ABOUT US

GuoHui OPTOelectronic (GHOPTO) is a fabrication and production company dedicated to meet your III/V component and system needs. Our facilities enable wafer based processing and device production capabilities in class 100 to class 100,000 controlled environments. GHOPTO is well known as the first commercial InGaAs imaging manufacturer in China. At GHOPTO domestic and international clients receive full access to unrestricted performance and full supply-chain control: from unprocessed starting material (usually epitaxy) to fully packaged production devices such as IR imagers/cameras, lasers, waveguides and systems.

GHOPTO possesses over 20 years of experience, specifically, in the design, development, and commercialization of imaging technologies such as PIN, QWIP, and other traditional SWIR-MIR-LWIR imaging cores. This is in addition to an expanding new portfolio of emerging research and development into APD and T2SL imaging capabilities.

GHOPTO' s technical team consists of world-renowned experts from China and Canada, with headquarters in Taiyuan, and branch offices in Beijing and Shenzhen.

OUR SERVICE

GHOPTO offers three main modes of business to other companies, universities and institutions: FOUNDRY SERVICES, STANDARD InGaAs IMAGERS, and CUSTOM IR IMAGERS. With each of these modes GHOPTO can provide a tailored spectrum of in-house capabilities from design to production manufacturing that best fits your need.

Standard InGaAs Imagers

Products lines of lattice matched Short-Wave-InfraRed (SWIR) Indium-Gallium-Arsenide (InGaAs) technology. This portfolio includes SWIR and VISIBLE-SWIR linear arrays, focal plane arrays, and cameras.

- Lattice Matched InGaAs Sensor and Camera Production
- 15um Pitch

Foundry Services

1300 square meters of clean rooms (class 100 to class 100,000) dedicated to wafer fabrication, chip packaging and device testing.

- Full Wafer Fabrication (up to 4 inch) and Production
- Device Processing and Chip Packaging
- Characterization

Custom IR Imagers

Custom ROIC and epitaxy integration, new imaging technologies such as APD, and T2SL FPAs.

- ITAR* and ITAR*-free Production Advanced Technologies such as Lattice Mismatched InGaAs, APD, QWIP and T2SL

