KLT-D6MA-S5K3P3 V3.0
16MP Samsung S5K3P3 MIPI Interface Auto Focus Camera Module

Front View

Back View

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www.KaiLapTech.com

Specifications

Camera Module No.	KLT-D6MA-S5K3P3 V3.0
Resolution	16MP
Image Sensor	S5K3P3
Sensor Type	1/3.1"
Pixel Size	1.00 um x 1.00 um
EFL	4.24 mm
F.NO	2.20
Pixel	4632 x 3480
View Angle	78.4°(DFOV) 66.2°(HFOV) 51.6°(VFOV)
Lens Dimensions	8.50 x 8.50 x 5.37 mm
Module Size	17.60 x 9.40 mm
Module Type	Auto Focus
Interface	MIPI
Auto Focus VCM Driver IC	DW9714
Lens Model	KLT-LENS-50065B5
Lens Type	650nm IR Cut
Operating Temperature	-30°C to +70°C
Mating Connector	OK-10F030-04

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

KLT-D6MA-S5K3P3 V3.0
16MP Samsung S5K3P3 MIPI Interface Auto Focus Camera Module

Top View

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Side View

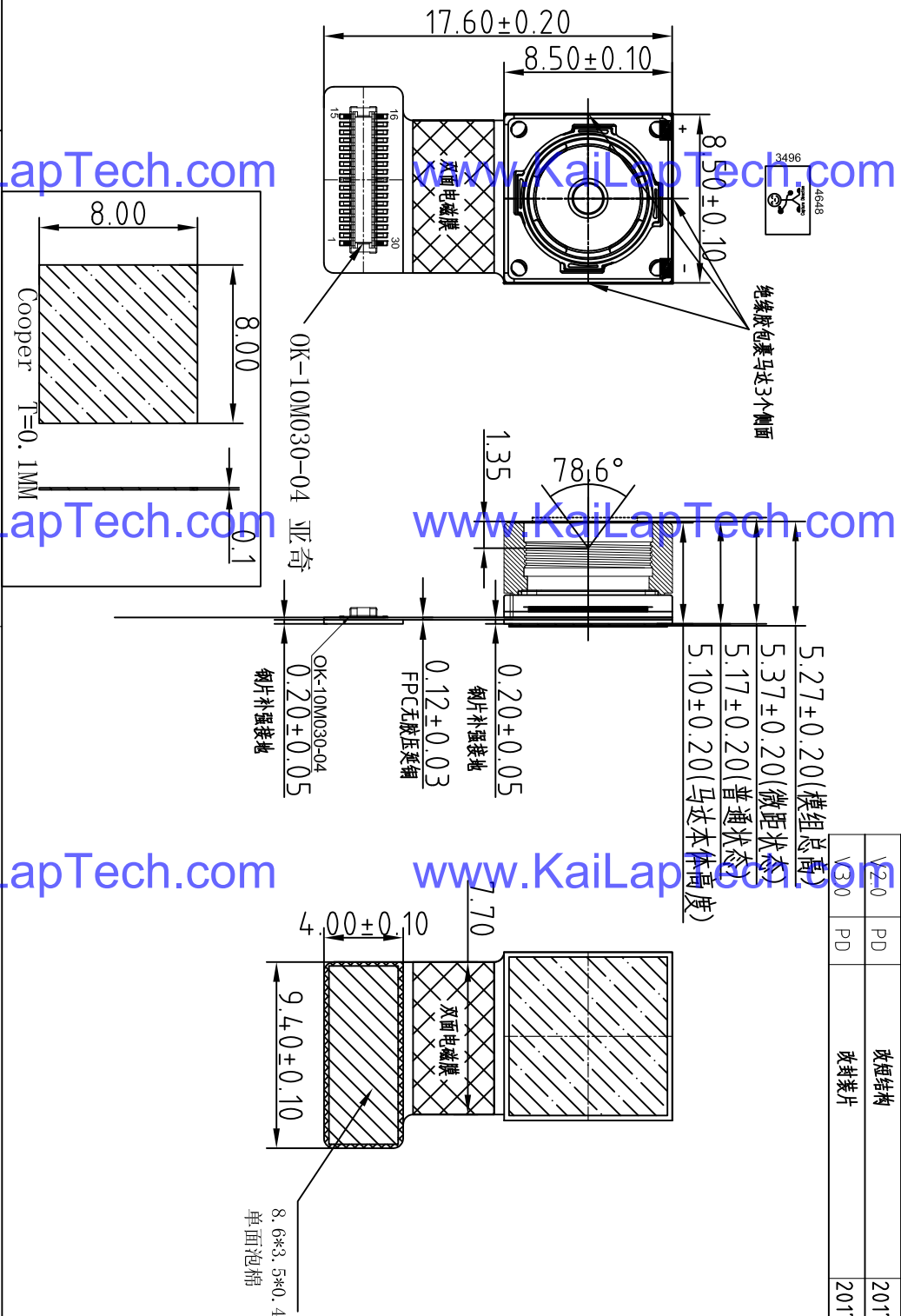www.KaiLapTech.com

Bottom View
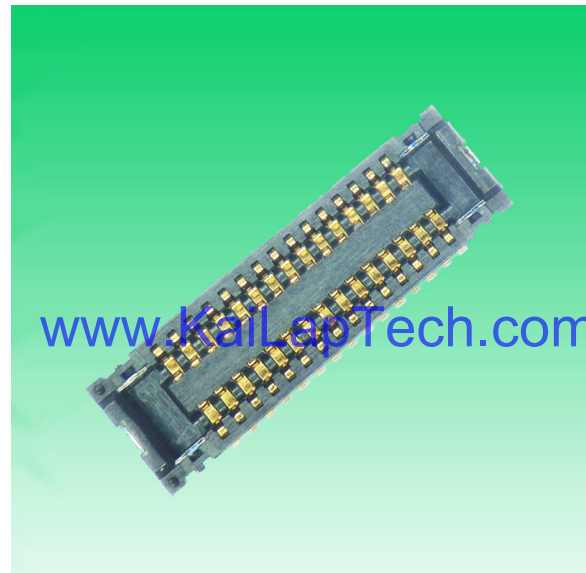
Mating Connector

RoHS

PIN DEFINITION

PIN	DEFINITION
1	AF_GND
2	AF_VDD_2.8V
3	DVDD_1.2V
4	DOVDD_1.8V
5	NC
6	AGND
7	AVDD_2.95V
8	DGND
9	SIO_D
10	SIO_C
11	RESET
12	NC
13	GND
14	MCLK
15	GND
16	MDP3
17	MDN3
18	GND
19	MDP2
20	MDN2
21	GND
22	MDP1
23	MDN1
24	GND
25	MCP
26	MCN
27	GND
28	MDP0
29	MDN0
30	GND

Parameters:

1. Sensor specification:
Image Sensor: S5K3P3
Pixel: 1.0um×1.0um
Lens Type: 1/3.1
Important Voltage Description: DVDD1.2V
I2C_IC:0X20

