

## KLT-MAA13-IMX298 V1.0

### 16MP Sony IMX298 MIPI Interface Auto Focus Camera Module



Front View



Back View

#### Specifications

Camera Module No.	KLT-MAA13-IMX298 V1.0
Resolution	16MP
Image Sensor	IMX298
Sensor Type	1/2.8"
Pixel Size	1.12 um x 1.12 um
EFL	4.05 mm
F.NO	1.80
Pixel	4656 x 3496
View Angle	76.4°(DFOV) 64.5°(HFOV) 50.7°(VFOV)
Lens Dimensions	8.80 x 8.80 x 6.05 mm
Module Size	21.00 x 8.80 mm
Module Type	Auto Focus
Interface	MIPI
Auto Focus VCM Driver IC	DW9763
Lens Model	KLT-LENS-60059A5
Lens Type	650nm IR Cut
Operating Temperature	-20°C to +70°C
Mating Connector	BBR43-30KB533



## KLT-MAA13-IMX298 V1.0

### 16MP Sony IMX298 MIPI Interface Auto Focus Camera Module



Top View



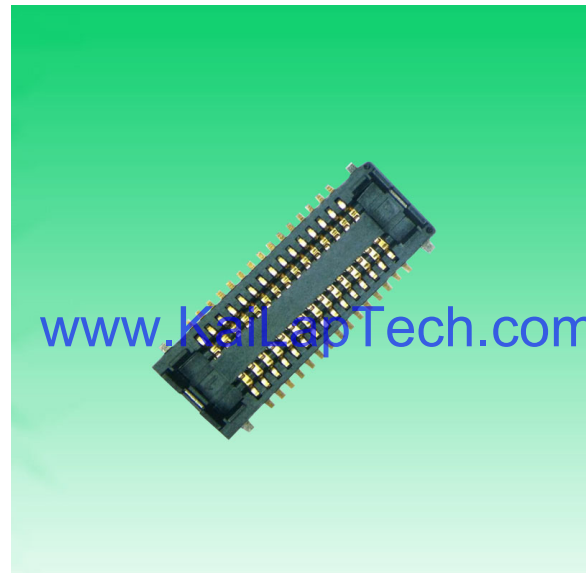
Side View

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Bottom View



Mating Connector

A

B

C

D

E

**RoHS**

0	SIGNAL
1	GND
2	GND
3	GND
4	GND
5	AFVDD 2.8V
6	AFEN
7	SDA
8	DOVDD1.8V
9	SCL
10	DVDD 1.1V
11	GND
12	XSHUTDOWN
13	MCN
14	NC
15	MCP
16	GND
17	MD0N
18	MCLK
19	MD0P
20	GND
21	MD1N
22	NC
23	MD1P
24	AVDD 2.8V
25	NC
26	AGND
27	MD2N
28	MD3N
29	MD2P
30	MD3P

**NOTE:**

1. The device slave address: 0x34;

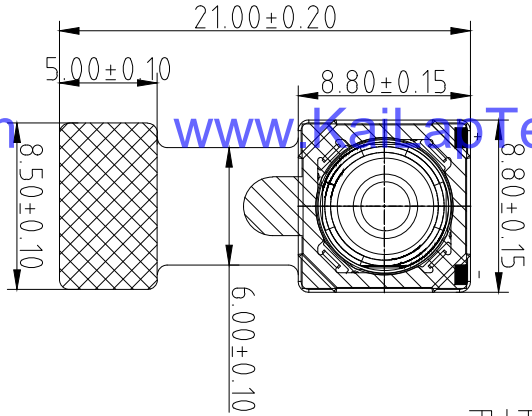
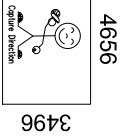
**Parameters:**

