

JAL-KJ9-OV5670 V1.0

5MP OmniVision OV5670 MIPI Interface Fixed Focus Camera Module



Front View



Back View

Specifications

Camera Module No.	JAL-KJ9-OV5670 V1.0
Resolution	5MP
Image Sensor	OV5670
Sensor Type	1/5"
Pixel Size	1.12 um x 1.12 um
EFL	2.32 mm
F.NO	2.20
Pixel	2592 x 1944
View Angle	76.1°(DFOV) 63.9°(HFOV) 49.8°(VFOV)
Lens Dimensions	6.50 x 6.50 x 3.90 mm
Module Size	19.00 x 6.50 mm
Module Type	Fixed Focus
Interface	MIPI
Auto Focus VCM Driver IC	None
Lens Model	KLT-LENS-SPY853B-2
Lens Type	650nm IR Cut
Operating Temperature	-30°C to +85°C
Mating Connector	DF37NB-20DS-0.4V



JAL-KJ9-OV5670 V1.0

5MP OmniVision OV5670 MIPI Interface Fixed Focus Camera Module



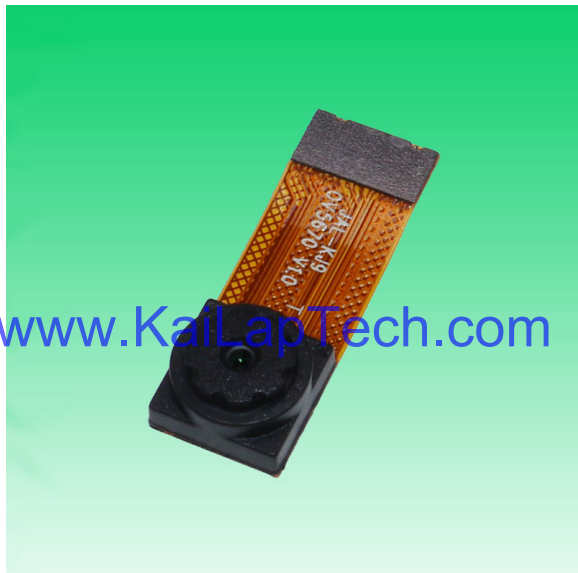
Top View



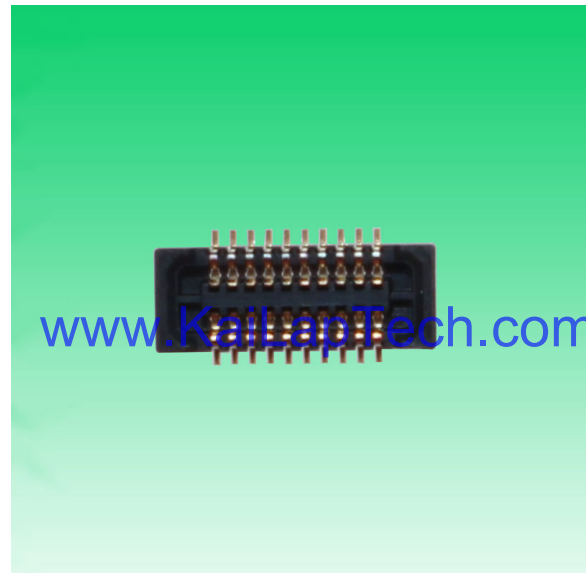
Side View

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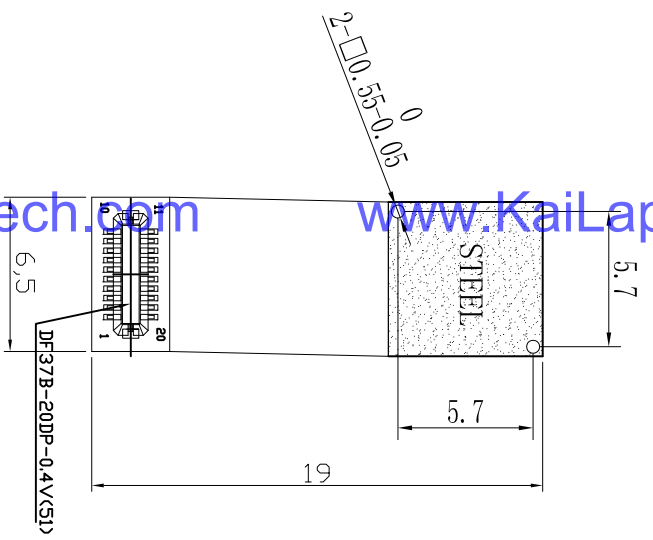
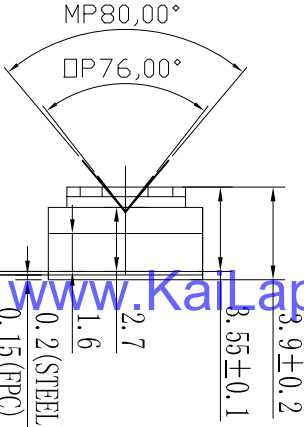
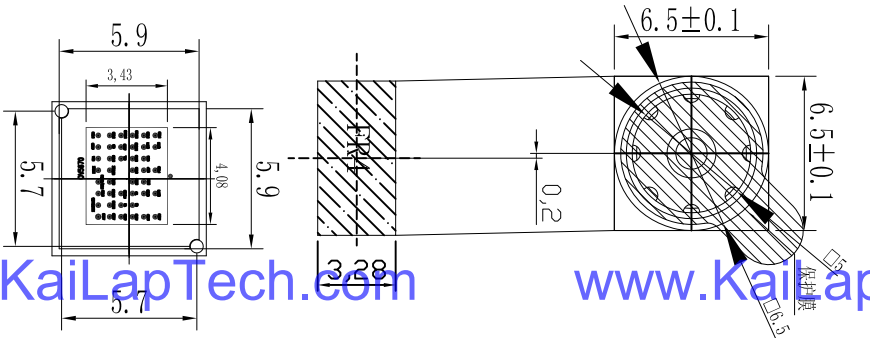
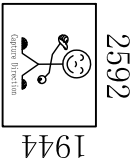
Bottom View



Mating Connector

CONNECTOR
20PIN DESCRIPTION

PIN	SIGNAL
1	DGND
2	AVDD2.8
3	VDDI1.8
4	DVDD1.2
5	PW/DN
6	RESET
7	SID_D
8	SID_C
9	FSIN/VSYNC
10	XCLK
11	DGND
12	MCN
13	MCP
14	DGND
15	MDN0
16	MDP0
17	DGND
18	MDN1
19	MDP1
20	DGND



