KLT-D3MA-IMX214 V2.2

13MP Sony IMX214 MIPI Interface Auto Focus Camera Module

Front View

Back View

Specifications

Camera Module No.	KLT-D3MA-IMX214 V2.2
Resolution	13MP
Image Sensor	IMX214
Sensor Type	1/3.06"
Pixel Size	1.12 um x 1.12 um
EFL	3.85 mm
F.NO	2.20
Pixel	4224 x 3136
View Angle	74.4°(DFOV) 62.7°(HFOV) 48.7°(VFOV)
Lens Dimensions	8.50 x 8.50 x 5.60 mm
Module Size	20.85 x 8.50 mm
Module Type	Auto Focus
Interface	MIPI
Auto Focus VCM Driver IC	FP5510
Lens Type	650nm IR Cut
Operating Temperature	-20°C to +70°C
Mating Connector	BBR43-30KB533

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KLT-D3MA-IMX214 V2.2

13MP Sony IMX214 MIPI Interface Auto Focus Camera Module

Top View

Side View

Bottom View

Mating Connector

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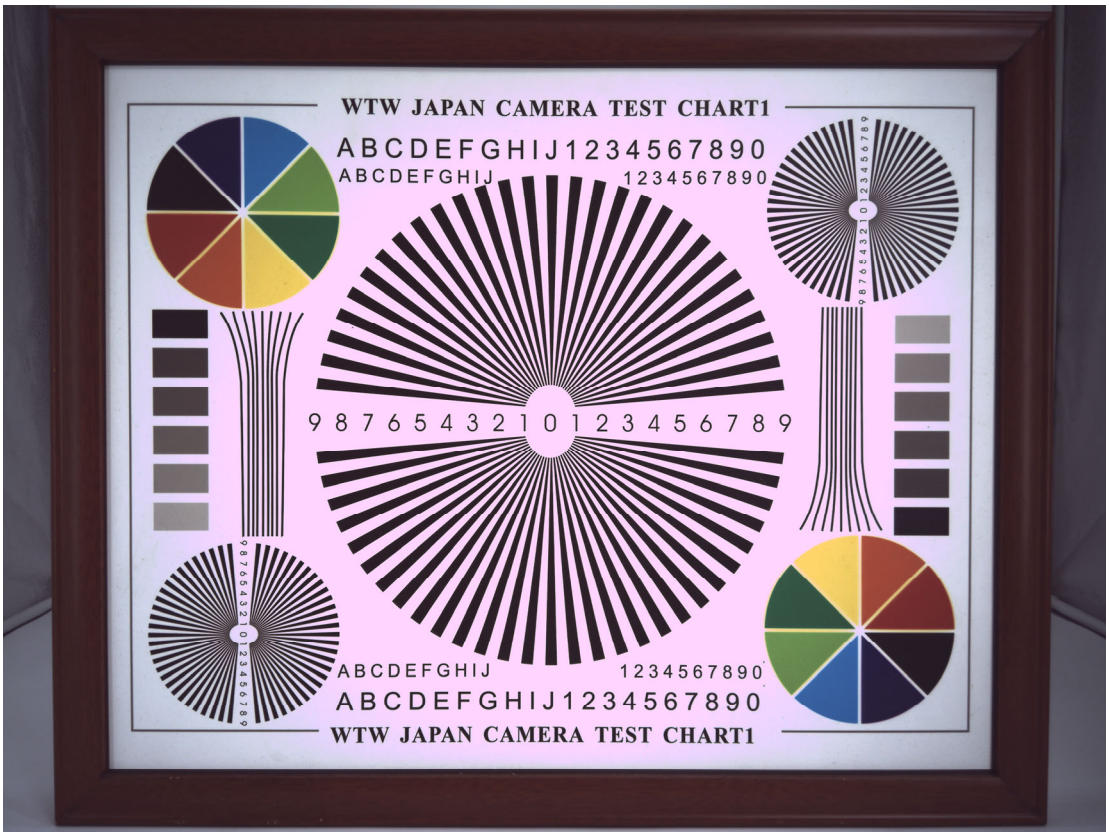

