



## KLT-L9MF-OV13855 V1.0

### 13MP OmniVision OV13855 MIPI Interface M12 Fixed Focus Camera Module



Front View



Back View

#### Specifications

|                          |                                       |
|--------------------------|---------------------------------------|
| Camera Module No.        | KLT-L9MF-OV13855 V1.0                 |
| Resolution               | 13MP                                  |
| Image Sensor             | OV13855                               |
| Sensor Type              | 1/3.06"                               |
| Pixel Size               | 1.12 um x 1.12 um                     |
| EFL                      | 2.27 mm                               |
| F.NO                     | 2.40                                  |
| Pixel                    | 4224 x 3136                           |
| View Angle               | 152.0°(DFOV) 122.0°(HFOV) 93.0°(VFOV) |
| Lens Dimensions          | 13.00 x 13.00 x 21.62 mm              |
| Module Size              | 40.05 x 22.00 mm                      |
| Module Type              | Fixed Focus                           |
| Interface                | MIPI                                  |
| Auto Focus VCM Driver IC | None                                  |
| Lens Model               | KLT-LENS-YM6081                       |
| Lens Type                | 650nm IR Cut                          |
| Operating Temperature    | -30°C to +85°C                        |
| Mating Connector         | DF30FC-30DS-0.4V                      |



## KLT-L9MF-OV13855 V1.0

### 13MP OmniVision OV13855 MIPI Interface M12 Fixed Focus Camera Module



Top View



Side View

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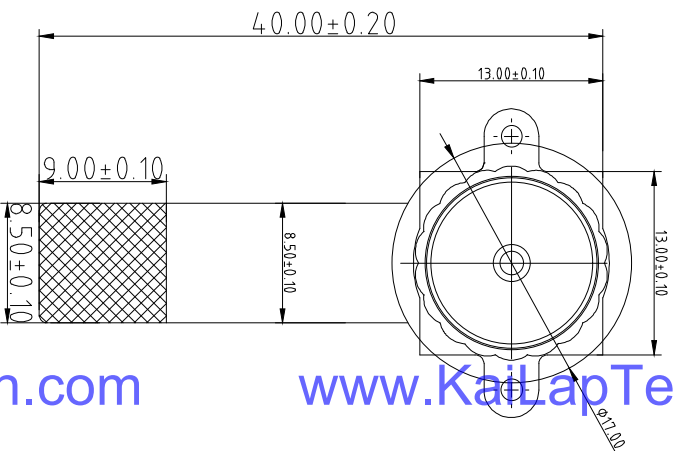
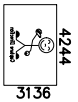
Bottom View



