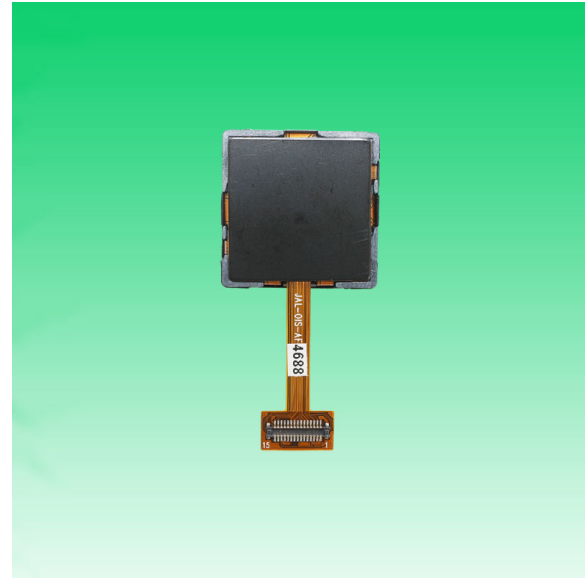
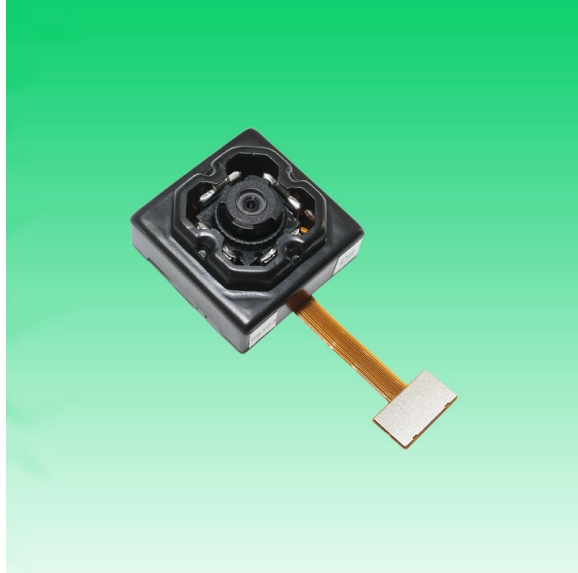
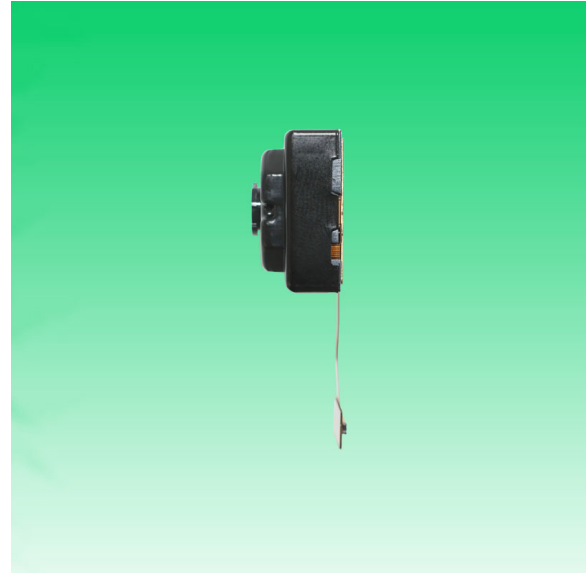


**KLT-OIS-FF-OV4688 V2.0****4MP OmniVision OV4688 OIS MGS MIPI Interface Fixed Focus Camera Module**

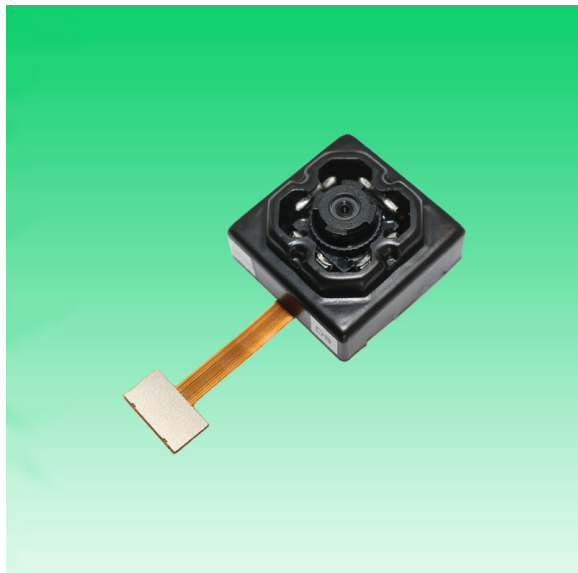
<b>Camera Module No.</b>	<b>KLT-OIS-FF-OV4688 V2.0</b>
<b>Resolution</b>	4MP
<b>Image Sensor</b>	OV4688 w/ MGS OIS
<b>Sensor Type</b>	1/3"
<b>Pixel Size</b>	2.0 um x 2.0 um
<b>EFL</b>	2.30 mm
<b>F.NO</b>	2.40
<b>Stabilization Method</b>	Optical Image Stabilization (OIS)
<b>Stabilizer Type</b>	Micro Gimbal Stabilizer (MGS)
<b>Stabilizer Axis No.</b>	2 Axis (Pitch and Yaw)
<b>Stabilizer Angle</b>	Max. 4.5°
<b>Stabilizer Power</b>	180 mW
<b>Pixel</b>	2688 x 1520
<b>View Angle</b>	117°(DFOV)
<b>Lens Dimensions</b>	19.00 x 19.00 x 9.90 mm
<b>Module Type</b>	Fixed Focus
<b>Lens Barrel</b>	M8.0 x P0.5
<b>Interface</b>	MIPI
<b>Lens Type</b>	650nm IR Cut
<b>Operating Temperature</b>	-30°C to +85°C
<b>Mating Connector</b>	BAF04-30083-0500

