KLT-MAA29-S5K3P8 V1.0

16MP Samsung S5K3P8 MIPI Interface Auto Focus Camera Module

Front View

Back View

Specifications

Camera Module No.	KLT-MAA29-S5K3P8 V1.0
Resolution	16MP
Image Sensor	S5K3P8
Sensor Type	1/3.1"
Pixel Size	1.0 um x 1.0 um
EFL	3.81 mm
F.NO	2.20
Pixel	4640 x 3488
View Angle	76.8°(DFOV) 62.7°(HFOV) 48.7°(VFOV)
Lens Dimensions	8.50 x 8.50 x 5.60 mm
Module Size	20.85 x 8.50 mm
Module Type	Auto Focus
Interface	MIPI
Auto Focus VCM Driver IC	CN3927E
Lens Model	KLT-LENS-60183A1
Lens Type	650nm IR Cut
Operating Temperature	-30°C to +70°C
Mating Connector	BBR43-30KB533

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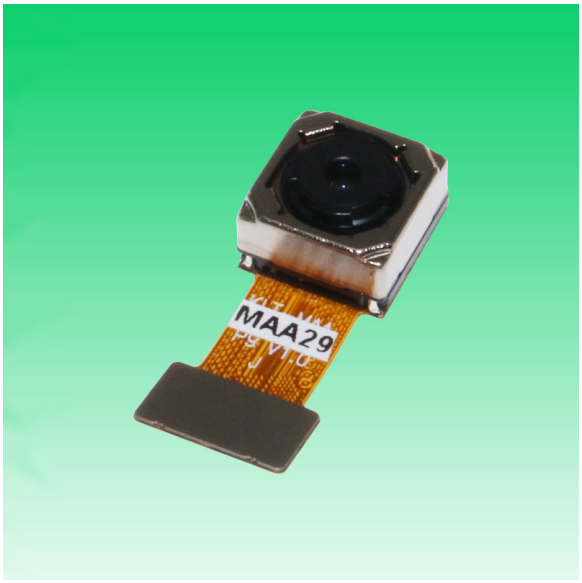
KLT-MAA29-S5K3P8 V1.0

16MP Samsung S5K3P8 MIPI Interface Auto Focus Camera Module



Top View

Side View

Bottom View

Mating Connector

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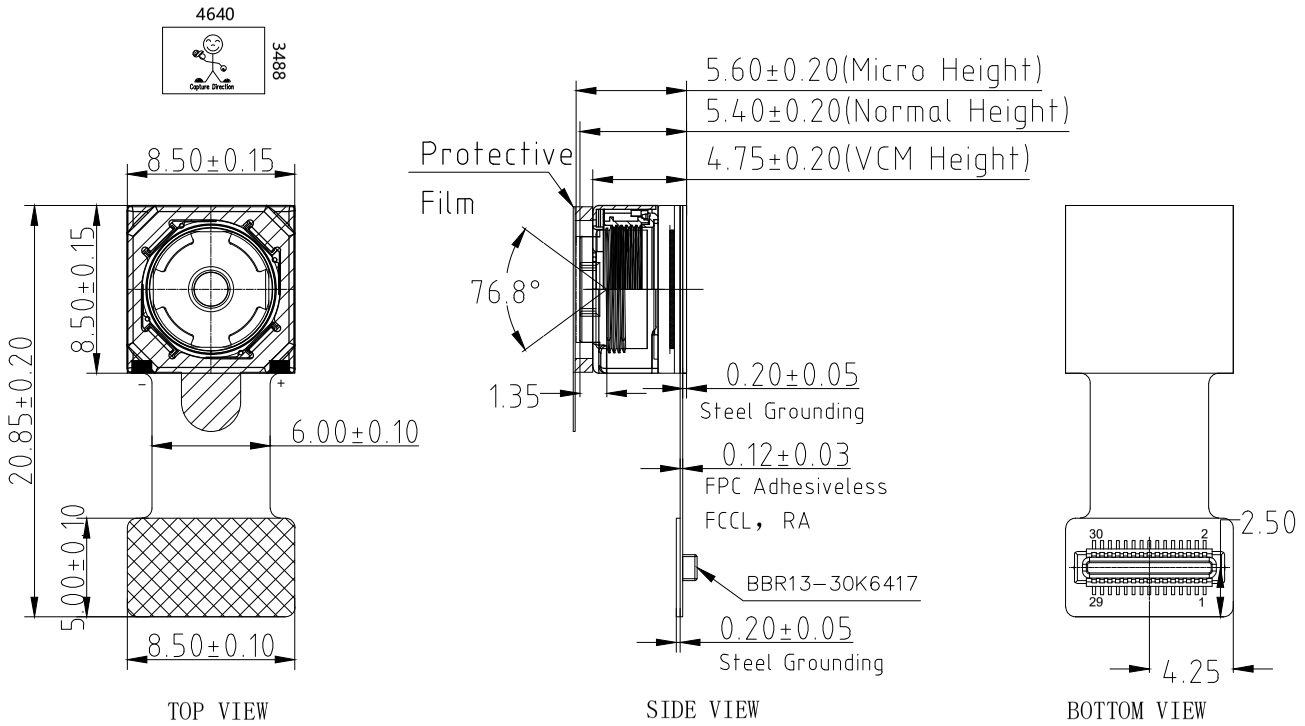
Version	Information	Date
V1.0	First Version	4-24-2022