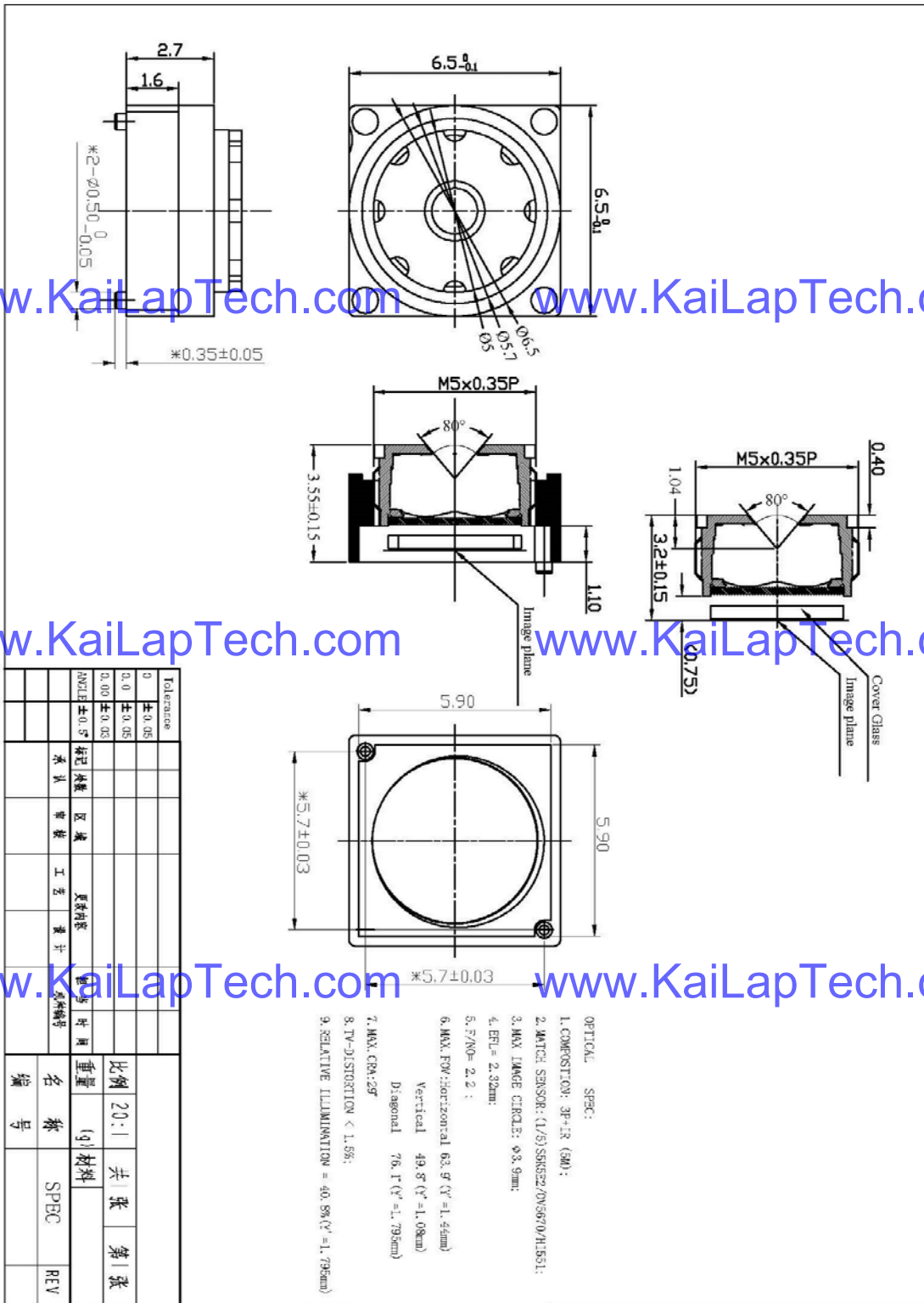
Parameter

SELECT	✓						
Level	A	B	C	D	EFL	BFL	
dim	±0.03	±0.05	±0.08	±0.10	2.32	0.75	
~ 5	±0.05	±0.08	±0.10	±0.15	F/N0	pixel	1.12um*1.12um
5~10	±0.08	±0.10	±0.15	±0.20	View Angle	Lens Type	1/5 inch
10~50	±0.10	±0.15	±0.20	±0.25	Distortion	Image Sensor	5620pixel
50~100	±0.10	±0.15	±0.20	±0.25			
100~	±0.10%	±0.15%	±0.20%	±0.30%			

1/0	All	First Release	Peter	2014-10-22
REV.	Zone	Description	Approved	Date
<p>Kai Lap Technologies Group Ltd</p>				
Designed By: ztpeng		Client Name: JAL-KJ9-DV5670 V1.0		
Checked By:		Model Name: JAL-KJ9-DV5670 V1.0		
Approved By:		Projection Type: Third Angle		
		Unit: mm	Material:	Scale: 1:1
		Sheet: 1 of 1	Version: 1/0	

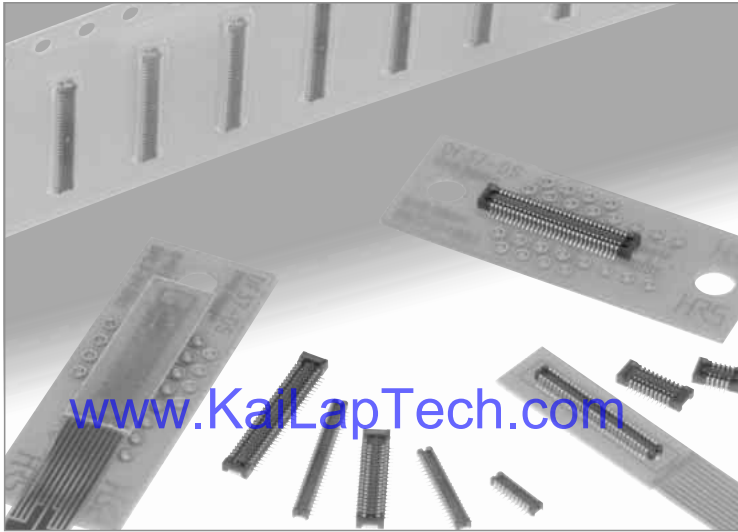


Lens Model: KLT-LENS-SPY853B-2



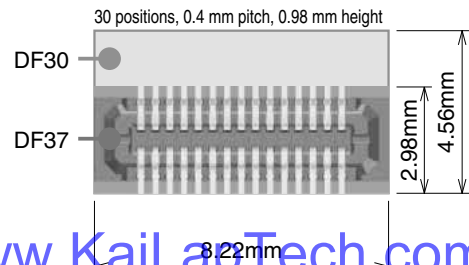
0.4 mm Pitch, 0.98 mm Mated Height, Board-to-Board / Board-to-FPC Connectors

DF37 Series



Further reduction of the board space.

Comparison of board mounting space



Features

1. Reduced size and board-occupied area

With the mated height of 0.98 mm, width of 2.98mm and length of 8.22 mm (30 positions) the connectors are one of the smallest in its class. Also 2.6mm depth short-lead type is available.

