

## YDS-KN4-OV5640-1B V4.0

### 5MP OmniVision OV5640-1B MIPI Interface LED Auto Focus Camera Module



Front View



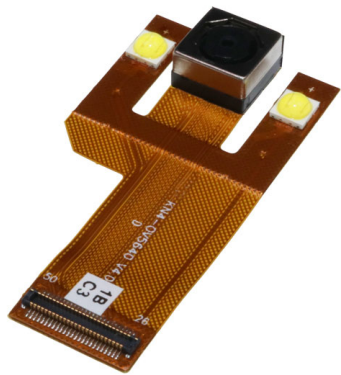
Back View

#### Specifications

|                                 |                                     |
|---------------------------------|-------------------------------------|
| <b>Camera Module No.</b>        | <b>YDS-KN4-OV5640-1B V4.0</b>       |
| <b>Resolution</b>               | 5MP                                 |
| <b>Image Sensor</b>             | OV5640-1B                           |
| <b>Sensor Type</b>              | 1/4"                                |
| <b>Pixel Size</b>               | 1.4 um x 1.4 um                     |
| <b>EFL</b>                      | 3.29 mm                             |
| <b>F.NO</b>                     | 2.80                                |
| <b>Pixel</b>                    | 2592 x 1944                         |
| <b>View Angle</b>               | 68.7°(DFOV) 58.1°(HFOV) 45.0°(VFOV) |
| <b>Lens Dimensions</b>          | 8.50 x 8.50 x 5.25 mm               |
| <b>Module Size</b>              | 42.00 x 22.00 mm                    |
| <b>Module Type</b>              | Auto Focus with LED                 |
| <b>Interface</b>                | MIPI                                |
| <b>Auto Focus VCM Driver IC</b> | Embedded                            |
| <b>Lens Model</b>               | YDS-LENS-M5101                      |
| <b>Lens Type</b>                | 650nm IR Cut                        |
| <b>Operating Temperature</b>    | -30°C to +70°C                      |
| <b>Mating Connector</b>         | AXT550124                           |



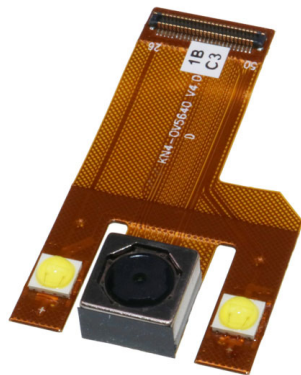
## YDS-KN4-OV5640-1B V4.0 5MP OmniVision OV5640-1B MIPI Interface LED Auto Focus Camera Module



