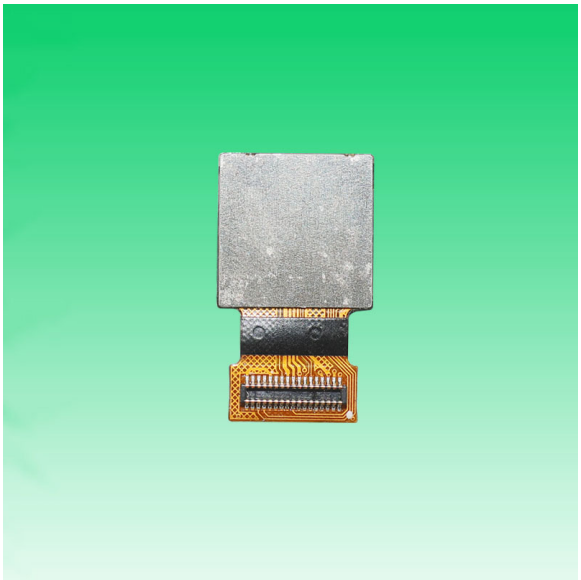
# KLT-5067-IMX586 V3.C

## 48MP Sony IMX586 C-PHY MIPI Interface Auto Focus Camera Module


Front View



Back View

### Specifications

| Camera Module No. | KLT-5067-IMX586 V3.C |
|---|---|
| Resolution | 48MP |
| Image Sensor | IMX586 |
| Sensor Type | 1/2.0" |
| Pixel Size | 0.8 um x 0.8 um |
| EFL | 4.74 mm |
| F.NO | 1.79 |
| Pixel | 8000 x 6000 |
| View Angle | 79.4°(DFOV) 67.2°(HFOV) 53.2°(VFOV) |
| Lens Dimensions | 10.90 x 10.90 x 6.21 mm |
| Module Size | 18.61 x 10.90 mm |
| Module Type | Auto Focus |
| Interface | C-PHY MIPI |
| Auto Focus VCM Driver IC | DW9800W |
| Lens Type | 650nm IR Cut |
| Operating Temperature | -20°C to +70°C |
| Mating Connector | BM20B(0.8)-30DS-0.4V(51) |

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# KLT-5067-IMX586 V3.C

## 48MP Sony IMX586 C-PHY MIPI Interface Auto Focus Camera Module


Top View

Side View


Bottom View

Mating Connector

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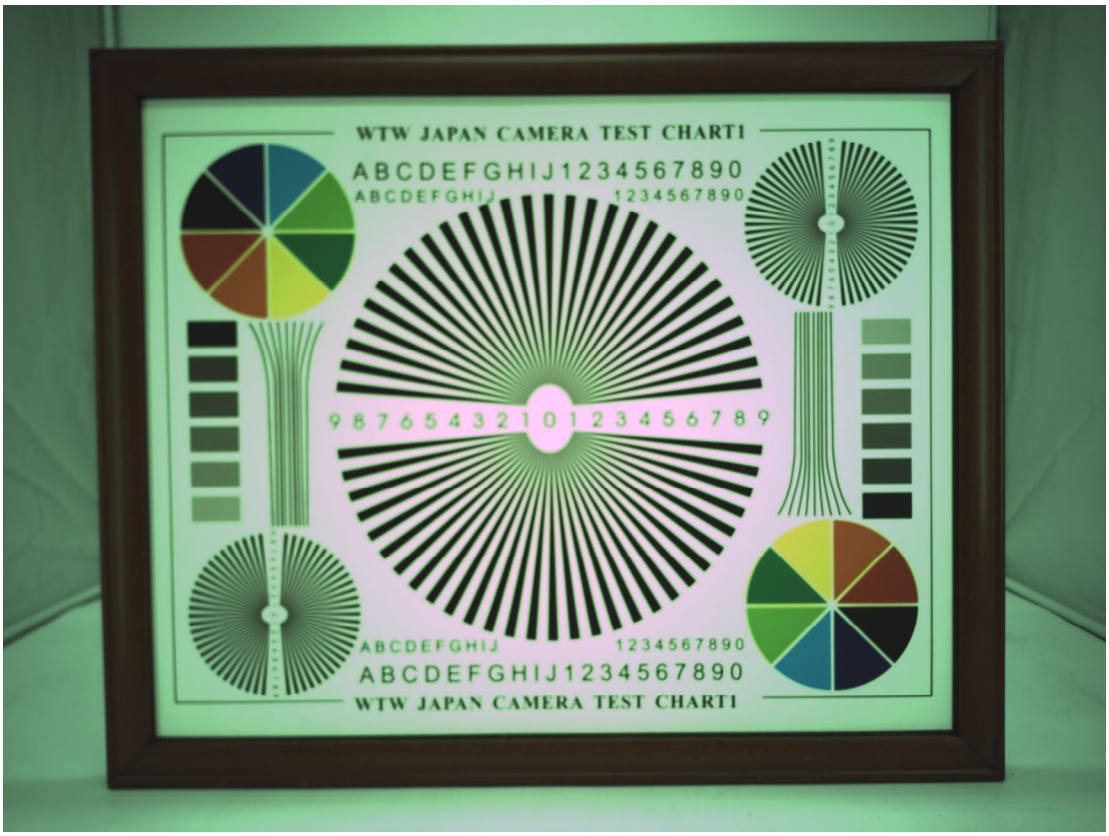
# CMOS CAMERA MODULES

