

**KLT-MFA84-OV12895 V1.0****12MP OmniVision OV12895 MIPI Interface M12 Fixed Focus Camera Module**

Front View



Back View

**Specifications**

|                                 |                                         |
|---------------------------------|-----------------------------------------|
| <b>Camera Module No.</b>        | <b>KLT-MFA84-OV12895 V1.0</b>           |
| <b>Resolution</b>               | 12MP                                    |
| <b>Image Sensor</b>             | OV12895                                 |
| <b>Sensor Type</b>              | 1/2.3"                                  |
| <b>Pixel Size</b>               | 1.55 $\mu\text{m}$ x 1.55 $\mu\text{m}$ |
| <b>EFL</b>                      | 3.00 mm                                 |
| <b>F.NO</b>                     | 2.40                                    |
| <b>Pixel</b>                    | 4096 x 3072                             |
| <b>View Angle</b>               | 160.0°(DFOV) 125.0°(HFOV) 92.0°(VFOV)   |
| <b>Lens Dimensions</b>          | 14.80 x 14.80 x 21.82 mm                |
| <b>Module Size</b>              | 50.00 x 23.00 mm                        |
| <b>Module Type</b>              | Fixed Focus                             |
| <b>Interface</b>                | MIPI                                    |
| <b>Auto Focus VCM Driver IC</b> | None                                    |
| <b>Lens Type</b>                | 415-650nm IR Cut                        |
| <b>Operating Temperature</b>    | -30°C to +85°C                          |
| <b>Mating Connector</b>         | AXE540124                               |

