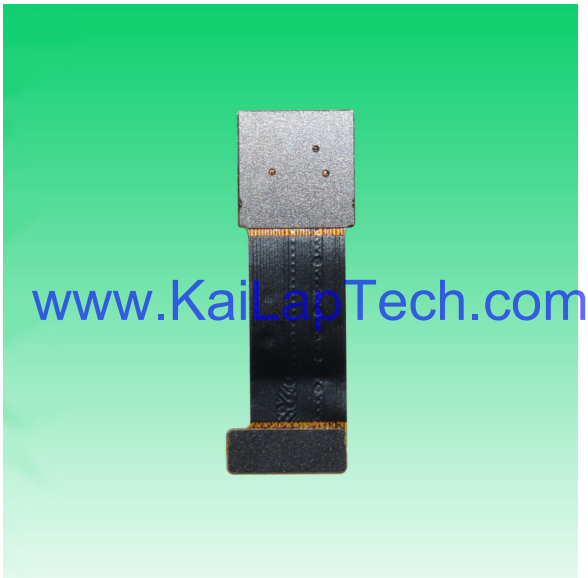
KLT-MAA28-OV16880 V1.0

16MP OmniVision OV16880 MIPI Interface Auto Focus Camera Module

Front View



Back View

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Specifications

Camera Module No.	KLT-MAA28-OV16880 V1.0
Resolution	16MP
Image Sensor	OV16880
Sensor Type	1/3.06"
Pixel Size	1.0 um x 1.0 um
EFL	3.81 mm
F.NO	2.20
Pixel	4672 x 3504
View Angle	76.8°(DFOV), 62.7°(HFOV), 48.7°(VFOV)
Lens Dimensions	8.50 x 8.50 x 5.60 mm
Module Size	26.50 x 8.80 mm
Module Type	Auto Focus
Interface	MIPI
Auto Focus VCM Driver IC	DW9714P
Lens Model	KLT-LENS-60183A1
Lens Type	650nm IR Cut
Operating Temperature	-30°C to +85°C
Mating Connector	OK-14F030-04

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KLT-MAA28-OV16880 V1.0

16MP OmniVision OV16880 MIPI Interface Auto Focus Camera Module

Top View

Side View

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Bottom View

Mating Connector

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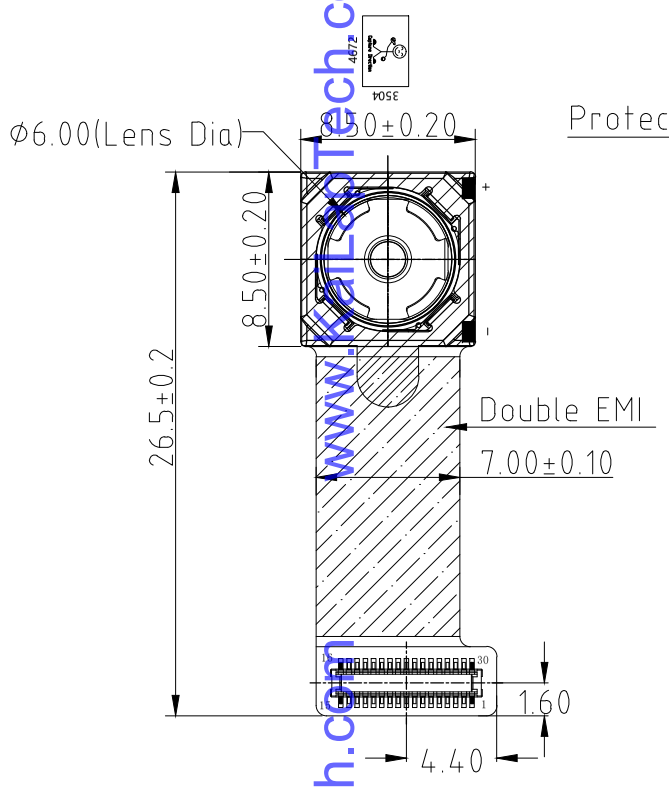
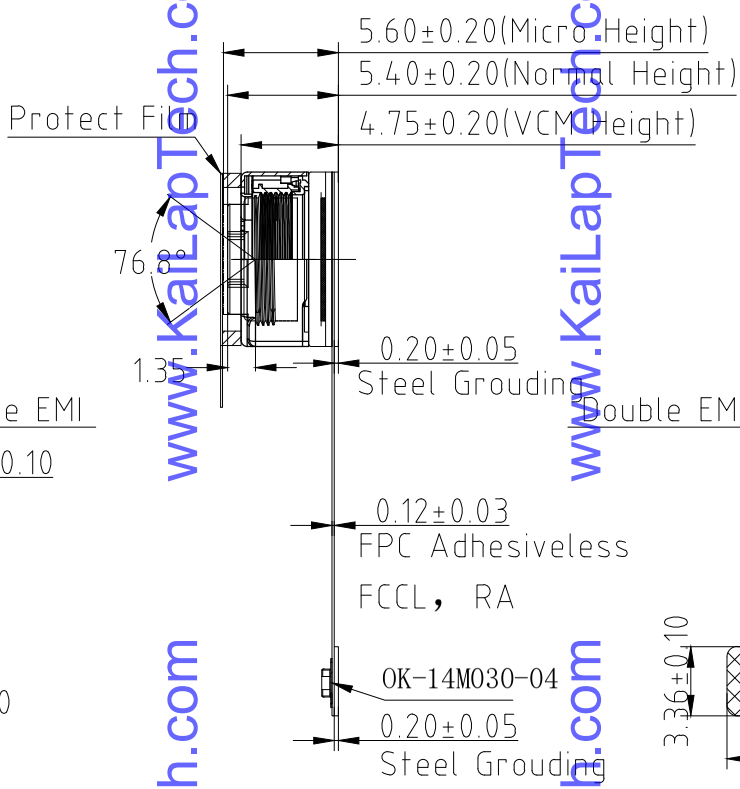
Version	Information	Date
V1.0	First Version	4-6-2022