*your BEST camera module partner*

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# CMOS CAMERA MODULES

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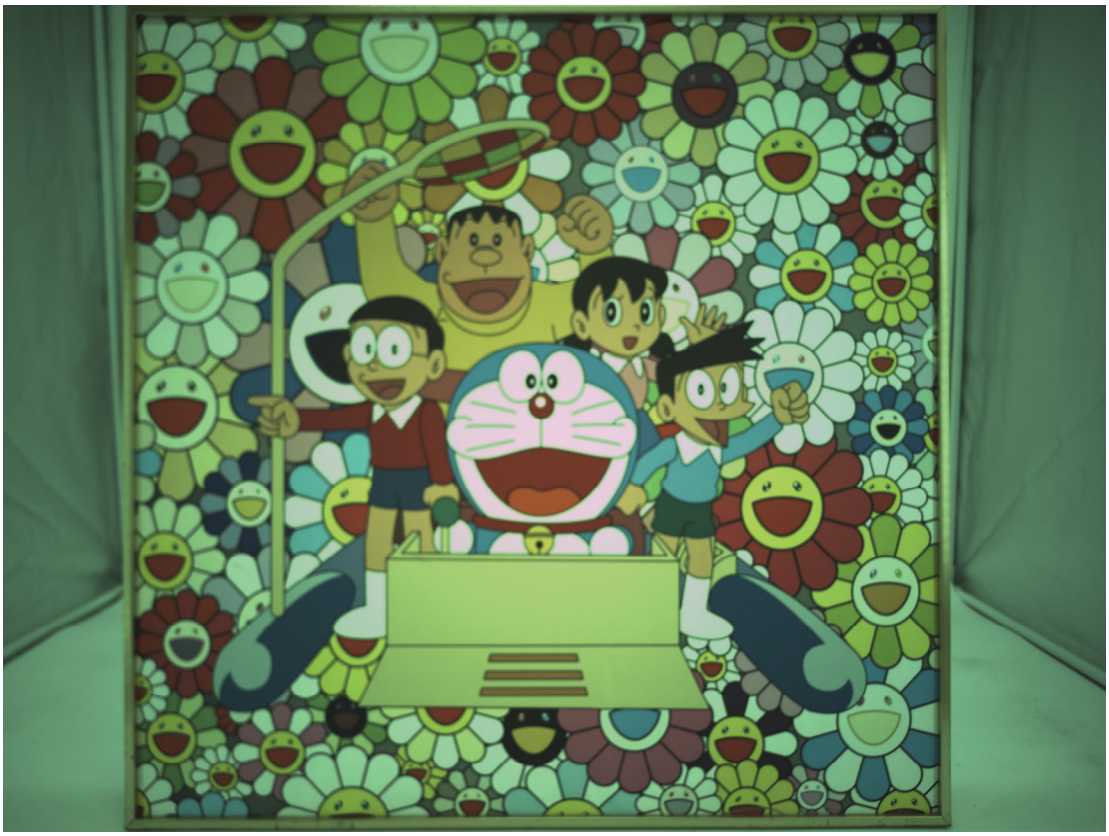

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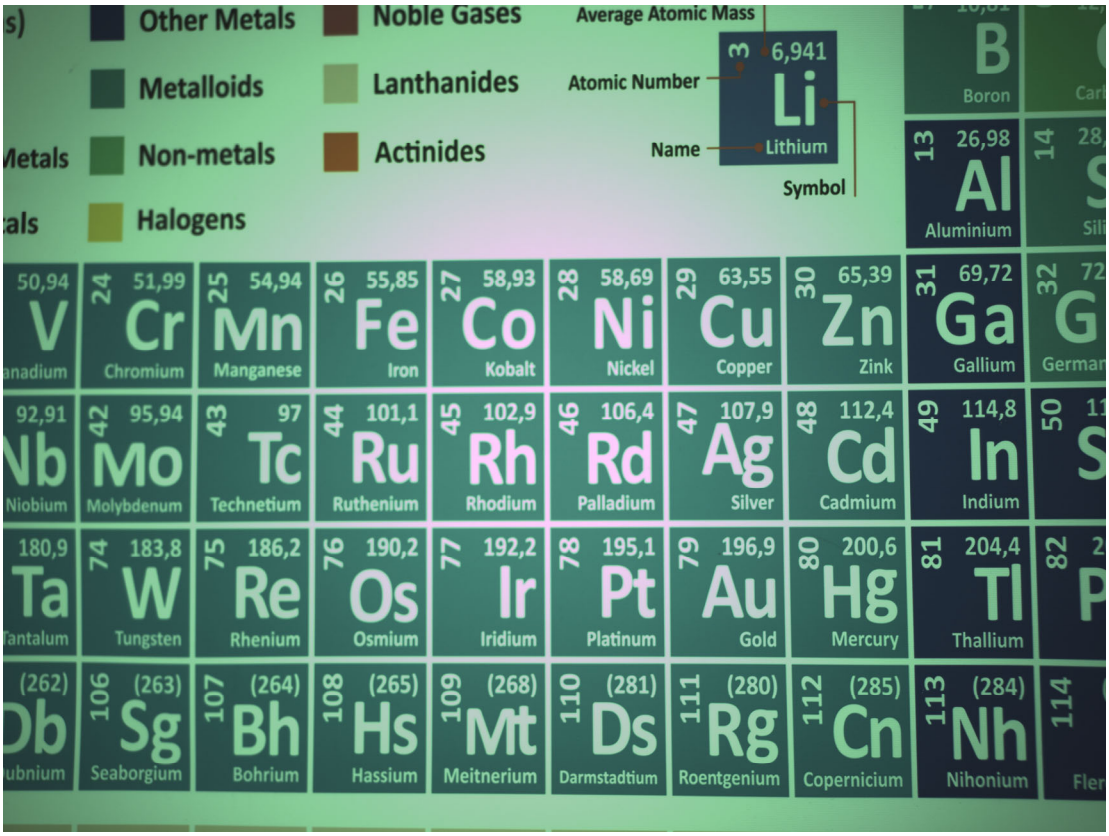


