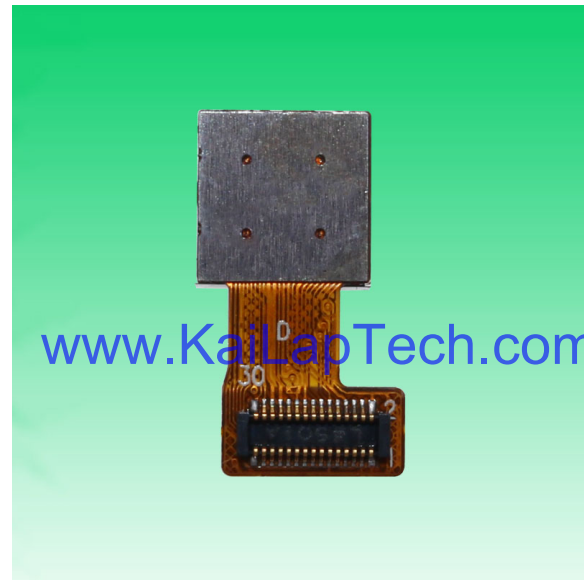


## KLT-OV13850-L50B V2.2

### 13MP OmniVision OV13850 MIPI Interface Auto Focus Camera Module



Front View



Back View

#### Specifications

Camera Module No.	KLT-OV13850-L50B V2.2
Resolution	13MP
Image Sensor	OV13850
Sensor Type	1/3.06"
Pixel Size	1.12 um x 1.12 um
EFL	3.81 mm
F.NO	2.20
Pixel	4224 x 3136
View Angle	74.4°(DFOV) 62.7°(HFOV) 48.7°(VFOV)
Lens Dimensions	8.50 x 8.50 x 5.60 mm
Module Size	17.90 x 9.00 mm
Module Type	Auto Focus
Interface	MIPI
Auto Focus VCM Driver IC	DW9714P
Lens Model	KLT-LENS-50013A1
Lens Type	650nm IR Cut
Operating Temperature	-30°C to +85°C
Mating Connector	GB042-30S-H10



## KLT-OV13850-L50B V2.2

13MP OmniVision OV13850 MIPI Interface Auto Focus Camera Module



Top View



Side View

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Bottom View



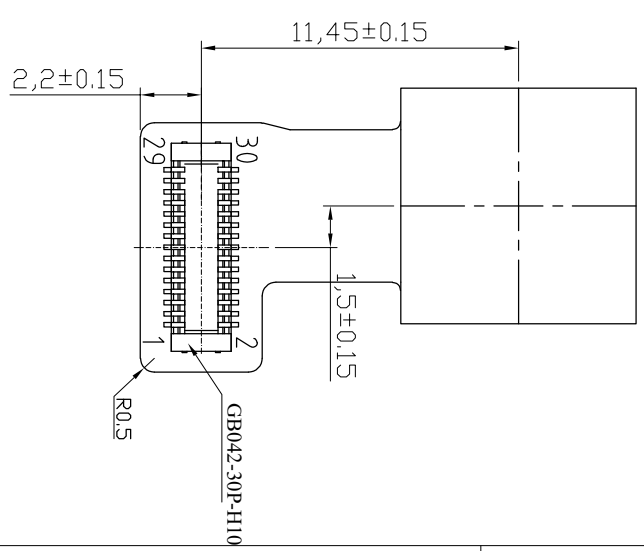
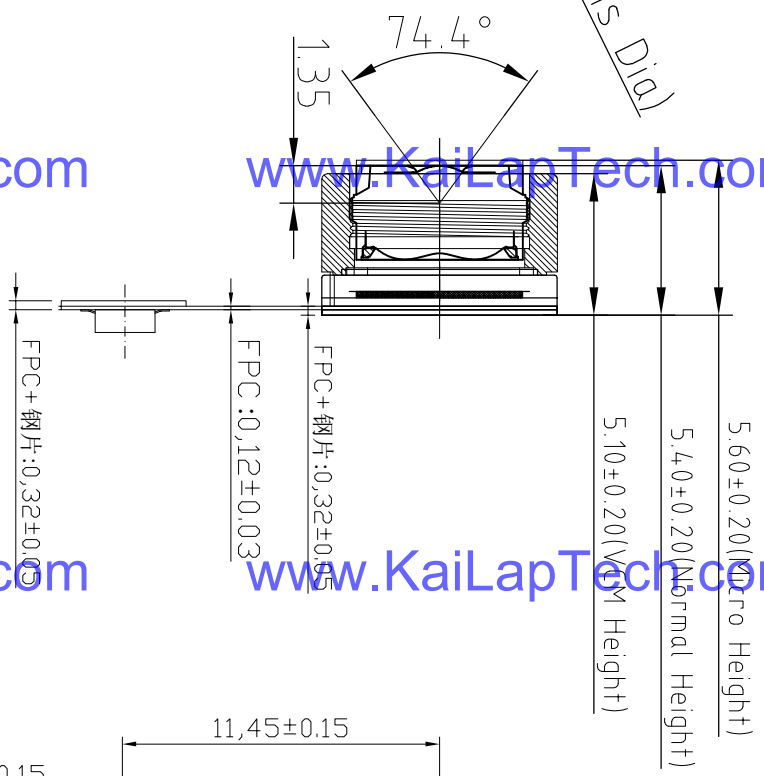
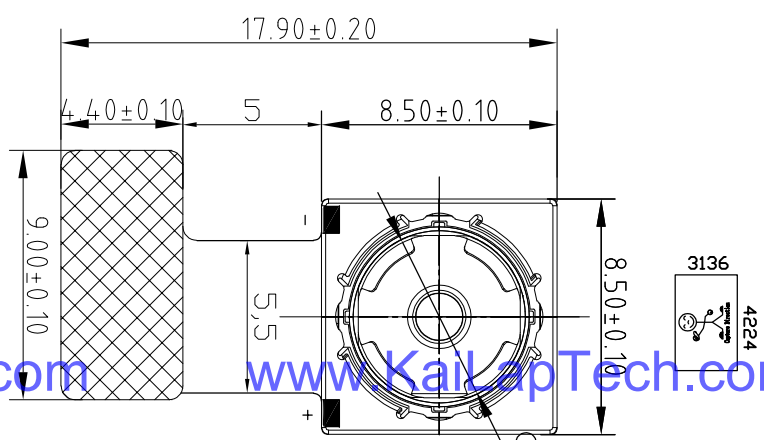
Mating Connector

