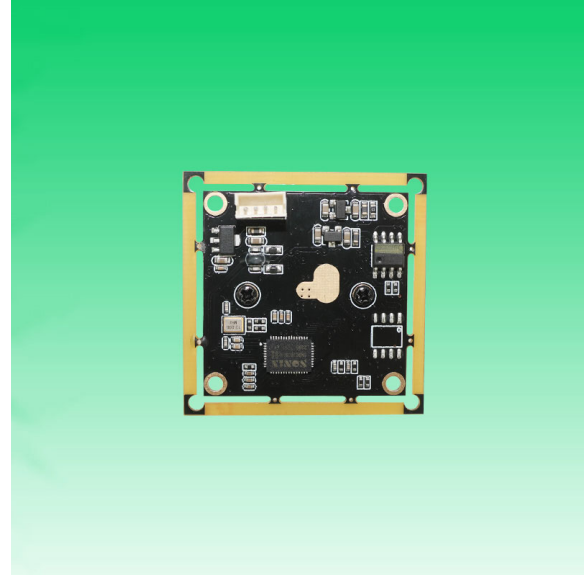


KLT-USB-0318 V1**2.13MP 0318 Sony IMX291 M12 Fixed Focus USB 2.0 Camera Module**

KLT-USB-0318 V1 is a 2.13MP Fixed Focus USB camera module based on 1/2.8" IMX291 image sensor. It delivers high-speed, 1080P resolution ultra sharp image. The S-mount (M12) lens holder enables customers to choose different lens as per varies applications. This camera module is ideal solution for face recognition, identity detection, automotive, access control.

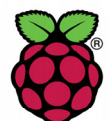
Key Features

- 2K resolution (1920 x 1080) Sony IMX291 sensor
- High speed USB 2.0 Plug and Play
- MJPEG and YUV2 output format
- Low power consumption
- Compact size
- UVC compliant to Windows, Linux, OS with UVC driver
- USB OTG (On-The-Go) support

**KLT-USB-0318 V1****2.13MP 0318 Sony IMX291 M12 Fixed Focus USB 2.0 Camera Module**

Camera Module No.	KLT-USB-0318 V1
Resolution	2.13MP
Image Sensor	IMX291
Sensor Type	1/2.8"
Pixel Size	2.9 um x 2.9 um
EFL	3.60 mm
F.NO	3.00
Pixel	1920 x 1080
View Angle	96.0°(DFOV) 80.0°(HFOV) 65.0°(VFOV)
Lens Dimensions	14.00 x 14.00 x 20.60 mm
Module Type	Fixed Focus
Interface	USB 2.0
Output Format	MJPEG / YUV2
Auto Control	Saturation, Contrast, Acutance White Balance, Exposure
Audio	Optional
Input Voltage	DC 5V
Working Current	Max 500mA
PCB Size	38.00 x 38.00 mm / 32.00 x 32.00 mm
System Compatibility	Windows XP (SP2, SP3), Vista, 7, 8, 10, 11 Android, Mac OS, Linux or OS with UVC Driver Raspberry Pi by USB Port
Software for USB Camera	AMCAP, Webcam Viewer, V4L2 Controls Contacam, VLC Player, MotionEye OS iSpy, ZoneMider, Yawcam
Lens Type	650nm IR Cut
Operating Temperature	-30°C to +85°C
USB Cable	USB Cable

Wide Compatibility with Windows, Android, Mac OS, Linux, or Raspberry Pi



Windows®

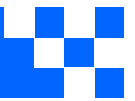
android

Mac OS

Linux

Raspberry Pi

www.KaiLapTech.com sales@KaiLapTech.com Tel: (852) 6908 1256 Fax: (852) 3017 6778