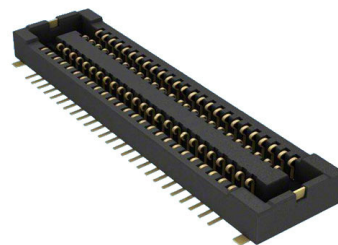
Top View



Side View



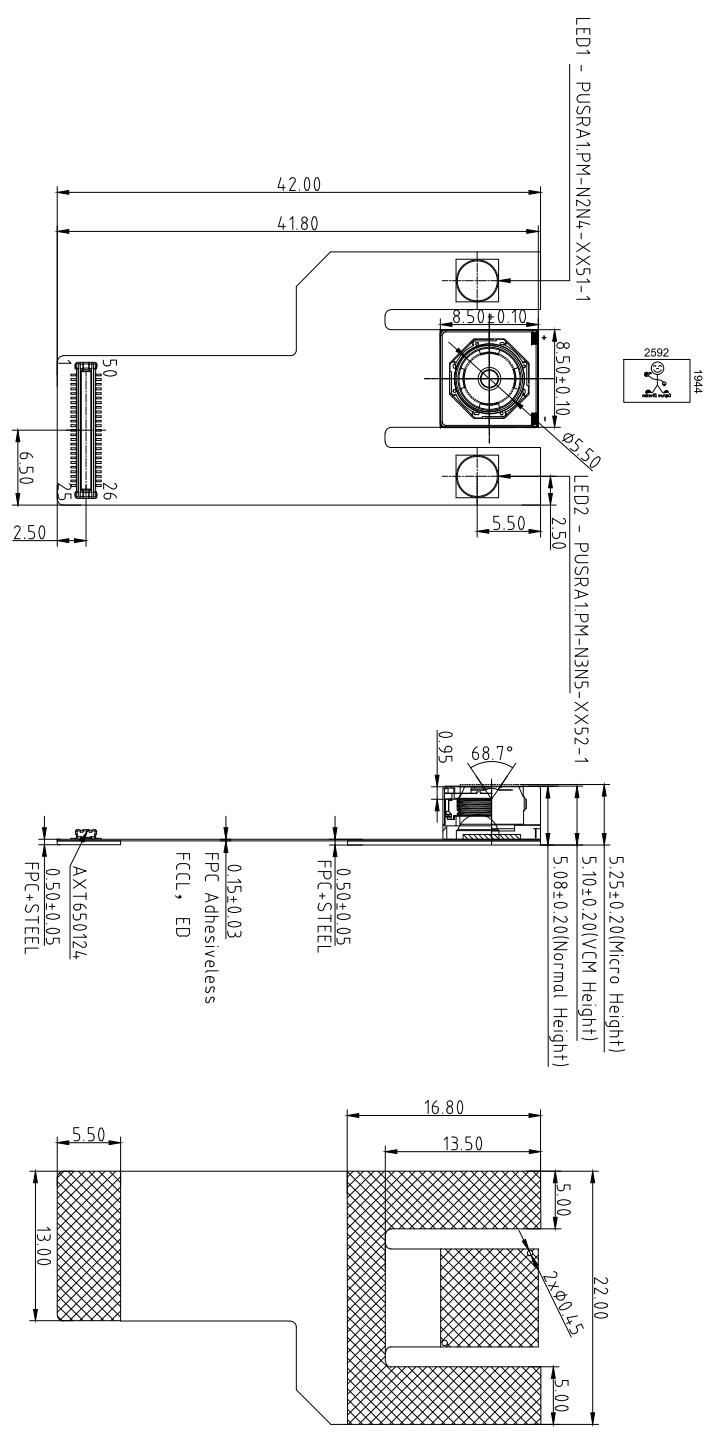
Bottom View



Mating Connector

| Version | Information   | Date     |
|---------|---------------|----------|
| V1.0    | First Version | 3-9-2022 |

| PNOS | DESCRIPTION   |
|------|---------------|
| 1    | LED1_A        |
| 2    | GND           |
| 3    | GND           |
| 4    | MPL_V1        |
| 5    | MPL_V1        |
| 6    | GND           |
| 7    | MPL_V1N       |
| 8    | MPL_V1N       |
| 9    | GND           |
| 10   | MPL_V1N       |
| 11   | MPL_V1N       |
| 12   | GND           |
| 13   | AVDD12V       |
| 14   | GND           |
| 15   | LED2_A        |
| 16   | GND           |
| 17   | NC            |
| 18   | NC            |
| 19   | GND           |
| 20   | NC            |
| 21   | NC            |
| 22   | GND           |
| 23   | NC            |
| 24   | NC            |
| 25   | GND           |
| 26   | GND           |
| 27   | NC            |
| 28   | NC            |
| 29   | GND           |
| 30   | NC            |
| 31   | NC            |
| 32   | GND           |
| 33   | NC            |
| 34   | NC            |
| 35   | GND           |
| 36   | LED2_A        |
| 37   | GND           |
| 38   | GND           |
| 39   | MCLK          |
| 40   | GND           |
| 41   | DOVDD18V      |
| 42   | CAVDD18V      |
| 43   | S1A           |
| 44   | S1A           |
| 45   | S1A           |
| 46   | RESET         |
| 47   | GND           |
| 48   | DVDD115V      |
| 49   | VDD1_AF (2.8) |
| 50   | GND           |
| 51   | LED1_A        |



TOP VIEW

SIDE VIEW

BOTTOM VIEW

Parameter:

- Sensor specification:
  - Image Sensor: OV5640-1B
  - Pixel: 1.4umx1.4um
  - Lens Type: 1/4
  - Important Voltage Description: DVDD1.5V (external power supply);

2、Lens specification:

- FOV: 68.7°(D);58.1°(H);45°(V)
- F/NO.: 2.8
- TV distortion: <1.0%
- Focal length: 3.29mm
- Composition: 4P+IR FILTER
- IR Cut Coating: 650nm±10nm@50%

|             |           |                 |                    |               |              |
|-------------|-----------|-----------------|--------------------|---------------|--------------|
| Designed By | Kevin     | Model Name:     | KN4-OV5640-1B V4.0 |               |              |
| Checked By  | Aouly_Yan | Projection Type | Unit: mm           | Material:     | -----        |
|             |           | Third Angle     | Scale: 1:1         | Sheet: 1 of 1 | Version: 1/0 |