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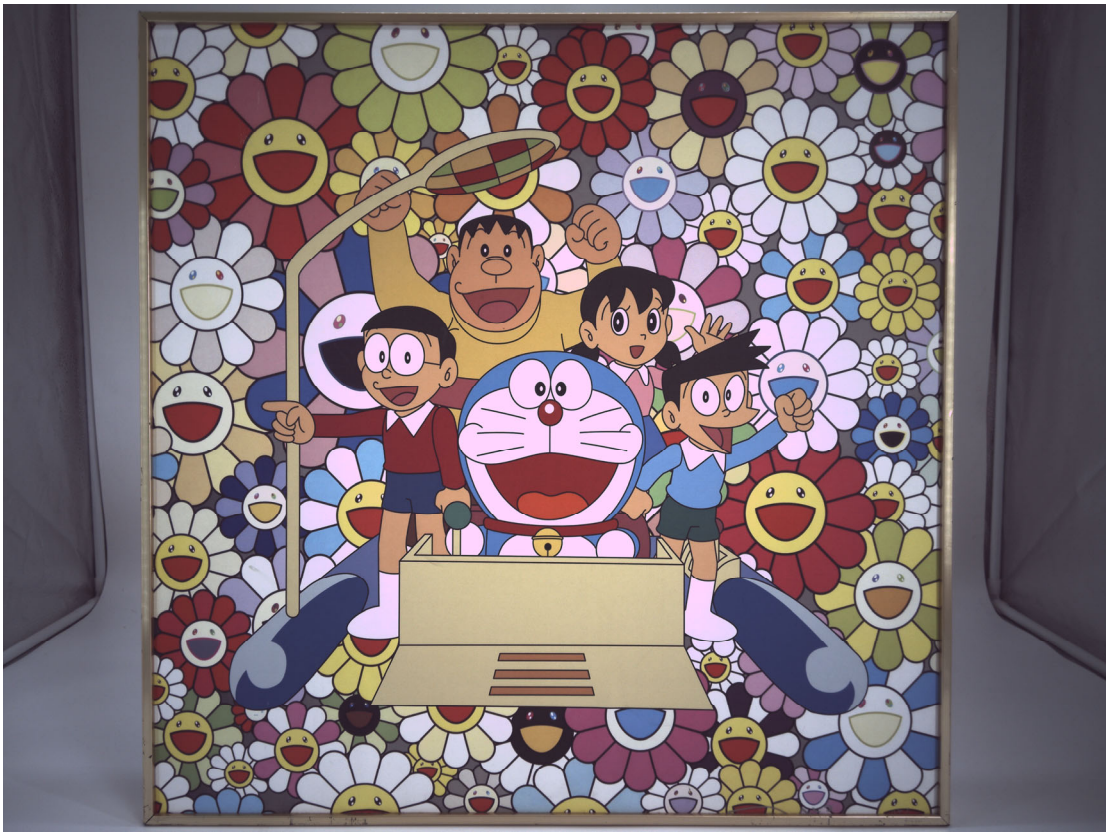

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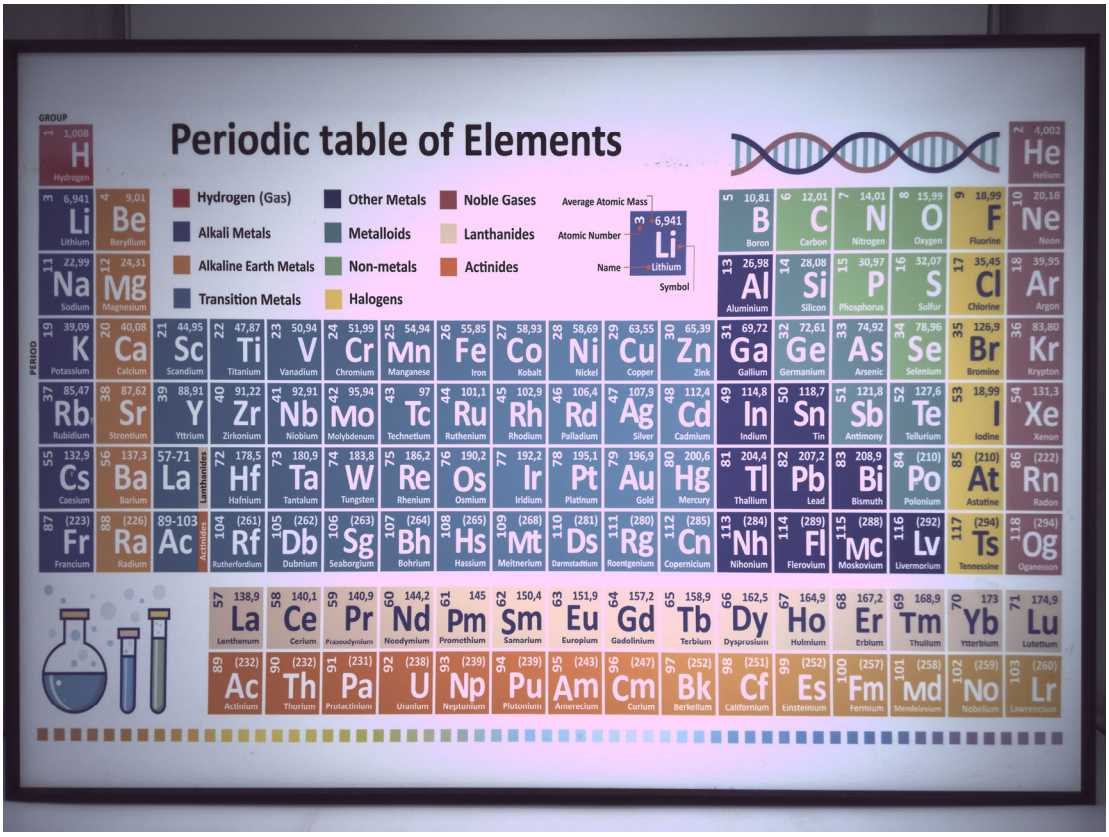