**KLT-USB-0318 V1****2.13MP 0318 Sony IMX291 M12 Fixed Focus USB 2.0 Camera Module**

Top View



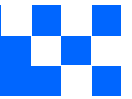
Side View



Bottom View

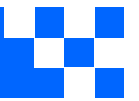


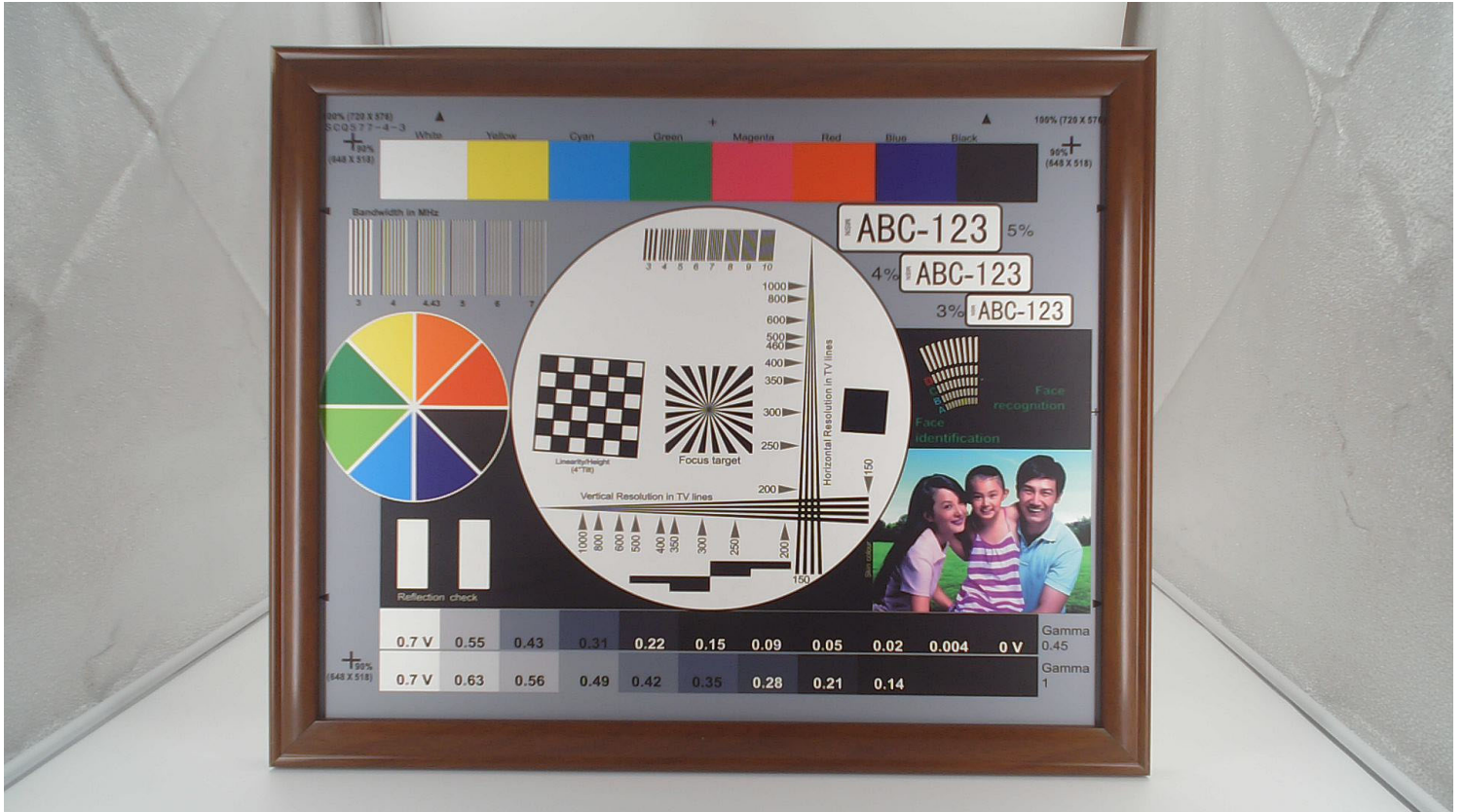
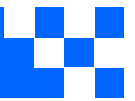
USB Cable