Standard InGaAs cameras

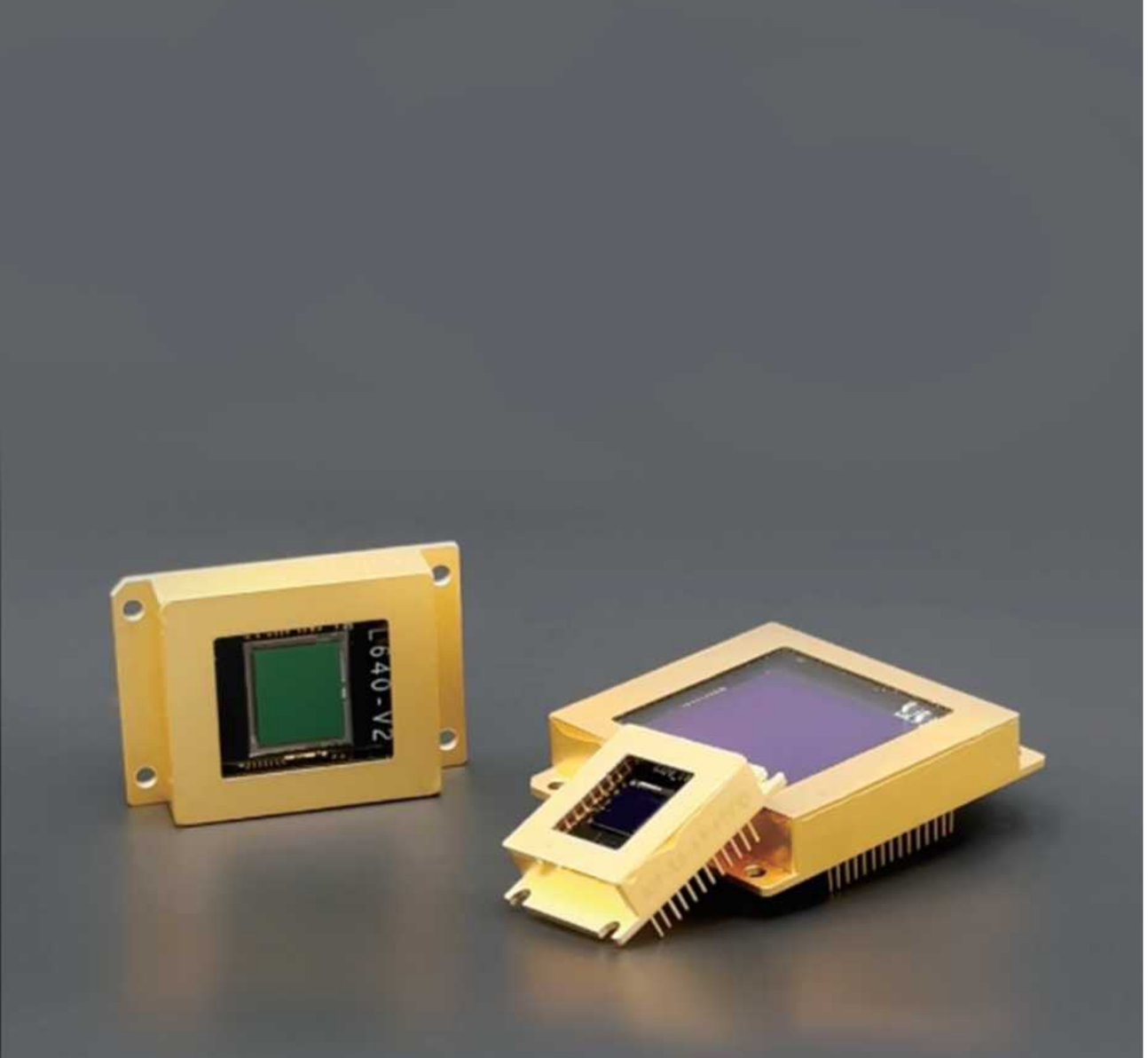
- Multiple digital signal output interfaces available
  USB, GigE, Camera Link

Domestic InGaAs camera solutions

- Completely Self-developed SWIR Camera， Meeting a variety of specific project needs

SWIR LENS

- Various Focal lengths
  8mm, 12mm, 25mm, 35mm, 50mm, 75mm, 100mm, 200mm



SWIR SENSORS

Basic Specs

SENSOR	GH-SW320	GH-SW640Pro	GH-SW1280
Material	InGaAs	InGaAs	InGaAs
Array Format	320 x 256	640 x 512	1280 x 1024
Pixel Pitch	15μm	15μm	15μm
Spectral Response	0.9μm ~ 1.7μm	0.9μm ~ 1.7μm 0.4μm ~ 1.7μm	0.9μm ~ 1.7μm