**KLT-MFA84-OV12895 V1.0****12MP OmniVision OV12895 MIPI Interface M12 Fixed Focus Camera Module**

Top View



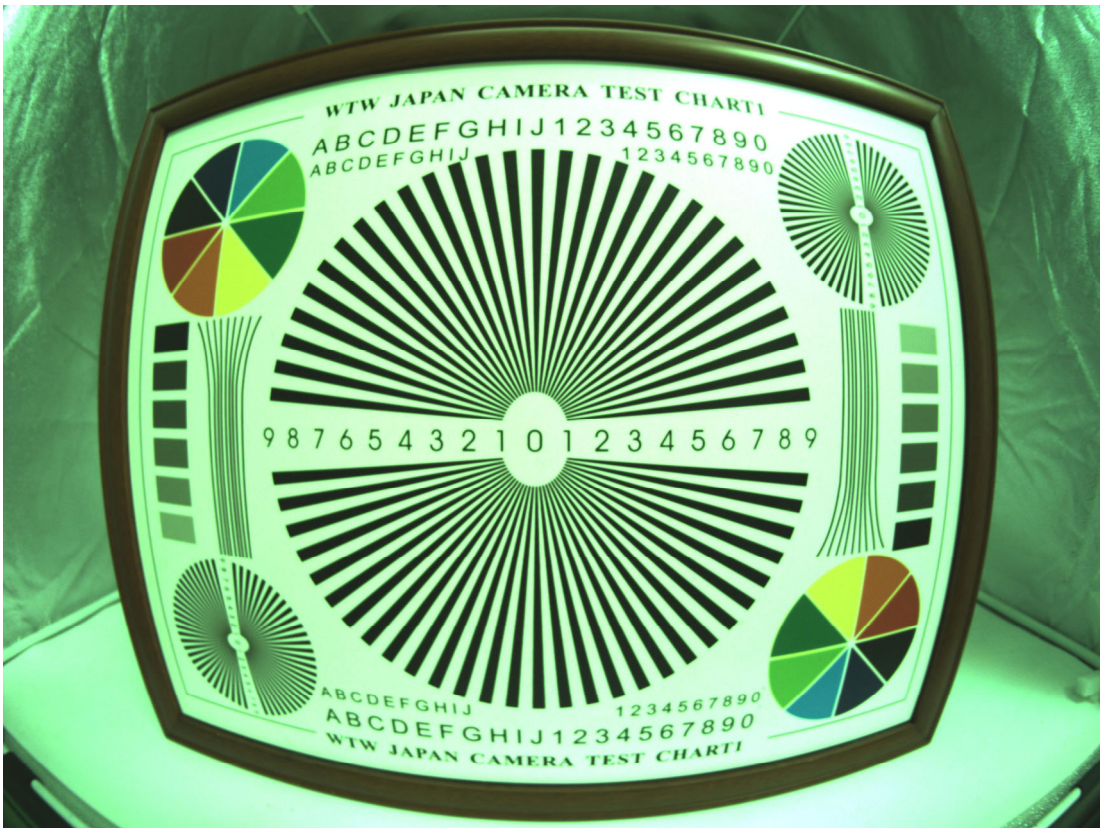
Side View



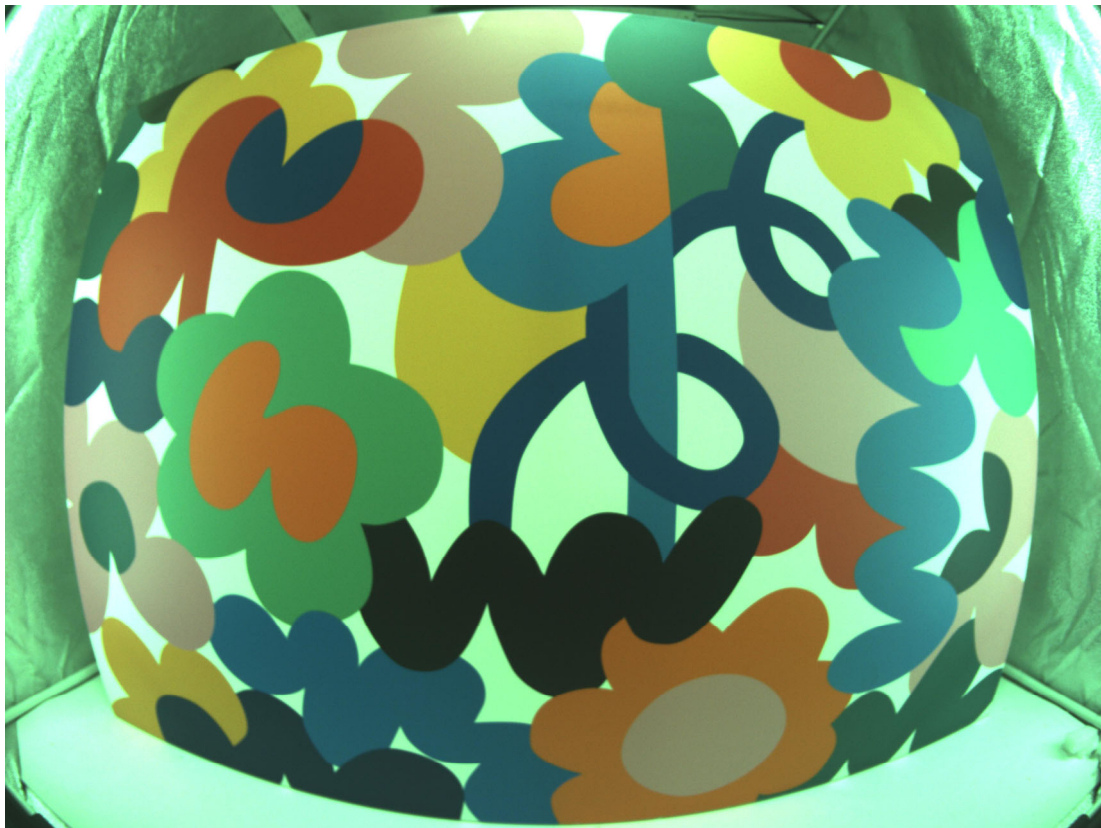
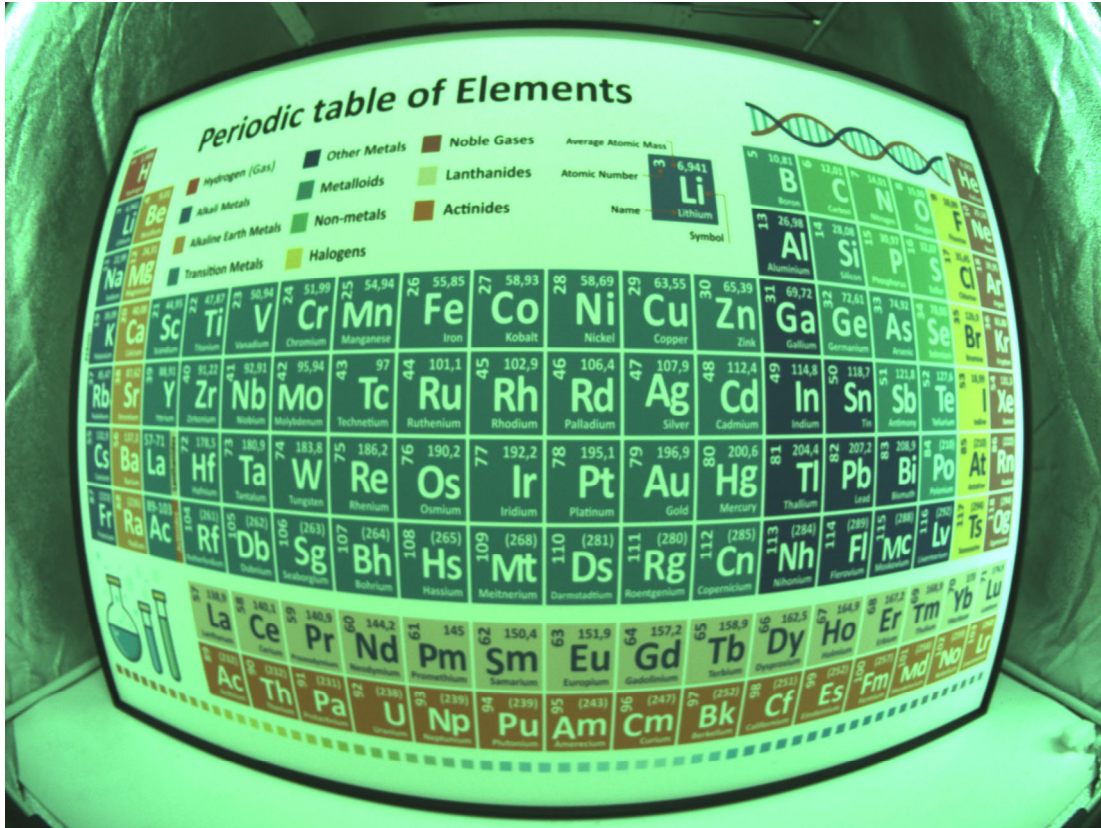
Bottom View