**1. Sensor specification:**

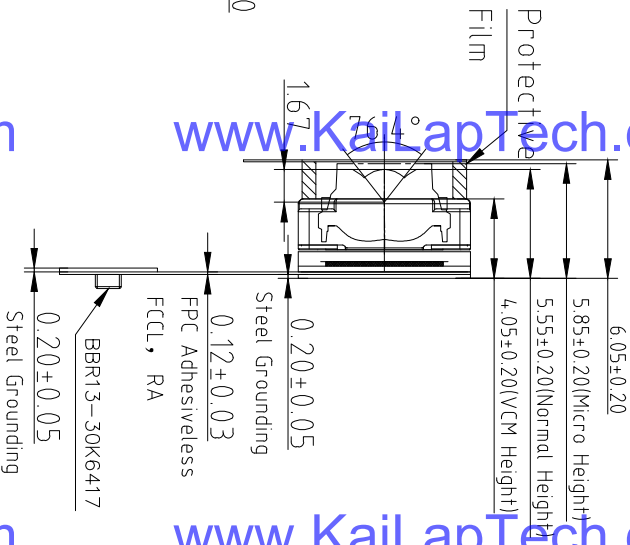
Image Sensor: IMX298  
 Pixel: 1.12umx1.12um  
 Lens Type: 1/2.8  
 Important Voltage Description: DVDD1.1V  
 (external power supply);

**2. Lens specification:**

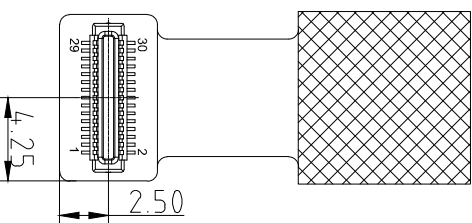
F/NO: 1.8  
 FOV: 76.4°(D),64.5°(H),50.7°(V)  
 TV distortion: <1%  
 Focal length: 4.05mm  
 Composition: 6P+IR FILTER  
 IR Cut Coating: 650nm±10nm@50%



TOP VIEW



SIDE VIEW



BOTTOM VIEW

Version	Information	Date
V1.0	First Version	4-22-2022

Kai Lap Technologies Group Ltd

Designed By

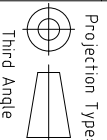
Kevin

Model Name:

KLT-MAA13-IMX298 V1.0

Checked By

Aouly\_Yan



Unit: mm

Scale: 1:1

Sheet: 1 of 1

Version: 1/0

A

B

C

D

E

3

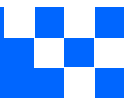
2

1

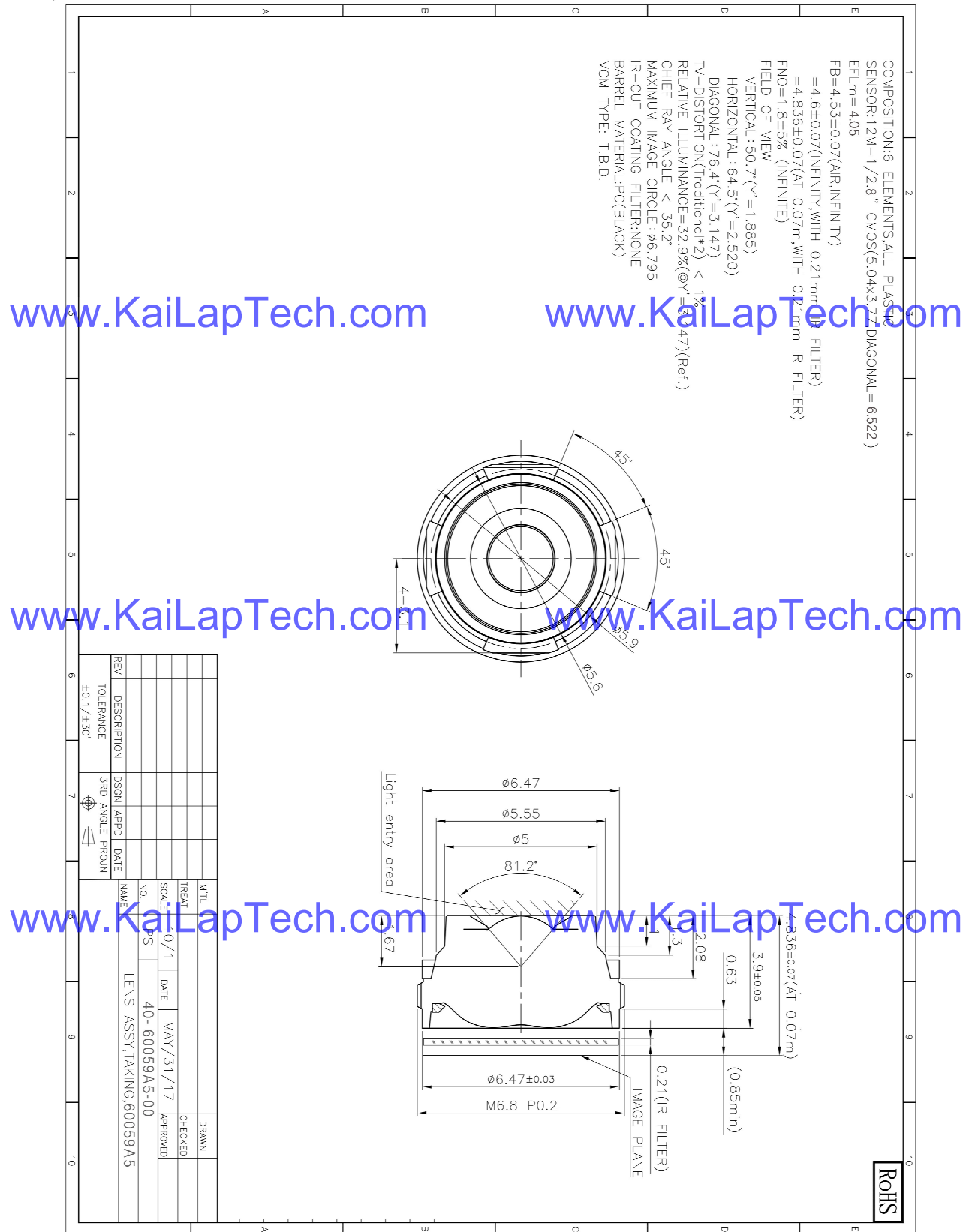
3

2

1



Lens Model: KLT-LENS-60059A5



## 1. General Description

The DW9763 is a single 10-bit DAC with 100mA output current sinking capability and embedded 8KByte eFlash memory. Designed for linear control of voice coil motors, the DW9763 is capable of operating voltage up to 3.3V.

The SAC (Smart Actuator Control) mode is applied to minimize the mechanical vibration. The SAC mode highly improves the actuator's settling time and tolerance coverage compared with conventional LSC (Linear Slope Control) mode. The DAC and eFlash are controlled via an I2C compatible serial interface.

The DW9763 incorporates with a POR (Power On Reset) circuit, power down mode. POR circuit gets to operate when VDD (supply power) turns on. The output current keeps 0mA until valid register value takes place. During the power down mode, it consumes current max.1uA.

The DW9763 is designed for auto focus and optical zoom for mobile camera, digital still camera, camcorders and other nano actuator applications.

