

## IMT-1A6E001-6

### 1/4" 5MP CSP F2.8 DFOV 67.4 Degree M6 Lens



Lens Model	<b>IMT-1A6E001-6</b>
Sensor Format	1/4"
Resolution	5 MP
Sensor Type	CSP
Structure	4P + IR Filter
Max Image Circle	Ø4.8
F/NO.	2.8 +/- 5%
EFL (mm)	3.37
TTL (mm)	4.15
FOV	Field of View
Diagonal DFOV	67.4°
Horizontal HFOV	56.3°
Vertical VFOV	43.7°
TV Distortion	<1.5%
CRA	<26°
Lens Filter	650nm +/- 10nm @50%
Barrel	M6*P0.35
KLT Camera Modules	KLT-OV5640-V4320 V4.0
Use IMT Made Lenses	KLT-OV5645-Y660B V2.1

# IMT-1A6E001-6

1/4" 5MP CSP F2.8 DFOV 67.4 Degree M6 Lens



IMT Lens on  
the real  
Camera

KLT is our  
Camera  
Modules  
Design and  
Manufacture  
Partner

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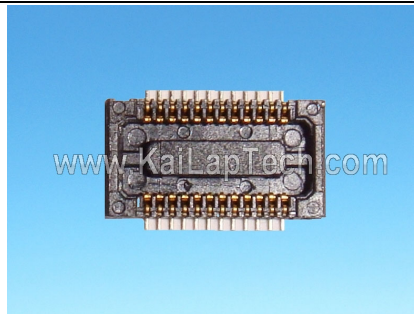
[www.InMakerTech.com](http://www.InMakerTech.com) [Sales@InMakerTech.com](mailto:Sales@InMakerTech.com) China: (+86) 17727326718 HK: (+852) 69089316

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**KLT-OV5640-V4320 V4.0****OmniVision OV5640 MIPI Interface Auto Focus 5MP Camera Module**

<b>Camera Module No.</b>	<b>KLT-OV5640-V4320 V4.0</b>
<b>Image Sensor</b>	OV5640
<b>EFL</b>	3.37 mm
<b>F.NO</b>	2.8
<b>Pixel</b>	2592 x 1944 (QXGA)
<b>View Angle</b>	67.4°
<b>Lens Type</b>	1/4 inch
<b>Lens Dimensions</b>	8.50 x 8.50 x 5.07 mm
<b>Module Size</b>	35.5 x 8.50 mm
<b>Module Type</b>	Auto Focus
<b>Interface</b>	MIPI
<b>IMT Lens Model</b>	IMT-1A6E001-6

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



Mating Connector On Main Board. Sold Separately.



# OV5640 5-megapixel product brief



## 1/4-inch, 5-Megapixel SOC Image Sensor Optimized for High-Volume Mobile Markets



available in  
a lead-free  
package

The OV5640 delivers a complete 5-megapixel camera solution on a single chip, aimed at offering cost efficiencies that serve the high-volume autofocus (AF) camera phone market. The system-on-a-chip (SOC) sensor features OmniVision's 1.4 micron OmniBSI™ backside illumination architecture to deliver excellent pixel performance and best-in-class low-light sensitivity, while enabling ultra compact camera module designs of 8.5 mm x 8.5 mm with <6 mm z-height. The OV5640 provides the full functionality of a complete camera, including anti-shake technology, AF control, and MIPI while being easier to tune than two-chip solutions, making it an ideal choice in terms of cost, time-to-market and ease of platform integration.

The OV5640 enables 720p HD video at 60 frames per second (fps) and 1080p HD video at 30 fps with complete user control over formatting and output data transfer. The 720p/60 HD video is captured in full field of view (FOV) with 2 x 2 binning, which doubles the sensitivity and improves the signal-to-noise ratio (SNR). Additionally, a unique post-binning re-sampling filter function removes zigzag artifacts around slant edges and minimizes spatial artifacts to deliver even sharper, crisper

color images. To further improve camera performance and user experience, the OV5640 features an internal anti-shake engine for image stabilization, and it supports Scalado™ tagging for faster image preview and zoom.

