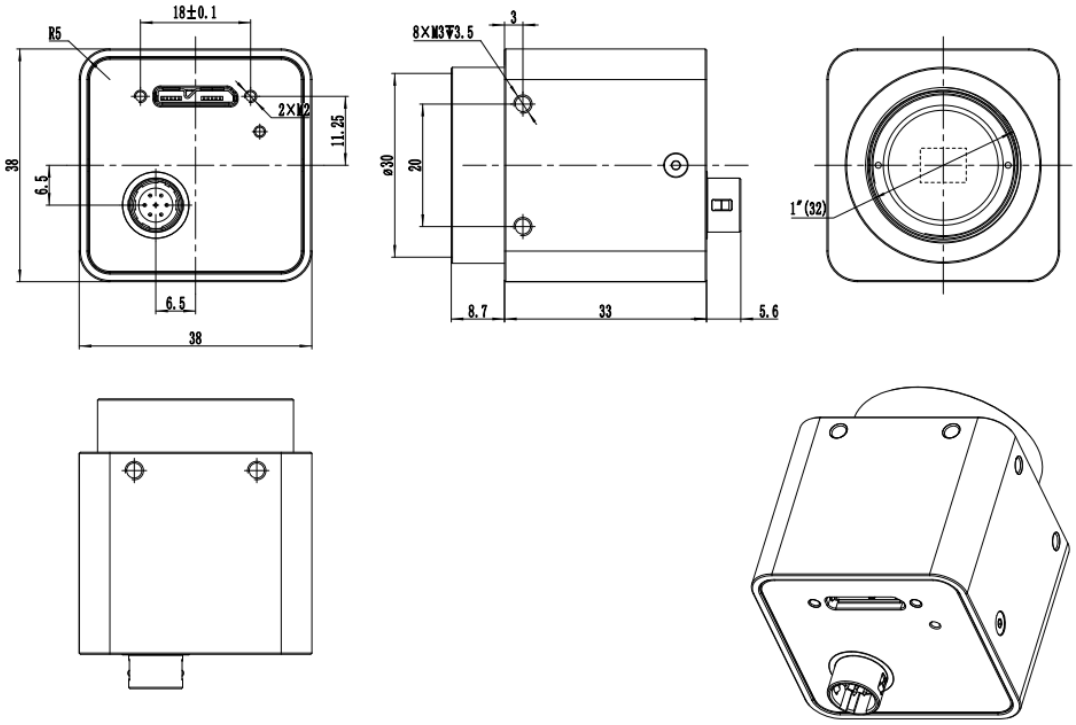


Figure 9-30 Dimensions of camera housing(mm)

9.7.3 I3CMOS and I3ISPM Series Camera Interface

The back of the industrial camera is shown in Figure 9-31. 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.

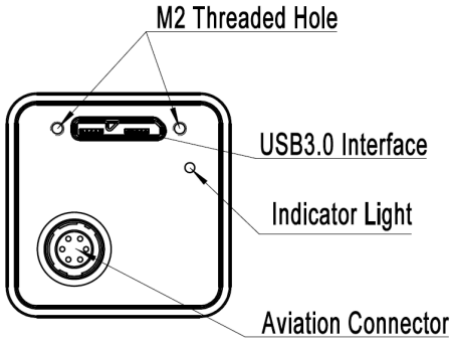


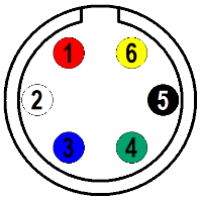
Figure 9-31 Schematic diagram of camera back panel

9.7.4 I3CMOS and I3ISPM Series Camera 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 9-22.

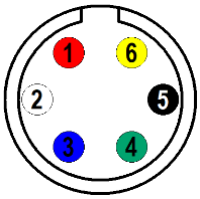
Table 9-22 Pin signal definition



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 9-23.

Table 9-23 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

9.7.5 I3CMOS and I3ISPM Series Camera Packing Informatio

For normal use of industrial cameras, please prepare the required accessories as shown in Table 9-24 before installation.

Table 9-24 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	USB3.0 cable	1	Suitable length of Micro USB3.0 cable
4	Lens (optional)	1	C-mount lens

10 Electrical Characteristics

10.1 SWIR and IUX Series Camera's I/ O Electrical Properties

10.1.1 Opto-isolated Input Circuit (line0)

In the camera I/O control, opto-isolated input circuit is shown in Figure 10-1.

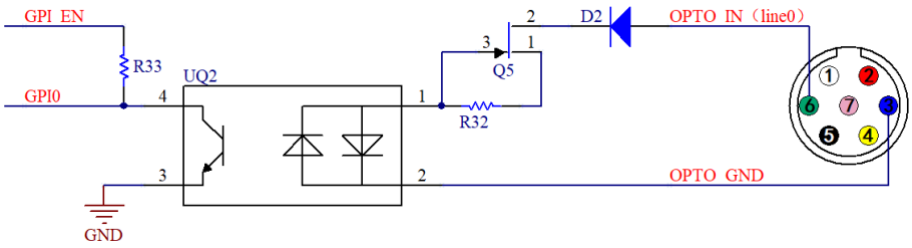


Figure 10-1 Opto-isolated input circuit

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.

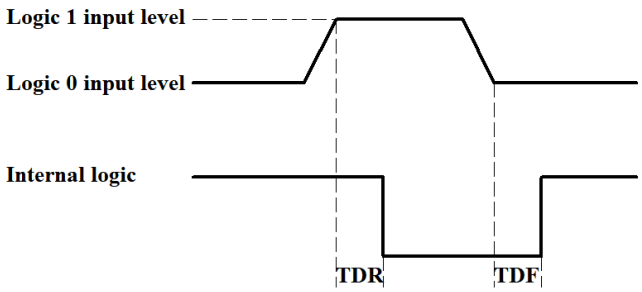


Figure 10-2 Input logic level

Input rise delay (TDR): 6us

Input drop delay (TDF): 6us

10.1.2 Opto-isolated Output Circuit(line1)

In camera I/O control, opto-isolated output circuit is shown in Figure 10-3.

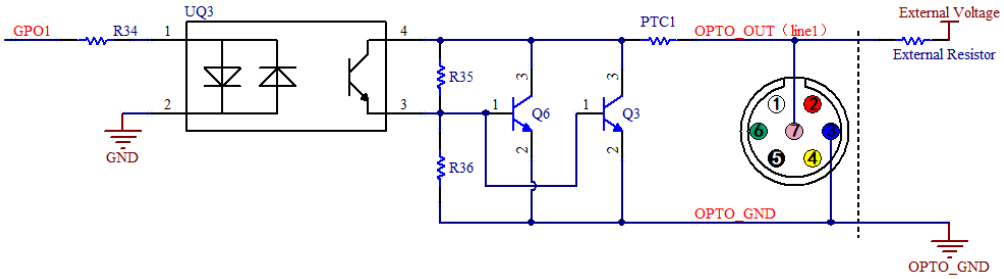


Figure 10-3 Opto-isolated output circuit

Opto-isolated output maximum current: 30mA

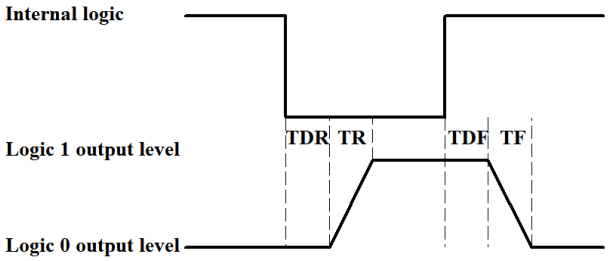


Figure 10-4 Output logic level

The electrical characteristics of the opto-isolated output signal (external voltage 5V, external resistor 1K) are shown in Table 10-1.