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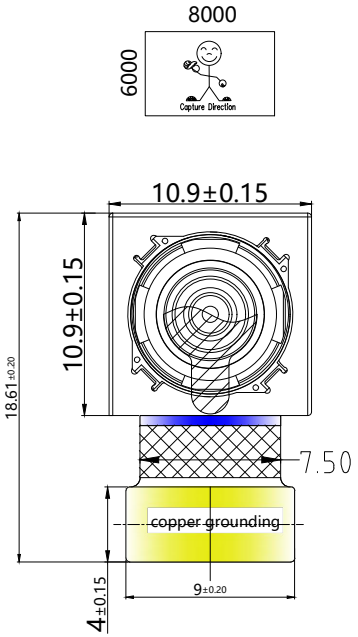
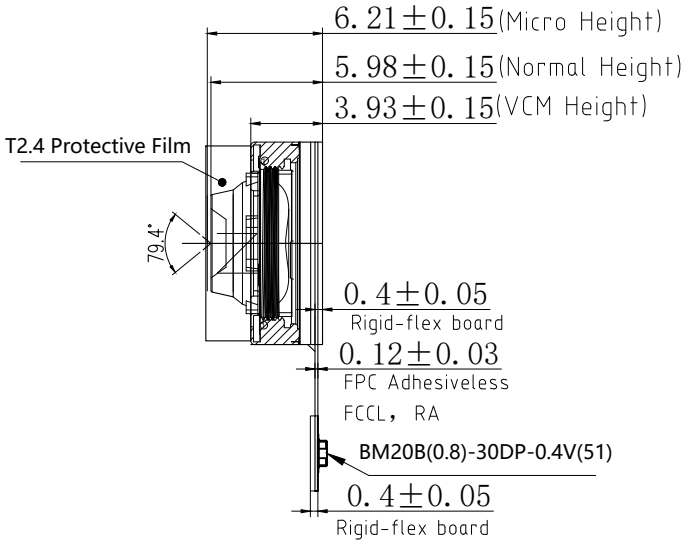
| RoHS | |
|---|---|
| 0 | SIGNAL |
| 1 | NC |
| 2 | NC |
| 3 | AVDD 2.9V |
| 4 | GND |
| 5 | XCLR |
| 6 | GND |
| 7 | MCN1C |
| 8 | D1P2A |
| 9 | GND |
| 10 | D2N0B |
| 11 | D0P0C |
| 12 | GND |
| 13 | D1N2B |
| 14 | D3P2C |
| 15 | NC |
| 16 | GND |
| 17 | MCP1B |
| 18 | D0N1A |
| 19 | GND |
| 20 | D2P0A |
| 21 | D3N |
| 22 | GND |
| 23 | MCLK |
| 24 | GND |
| 25 | SCL |
| 26 | SDA |
| 27 | NC |
| 28 | DOVDD 1.8V |
| 29 | GND |
| 30 | DVDD 1.1V |

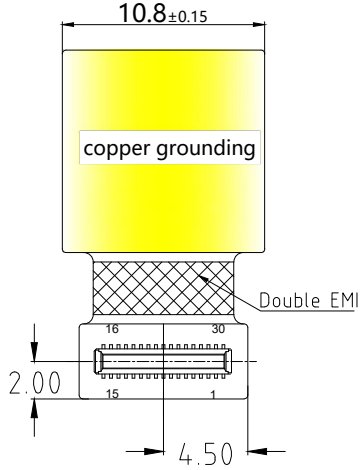
| Version | Information |
|---|---|
| V1.0 | First Version |
| V2.0 | Change pin signal,connector and capture direction |
| V3.C | Update pin map as same as 5067-IMX686 V3.C |




TOP VIEW




SIDE VIEW




BOTTOM VIEW

NOTE:
1.Sensor I2C slave address: 0x20(W);021(R).
2.Driver IC:DW9800W I2C:0x18(W);0x19(R).

Parameter:

1、Sensor specification:

Image Sensor: IMX586-AAHJ5
Pixel: 0.8um×0.8um
Lens Type: 1/2
Important Voltage Description: DVDD1.1V (external power supply);

2、Lens specification:

FOV: 79.4°(D);67.2°(H);53.2°(V)
F/NO.: 1.79
TV distortion: <1.5%
Focal length: 4.74mm
Composition: 6P+IR FILTER
IR Cut Coating: 650nm±10nm@50%

Kai Lap Technologies Group Ltd

| | | | |
|---|---|---|---|
| Designed By | Kevin | Model Name: | KLT-5067-IMX586 V3.C |
| Checked By | Aouly_Yan | Projection Type: Third Angle | Unit: mm / Date: 12/25/2024 / Scale: 1:1 / Sheet: 1 of 1 / Version: 1/0 |

SONY

Diagonal 8.000 mm (Type 1/2.0) 48Mega-Pixel CMOS Image Sensor with Square Pixel for Color Cameras

# IMX586-AAJH5-C

## General description and application

IMX586 is a diagonal 8.000 mm (Type 1/2.0) 48 Mega-pixel CMOS active pixel type stacked image sensor with a square pixel array. It adopts Sony's back-illuminated and stacked CMOS image sensor to achieve high speed image capturing by column parallel A/D converter circuits and high sensitivity and low noise image (comparing with conventional CMOS image sensor) through the backside illuminated imaging pixel structure. R, G, and B pigment primary color mosaic filter is employed. It operates with five power supply voltages: analog 2.9 V and 1.8V, digital 1.1 V, PLL-PHY 1.1V and 1.8 V for input/output interface and achieves low power consumption.
In addition, this product is designed for use in cellular phone and tablet PC. When using this for another application, Sony Semiconductor Solutions Corporation does not guarantee the quality and reliability of product. Therefore, don't use this for applications other than cellular phone and tablet PC. Consult your Sony Semiconductor Solutions Corporation sales representative if you have any questions.

## Functions and Features

- ◆ Back-illuminated and stacked CMOS image sensor
- ◆ Quad Bayer Coding color filter arrangement
- ◆ Phase Detection Auto Focus (PDAF)
- ◆ High Frame Rate 30fps@Full resolution (QBC Re-mosaic) / 30fps@QBC-HDR / 120fps@2x2 Adjacent Pixel Binning (16:9) / 240fps@2x2 Adjacent Pixel Binning V2H2(16:9)
- ◆ High signal to noise ratio(SNR)
- ◆ Dual sensor synchronization operation
- ◆ Built-in 2D Dynamic Defect Pixel Correction
- ◆ Lens Shading Correction (LSC)
- ◆ Built-in temperature sensor
- ◆ Output video format of RAW10/8, COMP8
- ◆ QBC Re-mosaic function
- ◆ QBC HDR function
- ◆ Two PLLs for independent clock generation for pixel control and data output interface
- ◆ CSI-2 serial data output
  MIPI D-PHY 2lane/4lane, Max. 2.5Gbps/lane, D-PHY spec. ver. 1.2 compliant
  MIPI C-PHY 1/2/3trio, Max 2.5Gsps/Trio, C-PHY spec ver. 1.0 compliant
- ◆ 2-wire serial communication (Supports $I^2C$ "Fast mode" and "Fast-mode Plus")
- ◆ 28K bit of OTP ROM for users





