

## KLT-G4K-OV8858 V2.3

### 8MP OmniVision OV8858 MIPI Interface LED Auto Focus Camera Module



Front View



Back View

#### Specifications

|                          |                                     |
|--------------------------|-------------------------------------|
| Camera Module No.        | KLT-G4K-OV8858 V2.3                 |
| Resolution               | 8MP                                 |
| Image Sensor             | OV8858-R2A                          |
| Sensor Type              | 1/4"                                |
| Pixel Size               | 1.12 um x 1.12 um                   |
| EFL                      | 2.96 mm                             |
| F.NO                     | 2.00                                |
| Pixel                    | 3264 x 2448                         |
| View Angle               | 75.0°(DFOV) 62.8°(HFOV) 49.3°(VFOV) |
| Lens Dimensions          | 8.50 x 8.50 x 4.90 mm               |
| Module Size              | 28.70 x 26.15 mm                    |
| Module Type              | Auto Focus with LED                 |
| Interface                | MIPI                                |
| Auto Focus VCM Driver IC | DW9714P                             |
| Lens Model               | KLT-LENS-9570A3                     |
| Lens Type                | 650nm IR Cut                        |
| Operating Temperature    | -30°C to +85°C                      |
| Mating Connector         | FH12-30S-0.5SH                      |



## KLT-G4K-OV8858 V2.3

8MP OmniVision OV8858 MIPI Interface LED Auto Focus Camera Module



Top View



Side View

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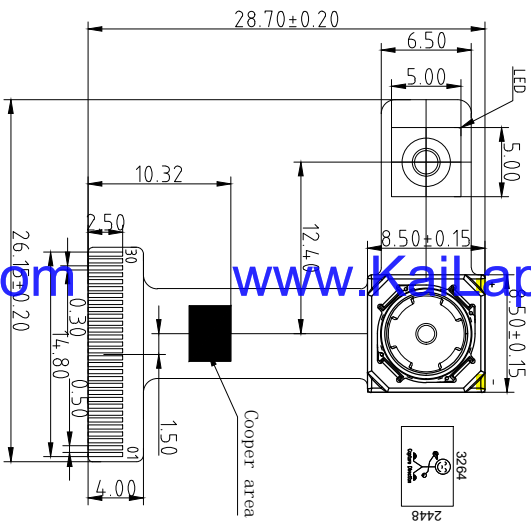
Bottom View



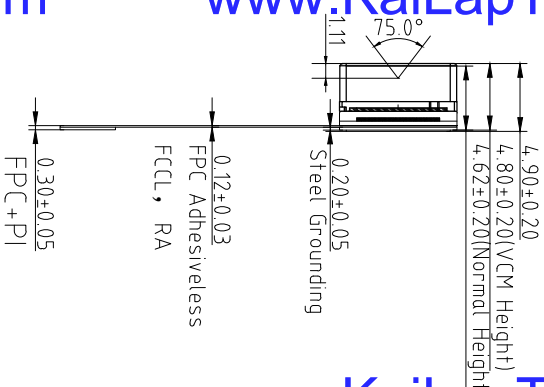
Mating Connector

# ROHS

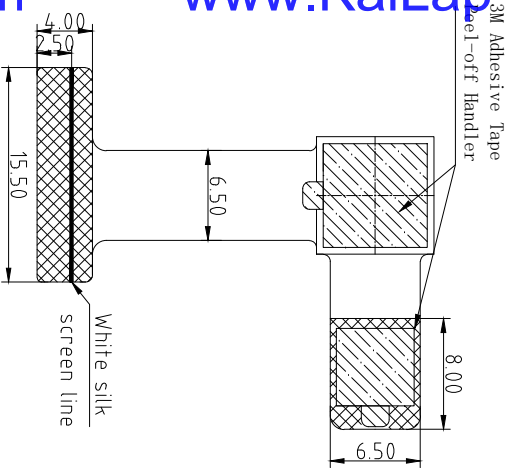
|    |           |
|----|-----------|
| 1  | DGND      |
| 2  | MCLK      |
| 3  | DGND      |
| 4  | AVDD2.8V  |
| 5  | AGND      |
| 6  | DVDD1.2V  |
| 7  | DOVDD1.8V |
| 8  | DGND      |
| 9  | AFVDD2.8V |
| 10 | SDA       |
| 11 | SCL       |
| 12 | RESET     |
| 13 | PWDN      |
| 14 | SID(GND)  |
| 15 | DGND      |
| 16 | MDP1      |
| 17 | MDN1      |
| 18 | DGND      |
| 19 | MDP0      |
| 20 | MDN0      |
| 21 | DGND      |
| 22 | MCP       |
| 23 | MCN       |
| 24 | DGND      |
| 25 | LED1+     |
| 26 | LED2+     |
| 27 | LED1-     |
| 28 | LED2-     |
| 29 | STROBE    |
| 30 | DGND      |



