

LV0625A

Single-Chip Dual-Spectrum Module

Technical Specification

Uncooled LWIR thermal imaging · 5 MP monochrome visible imaging · RS422 control · compact payload integration

THERMAL RESOLUTION 640 × 512	VISIBLE RESOLUTION 2560 × 1920	POWER INPUT DC 5.0–5.5 V	TOTAL WEIGHT ≤70 g
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The LV0625A is a compact dual-spectrum imaging module integrating long-wave infrared thermal imaging and visible-light imaging functions for embedded electro-optical systems. It provides digital video output, image preprocessing/enhancement, self-test reporting, version query and serial-port online software upgrade functions, making it suitable for compact payloads and multi-sensor platforms.

Dual-spectrum output	Independent visible-light and infrared digital video outputs for system-level image fusion or parallel processing.
Compact and lightweight	Thermal module envelope ≤35 × 35 × 32.2 mm; visible module envelope ≤41 × 23 × 5.5 mm; total weight ≤70 g.
Enhanced imaging functions	Visible-light image enhancement, haze penetration, strong-light suppression, digital zoom and manual image tuning.
Thermal image processing	Automatic/manual NUC, shutter correction disable, polarity switching, gain/brightness control, digital zoom and OSD blanking.

1 Product Overview

The LV0625A dual-spectrum module is designed for applications requiring compact infrared and visible-light imaging in a single payload architecture. It supports real-time digital video output, serial communication control, image enhancement and built-in test functions. The module is intended for integration into EO payloads, compact gimbals, vehicle-borne systems, unmanned platforms and other embedded imaging devices.

2 Sensor Specifications

Category	Parameter	Specification
Thermal Sensor	Resolution	640 × 512
	Pixel pitch	12 μm
	Spectral response	8–14 μm
	Defective pixels	Total detector defective pixels: ≤5‰. No defective pixels are allowed in the central area (128 × 104). Outside the central area, clustered defective pixels shall be ≤3 groups.
	MRTD	≤0.45 K (@ 2 cy/mrad, focal length 40 mm, F# 1.1)
	NETD	≤60 mK (@ 25°C, 75% FOV, temporal domain)
Visible-Light Sensor	Resolution	2560 × 1920
	Pixel size	2.5 μm
	Spectral response	0.4–1.1 μm
	Illumination range	200 Lux–170,000 Lux
	Color mode	Monochrome

3 Functional Capabilities

Category	Parameter	Specification
General Functions	Video output	Supports output of visible-light and infrared digital video signals.
	Image preprocessing	Supports preprocessing and enhancement of visible-light and infrared digital images.
	Built-in test	Supports power-on self-test and forced self-test, and reports self-test results.
	Version management	Supports software version reporting and query.
	Online upgrade	Supports online software upgrade through the serial port.
Visible-Light Imaging	Automatic controls	Automatic brightness, automatic gain and automatic exposure.
	Manual adjustment	Manual brightness and contrast adjustment.
	Strong-light suppression	Supports strong-light suppression.
	Enhancement and dehazing	Supports image enhancement and haze penetration / dehazing.
	Digital zoom	1× / 2× / 4× electronic zoom.
Thermal Imaging	NUC	Automatic and manual non-uniformity correction.
	Shutter control	Supports disabling shutter correction.
	Image enhancement	Supports infrared image enhancement.
	Digital zoom	Supports electronic zoom.
	Image control	Polarity switching, gain adjustment, brightness adjustment and automatic gain/brightness control.



Category	Parameter	Specification
	OSD	Supports character overlay and blanking.

4 Performance and Image Quality

Category	Parameter	Specification
Performance	Self-test time	≤4 s
	Start-up time	≤8 s
	Image quality	The overall image shall be clear, consistent and uniform, without vignetting, overexposure, stripes, snow noise, aperture artifacts or other visual interference.
Anti-Interference Imaging	Natural background	The module shall provide reliable imaging under front-lighting, back-lighting and other natural background conditions.
	Sun-angle condition	When the angle between the optical axis and the sun is ≥15°, the module shall maintain reliable imaging without excessive overexposure or underexposure.
	Nearby fire source	When a burning object is located 30 m laterally from the target, the module shall maintain reliable imaging.

