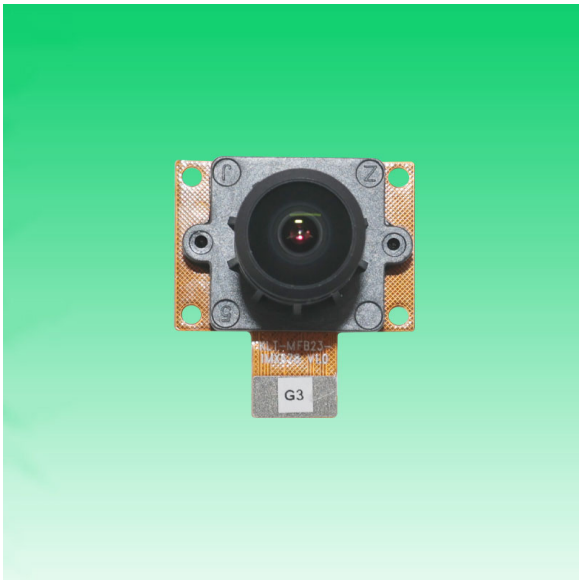
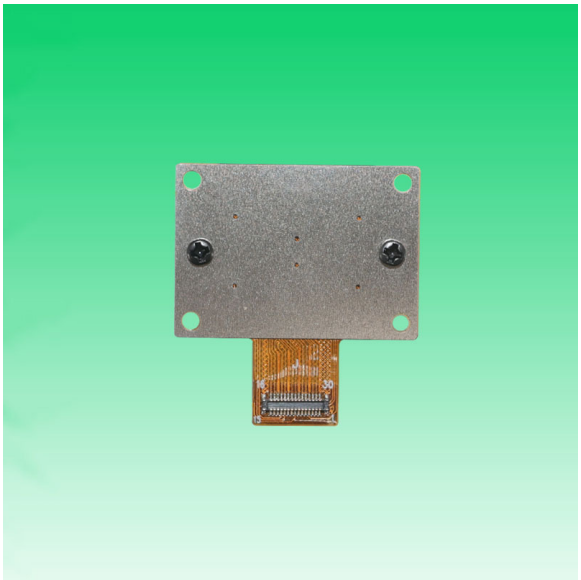
KLT-MFB23-IMX678 V1.0

8.40MP Sony IMX678 MIPI Interface M12 Fixed Focus Camera Module



Front View



Back View

Specifications

Camera Module No.	KLT-MFB23-IMX678 V1.0
Resolution	8.40MP
Image Sensor	IMX678
Sensor Type	1/1.8"
Pixel Size	2.0 um x 2.0 um
EFL	4.00 mm
F.NO	2.00
Pixel	3856 x 2200
View Angle	135.0°(DFOV) 110.0°(HFOV) 72.0°(VFOV)
Lens Dimensions	20.00 x 20.00 x 24.50 mm
Module Size	30.05 x 28.00 mm
Module Type	Fixed Focus
Interface	MIPI
Auto Focus VCM Driver IC	None
Lens Type	650nm IR Cut
Operating Temperature	-30°C to +85°C
Mating Connector	OK-14F030-04