TOP VIEW



SIDE VIEW



BOTTOM VIEW

## Parameters:

### 1、Sensor specification:

Image Sensor: OV8858-R2A  
 Pixel: 1.2um×1.2um  
 Lens Type: 1/4  
 Important Voltage Description: DVDD1.2V (external power supply);

### 2 Lens specification:

FOV: 75°(D);62.8°(H);49.3°(V);  
 F/#: 2.0  
 TVD: <1.0%  
 Focal length: 2.96mm  
 IR Cut Coating: 650nm±10nm@50%  
 Sensor I2C: 0X6C

| Version | Information         | Date      |
|---------|---------------------|-----------|
| V1.0    | First Version       | 6-23-2016 |
| V2.0    | Update layout       | 7-27-2016 |
| V2.3    | Change lens and vcm | 5-7-2022  |

**Kai Lap Technologies Group Ltd**

Designed By

Key

Model Name: KLT-G4K-OV8858 V2.3

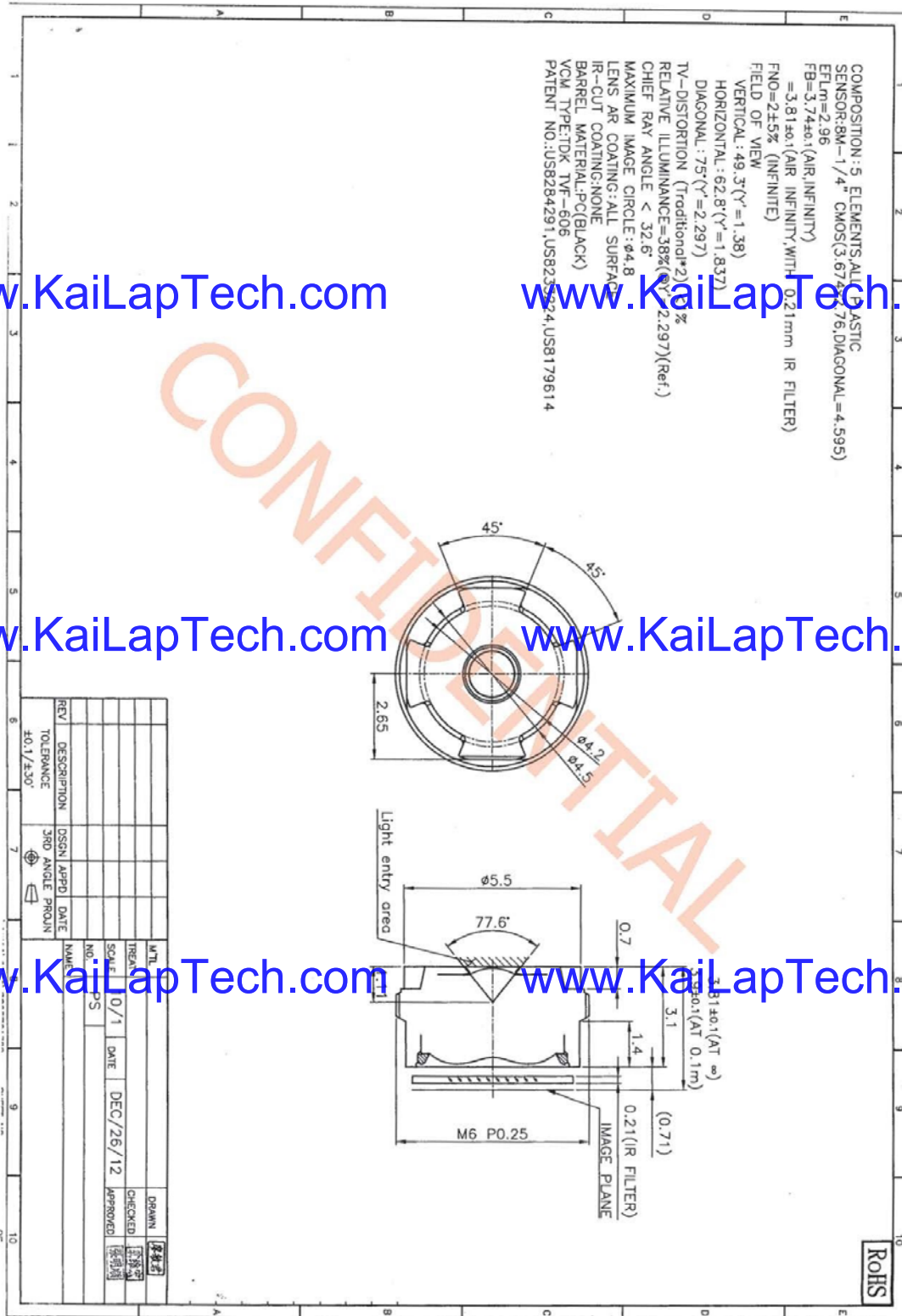
Checked By

Aouly\_Yan

Projection Type: Unit: mm Material:   
 Scale: 1:1 Sheet: 1 of 1 Version: 1/0



Lens Model: KLT-LENS-9570A3



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### FEATURES

120mA output driver with 10-bit resolution DAC  
 Smart Actuator Control (SAC™) modes  
 Supply voltage ( $V_{DD}$ ): 2.3V to 4.3V  
 I/O voltage ( $V_{IN}$ ): 1.8V to  $V_{DD}$   
 Fast mode and Fast mode plus I<sup>2</sup>C interface compatible  
 Power On Reset (POR)  
 Power Down (PD) mode current consumption less than 1 $\mu$ A  
 Package: 6-pin WLCSP (0.77mm x 1.14mm x 0.30mm)

### APPLICATIONS

Mobile camera  
 Digital still camera  
 Camcorder  
 Web camera  
 Action camera

### GENERAL DESCRIPTION

The DW9714P designed for linear control of Voice Coil Motors (VCM). This device is compatible with DW9714. The DW9714P has a single 10-bit DAC with 120mA output current sink capability. This device features SAC™ mode which can minimize the mechanical vibration and achieve very fast mechanical settling time. The SAC™ is protected by patent and registered trademark of DONGWOON ANATECH.

The DW9714P operates from a single 2.3V to 4.3V supply. The internal DAC is controlled via an I<sup>2</sup>C serial interface that operates at clock rate up to 1MHz. The I<sup>2</sup>C address for the DW9714P is 0x18. The DW9714P offers PD mode with current consumption less than 1 $\mu$ A.

The DW9714P can be used for auto focus applications in mobile cameras, digital still cameras, camcorders, web cameras and action cameras.