Mating Connector

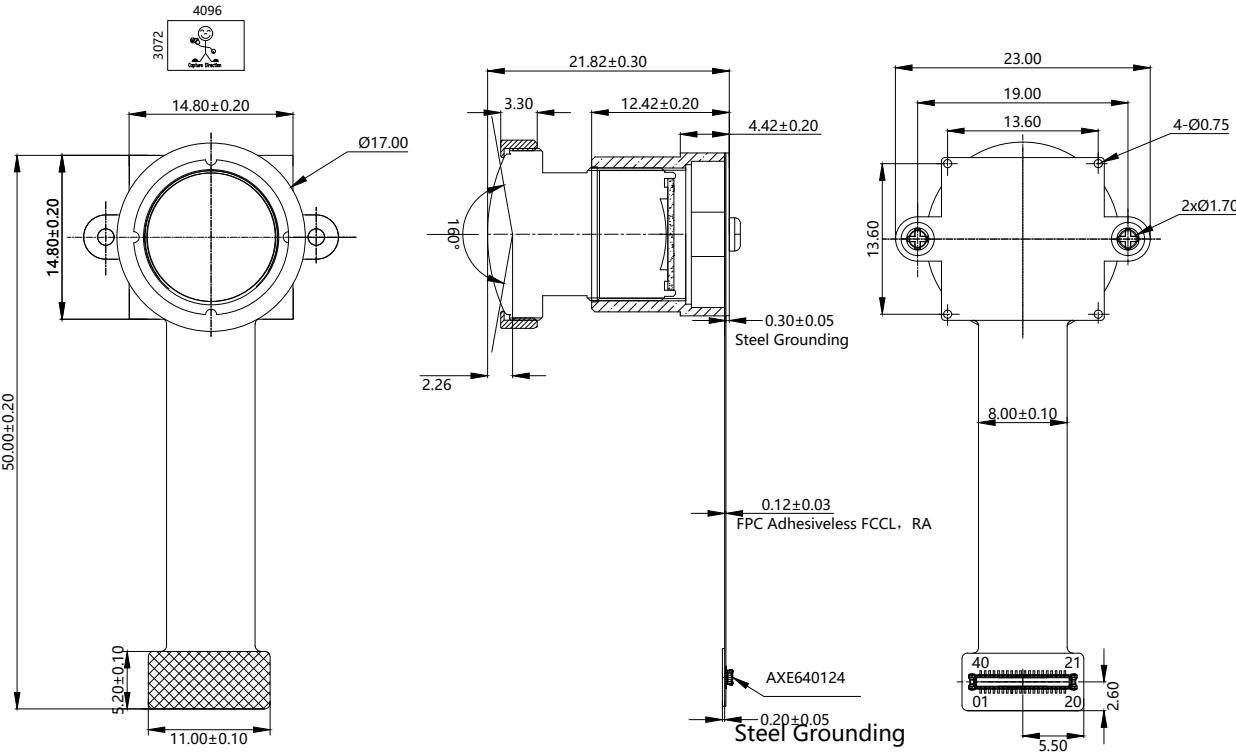






RoHS

| PIN | SIGNAL    |
|-----|-----------|
| 1   | XSHUTDOWN |
| 2   | PWDNB     |
| 3   | DGND      |
| 4   | MDP0      |
| 5   | MDN0      |
| 6   | DGND      |
| 7   | MDP1      |
| 8   | MDN1      |
| 9   | DGND      |
| 10  | MDP2      |
| 11  | MDN2      |
| 12  | DGND      |
| 13  | MDP3      |
| 14  | MDN3      |
| 15  | DGND      |
| 16  | MCP       |
| 17  | MCN       |
| 18  | SID       |
| 19  | STROBE    |
| 20  | ILPWM     |
| 21  | FSIN      |
| 22  | FREX      |
| 23  | HREF      |
| 24  | VSYNC     |
| 25  | SCL       |
| 26  | SDA       |
| 27  | DGND      |
| 28  | XVCLK     |
| 29  | DVDD1.2V  |
| 30  | DOVDD1.8V |
| 31  | DGND      |
| 32  | AVDD2.8V  |
| 33  | AGND      |
| 34  | DGND      |
| 35  | NC        |
| 36  | NC        |
| 37  | NC        |
| 38  | NC        |
| 39  | DGND      |
| 40  | DGND      |

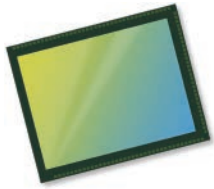


Parameter:

1、Sensor specification:  
Image Sensor: OV12895  
Pixel: 1.55um\*1.55um  
Lens Type: 1/2.3  
Important Voltage Description:  
DVDD1.2V (external power supply);

2、Lens specification:  
FOV: 160°(D),125°(H),92°(V)  
F/NO.: 2.4  
TV distortion: <-15%(V)  
Focal length: 3.0mm  
Composition: 7G+IR FILTER  
IR Cut Coating: 415-650nm $\pm$ 10nm@50%

|             |       |                  |                        |                 |              |
|-------------|-------|------------------|------------------------|-----------------|--------------|
| Designed By | Kevin | Model Name:      | KLT-MFA84-OV12895 V1.0 |                 |              |
| Checked By  | Jacky | Projection Type: | Unit: mm               | Date: 2/25/2025 |              |
|             |       | Third Angle      | Scale: 1:1             | Sheet: 1 of 1   | Version: 1/0 |



# OV12895 12MP product brief



available in  
a lead-free  
package

## 12-Megapixel PureCel®Plus-S Sensor for High-End Consumer Drones and Action Cameras

OmniVision's OV12895 is a high-speed PureCel®Plus-S image sensor that brings 4K2K video and 12-megapixel images to consumer-grade drones, surveillance systems, and 360-degree action cameras. Leveraging a 1.55-micron pixel, the OV12895 captures stunning still images using 10-bit or optional 12-bit readout architecture that provides high-bit depth snapshots.

The OV12895 is built on OmniVision's PureCel®Plus-S stacked-die architecture, featuring backside illumination for ultra-high resolution and crisp, vibrant images across all light levels. The stacked-die structure allows for additional sensor functionality while enabling smaller die sizes compared to non-stacked sensors.

The OV12895 captures ultra-high-resolution 4K2K video at 60 frames per second (fps) and full high-definition (FHD) 1080p videos at 240 fps with full field of view, enabling high-quality slow-motion video capture.

Available in the widely used 1/2.3-inch optical format, the OV12895's low chief ray angle of 5 degrees is suitable for mature lens ecosystems. The sensor currently is available in both RW and CLGA package formats.