**KLT-OIS-FF-OV4688 V2.0****4MP OmniVision OV4688 OIS MGS MIPI Interface Fixed Focus Camera Module**

Top View



Side View



Bottom View

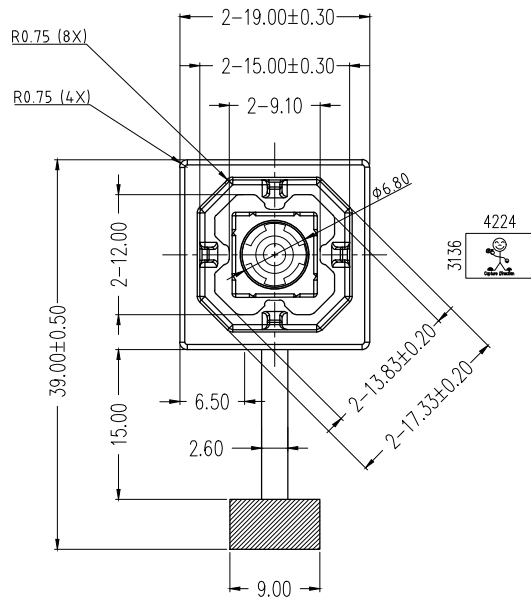


Mating Connector

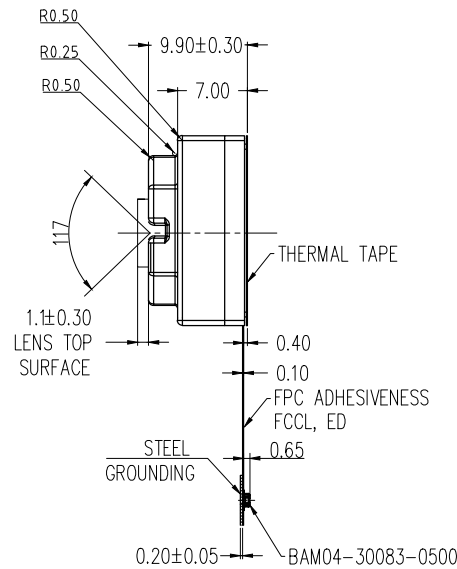
Version	Information	Date
V2.0	First Version	7-21-2023

**RoHS**

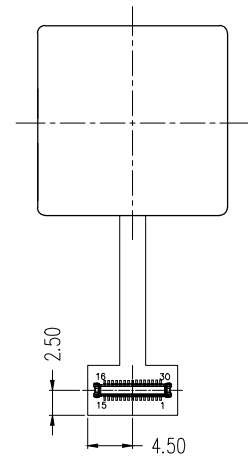
PIN	SIGNAL
1	VCM_GND
2	VCM_GND
3	VCM_3.3V
4	SDA
5	SCL
6	MIPI_GND
7	MCN
8	MCP
9	MDNO
10	MDPO
11	MDN1
12	MDP1
13	NC
14	MDN2
15	MDP2
16	MDN3
17	MDP3
18	AGND
19	AVDD_2.8V
20	VCM_3.3V
21	DGND
22	MCLK
23	DGND
24	NC
25	PWDN(XCLR)
26	DVDD_1.2V
27	VDDIO_1.8V
28	Reset_N(GPIO)
29	ID
30	DGND



TOP VIEW



SIDE VIEW



BOTTOM VIEW

Remark:

- Sensor I2C Slave Address: 0X20(W)/0X21(R) ID=1  
0X6C(W)/0X6D(R) ID=0
- MGS Driver I2C Slave Address: 0X52(W)/0X53(R)
- AF Driver I2C Slave Address: 0X18(W)/0X19(R)
- VCM\_3.3V: 3.3V(+/-0.05V) during operation
- AVDD\_2.8V: 2.8V(+/-0.05V) during operation
- Reset\_N: Connected to GPIO for the purpose of MGS ON/OFF, the pin is internal pull high, active low (MGS OFF)
- Tool0: NC, reserved

PARAMETERS PARAMETERS

Sensor Specification

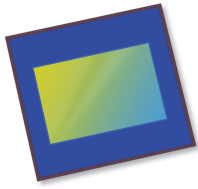
Image Sensor: OV4688  
 Pixel: 2.0umx2.0um  
 Lens Type: 1/3"  
 Important Voltage Description:  
 VCM\_3.3V: 3.3V  
 AVDD\_2.8V: 2.8V  
 VDDIO\_1.8V: 1.8V  
 DVDD\_1.2V: 1.2V

Lens Specification

FOV: 117° (DIAGONAL)  
 F/NO.: 2.4±5% (INFINITE)  
 TV Distortion: <-18%  
 Focal Length: 2.3mm  
 Composition: 6 elements, all plastic