### TYPICAL APPLICATION CIRCUIT

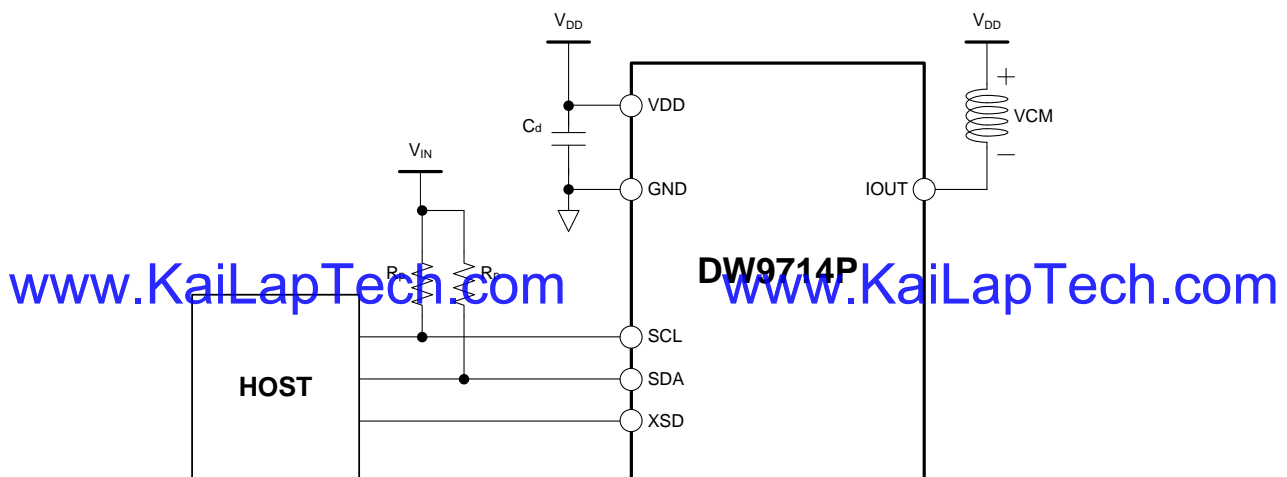
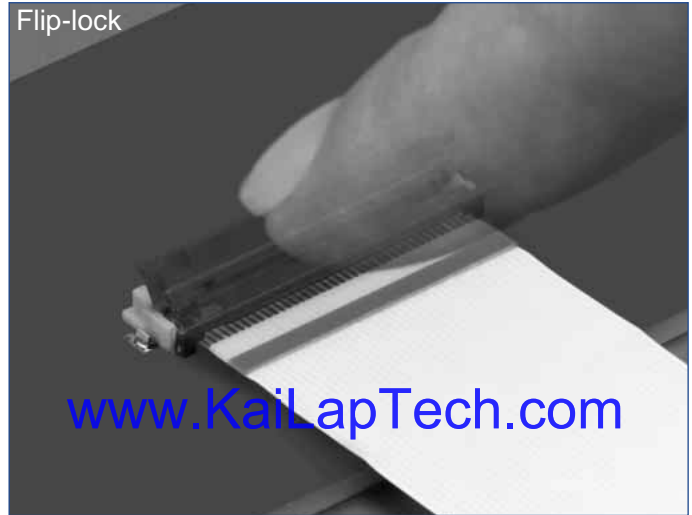
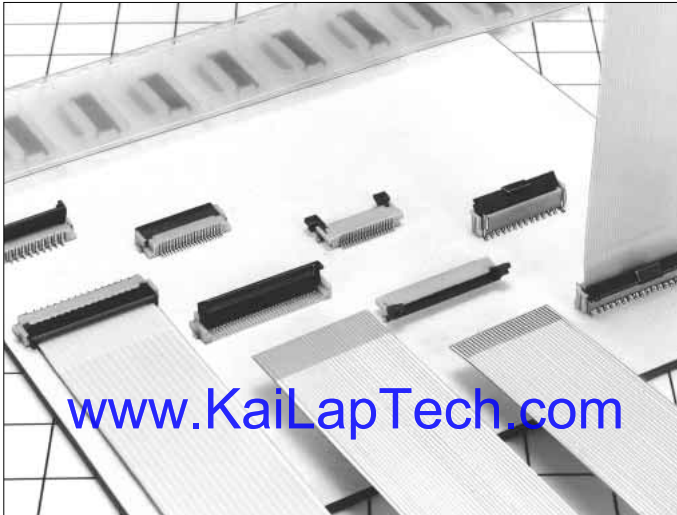


Figure 1. Typical application circuit

# 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

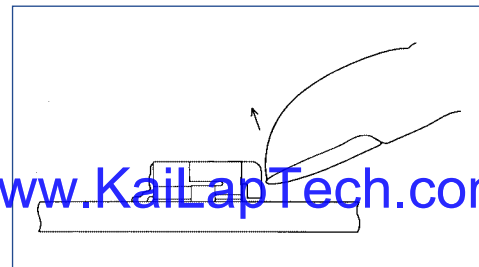
FH12 is offered in Top & Bottom Contact and Vertical Mount and offered in both a 0.5mm contact pitch as well as a 1.0mm contact pitch (bottom contact only).