2. Lens specification:
FOV: 78.6°
F/NO.: 2.2±5%
TV distortion: <1.5%
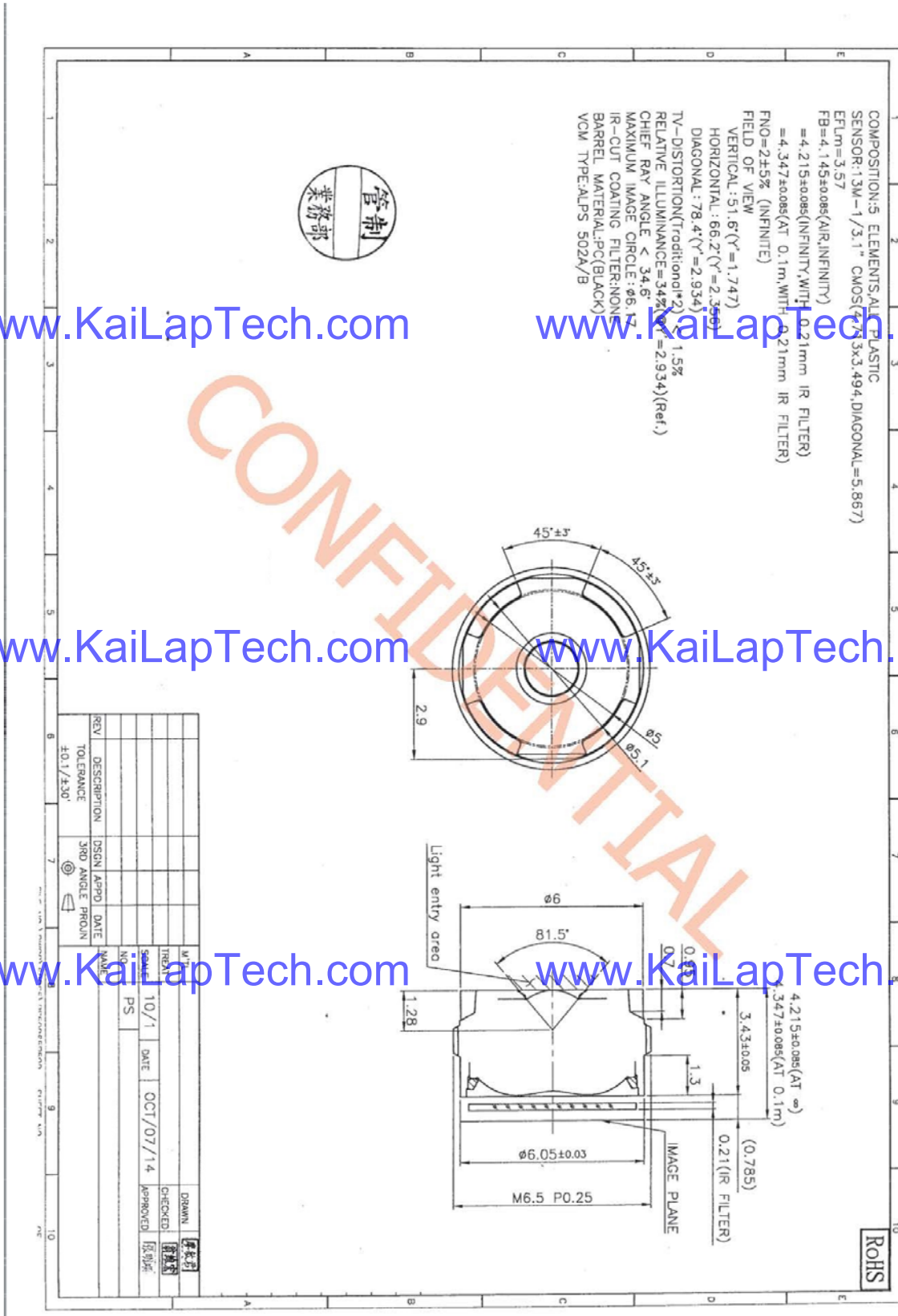Focal length: 4.24mm
Composition: 5P

Cooper T=0.1MM

8.00
8.00
0.1

OK-10M030-04 亚奇

17.60±0.20
8.50±0.10
8.50±0.10

3496
4648

绝缘胶包裹马达3个侧面

78.6°
1.35

5.27±0.20（模组总高）
5.37±0.20（微距状态）
5.17±0.20（普通状态）
5.10±0.20（马达本体高度）

0.20±0.05 钢片补强接地
0.12±0.03 FPC无胶压death销
0.20±0.05 钢片补强接地
OK-10M030-04

双面电磁膜

4.00±0.10
9.40±0.10
0.70

双面电磁膜
8.6*3.5*0.4
单面泡棉

Kai Lap Technologies Group Ltd

Designed By	Kevin
Checked By	Aouly_Yan
Model Name:	KLT-D6MA-S5K3P3 V3.0

Projection Type: Third Angle
Unit: mm
Scale: 1:1
Material: ──────
Sheet: 1 of 1
Version: 1/0

Version Mark	Information	Date
V10	PD	攻组结构	2017-02-28
V20	PD	政封菜片	2017-06-28
V30	PD	政封菜片	2017-06-28