1	DGND
2	DGND
3	DGND
4	XSHUTDOWN(RST)
5	VDD_VCM 2.8V
6	PWDN_VCM
7	SDA
8	DOVDD 1.8V
9	SCL
10	DVDD 1.2V
11	DGND
12	PWDN (Sensor)
13	CLK_N
14	NC
15	CLK_P
16	DGND
17	DATA0_N
18	MCLK
19	DATA0_P
20	DGND
21	DATA1_N
22	NC
23	DATA1_P
24	AVDD2.8V
25	NC
26	AGND
27	DATA2_N
28	DATA3_N
29	DATA2_P
30	DATA3_P

TECHNOLOGY SPEC (技术规范)

焦距 (EFL)	3.81
光圈 (F.NO)	2.2 ± 5%
视场角 (View Angle)	74.4°
畸变 (Distortion)	< 1.5%
镜头类型 (Lens Size)	1/3.06 inch
像素 (Pixels)	4224*3136
感光芯片 (Chip Type)	OV13850-R2A

芯片地址 (Sensor I2C)	0x20
马达驱动 (VCM Driver)	



SELECT	A	B	C	D
Level	±0.03	±0.05	±0.08	±0.10
dim	±0.05	±0.08	±0.10	±0.15
~ 5	±0.08	±0.10	±0.15	±0.20
5~10	±0.10	±0.15	±0.20	±0.25
10~50	±0.15	±0.20	±0.25	±0.30
50~100	±0.20	±0.25	±0.30	±0.35
100~	±0.25	±0.30	±0.35	±0.40

2.2	All	Change VCM	Kevin	2022-3-8
1/0	All	First Release	Kevin	2017-10-30
REV.	Zone	Description	Approved	Date

Kai Lap Technologies Group Ltd

Designed By:	Kevin
Checked By:	Feng Liu
Approved By:	Aouly_Yan

Client Name:	L50_B
Model Name:	KLT-DV13850-L50B V2.2
Projection Type:	Unit: mm
Scale:	1:1
Sheet:	1 of 1
Version:	1/0