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



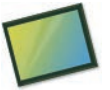
## Applications

- Consumer-grade Drones
- 360-degree Action Cameras
- Surveillance Systems

## Product Features

- 1.55  $\mu\text{m}$  x 1.55  $\mu\text{m}$  pixel
- optical size of 1/2.3"
- 5° CRA
- enhanced dual camera support
- high-speed architecture for fast frames per second (fps)
- programmable controls for:
  - gain
  - exposure
  - frame rate
  - image size
  - horizontal mirror
  - vertical flip
  - cropping
  - panning
  - windowing
- support for image sizes:
  - 12MP (4096x3072)
  - 4K2K (3840x2160)
  - 1080p (1920x1080), and more
- two-wire serial bus control (SCCB)
- strobe output to control flash
- total embedded one-time programmable (OTP) memory: 4096 bytes, 64 bytes for customer use, remaining bytes for internal use
- two on-chip phase lock loops (PLLs)
- image quality controls for:
  - defect pixel correction
  - automatic black level calibration
  - lens shading correction
  - alternate row HDR
- built-in temperature sensor

# OV12895



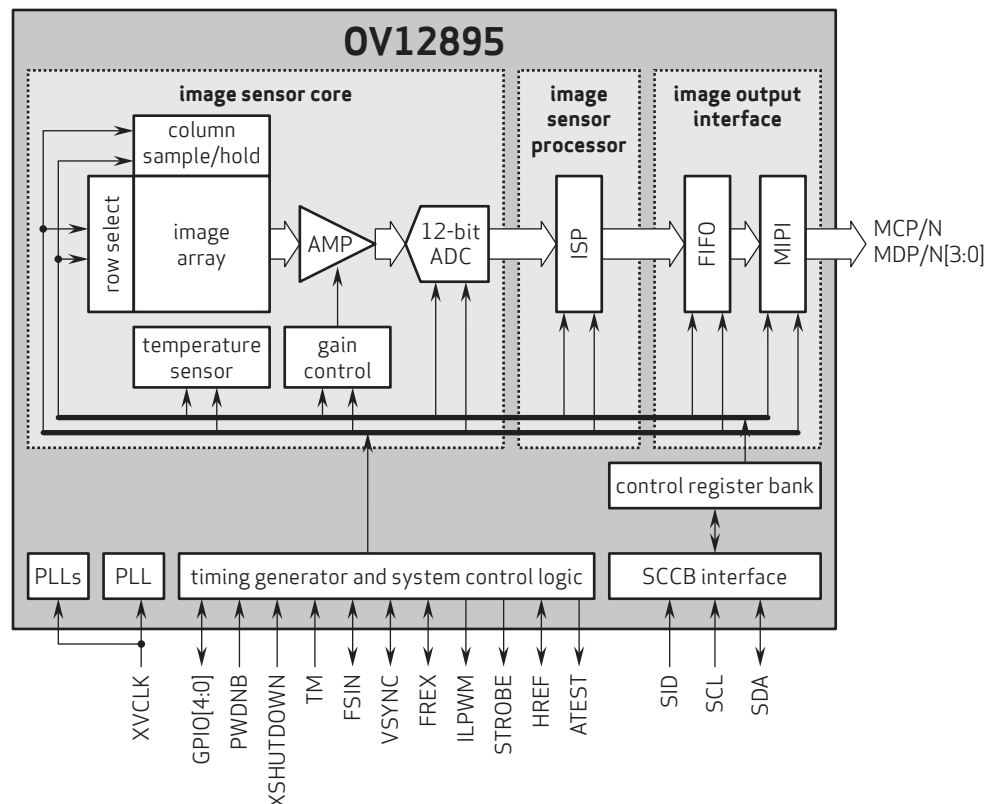
## Ordering Information

- OV12895-GA5A (color, chip probing, 150  $\mu\text{m}$  backgrinding, reconstructed wafer with good die)
- OV12895-C61A (color, lead-free) 161-pin CLGA

## Technical Specifications

- active array size: 4096 x 3072
- maximum image transfer rate:
  - 12MP (12-bit) (4:3): 30 fps
  - 12MP (10-bit) (4:3): 45 fps
  - 4K2K (16:9): 60 fps
  - 1080p HD (crop+bin): 240 fps
- power supply:
  - core: 1.2V
  - analog: 2.8V
  - I/O: 1.8V
- power requirements:
  - active: 320 mW @ full-res, 30 fps, 12-bit
  - XSHUTDOWN: <10  $\mu\text{W}$
- temperature range:
  - operating: -30°C to +85°C junction temperature
  - stable image: 0°C to +60°C junction temperature
- output formats: 10/12-bit RGB RAW, DPCM 10-8 compression
- lens size: 1/2.3"
- lens chief ray angle: 5° linear
- scan mode: progressive
- pixel size: 1.55  $\mu\text{m}$  x 1.55  $\mu\text{m}$
- image area: 6398.4  $\mu\text{m}$  x 4811.2  $\mu\text{m}$

## Functional Block Diagram



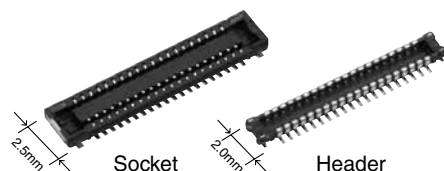
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OmniVision



RoHS compliant

For board-to-FPC

**Narrow pitch connectors  
(0.4mm pitch)**

**A4S Series**

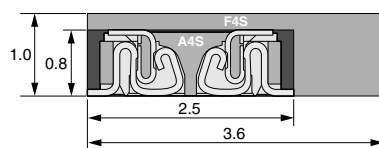
## FEATURES

### 1. 2.5 mm wide slim two-piece style connectors

Compact and slim structure contributes overall miniaturization of product design.

