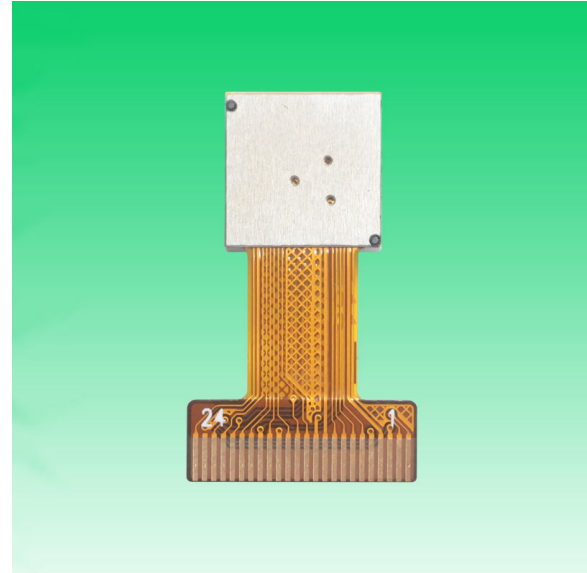


**KLT-PAA40-OV5640-1B V1.0 45mm ESP32**

**5MP OmniVision OV5640-1B DVP Parallel Interface  
ESP32 Auto Focus Camera Module 45mm Short Focus**



Front View

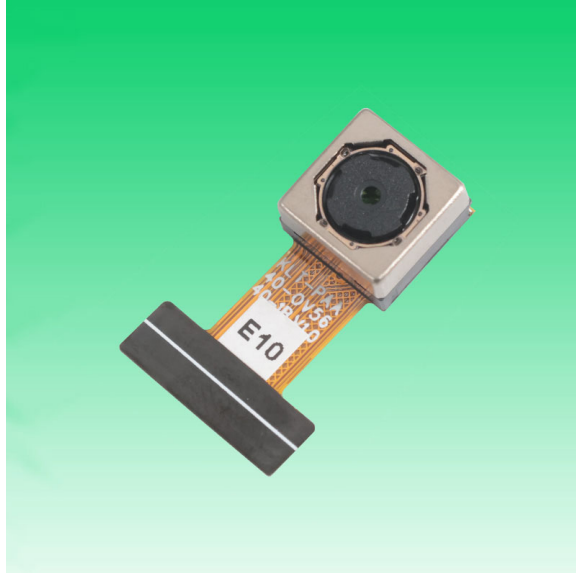


Back View

**Specifications**

|                                 |                                       |
|---------------------------------|---------------------------------------|
| <b>Camera Module No.</b>        | <b>KLT-PAA40-OV5640-1B V1.0 ESP32</b> |
| <b>Resolution</b>               | 5MP                                   |
| <b>Image Sensor</b>             | OV5640-1B                             |
| <b>Sensor Type</b>              | 1/4"                                  |
| <b>Pixel Size</b>               | 1.4 $\mu\text{m}$ x 1.4 $\mu\text{m}$ |
| <b>EFL</b>                      | 3.29 mm                               |
| <b>F.NO</b>                     | 2.80                                  |
| <b>Pixel</b>                    | 2592 x 1944                           |
| <b>View Angle</b>               | 68.7°(DFOV) 58.1°(HFOV) 45.0°(VFOV)   |
| <b>Lens Dimensions</b>          | 8.50 x 8.50 x 5.07 mm                 |
| <b>Module Size</b>              | 21.25 x 8.50 mm                       |
| <b>Module Type</b>              | Auto Focus                            |
| <b>Interface</b>                | DVP Parallel                          |
| <b>Auto Focus VCM Driver IC</b> | Embedded                              |
| <b>Lens Type</b>                | 650nm IR Cut                          |
| <b>Operating Temperature</b>    | -30°C to +70°C                        |
| <b>Mating Connector</b>         | FH12-24S-0.5SH                        |

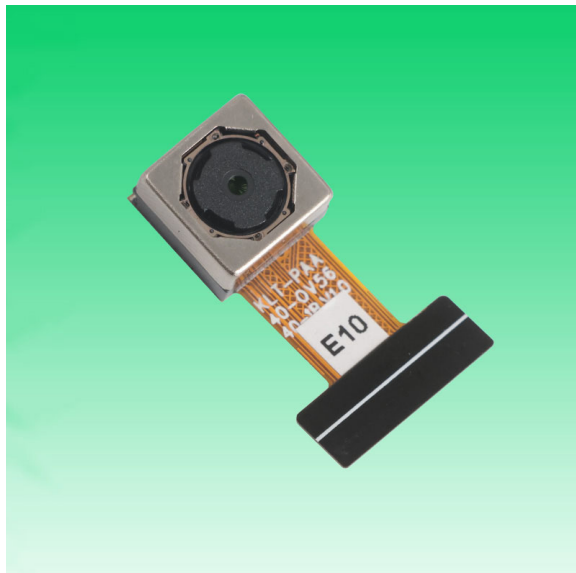
**KLT-PAA40-OV5640-1B V1.0 45mm ESP32**  
**5MP OmniVision OV5640-1B DVP Parallel Interface**  
**ESP32 Auto Focus Camera Module 45mm Short Focus**