E18Y10B9Z

## Device Structure

◆ CMOS image sensor
◆ Image size : Diagonal 8.000 mm (Type 1/2.0)
◆ Total number of pixels : 8032 (H) × 6248 (V) approx. 50.18 M pixels
◆ Number of effective pixels : 8032 (H) × 6088 (V) approx. 48.89 M pixels
◆ Number of active pixels : 8000 (H) × 6000 (V) approx. 48.00 M pixels
◆ Chip size : 7.504 mm (H) × 5.659 mm (V)
◆ Unit cell size : 0.80 μm (H) × 0.80 μm (V)
◆ Substrate material : Silicon

## Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit | notes |
|---|---|---|---|---|
| Supply voltage (analog1) | VANA1 | -0.3 to +4.2 | V | refer to VSS level |
| Supply voltage (analog2) | VANA2 | -0.3 to +2.52 | V | |
| Supply voltage (digital1, digital2(PLL-PHY)) | VDIG1,2 | -0.3 to +1.54 | V | |
| Supply voltage (interface) | VIF | -0.3 to +2.52 | V | |
| Input voltage (digital) | VI | -0.3 to +2.52 | V | |
| Output voltage (digital) | VO | -0.3 to +2.52 | V | |
| Guaranteed Operating temperature | TOPR | -20 to +70 | ˚C | |
| Guaranteed storage temperature | TSTG | -30 to +80 | ˚C | |
| Guaranteed performance temperature | TSPEC | -20 to +60 | ˚C | |

## Recommended Operating Voltage

| Item | Symbol | Ratings | Unit | notes |
|---|---|---|---|---|
| Supply voltage (analog1) | VANA1 | 2.9 ± 0.1 | V | refer to VSS level |
| Supply voltage (analog2) | VANA2 | 1.8 ± 0.1 | V | |
| Supply voltage (digital1, digital2(PLL-PHY)) | VDIG1,2 | 1.1 ± 0.1 | V | |
| Supply voltage (interface) | VIF | 1.8 ± 0.1 | V | |

RoHS COMPLIANT H F BFRs/CFRs/PVC-Free

# DW9800W

- H-Bridge Driver IC

Ver. 0.1
2015-04-03

## 1. General Description

The DW9800W is designed for linear control of bi-direction voice coil motors(Bi-VCM). The DW9800W is a single 10-bit DAC with ±100mA output current sinking capability. The DW9800W has Smart Actuator Control (SAC$^{TM}$) mode. SAC$^{TM}$ mode can be applied to minimize the mechanical vibration. The SAC$^{TM}$ mode has improved the actuator's settling time and wide tolerance coverage compared with conventional Linear Slope Control (LSC) mode. The SAC$^{TM}$ is registered trademark of DONGWOON ANATECH. The SAC$^{TM}$ technologies belong to DONGWOON ANATECH's own knowhow and patents.

The DW9800W also features an internal reference and operates from a single 2.3 V to 4.8V supply. The DAC is controlled via a I2C serial interface that operates at cloak rate up to 400kHz. The DW9800W has a Power On Reset (POR) circuit and power down (PD) mode. POR circuit gets to operate when VDD (supply voltage) turns on. The output current keeps 0mA until valid register value takes place. The DW9800W offers to the user the choice of PD mode that insures the minimal power (Max. 2uA) is consumed in shutdown mode. The DW9800W is protected by thermal shutdown (TSD) circuit for thermal attack.

The DW9800W is designed for auto focus, optical zoom for mobile camera, digital still camera, camcorders, web camera and action camera applications.

should be 4.8V

■ Features

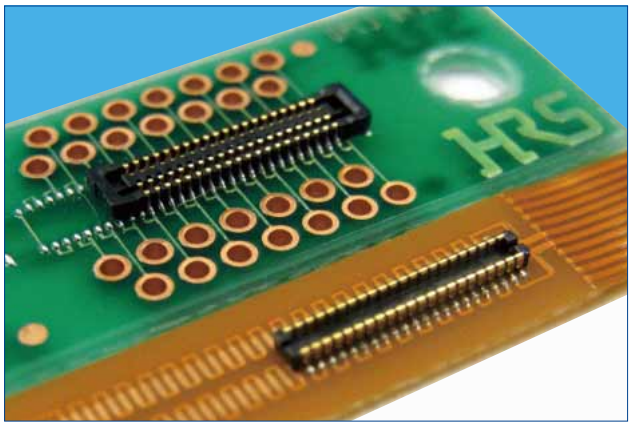
- 10-bit resolution current sinking of ±100mA
- Smart Actuator Control (SAC$^{TM}$) mode
- Supply voltage range ($V_{DD}$): 2.3V to 3.3V
- Fast mode plus I2C interface compatible (1.8V interface available)
- Power On Reset (POR)
- Power Down (PD) mode
- Thermal Shutdown (TSD)
- Package dimension : 0.73mm X 1.13mm X 0.31mm (6-pin WLCSP)

■ Applications

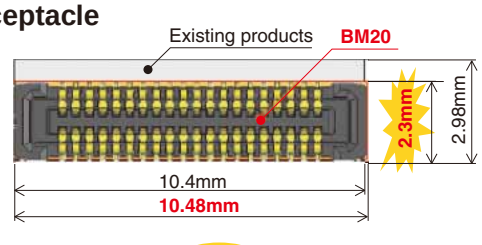
Mobile camera
Digital still camera
Camcorder
Web camera
Nano actuator

# 0.4mm Pitch, 0.6 and 0.8mm Height, Board-to-Board and Board-to-FPC Connectors

## BM20 Series



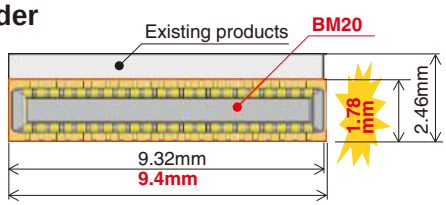
■Receptacle




A 22.3% reduction in size!