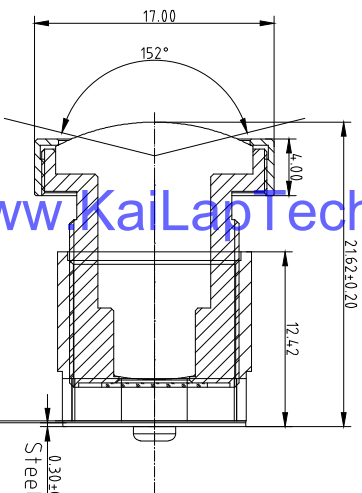
Mating Connector

# ROHS

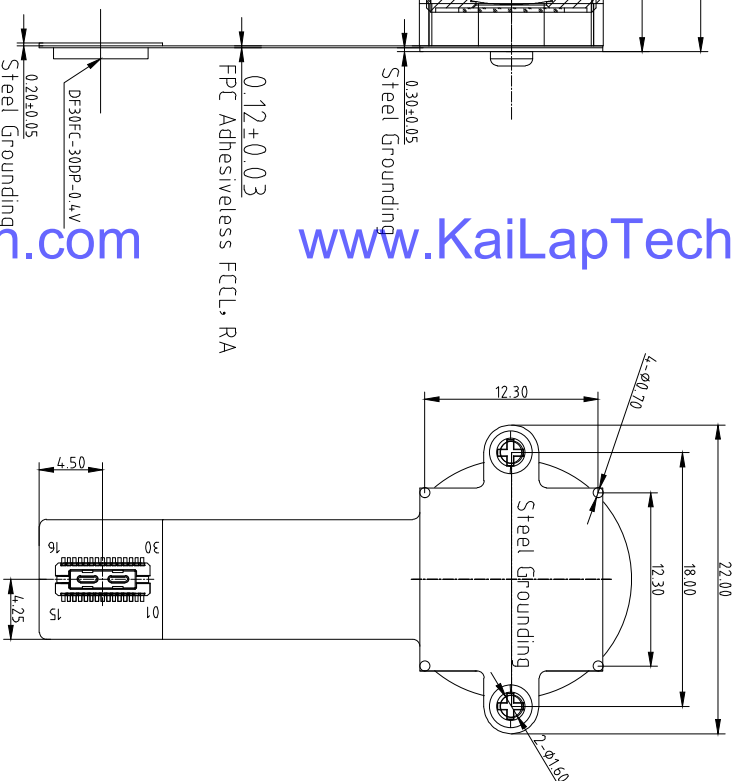
|    |           |
|----|-----------|
| NO | SIGNAL    |
| 1  | FSIN      |
| 2  | VSIN      |
| 3  | AGND      |
| 4  | AVDD2.8V  |
| 5  | DGND      |
| 6  | DVDD1.2V  |
| 7  | DVDD1.8V  |
| 8  | SDA       |
| 9  | SCL       |
| 10 | DGND      |
| 11 | DGND      |
| 12 | XSHUTDOWN |
| 13 | DGND      |
| 14 | MCLK      |
| 15 | DGND      |
| 16 | MDNO      |
| 17 | MDDPO     |
| 18 | DGND      |
| 19 | MCP       |
| 20 | MCN       |
| 21 | DGND      |
| 22 | MDN1      |
| 23 | MDDP1     |
| 24 | DGND      |
| 25 | MDN2      |
| 26 | MDDP2     |
| 27 | DGND      |
| 28 | MDN3      |
| 29 | MDDP3     |
| 30 | STD       |



TOP VIEW



SIDE VIEW



BOTTOM VIEW

## 2. Lens specification:

FOV: 152°(D), 122°(H), 93°(V)  
 F/#: 2.4  
 TV distortion: <-15%  
 Focal length: 2.27mm  
 Composition: 6G

## Parameters:

### 1. Sensor specification:

Image Sensor: OV13855  
 Pixel: 1.12umx1.12um  
 Lens Type: 1/3.06  
 Important Voltage Description: DVDD1.2V (external power supply);

| Version | Mark | Information   | Date       |
|---------|------|---------------|------------|
| V1.0    | PD   | First Version | 27-06-2019 |
|         |      |               |            |

Kai Lap Technologies Group Ltd

Designed By

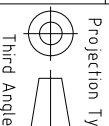
Kevin

Model Name:

KLT-L9MF-OV13855 V1.0

Checked By

Alouy Yan



Unit: mm

Scale: 1:1

Sheet: 1 of 1

Version: 1/0

A

B

C

D

E

3

2

1

3

2

1



Lens Model: KLT-LENS-YM6081

| No.       | ITEM   | SPECIFICATION   |
|-----------|--|---|
| 1         | 孔径 (EFL)                                     | 2.25mm  |
| 2         | 光学后焦 (BFL)                                   | 3.94mm (IR0.21mm)   |
| 3         | 机械后焦 (MFL)                                   | 4.37mm (IR0.21mm)   |
| 4         | 光学总长 (TTL)                                   | 2.20mm (IR0.21mm)   |
| 5         | 光瞳 (FNo)                                     | 2.8   |
| 6         | 最大像面/机械像面 (C/cM)                             | 6.54IR  |
| 7         | 光学材料 (Structure)                             | M12xP0.5  |
| 8         | 光学涂层 (Special Transmitt)                     | Trans=99.9%   |
| 9         | 光轴歪扭率 (Special Transmitt)                    | IMX214  |
| Sensor    |  |   |
| 视场角 (FOV) |  | Vertical 89.1°<br>Horizontal 130.0°<br>Diagonal 149.4°<br>(y=2.857) |
| 11        | 光学公差 (Optical Dimension)                     | -64.3%  |
| 12        | 制程公差 (Process T)                             | 65.3%   |
| 13        | 主光线角度 (CRA)                                  | 29.7°   |
| 14        | R FILTER SPEC (Built-in Other's spec as req) |   |