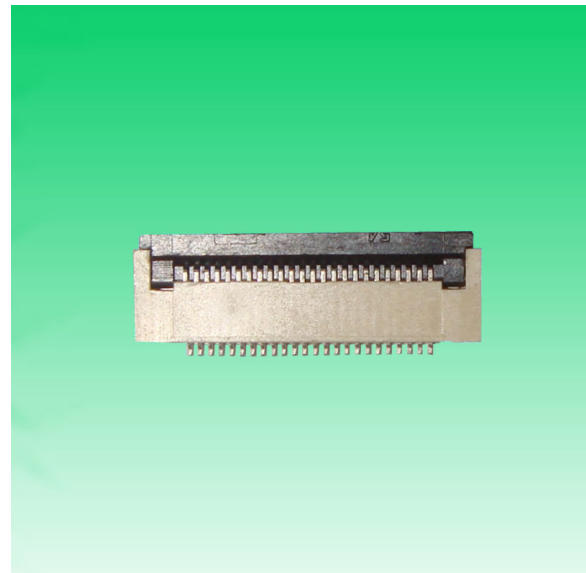
Top View



Side View



Bottom View



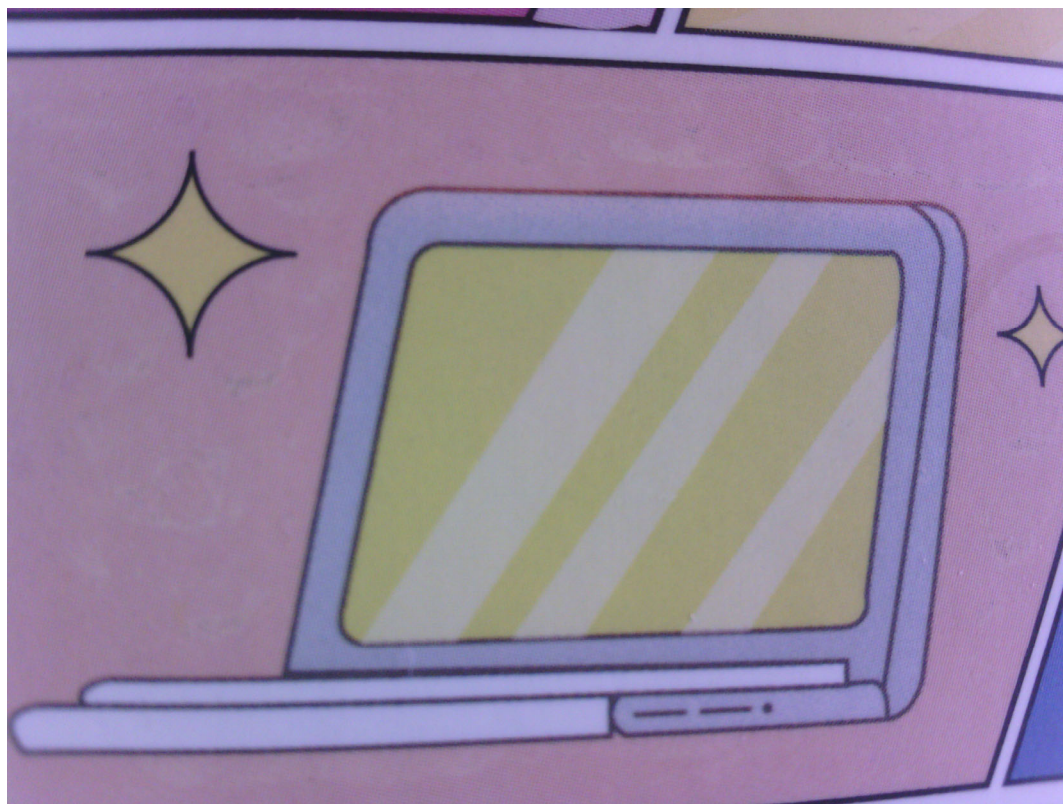
Mating Connector



# CMOS CAMERA MODULES



*your BEST camera module partner*



[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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## Product Specifica

Product Name: 360° Rotati

Product Size: 7.9" (L&W)\*

Product weight: 1lb

## Product Specification:

Product Name: 360° Rotating Display

Product Size: 7.9" (L&W)\*1.4" (H)

