



your BEST camera module partner

KLT-Z4MA-F-OV5640-1B V2.0

5MP OmniVision OV5640-1B MIPI Interface Auto Focus Camera Module





Front View

Back View

Specifications

Camera Module No.	KLT-Z4MA-F-OV5640-1B V2.0		
Resolution	5MP		
Image Sensor	OV5640-1B		
Sensor Type	1/4"		
Pixel Size	1.4 um x 1.4 um		
EFL	3.29 mm		
F.NO	2.80		
Pixel	2592 x 1944		
View Angle	68.7°(DFOV) 58.1°(HFOV) 45.0°(VFOV)		
Lens Dimensions	8.50 x 8.50 x 5.07 mm		
Module Size	28.88 x 16.90 mm		
Module Type	Auto Focus		
Interface	MIPI		
Auto Focus VCM Driver IC	Embedded		
Lens Type	650nm IR Cut		
Operating Temperature	-30°C to +70°C		
Mating Connector	AXT530124		





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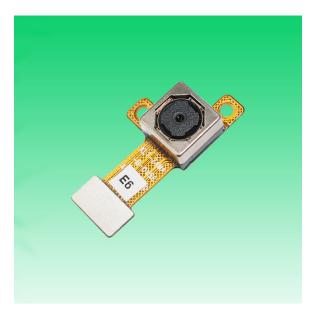
KLT-Z4MA-F-OV5640-1B V2.0 5MP OmniVision OV5640-1B MIPI Interface Auto Focus Camera Module