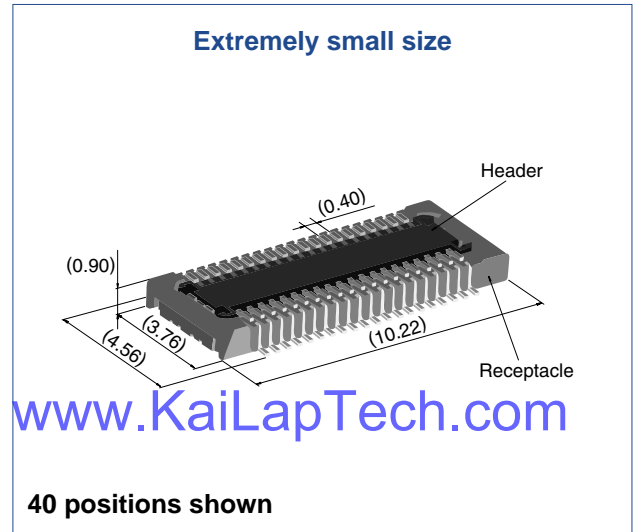
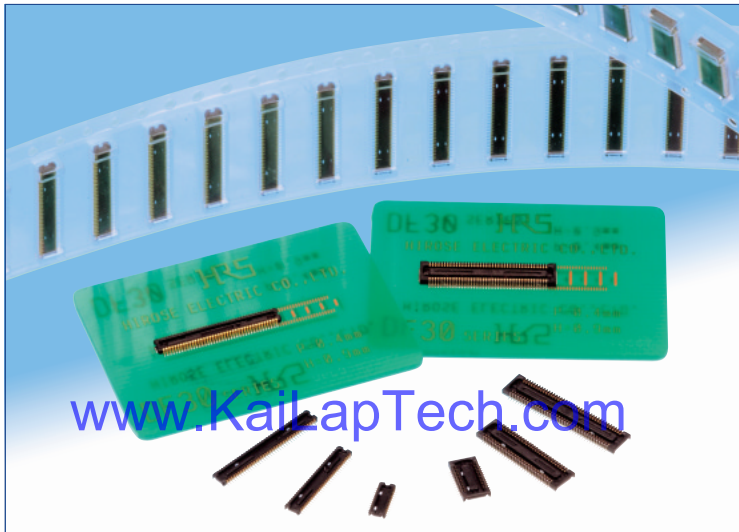
|    |    |          |       |    |       |
|----|----|----------|-------|----|-------|
| 设计 | 处数 | 分区       | 更改文件号 | 签名 | 年、月、日 |
| 审核 |    | 20210427 | 标准化   |    |       |
| 工艺 |    |          | 批准    |    |       |

|      |      |
|------|------|
| 阶段标记 | 重量比例 |
|      | 1:1  |
| 共    | 张    |
| 第    | 张    |

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

## DF30 Series



### Overview

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

### Features

- 1. Contact reliability**  
Concentration of the contact's normal forces at the single point assures good contact wipe and electrical reliability, while confirming the fully mated condition with a definite tactile click.
- 2. Self alignment**  
Recognizing the difficulties of mating extremely small connectors in limited spaces the connectors will self align in horizontal axis within 0.3 mm.
- 3. Automatic board placement**  
Packaged on tape-and-reel the plug and headers have sufficiently large flat areas to allow pick-up with vacuum nozzles of automatic placement equipment.
- 4. Variety of contact positions and styles**  
Available in standard contact positions of: 20, 22, 24, 30, 34, 40, 50, 60, 70 and 80 with and without metal fittings. Addition of metal fittings does not affect external dimensions of the connectors. Smaller contact positions are also available.
- 5. Support for continuity test connector**  
Connectors which have increased insertion and removal durability are available for continuity tests. Contact your Hirose sales representative for details.

### Applications

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



## Product Specifications

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

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

Note 1: Includes temperature rise caused by current flow.

