



Sensors Unlimited Mini-SWIR™ Camera

High-Resolution, Mil-Rugged, High-Sensitivity InGaAs SWIR

The compact J-Series is Sensors Unlimited's next generation SWIR digital video camera featuring a 1.3MP high-resolution, high-sensitivity InGaAs imager. It provides real-time daylight to low-light imaging in the Short Wave Infrared (SWIR) wavelength spectrum for persistent surveillance, laser detection, and penetration through dust, and smoke. In addition, the camera employs on-board Automatic Gain Control (AGC) and built-in non-uniformity corrections (NUCs), allowing it to address the challenges of high-dynamic-range urban night imaging without blooming. Camera Link® digital output provides for plug-and-play video with 12-bit images for digital image processing or transmission. The light-weight and compact size enables easy integration into aerial, mobile and hand-held surveillance systems. Sensors Unlimited's proprietary bin mode allows the user to operate the camera as 640 x 512 pixel with 30 µm pixels to extreme low light imaging applications. Optional NIR/SWIR technology is available to extend the sensitivity of Sensors Unlimited cameras down to 0.7 µm, offering the advantage of extended wavelength response.

APPLICATIONS

- Low-light level imaging
- Covert surveillance with passive 24 hr./7 day operation
- Multi-laser spotting and tracking
- Imaging through atmospheric obscurants
- OEM version for easy integration into Unmanned Aerial Systems, handheld, or robotic systems
- Driver Vision Enhancement (DVE)

FEATURES

- 1280 x 1024 pixel format, 15 µm pitch
- High sensitivity 2:2 bin mode for 640 x 512 pixel format, 30 µm pitch for low light imaging
- 30 frames per second full frame rate
- Highest sensitivity available in 0.9 to 1.7 µm spectrum; NIR/SWIR, from 0.7 to 1.7 µm
- Partial moonlight to day time imaging
- Compact OEM module size < 4.5 in³
- All solid-state InGaAs imager
- On-board, real time non-uniformity corrections
- Digital 12-bit base Camera Link® output
- Automatic Gain Control (AGC)
- Local Area Processing Dynamic Range Enhancements
- Tested to MIL-STD-810G for functional shock, vibration, thermal shock, storage temperature, altitude, humidity, and acceleration
- FCC, MIL-STD-461F, and CE certified



MECHANICAL SPECIFICATIONS		
	Enclosed	OEM
Module dimensions Width x Height x Depth	2.0 x 2.0 x 2.44 inches 50.8 x 50.8 x 62.1 mm (with I/O connectors, no lens or mount)	1.60 x 1.65 x 1.60 inches 40.6 x 41.9 x 40.6 mm (excludes optional output panel)
Weight (no lens)	≤ 235 g	≤ 120 g
Lens Mount	M42x1 mount	M42x1 mount bracket
Included Lens	f/1.4, 50 mm, 21.7° FOV width, M42x1-mount	none
Camera Link Connector	3M SDR26 Connector	none
Interface Connector	Not applicable	Samtec LSHM-130-030-L-DV-A-N
Pixel Pitch	15 μm; 30 μm in 2:2 bin mode	15 μm; 30 μm in 2:2 bin mode
Focal Plane Array Format	1280 x 1024 pixels; 640 x 512 in 2:2 bin mode	1280 x 1024 pixels; 640 x 512 in 2:2 bin mode
Active Area	19.2 mm x 15.4 mm x 24.6 mm diagonal	19.2 mm x 15.4 mm x 24.6 mm diagonal

ENVIRONMENTAL & POWER SPECIFICATIONS	
Operating Case Temperature	-20°C to 45°C
Storage Temperature	-54°C to 85°C, MIL-STD-810G Method 501.5 and 502.5
Humidity	95% relative humidity, MIL-STD-810G Method 507.5 Procedure II
Power Requirements:	
AC Adapter Supplied	100-240 VAC, 47-63 Hz
DC Voltage	+8-16 V
Power	≤ 4.5 W at 20°C (case temperature), ≤ 8 W at 45°C
Functional Shock, Random Vibration, Thermal Shock, Temperature/Altitude/ Humidity Combine, Acceleration	MIL-STD-810G compliant
Electromagnetic Interference (EMI)	FCC Part 15, Subpart B, MIL-STD-461F RE102, CE102, CS115, CS116, RS103
CE Compliance	EN 61326-1:2006, EN 60950-1
Mean Time Between Failure	≥ 10,000 hours, MIL-HDBK-217 with VITA 51.1 Supplement Telcordia Issue 2
Fungus-Inert Material	MIL-HDBK-454B

ELECTRICAL SPECIFICATIONS	
Optical Fill Factor	100%
Spectral Response	Standard, 0.9 μm to 1.7 μm NIR/SWIR, 0.7 μm to 1.7 μm
Quantum Efficiency	Standard, ≥ 65% from 1 μm to 1.6 μm NIR/SWIR, ≥ 65% from 0.9 μm to 1.6 μm
Bin Mode	Analog 2:2
Mean Detectivity, D* (Typical) ¹	1.4 x 10 ¹³ cm ¹ /Hz/W (full resolution) 2.7 x 10 ¹³ cm ¹ /Hz/W (2:2 binning mode) 1.5 x 10 ⁹ photons/cm ² ·s (full resolution) 5.3 x 10 ⁸ photons/cm ² ·s (2:2 binning mode)
Noise Equivalent Irradiance (Typical) ¹	85 electrons
Noise (RMS, Typical) ¹	4.5 x 10 ⁵ electrons
Full Well Capacity ²	1000:1
Dynamic Range (Typical) ³	≥ 99%
Operability ⁴	224 μs to 32.0 ms
Exposure Times	2-point (offset and gain) pixel by pixel, user selectable
Image Correction	12-bit base Camera Link®
Digital Output Format	30 fps
Digital Output Frame Rate	Continuous or 3 externally triggered modes
Scan Mode	

¹ λ = 1.55 μm, exposure time = 32 ms, highest sensitivity OPR level, no lens, x1 digital gain with enhancement, AGC, and correction off.

² Exposure time = 224 μs, low gain.

³ In high dynamic range OPR settings. Able to achieve 300:1 in highest sensitivity OPR settings.

⁴ The fraction of pixels with responsivity deviation between +/-35% from the mean.

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