

## YDS-E4MPF-OV9281 V4.0

**1MP OmniVision OV9281 Global Shutter MIPI and DVP Interface  
Fixed Focus Camera Module**



Front View



Back View

### Specifications

<b>Camera Module No.</b>	<b>YDS-E4MPF-OV9281 V4.0</b>
<b>Resolution</b>	1MP
<b>Image Sensor</b>	OV9281 Global Shutter
<b>Sensor Type</b>	1/4"
<b>Pixel Size</b>	3.0 um x 3.0 um
<b>EFL</b>	2.33 mm
<b>F.NO</b>	2.50
<b>Pixel</b>	1296 x 816
<b>View Angle</b>	120.0°(DFOV) 99.0°(HFOV) 55.0°(VFOV)
<b>Lens Dimensions</b>	8.00 x 8.00 x 12.50 mm
<b>Module Size</b>	120.00 x 10.00 mm
<b>Module Type</b>	Fixed Focus
<b>Interface</b>	MIPI and DVP Parallel
<b>Auto Focus VCM Driver IC</b>	None
<b>Lens Model</b>	YDS-LENS-TRC-4021B1
<b>Lens Type</b>	650nm IR Cut
<b>Operating Temperature</b>	-30°C to +85°C
<b>Mating Connector</b>	DF30FC-24DS-0.4V



## YDS-E4MPF-OV9281 V4.0

1MP OmniVision OV9281 Global Shutter MIPI and DVP Interface  
Fixed Focus Camera Module



