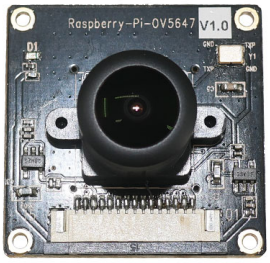
YDS CAMERA MODULE

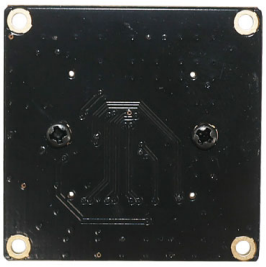
your best camera partner

YDS-Raspberry-Pi-OV5647 V1.0

5MP OmniVision OV5647 Raspberry Pi MIPI Interface
M12 Fixed Focus Camera Module



Front View



Back View

Specifications

Camera Module No.	YDS-Raspberry-Pi-OV5647 V1.0
Resolution	5MP
Image Sensor	OV5647
Sensor Type	1/4"
Pixel Size	1.4 um x 1.4 um
EFL	3.56 mm
F.NO	2.40
Pixel	2592 x 1944
View Angle	78.0°(DFOV)
Lens Dimensions	16.00 x 16.00 x 16.00 mm
Module Size	32.00 x 32.00 mm
Module Type	Fixed Focus
Interface	MIPI
Auto Focus VCM Driver IC	None
Lens Model	YDS-LENS-50306A
Lens Type	650nm IR Cut
Operating Temperature	-30°C to +70°C
Mating Connector	Raspberry Pi Cable

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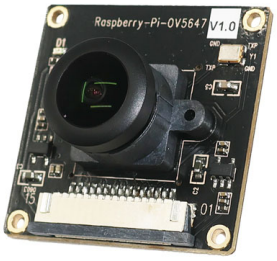
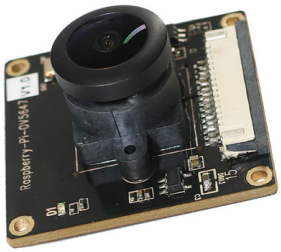
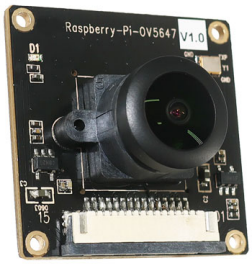


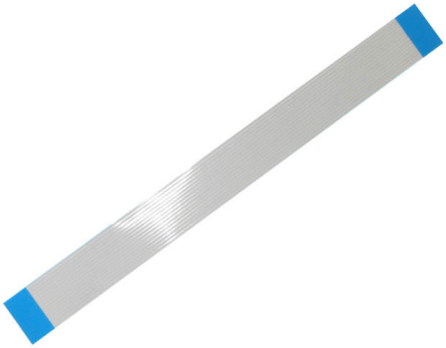
Top View



Side View



Bottom View



Mating Connector

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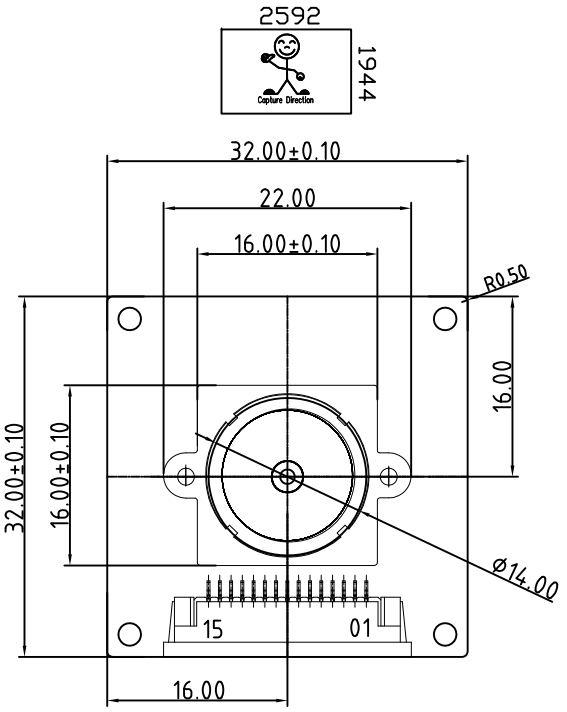
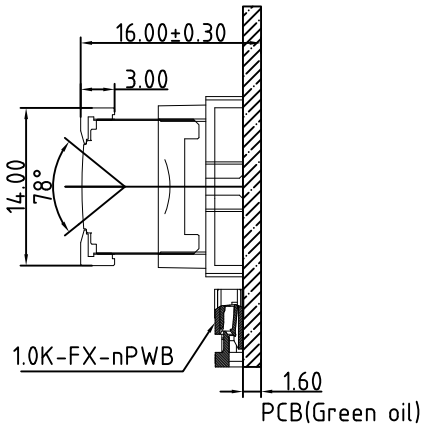
ROHS