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

## Materials and Finishes

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

## Ordering information

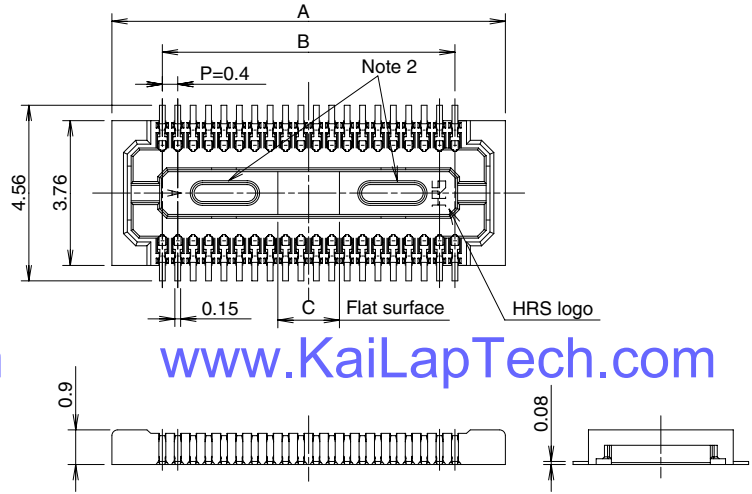
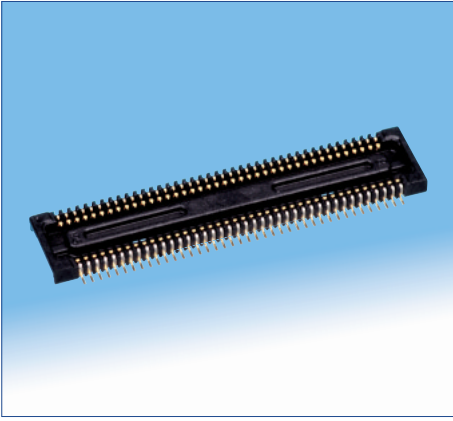
### Receptacles and Headers

DF30 FC - \* DS - 0.4 V (\*\*)

1 2 3 4 5 6 7

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

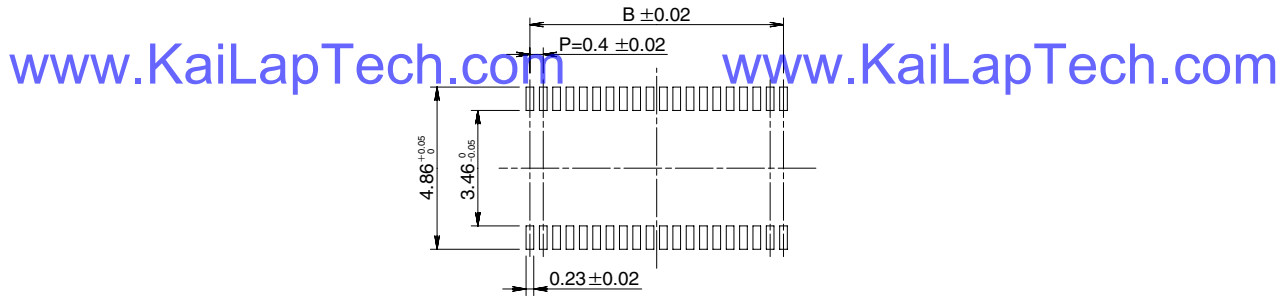
## ■ Receptacles (without metal fittings)



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## ◆ Recommended PCB mounting pattern



Recommended solder paste thickness: 120  $\mu$ m

[www.KaiLapTech.com](http://www.KaiLapTech.com) [Specification number] -\*\*, (\*\*)  
(81): Embossed tape packaging (5 000 pieces per reel) [www.KaiLapTech.com](http://www.KaiLapTech.com)

\* Tolerances non- accumulative.

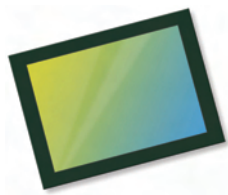
Unit: mm

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

Note 1: Order by number of reels.

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





# OV13855 13MP product brief



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## 13-Megapixel PureCel®Plus Sensor Brings High-End Imaging Capabilities to Mainstream Smartphones



available in  
a lead free  
package

OmniVision's high performance OV13855 is a 13-megapixel PureCel Plus image sensor designed to bring high-quality imaging to rear-facing camera applications in mainstream smartphones. It is also well-suited for front-facing and dual camera applications in high-end mobile devices. In addition to best-in-class pixel performance, this third generation 13-megapixel sensor also offers advanced features, such as phase detection autofocus (PDAF).

Built on OmniVision's PureCel®Plus pixel technology, the OV13855 delivers significant improvements in low-light performance, color crosstalk reduction, and angular response when compared with previous-generation 13-megapixel sensors. The OV13855 captures full-

resolution 13-megapixel still images at 30 frames per second (fps) and records ultra-high resolution 4K2K video at 30 fps or 1080p full high definition (HD) at 60 fps.