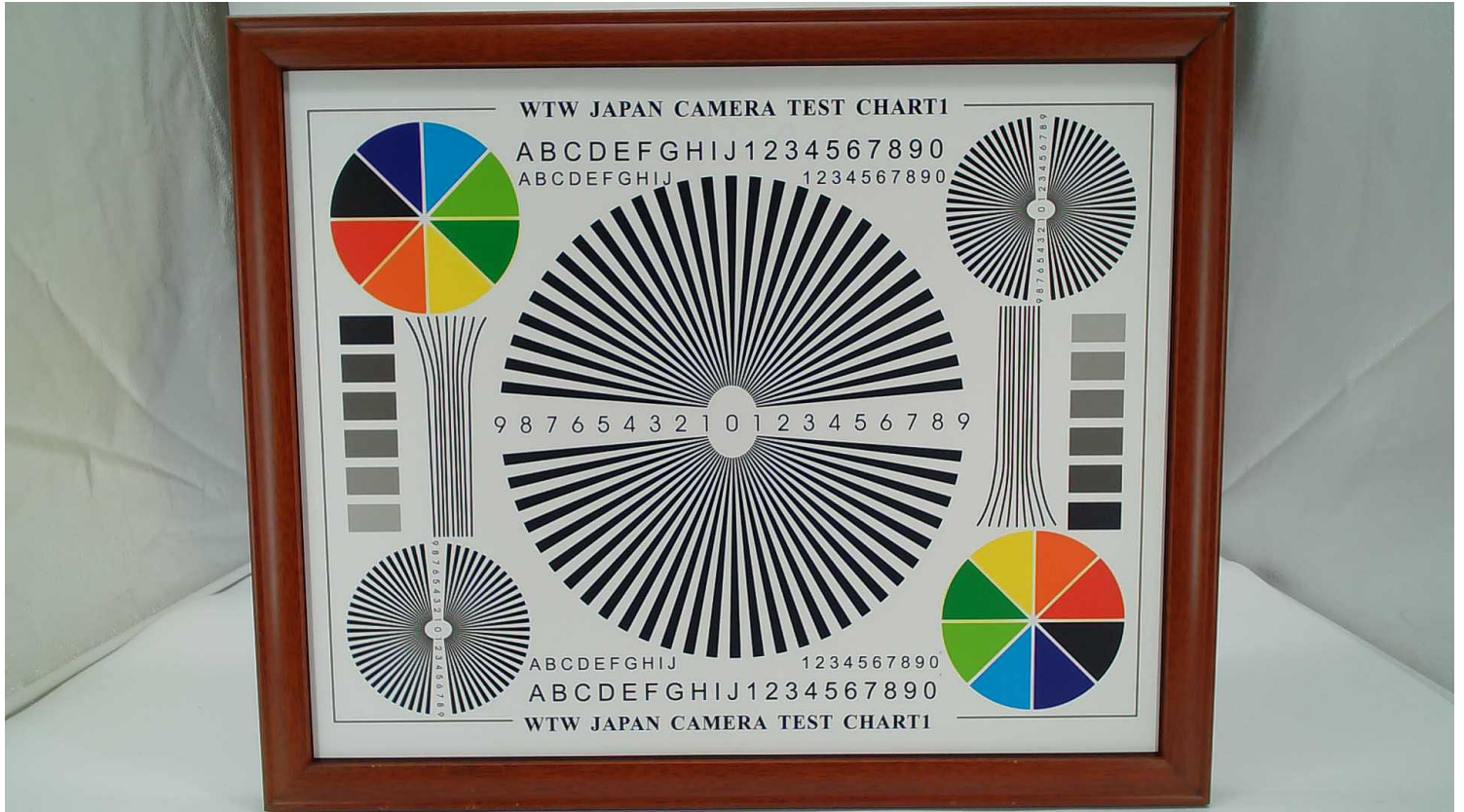
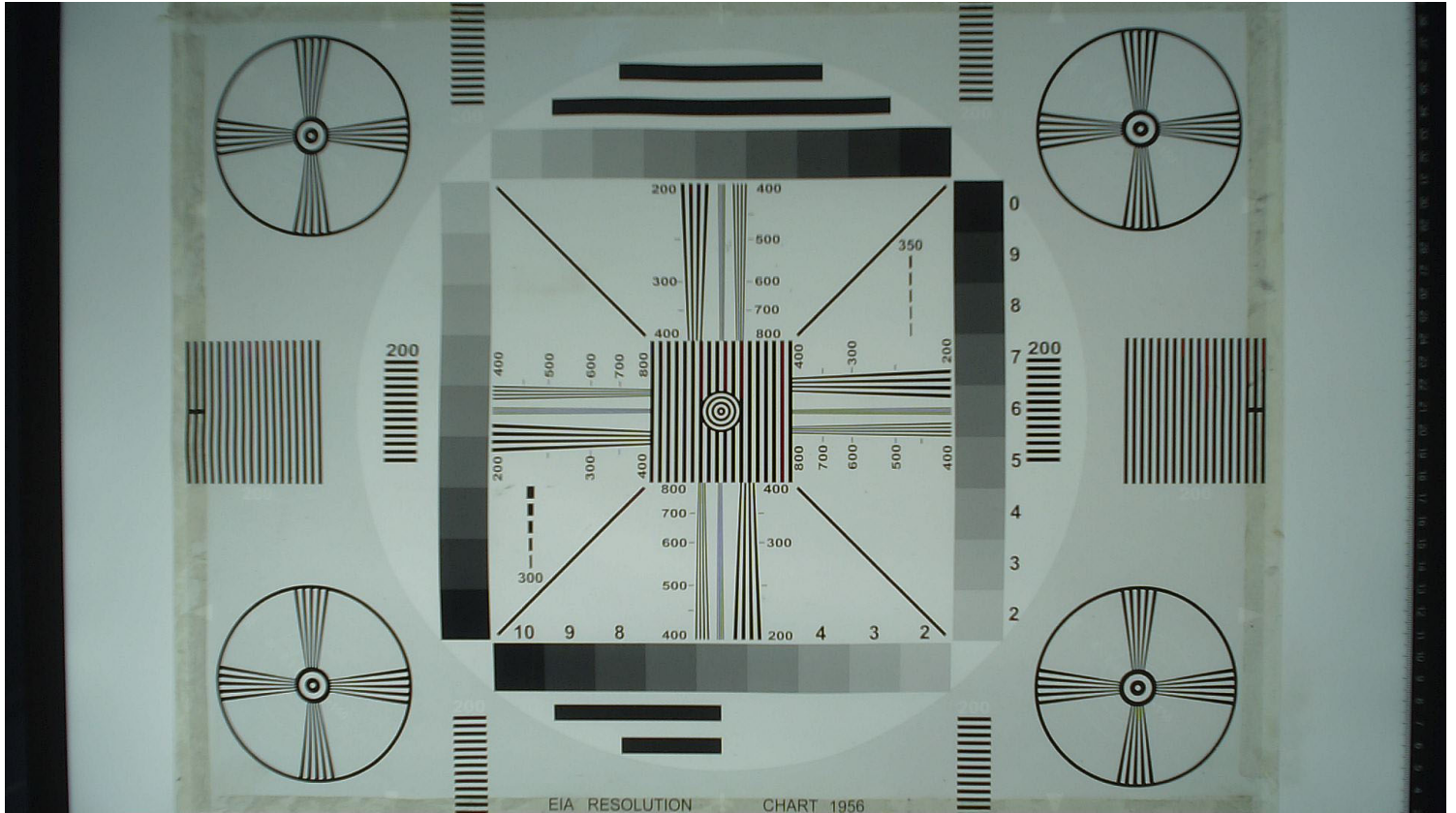
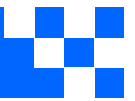
**KLT-USB-0318 V1****2.13MP 0318 Sony IMX291 M12 Fixed Focus USB 2.0 Camera Module**

