



## IMT-1B12B002-6

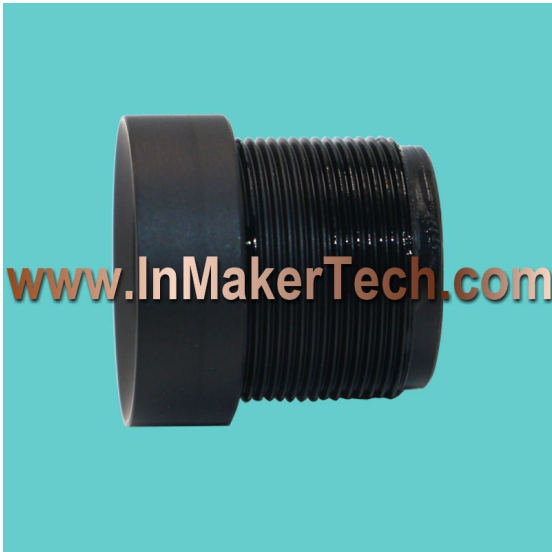
### 1/4" 2MP CSP F2.1 DFOV 120 Degree M12 Lens



Lens Model	<b>IMT-1B12B002-6</b>
Sensor Format	1/4"
Resolution	2 MP
Sensor Type	CSP
Structure	4P + IR Filter
Max Image Circle	Ø4.8
F/NO.	2.1 +/- 5%
EFL (mm)	2.50
TTL (mm)	17.20
FOV	Field of View
Diagonal DFOV	120°
Horizontal HFOV	93°
Vertical VFOV	54.3°
TV Distortion	<15%
CRA	<17°
Lens Filter	650nm +/- 10nm @50%
Barrel	M12*P0.5
KLT Camera Modules	KLT-E4MPF-OV9281 V1.0
Use IMT Made Lenses	KLT-C3PF-IRSW-OV9732 V1.0

# IMT-1B12B002-6

1/4" 2MP CSP F2.1 DFOV 120 Degree M12 Lens



IMT Lens on  
the real  
Camera



KLT is our  
Camera  
Modules  
Design and  
Manufacture  
Partner



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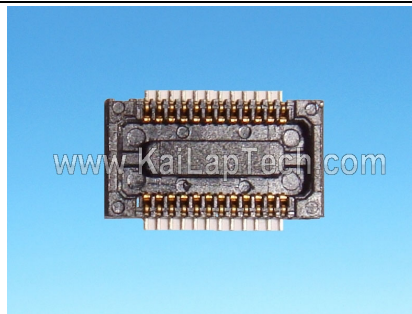
**KLT-E4MPF-OV9281 V1.0**

**OmniVision OV9281 Global Shutter MIPI and DVP Parallel Interface Fixed Focus  
1MP Camera Module**

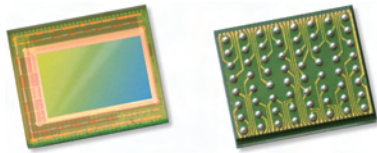


<b>Camera Module No.</b>	<b>KLT-E4MPF-OV9281 V1.0</b>
<b>Image Sensor</b>	OV9281
<b>EFL</b>	2.5 mm
<b>F.NO</b>	2.1
<b>Pixel</b>	1296 x 816
<b>View Angle</b>	120°
<b>Lens Type</b>	1/4 inch
<b>Lens Dimensions</b>	13.70 x 13.70 x 18.53 mm
<b>Module Size</b>	40.00 x 22.00 mm
<b>Module Type</b>	Fixed Focus
<b>Interface</b>	MIPI and DVP Parallel
<b>IMT Lens Model</b>	IMT-1B12B002-6

**Mating Connector Part No. DF30FC-24DS-0.4V**



Mating Connector On Main Board. Sold Separately.



# OV9281-OV9282 1-megapixel product brief



## 1-Megapixel OmniPixel3-GS™ Sensors for Computer Vision Applications



available in  
a lead-free  
package

OmniVision's OV9281 and OV9282 are high-speed global shutter image sensors that bring 1-megapixel resolution to a wide range of consumer and industrial computer vision applications, including augmented reality (AR), virtual reality (VR), collision avoidance in drones, bar code scanning and factory automation. Built on OmniVision's OmniPixel3-GS™ pixel technology, the OV9281 and OV9282 feature a high-speed global shutter pixel with best-in-class near-infrared (NIR) quantum efficiency (QE) to meet high-resolution and low-latency requirements.