The OV13855 fits in 8.5 x 8.5 mm autofocus modules with z-heights of less than 5 mm for rear cameras, and 7.5 x 7.5 mm fixed focus modules with z-heights of less than 4.5 mm for high-end front-facing cameras. The sensor is available in non-PDAF (OV13858) and monochrome (OV13355) versions for front-facing and dual camera applications.

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





## Applications

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

## Product Features

- 1.12  $\mu\text{m}$  x 1.12  $\mu\text{m}$  pixel
- optical size of 1/3.06"
- 33.15° CRA
- support for PDAF
- 13MP at 30 fps
- programmable controls for:
  - frame rate
  - mirror and flip
  - cropping
  - windowing
- supports images sizes:
  - 13MP (4224x3136)
  - 10MP (4224x2376)
  - 3MP (2112x1568), and more
- total embedded one-time programmable (OTP) memory: 1024 bytes, 416 bytes for customer use, remaining bytes for internal use
- support for output formats: 10-bit RGB RAW
- interlaced row HDR output
- two-wire serial bus control (SCCB)
- MIPI serial output interface (1-, 2-lane, or 4-lane)
- two on-chip phase lock loops (PLLs)
- 2x binning support
- image quality controls:
  - defect pixel correction
  - automatic black level calibration
  - lens shading correction
- built-in temperature sensor
- suitable for module size of 8.5 x 8.5 x <5 mm

# OV13855



## Ordering Information

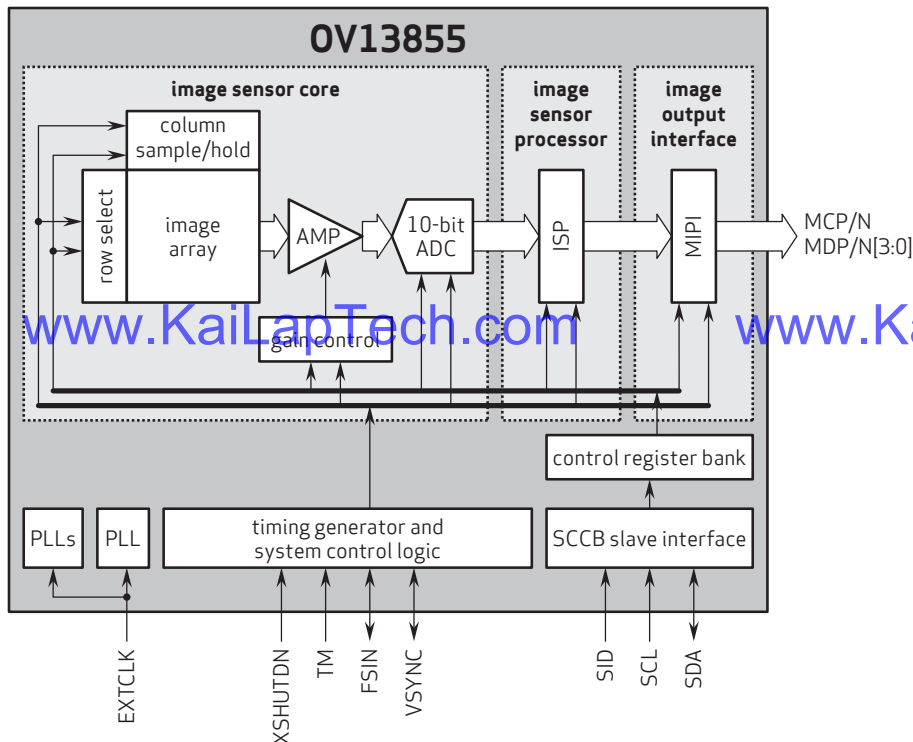
- OV13855-GA5A-2A (color, chip probing, 150  $\mu\text{m}$  backgrinding, reconstructed wafer)