Product weight: 1lb

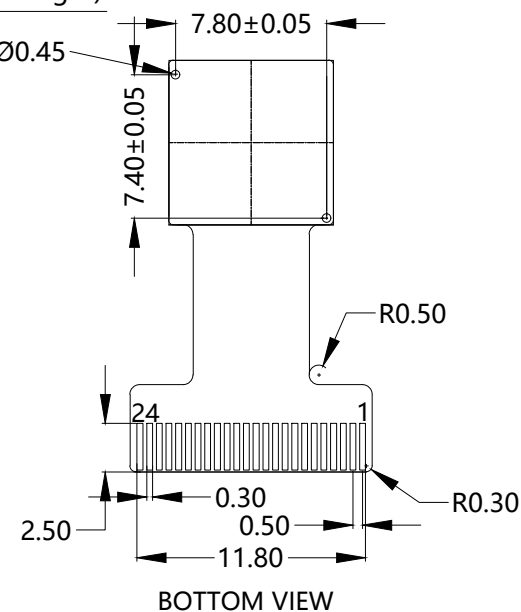
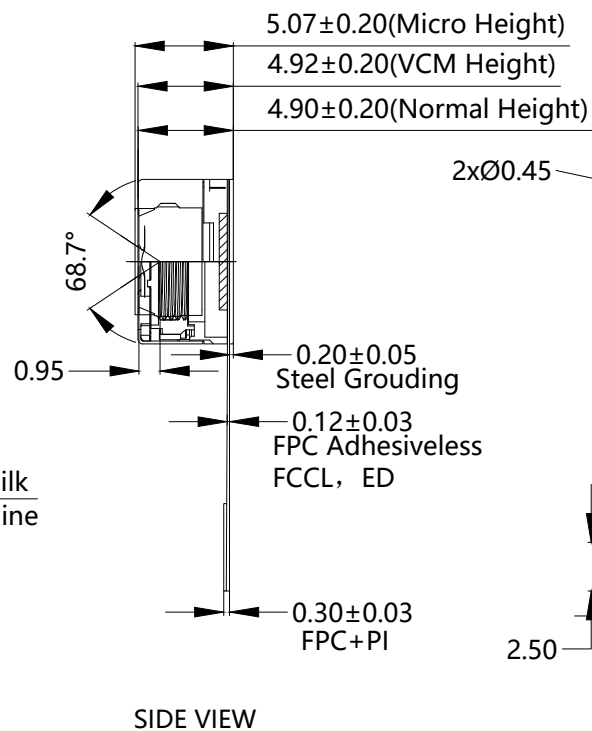
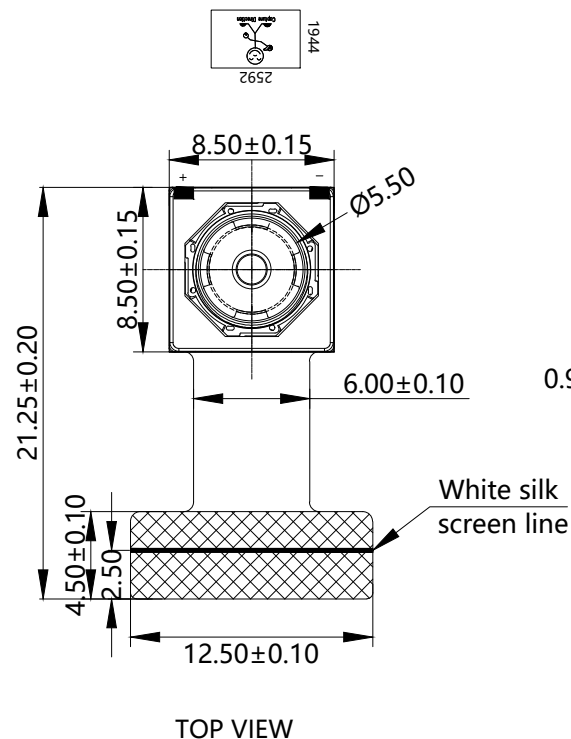
Rotating Angle: 90°/180°/360°





| PIN | SIGNAL     |
|-----|------------|
| 1   | STROBE     |
| 2   | DGND       |
| 3   | SIO_D      |
| 4   | AVDD 2.8V  |
| 5   | SIO_C      |
| 6   | RESET      |
| 7   | VSYN       |
| 8   | PWDN       |
| 9   | HREF       |
| 10  | DVDD1.5V   |
| 11  | DOVDD 2.8V |
| 12  | D9         |
| 13  | XCLK       |
| 14  | D8         |
| 15  | DGND       |
| 16  | D7         |
| 17  | PCLK       |
| 18  | D6         |
| 19  | D2         |
| 20  | D5         |
| 21  | D3         |
| 22  | D4         |
| 23  | NC         |
| 24  | AFVDD 2.8V |

| Version | Information   | Date       |
|---------|---------------|------------|
| V1.0    | First Version | 10-14-2023 |



Parameter:

1、Sensor specification:

Image Sensor: OV5640-1B

Pixel: 1.4um\*1.4um

Lens Type: 1/4

Important Voltage Description:

DVDD1.5V (external power supply);

2、Lens specification:

FOV: 68.7°(D);58.1°(H);45°(V)

F/NO.: 2.8

TV distortion: <1.0%

Focal length: 3.29mm

Composition: 4P+IR FILTER

IR Cut Coating: 650nm±10nm@50%

Kai Lap Technologies Group Ltd

Designed By

Kevin

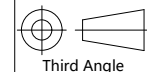
Model Name:

KLT-PAA40-OV5640-1B V1.0

Checked By

Jacky

Projection Type:



Unit:

mm

Scale:

1:1

Material:

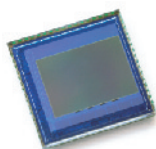
Sheet:

1 of 1

Version:

1/0





# OV5640 5-megapixel product brief



available in  
a lead-free  
package

## 1/4-inch, 5-Megapixel SOC Image Sensor Optimized for High-Volume Mobile Markets

The OV5640 delivers a complete 5-megapixel camera solution on a single chip, aimed at offering cost efficiencies that serve the high-volume autofocus (AF) camera phone market. The system-on-a-chip (SOC) sensor features OmniVision's 1.4 micron OmniBSI™ backside illumination architecture to deliver excellent pixel performance and best-in-class low-light sensitivity, while enabling ultra compact camera module designs of 8.5 mm x 8.5 mm with <6 mm z-height. The OV5640 provides the full functionality of a complete camera, including anti-shake technology, AF control, and MIPI while being easier to tune than two-chip solutions, making it an ideal choice in terms of cost, time-to-market and ease of platform integration.