Top View



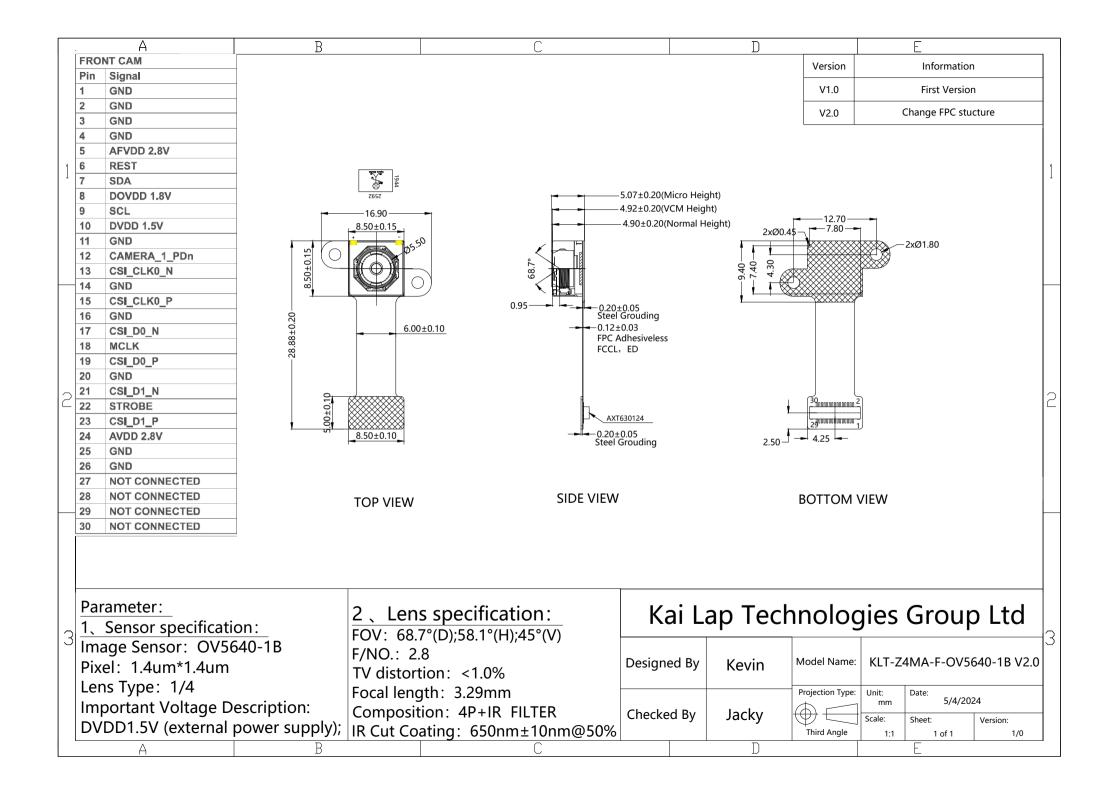
Side View



Bottom View



Mating Connector





OV5640 5-megapixel product brief





available in a lead-free package

1/4-inch, 5-Megapixel SOC Image Sensor Optimized for High-Volume Mobile Markets

The OV5640 delivers a complete 5-megapixel camera solution on a single chip, aimed at offering cost efficiencies that serve the high-volume autofocus (AF) camera phone market. The system-on-a-chip (SOC) sensor features OmniVision's 1.4 micron OmniBSI™ backside illumination architecture to deliver excellent pixel performance and best-in-class low-light sensitivity, while enabling ultra compact camera module designs of 8.5 mm x 8.5 mm with <6 mm z-height. The OV5640 provides the full functionality of a complete camera, including anti-shake technology, AF control, and MIPI while being easier to tune then two-chip solutions, making it an ideal choice in terms of cost, time-to-market and ease of platform integration.

The OV5640 enables 720p HD video at 60 frames per second (fps) and 1080p HD video at 30 fps with complete user control over formatting and output data transfer. The 720p/60 HD video is captured in full field of view (FOV) with 2 x 2 binning, which doubles the sensitivity and improves the signal-to-noise ratio (SNR). Additionally, a unique post-binning re-sampling filter function removes zigzag artifacts around slant edges and minimizes spatial artifacts to deliver even sharper, crisper

color images. To further improve camera performance and user experience, the OV5640 features an internal anti-shake engine for image stabilization, and it supports Scalado™ tagging for faster image preview and zoom.

The OV5640 offers a digital video port (DVP) parallel interface and a high-speed dual lane MIPI interface, supporting multiple output formats. An integrated JPEG compression engine simplifies data transfer for bandwidth-limited interfaces. The sensor's automatic image control functions include automatic exposure control (AEC), automatic white balance (AWB), automatic band filter (ABF), 50/60 Hz automatic luminance detection, and automatic black level calibration (ABLC). The OV5640 delivers programmable controls for frame rate, AEC/AGC 16-zone size/position/weight control, mirror and flip, cropping, windowing, and panning. It also offers color saturation, hue, gamma, sharpness (edge enhancement), lens correction, defective pixel canceling, and noise canceling to improve image quality.

Find out more at www.ovt.com.



applications

- cellular phones
- toys
- PC multimedia
- digital still cameras

ordering information

OV05640-A71A-1B (color, lead-free)71-pin CSP

features

- 1.4 µm x 1.4 µm pixel with OmniBSI technology for high performance (high sensitivity, low crosstalk, low noise, improved quantum efficiency)
- optical size of 1/4"
- automatic image control functions: automatic exposure control (AEC), automatic white balance (AWB), automatic band filter (ABF), automatic 50/60 Hz luminance detection, and automatic black level calibration (ABLC)
- programmable controls for frame rate, AEC/AGC 16-zone size/position/weight control, mirror and flip, cropping, windowing, and panning
- image quality controls: color saturation, hue, gamma, sharpness (edge enhancement), lens correction, defective pixel canceling, and noise canceling
- support for output formats: RAW RGB, RGB565/555/444, CCIR656, YUV422/420, YCbCr422, and compression
- support for video or snapshot operations
- support for internal and external frame synchronization for frame exposure mode

- support for LED and flash strobe mode
- support for horizontal and vertical sub-sampling, binning
- support for minimizing artifacts on binned image
- support for data compression output
- support for anti-shake
- standard serial SCCB interface
- digital video port (DVP) parallel output interface and dual lane MIPI output interface
- embedded 1.5V regulator for core power
- programmable I/O drive capability, I/O tri-state configurability
- support for black sun cancellation
- support for images sizes: 5 megapixel, and any arbitrary size scaling down from 5 megapixel
- support for auto focus control (AFC) with embedded AF VCM driver
- embedded microcontroller
- suitable for module size of 8.5 x 8.5 x <6mm with both CSP and RW packaging

key specifications (typical)

active array size: 2592 x 1944

power supply:

core: $1.425 \sim 1.675V$ (with embedded 1.5V regulator) analog: $2.6 \sim 3.0V$ (2.8V typical) I/O: 1.8V / 2.8V

power requirements:

active: 140 mA standby: 20 µA

temperature range:

operating: -30°C to 70°C junction temperature (see table 8-2)

stable image: 0°C to 50°C junction temperature (see table 8-2)

output formats: 8-/10-bit RGB RAW output

lens size: 1/4"

lens chief ray angle: 24° (see figure 10-2)

