

**KLT-MFA77-IMX219 V2.0**

**8MP Sony IMX219 MIPI Interface Nvidia Jetson Nano Xavier NX  
Fixed Focus Camera Module**



Front View



Back View

**Specifications**

<b>Camera Module No.</b>	<b>KLT-MFA77-IMX219 V2.0</b>
<b>Resolution</b>	8MP
<b>Image Sensor</b>	IMX219
<b>Sensor Type</b>	1/4"
<b>Pixel Size</b>	1.12 um x 1.12 um
<b>EFL</b>	2.30 mm
<b>F.NO</b>	2.60
<b>Pixel</b>	3264 x 2448
<b>View Angle</b>	136.0°(DFOV) 105.0°(HFOV) 60.0°(VFOV)
<b>Lens Dimensions</b>	10.00 x 10.00 x 15.32 mm
<b>Module Size</b>	150.00 x 25.00 mm
<b>Module Type</b>	Fixed Focus
<b>Interface</b>	MIPI
<b>Auto Focus VCM Driver IC</b>	None
<b>Lens Type</b>	650nm IR Cut
<b>Operating Temperature</b>	-20°C to +60°C
<b>Mating Connector</b>	TE, 1-1734248-5

**KLT-MFA77-IMX219 V2.0**

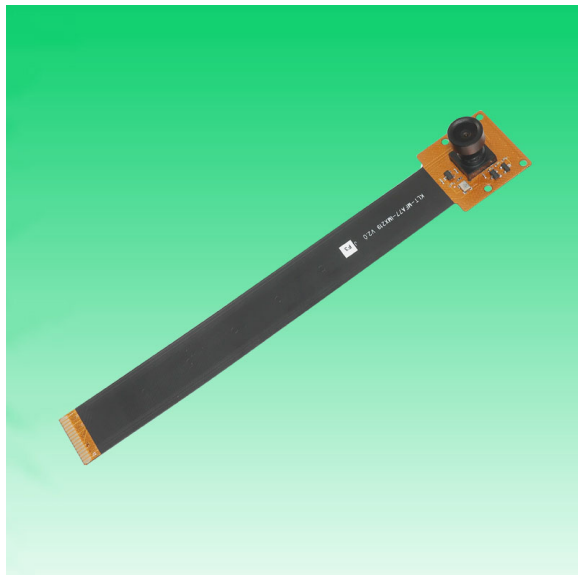
**8MP Sony IMX219 MIPI Interface Nvidia Jetson Nano Xavier NX  
Fixed Focus Camera Module**