### ■ Applications

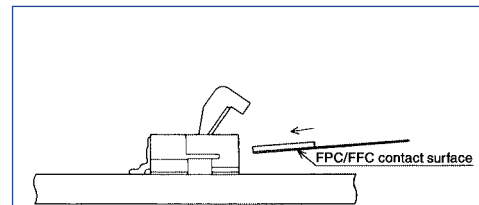
Notebook computers, printers, PDAs, digital cameras and other compact devices for interconnecting the main circuit board with the LCD, HDD or other device.

#### Rotating One-touch Mechanism

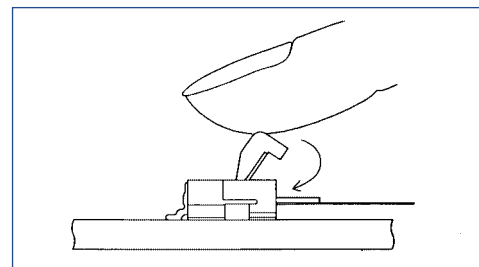
①



②



③





## 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

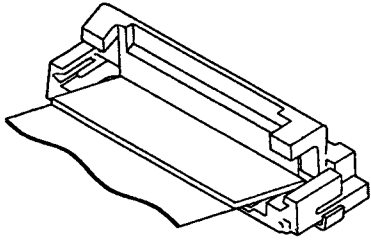
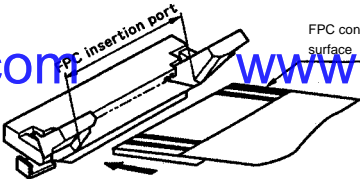
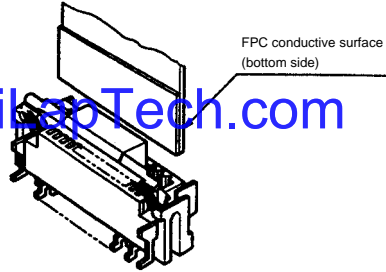
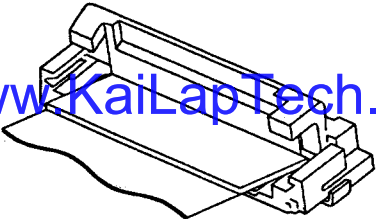
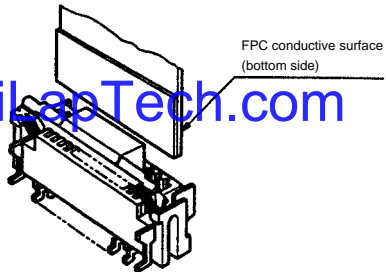
**FH12** **A** - **10** **(4)** - **S** **A** - **0.5** **SH** **(55)**

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  |

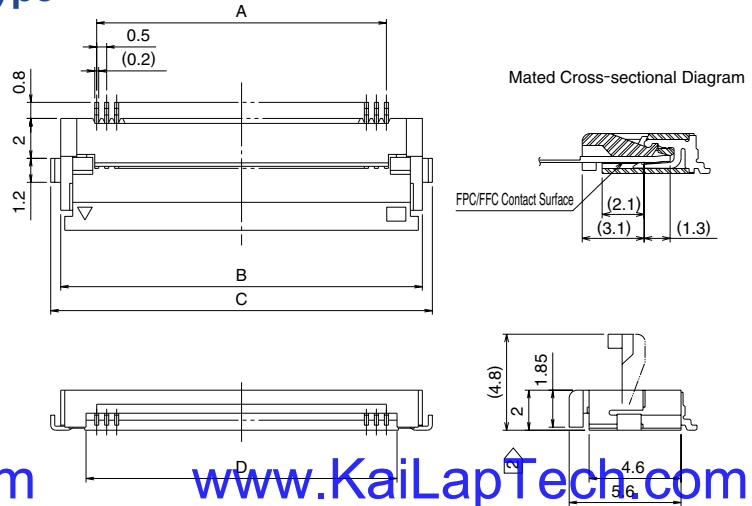
**FH12 Series 0.5mm and 1mm Pitch Connectors For FPC/FPC**