The OV5640 offers a digital video port (DVP) parallel interface and a high-speed dual lane MIPI interface, supporting multiple output formats. An integrated JPEG compression engine simplifies data transfer for bandwidth-limited interfaces. The sensor's automatic image control functions include automatic exposure control (AEC), automatic white balance (AWB), automatic band filter (ABF), 50/60 Hz automatic luminance detection, and automatic black level calibration (ABLC). The OV5640 delivers programmable controls for frame rate, AEC/AGC 16-zone size/position/weight control, mirror and flip, cropping, windowing, and panning. It also offers color saturation, hue, gamma, sharpness (edge enhancement), lens correction, defective pixel canceling, and noise canceling to improve image quality.

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

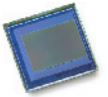
## Applications

- Mobile Phones
- Entertainment
- Digital Still and Video Cameras

## Product Features

- 1.4  $\mu\text{m}$  x 1.4  $\mu\text{m}$  pixel with OmniBSI technology for high performance (high sensitivity, low crosstalk, low noise, improved quantum efficiency)
- optical size of 1/4"
- automatic image control functions:
  - automatic exposure control (AEC)
  - automatic white balance (AWB)
  - automatic band filter (ABF)
  - automatic 50/60 Hz luminance detection
  - automatic black level calibration (ABLCL)
- programmable controls for frame rate, AEC/AGC 16-zone size/position/weight control, mirror and flip, cropping, windowing, and panning
- image quality controls: color saturation, hue, gamma, sharpness (edge enhancement), lens correction, defective pixel canceling, and noise canceling
- support for output formats: RAW RGB, RGB565/555/444, CCIR656, YUV422/420, YCbCr422, and compression
- support for LED and flash strobe mode
- support for internal and external frame synchronization for frame exposure mode
- support horizontal binning and vertical sub-sampling
- support horizontal binning and vertical sub-sampling
- post binning resampling filter to minimize spatial/aliasing artifacts on 2x2 binned image
- embedded JPEG compression
- support for anti-shake
- digital video port (DVP) parallel output interface and dual lane MIPI output interface
- embedded 1.5V regulator for core power
- programmable I/O drive capability, I/O tri-state configurability
- support for black sun cancellation
- embedded arbitrary scalar supporting any size from 5 MP and below
- auto focus control (AFC) with embedded AF VCM driver
- embedded microcontroller
- suitable for module size of 8.5 x 8.5 x <math>\pm 6\text{mm}</math> with both CSP and RW packaging