Special features of the OV9281 and OV9282 include region of interest (ROI) selection and context switching. This allows some of the camera settings to change dynamically as fast as alternating frames. The sensors are available in both narrow and wide chief ray angle (CRA) settings.

The 1/4-inch OV9281 and OV9282 capture 1280 x 800 resolution images at 120 frames per second (fps) and VGA resolution at 180 fps with 2-lane MIPI and DVP output. The OV9281 and OV9282 also feature support for frame synchronization and dynamic defective pixel correction.

The OV9281 has a chief ray angle (CRA) of 9 degrees and comes in a chip scale package (CSP). The OV9282 features a CRA of 27 degrees and is available in a reconstructed wafer (RW) format. Both sensors are currently available in volume production.

Find out more at [www.ovt.com](http://www.ovt.com).





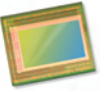
## Applications

- Consumer HMD
- Drones
- Machine Vision
- PCNB

## Product Features

- 3  $\mu\text{m}$  x 3  $\mu\text{m}$  pixel with OmniPixel3-GS™ technology
- automatic black level calibration (ABLC)
- programmable controls for:
  - frame rate
  - mirror and flip
  - cropping and windowing
- support output formats: 8/10-bit RAW
- fast mode switching
- supports 2x2 monochrome binning
- two-lane MIPI serial output interface
- DVP parallel output interface
- supports horizontal and vertical 2:1 and 4:1 monochrome subsampling
- support for image sizes:
  - 1280 x 800
  - 1280 x 720
  - 640 x 480
  - 640 x 400
- embedded 256 bits of one-time programmable (OTP) memory for part identification
- two on-chip phase lock loops (PLLs)
- LED PWM
- built-in strobe control

# OV9281-OV9282



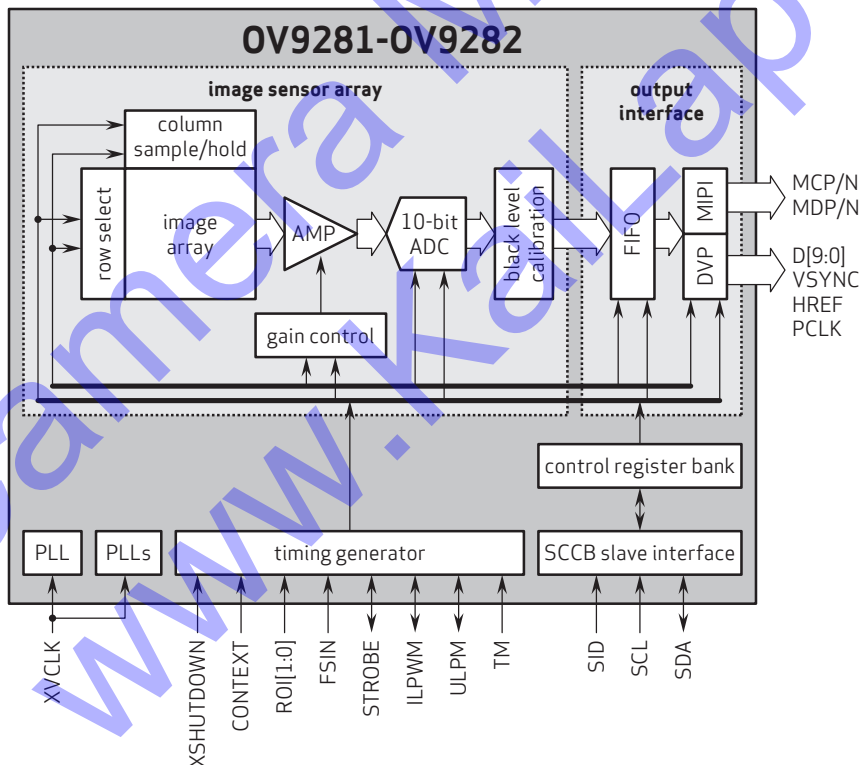
## Ordering Information

- OV9281-H64A (b&w, lead-free, 64-pin CSP5)
- OV9282-GA4A (b&w, lead-free, 200  $\mu\text{m}$  background, reconstructed wafer with good die)