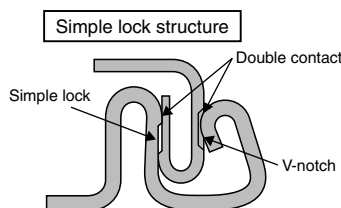
<Compared to F4S series (40 pin contacts, when mated)>

- Width: 30% down
- Footprint: 30% down



2. **"TOUGH CONTACT ADVANCED"** ensures high resistance to various environments in lieu of slim and low profile body

3. Simple lock structure provides tactile feedback to ensure excellent mating/unmating operation feel.



The connector gives the tactile feedback when inserted, allowing reliable mating.

4. Mated heights of 0.8 and 1.0 mm are available for the same foot pattern.

5. Connectors for inspection available

## APPLICATIONS

Recommended for board-to-FPC connections of mobile equipment, such as cellular phones, smart phones, laptops, and portable music players

## ORDERING INFORMATION

5: Narrow Pitch Connector A4S (0.4 mm pitch) Socket  
6: Narrow Pitch Connector A4S (0.4 mm pitch) Header

Number of pins (2 digits)

Mated height

<Socket>

1: For mated height 0.8/1.0 mm

<Header>

1: For mated height 0.8 mm

2: For mated height 1.0 mm

Functions

2: Without positioning bosses

Surface treatment (Contact portion / Terminal portion)

<Socket>

4: Ni plating on base, Au plating on surface (for Ni barrier available)

<Header>

4: Ni plating on base, Au plating on surface

AXE

2

4

## PRODUCT TYPES

| Mated height | Number of pins | Part number |           | Packing               |               |
|--------------|----------------|-------------|-----------|-----------------------|---------------|
|              |                | Socket      | Header    | Inner carton (1-reel) | Outer carton  |
| 0.8mm        | 10             | AXE510124   | AXE610124 | 5,000 pieces          | 10,000 pieces |
|              | 12             | AXE512124   | AXE612124 |                       |               |
|              | 14             | AXE514124   | AXE614124 |                       |               |
|              | 16             | AXE516124   | AXE616124 |                       |               |
|              | 18             | AXE518124   | AXE618124 |                       |               |
|              | 20             | AXE520124   | AXE620124 |                       |               |
|              | 22             | AXE522124   | AXE622124 |                       |               |
|              | 24             | AXE524124   | AXE624124 |                       |               |
|              | 26             | AXE526124   | AXE626124 |                       |               |
|              | 28             | AXE528124   | AXE628124 |                       |               |
|              | 30             | AXE530124   | AXE630124 |                       |               |
|              | 32             | AXE532124   | AXE632124 |                       |               |
|              | 34             | AXE534124   | AXE634124 |                       |               |
|              | 36             | AXE536124   | AXE636124 |                       |               |
|              | 38             | AXE538124   | AXE638124 |                       |               |
|              | 40             | AXE540124   | AXE640124 |                       |               |
|              | 44             | AXE544124   | AXE644124 |                       |               |
|              | 50             | AXE550124   | AXE650124 |                       |               |
|              | 54             | AXE554124   | AXE654124 |                       |               |
|              | 56             | AXE556124   | AXE656124 |                       |               |
| 1.0mm        | 60             | AXE560124   | AXE660124 |                       |               |
|              | 64             | AXE564124   | AXE664124 |                       |               |
|              | 70             | AXE570124   | AXE670124 |                       |               |
|              | 80             | AXE580124   | AXE680124 |                       |               |
|              | 10             | AXE510124   | AXE610224 |                       |               |
|              | 12             | AXE512124   | AXE612224 |                       |               |
|              | 14             | AXE514124   | AXE614224 |                       |               |
|              | 20             | AXE520124   | AXE620224 |                       |               |
|              | 24             | AXE524124   | AXE624224 |                       |               |
|              | 26             | AXE526124   | AXE626224 |                       |               |
|              | 30             | AXE530124   | AXE630224 |                       |               |
|              | 32             | AXE532124   | AXE632224 |                       |               |
|              | 40             | AXE540124   | AXE640224 |                       |               |
|              | 44             | AXE544124   | AXE644224 |                       |               |
|              | 50             | AXE550124   | AXE650224 |                       |               |
|              | 54             | AXE554124   | AXE654224 |                       |               |
|              | 60             | AXE560124   | AXE660224 |                       |               |
|              | 70             | AXE570124   | AXE670224 |                       |               |
|              | 80             | AXE580124   | AXE680224 |                       |               |

Notes: 1. Order unit:

For volume production: 1-inner carton (1-reel) units

Samples for mounting check: 50-connector units. Please contact our sales office.

Samples: Small lot orders are possible. Please contact our sales office.

2. The above part numbers are for connectors without positioning bosses, which are standard. When ordering connectors with positioning bosses, please contact our sales office.