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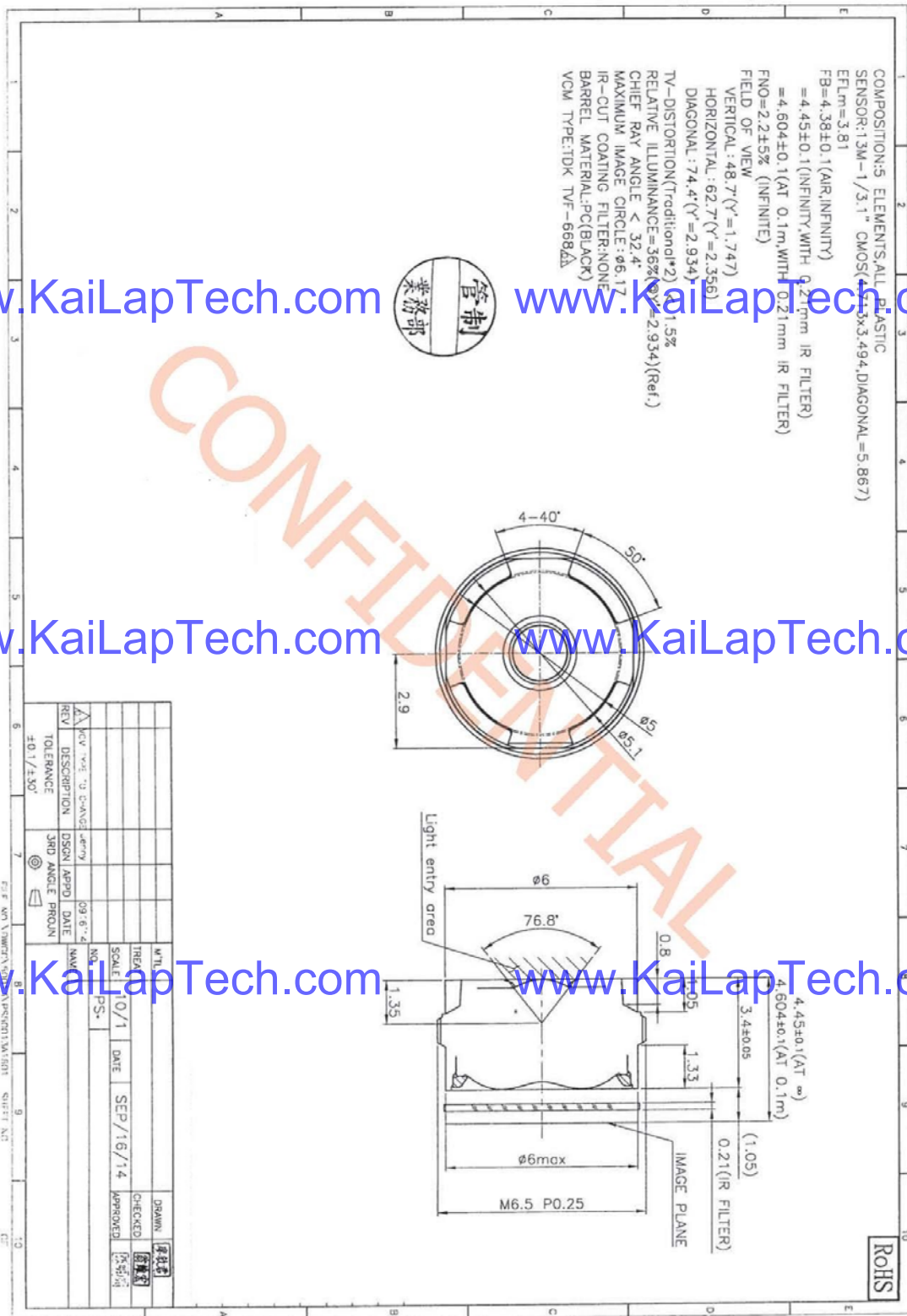
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Lens Model: KLT-LENS-50013A1



## 10-Bit DAC 120mA VCM Driver with I<sup>2</sup>C Interface

### Description

The FP5510 is a single 10-bit DAC with 120mA output current voice coil motor (VCM) driver, with an I<sup>2</sup>C-compatible serial interface that operates at clock rates up to 400kHz. Its supply operates from 2.3V to 3.6V.

The FP5510 incorporates with a power-on reset circuit, power-down function. Power-on reset circuit ensure when supply power up, DAC output is to 0V until valid write bit value takes place. In power down mode, the supply current is about 1µA.

The FP5510 is designed for auto focus operation includes digital camera module, optical zoom camera phones and lens auto focus. The I<sup>2</sup>C address of FP5510 is 0x18h.

The FP5510 with WLCSP package which it is suitable for reduced-space mounting in mobile phone and other portable applications.

### Pin Assignments

#### 6-Ball WLCSP

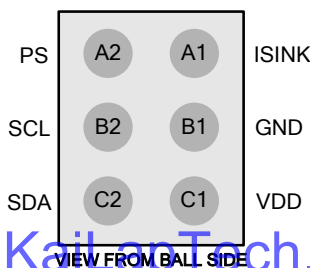


Figure 1. Pin Assignment of FP5510

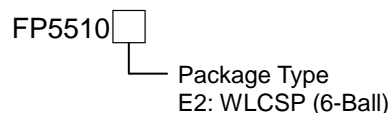
### Features

- Power Supply Voltage Rang: 2.3V to 3.6V
- VCM Driver for Auto-Focus
- 10-Bit Resolution Current Sinking of 120mA for VCM
- 2-Wire I<sup>2</sup>C Interface (1.8V Interface Compatible)
- Internal 4 Slope Control Mechanism
  1. Enhance Slope Control Mode
  2. One Step Mode
  3. Linear Slope Mode
  4. Two Step Slope Mode
- Power-Save Mode Current < 1µA
- Power On Reset (POR)
- Small Size: 0.7mm×1.1mm (6-Balls WLCSP)