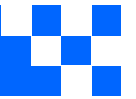
FORMAT	RESOLUTION	FRAME RATE
		USB 2.0
MJPEG	640 x 480 (VGA)	30 FPS
	1280 x 720 (720P)	30 FPS
	1920 x 1080 (1080P)	30 FPS
YUV2	640 x 480 (VGA)	30 FPS
	1280 x 720 (720P)	10 FPS
	1920 x 1080 (1080P)	5 FPS



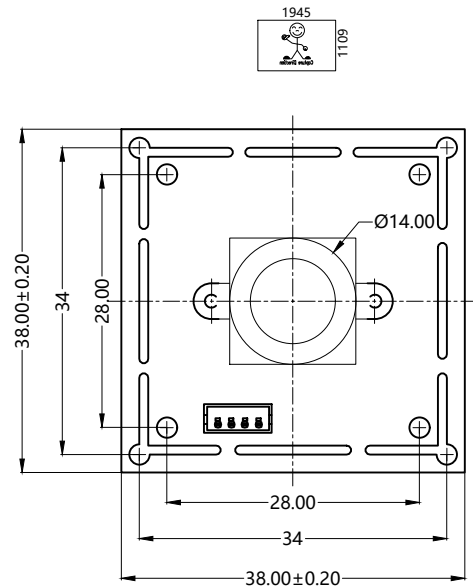




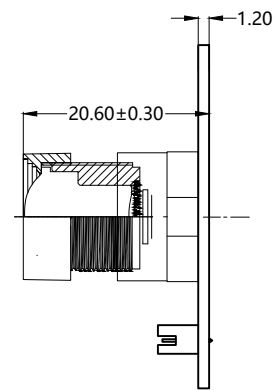




Version	Information
V1.0	First Version



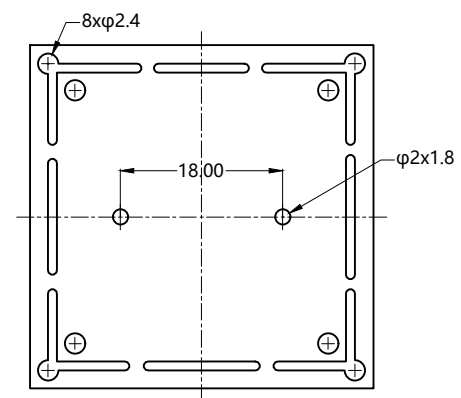
TOP VIEW



PH1.5,top entry type, 4 PINS

DGND	DP	DM	USB5V
P4	P3	P2	P1

SIDE VIEW



BOTTOM VIEW

Parameter:

1、 Sensor specification:

Image Sensor: IMX291

Pixel: 2.9um*2.9um

Lens Type: 1/2.8

Important Voltage Description:

2、 Lens specification:

FOV: 96°(D);80°(H);65°(V)