Table 10-1 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 10-2 when different voltage and resistors are used in external circuit.

Table 10-2 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

10.1.3 Input and Output I/O Circuit(line2/line3)

Non-isolated configurable input, output I/O circuit is shown in Figure 10-5, Figure 10-6.

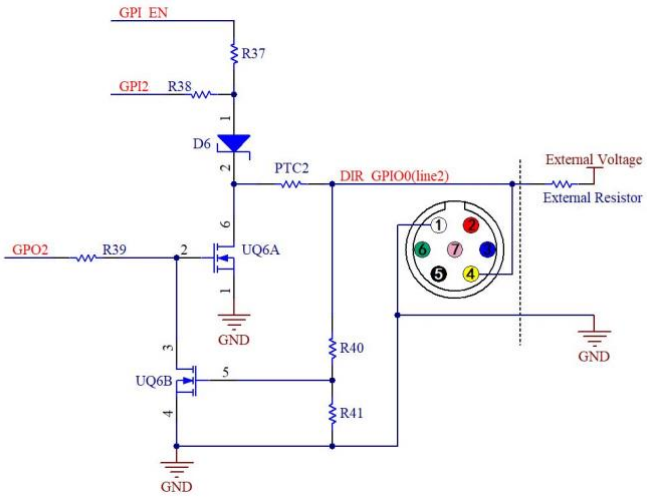


Figure 10-5 Non-isolated configurable input, output I/ O circuit (line2)

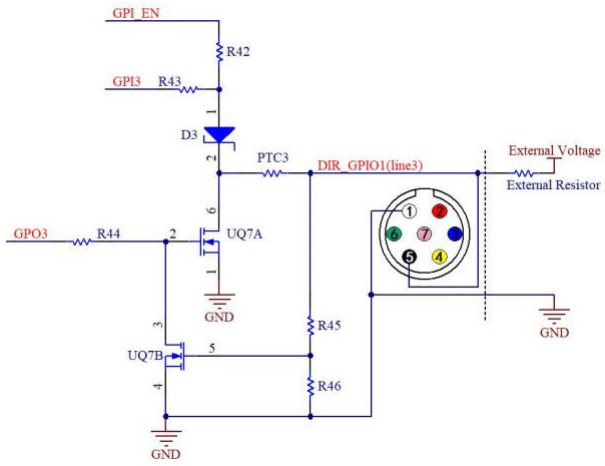


Figure 10-6 Non-isolated configurable input, output I/ O circuit (line3)

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.

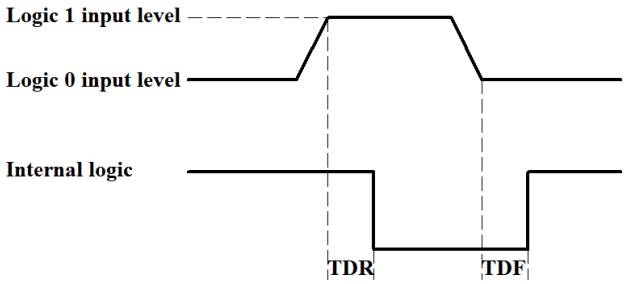


Figure 10-7 Input logic level

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 10-3.

Table 10-3 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 10-8.

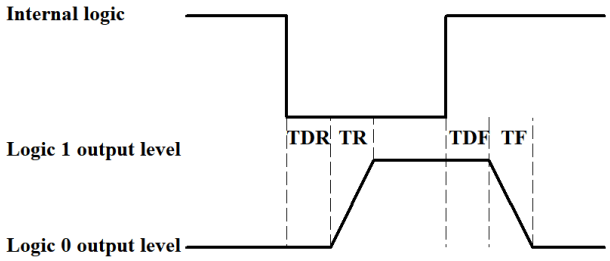


Figure 10-8 Output logic level

Table 10-4 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

10.2 I3 Series Camera's I/ O Electrical Properties

10.2.1 Opto-isolated Input Circuit (line0)

In the camera I/O control, opto-isolated input circuit is shown in Figure 10-9.

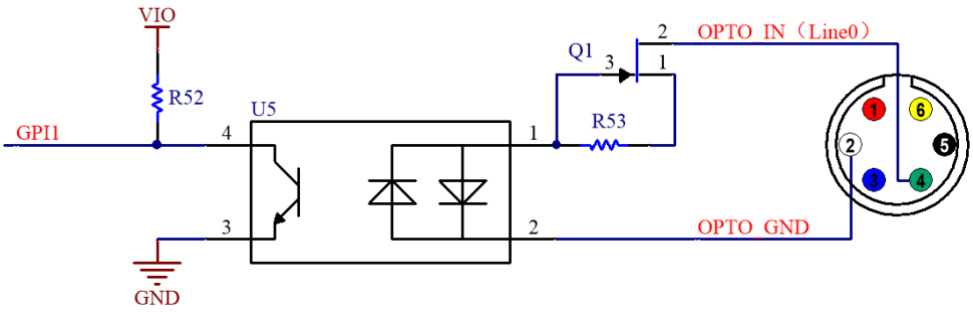


Figure 10-9 Opto-isolated input circuit

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.

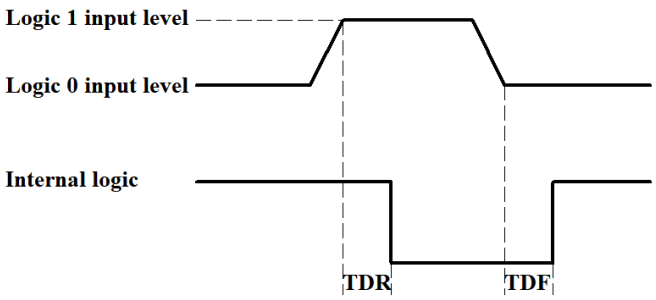


Figure 10-10 Input logic level

Input rise delay (TDR): 5us

Input drop delay (TDF): 25us

10.2.2 Opto-isolated Output Circuit(line1)

In camera I/O control, opto-isolated output circuit is shown in Figure 10-11.