The OV5640 enables 720p HD video at 60 frames per second (fps) and 1080p HD video at 30 fps with complete user control over formatting and output data transfer. The 720p/60 HD video is captured in full field of view (FOV) with 2 x 2 binning, which doubles the sensitivity and improves the signal-to-noise ratio (SNR). Additionally, a unique post-binning re-sampling filter function removes zigzag artifacts around slant edges and minimizes spatial artifacts to deliver even sharper, crisper

color images. To further improve camera performance and user experience, the OV5640 features an internal anti-shake engine for image stabilization, and it supports Scalado™ tagging for faster image preview and zoom.

The OV5640 offers a digital video port (DVP) parallel interface and a high-speed dual lane MIPI interface, supporting multiple output formats. An integrated JPEG compression engine simplifies data transfer for bandwidth-limited interfaces. The sensor's automatic image control functions include automatic exposure control (AEC), automatic white balance (AWB), automatic band filter (ABF), 50/60 Hz automatic luminance detection, and automatic black level calibration (ABLC). The OV5640 delivers programmable controls for frame rate, AEC/AGC 16-zone size/position/weight control, mirror and flip, cropping, windowing, and panning. It also offers color saturation, hue, gamma, sharpness (edge enhancement), lens correction, defective pixel canceling, and noise canceling to improve image quality.

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



## applications

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

## ordering information

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

## features

- 1.4  $\mu\text{m}$  x 1.4  $\mu\text{m}$  pixel with OmniBSI technology for high performance (high sensitivity, low crosstalk, low noise, improved quantum efficiency)
- optical size of 1/4"
- automatic image control functions: automatic exposure control (AEC), automatic white balance (AWB), automatic band filter (ABF), automatic 50/60 Hz luminance detection, and automatic black level calibration (ABLC)
- programmable controls for frame rate, AEC/AGC 16-zone size/position/weight control, mirror and flip, cropping, windowing, and panning
- image quality controls: color saturation, hue, gamma, sharpness (edge enhancement), lens correction, defective pixel canceling, and noise canceling
- support for output formats: RAW RGB, RGB565/555/444, CCIR656, YUV422/420, YCbCr422, and compression
- support for video or snapshot operations
- support for internal and external frame synchronization for frame exposure mode
- support for LED and flash strobe mode
- support for horizontal and vertical sub-sampling, binning
- support for minimizing artifacts on binned image
- support for data compression output
- support for anti-shake
- standard serial SCCB interface
- digital video port (DVP) parallel output interface and dual lane MIPI output interface
- embedded 1.5V regulator for core power
- programmable I/O drive capability, I/O tri-state configurability
- support for black sun cancellation
- support for images sizes: 5 megapixel, and any arbitrary size scaling down from 5 megapixel
- support for auto focus control (AFC) with embedded AF VCM driver
- embedded microcontroller
- suitable for module size of 8.5 x 8.5 x <6mm with both CSP and RW packaging

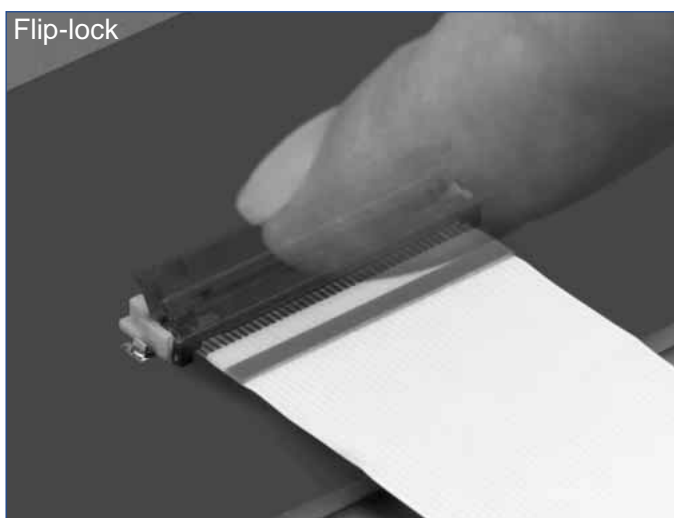
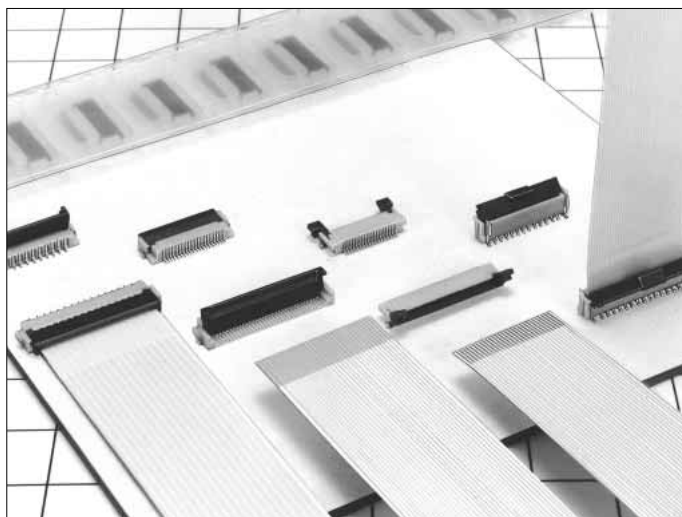
## key specifications (typical)

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



# 0.5mm and 1mm Pitch Connectors For FPC/FFC

## FH12 Series



### ■ Features

#### 1. Ease of Use and Space Savings

Only one finger or 6.9N (Newtons) of force is required to lock Hirose's rotational actuator (flip-lock) as compared to using 2 fingers and 39.2N to close a FFC/FPC connector from our competition.

