VENUSLAB
OPTOELECTRONICS

Precision Meets Simplicity

VL 640 High-Resolution Mini UAV Thermal Camera Core

An ultra-lightweight, high-resolution (640×512) thermal imaging core engineered for SWaP-optimized UAV payloads and demanding industrial electro-optical integration.

- Ultimate SWaP Optimization
- High-Definition & Fluid Imaging
- Precision Industrial Thermometry
- Seamless Secondary Development

One Platform Many Possibilities

Contact Us sales@venuslabtech.com

Get a Quote

Get Expert Advice
+658099 5547（WhatsApp）

Visit Us
www.venuslabtech.com

VL 640 High-Resolution Mini UAV Thermal Camera Core

Overview

Product Overview

This 640×512 high-resolution uncooled thermal imaging module is meticulously designed for demanding applications with strict SWaP (Size, Weight, and Power) constraints. With its ultra-compact "cherry-sized" form factor and extremely light weight, this module is perfectly suited for light unmanned aerial vehicles (UAVs), FPV drones, miniature handheld observation devices, and various electro-optical system integrations.

Combined with an advanced 5th-generation infrared image processing algorithm, it not only delivers smooth and clear night vision but also supports deep secondary development, making it an ideal core component for industrial thermometry, machine vision, and security monitoring equipment.

Key Features

- Ultra-Lightweight Design: The core board measures only about 26×26×22mm and weighs as little as 20g (excluding lens), minimizing the impact on drone flight endurance and dynamics. It is an excellent choice for space-constrained electro-optical pods.
- Outstanding Thermal Sensitivity & High Frame Rate: Equipped with a 12μm Vanadium Oxide (VOx) detector, it offers exceptional thermal sensitivity (NETD). Paired with a 50Hz high frame rate, it captures smooth, stutter-free, and crystal-clear thermal images even during high-speed movement.
- Ultra-Low Power Consumption: The typical power consumption is under 700mW at full frame rate operation, significantly reducing the cooling pressure on the overall system and ensuring steadfast stability during continuous operation.
- Rich Interfaces & High Integration: Compatible with multiple serial communication protocols and video output interfaces (CVBS analog output, USB, UART, BT.656/LVCMOS). It features shutterless technology, facilitating rapid secondary development and seamless integration.
- Wide & Precise Temperature Measurement (Thermometry Version): The temperature measurement range spans from -20℃ to +550℃ with an accuracy of ±3℃ or ±3%, perfectly fulfilling thermal monitoring requirements in complex industrial scenarios, including high and low-temperature stages.

Typical Applications

- UAVs and Unmanned Systems: FPV racing night vision, light commercial drone navigation, UAV inspection pods.
- Electro-Optical System Integration: Multispectral systems, and optical path auxiliary thermal imaging monitoring for spectrometers and laser equipment.
- Industrial and Machine Vision: High/low-temperature environmental test monitoring, industrial manufacturing automated temperature measurement, and power equipment inspection.
- Portable Devices: Miniature Enhanced Night Vision Goggles (ENVG), security helmets, and handheld thermal observation devices.

Specifications

Technical Specifications

Parameter	Specification Details
Detector Type	Vanadium Oxide (VOx) Uncooled Infrared Focal Plane Detector
Resolution	640 × 512 pixels
Pixel Pitch	12μm
Spectral Range	8 ~ 14μm
Thermal Sensitivity (NETD)	≤40mK or ≤50mK (@25°C, F#1.0)
Frame Rate	50Hz (Ensures smooth dynamic imaging)
Typical Power Consumption	< 700mW
Image Processing	NUC / 3D DNR / DDE (Digital Detail Enhancement), supports image flip and pseudo-color switching

Video Output	Analog: CVBS (PAL/NTSC) / Digital: BT.656 / 8Bit/14Bit LVCMOS / USB
Control Interface	UART / RS232
Measurement Range (Thermometry Version)	-20°C ~ +550°C
Measurement Accuracy (Thermometry Version)	±3°C or ±3% (whichever absolute value is greater)
Dimensions	Approx. 26mm × 26mm × 22mm (excluding lens and expansion board)
Weight	Approx. 20g - 30g (excluding lens)
Operating Temperature	-40°C ~ +80°C

Serivce & Support

We are dedicated to delivering exceptional optoelectronic solutions to every client. From precision manufacturing and secure delivery to full-lifecycle technical support, we are here to ensure a seamless and reliable experience at every step.

1. Warranty Policy

Quality First, Worry-Free Operation

Warranty Period: We offer a **two-year** warranty service for all of our core optoelectronic products, effective from the date of shipment.

Coverage: We provide free repair or replacement services for malfunctions caused by material defects or workmanship errors under normal operating conditions.

Rapid Response: Upon receiving a warranty claim, we guarantee to initiate the assessment process within **24 hours** to minimize your equipment downtime.

2. Technical Support

Expert Team, Full-Process Guidance

Technical Consultation: Our team of senior optical engineers provides **24/7 online support** to assist with installation, commissioning, optical path alignment, and parameter optimization.

Scheduled Maintenance: We offer full-lifecycle maintenance recommendations, including firmware upgrades, optical component cleaning guidelines, and precision calibration services.

Training Services: We provide customized remote or on-site operational and safety training to ensure your team can operate the equipment efficiently and safely.

3. Logistics & Delivery

Precision Packaging, Global Reach

Professional Packaging: Given the fragile nature of optical instruments, we utilize industrial-grade shockproof, anti-static, and moisture-proof vacuum packaging to ensure zero damage during transit.

Logistics Partners: We partner with top-tier global logistics providers **(DHL / FedEx / UPS / SF Express)** to offer reliable shipping with real-time tracking.

Shipping Insurance: All shipments are fully insured to eliminate logistics risks.

4. Compliance & Certification

Strict Standards, Total Compliance

Quality Certification: Our manufacturing process is **ISO 9001 certified**, and our products comply with international standards such as **CE** and **RoHS.**

Export Compliance: "Committed to environmental responsibility, all our products comply with **RoHS 2.0** and **REACH** standards, ensuring safety and global compliance."

VENUSLAB
OPTOELECTRONICS

VL 640 High-Resolution Mini UAV Thermal Camera Core

Explore Series

Model	Pixel Pitch	Response Spectra	Frame Rate	Resolution
VL-IR384	12μm	8~14μm	50Hz	384x288
VL-IR384-T	12μm	8~14μm	50Hz	384x288
VL-IR640	12μm	8~14μm	50Hz	640x512
VL-IR640-T	12μm	8~14μm	50Hz	640x512

📩 Get in touch with our team to explore configurations,request a quote,or learn more about customized solutions tailored to your needs.

Let us help you moves cience forward—faster and smarter.

Get a Quote

Get Expert Advice
+658099 5547（WhatsApp）

Visit Us
www.venuslabtech.com