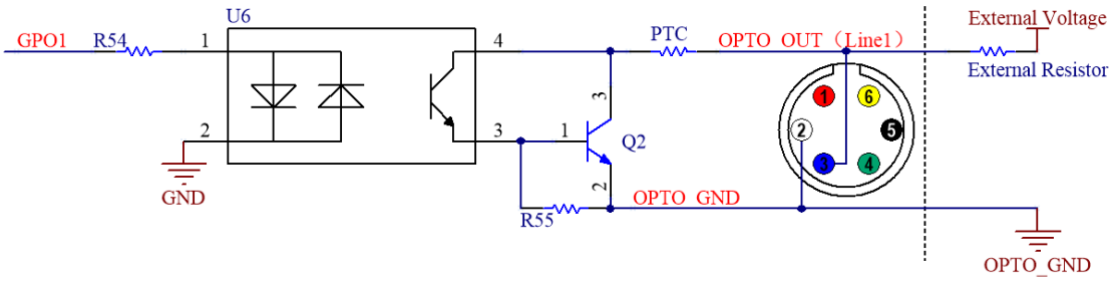


Figure 10-11 Opto-isolated output circuit

Opto-isolated output maximum current: 30mA

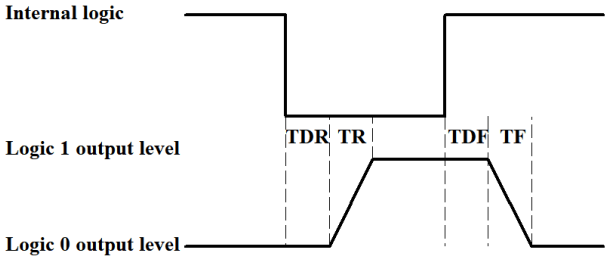


Figure 10-12 Output logic level

The electrical characteristics of the opto-isolated output signal (external voltage 5V, external resistor 1K) are shown in Table 10-5.

Table 10-5 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 10-6 when different voltage and resistors are used in external circuit.

Table 10-6 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

10.2.3 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 10-13.

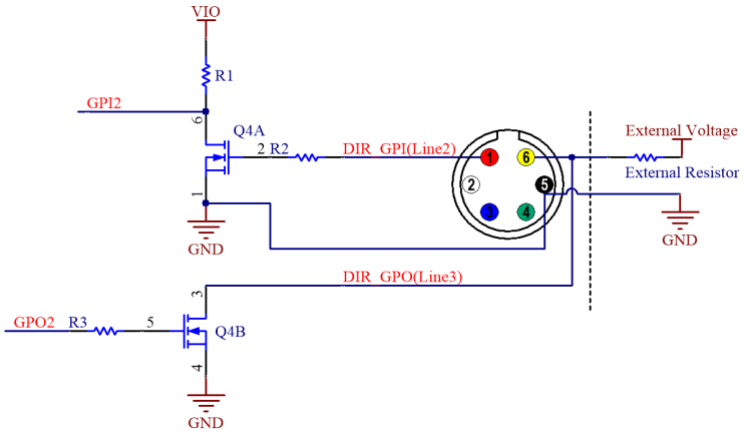


Figure 10-13 Non-isolated input, output I/ O circuit(line2)

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)

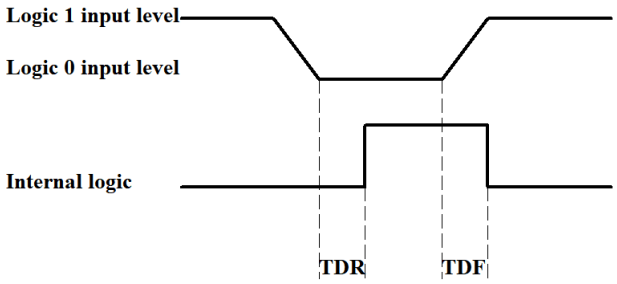


Figure 10-14 Input logic level

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 10-7.

Table 10-7 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 10-15.

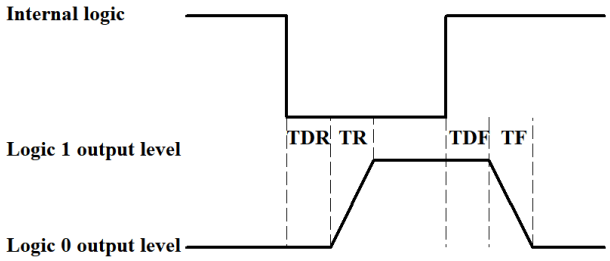


Figure 10-15 Output logic level

Table 10-8 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

10.2.4 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 10-16.

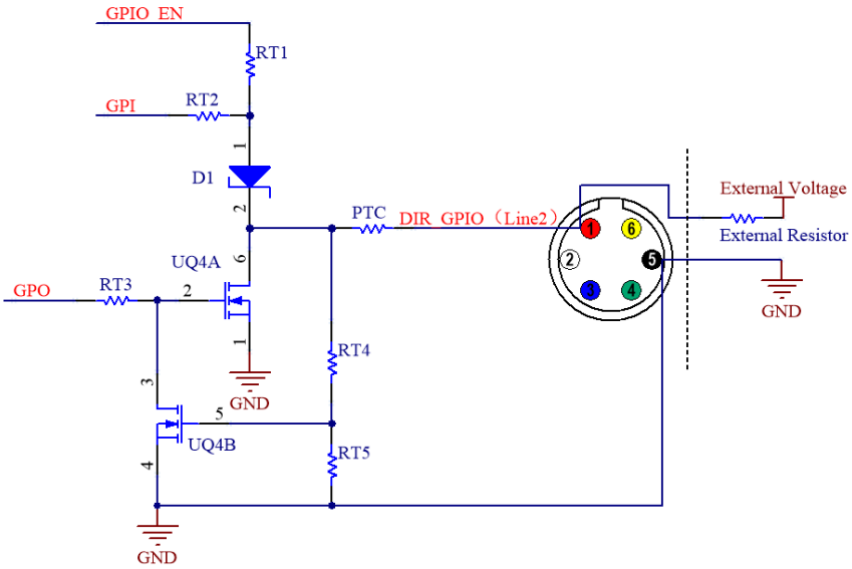


Figure 10-16 Non-isolated configurable input / output I/O circuits

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.

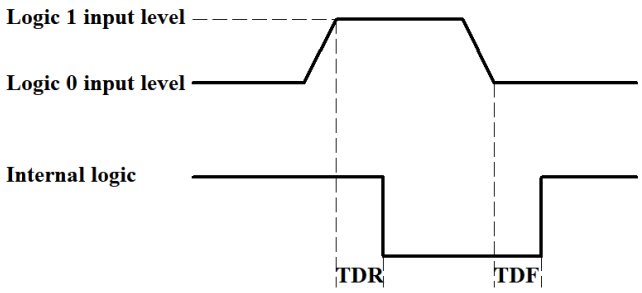


Figure 10-17 Input logic level

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 10-9.

Table 10-9 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 10-18.

