

P R E L I M I N A R Y

SENSORS  
UNLIMITED



1.25 x 1.25 x 1.10 inches  
31.8 x 31.8 x 28 mm

## Micro-SWIR™ 640CSX Camera

Mil-Rugged, High Sensitivity, Small SWaP,+C InGaAs SWIR Camera

**The compact 640CSX is the next generation SWIR video camera, designed for applications requiring small Size, Weight, and Power (SWaP) applications and available without ITAR restriction.**

The Sensors Unlimited Micro-SWIR 640CSX camera features a 640x512 pixel, high-sensitivity, stabilized InGaAs snapshot imager and utilizes Sensors Unlimited's advanced image enhancement algorithms to produce highest quality imagery in all lighting conditions.

The camera provides real-time daylight to low-light imaging in the Short Wave Infrared (SWIR) wavelength spectrum for a range of applications that include industrial process monitoring, enhanced vision, and persistent surveillance. On-board Automatic Gain Control (AGC) optimizes the camera's dynamic response throughout day and night imaging scenarios. Camera Link® digital output provides for plug-and-play video with 12-bit images for digital image output.

The light weight, compact size, and low power draw are ideally suited for integration into commercial systems and industrial process monitoring applications. Optional NIR/SWIR technology is available to extend the sensitivity of the 640CSX below 0.9  $\mu\text{m}$ , offering the advantage of both Near Infrared (NIR) and Short Wave Infrared wavelength response.

### FEATURES

- 640x512 pixel format, 12.5  $\mu\text{m}$  pitch
- 30 or 60 frames per second full frame rate
- 1.5 W power consumption (@ 20° C)
- High sensitivity 0.9 to 1.7  $\mu\text{m}$  spectrum response imager; NIR/SWIR, from 0.7 to 1.7  $\mu\text{m}$
- Low light to daytime imaging
- Compact size
- All solid-state InGaAs imager
- Snapshot exposure
- On-board, real time non-uniformity corrections
- Digital 12-bit Camera Link® base output  
Other output options available upon request
- Automatic Gain Control (AGC)
- C-mount compatible; adapters available
- Selectable contrast enhancement modes
- User defined Region of Interest (ROI) windowing mode
- Digital pixel binning
- FCC Part 15 and MIL-STD-461F certified
- Tested to MIL-STD-810G for functional shock, vibration, thermal shock, storage temperature, and humidity
- Operation from -40°C to 70°C case temperature

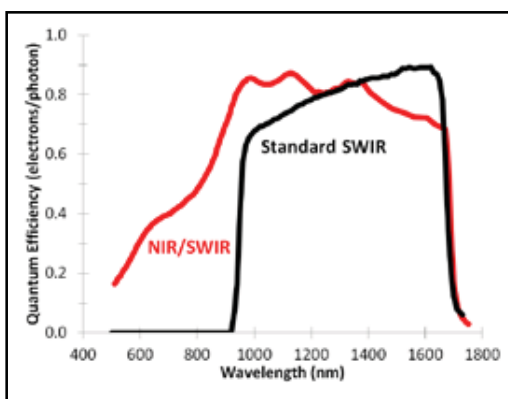


### MECHANICAL SPECIFICATIONS

<b>Model</b>	SU640CSX-12.5B-ENC housed series SU640CSX-12.5B-OEM
<b>Dimensions (width x height x depth) (excludes connectors, excludes lens)</b>	ENC Series: 1.25"W x 1.25"H x 1.10"D 31.8 x 31.8 x 28 mm OEM Series: 1.25"W x 1.25"H x 1.10"D 31.8 x 31.8 x 28 mm
<b>Weight</b>	ENC Series: ≤45 grams OEM Series: ≤41 grams
<b>Lens mount</b>	C-mount
<b>Camera Link Connector</b>	26 Pin SDR standard connector Board-to-board connector option for OEM model
<b>Power Input Connector</b>	14 Pin SDR standard connector
<b>Pixel Pitch</b>	12.5 μm
<b>Focal Plane Array Format</b>	640 x 512 pixels
<b>Active Area</b>	8.0 mm x 6.4 mm (10.2 mm diagonal)

### ENVIRONMENTAL & POWER SPECIFICATIONS

<b>Operating Case Temperature</b>	-40°C to 70°C
<b>Storage Temperature</b>	-54°C to 85°C
<b>Humidity</b>	95% RH non-condensing
<b>Power Requirements:</b>	
<b>DC Voltage</b>	DC Voltage: +4.5-16V
<b>Steady State Power</b>	Power: 1.5 W at 20°C case temperature, max ≤4.25 W
<b>Max Power</b>	
<b>Functional Shock, Random Vibration, Thermal Shock</b>	MIL-STD-810G compliant design



### ELECTRICAL SPECIFICATIONS

<b>Optical Fill Factor</b>	100 %	
<b>Spectral Response</b>	Standard, 0.9 μm to 1.7 μm NIR/SWIR, 0.7 μm to 1.7 μm	
<b>Quantum Efficiency</b>	Standard, ≥ 65% from 1 μm to 1.6 μm NIR/SWIR, ≥ 65% from 0.9 μm to 1.6 μm	
<b>Digital Output Frame</b>	<b>30 fps</b>	<b>60 fps</b>
<b>Mean Detectivity, D*<sup>1</sup> (cm√Hz/W)</b>	≥ 2.5 x 10 <sup>13</sup>	≥ 2.8 x 10 <sup>13</sup>
<b>Noise Equivalent Irradiance<sup>1</sup> (photons/cm<sup>2</sup>/s)</b>	≤ 9.7 x 10 <sup>8</sup>	≤ 1.2 x 10 <sup>9</sup>
<b>Noise (RMS)<sup>1</sup></b>	≤ 35 electrons (typical)	≤ 25 electrons (typical)
<b>Dynamic Range<sup>1</sup></b>	≥ 2500:1 at low gain ≥ 800:1 at high gain	≥ 2500:1 at low gain ≥ 1100:1 at high gain
<b>Operability<sup>2</sup></b>	≥ 99 %	
<b>Exposure Times</b>	Proconfigured: 200 μs to 33 ms User configurable	
<b>Image Correction</b>	2-point (offset and gain) pixel by pixel, user selectable	
<b>Output Format</b>	12 bit base Camera Link® Other output options available	
<b>Scan Mode</b>	Continuous with user configurable trigger modes	

<sup>1</sup>λ = 1.55 μm, exposure time = 33 ms (30fps), 16.67 ms (60 fps), case temperature = 20°C, highest sensitivity gain setting, no lens, x1 digital gain with enhancement, AGC, and correction off

<sup>2</sup> The fraction of pixels with responsivity deviation between +/- 35% from the mean.

Distribution in the UK & Ireland



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**Characterisation,  
 Measurement &  
 Analysis**



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