| Existing products | BM20 |
|---|---|
| 2.98 × 10.4 =About 31.0mm² | 2.3 × 10.48 = About 24.1mm² |

■Header

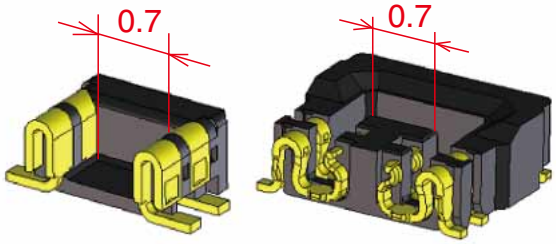



Board occupied area

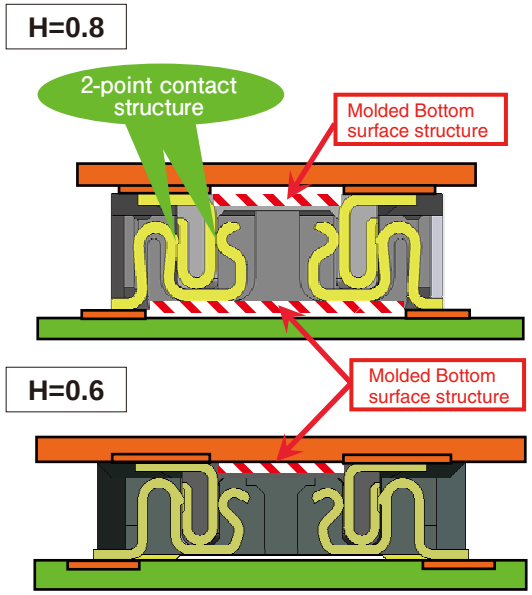
A 27.1% reduction in size!

| Existing products | BM20 |
|---|---|
| 2.46 × 9.32 = About 22.9mm² | 1.78 × 9.4 = About 16.7mm² |

Vaccum pick-up




Mating diagram (cross section)




## ■Features

### 1. High density mounting capability

A space saving design that keeps the connector compact, but still maintains an adequate vacuum area (no less than 0.7mm wide).
Depth DS : 2.3mm DP : 1.78mm

### 2. Reliable contact performance

Even though the mated height is low, the BM20 still leads it class in maximum effective mating lengths for each mating height.
<Effective Mating Length>
Height 0.8mm : 0.2mm
Height 0.6mm : 0.15mm
The addition of the two point contact system adds more reliability to the contacts.

### 3. No restrictions to PCB pattern design for the 0.8 mm height connector *1

This series utilizes a thin wall to insulate the bottom surface of the connector and maintains an effective mating length of 0.2mm. This removes any restriction for PCB pattern layout design under the connector.
Note *1: There are some restrictions for the 0.6 mm height style.

### 4. Enhanced mating operations

The structure uses guide ribs to ease the mating process and offers a self alignment range of up to 0.3mm. A clear tactile click is used as an indicator to the user that the mating process was completed.

### 5. Drop and shock resistant structure

Dimples were designed into the contacts to increase their retention force and to absorb the shock delivered from a drop or other impact.

### 6. Debris resisting design

When mated, the connector's design covers the contacts which help to keep dust and other debris away from the contacts. The SMT leads are kept very close to the connector housing which also helps to prevent shorts caused by debris on the exposed contacts

## ■Product Specifications

| | | | | | | |
|---|---|---|---|---|---|---|
| Ratings | Rated Current | 0.3A | Operating Temperature Range | - 35 ～ 85°C (Note 1) | Storage Temperature Range | - 10 ～ 60°C (Note 2) |
| | Rated Voltage | AC, DC 30V | Operating Humidity Range | 20 ～ 80% | Storage Humidity Range | 40 ～ 70% (Note 2) |

| Items | Specifications | Conditions |
|---|---|---|
| 1. Insulation Resistance | Minimum of 50MΩ | Measured with DC 100V |
| 2. Withstanding Voltage | No flashover or breakdown | Apply AC 100V for 1 minute |
| 3. Contact Resistance | Maximum of 100mΩ | Measured with AC 20 mV, 1 kHz and 1 mA |
| 4. Vibration Resistance | No electrical discontinuity of 1μs or greater | Frequency 10-55 Hz, half amplitude 0.75mm, 3 directions for 2 hours |
| 5. Humidity Resistance | Contact resistance Maximum of 100mΩ<br>Insulation resistance Minimum of 25mΩ | Left at temperature 40±2℃, humidity 90 to 95%, 96 hours |
| 6. Temperature Cycles | Contact resistance Maximum of 100mΩ<br>Insulation resistance Minimum of 50mΩ | (-55°C : 30 minutes → 5～35℃ : 10 minutes → 85°C : 30 minutes → 5～35℃ : 10 minutes) 5 cycles |
| 7. Durability | Contact Resistance: maximum of 100mΩ | 10 mating cycles |
| 8. Soldering Heat Resistance | Should be no melting of resin parts that affects its performance | Reflow : according to the Recommended Solder Profile<br>Hand solder : Soldering iron temperature 350°C, no more than 3 seconds. |

Note 1 : Includes temperature rise caused by current flow.

Note 2 : The term "storage" here refers to products stored for a long period prior to board mounting and use. The operating temperature and humidity range covers the non-energized condition of connectors after board mounting and the temporary storage conditions during transportation, etc.