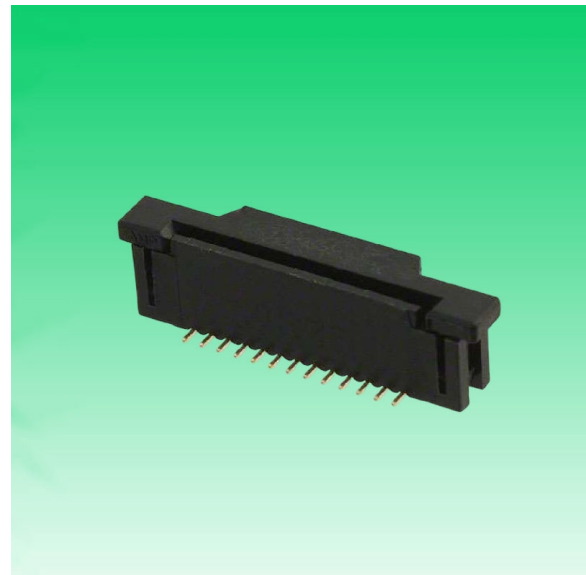
Top View



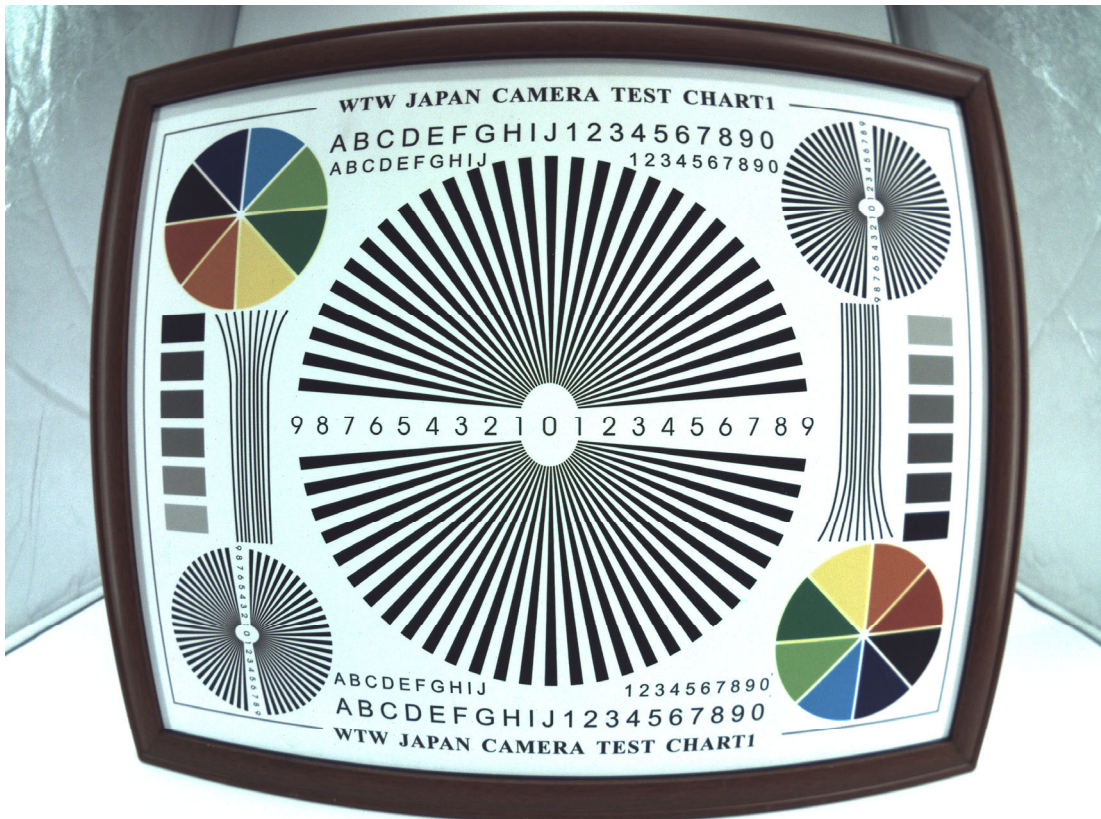
Side View



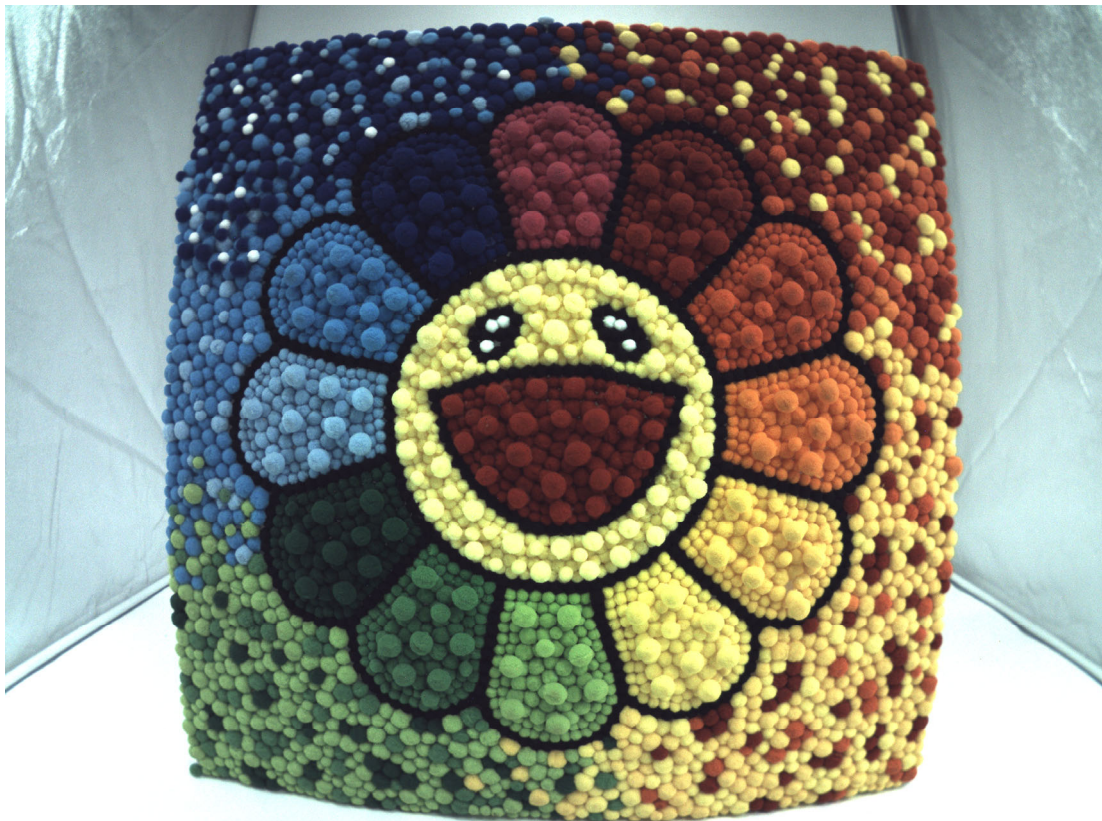
Bottom View



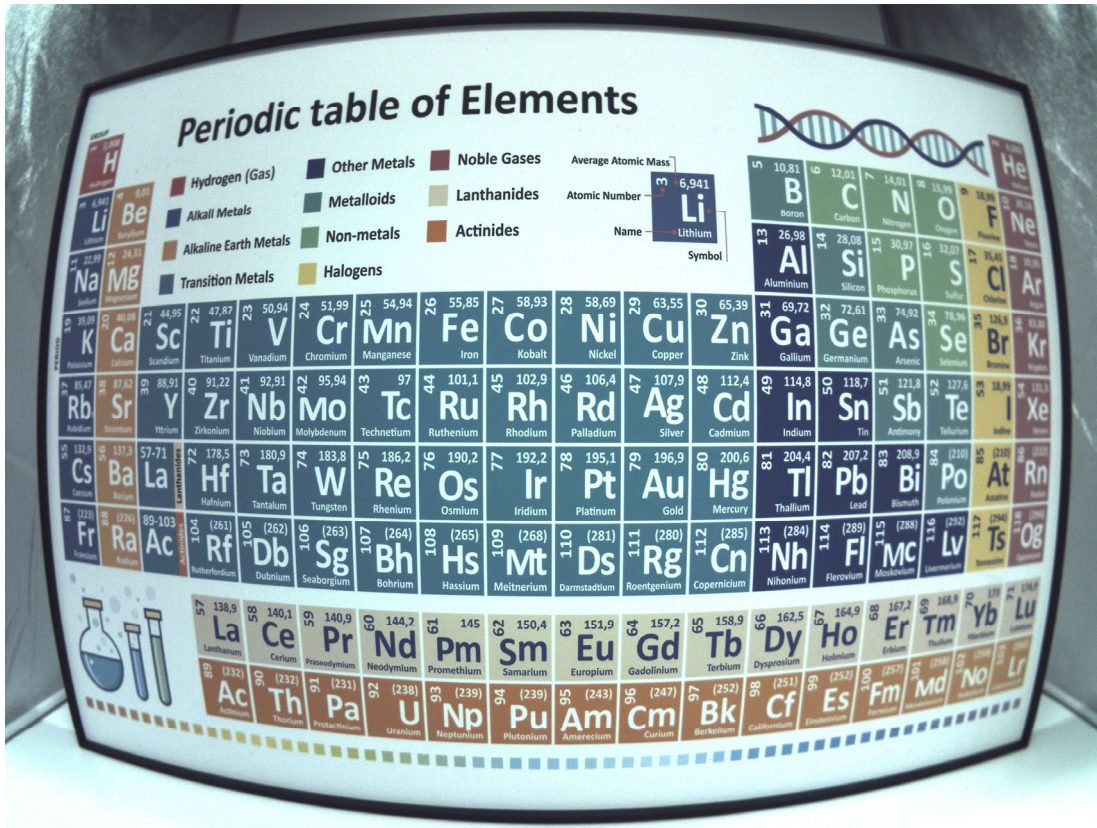
Mating Connector

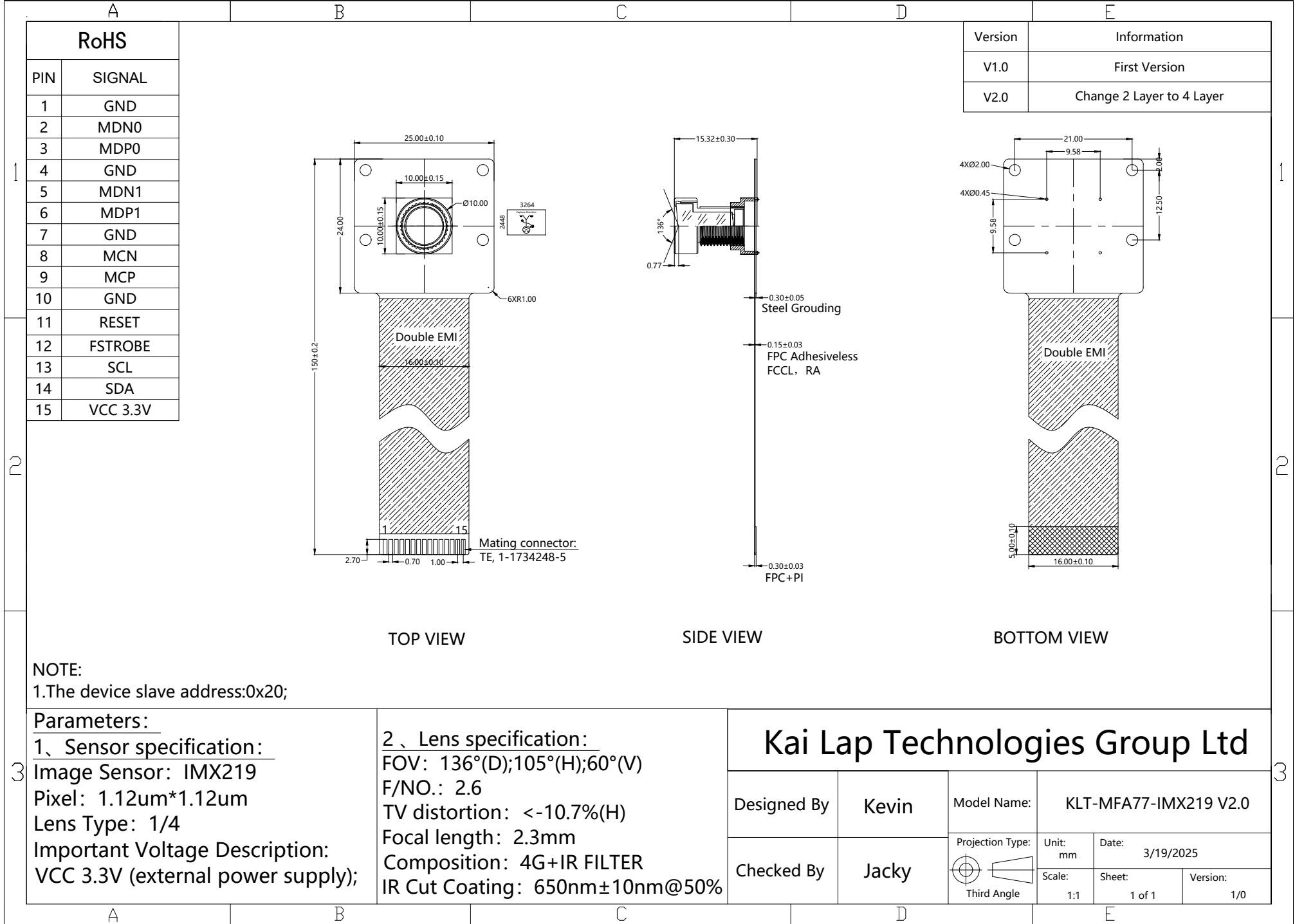












## [Product Brief]

Ver.1.0

# IMX219PQ

Diagonal 4.60mm (Type 1/4.0) 8M Pixel CMOS Image Sensor with Square Pixel for Color Cameras

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### Description

IMX219PQ is a diagonal 4.60mm (Type 1/4.0) CMOS active pixel type image sensor with a square pixel array and 8.08M effective pixels. This chip operates with three power supplies, analogue 