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



TOP VIEW SIDE VIEW BOTTOM VIEW

NOTE:

1.The device slave address:0x20;

Parameters:

1、Sensor specification:

Image Sensor: S5K3P8

Pixel: 1.0um×1.0um

Lens Type: 1/3.1

Important Voltage Description: DVDD1.0V (external power supply);

2、Lens specification:

FOV: 76.8°(D);62.7°(H);48.7°(V);

F/NO.: 2.2

TV distortion: <1.5%

Focal length: 3.81mm

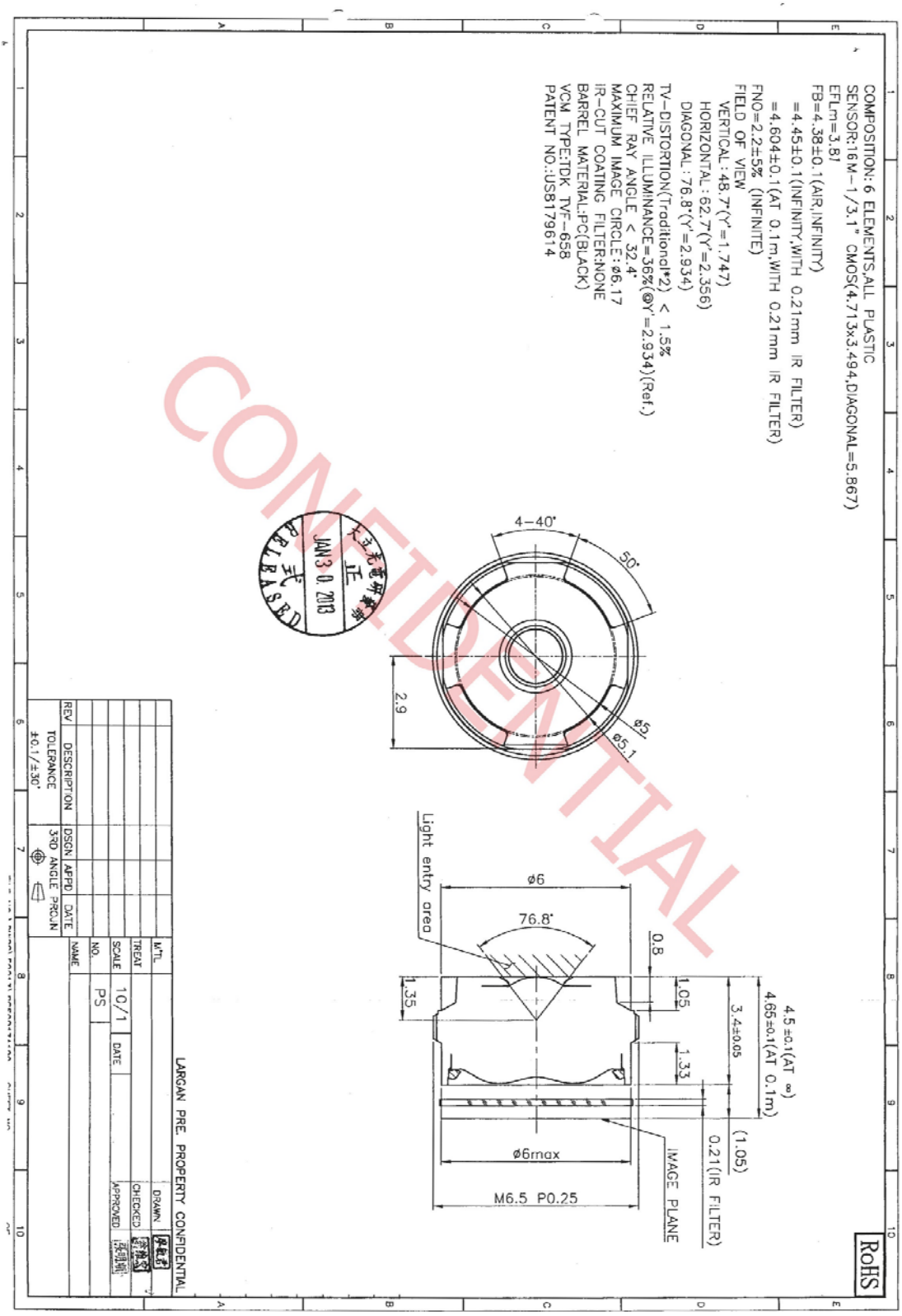
Composition: 6P+IR FILTER

IR Cut Coating: 650nm±10nm@50%

Kai Lap Technologies Group Ltd

Designed By	Kevin	Model Name:	KLT-MAA29-S5K3P8 V1.0
Checked By	Aouly_Yan	Projection Type: Third Angle	Unit: mm; Material: ----------
			Scale: 1:1; Sheet: 1 of 1; Version: 1/0

Lens Model: KLT-LENS-60183A1



CN3927E

Low Cost Voice Coil Motor Driver with I2C interface

1. Description

The CN3927E is a low cost single 10-bit DAC with 120mA output current sink capability. Designed for linear control of voice coil motors, the CN3927E is capable of operating voltage from 2.3V to 5.5V. The DAC is controlled via a I2C serial interface that operates DAC by clock rates up to 400kHz.

