

# **PARTICIPATION**YDS CAMERA MODULE

your best camera partner

# YDS-KG7-V3F V5.0 5MP OmniVision OV5648 MIPI Interface Fixed Focus Camera Module





Front View Back View

#### **Specifications**

Camera Module No.	YDS-KG7-V3F V5.0
Resolution	5MP
Image Sensor	OV5648
Sensor Type	1/4"
Pixel Size	1.4 um x 1.4 um
EFL	3.20 mm
F.NO	2.80
Pixel	2592 x 1944
View Angle	70.0°(DFOV) 58.6°(HFOV) 45.3°(VFOV)
Lens Dimensions	8.50 x 8.50 x 4.92 mm
Module Size	15.31 x 8.50 mm
Module Type	Fixed Focus
Interface	MIPI
Auto Focus VCM Driver IC	None
Lens Type	650nm IR Cut
Operating Temperature	-30°C to +70°C
Mating Connector	AXE524124



your best camera partner

# YDS-KG7-V3F V5.0 5MP OmniVision OV5648 MIPI Interface Fixed Focus Camera Module



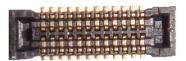




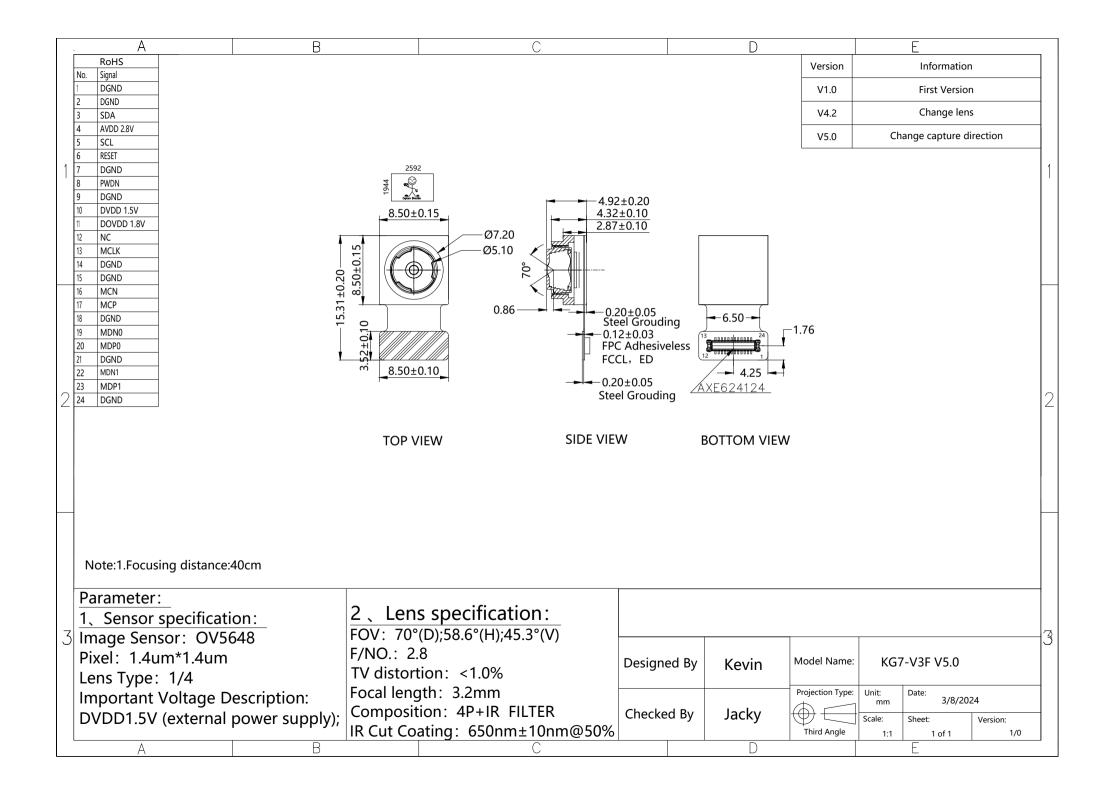
Side View

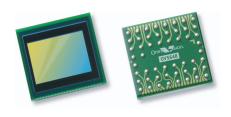


**Bottom View** 



**Mating Connector** 





# OV5648 5-megapixel product brief





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<sup>™</sup> 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.