NO	SIGNAL
1	GND
2	DN0
3	DP0
4	GND
5	DN1
6	DP1
7	GND
8	MCN
9	MCP
10	GND
11	GPIO
12	MCLK
13	SCL
14	SDA
15	AVDD3.3V

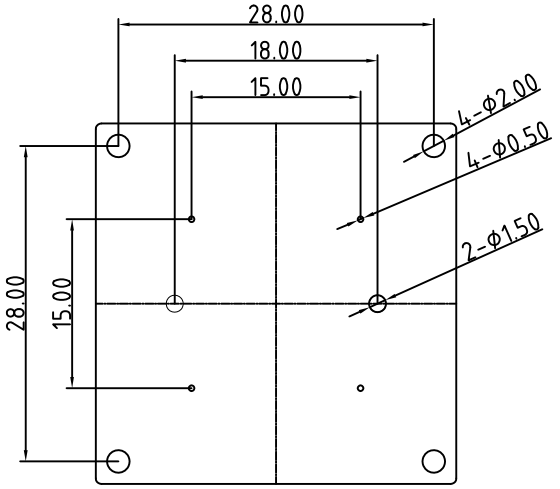
Version	Mark	Information	Date
V1.0	PD	First Version	2016-05-17
	2		
	3		



TOP VIEW



SIDE VIEW



BOTTEM VIEW

Parameters:

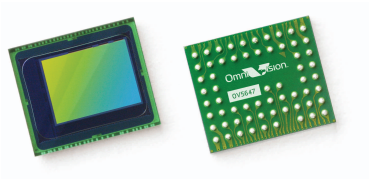
1、Sensor specification:

Image Sensor: OV5647
Pixel: 1.4um×1.4um
Lens Type: 1/4
Important Voltage Description: DVDD1.5V (internal power supply);

2、Lens specification:

FOV: 78°
F/NO.: 2.4
TV distortion: <-2.7%
Focal length: 3.56mm
Composition: 5G
IR Cut Coating: 650nm±10nm@50%

Designed By	Kevin	Model Name:	Raspberry-Pi-OV5647 V1.0
Checked By	ztpeng	Projection Type: Third Angle	Unit: mm / Material: ---------- / Scale: 1:1 / Sheet: 1 of 1 / Version: 1/0



OV5647 5-megapixel product brief

5-megapixel 1/4" Image Sensor with 1.4 µm OmniBSI Technology Offering HD Video

lead free

available in a lead-free package

The OV5647 is a 5-megapixel CMOS image sensor built on OmniVision's proprietary 1.4-micron OmniBSI™ backside illumination pixel architecture. The OV5647 delivers 5-megapixel photography in addition to high frame rate of 720p/60 and 1080p/30 high-definition (HD) video capture in an industry standard camera module size of 8.5 x 8.5 x 5 mm, making it an ideal solution for the mainstream mobile phone market.

The 720p/60 HD video is captured in full field of view (FOV) with 2x2 binning to double the sensitivity and improve signal-to-noise ratio (SNR). The post binning re-sampling filter helps minimize spatial and aliasing artifacts to provide superior image quality.

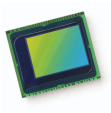
OmniBSI technology offers significant performance benefits over front-side illumination technology, such as increased sensitivity per unit area, improved quantum efficiency, reduced crosstalk and photo response non-uniformity, which all contribute to significant improvements in image quality and color reproduction. Additionally, OmniVision CMOS image sensors use proprietary sensor technology to improve image quality by reducing or eliminating common lighting/electrical sources of image contamination, such as fixed pattern noise and smearing to produce a clean, fully stable color image.