### ■ Features

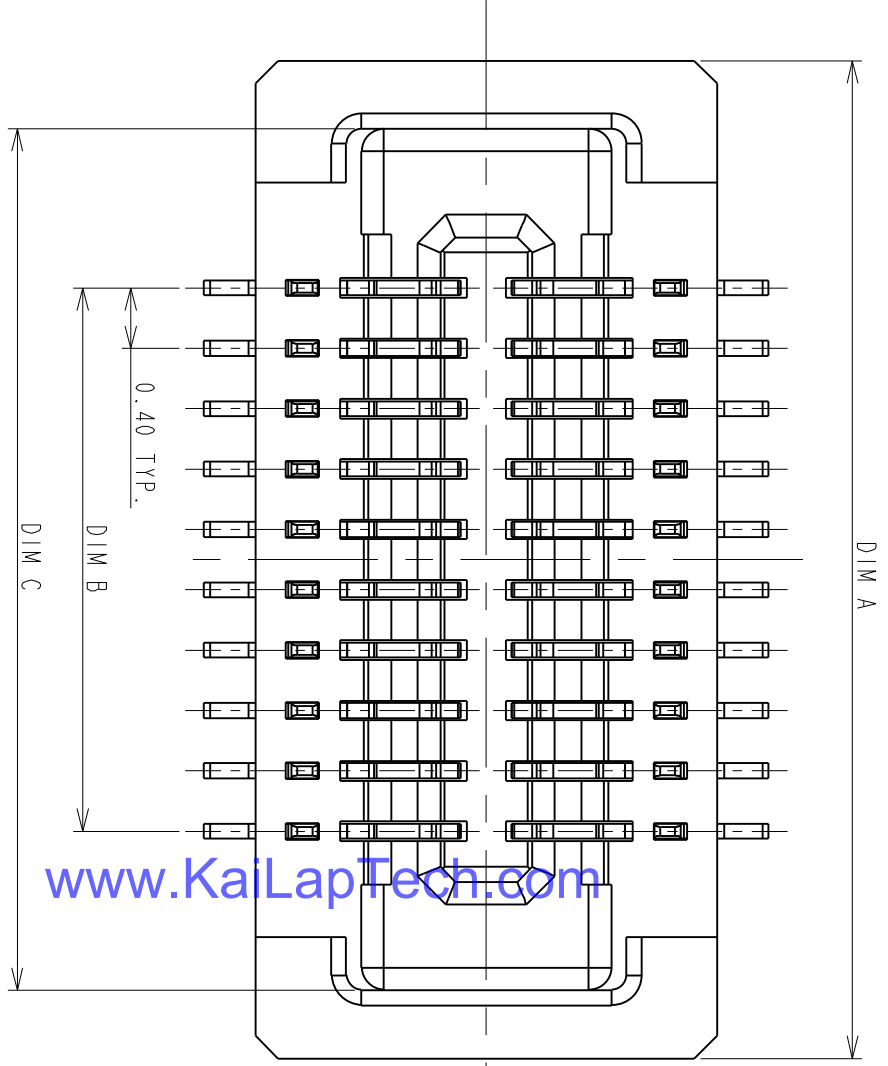
- 10 bit resolution current sinking of 100mA for VCM
- SAC (Smart Actuator Control) mode
- Supply voltage range (VDD) : 2.3V to 3.3V
- Fast mode I2C interface compatible (1.8V interface available)
- Power down mode
- Power on reset (POR)
- Embedded 8KByte eFlash memory
- Package : 8 pin WLCSP
- Package Size : 0.77mm X 1.75mm X 0.3mm

### ■ Applications

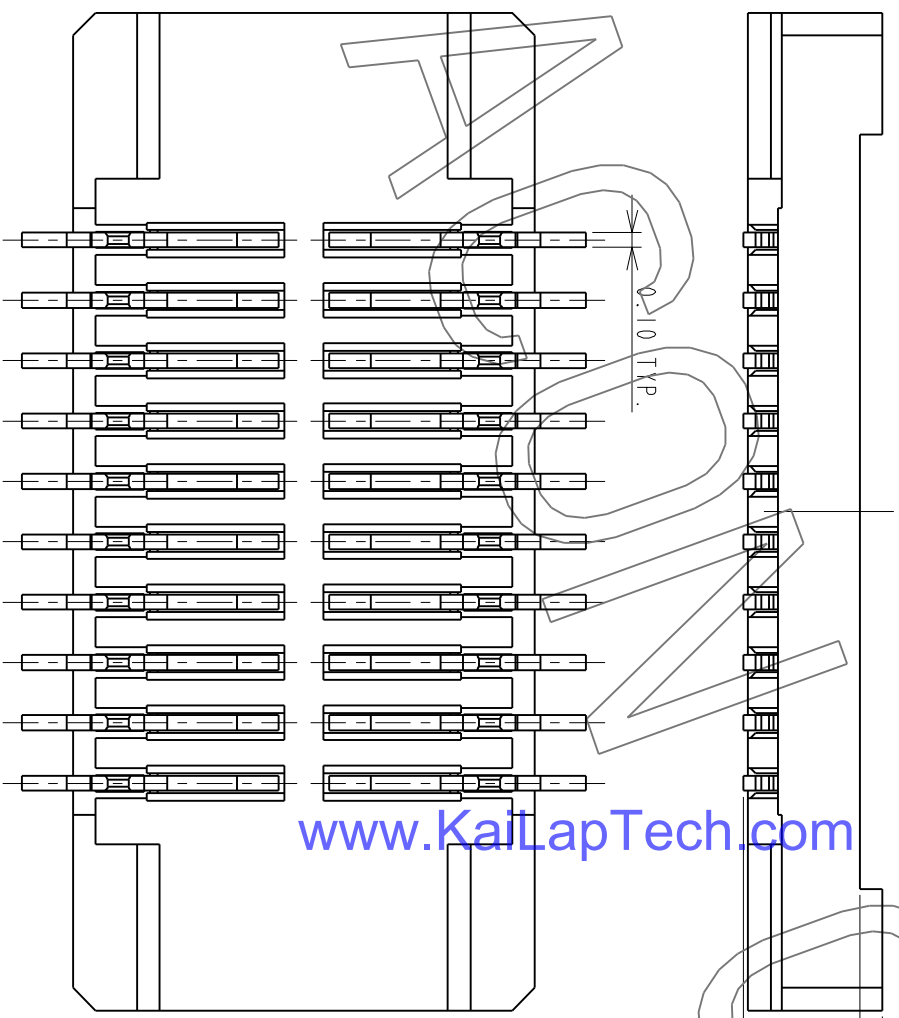
- Mobile camera
- Digital still camera
- Camcorder
- Web camera
- Nano actuator