## Product Specifications

- active array size: 4256 x 3168
- lens chief ray angle: 33.15° non-linear
- power supply:
  - analog: 2.7 - 3.0V (2.8V nominal)
  - core: 1.14 - 1.26V (1.2V nominal)
  - I/O: 1.7 - 1.9V (1.8V nominal)
- power requirements:
  - active: 233 mW (based on ISP ON)
  - standby: 1 mW
  - XSHUTDOWN: <10  $\mu\text{A}$
- temperature range:
  - operating: -30°C to +85°C junction temperature
  - stable image: 0°C to +60°C junction temperature
- output interfaces: 4-lane MIPI serial output
- output formats: 10-bit RGB RAW
- lens size: 1/3.06"
- input clock frequency: 6 - 64 MHz
- maximum image transfer rate:
  - 13MP (4224x3136): 30 fps
  - 10MP (4224x2376): 30 fps
  - 3MP (2112x1568): 60 fps
- sensitivity: 3000 e<sup>-</sup>/Lux-sec
- max S/N ratio: 36.5 dB
- dynamic range: 65 dB @ 1x gain
- minimum exposure: 4-row
- maximum exposure: VTS-8
- pixel size: 1.12  $\mu\text{m}$  x 1.12  $\mu\text{m}$
- image area: 4749.70  $\mu\text{m}$  x 3535.49  $\mu\text{m}$
- die dimensions:
  - COB: 5868  $\mu\text{m}$  x 4950  $\mu\text{m}$
  - RW: 5918  $\mu\text{m}$  x 5000  $\mu\text{m}$

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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  |         |        |       |            |        |           |         |
| HREF XHS                      |      | DVP HREF output   |         |        |       |            |        |           |         |
| DOVDD                         |      | power for I/O circuit                                   |         |        |       |            |        |           |         |
| AFVDD                         |      | power for VCM circuit                                   |         |        |       |            |        |           |         |
| AVDD                          |      | power for analog circuit                                |         |        |       |            |        |           |         |
| DVDD                          |      | power for digital circuit                               |         |        |       |            |        |           |         |
| STROBE FSTROBE                |      | strobe output   |         |        |       |            |        |           |         |
| FSIN                          |      | synchronize the VSYNC signal from the other sensor      |         |        |       |            |        |           |         |
| SID                           |      | SCCB last bit ID input                                  |         |        |       |            |        |           |         |
| ILPWM                         |      | mechanical shutter output indicator                     |         |        |       |            |        |           |         |
| FREQ                          |      | frame exposure / mechanical shutter                     |         |        |       |            |        |           |         |
| GPIO                          |      | general purpose inputs                                  |         |        |       |            |        |           |         |
| SLASEL                        |      | I2C slave address select                                |         |        |       |            |        |           |         |
| AFEN                          |      | CEN chip enable active high on VCM driver IC            |         |        |       |            |        |           |         |
| <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                                 |         |        |       |            |        |           |         |



your **BEST** camera module partner

## Cameras Applications



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## Camera Reliability Test

| Reliability Inspection Item |  | Testing Method  | Acceptance Criteria     |                         |
|-----------------------------|--|---|-------------------------|-------------------------|
| Category                    | Item   |   |                         |                         |
| Environmental               | Storage Temperature                                      | High 60°C 96 Hours  | Temperature Chamber     | No Abnormal Situation   |
|                             |  | Low -20°C 96 Hours  | Temperature Chamber     | No Abnormal Situation   |
|                             | Operation Temperature                                    | High 60°C 24 Hours  | Temperature Chamber     | No Abnormal Situation   |
|                             |  | Low -20°C 24 Hours  | Temperature Chamber     | No Abnormal Situation   |
|                             | Humidity   | 60°C 80% 24 Hours   | Temperature Chamber     | No Abnormal Situation   |
|                             | Thermal Shock  | High 60°C 0.5 Hours<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 |



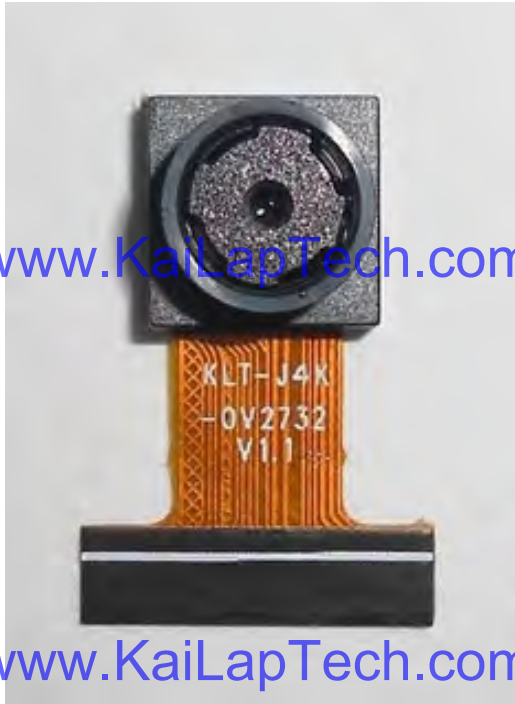


| Inspection Item  |          | Inspection Method | Standard of Inspection      |  |
|------------------|----------|-------------------|-----------------------------|--|
| Category         | Item     |                   |                             |  |
| Appearance       | FPC/ PCB | Color             | 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 |  |

