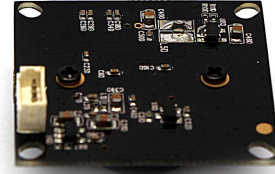
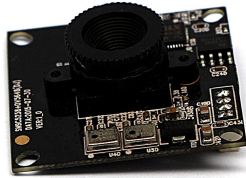




## **HAMPO-USB-0022-V1.0**

### **5MP OV5648 Fixed Focus USB2.0 Camera Module**



Hampo 003-0022 is a 2K 5M cost-efficient USB camera module .

Adopting high quality 1/4" Omnivision OV5648 Cmos image sensor. The 1/4" OV5648 Camera Module is capable of capturing high quality still image as well as 720p HD video at 60 frames per second(fps) and 1080p HD video at 30fps.

Widely used for document scanner,car and ship control,face matching, OCR components, all-in-one machine, advertising machines, automatic vending machine, ndustrial&medical equipment, robot project, security and surveillance, etc.

#### **Key Features**

- More than HD: The 5MP mini USB camera module adopts 1/4" OV5648 sensor for sharp image and accurate color reproduction.
- Capture Video with Audio: Camera Module is capable of capturing high quality still image as well as 720p HD video at 60 frames per second(fps) and 1080p HD video at 30fps.
- Plug&Play: UVC-compliant, just connect the camera to PC computer, laptop, Android device or Raspberry Pi with the USB cable without extra drivers to be installed.
- Applications: This tiny 32mm\*32mm camera board can be installed in most hidden and narrow position for a home surveillance system, monitoring 3D Printer, document scanner, OCR reader, beauty instrument, teachingsystem,object recognition and tracking or other machine vision application.



## HAMPO-USB-0022-V1.0

### 5MP OV5648 Fixed Focus USB2.0 Camera Module

Camera Module No.	<b>HAMPO-USB-0022-V1.0</b>
Resolution	5MP
Image Sensor	OV5648
Sensor Type	1/4"
Pixel Size	1.4um x 1.4um
Dynamic Range	67DB
F.NO	2.0
Pixel	2592*1944
View Angle	69°(DFOV) 52°(HFOV)42°(VFOV)
Lens TTL	10.1mm
Module Type	Fixed Focus
Lens Model	HAMPO-LENS-7030CSP
Interface	USB 2.0
Output Format	MJPEG / YUV
Auto Control	Saturation, Contrast, Acutance White Balance, Exposure
Audio	High quality digital MIC, single channel
Input Voltage	DC5V
Working Current	Max 250mA
PCB Size	32mm x 32mm
System Compatibility	Windows XP (SP2, SP3), Vista, 7, 8, 10, 11 Android, Mac OS, Linux or OS with UVC Driver Raspberry Pi by USB Port
Software for USB Camera	AMCAP, Webcam Viewer, V4L2 Controls Contacam, VLC Player, MotionEye OS iSpy, ZoneMider, Yawcam
Lens Type	IR CUT 650
Operating Temperature	-20°C to +70°C
USB Cable	USB-Cable-U015

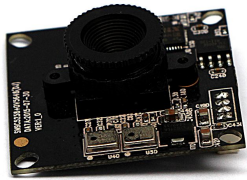
Wide Compatibility with Windows, Android, Mac OS, Linux, or Raspberry Pi



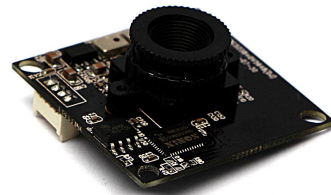


# HAMPO-USB-0022-V1.0

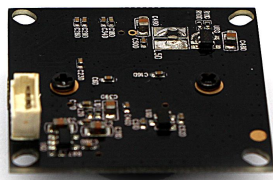
## 5MP OV5648 Fixed Focus USB2.0 Camera Module