2.8V, digital 1.2 V, and IF 1.8 V, 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 pigment mosaic filters. This chip features an electronic shutter with variable charge-storage time.

In addition, this product is designed for use in cellular phone and tablet pc. When using this 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 pc. Consult your Sony sales representative if you have any questions.

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### Functions and Features

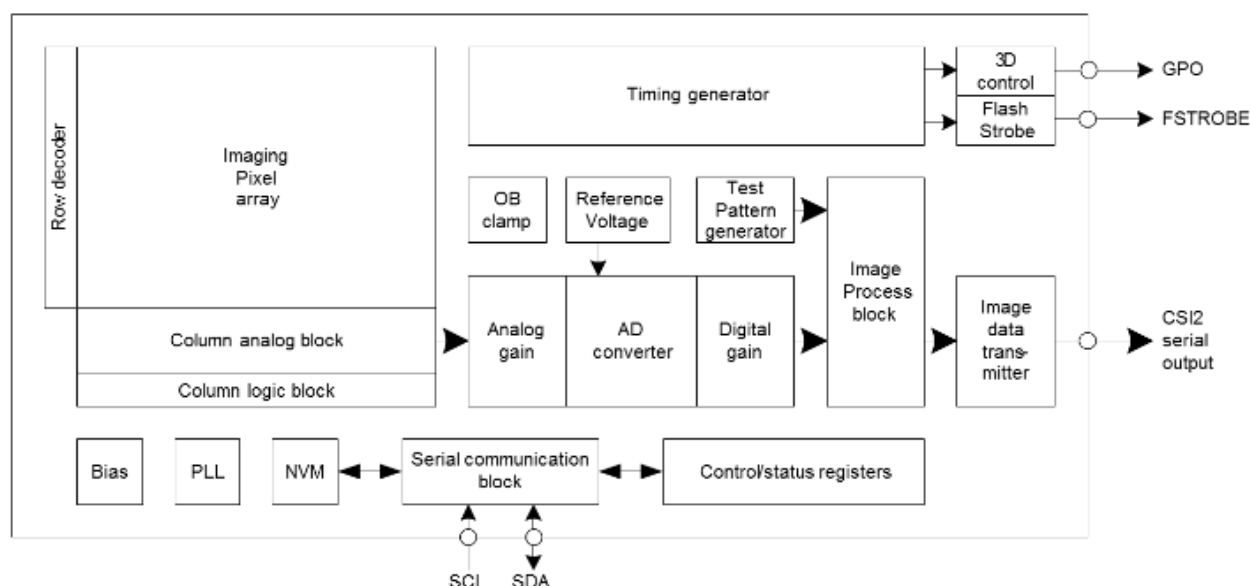
- ◆ Back-illuminated CMOS image sensor Exmor R™
- ◆ 2-wire serial communication circuit on chip
- ◆ CSI2 serial data output (selection of 4lane/2lane)
- ◆ Timing generator, H and V driver circuits on chip
- ◆ CDS/PGA on chip
- ◆ 10-bit A/D converter on chip
- ◆ Automatic optical black (OB) clamp circuit on chip
- ◆ PLL on chip (rectangular wave)
- ◆ High sensitivity, low dark current, no smear
- ◆ Excellent anti-blooming characteristics
- ◆ Variable-speed shutter function (1 H units)
- ◆ R, G, B primary color pigment mosaic filters on chip
- ◆ Max. 30frame/s in all-pixel scan mode
- ◆ Pixel rate: 280 [Mpixel/s] (All-pixels mode)
- ◆ 180 frame/s @720p with 2x2 analog (special) binning, 60 frame/s @1080p with V-crop
- ◆ Datarate: Max.755Mbps/lane (@4lane), 912Mbps/Lane(@2lane)