## Product Specifications

- active array size: 1296 x 816
- power supply:
  - core: 1.2V (nominal)
  - analog: 2.8V (nominal)
  - I/O: 1.8V (nominal)
- power requirements:
  - active: 134 mW
  - standby: 65  $\mu\text{A}$
  - XSHUTDOWN: 50  $\mu\text{A}$
- temperature range:
  - operating: -30°C to +85°C junction temperature
  - stable image: 0°C to +50°C junction temperature
- output interfaces:
  - 2-lane MIPI serial output and DVP parallel output
- output formats: 8/10-bit RAW
- lens size: 1/4"
- lens chief ray angle:
  - OV9281: 9° linear
  - OV9282: 26.78° non-linear
- input clock frequency: 6 - 27 MHz
- scan mode: progressive
- maximum image transfer rate:
  - 1280 x 800: 120 fps
- minimum exposure time: 1 row period
- maximum exposure time:
  - frame length - 12 row periods, where frame length is set by registers [0x380E, 0x380F]
- pixel size: 3  $\mu\text{m}$  x 3  $\mu\text{m}$
- image area: 3896  $\mu\text{m}$  x 2453  $\mu\text{m}$
- package dimensions:
  - OV9281 CSP5: 5237  $\mu\text{m}$  x 4463  $\mu\text{m}$
  - OV9282 RW: 5252  $\mu\text{m}$  x 4478  $\mu\text{m}$

## Functional Block Diagram



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OmniVision



## KLT-C3PF-IRSW-OV9732 V1.0

OmniVision OV9732 with IR Switch MIPI Interface Fixed Focus 1MP Camera Module

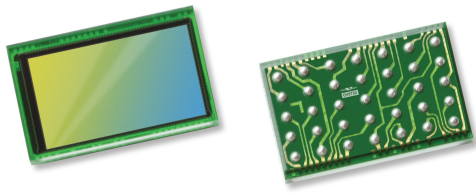


<b>Camera Module No.</b>	<b>KLT-C3PF-IRSW-OV9732 V1.0</b>	<b>IR SWITCH</b>
<b>Image Sensor</b>	OV9732	Input Voltage: 3.5V ~ 12V
<b>EFL</b>	2.5 mm	Operating Current: 88 ~ 300 mA
<b>F.NO</b>	2.1	Red Line: Positive
<b>Pixel</b>	1280 x 720	Black Line: Negative
<b>View Angle</b>	120°	
<b>Lens Type</b>	1/4 inch	Operation:
<b>Lens Dimensions</b>	24.80 x 16.00 x 18.61 mm	ON: IR Active (Day Time)
<b>Module Size</b>	90.00 x 30.00 mm	OFF: IR Disable (Night Time)
<b>Module Type</b>	Fixed Focus	
<b>Interface</b>	MIPI	
<b>IMT Lens Model</b>	IMT-1B12B002-6	

**Mating Connector Part No. FH12-24S-0.5SH**



Mating Connector On Main Board. Sold Separately.



# OV9732 720p HD product brief



## Power-Efficient and Compact HD CameraChip™ Sensor for Battery-Powered Smart-Home and Security Applications



available in  
a lead-free  
package

OmniVision's OV9732 is a low-power and ultra-compact CameraChip™ sensor that brings 720p high definition (HD) video to mainstream security systems and wireless battery-powered smart-home cameras. Compared to the previous generation OV9712, the OV9732 is 35 percent smaller and delivers dramatically improved pixel performance.

The OV9732 CameraChip sensor utilizes OmniPixel3-HS™ high sensitivity 3.0 μm pixel technology to bring industry-leading scene reproduction to a wide range of security and lifestyle camera

applications that operate in extremely high- and low-light conditions. The sensor's narrow 9-degree chief ray angle (CRA) supports consumer-grade optical lens systems and reduces image artifacts for enhanced performance.

When operating in low-power mode, the 1/4-inch OV9732 requires just 99 mW to capture 720p HD video at 30 frames per second.

Find out more at [www.ovt.com](http://www.ovt.com).