**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>  |  <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>Type with Strengthened Lock Lever</p>   |   |   |
|       | <p><b>FH12S- ** S-0.5SH</b> <b>P.13</b></p> <p>Number of contacts 30, 40, 45, 50, 53</p> <p>Type with 0.18mm FPC End Thickness</p>   |   |   |
|       | <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>   |   |   |
| 1mm   |  <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



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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)        | 586-0523-0-55 | 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.

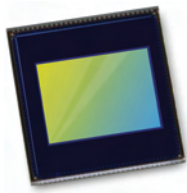
Note ② : If there is no problem with the connector height, we recommend the type with the strengthened Flip-lock actuator (FH12S-\*S-0.5SH).  
 Standard type connector height: 2 mm  
 Connector height of type with strengthened Flip-lock actuator: 2.4 mm

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# OV8858 8MP product brief



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available in a lead-free package

## Cost-Effective 1/4-Inch 8-Megapixel Image Sensor with Video-in-Video Support for Mainstream Mobile Devices

OmniVision's OV8858 is a 1/4-inch 8-megapixel PureCel® image sensor for the rapidly growing mainstream smartphone and tablet market. The compact and cost-effective OV8858 sensor delivers dramatically reduced power consumption and best-in-class performance, making it a highly competitive solution for the next-generation of mobile devices.

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Compared to OmniVision's previous-generation 1/4-inch 8-megapixel sensor, the OV8858 delivers a number of performance enhancements, including dramatically improved full-well capacity (FWC) and sensitivity for enhanced high- and low-light performance. It also offers a significant reduction in power consumption and form factor.

The sensor also features OmniVision's Video-in-Video (ViV®) technology, which stitches together images from the front- and rear-cameras, applies enhancements such as independent lens correction and color compensation, and sends the combined image to the host ISP. In ViV mode, users can capture a portrait scene perfectly alongside their own face, record video while narrating for

high quality video blogging, or utilize the feature for video conferencing. This is made possible by a special input MIPI receiver on the OV8858 that can accept image data from a wide range of OmniVision image sensors designed for front-facing applications of 2-megapixel and below, thus saving a camera port on the host ISP.

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The OV8858 supports an active array of 3264 x 2448 pixels (8-megapixel) operating at 30 frames per second (fps) for zero shutter lag, enabling high-speed photography. The sensor is capable of recording 1080p high definition (HD) video at 60 fps, or 720p HD video at 90 fps, each with additional pixels for electronic image stabilization (EIS). The OV8858, when paired with OmniVision's latest 2-megapixel sensors, can provide full resolution ViV snapshot images at 15 fps and preview ViV video at 30 fps.

The OV8858 fits into an 8.5 x 8.5 mm camera module with a build height of approximately 4 mm.

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



## Applications

- Cellular Phones
- Tablets
- PC Multimedia

## Product Features

- 1.12  $\mu\text{m}$  x 1.12  $\mu\text{m}$  pixel
- optical size of 1/4"
- 32.9° CRA for -4 mm Z-height
- programmable controls for:
  - frame rate
  - mirror and flip
  - cropping
  - windowing
- supports image sizes:
  - QVGA (320x240)
  - VGA (640x480)
  - 3MP (1280x1024)
  - 5MP (2560x1920)
  - EIS 1080p (2112x1188)
  - 1080p (1920x1080)
  - EIS 720p (1408x792), and more
- 8MP at 30 fps (720 Mbps/4-lane or 10-8 DPCM 1.104 Gbps/2-lane)
- two on-chip phase lock loops (PLLs)
- two-wire serial bus control (SCCB)
- built-in temperature sensor
- frame exposure mode for still image (with mechanical shutter)
- 4k bits of embedded one-time programmable (OTP) memory for customer use
- supports Video-in-Video (ViV\*) mode using an on-chip 1-lane MIPI receiver and a secondary sensor
- special ViV features include:
  - ViV video at up to 30 fps
  - ViV starts at up to 12 fps
  - arbitrary positions and shapes for ViV window
  - separate AWB compensation for secondary sensor, and more
- image quality control:
  - defect pixel correction
  - automatic black level calibration
  - lens shading correction
  - alternate row HDR
- suitable for module size of 8.5 x 8.5 x -4 mm