Top View



Side View

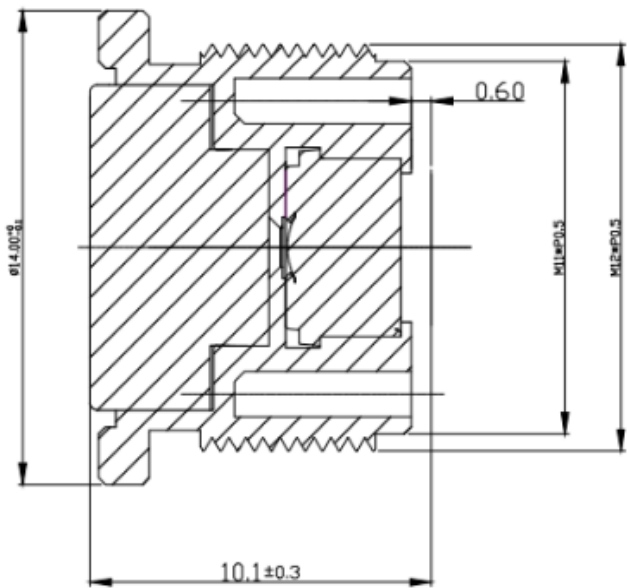
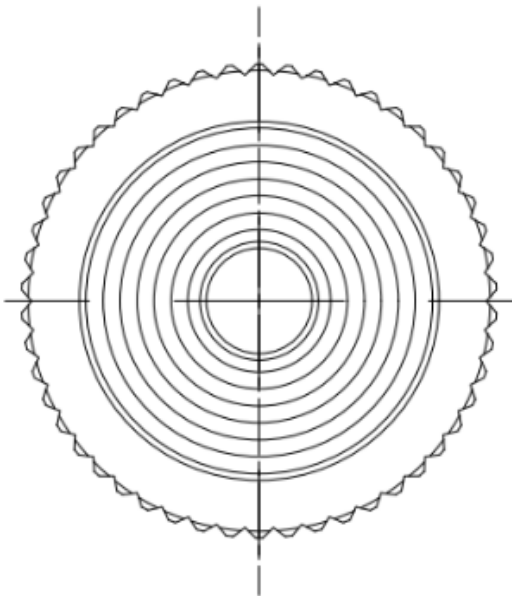


Bottom View

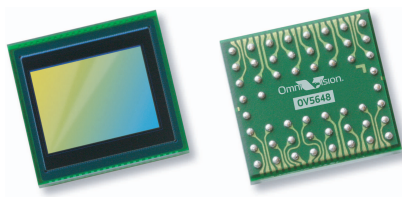


Mating Connector

序号	名 称	规 格	备注	序号	名 称	规 格	备注
1	型号 (Model)	7030CSP		8	畸变 (Distortion)	-1%	
2	感测器 (Sensor)	1/4"		9	镜头组成 (Lens Construction)	4Element	
3	靶面格式 (Image Format)	Ø4.5		10	滤光片 (IR CUT)	650±10nm	
4	焦距 (Focal Length)	3.3		11	接口 (Mount)	M12*P0.5	
5	通光孔径 (Aperture F/#)	2.8		12	外形尺寸 (Dimension)	Ø14*9.4	
6	视场角(FOV)	D:69° H : 52°	V:42°	13	重量 (Weight)		
7	后焦距 (Back Focal Length)	>0.6					



				ROHS	绘图员	日期	<div>   </div>	
				绘 图			产 品 型 号	版 本
				核 准			7030CSP	00
0.00 ±0.1	④							
0.0 ±0.2	③							
0 ±0.3	②							
	①							
未注公差		修改记录	修改人	日期				



# OV5648 5-megapixel product brief



available in  
a lead-free  
package

## Cost-Efficient 5-Megapixel Camera Solution for Mainstream Mobile Devices

The OV5648 is a cost-efficient, high performance 5-megapixel CameraChip™ sensor for smartphones and tablets. Utilizing OmniVision's latest 1.4-micron OmniBSI+™ pixel architecture, the OV5648 combines a reduced die size with improved quality photography and high-definition (HD) video, making it ideally suited for mainstream mobile applications.

