

## Features

- Sony SenSWIR IMX990 InGaAs Imager
- VIS through SWIR operation [400 – 1700nm]
- Peak QE  $\approx$  75% at  $\lambda = 1170\text{nm}$  (estimated)
- $5\mu\text{m} \times 5\mu\text{m}$  pixels with Global Shutter
- Exposure Range of 50 $\mu\text{s}$ -to-1hour
- Compatible with 1/2" C-mount Optics
- 1280(H) x 1024(V) pixels at up to 132 Frames/sec
- 8-bit or 12-bit Digital Output
- USB3.0 Interface
- TE-Cooling, up to 25°C below ambient
- Regulated cooling for stable operation conditions
- Flexible Operation: Gain, Binning and ROI Control
- Triggering: via Software or Hardware; cable included
- ToupView Image Capture & Control Software/SDK
- Windows/WinRT/Linux/macOS/Android
- C/C++, C#/VB.NET, Python, Java, DirectShow, Twain
- 3<sup>rd</sup> Party Software: Matlab, LabVIEW, Micro-manager
- CE / FCC Certified



**SONY**  
**SenSWIR**



## Description

The SWIR1300KMA is a TE-cooled, USB3.0 InGaAs SWIR camera based on Sony's SenSWIR IMX990 image sensor. This camera can capture images in the visible *and* invisible (SWIR: Short-Wavelength Infrared) regions of the spectrum. With its 1280 x 1024 x 5 $\mu\text{m}$  pixels users can acquire high-resolution VIS & SWIR images using readily-available and cost-effective 1/2" C-mount optics. The camera operates in Global Shutter mode: all pixels begin and end exposure at the same instant - ideal for imaging fast changes or rapid motion in the Field-of-View.

## Applications (a partial list)

- Inspection of semiconductors
- EL and PL inspection of Photovoltaic Cells
- NIR and SWIR fluorescence
- Materials Sciences and Physical Sciences
- Inspection and Sorting of Food & Packaging
- Airborne Environmental & Agriculture Inspection
- Anti-counterfeit measures
- Detection of Incipient Spoilage in Produce
- VIS/SWIR Spectroscopy & Multispectral Imaging
- Thermal Imaging (from 250°C to 800°C)
- Laser Beam Alignment, Profiling, M<sup>2</sup> Estimation

# Specifications

## Imager

### Sony IMX990 SenSWIR InGaAs

Active Pixels	1280 x 1024
Pixel Size	5 $\mu\text{m}$ X 5 $\mu\text{m}$
Imager Size	6.4mm (H) x 5.12mm (V)   8.2 mm (diagonal)
Aspect Ratio	5:4
Exposure Range	50 $\mu\text{s}$ to 60 sec.
Peak QE	75% @ $\lambda = 1170\text{nm}$ (see graph)
Shutter Type	Global Shutter
Gain   e-/ADU, 12 bit	1.0x   44.3   3.98x   11.15   7.94x   5.52   15.00x   2.9
Full Well Capacity	181.6Ke <sup>-</sup>   45.7Ke <sup>-</sup>   22.6Ke <sup>-</sup>   11.9Ke <sup>-</sup>
Read Noise	211e <sup>-</sup>   204e <sup>-</sup>   198e <sup>-</sup>   199e <sup>-</sup>
Dynamic Range	58.7dB   47.0dB   41.2dB   35.5dB
Dark Current [e-/p/s]	383 @ 0°C   510 @ 10°C   638 @ 20°C

## Digital Video

A/D Conversion	8-bit or 12-bit									
Host Interface	USB3.0 [5 Gbit/s USB SuperSpeed (SS) interface]									
Binning	1X1   2X2   3X3   4X4 [via software]									
Frame rate & ROI [Selected Examples]	<table border="1"> <tr> <td></td> <td>8-bit</td> <td>12-bit</td> </tr> <tr> <td>1280 X 1024</td> <td>132 f/sec</td> <td>70f/sec</td> </tr> <tr> <td>640 X 512</td> <td>253 f/sec</td> <td>135f/sec</td> </tr> </table>		8-bit	12-bit	1280 X 1024	132 f/sec	70f/sec	640 X 512	253 f/sec	135f/sec
	8-bit	12-bit								
1280 X 1024	132 f/sec	70f/sec								
640 X 512	253 f/sec	135f/sec								
Image Buffer	512MBytes (4Gb) DDR3 for stable frame delivery									

## Electrical

Input Voltage	USB3.0 and 12V adapter
Power	<2.1 Watts w/out cooling or <25W with TE-cooling