Key Specs

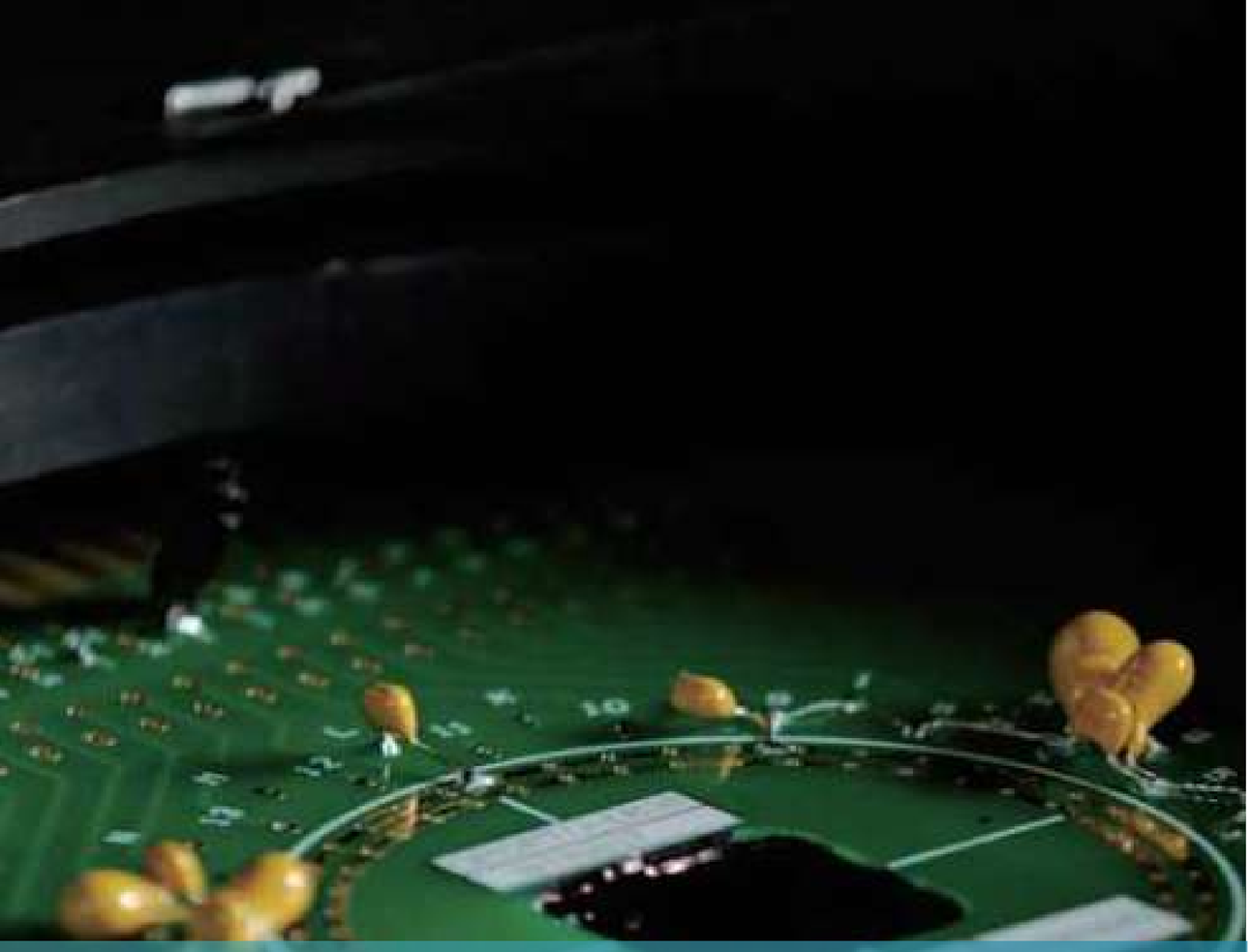
SENSOR	GH-SW320	GH-SW640Pro	GH-SW1280
Quantum Efficiency	>70% (1.0μm ~ 1.6μm)	>70% (1.0μm ~ 1.6μm)	>70% (1.0μm ~ 1.6μm)
Readout Noise	35e- @HG	18e- @HG	40e- @HG
Dark Current	30fA@0.1V&18℃	30fA@0.1V&18℃	30fA@0.1V&18℃
Pixel Operability	> 99.5%(Minimum)	> 99.5%(Minimum)	>99.5%(Minimum)
Non Uniformity	< 5%	< 5%	< 5%

ROIC

SENSOR	GH-SW320	GH-SW640Pro	GH-SW1280
Integration Type	Snapshot	Snapshot	Snapshot
Readout Modes	ITR, IWR, CDS	ITR, IWR, CDS	ITR, IWR, CDS
Integration Time	0.2μs to full frame	0.2μs to full frame	0.2μs to full frame
Frame Rate Max	500 Hz	300Hz	100 Hz
Maximum Pixel Rate	18MHz	18MHz	22MHz
Output Swing	≤2V	≤2V	≤2V
Temperature Sensor	Yes	Yes	Yes