## Device Structure

◆ CMOS image sensor	
◆ Image size	: Diagonal 4.60mm (Type 1/4.0)
◆ Total number of pixels	: 3296(H) × 2512(V) approx. 8.28M pixels
◆ Number of effective pixels	: 3296(H) × 2480(V) approx. 8.17M pixels
◆ Number of active pixels	: 3280(H) × 2464(V) approx. 8.08M pixels
◆ Chip size	: 5.095mm (H) × 4.930mm (V) (w/ Scribe)
◆ Unit cell size	: 1.12μm (H) × 1.12μm (V)
◆ Substrate material	: Silicon

## Functional Description

Block diagram



**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 Exmor™ pixel adopted column parallel A/D converter to back-illuminated type.

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

This information does not convey any license by any implication or otherwise under any patents or other right.

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.



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LOC

DIST

REVISIONS

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DW

P

LTR

DESCRIPTION

DATE

DWN

APVD

E1

REVISED (ECR-14-000556), ADD NEW PART NUMBER.

06JAN14

S.C. H.L.

## NOTES:

## 1. MATERIAL:

1.1 HOUSING: THERMOPLASTIC (PA9T)  
UL94 V-0, COLOR: BLACK.1.2 ACTUATOR: THERMOPLASTIC (PA9T)  
UL94 V-0, COLOR: BLACK.

1.3 CONTACTS: PHOSPHOR BRONZE

1.4 MYLAR: CAPTON. THICKNESS: 0.12. COLOR: YELLOW

## 2. FINISH:

## 2.1 CONTACT:

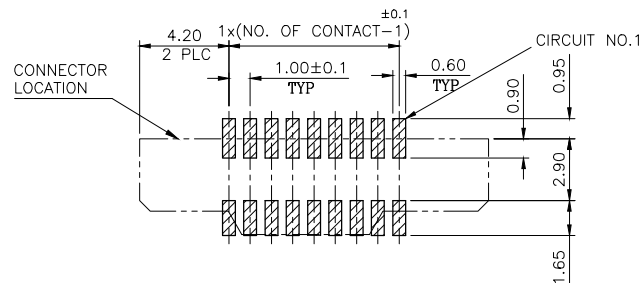
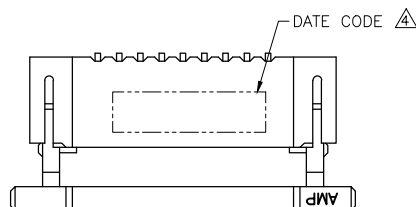
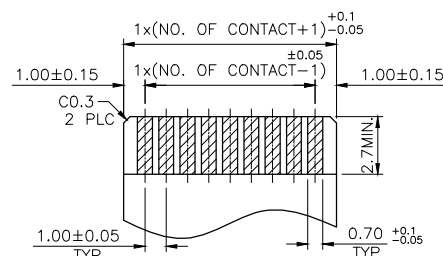
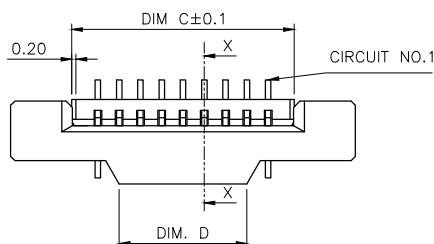
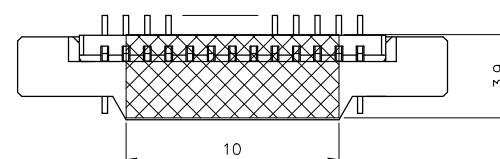
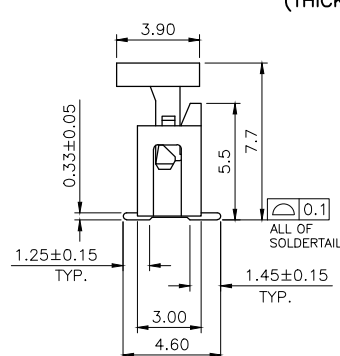
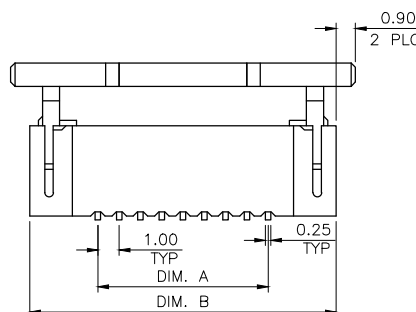
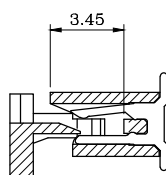
GOLD FLASH PLATING OVERALL.