Sufficiently large flat areas allow pick-up with vacuum nozzles of automatic placement equipment.

2. Reliable electrical and mechanical connection

Despite its small mated height, unique contact configuration, with a 2-point contacts and effective mating length of 0.25mm, assures highly reliable connection while confirming a complete mating with a definite tactile feel.

3. Self alignment

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

4. Physical shock and vibration protection

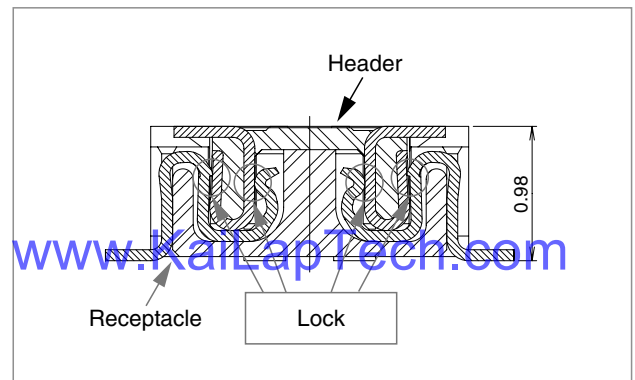
2-point contact assures electrical connection in a shock or vibration applications.

5. Solder wicking prevention

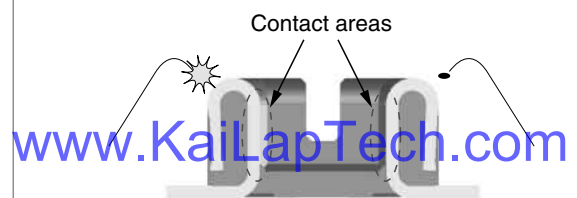
Nickel barriers (receptacles) and unique forming of the contacts (headers) prevent un-intentional solder wicking.

6. Contamination protection

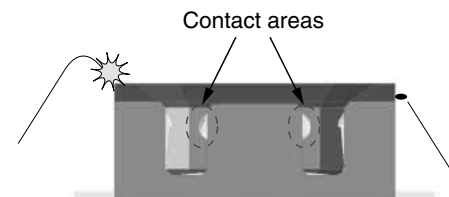
Insulator walls protect the contact areas against flux splatter or other physical particles contamination.



Splatter protection



Contact areas are not exposed to the outside penetration of the flux or other physical particles.



■ Specifications

Ratings	Current rating	0.3 A	Operating temperature range	-35°C to +85°C (Note 1)	Storage temperature range	-10°C to +60°C (Note 2)
	Voltage rating	30 V AC, DC	Operating humidity range	RH 20% to 80%	Storage humidity range	RH 40% to 70% (Note 2)

Item	Specification	Conditions
1. Insulation resistance	50 MΩ min	100 V DC
2. Withstanding voltage	No flashover or insulation breakdown	100 V AC / 1 minute
3. Contact resistance	100 mΩ max.	20 mV AC, 1 kHz, 1 mA
4. Vibration	No electrical discontinuity of 1 μs or longer No damage or parts dislocation	Frequency: 10 to 55 Hz, single amplitude of 0.75 mm, 2 hours, 3 axis
5. Humidity	Contact resistance: 100 mΩ max., Insulation resistance: 25 MΩ min.	96 hours at 40 ±2°C and humidity of 90 to 95% No damage or parts dislocation
6. Temperature cycle	Contact resistance: 100 mΩ max., Insulation resistance: 50 MΩ min. No damage or parts dislocation	-55°C → 5 to 35°C → 85°C → 5 to 35°C Time: 30 min. → 10 min. → 30 min. → 10 min. 5 cycles
7. Durability	Contact resistance: 100 mΩ max.	10 cycles
8. Resistance to soldering heat	No deformation of components affecting performance	Reflow: At the recommended temperature profile Manual soldering: 350°C for 3 seconds

Note 1: Includes temperature rise caused by current flow.

Note 2: The term "storage" here refers to products stored for a long period prior to board mounting and use.

The operating temperature and humidity range covers the non-conducting condition of connectors after board mounting and the temporary storage conditions of transportation, etc.