OmniVision's powerful new OmniBSI+ pixel architecture offers significant performance improvements over our original OmniBSI™ architecture, including a 60 percent increase in full-well capacity and a significant improvement in low-light sensitivity. With OmniBSI+, the 1/4-inch OV5648 is capable of capturing high quality still images as well as 720p HD video at 60 frames per second (fps) and 1080p HD video at 30 fps.

The sensor supports a two-lane MIPI interface, and provides full-frame, windowed or binned 10-bit images in RAW RGB format with complete user control over

formatting and output transfer. It offers defective pixel canceling and all required automatic image control functions, including automatic exposure control, automatic gain control, automatic white balance, and automatic black level calibration.

A secondary image sensor may be connected to the OV5648 enabling a Video-in-Video (ViV) feature in which the secondary image is overlaid to the OV5648 output video. The combined video is streamed out over the MIPI interface. A bypass mode allows a secondary sensor to utilize the OV5648 MIPI interfaced baseband.

The OV5648 can fit into a 6 x 6 mm fixed focus camera module with a z-height of less than 4.5 mm.

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



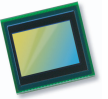
## Applications

- Cellular and Picture Phones
- Toys
- PC Multimedia
- 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)
- optical size of 1/4"
- automatic image control functions:
  - automatic exposure control (AEC)
  - automatic gain control (AGC)
  - automatic white balance (AWB)
  - automatic black level calibration (ABLC)
- programmable controls for frame rate, AEC/AGC 16-zone size/position/weight control, mirror and flip, cropping, windowing, and panning
- defective pixel canceling
- support for output formats: 8-/10-bit raw RGB data
- support for video or snapshot operations
- support for LED and flash strobe mode
- support for internal and external frame synchronization for frame exposure mode
- support for horizontal and vertical sub-sampling
- standard serial SCCB interface
- MIPI interface (two lanes)
- Video-in-Video (ViV) and bypass support for secondary sensor
- 32 bytes of embedded one-time programmable (OTP) memory
- on-chip phase lock loop (PLL)
- embedded 1.5V regulator for core power
- programmable I/O drive capability, I/O tri-state configurability
- support for black sun cancellation