### Applications

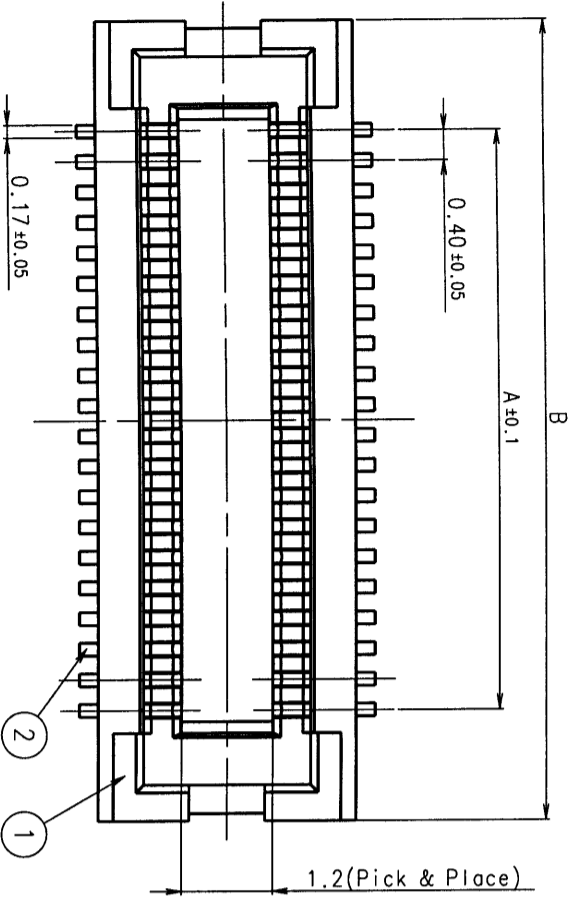
- Digital Camera Module
- Cell Phone
- Lens Cover
- Web Camera

### Ordering Information

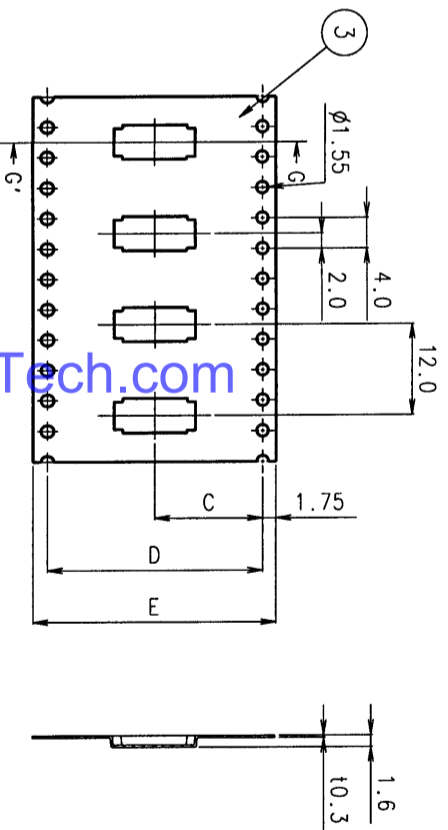
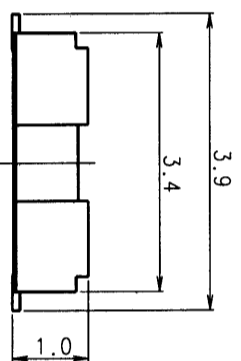
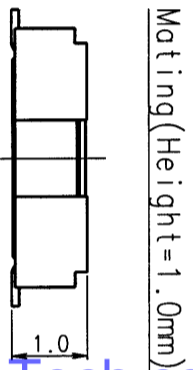


#### WLCSP-6 (0.7mm×1.1mm) Marking

Part Number	Product Code
FP5510E2	2

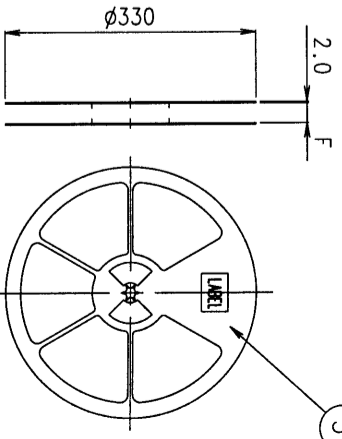


1.2(Pick & Place)