The Flip-Lock design also allows customers to place 2 or more connectors side by side as there is no need to waste additional board space for a side latch.

#### 2. Strengthened Flip-lock Actuator

The standard Flip-Lock requires only 2.0mm height above the board. A strengthened lock lever is available which only requires an additional 0.4mm.

#### 3. Supports Thin FPC (0.18mm)

Hirose does not require double-sided FPC to have any additional strengthening plate or stiffener and can therefore support a thickness of as little as 0.18mm +/- 0.05.

#### 4. Hirose Ensures Reliability

Hirose's patented half tuning fork contacts maintain the required normal force without relying on the connector housing. With our competitor's conventional products the housing walls support the contact force, which does not provide for long-term reliability.

#### 5. Prevention of Solder Bridge

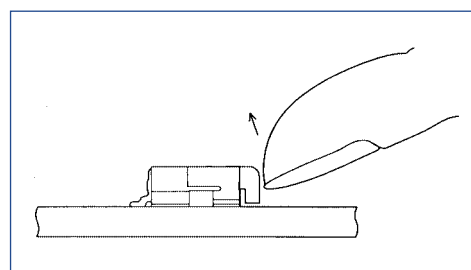
Excess solder cavity absorbs excessive solder and avoids solder bridging.

#### 6. Three different assembly types

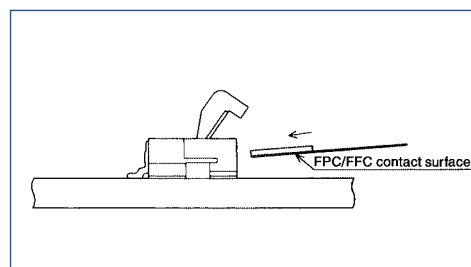
FH12 is offered in Top & Bottom Contact and Vertical Mount and offered in both a 0.5mm contact pitch as well as a 1.0mm contact pitch (bottom contact only).

### Rotating One-touch Mechanism

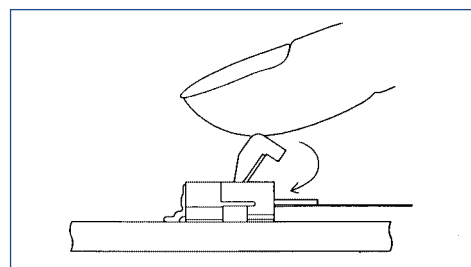
①



②



③



### ■ Applications

Notebook computers, printers, PDAs, digital cameras and other compact devices for interconnecting the main circuit board with the LCD, HDD or other device.

## Product Specifications

|        |                                 |  |  |
|--------|---------------------------------|--|--|
| Rating | Current rating: 0.5A DC(Note 1) | Operating Temperature Range: -40 to +70°C (Note 2)                   | Storage Temperature Range: -10 to +50°C (Note 3)                   |
|        | Voltage rating: 50V AC          | Operating Humidity Range: Relative humidity, 90% max.<br>(Not dewed) | Storage Humidity Range: Relative humidity, 90% max.<br>(Not dewed) |

|                |                        |                                  |
|----------------|------------------------|----------------------------------|
| Applicable FPC | t=0.3±0.05 Gold plated | t=0.18 ± 0.05 for FH12F-*S-0.5SH |
|----------------|------------------------|----------------------------------|

| Item                                 | Specification   | Conditions   |
|--------------------------------------|---|--|
| 1. Insulation resistance             | 500M ohms minimum   | 100V DC  |
| 2. Withstanding voltage              | No flashover or insulation breakdown.   | 150V AC/1 minute   |
| 3. Contact resistance                | 50m ohms maximum  | 1mA  |
| 4. Durability (Insertion/withdrawal) | Contact resistance: 50m ohms maximum<br>No damage, cracks, or parts dislocation.  | 20 cycles  |
| 5. Vibration                         | No electrical discontinuity of 1μs or more<br>Contact resistance: 50m ohms maximum.<br>No damage, cracks, or parts dislocation. | Frequency: 10 to 55 Hz, single amplitude of 0.75 mm,<br>2 hours in each of the 3 directions.                       |
| 6. Shock                             | No electrical discontinuity of 1μs or more<br>Contact resistance: 50m ohms maximum.<br>No damage, cracks, or parts dislocation. | Acceleration of 490 m/s <sup>2</sup> , 11 ms duration,<br>sine half-wave waveform, 3 cycles in each of the 3 axis. |
| 7. Humidity(Steady state)            | Contact resistance: 50m ohms maximum.<br>Insulation resistance: 50M ohms minimum.<br>No damage, cracks, or parts dislocation.   | 96 hours at 40°C and humidity of 90% to 95%  |
| 8. Temperature Cycle                 | Contact resistance: 50m ohms maximum.<br>Insulation resistance: 50M ohms minimum.<br>No damage, cracks, or parts dislocation.   | Temperature: -40°C → 15 to 35°C → 85°C → 15 to 35°C,<br>Time: 30 → 5 max. → 30 → 5 max.(minutes)<br>5 cycles       |
| 9. Resistance to Soldering heat      | No deformation of components affecting performance.   | Reflow: At the recommended temperature profile<br>Manual soldering: 350±5°C for 3 seconds                          |

Note 1: When passing the current through all of the contacts, use 70% of the current rating.