1.27mm (50m") MIN. NICKEL UNDERPLATING OVERALL.

3. REFLOW SOLDER CAPABLE TO 260°C PER TEC-109-201, CONDITION B.

4. WITHOUT DATE CODE FOR 8 POSITION UNDER.

5. MYLAR ATTACHED FOR PN 6-1734248-0 ONLY

RECOMMENDED PCB LAYOUT  
(TOLERANCE : ±0.05)APPLICABLE FPC  
RECOMMENDED DIMENSION  
(THICKNESS:0.3±0.05)W/ MYLAR  
4 (FOR 6-1734248-0 ONLY)

SECTION X-X

ACTIVE	27	31.40	35.6	29.0	30	6-1734248-0
	37	41.40	45.6	39.0	40	4-1734248-0
	36	40.40	44.6	38.0	39	3-1734248-9
	35	39.40	43.6	37.0	38	3-1734248-8
	34	38.40	42.6	36.0	37	3-1734248-7
	33	37.40	41.6	35.0	36	3-1734248-6
	32	36.40	40.6	34.0	35	3-1734248-5
	31	35.40	39.6	33.0	34	3-1734248-4
	30	34.40	38.6	32.0	33	3-1734248-3
	29	33.40	37.6	31.0	32	3-1734248-2
	28	32.40	36.6	30.0	31	3-1734248-1
ACTIVE	27	31.40	35.6	29.0	30	3-1734248-0
	26	30.40	34.6	28.0	29	2-1734248-9
	25	29.40	33.6	27.0	28	2-1734248-8
	24	28.40	32.6	26.0	27	2-1734248-7
	23	27.40	31.6	25.0	26	2-1734248-6
	22	26.40	30.6	24.0	25	2-1734248-5
	21	25.40	29.6	23.0	24	2-1734248-4
OBSOLETE	20	24.40	28.6	22.0	23	2-1734248-3
	19	23.40	27.6	21.0	22	2-1734248-2
	18	22.40	26.6	20.0	21	2-1734248-1
	17	21.40	25.6	19.0	20	2-1734248-0
	16	20.40	24.6	18.0	19	1-1734248-9
	15	19.40	23.6	17.0	18	1-1734248-8
	14	18.40	22.6	16.0	17	1-1734248-7
	13	17.40	21.6	15.0	16	1-1734248-6
	12	16.40	20.6	14.0	15	1-1734248-5
	11	15.40	19.6	13.0	14	1-1734248-4
	10	14.40	18.6	12.0	13	1-1734248-3
	9	13.40	17.6	11.0	12	1-1734248-2
ACTIVE	8	12.40	16.6	10.0	11	1-1734248-1
	7	11.40	15.6	9.0	10	1-1734248-0
	6	10.40	14.6	8.0	9	1734248-9
	5	9.40	13.6	7.0	8	1734248-8
	4	8.40	12.6	6.0	7	1734248-7
	3	7.40	11.6	5.0	6	1734248-6
	2	6.40	10.6	4.0	5	1734248-5
	2	5.40	9.6	3.0	4	1734248-4
	2	4.40	8.6	2.0	3	1734248-3
STATUS	DIM D	DIM C	DIM B	DIM A	POS.	PART NUMBER

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DWN  
H. HUANG

30MAR2007

CHK  
S. HOU

30MAR2007

APVD  
W.J. KE

30MAR2007

PRODUCT SPEC

108-57080

APPLICATION SPEC

WEIGHT

-

CUSTOMER DRAWING



TE Connectivity

NAME

1.0 MM FPC, ZIF VERTICAL, SMT TYPE

SIZE

CAGE CODE

DRAWING NO

RESTRICTED TO

A3

00779

C=1734248

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SCALE

SHEET

1 OF 2

REV

E1

5. PEELING SPEED: 300mm/minutes.



4	68.4	34.2	72.4	72	46	41	8.70	5.50	40	4	1734248-0
					45	40	8.57	5.37	39	3	1734248-9
					44	39	8.45	5.25	38	3	1734248-8
5	52.4	26.2	56.4	56	36	31	10.25	6.33	30	6	1734248-0
					43	38	11.60	7.68	37	3	1734248-7
					42	37	11.40	7.48	36	3	1734248-6
					41	36	11.21	7.29	35	3	1734248-5
					40	35	11.02	7.10	34	3	1734248-4
					39	34	10.83	6.91	33	3	1734248-3
					38	33	10.63	6.71	32	3	1734248-2
					37	32	10.44	6.52	31	3	1734248-1
					36	31	10.25	6.33	30	3	1734248-0
					35	30	10.06	6.14	29	2	1734248-9
					34	29	9.86	5.94	28	2	1734248-8
					33	28	9.67	5.75	27	2	1734248-7
					32	27	9.00	5.56	26	2	1734248-6
					31	26	8.80	5.36	25	2	1734248-5
					30	25	8.61	5.17	24	2	1734248-4
					6	40.4	20.2	44.4	44	29	24
28	23	8.23	4.79	22						2	1734248-2
27	22	8.03	4.59	21						2	1734248-1
26	21	7.84	4.40	20						2	1734248-0
25	20	7.65	4.21	19						1	1734248-9
24	19	7.46	4.02	18						1	1734248-8
23	18	7.26	3.82	17						1	1734248-7
22	17	7.07	3.63	16						1	1734248-6
21	16	9.20	5.16	15						1	1734248-5
20	15	8.91	4.87	14						1	1734248-4
8	28.4	14.2	32.4	32	19	14	8.62	4.58	13	1	1734248-3
					18	13	8.33	4.29	12	1	1734248-2
					17	12	8.04	4.00	11	1	1734248-1
10	-	11.5	24.4	24	16	11	7.73	4.13	10	1	1734248-0
					15	10	7.41	3.81	9		1734248-9
					14	9	7.08	3.48	8		1734248-8
					13	8	6.76	3.16	7		1734248-7
					12	7	6.44	2.84	6		1734248-6
					11	6	6.12	2.52	5		1734248-5
					10	5	5.80	2.20	4		1734248-4
					9	4	5.48	1.88	3		1734248-3
REELS/ BOX	DIM F	DIM E	DIM D	DIM C	DIM B	DIM A	G/w (kg)	N/w (kg)	PDS.	PART NUMBER	