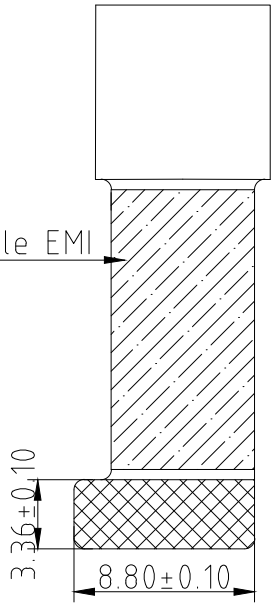
RoHS	
PIN	SIGNAL
1	MCLK
2	DGND
3	MDP0
4	MDN0
5	DGND
6	MDN1
7	MDP1
8	DGND
9	MCN
10	MCP
11	DGND
12	AFVDD2.8V
13	AFGND
14	AVDD2.8V
15	AGND
16	DVDD1.2V
17	DOVDD1.8V
18	DGND
19	SCL
20	SDA
21	RESET
22	DGND
23	NC
24	DGND
25	MDP3
26	MDN3
27	DGND
28	MDN2
29	MDP2
30	DGND



TOP VIEW



SIDE VIEW



BOTTOM VIEW

NOTE:

1.The device slave address:0x20(w);0x21(r)

Parameters:

1、Sensor specification:

Image Sensor: OV16880

Pixel: 1.0um×1.0um

Lens Type: 1/3.06

Important Voltage Description: DVDD1.2V (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%

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Designed By	Kevin	Model Name:	KLT-MAA28-OV16880 V1.0
Checked By	Aouly_Yan	Projection Type: Third Angle	Unit: mm / Material: ---------- / Scale: 1:1 / Sheet: 1 of 1 / Version: 1/0