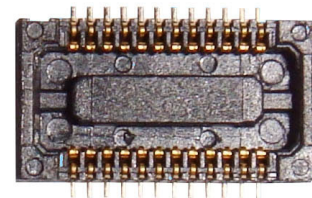
Top View



Side View



Bottom View

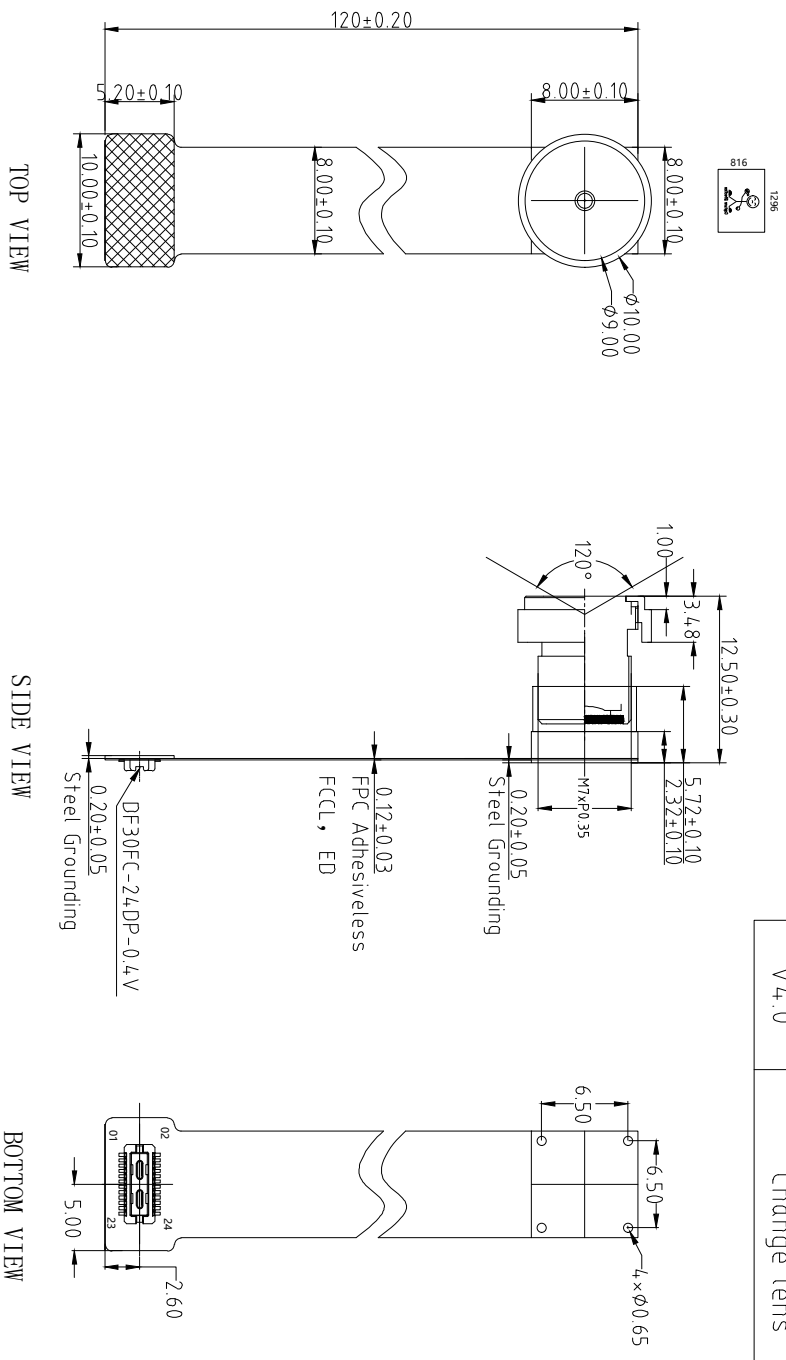


Mating Connector

# ROHS

Pin	Name
1	FSIN/VSYNC
2	AVDD2.8V
3	SCL
4	SDA
5	RESET
6	NC
7	DOVDD1.8V
8	DVDD1.2V
9	GND
10	XCLK
11	PCLK
12	HREF
13	MDP0/D2
14	MCP/D4
15	MDN0/D3
16	MCN/D5
17	DGND
18	SID
19	DGND
20	MDP1/D6
21	DGND
22	MDN1/D7
23	D8
24	D9

Version	Information	Date
V1.0	First Version	9-23-2019
V2.0	Change lens and holder	8-20-2020
V3.0	Extend FPC length	9-24-2020
V4.0	Change lens	11-14-2020



NOTE:  
 1.Sensor I2C slave address:  
 0x00 If SID=0, or 0x20 If SID=1

## Parameters:

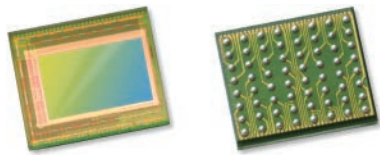
### 1、Sensor specification:

Image Sensor: OV9281  
 Pixel: 3um×3um  
 Lens Type: 1/4  
 Important Voltage Description: DVDD1.2V (external power supply);

### 2、Lens specification:

FOV: 120°(D);99°(H);55°(V);  
 F/NO: 2.5  
 TV distortion: <7.5%  
 Focal length: 2.33mm  
 Composition: 4E+IR FILTER  
 IR Cut Coating: 650nm±10nm@50%

Designed By	Kevin	Model Name:	E4MPF-0V9281 V4.0	
Checked By	Aouly	Projection Type:	Unit: mm	Material: -----
		Third Angle	Scale: 1:1	Sheet: 1 of 1
				Version: 1/0



# OV9281-OV9282 1-megapixel product brief



## 1-Megapixel OmniPixel®3-GS Sensors for Computer Vision Applications



available in a lead-free package

OmniVision's OV9281 and OV9282 are high-speed global shutter image sensors that bring 1-megapixel resolution to a wide range of consumer and industrial computer vision applications, including augmented reality (AR), virtual reality (VR), collision avoidance in drones, bar code scanning and factory automation. Built on OmniVision's OmniPixel®3-GS pixel technology, the OV9281 and OV9282 feature a high-speed global shutter pixel with best-in-class near-infrared (NIR) quantum efficiency (QE) to meet high-resolution and low-latency requirements.

Special features of the OV9281 and OV9282 include region of interest (ROI) selection and context switching. This allows some of the camera settings to change dynamically as fast as alternating frames. The sensors are available in both narrow and wide chief ray angle (CRA) settings.