# OV5648



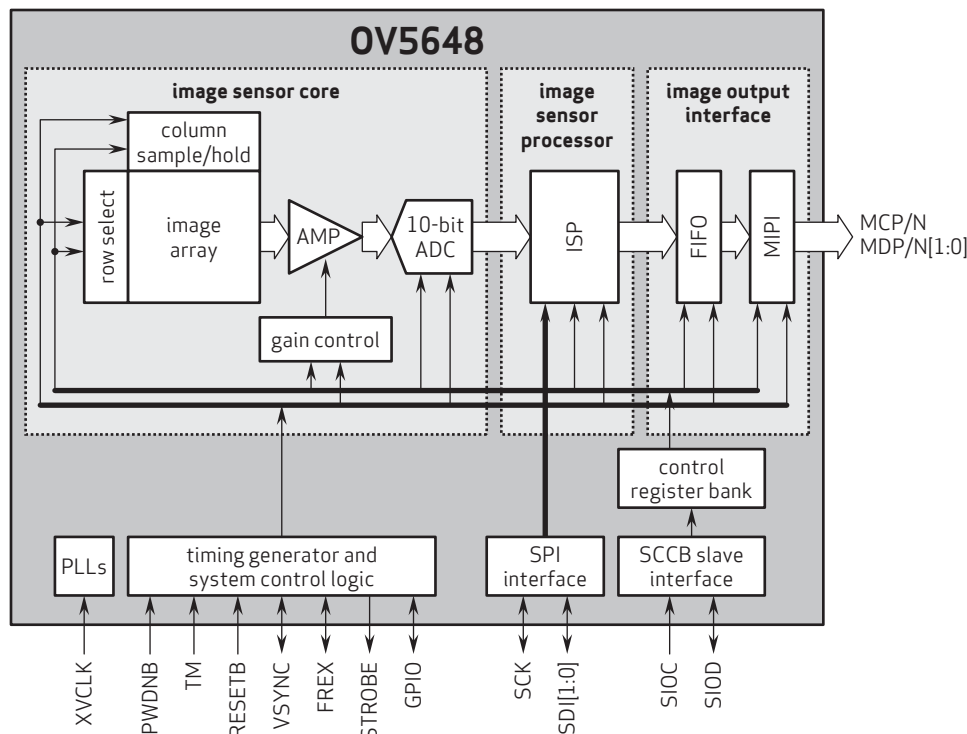
## Ordering Information

- OV05648-A53A (color, lead-free, 53-pin CSP3)
- OV05648-G04A (color, chip-probing, 200  $\mu\text{m}$  backgrinding, reconstructed wafer)

## Product Specifications

- active array size: 2592 x 1944
- max S/N ratio: 36 dB
- power supply:
  - core: 1.5V  $\pm$ 5% (with embedded 1.5V regulator)
  - analog: 2.6 - 3.0V (2.8V typical)
  - I/O: 1.7 - 3.0V
- power requirements:
  - active: 219 mW
  - standby: 36  $\mu\text{W}$
- 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 output
- lens size: 1/4"
- lens chief ray angle: 29.1°
- input clock frequency: 6 - 27 MHz
- dynamic range: 72 dB @ 8x gain
- maximum image transfer rate:
  - QSGA (2592x1944): 15 fps
  - 1080p: 30 fps
  - 960p: 45 fps
  - 720p: 60 fps
  - VGA (640x480): 90 fps
- sensitivity: 690 mV/lux-sec
- shutter: rolling shutter
- pixel size: 1.4  $\mu\text{m}$  x 1.4  $\mu\text{m}$
- dark current: 0.7 mV/s @ 50°C junction temperature
- image area: 3673.6  $\mu\text{m}$  x 2738.4  $\mu\text{m}$
- package/die dimensions:
  - CSP3: 5010  $\mu\text{m}$  x 4810  $\mu\text{m}$
  - COB: 5000  $\mu\text{m}$  x 4800  $\mu\text{m}$

## Functional Block Diagram



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OmniVision





## Camera Reliability Test

Reliability Inspection Item			Testing Method	Acceptance Criteria
Category		Item		
Environmental	Storage Temperature	High 60°C 96 Hours	Temperature Chamber	No Abnormal Situation
		Low -20°C 96 Hours	Temperature Chamber	No Abnormal Situation
	Operation Temperature	High 60°C 24 Hours	Temperature Chamber	No Abnormal Situation
		Low -20°C 24 Hours	Temperature Chamber	No Abnormal Situation
	Humidity	60°C 80% 24 Hours	Temperature Chamber	No Abnormal Situation
	Thermal Shock	High 60°C 0.5 Hours Low -20°C 0.5 Hours Cycling in 24 Hours	Temperature Chamber	No Abnormal Situation
Physical	Drop Test (Free Falling)	Without Package 60cm	10 Times on Wood Floor	Electrically Functional
		With Package 60cm	10 Times on Wood Floor	Electrically Functional
	Vibration Test	50Hz X-Axis 2mm 30min	Vibration Table	Electrically Functional
		50Hz Y-Axis 2mm 30min	Vibration Table	Electrically Functional
		50Hz Z-Axis 2mm 30min	Vibration Table	Electrically Functional
	Cable Tensile Strength Test	Loading Weight 4 kg 60 Seconds Cycling in 24 Hours	Tensile Testing Machine	Electrically Functional
Electrical	ESD Test	Contact Discharge 2 KV	ESD Testing Machine	Electrically Functional
		Air Discharge 4 KV	ESD Testing Machine	Electrically Functional
	Aging Test	On/Off 30 Seconds Cycling in 24 Hours	Power Switch	Electrically Functional
	USB Connector	On/Off 250 Times	Plug and Unplug	Electrically Functional