The CN3927E incorporates with a UVLO reset circuit, power-down function, and exactly matched sense resistor. UVLO reset circuit ensure when supply power up, DAC output is to 0V until valid write-bit value takes place. It has a power down features that reduces the current consumption of the device to 1uA maximum.

The CN3927E is designed for auto focus and optical zoom camera phones, digital still cameras, and camcorders applications. The I2C address for the CN3927E is 0x18.

Features

- WLCSP package for minimum footprint
- Ramp control circuit
- Fixed I²C logic thresholds
- 10-bit D-to-A converter
- 117μA *Iout* resolution
- I2C serial interface (1.8V input available)
- Low current sleep mode
- 2.3 to 5.5 V power supply

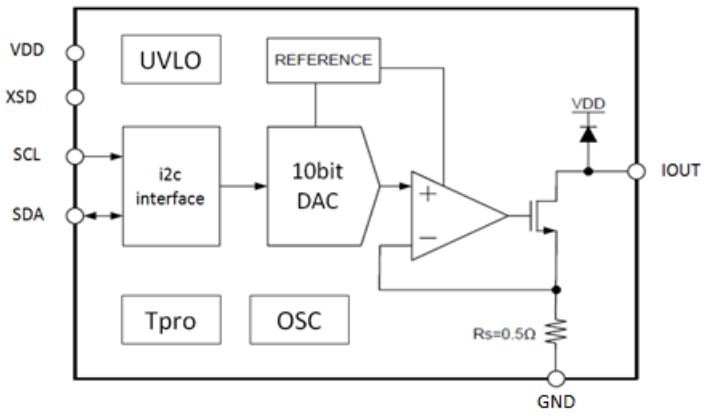
Applications

- Digital camera
- Cell phone
- Lens auto focus
- Web camera

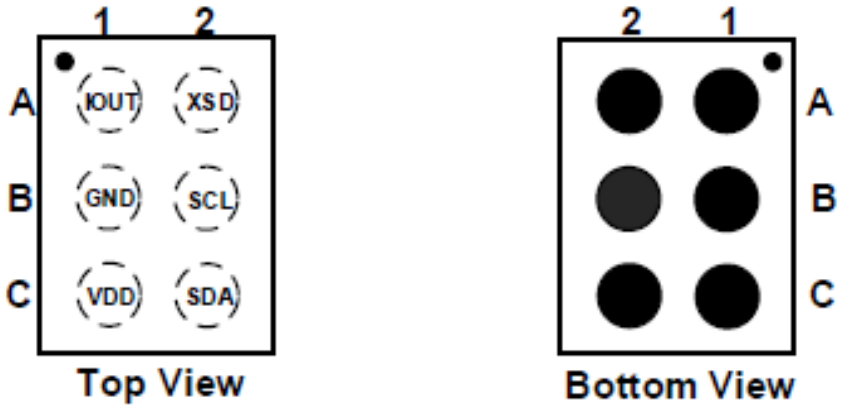
Package:

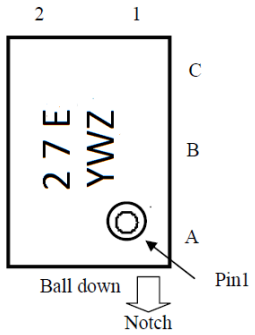
- 6-Bump Chip Scale Package
- 0.70mm(W) x1.10mm(H) x 0.28mm(T)
- 0.4mm Bump Pitch

2. Functional Block Diagram



3. Pin Assignments





Top Mark

4. Pin Description

Pin Name	Pin Number	Description
IOUT	A1	Sink Drive Output
XSD	A2	Standby Mode Control
GND	B1	Ground
SCL	B2	I^2C clock
VDD	C1	Power Supply In
SDA	C2	I^2C data

5. Ordering Information

Order Part Number	Top Marking	Pb-Free	T_A	Package	
CN3927E	27E	Yes	-40 to +85°C	WLCSP6	Tape & Reel, 3K

6. Absolute Maximum Ratings

Stresses beyond those listed under "Absolute Maximum Rating" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maxim rating conditions for extended periods may affect device reliability.

Parameter		Conditions	Min.	Typ	Max.	Unit
Supply Voltage	VDD				6.5	V
Logic Input Voltage Range	Vin		-3		Vdd+0.3	V
Junction Temperature	Tj				150	°C
Storage Temperature Range	Ts		-40		150	°C
Operating Temperature Range			-40		85	°C
ESD (HBM)				6		KV
CN3927E	Rja	4 layer PCB			64	°C/W

7. Recommend Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation to ensure optimal performance to the datasheet specifications. CHIPNEXT does not recommend exceeding them or designing to Absolute Maximum Ratings.

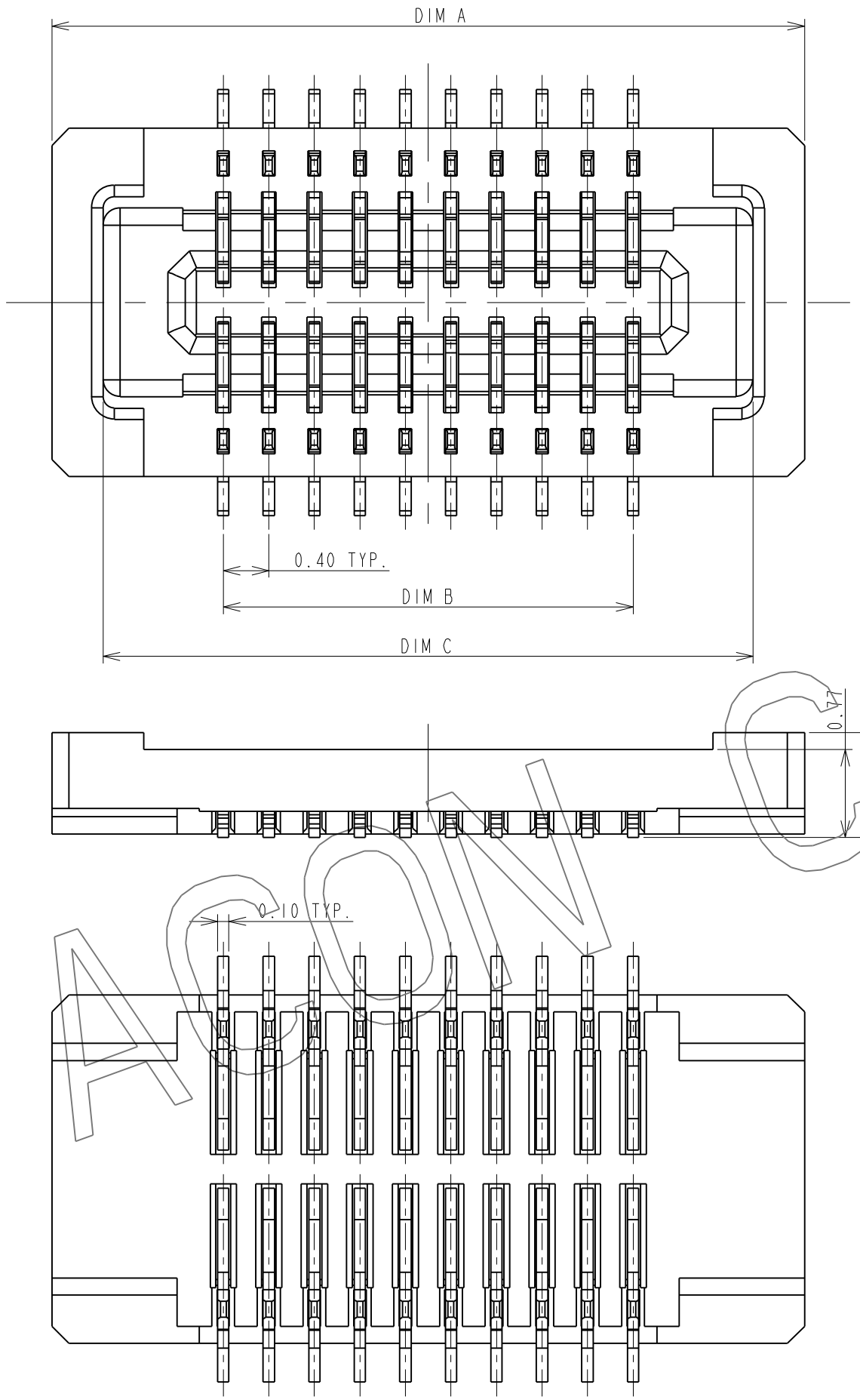
Parameter	Min.	Typ.	Max.	Unit
Supply Input Voltage	2.3	3	5.5	V
Junction Temperature Range	-40		125	V
Ambient Temperature Range	-40		85	°C