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# OV8858



## Ordering Information

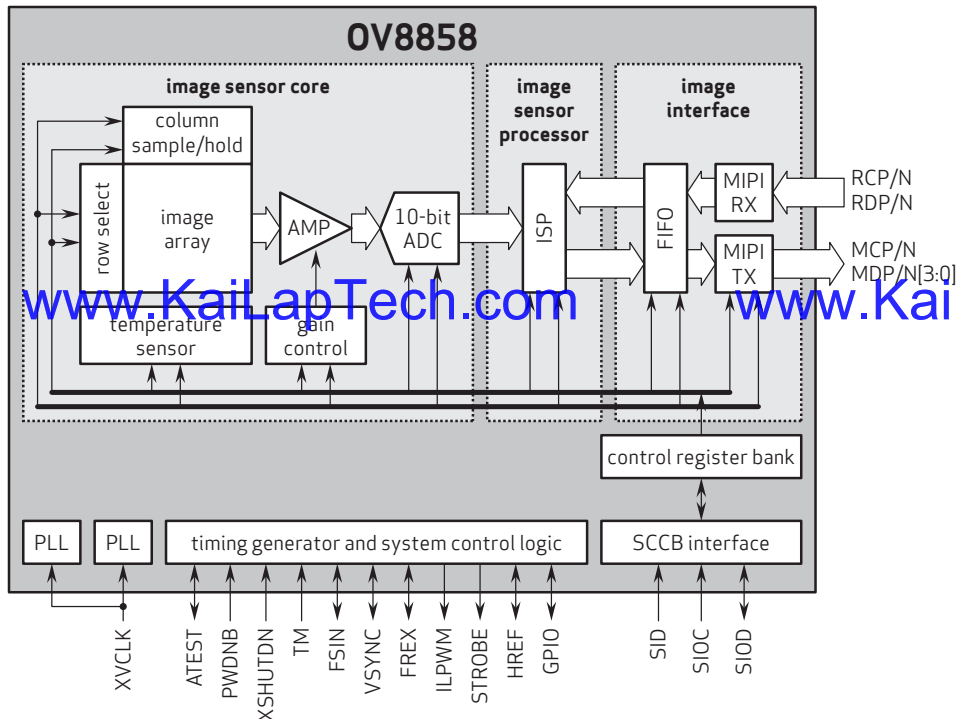
- OV08858-G04A**  
(color, chip probing, 200  $\mu\text{m}$  backgrinding, reconstructed wafer with good die)

## Product Specifications

- active array size:** 3264 x 2448
- input clock frequency:** 6 - 27 MHz
- power supply:**
  - analog: 2.6 to 3.0V (2.8V nominal)
  - core: 1.14 to 1.26V (1.2V nominal)
  - I/O: 1.7 to 3.0V (1.8V or 2.8V nominal)
- max S/N ratio:** 35.8 dB
- dynamic range:** 64.4 dB @ 8x gain
- power requirements:**
  - active: 153 mW
  - standby: 160  $\mu\text{W}$
  - XSHUTDOWN: 0.3  $\mu\text{W}$
- temperature range:**
  - operating: -30°C to +85°C junction temperature
  - stable image: 0°C to +60°C junction temperature
- output formats:** up to 4-lane MIPI serial output
- output formats:** 10-bit RAW RGB data
- lens chief ray angle:** 32.9° non-linear
- lens size:** 1/4"
- maximum image transfer rate:**
  - 3264 x 2448: 30 fps
  - 3264 x 1836: 30 fps
  - 2112 x 1184: 60 fps
  - 1920 x 1080: 60 fps
  - 1408 x 792: 90 fps
- sensitivity:** 486 mV/Lux-sec
- scan mode:** progressive
- pixel size:** 1.12  $\mu\text{m}$  x 1.12  $\mu\text{m}$
- dark current:** 17 e-/sec @ 60°C junction temperature
- image area:** 3678.3  $\mu\text{m}$  x 2767.68  $\mu\text{m}$
- die dimensions:**
  - COB: 5040  $\mu\text{m}$  x 4590  $\mu\text{m}$
  - RW: 5090  $\mu\text{m}$  x 4640  $\mu\text{m}$