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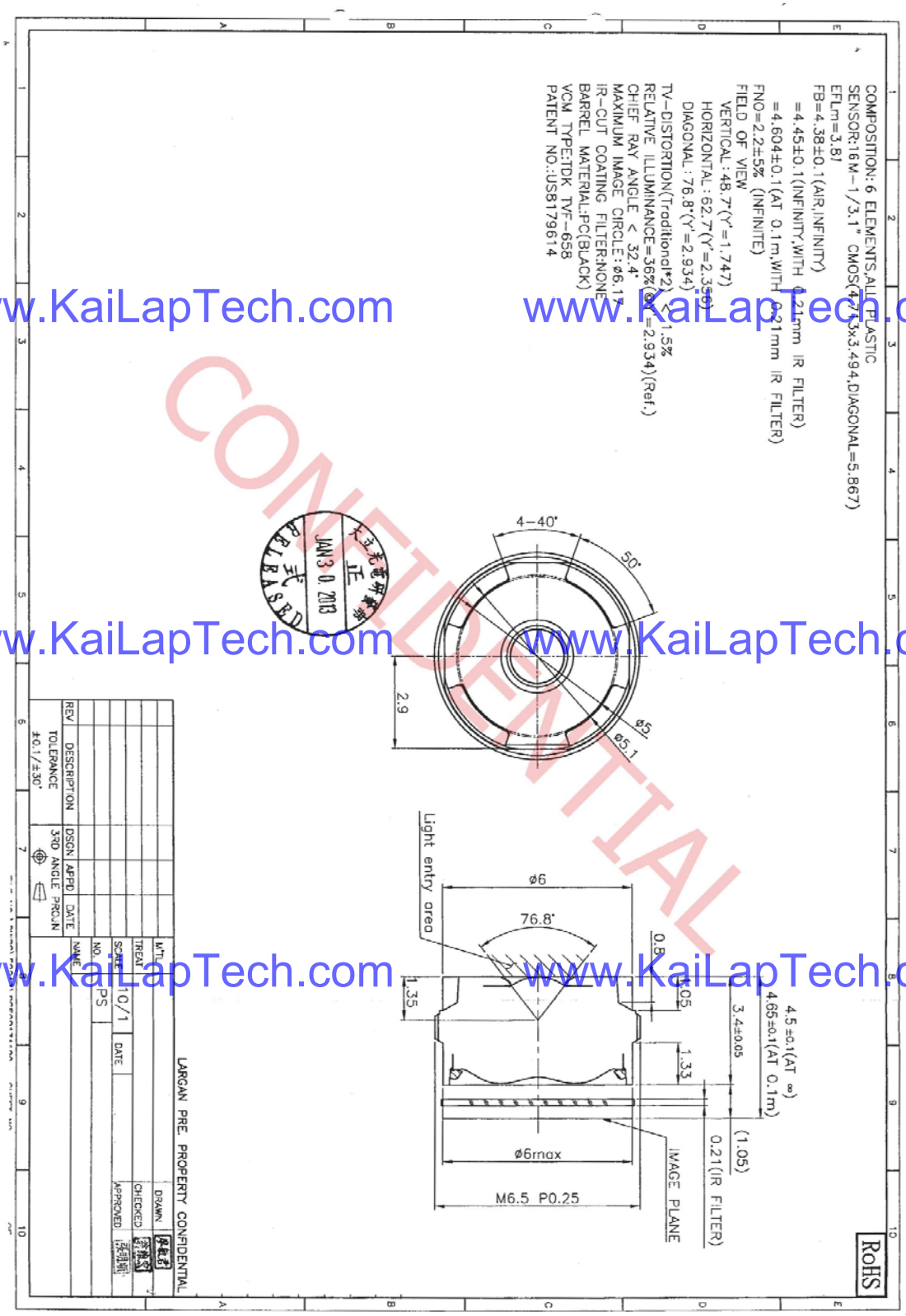
Lens Model: KLT-LENS-60183A1



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DONGWOON ANATECH

DW9714P

Upgraded Conventional AF Driver IC

FEATURES

120mA output driver with 10-bit resolution DAC

Smart Actuator Control (SAC^{TM}) modes

Supply voltage (V_{DD}): 2.3V to 4.3V

I/O voltage (V_{IN}): 1.8V to V_{DD}

Fast mode and Fast mode plus I^2C interface compatible

Power On Reset (POR)

Power Down (PD) mode current consumption less than 1uA

Package: 6-pin WLCSP (0.77mm x 1.14mm x 0.30mm)

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APPLICATIONS

Mobile camera

Digital still camera

Camcorder

Web camera

Action camera

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GENERAL DESCRIPTION

The DW9714P designed for linear control of Voice Coil Motors (VCM). This device is compatible with DW9714. The DW9714P has a single 10-bit DAC with 120mA output current sink capability. This device features SAC^{TM} mode which can minimize the mechanical vibration and achieve very fast mechanical settling time. The SAC^{TM} is protected by patent and registered trademark of DONGWOON ANATECH.

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The DW9714P operates from a single 2.3V to 4.3V supply. The internal DAC is controlled via an I^2C serial interface that operates at clock rate up to 1MHz. The I^2C address for the DW9714P is 0x18. The DW9714P offers PD mode with current consumption less than 1uA.