Note 2: Includes temperature rise caused by current flow.

Note 3: The term "storage" refers to products stored for long period of time prior to mounting and use. Operating Temperature Range and Humidity range covers nonconducting condition of installed connectors in storage, shipment or during transportation.

## Material

| Part           | Material                | Finish             | Remarks |
|----------------|-------------------------|--------------------|---------|
| Insulator      | Polyamide, LCP(60 pos.) | Color : Beige      | UL94V-0 |
| Actuator       | PPS                     | Color : Dark brown |         |
| Contact        | Phosphor bronze         | Gold plated        | _____   |
| Metal Fittings | Brass                   | Tin plated         |         |

## Ordering Information

**FH12   A - 10 (4) - S A - 0.5 SH (55)**

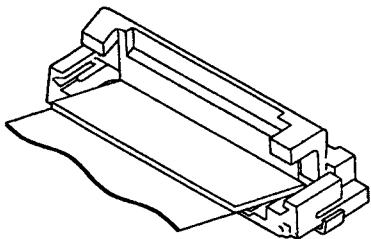
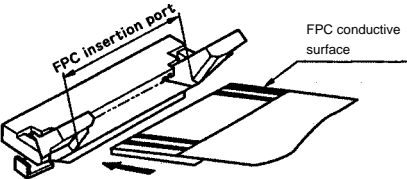
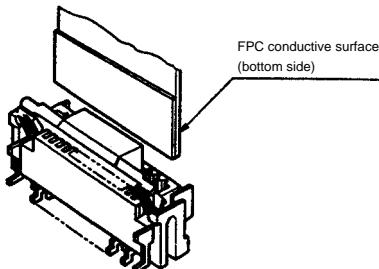
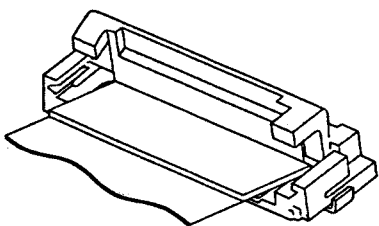
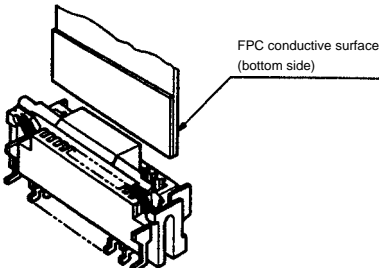
①   ②   ③   ④   ⑤   ⑥   ⑦   ⑧   ⑨

|  |  |
|--|--|
| ① Series Name : FH12   | ⑤ Contact alignment: Single  |
| ② Blank : standard type<br>A : Top contact type<br>S : Type with strengthened flip-lock actuator<br>F : Type with 0.18mm FPC End Thickness | ⑥ Eccentric direction:<br>Blank : standard type<br>A : Eccentric type                  |
| ③ Standard type : Number of contacts<br>Eccentric type : Number of contacts in 0.5mm housing   | ⑦ Contacts Pitch : 0.5mm, 1mm  |
| ④ Standard type : Blank<br>Eccentric type : Number of contacts   | ⑧ Contact type<br>SH : SMT horizontal mounting type<br>SV : SMT vertical mounting type |
|  | ⑨ Plating specification<br>(55) : Gold plated  |