The 1/4-inch OV9281 and OV9282 capture 1280 x 800 resolution images at 120 frames per second (fps) and VGA resolution at 180 fps with 2-lane MIPI and DVP output. The OV9281 and OV9282 also feature support for frame synchronization and dynamic defective pixel correction.

The OV9281 has a chief ray angle (CRA) of 9 degrees and comes in a chip scale package (CSP). The OV9282 features a CRA of 27 degrees and is available in a reconstructed wafer (RW) format. Both sensors are currently available in volume production.

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



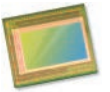
## Applications

- Consumer HMD
- Drones
- Machine Vision
- PCNB

## Product Features

- 3  $\mu\text{m}$  x 3  $\mu\text{m}$  pixel with OmniPixel<sup>3</sup>-GS technology
- automatic black level calibration (ABLC)
- programmable controls for:
  - frame rate
  - mirror and flip
  - cropping
  - windowing
- support output formats: 8/10-bit RAW
- fast mode switching
- supports 2x2 monochrome binning
- two-lane MIPI serial output interface
- DVP parallel output interface
- supports horizontal and vertical 2:1 and 4:1 monochrome subsampling
- support for image sizes:
  - 1280 x 800
  - 1280 x 720
  - 640 x 480
  - 640 x 400
- embedded 256 bits of one-time programmable (OTP) memory for part identification
- two on-chip phase lock loops (PLLs)
- LED PWM
- built-in strobe control

# OV9281-OV9282



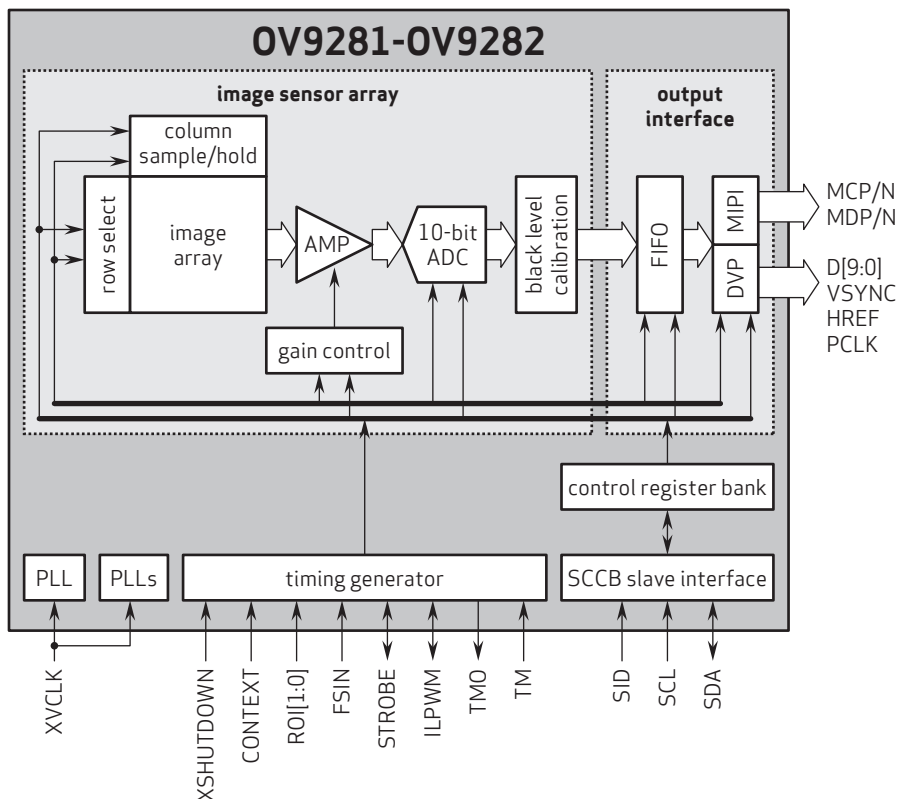
## Ordering Information

- **OV9281-H64A**  
(b&w, lead-free) 64-pin CSP
- **OV9282-GA4A**  
(b&w, lead-free, 200  $\mu\text{m}$  backgrinding, reconstructed wafer with good die)