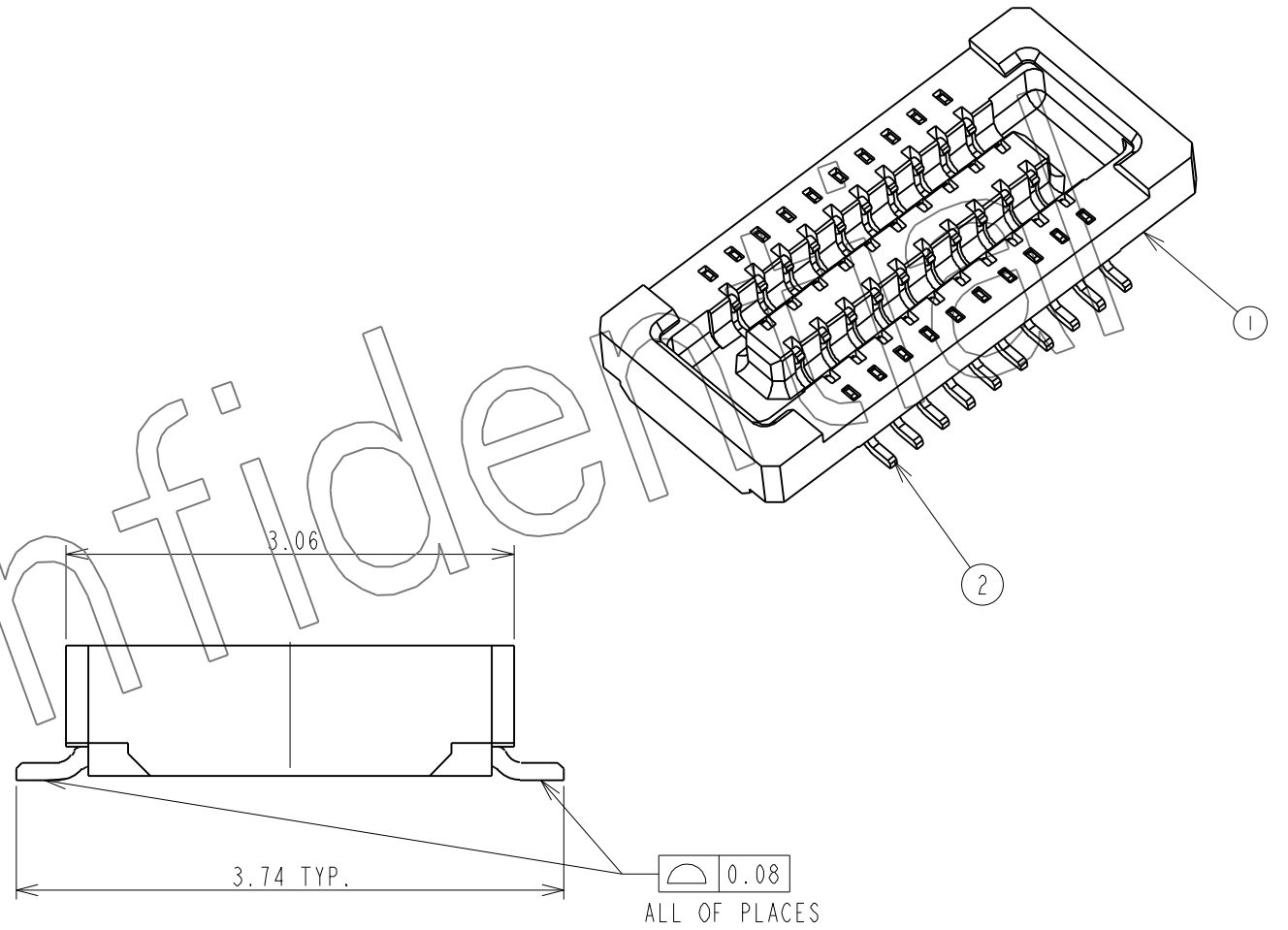
8. Electrical Characteristics

T_A = 25°C, VDD=2.8V, (unless otherwise specified)