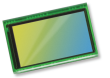
## Applications

- IP Cameras
- Life Style Cameras
- Surveillance
- Motion Cameras

## Product Features

- support for image sizes: full size (1280x720), VGA (640x480), 2x2 RGB binning (640x360)
- support for output formats: 10-bit RAW output with 1-lane MIPI and DVP
- on-chip phase lock loop (PLL)
- programmable controls for frame rate, mirror and flip, gain/exposure, and windowing
- support for horizontal and vertical sub-sampling
- low power mode (LPM) function
- capable of maintaining register values at software power down
- standard SCCB interface
- GPIO tri-state configurability and programmable polarity
- FSIN
- image quality control: defect pixel correction (DPC) and automatic black level calibration (ABLC)

# OV9732



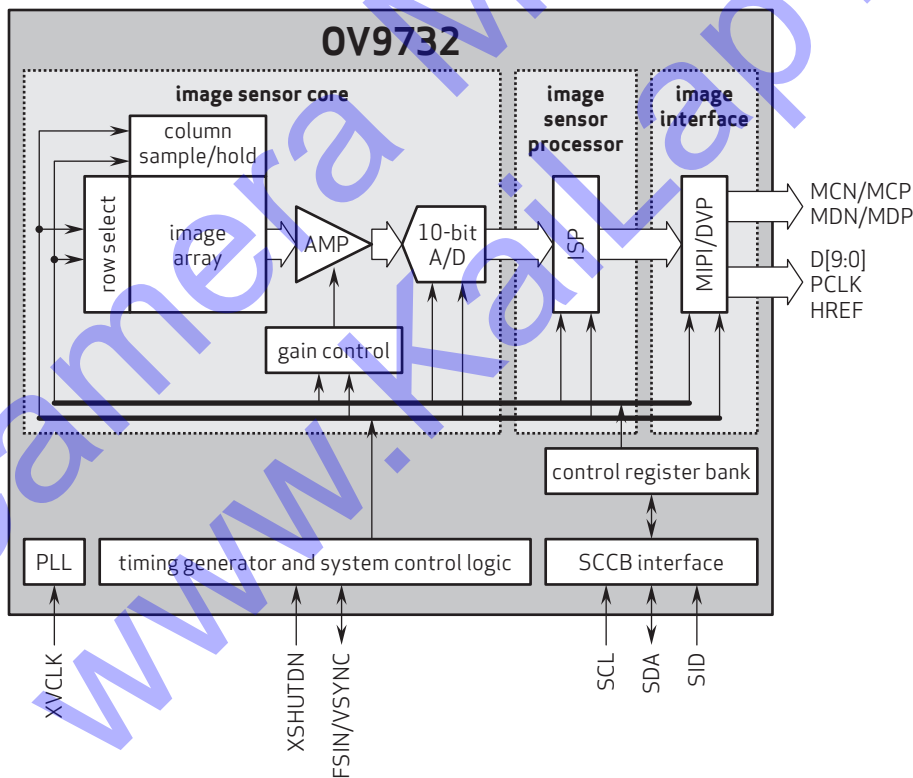
## Ordering Information

- OV9732-H35A (color, lead-free, 35-pin CSP5)

## Product Specifications

- active array size: 1280 x 720
- power supply:
  - core: 1.7 - 1.9V (1.8V normal)
  - analog: 2.7 - 2.9V (2.8V normal)
  - I/O: 1.7 - 1.9V (1.8V normal)
- power requirements:
  - active: 99 mW
  - standby: 36  $\mu$ W
- temperature range:
  - operating: -30°C to +70°C junction temperature
  - stable image: 0°C to +50°C junction temperature
- output formats: 10-bit RAW RGB
- lens size: 1/4"
- lens chief ray angle: 9°
- input clock frequency: 6 - 27 MHz
- maximum image transfer rate: 30 fps
- sensitivity: 2.066 V/lux-sec
- scan mode: progressive
- shutter: rolling shutter
- max S/N ratio: 39 dB
- dynamic range: 72 dB @ 8x gain
- maximum exposure interval: 798 x t<sub>row</sub>
- pixel size: 3  $\mu$ m x 3  $\mu$ m
- dark current: 5 mV/sec @ 60°C junction temperature
- image area: 3888  $\mu$ m x 2208  $\mu$ m
- package dimensions: 4704  $\mu$ m x 2994  $\mu$ m

## Functional Block Diagram



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