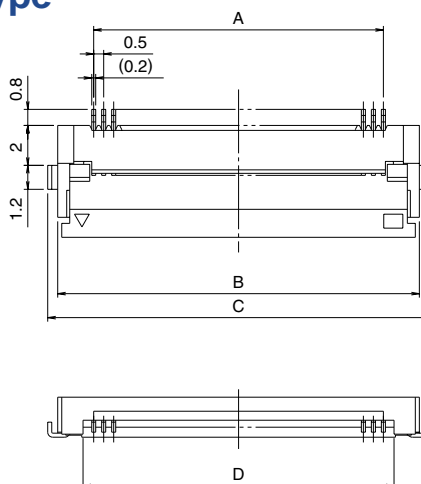


## FH12 Series 0.5mm and 1mm Pitch Connectors For FPC/FPC

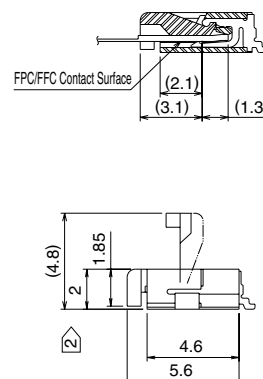
### Series Configuration

| Pitch | Bottom Contact Type   | Top Contact Type   | Vertical mounting Type   |
|-------|---|--|--|
| 0.5mm |  <p><b>FH12- ** S-0.5SH</b> <b>P.12</b></p> <p>Number of contacts 6, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 28, 30, 32, 33, 34, 35, 36, 40, 45, 50, 53</p>   |    |   |
|       | Type with Strengthened Lock Lever   |  |  |
|       | <p><b>FH12S- ** S-0.5SH</b> <b>P.13</b></p> <p>Number of contacts 30, 40, 45, 50, 53</p>  |  |  |
|       | Type with 0.18mm FPC End Thickness  |  |  |
| 1mm   | <p><b>FH12F- ** S-0.5SH</b> <b>P.14</b></p> <p>Number of contacts 6, 8, 10, 12, 13, 14, 15, 16, 18, 20, 22, 24, 25, 26, 28, 30, 32, 34, 36, 40</p>  | <p><b>FH12A- ** S-0.5SH</b> <b>P.15</b></p> <p>Number of contacts 10, 12, 15, 16, 18, 20, 22, 24, 26, 28, 29, 30, 32, 33, 34, 36, 40, 42, 45, 50</p> | <p><b>FH12- ** S-0.5SV</b> <b>P.16</b></p> <p>Number of contacts 10, 12, 13, 15, 16, 17, 18, 20, 22, 24, 26, 30, 32, 33, 34, 36, 40, 45, 49, 50, 60</p>                          |
|       |  <p>Standard <b>FH12- ** S-1SH</b> <b>P.18</b></p> <p>Eccentric <b>FH12- ** (**) SA-1SH</b></p> <p>Standard</p> <p>Number of contacts 5, 6, 7, 8, 9, 11, 12, 16, 17, 22, 26</p> <p>Eccentric</p> <p>Number of contacts 4, 6, 8, 10, 11, 14, 19, 24</p> |  |  |
|       |   |  |  <p><b>FH12- ** S-1SV</b> <b>P.19</b></p> <p>Number of contacts 6, 7, 8, 16, 20, 22, 24</p> |

## 0.5mm Pitch Bottom Contact Type



Mated Cross-sectional Diagram



Unit:mm

| Part Number               | CL No.        | Number of Contacts | A    | B    | C    | D     | RoHS |
|---------------------------|---------------|--------------------|------|------|------|-------|------|
| FH12- 6S-0.5SH(55)        | 586-0582-5-55 | 6                  | 2.5  | 6.1  | 7.1  | 3.57  | YES  |
| FH12- 8S-0.5SH(55)        | 586-0744-5-55 | 8                  | 3.5  | 7.1  | 8.1  | 4.57  |      |
| FH12-10S-0.5SH(55)        | 586-0522-3-55 | 10                 | 4.5  | 8.1  | 9.1  | 5.57  |      |
| FH12-11S-0.5SH(55)        | 586-0600-5-55 | 11                 | 5    | 8.6  | 9.6  | 6.07  |      |
| FH12-12S-0.5SH(55)        | 586-0704-0-55 | 12                 | 5.5  | 9.1  | 10.1 | 6.57  |      |
| FH12-13S-0.5SH(55)        | 586-0549-0-55 | 13                 | 6    | 9.6  | 10.6 | 7.07  |      |
| FH12-14S-0.5SH(55)        | 586-0533-0-55 | 14                 | 6.5  | 10.1 | 11.1 | 7.57  |      |
| FH12-15S-0.5SH(55)        | 586-0523-6-55 | 15                 | 7    | 10.6 | 11.6 | 8.07  |      |
| FH12-16S-0.5SH(55)        | 586-0531-4-55 | 16                 | 7.5  | 11.1 | 12.1 | 8.57  |      |
| FH12-17S-0.5SH(55)        | 586-0606-1-55 | 17                 | 8    | 11.6 | 12.6 | 9.07  |      |
| FH12-18S-0.5SH(55)        | 586-0530-1-55 | 18                 | 8.5  | 12.1 | 13.1 | 9.57  |      |
| FH12-19S-0.5SH(55)        | 586-0534-2-55 | 19                 | 9    | 12.6 | 13.6 | 10.07 |      |
| FH12-20S-0.5SH(55)        | 586-0524-9-55 | 20                 | 9.5  | 13.1 | 14.1 | 10.57 |      |
| FH12-22S-0.5SH(55)        | 586-0532-7-55 | 22                 | 10.5 | 14.1 | 15.1 | 11.57 |      |
| FH12-24S-0.5SH(55)        | 586-0521-0-55 | 24                 | 11.5 | 15.1 | 16.1 | 12.57 |      |
| FH12-25S-0.5SH(55)        | 586-0692-3-55 | 25                 | 12   | 15.6 | 16.6 | 13.07 |      |
| FH12-26S-0.5SH(55)        | 586-0576-2-55 | 26                 | 12.5 | 16.1 | 17.1 | 13.57 |      |
| FH12-28S-0.5SH(55)        | 586-0612-4-55 | 28                 | 13.5 | 17.1 | 18.1 | 14.57 |      |
| Note ② FH12-30S-0.5SH(55) | 586-0525-1-55 | 30                 | 14.5 | 18.1 | 19.1 | 15.57 |      |
| FH12-32S-0.5SH(55)        | 586-0681-7-55 | 32                 | 15.5 | 19.1 | 20.1 | 16.57 |      |
| FH12-33S-0.5SH(55)        | 586-0520-8-55 | 33                 | 16   | 19.6 | 20.6 | 17.07 |      |
| FH12-34S-0.5SH(55)        | 586-0617-8-55 | 34                 | 16.5 | 20.1 | 21.1 | 17.57 |      |
| FH12-35S-0.5SH(55)        | 586-0740-4-55 | 35                 | 17.0 | 20.6 | 21.6 | 18.07 |      |
| FH12-36S-0.5SH(55)        | 586-0526-4-55 | 36                 | 17.5 | 21.1 | 22.1 | 18.57 |      |
| Note ② FH12-40S-0.5SH(55) | 586-0527-7-55 | 40                 | 19.5 | 23.1 | 24.1 | 20.57 |      |
| Note ② FH12-45S-0.5SH(55) | 586-0528-0-55 | 45                 | 22   | 25.6 | 26.6 | 23.07 |      |
| Note ② FH12-50S-0.5SH(55) | 586-0529-2-55 | 50                 | 24.5 | 28.1 | 29.1 | 25.57 |      |
| Note ② FH12-53S-0.5SH(55) | 586-0595-7-55 | 53                 | 26   | 29.6 | 30.6 | 27.07 |      |