# 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

- cellular phones
- toys
- PC multimedia
- digital still cameras

## ordering information

- OV05640-A71A-1B** (color, lead-free)  
71-pin CSP

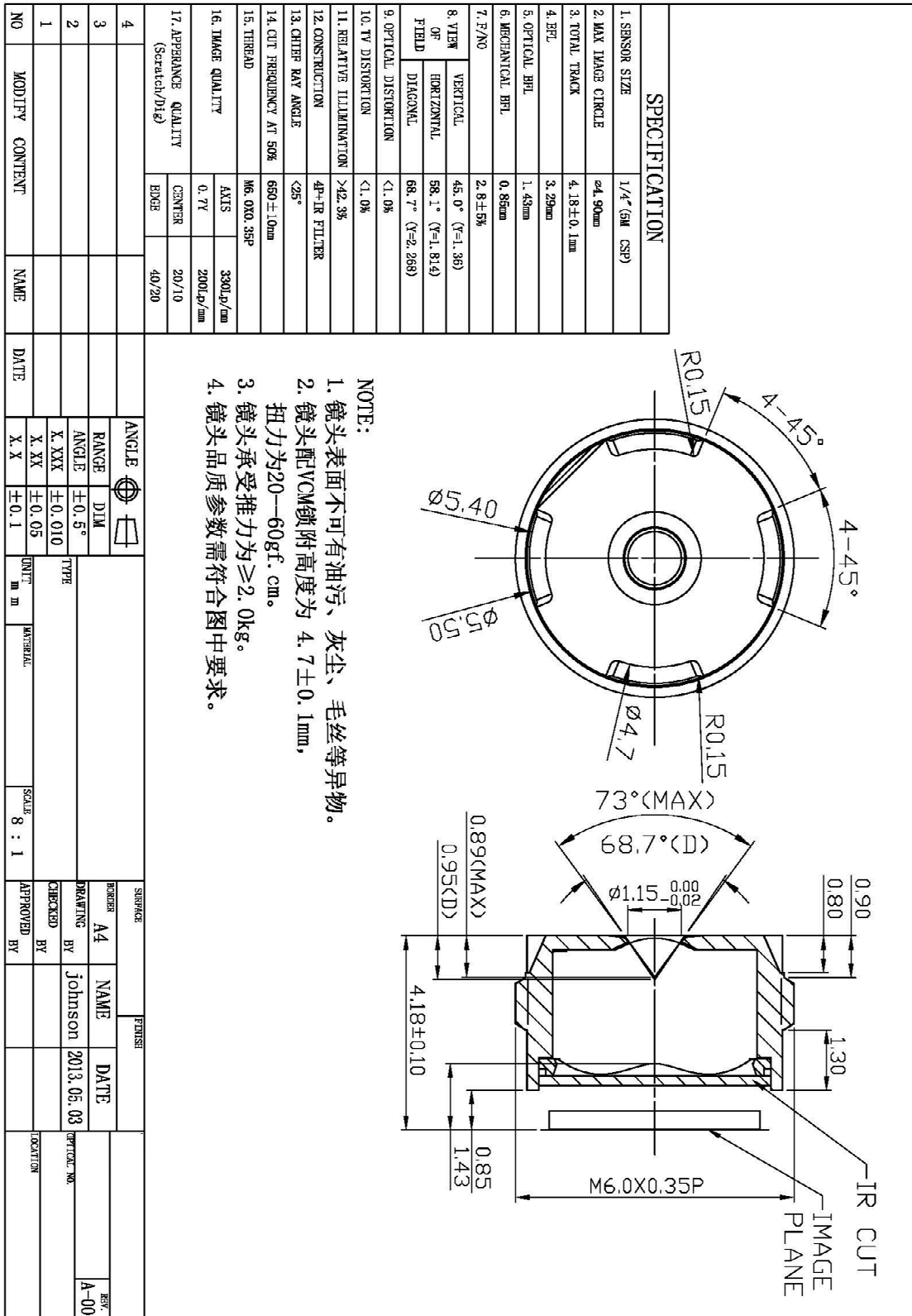
## features

- 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 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: 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 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
- 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
- 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 <6mm with both CSP and RW packaging