## ■Materials

| Product | Component | Materials | Finish | UL Regulation |
|---|---|---|---|---|
| Receptacle | Insulator | LCP | Black | UL94V-0 |
| Header | Contact | Phosphorous bronze | Gold plating | ———— |

## ■Product Number Structure

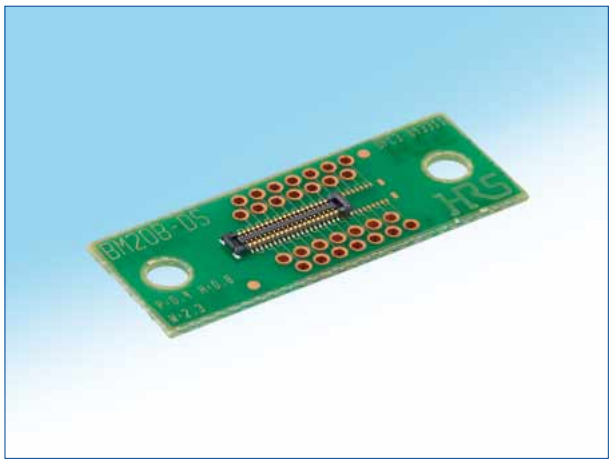
Refer to this page when determining product specifications by model types. Please place orders with part numbers listed in this catalog. The characteristics and specifications of the product described in this catalog are reference values. Please make sure to check the latest delivery specifications at the time of product use.

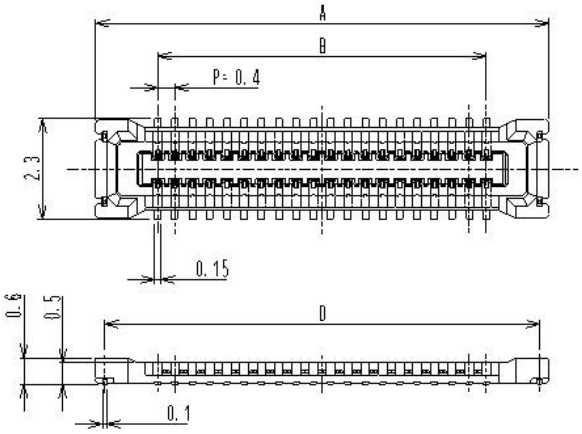
### ●Receptacle/Header

**BM ❶ 20 ❷ # ❸ (**) ❹ - * ❺ DS ❻ - 0.4 ❼ V ❽ (51) ❾**

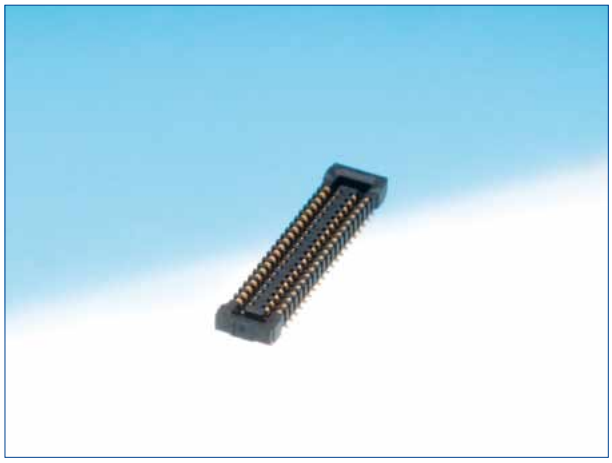
| | |
|---|---|
| ❶ Series Name : BM | ❻ Connector Type<br>DS : Double row receptacle<br>DP : Double row header |
| ❷ Series No. : 20 | |
| ❸ Shape Symbols<br>B : With reinforcing metal fitting | ❼ Contact Pitch : 0.4mm |
| ❹ Stack height : 0.6mm, 0.8mm | ❽ Terminal Shape V : Vertical SMT |
| ❺ No. of Contacts : Please refer to page 3 and after. | ❾ Packaging<br>(51) : Embossed tape package (8,000 pieces per reel) |