F/NO.: 3.0%

Optical distortion: <0.35%

Focal length: 3.6mm

Composition: 2G2P+IR FILTER

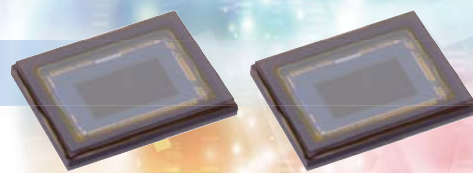
IR Cut Coating: 650nm±10nm@50%

Kai Lap Technologies Group Ltd

Designed By	Kevin	Model Name:	KLT-USB-0318 V1		
Checked By	Jacky	Projection Type:	Unit: mm	Date: 6/25/2024	
		Third Angle	Scale: 1:1	Sheet: 1 of 1	Version: 1/0

IMX290LQR, IMX291LQR

Diagonal 6.46 mm (Type 1/2.8) Square Pixel Array
Color CMOS Image Sensor



Back-Illuminated CMOS image Sensors with Improved Visible Light and Near Infrared Sensitivity that Support 1080p

Sony has developed the approx. 2.13M effective pixel back-illuminated CMOS image sensors IMX290LQR and IMX291LQR with improved sensitivity in the visible-light and near infrared light regions for industrial applications.

A new 2.9 μm -square unit pixel has been developed that combines a back-illuminated structure with technology for improving near infrared sensitivity to further enhance picture quality at low illumination while at the same time realizing Full HD cameras for industrial applications. This realizes two or

more times the sensitivity in the visible-light region and three or more times the sensitivity in the near infrared light region than that of the existing Sony product (IMX236LQJ)*¹. In addition, two types of WDR (Wide Dynamic Range) technology are also provided to further improve imaging performance.

The new lineup includes the two types of the IMX290LQR, which has the DOL (Digital Overlap) -WDR function and the IMX291LQR, which does not have the DOL-WDR function.

*¹ See the New Product Information released in September 2013.

- Back-illuminated structure with 2.9 μm -square unit pixel
- High sensitivity characteristics (two or more times that of the existing product)
- Improved sensitivity in the near infrared light region (three or more times that of the existing product)
- Supports WDR (multiple exposure WDR, DOL-WDR)
- Versatile interface (CMOS parallel, low-voltage LVDS serial, MIPI CSI-2)

Exmor R

* Exmor R is a trademark of Sony Corporation. The Exmor R is a Sony's CMOS image sensor with significantly enhanced imaging characteristics including sensitivity and low noise by changing fundamental structure of ExmorTM pixel adopted column parallel A/D converter to back-illuminated type.

STARVIS

*STARVIS is a trademark of Sony Corporation. The STARVIS is back-illuminated pixel technology used in CMOS image sensors for surveillance camera applications. It features a sensitivity of 2000 mV or more per 1 μm^2 (color product, when imaging with a 706 cd/m² light source, F5.6 in 1 s accumulation equivalent), and realizes high picture quality in the visible-light and near infrared light regions.

Back-Illuminated Structure + Improved Sensitivity in the Near Infrared Light Region

Good sensitivity characteristics at low illumination and in the near infrared light region are a required performance of cameras for industrial applications. These new image sensors use a back-illuminated structure and also have an expanded photodiode area, which simultaneously improve sensitivity in both light regions compared to the existing front-illuminated structure.

In addition, the new image sensors realize improved sensitivity characteristics two or more times in the visible-light region and three or more times in the near infrared light region (850 nm) compared to the existing Sony product (IMX236LQJ) with the same pixel size and increased sensitivity in the near infrared light region (Photograph 2).

WDR Function

The IMX290LQR supports both multiple exposure and DOL-type WDR functions. (The IMX291LQR supports only the multiple exposure-type WDR function.)

The multiple exposure-type WDR function outputs one set of two or four frames with different exposure times. In this case, the gain can also be set separately for each frame in addition to the exposure time.

The DOL-type WDR function outputs the data for up to three frames with different storage times line by line. By performing special signal processing with an ISP (Image Signal Processor) or other device at the image sensor rear-end, this enables improvement of picture quality under low illumination compared to the multiple exposure-type WDR function.

Versatile interface

The IMX290LQR and IMX291LQR are equipped with three different types of output interface (low-voltage LVDS serial, MIPI CSI-2, CMOS parallel) to meet diverse needs. The low-voltage LVDS serial interface has a maximum output data rate of 445.5 Mbps/ch and the number of output channels

can be selected from 2ch, 4ch or 8ch. The MIPI CSI-2 interface has a maximum output data rate of 891 Mbps/lane and the number of output channels can be selected from 2 lanes or 4 lanes. The CMOS parallel interface has a maximum output data rate of 74.25 Mpixels/s.