**Kai Lap Technologies Group Ltd**

DESIGNED BY	Kevin	MODEL NAME	KLT-OIS-FF-OV4688 V2.0		
CHECKED BY	Aouly Yan	Projection Type:	Unit:	Material:	
		Third Angle	Scale: 1:1	Sheet: 1 of 1	Version: 1.0



# OV4688 4MP product brief



## Native 16:9 HD 4-Megapixel CameraChip™ Sensor with High Frame Rate and Excellent Low Light Sensitivity for Next-Generation Video Applications



available in a lead-free package

The OV4688 is a high-performance 4-megapixel CameraChip sensor in a native 16:9 high definition (HD) format designed to deliver ultra-high quality fast frame rate HD video for mobile devices. Built on a new 2-micron OmniBSI-2™ pixel, the OV4688 offers best-in-class low-light performance with a 40 percent increase in sensitivity compared to the 1.75-micron OmniBSI-2 pixel.

The OV4688 supports timing for two High Dynamic Range (HDR) modes, frame-based sequential HDR and line-based staggered HDR. A major advantage of staggered mode over sequential mode is a significant reduction of motion artifacts in the captured images. The sensor's enhanced performance, along with its ability to record full resolution 4MP @ 90 frames per second (fps), allows it to capture best-in-class video and high-speed photography with zero shutter lag, and video HDR at 30 fps.

The 1/3-inch OV4688 can also capture 1080p HD at 120 fps with electronic image stabilization (EIS), or 720p HD at 180 fps. The OV4688's high frame rates enable additional key benefits, including full-resolution continuous frame capture or burst photography and recording of high-quality slow-motion video.

The OV4688 features a high-speed 4-lane MIPI serial output interface to facilitate the required high data transfer rate and fits into an 8.5 x 8.5 mm module with a z-height of about 5 mm.

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



## Applications

- Cellular Phones
- Digital Video Camcorders (DVC)
- Digital Still Cameras (DSC)
- PC Multimedia

## Product Features

- supports staggered, sequential HDR timing
- automatic black level calibration (ABLC)
- programmable controls for frame rate, mirror and flip, cropping, and windowing
- static defective pixel canceling
- supports output formats: 10-bit RAW RGB (MIPI)
- supports horizontal and vertical subsampling
- supports images sizes: 4MP, 3MP, EIS1080p, 1080p, EIS720p
- fast mode switching
- support 2x2 binning, 4x4 binning, re-sampling filter
- standard serial SCCB interface
- up to 4-lane MIPI serial output interface
- embedded 1.5K bits one-time programmable (OTP) memory for part identification, etc
- two on-chip phase lock loops (PLLs)
- programmable I/O drive capability
- built-in temperature sensor

# OV4688



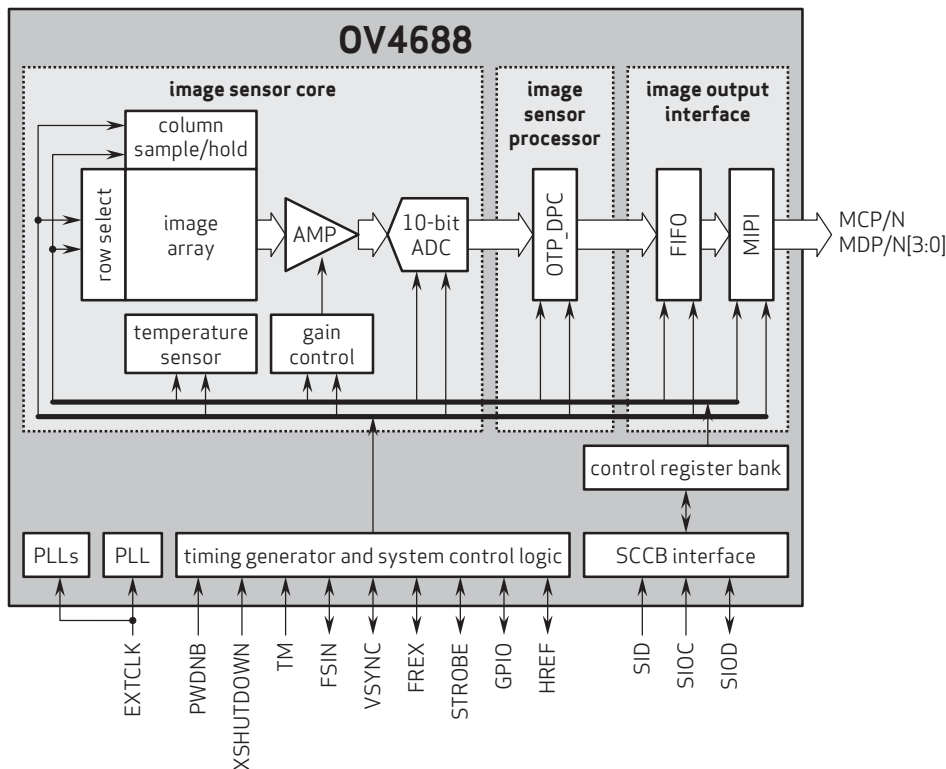
## Ordering Information

- OV04688-G04A-Z**  
(color, chip probing, 200  $\mu\text{m}$  backgrinding, reconstructed wafer with good die)