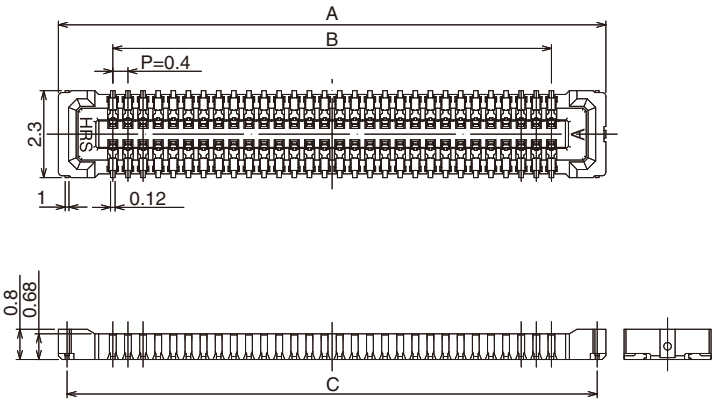
## ■H=0.6mm receptacle



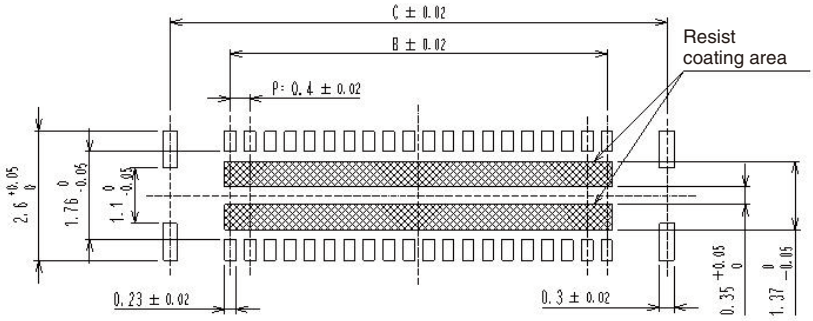



## ■H=0.8mm receptacle

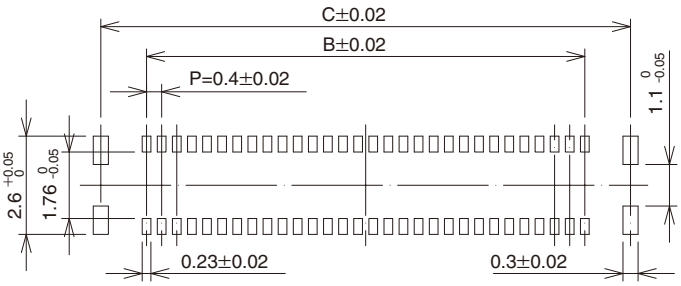




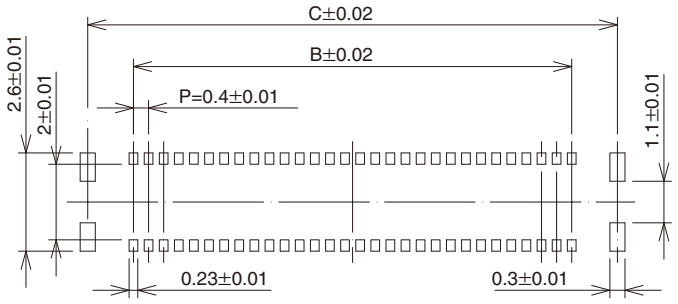

### ◆Recommended PCB layout【H= 0.6mm】




### ◆Recommended PCB layout【H= 0.8mm】



## ◆Recommended metal mask size (Mask thickness 100 µm)【0.6 mm and 0.8 mm common】




Unit : mm

| Part No. | HRS No. | No. of Contacts | A | B | C | D |
|---|---|---|---|---|---|---|
| BM20B(0.6)-10DS-0.4V(51) | 0684-9308-8 51 | 10 | 4.48 | 1.6 | 4.02 | 4.06 |
| BM20B(0.6)-20DS-0.4V(51) | 0684-9309-0 51 | 20 | 6.48 | 3.6 | 6.02 | 6.06 |
| BM20B(0.6)-24DS-0.4V(51) | 0684-9310-0 51 | 24 | 7.28 | 4.4 | 6.82 | 6.86 |
| BM20B(0.6)-30DS-0.4V(51) | 0684-9311-2 51 | 30 | 8.48 | 5.6 | 8.02 | 8.06 |
| BM20B(0.6)-34DS-0.4V(51) | 0684-9312-5 51 | 34 | 9.28 | 6.4 | 8.82 | 8.86 |
| BM20B(0.6)-40DS-0.4V(51) | 0684-9313-8 51 | 40 | 10.48 | 7.6 | 10.02 | 10.06 |
| BM20B(0.6)-50DS-0.4V(51) | 0684-9314-0 51 | 50 | 12.48 | 9.6 | 12.02 | 12.06 |
| BM20B(0.6)-60DS-0.4V(51) | 0684-9315-3 51 | 60 | 14.48 | 11.6 | 14.02 | 14.06 |

| Part No. | HRS No. | No. of Contacts | A | B | C |
|---|---|---|---|---|---|
| BM20B(0.8)-10DS-0.4V(51) | 0684-9008-4 51 | 10 | 4.48 | 1.6 | 4.02 |
| BM20B(0.8)-16DS-0.4V(51) | 0684-9041-0 51 | 16 | 5.68 | 2.8 | 5.22 |
| BM20B(0.8)-20DS-0.4V(51) | 0684-9009-7 51 | 20 | 6.48 | 3.6 | 6.02 |
| BM20B(0.8)-24DS-0.4V(51) | 0684-9010-6 51 | 24 | 7.28 | 4.4 | 6.82 |
| BM20B(0.8)-30DS-0.4V(51) | 0684-9011-9 51 | 30 | 8.48 | 5.6 | 8.02 |
| BM20B(0.8)-34DS-0.4V(51) | 0684-9020-0 51 | 34 | 9.28 | 6.4 | 8.82 |
| BM20B(0.8)-40DS-0.4V(51) | 0684-9012-1 51 | 40 | 10.48 | 7.6 | 10.02 |
| BM20B(0.8)-50DS-0.4V(51) | 0684-9013-4 51 | 50 | 12.48 | 9.6 | 12.02 |

Note 1 : This product is sold by full reel quantities of 8,000 pieces per reel. Please place orders in full reel quantities.
Note 2 : This connector is NOT polarized.

# CMOS CAMERA MODULES

*your BEST camera module partner*

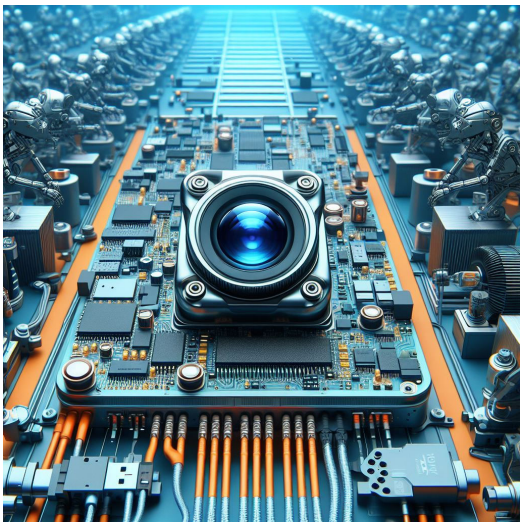
**Cameras Applications**

Automotive Driver Pilot

Live Streaming


Video Conference

Eye Tracker Biometric Detection



Machine Vision

Agricultural Monitor

Night Vision Security

Drone and Sports Eagle Eyes

Interactive Pet Camera

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# CMOS CAMERA MODULES

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**Cameras Applications**





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**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 |
| **MIPI Interface** | |
| 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 |
| **DVP Parallel Interface** | |
| 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 |




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**Camera Inspection Standard**

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| 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 |

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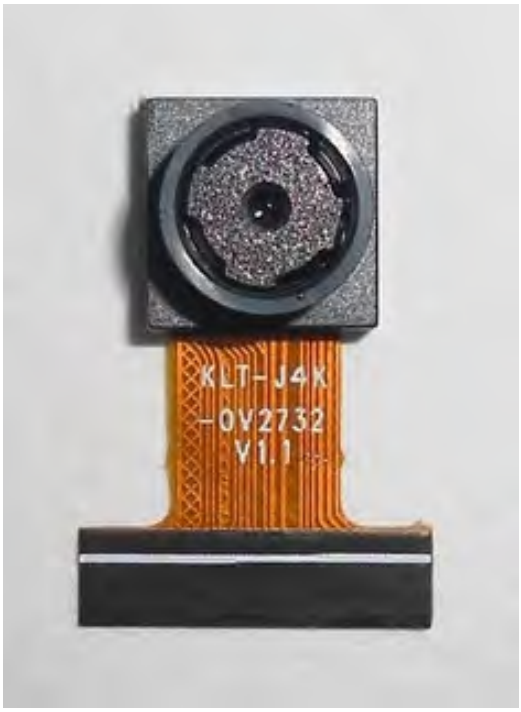
## KLT Package Solutions