The DW9714P can be used for auto focus applications in mobile cameras, digital still cameras, camcorders, web cameras and action cameras.

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TYPICAL APPLICATION CIRCUIT

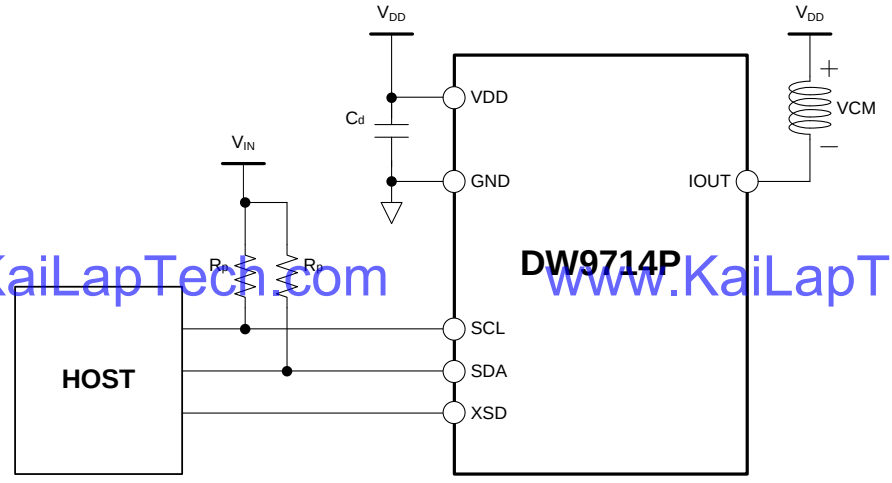

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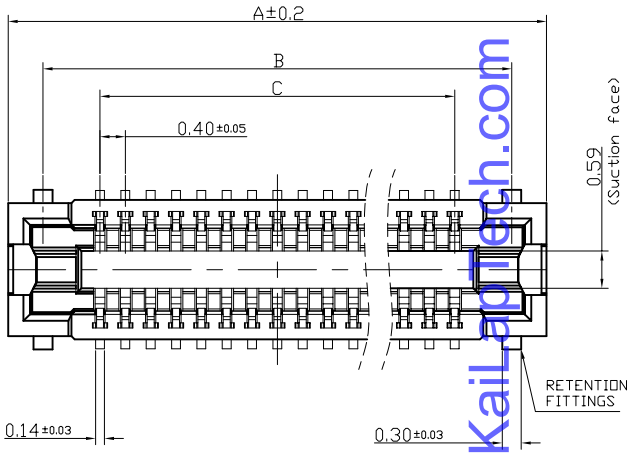
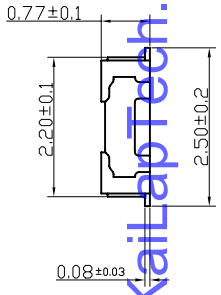
Figure 1. Typical application circuit

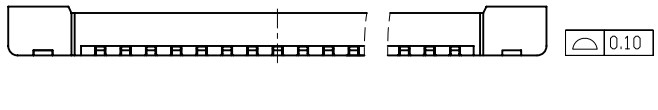
RoHS COMPLIANT

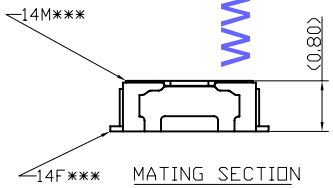
H F BFRs/CFRs/PVC-Free

REV	ECN NO	DRA	APPD	DATE
A	FIRST RELEASE	George Gao	Human Zhou	2013.09.18
B	SECOND VERSINONS	George Gao	Human Zhou	2015.10.22