## Product Specifications

- active array size:** 2688 x 1520
- max S/N ratio:** 38.3 dB
- power supply:**
  - core: 1.1 - 1.3V
  - analog: 2.6 - 3.0V
  - I/O: 1.7 - 3.0V
- power requirements:**
  - active: 163 mA (261 mW)
  - standby: 1 mA
  - XSHUTDOWN: <math><10 \mu\text{A}</math>
- temperature range:**
  - operating: -30°C to +85°C junction temperature
  - stable image: 0°C to +60°C junction temperature
- output formats:** 10-bit RAW RGB data
- lens size:** 1/3"
- input clock frequency:** 6 - 64 MHz
- lens chief ray angle:** 31.5° non-linear
- dynamic range:** 64.6 dB @ 1x gain
- maximum image transfer rate:**
  - 2688x1520: 90 fps
  - 1920x1080: 120 fps
  - 1280x720: 180 fps
  - 672x380: 330 fps
- sensitivity:** 1900 mV/lux-sec
- scan mode:** progressive
- maximum exposure interval:** 1548 x  $T_{\text{ROW}}$
- pixel size:** 2  $\mu\text{m}$  x 2  $\mu\text{m}$
- dark current:** 4 mV/sec @ 60°C junction temperature
- image area:** 5440  $\mu\text{m}$  x 3072  $\mu\text{m}$
- die dimensions:**
  - COB: 6600  $\mu\text{m}$  x 5800  $\mu\text{m}$

## Functional Block Diagram



4275 Burton Drive  
Santa Clara, CA 95054  
USA

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

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**OmniVision**



## Micro Gimbal Stabilizer (MGS) OIS Camera Modules

Micro Gimbal Stabilizer (MGS) is the patented mechanical optical image stabilizer (OIS) for camera modules. The MGS technology is tilting the image sensor and lens together, enabling anti-shaking performance for moving devices to take a sharp and clear image, even in the low light environment.



### Features

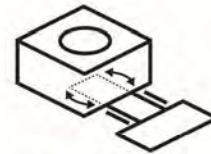
**2-Axis Compensation**  
**Small, Light Weight**  
**18.80x18.80x15.80mm**



Smallest Gimbal



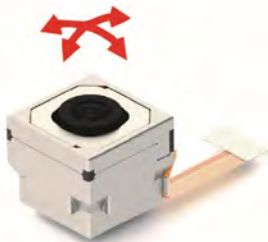
Multi-Axis Compensation



Embedded Moving FPC



One-stop Solution



Stabilizer



Max. View Angle



Integrated Design



Patents

### Applications



**5G Smart Helmet**



**Sport Camera**



**Drones**



**Robots**

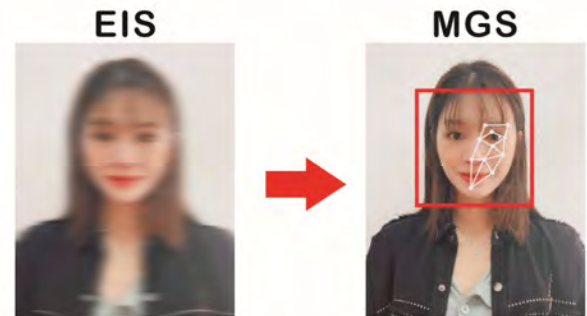
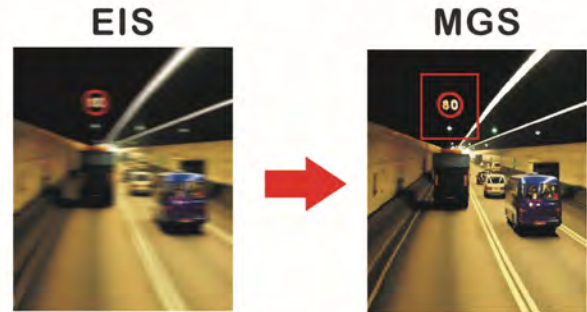
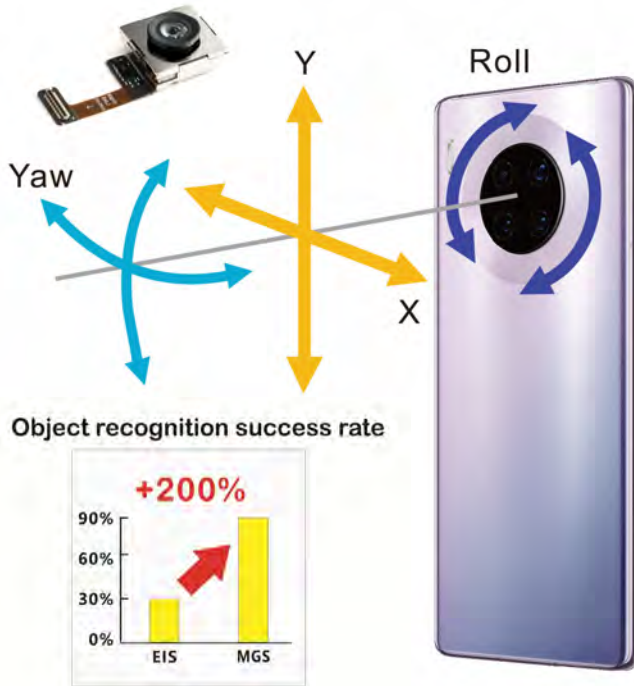


**Wearable Cameras**



## Micro Gimbal Stabilizer (MGS) for Mobile Phones

Micro Gimbal Stabilizer (MGS) is fitting in the compact size, enabling the smartphones and tablet PC to take clear images in the moving environment.