1 2 3 4 5 6 7 8

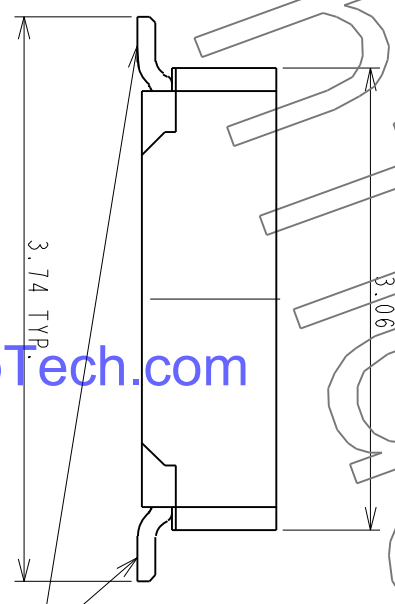
REV.	EC#	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
A	TJECR10018-02	NEW RELEASE PER NPRI 0009	11/05/10	RAIN	DICK, SON	HARDWARE
B	TJECR13014	AXI, AXI	05/13/13	RAIN	SteveM	eng
						Jeff



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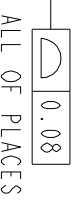
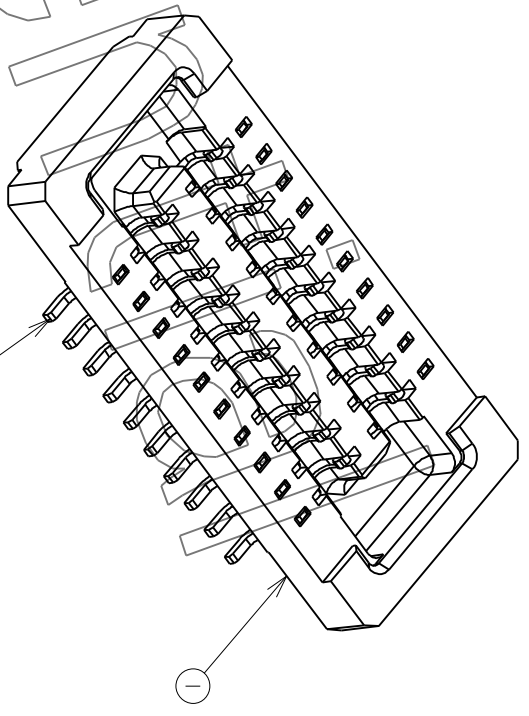