3. Please contact us for connectors having a number of pins other than those listed above.

# SPECIFICATIONS

## ■ Characteristics

|                               | Item                                                  | Specifications                                                                                                                             | Conditions                                                                                                         |
|-------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Electrical characteristics    | Rated current                                         | 0.3A/pin contact (Max. 5 A at total pin contacts)                                                                                          |                                                                                                                    |
|                               | Rated voltage                                         | 60V AC/DC                                                                                                                                  |                                                                                                                    |
|                               | Breakdown voltage                                     | 150V AC for 1 min.                                                                                                                         | No short-circuiting or damage at a detection current of 1 mA when the specified voltage is applied for one minute. |
|                               | Insulation resistance                                 | Min. 1.000MΩ (initial)                                                                                                                     | Using 250V DC megger (applied for 1 min.)                                                                          |
|                               | Contact resistance                                    | Max. 90mΩ                                                                                                                                  | Based on the contact resistance measurement method specified by JIS C 5402.                                        |
| Mechanical characteristics    | Composite insertion force                             | Max. 1.200N/pin contacts × pin contacts (initial)                                                                                          |                                                                                                                    |
|                               | Composite removal force                               | Min. 0.165N/pin contacts × pin contacts                                                                                                    |                                                                                                                    |
|                               | Contact holding force (Socket contact)                | Min. 0.20N/pin contacts                                                                                                                    | Measuring the maximum force. As the contact is axially pull out.                                                   |
| Environmental characteristics | Ambient temperature                                   | −55°C to +85°C                                                                                                                             | No freezing at low temperatures. No dew condensation.                                                              |
|                               | Soldering heat resistance                             | Peak temperature: 260°C or less (on the surface of the PC board around the connector terminals)<br>300°C within 5 sec. 350°C within 3 sec. | Infrared reflow soldering<br>Soldering iron                                                                        |
|                               | Storage temperature                                   | −55°C to +85°C (product only)<br>−40°C to +50°C (emboss packing)                                                                           | No freezing at low temperatures. No dew condensation.                                                              |
|                               | Thermal shock resistance (header and socket mated)    | 5 cycles, insulation resistance min. 100MΩ, contact resistance max. 90mΩ                                                                   | Sequence<br>1. −55.0°C, 30 minutes<br>2. ~, Max. 5 minutes<br>3. 85.0°C, 30 minutes<br>4. ~, Max. 5 minutes        |
|                               | Humidity resistance (header and socket mated)         | 120 hours, insulation resistance min. 100MΩ, contact resistance max. 90mΩ                                                                  | Bath temperature 40±2°C, humidity 90 to 95% R.H.                                                                   |
|                               | Saltwater spray resistance (header and socket mated)  | 24 hours, insulation resistance min. 100MΩ, contact resistance max. 90mΩ                                                                   | Bath temperature 35±2°C, saltwater concentration 5±1%                                                              |
|                               | H <sub>2</sub> S resistance (header and socket mated) | 48 hours, contact resistance max. 90mΩ                                                                                                     | Bath temperature 40±2°C, gas concentration 3±1 ppm, humidity 75 to 80% R.H.                                        |
| Lifetime characteristics      | Insertion and removal life                            | 30 times                                                                                                                                   | Repeated insertion and removal speed of max. 200 times/hours                                                       |
| Unit weight                   |                                                       | 20 pin contact type: Socket: 0.02 g Header: 0.01 g                                                                                         |                                                                                                                    |

## ■ Material and surface treatment

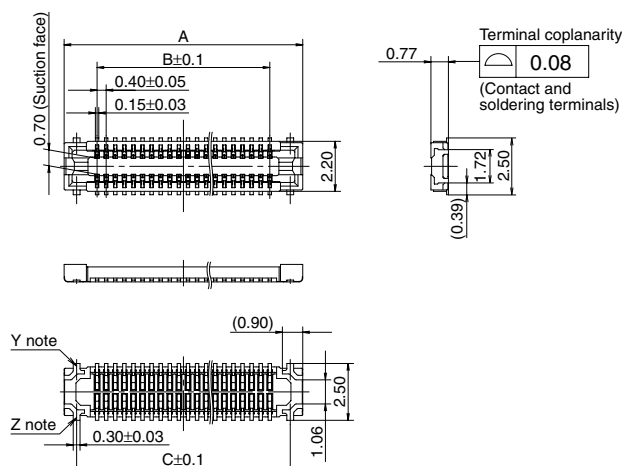
| Part name        | Material            | Surface treatment                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Molded portion   | LCP resin (UL94V-0) | —                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Contact and Post | Copper alloy        | Contact portion: Base: Ni plating Surface: Au plating<br>Terminal portion: Base: Ni plating Surface: Au plating (except the terminal tips)<br>The socket terminals close to the portion to be soldered have nickel barriers (exposed nickel portions).<br>Soldering terminals: Sockets: Base: Ni plating Surface: Pd+Au flash plating (except the terminal tips)<br>Headers: Base: Ni plating Surface: Au plating (except the terminal tips) |

# DIMENSIONS (Unit: mm)

The CAD data of the products with a **CAD Data** mark can be downloaded from: <http://industrial.panasonic.com/ac/e>

## ■ Socket (Mated height: 0.8 mm/1.0 mm)

### CAD Data



General tolerance: ±0.2

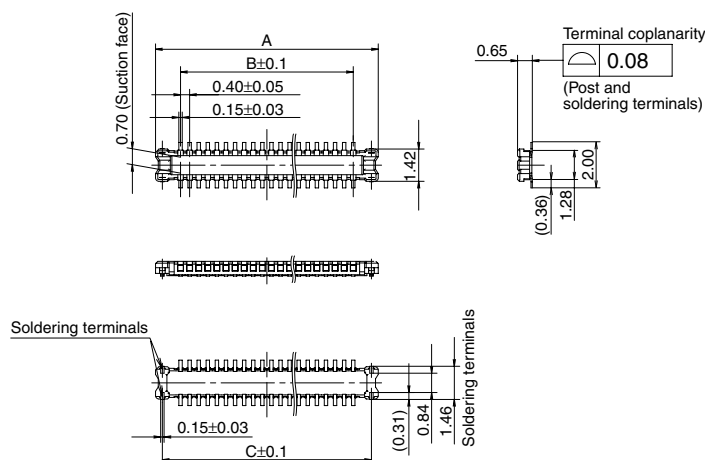
Note: Since the soldering terminals has a single-piece construction, sections Y and Z are electrically connected.