REV.	Q'TY	ECN. NO.	APR.	DATE
A	--	RC-12-2-019	Juson Su	2012.08.07

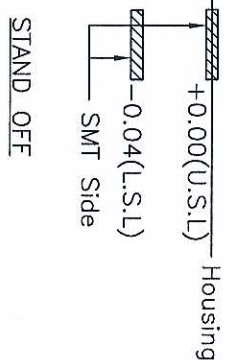
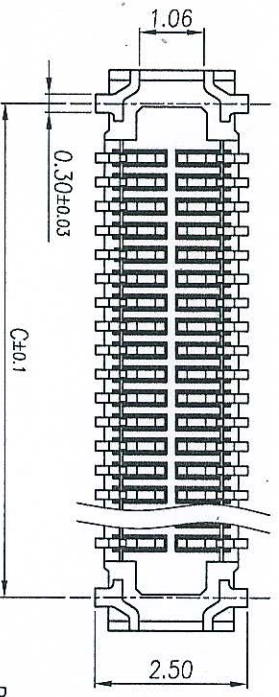
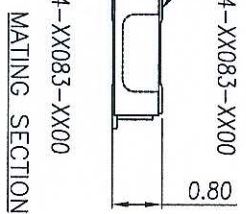
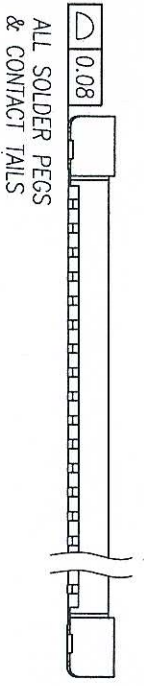
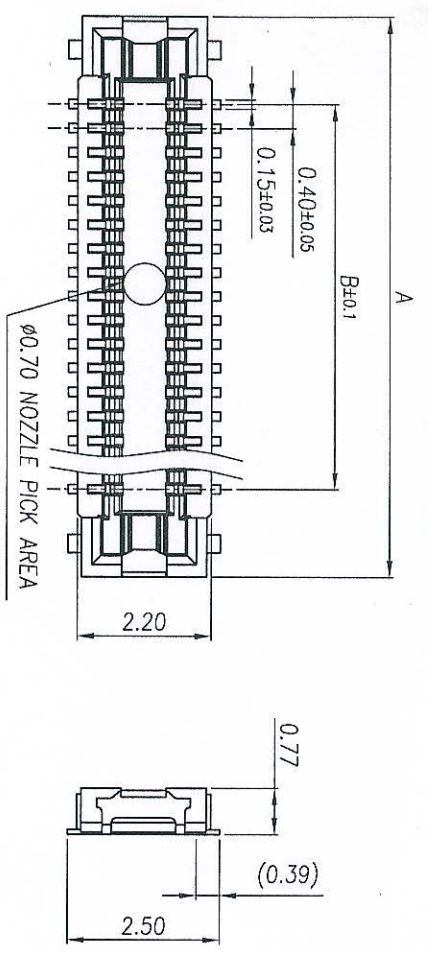
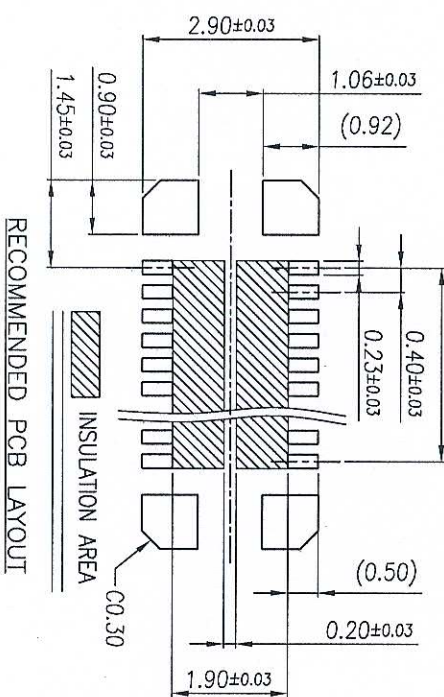
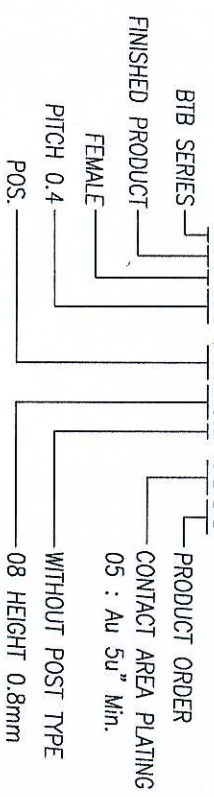


TABLE:

60	14.50	11.60	13.40	
50	12.50	9.60	11.40	
40	10.50	7.60	9.40	
34	9.30	6.40	8.20	
30	8.50	5.60	7.40	⊙
26	7.70	4.80	6.60	
24	7.30	4.40	6.20	⊙
20	6.50	3.60	5.40	
16	5.70	2.80	4.60	
10	4.50	1.60	3.40	⊙
Pos No:	A	B	C	Available