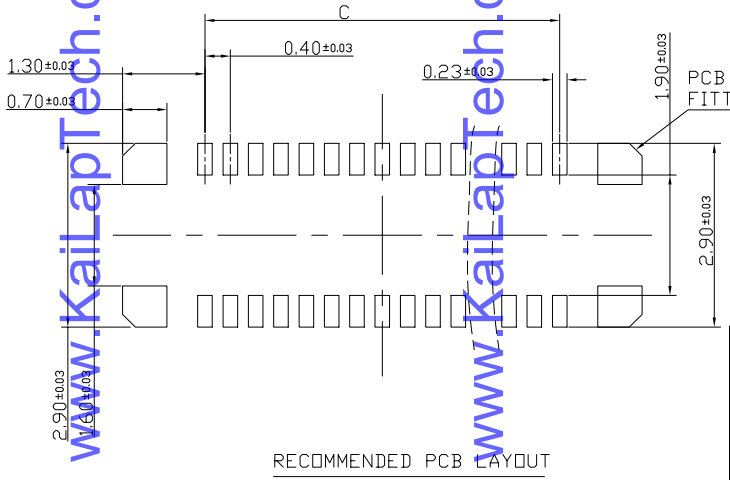




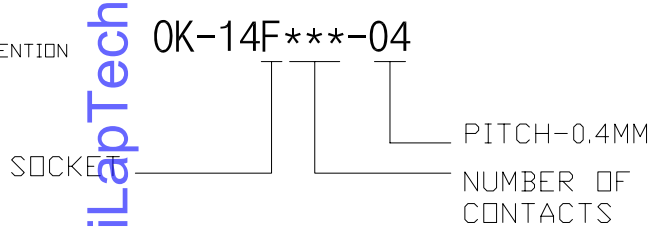
Specifications:
1) Material:
1-1.Molded portion: LCP resin (UL94 V-0)
1-2.Contact and Post: Copper alloy.
2) Surface treatment:
2-1.Terminal portion: Base: Ni plating Surface: Au plating (except the terminal tips) ; Exposed nickel portions
2-2.Metal clips: Base: Ni plating Surface: Au flash plating (except 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

TABLE:

70	16.50	15.40	13.60
50	12.50	11.40	9.60
40	10.50	9.40	7.60
34	9.30	8.20	6.40
30	8.50	7.40	5.60
24	7.30	6.20	4.40
16	5.70	4.60	2.80
12	4.90	3.80	2.00
10	4.50	3.40	1.60
NUMBER OF CONTACTS	A	B	C



RECOMMENDED PCB LAYOUT



DIMENTION IN mm		OCN TECHNOLOGY					
TOLERANCE UNLESS OTHERWISE SPECIFIED		APPD:	TITLE: 0.4MM BTB (MATING HEIGHT 0.8H)				
. ±0.20	. ±2°	CHKD:	DWG NO: OK-14F***-04				
.0 ±0.10	.0 ±1°	DRA: George Gao 2015.10.22	PROJ	Q'TY	SIZE	SHEET	SCALE	REV
.00 ±0.05	.00±0.5°			--	A4	1/1	1:1	B
.000±0.03	.000±0.3°							

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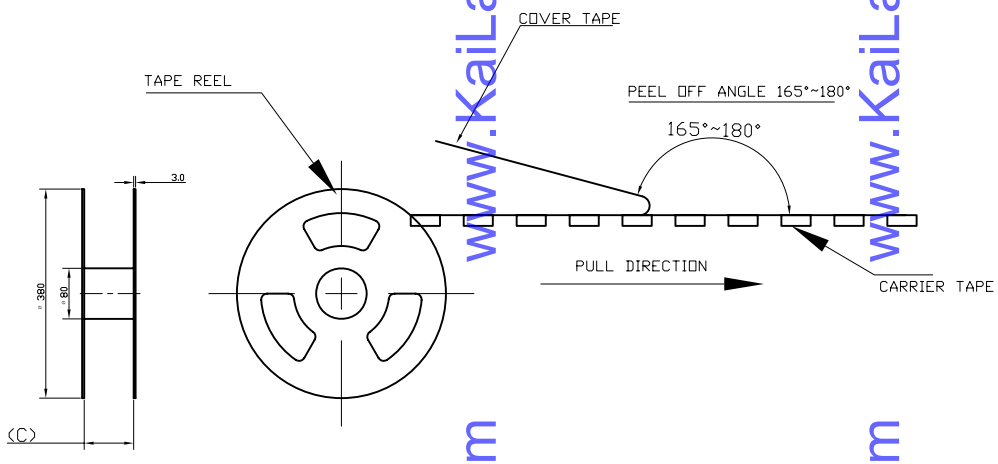
REV	ECN NO	DRA	APPD	DATE
A	FIRST RELEASE	George Gao	Human zhou	2013.09.12