#### **Applications**

- Cellular and Picture Phones
- PC Multimedia
- Tovs
- 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 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:
- support for video or snapshot operations programmable I/O drive capability,
- 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
- /O tri-state configurability
- support for black sun cancellation

### OV5648



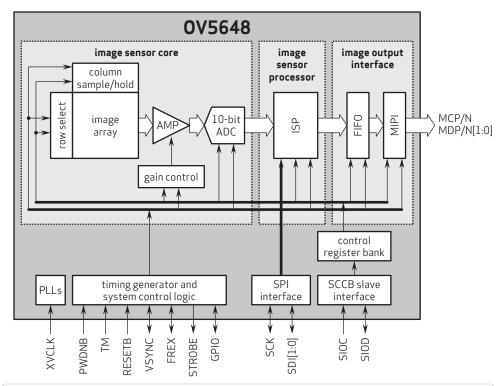
■ 0V05648-A53A (color, lead-free, 53-pin CSP3) ■ 0V05648-G04A (color, chip-probing, 200 µm backgrinding, reconstructed wafer)

#### **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: 219 mW
- standby: 36 µW
- temperature range:
- operating: -30°C to 70°C junction temperature
- stable image: 0°C to 50°C junction temperature
- 8-/10-bit RGB RAW output
- lens size: 1/4"
- lens chief ray angle: 29.1°
- input clock frequency: 6 27 MHz

- max S/N ratio: 36 dB
- dynamic range: 72 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: 690 mV/lux-sec
- shutter: rolling shutter
- pixel size: 1.4 µm x 1.4 µm
- dark current: 0.7 mV/s @ 50°C junction temperature
- image area: 3673.6 µm x 2738.4 µm
- package/die dimensions: CSP3: 5010 µm x 4810 µm - COB: 5000 µm x 4800 µm

#### Functional Block Diagram



4275 Burton Drive Santa Clara, CA 95054

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

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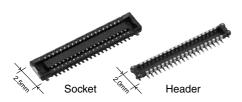
# Panasonic ideas for life

Narrow pitch connectors (0.4mm pitch)

For board-to-FPC

A4S Series





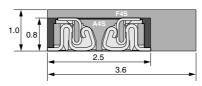
RoHS compliant

#### **FEATURES**

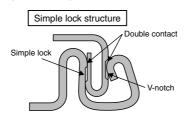
### 1. 2.5 mm wide slim two-piece style connectors

Compact and slim structure contributes overall miniaturization of product design.

- <Compared to F4S series (40 pin contacts, when mated)>
- Width: 30% down
- Footprint: 30% down



- 2. "TOUGH CONTRET FROURNEED" ensures high resistance to various environments in lieu of slim and low profile body
- 3. Simple lock structure provides tactile feedback to ensure excellent mating/unmating operation feel.



The connector gives the tactile feedback when inserted, allowing reliable mating.

- 4. Mated heights of 0.8 and 1.0 mm are available for the same foot pattern.
- 5. Connectors for inspection available

#### **APPLICATIONS**

Recommended for board-to-FPC connections of mobile equipment, such as cellular phones, smart phones, laptops, and portable music players

#### **ORDERING INFORMATION**

	AXE				2	4
5: Narrow Pitch Connector A4S (0.4 mm pitch) Socket 6: Narrow Pitch Connector A4S (0.4 mm pitch) Header						
Number of pins (2 digits)						
Mated height <socket> 1: For mated height 0.8/1.0 mm <header> 1: For mated height 0.8 mm 2: For mated height 1.0 mm</header></socket>						
Functions 2: Without positioning bosses						
Surface treatment (Contact portion / Terminal portion) <socket> 4: Ni plating on base, Au plating on surface (for Ni barrie <header> 4: Ni plating on base, Au plating on surface</header></socket>	er availat	ble)				