■ Materials

Receptacle

Part	Material	Finish	Remarks
Insulator	LCP	Color: Black	UL94V-0

Header

Part	Material	Finish	Remarks
Contacts	Phosphor bronze	Gold plated	—

■ Ordering Information

● Receptacles

DF 37 # - * DS - 0.4 V ()**

① ② ③ ④ ⑤ ⑥ ⑦

① Series name : DF37	④ Connector style DS: Receptacle
② Configuration NB: With metal fittings NC: Without metal fittings SB: Short-lead type with metal fittings	⑤ Contact pitch : 0.4 mm
③ Number of contacts NB/NC : 10, 16, 20, 24, 30, 34, 40, 50, 60, 70, 74 SB : 10, 16, 20, 24, 30, 34, 40, 50, 60	⑥ Terminal type V: SMT vertical mount
	⑦ Packaging (51): Embossed tape packaging (8,000 pieces per reel) (53): Embossed tape packaging (1,000 pieces per reel)

● Headers

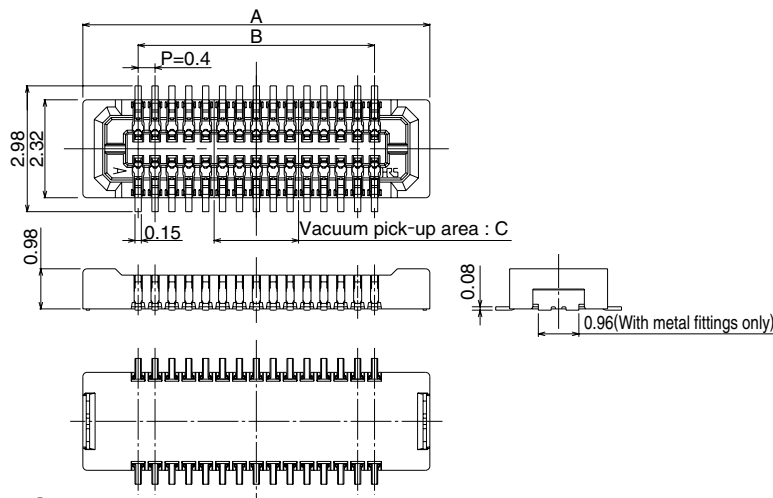
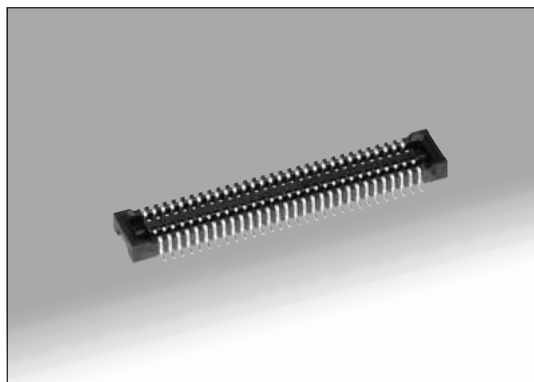
DF 37 # - * DP - 0.4 V ()**

① ② ③ ④ ⑤ ⑥ ⑦

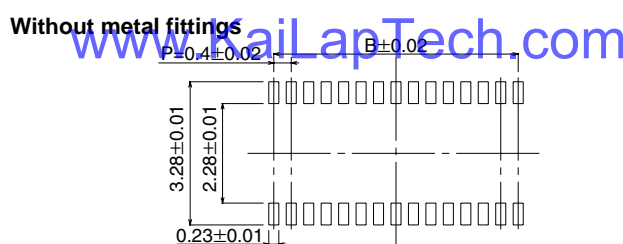
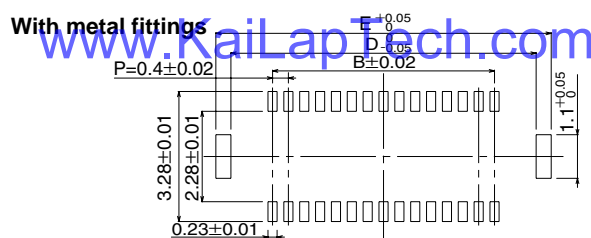
① Series name : DF37	④ Connector style DP: Header
② Configuration B: With metal fittings C: Without metal fittings	⑤ Contact pitch : 0.4 mm
③ Number of contacts 10, 16, 20, 24, 30, 34, 40, 50, 60, 70, 74	⑥ Terminal type V: SMT vertical mount
	⑦ Packaging (51): Embossed tape packaging (8,000 pieces per reel) (53): Embossed tape packaging (1,000 pieces per reel)

Note : The short-lead type is only available for the receptacle side (with hardware).