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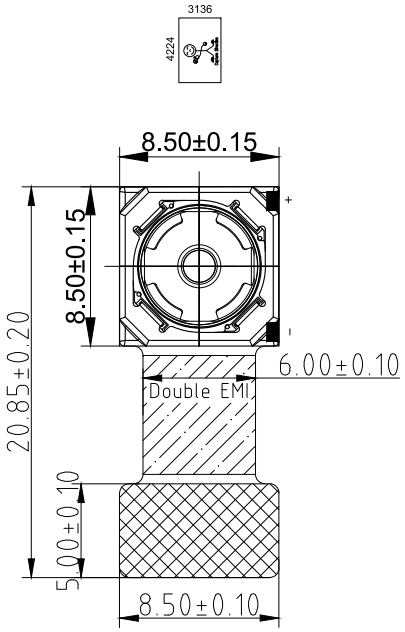
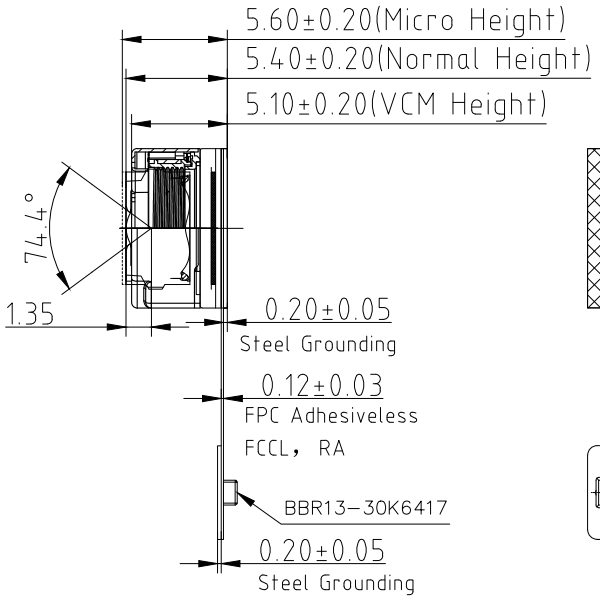
RoHS	
0	SIGNAL
1	GND
2	GND
3	GND
4	GND
5	AFVDD2.8V
6	AFEN
7	SDA
8	DOVDD1.8V
9	SCL
10	DVDD1.0V
11	GND
12	XSHUTDOWN
13	MCN
14	NC
15	MCP
16	GND
17	MD0N
18	MCLK
19	MD0P
20	GND
21	MD1N
22	FLASH
23	MD1P
24	AVDD2.8V
25	VPP(NC)
26	AGND
27	MD2N
28	MD3N
29	MD2P
30	MD3P

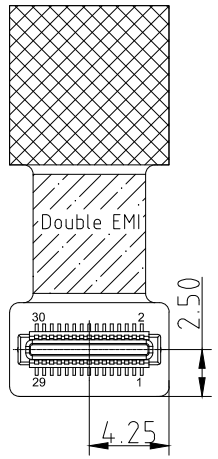
Version	Information
V1.0	First Version
V2.0	Update the capture direction
V2.2	Change VCM



TOP VIEW



SIDE VIEW



BOTTOM VIEW

NOTE:
1.The device slave address:0x34;
2.Driver IC and its I2C Address:
FP5510; 0x18h;

Parameters:

1、Sensor specification:

Image Sensor: IMX214
Pixel: 1.12um×1.12um
Lens Type: 1/3.06
Important Voltage Description: DVDD1.0V (external power supply);

2、Lens specification:

FOV: 74.4°(D);62.7°(H);48.7°(V);
F/NO.: 2.2
TV distortion: <1.5%
Focal length: 3.85mm
Composition: 5P+IR FILTER
IR Cut Coating: 650nm±10nm@50%

Kai Lap Technologies Group Ltd

Designed By	Kevin	Model Name:	KLT-D3MA-IMX214 V2.2
Checked By	Jacky	Projection Type: Third Angle	Unit: mm / Date: 4/7/2025 / Scale: 1:1 / Sheet: 1 of 1 / Version: 1/0

SONY

[Product Brief]

Ver.1.0

IMX214

Diagonal 5.867mm (Type 1/3.06) 13M Pixel CMOS Image Sensor with Square Pixel for Color Cameras

Description

IMX214 is a diagonal 5.867mm(Type 1/3.06) 13M pixel CMOS active pixel type stacked image sensor with a square pixel array. It adopts Exmor RS™ technology 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. By introducing spacially varying exposure technology, high dynamic range still pictures and movies are achievable. It equips an electronic shutter with variable integration time. It operates with three power supply voltages: analog 2.7 V, digital 1.0V and 1.8 V for input/output interface and achieves low power consumption.
IMX214 is designed for use in cellular phones or tablet devices*.

.

Functions and Features

- ◆Back illuminated and stacked CMOS image sensor Exmor RS
- ◆Single Frame High Dynamic Range (HDR) with equivalent full pixels.
- ◆High signal to noise ratio (SNR).
- ◆Full resolution @30fps (Nornmal / HDR).4K2K @30fps (Normal / HDR)1080p @60fps (Normal / HDR)
- ◆Output video format of RAW10/8, COMP8/6
- ◆Pixel binning readout and H/V sub sampling function
- ◆Advanced Noise Reduction (Chroma noise reduction and luminance noise reduction)
- ◆Independent flipping and mirroring.
- ◆CSI 2 serial data output (MIPI 2lane/4lane, Max. 1.2Gbps/lane, DPHY spec. ver. 1.1 compliant)
- ◆2wire serial communication
- ◆Two PLLs for independent clock generation for pixel control and data output interface.
- ◆Advanced Noise Reduction.
- ◆Dynamic Defect Pixel Correction.
- ◆Zero shutter lag.
- ◆Power on reset function
- ◆Dual sensor synchronization operation.
- ◆8K bit of OTP ROM for users.
- ◆Built in temperature sensor

NOTE)
1. When using this product for another application, Sony does not guarantee the quality and reliability of product. Therefore, don’t use this for applications other than cellular phone and Tablet PCs. Consult your Sony sales representative if you have any questions.