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KLT-MFB23-IMX678 V1.0

8.40MP Sony IMX678 MIPI Interface M12 Fixed Focus Camera Module

Top View

Side View

Bottom View

Mating Connector

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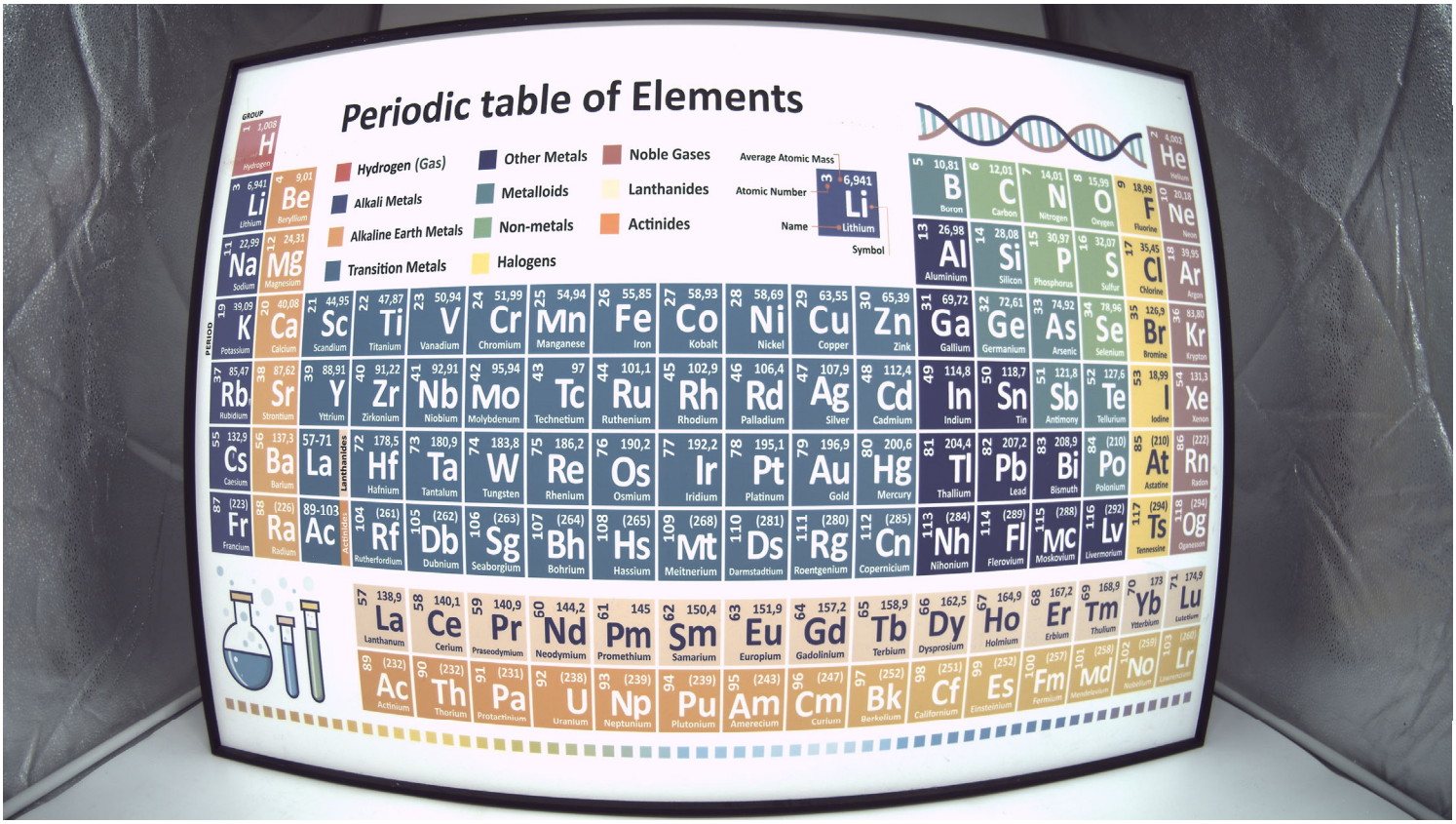