#### **PRODUCT TYPES**

Mated height	Number of pine	Part r	umber	Packi	ng
wated neight	Number of pins	Socket	Header	Inner carton (1-reel)	Outer carton
	10	AXE510124	AXE610124		
	12	AXE512124	AXE612124		
	14	AXE514124	AXE614124		
	16	AXE516124	AXE616124		
	18	AXE518124	AXE618124		
	20	AXE520124	AXE620124		
	22	AXE522124	AXE622124		
	24	AXE524124	AXE624124		
	26	AXE526124	AXE626124		
	28	AXE528124	AXE628124		
	30	AXE530124	AXE630124		
0.0	32	AXE532124	AXE632124		
0.8mm	34	AXE534124	AXE634124		
	36	AXE536124	AXE636124		
	38	AXE538124	AXE638124		
	40	AXE540124	AXE640124		
	44	AXE544124	AXE644124		
	50	AXE550124	AXE650124		
	54	AXE554124	AXE654124		
	56	AXE556124	AXE656124	5,000 pieces	10,000 pieces
	60	AXE560124	AXE660124		
	64	AXE564124	AXE664124		
	70	AXE570124	AXE670124		
	80	AXE580124	AXE680124		
	10	AXE510124	AXE610224		
	12	AXE512124	AXE612224		
	14	AXE514124	AXE614224		
	20	AXE520124	AXE620224		
	24	AXE524124	AXE624224		
	26	AXE526124	AXE626224		
	30	AXE530124	AXE630224		
1.0mm	32	AXE532124	AXE632224		
	40	AXE540124	AXE640224		
	44	AXE544124	AXE644224		
	50	AXE550124	AXE650224		
	54	AXE554124	AXE654224		
	60	AXE560124	AXE660224		
	70	AXE570124	AXE670224		
	80	AXE580124	AXE680224		

Notes: 1. Order unit:

For volume production: 1-inner carton (1-reel) units

Samples for mounting check: 50-connector units. Please contact our sales office.
Samples: Small lot orders are possible. Please contact our sales office.

2. The above part numbers are for connectors without positioning bosses, which are standard. When ordering connectors with positioning bosses, please contact our sales office.

3. Please contact us for connectors having a number of pins other than those listed above.

#### **SPECIFICATIONS**

#### ■ Characteristics

	Item	Specifications	Conditions
	Rated current	0.3A/pin contact (Max. 5 A at total pin contacts)	
	Rated voltage	60V AC/DC	
Electrical Break	Breakdown voltage	150V AC for 1 min.	No short-circuiting or damage at a detection current of 1 mA when the specified voltage is applied for one minute.
Griaractoriotico	Insulation resistance	Min. 1,000M $\Omega$ (initial)	Using 250V DC megger (applied for 1 min.)
	Contact resistance	Max. 90mΩ	Based on the contact resistance measurement method specified by JIS C 5402.
	Composite insertion force	Max. 1.200N/pin contacts × pin contacts (initial)	
Mechanical	Composite removal force	Min. 0.165N/pin contacts × pin contacts	
characteristics	Contact holding force (Socket contact)	Min. 0.20N/pin contacts	Measuring the maximum force. As the contact is axially pull out.
	Ambient temperature	-55°C to +85°C	No freezing at low temperatures. No dew condensation.
	Soldering heat resistance	Peak temperature: 260°C or less (on the surface of the PC board around the connector terminals)	Infrared reflow soldering
		300°C within 5 sec. 350°C within 3 sec.	Soldering iron
	Storage temperature	-55°C to +85°C (product only) -40°C to +50°C (emboss packing)	No freezing at low temperatures. No dew condensation.
Environmental characteristics	Thermal shock resistance (header and socket mated)	5 cycles, insulation resistance min. 100M $\Omega$ , contact resistance max. $90m\Omega$	Sequence 1. –55-\(\frac{9}{3}\)°C, 30 minutes 2. \(\times\), Max. 5 minutes 3. 85-\(\frac{9}{3}\)°C, 30 minutes 4. \(\times\), Max. 5 minutes
	Humidity resistance (header and socket mated)	120 hours, insulation resistance min. 100M $\Omega$ , contact resistance max. $90m\Omega$	Bath temperature 40±2°C, humidity 90 to 95% R.H.
	Saltwater spray resistance (header and socket mated)	24 hours, insulation resistance min. 100M $\Omega$ , contact resistance max. 90m $\Omega$	Bath temperature 35±2°C, saltwater concentration 5±1%
	H <sub>2</sub> S resistance (header and socket mated)	48 hours, contact resistance max. 90mΩ	Bath temperature 40±2°C, gas concentration 3±1 ppm, humidity 75 to 80% R.H.
Lifetime characteristics	Insertion and removal life	30 times	Repeated insertion and removal speed of max. 200 times/ hours
Unit weight		20 pin contact type: Socket: 0.02 g Header: 0.01 g	