The low power OV5647 supports a digital video parallel port or high-speed two-lane MIPI interface, and provides full-frame, windowed or binned 10-bit images in RAW RGB format. It offers all required automatic image control functions, including automatic exposure control, automatic white balance, automatic band filter, automatic 50/60 Hz luminance detection, and automatic black level calibration.

Find out more at www.ovt.com.

OmniVision

OV5647



Applications

- Mobile Phones
- PC Multimedia
- Digital Still Cameras

Product Features

- 1.4 µm x 1.4 µm 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 white balance (AWB)
  - automatic band filter (ABF)
  - automatic 50/60 Hz luminance detection
  - 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
- image quality controls: lens correction, 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 2x2 binning for better SNR in low light conditions
- post binning resampling filter to minimize spatial/aliasing artifacts on 2x2 binned image
- support for horizontal and vertical sub-sampling
- standard serial SCCB interface
- digital video port (DVP) parallel output interface
- MIPI interface (two lanes)
- 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

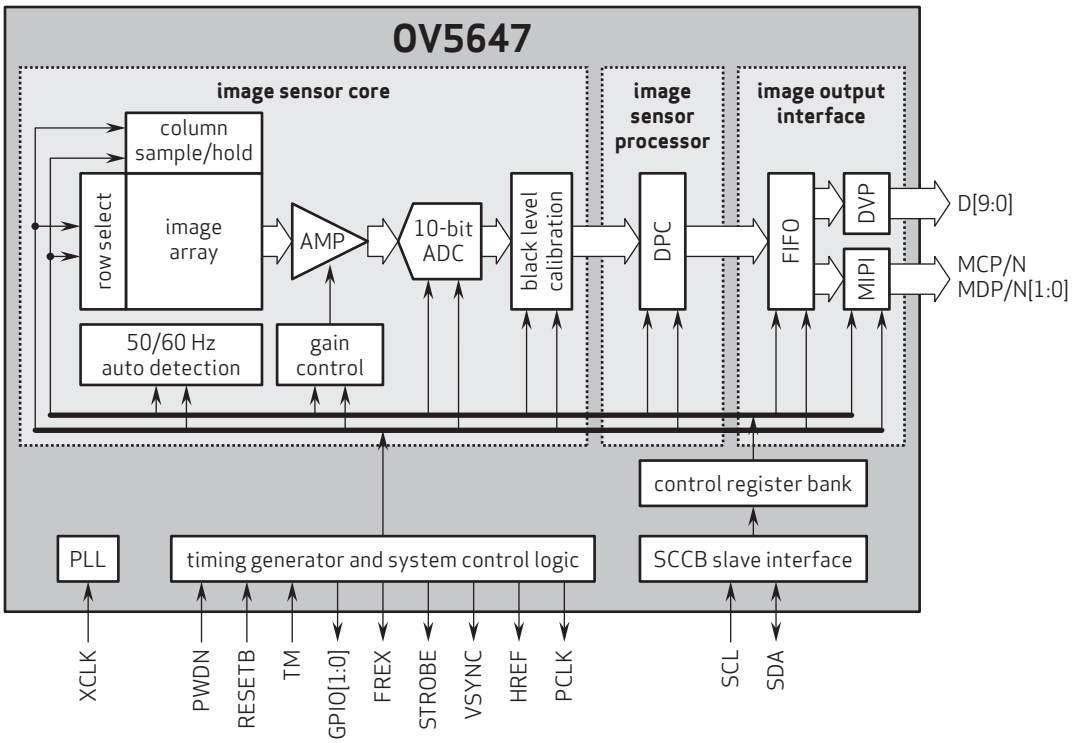
Ordering Information

- **OV05647-G04A**
  (color, chip probing, 200 µm backgrinding, reconstructed wafer)

Product Specifications

- **active array size:** 2592 x 1944
- **power supply:**
  - **core:** 1.5V ±5%
    (with embedded 1.5V regulator)
  - **analog:** 2.6 - 3.0V (2.8V typical)
  - **I/O:** 1.7 - 3.0V
- **power requirements:**
  - **active:** 96 mA
  - **standby:** 20 µA
- **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 data
- **lens size:** 1/4"
- **lens chief ray angle:** 24°
- **input clock frequency:** 6 - 27 MHz
- **max S/N ratio:** 34 dB
- **dynamic range:** 67 dB @ 8x gain
- **maximum image transfer rate:**
  - **QSXGA (2592x1944):** 15 fps
  - **1080p:** 30 fps
  - **960p:** 45 fps
  - **720p:** 60 fps
  - **VGA (640x480):** 90 fps
- **sensitivity:** 600 mV/lux-sec
- **shutter:** rolling shutter
- **maximum exposure interval:** 1968 x t_{ROW}
- **pixel size:** 1.4 µm x 1.4 µm
- **dark current:** 8 mV/sec @ 50°C junction temperature
- **image area:** 3673.6 µm x 2738.4 µm
- **die dimensions:** 5520 µm x 4700 µm