Carrier Tape (S=1/1)

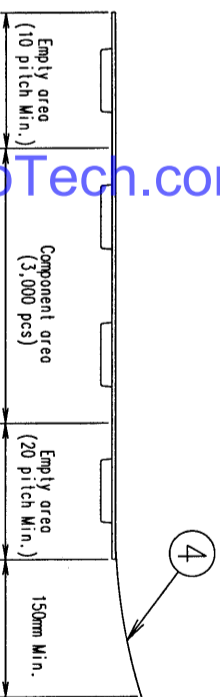
SEC. G-G'



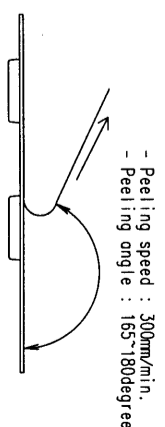
[NOTE] 1. Ordering Information

GB042 - \*\* S - H10 - E3000  
 No of \_\_\_\_\_ Receptacle \_\_\_\_\_ 3,000pcs/Plastic reel  
 position \_\_\_\_\_

- Packing Specification
- Peel strength : 10~70g



4. Co-planarity of contacts is 0.1mm Max.



Recommended PCB Lay-Out

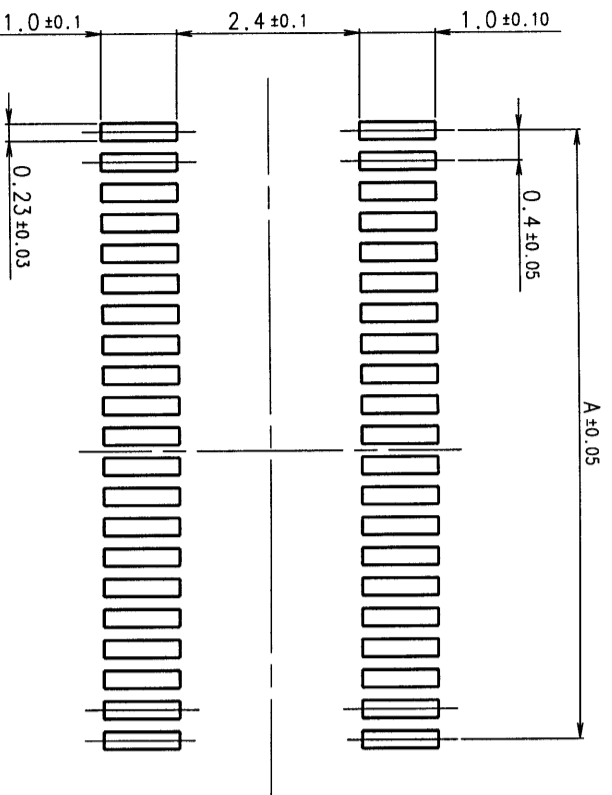


Table-1

No. of Positions	A	B	C	D	E	F
20	3.6	6.5	7.5	—	16.0	18.0
24	4.4	7.3	—	—	16.0	18.0
30	5.6	8.5	—	—	—	—
34	6.4	9.3	—	—	—	—
40	7.6	10.5	11.5	—	24.0	26.0
50	9.6	12.5	—	—	—	—
54	10.4	13.3	—	—	—	—
60	11.6	14.5	—	—	—	—
70	13.6	16.5	14.2	28.4	32.0	34.0
80	15.6	18.5	—	—	—	—

ITEM	DESCRIPTION	Q'TY	MATERIAL	FINISH	REMARKS
1	Recep. Insulator	1	Engineering Plastic	-	UL94V-0
2	Recep. Contact	n	Copper Alloy	Au over Ni	-
3	Carrier Tape	1	Polyester or Polystyrene	-	-
4	Cover Tape	1	Polyester or Polystyrene	-	-
5	Bobbin	1	Plastic	-	-

UNIT - mm

GENERAL TOLERANCES:  
 DIMENSION . X ± 0.2  
 . XX ± 0.1  
 ANGLES X.X

REFERENCE DOCUMENT LGC(25)-K-AS118

DATE Mor. 31. 2005

DESIGNED K.C. Park

CHECKED

APPROVED D.H. Kim

SERIES GB042

SHEET 1 / 1

SCALE 10/1

TITLE GB042 Receptacle (GB042-\*\*S-H10)

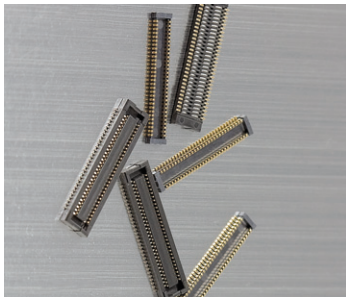
SIZE A3

DWG. NO GUS511802

555, Hoge-Dong, Anyang-Si, Kyungki-Do, 430-080, KOREA

REV. NO	DATE	DCN. NO	REMARKS	DES'D	CHE'D	APP'D

# GB042 series 0.4mm pitch PCB to PCB Connector



### Features

- GB042 series Connector is 0.4 mm pitch, low profile PCB to PCB SMT type connector.
- Improved contact reliability with plug and receptacle contacting at 2 point simultaneously.
- Stable unmating mechanism preventing receptacle contact from being deformed.