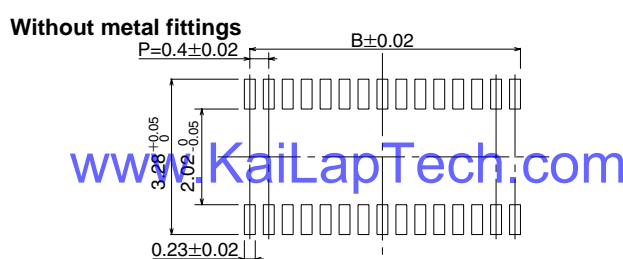
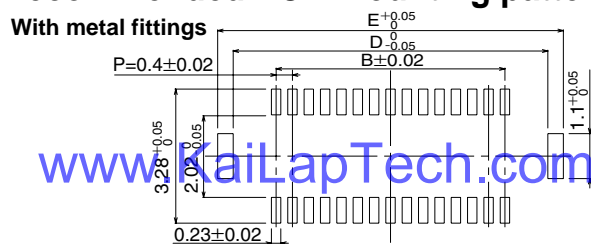
■ Receptacles (DF37NB/NC)



■ Recommended metal mask dimensions



■ Recommended PCB mounting pattern



● With metal fittings

All dimensions: mm

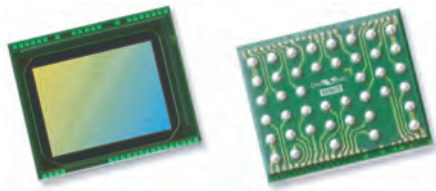
Part Number	CL No.	Number of Contacts	A	B	C	D	E
DF37NB-10DS-0.4V(51)	CL684-3301-6-51	10	4.22	1.6	0.8	3.7	4.46
DF37NB-16DS-0.4V(51)	CL684-3302-9-51	16	5.42	2.8	1.2	4.9	5.66
DF37NB-20DS-0.4V(51)	CL684-3303-1-51	20	6.22	3.6	1.6	5.7	6.46
DF37NB-24DS-0.4V(51)	CL684-3304-4-51	24	7.02	4.4	2	6.5	7.26
DF37NB-30DS-0.4V(51)	CL684-3305-7-51	30	8.22	5.6	2	7.7	8.46
DF37NB-34DS-0.4V(51)	CL684-3082-4-51	34	9.02	6.4	2.4	8.5	9.26
DF37NB-40DS-0.4V(51)	CL684-3306-0-51	40	10.22	7.6	2.4	9.7	10.46
DF37NB-50DS-0.4V(51)	CL684-3307-2-51	50	12.22	9.6	2.8	11.7	12.46
DF37NB-60DS-0.4V(51)	CL684-3308-5-51	60	14.22	11.6	3.2	13.7	14.46
DF37NB-70DS-0.4V(51)	CL684-3409-2-51	70	16.22	13.6	3.6	15.7	16.46
DF37NB-74DS-0.4V(51)	CL684-3080-9-51	74	17.02	14.4	4	16.5	17.26

● Without metal fittings

All dimensions: mm

Part Number	CL No.	Number of Contacts	A	B	C
DF37NC-10DS-0.4V(51)	CL684-3309-8-51	10	4.22	1.6	0.8
DF37NC-16DS-0.4V(51)	CL684-3310-7-51	16	5.42	2.8	1.2
DF37NC-20DS-0.4V(51)	CL684-3311-0-51	20	6.22	3.6	1.6
DF37NC-24DS-0.4V(51)	CL684-3312-2-51	24	7.02	4.4	2
DF37NC-30DS-0.4V(51)	CL684-3313-5-51	30	8.22	5.6	2
DF37NC-34DS-0.4V(51)	CL684-3083-7-51	34	9.02	6.4	2.4
DF37NC-40DS-0.4V(51)	CL684-3314-8-51	40	10.22	7.6	2.4
DF37NC-50DS-0.4V(51)	CL684-3315-0-51	50	12.22	9.6	2.8
DF37NC-60DS-0.4V(51)	CL684-3316-3-51	60	14.22	11.6	3.2
DF37NC-70DS-0.4V(51)	CL684-3084-0-51	70	16.22	13.6	3.6
DF37NC-74DS-0.4V(51)	CL684-3081-1-51	74	17.02	14.4	4

Note 1: Tape and reel packaging (8,000 pieces/reel). Order by number of reels.
 Note 2: This connector is NOT polarized.



OV5670 5-megapixel product brief



5-Megapixel PureCel® Image Sensor Brings Improved Image Quality to Rear- and Front-Facing Cameras in Mobile Devices



The OV5670 is a 5-megapixel PureCel image sensor that leverages a 1.12-micron pixel to deliver exceptional still images and high-definition (HD) video to front- and rear-facing cameras in smartphones and tablets.

The OV5670 PureCel image sensor can capture full resolution 5-megapixel (2592x1944) images at 30 frames per second (fps), quad HD video at 30 fps, cropped 1080p HD at 60 fps, or 720p HD at 60 fps. When recording 720p HD video with binning, the sensor achieves sensitivity and signal-to-noise ratio that is comparable to the industry's popular 1.75-micron pixel. Additionally, the sensor's 1.12-micron pixel achieves similar full-well capacity (FWC) as the previous generation's 1.4-micron pixel.