Device Structure

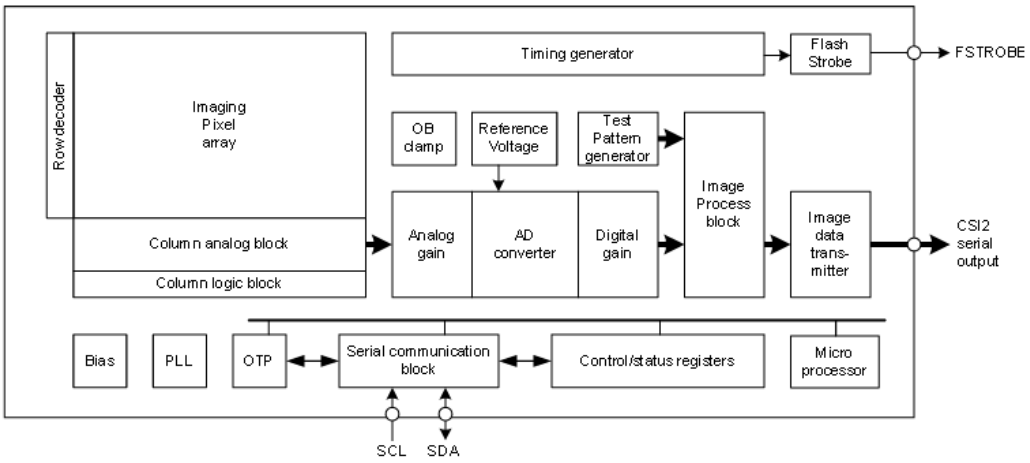
- ◆CMOS image sensor
- ◆Image size : Diagonal 5.867mm (Type 1/3.06)
- ◆Total number of pixels : 4224 (H) ×3200(V) approx. 13.51M pixels
- ◆Number of effective pixels : 4224 (H) ×3136 (V)approx. 13.25 M pixels
- ◆Number of active pixels : 4208 (H) ×3120 (V) approx. 13.13 M pixels
- ◆Chip size : 6.100mm (H) × 4.524mm (V)
- ◆Unit cell size : 1.12 μm (H) × 1.12 μm (V)
- ◆Substrate material : Silicon

Functional Description

System Outline

IMX214 is a CMOS active pixel type image sensor which adopts the Exmor RS ™ technology to achieve high sensitivity, low noise and high speed image capturing. It is embedded with backside illuminated imaging pixel, low noise analog amplifier,
column parallel A/D converters which enables high speed capturing, digital amplifier, image binning circuit, timing control circuit for imaging size and frame rate, CSI2 image data high speed serial interface, PLL oscillator, and serial communication interface to control these functions.
Several additional image processing functions and peripheral circuits are also included for easy system optimization by the users. A one time programmable memory is embedded in the chip for storing the user data. It has 8 K-bit for users, 10 K-bit as a whole.

Block Diagram



Exmor RS

* Exmor RS is a trademark of Sony Corporation. The Exmor RS is a Sony's CMOS image sensor with high-resolution, high-performance and compact size by replacing a supporting substrate in Exmor R™ which changed fundamental structure of Exmor™ pixel adopted column parallel A/D converter to back-illuminated type, with layered chips formed signal processing circuits.

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Application circuits shown, if any, are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits.

FP5510

10-Bit DAC 120mA VCM Driver with I²C Interface

Description

The FP5510 is a single 10-bit DAC with 120mA output current voice coil motor (VCM) driver, with an I²C-compatible serial interface that operates at clock rates up to 400kHz. Its supply operates from 2.3V to 3.6V.

The FP5510 incorporates with a power-on reset circuit, power-down function. Power-on reset circuit ensure when supply power up, DAC output is to 0V until valid write bit value takes place. In power down mode, the supply current is about 1μA.

The FP5510 is designed for auto focus operation includes digital camera module, optical zoom camera phones and lens auto focus. The I²C address of FP5510 is 0x18h.

The FP5510 with WLCSP package which it is suitable for reduced-space mounting in mobile phone and other portable applications.

Features

- Power Supply Voltage Rang: 2.3V to 3.6V
- VCM Driver for Auto-Focus
- 10-Bit Resolution Current Sinking of 120mA for VCM
- 2-Wire I²C Interface (1.8V Interface Compatible)
- Internal 4 Slope Control Mechanism
  1. Enhance Slope Control Mode
  2. One Step Mode
  3. Linear Slope Mode
  4. Two Step Slope Mode
- Power-Save Mode Current < 1μA
- Power On Reset (POR)
- Small Size: 0.7mm×1.1mm (6-Balls WLCSP)