## key specifications (typical)

- active array size:** 2592 x 1944
- power supply:**
  - core: 1.425 ~ 1.675V (with embedded 1.5V regulator)
  - analog: 2.6 ~ 3.0V (2.8V typical)
  - I/O: 1.8V / 2.8V
- power requirements:**
  - active: 140 mA
  - standby: 20  $\mu\text{A}$
- temperature range:**
  - operating: -30°C to 70°C junction temperature (see [table 8-2](#))
  - stable image: 0°C to 50°C junction temperature (see [table 8-2](#))
- output formats:** 8-/10-bit RGB RAW output
- lens size:** 1/4"
- lens chief ray angle:** 24° (see [figure 10-2](#))
- input clock frequency:** 6~27 MHz
- max S/N ratio:** 36 dB
- dynamic range:** 68 dB @ 8x gain
- maximum image transfer rate:**
  - QSXGA (2592x1944): 15 fps
  - 1080p: 30 fps
  - 1280x960: 45 fps
  - 720p: 60 fps
  - VGA (640x480): 90 fps
- sensitivity:** 600 mV/Lux-sec
- shutter:** rolling shutter / frame exposure
- maximum exposure interval:** 1964 x  $t_{\text{ROW}}$
- pixel size:** 1.4  $\mu\text{m}$  x 1.4  $\mu\text{m}$
- dark current:** 8 mV/s @ 60°C junction temperature
- image area:** 3673.6  $\mu\text{m}$  x 2738.4  $\mu\text{m}$
- package dimensions:** 5985  $\mu\text{m}$  x 5835  $\mu\text{m}$

## YDS-LENS-M5101





# YDS CAMERA MODULE

*your best camera partner*

## 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       |   |                         |   |                                    |            |        |           |         |
| <b>MIPI Interface</b>         |  |   |                         |   |                                    |            |        |           |         |
| 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         |            |        |           |         |
| <b>DVP Parallel Interface</b> |  |   |                         |   |                                    |            |        |           |         |
| 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 |   |                                    |            |        |           |         |

[www.YDSCAM.com](http://www.YDSCAM.com) [sales@ydscam.com](mailto:sales@ydscam.com) Phone (WeChat, QQ): (+86) 177 2732 6718

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## Cameras Applications



### IMAGING DEVICES





## 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<br>Low -20°C 0.5 Hours<br>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<br>60 Seconds<br>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<br>Cycling in 24 Hours                          | Power Switch            | Electrically Functional |
|                             | USB Connector               | On/Off 250 Times  | Plug and Unplug         | Electrically Functional |



## Camera Inspection Standard

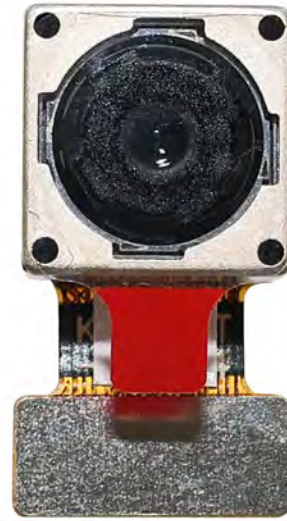
| Inspection Item  |          | Inspection Method | Standard of Inspection      |  |                                 |
|------------------|----------|-------------------|-----------------------------|--|---------------------------------|
| Category         | Item     |                   |                             |  |                                 |
| 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 |  |                                 |