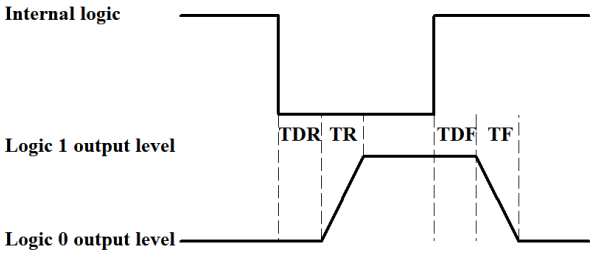


Figure 10-18 Output logic level

Table 10-10 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

11 Description of Functions

11.1 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).

11.2 ROI Control

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

11.3 Bandwidth and Precise Frame Rate Control

11.3.1 Bandwidth

Partial cameras supports bandwidth adjustment from 1% to 100%. As shown in Figure 11-1, the camera is with 100% bandwidth by default, and you can drag the slider to set the desired bandwidth.

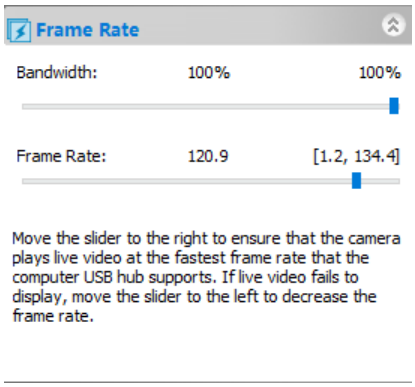


Figure 11-1 Bandwidth and precise frame rate settings

11.3.2 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 11-1, the current frame rate can be set by dragging the Bandwith or Frame Rate slider bar left or right.

11.4 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.

11.5 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.

11.6 DC12V Power Supply and Cooling System

For the SWIR series camera, when the DC12V power supply is plugged in, both the camera cooling system and the imaging system use a unified 12V power supply.

When the DC12V power supply 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 SWIR series has a built-in or external TEC cooling for the sensor. It uses an external heat dissipation structure and a fan to assist heat dissipation. The working temperature can be adjusted to a specific value, and the effective cooling temperature can be lower than the ambient temperature by 10 - 25 °C. The efficient cooling system guarantees extremely low dark current levels.

The TEC system is controlled by PID algorithm, so that the TEC can be accurately adjusted to the target

temperature, and the temperature deviation is 0.1°C.

12 Trigger Mode and its Configuration

12.1 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 12-1 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.

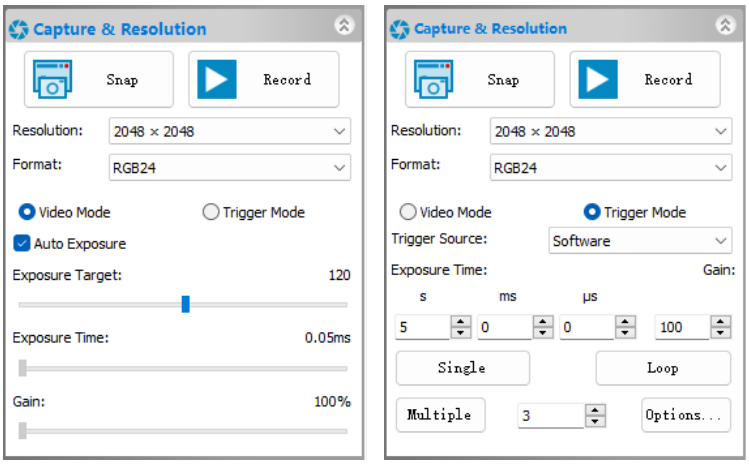


Figure 12-1 Video Mode and Trigger Mode on the Capture & Resolution group in ToupView

After the Trigger Mode is checked, the Capture & Resolution group will switch to Trigger Mode as shown in Figure 12-1 on the right. Where, the Trigger Source, Exposure Time, Gain, Single, Loop, Multiple, Frame Box, and Options can be set.

12.2 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 12-2 shows the possible Trigger Sources. Table 12-1 shows the designed Trigger Source descriptions and possible capture styles for ToupTek camera.

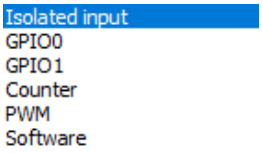
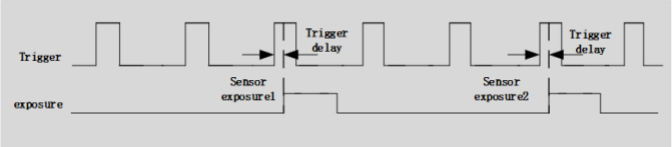
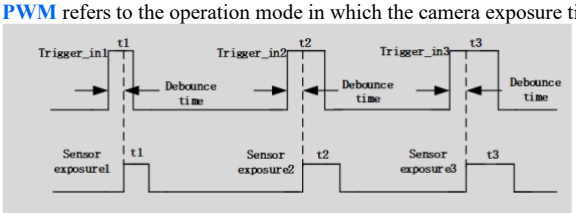
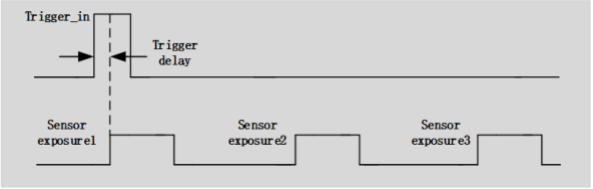


Figure 12-2 Possible Trigger Sources

Table 12-1 Description of possible Trigger Sources and their capture styles

Trigger Source	Description
Isolated input	Logic 0 input level: 0~2.2VDC; Logic 1 input level: 3.3~24VDC;. Maximum input current: 30mA;
GPIO0	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 **GPIO0** is chosen as **Trigger Source**, it should be configurated as **Input** in the **GPIO Mode**'s combo box on the **Options>IO Control** page;
GPIO1	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 **GPIO1** is chosen as **Trigger Source**, it should be configurated as **Input** in the **GPIO Mode**'s combo box on the **Options>IO Control** page;
Counter	**Counter** refers to the operation mode in which the camera can divide the frequency of the external input trigger signal through the preset **Counter Value** and perform image acquisition according to the customer's logic. For example, when the counter value(Counter Value: 3 [1,1023]) is set to 3, the