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ALL OF PLACES

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

TOLERANCES UNLESS OTHERWISE SPECIFIED	
GENERAL	±0.38
DESIGN	±0.25
RAIN	±0.05
CHECKED	DATE
HARDWARE	DATE
APPROVED	DATE
DICK, LEE	04/24/10

SCALE	20:1
SHEET	1 OF 2
UNIT	MM

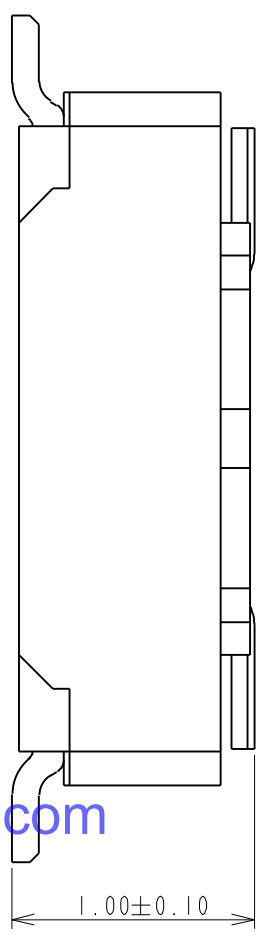
  

<b>CUSTOMER DRAWING</b>	
SERIES	BBR
DWG NO.	C-BBR43-04-01
SIZE	A3
REV.	B



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All materials meet the ACON's spec. environment-related substances management technical standard



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 10u" MIN  
 2: GOLD 5u" MIN  
 3: GOLD 10u" MIN  
 B: GOLD 4u" MIN FOR SPOT PLATING  
 ALL OVER: NI 50~100u"

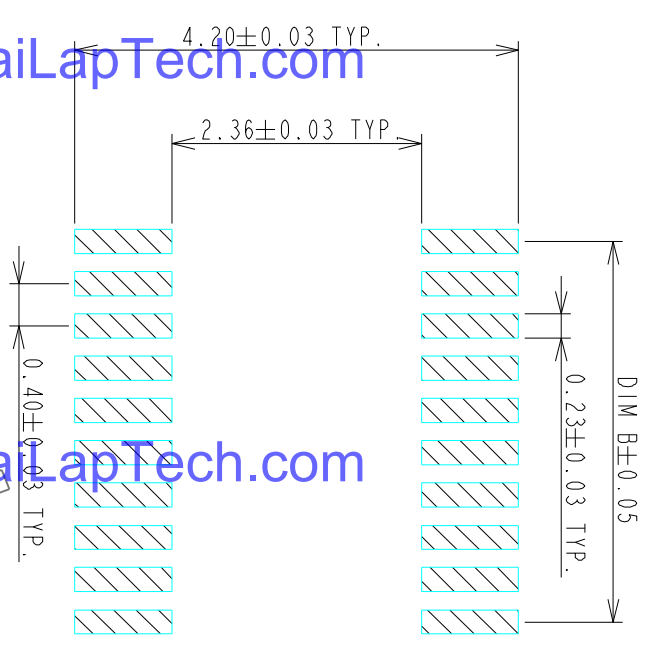
5. TYPE OF HEIGHT:  
 5: H=0.77mm

6. TYPE OF HOLD DOWN:  
 3: WITHOUT HOLD DOWN

7. OTHER  
 2: WITH POST, FINISHED PRODUCTS  
 3: WITHOUT POST, FINISHED PRODUCTS

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

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: DIELECTRIC 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

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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

4.0 ALL COPLANARITY IS 0.08mm MAX. BEFORE REFLOW  
 ALL COPLANARITY IS 0.10mm MAX. AFTER REFLOW

TOLERANCES UNLESS OTHERWISE SPECIFIED		DRAWN		DATE	
GENERAL X	±0.38	RAIN	04/15/10		
XXX	±0.13	DESIGN			
ANGLES X°	±0.13	RAIN	04/15/10		
UNIT	MM	CHECKED			
SCALE	20:1	HARDWARE	04/24/10		
SHEET	2 OF 2	APPROVED			
UNIT	MM	DICK. LEE	04/24/10		
		<b>CUSTOMER DRAWING</b>		TITLE	
		SERIES		P0.4#11.0mm BOARD TO BOARD	
		DWG NO.		CONN. RECEPTACLE	
		C-BBR43-04-01		WITHOUT HOLD DOWN	
		REV.		SIZE	
		B		A3	