First Version

Lens Model: KLT-LENS-50065B5

COMPOSITION:5 ELEMENTS,ALL PLASTIC
SENSOR:1.3M~1/3.1" CMOS(4.23x3.494,DIAGONAL=5.867)
EFLm=3.57
FB=4.145±0.085(AIR,INFINITY)
  =4.347±0.085(INFINITY,WITH 0.21mm IR FILTER)
FNO=2±5% (INFINITE)
FIELD OF VIEW
  VERTICAL:51.6°(Y'=1.747)
  HORIZONTAL:66.2°(Y'=2.35)
  DIAGONAL:78.4°(Y'=2.934)
TV-DISTORTION(Traditional*2): 1.5%
RELATIVE ILLUMINANCE=34%
CHIEF RAY ANGLE < 34.6°
MAXIMUM IMAGE CIRCLE:Φ6.7
IR-CUT COATING FILTER:NONE
BARREL MATERIAL:PC(BLACK)
VCM TYPE:ALPS 502A/B

1. General Description

The DW9714 is single 10-bit DAC with 120mA output current sink capability. Designed for linear control of voice coil motors, the DW9714 is capable of operating voltage to 3.6V. The DAC is controlled via a I²C serial interface that operates DAC by clock rates up to 400kHz.

The DW9714 incorporates with a power-on reset circuit, power-down function, and exactly matched sense resistor. Power-on 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 DW9714 is designed for auto focus and optical zoom camera phones, digital still cameras, and camcorders applications. The I²C address for the DW9714 is 0x18.
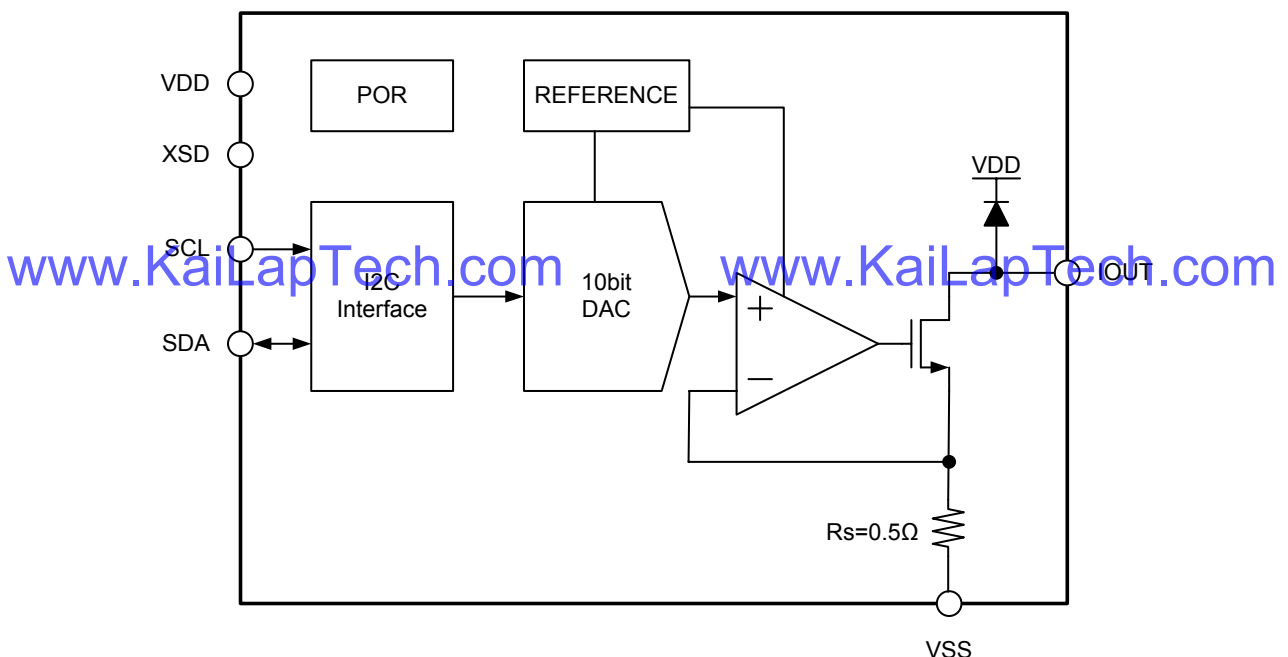
■ **Features**

VCM driver for auto-focus

10bit resolution current sinking of 120mA for VCM

VCM slew rate control (SRC) – Linear slope control, Dual level control

Supply voltage range (VDD) : 2.3V to 3.6V

Fast mode I2C interface (1.8V interface available)

Power on reset (POR)