- NOTES:
- MATERIAL:
    - HOUSING: THERMOPLASTIC,U94 V-0,BLACK;
    - CONTACT: COPPER ALLOY, T=0.08mm
  - FINISH:
    - CONTACT: Au 5u" MIN PLATING ON CONTACT AREA, Au 1u" MIN. PLATING ON SOLDER TAIL, 50u" MIN. NICKEL UNDERPLATING OVER ALL
  - PRODUCT SPECIFICATIONS:
    - VOLTAGE RATING: 60V AC/DC
    - CURRENT RATING: 0.3A/CONTACT(MAX. 5A AT TOTAL CONTACT)
    - INSULATION RESISTANCE: 100MEG.OHM MIN(INITIAL)
    - WITHSTANDING VOLTAGE: 150V AC FOR 1 MINUTE
    - CONTACT RESISTANCE: 70 MILL.OHM MAX PER PIN INITIAL, AFTER CONDITION ΔR=20 MILL.OHM Max.
    - OPERATION TEMPERATURE: -55° TO +85°
    - MATING FORCE: 120g Max./POS.
    - UNMATING FORCE: 15g Min./POS.
    - DURABILITY: 30 CYCLES
  - PART NO: BAF04-XX083-0500



DIMENSION IN mm		TOLERANCE UNLESS OTHERWISE SPECIFIED	
X ± 0.35	X ± 5°	.XX ± 0.25	X ± 3°
.XXX ± 0.15	.XX ± 1°		

**LCN** Shenzhen Linkconn Electronics Co., Ltd.

APR: CHK: DPA Kevin Wang 2012.08.07

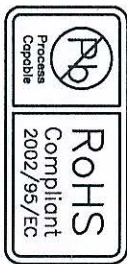
TITLE: 0.4mm PITCH BTB FEMALE MATING HEIGHT 0.8mm

DWG NO: BAF04-24083-0500

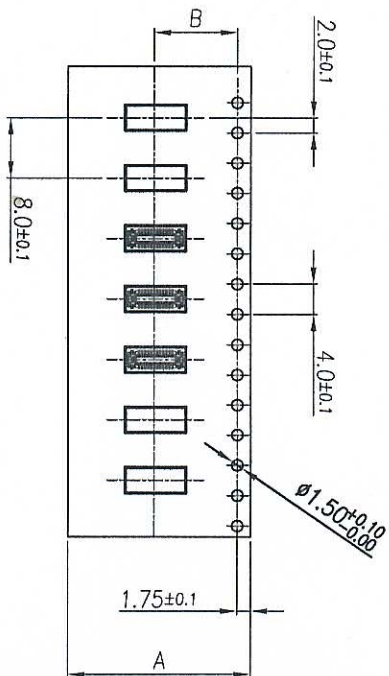
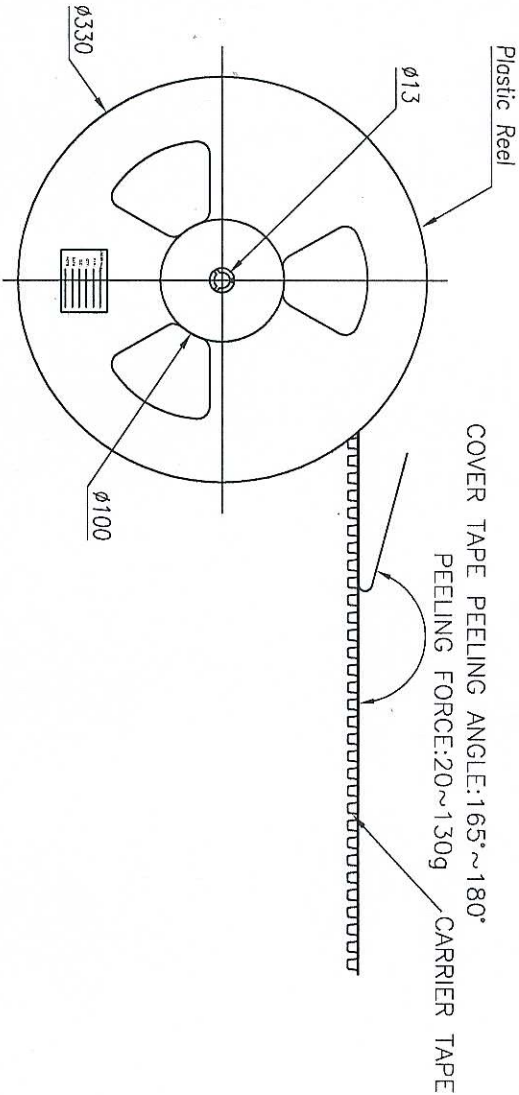
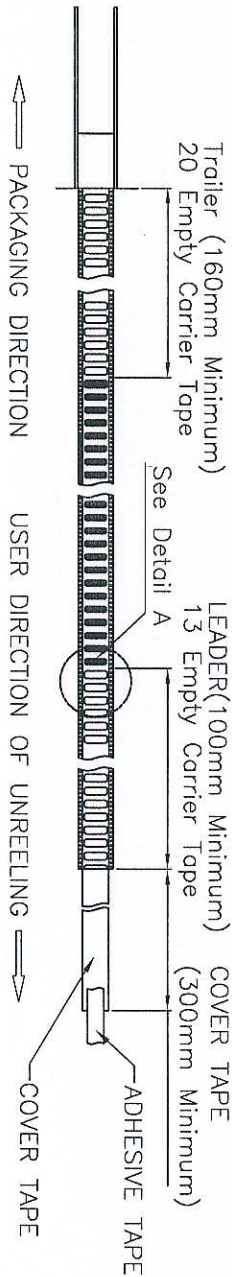
PROJ: SCALE N/A SHEET 1/2 CUSTOMER DRAWING