# OV5640



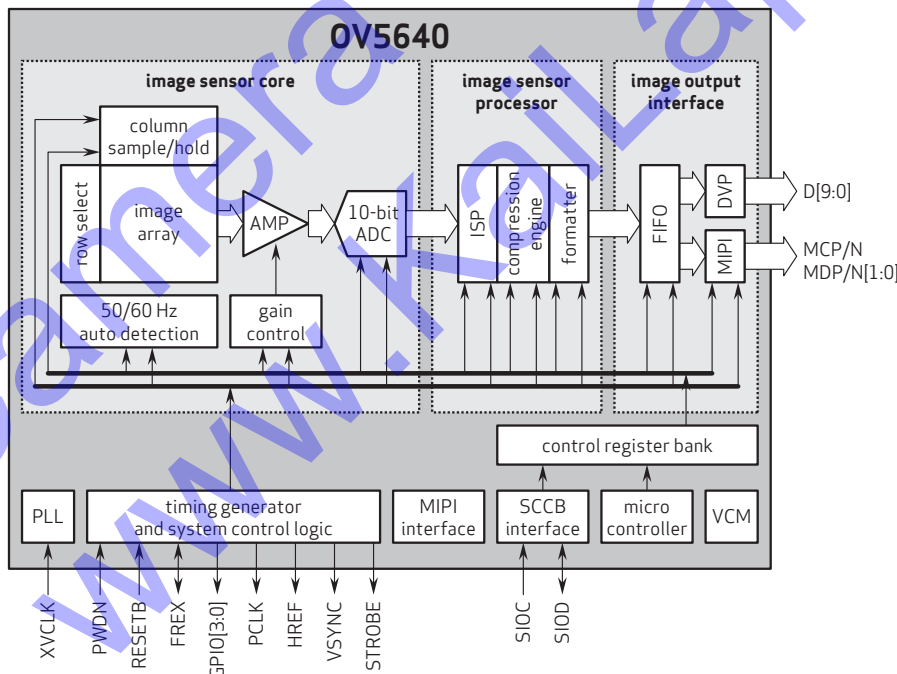
## Ordering Information

- OV05640-A71A (color, lead-free, 71-pin CSP3)
- OV05640-G04A (color, chip probing, 200  $\mu\text{m}$  backgrinding, reconstructed wafer)

## Product Specifications

- active array size: 2592 x 1944
- power supply:
  - core: 1.5 V  $\pm 5\%$  (with embedded 1.5 V regulator)
  - analog: 2.6 - 3.0 V (2.8 V typical)
  - I/O: 1.8 V / 2.8 V
- power requirements:
  - active: 140 mA
  - standby: 20  $\mu\text{A}$
- temperature range:
  - operating: -30°C to 70°C junction temperature
  - stable image: 0°C to 50°C junction temperature
- lens size: 1/4"
- lens chief ray angle: 24°
- input clock frequency: 6 - 27 MHz
- shutter: rolling shutter / frame exposure
- maximum image transfer rate:
  - QSXGA (2592x1944): 15 fps
  - 1080p: 30 fps
  - 1280 x 960: 45 fps
  - 720p: 60 fps
  - VGA (640x480): 90 fps
  - QVGA (320x240): 120 fps
- sensitivity: 600 mV/lux-sec
- maximum exposure interval: 1964 x  $t_{\text{row}}$
- max S/N ratio: 36 dB
- dynamic range: 68 dB @ 8x gain
- pixel size: 1.4  $\mu\text{m}$  x 1.4  $\mu\text{m}$
- dark current: 8 mV/sec @ 60°C junction temperature
- image area: 3673.6  $\mu\text{m}$  x 2738.4  $\mu\text{m}$
- package dimensions:
  - CSP3: 5985  $\mu\text{m}$  x 5835  $\mu\text{m}$
  - COB: 6000  $\mu\text{m}$  x 5850  $\mu\text{m}$

## Functional Block Diagram



4275 Burton Drive  
Santa Clara, CA 95054  
USA

Tel: + 1 408 567 3000  
Fax: + 1 408 567 3001  
www.ovt.com

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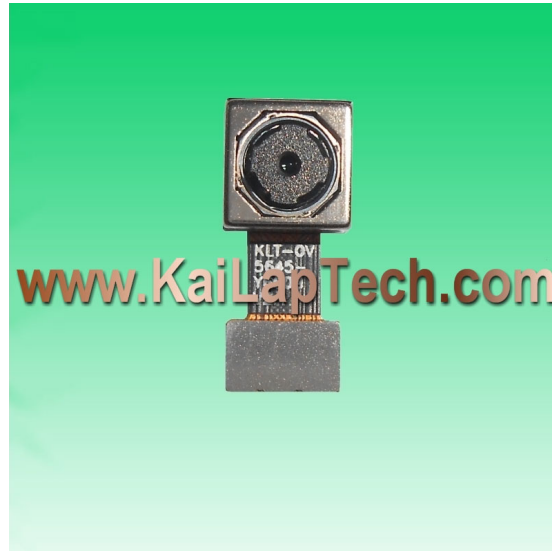


# CMOS CAMERA MODULES

*your BEST camera module partner*

## KLT-OV5645-Y660B V2.1

OmniVision OV5645 MIPI Interface Auto Focus 5MP Camera Module



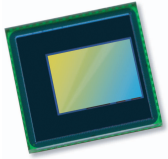
<b>Camera Module No.</b>	<b>KLT-OV5645-Y660B V2.1</b>
<b>Image Sensor</b>	OV5645
<b>EFL</b>	3.37 mm
<b>F.NO</b>	2.8
<b>Pixel</b>	2592 x 1944 (QSXGA)
<b>View Angle</b>	67.4°
<b>Lens Type</b>	1/4 inch
<b>Lens Dimensions</b>	8.5 x 8.5 x 5.17 mm
<b>Module Size</b>	19.57 x 8.50 mm
<b>Module Type</b>	Auto Focus
<b>Interface</b>	MIPI
<b>IMT Lens Model</b>	IMT-1A6E001-6

<b>Mating Connector Part No. BBR43-24KB533</b>
Mating Connector On Main Board. Sold Separately.