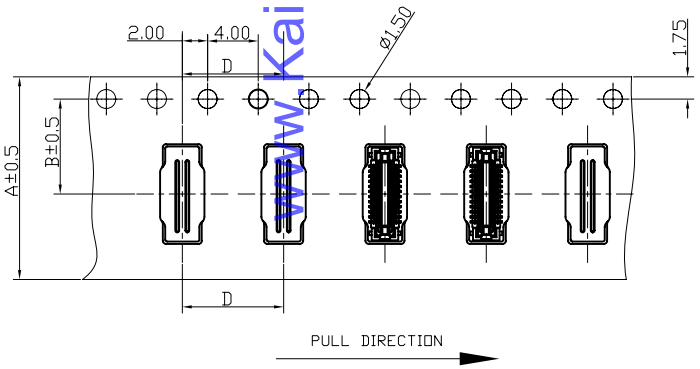


TABLE:

NUMBER OF CONTACTS	A	B	C	D	QTY/REEL
70	24.00	11.50	25.4	8.00	10000
50					
40				4.00	20000
34					
30	16.00	7.50	17.4		
24					
16				8.00	10000
12					
10					

DIMENTION IN mm		APPD:	TITLE: 0.4MM BTB (MATING HEIGHT 0.8H)					
TOLERANCE UNLESS OTHERWISE SPECIFIED		CHKD:	DWG NO: OK-14F***-04					
. ±0.20	. ±2°	DRA: George Gao 2013.09.18	PROJ	Q'TY	SIZE	SHEET	SCALE	REV
.0 ±0.10	.0 ±1°			--	A4	1/1	1:1	A
.00 ±0.05	.00±0.5°							
.000±0.03	.000±0.3°							

OCN TECHNOLOGY

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OV16880 16MP product brief

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16-Megapixel 1-Micron Pixel PureCel®Plus-S Image Sensor with Phase Detection Autofocus for Slim Mobile Devices

lead free
available in a lead-free package

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OmniVision's high performance OV16880 is a 1/3.06-inch 16-megapixel image sensor built on OmniVision's PureCel®Plus-S stacked die technology. Utilizing an advanced 1-micron pixel, the sensor brings ultra-high resolution image and video capture, as well as advanced features such as phase detection autofocus (PDAF), to slim smartphones and tablets.

OmniVision's PureCel®Plus-S sensors utilize buried color filter array (BCFA) and deep trench isolation (DTI) technology, which dramatically reduces pixel crosstalk and improves signal-to-noise ratio to produce superior images and video. Additionally, this technology enables a slimmer module design by allowing larger chief ray angle (CRA) lenses without degradation of image quality.

The OV16880 PureCel®Plus-S image sensor is capable of capturing 16-megapixel (4672 x 3504 pixels) images at 30 frames per second (fps), thus allowing burst photography and zero shutter lag at full resolution. Additionally, the sensor is capable of capturing 4K video at 30 fps, 1080p video at 90 fps, and 720p video at 120 fps.

The sensor can fit into an 8.5 x 8.5 mm module with a z-height less than 5 mm. The OV16880 is currently in mass production.

Find out more at www.ovt.com.

OmniVision

OV16880

Applications

- Smartphones
- Digital Still Cameras (DSC)
- Digital Video Camcorders (DVC)
- PC Multimedia

Product Features

- automatic black level calibration (ABLC)
- programmable controls for frame rate, mirror and flip, cropping, and windowing
- support for dynamic DPC cancellation
- supports output formats: 10-bit RAW RGB
- supports horizontal and vertical subsampling
- supports typical images sizes: 4672x3504, 4672x2628, 2336x1752, 1920x1080, 1280x720
- supports 2x2 binning
- standard serial SCCB interface
- up to 4-lane MIPI TX interface with speed up to 1.5 Gbps/lane
- programmable I/O drive capability
- up to 1/2/4-lane LVDS interface with speed up to 1.5 Gbps/lane
- embedded 13kbits (1664 bytes) of one-time programmable (OTP) memory for customer use
- interleave row HDR output
- support for high speed AF
- support for PDAF
- three on-chip phase lock loops (PLLs)
- programmable I/O drive capability
- built-in temperature sensor

Ordering Information

- **OV16880-GA5A-1B**
  (color, chip probing, 150 µm backgrinding, reconstructed wafer with good die)