SIZE A4





REV.	Q'TY	ECN. NO.	APR.	DATE
A	--	RC-12-2-019	Jason Su	2012.08.07



PACKAGING DIRECTION → USER DIRECTION OF UNREELING →

POS NO	DIM A	DIM B	QTY/REEL	REEL/CARTON	QTY/CARTON	CARTON SIZE
60						
50						
40	24.00	11.50	3000	10	30000	340*340*330
30						
26						
24						
20						
16	16.00	7.50	3000	14	42000	340*340*330
10						

DIMENSION IN mm		TOLERANCE UNLESS OTHERWISE SPECIFIED	
X±	0.35	X:±	1.5'
.XX±	0.25	.X:±	1.0'
.XXX±	0.15	.XX:±	0.5'



Shenzhen Linkcomm Electronics Co., Ltd.

APR	DRN Kevin Wang	2012.08.07	TITLE	0.4mm PITCH BTB FEMALE
CHK			DWG NO.	BAF04-24083-0500
PROJ			MATING HEIGHT	0.8mm
SCALE	N/A		PREL	
SHEET	2/2		CUSTOMER DRAWING	
REV.	A			



*your BEST camera module partner*

## Cameras Applications



Automotive Driver Pilot



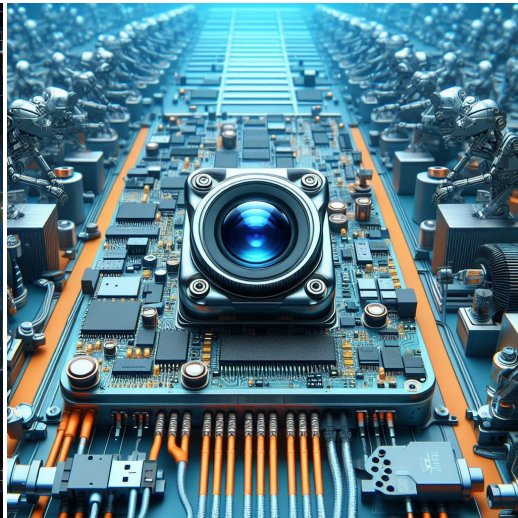
Live Streaming



Video Conference



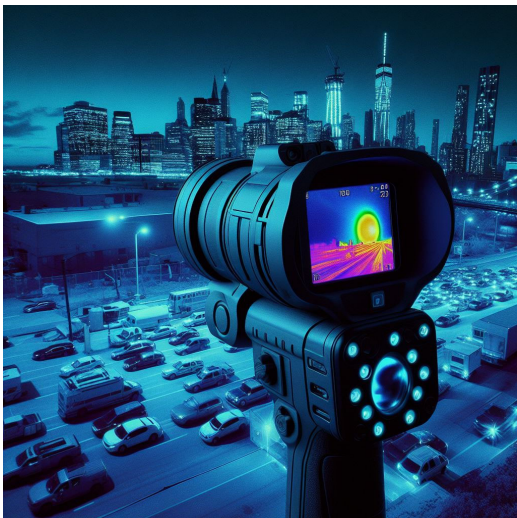
Eye Tracker Biometric Detection



Machine Vision



Agricultural Monitor



Night Vision Security



Drone and Sports Eagle Eyes



Interactive Pet Camera

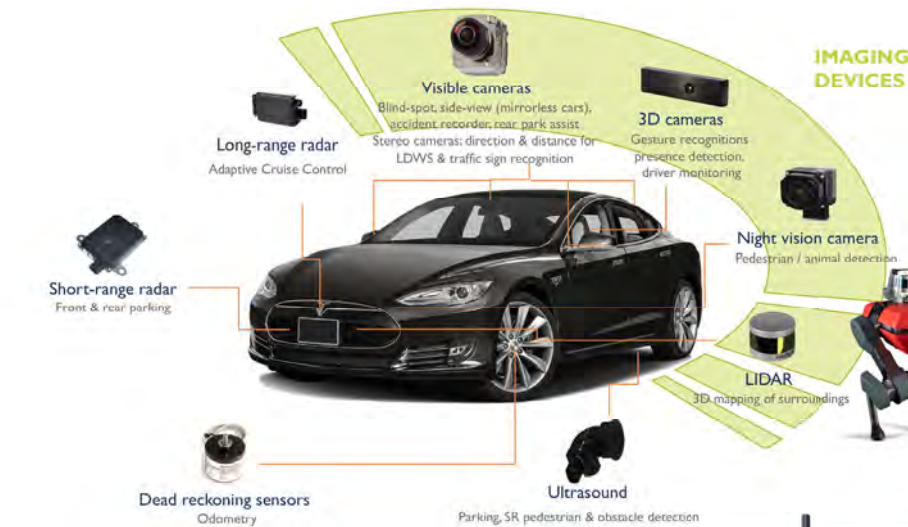
[www.KaiLapTech.com](http://www.KaiLapTech.com) [sales@KaiLapTech.com](mailto:sales@KaiLapTech.com) Tel: (852) 6908 1256 Fax: (852) 3017 6778