Functional Block Diagram



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USA

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www.ovt.com

Version 1.3, October, 2012

YDS-LENS-50306A

1、镜头参数

1、芯片规格 = 1/4"(NT99141)

2、焦距f = 3.56 mm

3、F/NO = 2.4

4、机械后焦 = 3.62 mm

5、光学后焦 = 6.18 mm

6、视场角(D) = 78°(H=66°V=37°)

7、光学畸变 < -2.7%

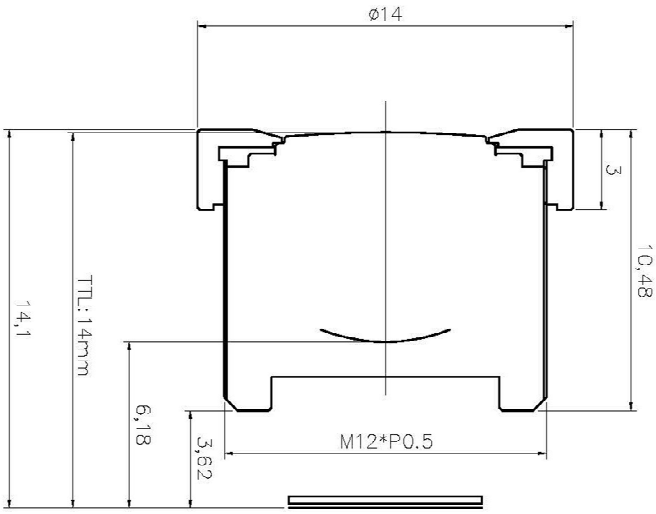
8、螺纹 = M12*P0.5

9、结构 = 5G+IR650

10、像素 = 500万

11、最大像面 = ø7.3mm

2、结构示意图：



ITEM	SPECIFICATION	
视场角 (FOV)	1/2.5"	1/2.7"
Horizontal	123°	109°
Vertical	91°	55°
Diagonal	170°	138°

No.	修订内容	修订者	日期
1			
2			
3			
4			

Common Tolerance		
Model	Value	
Angle	±0.5°	0.00
0.00	0.03	0.0
0.0	0.05	0.1

单位 mm 比例 5:1 数量 版本 页码

材料（环保）：

设计 校对 审核

名字 日期

Camera Module Pinout Definition Reference Chart

OmniVision Sony Samsung On-Semi Aptina Himax GalaxyCore PixArt SmartSens Sensors	
Pin Signal	**Description**
DGND GND	ground for digital circuit
AGND	ground for analog circuit
PCLK DCK	DVP PCLK output
XCLR PWDN XSHUTDOWN STANDBY	power down active high with internal pull-down resistor
MCLK XVCLK XCLK INCK	system input clock
RESET RST	reset active low with internal pull-up resistor
NC NULL	no connect
SDA SIO_D SIOD	SCCB data
SCL SIO_C SIOC	SCCB input clock
VSYNC XVS FSYNC	DVP VSYNC output
HREF XHS	DVP HREF output
DOVDD	power for I/O circuit
AFVDD	power for VCM circuit
AVDD	power for analog circuit
DVDD	power for digital circuit
STROBE FSTROBE	strobe output
FSIN	synchronize the VSYNC signal from the other sensor
SID	SCCB last bit ID input
ILPWM	mechanical shutter output indicator
FREX	frame exposure / mechanical shutter
GPIO	general purpose inputs
SLASEL	I2C slave address select
AFEN	CEN chip enable active high on VCM driver IC
MIPI Interface	
MDN0 DN0 MD0N DATA_N DMO1N	MIPI 1st data lane negative output
MDP0 DP0 MD0P DATA_P DMO1P	MIPI 1st data lane positive output
MDN1 DN1 MD1N DATA2_N DMO2N	MIPI 2nd data lane negative output
MDP1 DP1 MD1P DATA2_P DMO2P	MIPI 2nd data lane positive output
MDN2 DN2 MD2N DATA3_N DMO3N	MIPI 3rd data lane negative output
MDP2 DP2 MD2P DATA3_P DMO3P	MIPI 3rd data lane positive output
MDN3 DN3 MD3N DATA4_N DMO4N	MIPI 4th data lane negative output
MDP3 DP3 MD3P DATA4_P DMO4P	MIPI 4th data lane positive output
MCN CLKN CLK_N DCKN	MIPI clock negative output
MCP CLKP MCP CLK_P DCKN	MIPI clock positive output
DVP Parallel Interface	
D0 DO0 Y0	DVP data output port 0
D1 DO1 Y1	DVP data output port 1
D2 DO2 Y2	DVP data output port 2
D3 DO3 Y3	DVP data output port 3
D4 DO4 Y4	DVP data output port 4
D5 DO5 Y5	DVP data output port 5
D6 DO6 Y6	DVP data output port 6
D7 DO7 Y7	DVP data output port 7
D8 DO8 Y8	DVP data output port 8
D9 DO9 Y9	DVP data output port 9
D10 DO10 Y10	DVP data output port 10
D11 DO11 Y11	DVP data output port 11