Characteristics	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max	Units
Supply Current	Ivdd	Code=0		0.2		mA
		Sleep Mode (XSD=Low),			1	uA
		Software PD Mode , PD=1,			1	uA
UVLO VDD threshold	Vth_uvlo	Iout<1uA, when VDD decrease to Vth_uvlo			2.15	V
UVLO hysteresis	Vhys_uvlo			100		mV

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





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

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

SCALE 20:1
SHEET 1 OF 2
UNIT mm

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

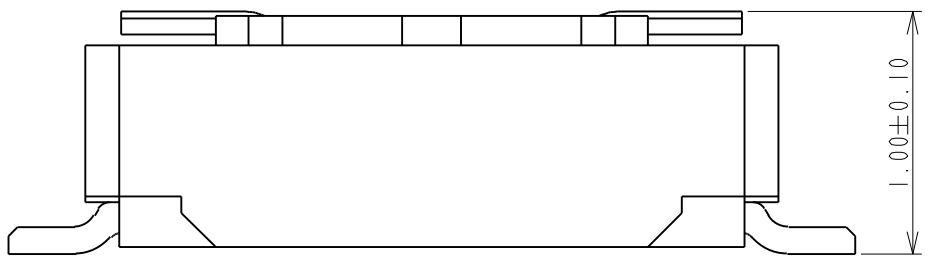
CUSTOMER DRAWING

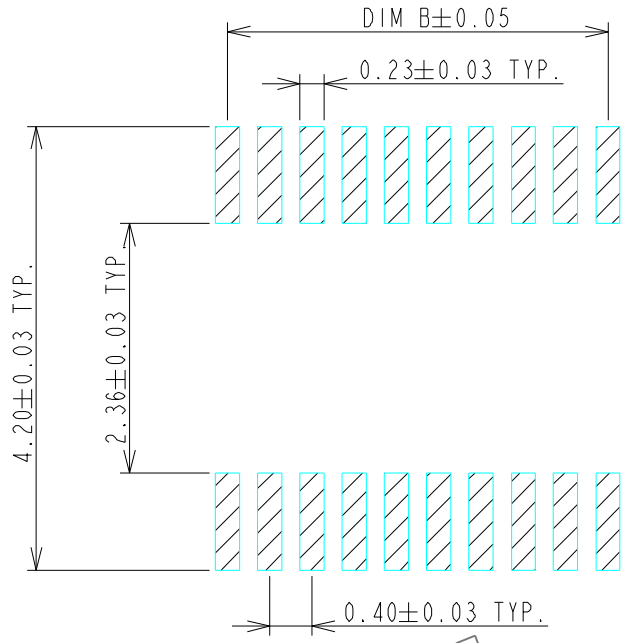
ACON ADVANCED— CONNECTEK INC.

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

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

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





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

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

PRODUCT NUMBERING CODE:

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

1.PRODUCTION CODE:

BBR43:BOARD TO BOARD 0.4 PITCH RECEPTACLE

2.POSITIONS:

XX: POSITIONS(SEE TABLE A

3.INSULATOR COLOR:

K: BLACK

4.CONTACT PLATING:

1:GOLD 1u" MIN

2.GOLD 5u" MIN

3:GOLD 10u" MIN

B:GOLD 4u" MIN FOR SPOT PLATING

ALL OVER Ni 50~100u"

5.TYPE OF HEIGHT:

5: H=0.77mm

6. TYPE OF HOLD DOWN:

3: WITHOUT HOLD DOWN

7.OTHER

2: WITH POST,FINISHED PRODUCTS

3: WITHOUT POST,FINISHED PRODUCTS

NOTES:

1.0: RATING:

1.1: VOLTAGE:60V AC/DC

1.2: CURRENT:0.5 AMPS

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

2.0: ELECTRICAL CHARACTERISTIC:

2.1: CONTACT RESISTANCE: 50 mΩ MAX INITIAL

2.2: INSULATION RESISTANCE: 1000 MΩ MIN INITIAL

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

3.0 TOLERANCES UNLESS OTHERWISE SPECIFIED

GENERAL: DIMENSION >10.00 ±0.13

DIMENSION 5.00~10.00 ±0.10

DIMENSION <5.00 ±0.05

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

ALL COPLANARITY IS 0.10mm MAX.AFTER REFLOW

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

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

S5K3P8SX03

1/3.1" 16Mp CMOS Image Sensor for supporting SWDR and PD-AF Pattern

Revision 1.02

May 2016

Data Sheet

1 Product Overview

1.1 Introduction

The S5K3P8SX is a highly integrated 16M pixel camera chip that includes a CMOS image sensor (CIS), image correction functionality and serial transmission using 4-lane MIPI. It is designed for fast yet low power operation, delivering full resolution capture at 30 frames per second (fps) and full field of view (16:9) FHD video at 60fps.

The S5K3P8SX supports Wide Dynamic Range (WDR) image capturing at both video and still modes, allowing high quality image capturing in cases of mixed lightening scenes. It also supports Phase Detection Auto Focus (PD AF) mechanism allowing efficient Auto Focus in the system.

It is fabricated by the SAMSUNG 65nm back side illumination (BSI) CMOS image sensor process developed for imaging applications to realize a high-efficiency and low-power photo sensor. The sensor consists of 4640 x 3488 effective pixels that meet with the 1/3.1-inch optical format.

The CIS has on-chip 10-bit ADC arrays to digitize the pixel output and on-chip Correlated Double Sampling (CDS) to drastically reduce Fixed Pattern Noise (FPN). It incorporates on-chip camera functions such as defect correction, exposure setting, white balance setting and image data compression.

The S5K3P8SX CIS is programmable through a CCI or SPI serial interface and includes on-chip one-time programmable (OTP) none-volatile memory (NVM).

The S5K3P8SX is suitable for a low-power camera module with a 2.8V/1.0V power supply.

1.2 Features

- 16Mp sensor with 1/3.1" optics
- Unit Pixel Size : 1.0 um
- Effective Resolution : 4640(H) x 3488(V)
- Active Resolution : 4656(H) x 3504(V)
- Color Filter : RGB Bayer Pattern
- Shutter Type : Electronic Rolling Shutter
- Max. Normal Frame Rate : 30fps@Full
- Max. Video Frame Rate : 60fps@1080p, 120fps@720p, 120fps@WVGA
- Data rate : 1500Mbps/lane
- ADC Accuracy : 10bits
- Wide Dynamic Range (WDR) image capturing support
- Phase Detection Auto Focus (PDAF) support
- PDAF tail mode support
- Interfaces :
  - Fine interface frequency control using additional dedicated PLL for EMI avoidance and integration flexibility.
  - MIPI CSI-2 four lanes (1.5Gbps per lane)
  - Output formats - RAW8 (using DPCM/PCM compression), RAW10
- Control interface :
  - I2C-compatible - Two-wire serial communication circuit up to 400 KHz
    - In Fast-mode Plus(Fm+) up to 1Mhz (External Clock >= 24Mhz)
  - SPI interface - Three-wire serial communication circuit up to 10MHz
- 32 Kbit on-chip OTP memory to support defect corrections and Chip ID
- Analog gain x16
- Vertical flip and horizontal mirror mode
- Continuous frame capture mode
- 2/2, 3/3, 4/4, 6/6 - average/average-sub-sampling readout
- Pixel elimination readout function
- Bad pixel correction
- Built-in test pattern generation
- Supply voltage : 2.8V for analog, 1.8V for I/O
  1.0V digital core supply for normal mode
- Operating temperature : -30℃ to +70℃

Camera Module Pinout Definition Reference Chart

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

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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




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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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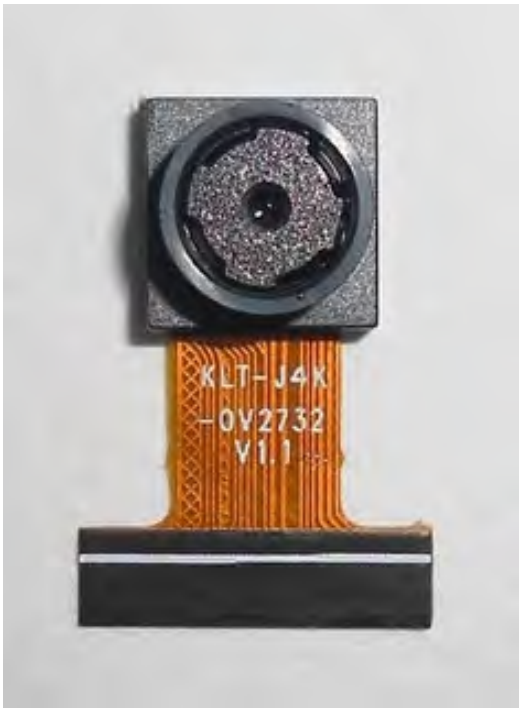
KLT Package Solutions