Product Specifications

- **active array size:** 4672 x 3504
- **power supply:**
  - **core:** 1.2V
  - **analog:** 2.8V
  - **I/O:** 1.8V
- **power requirements:**
  - **active:** 300 mW
  - **standby:** 6 mA
  - **XSHUTDN:** 3 µA
- **temperature range:**
  - **operating:** -30°C to +85°C junction temperature
  - **stable image:** 0°C to +60°C junction temperature
- **output formats:** 10-bit RGB RAW
- **lens size:** 1/3.06"
- **lens chief ray angle:** 34.2° non-linear
- **input clock frequency:** 6 - 64 MHz
- **maximum image transfer rate:**
  - **4672x3504:** 30 fps
  - **4672x2628:** 30 fps
  - **2336x1752:** 60 fps
  - **1920x1080:** 90 fps
  - **1280x720:** 120 fps
- **sensitivity:** 3200 e⁻/lux-sec
- **max S/N ratio:** 36.8 dB
- **dynamic range:** 72 dB @ 16x gain
- **scan mode:** progressive
- **pixel size:** 1.0 µm x 1.0 µm
- **dark current:** 4 e⁻/sec @ 60°C junction temperature
- **image area:** 4741.632 µm x 3564.288 µm
- **die dimensions:**
  - **COB:** 5640 µm x 4560 µm
  - **RW:** 5690 µm x 4610 µm

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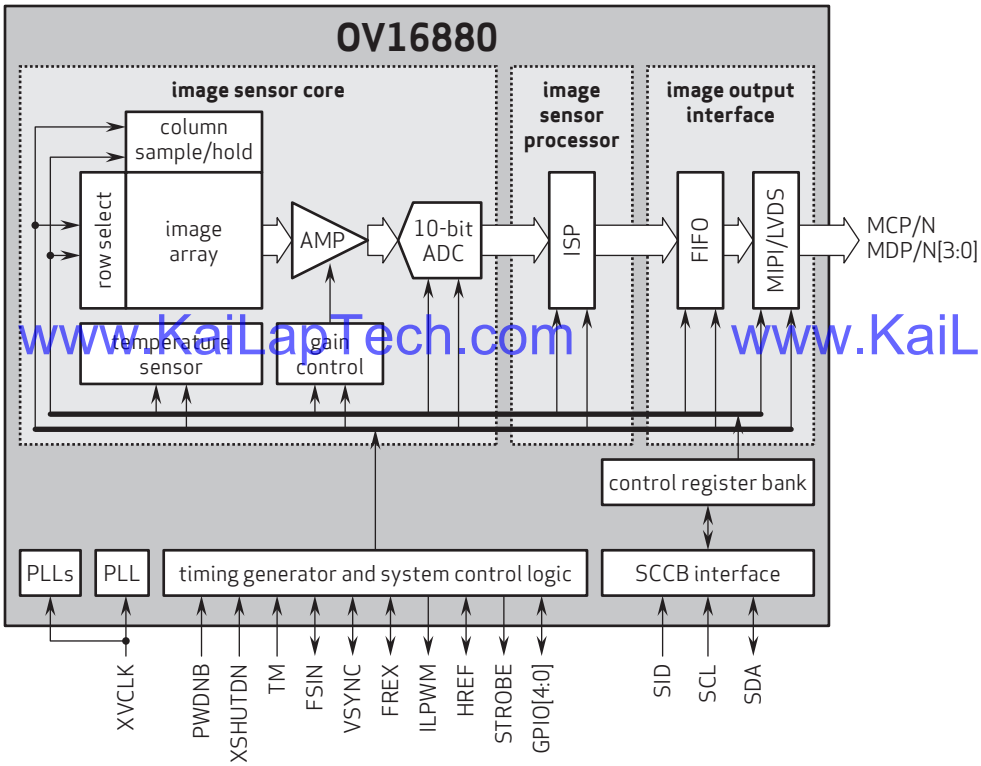
Functional Block Diagram



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Version 1.2, September, 2016

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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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