< Photograph 1 > IMX290LQR Sample Image

Condition: 400 lx F1.4 (Full HD image, 60 frames/s)



IMX290LQR (Internal gain 0 dB)

< Photograph 2 > Comparisons with the Existing Sony Product

Condition1: 0.08 lx F1.4 (Full HD image, 30 frames/s)



Existing IMX236LQJ
Internal gain 48 dB



IMX290LQR
Internal gain 63 dB

Condition 2: 0 lx (850 nm IR) F1.4 (Full HD image, 30 frames/s)



Existing IMX236LQJ
Internal gain 0 dB



IMX290LQR
Internal gain 0 dB

< Table 1 > Device Structure

Item	IMX290LQR / IMX291LQR	
Output Image size	Diagonal 6.46 mm (Type 1 / 2.8) (Full HD mode) Diagonal 4.31 mm (Type 1 / 4.2) (HD720p mode)	
Number of effective pixels	1945 (H) × 1097 (V) approx. 2.13M pixels 1305 (H) × 729 (V) approx. 0.95M pixels	
Unit cell size	2.9 μm (H) × 2.9 μm (V)	
Optical blacks	Horizontal	Front: 0 pixels, rear: 0 pixels
	Vertical	Front: 10 pixels, rear: 0 pixels
Input drive frequency	74.25 MHz / 37.125 MHz	
Package	110-pin LGA	
Supply voltage V _{DD} (Typ.)	2.9 V / 1.8 V / 1.2 V	

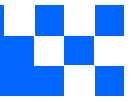
< Table 2 > Image Sensor Characteristics

Item	Value	Remarks
Sensitivity (F5.6)	Typ.	1300 mV 1/30s accumulation
Saturation signal	Min.	914 mV T _j = 60 °C

< Table 3 > Basic Drive Mode

Drive mode	Interface	ADC	Frame rate (Max.)	Bit rate (Max.)
Full HD 1080p	Low voltage LVDS serial 8 ch	10 bit	120 frame/s	445.5 Mbps/ch
	Low voltage LVDS serial 8 ch	12 bit	60 frame/s	222.75 Mbps/ch
	CSI-2 4 lane	10 bit	120 frame/s	891 Mbps/lane
	CSI-2 4 lane	12 bit	60 frame/s	445.5 Mbps/lane
HD720p	CMOS parallel	10 bits / 12 bits	30 frame/s	74.25 Mpixel/s
	Low voltage LVDS serial 4 ch	10 bit	120 frame/s	594 Mbps/ch
	Low voltage LVDS serial 4 ch	12 bit	60 frame/s	297 Mbps/ch
	CSI-2 4 lane	10 bit	120 frame/s	594 Mbps/lane
	CSI-2 4 lane	12 bit	60 frame/s	297 Mbps/lane
	CMOS parallel	10 bits / 12 bits	60 frame/s	74.25 Mpixel/s

*Sony reserves the right to change products and specifications without prior notice.