Applications

- Digital Camera Module
- Cell Phone
- Lens Cover
- Web Camera

Pin Assignments

6-Ball WLCSP

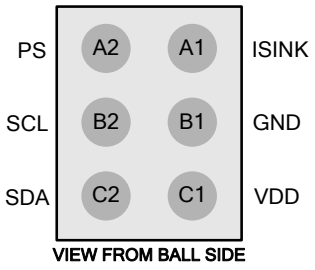


Figure 1. Pin Assignment of FP5510

Ordering Information

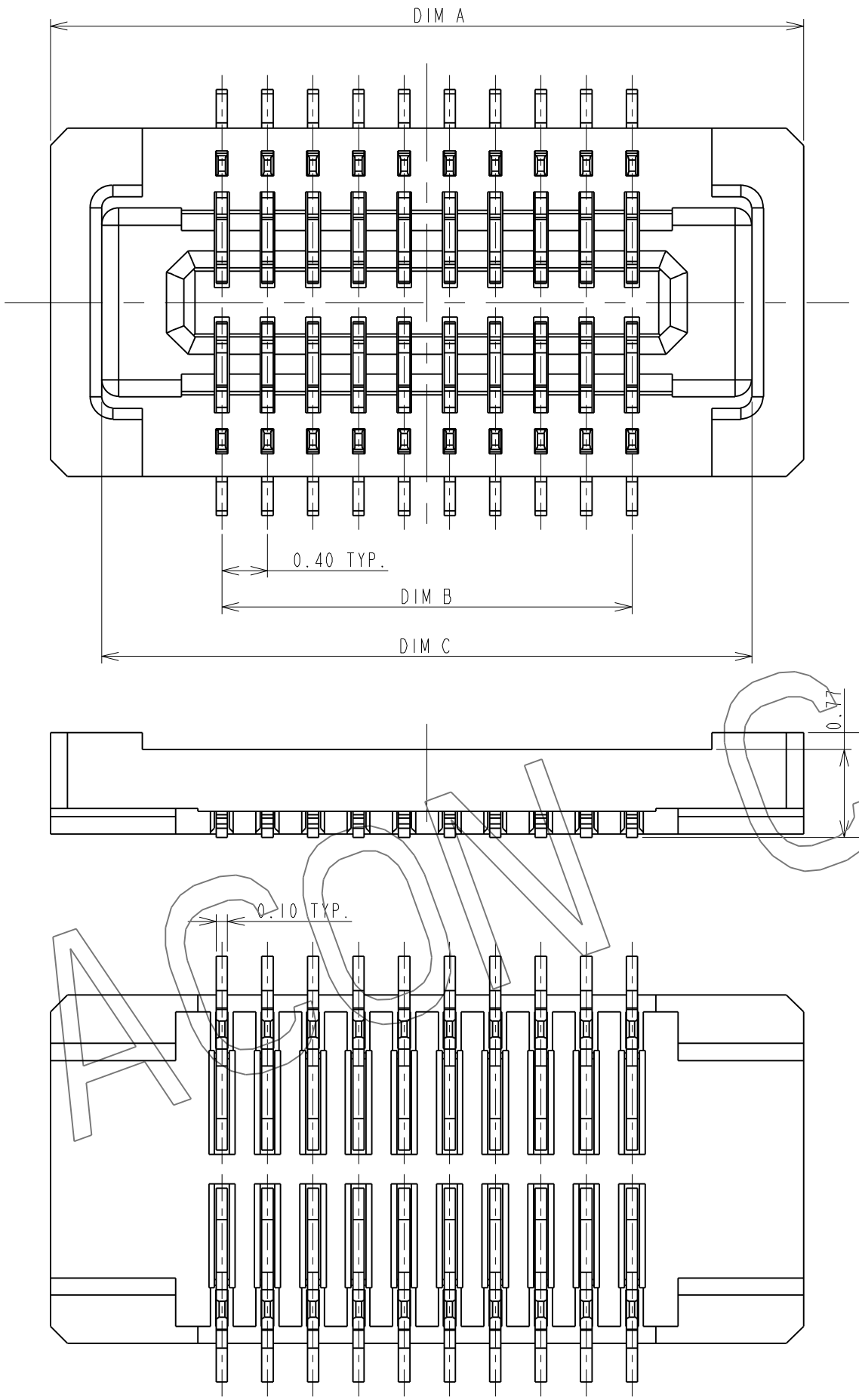
FP5510□

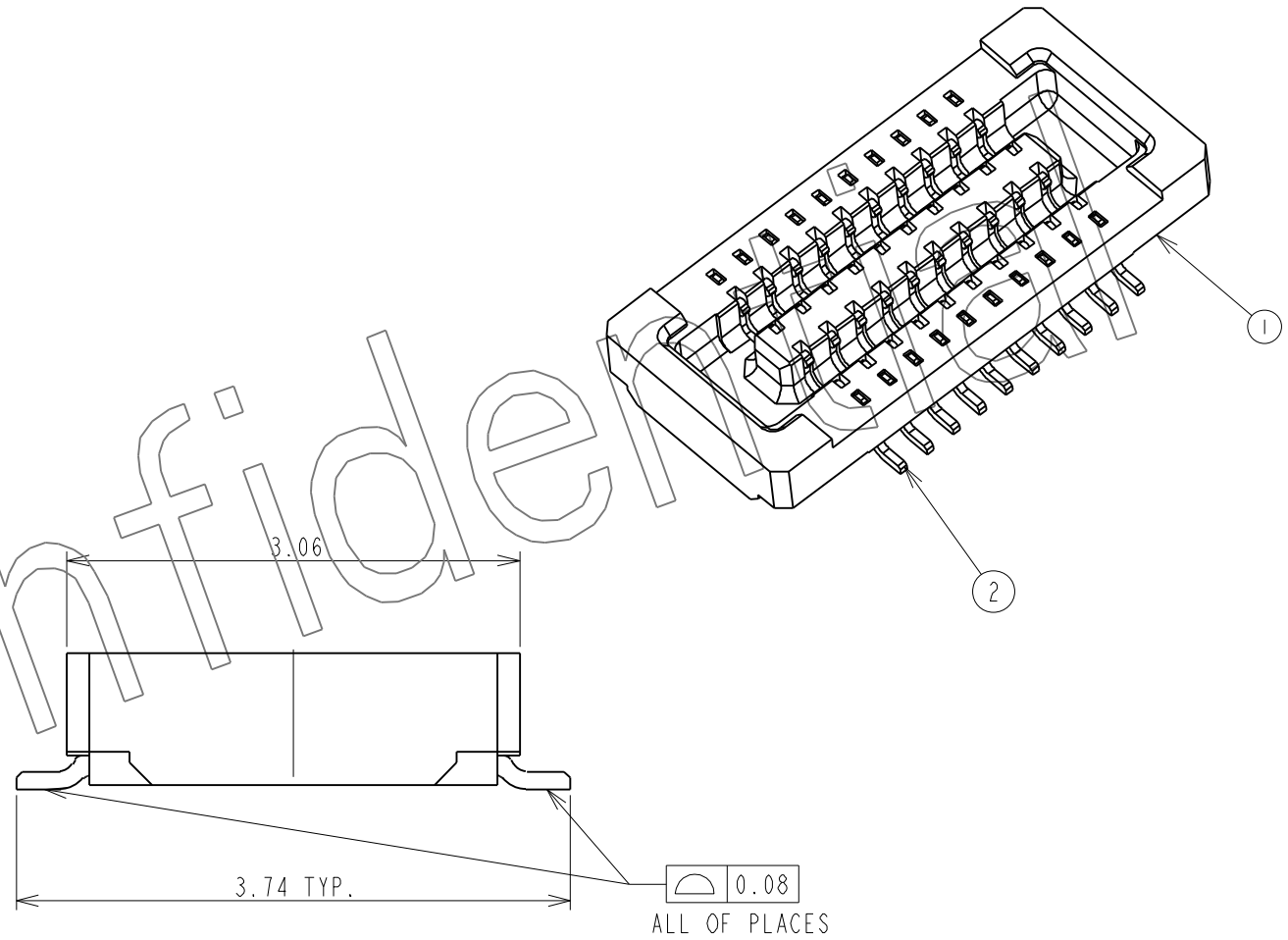
Package Type
E2: WLCSP (6-Ball)