## Technical Specifications

- **active array size:** 1296 x 816
- **maximum image transfer rate:**  
- 1280 x 800: 120 fps
- **power supply:**
  - analog: 2.8V (nominal)
  - core: 1.2V (nominal)
  - I/O: 1.8V (nominal)
- **power requirements:**
  - active: 156 mW
  - standby: 150  $\mu\text{A}$
  - XSHUTDOWN: 150  $\mu\text{A}$
- **temperature range:**
  - operating: -30°C to +85°C junction temperature
  - stable image: 0°C to +50°C junction temperature
- **output interfaces:** 2-lane MIPI serial output and DVP parallel output
- **output formats:** 8/10-bit RAW
- **lens size:** 1/4"
- **lens chief ray angle:**
  - OV9281: 9° linear
  - OV9282: 26.78° non-linear
- **scan mode:** progressive
- **pixel size:** 3  $\mu\text{m}$  x 3  $\mu\text{m}$
- **image area:** 3896  $\mu\text{m}$  x 2453  $\mu\text{m}$

## Functional Block Diagram



4275 Burton Drive  
Santa Clara, CA 95054  
USA

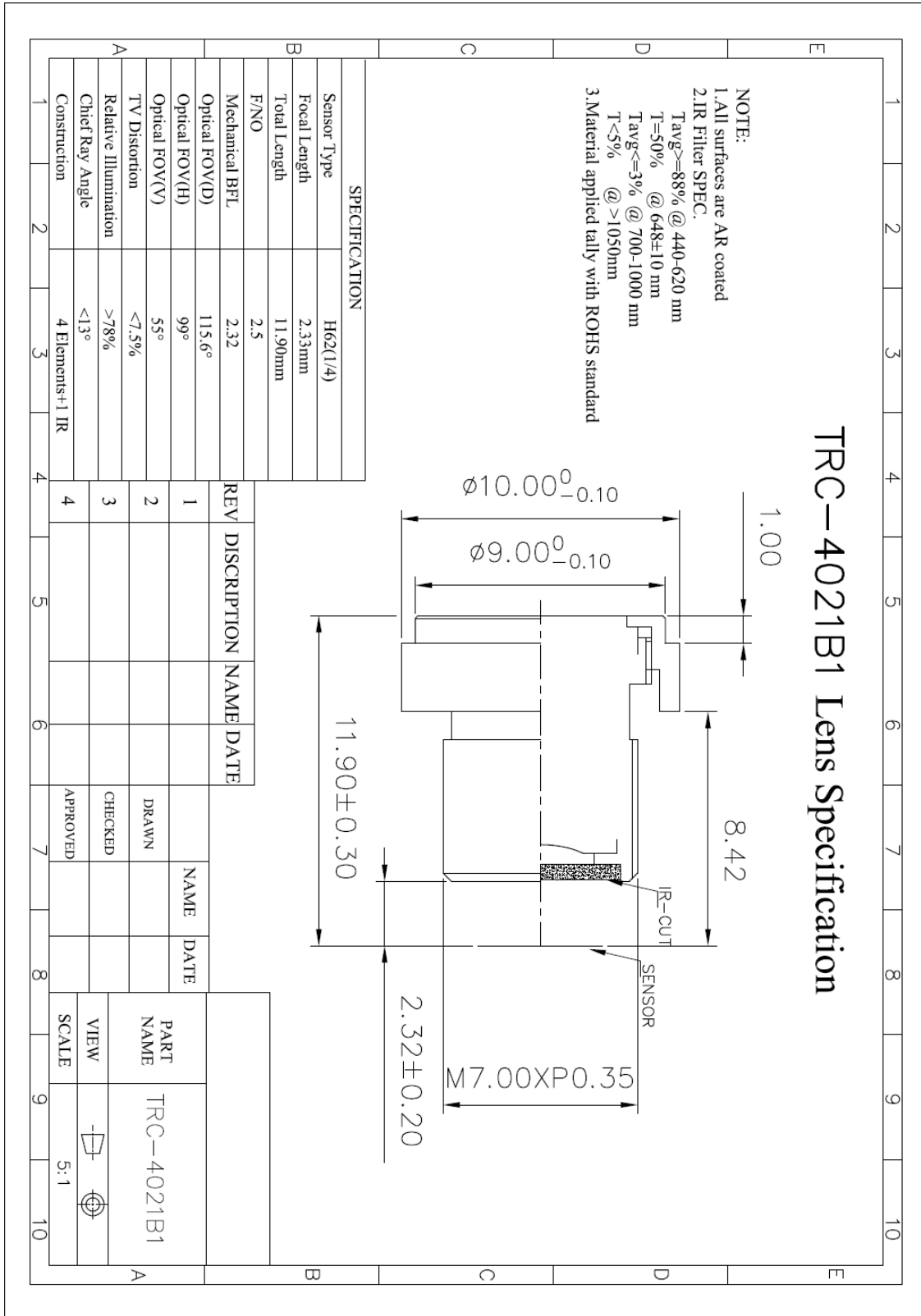
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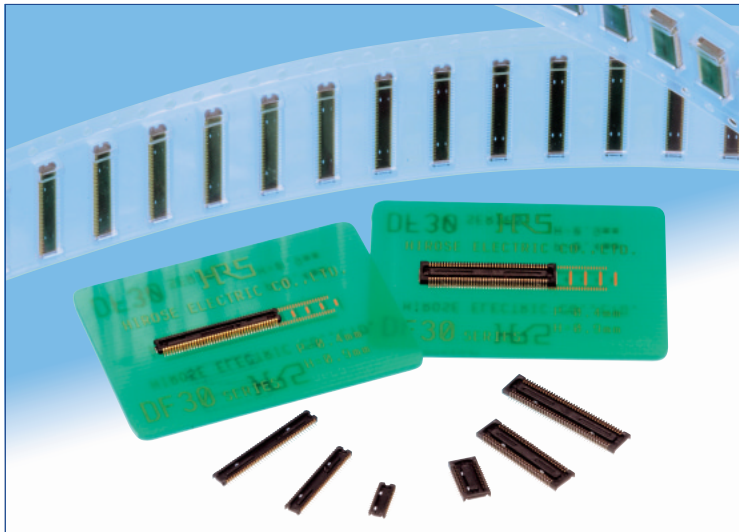
OmniVision