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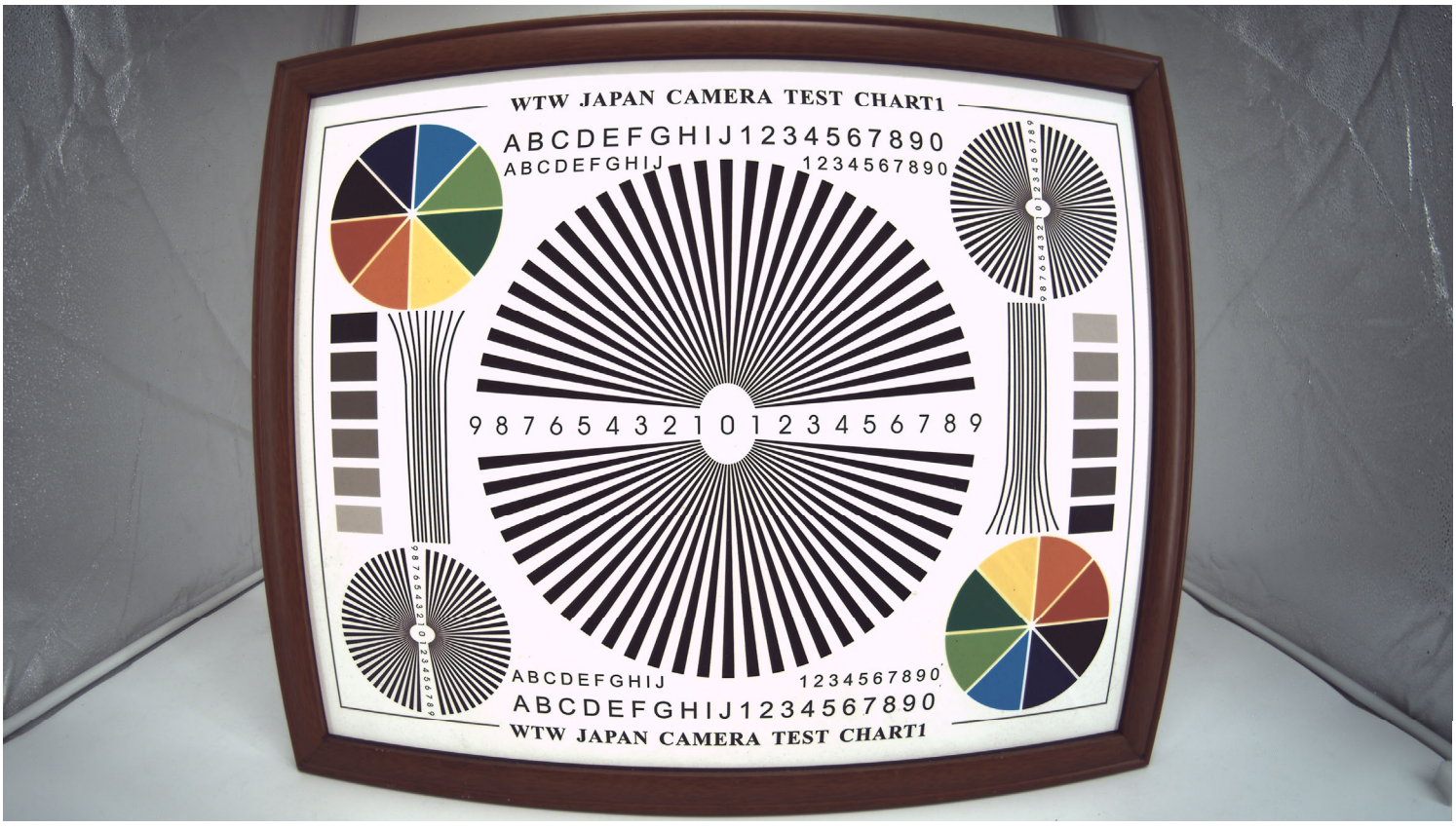

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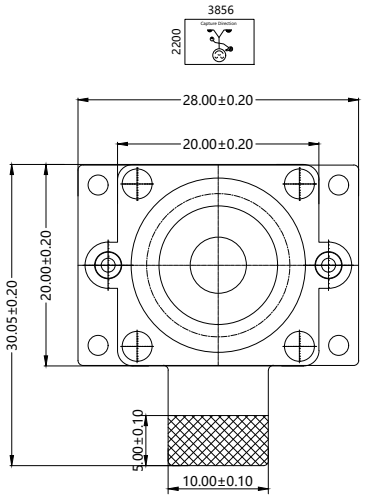
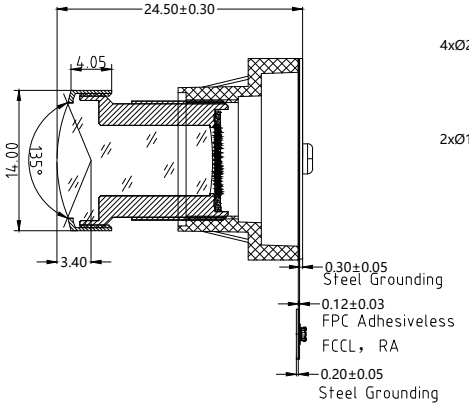
RoHS	
PIN	SIGNAL
1	DGND
2	NC
3	SDA
4	XMASTER
5	DOVDD 1.8V
6	SCL
7	AGND
8	XHS
9	AVDD 3.3V
10	DVDD 1.1V
11	XVS
12	XSHUTDOWN
13	DGND
14	MCLK
15	DGND
16	MDP1
17	MDN1
18	DGND
19	MDP4
20	MDN4
21	DGND
22	MCP
23	MCN
24	DGND
25	MDP2
26	MDN2
27	DGND
28	MDP3
29	MDN3
30	DGND

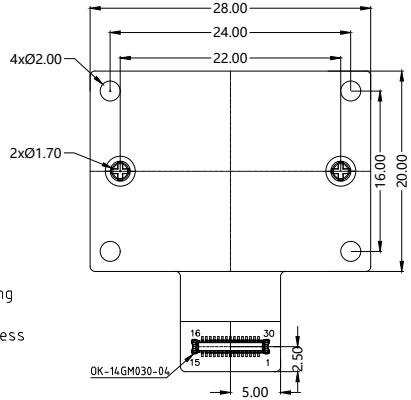
Version	Information
V1.0	First Version



TOP VIEW



SIDE VIEW



BOTTOM VIEW

NOTE:
1.The device slave address:0x34;