5 Electrical and Interface Characteristics

Category	Parameter	Specification
Electrical	Power supply	DC +5.0 to +5.5 V
	Power consumption	≤7 W under all operating conditions
Communication	Control interface	Standard asynchronous RS422 communication interface, 115200 bps baud rate
Video Interface	Visible-light video	2560 × 1920 pixels/frame, 25 fps, 8-bit transmission
	Infrared video	640 × 512 pixels/frame, 25 fps, simultaneous 8-bit + 14-bit transmission
	Output channels	One visible-light channel and one infrared channel
Grounding	Grounding requirement	The housing is used as shield ground. The internal circuitry is not connected to chassis ground.

6 Physical Characteristics and Optional Lenses

Category	Parameter	Specification
Mechanical Envelope	Thermal module	35 (±0.3) mm × 35 (±0.3) mm × 32.2 (±0.2) mm
	Visible-light module	41 (±0.1) mm × 23 (±0.2) mm × 5.5 (±0.1) mm
	Total weight	≤70 g
Optional Lenses	Thermal imaging lenses	25 mm / 40 mm / 65 mm
	Visible-light lenses	25 mm / 40 mm

7 Environmental Conditions

Category	Parameter	Specification
Temperature	Operating temperature	-40°C to +65°C
	Storage temperature	-50°C to +75°C

Category	Parameter	Specification
Mechanical Environment	Vibration	Random vibration, all axes, 10 min/axis
	Shock	20 g (or half-sine 10 g), three axes, duration 11 ms
EMC	Electromagnetic compatibility	When integrated with the system, the product shall not interfere with satellite signals.

8 Mechanical Interface and Dimensions

The following drawing summarizes the mechanical interface and main dimensions for the thermal module and visible-light module. Final mounting design should be verified against the formal mechanical interface drawing and project-specific integration requirements.

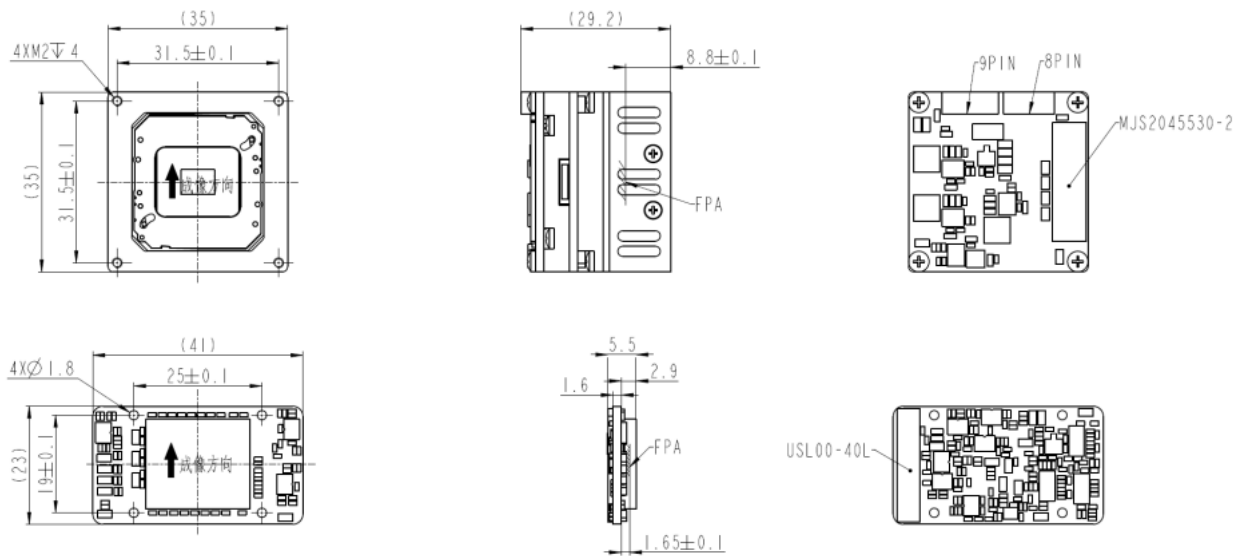


Figure 1. LV0625A mechanical interface and envelope dimensions

Category	Parameter	Specification
Mechanical Interface	Thermal module	35 (±0.3) mm × 35 (±0.3) mm × 29.2 (±0.2) mm
	Visible-light module	41 (±0.1) mm × 23 (±0.2) mm × 5.5 (±0.1) mm

9 Delivery and Integration Notes

- The specifications listed in this document describe the standard LV0625A module. Final delivery configuration may be adjusted according to lens selection, interface definition and platform integration requirements.
- For system integration, joint verification is recommended for mechanical mounting, power stability, RS422 communication, video timing, thermal management, grounding/shielding and optical-axis alignment.
- All performance values should be interpreted under the test conditions and configuration stated in the corresponding engineering documentation.