WLCSP-6 (0.7mmx1.1mm) Marking

Part Number	Product Code
FP5510E2	2

REV.	EC#	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
A	TJECR10018-02	NEW RELEASE PER NPR10009	11/05/10'	RAIN	DICK.SON	HARDWARE
B	TJECR13014	B XI,AXI	05/13/13'	RAIN	Steve.M eng	Jeff





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ITEM	NAME	Q'TY	PART #	MATERIAL / FINISH
2	CONTACT	XX	T-BBR43-100X30	COPPER ALLOY/PLATING GOLD
1	HOUSING	1	1-BBR43-1XXX33	HIGH TEMP RESIN/UL 94 V-0

TOLERANCES UNLESS OTHERWISE SPECIFIED
GENERAL X. ±0.38, .X ±0.25, .XX ±0.13, .XXX ±0.05
ANGLES X°. ±3.0°, .X° ±2.0°, .XX° ±1.0°

SCALE 20:1
SHEET 1 OF 2
UNIT mm

DRAWN	RAIN	04/15/10'
DESIGN	RAIN	04/15/10'
CHECKED	HARDWARE	04/24/10'
APPROVED	DICK.LEE	04/24/10'

CUSTOMER DRAWING

ACON ADVANCED— CONNECTEK INC.

TITLE: P0.4*H1.0mm BOARD TO BOARD CONN.RECEPTACLE WITHOUT HOLD DOWN

SERIES: BBR | SIZE: A3
DWG NO.: C-BBR43-04-01 | REV.: B

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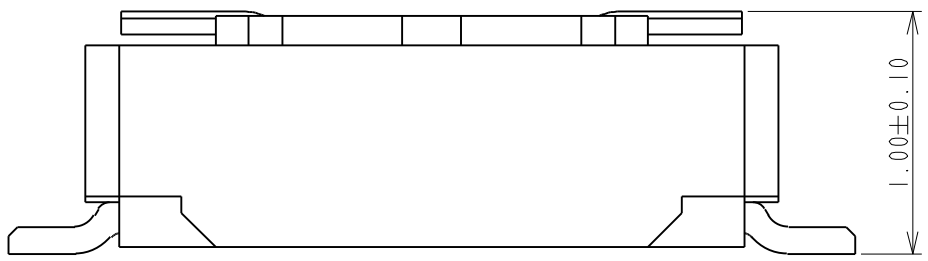

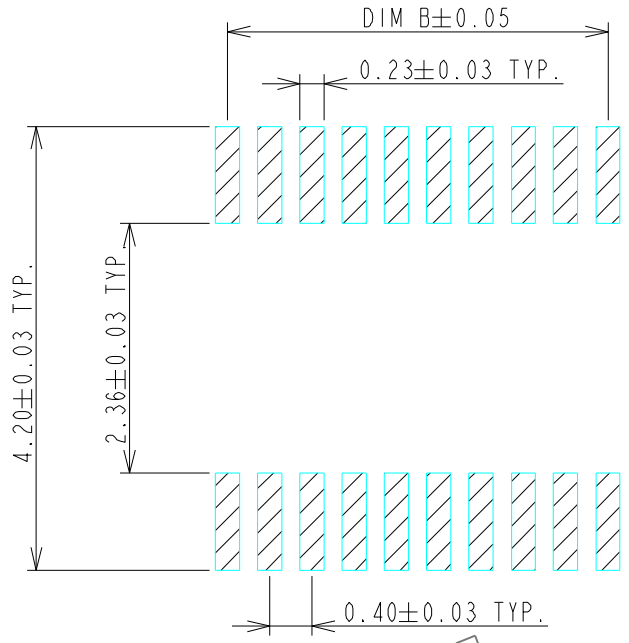

RECOMMENDED P.C.BOARD PATTERN DIMENSION (WITHOUT HOLD DOWN)

PRODUCT NUMBERING CODE:

BBR43	-	XX	K	X	5	X	X
1		2	3	4	5	6	7

1.PRODUCTION CODE:

BBR43:BOARD TO BOARD 0.4 PITCH RECEPTACLE

2.POSITIONS:

XX: POSITIONS(SEE TABLE A

3.INSULATOR COLOR:

K: BLACK

4.CONTACT PLATING:

1:GOLD 1u" MIN

2.GOLD 5u" MIN

3:GOLD 10u" MIN

B:GOLD 4u" MIN FOR SPOT PLATING

ALL OVER Ni 50~100u"

5.TYPE OF HEIGHT:

5: H=0.77mm

6. TYPE OF HOLD DOWN:

3: WITHOUT HOLD DOWN

7.OTHER

2: WITH POST,FINISHED PRODUCTS

3: WITHOUT POST,FINISHED PRODUCTS

TABLE A:

POSITIONS	DIM A	DIM B	DIM C
10	4.61	1.60	3.71
14	5.41	2.40	4.51
16	5.81	2.80	4.91
18	6.21	3.20	5.31
20	6.61	3.60	5.71
22	7.01	4.00	6.11
24	7.41	4.40	6.51
26	7.81	4.80	6.91
30	8.61	5.60	7.71
32	9.01	6.00	8.11
34	9.41	6.40	8.51
40	10.61	7.60	9.71
44	11.41	8.4	10.51
48	12.21	9.20	11.31
50	12.61	9.60	11.71
54	13.41	10.40	12.51
60	14.61	11.60	13.71
70	16.61	13.60	15.71
80	18.61	15.60	17.71

NOTES:

1.0: RATING:

1.1: VOLTAGE:60V AC/DC

1.2: CURRENT:0.5 AMPS

1.3: OPERATION TEMPERATURE:-40°C TO +85°C

2.0: ELECTRICAL CHARACTERISTIC:

2.1: CONTACT RESISTANCE: 50 mΩ MAX INITIAL

2.2: INSULATION RESISTANCE: 1000 MΩ MIN INITIAL

2.3: DIELECTIC WITHSTANDING VOLTAGE: 250V AC FOR ONE MINUTE

3.0 TOLERANCES UNLESS OTHERWISE SPECIFIED

GENERAL:	DIMENSION >10.00	±0.13
	DIMENSION 5.00~10.00	±0.10
	DIMENSION <5.00	±0.05

⚠B 4.0 ALL COPLANARITY IS 0.08mm MAX.BEFORE REFLOW

ALL COPLANARITY IS 0.10mm MAX.AFTER REFLOW

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TOLERANCES UNLESS OTHERWISE SPECIFIED GENERAL X. ±0.38 .X ±0.25 .XX ±0.13 .XXX ±0.05 ANGLES X° ±3.0° .X° ±2.0° .XX° ±1.0°	DRAWN RAIN DATE 04/15/10'	ACON ADVANCED— CONNECTEK INC.
	DESIGN RAIN DATE 04/15/10'	TITLE P0.4*H1.0mm BOARD TO BOARD CONN.RECEPTACLE WITHOUT HOLD DOWN
SCALE 20:1	CHECKED HARDWARE DATE 04/24/10'	
SHEET 2 OF 2	APPROVED DICK.LEE DATE 04/24/10'	SERIES BBR / SIZE A3
UNIT mm	CUSTOMER DRAWING	DWG NO. C-BBR43-04-01 / REV. B

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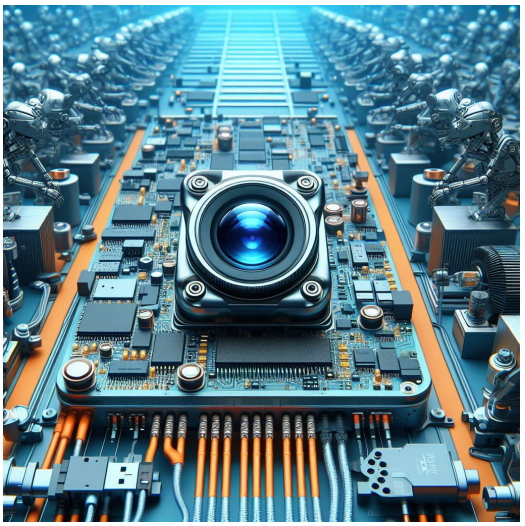
Cameras Applications

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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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

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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 Low -20°C 0.5 Hours 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 60 Seconds 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 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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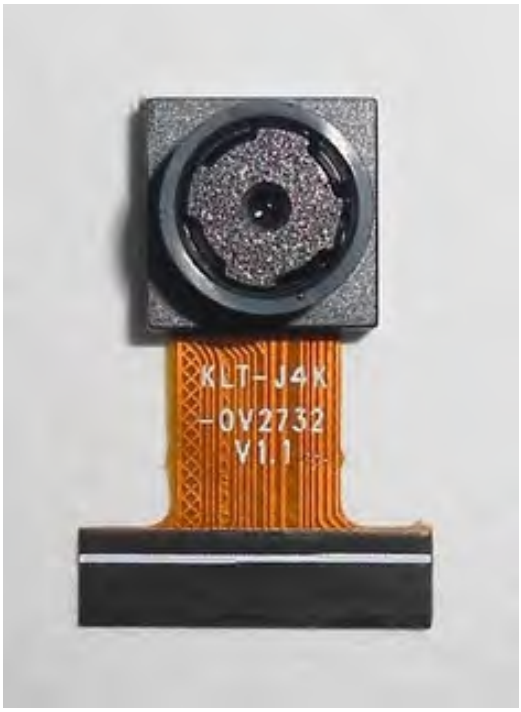
your BEST camera module partner