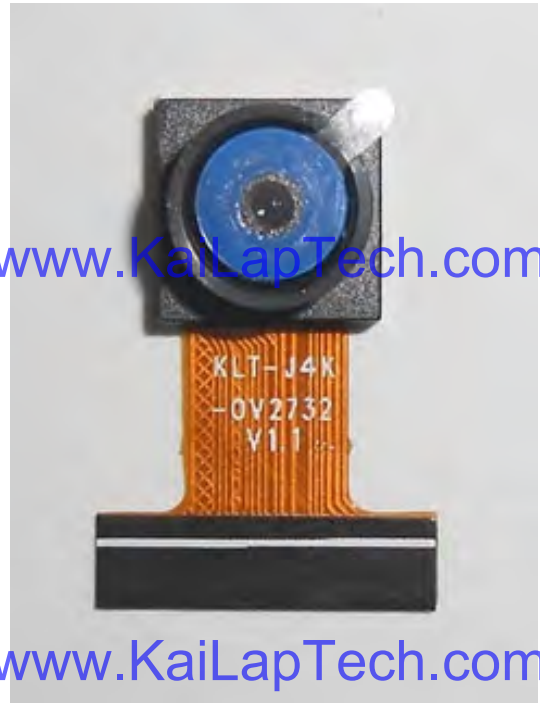


## KLT Package Solutions

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



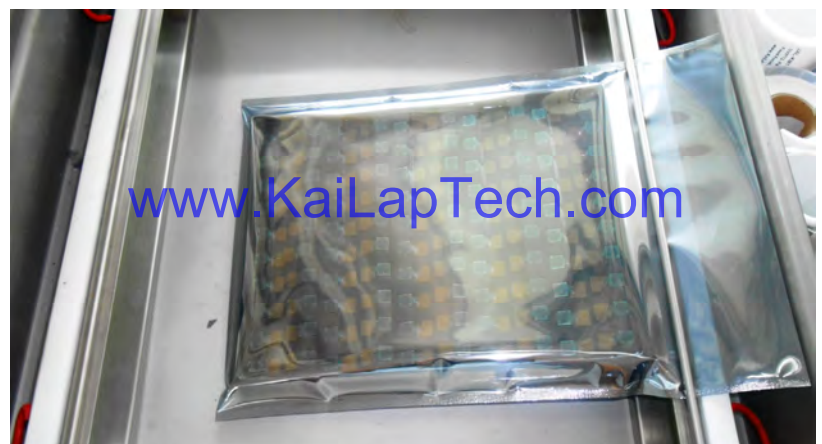
Cover Tray with Lid



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

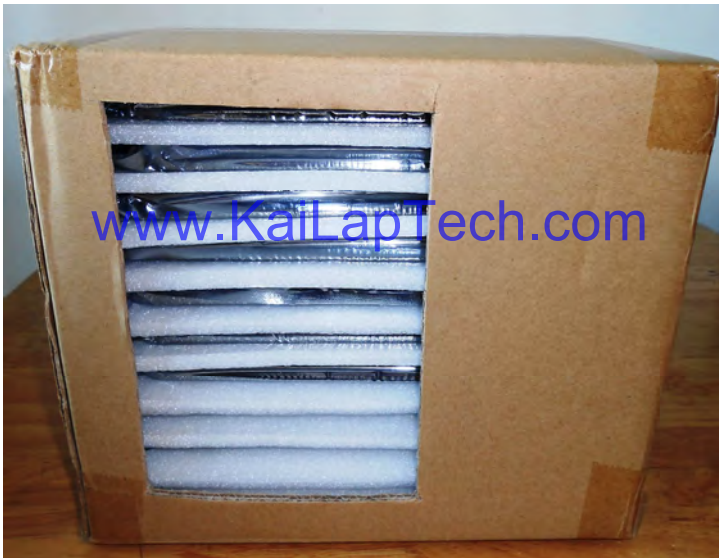


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Place Foam Sheets and Trays into Box

Foam Sheets are Tightly Fitting Box



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## Small Order Package Solution

Place Foam Sheets and Trays into Small Box

Foam Sheets are Nicely Fitting the Small Box



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Package in Small Box for Shipment

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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