Dimension table (mm)

| Number of pins/<br>dimension | A    | B    | C    |
|------------------------------|------|------|------|
| 10                           | 4.5  | 1.6  | 3.4  |
| 12                           | 4.9  | 2.0  | 3.8  |
| 14                           | 5.3  | 2.4  | 4.2  |
| 16                           | 5.7  | 2.8  | 4.6  |
| 18                           | 6.1  | 3.2  | 5.0  |
| 20                           | 6.5  | 3.6  | 5.4  |
| 22                           | 6.9  | 4.0  | 5.8  |
| 24                           | 7.3  | 4.4  | 6.2  |
| 26                           | 7.7  | 4.8  | 6.6  |
| 28                           | 8.1  | 5.2  | 7.0  |
| 30                           | 8.5  | 5.6  | 7.4  |
| 32                           | 8.9  | 6.0  | 7.8  |
| 34                           | 9.3  | 6.4  | 8.2  |
| 36                           | 9.7  | 6.8  | 8.6  |
| 38                           | 10.1 | 7.2  | 9.0  |
| 40                           | 10.5 | 7.6  | 9.4  |
| 44                           | 11.3 | 8.4  | 10.2 |
| 50                           | 12.5 | 9.6  | 11.4 |
| 54                           | 13.3 | 10.4 | 12.2 |
| 56                           | 13.7 | 10.8 | 12.6 |
| 60                           | 14.5 | 11.6 | 13.4 |
| 64                           | 15.3 | 12.4 | 14.2 |
| 70                           | 16.5 | 13.6 | 15.4 |
| 80                           | 18.5 | 15.6 | 17.4 |

## ■ Header (Mated height: 0.8 mm)

### CAD Data



General tolerance: ±0.2

Dimension table (mm)

| Number of pins/<br>dimension | A    | B    | C    |
|------------------------------|------|------|------|
| 10                           | 3.8  | 1.6  | 3.2  |
| 12                           | 4.2  | 2.0  | 3.6  |
| 14                           | 4.6  | 2.4  | 4.0  |
| 16                           | 5.0  | 2.8  | 4.4  |
| 18                           | 5.4  | 3.2  | 4.8  |
| 20                           | 5.8  | 3.6  | 5.2  |
| 22                           | 6.2  | 4.0  | 5.6  |
| 24                           | 6.6  | 4.4  | 6.0  |
| 26                           | 7.0  | 4.8  | 6.4  |
| 28                           | 7.4  | 5.2  | 6.8  |
| 30                           | 7.8  | 5.6  | 7.2  |
| 32                           | 8.2  | 6.0  | 7.6  |
| 34                           | 8.6  | 6.4  | 8.0  |
| 36                           | 9.0  | 6.8  | 8.4  |
| 38                           | 9.4  | 7.2  | 8.8  |
| 40                           | 9.8  | 7.6  | 9.2  |
| 44                           | 10.6 | 8.4  | 10.0 |
| 50                           | 11.8 | 9.6  | 11.2 |
| 54                           | 12.6 | 10.4 | 12.0 |
| 56                           | 13.0 | 10.8 | 12.4 |
| 60                           | 13.8 | 11.6 | 13.2 |
| 64                           | 14.6 | 12.4 | 14.0 |
| 70                           | 15.8 | 13.6 | 15.2 |
| 80                           | 17.8 | 15.6 | 17.2 |

## Cameras Applications



Automotive Driver Pilot



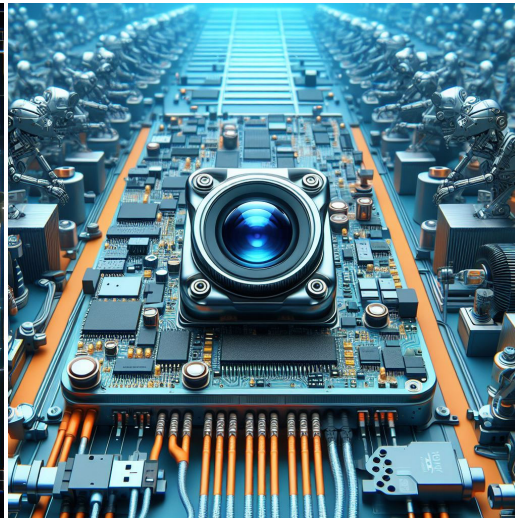
Live Streaming



Video Conference



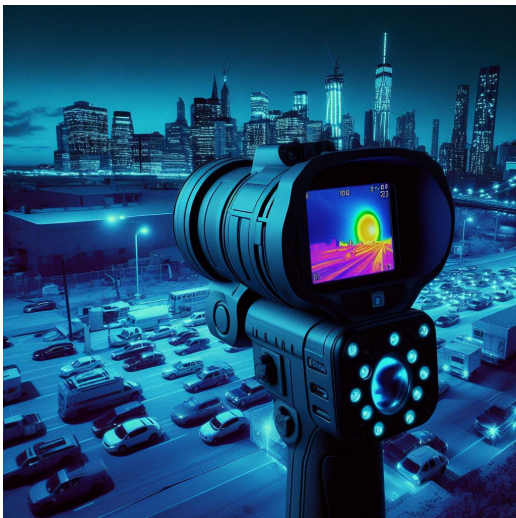
Eye Tracker Biometric Detection



Machine Vision



Agricultural Monitor



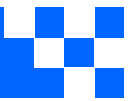
Night Vision Security



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

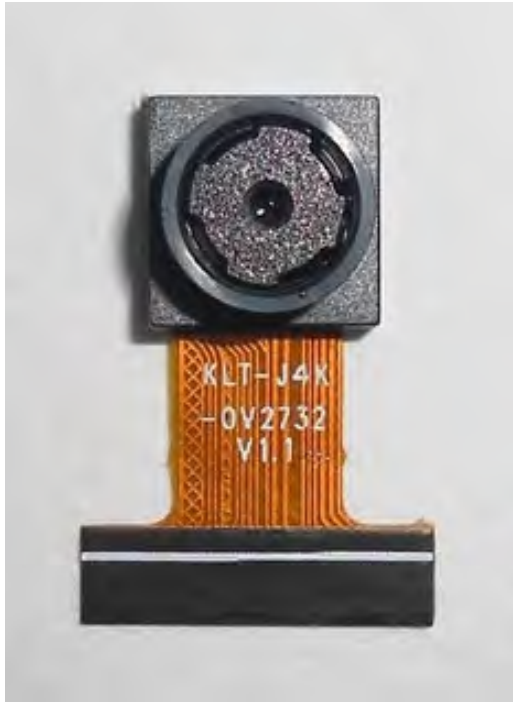
| Reliability Inspection Item |                             |                                                                   | Testing Method          | Acceptance Criteria     |
|-----------------------------|-----------------------------|-------------------------------------------------------------------|-------------------------|-------------------------|
| 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