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ANGLES	
FINISH	

REV 1



## Cameras Applications



Automotive Driver Pilot



Live Streaming



Video Conference



Eye Tracker Biometric Detection



Machine Vision



Agricultural Monitor



Night Vision Security



Drone and Sports Eagle Eyes



Interactive Pet Camera



## Cameras Applications

*your BEST camera module partner*



## IMAGING DEVICES



## Camera Module Pinout Definition Reference Chart

OmniVision Sony Samsung On-Semi Aptina Himax GalaxyCore PixArt SmartSens Sensors	
Pin Signal	Description
DGND GND	ground for digital circuit
AGND	ground for analog circuit
PCLK DCK	DVP PCLK output
XCLR PWDN XSHUTDOWN STANDBY	power down active high with internal pull-down resistor
MCLK XVCLK XCLK INCK	system input clock
RESET RST	reset active low with internal pull-up resistor
NC NULL	no connect
SDA SIO_D SIOD	SCCB data
SCL SIO_C SIOC	SCCB input clock
VSYNC XVS FSYNC	DVP VSYNC output
HREF XHS	DVP HREF output
DOVDD	power for I/O circuit
AFVDD	power for VCM circuit
AVDD	power for analog circuit
DVDD	power for digital circuit
STROBE FSTROBE	strobe output
FSIN	synchronize the VSYNC signal from the other sensor
SID	SCCB last bit ID input
ILPWM	mechanical shutter output indicator
FREX	frame exposure / mechanical shutter
GPIO	general purpose inputs
SLASEL	I2C slave address select
AFEN	CEN chip enable active high on VCM driver IC
<b>MIPI Interface</b>	
MDN0 DN0 MD0N DATA_N DMO1N	MIPI 1st data lane negative output
MDP0 DP0 MD0P DATA_P DMO1P	MIPI 1st data lane positive output
MDN1 DN1 MD1N DATA2_N DMO2N	MIPI 2nd data lane negative output
MDP1 DP1 MD1P DATA2_P DMO2P	MIPI 2nd data lane positive output
MDN2 DN2 MD2N DATA3_N DMO3N	MIPI 3rd data lane negative output
MDP2 DP2 MD2P DATA3_P DMO3P	MIPI 3rd data lane positive output
MDN3 DN3 MD3N DATA4_N DMO4N	MIPI 4th data lane negative output
MDP3 DP3 MD3P DATA4_P DMO4P	MIPI 4th data lane positive output
MCN CLKN CLK_N DCKN	MIPI clock negative output
MCP CLKP MCP CLK_P DCKN	MIPI clock positive output
<b>DVP Parallel Interface</b>	
D0 DO0 Y0	DVP data output port 0
D1 DO1 Y1	DVP data output port 1
D2 DO2 Y2	DVP data output port 2
D3 DO3 Y3	DVP data output port 3
D4 DO4 Y4	DVP data output port 4
D5 DO5 Y5	DVP data output port 5
D6 DO6 Y6	DVP data output port 6
D7 DO7 Y7	DVP data output port 7
D8 DO8 Y8	DVP data output port 8
D9 DO9 Y9	DVP data output port 9
D10 DO10 Y10	DVP data output port 10
D11 DO11 Y11	DVP data output port 11