F

E

D

C

B

A

## [Product Brief]

Ver.1.0

# IMX298

Diagonal 6.521 mm (Type 1/2.8) 16Mega-Pixel CMOS Image Sensor with Square Pixel for Color Cameras

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### Description

IMX298 is a diagonal 6.521 mm (Type 1/2.8) 16 Mega-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 spatially multiplexed 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 2.5 V, digital 1.1 V and 1.8 V for input/output interface and achieves low power consumption.

In addition, this product is designed for use in cellular phone and tablet pc. When using this for another application, Sony 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

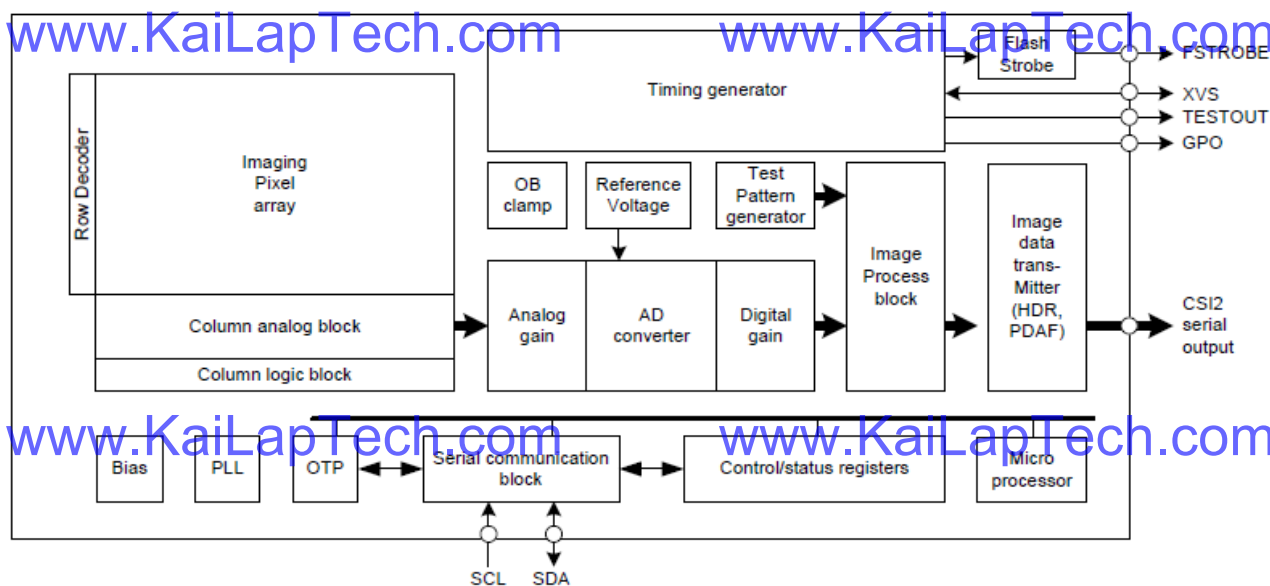
- ◆ Back-illuminated and stacked CMOS image sensor Exmor RS
- ◆ Phase Detection Auto Focus (PDAF)
- ◆ Single Frame High Dynamic Range (HDR) with equivalent full pixels
- ◆ High signal to noise ratio (SNR)
- ◆ Full resolution @30 frame/s (Normal / HDR). 4K2K @30 frame/s (Normal / HDR) 1080p @60 frame/s (Normal / HDR)
- ◆ Output video format of RAW10/8, COMP8
- ◆ Pixel binning readout and H/V sub-sampling function
- ◆ Advanced Noise Reduction (Chroma noise reduction and RAW noise reduction)
- ◆ Independent flipping and mirroring
- ◆ CSI-2 serial data output (MIPI 2lane/4lane, Max. 1.5 Gbps/lane, D-PHY spec. ver. 1.1 compliant)
- ◆ 2-wire serial communication
- ◆ Two PLLs for independent clock generation for pixel control and data output interface
- ◆ Dynamic Defect Pixel Correction
- ◆ Power-on reset function
- ◆ Dual sensor synchronization operation
- ◆ 9 K bit of OTP ROM for users
- ◆ Built-in temperature sensor