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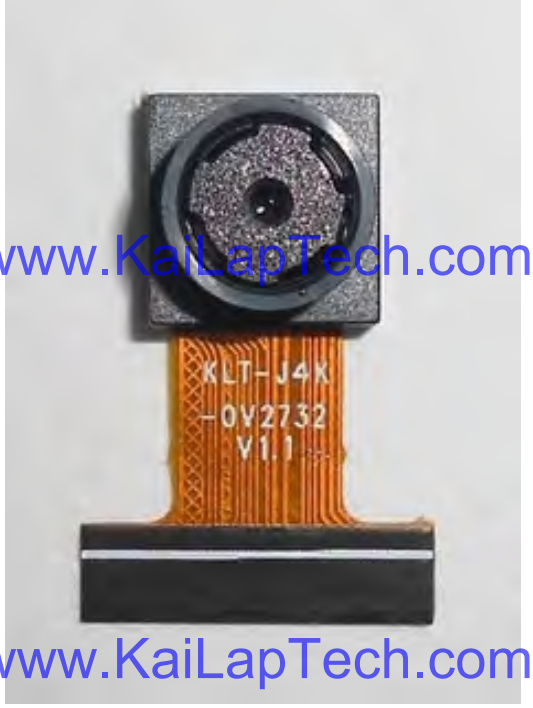
KLT Package Solutions

KLT Camera Module



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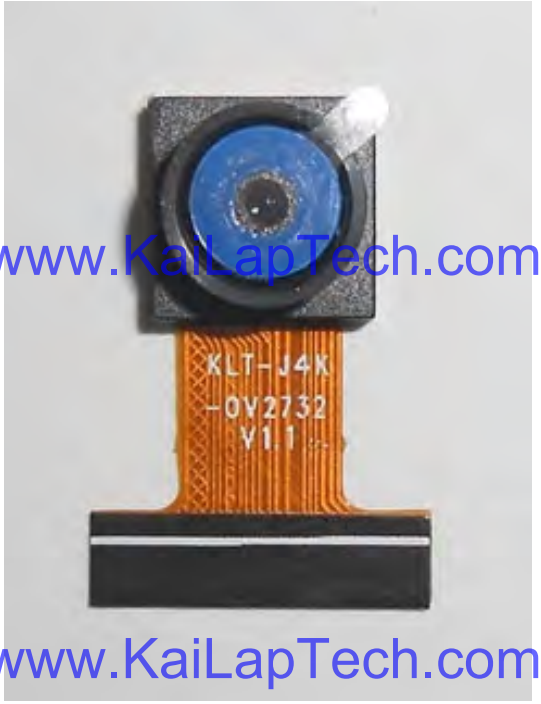
Complete with Lens Protection Film



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Tray with Grid and Space

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Place Cameras on the Tray

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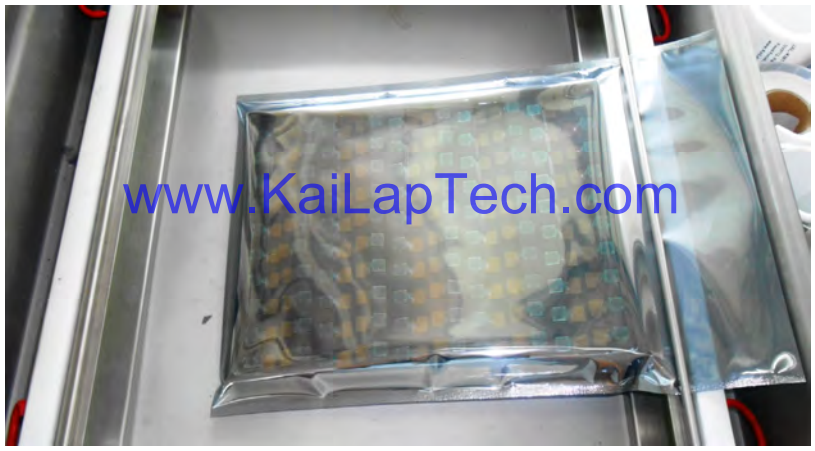
Camera Modules Package Solution

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

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Place Foam Sheets and Trays into Box

Foam Sheets are Tightly Fitting Box

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Small Order Package Solution

Place Foam Sheets and Trays into Small Box

Foam Sheets are Nicely Fitting the Small Box

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Package in Small Box for Shipment

Place Small Boxes into Larger Box

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Carbon Box Package Solution

Seal the Carbon Box

Final Package Labelled Box

Carbon Box Ready for Shipment

1. Delivery Address and Phone No. 2. Box No. and Ship Date 3. Fragile Caution

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Sample Order Package Solution

Place Sample into Small Anti-Static Bag

Place Connectors into Small Ant-Static Bag

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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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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.

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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. 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").

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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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