	camera needs to receive 3 trigger signals to trigger once;  When **Counter** is chosen in **Trigger Source** combo box in the **Capture & Resolution** group, the **Counter Source** can be **Isolated input**, **GPIO0** or **GPIO1** which can be chosen on **Options>IO Control** page; If **GPIO0** or **GPIO1** is chosen in the **Counter Source** combo box on **Options>IO Control** page. It should be configured as **Input** in the **GPIO Mode** combo box; Check **Options>IO Control** page's **Line Select** related items and **Counter** related items for details;
PWM	**PWM** refers to the operation mode in which the camera exposure time is controlled by the input trigger signal's pulse width;  **PWM Trigger Source** can be **Isolated input**, **GPIO0** or **GPIO1**. If **GPIO0** or **GPIO1** is chosen in the **PWM Source** combo box on the **Options>IO Control** page, it should be configured as **Input** in the **GPIO Mode** combo box; Check **Options>IO Control** page's **Line Select** related items and **PWM** related items for details;
Software	When **Software** trigger is chosen, the client software can send the command through USB3.0 to trigger, acquire and transfer images, In ToupView, **Single**, **Loop**, **Multiple,** or **Sequence** can be used to send the **Software** trigger command; If the **Plan** or **Hardware** is chosen in the **Type** combo box on the **Options>Sequence** page, the **Multiple** button will switch to **Sequence** button and the camera will use the **Exposure Time** and **Gain** in the **Sequence table** on this page one by one to capture the specified frames. Check **Single**, **Loop**, **Multiple,** or **Sequence** on **Capture & Resolution** group for the **Software** capture operations; Check **Options>Sequence** page and **Options>Advanced** page for the related **Sequence** and **Software** capture setup options;
Single	When **Single** is clicked, the camera will start to capture the image. At the same time the **Single** button will switch to **Stop** button. Clicking **Stop** button to stop the current **Single** capture operation, the **Stop** button will switch to **Single** button again for the next capture operation; Note: 1) The captured frames will always **Show in the video window** to prevent too many captures; 2) Enabled when **Software** in the **Trigger Source** combo box is chosen or **Always enable software trigger** checkbox is checked on the **Options>Advanced** property page;
Loop	When **Loop** is clicked, the camera will start to capture the image continuously and the **Loop** button will switch to **Stop** button. Clicking **Stop** button to stop **Loop** captures and the **Stop** button will switch to **Loop** button for the next **Loop** capture operation; Note: 1)The captured frames will always **Show in the video window** to prevent too many captures; 2)Enabled to capture continually when **Software** in the **Trigger Source** combo box is chosen or **Always enable software trigger** checkbox is checked on the **Options>Advanced** property page;
Multiple	**Multiple** refers to the operation mode in which the camera receives **Software** trigger signal or command and exports multiple frames of images. An edit box with spin(we call it **Frames Box**) is designed and affiliated to the **Multiple** button (Multiple 3 Options...) for the setting of the frames to be captured; The **Frames Box** can be set in the range of 1~65535. If the **Frames Box** is 3, a three-frame image will be captured and exported;  Note: 1)**Multiple** capture is enabled to capture continually when **Software** in the **Trigger Source** combo box is chosen; 2) **Multiple** capture is enabled when **Always enable software trigger** is checked on the **Options>Advanced** property page, no matter whether **Trigger Source** is **Software** or **Hardware** on the **Capture & Resolution** group; 3) If the **Plan** or **Hardware** is chosen in the **Type** combo box on the **Options>Sequence** page, the **Multiple** button will switch to **Sequence** button and the camera will use the **Exposure Time** and **Gain** in the **Sequence table** on this page. The captured frames will be displayed either in **Show in the video window**, or **Show in a new window** or **Save to disk** which can be specified on **Options>Output** page;
Sequence	When **Sequence** is clicked, the camera will start to capture the image until the specified frames in the **Frames Box** are captured. At the same time the **Sequence** button will switch to **Stop** button. Clicking **Stop** button will stop the current **Sequence** capture and the **Stop** button will switch to **Sequence** again for the next **Sequence** capture operation; 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;

12.3 The trigger capture and IO Control configurations

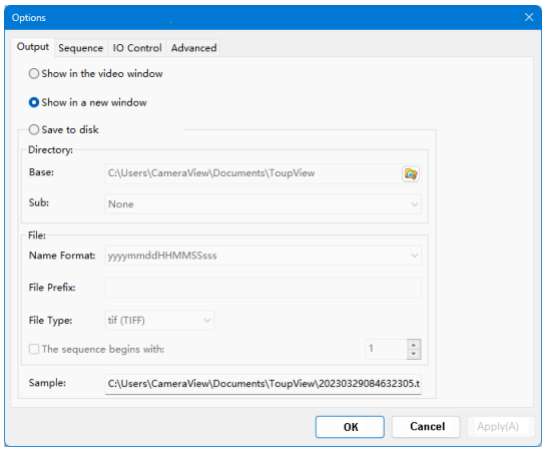


Figure 12-3 Options>Output page

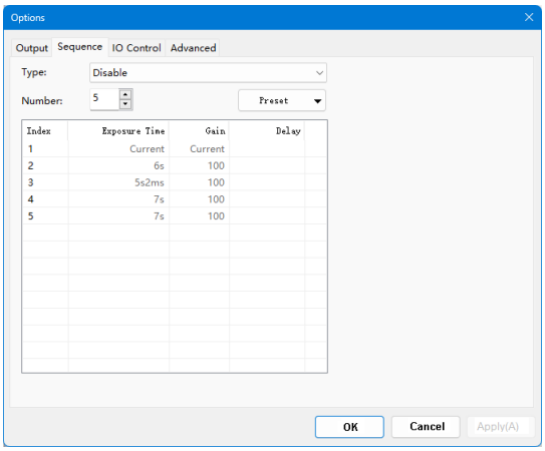


Figure 12-4 Options>Sequence page

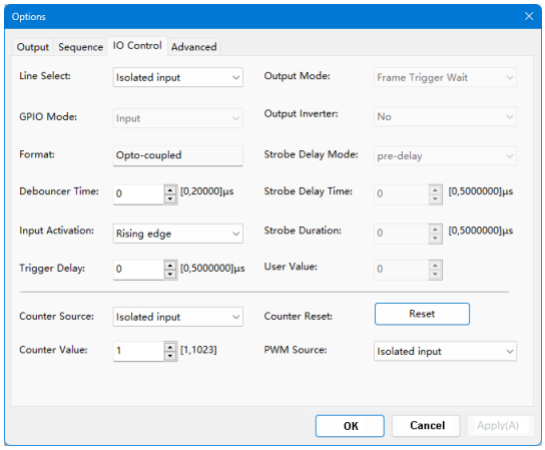


Figure 12-5 Options>IO Control page

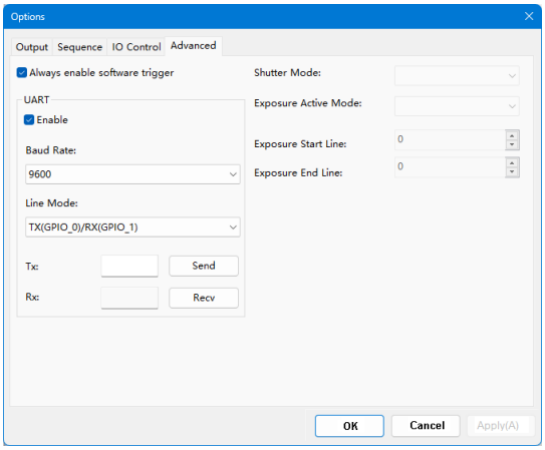


Figure 12-6 Options>Advanced page

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 12-2 below.