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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  |         |        |       |            |        |           |         |
| VREF 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 for VCM driver              |         |        |       |            |        |           |         |
| <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                                 |         |        |       |            |        |           |         |





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## 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<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                                 |
| 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 |  |

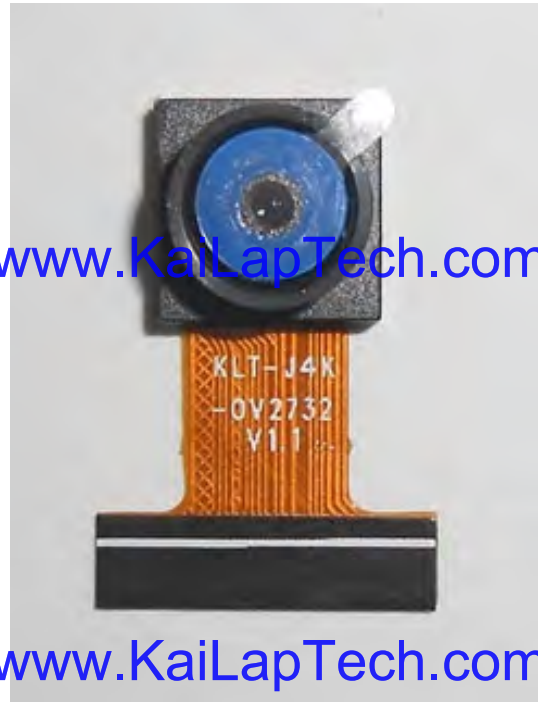


## KLT Package Solutions

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



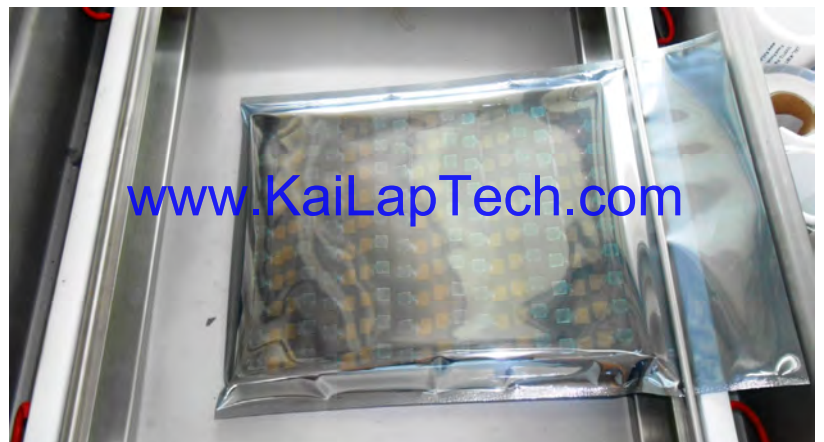
Cover Tray with Lid



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







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## Large Order Package Solution

Place Foam Sheets Between Trays

Foam Sheets are Slightly Larger than Trays



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Place Foam Sheets and Trays into Box

Foam Sheets are Tightly Fitting Box



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## Small Order Package Solution

Place Foam Sheets and Trays into Small Box



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Package in Small Box for Shipment

Foam Sheets are Nicely Fitting the Small Box



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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.

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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](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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## KLT Strength

### Powerful Factory



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