### Applications

- Mobile phone
- Compact portable devices, etc

### Materials & Finishes

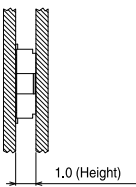
Parts	Materials / Finishes
Insulator	UL94V-0
Plug	Copper Alloy
Recept.	Copper Alloy Au Plating

### Specifications

No. of Contacts	10-80
Stacking Height	1.0mm
Contact Spacing	0.4mm
Current Rating	AC, DC 0.3A/pin
Voltage Rating	AC, DC 50V
Dielectric Withstanding Voltage	AC 250V (rms for one minute)
Insulation Resistance	1000M $\Omega$
Contact Resistance	70m $\Omega$
Operating Temp.	-25 $^{\circ}$ C ~ +85 $^{\circ}$ C

### Ordering Information

Series	GB042	No. of Contacts	40	Contact Type	P	Mating Height	H10
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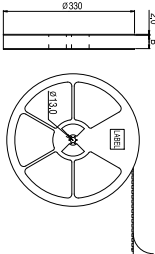
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### Receptacle



### Embossed Tape Assembly

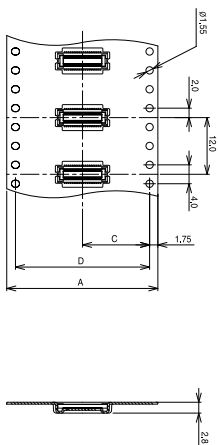
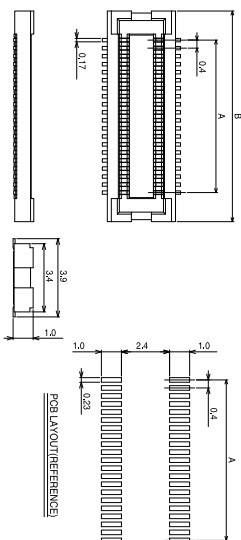
#### Bobbin



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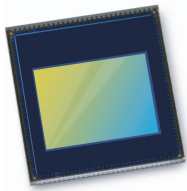
### GB042 series | Receptacle & Embossed Tape Assembly



No. of Pin	Part Number	Receptable		Embossed Tape Assembly			
		A	B	A	B	C	D
10	GB042-10S-**-H10-E3000	1.6	4.5				
20	GB042-20S-**-H10-E3000	3.6	6.5	16.0			
24	GB042-24S-**-H10-E3000	4.4	7.3		18.0	7.5	
28	GB042-28S-**-H10-E3000	5.2	8.1				
30	GB042-30S-**-H10-E3000	5.6	8.5				
34	GB042-34S-**-H10-E3000	6.4	9.3				
40	GB042-40S-**-H10-E3000	7.6	10.5				
44	GB042-44S-**-H10-E3000	8.4	11.3	24.0	26.0	11.5	
50	GB042-50S-**-H10-E3000	9.6	12.5				
54	GB042-54S-**-H10-E3000	10.4	13.3				
60	GB042-60S-**-H10-E3000	11.6	14.5				
64	GB042-64S-**-H10-E3000	12.4	15.3	32.0			
70	GB042-70S-**-H10-E3000	13.6	16.5		34.0	14.2	28.4

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# OV13850 13MP product brief



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## Power-Efficient 13-Megapixel Image Sensor with Best-In-Class Performance

### for High-End Smartphones and Tablets



available in a lead free package

The OV13850 is a high performance PureCel™ 13-megapixel CameraChip™ sensor that delivers best-in-class high- and low-light performance, as well as dramatically reduced power consumption for smartphones and tablets.

The OV13850 sensor offers a number of performance enhancements, including improved full-well capacity (FWC) and sensitivity for industry-leading high- and low-light performance. It also offers a 40 percent reduction in power consumption compared to our previous generation sensor, making the OV13850 ideally suited for feature-rich mobile devices.

The 1/3.06-inch OV13850 supports an active array of 4224 x 3136 pixels (13.2-megapixels) operating at 30 frames per second (fps) for zero shutter lag and can seamlessly transition between recording video and capturing still images. Additionally, the sensor supports 4K2K ultra-high definition video at 30 fps with full-horizontal field of view (FOV) and electronic image stabilization (EIS), as well as high frame rate 1080p HD video at 60 fps with EIS to enable high quality videos.