[www.KaiLapTech.com](http://www.KaiLapTech.com) [sales@KaiLapTech.com](mailto:sales@KaiLapTech.com) Tel: (852) 6908 1256 Fax: (852) 3017 6778

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# OV5645 5-megapixel product brief



## High Quality 5-Megapixel Photography and HD Video for Low-Cost Mobile Devices



available in  
a lead-free  
package

OmniVision's OV5645 is a high performance, 5-megapixel system-on-chip (SOC) ideally suited for the cost-sensitive segment of the mobile handset market. The CameraChip™ sensor's single MIPI port replaces both a bandwidth-limited DVP interface and a costly embedded JPEG compressor, allowing the new OV5645 sensor to save significant silicon area and cost. An embedded autofocus control with voice coil motor driver offers further cost savings for the end user, making the OV5645 a highly attractive alternative to other 5-megapixel sensors currently on the market.

The OV5645 also features a new picture-in-picture (PIP) architecture that offers an easy-to-implement, low-cost dual camera system solution for mobile handsets and smartphones. The feature is based on a master/slave configuration where a front-facing camera (OV7965) can be connected through the OV5645 master camera, enabling a two-camera system with PIP functionality without the need for an additional MIPI interface into the baseband processor.

Built on OmniVision's 1.4-micron OmniBSI™ pixel architecture, the OV5645 offers high performance 5-megapixel photography and 720p HD video at 60 frames per second (FPS) and 1080p HD video at 30 FPS with complete user control over formatting and output data transfer. The sensor's 720p HD video is captured in full field-of-view with 2 x 2 binning, which doubles the sensitivity and improves the signal-to-noise ratio (SNR). A unique post-binning, re-sampling filter function removes zigzag artifacts around slant edges and minimizes spatial artifacts to deliver even sharper, crisper color images.

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

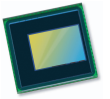
## Applications

- Cellular Phones
- PC Multimedia
- Toys
- Digital Still Cameras

## Product Features

- 1.4  $\mu\text{m}$  x 1.4  $\mu\text{m}$  pixel with OmniBSI+™ technology for high performance (high sensitivity, low crosstalk, low noise, improved quantum efficiency)
- optical size of 1/4"
- automatic image control functions: automatic exposure control (AEC), automatic white balance (AWB), automatic band filter (ABF), automatic 50/60 Hz luminance detection, and automatic blacklevel calibration (ABLC)
- image quality controls: color saturation, hue, gamma, sharpness (edge enhancement), lens correction, defective pixel canceling, and noise canceling
- support for output formats: RAW RGB, RGB565/555/444, YUV422/420, YCbCr422
- support for video or snapshot operations
- support for internal and external frame synchronization for frame exposure mode
- support for LED and flash strobe mode
- support for horizontal and vertical sub-sampling, binning
- support for minimizing artifacts on binned image
- support for data compression output
- support for anti-shake
- standard serial SCCB interface
- dual lane MIPI output interface
- embedded 1.5V regulator for core power
- programmable I/O drive capability, I/O tri-state configurability
- support for black sun cancellation
- support for images sizes: 5 megapixel, and any arbitrary size scaling down from 5 megapixel
- support for auto focus control (AFC) with embedded AF VCM driver
- embedded microcontroller
- suitable for module size of 8.5 x 8.5 x <math>\pm 6\text{mm}</math> with both CSP and RW packaging