Package

SENSOR	GH-SW320	GH-SW640Pro	GH-SW1280
Dimensions	24 x 18.5 x 6mm	36 × 25.4 × 7.2mm	40 × 36 ×7.2mm
Window Material	Quartz / sapphire	Quartz/ sapphire	Quartz/ sapphire
No.of Pin	24-pin Metal DIP Package	28-pin Metal DIP Package	30-pin Metal DIP Package
Packaging Type	Hermetically sealed	Hermetically sealed	Hermetically sealed
Operating Temperature	- 40℃ ~ 70℃	- 40℃ ~ 70℃	- 40℃ ~ 70℃
Storage Temperature	- 40℃ ~ 70℃	- 40℃ ~ 70℃	- 40℃ ~ 70℃



SWIR CAMERAS

900-1700nm / 400-1700nm SWIR Cameras

GH-SW640HS-U2
GH-SW640HS-Gnet

640x512 | 15μm | TEC 1

900-1700nm / 400-1700nm

USB2.0 / Gnet

Global shutter
Single point Correction

Basic Specs

Model Type	GH-SW640HS-U2	GH-SW640HS-Gnet
Frame Rate	50Hz	100Hz
Integration Time	100μs ~ 20ms	100 μs ~ 20ms / Max 9ms at 100Hz
Digital Output	USB 2.0	Gnet
Trigger	/	RS-422 / TTL

Key Specs

Sensor	GH-SW640HS
Resolution	640 x 512
Spectral Response	900 ~ 1700nm / 400 ~ 1700nm
Pixel Pitch	15μm
Active Area	9.6mm x 7.68mm
Quantum Efficiency	> 70%（1.0 μm~ 1.6μm）
Integration Type	snapshot
Pixel Capacity	> 99.5%
Full Well Capacity	1.8Me-
ADC	14bit
Analog Video Output	PAL、SMA Interface
Software	Windows Software/windows SDK
Power Input	DC 12V ± 2V
Power Dissipation	< 4W (TEC OFF)
Dimensions	65mm × 58mm × 75mm (without Lens)
Lens Mount	C-Mount
Operating Temp	-20 ℃ ~ +50 ℃ / -40 ℃ ~ +70 ℃ （Optional）
Storage Temp	-40 ℃ ~ +80 ℃
On-Board Image Processing	Single/two-point correction, bad pixel replacement, image denoising, image smoothing, controllable shutter compensation

* Technical data are subject to change without notice

900-1700nm / 400-1700nm SWIR Cameras

GH-SW640HS-CL

640x512

15μm

TEC 1

900-1700nm / 400-1700nm

CameraLink

Global shutter

Global shutter
Single point Correction

Model type	GH-SW640HS-CL
Sensor	GH-SW640HS
Resolution	640 x 512
Spectral Response	900 ~ 1700nm / 400 ~ 1700nm
Pixel Pitch	15μm
Active Area	9.6mm x 7.68mm
Quantum Efficiency	> 70 %（1.0 μm ~ 1.6μm）
Frame Rate	100Hz / 200 Hz （Optional）
Integration Type	snapshot
Integration Time	100μs ~ 20ms / Max 9ms at 100Hz
Pixel Capacity	> 99.5%
Full Well Capacity	1.8Me-
ADC	14bit
Analog Video Output	PAL、SMA Interface
Digital Output	SDR 26 pin connector，Base Camera Link
Software	Windows Software/windows SDK
Trigger	Camera link Via Camera Link CC1（Delay < 1μs）
Mode Control	Camera Link SerTC，SerTFG. Baud: 115200 bps
Power Input	DC 12V ± 2V
Power Dissipation	< 3W （TEC OFF）
Dimensions	61mm × 62mm × 59mm（without Lens）
Lens Mount	C-Mount
Operating Temp	-20 ℃~ +50 ℃ / -40 ℃~ + 70 ℃（Optional）
Storage Temp	-40 ℃ ~ + 80 ℃
On-Board Image Processing	Single/two-point correction, bad pixel replacement, image denoising, image smoothing, controllable shutter compensation