Parameters:

1、Sensor specification:

Image Sensor：IMX678-AAQR1-C
Pixel：2.0um*2.0um
Lens Type：1/1.8
Important Voltage Description:
DVDD1.1V (external power supply);

2、Lens specification:

FOV：135°(D),110°(H),72°(V)
F/NO.：2.0
TV distortion：<-35%(V)
Focal length：4mm
Composition：6G+IR FILTER
IR Cut Coating：650nm+850nm

Kai Lap Technologies Group Ltd

Designed By	Kevin	Model Name:	KLT-MFB23-IMX678 V1.0
Checked By	Jacky	Projection Type: Third Angle	Unit: mm / Date: 3/16/2026 / Scale: 1:1 / Sheet: 1 of 1 / Version: 1/0

SONY

[Product Information]

Ver.1.0

IMX678-AAQR1

Diagonal 8.86 mm (Type 1/1.8) CMOS Solid-state Image Sensor with Square Pixel for Color Cameras

Description

The IMX678-AAQR1 is a diagonal 8.86 mm (Type 1/1.8) CMOS active pixel type solid-state image sensor with a square pixel array and 8.40 M effective pixels. This chip operates with analog 3.3 V, digital 1.1 V, and interface 1.8 V triple power supply, and has low power consumption. High sensitivity, low dark current and no smear are achieved through the adoption of R, G and B primary color mosaic filters. This chip features an electronic shutter with variable charge-integration time.
(Applications: Security cameras)

Features

- ◆ CMOS active pixel type dots
- ◆ Built-in timing adjustment circuit, H/V driver and serial communication circuit
- ◆ Input frequency: 13.5MHz / 18MHz / 24MHz / 27MHz / 36MHz / 37.125 MHz / 72 MHz / 74.25 MHz
- ◆ Number of recommended recording pixels: 3840 (H) × 2160 (V) approx. 8.29M pixel
- ◆ Readout mode
  - All-pixel scan mode
  - Horizontal / Vertical 2/2-line binning mode
  - Window cropping mode
  - Horizontal / Vertical direction - Normal / Inverted readout mode
- ◆ Readout rate — Maximum frame rate in All-pixel scan mode: 12 bit: 60 frame/s, 10 bit: 60 frame/s
- ◆ High dynamic range (HDR) function
  - Digital overlap HDR
  - Clear HDR
- ◆ Synchronizing sensors function
- ◆ Variable-speed shutter function (resolution 1H units)
- ◆ CDS / PGA function
  - 0 dB to 30 dB: Analog Gain 30 dB (step pitch 0.3 dB)
  - 30.3 dB to 72 dB: Analog Gain 30 dB + Digital Gain 0.3 dB to 42 dB (step pitch 0.3 dB)
- ◆ Supports I/O
  - CSI-2 serial data output (2 Lane / 4 Lane / 8Lane / 4Lane × 2ch)
  - RAW10 / RAW12 output

STARVIS 2

* STARVIS 2 is a registered trademark or trademark of Sony Group Corporation or its affiliates. The STARVIS 2 is back-illuminated pixel technology used in CMOS image sensors for security camera applications. It features a sensitivity of 2000 mV or more per 1 μm^2 (color product, when imaging with a 706 cd/m^2 light source, F5.6 in 1 s accumulation equivalent). It also has a wide dynamic range (AD 12 bit) of more than 8 dB compared to STARVIS for the same pixel size in a single exposure, and achieves high picture quality in the visible-light and near infrared light regions.

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Device Structure

- ◆CMOS image sensor
- ◆Image size: Diagonal 8.86 mm (Type 1/1.8) approx. 8.40 M pixels, All pixels
- ◆Total number of pixels: 3856 (H) × 2200 (V) approx. 8.48 M pixels
- ◆Number of effective pixels: 3856 (H) × 2180 (V) approx. 8.40 M pixels
- ◆Number of active pixels: 3856 (H) × 2176 (V) approx. 8.39 M pixels
- ◆Number of recommended recording pixels: 3840 (H) × 2160 (V) approx. 8.29 M pixels
- ◆Unit cell size: 2.0 µm (H) × 2.0 µm (V)
- ◆Optical black: Horizontal (H) direction: Front 0 pixels, rear 0 pixels
  Vertical (V) direction: Front 20 pixels, rear 0 pixels
- ◆Dummy: Horizontal (H) direction: Front 0 pixels, rear 0 pixels
  Vertical (V) direction: Front 0 pixels, rear 0 pixels
- ◆Package: 132 pin LGA