# OV5645



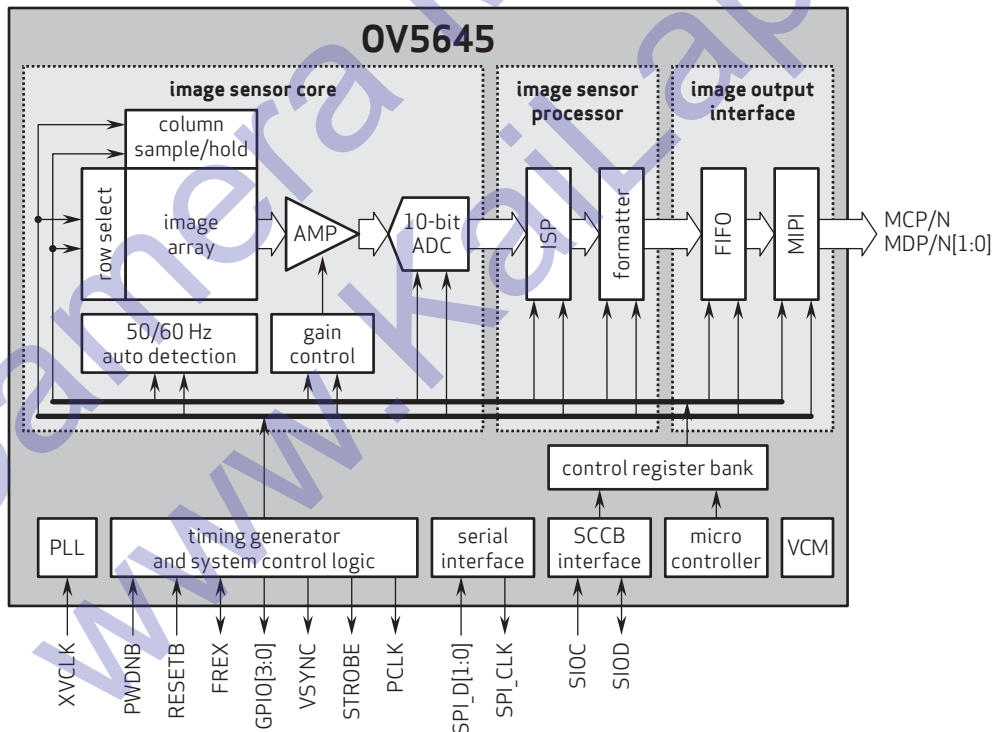
## Ordering Information

- OV05645-A66A**  
(color, lead-free, 66-pin CSP3)
- OV05645-G04A**  
(color, chip probing, 200  $\mu\text{m}$  backgrinding, reconstructed wafer)

## Product Specifications

- active array size:** 2592 x 1944
- power supply:**
  - core: 1.5V  $\pm 5\%$  (with embedded 1.5 regulator)
  - analog: 2.6 - 3.0V (2.8V typical)
  - I/O: 1.8V / 2.8V
- temperature range:**
  - operating: -30°C to 70°C junction temperature
  - stable image: 0°C to 50°C junction temperature
- output formats:** 8-/10-bit RGB RAW, RGB565/555/444, YUV422/420, YCbCr422 output
- lens size:** 1/4"
- lens chief ray angle:** 29.1°
- input clock frequency:** 6 - 27 MHz
- max S/N ratio:** 36 dB
- maximum image transfer rate:**
  - QSXGA (2592x1944): 15 fps
  - 1080p: 30 fps
  - 1280x960: 45 fps
  - 720p: 60 fps
- shutter:** rolling shutter / frame exposure
- maximum exposure interval:** 1964 x  $t_{\text{row}}$
- pixel size:** 1.4  $\mu\text{m}$  x 1.4  $\mu\text{m}$
- image area:** 3673.6  $\mu\text{m}$  x 2738.4  $\mu\text{m}$
- package/die dimensions:**
  - CSP3: 6200  $\mu\text{m}$  x 4860  $\mu\text{m}$
  - COB: 6190  $\mu\text{m}$  x 4850  $\mu\text{m}$

## Functional Block Diagram



4275 Burton Drive  
Santa Clara, CA 95054  
USA

Tel: + 1 408 567 3000  
Fax: + 1 408 567 3001  
www.ovt.com

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