When recording full resolution video, the OV5670 uses approximately 35 percent less power compared to OmniVision's previous generation 5-megapixel sensor. The sensor's ultra low power mode further reduces power consumption, thus minimizing battery drain.

The OV5670 fits into a compact 6 x 6 x 3.5 mm camera module, and is available in a cost-effective chip scale package (CSP).

Find out more at www.ovt.com.



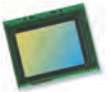
Applications

- Smartphones and Feature Phones
- Tablets
- PC Multimedia
- Wearables

Product Features

- 1.12 μm x 1.12 μm pixel
- 5MP at 30 fps
- programmable controls for frame rate, mirror and flip, cropping, and windowing
- supports images sizes:
 - 5MP (2592x1944)
 - Quad HD (2560x1440)
 - 1080p (1920x1080)
 - 720p (1280x720)
 - VGA (640x480), and more
- 2K bits of embedded one-time programmable (OTP) memory for customer use
- ultra low power mode (ULPM)
- support for output formats: 10-bit RAW
- interleave row HDR output
- two-wire serial bus control (SCCB)
- MIPI serial output interface (1- or 2-lane)
- 2x binning support
- image quality control:
 - defect pixel correction
 - automatic black level calibration

OV5670



Ordering Information

- OV05670-G04A**
(color, chip probing, 200 μm backgrinding, reconstructed wafer)
- OV05670-H42A**
(color, lead-free, 42-pin CSP5)