## Camera Reliability Test

Reliability Inspection Item			Testing Method	Acceptance Criteria
Category		Item		
Environmental	Storage Temperature	High 60°C 96 Hours	Temperature Chamber	No Abnormal Situation
		Low -20°C 96 Hours	Temperature Chamber	No Abnormal Situation
	Operation Temperature	High 60°C 24 Hours	Temperature Chamber	No Abnormal Situation
		Low -20°C 24 Hours	Temperature Chamber	No Abnormal Situation
	Humidity	60°C 80% 24 Hours	Temperature Chamber	No Abnormal Situation
	Thermal Shock	High 60°C 0.5 Hours 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	Major Difference is Not Allowed.
		Be Torn/Chopped	Copper Crack Exposure is Not Allowed.
		Marking	Clear, Recognizable (Within 30cm Distance)
	Holder	Scratches	The Inside Crack Exposure is Not Allowed
		Gap	Meet the Height Standard
		Screw	Make Sure Screws Are Presented (If Any)
		Damage	The Inside Crack Exposure is Not Allowed
	Lens	Scratch	No Effect On Resolution Standard
		Contamination	No Effect On Resolution Standard
		Oil Film	No Effect On Resolution Standard
		Cover Tape	No Issue On Appearance.
Function	Image	No Communication	Test Board Not Allowed
		Bright Pixel	Black Board Not Allowed In the Image Center
		Dark Pixel	White board Not Allowed In the Image Center
		Blurry	The Naked Eye Not Allowed
		No Image	The Naked Eye Not Allowed
		Vertical Line	The Naked Eye Not Allowed
		Horizontal Line	The Naked Eye Not Allowed
		Light Leakage	The Naked Eye Not Allowed
		Blinking Image	The Naked Eye Not Allowed
		Bruise	Inspection Jig Not Allowed
		Resolution	Chart Follows Outgoing Inspection Chart Standard
		Color	The Naked Eye No Issue
		Noise	The Naked Eye Not Allowed
		Corner Dark	The Naked Eye Less Than 100px By 100px
		Color Resolution	The Naked Eye No Issue
Dimension		Height	The Naked Eye Follows Approval Data Sheet
		Width	The Naked Eye Follows Approval Data Sheet
		Length	The Naked Eye Follows Approval Data Sheet
		Overall	The Naked Eye Follows Approval Data Sheet

## KLT Package Solutions

KLT Camera Module



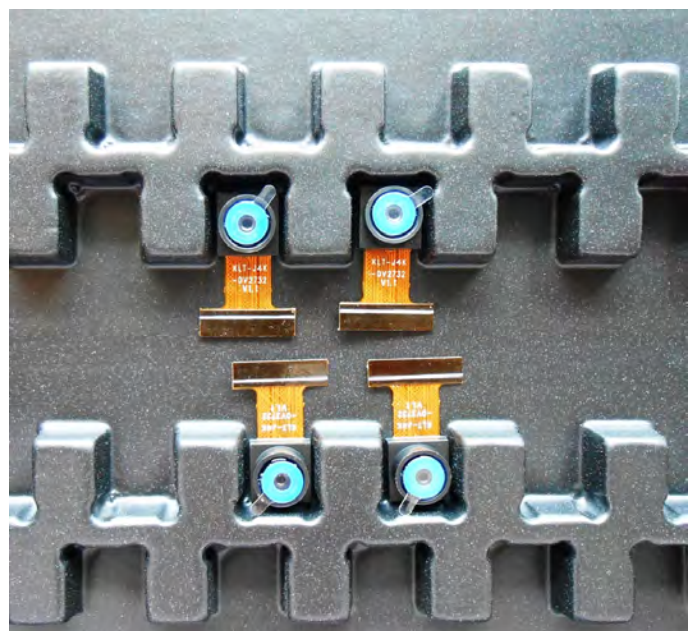
Complete with Lens Protection Film



Tray with Grid and Space



Place Cameras on the Tray



## Camera Modules Package Solution

Full Tray of Cameras



Cover Tray with Lid



Put Tray into Anti-Static Bag



Vacuum the Anti-Static Bag





## Camera Modules Package Solution

**Sealed Vacuum Bag with Labels**

**1. Model and Description 2. Quantity 3. Shipping Date 4. Caution**



## Large Order Package Solution

Place Foam Sheets Between Trays



Foam Sheets are Slightly Larger than Trays



Place Foam Sheets and Trays into Box



Foam Sheets are Tightly Fitting Box





## Small Order Package Solution

Place Foam Sheets and Trays into Small Box



Foam Sheets are Nicely Fitting the Small Box



Package in Small Box for Shipment



Place Small Boxes into Larger Box





## Carbon Box Package Solution

Seal the Carbon Box

Final Package Labelled Box



### Carbon Box Ready for Shipment

1. Delivery Address and Phone No. 2. Box No. and Ship Date 3. Fragile Caution



## Sample Order Package Solution

Place Sample into Small Anti-Static Bag



Place Connectors into Small Ant-Static Bag



### Sample Labels on the Small Bag

1. Camera Module or Connector Model 2. Shipping Date and Quantity 3. Caution





## Connectors Large Order Package Solution

Connectors in a Wheel



Label Connectors in the Wheel



The Wheel is Perfectly Fitting the Box



Connectors Box Ready for Shipment







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

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

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



[www.KaiLapTech.com](http://www.KaiLapTech.com) [sales@KaiLapTech.com](mailto:sales@KaiLapTech.com) Tel: (852) 6908 1256 Fax: (852) 3017 6778



# CMOS CAMERA MODULES



*your BEST camera module partner*

## KLT Strength

### Powerful Factory



### Professional Service



### Promised Delivery



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