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Cameras Applications

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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




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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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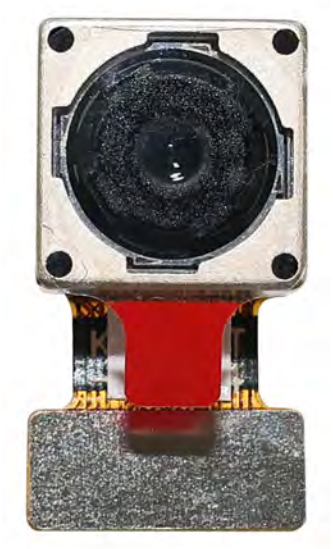
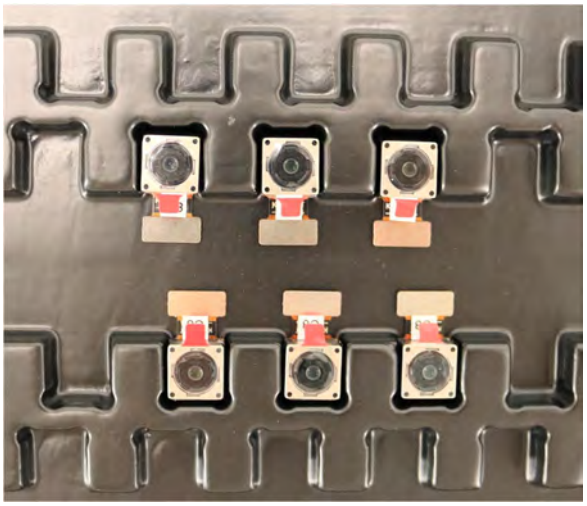
YDS Camera Module

Complete with Lens Protection Film



Tray with Grid and Space

Place Cameras on the Tray



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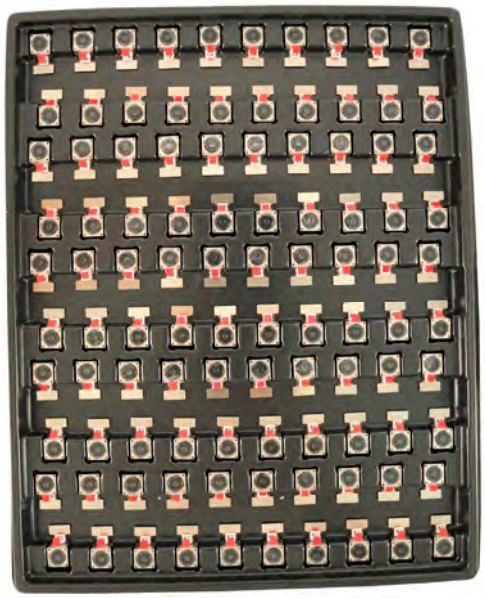
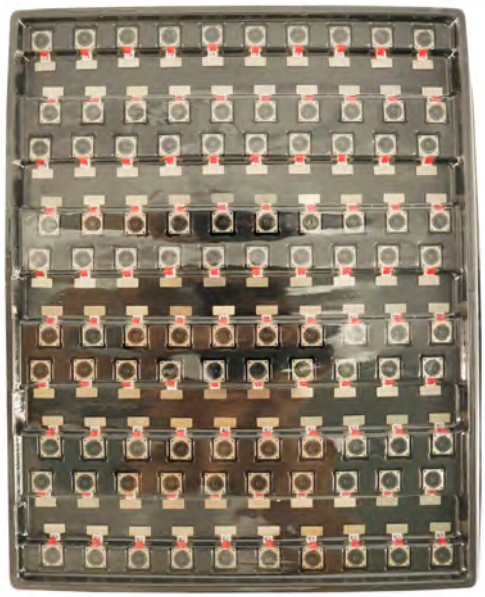
Full Tray of Cameras