Image Sensor Characteristics

(Tj = 60 °C)

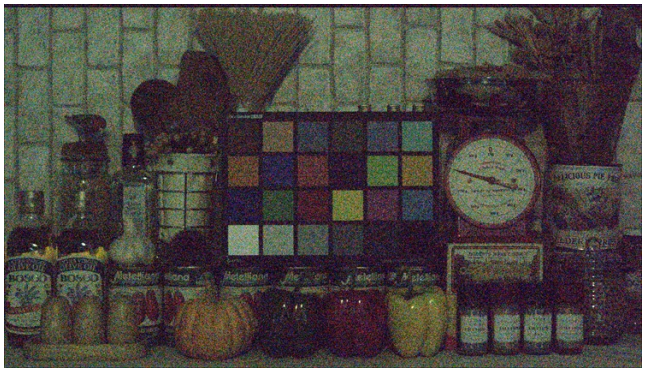
Item		Value	Remarks
Sensitivity (F5.6)	Typ.	15886 Digit/lx/s	12 bit converted value
Saturation signal	Min.	3895 Dight	12 bit converted value

Basic Drive Mode

Drive mode	Recommended number of recording pixels	Maximum frame rate [frame/s]	Output interface	ADC [bit]
All-pixel	3840 (H) × 2160 (V) approx. 8.29 M pixels	60	CSI-2	10
Horizontal/ Vertical 2/2-line binning	1920 (H) × 1080 (V) approx. 2.07 M pixels	60	CSI-2	10

Comparison Image under 0.2 lux

Gain setting of IMX334 is 4times of IMX678, however they can get same output brightness.



IMX334

Condition: F1.6, exposure time 33.3 ms, gain 60 dB

IMX678

Condition: F1.6, exposure time 33.3 ms, gain 48 dB

Comparison Image under NIR at 850 nm

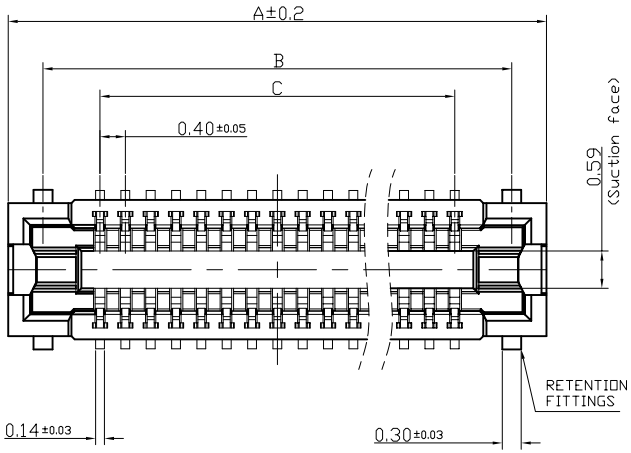
IMX334

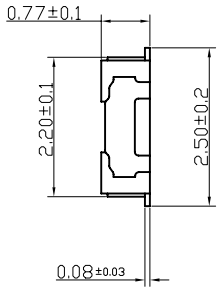
Condition: F1.6, exposure time 33.3 ms, gain 0 dB

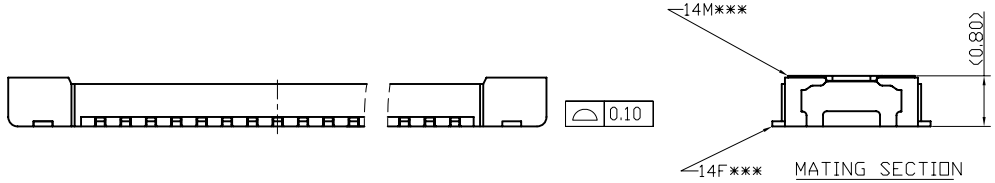
IMX678

Condition: F1.6, exposure time 33.3 ms, gain 0 dB

REV	ECN NO	DRA	APPD	DATE
A	FIRST RELEASE	George Gao	Human Zhou	2013.09.18
B	SECOND VERSINONS	George Gao	Human Zhou	2015.10.22