The OV13850 fits into an industry standard 8.5 x 8.5 x 5 mm module.

Find out more at [www.ovt.com](http://www.ovt.com).



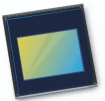
## Applications

- Cellular Phones
- Tablets
- PC Multimedia

## Product Features

- PureCel™ image sensor
- 1.12 μm x 1.12 μm pixel
- optical size of 1/3.06"
- 31.2° CRA for <6 mm z-height
- programmable controls for frame rate, mirror and flip, cropping, and windowing
- support for image sizes: 1.2MP (4224x3136), 10MP (16392x4224x2376), 4K2K (3840x2160), EIS 1080p (2112x1188), EIS 720p (1408x792), and more
- 13.2MP at 30 fps
- two-wire serial bus control (SCCB)
- strobe output to control flash
- 8 kbits of embedded one-time programmable (OTP) memory
- two on-chip phase lock loops (PLLs)
- programmable controls: gain, exposure, frame rate, image size, horizontal mirror, vertical flip, cropping, and panning
- image quality controls: defect pixel correction, automatic black level calibration, lens shading correction, and alternate row HDR
- built-in temperature sensor
- suitable for module size of 8.5 x 8.5 x <6 mm

# OV13850



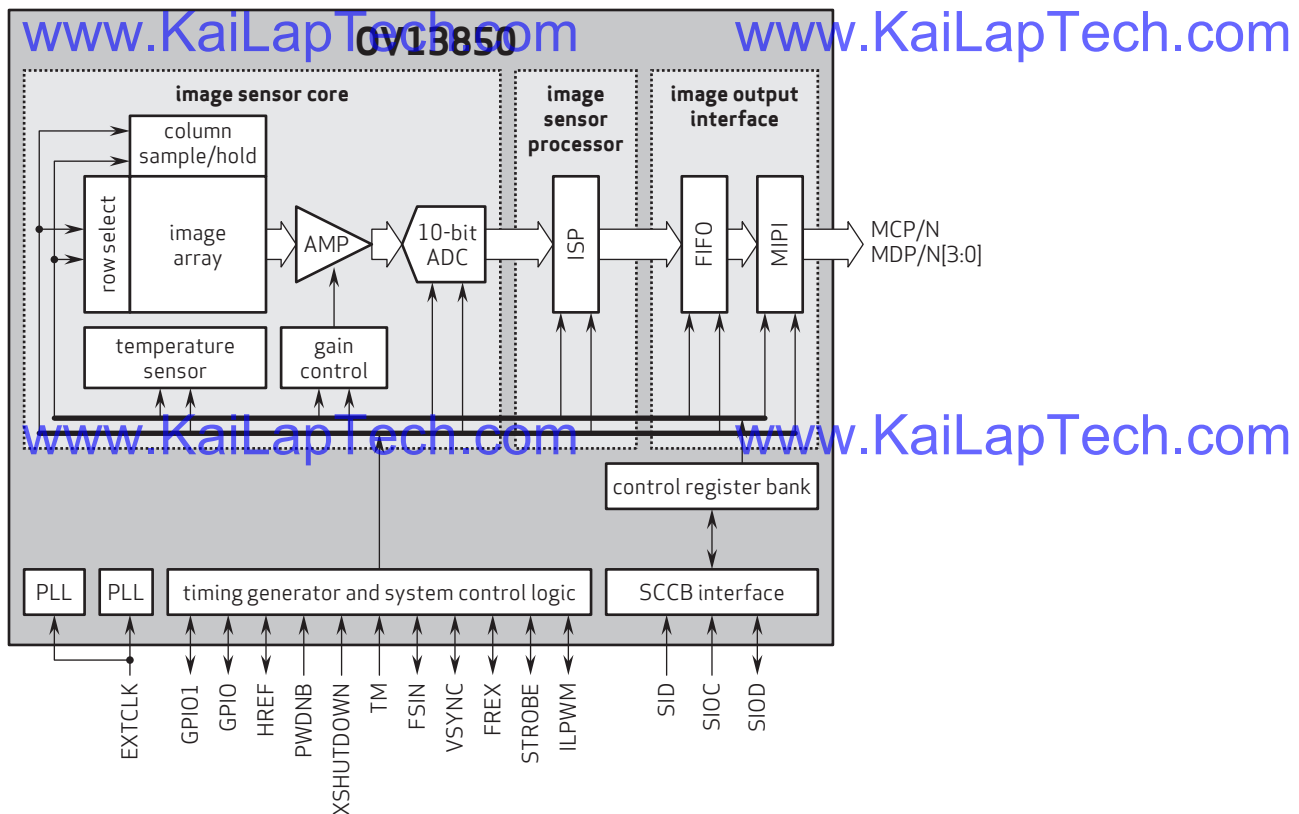
## Ordering Information

- OV13850-G04A**  
(color, chip probing, 200 μm backgrinding, reconstructed wafer with good die)