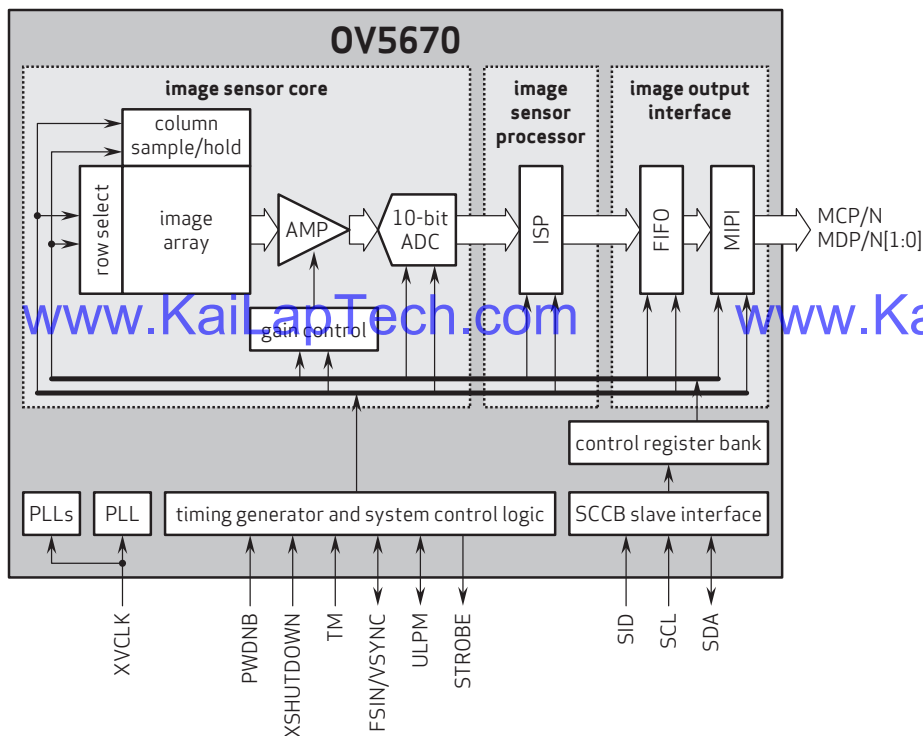
Product Specifications

- active array size:** 2592 x 1944
- input clock frequency:** 6 - 27 MHz
- power supply:**
 - core: 1.14 - 1.26V (1.2V nominal)
 - analog: 2.6 - 3.0V (2.8V nominal)
 - I/O: 1.7 - 1.9V (1.8V nominal)
- max S/N ratio:** 35.6 dB
- dynamic range:** 68.4 dB @ 16x gain
- power requirements:**
 - active: 126 mW
 - standby: 166 μW
 - XSHUTDOWN: 1 μW
- temperature range:**
 - operating: -30°C to +85°C junction temperature
 - stable image: -20°C to +60°C junction temperature
- output interfaces:** 2-lane MIPI serial output
- output formats:** 10-bit RAW RGB data
- lens size:** 1/5"
- lens chief ray angle:** 31.24° non-linear
- maximum image transfer rate:**
 - 5MP (2592x1944): 30 fps
 - Quad HD (2560x1440): 30 fps
 - 1080p (1920x1080): 60 fps
 - 720p (1280x720): 60 fps
 - VGA (640x480): 120 fps
- sensitivity:** 490 mV/lux-sec
- pixel size:** 1.12 μm x 1.12 μm
- dark current:** 14 e-/sec @ 60°C junction temperature
- image area:** 2945.7 μm x 2214 μm
- package/die dimensions:**
 - CSP5: 4080 μm x 3430.2 μm
 - COB: 4050 μm x 3400.2 μm
 - RW: 4100 μm x 3450.2 μm

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Functional Block Diagram



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OmniVision



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							
FREQ		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							



your **BEST** camera module partner

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





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
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	

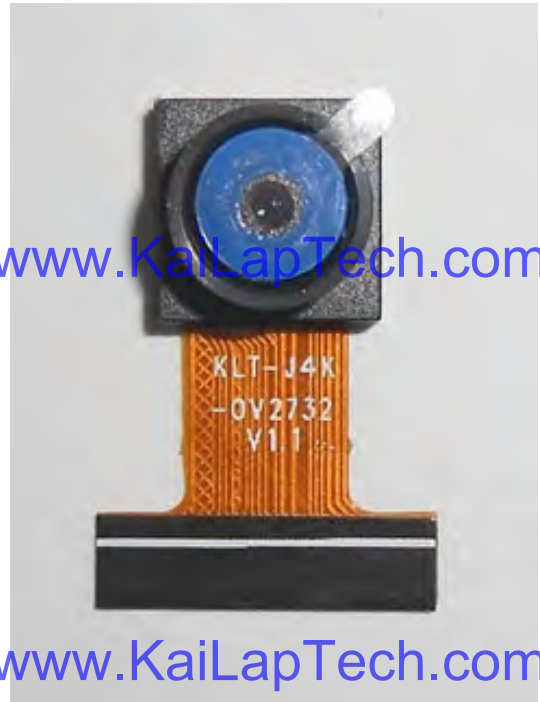


KLT Package Solutions

KLT Camera Module



Complete with Lens Protection Film



Tray with Grid and Space



Place Cameras on the Tray





Camera Modules Package Solution

Full Tray of Cameras



Cover Tray with Lid



Put Tray into Anti-Static Bag



Vacuum the Anti-Static Bag





Camera Modules Package Solution

Sealed Vacuum Bag with Labels

- 1. Model and Description 2. Quantity 3. Shipping Date 4. Caution**





CMOS CAMERA MODULES



your BEST camera module partner

Large Order Package Solution

Place Foam Sheets Between Trays