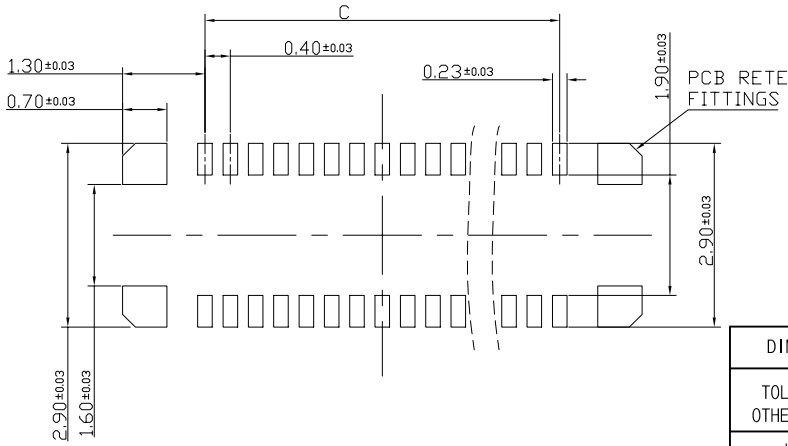


Specifications:

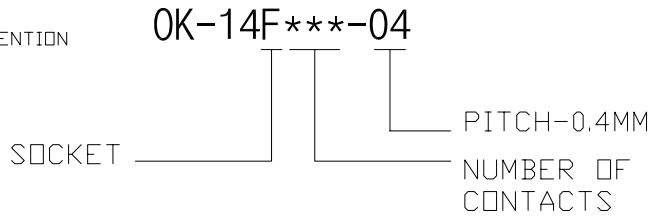
1) Material:
   1-1.Molded portion: LCP resin (UL94 V-0)
   1-2.Contact and Post: Copper alloy.
2) Surface treatment:
   2-1.Terminal portion: Base: Ni plating Surface: Au plating (except the terminal tips) ; Exposed nickel portions.
   2-2.Metal clips: Base: Ni plating Surface: Au flash plating (except the terminal tips) Or Base: Ni plating Surface: Sn flash plating (except the terminal tips)
3) Characteristics:
   3-1. Rated voltage: 60V AC/DC
   3-2. Rated current: 0.3A/contact (Max. 5A at total contact)
   3-3. Insulation resistance: Min. 1000MΩ (initial)
   3-4. Breakdown voltage: 150V AC for 1 min.
   3-5.Saltwater spray resistance (header and socket mated): 24 hours, insulation resistance min.100MΩ, contact resistance max. 90mΩ
   3-6. Contact resistance: Max. 90mΩ
   3-7. Ambient temperature: -55℃-+85℃
   3-8. Storage temperature: -55℃-+85℃ (product only); -40℃-+50℃ (emboss packing)
   3-9. Composite insertion force: Max. 0.981N/contacts X contacts (initial)
   3-10. Composite removal force: Min. 0.165N/contacts X contacts
   3-11. Post holding force: Min. 0.49N/contacts
   3-12. Insertion and removal life: 50 times

TABLE:

70	16.50	15.40	13.60
50	12.50	11.40	9.60
40	10.50	9.40	7.60
34	9.30	8.20	6.40
30	8.50	7.40	5.60
24	7.30	6.20	4.40
16	5.70	4.60	2.80
12	4.90	3.80	2.00
10	4.50	3.40	1.60
NUMBER OF CONTACTS	A	B	C



RECOMMENDED PCB LAYOUT



DIMENTION IN mm		OCN TECHNOLOGY					
TOLERANCE UNLESS OTHERWISE SPECIFIED		APPD:	TITLE: 0.4MM BTB (MATING HEIGHT 0.8H)				
. ±0.20	. ±2°	CHKD:	DWG NO: OK-14F***-04				
.0 ±0.10	.0 ±1°	DRA: George Gao 2015.10.22	PROJ	Q'TY	SIZE	SHEET	SCALE	REV
.00 ±0.05	.00±0.5°			--	A4	1/1	1:1	B
.000±0.03	.000±0.3°							