■ input clock frequency: 6~27 MHz

max S/N ratio: 36 dB

■ dynamic range: 68 dB @ 8x gain

maximum image transfer rate:

QSXGA (2592x1944): 15 fps 1080p: 30 fps 1280x960: 45 fps

720p: 60 fps

VGA (640x480): 90 fps

sensitivity: 600 mV/Lux-sec

shutter: rolling shutter / frame exposure

maximum exposure interval: 1964 x t_{ROW}

pixel size: 1.4 μm x 1.4 μm

■ dark current: 8 mV/s @ 60°C junction temperature

• image area: 3673.6 μm x 2738.4 μm

package dimensions: 5985 μm x 5835 μm



Panasonic

NARROW-PITCH. THIN AND SLIM CONNECTOR FOR BOARD-TO-FPC CONNECTION

NARROW PITCH (0.4 mm) CONNECTORS F4S SERIÉS

ideas for life







Compliance with RoHS Directive

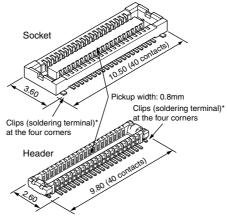
FEATURES

1. Space-saving (3.6 mm widthwise) The required space is smaller than our

F4 series (40-contact type): Socket — 27% smaller,

Header — 38% smaller

The small size contributes to the miniaturization of target equipment.

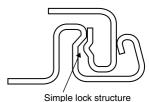


* Clips for preventing the solder joints from being removed

2. Highly reliable TDUGH CONTRCT has strong resistance to adverse environments.

(See Page 6 for details of the structure) Note: If extra resistance to shock caused by dropping is required, we recommend using our previous F4 Series.

3. The simple lock structure gives tactile feedback that ensures a superior mating/unmating operation feel.



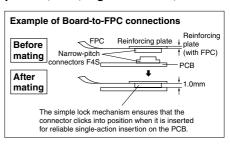
4. Gull-wing type terminals

The gull-wing type terminals facilitate automatic mounting inspections.

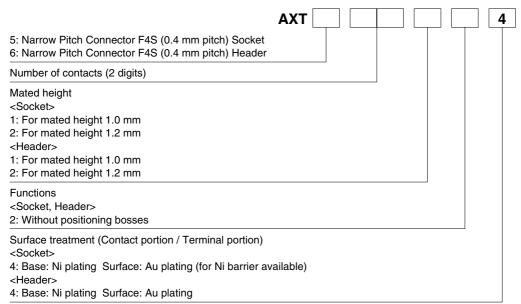
5. Connectors for inspection available Connectors for inspection are available that are ideal for modular unit inspection and inspection in device assembly processes.

APPLICATIONS

Compact portable devices "Cellular phones, DVC, Digital cameras, etc"



ORDERING INFORMATION



Note: Please note that models with a mated height of 1.0 mm (7th digit of part number is "1") and 1.2 mm (7th digit of part number is "2") are not compatible.

AXT5, 6

PRODUCT TYPES * TOUGH CONTACT

Made at the Solid	No mark and a sustained	Part n	umber	Pac	king
Mated height	Number of contacts	Socket	Header	Inner carton	Outer carton
	10	AXT510124	AXT610124		
	12	AXT512124	AXT612124		
	14	AXT514124	AXT614124		
	16	AXT516124	AXT616124		
	18	AXT518124	AXT618124		
	20	AXT520124	AXT620124		
	22	AXT522124	AXT622124		
	24	AXT524124	AXT624124		
	26	AXT526124	AXT626124		
	28	AXT528124	AXT628124		
	30	AXT530124	AXT630124		6,000 pieces
	32	AXT532124	AXT632124	3,000 pieces	
1.0mm	34	AXT534124	AXT634124		
1.0111111	36	AXT536124	AXT636124		
	38	AXT538124	AXT638124		
	40	AXT540124	AXT640124		
	42	AXT542124	AXT642124		
	44	AXT544124	AXT644124		
	46	AXT546124	AXT646124]	
	48	AXT548124	AXT648124		
	50	AXT550124	AXT650124		
	54	AXT554124	AXT654124		
	60	AXT560124	AXT660124		
	64	AXT564124	AXT664124		
	70	AXT570124	AXT670124		
	80	AXT580124	AXT680124		
	10	AXT510224	AXT610224		
	30	AXT530224	AXT630224		
1.2mm	40	AXT540224	AXT640224		
	50	AXT550224	AXT650224		
	80	AXT580224	AXT680224		