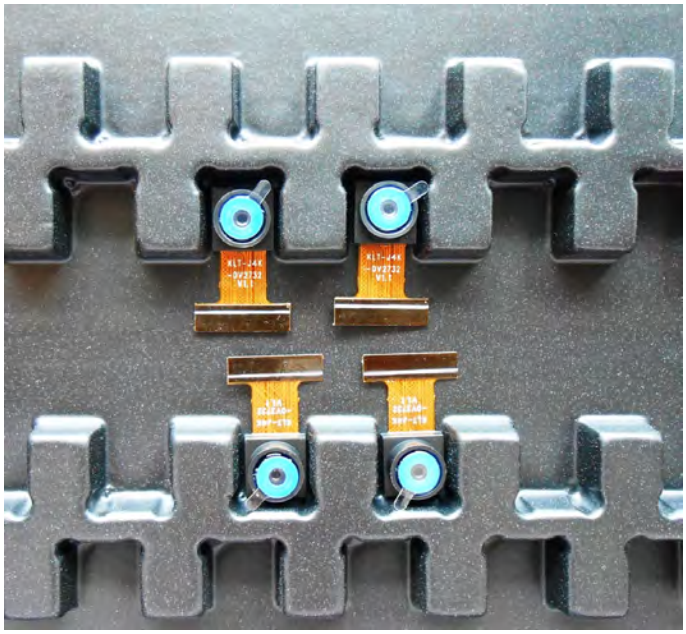
KLT Camera Module



Complete with Lens Protection Film

Tray with Grid and Space

Place Cameras on the Tray



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CMOS CAMERA MODULES

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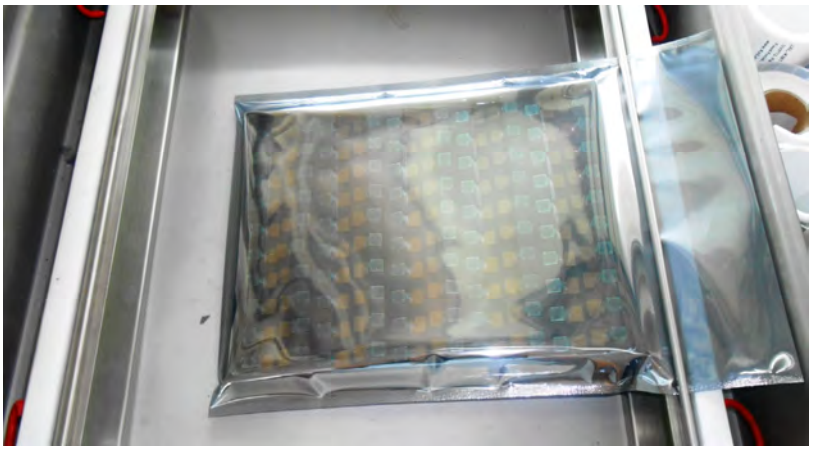
Camera Modules Package Solution

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

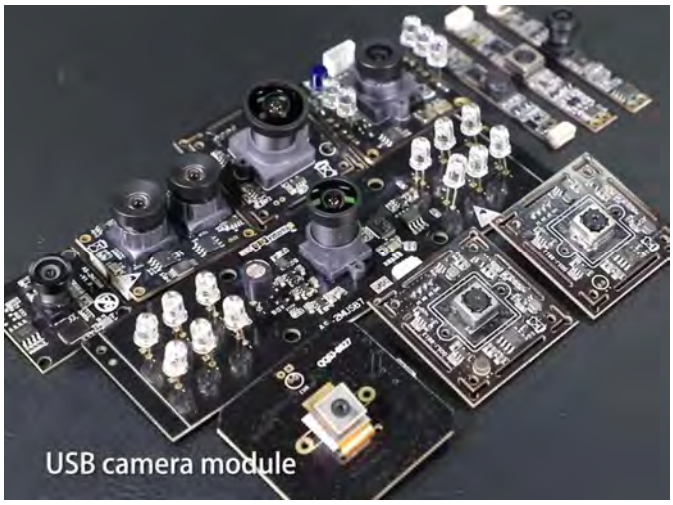
your BEST camera module partner

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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KLT Strength

Powerful Factory

Professional Service

Promised Delivery

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