* Technical data are subject to change without notice

900-1700nm / 400-1700nm SWIR Cameras

GH-SW640Pro-CL2
GH-SW640Pro-GigE

640x512

15μm

Global shutter

SDK

SDK

700fps

900-1700nm / 400-1700nm

Dual CameraLink Interface
GigE

TE Cooler
The cooling temperature is 40 degrees below the ambient temperature

Basic Specs

Model Type	GH-SW640Pro-GigE	GH-SW640Pro-CL2	
Frame rate	125Hz	500Hz	700Hz
Integration Time	50μs ~ 5s	31.25μs ~ 1.7ms	23.81μs ~ 1.3ms
Interface	GigE	Dual CameraLink Interface	
Software	SDK	SDK supporting CameraLink capture card	

Key Specs

Sensor	GH-SW640Pro
Resolution	640 x 512
Spectral Response	900 ~ 1700nm / 400 ~ 1700nm
Pixel pitch	15μm
Lens mount	C-Mount
Quantum efficiency	> 70%（1.0μm ~ 1.6μm）
Full well capacity	1.8Me-
ADC	8bit / 14bit
Cooling	TEC
Dark current	30fA@0.1V&18℃
Interface	Dual CameraLink Interface
Exposure mode	Global exposure
Readout mode	IWR
Power Input	DC 12V
Power consumption	< 10W
Weight	≤500g （without Lens）
Dimensions	68mm x 68mm x 89.1mm（without Lens）
Operating Temp	-20 ℃ ~ +60 ℃
Storage Temp	-40 ℃ ~ + 85 ℃

* Technical data are subject to change without notice

900-1700nm / 400-1700nm SWIR Cameras

GH-SW640Pro-U3

640x512 | 15μm | TEC | USB3.0 | SDK | 400fps

900-1700nm / 400-1700nm

Global shutter
Single point Correction

Model Type	GH-SW640Pro-U3		
Sensor	GH-SW640Pro		
Shutter Mode	Global Shutter		
Active Area	9.6mm x 7.2mm		
Resolution	640 x 512		
Pixel Pitch	15μm		
Frame Rate	400Hz		
Integration Time	40μs ~ 1s		
Pixel format	Mono		
Spectral Response	900 ~ 1700nm / 400 ~ 1700nm		
Dynamic Range	69.8dB		
SNR	62.42dB		
Pixel Bit Depth	8/14 bit		
Power Input	12V DC, 4.8W (TEC Off)		
Cooling Method	TEC		
Dimension(L x W x H)	55mm x 55mm x 60mm		
Lens Mount	C-Mount		
Operating Temp.	-40 ℃ ~ +60 ℃		
Weight	＜250g		
Certificate	CE、FCC、RoHS		
Dark Current	HG: 26.5e	MG: 42.8e	LG: 400e
Full Well Capacity	HG: 8.5Ke	MG: 63.9Ke	LG: 1.5Me
Data Interface	USB3.0		

* Technical data are subject to change without notice

900-1700nm / 400-1700nm SWIR Cameras

GH-SW320-U2
GH-SW320-Gnet

320x256 | 15μm | 400fps | 900-1700nm 400-1700nm | USB 2.0 /Gnet | TEC

Global shutter
Single point Correction

Basic Specs	Model Type	GH-SW320-U2	GH-SW320-Gnet
	Frame rate	200Hz	400Hz
	Integration Time	100 μs ~ 20 ms Max 4.5ms at 200Hz	100 μs ~ 20ms Max 2ms at 400Hz
	Interface	USB 2.0	Gnet

Key Specs		
	Sensor	GH-SW320
	Resolution	320 x 256
	Spectral Response	900 ~ 1700nm / 400 ~ 1700nm
	Pixel pitch	15μm
	Lens mount	C - Mount
	Quantum Efficiency	＞70% （1.0μm ~ 1.6μm）
	Full Well Capacity	2.2Me-
	ADC	14bit
	Cooling	TEC
	Dark Current	30fA@0.1V&18℃
	Software	Windows Software/windows SDK
	Trigger	RS-422 / TTL
	Exposure Mode	Global exposure
	Readout mode	IWR
	Power Input	DC 12V ± 2V
	Power consumption	＜4W （TEC off）
	Weight	200g （No lens）
	Dimensions	55mm x 50mm x 63mm （No lens）
	Operating Temp	-20 ℃ ~ +50 ℃ / -40 ℃ ~ + 70 ℃ （Optional）
	Storage Temp	-40 ℃ ~ + 80 ℃
	On-board Image Processing	Single/two-point correction, bad pixel replacement, image denoising,image smoothing, controllable shutter compensation