#### ■ Material and surface treatment

Part name	Material	Surface treatment
Molded portion	LCP resin (UL94V-0)	
Contact and Post	Copper alloy	Contact portion: Base: Ni plating Surface: Au plating Terminal portion: Base: Ni plating Surface: Au plating (except the terminal tips) The socket terminals close to the portion to be soldered have nickel barriers (exposed nickel portions). Soldering terminals: Sockets: Base: Ni plating Surface: Pd+Au flash plating (except the terminal tips) Headers: Base: Ni plating Surface: Au plating (except the terminal tips)

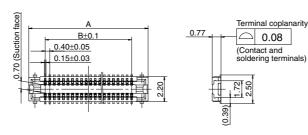
#### **DIMENSIONS** (Unit: mm)

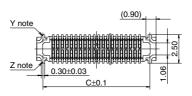
The CAD data of the products with a CAD Data mark can be downloaded from: http://industrial.panasonic.com/ac/e

#### ■ Socket (Mated height: 0.8 mm/1.0 mm)

#### CAD Data







General tolerance: ±0.2

Note: Since the soldering terminals has a single-piece construction, sections Y and Z are electrically connected.

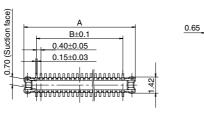
#### Dimension table (mm)

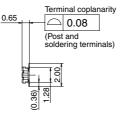
Number of pins/ dimension	А		С
10	4.5	1.6	3.4
12	4.9	2.0	3.8
14	5.3	2.4	4.2
16	5.7	2.8	4.6
18	6.1	3.2	5.0
20	6.5	3.6	5.4
22	6.9	4.0	5.8
24	7.3	4.4	6.2
26	7.7	4.8	6.6
28	8.1	5.2	7.0
30	8.5	5.6	7.4
32	8.9	6.0	7.8
34	9.3	6.4	8.2
36	9.7	6.8	8.6
38	10.1	7.2	9.0
40	10.5	7.6	9.4
44	11.3	8.4	10.2
50	12.5	9.6	11.4
54	13.3	10.4	12.2
56	13.7	10.8	12.6
60	14.5	11.6	13.4
64	15.3	12.4	14.2
70	16.5	13.6	15.4
80	18.5	15.6	17.4

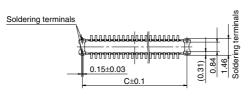
#### ■ Header (Mated height: 0.8 mm)

#### CAD Data









General tolerance: ±0.2

#### Dimension table (mm)

Number of pins/ dimension	А	В	С
10	3.8	1.6	3.2
12	4.2	2.0	3.6
14	4.6	2.4	4.0
16	5.0	2.8	4.4
18	5.4	3.2	4.8
20	5.8	3.6	5.2
22	6.2	4.0	5.6
24	6.6	4.4	6.0
26	7.0	4.8	6.4
28	7.4	5.2	6.8
30	7.8	5.6	7.2
32	8.2	6.0	7.6
34	8.6	6.4	8.0
36	9.0	6.8	8.4
38	9.4	7.2	8.8
40	9.8	7.6	9.2
44	10.6	8.4	10.0
50	11.8	9.6	11.2
54	12.6	10.4	12.0
56	13.0	10.8	12.4
60	13.8	11.6	13.2
64	14.6	12.4	14.0
70	15.8	13.6	15.2
80	17.8	15.6	17.2



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#### **Cameras Applications**







Automotive Driver Pilot

Live Streaming

Video Conference







Eye Tracker Biometric Detection

Machine Vision

Agricultural Monitor







Night Vision Security

Drone and Sports Eagle Eyes

Interactive Pet Camera



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#### **Camera Module Pinout Definition Reference Chart**

OmniVision Sony Samsung On-Semi Ap	otina 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	3
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 D00 Y0	DVP data output port 0
D1 D01 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 D06 Y6	DVP data output port 6
D7 D07 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 D011 Y11	DVP data output port 11
ווו ווטס ווס	DVI data output port 11