REV	ECN NO	DRA	APPD	DATE
A	FIRST RELEASE	George Gao	Human zhou	2013.09.12

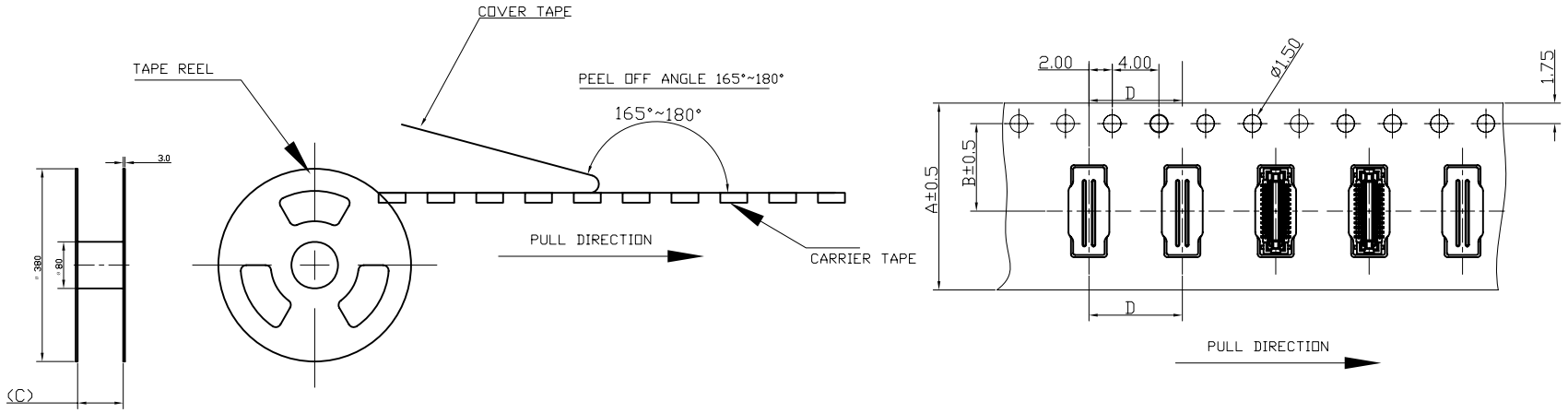


TABLE:

70	24.00	11.50	25.4	8.00	10000
50					
40				4.00	20000
34					
30	16.00	7.50	17.4		
24					
16				8.00	10000
12					
10					
NUMBER OF CONTACTS	A	B	C	D	QTY/REEL

DIMENTION IN mm		OCN TECHNOLOGY						
TOLERANCE UNLESS OTHERWISE SPECIFIED		APPD:	TITLE: 0.4MM BTB (MATING HEIGHT 0.8H)					
. ±0.20	. ±2°	CHKD:	DWG NO: OK-14F***-04					
.0 ±0.10	.0 ±1°	DRA: George Gao 2013.09.18	PROJ	Q'TY	SIZE	SHEET	SCALE	REV
.00 ±0.05	.00±0.5°			--	A4	1/1	1:1	A
.000±0.03	.000±0.3°							

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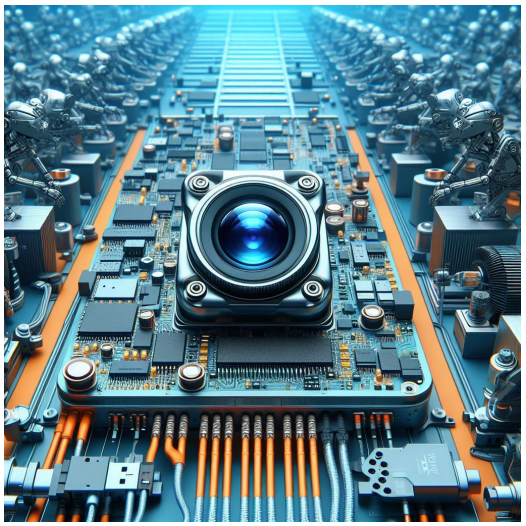
Cameras Applications

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

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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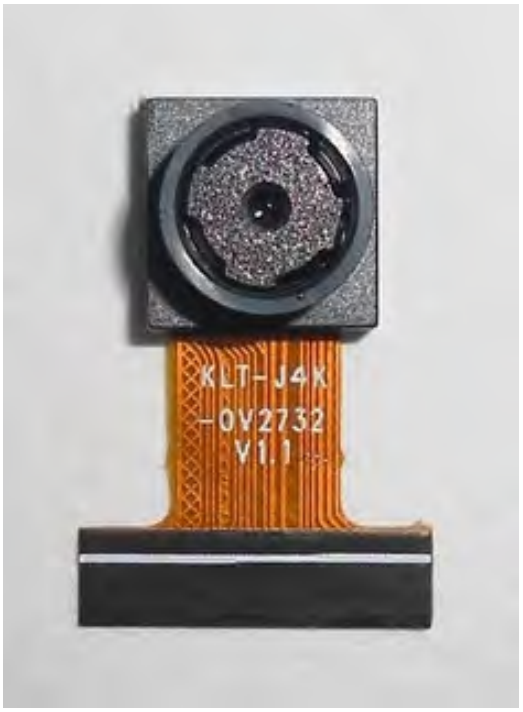
KLT Package Solutions