## YDS-LENS-TRC-4021B1

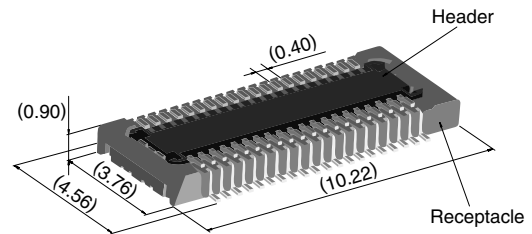


# 0.4 mm Pitch, 0.9 mm Height, Board-to-Board / Board-to-FPC Connectors

## DF30 Series



### Extremely small size



40 positions shown

### Overview

Continuous miniaturization and increased component density on PCB created demand for extremely low profile connectors. This series is addition of a new extremely low profile connectors to Hirose's wide range of high reliability board-to-board/board-to-FPC connection solutions.

### Features

#### 1. Contact reliability

Concentration of the contact's normal forces at the single point assures good contact wipe and electrical reliability, while confirming the fully mated condition with a definite tactile click.

#### 2. Self alignment

Recognizing the difficulties of mating extremely small connectors in limited spaces the connectors will self align in horizontal axis within 0.3 mm.

#### 3. Automatic board placement

Packaged on tape-and-reel the plug and headers have sufficiently large flat areas to allow pick-up with vacuum nozzles of automatic placement equipment.