KLT Package Solutions

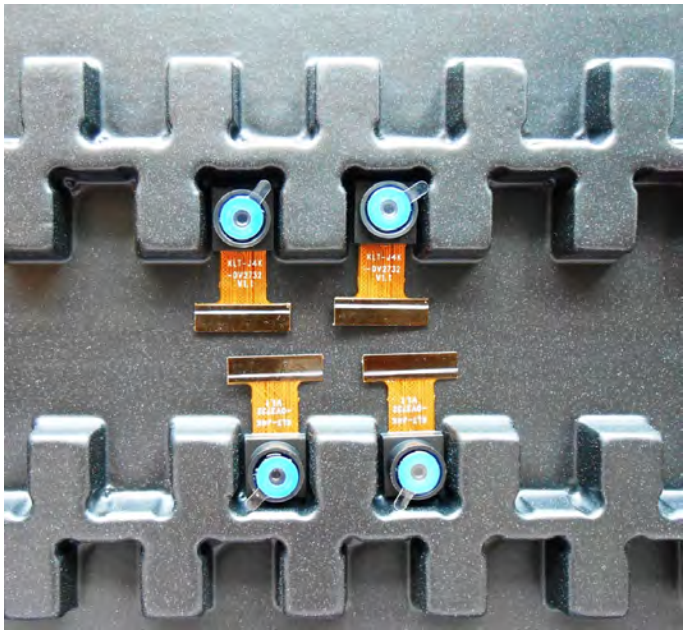
KLT Camera Module



Complete with Lens Protection Film

Tray with Grid and Space

Place Cameras on the Tray



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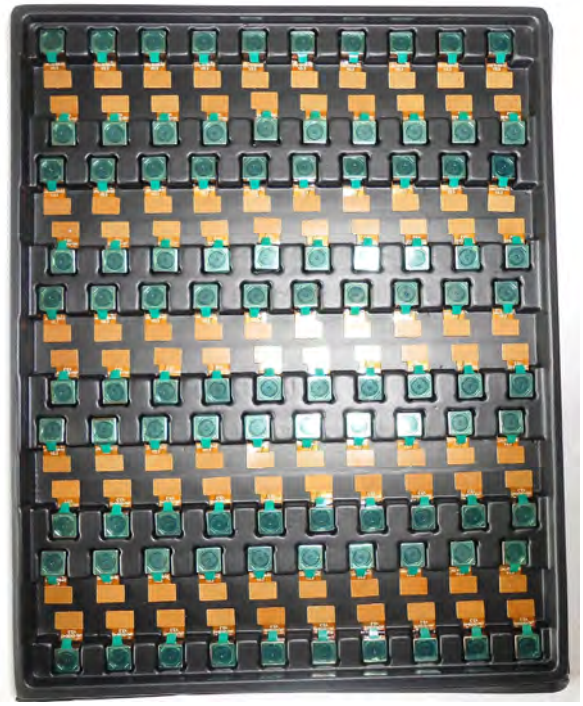
Camera Modules Package Solution

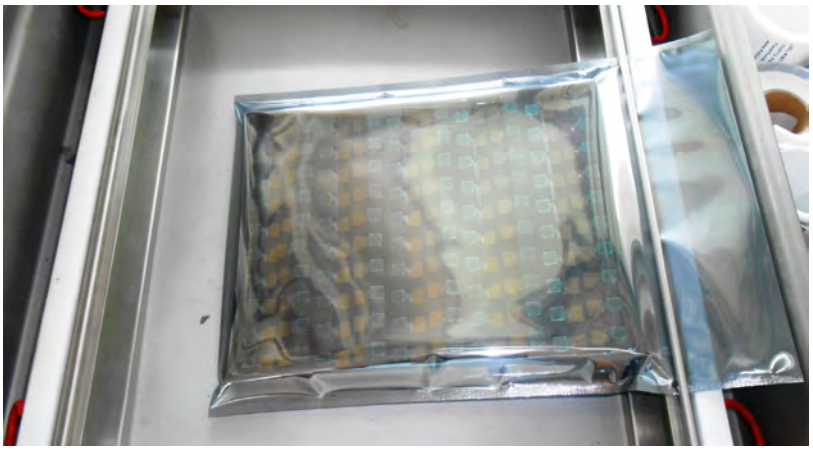
Full Tray of Cameras



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

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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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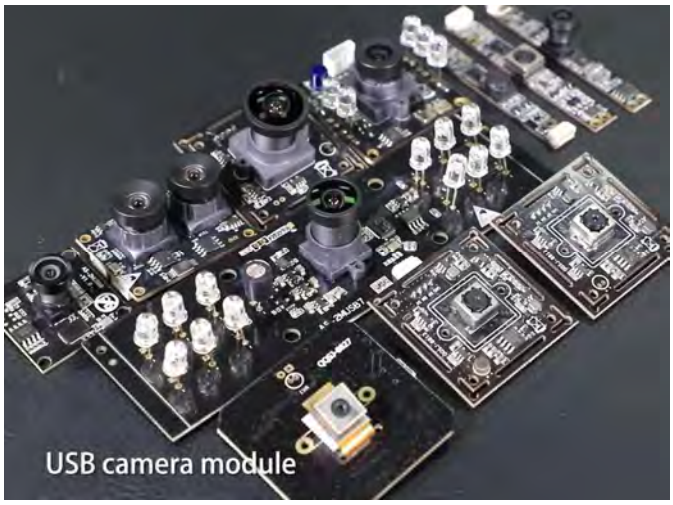
Company Kai Lap Technologies (KLT)

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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