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#### **Camera Reliability Test**

Reliability Inspection Item		Tanking Makhad	A a comptance Cuitoria		
Cat	egory	Item	Testing Method	Acceptance Criteria	
	Storage	High 60°C 96 Hours	Temperature Chamber	No Abnormal Situation	
	Temperature	Low -20°C 96 Hours	Temperature Chamber	No Abnormal Situation	
	Operation	High 60°C 24 Hours	Temperature Chamber	No Abnormal Situation	
Environmental	Temperature	Low -20°C 24 Hours	Temperature Chamber	No Abnormal Situation	
Environmental	Humidity	60°C 80% 24 Hours	Temperature Chamber	No Abnormal Situation	
Thermal Sh		High 60°C 0.5 Hours Low -20°C 0.5 Hours Cycling in 24 Hours	Temperature Chamber	No Abnormal Situation	
	Drop Test	Without Package 60cm	10 Times on Wood Floor	Electrically Functional	
	(Free Falling)	With Package 60cm	10 Times on Wood Floor	Electrically Functional	
		50Hz X-Axis 2mm 30min	Vibration Table	Electrically Functional	
Physical	Vibration Test	50Hz Y-Axis 2mm 30min	Vibration Table	Electrically Functional	
Physical		50Hz Z-Axis 2mm 30min	Vibration Table	Electrically Functional	
Cable Tensile Strength Test  Loading Weight 4 kg 60 Seconds Cycling in 24 Hours		60 Seconds	Tensile Testing Machine	Electrically Functional	
	ESD Test	Contact Discharge 2 KV	ESD Testing Machine	Electrically Functional	
	ESD Test	Air Discharge 4 KV	ESD Testing Machine	Electrically Functional	
Electrical	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**

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Inspection Ite		ı Item	lana antina Mathard	Otan dand of languages	
Cateo	gory	Item	Inspection Method	Standard of Inspection	
		Color	The Naked Eye	Major Difference is Not Allowed.	
	FPC/ PCB	Be Torn/Chopped	The Naked Eye	Copper Crack Exposure is Not Allowed.	
		Marking	The Naked Eye	Clear, Recognizable (Within 30cm Distance)	
		Scratches	The Naked Eye	The Inside Crack Exposure is Not Allowed	
	Holder	Gap	The Naked Eye	Meet the Height Standard	
Appearance	Holdel	Screw	The Naked Eye	Make Sure Screws Are Presented (If Any)	
		Damage	The Naked Eye	The Inside Crack Exposure is Not Allowed	
		Scratch	The Naked Eye	No Effect On Resolution Standard	
	Lens	Contamination	The Naked Eye	No Effect On Resolution Standard	
	Lens	Oil Film	The Naked Eye	No Effect On Resolution Standard	
		Cover Tape	The Naked Eye	No Issue On Appearance.	
		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	
Function	Image	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	
		Height	The Naked Eye	Follows Approval Data Sheet	
Dimer	neion	Width	The Naked Eye	Follows Approval Data Sheet	
Dille	131011	Length	The Naked Eye	Follows Approval Data Sheet	
	Overall		The Naked Eye	Follows Approval Data Sheet	



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### **YDSCAM Package Solutions**

YDS Camera Module



Tray with Grid and Space



Complete with Lens Protection Film



Place Cameras on the Tray





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### **YDSCAM Package Solutions**

**Full Tray of Cameras** 



Place Tray into Anti-Static Bag



Cover Tray with Lid



Vacuum the Anti-Static Bag





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### **YDSCAM Package Solutions**

#### Sealed Vacuum Anti-Static Bag with Labels

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





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### **YDSCAM Package Solutions**

Place Foam Sheets Between Tray Bags



Place Foam Sheets and Trays into Box



Seal the Carbon Box



Foam Sheets are Larger Than Trays



Foam Sheets are Tightly Fitting in Box



Label the Carbon Shipping Box





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### **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







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### **YDSCAM Package Solutions**

Place Camera Sample into Anti-Static Bag





Label the Sample Bags



Place Samples into the Carbon Box



Place Connectors into Anti-Static Bag





Place Connectors into Reel



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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