Note 1 : Embossed tape reel packaging (2,000 pieces/reel).  
 Order by number of reels.

Note ② : If there is no problem with the connector height, we recommend the type with the strengthened Flip-lock actuator (FH12S-\*S-0.5SH).  
 Standard type connector height: 2 mm  
 Connector height of type with strengthened Flip-lock actuator: 2.4 mm



## Cameras Applications



Automotive Driver Pilot



Live Streaming



Video Conference



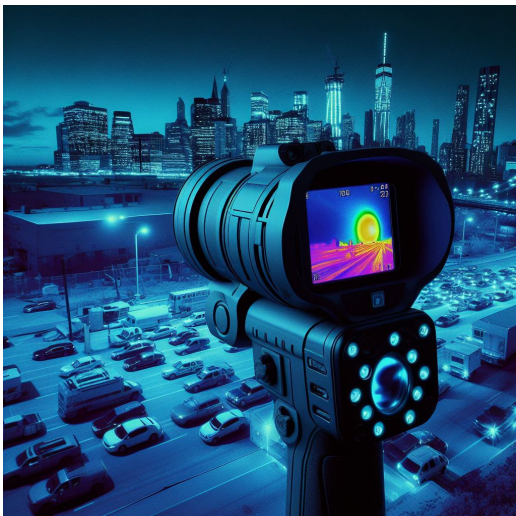
Eye Tracker Biometric Detection



Machine Vision



Agricultural Monitor



Night Vision Security



Drone and Sports Eagle Eyes



Interactive Pet Camera





## Cameras Applications

*your BEST camera module partner*



## IMAGING DEVICES



## 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                                 |



## Camera Reliability Test

| Reliability Inspection Item |                             |   | Testing Method          | Acceptance Criteria     |
|-----------------------------|-----------------------------|---|-------------------------|-------------------------|
| Category                    |                             | Item  |                         |                         |
| Environmental               | Storage Temperature         | High 60°C 96 Hours  | Temperature Chamber     | No Abnormal Situation   |
|                             |                             | Low -20°C 96 Hours  | Temperature Chamber     | No Abnormal Situation   |
|                             | Operation Temperature       | High 60°C 24 Hours  | Temperature Chamber     | No Abnormal Situation   |
|                             |                             | Low -20°C 24 Hours  | Temperature Chamber     | No Abnormal Situation   |
|                             | Humidity                    | 60°C 80% 24 Hours   | Temperature Chamber     | No Abnormal Situation   |
|                             | Thermal Shock               | High 60°C 0.5 Hours<br>Low -20°C 0.5 Hours<br>Cycling in 24 Hours | Temperature Chamber     | No Abnormal Situation   |
| Physical                    | Drop Test (Free Falling)    | Without Package 60cm  | 10 Times on Wood Floor  | Electrically Functional |
|                             |                             | With Package 60cm   | 10 Times on Wood Floor  | Electrically Functional |
|                             | Vibration Test              | 50Hz X-Axis 2mm 30min   | Vibration Table         | Electrically Functional |
|                             |                             | 50Hz Y-Axis 2mm 30min   | Vibration Table         | Electrically Functional |
|                             |                             | 50Hz Z-Axis 2mm 30min   | Vibration Table         | Electrically Functional |
|                             | Cable Tensile Strength Test | Loading Weight 4 kg<br>60 Seconds<br>Cycling in 24 Hours          | Tensile Testing Machine | Electrically Functional |
| Electrical                  | ESD Test                    | Contact Discharge 2 KV  | ESD Testing Machine     | Electrically Functional |
|                             |                             | Air Discharge 4 KV  | ESD Testing Machine     | Electrically Functional |
|                             | Aging Test                  | On/Off 30 Seconds<br>Cycling in 24 Hours                          | Power Switch            | Electrically Functional |
|                             | USB Connector               | On/Off 250 Times  | Plug and Unplug         | Electrically Functional |



| 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





## 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





# CMOS CAMERA MODULES



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## 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.



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# CMOS CAMERA MODULES



*your BEST camera module partner*

## KLT Strength

### Powerful Factory



### Professional Service



### Promised Delivery



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