Cameras Applications



Automotive Driver Pilot



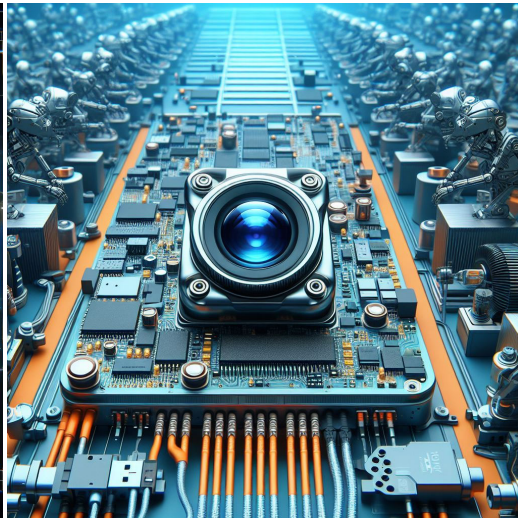
Live Streaming



Video Conference



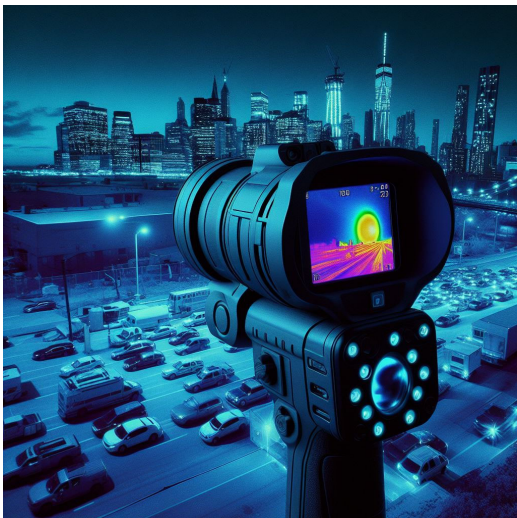
Eye Tracker Biometric Detection



Machine Vision



Agricultural Monitor



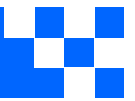
Night Vision Security



Drone and Sports Eagle Eyes



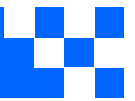
Interactive Pet Camera



your **BEST** camera module partner

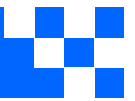
Cameras Applications





Camera Module Pinout Definition Reference Chart

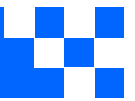
OmniVision	Sony	Samsung	On-Semi	Aptina	Himax	GalaxyCore	PixArt	SmartSens	Sensors	
Pin Signal										
Description										
DGND GND										ground for digital circuit
AGND										ground for analog circuit
PCLK DCK										DVP PCLK output
XCLR PWDN XSHUTDOWN STANDBY										power down active high with internal pull-down resistor
MCLK XVCLK XCLK INCK										system input clock
RESET RST										reset active low with internal pull-up resistor
NC NULL										no connect
SDA SIO_D SIOD										SCCB data
SCL SIO_C SIOC										SCCB input clock
VSYNC XVS FSYNC										DVP VSYNC output
HREF XHS										DVP HREF output
DOVDD										power for I/O circuit
AFVDD										power for VCM circuit
AVDD										power for analog circuit
DVDD										power for digital circuit
STROBE FSTROBE										strobe output
FSIN										synchronize the VSYNC signal from the other sensor
SID										SCCB last bit ID input
ILPWM										mechanical shutter output indicator
FREQ										frame exposure / mechanical shutter
GPIO										general purpose inputs
SLASEL										I2C slave address select
AFEN										CEN chip enable active high on VCM driver IC
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



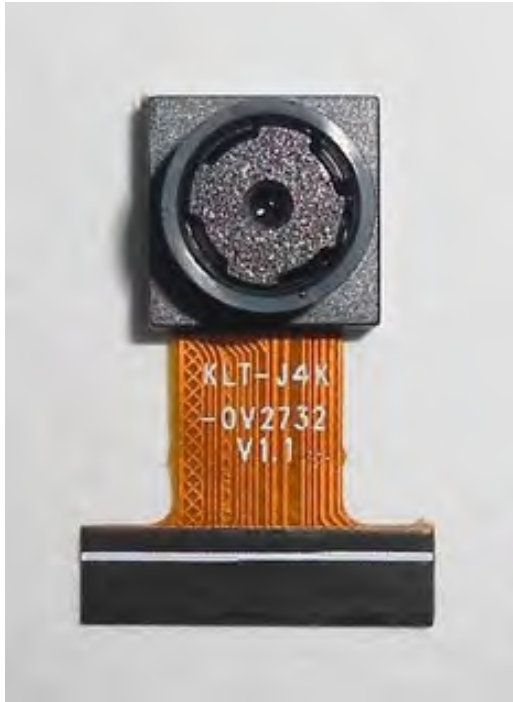


Inspection Item		Inspection Method	Standard of Inspection		
Category	Item				
Appearance	FPC/ PCB	Color	The Naked Eye	Major Difference is Not Allowed.	
		Be Torn/Chopped	The Naked Eye	Copper Crack Exposure is Not Allowed.	
		Marking	The Naked Eye	Clear, Recognizable (Within 30cm Distance)	
	Holder	Scratches	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