## YDSCAM Package Solutions

YDS Camera Module



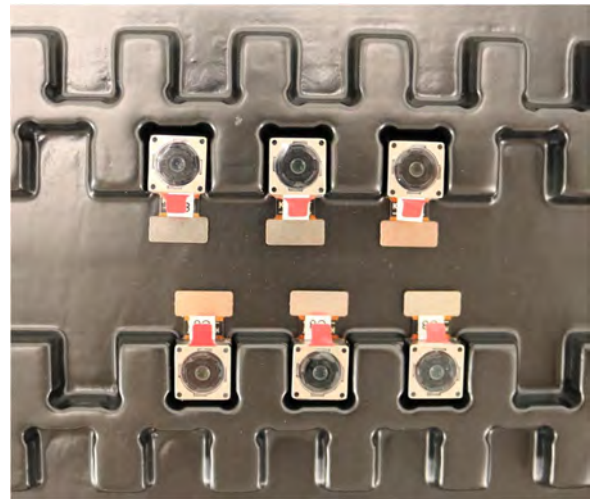
Complete with Lens Protection Film



Tray with Grid and Space

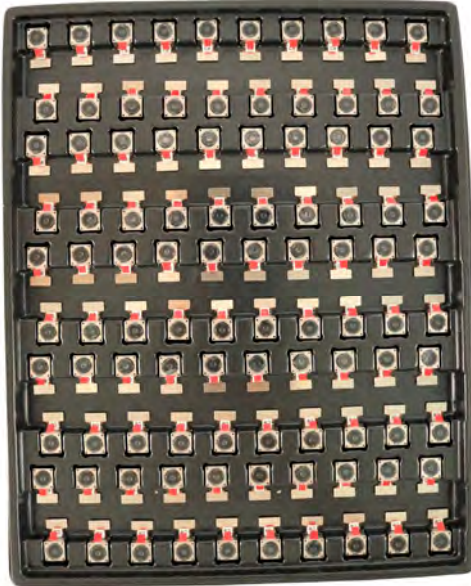


Place Cameras on the Tray

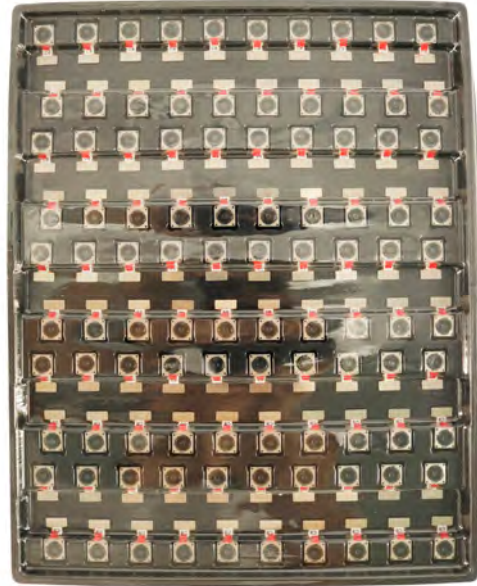


## YDSCAM Package Solutions

Full Tray of Cameras



Cover Tray with Lid



Place Tray into Anti-Static Bag



Vacuum the Anti-Static Bag



## YDSCAM Package Solutions

### Sealed Vacuum Anti-Static Bag with Labels

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



## YDSCAM Package Solutions

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

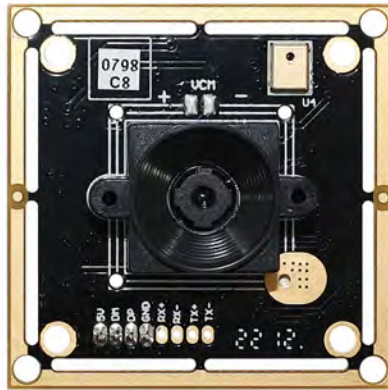




## YDSCAM Package Solutions

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



## YDSCAM Package Solutions

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







# YDS CAMERA MODULE

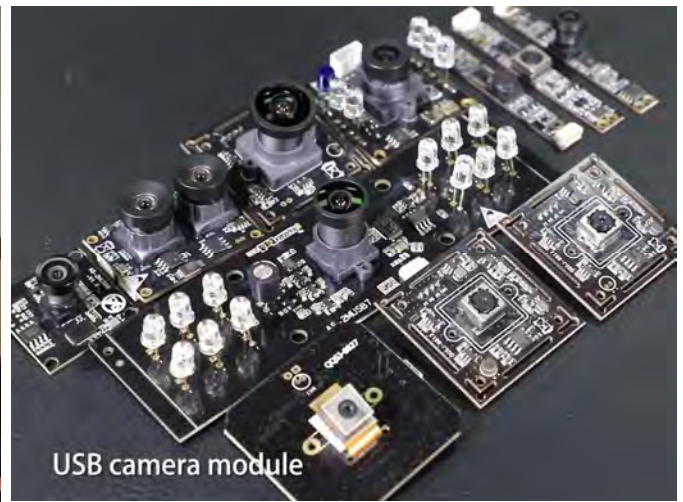
*your best camera partner*

## 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](http://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 subsequent events.



[www.YDSCAM.com](http://www.YDSCAM.com) [sales@ydscam.com](mailto:sales@ydscam.com) Phone (WeChat, QQ): (+86) 177 2732 6718

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# YDS CAMERA MODULE

*your best camera partner*

## YDS Strength

### Powerful Factory



### Professional Service



### Promised Delivery



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