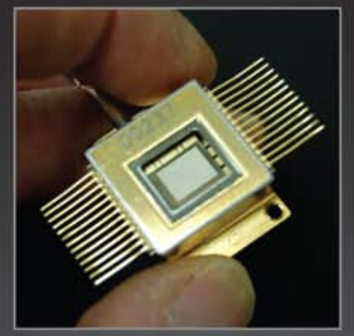

# TriWave®

Ge ENHANCED CMOS CAMERA

WARNING: The product described in this brochure is subject to export regulation by the International Traffic in Arms Regulations (ITAR). Buyers are required to comply with all applicable laws and regulations of the United States regarding the export of this product.

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TriWave®

Ge ENHANCED CMOS CAMERA


## FEATURES »

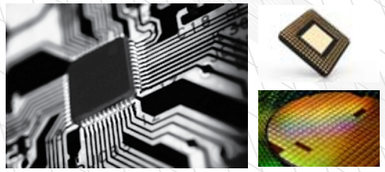
Spectral Response: 300nm - 1600nm
Pixel Format: 640 x 480
Pixel Pitch: 10µm
Low Noise <20e- RMS
ADC Resolution: 12 bits
Frame Rate: 30 fps
C-Mount Lens Adapter

## ADVANTAGES »

VIS - NIR - SWIR Operation
Fine Pixel Pitch for High Image Resolution
High Pixel Operability
Low Pixel Capacitance

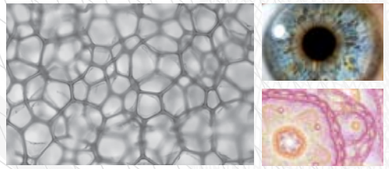
# APPLICATIONS

## SEMICONDUCTORS



- Packaging - Detection of Cracked Devices
- Materials and Circuit Inspection
- Failure Analysis - Backside Thru Silicon Imaging of Circuit Defects and Failures
- PV Inspection - Photoluminescence and Electroluminescence characterization

## BIO

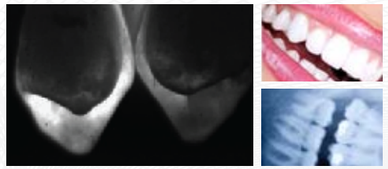


**Ophthalmology**
- Retinal Inspection
- Multi-Color Optical Coherence Tomography

**Dermatology**
- Skin Hydration
- Melanoma ID

**Surgery**
- Broad Spectrum Fluorescent Cancer Marker
- Blood Vessel ID
- Lipid ID

## DENTAL



- Interproximal Enamel Inspection
- Occlusal Enamel Inspection
- Surface Inspection

## MACHINE VISION

- "See Thru" Metrology for Most Plastic and Glass Bottle Inspection
- Ice / Water / Steam Detection
- Higher Temperature SWIR Thermal Imaging

## PHARMA

- Capsule Surface and Internal Product Inspection
- Tablet Inspection

## SPECTROSCOPY

- 2D Imaging Spectroscopy using Pixelated Filters
- High Resolution Broad Spectrum Linear Array Spectroscopy

## AGRICULTURE

**Irrigation Planning**
- Soil Hydration

**Produce Inspection**
- Damage Assessment and Quality Binning
- Contamination Detection

**Meat Inspection**
- Contamination Detection

## FIBER INSPECTION

- Cladding Inspection
- Complex Fiber Optic Circuit Debug
- TeleCom and Laser Optical Bench Stray Light Detection

## DEFENSE

**Night Vision**
- Persistent / Staring Passive Applications

**Target Acquisition**

**ISR Systems**

**Search & Rescue**
- Day / Night Visibility of IR Beacons

# SPECIFICATIONS

## SENSOR

| | |
|---|---|
| Pixel Pitch | 10 µm |
| Active Array Size (1/2" format) | 640 x 480 (6.4 mm x 4.8 mm) - VGA |
| Spectral Response at -80C | 300 to 1600nm |
| Temporal Dark Noise -80C 33msec exposure (+25C 130µsec exposure) | 16 e- (79 e-) |
| Read Noise with Gain = 1, -80C (+25C) | 11 e- (37 e-) |
| ADC Resolution | 12 bits |
| Operability (uncorrected/corrected) | (>98% / 100%) |
| Dynamic Range Gain=1, full exposure, -80C | 61 dB |
| Analog Gains | 0.5, 1, 2, 4 |
| Well Depth (Gain=4 / Gain=1 / Gain=.5) | 6,250 e- / 25,000 e- / 50,000 e- |
| Exposure Times @ 30 fps (frame rates: 1.875, 3.75, 7.5, 15, 30) | 33 ms to 143 µs |
| Outputs Available: Analog<br>Digital | Composite NTSC<br>USB 2.0: 12-bit video, 8-bit preview |
| Signal Corrections Available | Dark Frame Subtraction<br>Bad Pixel Mask<br>Static & Dynamic Gain Equalization |

## MECHANICAL & POWER

| | |
|---|---|
| Weight (Core/TriWave) with no lens | .668 kg / 1.44 kg |
| Physical Dimension (Core/TriWave) | 69 x 70 x 132 nm / 115 x 100 x 170 mm |
| Lens Mount | C-Mount |
| Included Lens | f/1.35, 25mm broadband 0.48 -1.7 µm |
| Operating Temperature (ambient) | -10° C to 40° C |
| AC Adapter Supplied | 100-240 VAC, 50-60 Hz |
| DC Power Supply | 12 VDC, (2 Amps, peak) (1.5 Amps nominal) |