Notes: 1. Order unit: For mass production: in 1-inner-box (1-reel) units
Samples for mounting check: in 50-connector units. Please contact our sales office.

Samples: Small lot orders are possible. Please contact our sales office.

The above part numbers are for connectors without positioning bosses, which are standard. When ordering connectors with positioning bosses, please contact our sales office.
 Please contact us for connectors having a number of contacts other than those listed above.

SPECIFICATIONS

1. Characteristics

	Item	Specifications	Conditions
	Rated current	0.3A/contact (Max. 5 A at total contacts)	
	Rated voltage	60V AC/DC	
Electrical characteristics	Breakdown voltage	150V AC for 1 min.	No short-circuiting or damage at a detection current of 1 mA when the specified voltage is applied for one minute.
onaraotonotico	Insulation resistance	Min. 1,000MΩ (initial)	Using 250V DC megger (applied for 1 min.)
	Contact resistance	Max. 90mΩ	Based on the contact resistance measurement method specified by JIS C 5402.
	Composite insertion force	Max. 0.981N/contacts × contacts (initial)	
Mechanical	Composite removal force	Min. 0.165N/contacts × contacts	
characteristics	Contact holding force (Socket contact)	Min. 0.49N/contacts	Measuring the maximum force. As the contact is axially pull out.
	Ambient temperature	-55°C to +85°C	No freezing at low temperatures. No dew condensation.
	Soldering heat resistance	Peak temperature: 260°C or less (on the surface of the PC board around the connector terminals)	Infrared reflow soldering
		300°C within 5 sec. 350°C within 3 sec.	Soldering iron
	Storage temperature	-55°C to +85°C (product only) -40°C to +50°C (emboss packing)	No freezing at low temperatures. No dew condensation.
Environmental characteristics	Thermal shock resistance (header and socket mated)	5 cycles, insulation resistance min. 100M Ω , contact resistance max. $90m\Omega$	Sequence 1. $-55.\frac{9}{3}$ °C, 30 minutes 2. \sim , Max. 5 minutes 3. $85.\frac{9}{3}$ °C, 30 minutes 4. \sim , Max. 5 minutes
	Humidity resistance (header and socket mated)	120 hours, insulation resistance min. 100M Ω , contact resistance max. $90m\Omega$	Bath temperature 40±2°C, humidity 90 to 95% R.H.
	Saltwater spray resistance (header and socket mated)	24 hours, insulation resistance min. 100M Ω , contact resistance max. 90m Ω	Bath temperature 35±2°C, saltwater concentration 5±1%
	H ₂ S resistance (header and socket mated)	48 hours, contact resistance max. 90mΩ	Bath temperature 40±2°C, gas concentration 3±1 ppm, humidity 75 to 80% R.H.
Lifetime characteristics	Insertion and removal life	50 times	Repeated insertion and removal speed of max. 200 times/ hours
Unit weight		20-contact type: Socket: 0.03 g Header: 0.01 g	

2. Material and surface treatment

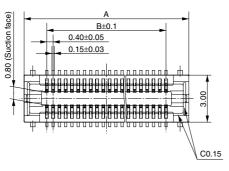
Part name	Material	Surface treatment
Molded portion	LCP resin (UL94V-0)	
Contact and Post	Copper alloy	Contact portion: Base: Ni plating Surface: Au plating Terminal portion: Base: Ni plating Surface: Au plating (except the terminal tips) The socket terminals close to the portion to be soldered have nickel barriers (exposed nickel portions). Metal clips: Sockets: Base: Ni plating Surface: Pd+Au flash plating (except the terminal tips) Headers: Base: Ni plating Surface: Au plating (except the terminal tips)