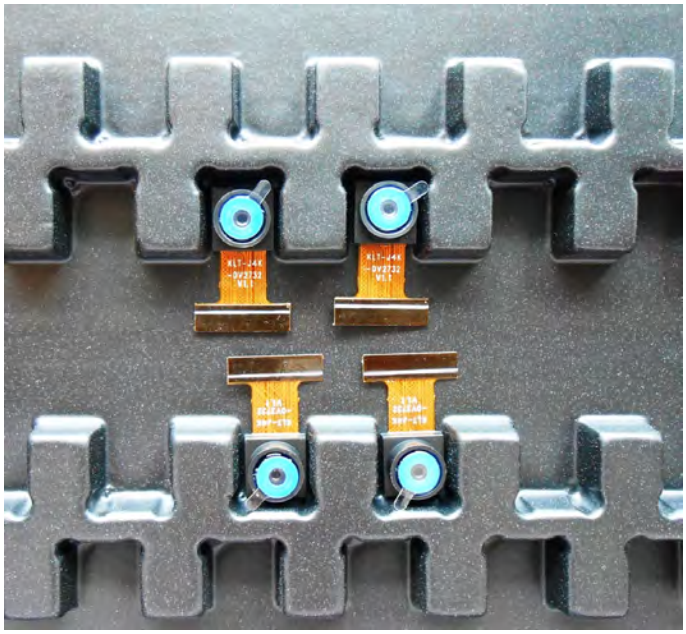
KLT Camera Module




Complete with Lens Protection Film


Tray with Grid and Space

Place Cameras on the Tray



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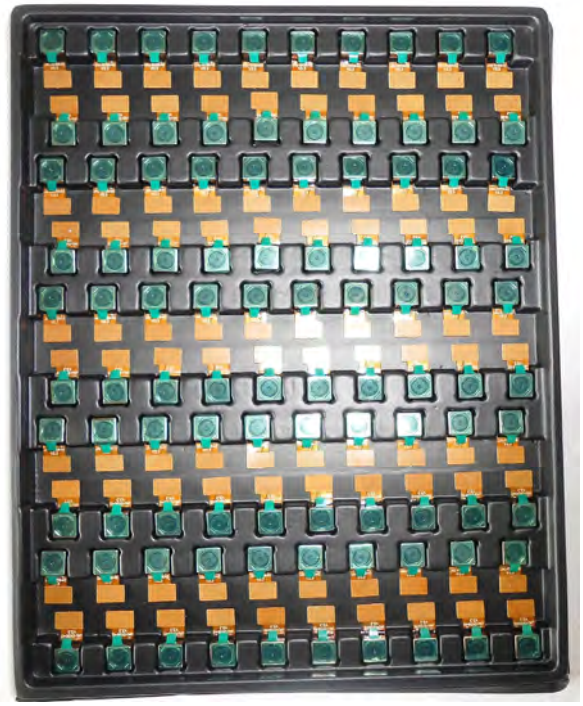
## Camera Modules Package Solution

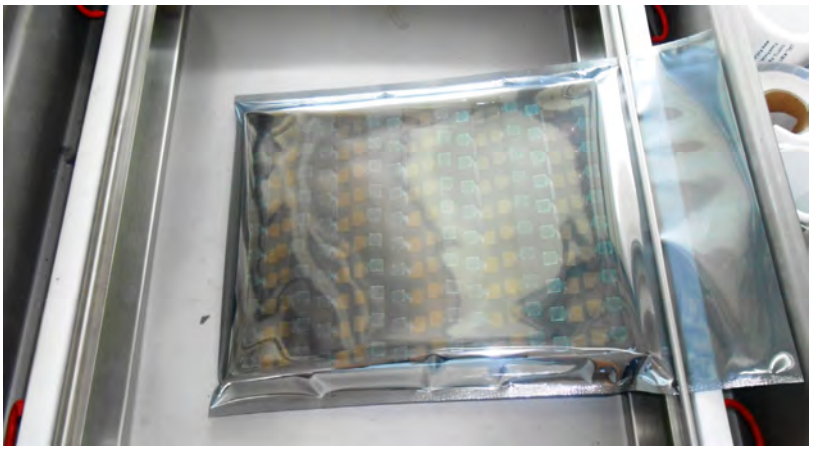
Full Tray of Cameras



Cover Tray with Lid

Put Tray into Anti-Static Bag

Vacuum the Anti-Static Bag



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# 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

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

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


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# 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

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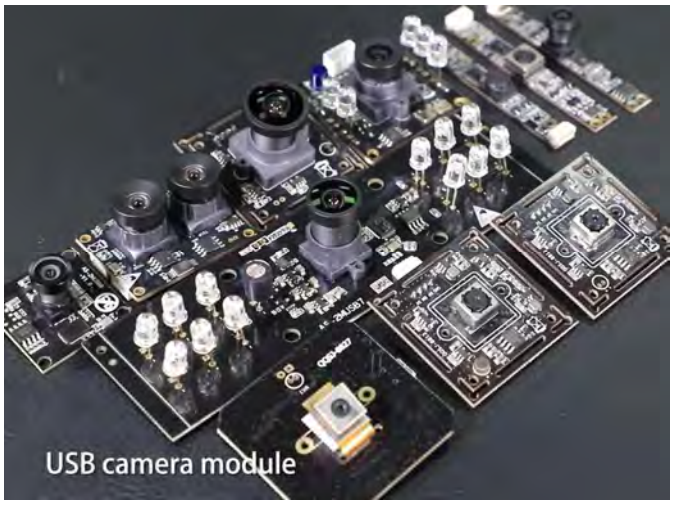
**Company Kai Lap Technologies (KLT)**

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

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

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


**Limited Warranty**

KLT provides the following limited warranty if you purchased the Product(s) directly from KLT company or from KLT's website, www.KaiLapTech.com. 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 subsequential events.

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**KLT Strength**

Powerful Factory

Professional Service

Promised Delivery

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