Package : 0.80mm(W) X 1.20mm(H) X 0.3mm(T) 6pins WLCSP

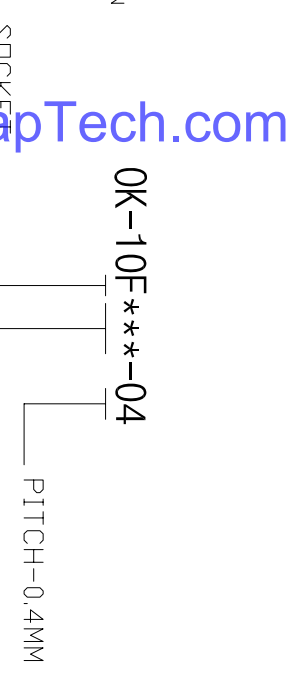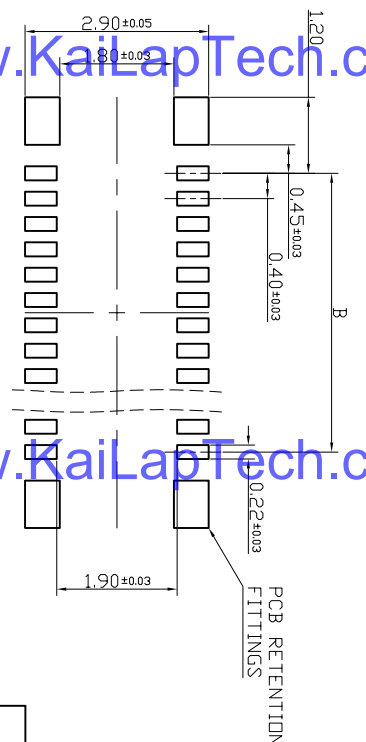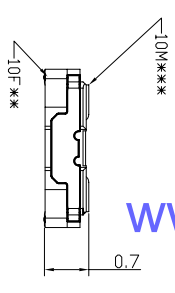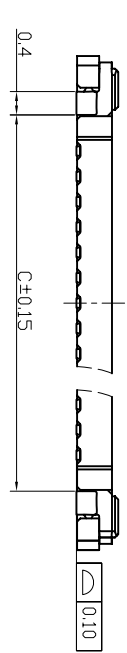■ **Applications**

Digital camera

Cell phone

Lens auto focus

Web camera

2. Block Diagram

TABLE:

	NUMBER OF CONTACTS	1	A	B
D	40		10.60	7.60
D	32		9.00	6.00
	30		8.60	5.60
	26		7.80	4.80
E	24		7.40	4.40
	10		4.60	1.60

RECOMMENDED PCB LAYOUT

2.90±0.05
1.80±0.03
1.20
0.45±0.03
0.40±0.03
B
0.22±0.03
1.90±0.03

PCB RETENTION FITTINGS

MATING SECTION

-10F**
-10M***

0.70
2.90±0.2
0.7

2.50
0.15±0.03
0.40±0.05
B
A
0.70
(Suction face)

RETENTION FITTINGS

0.4
C±0.15
0.10

SOCKET

OK-10F***-04

PITCH-0.4MM
NUMBER OF CONTACTS

Specifications:

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

DIMENTION IN mm			
TOLERANCE UNLESS OTHERWISE SPECIFIED			
.	±0.20	.	±2°
.0	±0.10	.0	±1°
.00	±0.05	.00	±0.5°
.000	±0.03	.000	±0.3°

CHKD:		APPD:	
DRA: George Gao 2013.09.18			

OCN 正奇 科技
OCN TECHNOLOGY

TITLE: 0.4MM BTB (MATING HEIGHT 0.7H)

DWG NO: OK-10F***-04				
PROJ	Q'TY	SIZE A4	SHEET 1/1	REV A
⊕ ⊕	--	SCALE 1:1		

REV	ECN NO	DRA	APPD	DATE
A	FIRST RELEASE	George Gao	Human Zhou	2013.09.18

S5K3P3SQ

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

Revision 0.00
December 2015

Data Sheet

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SAMSUNG ELECTRONICS

SAMSUNG

1 Product Overview

1.1 Introduction

The S5K3P3SQ 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 S5K3P3SQ supports Phase Detection Auto Focus (PD AF) mechanism allowing efficient Auto Focus in the system.