#### 4. Variety of contact positions and styles

Available in standard contact positions of: 20, 22, 24, 30, 34, 40, 50, 60, 70 and 80 with and without metal fittings. Addition of metal fittings does not affect external dimensions of the connectors.

Smaller contact positions are also available.

#### 5. Support for continuity test connector

Connectors which have increased insertion and removal durability are available for continuity tests. Contact your Hirose sales representative for details.

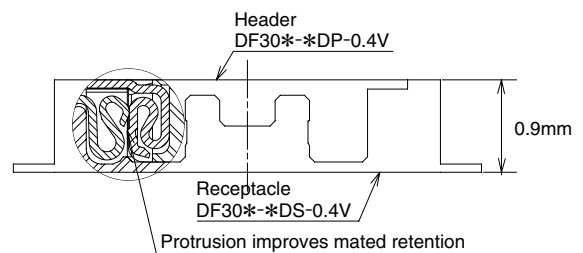
### Applications

Cellular phones, PDA's, mobile computers, digital cameras, digital video cameras, and other devices demanding high reliability connections in extremely limited spaces.

#### Low profile

#### Increased mated retention

#### High contact reliability



### Self alignment



## Product Specifications

Rating	Rated current 0.3A	Operating temperature range : -35°C to 85°C (Note 1)	Storage temperature range -10°C to 60°C (Note 2)
	Rated voltage 30V AC	Operating humidity range : Relative humidity 20% to 80%	Storage humidity range Relative humidity 40% to 70% (Note 2)

Item	Specification	Conditions
1. Insulation resistance	50 MΩ min.	100V DC
2. Withstanding voltage	No flashover or insulation breakdown.	100V AC / one minute
3. Contact resistance	100 mΩ max.	100 mA
4. Vibration	No electrical discontinuity of 1 μs or more	Frequency: 10 to 55 Hz, single amplitude of 0.75mm, 2 hours, 3 axis
5. Humidity	Contact resistance: 100 mΩ max. Insulation resistance: 25 MΩ min.	96 hours at temperature of 40°C±2°C and RH of 90% to 95%
6. Temperature cycle	Contact resistance: 100 mΩ max. Insulation resistance: 50 MΩ min.	Temperature: -55°C→+5°C to +35°C→+85°C→+5°C to +35°C Duration: 30→10→30→10(Minutes) 5 cycles
7. Durability (insertions/withdrawals)	Contact resistance: 100 mΩ max.	50 cycles(Connector for conductivity tests: 500 cycles)
8. Resistance to soldering heat	No deformation of components affecting performance.	Reflow: At the recommended temperature profile Manual soldering: 300°C for 3 seconds

Note 1: Includes temperature rise caused by current flow.

Note 2: The term "storage" refers to products stored for long period of time prior to mounting and use. Operating temperature range and humidity range covers non-conducting condition of installed connectors in storage, shipment or during transportation.

## Materials and Finishes

Connectors	Component	Material	Finish	Remarks
Receptacles and Headers	Insulator	LCP	Color : Black	UL94V-0
	Contacts	Phosphor bronze	Gold plated	————
	Metal fittings	Phosphor bronze	Tin-copper plated	————