* Technical data are subject to change without notice

400-1700nm SWIR Cameras

GH-SW033-U3
GH-SW130-U3

5μm | Global shutter | SDK | 400-1700nm | USB3.0

TE Cooler
The cooling temperature is 40 degrees below the ambient temperature

Basic Specs

Model type	GH-SW033-U3		GH-SW130-U3	
Sensor	Sony IMX991		Sony IMX990	
Resolution	640 x 512		1280 x 1024	
Active area	3.2mm x 2.56mm		6.4mm x 5.12mm	
Frame rate	137fps@640 x 512 258fps@320 x 256	257.8fps@640 x 512 486.1fps@320 x 256	70fps@1280 x 1024 135fps@640 x 512	132fps@1280 x 1024 253fps@640 x 512
ADC	12bit	8bit	12bit	8bit
Conversion gain	42.29e/ADU		44.3e/ADU	
Dynamic range	59.7dB		58.7dB	
Readout noise	174.99e-		211e-	
Full well charge	173.23ke-		181.6ke-	
Max SNR	52.39dB		52.6dB	
Dark current	172.39e-/s		383e-/s(0°C) 510e-/s(10°C) 638e-/s(20°C)	
Cooling temp	25℃ below ambient temperature		25 ~ 30℃ below ambient temperature	

Key Specs

Spectral range	400 ~ 1700nm	Pixel format	Mono8 / Mono12
Pixel pitch	5μm	Power consumption	<2.1W (uncooled) / <25W (cooled)
DDR3	512MB (4Gb)	Humidity	20% ~ 80% No Condensation
Sensitivity	121mV	Filter	400-1800nm (Standard) / 1030-1800nm (Optional)
Exposure time range	50μs ~ 60s	Dimensions	80mm x 80mm x 45.5mm
Gain range	1x ~ 15x	Lens mount	C-Mount
Shutter mode	Global Shutter	Software	SDK/ ToupView
Binning	Software 2x2, 3x3, 4x4	Weight	384.1g
Data interface	USB3.0	Certificate	CE, FCC

Operating system	Win32/ WinRT/ Linux/ macOS/ Android
Power supply	USB3.0 interface power supply / 12V power adapter power supply
Digital I/O	1 optical-coupling isolated input, 1 optical-coupling isolated output, 2 non-isolated input and output
Temperature	Operating Temp -20℃~ 60℃ ,Storage Temp -40℃~ 85℃

* Technical data are subject to change without notice

400-1700nm SWIR Cameras

GH-SW033-GigE
GH-SW130-GigE

5μm | Global shutter | SDK | 400-1700nm | GigE

Basic Specs

Model type	GH-SW033-GigE	GH-SW130-GigE
Sensor	Sony InGaAs CMOS IMX 991	Sony InGaAs CMOS IMX 990
Resolution	640 x 512	1280 x 1024
Image size	3.2mm x 2.56mm	6.4mm x 5.12mm
Max frame rate	258Hz	90Hz

Key Specs

Spectral range	400 ~ 1700nm	Pixel format	Mono 8/12
Pixel pitch	5μm	Binning	2×2 supported
Gain	24Times	Frame buffer	256M Bytes
Dynamic range	90DB	User parameter area	4K Bytes
Exposure time	0.013ms ~ 133ms	IP rating	IP30
Pixel depth	8/12bit	Data interface	GigE @ 1Gbps
Digital I/O	6 pin connectors for power supply, I/O: 1 optical-coupling isolated input, 2 optical-coupling isolated output		

