

## LEPTON Longwave Infrared (LWIR) Camera Module

### General Description

Lepton is a complete long-wave infrared (LWIR) camera module designed to interface easily into native mobile-device interfaces and other consumer electronics. It captures infrared radiation input in its nominal response wavelength band (from 8 to 14 microns) and outputs a uniform thermal image.

### Features

- 8.5 x 8.5 x 5.6 mm (without socket), 10.6 x 10.6 x 5.9 mm (including socket) fixed focus camera module
- 51-deg HFOV, 63.5-deg diagonal
- LWIR sensor, wavelength 8 to 14  $\mu\text{m}$
- 80 (h)  $\times$  60 (v) active pixels
- Thermal sensitivity, <50 mK
- Integrated digital thermal image processing functions, including automatic thermal environment compensation, noise filters, non-uniformity correction, and gain control
- Optional temperature-stable output to support radiometric processing
- Export compliant frame rate (< 9 Hz)
- MIPI and SPI video interfaces
- Two-wire I2C-like serial-control interface
- Uses standard cell-phone-compatible power supplies: 2.8V to sensor, 1.2V to digital core, and flexible IO from 2.5V to 3.1V
- Fast time to image (< 0.5 sec)



- Low operating power, nominally 150 mW (< 190 mW over temperature range)
- Low power standby mode
- RoHS compliant
- 32-pin socket interface to standard Molex or similar side-contact connector

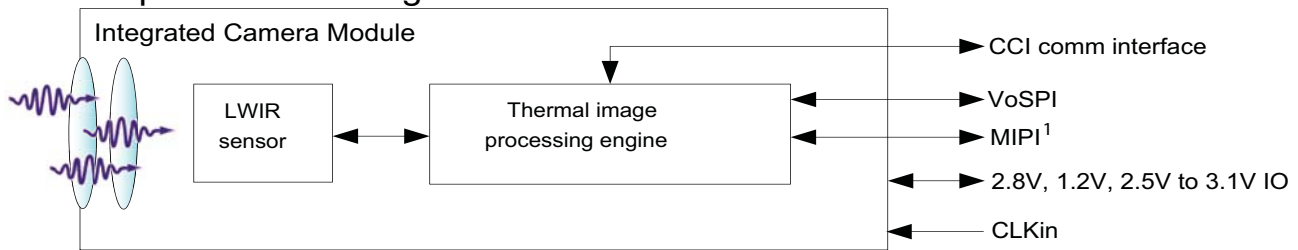
### Applications

- Mobile phones
- Gesture recognition
- Building automation
- Thermal imaging
- Night vision

### Key Specifications

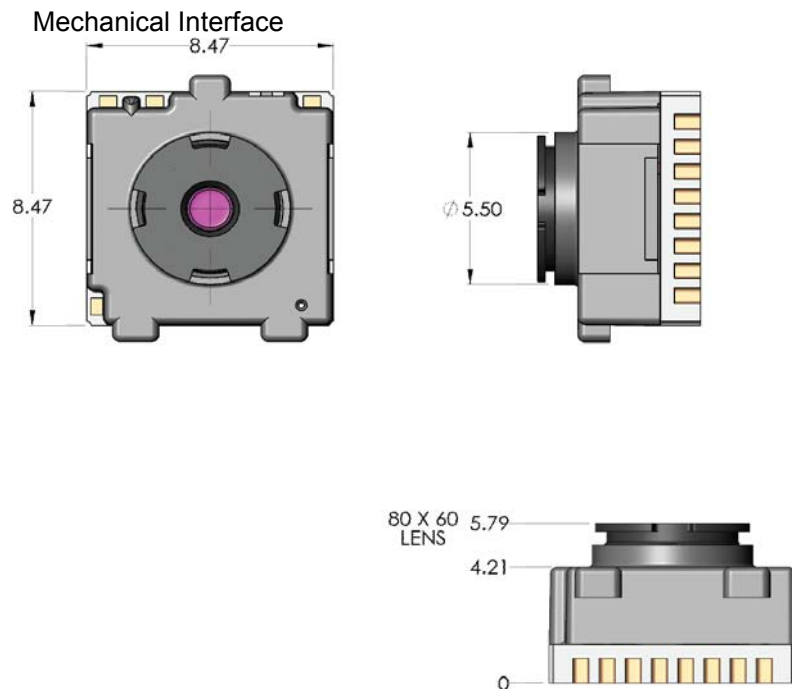
Overview	
Function	Passive thermal imaging module for mobile

### Simplified Block Diagram

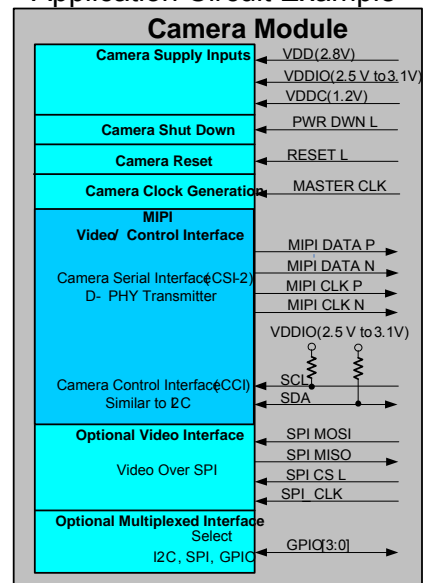


1. Feature anticipated in a future product release

Overview	
Sensor technology	Uncooled VOx microbolometer
Spectral range	Longwave infrared, 8 μm to 14 μm
Array format	80 × 60, progressive scan
Pixel size	17 μm
Effective frame rate	8.6 Hz (exportable)
Thermal sensitivity	<50 mK (0.050° C)
Temperature compensation	Automatic. Output image independent of camera temperature.
Non-uniformity corrections	Shutterless, automatic (with scene motion); also compatible with external shutter
Image optimization	Factory configured and fully automated
FOV - horizontal	51°
FOV - diagonal	63.5°
Output format	User-selectable 14-bit, 8-bit (AGC applied), or 24-bit RGB (AGC and colorization applied)
Solar protection	Integral
Electrical	
Input clock	25-MHz nominal, CMOS IO Voltage Levels
Video data interface	Video over SPI
Control port	CCI (I2C-like), CMOS IO Voltage Levels
Input supply voltage (nominal)	2.8 V, 1.2 V, 2.5 V to 3.1 V IO
Power dissipation	Nominally 150 mW at room temperature (operating), 4 mW (standby)
Mechanical	
Package dimensions – socket version	8.5 × 8.5 × 5.6 mm (w × l × h)
Weight	0.55 grams (typ)
Environmental	
Optimum operating temperature range	-10 °C to +65 °C
Non-operating temperature range	-40 °C to +80 °C
Shock	1500 G @ 0.4 ms



**Application Circuit Example**



- Note:
- (1) The CCI pullup resistors are required and must be handled outside the camera module by a host controller
  - (2) MIPI is not currently supported
  - (3) GPIO pins are not currently used