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

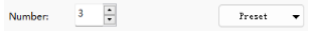
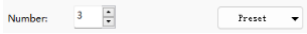
About the Sequence setup, one can find it on the Option>Sequence page;

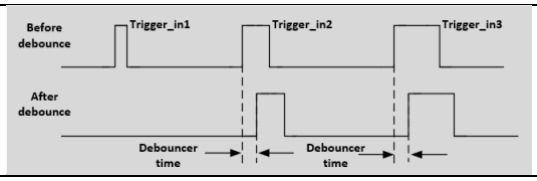
About the camera pin IO Control style, one can find it on the Options>IO Control page;

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 12-2 Options property sheet for Trigger Source or camera pin configuration

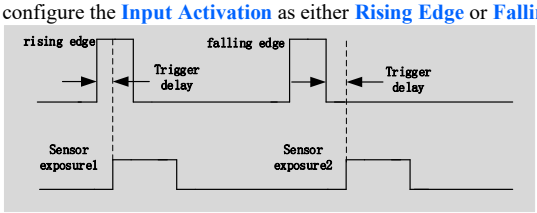
Pages	Items	Descriptions

Output page	**Output Destination**	Used to set the captured frame's **Output** destination, can be **Show in the video window**, **Show in a new window** or **Save to disk**; When **Save to disk** is checked, the  button will be enabled clicking it to choose the **Base** directory, clicking the **Sub** combo box's dropdown button to choose the **Sub** directory; The **File Name Format**, **File Prefix**, **File Type**, and even **The sequence begin with** can be chosen, set, or defined. Note: 1)Valid only for **Sequence** or **Multiple** capture setup; 2)For **Single** or **Loop** capture, the captured image will be always displayed on the video window;
Sequence page	**Type** 	**Disable**: If the **Disable** button is chosen in the **Type** combo box on the **Options>Sequence** page, the **Sequence** button on the **Capture & Resolution** page will switch to **Multiple** button;
		Plan: 1)If **Plan** is chosen in the **Type** combo box on the **Options>Sequence** page, the **Multiple** button on the **Capture & Resolution** group will switch to **Sequence** button; 2) If the **Software Trigger Source** is chosen in the **Capture & Resolution** group or the **Always enable software trigger** is checked on the **Options>Advanced** property page, the **Sequence** button will be enabled After the **Software** trigger signal is arrived(By clicking **Single**, **Loop**, or **Sequence** button), the camera will capture frames specified in the edit box with spin  (we call it **Frames Box**) affiliated to the **Sequence** button; The whole captures will use the **Exposure Time**, **Gain** and **Delay** in the **Sequence table** list under  one by one by the software; 3) If the **Disable** button is chosen in the **Type** combo box on the **Options>Sequence** page, the **Sequence** button on the **Capture & Resolution** page will switch to **Multiple** button; 4) The **Sequence** button will be enabled only when a) the **Plan** in the **Type** combo box is chosen on the **Options>Sequence** page and b) he **Software Trigger Source** is chosen in the **Capture & Resolution** group or c) **Always enable software trigger** is checked on the **Options>Advanced** property page;
		Hardware: 1) if **Hardware** is chosen in the **Type** combo box on the **Options>Sequence** page, the **Multiple** button on the **Capture & Resolution** group will switch to **Sequence** button and will be disabled for **Hardware** trigger. But users can still set the frames number in the **Frame Box** on the **Capture & Resolution** group; 2) After the **Hardware** trigger signal arrives, the camera will capture frames specified in the edit box with spin  (we call it **Frame Box**) affiliated to the **Sequence** button; The whole capture will use the **Exposure Time**, **Gain** (**Delay** is not used) in the **Sequence table** list under  one by one but stored in the camera hardware for the quick operation; 3) If the **Disable** button is chosen in the **Type** combo box on the **Options>Sequence** page, the **Sequence** button on the **Capture & Resolution** page will switch to **Multiple** button. 4) The **Sequence** button is always disabled if a) The **Hardware** is chosen in the **Type** combo box on the **Options>Sequence** page and b)the **Hardware Trigger Source** is chosen in the **Capture & Resolution** group; 5) The **Sequence** button will be enabled if a) the **Software Trigger Source** is chosen in the **Capture & Resolution** group or b) the **Always enable software trigger** checkbox is checked on the **Options>Advanced** property page, in this case, both the **Plan** and **Hardware Sequence** capture are supported;
	Number	The possible **Sequence**(capture) frames to be captured. If the **Number** is larger than the **Sequence Number** in the **Frames Box** on the **Capture & Resolution** group, the other **Indices** will be executed at the next **Sequence** operation one by one recycled;
	Index	The order of the **Number** group;
	Exposure Time	The camera **Exposure Time** for the specified capture **Index** in the **Sequence** capture;
	Gain	The camera **Gain** for the specified capture **Index** in the **Sequence** capture;
	Delay	The **Delay** time for the specified capture **Index** in the **Plan Sequence** capture(Valid for **Plan Sequence** capture only);
	Preset	Choosing **Save** to save the current **Sequence table**'s settings; Clicking **Management** to **Rename** the saved **Sequence table**'s setting files or **Remove** them from the **Management** list;
IO Control page	**Line Select**	Choosing which line to set. Can be **Isolated input**, **Isolated output**, **GPIO0** or **GPIO1 et al**;
	GPIO Mode	To configure whether the line selected in **Line Select** is for **Input** or **Output**. Only **GPIO0** or **GPIO1** can be configured as either **Input** or **Output**; If **Isolated input** or **Isolated output** is chosen, the **GPIO Mode** will be specified as **Input** or **Output** (Not configurable) respectively;
	Format	Specify the current selected signal's **Format** in the **Line Select** combo box, can be **Opto-coupled**(**Isolated input**, **Isolated output**)or **TTL** (**GPIO0** or **GPIO1**)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 **Debouncer Time**, otherwise, the trigger signal will be ignored; When **Isolated input**, **GPIO0** or **GPIO1** is chosen in the **Line Select** combo box and **GPIO0** or **GPIO1** is configured as **Input** in the **GPIO Mode** combo box, the **Debouncer Time** will be enabled for the user to input the **Debounter Time** between 0 to 20000us;



Input Activation

When **Isolated input**, **GPIO0** or **GPIO1** is chosen in the **Line Select** combo box and **GPIO0** or **GPIO1** is configured as **Input** in the **GPIO Mode** combo box; The **Input Activation** combo box will be enabled to configure the **Input Activation** as either **Rising Edge** or **Falling Edge**;

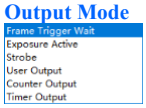


Also can be configure as **high level** or **low level**. When **high level** is selectd, the camera keeps triggering the frame when the input signal is high; When **low level** is selectd, the camera keeps triggering the frame when the input signal is low;