## Camera Inspection Standard

Inspection Item		Inspection Method	Standard of Inspection		
Category					
Item					
Appearance	FPC/ PCB	Color	The Naked Eye	Major Difference is Not Allowed.	
		Be Torn/Chopped	The Naked Eye	Copper Crack Exposure is Not Allowed.	
		Marking	The Naked Eye	Clear, Recognizable (Within 30cm Distance)	
	Holder	Scratches	The Naked Eye	The Inside Crack Exposure is Not Allowed	
		Gap	The Naked Eye	Meet the Height Standard	
		Screw	The Naked Eye	Make Sure Screws Are Presented (If Any)	
		Damage	The Naked Eye	The Inside Crack Exposure is Not Allowed	
	Lens	Scratch	The Naked Eye	No Effect On Resolution Standard	
		Contamination	The Naked Eye	No Effect On Resolution Standard	
		Oil Film	The Naked Eye	No Effect On Resolution Standard	
		Cover Tape	The Naked Eye	No Issue On Appearance.	
	Function	Image	No Communication	Test Board	Not Allowed
			Bright Pixel	Black Board	Not Allowed In the Image Center
Dark Pixel			White board	Not Allowed In the Image Center	
Blurry			The Naked Eye	Not Allowed	
No Image			The Naked Eye	Not Allowed	
Vertical Line			The Naked Eye	Not Allowed	
Horizontal Line			The Naked Eye	Not Allowed	
Light Leakage			The Naked Eye	Not Allowed	
Blinking Image			The Naked Eye	Not Allowed	
Bruise			Inspection Jig	Not Allowed	
Resolution			Chart	Follows Outgoing Inspection Chart Standard	
Color			The Naked Eye	No Issue	
Noise			The Naked Eye	Not Allowed	
Corner Dark			The Naked Eye	Less Than 100px By 100px	
Color Resolution			The Naked Eye	No Issue	
Dimension			Height	The Naked Eye	Follows Approval Data Sheet
	Width	The Naked Eye	Follows Approval Data Sheet		
	Length	The Naked Eye	Follows Approval Data Sheet		
	Overall	The Naked Eye	Follows Approval Data Sheet		

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## Company HAMPO

Dongguan Hampo Electronic Technology Co., Ltd. was established in 2015, a next-generation technology driven manufacturer specialized in research, design, and produce of audio and video products. Hampo is occupying 150,000 square feet automated plants with 500 employees of annual throughput 180,000,000 units cameras.

Hampo provides OEM, ODM design, contract manufacturing, and builds the camera products. You may provide the requirements to us, even with a hand draft, our sales and engineering work together to meet your needs. We consider ourselves your last-term partner in developing practical and innovative solutions.

Our team covers everything from initial concept development to mass produced product. Hampo specializes in customized camera design, raw material, electronic engineering, firmware/software development, product testing, and packing design. Our experienced strategic supply systems offer a robust and dependable manufacturing capacity for orders of various sizes.



## Limited Warranty

Hampo provides the following limited warranty if you purchased the Product(s) directly from Hampo company or from Hampo's website, [www.hampotech.com](http://www.hampotech.com). Product(s) purchased from other sellers or sources are not covered by this Limited Warranty. Hampo guarantees that the Product(s) will be free from defects in materials and workmanship under normal use for a period of one (1) year from the date you receive the product ("Warranty Period").

For all Product(s) that contain or develop material defects in materials or workmanship during the Warranty Period, Hampo will, at its sole option, either: (i) repair the Product(s); (ii) replace the Product(s) with a new or refurbished Product(s) (replacement Product(s) being of identical model or functional equivalent); or (iii) provide you a refund of the price you paid for the Product(s).

This Limited Warranty of Hampo is solely limited to repair and/or replacement on the terms set forth above. Hampo is not reliable or responsible for any subsequent events.