It is fabricated by the SAMSUNG 65 nm 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 4632×3480 effective pixels which meet 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, image scaling and image data compression.

The S5K3P3SQ CIS is programmable through a CCI or SPI serial interface and includes on-chip one-time programmable (OTP) none-volatile memory (NVM).
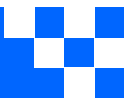
1.2 Features

- 16Mp sensor with 1/3.1" optics

- Pixel size: 1.0um

- Effective resolution: 4632 (H) $\times$ 3480 (V)

- Electronic rolling shutter and global reset

- Support digital video stabilization margins in main view modes

- Frame rate:

    - Capture: 16M 30 fps

    - FHD video: 4M(16:9) 60 fps

    - HD video: 1.78M (16:9) 120 fps

    - High speed: WVGA 120 fps

    - High speed: VGA (4:3) 120 fps

- Phase Detection Auto Focus (PD AF) support

- Interfaces:

    - Fine interface frequency control using additional dedicated PLL for EMI avoidance and integration flexibility.

    - MIPI CSI2 - four lanes (1.5 Gbps per lane)

    - Output formats: RAW8 (using DPCM/PCM compression), RAW10

- Control interface:

    - I2C interface - Two-wire serial communication circuit up to 400 kHz

- Xenon/LED flash

- Mechanical shutter

- 32Kbit on-chip OTP memory to support defect corrections and chip ID.

- Analog gain x16

- Vertical and horizontal flip mode

- Continuous frame capture mode

- 2/2, 3/3, 4/4, 6/6 - average/average-sub-sampling readout

- Pixel elimination readout function

- Bayer down scaler function for ratios of ~ x1.5, x2, x2.5, x3, ..., x8 and x1.25

- Bad pixel correction

- On-chip temperature sensor

- Built-in test pattern generation

- Supply voltage: 2.95 V for analog and 2.8 V or 1.8 V for I/O, 1.2 V for digital core supply

- Operating temperature: –30 °C to +70 °C

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

KLT

your BEST camera module partner

Cameras Applications

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IMAGING DEVICES

Visible cameras
Blind-spot, side-view (mirrorless cars), accident recorder, rear park assist
Stereo cameras: direction & distance for LDWS & traffic sign recognition

3D cameras
Gesture recognitions
presence detection,
driver monitoring

Long-range radar
Adaptive Cruise Control

Short-range radar
Front & rear parking

Night vision camera
Pedestrian / animal detection

LIDAR
3D mapping of surroundings

Dead reckoning sensors
Odometry

Ultrasound
Parking, SR pedestrian & obstacle detection

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Day

Night

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
	Storage Temperature — Low -20°C 96 Hours	Temperature Chamber	No Abnormal Situation
	Operation Temperature — High 60°C 24 Hours	Temperature Chamber	No Abnormal Situation
	Operation Temperature — 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
	Drop Test (Free Falling) — With Package 60cm	10 Times on Wood Floor	Electrically Functional
	Vibration Test — 50Hz X-Axis 2mm 30min	Vibration Table	Electrically Functional
	Vibration Test — 50Hz Y-Axis 2mm 30min	Vibration Table	Electrically Functional
	Vibration Test — 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
	ESD Test — 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

CMOS CAMERA MODULES

Camera Inspection Standard

your BEST camera module partner

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

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Complete with Lens Protection Film

