

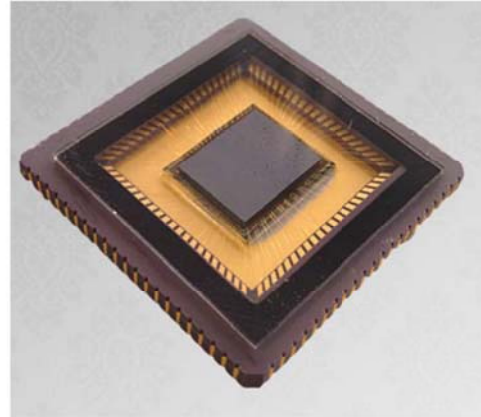
### Multispectral Image Sensor

#### Key Features

- 640 (H) x 512 (V) Active Pixels
- 15  $\mu\text{m}$  x 15  $\mu\text{m}$  Square Pixels
- 1 inch Optical Format
- SWIR Spectral Coverage: 900 – 1,700 nm
- VIS-SWIR Optional: 400– 1,700 nm
- Quantum Efficiency in visible & NIR/SWIR (>60% @ 600 – 1600 nm)
- Min. Detectable Threshold: 0.001 lux
- Variable Frame Rate: 30 – 800 fps for Active Window of 640 x 512
- Digital Output
- High Dynamic Range: 120 dB - Clear vision in fog, rain, shadows, excess light.
- Electronic Global Shutter
- $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  Operational Temperature Range
- 84-Pin LCC Package
- Power Dissipation: < 500 mW
- These Devices are Pb-Free and are RoHS Compliant

#### Applications

- High Speed Imaging / Short Integration
- SWIR Imaging, Night Vision /Fog Vision
- Homeland Security – Security & Surveillance, Military
- First-responders, Law Enforcement & Public Safety
- Automotive – Autonomous & Non-Autonomous Driving Sensors – Safety, Collision, Obstacle Avoidance
- Machine Vision
- Inspection – Solar Cell & Silicon Ingot
- Agricultural QC & Food Sorting
- Process Control – Semiconductor
- Spectroscopy, Microscopy, Scientific Imaging, Raman Chemical ID - Pharma
- Space & Atmospheric Remote Sensing
- Bio - Medical Imaging



#### Description

The Banpil *B42-640S Multispectral Image Sensor* is a next generation high performance 2-D array image sensor designed for a wide range of image sensing applications in the 0.9  $\mu\text{m}$  to 1.7  $\mu\text{m}$  SWIR wavelength band. There is an option to extend the image sensor spectral range from 0.4  $\mu\text{m}$  to 1.7  $\mu\text{m}$  multispectral wavelength bands from visible to SWIR imaging.

The sensor is built with a truly unique technology employing a single monolithic sensor that detects Visible, Near Infrared (NIR) and Shortwave IR (SWIR) light (4 bands in 1 or 4-in-1) with high quantum efficiency and broad range of peak response for multiple functions.

The *B42-640S multispectral* image sensor produces more than 2x consistently clearer, sharper, enhanced images than CCD sensors in visible light and clearer, sharper NIR/SWIR images where CCD fails. With a highly sensitive minimum detectable threshold of 0.001 lux, this sensor is able to “see” in practically total darkness. No light projection is needed. It also produces higher quality images in rapidly changing bright and dark conditions giving visibility in poor lighting.



## B42-640S Data Sheet

### SPECIFICATIONS

GENERAL SPECIFICATIONS		ELECTRO-OPTICAL SPECIFICATIONS	
Parameters	Specification	Parameters	Typical Specifications
Sensor Type	InGaAs	Max Frame Rate	800 FPS at Full Resolution
Active Pixels / Resolution	640 × 512 (digital) – Extended VGA	Optical Format	1"
Pixel Size/Pitch	15 μm x 15 μm	High Speed Sub Window	> 4,000 FPS (64 x 64 window)
Active Area (H x V)	Digital: 9.6 mm x 7.7 mm	Windowing (ROI)	Randomly programmable ROI
Pixel Type	Global shutter pixel architecture	Readout	Windowed & subsampled readout
Integration Time	500 ns to 500 ms	Fill Factor (FF)	95%
Integration Modes	Integrate-Then-Read	Quantum Efficiency (QE)	> 60% from 0.6 to 1.6 μm
Internal Master Clock	Up to 250 MHz	Spectral Response (Optional)	Standard 0.9 - 1.7 μm VIS/SWIR 0.4 - 1.7 μm
Digital Output Format	24 bit LVDS; Low power LVDS 160 MHz	Photo Response Nonuniformity (PRNU)	10% of Signal
Power Dissipation	≤ 500 mW, 3.3 V and 1.8 V supplies	Min Detectable Range	0.001 lux
Package Type	84 LCC; Glass Lid	Dynamic Range	120 dB

**Banpil Photonics, Inc.**

**Santa Clara, CA 95054**