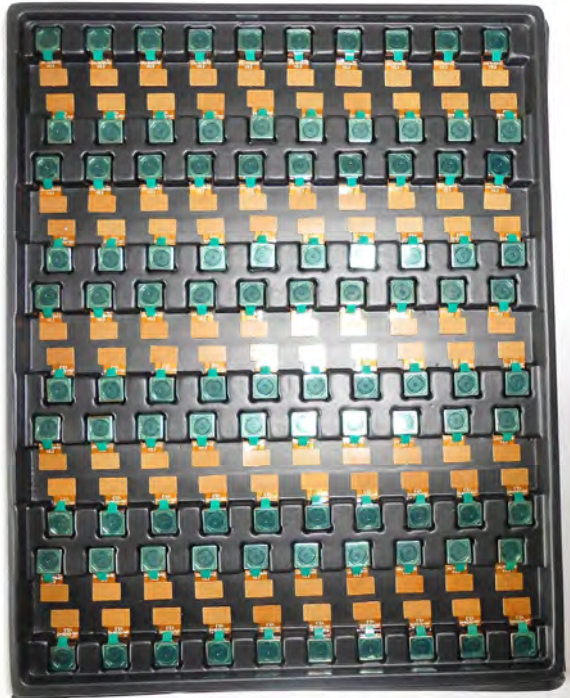


Place Cameras on the Tray



## Camera Modules Package Solution

Full Tray of Cameras



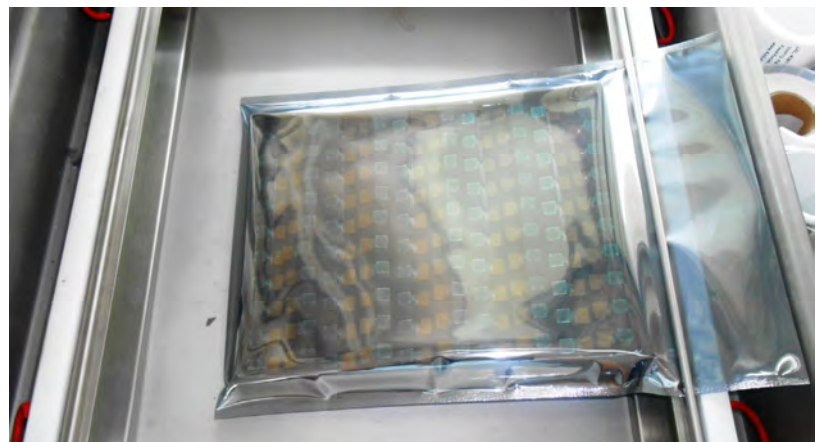
Cover Tray with Lid



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

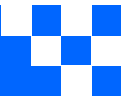


The Wheel is Perfectly Fitting the Box



Connectors Box Ready for Shipment

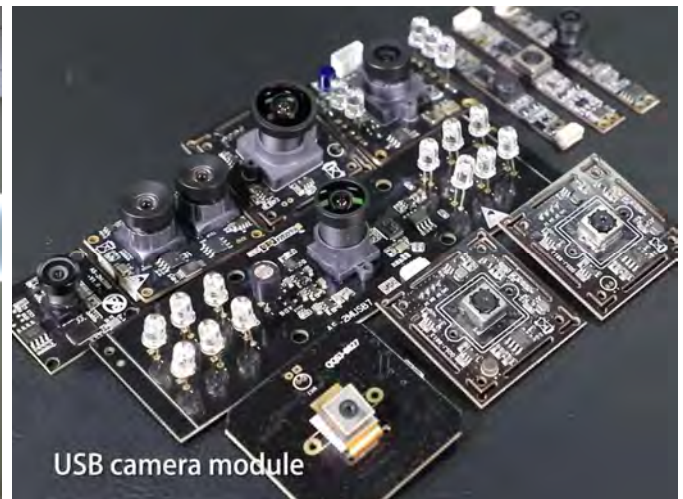


**Company Kai Lap Technologies (KLT)**

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

KLT provides OEM, ODM design, contract manufacturing, and builds the camera products. You may provide the requirements to us, even with a hand draft, our sales and engineering work together to meet your needs. We consider ourselves your last-term partner in developing practical and innovative solutions.

Our team covers everything from initial concept development to mass produced product. KLT specializes in customized camera design, raw material, electronic engineering, firmware/software development, product testing, and packing design. Our experienced strategic supply systems offer a robust and dependable manufacturing capacity for orders of various sizes.

**Limited Warranty**

KLT provides the following limited warranty if you purchased the Product(s) directly from KLT company or from KLT's website, [www.KaiLapTech.com](http://www.KaiLapTech.com). Product(s) purchased from other sellers or sources are not covered by this Limited Warranty. KLT guarantees that the Product(s) will be free from defects in materials and workmanship under normal use for a period of one (1) year from the date you receive the product ("Warranty Period").

For all Product(s) that contain or develop material defects in materials or workmanship during the Warranty Period, KLT will, at its sole option, either: (i) repair the Product(s); (ii) replace the Product(s) with a new or refurbished Product(s) (replacement Product(s) being of identical model or functional equivalent); or (iii) provide you a refund of the price you paid for the Product(s).

This Limited Warranty of KLT is solely limited to repair and/or replacement on the terms set forth above. KLT is not reliable or responsible for any subsequent events.





# CMOS CAMERA MODULES



*your BEST camera module partner*

## KLT Strength

### Powerful Factory



### Professional Service



### Promised Delivery



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