Cover Tray with Lid



Place Tray into Anti-Static Bag

Vacuum the Anti-Static Bag

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Sealed Vacuum Anti-Static Bag with Labels

1. Model and Description 2. Quantity 3. Manufacturing Date Code 4. Caution

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Place Foam Sheets Between Tray Bags

Foam Sheets are Larger Than Trays

Place Foam Sheets and Trays into Box

Foam Sheets are Tightly Fitting in Box

Seal the Carbon Box

Label the Carbon Shipping Box

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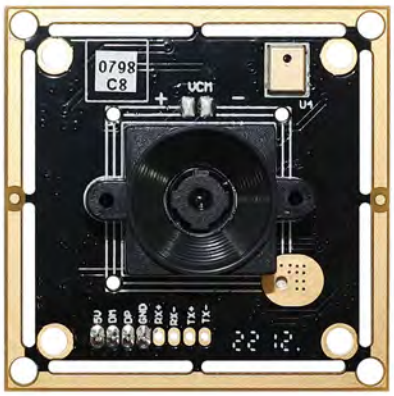
USB Camera Module



Complete with Lens Protection Film

Place Camera Sample into Anti-Static Bag

Place USB Cameras into Tray

Seal the Tray with Anti-Static Bag

Label the Carbon Shipping Box

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Place Camera Sample into Anti-Static Bag

Place Connectors into Anti-Static Bag

Label the Sample Bags

Place Connectors into Reel

Place Samples into the Carbon Box

Place Connectors into the Carbon Box

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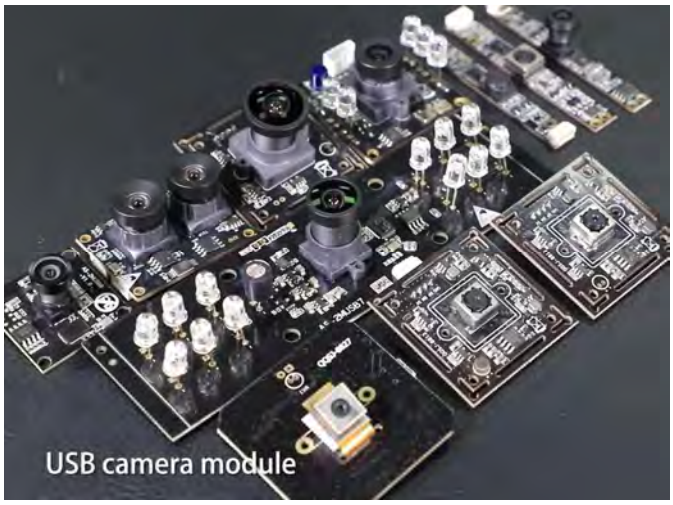
Company YDSCAM

YingDeShun Co. Ltd. (YDS) was established in 2017, a next-generation technology driven manufacturer specialized in research, design, and produce of audio and video products. YDS is occupying 20,000 square feet automated plants with 100 employees of annual throughput 30,000,000 units cameras.

YDS 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. YDS 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

YDS provides the following limited warranty if you purchased the Product(s) directly from YDS company or from YDS's website www.YDSCAM.com. Product(s) purchased from other sellers or sources are not covered by this Limited Warranty. YDS 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, YDS 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 YDS is solely limited to repair and/or replacement on the terms set forth above. YDS is not reliable or responsible for any subsequential events.

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YDS Strength

Powerful Factory

Professional Service

Promised Delivery

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