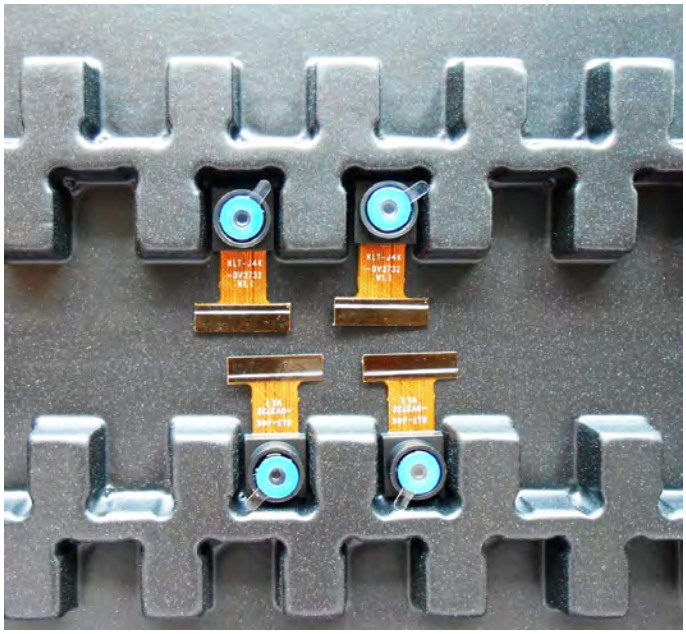
KLT Camera Module



Complete with Lens Protection Film

Tray with Grid and Space

Place Cameras on the Tray



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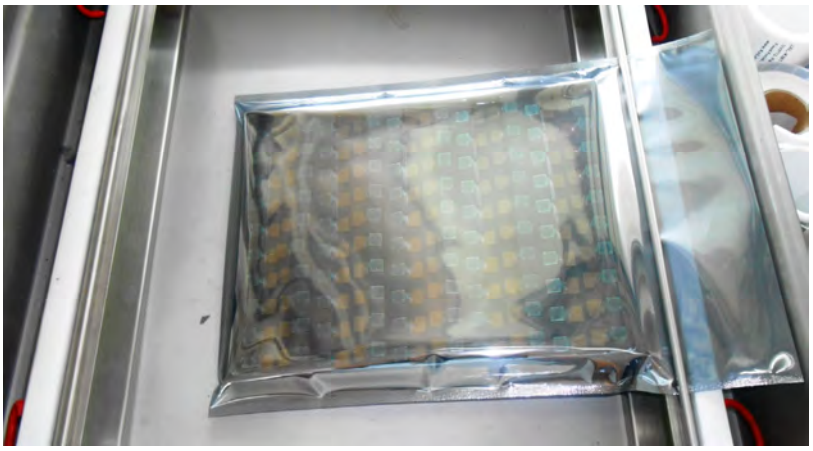
Camera Modules Package Solution

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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CMOS CAMERA MODULES

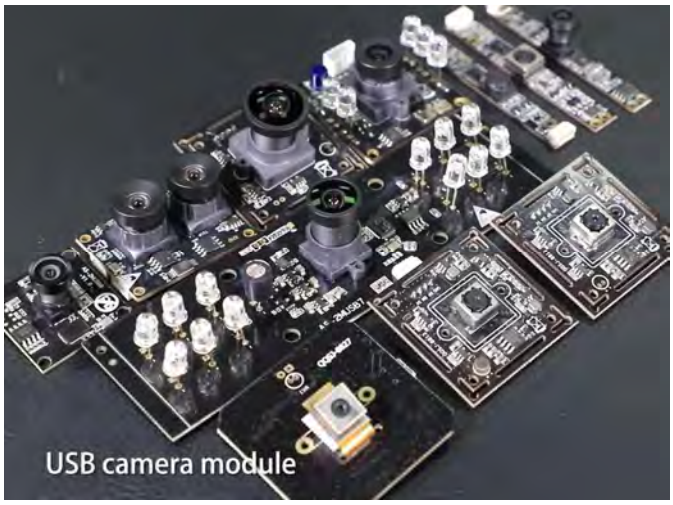
your BEST camera module partner

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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CMOS CAMERA MODULES

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KLT Strength

Powerful Factory

Professional Service

Promised Delivery

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