Foam Sheets are Slightly Larger than Trays



www.KaiLapTech.com

www.KaiLapTech.com

Place Foam Sheets and Trays into Box

Foam Sheets are Tightly Fitting Box



www.KaiLapTech.com sales@KaiLapTech.com Tel: (852) 6908 1256 Fax: (852) 3017 6778

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CMOS CAMERA MODULES



your BEST camera module partner

Small Order Package Solution

Place Foam Sheets and Trays into Small Box



www.KaiLapTech.com

Package in Small Box for Shipment

Foam Sheets are Nicely Fitting the Small Box



www.KaiLapTech.com

Place Small Boxes into Larger Box



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Carbon Box Package Solution

Seal the Carbon Box

Final Package Labelled Box



Carbon Box Ready for Shipment

1. Delivery Address and Phone No.
2. Box No. and Ship Date
3. Fragile Caution





Sample Order Package Solution

Place Sample into Small Anti-Static Bag



Place Connectors into Small Ant-Static Bag



Sample Labels on the Small Bag

1. Camera Module or Connector Model
2. Shipping Date and Quantity
3. Caution





Connectors Large Order Package Solution

Connectors in a Wheel



Label Connectors in the Wheel



The Wheel is Perfectly Fitting the Box



Connectors Box Ready for Shipment



Company Kai Lap Technologies (KLT)

Kai Lap Technologies Group Limited. (KLT) was established in 2009, a next-generation technology driven manufacturer specialized in research, design, and produce of audio and video products. KLT is occupying 20,000 square feet automated plants with 100 employees of annual throughput 30,000,000 units cameras.

KLT 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. KLT 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.

www.KaiLapTech.com

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Limited Warranty

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





CMOS CAMERA MODULES



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KLT Strength

Powerful Factory



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Professional Service



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Promised Delivery



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