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## Cameras Applications





## Camera Module Pinout Definition Reference Chart

OmniVision	Sony	Samsung	On-Semi	Aptina	Himax	GalaxyCore	PixArt	SmartSens	Sensors
Pin Signal									
Description									
DGND	GND								
AGND									
PCLK	DCK								
XCLR	PWDN	XSHUTDOWN	STANDBY						
MCLK	XVCLK	XCLK	INCK						
RESET	RST								
NC	NULL								
SDA	SIO_D	SIOD							
SCL	SIO_C	SIOC							
VSYNC	XVS	FSYNC							
HREF	XHS								
DOVDD									
AFVDD									
AVDD									
DVDD									
STROBE	FSTROBE								
FSIN									
SID									
ILPWM									
FREX									
GPIO									
SLASEL									
AFEN									
<b>MIPI Interface</b>									
MDN0	DN0	MD0N	DATA_N	DMO1N					
MDP0	DP0	MD0P	DATA_P	DMO1P					
MDN1	DN1	MD1N	DATA2_N	DMO2N					
MDP1	DP1	MD1P	DATA2_P	DMO2P					
MDN2	DN2	MD2N	DATA3_N	DMO3N					
MDP2	DP2	MD2P	DATA3_P	DMO3P					
MDN3	DN3	MD3N	DATA4_N	DMO4N					
MDP3	DP3	MD3P	DATA4_P	DMO4P					
MCN	CLKN	CLK_N	DCKN						
MCP	CLKP	MCP	CLK_P	DCKN					
<b>DVP Parallel Interface</b>									
D0	DO0	Y0							
D1	DO1	Y1							
D2	DO2	Y2							
D3	DO3	Y3							
D4	DO4	Y4							
D5	DO5	Y5							
D6	DO6	Y6							
D7	DO7	Y7							
D8	DO8	Y8							
D9	DO9	Y9							
D10	DO10	Y10							
D11	DO11	Y11							



## 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	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		



## 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



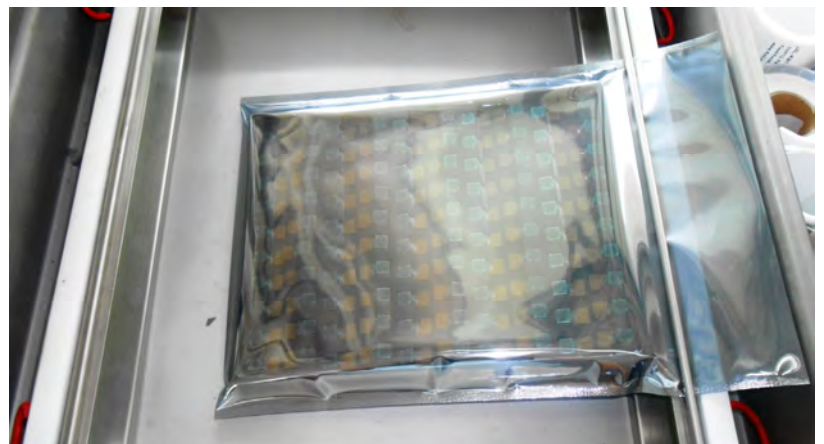
Cover Tray with Lid



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





## Large Order Package Solution

Place Foam Sheets Between Trays



Foam Sheets are Slightly Larger than Trays



Place Foam Sheets and Trays into Box



Foam Sheets are Tightly Fitting Box





## Small Order Package Solution

Place Foam Sheets and Trays into Small Box



Foam Sheets are Nicely Fitting the Small Box



Package in Small Box for Shipment



Place Small Boxes into Larger Box





## 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





*your BEST camera module partner*

## 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



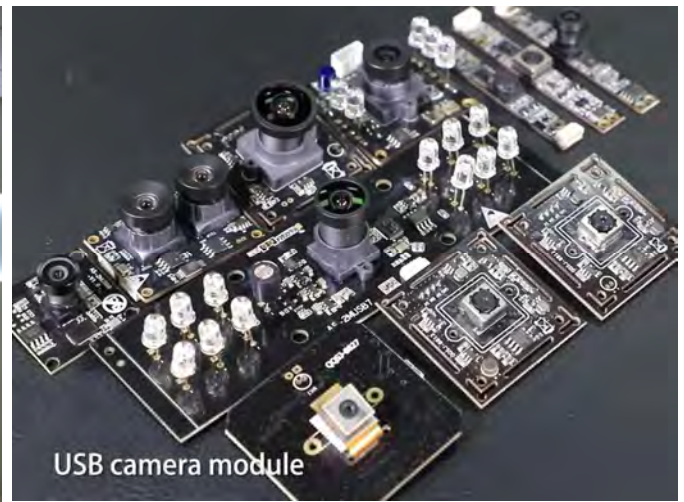


## Company Kai Lap Technologies (KLT)

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.



## 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](http://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



### Professional Service



### Promised Delivery



[www.KaiLapTech.com](http://www.KaiLapTech.com) [sales@KaiLapTech.com](mailto:sales@KaiLapTech.com) Tel: (852) 6908 1256 Fax: (852) 3017 6778

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