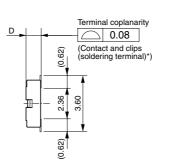
DIMENSIONS (Unit: mm)

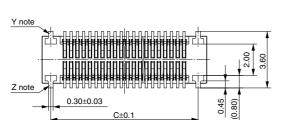
The CAD data of the products with a CAD Data mark can be downloaded from: http://panasonic-electric-works.net/ac

Socket (Mated height: 1.0 mm and 1.2 mm)









General tolerance: ±0.2

Mated height/ dimension	D
1.0mm	0.97
1.2mm	1.17

Dimension table (mm)

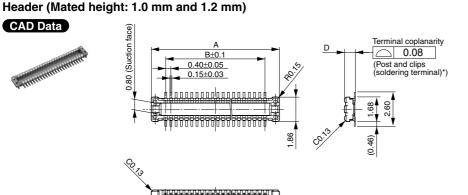
Number of contacts/ dimension	А		С
10	4.5	1.6	3.4
12	4.9	2.0	3.8
14	5.3	2.4	4.2
16	5.7	2.8	4.6
18	6.1	3.2	5.0
20	6.5	3.6	5.4
22	6.9	4.0	5.8
24	7.3	4.4	6.2
26	7.7	4.8	6.6
28	8.1	5.2	7.0
30	8.5	5.6	7.4
32	8.9	6.0	7.8
34	9.3	6.4	8.2
36	9.7	6.8	8.6
38	10.1	7.2	9.0
40	10.5	7.6	9.4
42	10.9	8.0	9.8
44	11.3	8.4	10.2
46	11.7	8.8	10.6
48	12.1	9.2	11.0
50	12.5	9.6	11.4
54	13.3	10.4	12.2
60	14.5	11.6	13.4
64	15.3	12.4	14.2
70	16.5	13.6	15.4
80	18.5	15.6	17.4

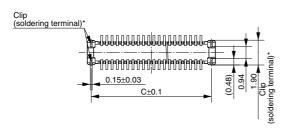
sections Y and Z are electrically connected.

Note: Since the clip (soldering terminal)* has a single-piece construction,









General tolerance: ±0.2

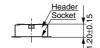
Mated height/ dimension	D
1.0mm	0.83
1.2mm	1.01

Dimension table (mm)

Number of contacts/ dimension	А	В	O
10	3.8	1.6	3.2
12	4.2	2.0	3.6
14	4.6	2.4	4.0
16	5.0	2.8	4.4
18	5.4	3.2	4.8
20	5.8	3.6	5.2
22	6.2	4.0	5.6
24	6.6	4.4	6.0
26	7.0	4.8	6.4
28	7.4	5.2	6.8
30	7.8	5.6	7.2
32	8.2	6.0	7.6
34	8.6	6.4	8.0
36	9.0	6.8	8.4
38	9.4	7.2	8.8
40	9.8	7.6	9.2
42	10.2	8.0	9.6
44	10.6	8.4	10.0
46	11.0	8.8	10.4
48	11.4	9.2	10.8
50	11.8	9.6	11.2
54	12.6	10.4	12.0
60	13.8	11.6	13.2
64	14.6	12.4	14.0
70	15.8	13.6	15.2
80	17.8	15.6	17.2

Socket and Header are mated





Mated height: 1.0 mm

Mated height: 1.2 mm





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Cameras Applications





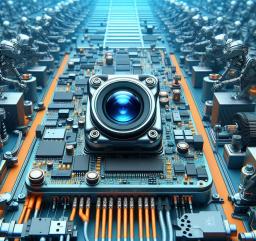


Automotive Driver Pilot

Live Streaming

Video Conference







Eye Tracker Biometric Detection

Machine Vision

Agricultural Monitor







Night Vision Security

Drone and Sports Eagle Eyes

Interactive Pet Camera





Cameras Applications

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Camera Module Pinout Definition Reference Chart

OmniVision Sony Samsung On-Semi Ap	otina 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 D00 Y0	DVP data output port 0		
D1 D01 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 D06 Y6	DVP data output port 6		
D7 D07 Y7	DVP data output port 7		
D8 D08 Y8	DVP data output port 8		
D9 DO9 Y9	DVP data output port 9		
D10 DO10 Y10	DVP data output port 9		
D11 D011 Y11	DVP data output port 10		
ווו ווטע ווע	port data output port i i		