## Thermal and Mechanical

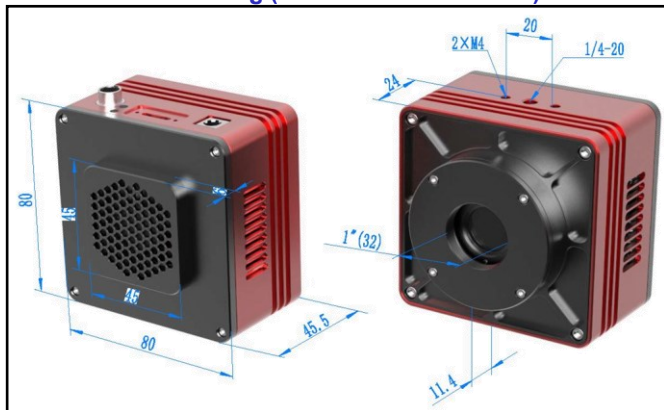
TE-cooling	Regulated to 0.1°C, $\Delta t$ of upto 25°C below ambient
Size [H X W X L]	80mm X 80mm X 62.9mm   3.15" X 3.15" X 2.48"
Weight	648 grams
Lens Mount	C-mount, 1/2" Optical Format
Camera Mount	Standard Tripod Mount, 1/4" x 20 and 2 x M4

## Camera Control

### ToupView/SDK

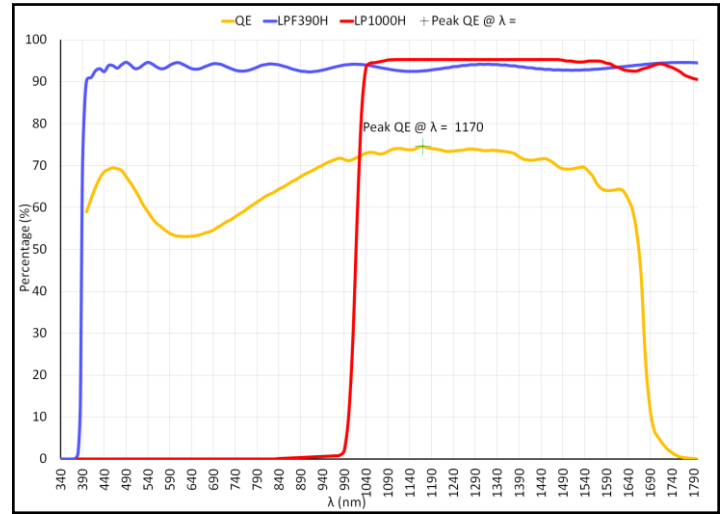
Operating System	Windows/WinRT/Linux/macOS/Android
Software Support	C/C++, C#/VB.NET, Python, Java, DirectShow Matlab, LabVIEW, Micro-manager

## Dimensioned 3D Drawing (dimensions are in mm)



## SWIR1300KMA

### \* Quantum Efficiency (Est. %) and Filter Transmission (%)

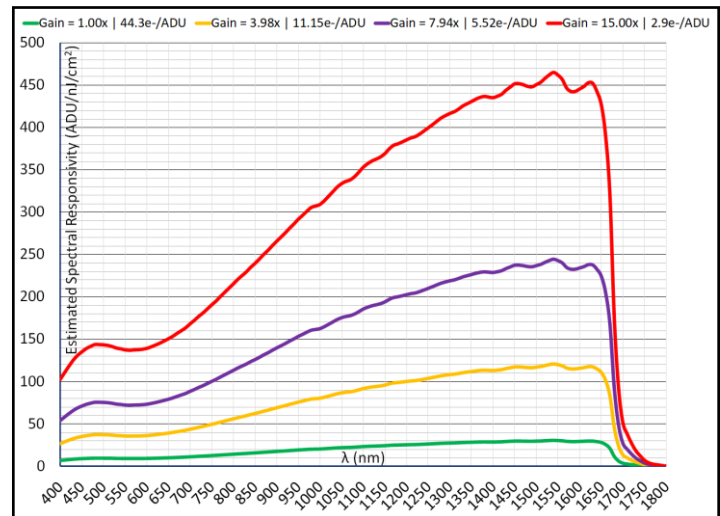


## Filter Options

### See graphs above

LPF390H	VIS+SWIR imaging [T > 90%: 400 – 1800nm]
LP1000H	SWIR imaging [T > 90%: 1040 – 1800nm]

### \* Estimated Spectral Responsivity (as a function of gain)



\* These values are estimated for the purposes of reference, but not specified by manufacturer, and thus not guaranteed.

## Dimensioned 2D Drawing (dimensions are in mm)