Trigger Delay

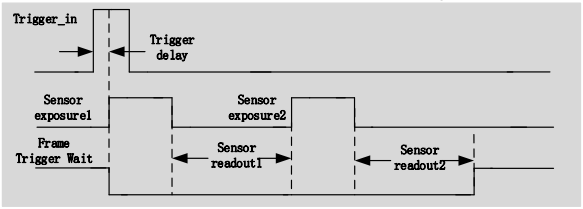
When **Isolated input**, **GPIO0** or **GPIO1** is chosen in the **Line Select** combo box and **GPIO0** or **GPIO1** is configured as **Input** in the **GPIO Mode** combo box, the **Trigger Delay** will be enabled for the user to input the **Trigger Delay** time between 0 to 5000000us;
If the **Trigger Delay** time is set to 1000000us, the camera will wait for 1s to capture the image after receiving the trigger signal;

Output Mode

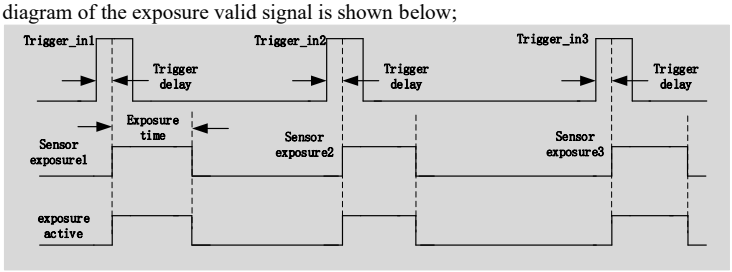


When **Isolated output**, **GPIO0** or **GPIO1** is selected in the **Line Select** combo box and **GPIO0** or **GPIO1** is configured as **Output** in the **GPIO Mode** combo box, the **Output Mode** will be enabled. It can be **Frame Trigger Wait**, **Exposure Active**, **Strobe**, **User Output**, **Counter Output** or **Timer Output**. The chosen mode can be used for diversified applications;

The Frame Trigger Wait 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;



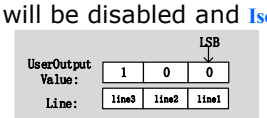
Exposure Active: when this signal is high, it means the sensor is exposing. This signal can be used to control an external mobile device to remain stationary or move at low speed while the camera is at exposure. The timing diagram of the exposure valid signal is shown below;



When the relative position of the camera and the object to be photographed changes, you can refer to **Exposure Active** signal to prevent the captured image from being affected by movement and focus adjustment during the exposure process;

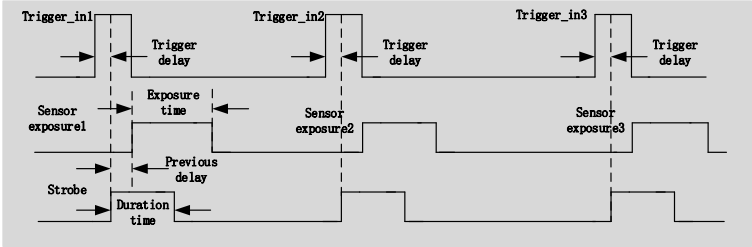
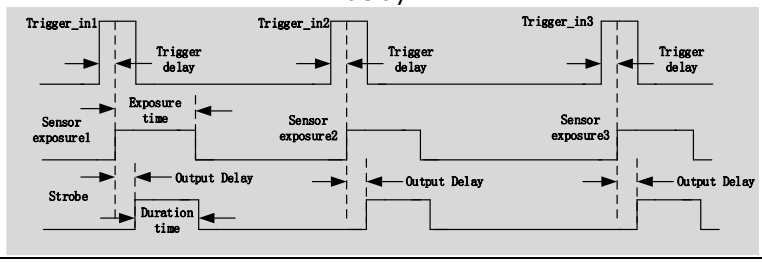
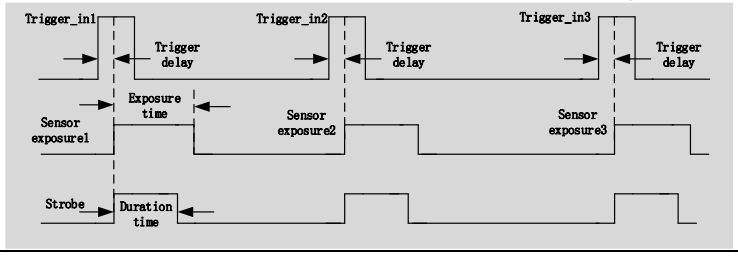
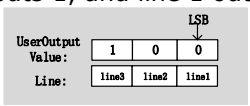
When Strobe is chosen, **Strobe Delay Mode**, **Strobe Delay Time**, **Strobe Duration** will be enabled;

When User Output is chosen, **User Value** will be enabled. lines3, line2, line1 are the combination of **GPIO1**, **GPIO0** and **Isolated output** respectively. If **User Value** is 001, then line **GPIO1** and **GPIO0** will be disabled and **Isolated output** will be enabled;



When the Counter Output is selectd, when the counter value is “m”, the camera triggers “m” times to output a signal.

When the Timer Output is selectd, the camera keeps output signals. When the **Strobe Delay Time** is **delay**, the pulse width of the high level is determined by the **Strobe Duration**. The pulse width of low level is determined by the **Strobe Delay Time**.

	Output Inverter	When **Isolated output**, **GPIO0** or **GPIO1** is selected in the **Line Select** combo box and **Output** is chosen for **GPIO0** or **GPIO1** in the **GPIO Mode** combo box, the **Output Inverter** will be enabled to configure the current selected line's output as either inverted or not(**Yes** or **No**).
	Strobe Delay Mode	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 **Output Mode** is **Strobe**, **Strobe Delay Mode** will be enabled. It can be **pre-delay** or **delay**;
	Strobe Delay Time	When exposure starts, the strobe does not take effect immediately, and the output is delayed according to the value set by **Strobe Delay Time** which is between 0 to 5000000us. The **Strobe Delay Mode** can be **pre-delay** or **delay**; It is described below; pre-delay:  delay: 
	Strobe Duration	The high level duration of the strobe is determined by the **Strobe Duration** which is between 0 to 5000000us as shown below; 
	User Value	Users can input a value at **User Value** edit box with spin to control the line as disable or enable. Enabled when **User Output** is chosen in the **Output Mode** combo box. The logical value 0 or 1's combination of **GPIO1**(line3), **GPIO0**(line2) and **Isolated output**(line1); When the output mode is selected as **User Output**, the user can input a value at **User Value** 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 **User Output** mode, and its **User Value** is set to 4 ('b100), then line 3 outputs 1, and line 1 outputs 0, as shown below. 
	Counter Source	When **Counter** is chosen in the **Trigger Source** combo box in the **Capture & Resolution** group, the **Counter Source** can be chosen from **Isolated input**, **GPIO0** or **GPIO1** in this combo box on the **Option>IO Control** page;
	Counter Value	The **Counter Value** is used to divide the frequency of the external input trigger signal when the **Counter Trigger Source** is chosen in the **Capture & Resolution** group; See **Counter** in Table 12-1 for detail;
	Counter Reset	Click **Reset** button can clear the current counting process and begin a new one;
	PWM Source	When **PWM** is chosen in the **Trigger Source** combo box in the **Capture & Resolution** group, the **PWM Source** can be from **Isolated input, GPIO0,** or **GPIO1** in this combo box et al. ;
Advanced page	**Always enable software trigger**	When this button is checked, no matter whether **Trigger Source** is **Software** or **Hardware**, the software trigger buttons(**Single**, **Loop**, **Multiple**) are always enabled; If the **Plan** or **Hardware** is chosen in the **Type** combo box on the **Options>Sequence** page, the **Multiple** button will switch to **Sequence** button; The **Sequence** button will be enabled if a)the **Software Trigger Source** is chosen

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

13 Cooling

For the SWIR series cameras, 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. And the cooling effect can reach about 10-25 degrees lower than the ambient temperature, as shown in Figure 13-1.