Device Structure

- ◆ CMOS image sensor
- ◆ Image size : Diagonal 6.521 mm (Type 1/2.8)
- ◆ Total number of pixels : 4720 (H) × 3600 (V) approx. 16.99 M pixels
- ◆ Number of effective pixels : 4672 (H) × 3520 (V) approx. 16.44 M pixels
- ◆ Number of active pixels : 4656 (H) × 3496 (V) approx. 16.28 M pixels
- ◆ Chip size : 6.433 mm (H) × 4.921 mm (V)
- ◆ Unit cell size : 1.12 μm (H) × 1.12 μm (V)
- ◆ Substrate material : Silicon

System block diagram



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**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.



## 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							
<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							

## Cameras Applications



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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





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
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



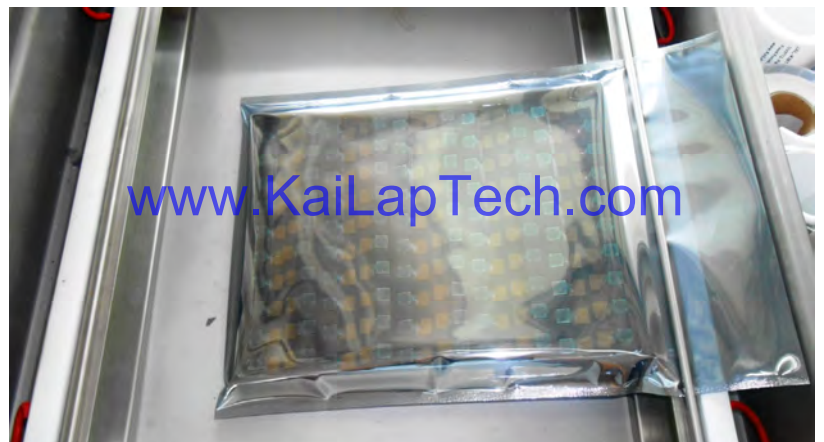
Cover Tray with Lid



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**







# CMOS CAMERA MODULES



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## Large Order Package Solution

Place Foam Sheets Between Trays

Foam Sheets are Slightly Larger than Trays

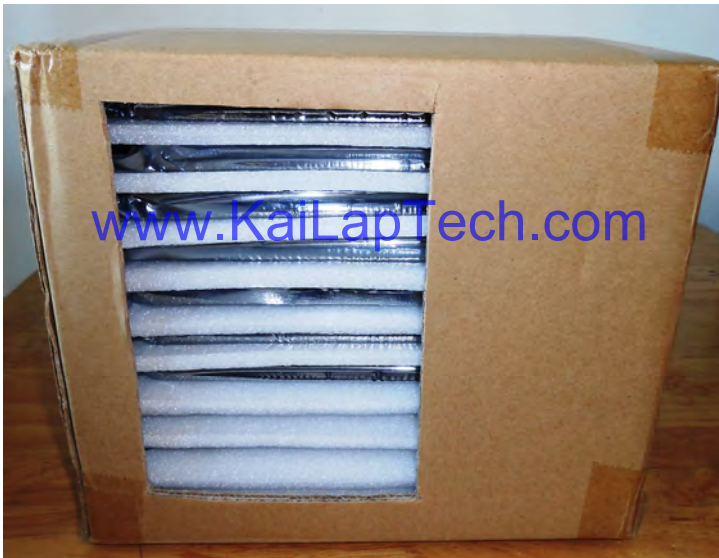


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Place Foam Sheets and Trays into Box

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



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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





*your BEST camera module partner*

## 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.

[www.KaiLapTech.com](http://www.KaiLapTech.com)

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## 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.





# CMOS CAMERA MODULES



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## KLT Strength

### Powerful Factory



### Professional Service



### Promised Delivery



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