www.KaiLapTech.com

www.KaiLapTech.com

Tray with Grid and Space

www.KaiLapTech.com

Place Cameras on the Tray

www.KaiLapTech.com

Camera Modules Package Solution

Full Tray of Cameras

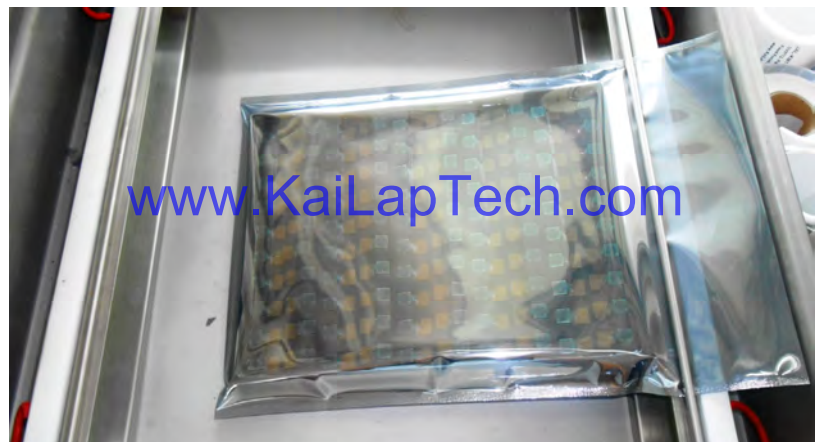
Cover Tray with Lid

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

KLT-J4K-OV2732 V1.1
OV2732, MIPI & Parallel
Fixed Focus, 67.4 Degree
www.KaiLapTech.com

100
PIECES

Shipping Date
10 August 2017

CAUTION
STATIC SENSITIVE
DEVICES
NOT TO BE HANDLED
BY UNAUTHORISED
PERSONNEL

Large Order Package Solution

Place Foam Sheets Between Trays

Foam Sheets are Slightly Larger than Trays

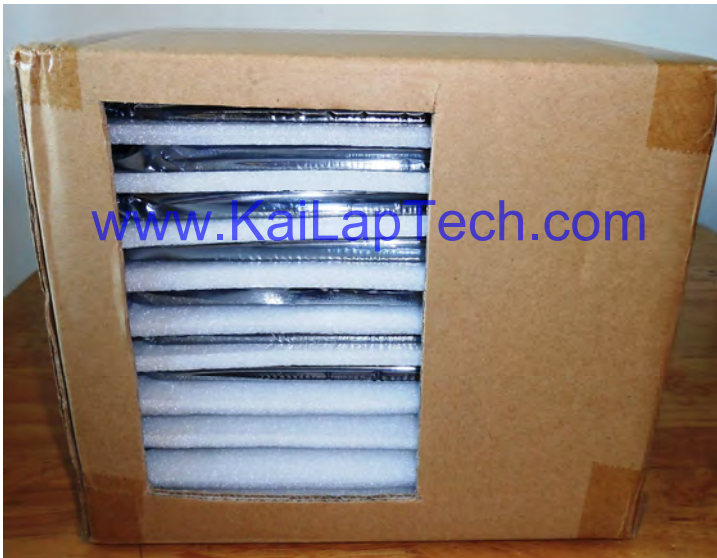www.KaiLapTech.com

www.KaiLapTech.com

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

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Foam Sheets are Nicely Fitting the Small Box

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Package in Small Box for Shipment

www.KaiLapTech.com

Place Small Boxes into Larger Box

www.KaiLapTech.com

100
PIECES

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

Please deliver to:
Kai Lap Technologies Group Ltd.
Kai Lap Technologies Group Ltd.
64-66A Sha Tsui Road, Tsuen Wan
HONG KONG
Attn: Sharon Chan
Phone: + 852 6908 1256
KLT KLT Camera Modules
www.KaiLapTech.com

PKG:
1 of 1
10 August 2017
MADE IN CHINA
KLT KLT Camera Modules
www.KaiLapTech.com

fragile
HANDLE WITH CARE

CMOS CAMERA MODULES

your BEST camera module partner

Sample Order Package Solution

Place Sample into Small Anti-Static Bag   Place Connectors into Small Ant-Static Bag

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www.KaiLapTech.com

Sample Labels on the Small Bag
1. Camera Module or Connector Model 2. Shipping Date and Quantity 3. Caution

KLT-J4K-OV2732 V1.1
OV2732 MIPI & Parallel
Fixed Focus, 67.4 Degree
www.KaiLapTech.com

Shipping Date
10 August 2017

CAUTION
STATIC SENSITIVE
DEVICES
NOT TO BE HANDLED
BY UNAUTHORISED
PERSONNEL

FH12-24S-0.5SH
Mating Connector for
KLT-J4K-OV2732 V1.0
www.KaiLapTech.com

10
PIECES

CAUTION
STATIC SENSITIVE
DEVICES
NOT TO BE HANDLED
BY UNAUTHORISED
PERSONNEL

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Connectors Large Order Package Solution

Connectors in a Wheel

Label Connectors in the Wheel

www.KaiLapTech.com

The Wheel is Perfectly Fitting the Box

Connectors Box Ready for Shipment

www.KaiLapTech.com

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