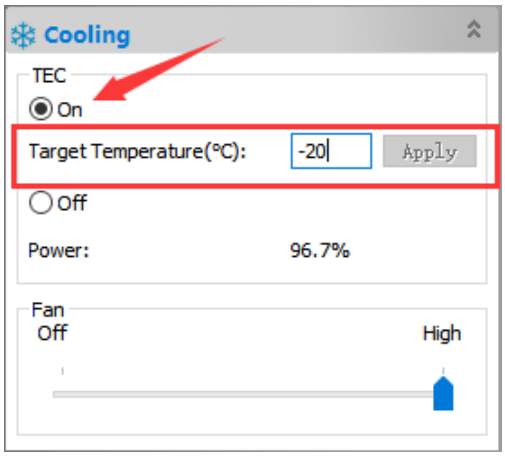


Figure 13-1 TEC settings

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 13-2.

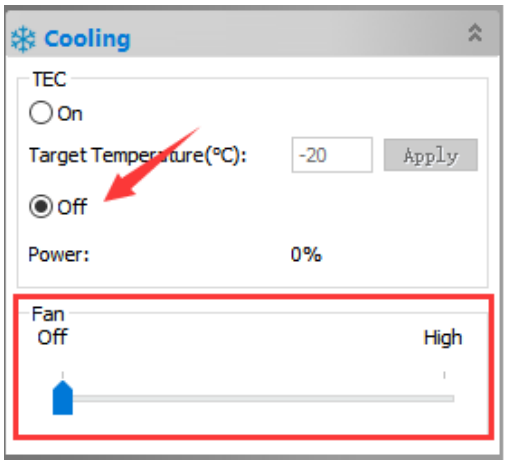


Figure 13-2 Fan settings

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.

14 Application

14.1 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.

14.2 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 ToupTek cameras

14.2.1 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

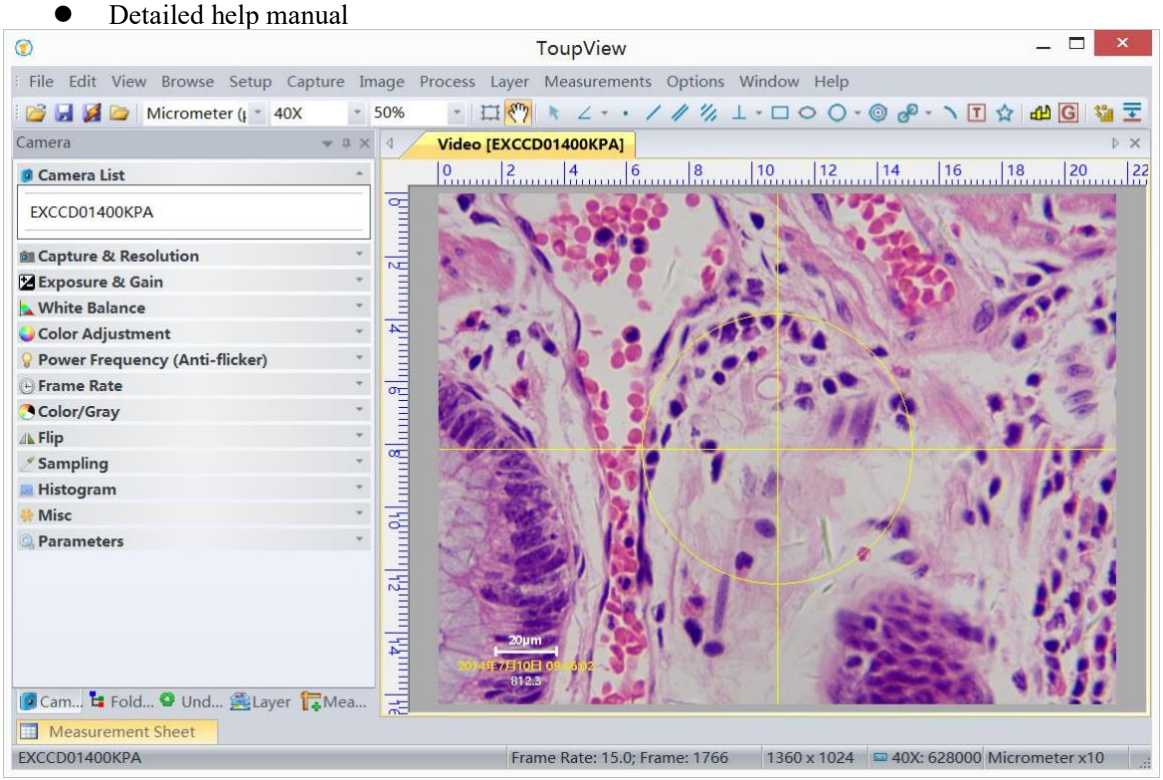


Figure 14-1 ToupView video window

14.2.2 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.)

14.2.3 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 ToupView 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

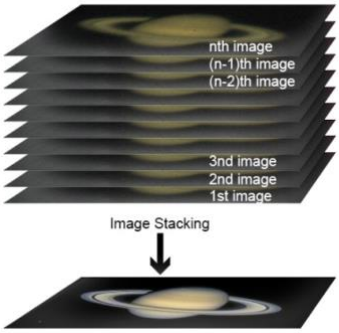


Figure 14-2 Image overlay denoising

14.2.4 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

14.2.5 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

15 Software development instructions

15.1 SDK description

The download link of the SDK is as follows:

http://www.touptek.com/download/showdownload.php?lang=en&id=32

15.1.1 SDK support platform

- Win32:
  x86: XP SP3 and above; the CPU needs to support at least the SSE2 instruction set.

  x64: Win7 and above.

  arm: Win10 and above.

  arm64: Win10 and above.
- WinRT: x86, x64, arm, arm64; Windows 10 and above.
- macOS: x86 and x64 bundle; macOS 10.10 and above.
- Linux: 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, arm64, x86, x64; compiled by android-ndk-r18b.

15.1.2 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.

    toupcam.vb, supports VB.NET. toupcam.vb uses P/Invoke to call toupcam.dll. Please copy toupcam.vb to your VB.NET 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 ModeTrigger 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.

- 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.