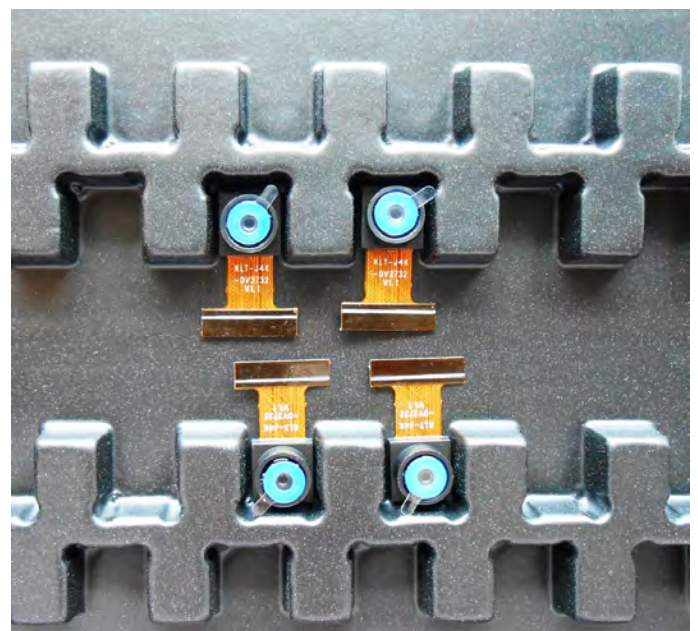
Complete with Lens Protection Film

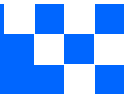


Tray with Grid and Space



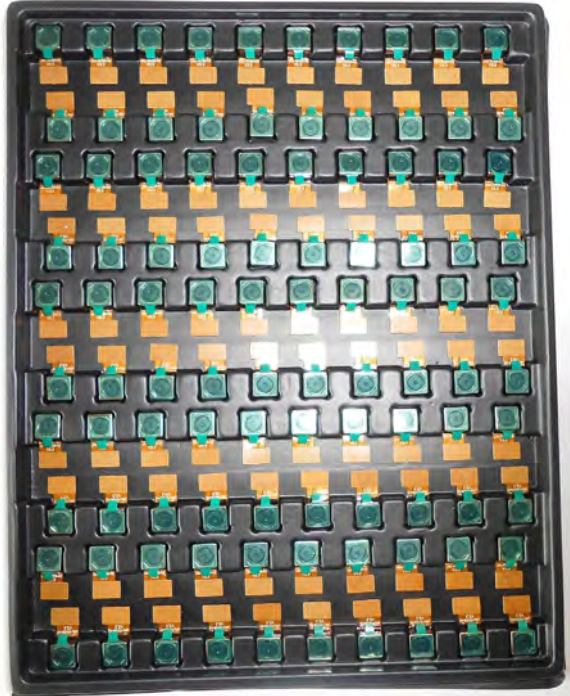
Place Cameras on the Tray





Camera Modules Package Solution

Full Tray of Cameras



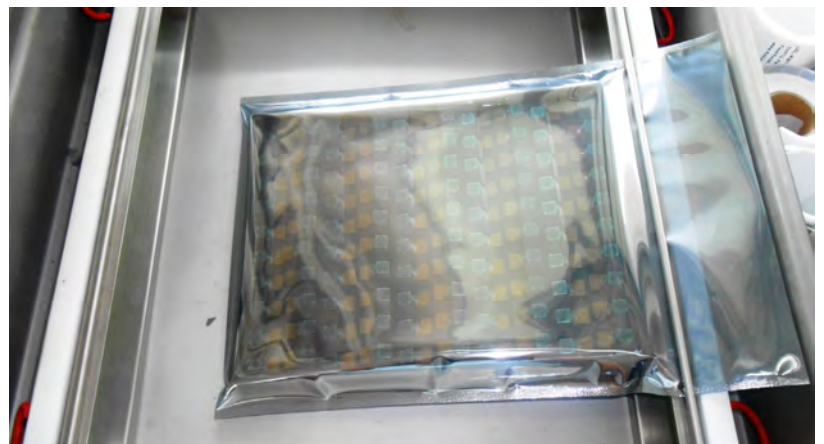
Cover Tray with Lid



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





your BEST camera module partner

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

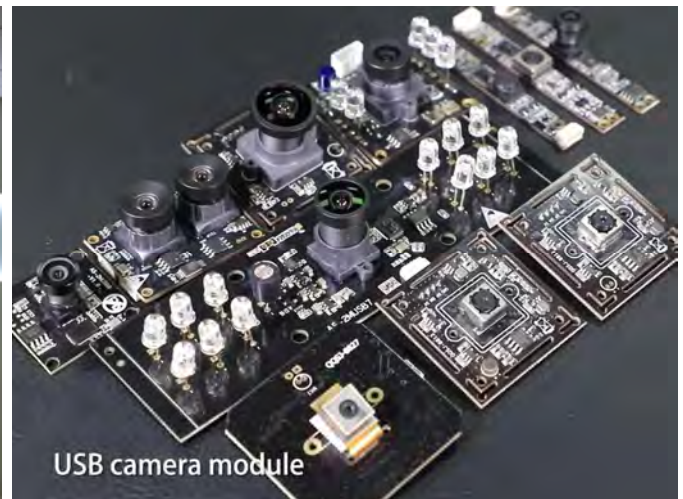


Company Kai Lap Technologies (KLT)

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. Product(s) purchased from other sellers or sources are not covered by this Limited Warranty. KLT guarantees that the Product(s) will be free from defects in materials and workmanship under normal use for a period of one (1) year from the date you receive the product ("Warranty Period").

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

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





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KLT Strength

Powerful Factory



Professional Service



Promised Delivery



www.KaiLapTech.com sales@KaiLapTech.com Tel: (852) 6908 1256 Fax: (852) 3017 6778

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