## Ordering information

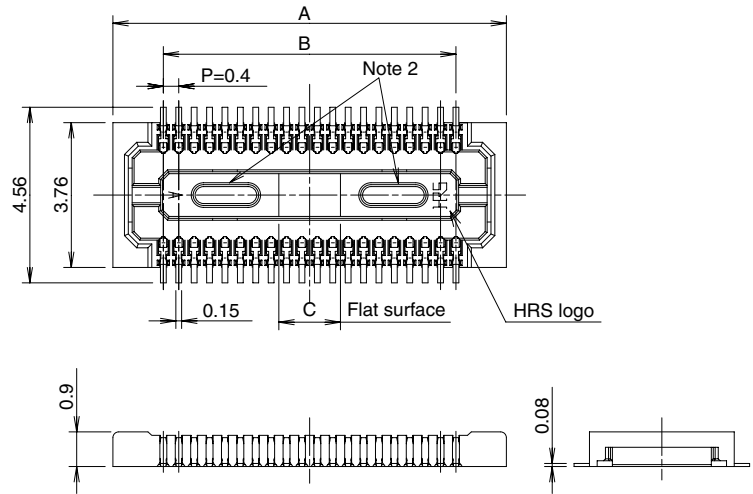
### Receptacles and Headers

**DF30**   **FC** -   **\***   **DS - 0.4**   **V**   **(\*\*)**  
①   ②   ③   ④   ⑤   ⑥   ⑦

① Series name: DF30	⑤ Contact pitch: 0.4 mm
② Configuration FB: With metal fittings, without bosses FC: Without metal fittings, without bosses CJ: Connector for conductivity tests	⑥ Termination section V: Straight SMT
③ Number of positions: 20, 22, 24, 30, 34, 40, 50, 60, 70, 80	⑦ Packaging (81): Embossed tape packaging (5,000 pieces per reel) (82): Embossed tape packaging (1,000 pieces per reel)
④ Connector type DS: Double row receptacle DP: Double row header	



## ■ Receptacles (without metal fittings)



## ◆ Recommended PCB mounting pattern



Recommended solder paste thickness: 120  $\mu\text{m}$

[Specification number] -\*\*, (\*\*)

(81): Embossed tape packaging (5,000 pieces per reel)

\* Tolerances non- accumulative.

Unit: mm

Part Number	CL No.	Number of contacts	A	B	C
DF30FC-20DS-0.4V(**)	CL684-1109-8-**	20	6.22	3.6	1.2
DF30FC-22DS-0.4V(**)	CL684-1110-7-**	22	6.62	4.0	1.2
DF30FC-24DS-0.4V(**)	CL684-1111-0-**	24	7.02	4.4	1.2
DF30FC-30DS-0.4V(**)	CL684-1112-2-**	30	8.22	5.6	1.2
DF30FC-34DS-0.4V(**)	CL684-1113-5-**	34	9.02	6.4	1.36
DF30FC-40DS-0.4V(**)	CL684-1078-6-**	40	10.22	7.6	1.6
DF30FC-50DS-0.4V(**)	CL684-1114-8-**	50	12.22	9.6	2.0
DF30FC-60DS-0.4V(**)	CL684-1082-3-**	60	14.22	11.6	2.4
DF30FC-70DS-0.4V(**)	CL684-1115-0-**	70	16.22	13.6	2.8
DF30FC-80DS-0.4V(**)	CL684-1116-3-**	80	18.22	15.6	3.2

Note 1: Order by number of reels.

Note 2: Receptacles with 24 or fewer contacts positions will not have recessed areas.



# 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 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		

## 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

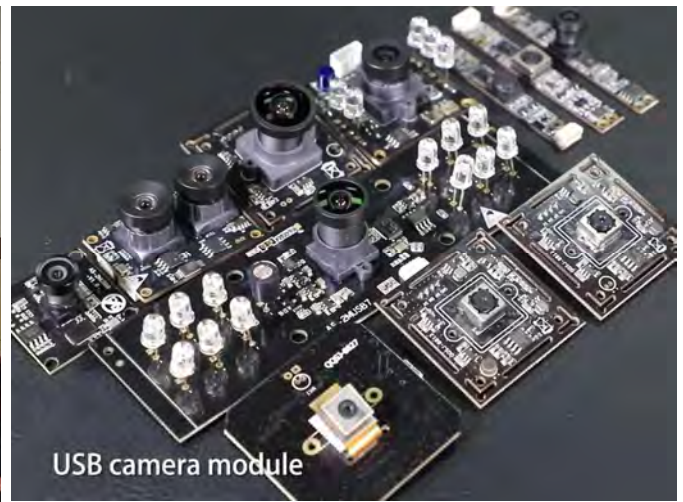
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## Company YDSCAM

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](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.



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# YDS CAMERA MODULE

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## YDS Strength

### Powerful Factory



### Professional Service



### Promised Delivery



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