## Product Specifications

- active array size:** 4224 x 3136
- power supply:**
  - core: 1.14 - 1.26V (1.2V nominal)
  - analog: 2.6 - 3.0V (2.8V nominal)
  - I/O: 1.7 - 3.0V (1.8V or 2.8V nominal)
- power requirements:**
  - active: 223 mW
  - standby: 300 μW
  - XSHUTDOWN: 1 μW
- temperature range:**
  - operating: -30°C to +85°C junction temperature
  - stable image: 0°C to +60°C junction temperature
- output interfaces:** up to 4-lane MIPI serial output
- output formats:** 10-bit RGB RAW
- lens size:** 1/3.06"
- lens chief ray angle:** 31.2°
- input clock frequency:** 6 - 64 MHz
- maximum image transfer rate:** 30 fps
- scan mode:** progressive
- pixel size:** 1.12 μm x 1.12 μm
- image area:** 4815 μm x 3678.3 μm
- die dimensions:** 6210 μm x 5517 μm

## Functional Block Diagram



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Santa Clara, CA 95054  
USA

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Fax: + 1 408 567 3001  
www.ovt.com

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## 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							



your **BEST** camera module partner

## 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



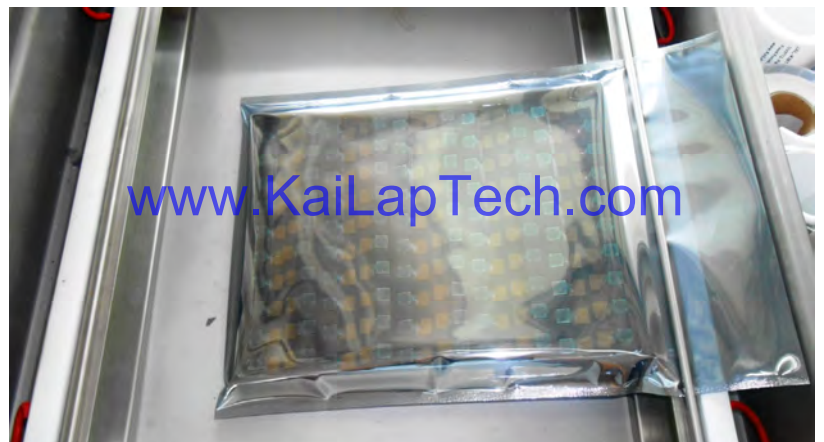
Cover Tray with Lid

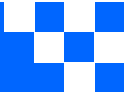


Put Tray into Anti-Static Bag



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







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## Large Order Package Solution

Place Foam Sheets Between Trays

Foam Sheets are Slightly Larger than Trays

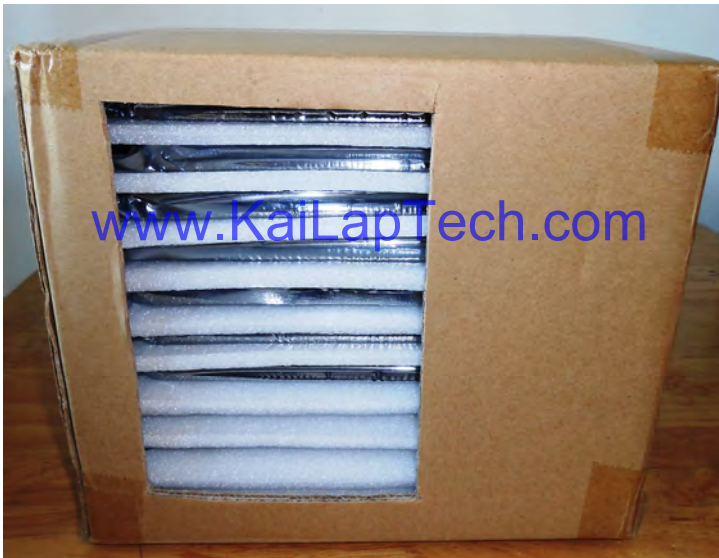


[www.KaiLapTech.com](http://www.KaiLapTech.com)

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

Place Foam Sheets and Trays into Box

Foam Sheets are Tightly Fitting Box



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

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## Small Order Package Solution

Place Foam Sheets and Trays into Small Box



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Package in Small Box for Shipment

Foam Sheets are Nicely Fitting the Small Box



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

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





## 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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