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Camera Reliability Test

Reliability Inspection Item		Tanting Mathad	A cooptoned Critoria		
Category		Item	Testing Method	Acceptance Criteria	
	Storage	High 60°C 96 Hours	Temperature Chamber	No Abnormal Situation	
	Temperature	Low -20°C 96 Hours	Temperature Chamber	No Abnormal Situation	
	Operation	High 60°C 24 Hours	Temperature Chamber	No Abnormal Situation	
Environmental	Temperature	Low -20°C 24 Hours	Temperature Chamber	No Abnormal Situation	
Environmental	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	
	Drop Test	Without Package 60cm	10 Times on Wood Floor	Electrically Functional	
	(Free Falling)	With Package 60cm	10 Times on Wood Floor	Electrically Functional	
Physical	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	
	Contact Discharge 2 K		ESD Testing Machine	Electrically Functional	
Electrical	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	













Camera Inspection Standard

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Inspection Iten		n Item	Lanca Cara Madha d	Chandard of Incorporation
Cate	gory	Item	Inspection Method	Standard of Inspection
		Color	The Naked Eye	Major Difference is Not Allowed.
	FPC/ PCB	Be Torn/Chopped	The Naked Eye	Copper Crack Exposure is Not Allowed.
		Marking	The Naked Eye	Clear, Recognizable (Within 30cm Distance)
		Scratches	The Naked Eye	The Inside Crack Exposure is Not Allowed
	Holder	Gap	The Naked Eye	Meet the Height Standard
Appearance	Holdel	Screw	The Naked Eye	Make Sure Screws Are Presented (If Any)
		Damage	The Naked Eye	The Inside Crack Exposure is Not Allowed
		Scratch	The Naked Eye	No Effect On Resolution Standard
	Long	Contamination	The Naked Eye	No Effect On Resolution Standard
	Lens	Oil Film	The Naked Eye	No Effect On Resolution Standard
		Cover Tape	The Naked Eye	No Issue On Appearance.
		No Communication	Test Board	Not Allowed
	Image	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
Function		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
		Height	The Naked Eye	Follows Approval Data Sheet
Dimer	neion	Width	The Naked Eye	Follows Approval Data Sheet
Dillel	131011	Length	The Naked Eye	Follows Approval Data Sheet
		Overall	The Naked Eye	Follows Approval Data Sheet

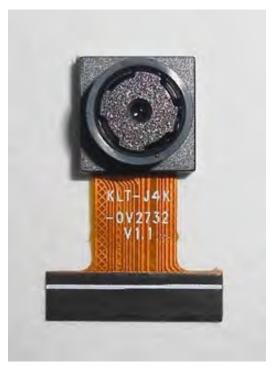




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KLT Package Solutions

KLT Camera Module



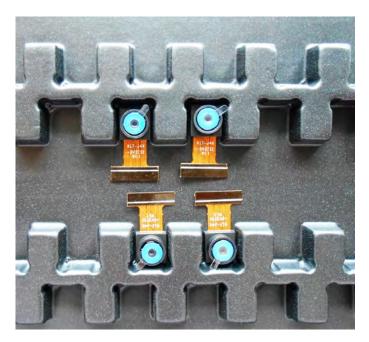
Tray with Grid and Space



Complete with Lens Protection Film



Place Cameras on the Tray







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Camera Modules Package Solution

Full Tray of Cameras



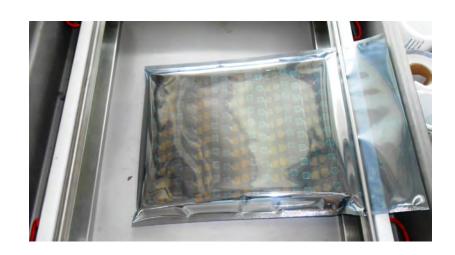
Put Tray into Anti-Static Bag



Cover Tray with Lid



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



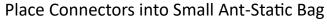




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Sample Order Package Solution

Place Sample into Small Anti-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







The Wheel is Perfectly Fitting the Box

Connectors Box Ready for Shipment









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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