Power supply	Default 12V DC, PoE Supported (USB3.0, 5V DC optional)
Power consumption	<3.5W @5V DC (USB for power supply) / < 3.0W @12V DC
Lens mount	C-mount / CS-mount
Collection method	Continuous / soft trigger / hard trigger
Temperature	Operating Temp 0℃~ 50℃ / Storage Temp -30℃~ 70℃
Humidity	20% ~ 80% RH No Condensation
Driver	DirectShow / Twain / Halcon / OCX supported
Software supported	Compatible with Halcon / OpenCV / LabView / Matlab
Programmable language	C/C++ / VB6 / VB.net / Delphi6 / C# / QT / C++Builder / LabView /Python
Oprating system	Windows / Linux / Android / MacOS
Protocol	GigE Vision V1.2

* Technical data are subject to change without notice

SWIR Lens

SWIR Lens	Focal Length	F/#	Mount	Working Wavelength	Weight
700-1700nm SWIR Lens	25 mm	1.4	C-Mount	700-1700nm	< 200g
700-1700nm SWIR Lens	35 mm	1.4	C-Mount	700-1700nm	189g
800-1700nm SWIR Lens	8 mm	1.4	C-Mount	800-1700nm	< 200g
800-1700nm SWIR Lens	12 mm	1.4	C-Mount	800-1700nm	< 260g
800-1700nm SWIR Lens	40 mm	1.4	C-Mount	800-1700nm	370
800-1800nm SWIR Lens	50 mm	2.15	C-Mount	800-1800nm	250g
800-1800nm SWIR Lens	25 mm	2.1	C-Mount	800-1800nm	/
800-1800nm SWIR Lens	100 mm	2.1	C-Mount	800-1800nm	/
900-1700nm SWIR Lens	200 mm	2.4	/	900-1700nm	/

APPLICATIONS

← Aerospace Applications

Based on the characteristics of the high spectral response of SWIR devices to the 1.3μm and 1.5μm of communication lasers, it can be applied to satellites, UAVs, and aircraft as optoelectronic payloads to achieve interplanetary communication, remote sensing detection, atmospheric composition analysis, geological exploration, etc.

→ Industrial Application

Based on the characteristics of SWIR can penetrate silicon material, it can be used for silicon wafer defect detection, photovoltaic cell inspection, infrared microscopic imaging, laser spot detection and other directions to achieve quality control in the production process of photovoltaic cells and quality control in the production process of lasers.

← Spectral Application

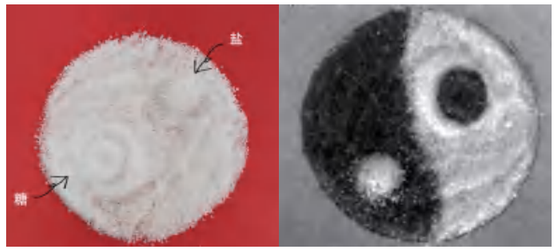
Based on the characteristics of the spectrum of different materials in SWIR, it can be applied in the direction of spectral sorting, plant moisture condition monitoring, and mineral type identification to achieve fine sorting of agricultural and food crops, plastic solid waste classification, and recycling, crop precision irrigation, mineral distribution exploration, etc.

→ Military Applications

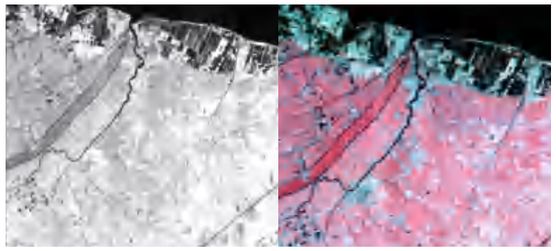
Based on the characteristics of the high response of SWIR devices from 0.78μm to 1.7μm wavelength, it can be applied in the direction of optoelectronic countermeasures, targeting systems, multi-band fusion optoelectronic loads, etc., achieving the goals of laser warning, day and night observation and precision strikes.

APPLICATIONS

APPLICATION | **Border Defense**



APPLICATION | **Agricultural Inspection**



APPLICATION | **Remote-Sensing Multispectral Imaging**

APPLICATION | **Non-invasive Inspection of Cultural Relics**

APPLICATION | **Semiconductor Inspection**

APPLICATION | **Industrial Inspection**

Find out more

SWIR Camera——Fog

SWIR Camera——Haze

SWIR Camera——Smoke